PROJECT MANUAL FOR

Additions and Renovations to West Carteret High School

Carteret County Schools

Carteret County, North Carolina

Hite associates

ARCHITECTURE / PLANNING / TECHNOLOGY

2600 Meridian Drive / Greenville, NC 27834 / tel 252.757.0333 / fax 252.757.1330 / www.hiteassoc.com

CIVIL ENGINEERING CONSULTANT: The Cullipher Group

151 NC Hwy 24, Morehead City, NC 28557, (252) 773-0090

STRUCTURAL ENGINEERING CONSULTANT: Queen Engineering & Design, P.A.

5530 Munford Road, Raleigh, NC 27612, (919) 420-0480

MECHANICAL / ELECTRICAL ENGINEERING CONSULTANT: Engineering Source of NC, P.A.

102-A2 Regency Blvd., Greenville, NC 27859, (252) 439-0338

August, 2023

NOTICE TO BIDDERS

Sealed proposals from selected bidders will be received by Carteret County Schools, at the offices of Facilities Services, 601 Mulberry Street, Beaufort, NC 28516, on Tuesday, November 21, 2023. Single Prime Bids for all construction will be accepted up to 3:00 p.m. for the furnishing of labor, material and equipment entering into the construction of the Additions and Renovations to West Carteret High School. Bids shall be marked "SEALED BID", addressed to the attention of Mr. Richard Paylor, Assistant Superintendent, Carteret County Schools, and shall include the Name, Address, and License Number of the Bidder, and the type proposal enclosed.
Bids will be received as follows:

1. Single Prime Contract (All Work; site work, general, plumbing, mechanical, electrical, and technology)

Complete plans, specifications and contract documents are available on the Hite Associates website, www.hiteassoc.com ; and will be open for inspection in the office of the Architect, Hite Associates, 2600 Meridian Drive, Greenville, North Carolina, 27834, and; may be obtained by purchased by calling Speedyblue Reprographics at (252) 758-1616, print@speedyblue.com.

There will be a Pre-Bid Conference Wednesday, November 8, 2023, at 3:00 p.m. at the project location, West Carteret High School, 4700 Country Club Rd, Morehead City, NC 28557. NOTICE – ALL GENERAL CONRACT BIDDERS MUST ATTEND THE PRE-BID CONFERENCE. ALSO, ALL HVAC AND ELECTRICAL SUB-BIDDERS MUST ATTEND THE PRE-BID CONFERENCE.

In accordance with federal regulations, the contractor must provide certification that it will not and has not used federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, an officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any federal contract, grant or any other award covered by this amendment. Each must also disclose any lobbying with non-federal funds that takes place in connection with obtaining any federal award.

All Contractors are hereby notified that they must have proper license under the State laws governing their respective trades.

Contractors are notified that Chapter 87, Article l, General Statutes of North Carolina, will be observed in receiving bids and awarding the Contracts. Contractors submitting bids on this project must have proper license classification.

Each proposal shall be accompanied by a cash deposit or a certified check drawn on some bank or trust company insured by the Federal Deposit Insurance Corporation, of an amount equal to not less than five percent (5%) of the proposal, or in lieu thereof, a bidder may offer a bid bond of five percent (5%) of the bid

executed by a surety company licensed under the laws of North Carolina to execute such bonds, conditioned that the surety will, upon demand forthwith make payment to the obligee upon said bond if the bidder fails to execute the contract in accordance with the bid bond. Said deposit shall be retained by the Owner as liquidated damages in event of failure of the successful bidder to execute the contract within ten days after the award or to give satisfactory surety as required by law. In determining the value of the bid bond, additive or deductive alternates shall be considered as they are accepted by the Owner.

A Performance Bond and a Labor and Materials Payment Bond will be required for one hundred percent (100%) of the contract price.

Payment will be made on the basis of ninety-five percent (95%) of monthly estimates and final payment made upon completion and acceptance of work.

No bid may be withdrawn after the scheduled closing time for the receipt of bids for a period of 30 days after the bid date.

The Owner reserves the right to reject any or all bids and to waive informalities.

SIGNED: Mr. Richard Paylor, Superintendent
Carteret County Schools
Beaufort, North Carolina

DESIGNER: HITE ASSOCIATES, P.C.
2600 Meridian Drive
Greenville, North Carolina 27834

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AIA® Document A701® – 2018

Instructions to Bidders

for the following Project:
(Name, location, and detailed description)

Additions & Renovations to West Carteret High School
West Carteret High School
4700 Country Club Road
Morehead City, NC 28557

THE OWNER:
(Name, legal status, address, and other information)

Carteret County Schools
107 Safrit Drive
Beaufort, NC 28516
Telephone Number: 252-728-4583

THE ARCHITECT:
(Name, legal status, address, and other information)

Hite Associates, P.C.
2600 Meridian Drive
Greenville, NC 27834
Telephone Number: 252-757-0333

TABLE OF ARTICLES

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

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

FEDERAL, STATE, AND LOCAL LAWS MAY IMPOSE REQUIREMENTS ON PUBLIC PROCUREMENT CONTRACTS. CONSULT LOCAL AUTHORITIES OR AN ATTORNEY TO VERIFY REQUIREMENTS APPLICABLE TO THIS PROCUREMENT BEFORE COMPLETING THIS FORM.

It is intended that AIA Document G612™–2017, Owner's Instructions to the Architect, Parts A and B will be completed prior to using this document.

ARTICLE 1 DEFINITIONS

§ 1.1 Bidding Documents include the Bidding Requirements and the Proposed Contract Documents. The Bidding Requirements consist of the advertisement or invitation to bid, Instructions to Bidders, supplementary instructions to bidders, the bid form, and any other bidding forms. The Proposed Contract Documents consist of the unexecuted form of Agreement between the Owner and Contractor and that Agreement's Exhibits, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, all Addenda, and all other documents enumerated in Article 8 of these Instructions.

§ 1.2 Definitions set forth in the General Conditions of the Contract for Construction, or in other Proposed Contract Documents apply to the Bidding Documents.

§ 1.3 Addenda are written or graphic instruments issued by the Architect, which, by additions, deletions, clarifications, or corrections, modify or interpret the Bidding Documents.

§ 1.4 A Bid is a complete and properly executed proposal to do the Work for the sums stipulated therein, submitted in accordance with the Bidding Documents.

§ 1.5 The Base Bid is the sum stated in the Bid for which the Bidder offers to perform the Work described in the Bidding Documents, to which Work may be added or deleted by sums stated in Alternate Bids.

§ 1.6 An Alternate Bid (or Alternate) is an amount stated in the Bid to be added to or deducted from, or that does not change, the Base Bid if the corresponding change in the Work, as described in the Bidding Documents, is accepted.

§ 1.7 A Unit Price is an amount stated in the Bid as a price per unit of measurement for materials, equipment, or services, or a portion of the Work, as described in the Bidding Documents.

§ 1.8 A Bidder is a person or entity who submits a Bid and who meets the requirements set forth in the Bidding Documents.

§ 1.9 A Sub-bidder is a person or entity who submits a bid to a Bidder for materials, equipment, or labor for a portion of the Work.

ARTICLE 2 BIDDER'S REPRESENTATIONS

§ 2.1 By submitting a Bid, the Bidder represents that:

- **.1** the Bidder has read and understands the Bidding Documents;
- **.2** the Bidder understands how the Bidding Documents relate to other portions of the Project, if any, being bid concurrently or presently under construction;
- **.3** the Bid complies with the Bidding Documents;
- **.4** the Bidder has visited the site, become familiar with local conditions under which the Work is to be performed, and has correlated the Bidder's observations with the requirements of the Proposed Contract Documents;
- **.5** the Bid is based upon the materials, equipment, and systems required by the Bidding Documents without exception; and
- **.6** the Bidder has read and understands the provisions for liquidated damages, if any, set forth in the form of Agreement between the Owner and Contractor.

ARTICLE 3 BIDDING DOCUMENTS

§ 3.1 Distribution

§ 3.1.1 Bidders shall obtain complete Bidding Documents, as indicated below, from the issuing office designated in the advertisement or invitation to bid, for the deposit sum, if any, stated therein.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall obtain Bidding Documents.)

§ 3.1.2 Any required deposit shall be refunded to Bidders who submit a bona fide Bid and return the paper Bidding Documents in good condition within ten days after receipt of Bids. The cost to replace missing or damaged paper documents will be deducted from the deposit. A Bidder receiving a Contract award may retain the paper Bidding Documents, and the Bidder's deposit will be refunded.

§ 3.1.3 Bidding Documents will not be issued directly to Sub-bidders unless specifically offered in the advertisement or invitation to bid, or in supplementary instructions to bidders.

§ 3.1.4 Bidders shall use complete Bidding Documents in preparing Bids. Neither the Owner nor Architect assumes responsibility for errors or misinterpretations resulting from the use of incomplete Bidding Documents.

§ 3.1.5 The Bidding Documents will be available for the sole purpose of obtaining Bids on the Work. No license or grant of use is conferred by distribution of the Bidding Documents.

§ 3.2 Modification or Interpretation of Bidding Documents

§ 3.2.1 The Bidder shall carefully study the Bidding Documents, shall examine the site and local conditions, and shall notify the Architect of errors, inconsistencies, or ambiguities discovered and request clarification or interpretation pursuant to Section 3.2.2.

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect the date for receipt of Bids.
(Indicate how, such as by email, website, host site/platform, paper copy, or other method Bidders shall submit requests for clarification and interpretation.)

§ 3.2.3 Modifications and interpretations of the Bidding Documents shall be made by Addendum. Modifications and interpretations of the Bidding Documents made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3 Substitutions

§ 3.3.1 The materials, products, and equipment described in the Bidding Documents establish a standard of required function, dimension, appearance, and quality to be met by any proposed substitution.

§ 3.3.2 Substitution Process

§ 3.3.2.1 Written requests for substitutions shall be received by the Architect at least ten days prior to the date for receipt of Bids. Requests shall be submitted in the same manner as that established for submitting clarifications and interpretations in Section 3.2.2.

§ 3.3.2.2 Bidders shall submit substitution requests on a Substitution Request Form if one is provided in the Bidding Documents.

§ 3.3.2.3 If a Substitution Request Form is not provided, requests shall include (1) the name of the material or equipment specified in the Bidding Documents; (2) the reason for the requested substitution; (3) a complete description of the proposed substitution including the name of the material or equipment proposed as the substitute, performance and test data, and relevant drawings; and (4) any other information necessary for an evaluation. The request shall include a statement setting forth changes in other materials, equipment, or other portions of the Work, including changes in the work of other contracts or the impact on any Project Certifications (such as LEED), that will result from incorporation of the proposed substitution.

§ 3.3.3 The burden of proof of the merit of the proposed substitution is upon the proposer. The Architect's decision of approval or disapproval of a proposed substitution shall be final.

§ 3.3.4 If the Architect approves a proposed substitution prior to receipt of Bids, such approval shall be set forth in an Addendum. Approvals made in any other manner shall not be binding, and Bidders shall not rely upon them.

§ 3.3.5 No substitutions will be considered after the Contract award unless specifically provided for in the Contract Documents.

§ 3.4 Addenda

§ 3.4.1 Addenda will be transmitted to Bidders known by the issuing office to have received complete Bidding Documents.

(Indicate how, such as by email, website, host site/platform, paper copy, or other method Addenda will be transmitted.)

§ 3.4.2 Addenda will be available where Bidding Documents are on file.

§ 3.4.3 Addenda will be issued prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

§ 3.4.4 Prior to submitting a Bid, each Bidder shall ascertain that the Bidder has received all Addenda issued, and the Bidder shall acknowledge their receipt in the Bid.

ARTICLE 4 BIDDING PROCEDURES

§ 4.1 Preparation of Bids

§ 4.1.1 Bids shall be submitted on the forms included with or identified in the Bidding Documents.

§ 4.1.2 All blanks on the bid form shall be legibly executed. Paper bid forms shall be executed in a non-erasable medium.

§ 4.1.3 Sums shall be expressed in both words and numbers, unless noted otherwise on the bid form. In case of discrepancy, the amount entered in words shall govern.

§ 4.1.4 Edits to entries made on paper bid forms must be initialed by the signer of the Bid.

§ 4.1.5 All requested Alternates shall be bid. If no change in the Base Bid is required, enter "No Change" or as required by the bid form.

§ 4.1.6 Where two or more Bids for designated portions of the Work have been requested, the Bidder may, without forfeiture of the bid security, state the Bidder's refusal to accept award of less than the combination of Bids stipulated by the Bidder. The Bidder shall neither make additional stipulations on the bid form nor qualify the Bid in any other manner.

§ 4.1.7 Each copy of the Bid shall state the legal name and legal status of the Bidder. As part of the documentation submitted with the Bid, the Bidder shall provide evidence of its legal authority to perform the Work in the jurisdiction where the Project is located. Each copy of the Bid shall be signed by the person or persons legally authorized to bind the Bidder to a contract. A Bid by a corporation shall further name the state of incorporation and have the corporate seal affixed. A Bid submitted by an agent shall have a current power of attorney attached, certifying the agent's authority to bind the Bidder.

§ 4.1.8 A Bidder shall incur all costs associated with the preparation of its Bid.

§ 4.2 Bid Security

§ 4.2.1 Each Bid shall be accompanied by the following bid security:

(Insert the form and amount of bid security.)

§ 4.2.2 The Bidder pledges to enter into a Contract with the Owner on the terms stated in the Bid and shall, if required, furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder. Should the Bidder refuse to enter into such Contract or fail to furnish such bonds if required, the amount

of the bid security shall be forfeited to the Owner as liquidated damages, not as a penalty. In the event the Owner fails to comply with Section 6.2, the amount of the bid security shall not be forfeited to the Owner.

§ 4.2.3 If a surety bond is required as bid security, it shall be written on AIA Document A310™, Bid Bond, unless otherwise provided in the Bidding Documents. The attorney-in-fact who executes the bond on behalf of the surety shall affix to the bond a certified and current copy of an acceptable power of attorney. The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 4.2.4 The Owner will have the right to retain the bid security of Bidders to whom an award is being considered until (a) the Contract has been executed and bonds, if required, have been furnished; (b) the specified time has elapsed so that Bids may be withdrawn; or (c) all Bids have been rejected. However, if no Contract has been awarded or a Bidder has not been notified of the acceptance of its Bid, a Bidder may, beginning days after the opening of Bids, withdraw its Bid and request the return of its bid security.

§ 4.3 Submission of Bids

§ 4.3.1 A Bidder shall submit its Bid as indicated below:
(Indicate how, such as by website, host site/platform, paper copy, or other method Bidders shall submit their Bid.)

§ 4.3.2 Paper copies of the Bid, the bid security, and any other documents required to be submitted with the Bid shall be enclosed in a sealed opaque envelope. The envelope shall be addressed to the party receiving the Bids and shall be identified with the Project name, the Bidder's name and address, and, if applicable, the designated portion of the Work for which the Bid is submitted. If the Bid is sent by mail, the sealed envelope shall be enclosed in a separate mailing envelope with the notation "SEALED BID ENCLOSED" on the face thereof.

§ 4.3.3 Bids shall be submitted by the date and time and at the place indicated in the invitation to bid. Bids submitted after the date and time for receipt of Bids, or at an incorrect place, will not be accepted.

§ 4.3.4 The Bidder shall assume full responsibility for timely delivery at the location designated for receipt of Bids.

§ 4.3.5 A Bid submitted by any method other than as provided in this Section 4.3 will not be accepted.

§ 4.4 Modification or Withdrawal of Bid

§ 4.4.1 Prior to the date and time designated for receipt of Bids, a Bidder may submit a new Bid to replace a Bid previously submitted, or withdraw its Bid entirely, by notice to the party designated to receive the Bids. Such notice shall be received and duly recorded by the receiving party on or before the date and time set for receipt of Bids. The receiving party shall verify that replaced or withdrawn Bids are removed from the other submitted Bids and not considered. Notice of submission of a replacement Bid or withdrawal of a Bid shall be worded so as not to reveal the amount of the original Bid.

§ 4.4.2 Withdrawn Bids may be resubmitted up to the date and time designated for the receipt of Bids in the same format as that established in Section 4.3, provided they fully conform with these Instructions to Bidders. Bid security shall be in an amount sufficient for the Bid as resubmitted.

§ 4.4.3 After the date and time designated for receipt of Bids, a Bidder who discovers that it made a clerical error in its Bid shall notify the Architect of such error within two days, or pursuant to a timeframe specified by the law of the jurisdiction where the Project is located, requesting withdrawal of its Bid. Upon providing evidence of such error to the reasonable satisfaction of the Architect, the Bid shall be withdrawn and not resubmitted. If a Bid is withdrawn pursuant to this Section 4.4.3, the bid security will be attended to as follows:
(State the terms and conditions, such as Bid rank, for returning or retaining the bid security.)

ARTICLE 5 CONSIDERATION OF BIDS

§ 5.1 Opening of Bids

If stipulated in an advertisement or invitation to bid, or when otherwise required by law, Bids properly identified and received within the specified time limits will be publicly opened and read aloud. A summary of the Bids may be made available to Bidders.

§ 5.2 Rejection of Bids

Unless otherwise prohibited by law, the Owner shall have the right to reject any or all Bids.

§ 5.3 Acceptance of Bid (Award)

§ 5.3.1 It is the intent of the Owner to award a Contract to the lowest responsive and responsible Bidder, provided the Bid has been submitted in accordance with the requirements of the Bidding Documents. Unless otherwise prohibited by law, the Owner shall have the right to waive informalities and irregularities in a Bid received and to accept the Bid which, in the Owner's judgment, is in the Owner's best interests.

§ 5.3.2 Unless otherwise prohibited by law, the Owner shall have the right to accept Alternates in any order or combination, unless otherwise specifically provided in the Bidding Documents, and to determine the lowest responsive and responsible Bidder on the basis of the sum of the Base Bid and Alternates accepted.

ARTICLE 6 POST-BID INFORMATION

§ 6.1 Contractor's Qualification Statement

Bidders to whom award of a Contract is under consideration shall submit to the Architect, upon request and within the timeframe specified by the Architect, a properly executed AIA Document A305™, Contractor's Qualification Statement, unless such a Statement has been previously required and submitted for this Bid.

§ 6.2 Owner's Financial Capability

A Bidder to whom award of a Contract is under consideration may request in writing, fourteen days prior to the expiration of the time for withdrawal of Bids, that the Owner furnish to the Bidder reasonable evidence that financial arrangements have been made to fulfill the Owner's obligations under the Contract. The Owner shall then furnish such reasonable evidence to the Bidder no later than seven days prior to the expiration of the time for withdrawal of Bids. Unless such reasonable evidence is furnished within the allotted time, the Bidder will not be required to execute the Agreement between the Owner and Contractor.

§ 6.3 Submittals

§ 6.3.1 After notification of selection for the award of the Contract, the Bidder shall, as soon as practicable or as stipulated in the Bidding Documents, submit in writing to the Owner through the Architect:

.1 a designation of the Work to be performed with the Bidder's own forces;

.2 names of the principal products and systems proposed for the Work and the manufacturers and suppliers of each; and

.3 names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for the principal portions of the Work.

§ 6.3.2 The Bidder will be required to establish to the satisfaction of the Architect and Owner the reliability and responsibility of the persons or entities proposed to furnish and perform the Work described in the Bidding Documents.

§ 6.3.3 Prior to the execution of the Contract, the Architect will notify the Bidder if either the Owner or Architect, after due investigation, has reasonable objection to a person or entity proposed by the Bidder. If the Owner or Architect has reasonable objection to a proposed person or entity, the Bidder may, at the Bidder's option, withdraw the Bid or submit an acceptable substitute person or entity. The Bidder may also submit any required adjustment in the Base Bid or Alternate Bid to account for the difference in cost occasioned by such substitution. The Owner may accept the adjusted bid price or disqualify the Bidder. In the event of either withdrawal or disqualification, bid security will not be forfeited.

§ 6.3.4 Persons and entities proposed by the Bidder and to whom the Owner and Architect have made no reasonable objection must be used on the Work for which they were proposed and shall not be changed except with the written consent of the Owner and Architect.

ARTICLE 7 PERFORMANCE BOND AND PAYMENT BOND

§ 7.1 Bond Requirements

§ 7.1.1 If stipulated in the Bidding Documents, the Bidder shall furnish bonds covering the faithful performance of the Contract and payment of all obligations arising thereunder.

§ 7.1.2 If the furnishing of such bonds is stipulated in the Bidding Documents, the cost shall be included in the Bid. If the furnishing of such bonds is required after receipt of bids and before execution of the Contract, the cost of such bonds shall be added to the Bid in determining the Contract Sum.

§ 7.1.3 The Bidder shall provide surety bonds from a company or companies lawfully authorized to issue surety bonds in the jurisdiction where the Project is located.

§ 7.1.4 Unless otherwise indicated below, the Penal Sum of the Payment and Performance Bonds shall be the amount of the Contract Sum.
(If Payment or Performance Bonds are to be in an amount other than 100% of the Contract Sum, indicate the dollar amount or percentage of the Contract Sum.)

§ 7.2 Time of Delivery and Form of Bonds

§ 7.2.1 The Bidder shall deliver the required bonds to the Owner not later than three days following the date of execution of the Contract. If the Work is to commence sooner in response to a letter of intent, the Bidder shall, prior to commencement of the Work, submit evidence satisfactory to the Owner that such bonds will be furnished and delivered in accordance with this Section 7.2.1.

§ 7.2.2 Unless otherwise provided, the bonds shall be written on AIA Document A312, Performance Bond and Payment Bond.

§ 7.2.3 The bonds shall be dated on or after the date of the Contract.

§ 7.2.4 The Bidder shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix to the bond a certified and current copy of the power of attorney.

ARTICLE 8 ENUMERATION OF THE PROPOSED CONTRACT DOCUMENTS

§ 8.1 Copies of the proposed Contract Documents have been made available to the Bidder and consist of the following documents:

.1 AIA Document A101™–2017, Standard Form of Agreement Between Owner and Contractor, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.2 AIA Document A101™–2017, Exhibit A, Insurance and Bonds, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.3 AIA Document A201™–2017, General Conditions of the Contract for Construction, unless otherwise stated below.
(Insert the complete AIA Document number, including year, and Document title.)

.4 AIA Document E203™–2013, Building Information Modeling and Digital Data Exhibit, dated as indicated below:
(Insert the date of the E203-2013.)

.5 Drawings

Number	Title	Date

.6 Specifications

Section	Title	Date	Pages

.7 Addenda:

Number	Date	Pages

.8 Other Exhibits:
(Check all boxes that apply and include appropriate information identifying the exhibit where required.)

[ ] AIA Document E204™–2017, Sustainable Projects Exhibit, dated as indicated below:
(Insert the date of the E204-2017.)

[ ] The Sustainability Plan:

Title	Date	Pages

[ ] Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages

.9 Other documents listed below:
(List here any additional documents that are intended to form part of the Proposed Contract Documents.)

Additions and Deletions Report for
AIA® Document A701® – 2018

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

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 15:21:50 ET on 10/05/2023.

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Additions & Renovations to West Carteret High School
West Carteret High School
4700 Country Club Road
Morehead City, NC 28557

...

Carteret County Schools
107 Safrit Drive
Beaufort, NC 28516
Telephone Number: 252-728-4583

...

Hite Associates, P.C.
2600 Meridian Drive
Greenville, NC 27834
Telephone Number: 252-757-0333

PAGE 3

§ 3.2.2 Requests for clarification or interpretation of the Bidding Documents shall be submitted by the Bidder in writing and shall be received by the Architect ~~at least seven days prior to~~ the date for receipt of Bids.

PAGE 4

§ 3.4.3 Addenda will be issued ~~no later than four days~~ prior to the date for receipt of Bids, except an Addendum withdrawing the request for Bids or one which includes postponement of the date for receipt of Bids.

Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, , hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 15:21:50 ET on 10/05/2023 under Order No. 4104237868 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A701™ - 2018, Instructions to Bidders, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

ARTICLE 3

ADD subparagraph 3.4: In addition to obtaining Bidding Documents from the Hite Associates website, qualified bidders, subcontractors, material suppliers may obtain complete or partial sets of the Drawings Bidding Documents and specifications from SpeedyBlue Printers for the cost of printing and mailing.

ADD subparagraph 3.5: All Bidders, subcontractors, and material suppliers are to use the Hite Associates website only, for accurate and complete Bid Documents. The Owner nor the Designers will be responsible for information accessed from any other source.

ARTICLE 4

ADD: Bidders must identify the type of proposal clearly on the Bid Envelope, and include State License number thereon.

ARTICLE 7

ADD: Furnish Performance Bond and Payment Bonds in the amount of the Contract Price, covering faithful performance of contract and payment of all obligations arising thereunder on AIA Document A312.

F O R M OF P R O P O S A L

Additions and Renovations to West Carteret High School

From: _____ Contract: GENERAL

Address: _____

To: Carteret County Board of Education Date: _____

The undersigned, as bidder, hereby declares that the only person or persons interested in this proposal as principal or principals is or are named herein and that no other person than herein mentioned has any interest in this proposal or in the contract to be entered into; that this proposal is made without connection with any other person, company or parties making a bid or proposal; and that it is in all respects fair and in good faith without collusion or fraud.

The bidder further declares that he has attended the mandatory pre-bid conference, examined the site of the work and informed himself fully in regard to all conditions pertaining to the places where the work is to be done, that he has examined the specifications for the work and the contract documents relative thereto and has read all special provisions furnished prior to the opening of bids; that he has satisfied himself relative to the work to be performed.

The Bidder proposes and agrees if this proposal is accepted to contract with the ***Carteret County Board of Education*** in the form of contract specified below, to furnish all necessary materials, equipment, machinery, tools, apparatus, means of transportation and labor necessary to complete the construction of the: ***Additions and Renovations to West Carteret High School*** in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the Owner and / or Architect, with a definite understanding that no money will be allowed for extra work except as set forth in the General Conditions and the Contract Documents, for the sum of:

GENERAL CONSTRUCTION CONTRACT (ALL WORK)

Base Bid:

_____Dollars($)_____

Plumbing Subcontractor: _____

Mechanical Subcontractor: _____ (Pre-bid conference attendance mandatory)

Electrical Subcontractor: _____(Pre-bid conference attendance mandatory)

ALTERNATES:

Should any of the alternates as described in the contract documents be accepted, the amount written below shall be the amount to be added to the base bid.

ALTERNATE NO. 1-C Shall be the price to provide the gymnasium and associated site work using a conventional steel structure:

(Add) _____ Dollars ($) _____

ALTERNATE NO. 1-P Shall be the price to provide the gymnasium and associated site work using pre-engineered steel structure.

(Add) _____ Dollars ($) _____

ALTERNATE NO. 2 Shall be the price to relocate the east drive entrance to Country Club Road, and associated site work (tennis courts NOT part of this project).

(Add) _____ Dollars ($) _____

ALTERNATE NO. 3 Shall be the amount added to the Base Bid to provide door hardware and access control manufacturers as specified in Section 08700, in lieu of other, equivalent manufacturers:

(Add) _____ Dollars ($) _____

ALTERNATE NO. 4 Shall be the amount added to the Base Bid to provide scheduled Kitchen Equipment items K-1, K-2, K-5, K-6, K-7 (all kitchen equipment rough-ins to be provided in Base Bid):

(Add) _____ Dollars ($) _____

ALTERNATE NO. 5 Shall be the amount added to the Base Bid to provide Yukon 8770 specified acoustical ceiling tile units as manufactured by Armstrong, in lieu of other equivalent manufacturers:

(Add) _____ Dollars ($) _____

ALTERNATE NO. 6: Shall be the amount added to the Base Bid to provide backflow preventers manufactured by Watts, in lieu of other, equivalent manufacturers:

(Add) _____ Dollars ($) _____

ALTERNATE NO. 7: Shall be the amount added to the Base Bid to provide plumbing fixtures as scheduled in the Drawings, in lieu of other, equivalent manufacturers.

(Add) _____ Dollars($) _____

ALTERNATE NO. 8: Shall be the amount added to the Base Bid to provide HVAC DX Split System units and exhaust fans as scheduled on the Drawings, in lieu of other, equivalent manufacturers.

(Add) _____ Dollars($)

ALTERNATE NO. 9: Shall be the amount added to the Base Bid to provide Trane units, Belimo Valves, and B&G Pumps for the hydronic system in lieu of other, equivalent manufacturers.

(Add) _____ Dollars($)

ALTERNATE NO. 10: Shall be the amount added to the Base Bid to use Tridium controllers to expand the existing JCI Controls system to incorporate the new Classroom Addition, for a complete and operational building automation system. Including any programming, graphics and alterations to the existing system needed to meet the sequence of operation as shown, as well as timeclock control of the new interior lights and fans, and time clock control of exterior lights in lieu of JCI controllers.

(Add) _____ Dollars ($)

ALTERNATE NO. 11: Shall be the amount added to the Base Bid to use Tridium controllers to expand the existing JCI Controls system to incorporate the new Gym Addition as part of the main system during normal operation and as a “Stand Alone” system when operating as an Emergency Shelter. Including any programming, graphics and alterations to the existing system needed to meet the sequence of operation as shown, as well as timeclock control of the new interior lights and fans, and time clock control of exterior lights in lieu of other controls systems.

(Add) _____ Dollars ($)

ALTERNATE NO. 12: Shall be the amount added to the Base Bid to provide Mitsubishi Mini Split Equipment, in lieu of other equivalent equipment manufacturers.

(Add) _____ Dollars ($)

ALTERNATE NO. 13: Shall be the amount added to the Base Bid to provide Square D electrical gear, as scheduled in lieu of other equivalent equipment manufacturers.

(Add) _____ Dollars ($)

ALTERNATE NO. 14: Shall be the amount added to the Base Bid to provide light fixtures by Lithonia, as scheduled in lieu of other equivalent equipment manufacturers.

(Add) _____ Dollars ($)

ALTERNATE NO. 15: Shall be the amount added to the Base Bid to provide Notifier fire alarm system equipment to expand the existing Notifier NFS-640 as indicated on plans in lieu of other equivalent equipment manufacturers.

(Add) _____ Dollars ($)

ALTERNATE NO. 16: Shall be the amount added to the Base Bid to provide fabric duct as manufactured by Duct Sox in lieu of other equivalent manufacturers.

(Add) _____ Dollars ($) _____

UNIT PRICES:

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices will include all costs, and shall be applied, as appropriate, to compute the total value of changes in the scope of the installed work, all in accordance with the contract documents. Unit prices listed shall include all overhead and profit costs.

ITEM #	DESCRIPTION	UNIT PRICE
1	Unclassified Excavation (Disposal **OFF** Site)	_____ c.y. (cubic yard)
2	Mass Under Cut Excavation (Disposal **OFF** Site)	_____ c.y. (cubic yard)
3	Foundation Under Cut Excavation (Disposal **OFF** Site)	_____ c.y. (cubic yard)
4	Off-Site Select Borrow Fill	_____ c.y. (cubic yard)
5	#57 or #67 Stone (Building foundations)	_____ c.y. (cubic yard)
6	4” Thick Concrete Sidewalk	_____ s.y. (square yard)
7	Conflict Box	_____ each
8	Fire Alarm Voice/Strobe Notification device	_____ each
9	Fire Alarm Smoke/Heat Detector device	_____ each
10	Fire Alarm Multi Sensor Smoke/Carbon Monoxide device	_____ each
11	Duct Mounted Smoke Detector device	_____ each

NOTE: “Installed” means undercut and fill are measured compacted and in place, not by truckload or prior to compaction.

TIME

The Bidder further proposes and agrees hereby to commence work on a date specified in the Architect’s Notice to Proceed, and to complete all work according to the schedule of dates set under Article 8 “Time” of the Supplementary Conditions, WHICH ARE DATES CERTAIN, with no allowance for delays except as may be caused by the Owner. Applicable liquidated damages shall be as stated in the Supplementary General Conditions.

HUB PARTICIPATION REQUIREMENTS;

Provide with the bid - Under GS 143-128.2(c) the undersigned bidder shall identify **on its bid** (Identification of HUB Participation Form) the HUB businesses that it will use on the project with the total dollar value of the bids that will be performed by the HUB businesses. **Also** list the good faith efforts (Affidavit **A**) made to solicit HUB participation in the bid effort.

NOTE: A contractor that performs all of the work with its own workforce may submit an Affidavit (**B)** to that effect in lieu of Affidavit (**A)** required above. The HUB Participation Form must still be submitted even if there is zero participation.

After the bid opening - The Owner will consider all bids and alternates and determine the lowest responsible, responsive bidder. Upon notification of being the apparent low bidder, the bidder shall then file within 72 hours of the notification of being the apparent lowest bidder, the following:

An Affidavit (**C**) that includes a description of the portion of work to be executed by HUB businesses, expressed as a percentage of the total contract price, which is equal to or more than the 10% goal established. This affidavit shall give rise to the presumption that the bidder has made the required good faith effort and Affidavit **D** is not necessary;

OR

If less than the 10% goal, Affidavit (**D**) of its good faith effort to meet the goal shall be provided. The document must include evidence of all good faith efforts that were implemented, including any advertisements, solicitations and other specific actions demonstrating recruitment and selection of HUB businesses for participation in the contract.

Note:
Bidders must always submit **with their bid** the Identification of HUB Participation Form listing all HUB contractors, vendors and suppliers that will be used. If there is no HUB participation, then enter none or zero on the form. Affidavit A **or** Affidavit B, as applicable, also must be submitted with the bid. Failure to file a required affidavit or documentation with the bid or after being notified apparent low bidder is grounds for rejection of the bid.

Proposal Signature Page

The undersigned further agrees that in the case of failure on his part to execute the said contract and the bonds within ten (10) consecutive calendar days after being given written notice of the award of contract by the Designer, as agent for the Owner, the certified check, cash or bid bond accompanying this bid shall be paid into the funds of the Owner's account set aside for the project, as liquidated damages for such failure; otherwise the certified check, cash or bid bond accompanying this proposal shall be returned to the undersigned.

Respectfully submitted this day of _____

_____
(Name of firm or corporation making bid)

WITNESS:

By:_____
Signature

_____
(Proprietorship or Partnership)

Name: _____
Print or type

Title_____
(Owner / Partner / President / Vice President)

Address_____

ATTEST:

_____

By:_____

License No._____

Title:_____
(Corp. Sec. or Asst. Sec. only)

Federal I.D. No. _____

(CORPORATE SEAL)

Addendum received and used in computing bid:

Addendum No. 1 _____ Addendum No. 3 _____ Addendum No. 5_____ Addendum No. 6__

Addendum No. 2 _____ Addendum No. 4 _____ Addendum No. 6 _____ Addendum No. 7 __

GUIDELINES FOR RECRUITMENT AND SELECTION OF MINORITY BUSINESSES FOR PARTICIPATION IN CONSTRUCTION CONTRACTS

In accordance with G.S. 143-128.2 (effective January 1, 2002) these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, and alternative contracting methods. The legislation provides that the Public Owner shall have a verifiable ten percent (10%) goal for participation by minority businesses in the total value of work for each project for which a contract or contracts are awarded. These requirements are published to accomplish that end.

SECTION A: INTENT

It is the intent of these guidelines that the Owner, as awarding authority for construction projects, and the contractors and subcontractors performing the construction contracts awarded shall cooperate and in good faith do all things legal, proper and reasonable to achieve the statutory goal of ten percent (10%) for participation by minority businesses in each construction project as mandated by GS 143-128.2. Nothing in these guidelines shall be construed to require contractors or awarding authorities to award contracts or subcontracts to or to make purchases of materials or equipment from minority-business contractors or minority-business subcontractors who do not submit the lowest responsible, responsive bid or bids.

SECTION B: DEFINITIONS

1. Minority - a person who is a citizen or lawful permanent resident of the United States and who is:
   a. Black, that is, a person having origins in any of the black racial groups in Africa;
   b. Hispanic, that is, a person of Spanish or Portuguese culture with origins in Mexico, South or Central America, or the Caribbean Islands, regardless of race;
   c. Asian American, that is, a person having origins in any of the original peoples of the Far East, Southeast Asia and Asia, the Indian subcontinent, the Pacific Islands;
   d. American Indian, that is, a person having origins in any of the original peoples of North America; or
   e. Female

2. Minority Business - means a business:
   a. In which at least fifty-one percent (51%) is owned by one or more minority persons, or in the case of a corporation, in which at least fifty-one percent (51%) of the stock is owned by one or more minority persons or socially and economically disadvantaged individuals; and
   b. Of which the management and daily business operations are controlled by one or more of the minority persons or socially and economically disadvantaged individuals who own it.

3. Socially and economically disadvantaged individual - means the same as defined in 15 U.S.C. 637. "Socially disadvantaged individuals are those who have been subjected to racial or ethnic prejudice or cultural bias because of their identity as a member of a group without regard to their individual qualities". "Economically disadvantaged individuals are those socially disadvantaged individuals whose ability to compete in the free enterprise system has been impaired due to diminished capital and credit opportunities as compared to others in the same business area who are not socially disadvantaged".

4. Public Entity - means the Owner and all public subdivisions and local governmental units.

5. Owner - The public institution named in the contract.

6. Designer – Any person, firm, partnership, or corporation, which has contracted with the Owner to perform architectural or engineering work.

7. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.

8. Contract - A mutually binding legal relationship or any modification thereof, obligating the seller to furnish equipment, materials or services, including construction, and obligating the buyer to pay for them.

9. Contractor - Any person, firm, partnership, corporation, association, or joint venture which has contracted with the State of North Carolina to perform construction work or repair.

10. Subcontractor - A firm under contract with the prime contractor or construction manager at risk for supplying materials or labor and materials and/or installation. The subcontractor may or may not provide materials in his subcontract.

SECTION C: RESPONSIBILITIES

1. Office for Historically Underutilized Businesses, Department of Administration (hereinafter referred to as HUB Office).

   The HUB Office has established a program, which allows interested persons or businesses qualifying as a minority business under G.S. 143-128.2, to obtain certification in the State of North Carolina procurement system. The information provided by the minority businesses will be used by the HUB Office to:
   a. Identify those areas of work for which there are minority businesses, as requested.
   b. Make available to interested parties a list of prospective minority business contractors and subcontractors.
   c. Assist in the determination of technical assistance needed by minority business contractors.

   In addition to being responsible for the certification/verification of minority businesses that want to participate in the State construction program, the HUB Office will:
   (1) Maintain a current list of minority businesses. The list shall include the areas of work in which each minority business is interested.
   (2) Inform minority businesses on how to identify and obtain contracting and subcontracting opportunities through the State and other public entities.
   (3) Inform minority businesses of the contracting and subcontracting process for public construction building projects.
   (4) Work with the North Carolina trade and professional organizations to improve the ability of minority businesses to compete in the State construction projects.
   (5) The HUB Office also oversees the minority business program by:
      a. Monitoring compliance with the program requirements.
      b. Assisting in the implementation of training and technical assistance programs.
      c. Identifying and implementing outreach efforts to increase the utilization of minority businesses.
      d. Reporting the results of minority business utilization to the Secretary of the Department of Administration, the Governor, and the General Assembly.

2. The Owner
   The Owner will be responsible for the following:

a. Reviewing the apparent low bidders' statutory compliance with the requirements listed in the proposal prior to award of contracts. The Owner reserves the right to reject any or all bids and to waive informalities.
b. Monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
c. Providing statistical data and required reports to the HUB Office.
d. Resolving any protest and disputes arising after implementation of the plan.

3. Constituent Institutions of The State of North Carolina
Before awarding a contract, a constituent institution shall do the following:

a. Implement the constituent institution HUB plan.
b. Attend the scheduled prebid conference.
c. At least 10 days prior to the scheduled day of bid opening, notify minority businesses that have requested notices from the public entity for public construction or repair work and minority businesses that otherwise indicated to the Office for Historically Underutilized Businesses an interest in the type of work being bid or the potential contracting opportunities listed in the proposal. The notification shall include the following:
    1. A description of the work for which the bid is being solicited.
    2. The date, time, and location where bids are to be submitted.
    3. The name of the individual within the owner's organization who will be available to answer questions about the project.
    4. Where bid documents may be reviewed.
    5. Any special requirements that may exist.
d. Utilize other media, as appropriate, likely to inform potential minority businesses of the bid being sought.
e. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
f. Review, jointly with the designer, all requirements of G.S. 143-128.2(c) and G.S. 143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing good faith efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.
g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award.
h. Review prime contractors' pay applications for compliance with minority business utilization commitments prior to payment.
i. Document evidence of implementation of Owner's responsibilities.

4. Designer
Under the single-prime bidding, separate prime bidding, construction manager at risk, or alternative contracting method, the designer will:

a. Attend the scheduled prebid conference to explain minority business requirements to the prospective bidders.
b. Assist the owner to identify and notify prospective minority business prime and subcontractors of potential contracting opportunities.
c. Maintain documentation of any contacts, correspondence, or conversation with minority business firms made in an attempt to meet the goals.
d. Review jointly with the owner, all requirements of G.S. 143-128.2(c) and G.S.143-128.2(f) – (i.e. bidders' proposals for identification of the minority businesses that will be utilized with corresponding total dollar value of the bid and affidavit listing Good Faith Efforts, or affidavit of self-performance of work, if the contractor will perform work under contract by its own workforce) - prior to recommendation of award.

e. During construction phase of the project, review "MBE Documentation for Contract Payment" – (Appendix E) for compliance with minority business utilization commitments. Submit Appendix E form with monthly pay applications to the owner and forward copies to the Owner.
f. Make documentation showing evidence of implementation of Designer's responsibilities available for review by the Owner and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, and Its First-Tier Subcontractors
Under the single-prime bidding, the separate-prime bidding, construction manager at risk and alternative contracting methods, contractor(s) will:

a. Attend the scheduled prebid conference.
b. Identify or determine those work areas of a subcontract where minority businesses may have an interest in performing subcontract work.
c. At least ten (10) days prior to the scheduled day of bid opening, notify minority businesses of potential subcontracting opportunities listed in the proposal. The notification will include the following:
   (1) A description of the work for which the subbid is being solicited.
   (2) The date, time and location where subbids are to be submitted.
   (3) The name of the individual within the company who will be available to answer questions about the project.
   (4) Where bid documents may be reviewed.
   (5) Any special requirements that may exist, such as insurance, licenses, bonds and financial arrangements.

   If there are more than three (3) minority businesses in the general locality of the project who offer similar contracting or subcontracting services in the specific trade, the contractor(s) shall notify three (3), but may contact more, if the contractor(s) so desires.
d. During the bidding process, comply with the contractor(s) requirements listed in the proposal for minority participation.
e. Identify on the bid**,** the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit listing good faith efforts as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).
f. Make documentation showing evidence of implementation of PM, CM-at-Risk and First-Tier Subcontractor responsibilities available for review by the constituent institution and HUB Office, upon request.
g. Upon being named the apparent low bidder, the Bidder shall provide one of the following: (1) an affidavit (Affidavit C) that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal; (2) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal. Failure to comply with these requirements is grounds for rejection of the bid and award to the next lowest responsible and responsive bidder.
h. The contractor(s) shall identify the name(s) of minority business subcontractor(s) and corresponding dollar amount of work on the schedule of values. The schedule of values shall be provided as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
i. The contractor(s) shall submit with each monthly pay request(s) and final payment(s), "MBE Documentation for Contract Payment" – (Appendix E), for designer's review.
j. During the construction of a project, at any time**,** if it becomes necessary to replace a minority business subcontractor, immediately advise the Owner, and the Director of the HUB Office in writing**,** of the circumstances involved. The prime contractor shall make a good faith effort to replace a minority business subcontractor with another minority business subcontractor.
k. If during the construction of a project additional subcontracting opportunities become available, make a good faith effort to solicit subbids from minority businesses.
l. It is the intent of these requirements apply to all contractors performing as prime contractor and first tier subcontractor under construction manager at risk on state projects.

6. Minority Business Responsibilities
   While minority businesses are not required to become certified in order to participate in the State construction projects, it is recommended that they become certified and should take advantage of the appropriate technical assistance that is made available. In addition, minority businesses who are contacted by owners or bidders must respond promptly whether or not they wish to submit a bid.

SECTION D: DISPUTE PROCEDURES
It is the policy of this state that disputes that involves a person's rights, duties or privileges, should be settled through informal procedures. To that end, minority business disputes arising under these guidelines should be resolved as governed under G.S. 143-128(g).

SECTION E: These guidelines shall apply upon promulgation on University construction projects. Copies of these guidelines may be obtained from:
http://www.NorthCarolina.edu/finance/projects/projects.cfm#attachments

SECTION F: In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing MBE participation in State building projects. An explanation of the process follows, titled "MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)" along with relevant forms for its implementation ("Identification of Minority Business Participation" form, Affidavits A, B, C, D and Appendix E).

MINORITY BUSINESS CONTRACT PROVISIONS (CONSTRUCTION)

APPLICATION:

The **Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts** are hereby made a part of these contract documents. These guidelines shall apply to all contractors regardless of ownership. Copies of these guidelines may be obtained from: http://www.NorthCarolina.edu/finance/projects/projects.cfm#attachments

MINORITY BUSINESS SUBCONTRACT GOALS:

The goals for participation by minority firms as subcontractors on this project have been set at 10%.

The bidder must identify on its bid, the minority businesses that will be utilized on the project with corresponding total dollar value of the bid and affidavit (Affidavit A) listing good faith efforts **or** affidavit (Affidavit B) of self-performance of work, if the bidder will perform work under contract by its own workforce, as required by G.S. 143-128.2(c) and G.S. 143-128.2(f).

The lowest responsible, responsive bidder must provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, which is equal to or more than the applicable goal.

OR

Provide Affidavit C, that includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, **with documentation of Good Faith Effort, if the percentage is not equal to the applicable goal.**

OR

Provide Affidavit B, which includes sufficient information for the State to determine that the bidder does not customarily subcontract work on this type project.

The above information must be provided as required. Failure to submit these documents is grounds for rejection of the bid.

MINIMUM COMPLIANCE REQUIREMENTS:

All written statements, affidavits or intentions made by the Bidder shall become a part of the agreement between the Contractor and the Owner for performance of this contract. Failure to comply with any of these statements, affidavits, or intentions, or with the minority business Guidelines shall constitute a breach of the contract. A finding by the Owner that any information submitted either prior to award of the contract or during the performance of the contract is inaccurate, false or incomplete, shall also constitute a breach of the contract. Any such breach may result in termination of the contract in accordance with the termination provisions contained in the contract. It shall be solely at the option of the Owner whether to terminate the contract for breach.

In determining whether a contractor has made Good Faith Efforts, the Owner will evaluate all efforts made by the Contractor and will determine compliance in regard to quantity, intensity, and results of these efforts. Good Faith Efforts include:

(1) Contacting minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor or available on State or local government maintained lists at least 10 days before the bid or proposal date and notifying them of the nature and scope of the work to be performed.

(2) Making the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bid or proposals are due.

(3) Breaking down or combining elements of work into economically feasible units to facilitate minority participation.

(4) Working with minority trade, community, or contractor organizations identified by the Office for Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.

(5) Attending any prebid meetings scheduled by the public owner.

(6) Providing assistance in getting required bonding or insurance or providing alternatives to bonding or insurance for subcontractors.

(7) Negotiating in good faith with interested minority businesses and not rejecting them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.

(8) Providing assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisting minority businesses in obtaining the same unit pricing with the bidder's suppliers in order to help minority businesses in establishing credit.

(9) Negotiating joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.

(10) Providing quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

Identification of Minority Business Participation

I, _____,
(Bidder)

do hereby certify that on this project we will use the following minority business enterprises as construction subcontractors, vendors, suppliers or providers of professional services.

Firm Name, Address and Phone #	Work type	*Minority Category

*Minority categories: Black, African American **(**B), Hispanic **(**H), Asian American **(**A) American Indian **(**I), Female **(**F) Socially and Economically Disadvantaged **(**D)

The total value of minority business contracting will be ($)_____ .

AFFIDAVIT A – Listing of the Good Faith Effort

County of _____

Affidavit of_____
(Bidder)

I have made a good faith effort to comply under the following areas checked:
(A minimum of 5 areas must be checked in order to have achieved a "good faith effort")

- ❑ **1 -** Contacted minority businesses that reasonably could have been expected to submit a quote and that were known to the contractor, or available on State or local government maintained lists, at least 10 days before the bid date and notified them of the nature and scope of the work to be performed.
- ❑ **2 -**Made the construction plans, specifications and requirements available for review by prospective minority businesses, or providing these documents to them at least 10 days before the bids are due.
- ❑ **3** - Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- ❑ **4** - Worked with minority trade, community, or contractor organizations identified by the Office of Historically Underutilized Businesses and included in the bid documents that provide assistance in recruitment of minority businesses.
- ❑ **5** - Attended prebid meetings scheduled by the public owner.
- ❑ **6** - Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- ❑ **7** - Negotiated in good faith with interested minority businesses and did not reject them as unqualified without sound reasons based on their capabilities. Any rejection of a minority business based on lack of qualification should have the reasons documented in writing.
- ❑ **8** - Provided assistance to an otherwise qualified minority business in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letters of credit, including waiving credit that is ordinarily required. Assisted minority businesses in obtaining the same unit pricing with the bidder's suppliers, in order to help minority businesses in establishing credit.
- ❑ **9** - Negotiated joint venture and partnership arrangements with minority businesses in order to increase opportunities for minority business participation on a public construction or repair project when possible.
- ❑ **10** - Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

In accordance with GS143-128.2(d) the undersigned will enter into a formal agreement with the firms Listed, in the Identification of Minority Business Participation schedule conditional upon execution of a contract with the Owner. Failure to abide by this statutory provision will constitute a breach of the contract.
The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of North Carolina, County of _____
Subscribed and sworn to before me this _____day of_____ 20
Notary Public _____
My commission expires_____

AFFIDAVIT B – Intent to Perform Contract with Own Workforce.

County of_____

Affidavit of_____
(Name of Bidder)

I hereby certify that it is our intent to perform 100% of the work required for the_____contract.
(Name of Project)

In making this certification, the Bidder states that the Bidder does not customarily subcontract elements of this type project, and normally performs and has the capability to perform and will perform all elements of the work on this project with his/her own current work forces; and

The Bidder agrees to provide any additional information or documentation requested by the owner in support of the above statement.

The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date:_____ Name of Authorized Officer_____

Signature:_____

Title:_____

SEAL

State of North Carolina, County of _____
Subscribed and sworn to before me this _____day of _____20___
Notary Public_____
My commission expires_____

AFFIDAVIT C - Portion of the Work to be Performed by Minority Firms

Project _____

********(**NOTE: THIS FORM IS NOT TO BE SUBMITTED WITH THE BID PROPOSAL)*********

If the portion of the work to be executed by minority businesses as defined in GS143-128.2(g) is equal to or greater than 10% of the bidders total contract price, then the bidder must complete this affidavit. This affidavit shall be provided by the apparent lowest responsible, responsive bidder within 72 hours after notification of being low bidder.

Affidavit of:_____ I do hereby certify that on the
(Bidder)

_____
(Project Name)

Amount of Bid $_____

I will expend a minimum of _____% of the total dollar amount of the contract with minority business enterprises. Minority Businesses will be employed as construction subcontractors, vendors, suppliers or providers of professional services. Such work will be subcontracted to the following firms listed below.

Attach additional sheets if required.

Name and Phone Number	*Minority Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

Pursuant to GS143-128.2(d), the undersigned will enter into a formal agreement with Minority Firms for work listed in this schedule conditional upon execution of a contract with the Owner. Failure to fulfill this commitment may constitute a breach of the contract.

The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of North Carolina, County of_____
Subscribed and sworn to before me this _____day of _____20____
Notary Public_____
My commission expires_____

AFFIDAVIT D – Good Faith Efforts

Project _____

If the goal of 10% participation by minority business **is not** achieved, the Bidder shall provide the following documentation to the Owner of his good faith efforts

(Bidder

Affidavit of: _____)

I do certify the attached documentation as true and accurate representation of my good faith efforts.

(Attach additional sheets if required)

Name and Phone Number	*Minority Category	Work description	Dollar Value

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

Documentation of the Bidder's good faith efforts to meet the goals set forth in these provisions. Examples of documentation shall include the following evidence:

A. Copies of solicitations for quotes to at least three (3) minority business firms from the source list provided by the State for each subcontract to be let under this contract (if 3 or more firms are shown on the source list). Each solicitation shall contain a specific description of the work to be subcontracted, location where bid documents can be reviewed, representative of the Prime Bidder to contact, and location, date and time when quotes must be received.

B. Copies of quotes or responses received from each firm responding to the solicitation.

C. A telephone log of follow-up calls to each firm sent a solicitation.

D. For subcontracts where a minority business firm is not considered the lowest responsible sub-bidder, copies of quotes received from all firms submitting quotes for that particular subcontract.

E. Documentation of any contacts or correspondence to minority business, community, or contractor organizations in an attempt to meet the goal.

F. Copy of pre-bid roster.

G. Letter documenting efforts to provide assistance in obtaining required bonding or insurance for minority business.

H. Letter detailing reasons for rejection of minority business due to lack of qualification.

I. Letter documenting proposed assistance offered to minority businesses in need of equipment, loan capital, lines of credit, or joint pay agreements to secure loans, supplies, or letter of credit, including waiving credit that is ordinarily required.

Failure to provide the documentation as listed in these provisions may result in rejection of the bid and award to the next lowest responsible and responsive bidder.

Date:_____ Name of Authorized Officer:_____

Signature:_____

Title:_____

SEAL

State of North Carolina, County of _____

Subscribed and sworn to before me this _____day of _____20_____

Notary Public _____

My commission expires_____

APPENDIX E

MBE DOCUMENTATION FOR CONTRACT PAYMENTS

Prime Contractor/Architect: _____

Address & Phone: _____

Project Name: _____

Pay Application #: _____ Period: _____

The following is a list of payments to be made to minority business contractors on this project for the above-mentioned period.

Firm Name	***Minority Category**	**Payment Amount** (List invoice number and amount)	**Owner Use Only**

*Minority categories: Black, African American (**B**), Hispanic (**H**), Asian American (**A**) American Indian (**I**), Female (**F**) Socially and Economically Disadvantaged (**D**)

Date: _____ Approved/Certified By: _____
Name

_____
Title

_____
Signature

****THIS DOCUMENT MUST BE SUBMITTED WITH EACH PAY REQUEST & FINAL PAYMENT****

Standard Form of Agreement Between Owner and Contractor

where the basis of payment is a
STIPULATED SUM

AGREEMENT made as of the « » day of « » in the year «2023 »
(In words, indicate day, month and year.)

BETWEEN the Owner:
(Name, legal status, address and other information)

«Carteret County Board of Education»
«107 Safrit Drive »
«Beaufort, NC 27516 »
« »

and the Contractor:
(Name, legal status, address and other information)

«xyz »«CONTRACTOR »
« »
« »
« »

for the following Project:
(Name, location and detailed description)

«Additions and Renovations to West Carteret High School»
«4700 Country Club Rd
Morehead City, North Carolina 28557»

The Architect:
(Name, legal status, address and other information)

«Hite Associates, PC »
«2600 Meridian Drive »
«Greenville, NC 27834 »
« »

The Owner and Contractor agree as follows.

TABLE OF ARTICLES

ARTICLE 1 THE CONTRACT DOCUMENTS

The Contract Documents consist of this Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of this Agreement, other documents listed in this Agreement and Modifications issued after execution of this Agreement, all of which form the Contract, and are as fully a part of the Contract as if attached to this Agreement or repeated herein. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. An enumeration of the Contract Documents, other than a Modification, appears in Article 9.

ARTICLE 2 THE WORK OF THIS CONTRACT

The Contractor shall fully execute the Work described in the Contract Documents, except as specifically indicated in the Contract Documents to be the responsibility of others.

"Each Prime Contractor shall execute the entire Work described in the Contract Documents and reasonably inferable from them as being necessary to produce the intended results. In general, the Work includes but is not limited to the furnishing of all labor, materials, equipment, tools, services and supervision to perform the Work for the project".

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

§ 3.1 The date of commencement of the Work shall be the date of this Agreement unless a different date is stated below or provision is made for the date to be fixed in a notice to proceed issued by the Owner.
(Insert the date of commencement if it differs from the date of this Agreement or, if applicable, state that the date will be fixed in a notice to proceed.)

Seven days from receipt of Notice to Proceed.

If, prior to the commencement of the Work, the Owner requires time to file mortgages and other security interests, the Owner's time requirement shall be as follows:

« »

§ 3.2 The Contract Time shall be measured from the date of commencement.

§ 3.3 The Contractor shall achieve Substantial Completion of the entire Work not later than « » (« ») days from the date of commencement, or as follows:
(Insert number of calendar days. Alternatively, a calendar date may be used when coordinated with the date of commencement. If appropriate, insert requirements for earlier Substantial Completion of certain portions of the Work.)

In accordance with the schedule of COMPLETION DATES set forth in the Supplementary Conditions, under "Time" Article, all of which are DATES CERTAIN, with no delays allowed except as caused by the Owner.

« »

Portion of Work	Substantial Completion Date

, subject to adjustments of this Contract Time as provided in the Contract Documents.
(Insert provisions, if any, for liquidated damages relating to failure to achieve Substantial Completion on time or for bonus payments for early completion of the Work.)

«
Substantial Completion liquidated damages- $1000 per day.

Final Completion liquidated damages - $1000 per day.

See Section 9.11 of the General Conditions and the Liquidated Damages Articles of the Supplemental Conditions for additional provisions regarding liquidated damages.
»

ARTICLE 4 CONTRACT SUM
§ 4.1 The Owner shall pay the Contractor the Contract Sum in current funds for the Contractor's performance of the Contract. The Contract Sum shall be « » ($ « »), subject to additions and deductions as provided in the Contract Documents.

§ 4.2 The Contract Sum is based upon the following alternates, if any, which are described in the Contract Documents and are hereby accepted by the Owner:
(State the numbers or other identification of accepted alternates. If the bidding or proposal documents permit the Owner to accept other alternates subsequent to the execution of this Agreement, attach a schedule of such other alternates showing the amount for each and the date when that amount expires.)

« »

§ 4.3 Unit prices, if any: See Form of Proposal
(Identify and state the unit price; state quantity limitations, if any, to which the unit price will be applicable.)

Item	Units and Limitations	Price Per Unit ($0.00)

§ 4.4 Allowances included in the Contract Sum, if any: See Form of Proposal
(Identify allowance and state exclusions, if any, from the allowance price.)

Item	Price

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

§ 5.1.1 Based upon Applications for Payment submitted to the Architect by the Contractor and Certificates for Payment issued by the Architect, the Owner shall make progress payments on account of the Contract Sum to the Contractor as provided below and elsewhere in the Contract Documents.

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month, or as follows:

« One calendar month ending on the twenty-fifth day of the month. »

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the « » day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the « » day of the « » month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than « » (« ») days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

§ 5.1.4 Each Application for Payment shall be based on the most recent schedule of values submitted by the Contractor in accordance with the Contract Documents. The schedule of values shall allocate the entire Contract Sum among the various portions of the Work. The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 5.1.5 Applications for Payment shall show the percentage of completion of each portion of the Work as of the end of the period covered by the Application for Payment.

§ 5.1.6 Subject to other provisions of the Contract Documents, the amount of each progress payment shall be computed as follows:

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage as outlined in Section 9.3.1.3 of the General and Supplemental Conditions . Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction, as amended;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage as outlined in Section 9.3.1.3 of the General and Supplemental Conditions;

.3 Subtract the aggregate of previous payments made by the Owner; and

.4 Subtract amounts, if any, for which the Architect has withheld or nullified a Certificate for Payment as provided in Section 9.5 of AIA Document A201–2007, as amended.

§ 5.1.7 The progress payment amount determined in accordance with Section 5.1.6 shall be further modified under the following circumstances:

.1 Add, upon Substantial Completion of the Work, a sum sufficient to increase the total payments to the full amount of the Contract Sum, less such amounts as the Architect shall determine for incomplete Work, retainage applicable to such work and unsettled claims; and
(Section 9.8.5 of AIA Document A201–2007 requires release of applicable retainage upon Substantial Completion of Work with consent of surety, if any.)

.2 Add, if final completion of the Work is thereafter materially delayed through no fault of the Contractor, any additional amounts payable in accordance with Section 9.10.3 of AIA Document A201–2007, as amended.

§ 5.1.8 Reduction or limitation of retainage, if any, shall be as follows:
(If it is intended, prior to Substantial Completion of the entire Work, to reduce or limit the retainage resulting from the percentages inserted in Sections 5.1.6.1 and 5.1.6.2 above, and this is not explained elsewhere in the Contract Documents, insert here provisions for such reduction or limitation.)

«
See Section 9.3 of the General Conditions and the Supplemental Conditions.
»

§ 5.1.9 Except with the Owner's prior approval, the Contractor shall not make advance payments to suppliers for materials or equipment which have not been delivered and stored at the site.

§ 5.2 FINAL PAYMENT
§ 5.2.1 Final payment, constituting the entire unpaid balance of the Contract Sum, shall be made by the Owner to the Contractor when

.1 the Contractor has fully performed the Contract except for the Contractor's responsibility to correct Work as provided in Section 12.2.2 of AIA Document A201–2007, as amended, and to satisfy other requirements, if any, which extend beyond final payment; and

.2 a final Certificate for Payment has been issued by the Architect.

§ 5.2.2 The Owner's final payment to the Contractor shall be made no later than 30 days after the issuance of the Architect's final Certificate for Payment, or as follows:

« »

ARTICLE 6 DISPUTE RESOLUTION
§ 6.1 INITIAL DECISION MAKER
The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, as amended, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.
(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

«
The Architect shall be the Initial Decision Maker as outlined in Article 15 of the General Conditions and the Supplemental Conditions.
»
« »
« »
« »

§ 6.2 BINDING DISPUTE RESOLUTION
For any Claim subject to, but not resolved by, mediation pursuant to Section 15.3 of AIA Document A201–2007, as amended, the method of binding dispute resolution shall be as follows:
(Check the appropriate box. If the Owner and Contractor do not select a method of binding dispute resolution below, or do not subsequently agree in writing to a binding dispute resolution method other than litigation, Claims will be resolved by litigation in a court of competent jurisdiction.)

[«X»] Litigation in a court of competent jurisdiction

« »

ARTICLE 7 TERMINATION OR SUSPENSION

§ 7.1 The Contract may be terminated by the Owner or the Contractor as provided in Article 14 of AIA Document A201–2007, as amended.

§ 7.2 The Work may be suspended by the Owner as provided in Article 14 of AIA Document A201–2007, as amended.

ARTICLE 8 MISCELLANEOUS PROVISIONS

§ 8.1 Where reference is made in this Agreement to a provision of AIA Document A201–2007, as amended or another Contract Document, the reference refers to that provision as amended or supplemented by other provisions of the Contract Documents.

§ 8.2 Payments due and unpaid under the Contract shall not bear interest.
(Insert rate of interest agreed upon, if any.)

« Zero » % «0% »

§ 8.3 The Owner's representative:
(Name, address and other information)

« »
« »
« »
« »
« »
« »

§ 8.4 The Contractor's representative:
(Name, address and other information)

« »
« »
« »
« »
« »
« »

§ 8.5 Neither the Owner's nor the Contractor's representative shall be changed without ten days written notice to the other party.

§ 8.6 Other provisions:

« »

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

§ 9.1 The Contract Documents, except for Modifications issued after execution of this Agreement, are enumerated in the sections below.

§ 9.1.1 The Agreement is this executed AIA Document A101–2007, Standard Form of Agreement Between Owner and Contractor.

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction, as amended. The amended version of AIA Document A201-2007 is included in the Project Manual.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Section 01010	General Conditions	June 7, 2016	pp. 1-54
Section 01012	Supplementary General	June 7, 2016	pp. 1-4

Section 01040	Conditions General Requirements	June 7, 2016	pp. 1-13

§ 9.1.4 The Specifications:
(Either list the Specifications here or refer to an exhibit attached to this Agreement.)

«See Exhibit A »

Section	Title	Date	Pages

§ 9.1.5 The Drawings:
(Either list the Drawings here or refer to an exhibit attached to this Agreement.)

«See Exhibit B »

Number	Title	Date

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

Portions of Addenda relating to bidding requirements are not part of the Contract Documents unless the bidding requirements are also enumerated in this Article 9.

§ 9.1.7 Additional documents, if any, forming part of the Contract Documents:

.1 AIA Document E201™–2007, Digital Data Protocol Exhibit, if completed by the parties, or the following:

« »

.2 Other documents, if any, listed below:
(List here any additional documents that are intended to form part of the Contract Documents. AIA Document A201–2007 provides that bidding requirements such as advertisement or invitation to bid, Instructions to Bidders, sample forms and the Contractor's bid are not part of the Contract Documents unless enumerated in this Agreement. They should be listed here only if intended to be part of the Contract Documents.)

«FORM OF PROPOSAL »

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007, as amended.

This Agreement entered into as of the day and year first written above.

Carteret County Board of Education
107 Safrit Drive,
Beaufort, NC 27516

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
« »«Board Chairperson »	« »«President »
(Printed name and title)	*(Printed name and title)*

APPROVED AS TO FORM:

BY: _____

Carteret County BOE Attorney

PRE-AUDIT CERTIFICATION:

This instrument has been preaudited in the manner required by the Local Government Budget and Fiscal Control act.

BY: _____

Carteret County Schools Finance Officer

Carteret County Schools

AHERA Management Plan Book

West Carteret High School

Plant Operations Office Copy

This book is not to be removed from the Plant Operations Office for any reason

This information is to be available for both staff and public inspection upon request

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: Carteret County Board of Education

State System #: 160

Address: P.O. DRAWER 600
BEAUFORT, N.C. 28516

County: Carteret

Telephone: 252-728-4583

AHERA MANAGEMENT PLAN COVER SHEET

Management Plan Submission: ☐ Original ☐ Resubmittal ☐ New Building ☑ Reinspection

List of Documents Attached:

- ☐ School Buildings
- ☐ Preventive Measures and Response Actions Scheduled
- ☐ Response Actions Recommended
- ☐ Operations and Maintenance Plan
- ☐ Periodic Surveillance Plan
- ☐ Reinspection Plan
- ☐ Assessment of Materials
- ☐ Description of Each Sample Area
- ☐ Determination of Sampling Locations
- ☐ Bulk Sample Analysis Form
- ☐ Resources Needed
- ☐ Steps to Inform Others
- ☑ Reinspection Report

LEA AHERA DESIGNEE

Typed Name: Kenny Pedersen

Mailing Address: PO Drawer 600
Beaufort, North Carolina 28516

Name of Training Course: LEA Designee Training

Year 2015 Month 10 Day 12-13 Total Hours of Course 16

Name of Training Agency: NCHHS-HHCU

MANAGEMENT PLANNER

Typed Name: E. Raymond Childress

Signature: E. Raymond Childress Date 04/15/21

NC Accreditation Number: 20476

Training Agency: The EI Group, Inc.

INSPECTOR

Typed Name: E. Raymond Childress

Signature: E. Raymond Childress Date: 04/15/21

NC Accreditation Number: 10675

Training Agency: The EI Group, Inc.

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature: _____
LEA AHERA Designee

Date: _____

Signature: _____
LEA Superintendent

Dr. Rob Jackson
Typed Name of Superintendent

Date: _____

FOR REVIEWING AGENCY USE ONLY

☐ Accepted
☐ Returned for Reasons Stated Below

Reviewer's Signature: _____

Date: _____

DHHS 3531 (Revised 6/03; 8/00; 8/11; 1/2013)
Health Hazards Control Unit

PHOTOCOPYING PERMITTED

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No: West Carteret High School #160-344

Building(s): Main

School Address: 4700 Country Club Rd, Morehead City, NC 28557

Reinspection Date: 04/13/21

AHERA REINSPECTION REPORT

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT a. No Change	4. ASSESSMENT b. Condition Code	4. ASSESSMENT c. Comments	5. RESPONSE ACTION Description	5. RESPONSE ACTION Begin/End Dates
Entire Main/ Room 211 (715)	FT-3		(MIS-NF) Floor Tile 9x9 White/Tan OCC5	✓	5	Material has been removed. 40,000 SF	Removed	Removed July, 2017
Main/ Room 134 (408), Hall 166 (400's Hallway) & 254 (600's Hallway)	MM-1		(MIS-NF) Transite Fume Hood pipe 12" OCC5		5	Material has been removed.	Removed	Removed
Main/ Kitchen Rooms 143 (120), 182 (111), 237 (101), 238 (103) & 242 (102)	TO-1		(SUR-NF) Plaster Ceiling painted yellow/cream OCC7	✓	5	The material is in good condition with no damage to the plaster. The paint is peeling in some areas. Limited accessibility and low potential for disturbance.	O & M Plan	Ongoing

INSPECTOR: Typed Name: E. Raymond Childress Signature: E. Raymond Childress

NC Accreditation Number: 10675 Date: 4/16/21

LEA DESIGNEE: Typed Name: Kenny Pederson

Date: _____ Signature: _____

MANAGEMENT PLANNER: Typed Name: E. Raymond Childress Signature: E. Raymond Childress

NC Accreditation Number: 20476 Date: 4/16/21

DHHS 3778 (Revised 12/07; 1/2013)

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No.: West Carteret High School #160-344

Building: T-4, 4, and Main

AHERA REINSPECTION REPORT COMMENTS

HGA ID: FT-18, 20, & 21 **MATERIAL DESCRIPTION:** Floor tile

The mobile unit T-4, T-7, and T-8 are no longer at this location. Unit T-8 was destroyed by a tornado in 1993.

All mobile classrooms containing asbestos materials have been removed from this site. The floor tile and mastic in rooms 125, 126, 127, 129, and 108 (now known as room 310) and in rooms 100, 101 and 106 (now a portion of room 300) was removed in 1996.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

HGA ID: FT-3 **MATERIAL DESCRIPTION:** 9x9 Floor tile white/tan

40,000 SF of the material was removed in July 2017. New 12x12 floor tile has since been installed in its place.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No.: West Carteret High School #160-344

Building: Main

AHERA REINSPECTION REPORT COMMENTS

HGA ID: M-1 **MATERIAL DESCRIPTION:** Transite fume hood pipe 12"

Pipe and fume hood have been removed from site.

HGA ID: TO-1 **MATERIAL DESCRIPTION:** Plaster ceiling

The material is in good condition. No damage to the plaster was observed. There are areas where the cream paint is chipping and peeling.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

AHERA BUILDING INSPECTION
and
MANAGEMENT PLAN

WEST CARTERET HIGH SCHOOL

COUNTRY CLUB ROAD, RT #2

MOREHEAD CITY, NORTH CAROLINA

RES PROJECT NO. SAB-88s15S

ROBERTS ENVIRONMENTAL SERVICES, INC.

HIGHWAY 24 EAST, MAKO OFFICE COMPLEX

P. O. Box 308

SWANSBORO, NORTH CAROLINA 28584

AHERA Building Inspection
and Management Plan

RES Project No. SAB-88s15S

West Carteret High School

Section: CS - 2

Prepared By

Todd M. Nance

North Carolina AHERA Accreditation # 10099

Signature: Todd M. Nance Date: 9/16/97

Roberts Environmental Services, Inc.

September 19, 1988

Jim Rogers
Carteret County Board of Education
West Carteret High School
107 Safrit Drive
Beaufort, North Carolina 28516

RE: AHERA Management Plan
West Carteret High School

Dear Mr. Rogers:

On May 15, and May 16, 1988, a building inspection was conducted at the West Carteret High School by Roberts Environmental Services, Inc. (RES). The purpose of the inspection was to determine the presence of asbestos containing building materials (ACBM) and to assess the condition of those materials so identified. The inspection was conducted in accordance with the Asbestos Hazard Emergency Response Act (AHERA) and the final regulations on Asbestos - Containing Materials in Schools, as published in 40 CFR Part 763, Subpart E. This inspection revealed only NON-FRIABLE asbestos in your school.

To fulfill the remaining requirements of the Federal regulations and North Carolina Department of Human Resources, a Management Plan must be submitted. For schools containing only NON-FRIABLE ASBESTOS, the Management Plan to be sent to the state will consist of the following forms:

1.	AHERA Management Plan Cover Sheet	(DHS Form 3531)
2.	School Buildings	(DHS Form 3532)
3.	Periodic Surveillance Plan	(DHS Form 3543)
4.	Reinspection Plan	(DHS Form 3539)
5.	Assessment of Materials	(DHS Form 3542)
6.	Description of Each Sample Area	(DHS Form 3540)
7.	Determination of Sampling Locations	(DHS Form 3535)
8.	Bulk Sample Analysis Form	(DHS Form 3536)
9.	Steps to Inform Others	(DHS Form 3538)

The AHERA Inspector and Management Planner have completed the above forms except where the LEA has decisions to make and must enter those choices as appropriate.

Enclosed please find the necessary forms, with explanations and instructions for completing them. If your inspection report was previously submitted, include a statement to that effect in your cover letter to the state. The AHERA MANAGEMENT PLAN COVER SHEET, NC DHS Form #3541, in the "List of Documents Attached" section, has been completed to reflect submittal of required documents. The Inspection Report is part of these documents.

The LEA must fill in the appropriate information on DHS Forms listed as #1, #3, #4, and #9 (see page one) as follows:

1. AHERA Management Plan Cover Sheet - The LEA Designee "Name" and "Training", as well as the "Certification by the LEA Superintendent".

3. Reinspection Plan - The date to use on this form is not later than three years after you implement the Management Plan. The information listed as "Discussion Topics" is RES's suggestion. You may alter it to your liking by entering the changes on a blank form.

9. Steps to Inform Others - RES instructions to the LEA for completing this form are located in front of the blank Form DHS-3538 in Section II. The methods selected can be discussed on the form much like that for "Surveillance".

Once these forms are completed, the Management Plan is finished and ready for mailing to the following address:

Asbestos in Buildings Program
Occupational Health Branch
Division of Health Services
P.O. Box 2091
Raleigh, North Carolina 27602-2091

In the interest of conserving filing space, the state's Division of Health Services has indicated that it does not need the entire Management Plan. Send only those forms listed on page one and the Floor plans, if provided. However, the plan maintained by the LEA must contain all justifications, verifications, instructions, logs, reference lists, etc., that are required by the law.

If RES can be of further service, please write or call us at 919-393-6565.

Respectfully,

Todd M. Nance

Todd M. Nance
Management Planner
North Carolina Accreditation # 20073

PREFACE

This report contains the results of the Asbestos Hazard Emergency Response Act (AHERA) survey conducted April 11-14, 1988, for the West Carteret High School located on Country Club Road, Morehead City, North Carolina.

NORTH CAROLINA ACCREDITED INSPECTOR:

Todd M. Nance
North Carolina AHERA Inspector #10099

Roberts Environmental Services, Inc. (RES)
Highway 24 East, MAKO Office Complex
P. O. Box 308
Swansboro, North Carolina 28584

ANALYTICAL LABORATORY:

Roberts Environmental Services, Inc. (RES)
Highway 24 East, MAKO Office Complex
P. O. Box 308
Swansboro, North Carolina 28584

(919) 393-6167/2495

NORTH CAROLINA ACCREDITED MANAGEMENT PLANNER:

Todd M. Nance
North Carolina Management Planner #20073

Roberts Environmental Services, Inc. (RES)
Highway 24 East, MAKO Office Complex
P.O. Box 308
Swansboro, North Carolina 28584

TABLE OF CONTENTS

SECTION

SECTION I. INSPECTION SURVEY

This section contains a summary of the building inspection conducted by Roberts Environmental Services, Inc. This summary is intended to provide a concise overview of the results of the inspection, to highlight areas which warrant immediate corrective action, and to provide additional information regarding the report forms located in SECTION II. The contents of this section are organized as follows:

TITLE

A. PURPOSE

B. APPLICATION

C. SCOPE

D. SUMMARY OF FINDINGS

E. ASSESSMENT OF IDENTIFIED ACBM

F. RES SAMPLING PROTOCOL

SECTION I. INSPECTION SUMMARY

A. PURPOSE

The purpose of this inspection was to evaluate all school buildings for the presence of asbestos containing building materials (ACBM) and to assess the condition of those materials so identified.

B. APPLICATION

Suspect building materials were inspected and classified as either friable or non-friable ACBM. All known and suspect ACBM were then inventoried by homogeneous area and quantified. Bulk samples were collected from suspect building materials in each homogeneous area, using a random sampling scheme where feasible. Bulk samples were analyzed for asbestos content by polarized light microscopy, coupled with dispersion staining. The results for each sample were reported as positive or negative for asbestos content (SECTIONS I.D and II.B). Positive findings were further detailed as to the type and percent of asbestos identified (SECTION I.F).

The condition of the ACBM in each homogeneous area was assessed for damage, severity and extent of damage, suspected cause, accessibility, potential for disturbance, known or suspected cause of damage, preventive measure which might reduce or eliminate fiber release, and/or other comments appropriate to the conditions observed (SECTIONS I.E and II).

C. SCOPE

The West Carteret High School campus is composed of one main building, two permanent classroom buildings, two temporary classroom buildings, three storage buildings, two green houses and seven buildings associated with athletics. The main building houses classrooms, the gym, the auditorium, the cafeteria and offices. The main building and two permanent classroom buildings cover approximately 166,520 square feet. All three buildings are built on slab and have no attic.

The survey was conducted on fifteen (15) separate buildings. The following is a list of these buildings and their primary functional areas.

WEST CARTERET HIGH SCHOOL

BUILDINGS AND PRIMARY FUNCTIONAL AREAS

1. Main Building: Classrooms, gym, auditorium, cafeteria
2. Building 06: Classrooms
3. Building 07: Classrooms
4. Building 08: Storage
5. T-1 and T-2: Greenhouses
6. T-3 and T-4: Classrooms
7. T-9: Storage
8. T-5 and T-11: Ticket offices
9. T-6 and T-7: Baseball dugouts
10. T-8: Bathrooms
11. T-10: Pressbox
12. T-12: Pumphouse

D. SUMMARY OF FINDINGS

The following summarizes the findings for each of the buildings inspected. The presence or absence of asbestos is noted under each of three building material categories: 1) Surfacing Materials; 2) Thermal System Insulation; and 3) Miscellaneous Materials.

1. Main Building:

   a. Surfacing Materials - Asbestos found in ceiling materials
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - Asbestos found in floor tile and in fume hood exhaust pipe

2. Building 06:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

3. Building 07:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

4. Building 08:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

5. T-1 and T-2:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

6. T-3 and T-4:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

7. T-9:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

8. T-5 and T-11:

   a. Surfacing Materials - No asbestos found
   b. Thermal System Insulation - No asbestos found
   c. Miscellaneous Materials - No asbestos found

9. T-6 and T-7:

a. Surfacing Materials - No asbestos found
b. Thermal System Insulation - No asbestos found
c. Miscellaneous Materials - No asbestos found

10. T-8:

a. Surfacing Materials - No asbestos found
b. Thermal System Insulation - No asbestos found
c. Miscellaneous Materials - No asbestos found

11. T-10:

a. Surfacing Materials - No asbestos found
b. Thermal System Insulation - No asbestos found
c. Miscellaneous Materials - No asbestos found

12. T-12:

a. Surfacing Materials - No asbestos found
b. Thermal System Insulation - No asbestos found
c. Miscellaneous Materials - No asbestos found

E. ASSESSMENT OF IDENTIFIED ACBM

1. Main Building:

a. Surfacing Materials:

The The plaster ceilings in the kitchen (room 237) and adjoining storage and office spaces (rooms 238, 43, 182 and 242), are non-friable asbestos containing materials. (3-10% Chrysotile). There are 2127 square feet of ACBM in these areas in good condition. The material should not be penetrated or damaged.

b. Miscellaneous Materials

The nine inch square white floor tile with tan mottles located in room 211 is 2% chrysotile asbestos. The 768 square feet of ACBM is in good condition. The floor tile should not be abraded or penetrated.

The exhaust pipe for the fume hood in room 134 is 20% chrysotile asbestos. There are 25 linear feet of exhaust pipe in good condition located in room 134 and halls 166 and 254. The pipe should not be damaged in any way.

F. RES SAMPLING PROTOCOL

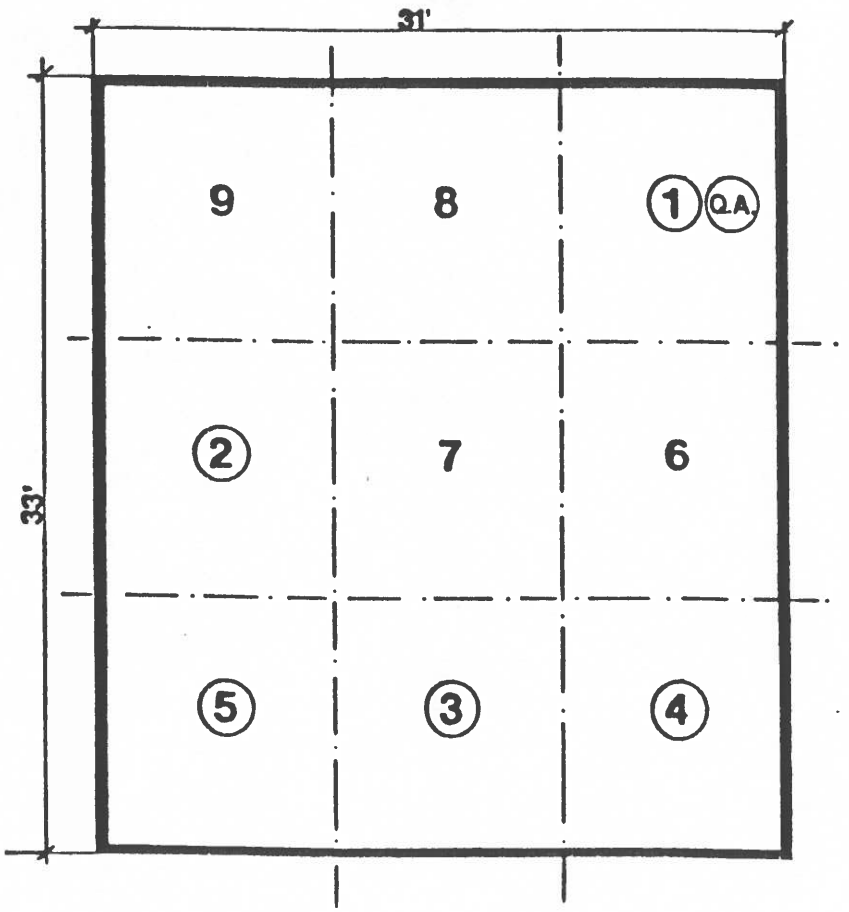
1. Surfacing Materials

Surfacing materials are identified and grouped into homogeneous areas. The homogeneous areas include materials which appear to be uniform in texture, color and appearance, were installed at one time, and are unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area is then assigned a unique identification number. For each homogeneous suspect ACBM, a sampling area sketch is prepared showing all surfaces on one diagram. Each sampling area diagram is then divided into nine approximately equal subareas. When the collection of nine samples is feasible, sample locations are distributed evenly over the homogeneous area.

In areas where the collection of nine samples is not feasible, or is cost prohibitive, the sampling area charts are prepared for each homogeneous area using a nine section grid and the random sampling scheme, as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a). The random numbering changes with the preparation of each succeeding sampling area (see charts on following page). The AHERA regulations allow a lesser number of samples per homogeneous area when conditions are unfavorable for the recommended minimum of nine samples. However, it is the opinion of RES that the AHERA minimum allowable sampling numbers are inadequate to ensure confidence in the identification of ACBM and to protect the liability of the building owner/operator. For these reasons, bulk samples are frequently collected in each room, building or functional area within a homogeneous sampling area.

Surfacing materials assumed to be asbestos containing building material (ACBM) are sampled at least once for verification.

Area size in sq.ft.	EPA recomended no.	AHERA minimum no.
< 1,000	9	3
> 1,000 but < 5,000	9	5
> 5,000	9	7



Example 1

CHART 2

Random Scheme

Sample 1

9	8	1
2	7	6
5	3	4

Sample 2

8	7	1
3	9	5
4	2	6

Sample 3

4	1	7
2	9	6
8	5	3

2. Thermal System Insulation

All insulating materials located on thermal system components are grouped into homogeneous areas. The classification of homogeneous areas is based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area is then assigned a unique identification number. Suspect ACBM is sampled in at least three randomly distributed locations.

Thermal insulation assumed to be ACBM is sampled at least once for verification.

No samples are collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM.

3. Suspect Miscellaneous ACBM

All suspect miscellaneous ACBM are identified and grouped into homogeneous areas. The homogeneous areas includes those materials which appeared uniform in texture, color and appearance, were installed at one time, and are unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area is then assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum are sampled at least once for verification.

4. Verification of Materials Assumed To Be ACBM

When access is permitted, at least one sample is collected for building materials assumed to contain asbestos. Whether asbestos content information is obtained from building records, or merely from the age and appearance of the material, such assumptions can result in expensive maintenance and control procedures if, indeed, there is no asbestos present. It is the opinion of RES that verification of asbestos content through bulk sample analyses is a worthwhile expense, when compared to the asbestos abatement cost for building materials which later prove not to be ACBM.

5. Quality Control

Each bulk sample is labeled in the field with a non-systematic, but unique sample identification number consisting of 14 characters. This number is placed on the sample container and submitted to the RES laboratory for analysis. Samples are then assigned unique laboratory numbers, using a four-digit, sequential numbering system. Both the field sample number and the laboratory number are reported with the sample results.

Quality control checks are included in each survey by the collection of essentially identical, side by side samples. The locations of such QC samples are not known to the laboratory. Quality control checks are collected at the rate of one QC sample per survey, or a QC sample per 20 samples, whichever is greater. Any disagreement of the presence or absence of asbestos in the paired QC samples is investigated by reanalyzing the samples and/or collecting additional samples. QC checks are made at no cost to the client.

Roberts Environmental Services, Inc. is a successful participant in the Interim Asbestos Bulk Sample Analysis Quality Assurance Program, currently administered by the Environmental Protection Agency.

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (FT-3) Floor tile - 9 x 9 square. White with tan mottles. Non-friable material. Classroom 211.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
WCH051688TMN-022	Chrysotile	2	None	Non-friable material in good condition	Classroom 211: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - High Quantity - 768 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces Total Quantity - 768 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 6/14/88

Accreditation Number: 10093 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (TO-1) Troweled on plaster on brown coat, painted yellow. Non-friable surfacing material. Kitchen 237; Storage Areas 238, 47 and 192; Office 242.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
WCH051688TMN-035	None	0	None	Non-friable surfacing Good condition	Kitchen 237: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 1,462 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 2,127 Sq. Ft.
WCH051588TMN-036	Chrysotile	5	None	Non-friable ACBM containing surfacing in good condition	Storage Area 238: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 240 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 2,127 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: 10029 Agency: Georgia Institute of Technology, Education Extension Services

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

LEA: Carteret County Board of Education

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (TO-1) Troweled on plaster on brown coat, painted yellow. Non-friable surfacing material. Kitchen 237; Storage Areas 238, 43 and 182; Office 242.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
WCH051688TMN-037	Chrysotile	7	None	Non-friable surfacing Good condition	Office 242: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 100 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 2,127 Sq. Ft.
WCH051688TMN-038	Chrysotile	10		Non-friable ACBM containing surfacing in good condition	Storage 43: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 25 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 2,127 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (TO-1) Troweled on plaster on brown coat, painted yellow. Non friable surfacing material. Kitchen 237; Storage Areas 238, 43 and 182; Office 242.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
WCH051688TMN-039	None	0	None	Non-friable surfacing Good condition	Storage Area 182: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 300 Sq. Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 2,127 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: 10029 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (M-1) Exhaust pipe for fume hood. 12 inch exhaust pipe. Non-friable miscellaneouserial. Hallways 254 and 166; Classroom 134.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
WCH05168BTMN-047	Chrysotile	20	None	Non-friable miscellaneous material Good condition	Hallway 254 : Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - High Quantity - 15 Linear Ft. Potential for damage. Do not disturb or abrade surfaces Total Quantity - 25 Linear Ft.
Assumed ACBM same as above sample	Chrysotile	20	None	Non-friable miscellaneous material Good condition	Classroom 134: Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 5 Linear Ft. Potential for damage. Do not disturb or abrade surfaces. Total Quantity - 25 Linear Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

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N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

ASSESSMENT OF MATERIALS

HOMOGENEOUS AREA(S): (M-1) Exhaust pipe for fume hood. 12 inch exhaust pipe. Non-friable miscellaneous material. Hallways 254 and 166; Classroom 134.

Sample ID	Asbestos		Photo	Assessment	Comments
	Type	%			
Assumed ACBM same as sample WCH05168BIMN-047	Chrysotile	20	None	Non-friable miscellaneous material Good condition	Hallway 166 : Damaged Area - 0% Deterioration - None noted Impact Damage - None noted Water Damage - None noted Accessibility - Medium Quantity - 5 Linear Ft. Potential for damage. Do not disturb or abrade surfaces Total Guantity - 25 Linear Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3542 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

School: West Carteret High School

Building: Main Building

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/15/88	Sample ID: WCH051588TMN-001 Classroom 231, S.E. corner of room	(C-1) - White sprayed on ceiling material Total Quantity - 3,746 Sq. Ft. Quantity - 729 Sq. Ft. (Classroom 231)
05/15/88	Sample ID: WCH051588TMN-002 Classroom 231, center of room	(C-1) - White sprayed on ceiling material Quantity - 729 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-003 Classroom 231, S.W. corner	(C-1) - White sprayed on ceiling material Quantity - 729 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-004 Classroom 235, above window	(C-1) - White sprayed on ceiling material Quantity - 628 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-005 Classroom 235, center or room at divider wall	(C-1) - White sprayed on ceiling material Quantity - 628 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-006 Classroom 234, N.W. corner of room	(C-1) - White sprayed on ceiling material Quantity - 399 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-007 Classroom 234, N.E. corner of room	(C-1) - White sprayed on ceiling material Quantity - 399 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/15/88	Sample ID: WCH051588TMN-008 Hallway 254, above light	(C-1) - White sprayed on ceiling material Quantity - 360 Sq. Ft. Total Quantity - 3,746 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/15/88	Sample ID: WCH051588TMN-009 Above entry door to room 235 from Hallway 254	(C-1) - White sprayed on ceiling material Quantity - 360 Sq. Ft. Total Quantity - 3, 746 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10280 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

School: West Carteret High School

Building: C6

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-010 Storage Area 164, N.W. corner of room	(C-5) - 2 x 4 ceiling tile with small holes Quantity - 40 Sq. Ft. Total Quantity - 5,467
05/16/88	Sample ID: WCH051688TMN-011 Classroom 160, S.E. corner	(FT-18) - Floor tile, 12 x 12 inch square. Bone, grey and blue grey Quantity - 1, 035 Sq. Ft. Total Quantity 2,547 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-012 Classroom 161, North center of room	(FT-19) - Floor tile - light brown with dark brown mottles Quantity - 864 Sq. Ft. Total Quantity - 1,728 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos In Buildings Program

School: West Carteret High School

Building: T-4

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-013 Classroom T-24, N.W. in front of door room	(FT-24) - Floor tile - bone, tan and blue Quantity - 768 Sq. Ft. Total Quantity - 768 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-014 Classroom T-4, N.E. corner above light	(C-7) - 12 x 12 inch square ceiling tiles. White, medium texture Quantity - 768 Sq. Ft. Total Quantity - 768 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-015 Classroom 142, center of east wall	(C-1) - White, sprayed on ceiling material Quantity - 828 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-016 Classroom 142, S.E. corner	(C-1) - White, sprayed on ceiling material Quantity - 828 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-017 Classroom 142, N.W. wall	(C-1) - White, sprayed on ceiling material Quantity - 828 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-018 Classroom 133, N.E. corner	(C-1) - White, sprayed on ceiling material Quantity - 702 Sq. Ft. Total Quantity 3,746 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-019 Classroom 133, S.W. corner	(C-1) - White, sprayed on ceiling material Quantity - 702 Sq. Ft. Total Quantity - 3,746 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-020 Classroom 215, doorway	(FT-1) - Floor tile - 9 x 9, bone with tan streaks Quantity - 768 Sq. Ft. Total Quantity - 8,209 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-021 Classroom 213, doorway	(FT-2) - Floor tile - 12 x 12, light grey, blue grey with white mottles Quantity - 768 Sq. Ft. Total Quantity - 14,266 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-022 Classroom 211, doorway	(FT-3) - Floor tile - 9 x 9, white with tan mottles Quantity - 768 Sq. Ft. Total Quantity - 768 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-023 Classroom 210, doorway	(FT-4) - Floor tile, 9 x 9, light grey w/blue green mottles Quantity - 768 Sq. Ft. Total Quantity - 1,320 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-024 Classroom 207, doorway	(FT-5) - Floor tile, 9 x 9, white w/olive green streaks Quantity - 216 Sq. Ft. Total Quantity - 8,435 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-025 Hallway 231, upstairs at doorway of Classroom 205	(FT-8) - Floor tile, 9 x 9, dark grey w/thick white mottling Quantity - 2,652 Sq. Ft. Total Quantity - 2,652 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-026 Hallway 231, at doorway of Room 204	(FT-6) - Floor tile, 9 x 9, battleship grey w/white streaks Quantity - 1,088 Sq. Ft. Total Quantity - 25,284 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-027 Hallway 231, E. end of hall under water fountain	(FT-9) - Floor tile, 9 x 9, blue w/white slivers Quantity - 12 Sq. Ft. Total Quantity - 30 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-028 Hallway 228, on stairs at E. end	(FT-10) - Floor tile - 12 x 12, grey, white and tan mottles Quantity - 10 Sq. Ft. Total Quantity - 110 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-029 Hallway 228, S. side top of stairwell	(FT-11) - Floor tile - 12 x 12, medium grey w/white streaks Quantity - 90 Sq. Ft. Total Quantity - 1,396 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-030 Hallway 220, W. end on stairs	(FT-12) - Floor tile - 12 x 12, cream w/white and black slivers Quantity - 90 Sq. Ft. Total Quantity - 350 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-031 Hallway 254, at E. end	(FT-13) - Floor tile, 12 x 12, deep blue w/ white streaks Quantity - 266 Sq. Ft. Total Quantity - 266 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-032 Library 247, S.W. corner	(FT-15) - Floor tile, 9 x 9, blue grey w/ large white mottles Quantity - 3,530 Sq. Ft. Total Quantity - 3,538
05/16/88	Sample ID: WCH051688TMN-033 Stage 242, right side	(FT-17) - Floor tile, 9 x 9, brown w/white and red streaks Quantity - 700 Sq. Ft. Total Quantity - 700 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-034 Cafeteria 236, E. side near cooler	(FT-16) - Floor tile, light tan w/dark brown and white mottles Quantity - 4,160 Sq. Ft. Total Quantity - 4,880 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-035 Kitchen 237, W. side above door	(TO-1) - Troweled on plaster on brown coat painted yellow Quantity - 1, 462 Sq. Ft. Total Quantity - 2,127 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-036 Kitchen 237, N.W. corner	(TO-1) - Troweled on plaster on brown coat painted yellow Quantity - 1,462 Sq. Ft. Total Quantity - 2,127 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-037 Kitchen 237, east side above back door	(TO-1) - Troweled on plaster on brown coat painted yellow Quantity - 1,462 Sq. Ft. Total Quantity - 2,127 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-038 Kitchen 237, N.E. corner	(TO-1) - Troweled on plaster on brown coat painted yellow Quantity - 1,462 Sq. Ft. Total Quantity - 2,127 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-039 Bathroom 84, S.W. end near light	(TO-2) - White troweled on plaster painted white Quantity - 50 Sq. Ft. Total Quantity - 798 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-040 Storage Area 147, above S.W. entrance	(TO-2) - White troweled on plaster painted white Quantity - 36 Sq. Ft. Total Quantity - 798 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-041 Bathroom 136, along center N. wall	(TO-2) - White troweled on plaster painted white Quantity - 120 Sq. Ft. Total Quantity - 798 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-042 Bathroom 121, above entrance N.E.	(TO-2) - White troweled on plaster painted white Quantity - 100 Sq. Ft. Total Quantity - 798 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-043 Bathroom 31, S.E. wall center	(TO-2) - White troweled on plaster painted white Quantity - 55 Sq. Ft. Total Quantity - 798 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-044 Office 103, south center	(C-2) - Ceiling tile, white with indentations Quantity - 150 Sq. Ft. Total Quantity - 2,343 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-045 Classroom 246, southside of door	(C-3) - Suspended acoustical ceiling tile with staggered indentations Quantity - 642 Sq. Ft. Total Quantity - 1,402 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-046 Classroom 206, west side of door	(FT-7) - Floor tile, white w/tan streaks and dark brown mottles Quantity - 768 Sq. Ft. Total Quantity - 768 Sq. Ft.

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
05/16/88	Sample ID: WCH051688TMN-047 Hallway 254, base of pipe	(M-1) - 12 inch exhaust pipe for fume hood Quantity - 15 Linear Ft. Total Quantity - 25 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-048 Classroom 118, S.W. corner	(FT-14) - Floor tile, light gray with small mottles and streaks Quantity - 150 Sq. Ft. Total Quantity - 886 Sq. Ft.
05/16/88	Sample ID: WCH051688TMN-049 Quality Control sample. Same as sample 020.	(FT-1) - same as sample 020
05/16/88	Sample ID: WCH051688TMN-042 Quality Control sample. Same as sample 050.	(TO-1) - same as sample 040

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 9/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
03/25/87	Sample ID: WCH032587TMN-001 Main Entrance, 2nd elbow from steam loop	(TSI-1) - Pipe fitting insulation - gray friable material Wrapped in canvas Quantity - Unknown
03/25/87	Sample ID: WCH032587TMN-002 Main Entrance, steam loop	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-003 Main Entrance, condensate elbow	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-004 South hall outside room 111, inner elbow	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-005 West end of hall 142, elbow leading to steam riser	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-006 North hall 142, elbow leading into ceiling	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-007 Corner of hall 142 and 260, water valve	(TSI-1) - same as above

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Carteret County Board of Education

N. C. Department of Human Resources
Division of Human Resources
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample		
Date	Location (see Floor Plans for details)	Discussion
03/25/87	Sample ID: WCH032587TMN-008 East gynm door in hall 260, elbow leading to valve nearest door	(TSI-1) - Pipe fitting insulation - gray friable material Wrapped in canvas Quantity - Unknown
03/25/87	Sample ID: WCH032587TMN-009 Hall 206, West of door to walk way beside gym, elbow leading to radiator	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-010 In hall outside room 157, elbow of large steam line	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-011 In hall outside room 157, elbow of small line	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-012 West of intersection of hall 166 and 142, steam loop elbow west of valve	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-013 West of intersection of hall 161 and 142, steam loop elbow west of valve	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-014 Hall outside east door of room 127, elbow of small pipe	(TSI-1) - same as above

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

Georgia Department of Human Resources
Division of Public Health
Asbestos in Buildings Program

[illegible] West [illegible] High School
Building: Main Building

DESCRIPTION OF EACH

SAMPLE AREA

Each Sample

Date	Location (see Floor Plans for details)	Discussion
03/25/87	Sample ID: WCH032587TMN-023 South East corner of cafeteria, steam elbow leading to radiator	(TSI-1) - Pipe fitting insulation - gray friable material Wrapped in canvas Quantity - Unknown
03/25/87	Sample ID: WCH032587TMN-024 South West corner of cafeteria, elbow nearest door	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-026 Hall 181 outside room 148, condensate elbow	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-027 South east door of gym, smallest elbow	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-028 North east corner of boiler room, elbow leading into pump	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-029 Electrical room, elbow of water line nearest door	(TSI-1) - same as above
03/25/87	Sample ID: WCH032587TMN-030 Electrical room, water line valve	(TSI-1) - same as above

Inspector

Typed Name: Todd M. Nance **Signature:** Todd M Nance **Date:** 8/4/88

Accreditation Number: 10099 **Agency:** Georgia Institute of Technology, Education Extension Services

DHS 3540 (1/88)
Occupational Health Branch (Review 1/89)

FLOOR PLANS

LEGEND

Below are some of the symbols used on floor plans and other drawings that represent key areas.

Sample number and location

008 Room number

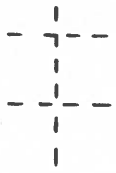
FT-2 Homogeneous area for floor tile

C-1 Homogeneous area for ceiling material

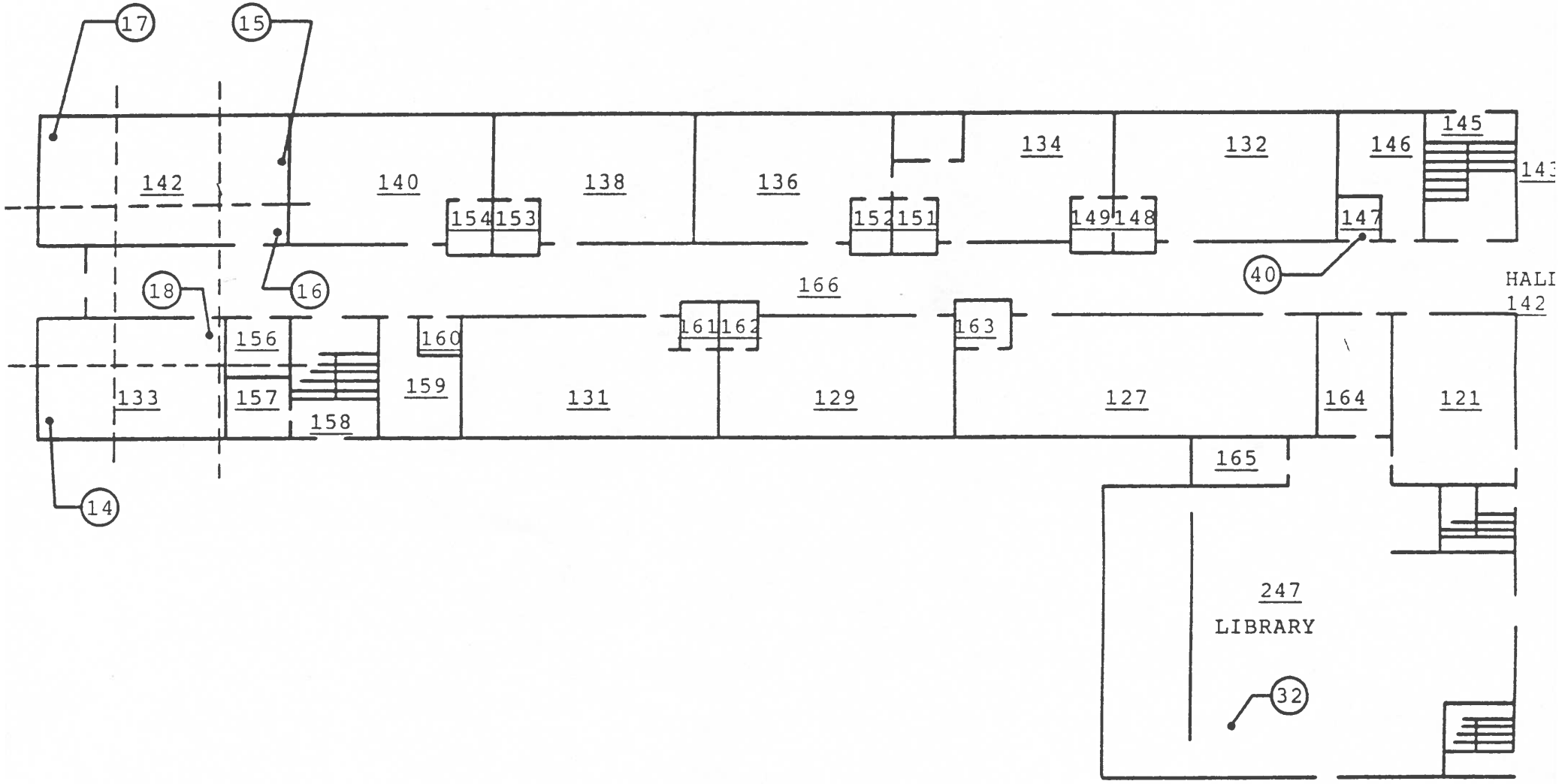
M-2 Homogeneous area miscellaneous material

DW-2 Homogeneous area for drywall material

TO-1 Homogeneous area for troweled on surfacing material



Random sampling grid



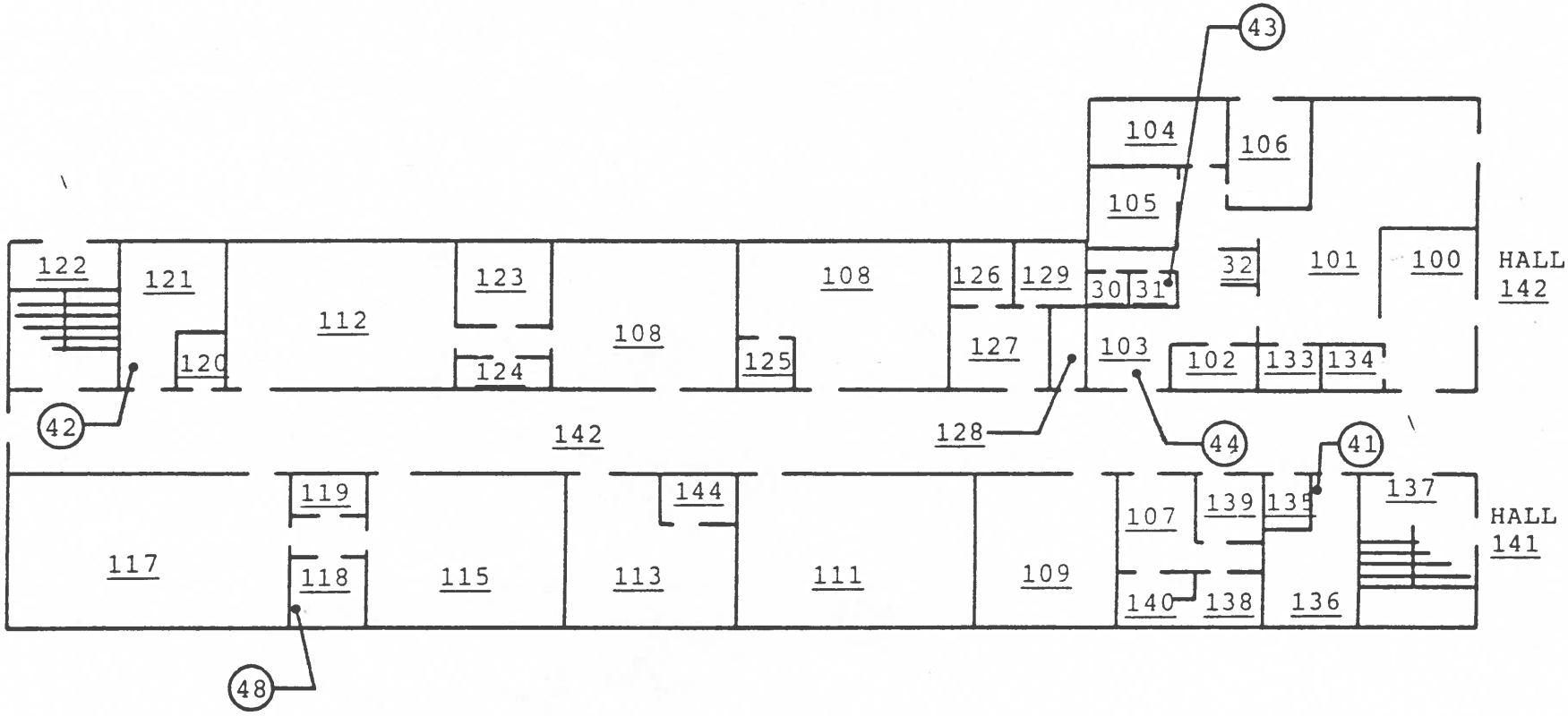
WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 03

SAMPLE LOCATIONS

RANDOM SAMPLING SCHEME C-1

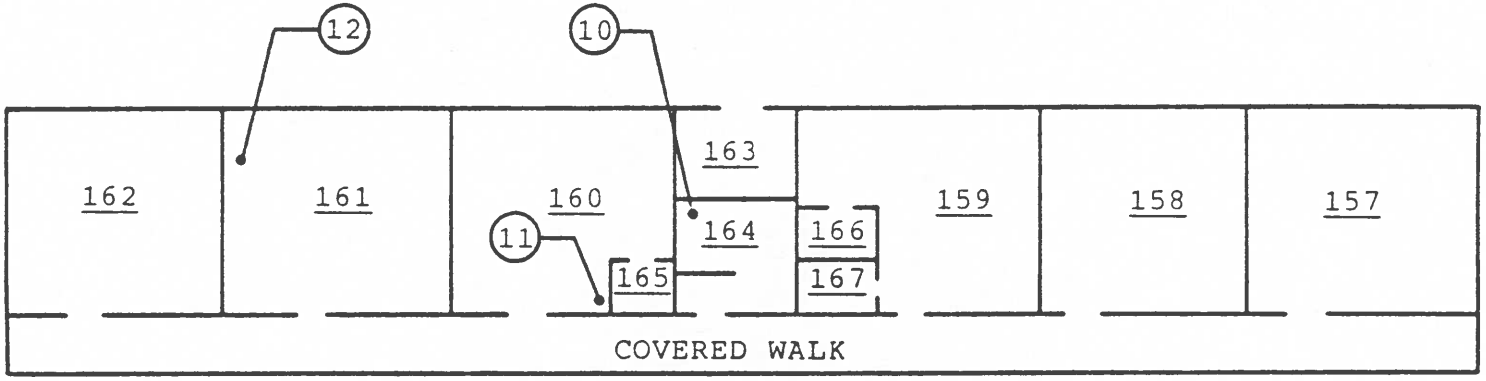


WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 04

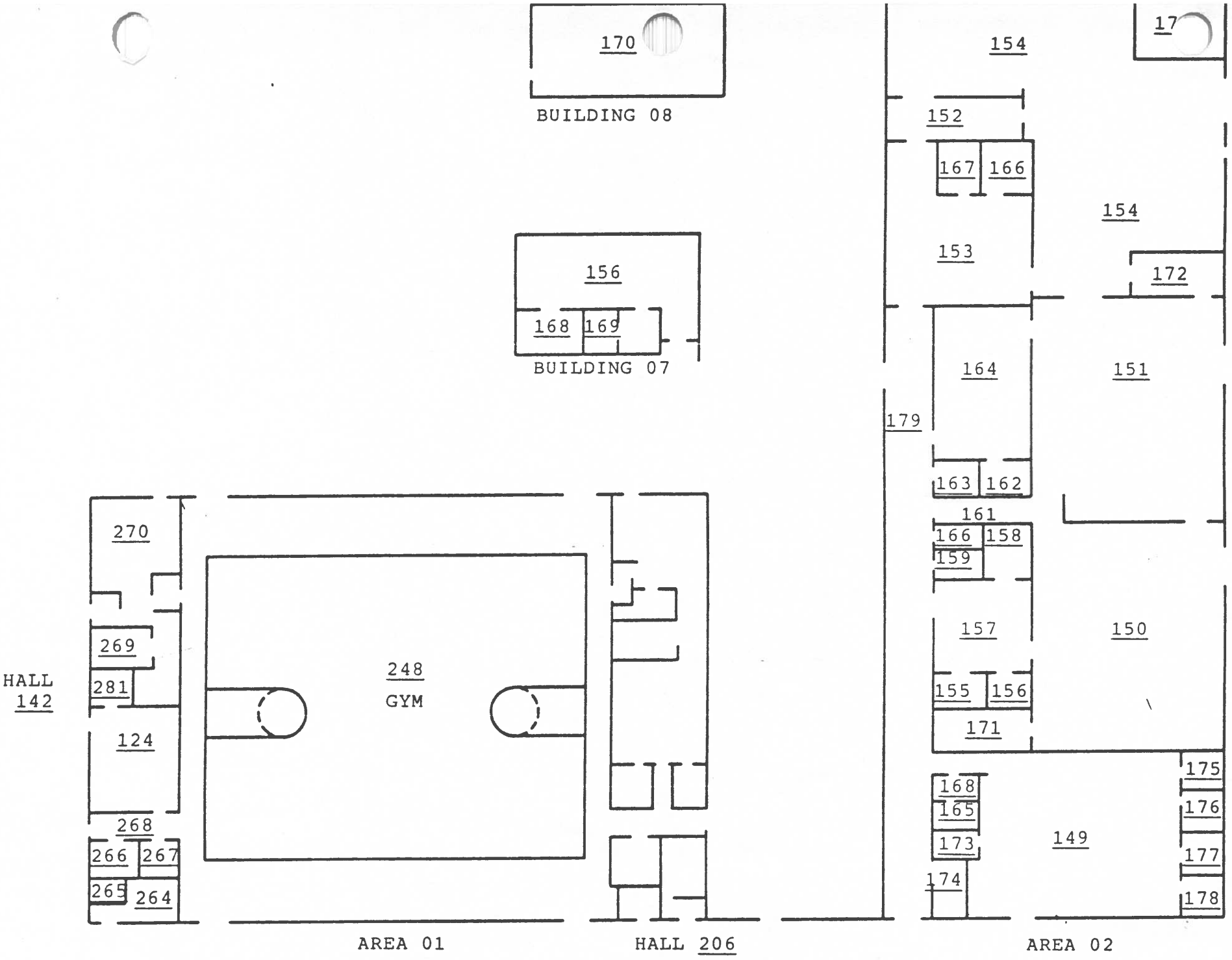
SAMPLE LOCATIONS



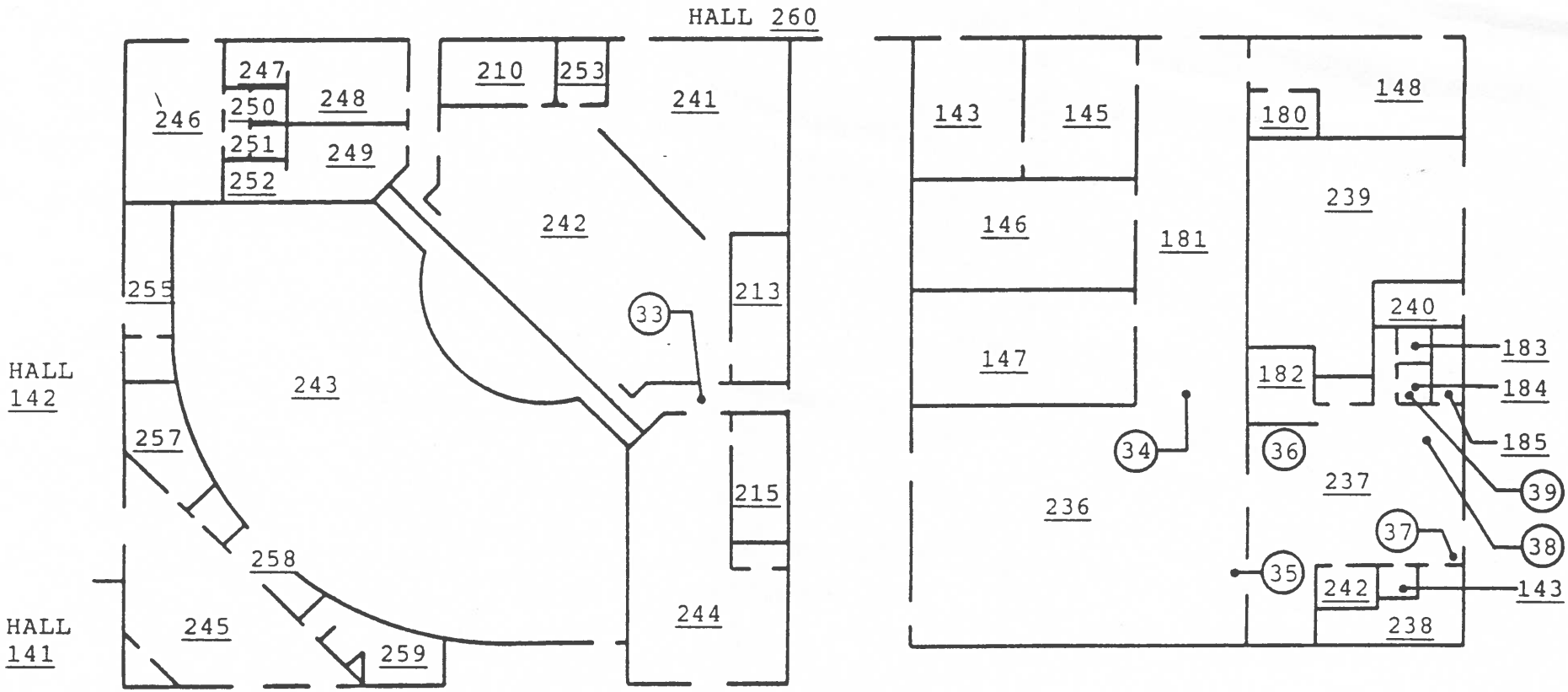
WEST CARTERET HIGH SCHOOL

BUILDING - 06

SAMPLE LOCATIONS



WEST CARTERET HIGH SCHOOL
MAIN BUILDING

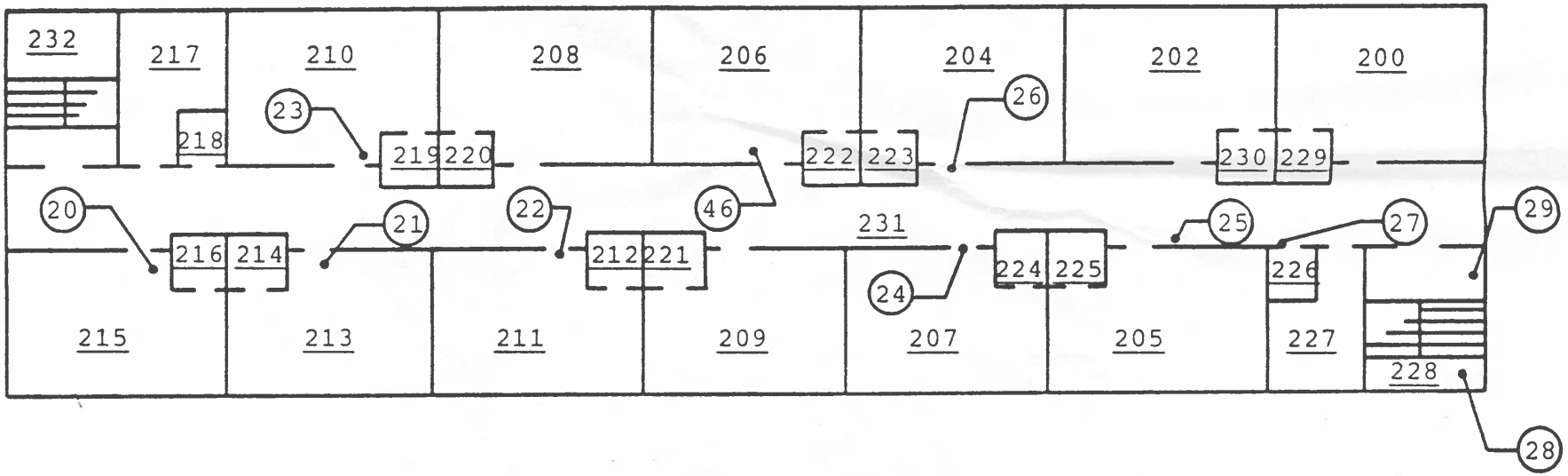


AREA - 00

WEST CARTERET HIGH SCHOOL

MAIN BUILDING

SAMPLE LOCATIONS

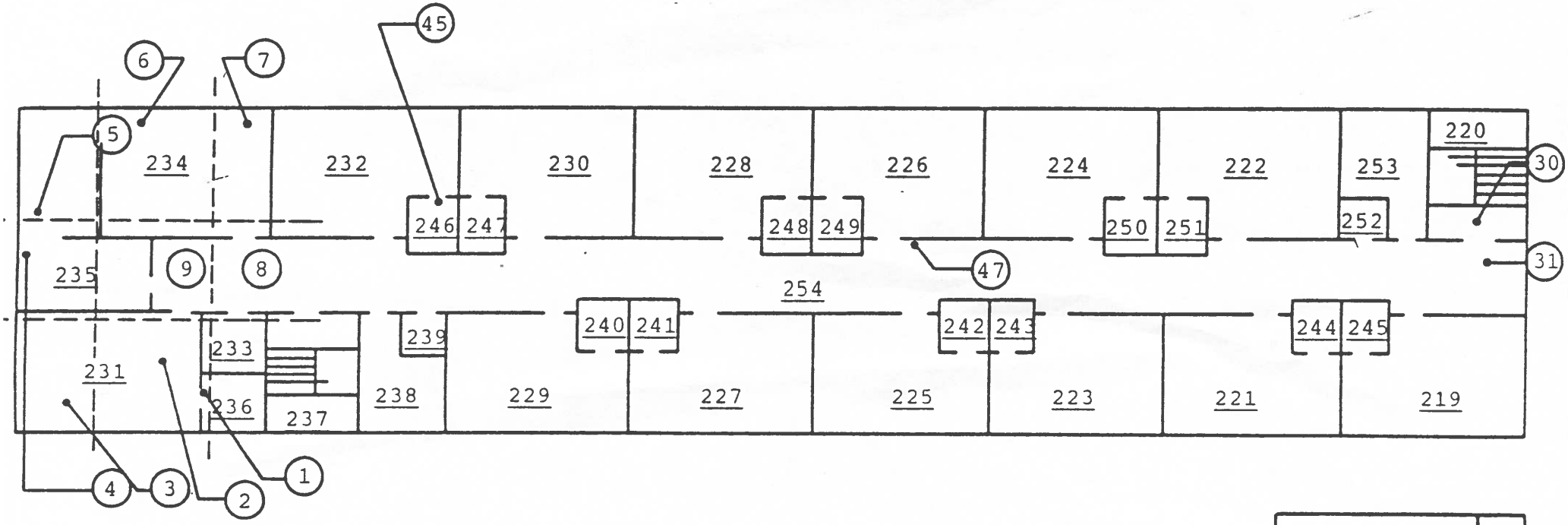


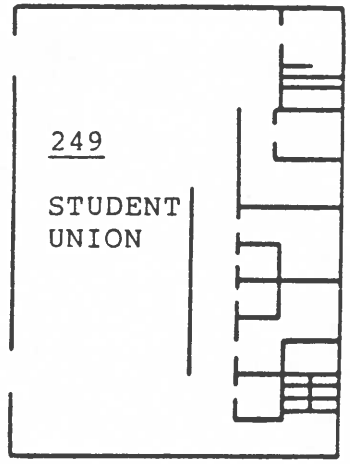
WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 05

SAMPLE LOCATIONS





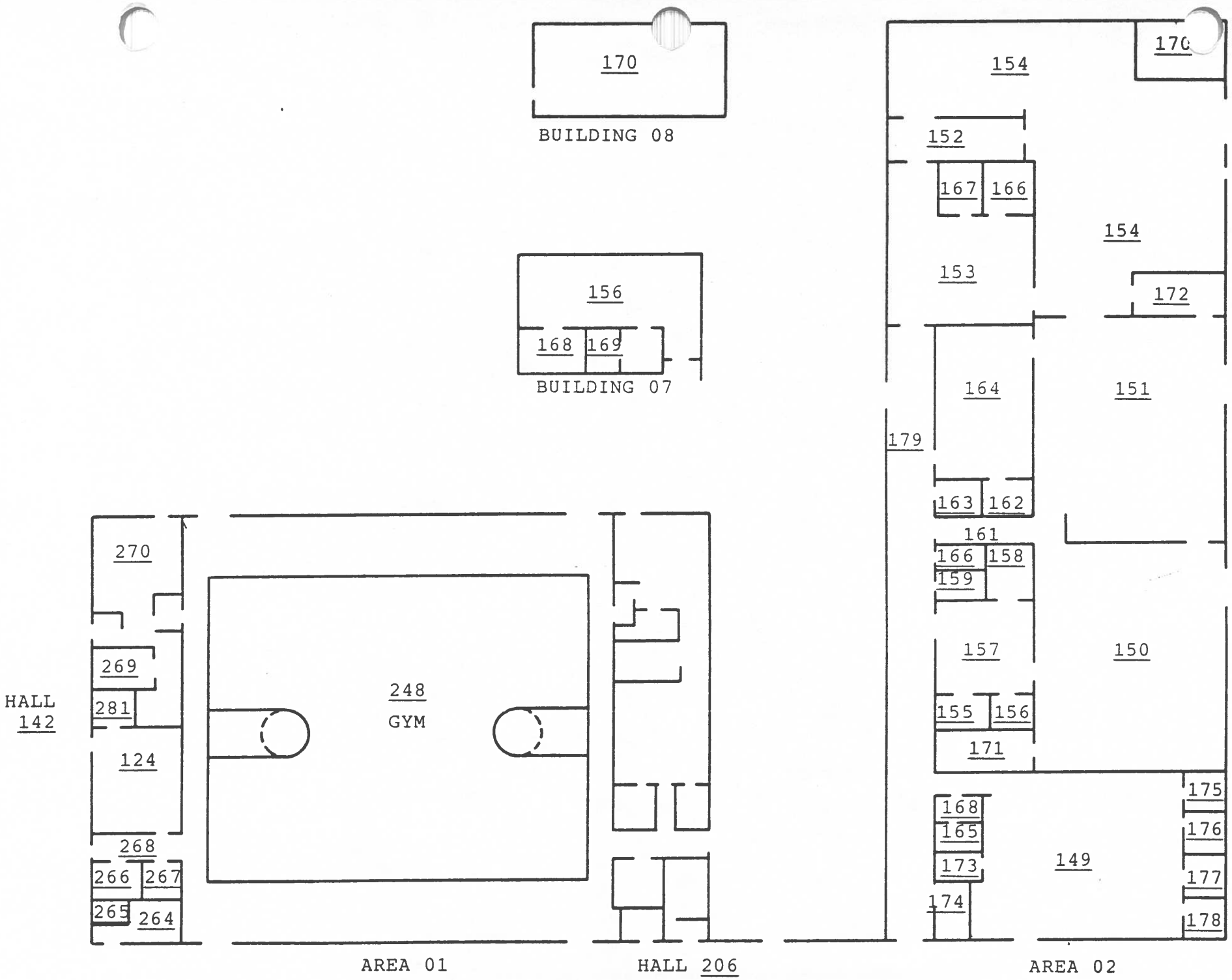
WEST CARTERET HIGH SCHOOL

MAIN BUILDING

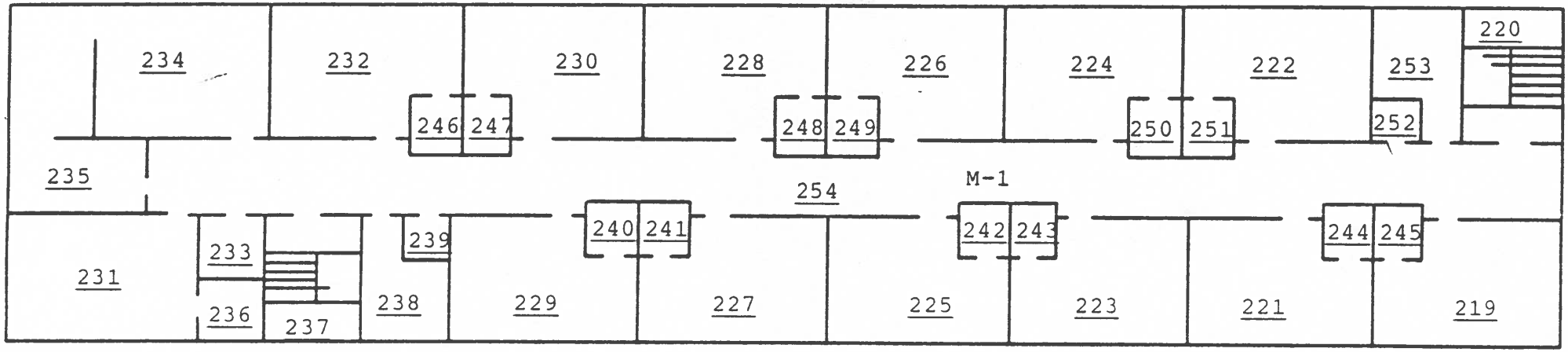
AREA 05

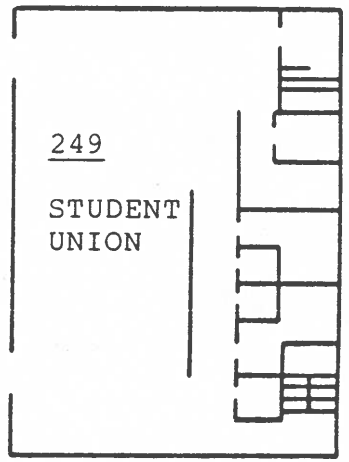
SAMPLE LOCATIONS

RANDOM SAMPLING SCHEME C-1



WEST CARTERET HIGH SCHOOL
MAIN BUILDING - NO ACBM FOUND



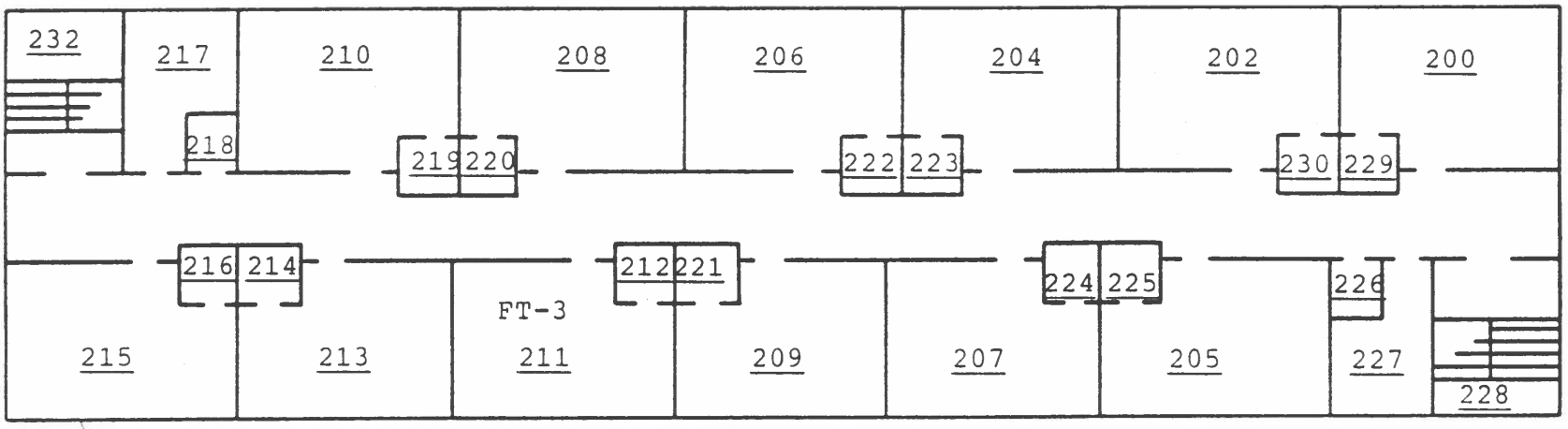


WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 05

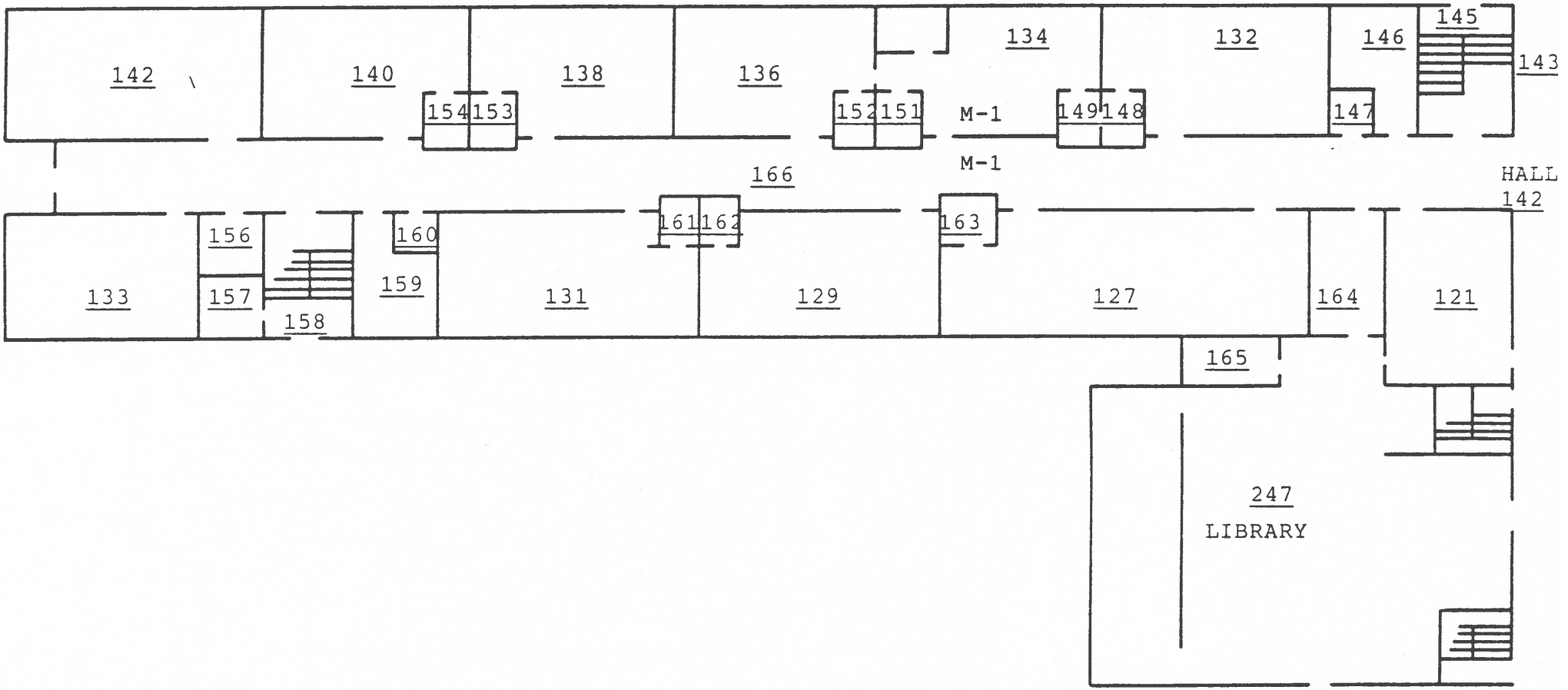
ACBM LOCATIONS



WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 05
ACBM LOCATIONS

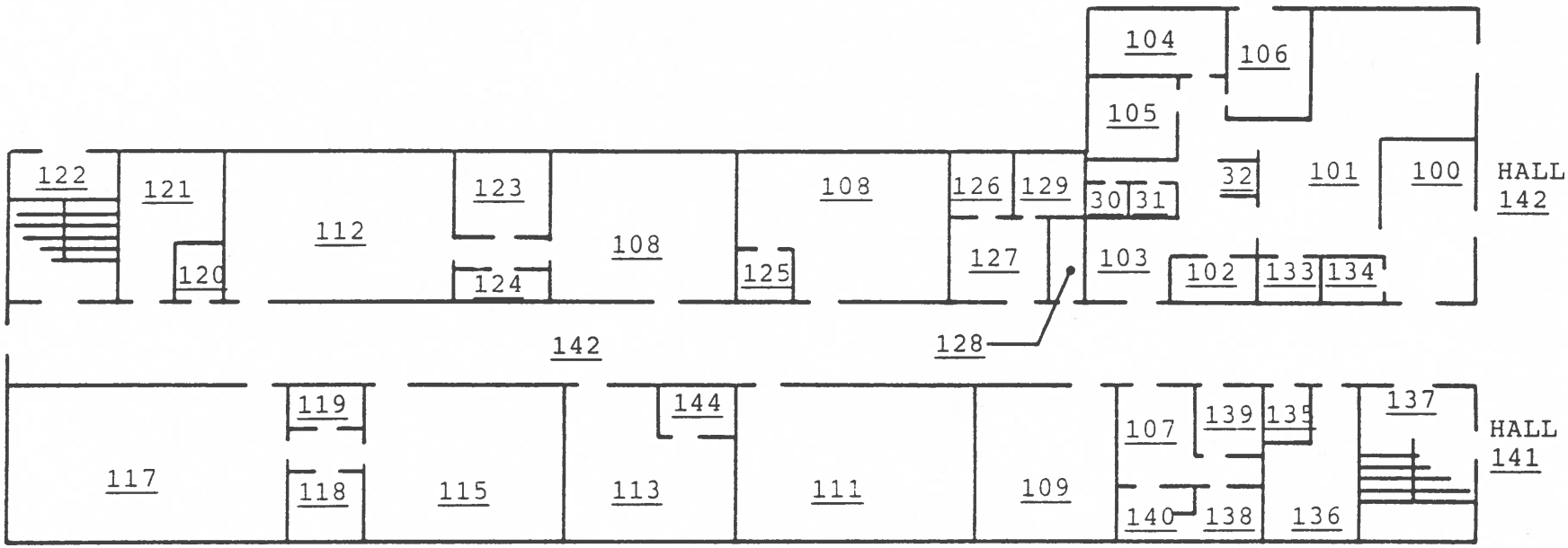


WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 03

ACBM LOCATIONS

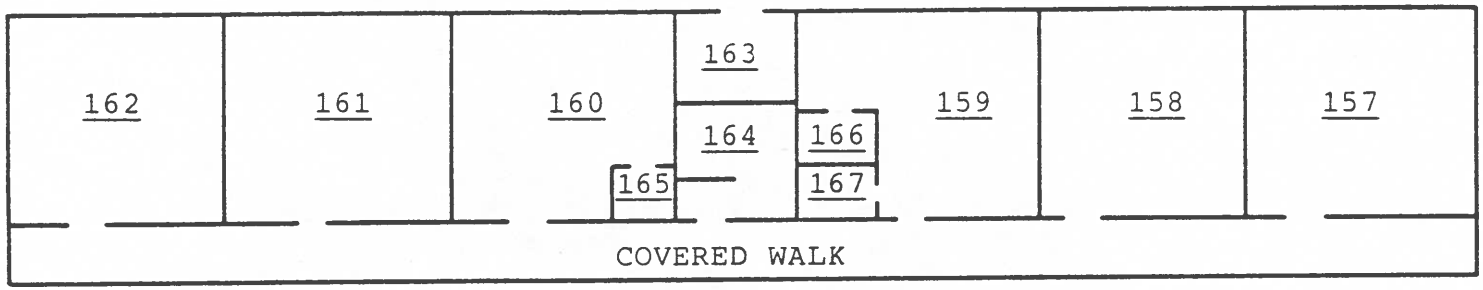


WEST CARTERET HIGH SCHOOL

MAIN BUILDING

AREA 04

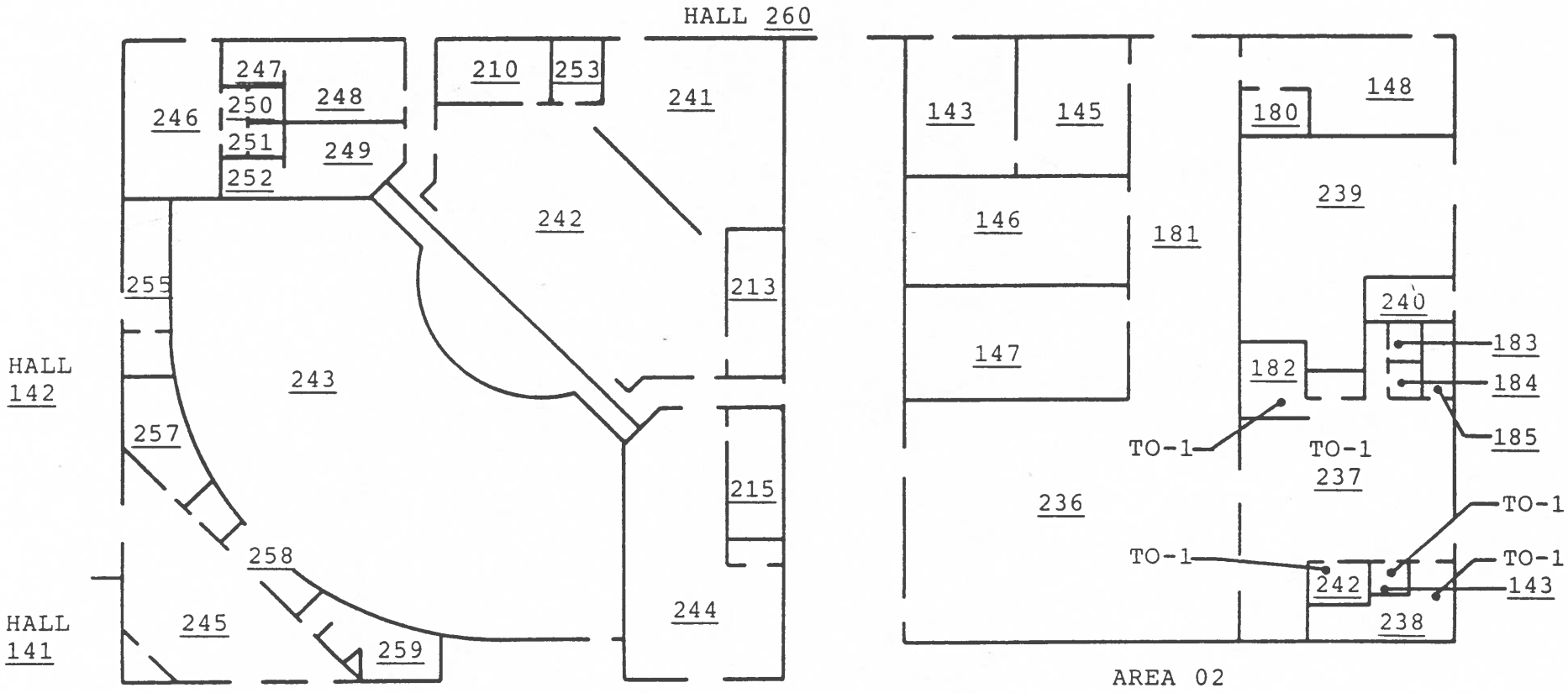
NO ACBM FOUND



WEST CARTERET HIGH SCHOOL

BUILDING - 06

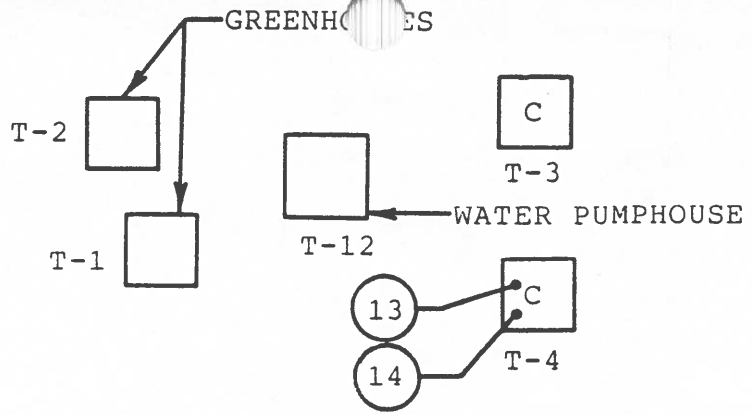
NO ACBM FOUND

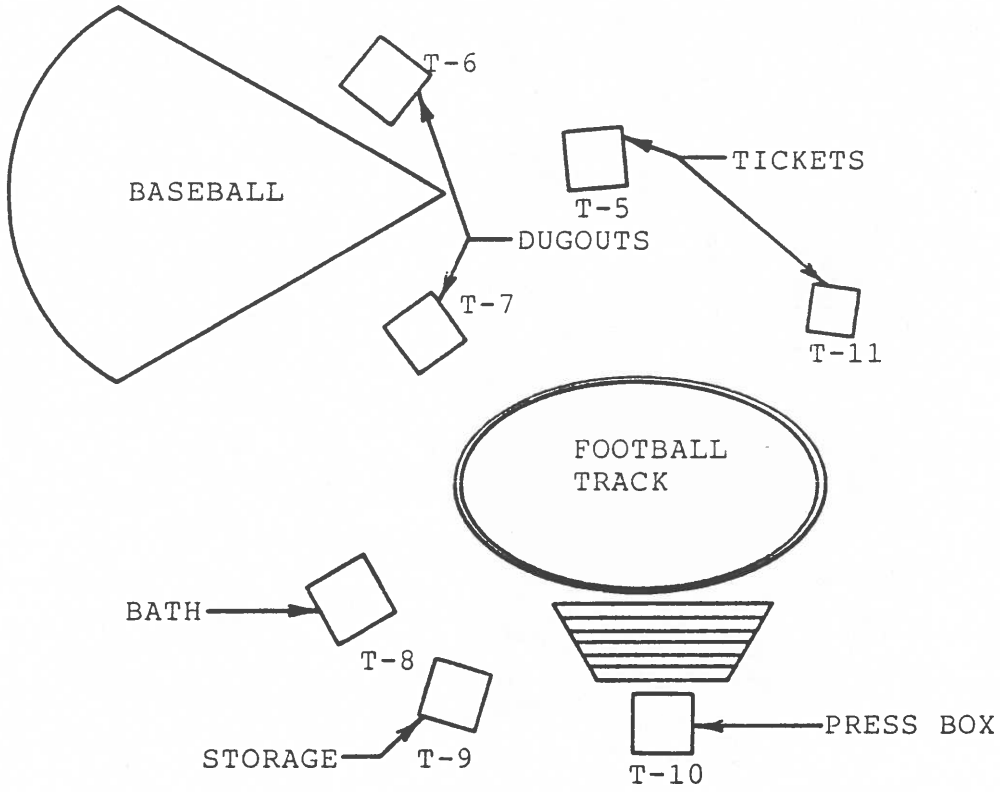


WEST CARTERET HIGH SCHOOL

MAIN BUILDING

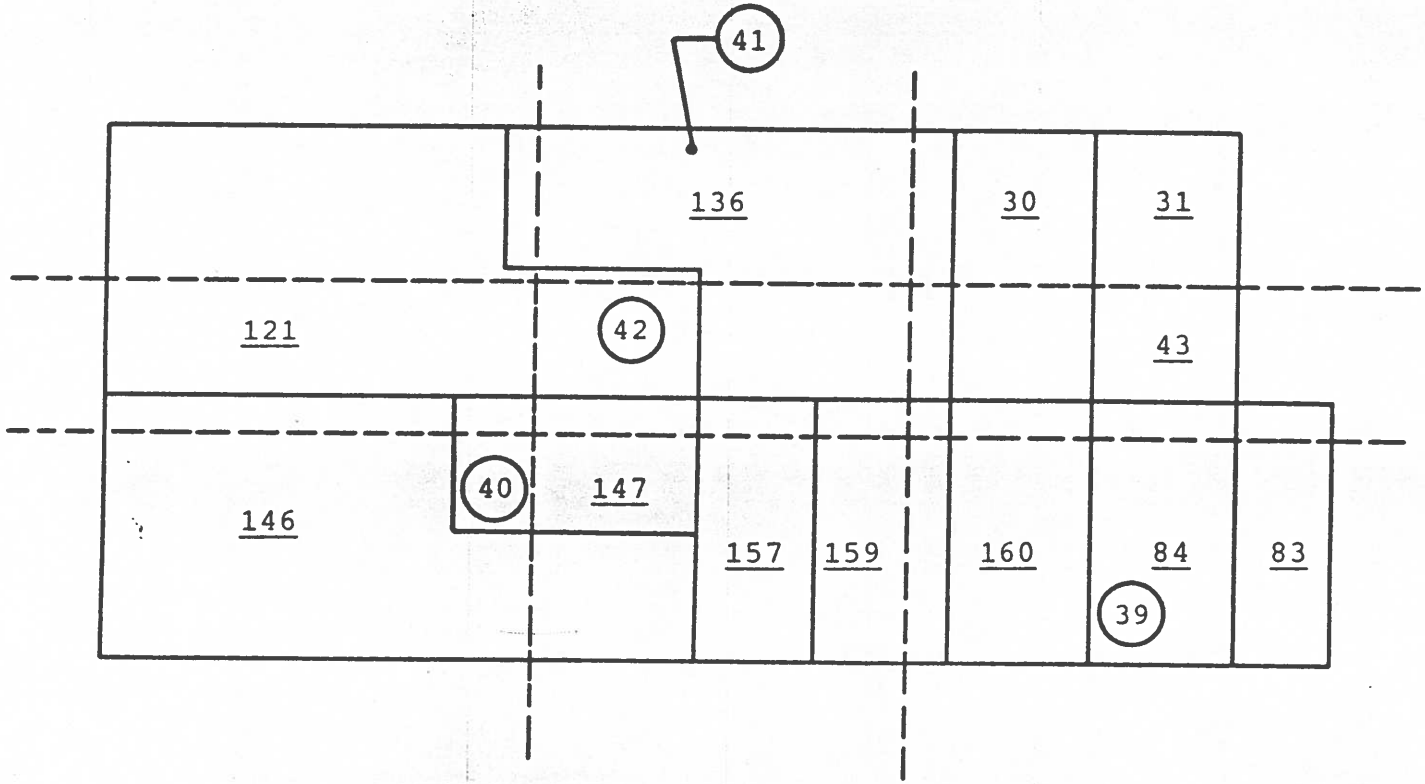
ACBM LOCATIONS





OUT BUILDING

SAMPLE LOCATIONS



WEST CARTERET HIGH SCHOOL
RANDOM SAMPLING SCHEME
TO-2

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
C-1	Spray on ceiling material - white spray on stippled material
TO-1	Troweled on plaster on brown coat painted yellow
TO-2	Troweled on plaster painted white

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 9/4/87

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
C-2	Ceiling tile - 2 x 4, white with indentations
C-3	Suspended ceiling tile - 2 x 2, acoustical, with staggered indentations
FT-1	Floor tile - 9 x 9, bone with small tan streaks
FT-2	Floor tile - 12 x 12, light grey, blue grey and white mottles
FT-3	Floor tile - 9 x 9, white with tan mottles
FT-4	Floor tile - 9 x 9, light grey with blue green mottles
FT-5	Floor tile - 9 x 9, white with olive green streaks
FT-6	Floor tile - 9 x 9, battleship grey with white streaks
FT-7	Floor tile - 9 x 9, white with tan streaks and dark brown mottles
FT-8	Floor tile - 9 x 9, dark grey with thick white mottling
FT-9	Floor tile - 9 x 9, blue with white slivers
FT-10	Floor tile - 12 x 12, grey white and tan mottles
FT-11	Floor tile - 12 x 12, medium grey with white streaks
FT-12	Floor tile - 12 x 12, Cream with white and black slivers
FT-13	Floor tile - 12 x 12, Deep blue with white streaks

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FT-14	Floor tile - 9 x 9, light grey with very small mottles and streaks
FT-15	Floor tile - 9 x 9, bluish grey with large white mottles
FT-16	Floor tile - light tan with dark brown and white mottles
FT-17	Floor tile - 9 x 9, brown with white and red streaks
M-1	Exhaust pipe for fume hood, 12 inch

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: Main Building

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
TSI-1	Pipe fitting insulation, grey friable material wrapped in canvas

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Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 06

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/24/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 06

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
C-4	Ceiling tile - 2 x 4, transite panels, white with 3/8" holes
FT-19	Floor tile - light brown with dark brown and white mottles
FT-18	Floor tile - 12 x 12, bone, light gray, and blue gray
C-5	Ceiling tile - 2 x 4, suspended tile with small holes

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 06

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 07

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 07

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FT-20	Floor tile - light brown with dark brown and white mottles

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Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 07

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 08

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 08

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: 08

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-1

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-1

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FT-21	Floor tile - 12 x 12, bone, light gray, and blue gray

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-1

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least thr randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EAC SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-2

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document "Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
No data	

Inspector

Typed Name: Todd M Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10028 Address: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-2

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FI-02	Floor tile - [illegible] bone, light gray and blue gray

Inspector

Typed Name: Todd M. Nance

Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC 10032

Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-2

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-3

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

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DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-3

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FT-23	Floor tile - 12 x 12, bone, tan, and blue
C-6	Ceiling tile - 12 x 12, white with medium texture

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-3

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/14/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-4

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/14/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-4

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
FT-24	Floor tile - 12 x 12, bone, tan, and blue
C-7	Ceiling tile - 12 x 12, white with medium texture

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-4

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-5

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-5

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-5

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least thr randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EAC SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-6

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included material which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample location were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-6

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-6

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sufficient to verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam [illegible] rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	[illegible] ACBM

Inspector

Typed Name: Todd M. Nance

Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC 10020 Company: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-7

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included material which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACM) were sampled at least once for verification. For each homogeneous suspect ACM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the area section grid and the random sampling scheme as recommended in the USEPA document "Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance

Signature: [illegible] Date: 8/4/88

Accreditation Number: NC 10093

Firm: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-7

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, were unlikely to consist of more than one type or formulation of material. Each homogeneous sampling area was assigned a unique identification number. Current miscellaneous ACBM, such as [illegible] floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the current miscellaneous ACBM identified in this building. See SECTION II DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for detailed sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
No ACBM	

Inspector

Typed Name: Todd M. Nance

Signature: Todd M Nance Date: 8/4/88

Accreditation Number: MI 10003 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-7

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once unless for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam polystyrene, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: AE 10022 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-8

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included material which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document "Asbestos in Buildings: Simplified Sampling Scheme for Friable Surfacing Materials (EPA 560/5-85-030a)."

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance | Signature: Todd M. Nance | Date: 8/4/88

Accreditation Number: NC 10093 | Company: Georgia Institute of Technology, Educational Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-9

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, a were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at leas once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance

Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC 10022

Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-8

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-9

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-9

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surface miscellaneous ACBM, such as acoustic, floor tiles, and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC [illegible] Employer: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-9

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once per identification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II, DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS for exact sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	NO ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: MC 10092 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Revised 1/88)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-10

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-10

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect miscellaneous asbestos containing materials (ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Suspect miscellaneous ACBM, such as transite, floor tiles and linoleum were sampled at least once sample for verification.

The following is a list of the suspect miscellaneous ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 2/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technolcgy, Education Extension Services

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-10

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once sample for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least thr randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EAC SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-11

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in texture, color and appearance, were installed at one time, and were unlikely to consist of more than one type, or formulation, of material. Each homogeneous sampling area was assigned a unique identification number. Surfacing materials assumed to be asbestos containing material (ACBM) were sampled at least once for verification. For each homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized subareas. When the collection of nine samples is feasible, sample locations were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, the minimum number of samples and their locations were selected using the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: Simplified Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	No ACBM

Inspector

Typed Name: Todd M. Nance Signature: Todd M Nance Date: 8/4/88

Accreditation Number: NC 10099 Agency: Georgia Institute of Technology, Education Extension Services

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

LEA: Craven County Board of Education

School: West Carteret High School

Building: I-II

DETERMINATION OF

SAMPLING LOCATIONS

DESCRIPTION OF EACH SAMPLE AREA:

All suspect miscellaneous [illegible] materials were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared [illegible] and appearance, were installed at one tim were unlikely to consist of more than one type, or formulation of material. Each homogeneous sampling area was assign unique identification number. [illegible] miscellaneous area, such as [illegible] floor tiles and linoleum were sampled at once sample for verification.

The following is a list of the [illegible] miscellaneous [illegible] in this building. See SECTION II. DESCRIPTION OF SAMPLING AREA and FLOOR PLAN, for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS MATERIAL
No ACBM	

Inspector

Typed Name: Todd M. Nance

Signature: Todd Nance Date: 8/4/88

Accreditation Number: NC 10099

Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review [illegible])

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-11

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification c homogeneous areas was based on the type of system insulated, uniformity of texture, color and appearance, and time of installation. Each homogeneous sampling area was then assigned a unique identification number. Thermal insulation assu to be ACBM was sampled at least [illegible] sample for verification. No samples were collected for materials known to contain asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II, DESCRIPTION OF SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	No ACBM

Inspector

Typed Name: Todd M. Nance   Signature: Todd M. Nance   Date: 8/4/88

Accreditation Number: NC 10099   Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review [illegible])

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: T-12

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

All suspect surfacing materials were identified and grouped into homogeneous areas. The homogeneous areas included mater[ial] which appeared uniform in texture, color and appearance, were installed at one time and were unlikely to consist of more than one type, or formulation, [illegible]. Each homogeneous [illegible] area was assigned a unique identification number. Surfacing materials assumed to be [illegible] containing material [illegible] were sampled at least once for verification. For a homogeneous suspect ACBM, a sampling area sketch was prepared showing all surfaces on one diagram. Each sampling area diagram was then divided into nine equally sized [illegible]. When the collection of nine samples is feasible, sample locat[ions] were distributed evenly over the homogeneous sampling area. In areas where this was not feasible, or cost prohibitive, t[he] minimum number of samples and their locations were selected [illegible] the nine section grid and the random sampling scheme as recommended in the USEPA document, Asbestos in Buildings: [illegible] Scheme for Friable Surfacing Materials (EPA 560/5-85-030a).

The following is a list of the homogeneous surfacing materials identified in this building. See SECTION II, DESCRIPTION [OF] EACH SAMPLING AREA and FLOOR PLANS for details of sample locations.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT SURFACING MATERIALS
	NO ACBM

Inspector

Typed Name: Todd M. Nance	Signature: Todd M. Nance Date: 8/4/88
Accreditation Number: NC 10099	Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review [illegible])

LEA: Craven County Board of Education

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

School: West Carteret High School

Building: I-12

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA

All suspect miscellaneous sprayed or trowelled surfacing materials (friable ACBM) were identified and grouped into homogeneous areas. The homogeneous areas included materials which appeared uniform in color, texture and appearance, were installed at one time, were unlikely to consist of more than one type of formulation. A separate each homogeneous sampling area was assigned unique identification number. Suspect miscellaneous ACBM such as ceramic floor tiles and linoleum were sampled at le once sample for verification.

The following is a list of the suspect miscellaneous ACBM found in the building. See SECTION II. DESCRIPTION OF EA SAMPLING AREA and FLOOR PLANS for details of sample location.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT MISCELLANEOUS MATERIAL
No ACBM	

Inspector

Typed Name: Todd M. Nance

Signature: Todd M Nance

Date: 8/4/88

Accreditation Number: NC 10099

Agency: Georgia Institute of Technology, Education Extension Services

DHS 3535 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos in Buildings Program

LEA: Craven County Board of Education

School: West Carteret High School

Building: T-12

DETERMINATION OF

SAMPLING LOCATIONS

DISCUSSION OF EACH SAMPLE AREA:

All insulating materials located on thermal system components were grouped into homogeneous areas. The classification of homogeneous areas was based on the type of system involved, material, texture, color and appearance, and time of installation. Each homogeneous building area was then assigned a unique identification number. Thermal insulation assumed to be ACBM was sampled at least once. Samples for verification. No samples were collected for materials known to contain no asbestos, such as fiber glass, foam materials, rubber and other non-ACBM. Suspect thermal ACBM was sampled in at least three randomly distributed locations.

The following is a list of the suspect thermal system ACBM identified in this building. See SECTION II. DESCRIPTION OF EACH SAMPLING AREA and FLOOR PLANS, for details of sample location.

HOMOGENEOUS AREA NO.	DESCRIPTION OF SUSPECT THERMAL SYSTEM ACBM
	NO ACBM

Inspector

Typed Name: Todd M. Nance

Signature: Todd M. Nance Date: 8/4/88

Accreditation Number: NC 10099

Agency: Georgia Institute of Technology, Education Extension Services

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/15/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): Quality Control samples

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-049	2214	None	0	Tan floor tiles
WCH051688TMN-050	2215	None	0	White/brown plaster

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc	Address: Highway 24 East, NAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 06/10/88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/15/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-3) Suspended ceiling tile - 2 x 2 acoustical tile with staggered indentations. Friable material. Classrooms 246 and 247.

Sample ID		Asbestos		Comments
Owner	Lab	Type	%	
WCH051a881MN-045	2250	None	0	Tan friable ceiling tile, 40% glasswool, 60% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/87)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (10-2) White troweled on plaster painted white non-friable material Bathrooms 136, 121, 030, 031, 146, 151, 159, 166, 084, and 083; Storage Area 147.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMH-039	2244	None	0	White/brown surfacing debris

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 17 East MARO Office Complex P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-7) Floor tile - 9 x 9, white with tan streaks and dark brown mottles. Non-friable. Classroom 20c.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-046	2251	None	ND	Off white floor tile

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Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-2) Ceiling tile [illegible], white with [illegible] friable material. Offices 103 and 149.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051o88IMN-044	2249	None	0	Tan friable ceilin tile, 40% glasswool 20% cellulose

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 353e (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-16) Floor tile - Light tan with dark brown and white mottles. Non-friable material. Cafeterias 236 and 181.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-034	2239	None	0	Brown floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Revised 1/88)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-1/) floor tile - 9 x 9, brown with white and red streaks. Non-friable material. Stage.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCHOS1688TMN-033	2238	None	0	Brown floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-13) Floor tile - 12 x 12, deep blue with white streaks, Non-friable material. Hallway 254.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688IMN-031	2236	None	0	Blue floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/98)
Occupational Health Branch (Review 1/99)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-12) Floor tile - 12" x 12", cream with white and black slivers. Non-friable material. Hallways 220, 254, and 237.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-030	2235	None	-0-	Tan floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 17 West, M&O Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-11) Floor tile - 12 x 12, medium grey with white streaks. Non-friable material. Hallways 228, 220, 014, 137, 122, 145, and 158; Classroom 134

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN 029	2234	None	-0-	Tan floor tile

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Laboratory: Roberts Environmental Services, Inc	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 6-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-10) 12 x 12, grey, white, and tan mottled. Hallway 228; Bathroom 055, Hallway 231.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051588TMN-028	2235	None	0	Grf white floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 70 East, NAKO Office Complex, P. O. Box 308 Swansboro North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-9) Floor tile 9 x 9, blue with white streaks, Non-friable material Hallways 231, 220, 254, and 237

Sample ID		Asbestos		Comments
Owner	Lab	Type	%	
WCH051688TMN-027	2232	None	0	Grey floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, NAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-5) Floor tile - 9 x 9, white with olive green streaks. Non-friable material. Classrooms 207, 260, 221, 225, 227, 232, 228, 224, 152, 138, 140, 158, 164, and 162.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688IMN-024	2229	None	0	White floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-4) Floor tile 9" x 9", light grey with blue green mottles. Non friable material. Classrooms 207 and 210.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-023	2228	None	0	Off white floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 70 East NAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-2) Floor tile - 12 x 12, light grey, blue grey and white mottles. Non-friable material. Classrooms 215, 234, 235, 229, 237 133, 142, 127, 149, 168, 165, 175, 176, 177, 178, 164, 152, 241, 253, 210, 248, 249, 246, 255, and 245; Hallways 231, and 256.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH05168STMN-021	2226	None	0	Off white floor tile

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Laboratory: Roberts Environmental Services Inc	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-1) Floor tile - 9" x 9", tone with tan swirl streaks, Non-friable material. Classrooms 215, 204, 209, 208, 228, 109, 113, 111, 115, 117, 112, 125, 124, and 110.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-020	2225	None	ND	Tan floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: 04
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-1) Sprayed on ceiling material - white spray-on stippled material. Friable surfacing. Classrooms 231, 235, 234, 142, and 137; Hallway 254; Storage area 256.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-015	2254	None	0	Tan plaster debris
WCH051688TMN-016	2255	None	0	Tan plaster debris
WCH051688TMN-017	2256	None	0	Tan plaster debris
WCH051688TMN-018	2257	None	0	Tan plaster debris
WCH051688TMN-019	2258	None	0	Tan plaster debris

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MARO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main Building
Sample Date: 05/15/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-1) Sprayed on ceiling material - white chalky on stippled material. Friable surfacing. Classrooms 231, 235, 234, 142, and 153, Hallway 254; Storage area 236.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051588TMN-001	2216	None	0	Tan plaster debris
WCH051588TMN-002	2217	None	0	Tan plaster debris
WCH051588TMN-003	2218	None	0	Tan plaster debris
WCH051588TMN-004	2219	None	0	Tan plaster debris, 1% cellulose
WCH051588TMN-005	2220	None	0	Tan plaster debris, 1% cellulose
WCH051588TMN-006	2221	None	0	Tan plaster debris

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Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main Building
Sample Date: 05/15/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-1) Sprayed-on ceiling material - White sprayed-on stippled material. Friable surfacing. Classrooms 231, 235, 234, 142, and 143. Hallway 254; Storage Area 256.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051588TMN-007	2222	None	0	Tan plaster debris
WCH051588TMN-008	2223	None	0	Tan plaster debris
WCH051588TMN-009	2224	None	0	Tan plaster debris

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MARO Office Complex, P. O. Box 308 Newsboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: 06
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-5) Ceiling tile - 2' x 4' suspended tiles with small holes. Friable miscellaneous material. Classrooms 160, 161, 162, 157, 158, and 159; Bathroom 167; Storage Areas 164, and 166.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-010	2261	None	-0-	Tan ceiling tile, 40% glasswool, 20% cellulose

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Revised 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (M-1) Exhaust pipe for fume hood. 12 inch exhaust pipe. Non-friable material. Classroom 134; Hallways 254 and 166.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-047	2252	Chrysotile	20	Debris, 20% synthetic, 10% cellulose

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Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date:

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-3) Floor tile 9" x 9", white with tan mottles. Non-friable material. Classroom 211.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-022	2227	Chrysotile	2	Off white floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MARO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-8) Floor tile - 9 x 9, dark grey with thick white mottling. Non-friable material. Hallway 231.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051o88TMN-025	2230	Chrysotile	1%	Grey floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MARO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-c) Floor tile - 9" x 9", battleship grey with white streaks. Non-friable material. Classrooms 107, 119, 121, 124, 126, 127, 129, 131, 136-140, 147, 161, 202, 205, 214, 222-227, 230, 240, 246-251; Offices 101, 103-106, 133, 134, 146, 148, 149, 157, 161-163, 165, 166, 239, 266, 267, 275, and 278; Bathrooms 030, and 031; Hallways 237, 254, 231, 268, and 277

Sample ID		Asbestos		Comments
Owner	Lab	Type	%	
WCH051688TMN-026	2231	Chrysotile	1%	Grey floor tile

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Laboratory: Roberts Environmental Services, Inc.	Address: Highway 21 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-14) Floor tile - 9" x 9", light grey with very small mottles and streaks. Non-friable material. Classrooms 118 and 108.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051888TMM-046	2253	none	0	9in floor tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/87)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-15) Floor tile - 9 x 9, blue gray with large white mottles. Non-friable material. Library 247; Offices 134 and 239.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688fMN-042	2237	Chrysotile	4%	Grey floor tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 east, MARU Office Complex, P. O. Box 308 Swansboro North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (TO-1) Troweled on plaster on brown coat painted yellow. non-friable surfacing Kitchen 237; Storage Areas 238, 043, and 182; Office 242

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCHO51688TMN-035	2240	None	~0	White friable plaster
WCHO51688TMN-036	2241	Chrysotile	5	White friable surfacing
WCHO51688TMN-037	2242	Chrysotile	5	White friable surfacing
WCHO51688TMN-038	2243	Chrysotile	10	White friable surfacing

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc	Address: Highway 70 East, PARO Office Complex, P. O. Box 308 Swansboro North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: 06
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-18) Floor tile - Bone, light grey, and blue grey. Non-Friable material. Classrooms 160, 162, and 158.

Sample ID		Asbestos		Comments
Owner	Lab	Type	%	
WCH051688TMN-011	2262	None	-0-	White floor tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date:

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: 06
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FI-19) Floor tile - light brown with dark brown and white mottles - Non-friable material. Classroom 101, and Storage Area 164.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-012	2263	None	-0-	Tan floor tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services Inc	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: I-4
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-24) Floor tile 12 x 12, bone, tan and blue non-friable material. Classroom I-24, Classroom I-4

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-013	2259	None	-0-	Tan tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: T-4
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (C-7) 12 x 12 ceiling tiles, white medium texture friable material, Classroom T-4

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH051688TMN-014	2260	None	-	Brown particle board, 95% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MARO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Barry N. Blackburn	Signature: Barry N Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 03/25/87
Analysis Date: 04/01/87
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (TSI-1) Pipe fitting insulation - gray friable material wrapped in canvas. Main entrance; Hallways 142, 260, 206, 161, 166, 181; Cafeteria and kitchen; Boiler room; and Electrical rooms.

Sample ID		Asbestos		Comments
Owner	Lab	Type	%	
WCH032587TMN-001		None	-0-	White fluffy elbow insulation - 35% glass wool, 5% cellulose
WCH032587TMN-002		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-003		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-004		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-005		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-006		None	-0-	White fluffy elbow isnulation - 35% glass wool 5% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Glenn Osmond by Barry Blackburn	Signature: Barry N. Blackburn	Date: 8-5-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 03/25/87
Analysis Date: 04/01/87
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (TSI-1) Pipe fitting insulation - gray friable material wrapped in canvas. Main entrance; Hallways 142, 260, 206, 161, 166, 181; Cafeteria and kitchen; Boiler room; and Electrical rooms.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH032587TMN-007		None	-0-	White fluffy elbow insulation - 35% glass wool, 5% cellulose
WCH032587TMN-008		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-009		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-010		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-011		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-012		None	-0-	White fluffy elbow isnulation - 35% glass wool 5% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Glenn Osmond by Barry Blackburn	Signature: Barry N. Blackburn	Date: 8-5-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 03/25/87
Analysis Date: 04/01/87
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (TSI-1) Pipe fitting insulation - gray friable material wrapped in canvas. Main entrance; Hallways 142, 260, 206, 161, 166, 181; Cafeteria and kitchen; Boiler room; and Electrical rooms.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH032587TMN-013		None	-0-	White fluffy elbow insulation - 35% glass wool, 5% cellulose
WCH032587TMN-014		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-023		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-024		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-026		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-027		None	-0-	White fluffy elbow isnulation - 35% glass wool 5% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Glenn Osmond by Barry Blackburn	Signature: Barry N. Blackburn	Date: 8-5-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

N. C. Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 03/25/87
Analysis Date: 04/01/87
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (TSI-1) Pipe fitting insulation - gray friable material wrapped in canvas. Main entrance; Hallways 142, 260, 206, 161, 166, 181; Cafeteria and kitchen; Boiler room; and Electrical rooms.

Sample ID		Asbestos		
Owner	Lab	Type	%	Comments
WCH032587TMN-028		None	-0-	White fluffy elbow insulation - 35% glass wool, 5% cellulose
WCH032587TMN-029		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose
WCH032587TMN-030		None	-0-	White fluffy elbow insulation - 35% glass wool 5% cellulose

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services, Inc.	Address: Highway 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584

Analysis Performed By:

Typed Name: Glenn Osmond by Barry Blackburn	Signature: Barry N. Blackburn	Date: 8-5-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/89)

ROBERTS ENVIRONMENTAL SERVICES, INC.

Environmental and Analytical Services

P.O. Box 308, Highway 24 West
Swansboro, North Carolina 28584

Phone: (919) 326-3040 FAX: (919) 326-3354

Project: West Carteret High School
Kitchen, rm 237
Overhead
BULK SAMPLE ANALYSIS REPORT

Report Date: 7/17/91

Client: Carteret County Board of Education
Address: P.O. Drawer 600
Beaufort, NC 28516

Analytical Method: NIOSH Method 7403, Polarized Light with Dispersion Staining. Percent by volume visually estimated.

Sample ID		ASBESTOS FIBERS		Non Asbestos Fibers	
Client No./Description	Lab. No.	Type	%	Type and %	Comments
WCHS - 001	22994	No asbestos		< 1% Cellulose	White spongy material
WCHS - 002	22995	NO asbestos		No fibers	Cementitious material

Sample Collected By: Client Date: 7/17/91

Analysis Performed By: Christine Nitt Signature: Christine Nitt Analysis Date: 7/17/91

QC-018-b (04/90)

N C Department of Human Resources
Division of Health Services
Asbestos In Buildings Program

LEA: Carteret County Board of Education
School: West Carteret High School
Building: Main
Sample Date: 05/16/88
Analysis Date: 05/24/88
Analytical Method: Polarized Light With Dispersion Staining

BULK SAMPLE ANALYSIS

HOMOGENEOUS AREA(S): (FT-6) Floor tile - 9" x 9", battleship grey with white streaks - Non-friable material
Classrooms 107, 119, 121, 124, 126, 127, 129, 131, 136-140, 142, 164, 202, 205, 214, 222 227, 230, 240, 246-251; Offices 10[illegible] 101, 103-106, 133, 134, 146, 148, 149, 157, 161-163, 165, 166, 239, 266, 267, 275, and 278; Bathrooms 030, and 031; Hallways 237, 254, 231, 268, and 277

Sample ID		Asbestos		
Owner	Lab	Type		Comments
WCH051688TMN-026	2231	Chrysotile	1%	Grey floor tile

It is certified by the signature below that the laboratory named is accredited by the National Bureau of Standards or has received interim accreditation for polarized light microscope (PLM) analysis under the EPA Interim Asbestos Bulk Sample Analysis Quality Assurance Program.

Laboratory: Roberts Environmental Services Inc.	Address: [illegible] Highway, 24 East, MAKO Office Complex, P. O. Box 308 Swansboro, North Carolina 28584	
Analysis Performed By:		
Typed Name: Barry N. Blackburn	Signature: Barry N. Blackburn	Date: 8-1-88

DHS 3536 (1/88)
Occupational Health Branch (Review 1/87)

NC DEPARTMENT OF HEALTH AND HUMAN SERVICES
DIVISION OF PUBLIC HEALTH

LEA: Carteret County Board of Education

State System #: 160

Address: P.O. DRAWER 600
BEAUFORT, N.C. 28516

County: Carteret

Telephone: 252-728-4583

AHERA MANAGEMENT PLAN COVER SHEET

Management Plan Submission: ☐ Original ☐ Resubmittal ☐ New Building ☑ Reinspection

List of Documents Attached:

- ☐ School Buildings
- ☐ Preventive Measures and Response Actions Scheduled
- ☐ Response Actions Recommended
- ☐ Operations and Maintenance Plan
- ☐ Periodic Surveillance Plan
- ☐ Reinspection Plan
- ☐ Assessment of Materials
- ☐ Description of Each Sample Area
- ☐ Determination of Sampling Locations
- ☐ Bulk Sample Analysis Form
- ☐ Resources Needed
- ☐ Steps to Inform Others
- ☑ Reinspection Report

LEA AHERA DESIGNEE

Typed Name: Kenny Pedersen

Mailing Address: PO Drawer 600
Beaufort, North Carolina 28516

Name of Training Course: LEA Designee Training

Year 2015 Month 10 Day 12-13 Total Hours of Course 16

Name of Training Agency: NCHHS-HHCU

MANAGEMENT PLANNER

Typed Name: E. Raymond Childress

Signature: E. Raymond Childress Date 04/15/21

NC Accreditation Number: 20476

Training Agency: The EI Group, Inc.

INSPECTOR

Typed Name: E. Raymond Childress

Signature: E. Raymond Childress Date: 04/15/21

NC Accreditation Number: 10675

Training Agency: The EI Group, Inc.

For persons who performed inspections, and recommend(ed) design, or carry out response actions (except for operations and maintenance) the local education agency used or will use persons who have been accredited by the State of North Carolina under Article 19, N.C. Gen.Stat. §130A--447 and 10A NCAC 41C .0602(a) of the Asbestos Hazard Management Program Rules. In addition, the LEA has considered whether any conflict of interest may arise from the interrelationship among accredited personnel, such as abatement activities being performed by an inspector or management planner, and whether that should influence the selection of accredited personnel to perform activities under this AHERA Program.

The signatories below certify that the general local education agency responsibilities, as stipulated by Part 763.84 have been met or will be met.

Signature:_____
LEA AHERA Designee

Date:_____

Signature:_____
LEA Superintendent

Dr. Rob Jackson
Typed Name of Superintendent

Date:_____

FOR REVIEWING AGENCY USE ONLY

☐ Accepted
☐ Returned for Reasons Stated Below

Reviewer's Signature:_____

Date:_____

AHERA REINSPECTION REPORT

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No: West Carteret High School #160-344

Building(s): Main

School Address: 4700 Country Club Rd, Morehead City, NC 28557

Reinspection Date: 04/13/21

All previously identified or newly discovered friable and nonfriable asbestos containing building material (ACBM) has been reinspected/assessed and findings specified below:

1. BUILDING AND FUNCTIONAL SPACE	2. HGA ID	N	3. MATERIAL DESCRIPTION (Friable/Nonfriable)	4. ASSESSMENT			5. RESPONSE ACTION	
				a. No Change	b. Condition Code	c. Comments	Description	Begin/End Dates
Entire Main/ Room 211 (715)	FT-3		(MIS-NF) Floor Tile 9x9 White/Tan OCC5	✓	5	Material has been removed. 40,000 SF	Removed	Removed July, 2017
Main/ Room 134 (408), Hall 166 (400's Hallway) & 254 (600's Hallway)	MM-1		(MIS-NF) Transite Fume Hood pipe 12" OCC5		5	Material has been removed.	Removed	Removed
Main/ Kitchen Rooms 143 (120), 182 (111), 237 (101), 238 (103) & 242 (102)	TO-1		(SUR-NF) Plaster Ceiling painted yellow/cream OCC7	✓	5	The material is in good condition with no damage to the plaster. The paint is peeling in some areas. Limited accessibility and low potential for disturbance.	O & M Plan	Ongoing

INSPECTOR: Typed Name: E. Raymond Childress Signature: E. Raymond Childress

NC Accreditation Number: 10675 Date 4/16/21

LEA DESIGNEE: Typed Name: Kenny Pederson

Date: Signature:

MANAGEMENT PLANNER: Typed Name: E. Raymond Childress Signature: E. Raymond Childress

NC Accreditation Number: 20476 Date: 4/16/21

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No.: West Carteret High School #160-344

Building: T-4, 4, and Main

AHERA REINSPECTION REPORT COMMENTS

HGA ID: FT-18, 20, & 21 **MATERIAL DESCRIPTION:** Floor tile

The mobile unit T-4, T-7, and T-8 are no longer at this location. Unit T-8 was destroyed by a tornado in 1993.

All mobile classrooms containing asbestos materials have been removed from this site. The floor tile and mastic in rooms 125, 126, 127, 129, and 108 (now known as room 310) and in rooms 100, 101 and 106 (now a portion of room 300) was removed in 1996.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

HGA ID: FT-3 **MATERIAL DESCRIPTION:** 9x9 Floor tile white/tan

40,000 SF of the material was removed in July 2017. New 12x12 floor tile has since been installed in its place.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

LEA/System #: Carteret County Bd. of Ed. #160

School Name and No.: West Carteret High School #160-344

Building: Main

AHERA REINSPECTION REPORT COMMENTS

HGA ID: M-1 **MATERIAL DESCRIPTION:** Transite fume hood pipe 12"

Pipe and fume hood have been removed from site.

HGA ID: TO-1 **MATERIAL DESCRIPTION:** Plaster ceiling

The material is in good condition. No damage to the plaster was observed. There are areas where the cream paint is chipping and peeling.

THERE HAS BEEN NO CHANGES SINCE THE LAST INSPECTION.

for the following PROJECT:
(Name and location or address)
Addition To Broad Creek Middle School
Newport, North Carolina

THE OWNER:
(Name and address)
Carteret County Board of Education
107 Safrit Drive
Beaufort, NC 27516

THE ARCHITECT:
(Name and address)
Hite Associates, PC
2600 Meridian Drive
Greenville, NC 27834

TABLE OF ARTICLES

INDEX
(Numbers and Topics in Bold are Section Headings)

ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect.

§ 1.1.2 THE CONTRACT

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

§ 1.1.3 THE WORK

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

§ 1.1.4 THE PROJECT

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

§ 1.1.5 THE DRAWINGS

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

§ 1.1.5.1 Dimensions indicated on the Drawings shall be followed. Do not scale drawings. Conflicts, discrepancies, and omissions shall be resolved prior to ordering or installing materials and equipment.

§ 1.1.5.2 The Contractor shall provide critical clearances, tolerances, and dimensions as indicated on the Drawings. These critical dimensions are not optional. The Architect shall be advised immediately if existing conditions do not permit critical dimensions as shown. No consideration will be given to any claim based on differences between the actual dimensions and those indicated on the drawings.

§ 1.1.5.3 Any modifications to the Drawings shall be approved b the Architect. The Architect's decision in matters relating to artistic effect and structural integrity will be final if consistent with the intent of the Contract Documents.

§ 1.1.5.4 The Drawings are developed to communicate design intent. Assemblies or components required to achieve this design intent are subject to approval by the Architect.

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

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

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS
§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and with terms reasonably inferable from them, though not expressly included in them, as being necessary to produce the indicated results.

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

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

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

§ 1.4 INTERPRETATION AND EXECUTION OF THE CONTRACT DOCUMENTS
§ 1.4.1 In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement. These Contract Documents periodically refer to 2007 Editions of AIA Documents A201 and/or B101. In the interest of brevity, the Contract Documents may not always specify that each such reference is to AIA Documents A201 and/or B101 only as modified and amended by the Owner. Nonetheless, each reference to AIA Documents A201and/or B101 is only to those documents as modified and amended by the Owner.

§ 1.4.2 The Contract Documents shall be signed by the Owner and Contractor in the places designated for their signatures. If either the Owner or Contractor or both do not sign all Contract Documents, the Architect shall identify such unsigned Documents and notify the Owner and Contractor.

§ 1.4.3 In the Contract Documents, where discrepancies are apparent, detailed information is lacking, or interpretation is not clear, the Contractor shall secure required information from the Architect in writing before proceeding with the work. Items that are detailed and/or specified, but not distinctly located on the drawings shall be located by the Architect upon the written request of the Contractor.

§ 1.5
OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVIC E
§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and joint owners with the Owner of their respective Instruments of Service, including the Drawings and Specifications, and will retain, with the Owner, all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or

claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

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

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM
If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall do so as provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER
§ 2.1 GENERAL
§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner may designate in its written policies or otherwise in writing a representative who may have express authority to bind the Owner with respect to identified matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or, where specifically authorized in writing, the Owner's authorized representative.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER
§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence within fifteen (15) days after its receipt of a request demonstrating the existence of one or more of the contractual bases for the request.

§ 2.2.2 Payment for permits and fees is the responsibility of the Contractor under the Contract Documents, including the payment of fees specified under Section 3.7.1. The Owner shall only pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities about which the Contractor notified the Owner in writing in advance of the execution of this Agreement..

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and any known utility locations for the site of the Project, and a legal description of the site. The information shown on the Drawings is based upon field surveys, plans from previous construction projects, and other information provided by the Owner. It is the Contractor's responsibility to verify locations of items that may impact the construction of the work. The Contractor shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish other relevant information or services under the Owner's exclusive control, not also under the Architect's and/or Contractor's control, after the Contractor demonstrates to the Owner's satisfaction in writing that such other information or service under the Owner's exclusive control is necessary to the Contractor's performance of the Work and provides the Owner with a written request for such information or service. .

§ 2.2.4.1 The Owner shall not be responsible or have control over or charge of the construction means, methods, techniques, sequences, or procedures or for safety precautions and programs in connection

with the work, and the Owner will not be responsible for the Contractor's failure to carry out the Work in accordance with the contract documents.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2. Additional sets will be furnished at the cost of reproduction, postage and handling.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

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

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

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

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

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

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

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

§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

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

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Specifications, Drawings and other Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents. The Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's

review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.2.1 The Contractor shall verify all grades, lines, levels and dimensions indicated or shown on the plans and specifications prior to beginning the Work and shall immediately report in writing any errors or inconsistencies to the Architect before commencing the Work.

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

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

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

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

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

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

§ 3.3.4 The general contractor shall be the project expediter for the project. In addition to the duties and responsibilities stated in this Agreement, the general contractor/project expediter shall perform the duties and obligations imposed on the general contractor and project expediter by State law.

§ 3.4 LABOR AND MATERIALS

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

§ 3.4.1.1 The Contractor shall use only new materials for the work of this Project. Reuse of existing materials or the use of other salvaged materials is acceptable only where specifically noted in the Construction Documents.

§ 3.4.1.2 The Contractor shall provide all special trims, moldings, and special shaped materials which are required for the satisfactory completion of the work. The Contractor shall provide all necessary fasteners, bracing, and supports required for the stable and secure installation of the Work.

§ 3.4.2 The Contractor may make substitutions only with the written consent of the Owner, after evaluation and approval by the Architect and in accordance with a Change Order or Construction Change Directive.

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

§ 3.4.4 After the contract has been executed, the Owner and the Architect will consider a formal request for the substitution of products in place of those specified only under the conditions set forth in the Contract Documents.

§ 3.4.5 By making request for substitutions based on subparagraphs 3.4.3 above, the Contractor: (1) represents that the Contractor has personally investigated the proposed substitute product and determined that it is equal or superior in all respects to that specified; (2) represents that the Contractor will provide the same warranty for the substitution that the Contractor would for that specified; (3) certifies that the cost data presented is complete and includes all related costs under this contract except the Architect's redesign costs, and waives all claims for additional costs related to the substitution which subsequently become apparent; and (4) will coordinate the installation of the accepted substitute, making such changes as may be required for the work to be complete in all respects.

§ 3.4.6 The Contractor shall provide the Owner at least two copies of all manufacturer's literature and operating manuals for all equipment and materials installed on the Project. The Contractor shall also demonstrate operation and maintenance of all mechanical and electrical equipment or apparatus installed as part of the contract.

§ 3.4.7. Contractor shall comply with all applicable laws and regulations in providing services under this Agreement. Contractor represents that it is aware of and in compliance with the Immigration Reform and Control Act, and that it will collect properly verified I-9 forms from each employee providing services under this Agreement. Contractor shall not employ any individuals to provide services to the Owner who are not authorized by federal law to work in the United States.

§ 3.5 WARRANTY

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

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

§ 3.6.2 The Contractor shall provide documentation of all sales tax paid in a format acceptable to the Owner with each pay application.

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

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

§ 3.7.2.1 While the Contractor is not responsible for ensuring that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules, regulations, and lawful orders of public authorities, if the Contractor observes that portions of the Contract Documents are at variance with applicable laws, statutes, ordinances, codes, rules, regulations, or lawful orders of public authorities, the Contractor shall promptly notify the Architect and Owner in writing, and the Architect shall make necessary changes through an appropriate modification.

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

§ 3.7.4 Concealed or Unknown Conditions. If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than ten (10) days after first observance of the conditions. The Architect will promptly investigate such conditions and, if they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If the Contractor disputes the Architect's determination or recommendation, the Contractor may proceed as provided in Article 15, giving the required notice of his/her dispute and stating a claim in writing to the Owner and the Architect within 21 days after the Architect has given notice of its decision. . The Contractor's failure to submit said claim in strict conformance with Article 15 shall be deemed a waiver of the claim and the Contractor shall not be entitled to any compensation associated with the claim.

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

and Contract Time arising from the existence of such remains or features may be made as provided in Article 15. The Contractor's failure to submit said claim in strict conformance with Article 15 shall be deemed a waiver of the claim and the Contractor shall not be entitled to any compensation associated with the claim.

§ 3.8 ALLOWANCES

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

§ 3.8.2 Unless otherwise provided in the Contract Documents,

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

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

§ 3.8.4 In any situations in which the Contractor has provided a unit price for an allowance quantity for soil, rock or any other item identified in the bid documents, the unit price shall include all of the costs identified in Section 3.8.2.1. and the costs for unloading and handling at the site, installation, overhead, profit and other expenses associated with the item. If the quantity of the items included in the allowance is not used or exceeded during the Project, the Contract Sum shall be decreased or increased based upon the unit price amount by Change Order.

§ 3.9 SUPERINTENDENT

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

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract but not more than 14 days after the award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of the proposed project manager and superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed project manager or superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection. Notwithstanding the above, the Owner and Architect reserve the right to notify the Contractor of their reasonable objection to the project manager and/or superintendent after the 14-day period based upon their performance or failure to perform their duties and responsibilities.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection and shall promptly replace a project manager and/or superintendent subsequently objected to by the Owner and Architect pursuant to Section 3.9.2.. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information and use and for the Owner's and Architect's approval as to the completion date a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for coordinated, expeditious and practicable execution of the Work and Project in cooperation with the other prime contractors on the Project. In the event the Project has been awarded as a multi-prime project, each of the prime contractors shall provide initial and updated schedule information to the Project Expediter as often and in any format reasonably requested by the Project Expediter.

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

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

§ 3.10.4 The general contractor shall be the project expediter for the Project. In addition to the duties and obligations stated in this Agreement, the general contractor/project expediter shall perform all duties and obligations imposed on the general contractor and project expediter by state law. It shall be the responsibility of the general contractor to integrate the construction schedules of the prime contractors into a project progress schedule that will show graphically, by a detailed bar chart, CPM, or other acceptable and approved methods, the projected progress of the Project from start to finish. The general contractor shall be responsible for providing adequate notice to all prime contractors to insure efficient continuity of all phases of the Project Work. All prime contractors shall review and conform their work to the approved progress schedule and fully inform the Project Expediter as to his work progress, including immediate notification of any work progress changes. The general contractor shall promptly notify Architect in writing of any Contractor's failure to progress the work in accordance with the schedule.

§ 3.10.5 All prime contractors shall be required to cooperate and consult with each other during the construction of this Project. Each prime contractor shall schedule and execute his work so as to cause no delay to other Contractors. Each prime contractor shall be financially responsible to the other prime contractors for delay caused by him to the other prime contractors on the Project.

§ 3.10.6 Each prime contractor is required to attend monthly job site progress conference called or scheduled by the Architect. Each prime contractor shall be represented at these job progress conferences by both home office and site personnel. These meetings shall be open to the subcontractors, materials suppliers, any others who can contribute toward maintaining required job progress. It shall be the principal purpose of these meetings, or conferences, to effect coordination, cooperation, and assistance in every practical way toward the end of maintaining progress the project on schedule and to complete the Project within the specified contract time. Each prime contractor shall be prepared to assess progress of the work as required in his particular contract and to recommend remedial measures for correction of progress as may be appropriate. The Architect or his representative shall be the coordinator of and preside over the conferences.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

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

delivered to the Architect for inclusion in the submittal to the Owner upon completion of the Work as a record of the Work as constructed.

§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

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

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

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

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

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

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

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

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

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

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the

Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents, but shall provide written notification to the Owner and Architect regarding any concerns or objections the Contractor may have regarding the design criteria.

§ 3.13 USE OF SITE

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

§ 3.14 CUTTING AND PATCHING

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

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

§ 3.14.3 All patching shall be performed by mechanics of the trades dictated by the materials used in the patching operations.

§ 3.15 CLEANING UP

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

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

§ 3.15.3 The general construction contractor shall leave the completed work in conditions for occupancy by the Owner such that no cleaning, waxing, polishing, or other janitorial operations are required.

§ 3.16 ACCESS TO WORK

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

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

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

§ 3.18 INDEMNIFICATION

§ 3.18.1 The Contractor shall indemnify and hold harmless the Owner, Architect, and their agents and consultants, for damages, losses, or claims, including attorneys' fees and costs incurred in the defense of such claims, that arise solely from the negligent acts, errors and/or omissions, or failures to perform, by the Contractor, its employees, agents, or consultants. The parties agree that this indemnification clause is an "evidence of indebtedness" for purpose of N.C. Gen. Stat. § 6-21.2. The parties also specifically acknowledge that the Owner is a public body and it is the intent of the parties that the Owner not incur any expenses when the Contractor is solely responsible for the claims.

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

§ 3.19 CONTRACTOR'S REPRESENTATIONS

§ 3.19.1 By entering into this contract with the Owner, the Contractor represents and warrants the following, together with all other representations and warranties in the Contract Documents:

.1 that he is experienced in and competent to perform the type of work required and to furnish the materials, supplies or equipment to be so performed or furnished by him;

.2 that he is financially solvent, able to pay his debts as they mature, and possessed of sufficient working capital to initiate and complete the work required under the contract;

.3 that he is familiar with all federal, state, county, and local laws, ordinances, permits, regulations, and resolutions which may in any way affect the work or those employed therein, including but not limited to any special laws or regulations relating to the work or any part thereof;

.4 that such temporary and permanent work required by the Contract Documents which is to be done by him will be satisfactorily constructed and fit for use for its intended purpose and that such construction will not injure any person, or damage any property;

.5 that he has carefully examined the Contract Documents and the site of the work and that from his own investigations, he has satisfied himself and made himself familiar with: (1) the nature and location of the work; (2) the character, quality, and quantity of surface and subsurface materials likely to be encountered, including but not limited to, all structures and obstructions on or at the project site, both natural and man-made; (3) the character of equipment and other facilities needed for the performance of the work; (4) the general and local conditions including without limitation its climatic conditions, the availability and cost of labor and the availability and cost of materials, tools, equipment, labor, and professional services necessary to complete the work in the manner required by the Contract Documents; and (6) all other matters or things which could in any manner affect the performance of the work;

.6 that he will fully comply with all requirements of the Contract Documents;

.7 that he will perform the work consistent with good workmanship, sound business practice, and in the most expeditious manner consistent with the best interests of the Owner;

.8 that he will furnish efficient business administration and experienced superintendence and an adequate supply of workmen/women, equipment, tools, and materials at all times;

.9 that he has carefully reviewed the work required and that the work can be planned and executed in a normal and orderly sequence of work and reasonably scheduled so as to ensure

completion of the project in accordance with the Contract Documents, allowing for normal and reasonably foreseeable weather, labor and other delays, interruptions and disruptions of the work;

.10 that he will complete the work within the contract time and all portions thereof within any required contract deadlines;

.11 that his contract price is based upon the labor, materials, systems and equipment required by the contract documents, without exception;

.12 that he will make a good faith effort to utilize minority business enterprises (MBEs) per N.C. Gen. Stat. § 143-128, et seq., and the Owner's policy, as subcontractors for the work; and

.13 that he and all others acting on his behalf and/or pursuant to a contract with the him have obtained and shall retain throughout the duration of this Agreement all required licenses and certifications required in order to perform the work identified in the Contract Documents, that he will not permit any such licenses or certifications to lapse at any time during the course of his work on this Project, and that he and all others acting on his behalf and/or pursuant to a contract with him are fully licensed and certified to perform all work required by the Contract Documents and this Agreement.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

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

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

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall in its sole discretion employ a successor architect whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will also be the Owner's representative from time to time during the period for correction of Work The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents, unless otherwise modified in writing in accordance with the other provisions of the Contract.

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

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

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

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

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

§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with an appropriate submittal schedule approved by the Architect such that the Architect's action will be taken with such reasonable promptness as to cause no delay in the Work or activities of the Owner, Contractor, or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review, or, in the absence of an approved submittal schedule, with reasonable promptness as to cause no delay in the Work or activities of the Owner, Contractor, or separate contractors while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

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

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion when in the Architect's professional opinion the Work or portion of Work is substantially complete and the date of final completion when in the Architect's professional opinion the Work or portion of the Work is finally complete; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10 and upon compliance with all other requirements of the Contract Documents.

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

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon in writing or otherwise with reasonable promptness as to cause no delay in the Work or activities of the Owner, Contractor, or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review.

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

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

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon in writing or otherwise with reasonable promptness as to cause no delay in the Work or activities of the Owner, Contractor, or separate contractors, while allowing sufficient time in the Architect's professional judgment to permit adequate review. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

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

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

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

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

§5.2.1.1 Notwithstanding Section 5.2.1, the Contractor shall identify in the list of names of the subcontractors proposed, those subcontractors that are minority business enterprises and the date each is planned to begin work on the Project. This list of subcontractors and materials suppliers shall be submitted to the Architect not later than 10 calendar days after the date the Contractor executes the Contract. The Contractor shall not use a different Contractor to perform the work of any subcontractor identified pursuant to this section without providing written notice to the Owner and Architect regarding the reason for the change and only after complying with any requirements in G.S. 143-128.2 to 128.4.

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

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

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

§ 5.2.5 If during the duration of the Project the Contractor effects a substitution for any subcontractor per subparagraph 5.2, or if additional subcontract opportunities become available, the Contractor shall make a good faith effort to utilize minority business enterprises. The Contractor shall provide written notification of all new subcontractors.

§ 5.3 SUBCONTRACTUAL RELATIONS

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

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

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

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

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and future obligations under the subcontract, but the Owner does not assume liability for obligations incurred by the Contractor prior to assignment of the subcontract.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the Owner shall not be legally responsible for any of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

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

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these. Failure by the Contractor to make a claim in any way associated with the Owner's right to perform construction and to award separate contracts in accordance with Article 15 shall forever waive the Contractor's right to pursue the claim against the Owner.

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

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

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

§ 6.2 MUTUAL RESPONSIBILITY

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

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

§ 6.2.3 Damages and costs caused by delays or by improperly timed activities or defective construction shall be borne by the party responsible therefor. The Contractor shall reimburse the Owner for any costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Contractor shall also reimburse the Owner for any other damages incurred by the Owner as a result of the Contractor's delays, improperly timed activities or defective construction.

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

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

§ 6.2.6 In accordance with N.C. Gen. Stat. § 143-128, the Contractor shall be directly liable to the Owner and to the other separate prime contractors for the full performance of all duties and obligations due respectively under the terms of the separate contracts and in accordance with the plans and specifications of the Project.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible. This provision shall not impose any obligation on the Owner to clean up the site if the Owner is not performing separate construction activities related to the Project.

ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

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

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

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

§ 7.2 CHANGE ORDERS

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

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

§ 7.2.2 The execution of a Change Order by the parties shall represent a final resolution to all issues addressed by the Change Order and shall constitute a waiver of any claim the Contractor may have to additional compensation or any adjustment to the Contract Time. The Owner, however, reserves the right to audit and confirm that the quantity of work performed was equal to the quantity contained in any Change Order in which payment is based upon unit prices or time and materials. The Owner shall be entitled to receive a credit for any overage contained in the Change Order. In order to receive the credit, the Owner must initiate the audit within thirty (30) days of substantial completion of the Project. The Contractors shall provide the Owner with reasonable access to any documents required to conduct the audit.

§7.2.3 The methods used in determining adjustments to the Contract Sum shall be the same as noted in Section 7.3.3 below.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

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

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

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

.1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;

.2 Unit prices stated in the Contract Documents or subsequently agreed upon;

.3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or

.4 As provided in Section 7.3.7.

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

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

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an allowance for overhead and profit in accordance with paragraph 7.3.11 and subparagraphs 7.3.11.1 through 7.3.11.6 below. . In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

.1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;

.2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;

.3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;

.4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and

.5 Additional costs of supervision and field office personnel directly attributable to the change.

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

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment in amounts not in dispute for Work completed under the Construction Change Directive in Applications for Payment accompanied by a Change Order indicating the parties' agreement with part or all of such costs. For any portion of such cost that remains in dispute, the Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect shall prepare a Change

Order accurately recording the agreement. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.3.11 In subparagraphs 7.3.6 and 7.3.7, the allowance for the combined overhead and profit included in the total cost to the Owner, including bonds, insurance, bookkeeping, clerical, estimating, superintendence, project management, and all other indirect or overhead costs shall not exceed the following:

.1 for the Contractor, for work performed by the Contractor's own forces, 15 percent of the cost;

.2 for the Contractor, for work performed by the Contractor's subcontractor, 10 percent of the amount due the subcontractor;

.3 for each subcontractor or sub-subcontractor involved, for work performed by that subcontractor's or sub-subcontractor's own forces, 10 percent of the cost;

.4 for each subcontractor, for work performed by the subcontractor's sub-subcontractor, 10 percent of the amount due the sub-subcontractor;

.5 cost to which overhead and profit is to be applied shall be determined in accordance with subparagraph 7.3.7;

.6 in order to facilitate checking of quotations for extras for credits, all proposals, except those so minor that their propriety can be seen by inspection, shall be accompanied by complete itemization of costs including labor, materials, and subcontracts utilizing a format approved by the Architect. Labor and materials shall be itemized in the manner described above. Where major cost items are subcontracts, they shall be itemized also. In no case will a change involving over $100 be approved without such itemization.

§ 7.4 MINOR CHANGES IN THE WORK

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

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

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

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

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

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

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents and Contractor's construction schedule, as integrated by the general contractor and as approved by the Architect as to completion date, are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

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

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

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 The time during which the Contractor is delayed in the performance of the work by the acts or omissions of the Owner, Architect or their employees or agents, acts of God, unusually severe and abnormal climatic conditions, fires, floods, epidemics, quarantine restrictions, strikes, riots, civil commotions or freight embargoes, issuance of building permits by authorities having jurisdiction over the Project, or other conditions beyond the Contractor's control and which the Contractor could not reasonably have foreseen and provided against, shall be added to the time for completion of the Work (i.e. the contract time) stated in the Agreement; provided, however, that no claim by the Contractor for an extension of time for delays will be considered or allowed unless made in compliance with the requirements of the Contract Documents, including Article 15 of this Agreement.

§ 8.3.1.1 Should a time extension be granted for substantial completion, an equal extension shall be applied to the date for final completion, unless specifically stated otherwise.

§ 8.3.1.2 Neither the Owner nor the Architect shall be obligated or liable to the Contractor for, and the Contractor hereby expressly waives, any claims against the Owner and the Architect on account of any indirect or direct damages, costs, or expenses of any nature (including extended overhead or additional personnel costs) which the Contractor, its subcontractors, or sub-subcontractors or any other person may incur as a result of any delays, interferences, changes in sequence or the like, which are identified in Section 8.3.1 above or which are reasonable, foreseeable, contemplated, or avoidable by Contractor, arising from or out of any act or omission of any governmental representative (excluding the Owner) or any of the other multiple prime contractors, it being understood and agreed that the Owner's only obligation in any such events shall be an extension of the contract time, but only as determined in accordance with the provisions of the Contract Documents, including Article 15, unless said delay, interference or change in sequence is solely caused by the Owner and/or Architect. Under no circumstances shall the Contractor be entitled to additional compensation from the Owner or Architect for any claim for delays, interferences, changes in sequence or the like, unless said delay, interference or change in sequence is solely caused by the Owner and/or Architect, except under no circumstances shall the Contractor be entitled to additional compensation for lost profits, home office overhead or lost business opportunity.

§8.3.2. Subject to other provisions of the contract, the Contractor may be entitled to an extension of the contract time (but no increase in the contract sum) for delays arising from unforeseeable causes beyond the control and without the fault or negligence of the Contractor, his subcontractors, or suppliers as follows:

.1 labor disputes and strikes (including strikes affecting transportation) that do, in fact, directly and critically affect the progress of the Work; however, and extension of contract time on account of an individual labor strike shall not exceed the number of days of said strike;

.2 acts of God, tornado, fire, hurricane, blizzard, earthquake, typhoon, or flood that damages completed work or stored materials;

.3 abnormal inclement weather; however, the contract time will not be extended due to normal inclement weather. The time for performance of this contract, as stated in the contract documents, includes an allowance for calendar days which may not be available for construction out-of-doors (prior to building dry-in), unless the Contractor can substantiate to the satisfaction of the Owner that there was greater than normal inclement weather considering the full term of the contract time for work to be performed out of doors (prior to building dry-in) using a ten year average of accumulated record mean values from climatological data compiled by the U.S. Department of Commerce National Oceanic and Atmospheric Administration for the locale of the Project and that such alleged greater than normal inclement weather actually delayed the work or portions thereof which had an effect upon the contract time, the Contractor shall only be entitled to an extension of time if the total accumulated number of calendar days lost due to inclement weather, from the start of work until building dry-in exceeds the total accumulated number to be expected for the same period based on the ten-year average. Time for completion will be extended by the number of calendar days needed to include the excess number of calendar days lost.

.4 Acts of the public enemy, acts of the State, federal, or local government in its sovereign capacity, and acts of another Contractor in the performance of a contract with the Owner relating to the Project.

§ 8.3.3 The burden of proof to substantiate a claim for an extension of the contract time shall rest with the Contractor, including evidence that the cause was beyond his control. The Architect shall base its findings of fact and decision on such justification and supporting evidence and shall advise the Contractor in writing thereof. If the Architect finds that the Contractor was delayed on activities that were on the schedule's critical path, the Architect's determination of the total number of days extension shall be based upon the currently approved progress schedule and on all data relevant to the extension. Such data will be incorporated into the schedule in the form of a revision thereto, accomplished in a timely manner. The Contractor acknowledges and agrees that delays in activities which, according to the schedule, do not affect the contract time of the schedule's critical path, do not have any effect upon the Project's contract time and therefore will not be the basis for an extension of time. The Contractor acknowledges and agrees that time extensions will be granted only to the extent that excusable delays adversely impact critical path activities on the Contractor's schedule. Notwithstanding the above, the Contractor further agrees that if the currently approved schedule is a recovery schedule intended to address delays caused by the Contractor or for which the Contractor was not entitled to an extension of time, the Architect shall be allowed to assess the impact of the delays caused by the Contractor in determining whether the Contractor shall be granted an extension to the contract times.

§ 8.3.4. Extensions in the contract time by Change Orders are subject to an extension-of-time audit by the Owner as follows: (1) The Contractor agrees that, even though the Owner, Contractor, and Architect have previously signed a Change Order containing an extension of time resulting from a change in or addition to the Work that extension in the contract time may be adjusted by an audit after the fact by the Owner. If such an audit is to be made, the Owner must undertake the audit and make a ruling within 30 days after the completion of the Work under the Change Order. (2) The Contractor agrees that any extension of the contract time to which he is entitled arising out of a Change Order undertaken on a force accounting (labor and materials) basis shall be determined by an extension-of-time audit by the Owner or Architect after the work of the Change Order is completed. Such rulings shall be made by the Owner or Architect within 30 days after a request for same is made, except said 30 days will not start until the work under the Change Order is completed.

§ 8.3.5. The Contractor shall not be entitled to and hereby expressly waives any extension of time resulting from any condition or cause unless said claim for extension of time is made in writing to the Architect as required by Article 15.2. Circumstances and activities leading to such claim shall be indicated or referenced in a daily field inspection report for the day(s) affected; otherwise, all such claims are waived by the Contractor. In every such written claim, the Contractor shall provide the following information: (1) nature of delay; (2) date (or anticipated date) of commencement of delay; (3) activities on the progress schedule affected by the delay and/or new activities created by the delay and their relationship with existing activities; (4) identification of person(s) or organization(s) or event(s) responsible for the delay; (5) anticipated extent of the delay; and (6) recommended action to avoid or minimize the delay.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

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

§ 9.2 SCHEDULE OF VALUES

The Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

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

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

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

§ 9.3.1.3 The Owner will retain five percent of the amount of each progress payment on the Project for as long as is authorized by N.C. Gen. Stat. § 143-134.1. At all times during the Project, the Owner shall retain the maximum funds allowed by N.C. Gen. Stat. § 143-134.1. The Owner specifically reserves the right to withhold additional funds as authorized by this Agreement or N.C. Gen. Stat. § 143-134.1.

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

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall be free and clear of liens, claims, security interests or encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.3.4 The Contractor with each application for payment submitted shall include a list of those minority business enterprises subcontractors whose work is included in the application and the amount due each. By including the minority business enterprises on the list, the contractor certifies that the minority business enterprise performed the work or services or provided supplies under the contract and was not acting as a mere conduit.

§ 9.3.5 The Contractor shall submit with each application for payment documentation in a form acceptable to the Owner showing all sales tax paid by the Contractor for all work and materials covered by the application for payment.

§ 9.4 CERTIFICATES FOR PAYMENT

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

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's observations and evaluation of the Work and the data comprising the

Contractor's Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated in the Application for Payment; that the quality of the Work is in accordance with the Contract Documents; and that the Work has been performed in a good workmanlike fashion, subject (1) to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, (2) to results of subsequent tests and inspections required by or performed under the Contract Documents, (3) to correction of minor deviations from the Contract Documents prior to completion, and (4) to specific qualifications expressed by the Architect in the Certificate for Payment. The issuance of a Certificate for Payment will further constitute a representation by the Architect that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has reviewed construction means, methods, techniques, sequences or procedures or made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

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

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or another contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay;
- **.7** failure to carry out the Work in accordance with the Contract Documents;
- **.8** failure to provide sales tax documentation in accordance with subparagraph 9.3.5;
- **.9** failure or refusal of the Contractor to submit the required information on minority business enterprises;
- **.10** additional services provided by the Architect pursuant to paragraph 9.6.8; or
- **.11** any other reason deemed necessary by the Architect to protect the Owner.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld. No interest shall be added to any amounts withheld pursuant to Article 9.5.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option and in its sole discretion, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment. No interest shall be added to any amounts withheld pursuant to this provision.

§ 9.6 PROGRESS PAYMENTS

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

§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner and in accordance with N.C. Gen. Stat. § 143-134.1 the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner and in accordance with N.C. Gen. Stat. § 143-134.1.

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

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

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

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

§ 9.6.8 The Contractor shall reimburse the Owner or the Owner will retain from the compensation otherwise to be paid to the Contractor funds sufficient to cover the payment of the following additional services performed by the Architect: (1) services required pursuant to the Owner's dispute resolution policy; (2) expense of overtime work requiring higher than regular rates when such work is required due to the failure of the Contractor to perform in accordance with the Contract Documents; (3) review of the Contractor's submittal or shop drawing out of sequence of the submittal schedule agreed to by the Contractor and Architect; (4) responses to the Contractor's requests for information where such information is available to the Contractor from a careful study and comparison of the Contract Documents, field conditions, other Owner-provided information, Contractor-prepared coordination drawings, or prior project correspondence or documentation; (5) evaluation of an extensive number of substitutions proposed by the Contractor and making subsequent revisions to instruments of service resulting therefrom; (6) design services related to the default of the Contractor; (7) contract administration services provided 60 days after the date of substantial completion of the work if required due to the Contractor's failure to complete its punchlist work in a timely fashion; (8) more than two inspections or reviews of the same area or areas for the purpose of determining substantial completion of the area or areas; (9) more than two inspection or reviews of the same area or areas for the purpose of determining final completion of the area or areas; and (10) multiple reviews of an incomplete or deficient submittal or shop drawing from the Contractor.

§ 9.7 FAILURE OF PAYMENT

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

§ 9.8 SUBSTANTIAL COMPLETION

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

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

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Project or designated portion thereof is substantially complete. The Architect shall have no obligation to make an inspection to determine whether the Project is substantially complete until the Contractor prepares the Contractor's comprehensive list of items to be completed or corrected prior to final payment. If the Architect determines that the Contractor's list is excessive or through its observations it determines that the Project is not substantially complete, the Architect may require the Contractor to perform additional work prior to the Architect's inspection of the Project. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Project or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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

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

§ 9.9 PARTIAL OCCUPANCY OR USE

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

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

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

§ 9.9.4 The Owner's partial use or occupancy of the Project shall not be construed as a declaration by the Owner or Architect that the building is substantially complete unless specifically stated in writing by the Owner or Architect. The Owner's partial occupancy or use of the Project shall not prevent the Owner from assessing liquidated damages for the entire Project through the actual date of substantial completion of the Project.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

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

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment, (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner and (6) documentation regarding all of the sales tax paid by the Contractor in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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

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

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents;
- **.3** terms of special warranties required by the Contract Documents;
- **.4** failure of the work to be performed in a good workmanlike manner;
- **.5** conditions not recognized by the Owner at the time of payment; or
- **.6** those claims reserved by the Owner at or before the time of payment.

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

§ 9.10.6 Application for final payment for each prime contract shall be accompanied by executed and notarized copies of AIA Document G706, Contractor's Affidavit of Payment of Debts and Claims, AIA Documents G706A, Contractor's Affidavit of Release of Liens, and AIA Document G707, Consent of Surety Company to Final Payment, and an affidavit that no materials containing asbestos were used on the Project. In addition, each prime contractor shall furnish separate releases or liens from each subcontractor and materials and equipment supplier involved in its portion of the Work.

§ 9.11 LIQUIDATED DAMAGES

§9.11.1 The damages incurred by the Owner due to the Contractor's failure to complete the work within the required contract time, including any extensions thereof, shall be in the amount set forth in the Contract Documents, for each consecutive day beyond the established contract time (Saturdays, Sundays and all holidays included) for which the Contractor shall fail to complete the work. Should the Contractor fail to substantially complete the Project on or before the date stipulated for substantial completion (or such later date as may result from extension of time granted by Owner), he shall pay the Owner, or the Owner will retain as liquidated damages, the sum identified in the Contract Documents for substantial completion for each consecutive calendar day that terms of the contract remain unfulfilled beyond the date allowed by the contract, which sum is agreed upon as a reasonable and proper measure of damages which the Owner will sustain per day by failure of the Contractor to complete the Project within time as stipulated; it being recognized by the Owner and the Contractor that the injury to the Owner which could result from a failure of the Contractor to complete on schedule is uncertain and cannot be computed exactly. In no way shall costs for liquidated damages be construed as a penalty on the Contractor.

§ 9.11.2 For each consecutive calendar day that the Work and/or Project remains incomplete after the date established for final completion, the Contractor shall pay or Owner will retain from the compensation otherwise paid to the Contractor the sum identified in the Contract Documents as final completion liquidated damages for each consecutive day that the Project remains incomplete. This amount is the minimum measure of damages the Owner will sustain due to the delay in the completion of all remedial work, the delay in the correction of deficient work, the disruption to the school and the learning environment, and the inability to use the facilities fully. This amount is in addition to the liquidated damages prescribed above for substantial completion.

§ 9.11.3 If it is determined that the Contractor was delayed at any time in the progress of the work by acts or omissions of the Owner, Architect or their employees or agents and no time extension was granted for the delay, then the Contractor shall not be assessed liquidated damages for any delay caused by the Owner, Architect or their employees or agents.

§ 9.11.4 The liquidated damages set forth in Articles 9.11.1 and 9.11.2 above shall be assessed cumulatively. This provision for liquidated damages does not bar Owner's right to enforce other rights and remedies against Contractor, including but not limited to, specific performance or injunctive relief.

§ 9.11.5 The liquidated damages set forth in Articles 9.11.1 and 9.11.2 above shall not include legal or additional design professional fees that result from termination for cause of the Contractor's contract. If

such legal or additional design professional fees are incurred by the Owner, the Contractor shall be liable to the Owner for those costs in addition to the liquidated damages amount set forth above and in the Contract Documents.

§ 9.11.6 The liquidated damages set forth in Articles 9.11.1 and 9.11.2 above shall not include legal or additional design professional costs that are incurred by the Owner in responding to concerns with the Contractor's performance that result in the Owner sending notice of consideration of the termination of the Contractor's contract to the Surety and Contractor. If such legal or additional design professional costs are incurred by the Owner, the Contractor shall be liable to the Owner for those costs in addition to the liquidated damages amount set forth above and in the Contract Documents.

§ 9.11.7 The Owner's entitlement to liquidated damages shall not be considered a "Claim" subject to any time limitation for asserting Claims, but rather accrues automatically upon the Contractor's failure to meet the substantial completion date and/or final completion date.

§ 9.11.8 The Owner's partial use or partial occupancy of the Project shall not be construed as a declaration by the Owner or Architect that the building is substantially or finally complete, unless specifically stated in writing by the Owner or Architect. The Owner's partial occupancy or use of the Project shall not prevent the Owner from assessing liquidated damages for the entire Project through the actual dates of substantial and final completion.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

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

§ 10.2 SAFETY OF PERSONS AND PROPERTY

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

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

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

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

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

§ 10.2.4.1 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary, the Contractor shall give the applicable State and local government officials and the Owner reasonable advance notice.

§ 10.2.5 The Contractor shall promptly remedy damage and loss to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor,

or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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

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

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If the Contractor suffers injury or damage to person or property because of an act or omission of the Owner , or of others for whose acts the Owner is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the Owner within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the Owner to investigate the matter.

§ 10.2.9 Contractor acknowledges that he will be performing the Work on a school site and that a construction site might be an "attractive nuisance" which might draw children to said site. Contractor agrees that it will take reasonable precautions necessary to prevent children from entering the construction site or an area where materials are stored.

§ 10.2.10 Contractor and its subcontractors shall not bring any weapons, firearms or alcoholic beverages on any of the Owner's property.

§ 10.2.11 The Contractor will comply with the Occupational Safety and Health Act of 1970 (OSHA) including all federal and State standards and regulations which have been or shall be promulgated thereunder or in accordance therewith. The Contractor shall be responsible for all citations, assessments, fines, penalties, and delays in the performance of any work on the Project incurred by reason of failure or failure on the part of its agents, employees, assignees or subcontractors to comply. The Contractor shall also comply with all applicable laws, ordinances, rules, regulations, and lawful orders of any public authority having jurisdiction for the safety of persons or property.

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

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such hazardous material or substance is found to be present, to cause it to be rendered harmless or to verify that it has already been rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has a reasonable objection to a person or entity proposed by the Owner, the

Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

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

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor or its subcontractor brings to the site.

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

§ 10.4 EMERGENCIES

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

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

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

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

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages shall be written on an occurrence basis and, shall be maintained without interruption from the date of

commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.2.1 Liability insurance shall include all major divisions of coverage and be on a comprehensive basis including:

.1 premises operations (including X, C, and U coverages as applicable).
.2 independent contractor's protective.
.3 products and completed operations.
.4 personal injury liability with employment exclusion deleted.
.5 contractual, including specified provision for Contractor's obligation under Paragraph 3.18.
.6 owned, non-owned and hired motor vehicles.
.7 broad form property damage including completed operations.

§ 11.1.2.2 If the general liability coverages are provided by a commercial general liability policy on a claims-made basis, the policy date or retroactive date shall predate the contract; the termination date of the policy or applicable extended reporting period shall be no earlier than the termination date of coverages required to be maintained after final payment, certified in accordance with subparagraph 9.10.2.

§ 11.1.2.3 The insurance required by subparagraph 11.1.1 shall be written for not less than the following limits or greater if required by law:

1. Worker's Compensation:
    a. State: Statutory
    b. Applicable Federal: Statutory
    c. Employer's liability:
        i. $100,000 each accident
        ii. $1,000,000 disease policy limit
        iii. $100,000 disease, each employee
2. Comprehensive or Commercial General Liability
    a. Limits of Insurance (CSL)
        i. $1,000,000 each occurrence
        ii. $1,000,000 aggregate
    b. Products and Completed Operations to be Maintained for One Year After Final Payment
        i. $1,000,000 aggregate
    c. Property Damage Liability Insurance Shall Provide X, C, and U Coverage
    d. Broad Form Property Damage Coverage Shall Include Completed Operations
3. Contractual Liability (Hold Harmless Coverage):
    a. Limits of Insurance (CSL):
        i. $1,000,000 each occurrence
        ii. $1,000,000 aggregate
4. Personal Injury, with Employment Exclusion Deleted: $1,000,000 aggregate
5. Business Auto Liability (Including Owned, Non-Owned, and Hired Vehicles):
    a. Limits of Insurance (CLS):
        i. $500,000
6. If the General Liability Coverages are Provided by a Commercial Liability Policy, The:
    a. General aggregates shall be not less than $1,000,000 and it shall apply, in total, to this Project only;
    b. Fire damage limit shall be not less than $50,000 on any one fire; and
    c. Medical expense limit shall be not less than $5,000 on any one person.
7. Umbrella Excess Liability:
    a. $1,000,000 over primary insurance;
    b. $10,000 retention.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness. If this insurance is written on the comprehensive liability policy, the certificates shall be AIA Document G705, Certificate of Insurance. If this insurance is written on a commercial general liability policy form, accord form 25S will be acceptable.

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

§ 11.1.5 Each prime contractor shall either require each of his subcontractors to procure and maintain during the life of his subcontract insurance of the types and amounts described in Paragraph 11.1.2.1 above or he shall insure the activities of his subcontractors in his own policy.

§ 11.1.6 The Contractor shall not commence work under this contract until he has obtained all the insurance and bonds required hereunder and such insurance and bonds have been accepted by the Owner. Nor shall the Contractor allow any subcontractor to commence work on his subcontract until all similar insurance and bonds required of the subcontractor have been so obtained and accepted. Acceptance of the insurance by the Owner shall not constitute an approval of the insurance as meeting the requirements of the Contract Documents nor relieve or decrease the liability of the Contractor hereunder.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner may purchase and maintain the Owner's usual liability insurance, and the Contractor shall purchase and maintain insurance covering the Owner's contingent liability for claims which may arise from operations under the contract.

§ 11.3 PROPERTY INSURANCE

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

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including

demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

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

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

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

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

§ 11.3.3 LOSS OF USE INSURANCE
The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused.

§ 11.3.6 Prior to commencement of the Work, the Contractor shall file with the Owner a certificate of insurance for the policy or policies providing the property insurance coverage required for this Project. The certificate of insurance shall contain a provision that the policy will not be cancelled or allowed to expire until at least 30 days prior written notice has been given to the Owner.

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

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

§ 11.3.9 If required in writing by a party in interest, the Contractor as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Contractor's duties. The cost of required bonds

shall be charged against proceeds received as fiduciary. The Contractor shall deposit in a separate account proceeds so received, which the Contractor shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss due to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Contractor shall furnish bonds satisfactory to the Owner and from a company licensed by the State of North Carolina to issue such bonds covering the faithful performance of the contract and payment of obligations arising thereunder as required by law. The cost of the Contractor's bonds shall be included in the contract sum. The amount of the performance bond and the labor and material payment bonds shall each be equal to 100 percent of the contract sum. These bonds shall be maintained in full force and effect throughout the full term of the contract.

§ 11.4.1.1 The Contractor shall deliver the required bonds to the Owner when he delivers the executed contracts to the Architect, or if the work is to be commenced prior thereto, in response to a letter of intent, the Contractor shall, prior to the commencement of the work, submit evidence satisfactory to the Owner that such bonds will be furnished.

§ 11.4.1.2 The Contractor shall require the attorney-in-fact who executes the required bonds on behalf of the surety to affix thereto a certified and current copy of the power of attorney.

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

§ 11.5 INSURANCE COMPANY QUALIFICATIONS

§ 11.5.1 All insurance and bonds required by this contract shall be written by a company or companies having a rating of "A" or above by A.M. Best Company and which are licensed and authorized to do business in North Carolina.

ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

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

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

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

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION
§ 12.2.2.1 In addition to the Contractor's obligations under Sections 3.5 and 12.2.1, if, within one year after the date of Substantial Completion of the Project or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

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

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

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

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

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

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

ARTICLE 13 MISCELLANEOUS PROVISIONS
§ 13.1 GOVERNING LAW
§ 13.1.1 The Contract shall be governed by the law of the State of North Carolina.

§ 13.1.2 Each and every provision of law and clause required by law to be inserted in this contract shall be deemed to be inserted herein and the contract shall be read and enforced as though it were included herein. If, through mistake or otherwise, any such provisions are not inserted or are not correctly or fully

inserted, then upon the application of either party, the contract shall forthwith be physically amended to make such insertion.

§ 13.1.3 Whenever possible, each provision of this Agreement shall be interpreted in a manner as to be effective and valid under applicable law. If, however, any provision of this Agreement, or portion thereof, is prohibited by law or found invalid under any law, only such provision or portion thereof shall be ineffective, without in any manner invalidating or affecting the remaining provisions of this Agreement or valid portions of such provisions, which are hereby deemed severable.

§ 13.2 SUCCESSORS AND ASSIGNS

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

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

§ 13.3 WRITTEN NOTICE

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

§ 13.4 RIGHTS AND REMEDIES

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

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

§ 13.4.3 Each party hereto agrees to do all acts and things and to make, execute and deliver such written instruments, as shall from time to time be reasonably required to carry out the terms and provisions of the Contract Documents.

§ 13.4.4 Any specific requirements in this Contract that the responsibilities or obligations of the Contractor also apply to a Subcontractor is added for emphasis and are also hereby deemed to include a Subcontractor to any tier. The omission of a reference to a Subcontractor in connection with any of the Contractor's responsibilities or obligations shall not be construed to diminish, abrogate, or limit any responsibilities or obligations of a Subcontractor of any tier under the Contract Documents or the applicable subcontract.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections

are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals for which applicable laws or regulations expressly prohibit the Owner from delegating their cost to the Contractor.

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

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

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

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

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

§ 13.6 INTEREST
Payments due and unpaid under the Contract Documents shall not bear interest.

§ 13.8 CONDUCT ON SITE
§ 13.8.1 In accordance with N.C. Gen. Stat. § 14-269.2, the Contractor, its subcontractors and employees shall not possess or carry, whether openly or concealed, any gun, rifle, pistol, or explosive on any property owned by the Owner. This includes firearms locked in containers, vehicles or firearm racks within vehicles. The Contractor, its subcontractors and employees shall not cause, encourage or aid a minor, who is less than 18 years old to possess or carry, whether openly or concealed, any weapons on any property owned by the Owner.

§ 13.8.2 The Contractor, its subcontractors and employees, are prohibited from profane, lewd, obscene or offensive conduct or language, including engaging in sexual harassment.

§ 13.8.3 The Contractor and its subcontractors and their employees shall not manufacture, transmit, conspire to transmit, possess, use or be under the influence of any alcoholic or other intoxicating beverage, narcotic drug, hallucinogenic drug, amphetamine, barbiturate, marijuana or anabolic steroids, or possess, use, transmit or conspire to transmit drug paraphernalia on any property owned by the Owner.

§ 13.8.4 The Contractor, its subcontractors and employees shall not solicit from or sell to students or staff within the Owner's facilities or campuses, and shall not give gifts of any value to school system employees.

§ 13.8.5 The Contractor, its subcontractors and employees are prohibited from using access to the site pursuant to this Contract as a means to date, court, or enter into a romantic or sexual relationship with any student enrolled in the Owner's school system. The Contractor agrees to indemnify the Owner for claims against the Owner resulting from relationships which have occurred or may occur between a student and an employee of the Contractor or subcontractor.

§ 13.8.6 The Contractor, its subcontractors and employees shall not interact with any students. However, nothing in this section shall be construed to prevent the Contractor, its subcontractors and employees from taking necessary measures to protect the safety of students, staff, or other employees.

§ 13.8.7 The Contractor shall at all times enforce strict discipline and good order among its employees and shall not employ any unfit person or anyone not skilled in the task assigned to it. The Owner may require the Contractor to remove any employee the Owner deems incompetent, careless or otherwise objectionable.

§ 13.9 COMPLIANCE WITH APPLICABLE LAWS

§ 13.9.1 Lunsford Act/Criminal Background Checks. The Contractor shall conduct at its own expense sexual offender registry checks on each of its owners, employees, agents, or subcontractors ("contractual personnel") who will engage in any service on or delivery of goods to school system property or at a school-system sponsored event, except checks shall not be required for individuals who are solely delivering or picking up equipment, materials, or supplies at: (1) the administrative office or loading dock of a school; (2) non-school sites; (3) schools closed for renovation; or (4) school construction sites.. The checks shall include at a minimum checks of the State Sex Offender and Public Protection Registration Program, the State Sexually Violent Predator Registration Program, and the National Sex Offender Registry ("the Registries"). For the Contractor's convenience only, all of the required registry checks may be completed at no cost by accessing the United States Department of Justice Sex Offender Public Website at http:// www. nsopw.gov/. The Contractor shall provide certification that the registry checks were conducted on each of its contractual personnel providing services or delivering goods under this Agreement prior to the commencement of such services or the delivery of such goods. The Contractor shall conduct a current initial check of the registries (a check done more than 30 days prior to the date of this Agreement shall not satisfy this contractual obligation). In addition, Contractor agrees to conduct the registry checks and provide a supplemental certification before any additional contractual personnel are used to deliver goods or provide services pursuant to this Agreement. Contractor further agrees to conduct annual registry checks of all contractual personnel and provide annual certifications at each anniversary date of this Agreement. Contractor shall not assign any individual to deliver goods or provide services pursuant to this Agreement if said individual appears on any of the listed registries. Contractor agrees that it will maintain all records and documents necessary to demonstrate that it has conducted a thorough check of the registries as to each contractual personnel, and agrees to provide such records and documents to the school system upon request. Contractor specifically acknowledges that the school system retains the right to audit these records to ensure compliance with this section at any time in the school system's sole discretion. Failure to comply with the terms of this provision shall be grounds for immediate termination of the Agreement. In addition, the Owner may conduct additional criminal records checks at the Owner's expense. If the school system exercises this right to conduct additional criminal records checks, Contractor agrees to provide within seven (7) days of request the full name, date of birth, state of residency for the past ten years, and any additional information requested by the school system for all contractual personnel who may deliver goods or perform services under this Agreement. Contractor further agrees that it has an ongoing obligation to provide the school system with the name of any new contractual personnel who may deliver goods or provide services under the Agreement. The Owner reserves the right to prohibit any contractual personnel of Contractor from delivering goods or providing services under this Agreement if the Owner determines, in its sole discretion, that such contractual personnel may pose a threat to the safety or well-being of students, school personnel or others.

§ 13.9.2. Compliance with Applicable Laws. Contractor shall comply with all applicable laws and regulations in providing services under this Agreement. In particular, Contractor shall not employ any individuals to provide services to the Owner who are not authorized by federal law to work in the United States. Contractor represents and warrants that it is aware of and in compliance with the Immigration Reform and Control Act and North Carolina law (Article 2 of Chapter 64 of the North Carolina General Statutes) requiring use of the E-Verify system for employers who employ twenty-five (25) or more employees and that it is and will remain in compliance with these laws at all times while providing services

pursuant to this Agreement. Contractor shall also ensure that any of its subcontractors (of any tier) will remain in compliance with these laws at all times while providing subcontracted services in connection with this Agreement. Contractor is responsible for providing affordable health care coverage to all of its full-time employees providing services to the School System. The definitions of "affordable coverage" and "full-time employee" are governed by the Affordable Care Act and accompanying IRS and Treasury Department regulations.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

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

.1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;

.2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;

.3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment in the amount approved by the Architect on a Certificate for Payment within the time stated in the Contract Documents and after an additional 30 days notice to the Owner and Architect and an opportunity to cure; or

.4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

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

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon fifteen (15) days' written notice to the Owner and Architect and a reasonable opportunity to cure, terminate the Contract and recover from the Owner payment for Work executed prior to the date of termination as allowed in the Contract, including reasonable overhead and profit to the date of termination as allowed in the Contract, and actual and verifiable costs incurred by reason of such termination as allowed in the Contract and proven by the Contractor through valid documentation of such expenses incurred..

§ 14.1.4 If the Work is stopped for a period of 120 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon fourteen (14) additional days' written notice to the Owner and the Architect and an opportunity to cure, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

.1 refuses or fails to supply enough properly skilled workers or proper materials;

.2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;

.3 disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority**.4** otherwise is guilty of substantial breach of a provision of the Contract Documents;

.5 refuses or fails to prosecute the work or any separable part thereof with such diligence as will ensure the Substantial or Final Completion of the Work within the Contract Time or fails to complete the Work or remedy a default within said period; or

6. refuses or fails to properly schedule, plan coordinate and execute the Work, as specified herein, so as to perform the Work within the specified milestone and completion dates, or to provide scheduling or related information, revisions and updates as required by the Contract Documents;

7. fails to comply with (1) the provisions of the Sedimentation and Pollution Control Act (N.C. Gen. Stat. §113A-50 *et seq.)*, and/or (2) any Notice of Violation issued by the North Carolina Department of Natural Resources.

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

.1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;

.2 Accept assignment of subcontracts pursuant to Section 5.4; and

.3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished, and the Contractor shall reimburse the Owner for any legal or architectural fees incurred by the Owner as a result of the Contractor's default.

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

§14.2.5 If the Owner terminates the whole or any part of the Work pursuant to Section 14.2, the Owner may procure, upon such terms and in such manner as the Owner may deem appropriate, supplies or services similar to those so terminated, and the Contractor shall be liable to the Owner for any excess costs for such similar supplies or services. The Contractor shall continue the performance of the Contract to the extent not terminated hereunder.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

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

§ 14.3.2 If a suspension, delay, or interruption ordered by the Owner pursuant to Section 14.3.1 exceeds fourteen consecutive days, an adjustment shall be made for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

.1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or

.2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

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

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

.1 cease operations as directed by the Owner in the notice;

.2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and

.3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders to the extent they relate to the Work terminated and enter into no further subcontracts and purchase orders.

§ 14.4.3 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.4, then the Owner shall only be liable to the Contractor for those costs reimbursable to the Contractor in accordance with Section 14.4.4, plus a markup of 10 percent for profit and overhead on the actual fully accounted costs recovered under 14.4.4; provided however, that if there is evidence that the Contractor would have sustained a loss on the entire Contract had it been completed, no profit shall be included or allowed hereunder and an appropriate adjustment shall be made reducing the amount of the settlement to reflect the indicated rate of loss.

§ 14.4.3.1 After receipt of a Notice of Termination for Convenience, the Contractor shall submit to the Owner its termination claim in the form and with certification prescribed by the Owner. Such claims shall be submitted promptly but in no event later than three (3) months from the effective date of termination, unless one or more extensions in writing are granted by the Owner upon request of the Contractor made in writing within such three (3) month period or authorized extension thereof. However, if the Owner determines that the facts justify such action, it may receive and evaluate any such termination claim at any time after such three (3) month period or any extension thereof. Upon failure of the Contractor to submit its termination claim within the time allowed, the Owner may determine, on the basis of information available to it, the amount, if any, due to the Contractor by reason of the termination.

§14.4.4 If the Owner terminates the whole or any portion of the Work pursuant to Section 14.4, the Owner shall pay the Contractor the amounts determined by the Owner as follows:

14.4.4.1 an amount for supplies, services, or property accepted by the Owner pursuant to Subparagraph 14.5.1.6 or sold or acquired pursuant to Subparagraph 14.5.1.7 and not heretofore paid for, and to the extent provided in the Contract such amount shall be equivalent to the aggregate price for such supplies or services computed in accordance with the price or prices specified in the Contract appropriately adjusted for any saving of freight or other charges;

14.4.4.2 the total of the cost incurred in the performance of the Work through the date of termination including initial costs and preparatory expense allocable thereto but exclusive of any costs attributable to supplies or services paid or to be paid for under Section 14.4.4.1; and

14.4.4.3 Provided, however, that neither the Owner nor the Design Consultant will be liable for payments to subcontractors pursuant to Section 14.4.4.2 unless each subcontractor contains termination provisions identical to those set forth in Article 14. The Owner and the Design Consultant will not be liable to the Contractor or any of its subcontractors for any costs associated with termination if the subcontract of the party involved does not include the proper termination clauses.

§ 14.4.5 In arriving at any amount due the Contractor pursuant to Section 14.4, there shall be deducted the following:

14.4.5.1 all unliquidated advance or other payments on account theretofore made to the Contractor applicable to the terminated portion of the Contract;

14.4.5.2 any claim which the Owner may have against the Contractor;

14.4.5.3 such amount as the Owner determines to be necessary to protect the Owner against loss because of outstanding or potential liens or claims; and

14.4.5.4 the agreed price for, or the proceeds of sale of, any materials, supplies or other things acquired by the Contractor or sold pursuant to the provision of Section 14.5.1.7 and not otherwise recovered by or credited to the Owner.

§14.4.6. The total sum to be paid to the Contractor and Section 14.4 shall not exceed the Contract Sum as reduced by the amount of payments otherwise made or to be made for Work not terminated and as otherwise permitted by the Contract. Except for normal spoilage, and except to the extent that the Owner shall have otherwise expressly assumed the risk of loss, there shall be excluded from the amounts payable to the Contractor, as provided in Section 14.4.4, the fair value, as determined by the Owner, of property which is destroyed, lost, stolen or damaged so as to become undeliverable to the Owner, or to a buyer pursuant to Section 14.5.1.7

§14.5 GENERAL TERMINATION FOR CONVENIENCE PROVISIONS

§ 14.5.1 After receipt of a notice of termination for convenience from the Owner, pursuant to Section 14.4, and except as otherwise directed by the Owner, the Contractor shall:

§ 14.5.1.1 stop work under the Contract on the date and to the extent specified in the notice of termination;

§14.5.1.2 place no further orders or subcontracts for materials, services or facilities, except as may be necessary for completion of such portion of the work under the Contract as is not terminated;

§14.5.1.3 terminate all orders and subcontracts to the extent that they relate to the performance of work terminated by the notice of termination;

§ 14.5.1.4 at the option of the Owner, assign to the Owner in the manner, at the times and to the extent directed by the Owner, all of the rights in the contracts so terminated, in which case the Owner shall have the right, at its discretion, to settle or pay any or all claims arising out of the termination of such orders and subcontracts;

§ 14.5.1.5 settle all outstanding liabilities and all claims arising out of such termination or orders and subcontracts, with the approval or ratification of the Owner, to the extent it may require, which approval or ratification shall be final for all the purposes of this Article;

§ 14.5.1.6 transfer title and deliver to the entity or entities designated by the Owner, in the manner, at the times and to the extent directed by the Owner to the extent specifically produced or specifically acquired by the Contractor for the performance of such portion of the Work as had been terminated, the following:

(1) the fabricated or unfabricated parts, work in process, partially completed supplies and equipment, materials, parts, tools, dies, jigs and other fixtures, completed Work, supplies and other material produced as part of, or acquired in connection with the performance of, the Work terminated by the notice of termination; and

(2) the completed or partially completed plans, drawings, information, releases, manuals and other property related to the Work and which, if the Contract had been completed, would have been required to be furnished to the Owner;

§ 14.5.1.7 use its best efforts to sell, in the manner, at the times, to the extent and at the price or prices directed or authorized by the Owner, any property of the types referred to in Subparagraph 14.5.1.6; provided, however, that the Contractor:

(1) shall not be required to extend credit to any buyer, and
(2) may acquire any such property under the conditions prescribed by and at a price or prices approved by the Owner; and provided further that the proceeds of any such transfer or disposition shall be applied in reduction of any payments to be made by the Owner to the Contractor under the Contract or shall otherwise be credited to the Contract Sum covered by the Contract or paid in such other manner as the Owner may direct;

§ 14.5.1.8 complete performance of such part of the Work as shall not have been terminated by the notice of termination; and

§ 14.5.1.9 take such action as may be necessary, or as the Owner may direct, for the protection and preservation of the property related to the Contract which is in the possession of the Contractor and in which the Owner has or may acquire an interest.

§ 14.5.2 The Contractor shall, from the effective date of termination until the expiration of three (3) years after final settlement under the Contract, preserve and make available to the Owner, at all reasonable times at the office of the Contractor, but without direct charge to the Owner, all its books, records, documents and other evidence bearing on the costs and expenses of the Contractor under the Contract and relating to the Work terminated hereunder, or, to the extent approved by the Owner, photographs, micro-photographs or other authentic reproductions thereof.

§ 14.5.3 If the termination for convenience, pursuant to Section 14.4, be partial, the Contractor may file with the Owner a claim for an equitable adjustment of the price or prices specified in the Contract relating to the continued portion of the Contract (the portion not terminated by the notice of termination), and such equitable adjustment as may be agreed upon shall be made in such price or prices. Any claim by the Contractor for an equitable adjustment under this Subparagraph must be asserted within three (3) months from the effective date of the notice of termination.

§ 14.5.4 The Contractor shall refund to the Owner any amounts paid by the Owner to the Contractor in excess of costs reimbursable under Section 14.4.

§ 14.5.5 The Contractor shall be entitled to only those damages and that relief from termination by the Owner as specifically provided in Section 14.4.

ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

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

§ 15.1.2 TIME LIMITS ON AND NOTICE OF CLAIMS

Claims by the Contractor must be initiated by written notice to the Owner and the Architect. Claims by the contractor must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later. The Contractor’s failure to submit a claim in accordance with these time limits shall forever waive the Contractor’s right to pursue the claim. The Contractor shall indemnify and hold the Owner harmless from any claims by the Contractor’s subcontractors arising out of the Contractor’s failure to submit the claim in a timely fashion.

§ 15.1.2.1 The resolution of a claim by change order shall finally resolve any and all claims arising from the event giving rise to the claim.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE
Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments as requests for payment are substantiated by the Contractor and approved by the Architect. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with his/her exercise of professional judgment and the requirements of the Contract Documents, this Agreement, and AIA Document B101, 2007 Edition, as modified. The Contractor shall not slow or stop the progress of the Work while a claim or dispute is pending or under negotiation.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST
If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. The Contractor's failure to provide written notice of the Claim before proceeding to execute the Work shall be grounds for the denial of the Claim by the Architect and/or Owner. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME
§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary. The Contractor's claim shall specifically show the impact of the delay on the Project's critical path. The Contractor's failure to submit a claim in accordance with the time limits shall forever waive the Contractor's right to pursue the Claim.

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

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

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

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14 except it shall not apply to limit the Owner's ability to recover additional architectural and legal fees resulting from a default by the Contractor. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION
§ 15.2.1 Claims by the Contractor, including those alleging an error or omission by the Architect but excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Architect for initial decision. The Architect will serve as the Initial Decision Maker. Except for those Claims excluded by this Section 15.2.1, an initial decision by the Architect shall be required as a condition precedent to litigation or mediation of any Claim by the Contractor arising prior to the date final payment is made, unless 30 days have passed after the Claim has been referred to the Architect with no decision having been rendered. The Architect may be granted an extension of time to render a decision by mutual agreement of the parties. The Owner may, in its sole discretion, submit its claims to the Architect for an initial decision before instituting mediation or litigation.

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

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

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

§ 15.2.5 The Architect will render an initial decision approving or rejecting the Claim, or indicating that the Architect is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and/ or litigation.

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

§ 15.3 MEDIATION

§ 15.3.2 The parties shall endeavor to resolve their Claims by voluntary mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for voluntary mediation shall be made in writing, delivered to the other party to the Contract.

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

NOTE: THESE CONDITIONS SUPERCEDE ANY CONFLICTING CONDITIONS IN THE GENERAL CONDITIONS.

SALES TAX

Itemized sales tax expenditures by the Contractor will be reimbursed to the Owner. BIDS MUST INCLUDE SALES TAX.

DELAYS / CLAIMS

Any contractor whose work is delayed for reasons beyond his control shall immediately notify the Architect as to the nature of the delay, the cause of the delay, and the immediate effect on the project, including cost effects. Verbal notification shall be followed with written notification to the Architect no later than 10 days following the delay; otherwise, no consideration for a claim will be given. For delays claimed by reason of weather, the Contractor shall be required to substantiate such claim by the submission of weather reports for the time period of the delay as well as national weather service reports for the project area for the last ten years, the average of which shall become the basis to determine the validity of such claim. Time extensions granted for reasons of weather or other reasons except as caused by the Owner, with exceptions and time limits for convenience of the Owner as indicated under Section 01011, do not entitle the Contractor to “extended overhead” or “lost profit” recovery.

Delays which do not affect activities on the Critical Path of the approved CPM Construction Schedule will not be considered reason to allow time extensions. Time extensions granted for reasons other than natural weather disasters do not entitle the Contractor to “lost profit” recovery. Time extensions granted for reasons other than natural weather disasters do not entitle the Contractor to “extended overhead” recovery.

CLEAN UP AND PROTECTION OF WORK

The Contractor shall replace any broken glass, remove stains, spots and dirt from decorated work, clean hardware, remove paint spots and smears from all surfaces, clean plumbing fixtures and wash all concrete, and clean and wax resilient tile floors and clean hard tile floors. The Contractor shall be responsible for leaving his work clean in all respects, and shall be responsible for protecting his work from damage by other parties.

CHANGES IN THE WORK

The cost or credit to the Owner resulting from a Change in the work shall be determined as follows:

1. Allowances for overhead and profit combined shall not exceed 15 percent of net cost except when the change involves a Subcontractor, in which case allowances shall not exceed 15 percent for the Subcontractor and 7-1/2 percent for the Prime Contractor.

2. The profit and overhead rates proposed by the Contractor for the initial Change in the Work shall not be changed or modified for the duration of the Contract, and shall apply equally for additive and / or deductive changes.

3. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein may include all items of material and labor, the use of power tools and equipment, and such items of cost as Workmen's Compensation Insurance, Social Security and Old Age Benefit, Performance Bond Adjustment and pro-rata charges for foreman. The following items shall be considered as overhead: insurance other than mentioned above, supervision, superintendents, timekeepers, clerks, watchmen, small tools, incidental job burdens and general office expense, and all other items not included in "cost" as above defined.

4. Price requests for changes in the Work furnished to the Architect shall include individual costs for materials, labor, subcontractor work (if applicable), and profit and overhead unless otherwise noted.

5. Unit Prices listed on Bid Form of Proposal, Sitework Material allowances, and Form of Contract shall include all overhead and profit costs. Overhead and profit shall not be listed as a separate or added cost when unit prices and materials allowances are used or credited.

TIME

The Contractor shall fully complete the Work in accordance with the schedule of COMPLETION DATES which are DATES CERTAIN, with no time extensions granted for any reason other than delays caused by the Owner (see below).

WEATHER

Weather is by its nature not “normal”, and rail fall varies from year to year. Weather delays are to be accommodated within the schedule as specified, however, “natural disasters”, such as caused by severe hurricanes, are excepted. In making his bid, the bidder acknowledges that provisions to accelerate the schedule will be provided as required to meet the scheduled dates, to accommodate abnormal weather conditions, or other delays, except as caused by the Owner.

PROJECT PHASING (note: “Prime” contractor means “sub” contractor under a Single Prime contracting method)

1. The General Contractor is responsible as the project coordinator for all the Prime Contractors. It is the General Contractor’s responsibility to schedule the work of all Contractors, to maintain weekly reports to the Architect and the Owner regarding the status of activities of all Contractors, and to submit plans to the Architect and Owner for recovery of any scheduled activity by any Contractor, to the Owner and Architect, for review and immediate implementation.

2. Each Prime Contractor shall be required to coordinate their schedule of activities with the General Contractor, and, in submitting a bid, agree to execute a construction schedule in conformance with the required completion dates. All parts of this schedule will be binding on each Contractor, and it is agreed by all Contractors that liquidated damages will be withheld for any delays caused by them which affect the completion date directly or indirectly, in the sole opinion of the Architect, as further described and defined under the Contract for Construction.

3. All Contractors agree that maintaining the scheduled completion of individual activities is essential for the overall completion of the project schedule, and understand that many activities by other Contractors are dependent on timely completion of their own activities. As such, it is understood and agreed by all Contractors that liquidated damages will be withheld, at the time of delay, for any delays which impact the completion of activities by other Contractors and cause the schedule to be revised to a later completion date. For example, the Sitework Contractor must complete various aspects of sitework in a timely manner to allow the other Prime Contractors to store and stage materials on stoned parking areas, or that finish grading, seeding, mulching, and fertilizing operations shall be completed in a manner which will allow the other Prime Contractors to complete their exterior finish work on time, to provide the project with a completed, full stand of grass on the completion date and not afterwards. As an additional example, General Contractor shall schedule his work and make all provisions to allow the Mechanical Contractor to complete his work in a timely manner to meet his scheduled completion date, which is prior to the General Contractor’s completion date, in order for the General Contractor to utilize the HVAC system for conditioning of the building. The foregoing illustrative examples are not intended to imply a listing of issues possible but only to serve as examples.

4. It is understood by all bidders that they will cooperate with each other to formulate and agree on a construction schedule detailing all significant activities of the project within 30 days of award.

COMPLETION DATES (ALL DATES CERTAIN)

The Start Date for commencement of the project will be the date of receipt of the Notice to Proceed issued by the Architect.

1. 30 days following Start Date: General Contractor shall submit construction schedule to Owner reflecting required dates and confirm that all subcontractors and material suppliers are in agreement.

2. 390 days following Start Date: The General Contractor shall complete their own construction review list and provide written statement stating as such to the Architect for all work, including finish grading, seeding, fertilizing and mulching all areas disturbed by construction activities.

3. 420 days following Date: The General Contractor will confirm in writing to the Architect that they have completed the Architect's construction review list (liquidated damages incurred).

4. 480 days following Date: General Contractor shall complete any remaining construction review items issued by Architect's (additional liquidated damages incurred).

LIQUIDATED DAMAGES

For each day in excess of the number of days allowed to complete construction under 8.1.5, for each scheduled date, the Contractor shall pay to the Owner the sum of $1000.00 as liquidated damages reasonably estimated in advance to cover the costs and/or losses incurred by the Owner by the failure of the Contractor to complete the Work of any Phase indicated in the time specified, such time being in the essence of this Contract and a material consideration thereof. Liquidated damages for days in excess of completion date shall be held as retainage from monthly payments by the Owner, and released from subsequent payments only if delay days are made up and no damages have been incurred by the Owner. The Architect shall be the sole judge as to the division of responsibility between the prime contractors, and shall apportion the amount of liquidated damages to be paid by each of them, according to delay caused by any or all of them. Issuance of a Certificate of Occupancy by any Building Official DOES NOT constitute Substantial Completion or completion of construction under this paragraph. Substantial Completion is defined as suitable for use, in the opinion of the Owner and the Architect.

ADDITIONAL LIQUIDATED DAMAGES

For each day in excess of sixty days beyond the date of Substantial Completion that any corrective or incompleted items remain to be done, for each scheduled date, the Contractor shall pay to the Owner the sum of $1000.00 as liquidated damages reasonably estimated in advance to cover the costs and/or losses incurred by the Owner by the failure of the Contractor to complete such corrective work or incomplete items for any Phase listed, such time being in the essence of this Contract and a material consideration thereof.

OWNER'S RIGHT TO COMPLETE WORK TO MAINTAIN SCHEDULE

The Contractor agrees that if the Architect determines, at his sole discretion, that the Contractor has repeatedly or persistently failed or refused to implement such measures as will bring the progress of the Work into conformity with the Construction Schedule, then the Owner may contract with others or use the Owner's own forces to perform the Work to bring the progress into conformity with the Construction Schedule. The Contractor agrees that the Owner will be entitled to a set off for the cost thereof including, but not limited to , actual costs, legal fees, and additional overhead costs, which will be charged against the Contract Sum due the Contractor.

COST INFORMATION FOR INSURANCE PURPOSES

During the course of the construction, the contractor will be required to provide written cost breakdowns for various parts of the work for insurance purposes.

PAY APPLICATIONS AND RETAINAGE

Contractor shall submit Applications for Payments to the Architect monthly for work completed and materials stored ending the twenty-fifth day of the month. Retainage shall be five percent (5%) of monthly estimates. The Architect may, at any time after fifty percent of the work has been completed, if he finds that satisfactory progress is being made and with written consent of Contractor's Surety, recommend to the Owner that retainage be reduced to two and one-half percent (2.5%) of monthly estimates.

Sales tax expenditures shall be substantiated with a certified statement by the Contractor and each of his Subcontractors individually showing total purchases of material from each separate vendor and total sales taxes paid each vendor. Certified statement must have the invoice number or numbers covered and inclusive dates of such invoices.

Materials used from Contractor's or Subcontractor's warehouse stock shall be shown in certified statement at warehouse stock prices and amount of tax paid.

The Contractor shall not be required to certify the Sub-Contractor's statements.

The Contractor and each of his Sub-Contractors shall also show purchases of materials from each separate vendor and the cost of same for which no sales tax has been paid.

When applicable, file a Form E-589CI, Affidavit Of Capital Improvement.

BUILDERS RISK INSURANCE

Contractor shall provide Builder’s Risk Insurance, payable to the Contractor and Owner as their interest may appear upon the amount of the bid and upon all materials in or adjacent thereto which are to be made apart of the insured structure to 100% of the insurable value thereof covering fire, extended coverage, vandalism and Malicious mischief.

SPECIAL REQUIREMENTS FOR PROJECTS FUNDED IN WHOLE OR PART WITH FEDERAL FUNDS

Appendix II to Part 200 - Contract Provisions for Non-Federal Entity Contracts Under Federal Awards

In addition to other provisions required by the Federal agency or non-Federal entity, all contracts made by the non-Federal entity under the Federal award must contain provisions covering the following, as applicable.

(A) Contracts for more than the simplified acquisition threshold, which is the inflation adjusted amount determined by the Civilian Agency Acquisition Council and the Defense Acquisition Regulations Council (Councils) as authorized by 41 U.S.C. 1908, must address administrative, contractual, or legal remedies in instances where contractors violate or breach contract terms, and provide for such sanctions and penalties as appropriate.

(B) All contracts in excess of $10,000 must address termination for cause and for convenience by the non-Federal entity including the manner by which it will be effected and the basis for settlement.

(C) Equal Employment Opportunity. Except as otherwise provided under 41 CFR Part 60, all contracts that meet the definition of “federally assisted construction contract” in 41 CFR Part 60-1.3 must include the equal opportunity clause provided under 41 CFR 60-1.4(b), in accordance with Executive Order

11246, “Equal Employment Opportunity” (30 FR 12319, 12935, 3 CFR Part, 1964-1965 Comp., p. 339), as amended by Executive Order 11375, “Amending Executive Order 11246 Relating to Equal Employment Opportunity,” and implementing regulations at 41 CFR part 60, “Office of Federal Contract Compliance Programs, Equal Employment Opportunity, Department of Labor.”

(D) Davis-Bacon Act, as amended (40 U.S.C. 3141-3148). When required by Federal program legislation, all prime construction contracts in excess of $2,000 awarded by non-Federal entities must include a provision for compliance with the Davis-Bacon Act (40 U.S.C. 3141-3144, and 3146-3148) as supplemented by Department of Labor regulations (29 CFR Part 5, “Labor Standards Provisions Applicable to Contracts Covering Federally Financed and Assisted Construction”). In accordance with the statute, contractors must be required to pay wages to laborers and mechanics at a rate not less than the prevailing wages specified in a wage determination made by the Secretary of Labor. In addition, contractors must be required to pay wages not less than once a week. The non-Federal entity must place a copy of the current prevailing wage determination issued by the Department of Labor in each solicitation. The decision to award a contract or subcontract must be conditioned upon the acceptance of the wage determination. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency. The contracts must also include a provision for compliance with the Copeland “Anti-Kickback” Act (40 U.S.C. 3145), as supplemented by Department of Labor regulations (29 CFR Part 3, “Contractors and Subcontractors on Public Building or Public Work Financed in Whole or in Part by Loans or Grants from the United States”). The Act provides that each contractor or subrecipient must be prohibited from inducing, by any means, any person employed in the construction, completion, or repair of public work, to give up any part of the compensation to which he or she is otherwise entitled. The non-Federal entity must report all suspected or reported violations to the Federal awarding agency.

(E) Contract Work Hours and Safety Standards Act (40 U.S.C. 3701-3708). Where applicable, all contracts awarded by the non-Federal entity in excess of $100,000 that involve the employment of mechanics or laborers must include a provision for compliance with 40 U.S.C. 3702 and 3704, as supplemented by Department of Labor regulations (29 CFR Part 5). Under 40 U.S.C. 3702 of the Act, each contractor must be required to compute the wages of every mechanic and laborer on the basis of a standard work week of 40 hours. Work in excess of the standard work week is permissible provided that the worker is compensated at a rate of not less than one and a half times the basic rate of pay for all hours worked in excess of 40 hours in the work week. The requirements of 40 U.S.C. 3704 are applicable to construction work and provide that no laborer or mechanic must be required to work in surroundings or under working conditions which are unsanitary, hazardous or dangerous. These requirements do not apply to the purchases of supplies or materials or articles ordinarily available on the open market, or contracts for transportation or transmission of intelligence.

(F) Rights to Inventions Made Under a Contract or Agreement. If the Federal award meets the definition of “funding agreement” under 37 CFR § 401.2 (a) and the recipient or subrecipient wishes to enter into a contract with a small business firm or nonprofit organization regarding the substitution of parties, assignment or performance of experimental, developmental, or research work under that “funding agreement,” the recipient or subrecipient must comply with the requirements of 37 CFR Part 401, “Rights to Inventions Made by Nonprofit Organizations and Small Business Firms Under Government Grants, Contracts and Cooperative Agreements,” and any implementing regulations issued by the awarding agency.

(G) Clean Air Act (42 U.S.C. 7401-7671q.) and the Federal Water Pollution Control Act (33 U.S.C. 1251-1387), as amended - Contracts and subgrants of amounts in excess of $150,000 must contain a provision that requires the non-Federal award to agree to comply with all applicable standards, orders or regulations issued pursuant to the Clean Air Act (42 U.S.C. 7401-7671q) and the Federal Water Pollution Control Act as amended (33 U.S.C. 1251-1387). Violations must be reported to the Federal awarding agency and the Regional Office of the Environmental Protection Agency (EPA).

(H) Debarment and Suspension (Executive Orders 12549 and 12689) - A contract award (see 2 CFR 180.220) must not be made to parties listed on the governmentwide exclusions in the System for Award Management (SAM), in accordance with the OMB guidelines at 2 CFR 180 that implement Executive Orders 12549 (3 CFR part 1986 Comp., p. 189) and 12689 (3 CFR part 1989 Comp., p. 235), “Debarment and Suspension.” SAM Exclusions contains the names of parties debarred, suspended, or

otherwise excluded by agencies, as well as parties declared ineligible under statutory or regulatory authority other than Executive Order 12549.

(I) Byrd Anti-Lobbying Amendment (31 U.S.C. 1352) - Contractors that apply or bid for an award exceeding $100,000 must file the required certification. Each tier certifies to the tier above that it will not and has not used Federal appropriated funds to pay any person or organization for influencing or attempting to influence an officer or employee of any agency, a member of Congress, officer or employee of Congress, or an employee of a member of Congress in connection with obtaining any Federal contract, grant or any other award covered by 31 U.S.C. 1352. Each tier must also disclose any lobbying with non-Federal funds that takes place in connection with obtaining any Federal award. Such disclosures are forwarded from tier to tier up to the non-Federal award.

(J) See § 200.323.

(K) See § 200.216.

(L) See § 200.322.

[78 FR 78608, Dec. 26, 2013, as amended at 79 FR 75888, Dec. 19, 2014; 85 FR 49577, Aug. 13, 2020]

END OF SUPPLEMENTARY CONDITIONS

SUMMARY OF WORK

This project involves the furnishing of all labor, materials, and services necessary to complete the construction of the ADDITIONS TO WEST CARTERET HIGH SCHOOL, Carteret County Schools, North Carolina as shown by the drawings and as specified herein.

CONSTRUCTION SCHEDULE

Each Prime Contractor shall coordinate his work with the others to complete his work, on schedule, within the specified time allowed. Within thirty days of award of Contracts to the successful Bidders, the General Contractor will prepare, with the assistance of each Prime Contractor, a Master Construction Schedule, in both bar chart and critical path method form, which shall be signed by each Contractor and become a requirement and part of the Contract Documents.

The Schedule shall include work by Architect and Owner, as may be required by the contractor (i.e. Critical shop drawing review, color selection, inspections, etc.).

The Master Schedule shall be created in electronic computer form using an industry-recognized “Critical Path Method” software program, and continuously maintained for the benefit and use of all Contractors and the Owner/Architect. The General Contractor shall submit to all parties, at each monthly meeting, printed reports, generated from the computer program file, indicating the current status of all project activities, including those of the other Contractors.

CONTRACTS

Contracts will be executed for each Prime Contractor on AIA Document A101, Standard Form of Agreement Between Owner and Contractor, as amended herein.

PAYMENTS

Payments to the Contractor will be made on the basis of ninety-five percent (95%) of monthly estimates approved by the Architect.

Bids shall include North Carolina sales and Use Tax or local sales and use tax. The Owner shall be entitled to reimbursement of taxes paid by Contractor on basis shown separately on monthly request for payment. At the time of delivery of the periodic monthly estimate and request for progress payments, the Contractor shall attach to such requests a statement which shall show the amount of sales tax paid by the Contractor upon purchases of building materials during the period covered by the progress payment request. A sworn statement by the Contractor shall be attached stating that the property upon which such sales taxes where paid was or will be used in the performance of the contract. Sales tax on purchases or rental of tools and equipment is taxable to the Contractor and shall not be included in the sworn statement. When applicable, file a Form E-589CI, Affidavit Of Capital Improvement. Refer to Section 01011, Supplementary Conditions, subparagraph 9.3.4 for additional requirements.

CONSTRUCTION PROCEDURES

The following Construction Procedures are to be implemented for this project:

1. The General Contractor shall be the Project Coordinator, and as such shall schedule and manage the entire work. Notify the Architect immediately upon any conflict with separate Prime Contractors.

2. The General Contractor shall coordinate with all Prime Contractors to prepare and submit to the Architect within two weeks following the date of the Notice to Proceed his proposed Progress Schedule for completing the Project in the specified time. Include critical shop drawing reviews, inspections, or other work to be scheduled with Architect or Engineer.

3. Approved Schedule shall be distributed to all other Prime Contractors by the General Contractor. Also, post copy in Contractor's field office. General Contractor shall keep other contractors, including his subcontractors, informed of his planned and actual progress, so that the Project Schedule can be maintained.

4. All other prime and sub-contractors shall organize their work to conform to this Schedule and see that all phases of the work progress as smoothly and efficiently as possible.

5. The General Contractor will coordinate the location of tool sheds and storage areas for all contractors within the limits of the site area designated or approved by the Owner.

6. All Contractors shall submit within twenty (20) days from the date of the Notice to Proceed a complete list of all subcontractors and material suppliers (including addresses), that they propose to use on this Project for Architect's and Engineer's approval.

7. All Contractors are requested to furnish the Architect with the name of their project manager, safety manager, and job foreman or superintendent who will be in charge of the work. These men will not be changed during the course of construction without prior notice to the Architect. Furnish Architect and Owner with name and home telephone number of job superintendent and project manager for emergency contact.

8. Architect will hold monthly meetings at the project site on a day and time to be determined. Each Contractor shall have his job superintendent and project manager present. The purpose of these meetings is to evaluate progress, resolve problems, and in general to help expedite construction. Meeting representatives must have authority to act on behalf of the Contractor.

9. See Specifications, Division 1, General Requirements, for information relative to the following:

    a. Schedules and Reports

    b. Samples and Shop Drawings

    c. LEED Requirements (THIS IS NOT A LEED PROJECT)

    d. Temporary Facilities and Controls

    e. Cleaning Up

    f. Project Close Out

10. To expedite handling paperwork, the following procedures shall be used:

    a. Shop drawings and submittals shall be submitted electronically individually via e-mail, in non-editable format PDFs, each with its own transmittal. Electronic submittals e-mail subject line will contain the project name, specification number, and product name. Each submittal will bear the contractor’s review stamps and a statement of deviations.

    b. Each Contractor shall submit to the Architect a cost breakdown of his contract on standard AIA form. Breakdown shall show labor and material. Upon approval by Architect and Engineer, this breakdown shall be used for progress payments.

    c. Contractor's payment period shall be from the twenty-fifth day of the month to the twenty-fifth day of the following month. Contractor shall forward to the Architect by the first of the following month his Application for Payment in PDF format, submitted electronically, with ink professional seals. Owner will make payments by the fifteenth of the month. Professional seals shall be ink stamped, not embossed.

d. Sales tax expenditures for each pay period shall be substantiated with an attached certified statement by the Contractor and each of his Subcontractors individually showing total purchases of material from each separate vendor and total sales taxes paid each vendor for the applicable period.

e. Payment for material stored on site will be approved upon verification of material and quantity. Payment will also be approved if material is stored in a bonded warehouse approved by the Architect and Owner and insured for its full value. Include insurance certificates and certificates verifying storage in bonded warehouse with Application for Payment of such materials.

f. Submit copy of Building Permit prior to or with submission of first Pay Application. Payments will be withheld until permit copy is submitted.

11. All materials and submittal data must be approved before Contractor proceeds with installing such items in the Project. All materials requiring color selection shall be submitted together. Contractor shall confirm in writing that color samples provided are current and available to select from. An incomplete color schedule will not be issued. All material samples must be submitted in order to make a complete, coordinated schedule.

12. Materials and compaction testing company shall be selected by the Owner. The Architect will notify the Contractor of the company and of the specific testing to be done. Based on these instructions, the Contractor will be responsible for notifying the testing company of individual tests to be made.

13. The Contractor shall issue daily electronic update reports, in PDF format, via e-mail, with descriptions of day's work performed, 3 photos minimum, weather conditions, parties on site with manpower counts, and equipment on site.

14. Notify Architect, Structural Engineer, and Testing Laboratory twenty-four (24) hours prior to pouring footings. Pours shall always be the maximum that can be properly handled in a day.

15. Inspection Reports from Architect or Engineers pointing up defective or unacceptable work shall be corrected immediately. Failure to do so will be cause to withhold monthly progress payments.

16. Each Separate Prime Contractor shall be responsible for removing his own waste material and job debris from the all construction areas and the site, fully coordinated with requirements of the Construction Waste Management Plan (CWMP). This shall be done continually. Failure to keep job site clean and safe for maximum working efficiency will be cause to withhold monthly progress payments. Failure to comply with the Construction Waste Management Plan (CWMP) will be cause to withhold monthly progress payments.

17. Construction workers will be properly dressed at all times on the site (shirts, shoes, etc.), and the use of foul language, vulgar or lewd gestures, or any other conduct deemed inappropriate by the Owner will be cause for immediate dismissal.

18. Working Schedule: Working hours shall be coordinated among all Prime Contractors. Advise Owner and Architect.

19. Claims: Follow General Conditions, as amended, for any claims for additional money or time. Claim must be made at time of discovery, time limits in accordance with these Conditions.

20. Final Inspection of Projects: It is the Contractor's responsibility to notify the Architect that the project is complete and to submit a list of discrepancies to be corrected. Following such notification, the Architect shall make a preliminary review of the project to verify completion. From the preliminary review, the Architect shall prepare a punch list of discrepancies for the

Contractor. Upon notification by the Contractor that the discrepancies have been rectified, the Architect shall schedule a formal final inspection with the Owner.

21. Record Drawings: One (1) complete set of working drawings will be maintained on the job site by the General Contractor. If any changes or deviations from these drawings are made by any Contractor, such Contractor shall indicate the change on the drawings using colored pencils or ink.

22. Safety Regulations: All Contractors shall abide by current OSHA Regulations at all times. Be advised that the Owner is obligated by these Regulations to report any known violations to OSHA.

23. Smoking is prohibited and not allowed on the construction site property.

DRAWINGS AND SPECIFICATIONS

The following principles shall govern the settlement of disputes which may arise over discrepancies in the contract documents.

1. As between written figures given on drawings and the scale measurements, the figures shall govern.

2. As between large-scale drawings, and small scale drawings, the larger scale drawings shall govern. Discrepancies noted shall be reported to the Architect before commencing work.

3. Where more than one item or procedure is specified or indicated, the Contractor shall provide the item of greatest expense or most stringent procedure.

Titles to divisions and paragraphs in the contract documents are introduced merely for convenience and shall not be taken as a correct or complete segregation of the several units of materials and labor. The Contractor shall see that each subcontractor is familiar with the entire work under this contract to the extent that it affects his portion of the work, as no responsibility is assumed by the Architect for omissions or duplications by the Contractor or his subcontractors due to real or alleged error in arrangement of material in these documents.

The plans and specifications are both a part of this contract and shall be considered cooperative. Any work called for by the plans and not hereinafter specified or vice versa, shall be executed by the Contractor as if specifically mentioned in both.

The drawings and specifications are to be used for this building only and are the property of the Architect; they are to be returned to him before the final certificates are given.

After award of Contract, drawings and specifications shall be obtained and /or downloaded by the General Contractor from the Hite Associates website, www.hiteassoc.com. Additional drawings and / or specifications may be purchased by contacting Speedyblue Reprographics at (252) 758-1616, print@speedyblue.com.

INTENT OF DRAWINGS

In making a Proposal, the Contractor acknowledges that the drawings are diagrammatic in nature, and agrees to provide complete and finished construction assemblies to comply with the Architect's intent and pertinent Building Codes, whether all parts or components of such assemblies are shown or not (for example, doors or frames shown on plan drawings but not scheduled or detailed otherwise shall be furnished, consistent with other doors or frames of type and material as would be reasonably inferable, complete with hardware).

For renovations and additions, the plans and specifications are intended to convey the broad scope of work that is to be included in the demolition scope and/or renovations scope of existing areas in the contract, they do not show every item or detail to be installed or removed. Provide complete and finished construction assemblies.

Bidders and their subcontractors must visit the site prior to bid to verify all existing conditions in areas to be renovated, including equipment platforms, to ascertain items to be removed or relocated to perform the work as shown and specified, and to provide complete assemblies. When available, existing building drawings are to be reviewed for concealed conditions. No allowance will be made for claims for additional cost or time based on conditions that are accessible for inspection.

STANDARD OF QUALITY, CONTRACT DEFINITION

The Standard of quality for all work shall be first class is all respects, in the opinion of the Project Architect and Project Engineer. In submitting a Bid, the Contractor agrees to abide by this Standard, and no other. Any work considered less than first class by the Architect/Engineer shall be corrected or removed and replaced as directed.

PROJECT MANAGER AND SUPERINTENDENTS, APPROVAL OF PERSONNEL

The Contractor shall provide resumes of proposed Project Manager and Superintendents to Owner, through Architect, for review and approval prior to assignment. Contractor shall submit only those candidates with a minimum of five years experience in the respective capacities proposed, with projects of similar size and scope.

FIELD SUPERVISION REQUIREMENTS

The Contractor is required to provide a full time Field Superintendent to supervise the work of their Contract and to be present, in the field, and not in a field office, at all times work is being performed by that Contractor or his Subcontractors, for the express purpose of providing continuous control of the quality and correctness of construction. In addition, the Contractor's Field Superintendent is required to provide general supervision and coordination of the work of all other Prime Contractors. This person is required to be equipped with a mobile telephone at all times. The Contractor shall issue daily electronic update reports, in PDF format, via e-mail, with descriptions of day's work performed, 3 photos minimum, weather conditions, parties on site with manpower counts, and equipment on site.

FIRE RATED CONSTRUCTION ASSEMBLIES

Where U.L., F.M., W.H.I., or other independent testing agency fire rated construction assemblies are referenced on the drawings, it shall be the Contractor's responsibility to meet the specific requirements of the assembly, as defined by State and Local Building Authorities.

MEASUREMENTS AND DIMENSIONS

Before ordering material or doing work which is dependent for proper size or installation upon coordination with building conditions, the Contractor shall verify all dimensions by taking measurements at the building and shall be responsible for the correctness of same. No consideration will be given to any claim based on differences between the actual dimensions and those indicated on the drawings. Any discrepancies between the drawings and/or the specifications and the existing conditions shall be referred to the Architect for adjustment before any work affected thereby is begun.

SAMPLES AND SHOP DRAWINGS

Each Contractor shall submit such samples of materials and examples of workmanship as are requested by the Architect to show quality and kind of material and work he proposes to deliver or perform in executing his contract.

Shop drawings and submittals shall be submitted electronically, in non-editable format PDFs, submitted via e-mail. Electronic submittals e-mail subject line will contain the project name, specification number, and product name.

Coordinate LEED submittals with general submittal requirements. Refer to Section 01405 LEED Requirements.

Contractors shall make all submittals promptly after award of contract. Submittals requiring color selection shall be made no later than 60 days after award of contract. Contractor and manufacturer shall confirm in writing that color samples provided are up-to-date, current and can be provided.

All material requiring color selection shall be submitted for review before any colors are selected. The Contractor shall allow 45 days after all submittals are made and all color samples received for the Owner to make selections, and schedule his submittals accordingly.

OWNER SYSTEM TRAINING SESSIONS

Each Contractor shall have factory trained and certified product representatives provide equipment and system training sessions for the Owner for each product and system. Sufficient training shall be provided to the extent that each Owner attendee is fully versed on the product and/or system and can be a designated “trained” participant, and that each participant can demonstrate the ability to operate each product and system in total variety of operations. Provide multiple training sessions if such is required to be certified as fully trained personnel. An Owner Training Certification is to be provided. Submit an affidavit that each required Owner training session has been performed. Submitted affidavit to include sign-up log of attendees/trainees and description of system or product, cross referenced to the specific contract document.

TEMPORARY FACILITIES

This section covers the furnishing of all appliances, labor, materials, tools, transportation and services required to perform and complete all preliminary work and temporary construction required for the building and site as indicated.

Storage - Each Contractor shall provide such temporary structures as are required for the protection of persons and property. On barricades where necessary, lights shall be maintained at night.

Field Office - General Contractor shall provide and maintain a full time field office construction trailer at the site, equipped with heat, lights, plan desks and telephones. Office shall be sufficient size for use by this Contractor and for on-site meetings with a separate office provided specifically for the Architect's Representatives.

Scaffolds, Tolls, etc. - Each Contractor shall erect and provide all necessary platforms and scaffolds of ample strength required for the handling of materials and equipment such as ladders, horses, poles, planks, ropes, wedges, centers, etc.

Staging: The location of trailers and material storage areas shall be approved by the Architect. Each Prime Contractor will be responsible for repair and testing of the paving base if damaged by his staging activities.

Working Hours: Single or separate prime contractors may set their own working hours, provided, however, that the Project is under supervision by the General Contractor at all times work is being performed.

Sanitation: The General Contractor shall provide and maintain temporary toilets as necessary for use of all workmen. Locate toilets where directed, keep in sanitary condition, and comply with the requirements of the local public health authority.

OSHA

It shall be the responsibility of all contractors to conform to the latest edition of Safety Standards for construction by "OSHA".

CUTTING AND PATCHING / REPLACE

All cutting and patching throughout Project shall be done by the trade requiring the cut. Patching of work or areas affected by cutting, digging and fitting shall be done by mechanics skilled in the applicable trades and shall match surrounding or adjoining similar work. If the quality of the cutting and patching work is not first class and, in the opinion of the Architect, not acceptable, the Contractor will be required to have this work done by the General Contractor, who will be reimbursed for the cost thereof.

Where documents indicate the terms “replace” or “replacing” of any item or system, the items or system called out to be replaced shall be removed in their entirety complete, by the trade performing the replacement.

CLEANING UP

Each Prime Contractor shall be responsible for keeping the project clean and free of hazardous working conditions. Remove scrap or surplus materials and keep stored materials in a neat and orderly fashion, minimum once weekly.

The General Contractor shall advise all subcontractors and separate prime contractors of their responsibility to keep their part of the project clear and free of accumulated debris.

After completion of Utility Platforms and Main Boiler and Electrical Room construction by all contractors, the General Contractor shall provide a complete vacuuming and wipe down of all mechanical and electrical equipment, including ductwork. The General Contractor shall then provide two coats of clear polyurethane floor sealer as specified to these spaces, after approval of the condition of each space by the Architect.

At the completion of work, the entire project shall be left clean and ready for occupancy. All finished surfaces shall be cleaned, polished, waxed and left in first class condition.

CONSTRUCTION WASTE MANAGEMENT: WASTE AND RECYCYLING

The General Contractor shall be responsible for developing and implementing a Construction Waste Management Plan (CWMP) that identifies the materials to be diverted from disposal and their quantities by weight in order to divert a minimum of 75% of all construction and demolition debris. The GC shall submit monthly progress reports indicating quantities disposed and quantities diverted along with each Payment Application. The GC shall also be responsible for providing separate recycling collection containers for disposal and recycling of non hazardous construction and demolition waste. All containers must be clearly labeled with a list of acceptable and unacceptable materials that meet the requirements of the recovery facility or recycling processor, to which the materials shall be hauled. The General Contractor shall provide on site instruction of appropriate separation, handling, and recycling, and return methods to be used by all contractors. These containers shall be maintained on a regular schedule by either the GC or a GC contracted service. If the contracted service provides off-site sorting services, then waste may be commingled on site per the contracted services specifications. If commingling on site is not permitted, then containers are to be provided for the following materials:

1. Concrete waste
2. Brick and CMU (shall be recycled)
3. Wood and Wood Products
4. Cardboard (shall be recycled)
5. Steel and Metals (shall be recycled)

PROJECT CLOSEOUT

Prior to issuance of a Certificate of Final Payment, unless otherwise noted, each Prime Contractor will be required to deliver to the Architect the following items, in encrypted electronic PDF format, indexed with a hyperlinked Table of Contents. All professional seals shall be stamps, not embossed. Files to be submitted on an electronic storage device. All warranties requiring signatures for execution, shall be submitted in paper format.

1. Certificate Of Occupancy issued by the jurisdiction having authority.

2. Fully executed final Change Order, reconciling all project allowances.

3. Submit five copies of Final Application for Payment, AIA Documents and Final Sales Tax Report collated and stapled together.

4. AIA Document G 706/Contractors Affidavit of Payment of Debts and Claims, and AIA Document G 706 A/Contractors Affidavit of Release of Liens, properly executed, notarized, with no exceptions.

5. Consent of Surety to Final Payment.

6. Certificate of Compliance. Each Prime Contractor shall furnish the Architect a certificate, duly notarized, stating that he has constructed his part of the work of the project in complete compliance with the Drawings and Specifications.

7. Each Prime Contractor shall furnish to the Owner through the Architect a certificate, duly notarized, stating that "no hazardous materials, including lead, asbestos, or PCBs, have been used in the work of the Contract".

8. Each Prime Contractor shall furnish to the Owner through the Architect in triplicate, duly notarized, an unconditional Warranty to guarantee his work free from defects in materials and workmanship for a period of one year following Substantial Completion.

9. Operations and Maintenance Manuals indexed, shall be submitted in electronic format with items and sections hyperlinked to the O&M's Table of Contents. Provide paper copies of product warranties.

10. As-Built drawings. Each prime contractor shall deliver to Architect one complete set of as-built drawings. Changes in the work shall be marked in red on a new set of drawings.

11. Transmittal of keys to Principal, acknowledgement signed by Principal, and Finish Hardware Bitting List.

12. Final Color Finishes Schedule.

13. Owner Training Certification: Submit affidavit that each required Owner training session has been performed. Submitted affidavit to include sign-up log of attendees and description of system or product cross referenced to the specific contract document.

14. Process and deliver to the Architect all product guarantees and warranties, materials and testing certificates, etc., as required by various sections within these specifications and by various agencies having jurisdiction over the Work, indexed.

Do not make separate submittals of the above. Incomplete submittals will be returned to the Contractor.

END OF SECTION

Contractor is required to use the provided "Contractor Sales Tax Report Of NC State And Local Taxes Paid". Report shall be provided for each pay period, as an attachment to the contractor's Payment Application.

GO TO NEXT PAGE

CONTRACTOR'S SALES TAX REPORT OF NC STATE AND LOCAL TAXES PAID DATE: _____

CONTRACTOR: _____ OWNER: _____
ADDRESS: _____ PROJECT: _____
_____ PERIOD FROM: _____
TO:

* County is the county of delivery or county in which the contractor directly picked up the merchandise. 4.75%

VENDOR	ADDRESS	SUMMARY OF ITEMS PURCHASED	INVOICE NUMBER	INVOICE DATE	INVOICE AMOUNT	NC TAXES	COUNTY TAXES	TOTAL TAXES	*NAME OF COUNTY
TOTAL					-	-	-		

NOTE: ATTACH COPIES OF INVOICES AS DESCRIBED ABOVE

I,_____, certify that the foregoing statement of applicable sales taxes paid in connection with the referenced contract is true to the best of my knowledge and belief.

By: _____ Title: _____

I, _____, Notary Public for _____ County, State of _____, do hereby certify that _____ personally appeared before me this day and acknowledged the due execution of the foregoing instrument.

Witness my hand and official seal, this the _____ day of _____, 20___.

_____
Notary Public (Official Seal)

Printed Name _____
My commission expires _____, 20___

1. **CONFLICT OF GRADE**: It is intended that the water mains be installed with a minimum of 36"inch cover, but the contractor is notified that he will be required to install the water mains with more than 36-inch cover as required in order to avoid conflicts.

2. **THRUST RESTRAINT**: Concrete blocking shall be installed as required at all tees, bends, etc., for all pipes unless otherwise directed. No separate payment shall be made for thrust restraint.

3. **CONNECTION TO AHJ (Authority Having Jurisdiction) OWNED FACILITIES**: No connection to or alteration (including operation of valves, hydrants, etc.) of the AHJ (Authority Having Jurisdiction) facilities shall be performed without the AHJ specific approval. All pipe, valves, taps, fittings, etc. which could possibly contaminate the AHJ's facilities shall be thoroughly disinfected prior to their use. Excavations for such connections shall be kept completely dewatered and the utmost care exercised to avoid contamination of AHJ owned facilities.

4. **SALVAGE OF AHJ OWNED FACILITIES**: When project work results in removal of AHJ owned facilities and equipment, the Contractor shall be required to deliver those facilities or equipment undamaged to the AHJ's Operation Center, if requested to do so by AHJ.

5. **NOTIFYING UTILITIES COMPANIES**:

5.1 In accordance with the Underground Damage Prevention Act, the Contractor shall, within a time frame of not less than 2 or no more than 10 working days prior to the start of any excavation within any public right of way or private easement areas owned by a utility company, notify each utility owner having underground utilities in the area to be excavated of the following information:

1. Name, address, and telephone number of the person serving the notice.
2. Name, address, and telephone number of the company that will be performing the excavation.
3. Anticipated starting date of the excavation and duration.
4. Type of excavation to be conducted.
5. Location of excavation.
6. Whether or not explosives will be used.

7. Contractor shall notify NC One Call, Greensboro, N.C. at least 48 hours prior to commencing construction in order that existing utilities in the area may be flagged or staked. The toll-free number is 1-800-632-4949. This service will in no way relieve Contractor of his responsibility to protect and maintain all existing utilities in an operational manner. Utilities location by NC One Call is not valid after the expiration of a 10-day period beginning on the date of such location.

5.2 **Responsibilities during Construction**: In addition to serving notice of intent to perform excavation, the Contractor shall:

1. Plan the excavation to avoid damage and to minimize interference with underground utilities in and near the construction area to the best of his abilities;

2.Maintain a clearance between an underground utility and the cutting edge or point of any mechanized equipment, taking into account the known limit of control of that cutting edge or point, as is reasonably required to avoid damage; and

3. Provide support for the underground utilities in or near the construction area, including backfill, as may be reasonably required by the utility owner for the protection of the underground utilities.

4. When excavation by the Contractor results in known damage to an underground utility, the Owner of the utility shall be notified immediately and the utility given a reasonable time in which to repair the damage before the Contractor proceeds with excavation in the immediate area of the damage.

5.3 **Responsibility of Utility**: Once notified, each utility must, prior to the day designated by the

Contractor as the anticipated start date, provide the Contractor with the following information:

1. The location of the utility;
2. The location and description of all utility markers;
3. Any other information that would assist in locating the utility, including temporary markers when necessary.

5.4 **Failure to Respond**: If the utility fails to respond to the Contractor's notice or fails to properly locate its underground utilities, the Contractor is free to proceed with excavation. Neither the Contractor nor Owner is liable for damage to utilities if the Contractor exercises due care.

6. **CONSTRUCTION STAKE-OUT**:
The construction staking shall be performed by a Registered Land Surveyor at least twenty-four (24) hours and three hundred feet (300') in advance of construction and shall identify the party responsible for payment for same.

The staking will include waterline, valves and fire hydrant stakeout; sanitary sewer stakeout; water and sewer services; rough grade staking; curb and gutter staking; storm drainage structure staking.

7. **TRAFFIC CONTROL**: The Contractor shall be responsible for maintaining an approved traffic control plan during the course of this work. The traffic control plan implemented for this project shall be devised through a joint effort of the NCDOT and the Contractor immediately prior to construction. In all instances, however, the Contractor shall be required to furnish, place, and maintain all signs, barricades, cones, and other traffic handling devices necessary to implement the traffic control plan.

8. **PROJECT SCHEDULE**: The Contractor shall be required to furnish an anticipated schedule of work at the time of the pre-construction conference. In addition, the Contractor shall be required to furnish bi- weekly updates of the schedule of work.

9. **FINAL CLEAN-UP**: The Contractor shall clear all streets, curbs, gutters, driveways and other contract items of all dirt and debris before final inspection will be made. The Owner will not inspect the improved area until they are cleaned.

10. **USE OF A PORTION OF THE WORK**: Whenever, in the opinion of the Engineer, any portion of the work is completed, or is in an acceptable condition for use, it shall be used for the purpose intended. Such use shall not be held in any way as an acceptance of that portion of the work used, or as a waiver of any of the provisions of these specifications. Necessary repairs or renewals in any section of the work due to defective materials, defective workmanship, or natural causes, under the instructions of the Engineer shall be performed by the Contractor at no additional cost to the Owner.

11. **SPECIAL AREAS**: Special access to construction other than existing easements or rights-of-ways shall be the responsibility of the Contractor and he shall be liable for all special agreements.

12. **MOBILIZATION**: Shall be accomplished in accordance with Section 800 of the N.C. State Highway Specifications for Roads and Structures except that there will be no compensation for mobilization as a line item.

13. **TEMPORARY TOILETS**: Provide temporary toilet facilities for use of all workmen. Insure temporary toilet facilities comply with local and State sanitation laws and regulations. Use of existing facilities by Contractor is not permitted.

14. **DRAWINGS SHOWING CHANGES DURING CONSTRUCTION**: The Contractor shall maintain a set of plans and specifications marked "Construction Record Drawings". The Contractor shall keep a complete and up-to-date record in red pencil of any and all changes made during

construction. This set of Contract Documents shall be submitted to the Engineer and approved by him prior to the Engineer recommending final payment.

15. **PRECONSTRUCTION CONFERENCE**: Conference shall be held in the AHJ at a designated place, after acceptance of proposals. Engineer will notify Contractor of time and date of meeting.

Prior to commencing any water or sewer extension construction work, the Department Engineer shall be contacted to schedule a preconstruction conference. No construction shall occur until after the preconstruction conference is held.

16. **WORK IN NORTH CAROLINA RIGHT-OF-WAY**: A bond shall be posted with the State of North Carolina for ten percent (10%) of the cost of construction within the right-of-way. This bond shall be posted prior to commencement of work.

17. **NORMAL WORK HOURS**: Unless special written consent is issued by the AHJ, all construction shall be performed during the regular office hours of the AHJ, i.e. 8:00 a.m. to 5:00 p.m. After hours, holiday, or weekend work should include only such tasks that do not require observation by the AHJ's Representative. Under certain conditions, the AHJ may agree to provide construction observation after hours or on weekends and holidays. The Contractor shall bear the costs of provision of such construction observation.

18. **OPERATION OF EXISTING FACILITIES**:

1. The Contractor performing water or sewer extension work shall contact the Department Engineer whenever operation of the AHJ's valves or hydrants is necessary to request scheduling of such operation. The AHJ shall require the Contractor to estimate the length of time service will be interrupted and the number of customers to be affected.

2. Facilities and equipment belonging to the AHJ may not be operated or adjusted without the express permission of the AHJ's Representative. In the case of any emergency, the Contractor shall be allowed to take such steps with valves and hydrants as necessary for the protection of life and property.

3. Valves which control networks not yet accepted but which are connected to the existing system shall be considered system valves. Valves within a network not yet accepted and which do not control the flow of water between new and existing systems are not considered system valves and do not require permission to operate.

4. Notification to the AHJ must be made by the Contractor upon breakage of any AHJ maintained water or sewer line or appurtenance thereof. Repair of the AHJ's facilities shall be made by the Contractor upon approval of the Department Engineer. Any repairs made with AHJ forces will be billed to the contractor at cost.

5. Where interruption of service is required, the AHJ shall be notified to request approval and subsequent scheduling of such interruption. The AHJ shall notify the affected customers should the interruption be approved.

19. **Project Close-out**:

A.. Pre-final Inspection: upon the completion of construction, the Contractor or Developer shall contact the AHJ to schedule a pre-final inspection. A pre-final inspection will not be scheduled until the following requirements are met:

a. The work shall be in accordance with the requirements of the AHJ.
b. A copy of the final estimate has been submitted and approved by the AHJ.
c. The easements and dedicated property required for the work by this Manual have been obtained and are recorded at the Register of Deeds.

d. The As- built drawings for the work have received the approval of the Department Engineer.
e. All fees applicable to the project have been received by the AHJ.
f. When a project includes sewer system extension(s), the AHJ has received certification by a Professional Engineer stating that the sewer system installation conforms with the requirements of the approved Contract Documents as required by Section .0219 of the DEHNR regulations (G.S. 143-215.1).
g. When a project includes water system extension(s), the AHJ has received certification by a Professional Engineer stating that the water system installation conforms with the requirements of the approved Contract Documents as required by Section .0903 of the NCDHS regulations (G.S. 130A-315; 130A-317).

At the scheduled pre-final inspection, the Department Engineer shall perform a visual inspection in the presence of the representatives of the Contractor and the Engineer. The Engineer or his representative shall prepare a detailed punch list of any deficiencies discovered and provide copies to the Developer, Contractor, and the AHJ. Any defective items noted shall be corrected prior to acceptance.

B. Final Inspection: upon completion of the items on the punch list, the Contractor or Developer shall contact the AHJ to schedule the final inspection. Any remaining defective items shall be noted and corrected prior to acceptance. No service shall be provided prior to project acceptance.

*****END OF SECTION*****

GENERAL

The Base Bid constitutes the primary choice of the Owner with respect to the pertinent specifications for construction, materials, equipment and supplies. The Owner reserves the right to accept or reject any or all Alternates, in any combination with the Base Bid, in accordance with the general provisions of the Contract for Construction.

See Form of Proposal for complete description of Alternates.

END OF SECTION

GENERAL

CASH ALLOWANCES:

The Contractor shall include a CASH ALLOWANCE in his bid of $570,000 to include labor, tax, and freight. The Owner reserves the right to bid the work or select subcontractors, and to credit the balance of the allowance at the completion of the Contract. Unit Prices listed on Bid Form of Proposal, Sitework Material allowances, and Form of Contract include all costs, including overhead and profit costs, and shall not be listed as a separate cost when unit prices and materials allowance materials are used or credited.

The work and items covered in the CASH ALLOWANCE are indicated in the plans and specifications, and include

- Testing and Special Inspections
- BDA Emergency Responders Radio Coverage system, testing and equipment as required
- Project sign and permanent signage inside and out
- Center Court School Mascot Image
- Video monitors or projectors with brackets
- Building equipment
- Fire alarm repair work
- Hazardous Material Abatement (Design, Monitoring & Contractor)
- Other items or work directed by the Owner

Equipment or items which are specified and not noted to be a part of an ALLOWANCE are to be priced and included in bid separately.

BUILDING PERMITS and all other permit costs shall be determined by Bidders and provided for in Bids.

MATERIAL ALLOWANCES:

1. Mass undercut for building pads and pavement areas: General Contractor shall provide in his bid 300 cubic yards of mass undercut, disposal off site, and select off-site borrow backfill, compacted in place, as directed by the Geotechnical Engineer. Specified stripping of site as indicated in Geotechnical Report and fill as indicated by finished construction grades is NOT a part of this allowance. Geotechnical Report recommendations for removal of wood/rootmat material subgrade layers, as a component of stripping and site clearing operations, is NOT a part of this allowance.

2. Foundation undercut: General Contractor shall provide in his bid 50 cubic yards of localized undercut installed for building foundations and floor slabs, disposal off site, with backfill of #57 or #67 washed stone, in addition to the specific requirements on the Structural Plans.

NOTE: THESE MATERIAL ALLOWANCES WILL BE MEASURED AND MONITORED BY THE OWNER'S TESTING AGENCY. AMOUNTS NOT USED WILL BE CREDITED BACK TO THE OWNER AT THE UNIT PRICE INDICATED ON FORM OF PROPOSAL. AMOUNTS USED IN EXCESS OF THESE ALLOWANCES WILL BE CHARGED TO THE OWNER AT THE SAME UNIT PRICES.

END OF SECTION

The recommendations of the Geotechnical Subsurface Report shall be and are the requirements of the Work, AS MODIFIED HEREIN.

All bidders are advised to carefully review the soil conditions of the project site and the site itself, and shall take into account in their bid, conditions that will require weatherproofing of the building pad or areas outside the building pad, with stone or other materials to allow construction to continue in wet weather, and to provide off site select backfill for trenches where natural soils may not reach specified compaction.

Geotechnical Engineering Report

West Carteret High School Additions
Morehead City, Carteret County, NC
February 25, 2022
Terracon Project No. 72215116

Prepared for:
Hite Associates, P.C.
Greenville, NC

Prepared by:
Terracon Consultants, Inc.
Greenville, North Carolina

February 25, 2022

Hite Associates, P.C.
2600 Meridian Drive
Greenville, NC 27834

Attn: Mr. James G. (Jimmy) Hite, AIA NCARB, LEED, ®AP
P: (252) 714-9970
E: jgh@hiteassoc.com

Re: Geotechnical Engineering Report
West Carteret High School Additions
4700 Country Club Road
Morehead City, Carteret County, NC
Terracon Project No. 72215116

Dear Mr. Hite:

We have completed the Geotechnical Engineering services for the above referenced project. This study was performed in general accordance with Terracon Proposal No. P71215116 dated September 28, 2021. This report presents the findings of the subsurface exploration and provides geotechnical recommendations concerning earthwork and the design and construction of foundations, floor slabs, and pavements for the proposed project.

We appreciate the opportunity to be of service to you on this project. If you have any questions concerning this report or if we may be of further service, please contact us.

Sincerely,
Terracon Consultants, Inc.

Justin L. DeNicola, P.E.
Project Engineer

Andrew J. Gliniak, PE
Project Engineer
Registered NC 042183

James (Jim) D. Hoskins, III, PE
Sr. Principal / Office Manager (Greensboro, NC)

REPORT TOPICS

Note: This report was originally delivered in a web-based format. **Orange Bold** text in the report indicates a referenced section heading. The PDF version also includes hyperlinks which direct the reader to that section and clicking on the ***GeoReport*** logo will bring you back to this page. For more interactive features, please view your project online at client.terracon.com.

ATTACHMENTS

Note: Refer to each individual Attachment for a listing of contents.

REPORT SUMMARY

Topic [1]	Overview Statement [2]
Project Description	This project consists of constructing three new building additions, a gymnasium and new paved parking areas. The buildings will range in size from approximately 7,000 to 14,900 square feet. The gymnasium and two of the proposed building additions will be located on the north end of the existing school while the storage building will be located on the east end of the existing school. The proposed pavement area will be located east of the existing school.
Geotechnical Characterization	The exploration encountered very loose to medium dense sand underlain by denser sand at approximately 50 feet below existing grades. A layer of very soft to medium stiff clay was encountered from approximately 30 to 40 feet below existing grades. Groundwater is anticipated at a depth of approximately 6.5 feet below existing grades.
Geotechnical Overview	Shallow foundations can be used for the relatively low design loads of the classroom additions. Deep foundations, such as helical piers, are recommended to support the proposed gymnasium foundations due to the heavier anticipated column loads. Ground improvement with aggregate piers could also be considered to support the gymnasium on shallow foundations. Values for helical piers capacities or bearing capacity after aggregate pier installation are typically provided by the respective specialty foundation contractor.
Earthwork	After stripping, the exposed subgrade soils in the building and pavement footprints should be densified in place using a medium weight vibratory roller. The purpose of the vibratory rolling is to densify the exposed subgrade soils for floor slab and pavement support and to potentially improve the foundation bearing soils.
Shallow Foundations	Allowable bearing pressure (classroom additions) = 1,500 psf Expected settlements: < 1-inch total, <1/2-inch differential settlement
Deep Foundations	Helical piers should be installed to a minimum depth of 50 feet below existing grade to ensure adequate development into the denser sand material. Lateral resistance should be obtained from the grade beam/pile caps to the surrounding soil.
Pavements	With subgrade prepared as noted in **Earthwork**. Concrete: ■ 5 inches Portland Cement Concrete (PCC) in Light and Medium Duty areas Asphalt: ■ 2 inches Asphaltic Concrete (AC) over 6 inches granular base in Light Duty areas ■ 3 inches AC over 8 inches granular base in Medium Duty areas A geosynthetic may be needed for subgrade stabilization in some areas.
General Comments	This section contains important information about the limitations of this geotechnical engineering report.

1. If the reader is reviewing this report as a pdf, the topics above can be used to access the appropriate section of the report by simply clicking on the topic itself.
2. This summary is for convenience only. It should be used in conjunction with the entire report for design purposes.

Geotechnical Engineering Report

West Carteret High School Additions
4700 Country Club Road
Morehead City, Carteret County, NC

Terracon Project No. 72215116
February 25, 2022

INTRODUCTION

This report presents the results of our subsurface exploration and geotechnical engineering services performed for the proposed West Carteret High School Additions project located at 4700 Country Club Road in Morehead City, Carteret County, NC. The purpose of these services is to provide information and geotechnical engineering recommendations relative to:

- Subsurface soil conditions
- Groundwater conditions
- Site preparation and earthwork
- Excavation considerations
- Foundation design and construction
- Seismic site classification
- Floor slab design and construction
- Pavement design and construction

The geotechnical engineering Scope of Services for this project included the advancement of 14 test borings to depths ranging from approximately 5 to 50 feet below existing site grades.

Maps showing the site and boring locations are shown in the **Site Location** and **Exploration Plan** sections, respectively. The results of the laboratory testing performed on soil samples obtained from the site during the field exploration are included on the boring logs and as separate graphs in the **Exploration Results** section.

SITE CONDITIONS

The following description of site conditions is derived from our site visit in association with the field exploration and our review of publicly available geologic and topographic maps.

Item	Description
Parcel Information	The project is located at West Carteret High School, 4700 Country Club Road in Morehead City, Carteret County, NC. See **Site Location**.
Coordinates	N 34.7377°, W 76.7866° (approximate)
Existing Improvements	Existing public-school buildings, asphalt paved parking lots and driveways, concrete sidewalks, and grassed sports fields.

Item	Description
Current Ground Cover	Asphalt paved parking lots and grass with some trees in landscaped areas.
Existing Topography	Relatively level in elevation ranging from 19 to 22 feet MSL based on publicly available GIS information.
Geology	Coastal Plain Physiographic Region. See **Geology**.

We also collected photographs at the time of our field exploration program. Representative photos are provided in our **Photography Log**.

PROJECT DESCRIPTION

Our final understanding of the project conditions is as follows:

Item	Description
Information Provided	Project details and structural loading were obtained from your emails on September 21, 2021 that included a site plan, and during the Client Kickoff Meeting on October 12, 2021. Updated structural loading information for the gymnasium was provided via email on December 8, 2021.
Proposed Structures	The new additions will include the following ■ A proposed one-story building addition, approximately 14,900 square feet. The building is anticipated to have science and ROTC classrooms. ■ A proposed one-story gymnasium, approximately 13,300 square feet. ■ A proposed one-story building addition, approximately 6,400 square feet. The building is anticipated to be a band room. ■ A proposed one-story building addition, approximately 7,000 square feet. The building is anticipated to be storage and office space.
Building Construction	The buildings will be metal framed structures with flooring consisting of a concrete slab on grade.
Finished Floor Elevation	Assumed to be at or near the finished floor elevation of the existing buildings
Maximum Loads (Provided by Structural)	■ Columns: ○ Up to 167 kips (compression) for the proposed gymnasium ○ Up to 30 kips (compression) for single story classrooms ○ Up to 8 kips per linear foot in shear ■ Walls: less than 3 kips per linear foot (klf) ■ Slabs: less than 100 pounds per square foot (psf)
Grading/Slopes	Up to 2 feet of cut and fill is assumed to be required to develop final grade.
Below-Grade Structures	None

Item	Description
Pavements	We assume both rigid (concrete) and flexible (asphalt) pavement sections will be considered and the pavement design period is 15 years and 20 years. Anticipated traffic is as follows: ■ Passenger Cars and Pick-ups: Approximately 200 vehicles per day ■ Buses: 60 per week ■ Trash Trucks: 3 per week ■ Tractor-trailer trucks: Less than 1 per week

GEOTECHNICAL CHARACTERIZATION

Geology

The project site is located in the Coastal Plain Physiographic Province. The Coastal Plain soils consist mainly of marine sediments that were deposited during successive periods of fluctuating sea level and moving shoreline. The soils include sands, silts, and clays with irregular deposits of shells, which are typical of those lain down in a shallow sloping sea bottom. Recent alluvial sands, silts, and clays are typically present near rivers and creeks.

According to USGS Mineral Resources On-Line Spatial Data based on the 1998 digital equivalent of the 1985 Geologic Map of North Carolina updated in 1998, the site is mapped within the Surficial Deposits Formation (Undivided).

Subsurface Profile

We have developed a general characterization of the subsurface conditions based upon our review of the subsurface exploration, laboratory data, geologic setting and our understanding of the project. This characterization, termed GeoModel, forms the basis of our geotechnical calculations and evaluation of site preparation and foundation options. Conditions encountered at each exploration point are indicated on the individual logs. The individual logs can be found in the **Exploration Results** section and the GeoModel can be found in the **Figures** section of this report.

As part of our analyses, we identified the following model layers within the subsurface profile. For a more detailed view of the model layer depths at each boring location, refer to the GeoModel.

Model Layer	Layer Name	General Description
1	**Sand**	Very loose to medium dense sand with varying amounts of silt and clay
2	**Clay**	Very soft to medium stiff lean clay with sand
3	**Underlying Sand**	Dense sand

Groundwater

Groundwater was detected in boring samples during drilling at a depth of approximately 6.5 feet below the existing ground surface. Mud rotary drilling techniques were used to advance the borings which can obscure the detection of water levels. For a more accurate levels of groundwater, long term readings could be obtained by installing piezometers and taking weekly readings.

The groundwater level can change due to seasonal variations in the amount of rainfall, runoff, ditch or pond water levels, and other factors not evident at the time the exploration was performed. It is not unusual for ground water to be within a few feet of the ground surface during times of the year in this region. The possibility of groundwater level fluctuations should be considered when developing the design and construction plans for the project.

GEOTECHNICAL OVERVIEW

The subsurface exploration encountered very loose to medium dense sand and very soft to medium stiff clay underlain by dense sand at a depth of approximately 50 feet beneath the existing ground surface. The clay layer was encountered at a depth of approximately 32 to 42 feet beneath the existing ground surface in boring B-4.

After stripping topsoil and once any areas of cut are excavated to proposed subgrade elevation, the exposed subgrade soils in the building and pavement footprints should be densified in place using a medium weight vibratory roller within 30 feet of the proposed structures. The purpose of the rolling is to densify the exposed subgrade soils for floor slab and pavement support and to potentially improve the foundation bearing soils. Areas with less than 2 feet of structural fill planned after site preparation could require additional repairs, especially in the vicinity of B-1 and B-6 due to the low SPT N-values exhibited in the upper 3 to 5 feet.

Following the recommended **Earthwork**, the building additions (excluding the gymnasium) may be supported on shallow foundations bearing on densified existing soils or structural fill compacted as recommended and sized for a maximum net allowable soil bearing pressure of 1,500 psf. The **Shallow Foundations** section addresses support of the building bearing on densified existing soils or structural fill.

The heavier column loads anticipated for the gymnasium addition will result in excessive settlements if founded on a typical shallow foundation system. The foundations of the gymnasium addition should be supported by a deep foundation system such as helical piers or on a typical shallow foundation system after implementation of ground improvement such as aggregate piers. The **Deep Foundations** sections address the support of the gymnasium on helical piers. The **Floor Slabs** section addresses slab-on-grade support of the gymnasium.

A rigid or flexible pavement system is suitable for this site. The **Pavements** section addresses the design of pavement systems supported on the densified existing soils or structural fill.

The **General Comments** section provides an understanding of the report limitations.

EARTHWORK

Earthwork is anticipated to include clearing and grubbing, excavations, densification, and fill placement. The following sections provide recommendations for use in the preparation of specifications for the work. Recommendations include critical quality criteria, as necessary, to render the site in the state considered in our geotechnical engineering evaluation for foundations, floor slabs, and pavements. Grading for the structure should incorporate the limits of the proposed structure plus 5 feet beyond proposed perimeter building walls and any exterior columns.

Site Preparation

Site preparation should begin with the complete removal of surface vegetation and topsoil in the proposed building footprints and pavement areas. Based on site observations during the drilling process, topsoil and surface vegetation in the proposed building footprint and pavement areas should be stripped to a depth of approximately 3 to 4 inches. The Geotechnical Engineer should field verify the stripping depth and existing fill material suitability during construction. Topsoil may be reused in areas of the site to be landscaped but should not be used as structural fill or backfill.

After stripping and removing topsoil and once any areas of cut have been excavated to proposed subgrade elevation, the exposed subgrade soils in the building and pavement footprints should be densified in place using a medium weight vibratory roller. The purpose of rolling is to densify the exposed subgrade soils for floor slab and pavement support and to potentially improve the foundation bearing soils. The roller should make at least six passes across the site, with the second set of three passes perpendicular to the first set of three passes. If water is brought to the surface by rolling, the operation should be discontinued until the water subsides. Rolling should be completed during dry weather. As previously mentioned, additional repairs may be needed in the areas of B-1 and B-6 due to the low SPT N-values exhibited by the soils encountered in the borings.

After vibratory rolling, pore pressures should be allowed to dissipate for a minimum of 16 hours. After the waiting period, proofrolling should be performed on the exposed subgrade soils in areas to receive fill or at the subgrade elevation with a loaded, tandem-axle dump truck (20 ton total vehicle weight) or similar rubber-tired construction equipment. Proofrolling is recommended as a means of detecting areas of soft or unstable subgrade soils. The proofrolling should be performed during a period of dry weather to avoid degrading an otherwise suitable subgrade. The proofrolling operations should be observed by a representative of the geotechnical engineer. Subgrade soils that exhibit excessive rutting or deflection during proofrolling should be repaired as directed by

the field representative. Typical repairs include overexcavation followed by replacement with either properly compacted fill or by a subgrade stabilization fabric in conjunction with a sand fill or crushed stone as previously mentioned.

Fill Material Types

Earthen materials used for structural fill should meet the following material property requirements.

Soil Type [1]	USCS Classification	Acceptable Location for Placement
Imported Soil	SC, SM, SP,	All location and elevations.
On-Site Soils	SC, SM, SP	All locations and elevations.

1. Structural fill should consist of approved materials free of organic matter and debris. Frozen material should not be used, and fill should not be placed on a frozen subgrade. A sample of each material type should be submitted to the Geotechnical Engineer for evaluation prior to use on this site.

Clay soils are not recommended for use as structural fill due to their high fines content and moisture sensitivity relative to the sandy soils that are available. Clay soil could be considered for use as general fill.

Fill Compaction Requirements

Structural fill should meet the following compaction requirements:

Item	Structural Fill	General Fill
Maximum Lift Thickness	9 inches or less in loose thickness when heavy, self-propelled compaction equipment is used 4 to 6 inches in loose thickness when hand-guided equipment (i.e. jumping jack or plate compactor) is used	Same as Structural fill
Minimum Compaction Requirements [1, 2, 3]	98% of maximum within 1 foot of finished subgrade. 95% of maximum greater than 1 foot below finished subgrade	92% of maximum

Item	Structural Fill	General Fill
Water Content Range [1, 3]	-3% to +3% of optimum	As required to achieve min. compaction requirements

1. Fill should be tested for moisture content and compaction during placement. If in-place density tests indicate the specified moisture or compaction limits have not been met, the area represented by the tests should be reworked and retested as required until the specified moisture and compaction requirements are achieved.
2. It is not necessary to achieve 95% compaction on the existing ground prior to placing fill or beginning construction. However, the subgrade should be evaluated by a representative of the geotechnical engineer prior to placing fill or beginning construction.
3. Maximum density and optimum water content as determined by the standard Proctor test (ASTM D 698).

Grading and Drainage

All grades must provide effective drainage away from the buildings during and after construction and should be maintained throughout the life of the structures. Water retained next to the buildings can result in soil movements greater than those discussed in this report. Greater movements can result in unacceptable differential floor slab and/or foundation movements, cracked slabs and walls, and roof leaks. The roofs should have gutters/drains with downspouts that discharge onto splash blocks at a distance of at least 10 feet from the buildings.

Exposed ground should be sloped and maintained at a minimum 5% away from the buildings for at least 5 feet beyond the perimeter of the buildings. Locally, flatter grades may be necessary to transition ADA access requirements for flatwork. After building construction and landscaping have been completed, final grades should be verified to document effective drainage has been achieved. Grades around the structures should also be periodically inspected and adjusted, as necessary, as part of the structure's maintenance program. Where paving or flatwork abuts the structures, a maintenance program should be established to effectively seal and maintain joints and prevent surface water infiltration.

Earthwork Construction Considerations

Shallow excavations for the proposed structures are anticipated to be accomplished with conventional construction equipment. Upon completion of filling and grading, care should be taken to maintain the subgrade water content prior to construction of floor slabs. Construction traffic over the completed subgrades should be avoided. The site should also be graded to prevent ponding of surface water on the prepared subgrades or in excavations. Water collecting over or adjacent to construction areas should be removed. If the subgrade freezes, desiccates, saturates, or is disturbed, the affected material should be removed, or the materials should be scarified, moisture conditioned, and recompacted prior to floor slab construction.

Groundwater encountered in excavations should be pumped out from sumps or well points if applicable. Pumping water, as required, should continue until excavations are completely backfilled

As a minimum, excavations should be performed in accordance with OSHA 29 CFR, Part 1926, Subpart P, “Excavations” and its appendices, and in accordance with any applicable local, and/or state regulations.

Construction site safety is the sole responsibility of the contractor who controls the means, methods, and sequencing of construction operations. Under no circumstances shall the information provided herein be interpreted to mean Terracon is assuming responsibility for construction site safety, or the contractor's activities; such responsibility shall neither be implied nor inferred.

Construction Observation and Testing

The earthwork efforts should be monitored under the direction of the Geotechnical Engineer. Monitoring should include documentation of adequate removal of vegetation and topsoil, proofrolling, and mitigation of areas delineated by the proofroll to require mitigation.

Each lift of compacted fill should be tested, evaluated, and reworked, as necessary, until approved by the Geotechnical Engineer prior to placement of additional lifts. Each lift of fill should be tested for density and water content at a frequency of at least one test for every 2,500 square feet of compacted fill in the building areas and 5,000 square feet in pavement areas. One density and water content test should be performed for every 50 linear feet of compacted utility trench backfill.

In areas of foundation excavations, the bearing subgrade should be evaluated under the direction of the Geotechnical Engineer. If unanticipated conditions are encountered, the Geotechnical Engineer should prescribe mitigation options.

In addition to the documentation of the essential parameters necessary for construction, the continuation of the Geotechnical Engineer into the construction phase of the project provides the continuity to maintain the Geotechnical Engineer’s evaluation of subsurface conditions, including assessing variations and associated design changes.

SHALLOW FOUNDATIONS

If the site has been prepared in accordance with the requirements noted in **Earthwork**, the following design parameters are applicable for shallow foundations for the building additions (excluding the gymnasium).

Design Parameters – Compressive Loads

Item	Description
Maximum Net allowable bearing pressure [1]	1,500 psf
The required embedment below lowest adjacent finished grade for frost protection and protective embedment [2]	12 inches
Minimum width for continuous wall footings	12 inches for thickened slab 16 inches for strip footings
Minimum width for isolated column footings	24 inches
Approximate total settlement [3]	Less than 1 inch
Estimated differential settlement [3]	Approximately 2/3 of total settlement
Ultimate coefficient of sliding friction [4]	0.35

1. The recommended net allowable bearing pressure is the pressure in excess of the minimum surrounding overburden pressure at the footing base elevation. The maximum net allowable bearing pressure may be increased by 1/3 for transient wind loads.
2. For frost protection and to reduce effects of seasonal moisture variations in subgrade soils. For perimeter footings and footings beneath unheated areas.
3. The actual magnitude of settlement that will occur beneath the foundations will depend upon the variations within the subsurface soil profile, the structural loading conditions and the quality of the foundation excavation. The estimated total and differential settlements listed assume that the foundation-related earthwork and the foundation design are completed in accordance with our recommendations.
4. For uplift resistance, use the weight of the foundation concrete plus the weight of the soil over the plan area of the footings. 110 pounds per cubic foot should be used for the density of the soil above the water table.

Construction Adjacent to Existing Building

Expansion joints should be provided between the existing buildings and the proposed additions to accommodate differential movements between the two structures. Underground piping should be designed with flexible couplings and utility knockouts in foundation walls should be oversized, so minor deflections in alignment do not result in breakage or distress. Care should be taken during excavation adjacent to existing foundations, to avoid disturbing existing foundation bearing soils.

New footings should bear at or near the bearing elevation of immediately adjacent existing foundations. Depending upon their locations and current loads on the existing footings, footings for the new addition could cause settlement of adjacent walls. To reduce this concern and risk, clear distances at least equal to the new footing widths should be maintained between the addition's footings and footings supporting the existing buildings.

Foundation Construction Considerations

The foundation bearing materials should be evaluated at the time of the foundation excavation. This is an essential part of the construction process. The Geotechnical Engineer should use a combination of hand auger borings and dynamic cone penetrometer (DCP) testing to determine the suitability of the bearing materials for the design bearing pressure. DCP testing should be performed to a depth of 3 to 5 feet below the bottom of foundation excavation. Excessively soft, loose, or wet bearing soils should be over excavated to a depth recommended by the Geotechnical Engineer. The excavated soils should be replaced with structural fill or washed, crushed stone (NCDOT No. 57) wrapped in a geotextile fabric (Mirafi 140 N or equivalent). The need for geotextile fabric with crushed stone should be determined by the Geotechnical Engineer during construction based on sloughing/caving soils and excavation observations. However, footings could bear directly on the exposed soils after over excavation if approved by the Geotechnical Engineer.

The base of all foundation excavations should be free of water and loose soil prior to placing concrete. Concrete should be placed soon after excavating to reduce bearing soil disturbance. Should the soils at bearing level become excessively disturbed or saturated, the affected soil should be removed prior to placing concrete.

DEEP FOUNDATIONS

For the gymnasium addition, we recommend helical piers to be installed with pile caps or grade beams to support the anticipated column loads to a depth of approximately 50 feet below existing grades into the dense sand layer. Helical piers with a helix of 12 inches in diameter would be expected to develop an axial capacity of up to 30 kips per pier with a factor of safety of 2 when installed to depths of about 50 feet. Additional helices can be added to the lead section, however, further embedment could be impeded by the denser sand.

The lateral capacity of the deep foundations should be obtained from soil resistance below the proposed ground surface to resist lateral movement. We recommend a passive lateral earth pressure coefficient of 2.5 and an earth pressure value of 285 psf per foot in thickness of the foundation restrained by soil. The earth pressure assumes a backfill unit weight of 115 pcf, does not include hydrostatic pressure, and no factor of safety.

We recommend that the piers have an on-center spacing of at least three times the maximum flight diameter. The minimum spacing should be maintained to prevent the pile group compression capacity from being significantly less than the summation of individual pier capacities. This spacing restriction also serves to reduce the possibility of damaging previously installed piers.

The helical pier installer should develop the final pier compressive, uplift and lateral design capacities, establish reasonable pier spacing and design loads and communicate pile capacities to

the structural engineer for design.

Torque measurements and load testing of a test pier should be considered to determine a more accurate measurement of capacity based on installation torque and verify that the contractor's construction methods and installation equipment can produce a foundation which will perform satisfactorily. The geotechnical engineer should be retained to select the test pier to be load tested, witness the load test, analyze and report the load test results and develop recommendations for the production foundation depths and installation procedures. The load test should be performed in general accordance with ASTM D 1143. The pier should be loaded to failure or at least 2.5 times the design capacity, whichever occurs first. Accurate deflection measurements should be made using at least two independent systems.

The Geotechnical Engineer should observe installation of the piers to confirm the torque and depth which can be used to check the capacity of the piers.

AGGREGATE PIERS

The foundations of the gymnasium can be supported on shallow foundations bearing on ground improved by the installation of aggregate piers. Aggregate piers are installed by creating a vertical hole in the ground by drilling or displacement using a vibratory probe and then backfilling with crushed stone aggregate. The piers do not serve as a structural load transfer device, but instead act as stiff elements within the soil matrix. The combination of aggregate piers and soil creates a stiffer bearing medium than the soil alone.

The layout, size and depth of the aggregate piers are typically designed by the specialty contractor that will install them. The design criteria that are provided by the project owner typically include desired design bearing pressure and settlement restrictions. A specified total settlement restriction of 1 inch or less would be reasonable for the project information provided and the subsurface conditions.

Aggregate piers typically range in diameters of 16 to 36 inches installed and should have a center-to-center spacing of about 6 to 7 feet. The maximum installation depth of piers is anticipated to extend to a depth of 10 to 20 feet below existing grades, however, the specialty foundation contractor will determine the final installation depth.

Uplift forces can be resisted by the dead weight of the footing and the effective weight of any soil above the footing. The large uplift forces can lead to oversized footings relative to the allowable bearing pressure. A unit weight of soil of 110 pcf should be assumed for soil backfill placed above the water table and 48 pcf below the water table, assuming that it is compacted to at least 95 percent of standard Proctor maximum dry density (ASTM D-698). A unit weight of 145 pcf can be assumed for foundation concrete above the water table and 82 pcf below the water table. Additionally, the specialty contractor could install anchors with the aggregate piers for uplift

resistance. The ground surface should be sloped away from the foundation to avoid ponding of water and saturation of the backfill materials.

SEISMIC CONSIDERATIONS

The seismic design requirements for buildings and other structures are based on Seismic Design Category. Site Classification is required to determine the Seismic Design Category for a structure. The Site Classification is based on the upper 100 feet of the site profile defined by a weighted average value of either shear wave velocity, standard penetration resistance, or undrained shear strength in accordance with Section 20.4 of ASCE 7 and the North Carolina State Building Code (NCBSC). Based on the soil properties encountered at the site and as described on the exploration logs and results, it is our professional opinion that the **Seismic Site Classification is E**. Subsurface explorations at this site were extended to a maximum depth of 50 feet. The site properties below the boring depth to 100 feet were estimated based on our experience and knowledge of geologic conditions of the general area. Geophysical testing may be performed to potentially improve the seismic site classification. Terracon can provide these services if requested.

LIQUEFACTION

Based on the results of the borings, liquefaction is not expected after the recommended earthwork, relatively low level of ground motions associated with the design earthquake as well as the clay content of the soils.

FLOOR SLABS

Design parameters for floor slabs assume the requirements for **Earthwork** have been followed. Specific attention should be given to positive drainage away from the structure and positive drainage of the aggregate base beneath the floor slab.

Floor Slab Design Parameters

Item	Description
Floor slab support	Densified existing soil or structural fill.
Modulus of subgrade reaction	100 pounds per square inch per inch (psi/in) for point loading conditions.
Base Course	4 inches crushed stone (NCDOT ABC)

The use of a vapor retarder should be considered beneath concrete slabs on grade covered with wood, tile, carpet, or other moisture sensitive or impervious coverings, or when the slab will

support equipment sensitive to moisture. When conditions warrant the use of a vapor retarder, the slab designer should refer to ACI 302 and/or ACI 360 for procedures and cautions regarding the use and placement of a vapor retarder.

Saw-cut control joints should be placed in the slab to help control the location and extent of cracking. For additional recommendations refer to the ACI Design Manual. Joints or cracks should be sealed with a water-proof, non-extruding compressible compound specifically recommended for heavy duty concrete pavement and wet environments.

Where floor slabs are tied to perimeter walls or turn-down slabs to meet structural or other construction objectives, our experience indicates differential movement between the walls and slabs will likely be observed in adjacent slab expansion joints or floor slab cracks beyond the length of the structural dowels. The Structural Engineer should account for potential differential settlement through use of sufficient control joints, appropriate reinforcing or other means.

Floor Slab Construction Considerations

On most project sites, the site grading is generally accomplished early in the construction phase. However, as construction proceeds, the subgrade may be disturbed due to utility excavations, construction traffic, desiccation, rainfall, etc. As a result, the floor slab subgrade may not be suitable for placement of base stone and concrete and corrective action will be required to repair the damaged areas.

Finished subgrade, within and for at least 5 feet beyond the floor slab, should be protected from traffic, rutting, or other disturbance and maintained in a relatively moist condition until floor slabs are constructed. If the subgrade should become damaged or desiccated prior to construction of floor slabs, the affected material should be removed, and structural fill should be added to replace the resulting excavation. Final conditioning of the finished subgrade should be performed immediately prior to placement of the floor slab support course.

The Geotechnical Engineer should approve the condition of the floor slab subgrades immediately prior to placement of the floor slab support course, reinforcing steel, and concrete. We recommend the area be thoroughly proofrolled. Attention should be paid to high traffic areas that were rutted and disturbed earlier, and to areas where backfilled trenches are located.

PAVEMENTS

Pavement thickness design is dependent upon the following:

- Anticipated traffic volumes and loading conditions during the life of the pavement.
- Subgrade and paving material characteristics.
- Climatic conditions of the region.

We have assumed that traffic loads at the site will be produced primarily by busses, delivery, and garbage trucks in the medium duty areas and by passenger cars and light delivery vehicles for the light duty areas. Two pavement section alternatives have been provided. The light-duty pavement sections are for car parking areas only. Medium-duty pavement sections should be used for concentrated car traffic (drive lanes / entrance drives) and garbage/delivery truck traffic areas. We have assumed a 15-year design period for flexible, 20-year for rigid, and the following traffic volume:

Medium-duty Areas	Light-duty Areas
■ Up to 60 busses per week ■ Less than 1 semi-truck per week ■ 3 trash trucks per week	■ 200 cars and pickups per day

A subgrade CBR of 2 was selected for design pavement sections based upon our experience with similar near surface subgrade soils and our understanding of the quality of the subgrade as prescribed by the **Site Preparation** conditions as outlined in **Earthwork**. The proposed flexible pavement thicknesses are noted below and should be adequate for the anticipated traffic.

Pavement Section Thicknesses

For areas subject to concentrated and repetitive loading conditions, i.e. dumpster pads and ingress/egress aprons, or in areas where vehicles will turn at low speeds, we recommend using a Portland cement concrete pavement with a thickness of at least 7 inches underlain by at least 4 inches of crushed stone. For dumpster pads, the concrete pavement area should be large enough to support the container and tipping axle of the refuse truck. The following table provides options for general AC and PCC Sections:

Recommended Minimum Pavement Sections			
Pavement Type	**Material**	**Layer Thickness (inches)**	
		Light Duty	**Medium Duty**
Portland Cement Concrete (PCC)/Rigid	Portland Cement Concrete	5	
	Crushed Aggregate Base Course (NCDOT ABC)	5	
Asphaltic Concrete (AC)/ Flexible (Superpave)	Asphalt Surface (NCDOT S9.5B)	2[2]	3[2]
	Crushed Aggregate Base Course (NCDOT ABC)	6	8

1. Crushed Aggregate Base Course is recommended for construction purposes. Concrete could be placed directly on an approved subgrade. However, stormwater can quickly degrade exposed subgrades without the crushed aggregate base course leading to additional subgrade repairs.
2. Placed in two equal lifts.

For subgrade instability that could develop due to the weather. We recommend that contingencies be placed in the budget for a geosynthetic and additional stone. The geosynthetic could be left off corridors/easements for deeper utility lines for ease of construction.

The placement of a partial pavement thickness for use during construction is not suggested without a detailed pavement analysis incorporating construction traffic. In addition, we should be contacted to confirm the traffic assumptions outlined above. If the actual traffic varies from the assumptions outlined above, modification of the pavement section thickness could be required.

Recommendations for pavement construction presented depend upon compliance with recommended material specifications. To assess compliance, observation and testing should be performed under the direction of the geotechnical engineer.

Asphalt concrete and aggregate base course materials should conform to the North Carolina Department of Transportation (NCDOT) “Standard Specifications for Roads and Structures”. Concrete pavement materials should conform to ACI 330.1 “Specifications for Unreinforced Parking Lots”. Concrete pavement should be air-entrained and have a minimum compressive strength of 4,000 psi after 28 days of laboratory curing per ASTM C-31. ACI 330R-01 recommendations should be followed concerning control and expansion joints, as well as other concrete pavement practices.

Pavement Drainage

Pavements should be sloped to provide rapid drainage of surface water. Water allowed to pond on or adjacent to the pavements could saturate the subgrade and contribute to premature pavement deterioration. In addition, the pavement subgrade should be graded to provide positive drainage within the granular base section. Appropriate sub-drainage or connection to a suitable daylight outlet should be provided to remove water from the granular subbase.

Pavement Maintenance

The pavement sections represent minimum recommended thicknesses and, as such, periodic maintenance should be anticipated. Therefore, preventive maintenance should be planned and provided for through an on-going pavement management program. Maintenance activities are intended to slow the rate of pavement deterioration and to preserve the pavement investment. Maintenance consists of both localized maintenance (e.g., crack and joint sealing and patching) and global maintenance (e.g., surface sealing). Preventive maintenance is usually the priority when implementing a pavement maintenance program. Additional engineering observation is recommended to determine the type and extent of a cost-effective program. Even with periodic maintenance, some movements and related cracking may still occur and repairs may be required.

Pavement performance is affected by its surroundings. In addition to providing preventive maintenance, the civil engineer should consider the following recommendations in the design and layout of pavements:

- Final grade adjacent to paved areas should slope down from the edges at a minimum 2%.
- Subgrade and pavement surfaces should have a minimum 2% slope to promote proper surface drainage.
- Install below pavement drainage systems surrounding areas anticipated for frequent wetting.
- Install joint sealant and seal cracks immediately.
- Seal all landscaped areas in or adjacent to pavements to reduce moisture migration to subgrade soils.
- Place compacted, low permeability backfill against the exterior side of curb and gutter.
- Place curb, gutter and/or sidewalk directly on clay subgrade soils rather than on unbound granular base course materials.

GENERAL COMMENTS

Our analysis and opinions are based upon our understanding of the project, the geotechnical conditions in the area, and the data obtained from our site exploration. Natural variations will occur between exploration point locations or due to the modifying effects of construction or weather. The nature and extent of such variations may not become evident until during or after construction. Terracon should be retained as the Geotechnical Engineer, where noted in this report, to provide observation and testing services during pertinent construction phases. If variations appear, we can provide further evaluation and supplemental recommendations. If variations are noted in the absence of our observation and testing services on-site, we should be immediately notified so that we can provide evaluation and supplemental recommendations.

Our Scope of Services does not include either specifically or by implication any environmental or biological (e.g., mold, fungi, bacteria) assessment of the site or identification or prevention of pollutants, hazardous materials or conditions. If the owner is concerned about the potential for such contamination or pollution, other studies should be undertaken.

Our services and any correspondence or collaboration through this system are intended for the sole benefit and exclusive use of our client for specific application to the project discussed and are accomplished in accordance with generally accepted geotechnical engineering practices with no third-party beneficiaries intended. Any third-party access to services or correspondence is solely for information purposes to support the services provided by Terracon to our client. Reliance upon the services and any work product is limited to our client, and is not intended for third parties. Any use or reliance of the provided information by third parties is done solely at their own risk. No warranties, either express or implied, are intended or made.

Site characteristics as provided are for design purposes and not to estimate excavation cost. Any use of our report in that regard is done at the sole risk of the excavating cost estimator as there may be variations on the site that are not apparent in the data that could significantly impact excavation cost. Any parties charged with estimating excavation costs should seek their own site characterization for specific purposes to obtain the specific level of detail necessary for costing. Site safety, and cost estimating including, excavation support, and dewatering requirements/design are the responsibility of others. If changes in the nature, design, or location of the project are planned, our conclusions and recommendations shall not be considered valid unless we review the changes and either verify or modify our conclusions in writing.

FIGURES

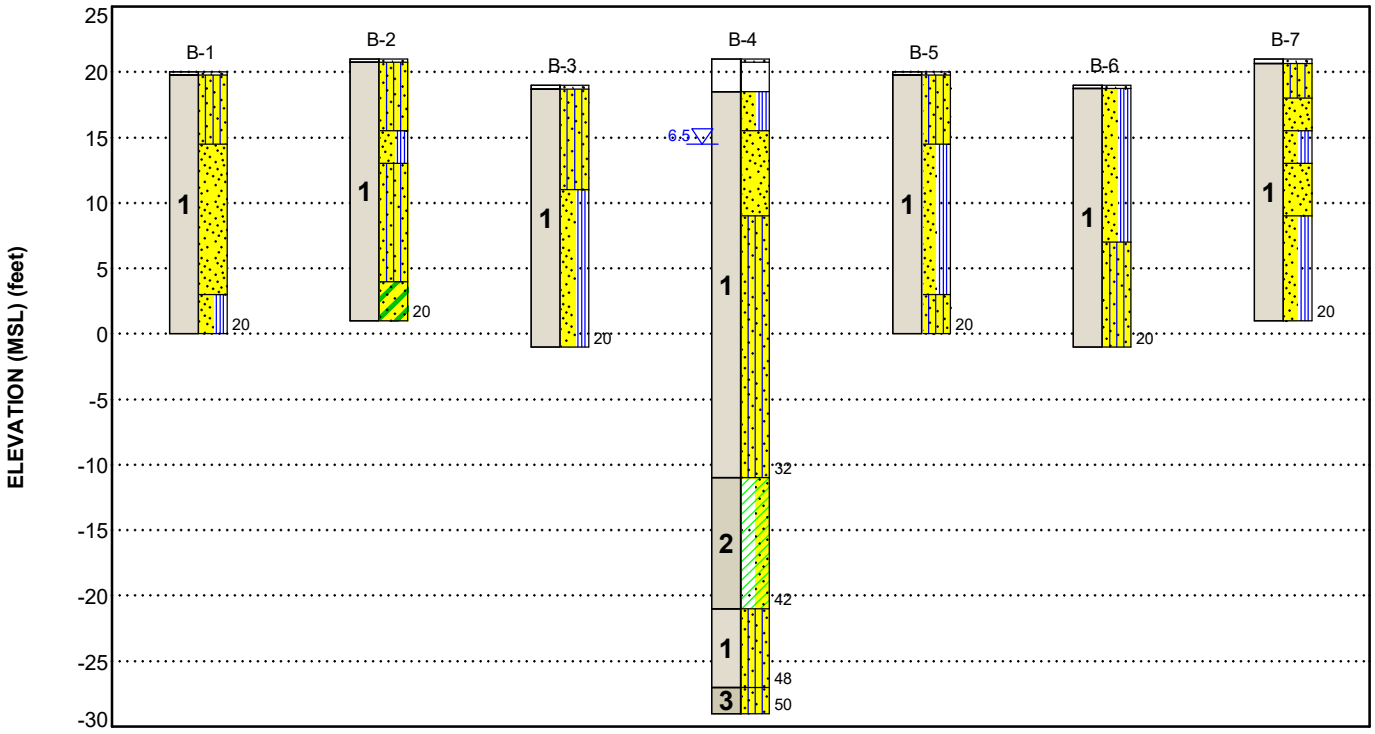
Contents:

Note: All attachments are one page unless otherwise noted.

GEOMODEL

West Carteret High School Addition ■ Morehead, NC
Terracon Project No. 72215116

Terracon GeoReport



This is not a cross section. This is intended to display the Geotechnical Model only. See individual logs for more detailed conditions.

Model Layer	Layer Name	General Description
1	Sand	Very loose to medium dense sand with varying amounts of clay and silt
2	Clay	Very soft to medium stiff lean clay with sand
3	Underlying Sand	Dense sand

LEGEND

- Topsoil
- Silty Sand
- Poorly-graded Sand
- Poorly-graded Sand with Silt
- Clayey Sand
- Lean Clay with Sand

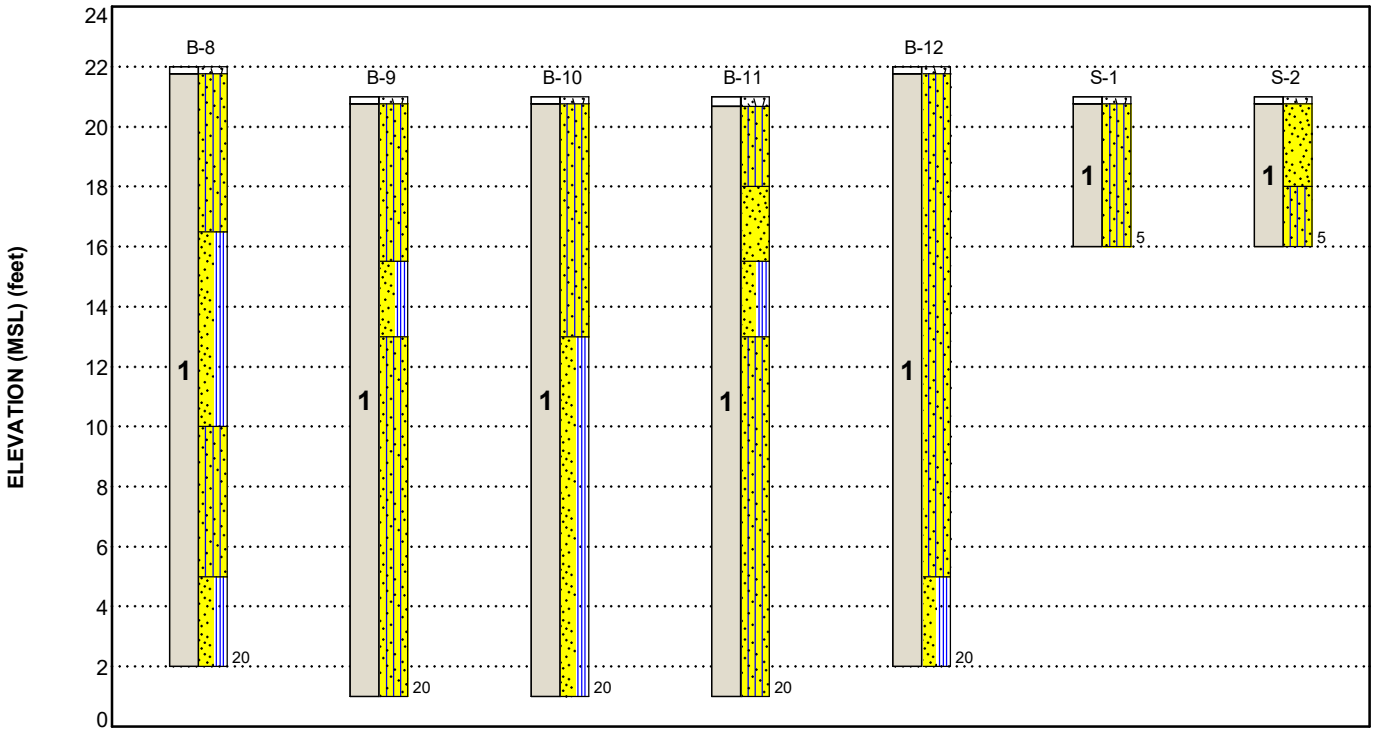
▽ First Water Observation

Groundwater levels are temporal. The levels shown are representative of the date and time of our exploration. Significant changes are possible over time.
Water levels shown are as measured during and/or after drilling. In some cases, boring advancement methods mask the presence/absence of groundwater. See individual logs for details.

NOTES:
Layering shown on this figure has been developed by the geotechnical engineer for purposes of modeling the subsurface conditions as required for the subsequent geotechnical engineering for this project.
Numbers adjacent to soil column indicate depth below ground surface.

GEOMODEL

West Carteret High School Addition ■ Morehead, NC
Terracon Project No. 72215116



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LEGEND

Topsoil
Poorly-graded Sand
Silty Sand
Poorly-graded Sand with Silt

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Numbers adjacent to soil column indicate depth below ground surface.

ATTACHMENTS

EXPLORATION AND TESTING PROCEDURES

Field Exploration

Borings	Boring Depth (feet)[1]	Location
B-1 through B-12	20 to 50	Proposed Building Additions
S-1 & S-2	5	Proposed Pavements

1. Referenced from existing ground surface.

Boring Layout and Elevations: Terracon personnel provided the boring layout. Coordinates were obtained with a handheld GPS unit (estimated horizontal accuracy of about ±10 feet) and approximate elevations were obtained from GoogleEarth Pro. If elevations and a more precise boring layout are desired, we recommend borings be surveyed.

Subsurface Exploration Procedures: We advanced the borings with a track-mounted rotary drill rig using mud rotary and continuous flight augers (hollow stem, as necessary, depending on soil conditions). Four samples were obtained in the upper 10 feet of each boring and at intervals of 5 feet thereafter. In the split-barrel sampling procedure, a standard 2-inch outer diameter split-barrel sampling spoon was driven into the ground by a 140-pound automatic hammer falling a distance of 30 inches. The number of blows required to advance the sampling spoon the last 12 inches of a normal 18-inch penetration is recorded as the Standard Penetration Test (SPT) resistance value. The SPT resistance values, also referred to as N-values, are indicated on the boring logs at the test depths. We observed and recorded groundwater levels during drilling and sampling. For safety purposes, all borings were backfilled with auger cuttings after their completion.

The sampling depths, penetration distances, and other sampling information was recorded on the field boring logs. The samples were placed in appropriate containers and taken to our soil laboratory for testing and classification by a Geotechnical Engineer. Our exploration team prepared field boring logs as part of the drilling operations. These field logs included visual classifications of the materials encountered during drilling and our interpretation of the subsurface conditions between samples. Final boring logs were prepared from the field logs. The final boring logs represent the Geotechnical Engineer's interpretation of the field logs and include modifications based on observations and tests of the samples in our laboratory.

Laboratory Testing

The project engineer reviewed the field data and assigned laboratory tests to understand the engineering properties of the various soil strata, as necessary, for this project. Procedural standards noted below are for reference to methodology in general. In some cases, variations to methods were applied because of local practice or professional judgment. Standards noted below

include reference to other, related standards. Such references are not necessarily applicable to describe the specific test performed.

- ASTM D2216 Standard Test Methods for Laboratory Determination of Water (Moisture) Content of Soil and Rock by Mass
- ASTM D2487 Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System)
- ASTM D2488 Standard Practice of Description and Identification of Soils (Visual Manual Method)
- ASTM D4318 Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils
- ASTM D422 Standard Test Methods for Particle Size Analysis of Soil

Detailed results of our laboratory testing can be found in in the **Exploration Results** section and are attached herein. Our laboratory testing program includes examination of soil samples by an engineer. Based on the material's texture and plasticity, we describe and classify soil samples in accordance with the Unified Soil Classification System (USCS).

PHOTOGRAPHY LOG

Photos Taken October 15, 2021

Photo 1: Location S-2 facing northwest

Photo 2: Location B-12 facing southwest

Photo 3: Location B-8 facing north

Photo 4: Location B-3 facing northwest

Photo 5: Location B-7 facing east

Photo 6: Location B-2 facing northeast

SITE LOCATION AND EXPLORATION PLANS

Contents:

Note: All attachments are one page unless noted above.

SITE LOCATION

West Carteret High School Additions ■ Morehead City, Carteret County, NC
February 25, 2022 ■ Terracon Project No. 72215116

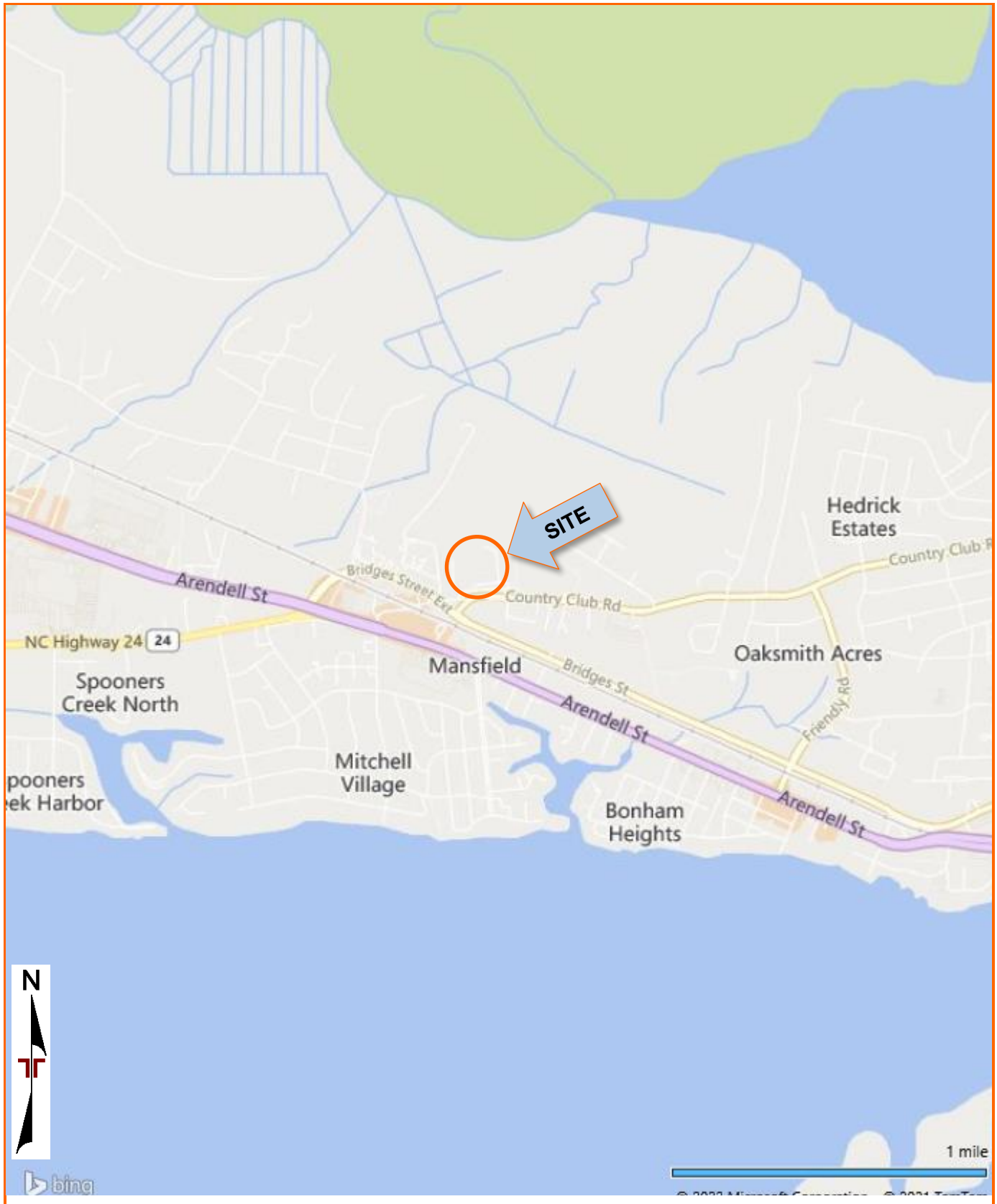


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

MAP PROVIDED BY MICROSOFT BING MAPS

EXPLORATION PLAN

West Carteret High School Additions ■ Morehead City, Carteret County, NC
February 25, 2022 ■ Terracon Project No. 72215116

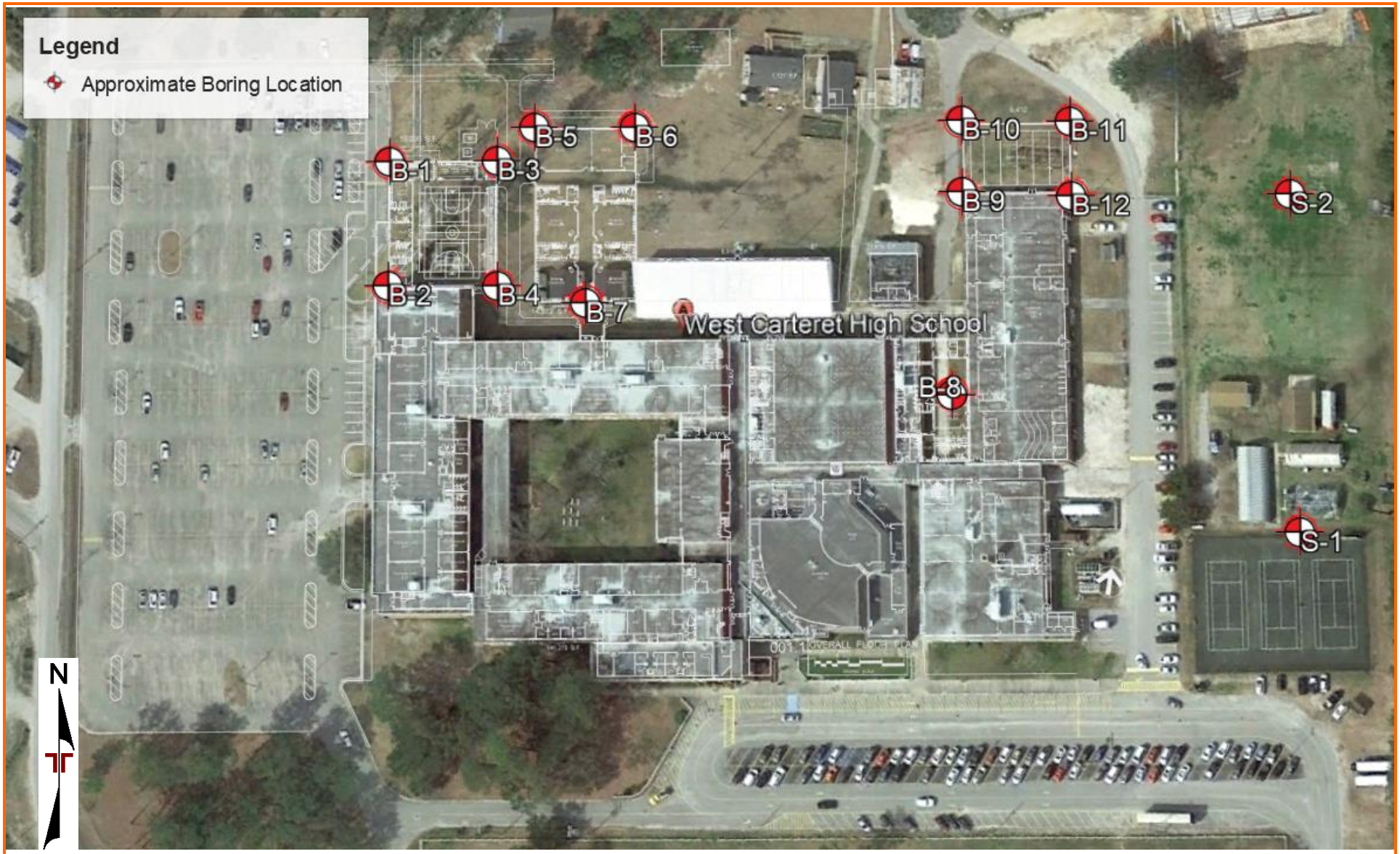


DIAGRAM IS FOR GENERAL LOCATION ONLY, AND IS NOT INTENDED FOR CONSTRUCTION PURPOSES

PLAN PROVIDED BY HITE ASSOCIATES

EXPLORATION RESULTS

Contents:

Note: All attachments are one page unless noted above.

BORING LOG NO. B-1

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7380° Longitude: -76.7872°

Approximate Surface Elev.: 20 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	20+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), dark brown and black, very loose				2-1-1 N=2			
							1-1-1 N=2			
		5.5	14.5+/-	5						
1			**POORLY GRADED SAND (SP)**, brownish tan to dark gray and black, very loose to medium dense				3-4-8 N=12			
							3-5-6 N=11			
				10						
							1-1-1 N=2			
		17.0	3+/-	15						
			POORLY GRADED SAND WITH SILT (SP-SM), gray and dark gray, very loose							
		20.0	0+/-	20			1-1-1 N=2			
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-04-2021 | Boring Completed: 11-04-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-2

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7377° Longitude: -76.7872°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	21+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), trace organics, black and brown, loose to medium dense			X	3-4-5 N=9			
						X	2-4-8 N=12			
		5.5	15.5+/-	5						
			POORLY GRADED SAND WITH SILT (SP-SM), trace roots, dark brown, loose			X	3-3-4 N=7			
		8.0	13+/-							
			SILTY SAND (SM), tan and gray, very loose			X	1-1-1 N=2			
1				10						
						X	1-1-2 N=3			
		17.0	4+/-	15						
			CLAYEY SAND (SC), with shell fragments, gray, very loose			X	1-1-1 N=2			
		20.0	1+/-	20						
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Not measured

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-04-2021 | Boring Completed: 11-04-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-3

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7380° Longitude: -76.7869°

Approximate Surface Elev.: 19 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	18.5+/-							
			TOPSOIL, 4-inches							
			SILTY SAND (SM), trace roots, dark brown and black to gray, very loose to loose				2-4-3 N=7			
							4-1-1 N=2			
			With clay	5			1-1-1 N=2			
		8.0	11+/-							
1			**POORLY GRADED SAND WITH SILT (SP-SM)**, gray and dark gray, very loose	10			0-0-0 N=0			
				15			0-0-0 N=0			
		20.0	-1+/-	20			3-1-1 N=2			
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-09-2021 | Boring Completed: 11-09-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-4

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7377° Longitude: -76.7869°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	21+/-							
			TOPSOIL, 3-inches							
			No recovery				2-2-3 N=5			
		2.5	18.5+/-							
			POORLY GRADED SAND WITH SILT (SP-SM), brown and dark brown, medium dense				10-6-8 N=14			
		5.5	15.5+/-	5						
			POORLY GRADED SAND (SP), tan and gray, very loose		▽		2-1-1 N=2			
							1-2-1 N=3			
		12.0	9+/-	10						
1			**SILTY SAND (SM)**, with clay seams, gray and dark gray, very loose to loose				0-0-0 N=0	34.6	NP	14
				15						
							0-0-0 N=0			
				20						
							1-5-3 N=8			
				25						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-05-2021 | Boring Completed: 11-05-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-4

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7377° Longitude: -76.7869°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1			**SILTY SAND (SM)**, with clay seams, gray and dark gray, very loose to loose *(continued)*							
				30			1-2-5 N=7			
		32.0	-11+/-							
2			**LEAN CLAY WITH SAND (CL)**, with shells, gray and dark gray, very soft to medium stiff							
				35			0-0-0 N=0			
							4-2-3 N=5			
		42.0	-21+/-	40						
1			**SILTY SAND (SM)**, with clay seams and shells, gray and dark gray, loose				4-3-6 N=9			
		48.0	-27+/-	45						
3			**SILTY SAND (SM)**, with clay seams and shells, gray and dark gray, dense				9-17-25 N=42			
		50.0	-29+/-	50						
			Boring Terminated at 50 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

▽ *At completion of drilling*

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-05-2021 | Boring Completed: 11-05-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-5

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7381° Longitude: -76.7868°

Approximate Surface Elev.: 20 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	20+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), dark brown and black, medium dense				1-3-8 N=11			
							7-9-6 N=15			
		5.5	14.5+/-	5						
1			**POORLY GRADED SAND WITH SILT (SP-SM)**, brown and gray to gray and dark gray, very loose to loose				1-2-3 N=5			
							1-0-0 N=0			
				10						
							1-2-5 N=7			
				15						
		17.0	3+/-							
			SILTY SAND (SM), tan and gray, medium dense				2-6-4 N=10			
		20.0	0+/-	20						
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-09-2021 | Boring Completed: 11-09-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-6

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7382° Longitude: -76.7865°

Approximate Surface Elev.: 19 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	19+/-							
			TOPSOIL, 3-inches							
1			**POORLY GRADED SAND WITH SILT (SP-SM)**, trace roots, brown and dark brown, very loose to loose			X	0-0-2 N=2			
						X	1-2-2 N=4			
			Brown and tan	5		X	1-2-4 N=6			
						X	1-1-1 N=2			
		12.0	7+/-	10						
			SILTY SAND (SM), dark brown to gray and dark gray, very loose to loose			X	1-1-1 N=2			
				15						
		20.0	-1+/-		▨	X	1-3-1 N=4			
			Boring Terminated at 20 Feet	20						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

▨ *Cave in*

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-09-2021 | Boring Completed: 11-09-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-7

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7377° Longitude: -76.7866°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	20.5+/-							
			TOPSOIL, 4-inches							
			SILTY SAND (SM), dark brown and black, loose				2-3-3 N=6			
		3.0	18+/-							
			POORLY GRADED SAND (SP), brown and orangish brown, loose				3-3-3 N=6			
		5.5	15.5+/-	5						
			POORLY GRADED SAND WITH SILT (SP-SM), gray and tan, loose				2-2-3 N=5			
		8.0	13+/-							
1			**POORLY GRADED SAND (SP)**, gray and tan, very loose				1-1-1 N=2			
		12.0	9+/-	10						
			POORLY GRADED SAND WITH SILT (SP-SM), with shells, gray and dark gray, loose				1-3-4 N=7			
				15						
					Cave in		1-3-5 N=8			
		20.0	1+/-	20						
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-09-2021 | Boring Completed: 11-09-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-8

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7376° Longitude: -76.7855°

Approximate Surface Elev.: 22 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	22+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), brown, tan, and dark brown, loose				3-4-5 N=9			
							1-2-6 N=8			
		5.5	16.5+/-	5						
1			**POORLY GRADED SAND WITH SILT (SP-SM)**, brown and orangish brown, loose				2-3-5 N=8			
							1-2-3 N=5			
		12.0	10+/-	10						
			SILTY SAND (SM), gray, very loose				1-1-1 N=2			
		17.0	5+/-	15						
			POORLY GRADED SAND WITH SILT (SP-SM), with clay seams, gray and dark gray, loose				1-2-2 N=4			
		20.0	2+/-	20						
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-9

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7381° Longitude: -76.7855°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	DESCRIPTION	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	**TOPSOIL**, 3-inches	21+/-							
1			**SILTY SAND (SM)**, brown and tan to dark brown, loose					1-1-6 N=7			
								1-2-2 N=4			
		5.5		15.5+/-	5						
			POORLY GRADED SAND WITH SILT (SP-SM), brown and tan, very loose					1-1-1 N=2			
		8.0		13+/-							
			SILTY SAND (SM), dark brown, gray, and black, very loose to loose					1-4-6 N=10			
					10						
								1-1-1 N=2			
					15						
								1-1-2 N=3			
		20.0		1+/-	20						
			Boring Terminated at 20 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-10

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7383° Longitude: -76.7855°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	21+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), black and dark brown, loose				4-3-3 N=6			
							1-2-2 N=4			
				5			3-3-4 N=7			
		8.0	13+/-							
1			**POORLY GRADED SAND WITH SILT (SP-SM)**, brown to tan and gray, loose				1-2-4 N=6			
				10						
							1-2-3 N=5			
				15						
							2-2-5 N=7			
		20.0	1+/-	20						
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-09-2021 | Boring Completed: 11-09-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-11

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7383° Longitude: -76.7852°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	20.5+/-							
			TOPSOIL, 4-inches							
			SILTY SAND (SM), dark brown and tan, medium dense				3-5-7 N=12			
		3.0	18+/-							
			POORLY GRADED SAND (SP), brown and tan, medium dense				2-4-6 N=10			
		5.5	15.5+/-	5						
			POORLY GRADED SAND WITH SILT (SP-SM), brown and tan, medium dense				2-3-4 N=7	22.6	NP	6
		8.0	13+/-							
1			**SILTY SAND (SM)**, with clay seams, gray and brown, very loose				1-1-1 N=2			
				10						
							1-1-1 N=2			
				15						
		20.0	1+/-				0-0-0 N=0			
			Boring Terminated at 20 Feet	20						

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Not measured

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. B-12

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7381° Longitude: -76.7852°

Approximate Surface Elev.: 22 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
1		0.3	22+/-							
			TOPSOIL, 3-inches							
			SILTY SAND (SM), brown and dark brown to tan and gray, very loose to loose				1-2-3 N=5			
				5			1-2-2 N=4			
							1-1-5 N=6			
				10			1-1-2 N=3			
				15			1-1-1 N=2			
		17.0	5+/-							
			POORLY GRADED SAND WITH SILT (SP-SM), gray and dark gray, loose							
		20.0	2+/-	20			2-2-2 N=4			
			Boring Terminated at 20 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Mud Rotary

Abandonment Method:
Boring backfilled with soil cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Cave in

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. S-1

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7374° Longitude: -76.7844°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	21+/-							
			TOPSOIL, 3-inches							
1			**SILTY SAND (SM)**, dark brown and black, very loose to medium dense				1-1-2 N=3			
							2-5-8 N=13			
		5.0	16+/-	5						
			Boring Terminated at 5 Feet							

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

BORING LOG NO. S-2

PROJECT: West Carteret High School Addition

CLIENT: Hite Associates, P.C.
Greenville, NC

SITE: 4700 Country Club Rd
Morehead, NC

LOCATION See Exploration Plan

Latitude: 34.7382° Longitude: -76.7845°

Approximate Surface Elev.: 21 (Ft.) +/-

MODEL LAYER	GRAPHIC LOG	DEPTH	ELEVATION (Ft.)	DEPTH (Ft.)	WATER LEVEL OBSERVATIONS	SAMPLE TYPE	FIELD TEST RESULTS	WATER CONTENT (%)	ATTERBERG LIMITS LL-PL-PI	PERCENT FINES
		0.3	21+/-							
		TOPSOIL, 3-inches								
1		**POORLY GRADED SAND (SP)**, dark brown and black, very loose				X	1-1-2 N=3	19.2	NP	5
		3.0	18+/-							
		SILTY SAND (SM), dark brown and black, loose				X	1-2-2 N=4			
		5.0	16+/-	5						
		Boring Terminated at 5 Feet								

Stratification lines are approximate. In-situ, the transition may be gradual.

Hammer Type: Automatic

Advancement Method:
Hollow Stem Auger

Abandonment Method:
Boring backfilled with auger cuttings upon completion.

See Exploration and Testing Procedures for a description of field and laboratory procedures used and additional data (If any).

See Supporting Information for explanation of symbols and abbreviations.

Elevation obtained from GoogleEarth Pro

Notes:

WATER LEVEL OBSERVATIONS

Groundwater not encountered

Terracon
314 Beacon Dr
Winterville, NC

Boring Started: 11-10-2021 | Boring Completed: 11-10-2021

Drill Rig: D-50 | Driller: M. Padgett

Project No.: 72215116

Summary of Laboratory Results

BORING ID	Depth (Ft.)	Soil Classification USCS	Liquid Limit	Plastic Limit	Plasticity Index	% Fines	Water Content (%)
B-4	13.5-15	SILTY SAND(SM)	NP	NP	NP	14.2	34.6
B-11	6-7.5	POORLY GRADED SAND with SILT(SP-SM)	NP	NP	NP	6.5	22.6
S-2	1-2.5	POORLY GRADED SAND(SP)	NP	NP	NP	4.9	19.2

PROJECT: West Carteret High School Addition

SITE: 4700 Country Club Rd
Morehead, NC

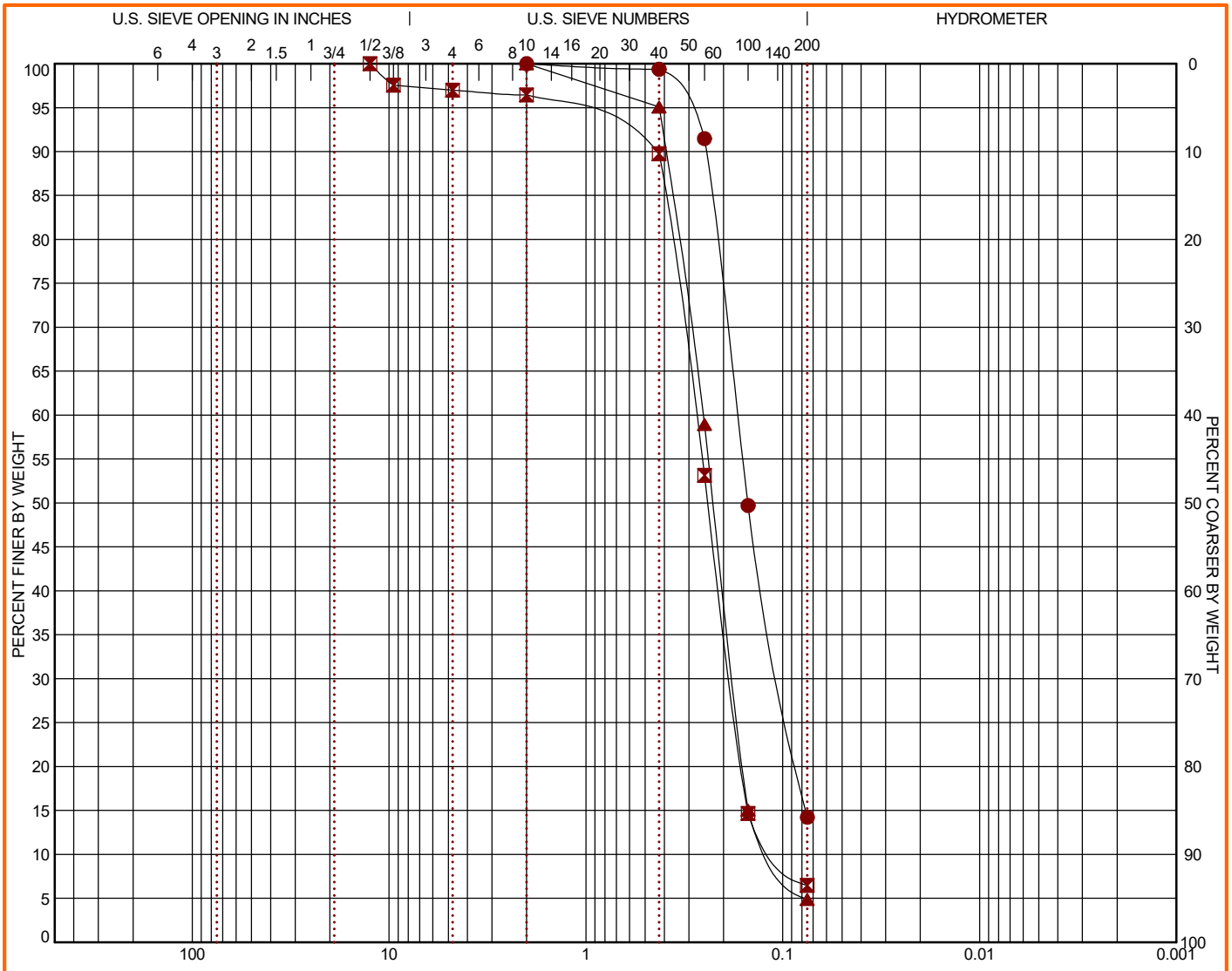
Terracon
314 Beacon Dr
Winterville, NC

PROJECT NUMBER: 72215116

CLIENT: Hite Associates, P.C.
Greenville, NC

GRAIN SIZE DISTRIBUTION

ASTM D422 / ASTM C136



COBBLES	GRAVEL		SAND			SILT OR CLAY
	coarse	fine	coarse	medium	fine	

	BORING ID	DEPTH	% COBBLES	% GRAVEL	% SAND	% SILT	% FINES	% CLAY	USCS
●	B-4	13.5 - 15	0.0	0.0	85.8		14.2		SM
⊠	B-11	6 - 7.5	0.0	3.0	90.5		6.5		SP-SM
▲	S-2	1 - 2.5	0.0	0.0	95.1		4.9		SP

GRAIN SIZE	●	⊠	▲
D_{60}	0.17	0.276	0.254
D_{30}	0.102	0.184	0.179
D_{10}		0.101	0.106

COEFFICIENTS	●	⊠	▲
C_C		1.21	1.18
C_U		2.73	2.39

●		⊠		▲	
Sieve	% Finer	Sieve	% Finer	Sieve	% Finer
#10	100.0	1/2"	100.0	#10	100.0
#40	99.37	3/8"	97.55	#40	95.07
#60	91.47	#4	97.0	#60	58.94
#100	49.71	#10	96.43	#100	15.03
#200	14.23	#40	89.75	#200	4.87
		#60	53.15		
		#100	14.65		
		#200	6.48		

SOIL DESCRIPTION	
●	SILTY SAND (SM)
⊠	POORLY GRADED SAND with SILT (SP-SM)
▲	POORLY GRADED SAND (SP)

REMARKS	
●	
⊠	
▲	

PROJECT: West Carteret High School Addition

SITE: 4700 Country Club Rd
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314 Beacon Dr
Winterville, NC

PROJECT NUMBER: 72215116

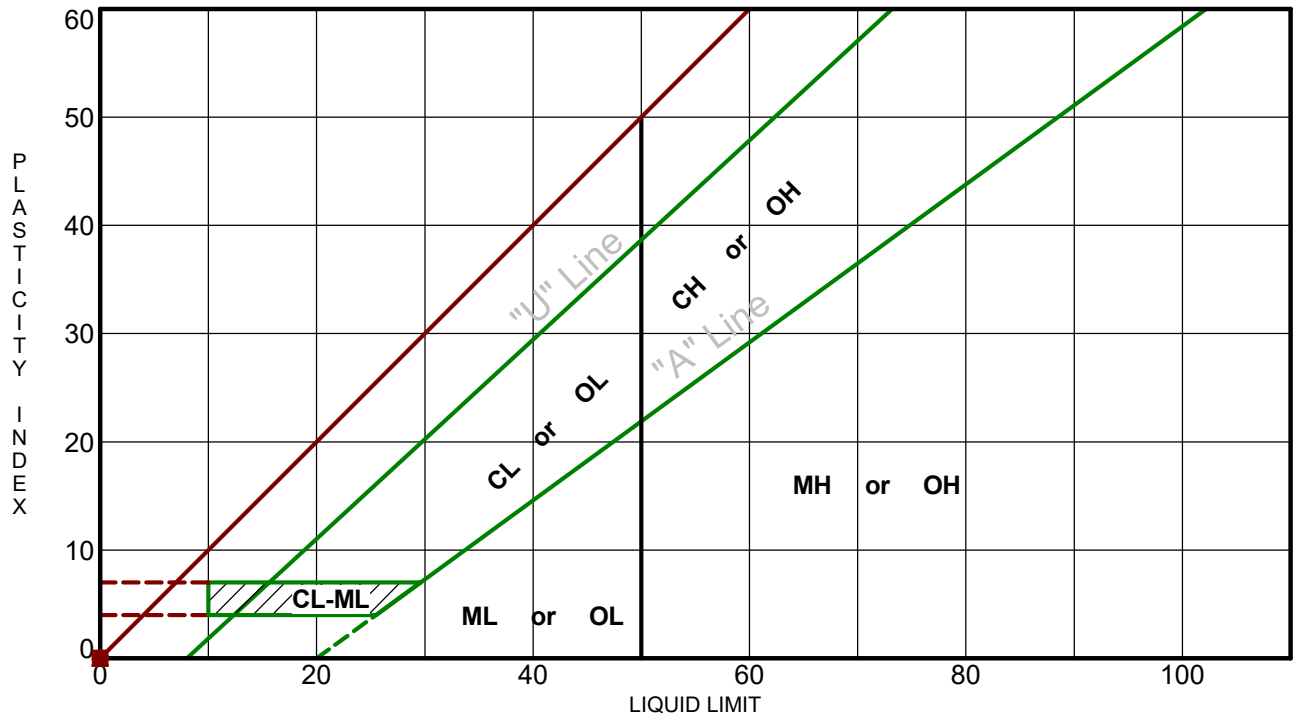
CLIENT: Hite Associates, P.C.
Greenville, NC

GRAIN SIZE: USCS 1 72215116 WEST CARTERET HIG.GPJ TERRACON_DATATEMPLATE.GDT 12/15/21

LABORATORY TESTS ARE NOT VALID IF SEPARATED FROM ORIGINAL REPORT.

ATTERBERG LIMITS RESULTS

ASTM D4318



Boring ID		Depth	LL	PL	PI	Fines	USCS	Description
●	B-4	13.5 - 15	NP	NP	NP	14.2	SM	SILTY SAND
⊠	B-11	6 - 7.5	NP	NP	NP	6.5	SP-SM	POORLY GRADED SAND with SILT
▲	S-2	1 - 2.5	NP	NP	NP	4.9	SP	POORLY GRADED SAND

PROJECT: West Carteret High School Addition

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Greenville, NC

SUPPORTING INFORMATION

Contents:

Note: All attachments are one page unless noted above.

GENERAL NOTES
DESCRIPTION OF SYMBOLS AND ABBREVIATIONS

SAMPLING	WATER LEVEL	FIELD TESTS
Split Spoon	**Water Initially Encountered** **Water Level After a Specified Period of Time** **Water Level After a Specified Period of Time** **Cave In Encountered** Water levels indicated on the soil boring logs are the levels measured in the borehole at the times indicated. Groundwater level variations will occur over time. In low permeability soils, accurate determination of groundwater levels is not possible with short term water level observations.	**N** Standard Penetration Test Resistance (Blows/Ft.) **(HP)** Hand Penetrometer **(T)** Torvane **(DCP)** Dynamic Cone Penetrometer **UC** Unconfined Compressive Strength **(PID)** Photo-Ionization Detector **(OVA)** Organic Vapor Analyzer

DESCRIPTIVE SOIL CLASSIFICATION

Soil classification as noted on the soil boring logs is based Unified Soil Classification System. Where sufficient laboratory data exist to classify the soils consistent with ASTM D2487 "Classification of Soils for Engineering Purposes" this procedure is used. ASTM D2488 "Description and Identification of Soils (Visual-Manual Procedure)" is also used to classify the soils, particularly where insufficient laboratory data exist to classify the soils in accordance with ASTM D2487. In addition to USCS classification, coarse grained soils are classified on the basis of their in-place relative density, and fine-grained soils are classified on the basis of their consistency. See "Strength Terms" table below for details. The ASTM standards noted above are for reference to methodology in general. In some cases, variations to methods are applied as a result of local practice or professional judgment.

LOCATION AND ELEVATION NOTES

Exploration point locations as shown on the Exploration Plan and as noted on the soil boring logs in the form of Latitude and Longitude are approximate. See Exploration and Testing Procedures in the report for the methods used to locate the exploration points for this project. Surface elevation data annotated with +/- indicates that no actual topographical survey was conducted to confirm the surface elevation. Instead, the surface elevation was approximately determined from topographic maps of the area.

STRENGTH TERMS

RELATIVE DENSITY OF COARSE-GRAINED SOILS (More than 50% retained on No. 200 sieve.) Density determined by Standard Penetration Resistance		CONSISTENCY OF FINE-GRAINED SOILS (50% or more passing the No. 200 sieve.) Consistency determined by laboratory shear strength testing, field visual-manual procedures or standard penetration resistance		
Descriptive Term (Density)	**Standard Penetration or N-Value Blows/Ft.**	**Descriptive Term (Consistency)**	**Unconfined Compressive Strength Qu, (tsf)**	**Standard Penetration or N-Value Blows/Ft.**
Very Loose	0 - 3	Very Soft	less than 0.25	0 - 1
Loose	4 - 9	Soft	0.25 to 0.50	2 - 4
Medium Dense	10 - 29	Medium Stiff	0.50 to 1.00	4 - 8
Dense	30 - 50	Stiff	1.00 to 2.00	8 - 15
Very Dense	> 50	Very Stiff	2.00 to 4.00	15 - 30
		Hard	> 4.00	> 30

RELEVANCE OF SOIL BORING LOG

The soil boring logs contained within this document are intended for application to the project as described in this document. Use of these soil boring logs for any other purpose may not be appropriate.

UNIFIED SOIL CLASSIFICATION SYSTEM

Criteria for Assigning Group Symbols and Group Names Using Laboratory Tests [A]					Soil Classification	
					Group Symbol	Group Name [B]
Coarse-Grained Soils: More than 50% retained on No. 200 sieve	**Gravels:** More than 50% of coarse fraction retained on No. 4 sieve	**Clean Gravels:** Less than 5% fines [C]	$Cu \geq 4$ and $1 \leq Cc \leq 3$ [E]		GW	Well-graded gravel [F]
			$Cu < 4$ and/or [$Cc<1$ or $Cc>3.0$] [E]		GP	Poorly graded gravel [F]
		Gravels with Fines: More than 12% fines [C]	Fines classify as ML or MH		GM	Silty gravel [F, G, H]
			Fines classify as CL or CH		GC	Clayey gravel [F, G, H]
	Sands: 50% or more of coarse fraction passes No. 4 sieve	**Clean Sands:** Less than 5% fines [D]	$Cu \geq 6$ and $1 \leq Cc \leq 3$ [E]		SW	Well-graded sand [I]
			$Cu < 6$ and/or [$Cc<1$ or $Cc>3.0$] [E]		SP	Poorly graded sand [I]
		Sands with Fines: More than 12% fines [D]	Fines classify as ML or MH		SM	Silty sand [G, H, I]
			Fines classify as CL or CH		SC	Clayey sand [G, H, I]
Fine-Grained Soils: 50% or more passes the No. 200 sieve	**Silts and Clays:** Liquid limit less than 50	**Inorganic:**	PI > 7 and plots on or above "A"		CL	Lean clay [K, L, M]
			PI < 4 or plots below "A" line [J]		ML	Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OL	Organic clay [K, L, M, N]
			Liquid limit - not dried			Organic silt [K, L, M, O]
	Silts and Clays: Liquid limit 50 or more	**Inorganic:**	PI plots on or above "A" line		CH	Fat clay [K, L, M]
			PI plots below "A" line		MH	Elastic Silt [K, L, M]
		Organic:	Liquid limit - oven dried	< 0.75	OH	Organic clay [K, L, M, P]
			Liquid limit - not dried			Organic silt [K, L, M, Q]
Highly organic soils:	Primarily organic matter, dark in color, and organic odor				PT	Peat

[A] Based on the material passing the 3-inch (75-mm) sieve.

[B] If field sample contained cobbles or boulders, or both, add "with cobbles or boulders, or both" to group name.

[C] Gravels with 5 to 12% fines require dual symbols: GW-GM well-graded gravel with silt, GW-GC well-graded gravel with clay, GP-GM poorly graded gravel with silt, GP-GC poorly graded gravel with clay.

[D] Sands with 5 to 12% fines require dual symbols: SW-SM well-graded sand with silt, SW-SC well-graded sand with clay, SP-SM poorly graded sand with silt, SP-SC poorly graded sand with clay.

[E] $Cu = D_{60}/D_{10}$ $\quad Cc = \dfrac{(D_{30})^2}{D_{10} \times D_{60}}$

[F] If soil contains ≥ 15% sand, add "with sand" to group name.

[G] If fines classify as CL-ML, use dual symbol GC-GM, or SC-SM.

[H] If fines are organic, add "with organic fines" to group name.

[I] If soil contains ≥ 15% gravel, add "with gravel" to group name.

[J] If Atterberg limits plot in shaded area, soil is a CL-ML, silty clay.

[K] If soil contains 15 to 29% plus No. 200, add "with sand" or "with gravel," whichever is predominant.

[L] If soil contains ≥ 30% plus No. 200 predominantly sand, add "sandy" to group name.

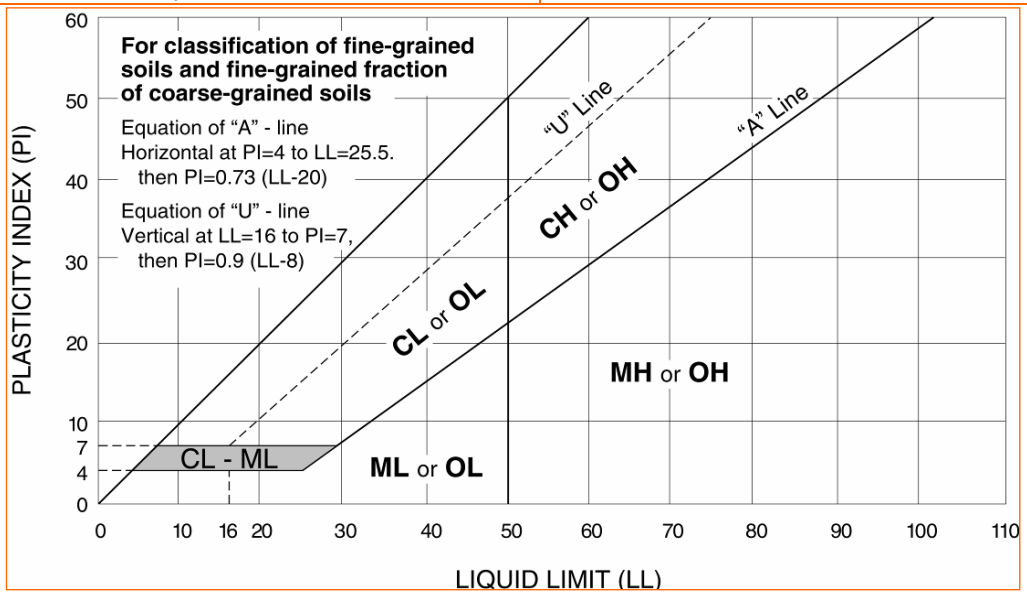
[M] If soil contains ≥ 30% plus No. 200, predominantly gravel, add "gravelly" to group name.

[N] PI ≥ 4 and plots on or above "A" line.

[O] PI < 4 or plots below "A" line.

[P] PI plots on or above "A" line.

[Q] PI plots below "A" line.



RELATED DOCUMENTS:

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

PART 1: GENERAL

Testing laboratory services will be paid for under the cash allowance as indicated in Section 01056 Allowances, to be provided in the General Contractor's bid, as amended below.

DESCRIPTION:

Work Included: From time to time during progress of the work, the Architect may require that testing be performed to determine that materials provided for the work meet the specified requirements; such testing includes, but not necessarily limited to:

- Proofrolling, Cutting & Filling of Soils Remediation Operations
- Soil Compaction
- Cast-In-Place Concrete & Reinforcing
- Structural Steel & Decking Connections
- Masonry Reinforcing
- Exterior Wall Light Gauge Framing
- Fireproofing

Related work described elsewhere: Requirements for testing may be described in various sections of these specifications and Drawings; where no testing requirements are described but the Architect decides that testing is required, the Architect may require testing to be performed under current pertinent standards for testing.

Work not included: Selection of testing laboratory: The Owner will select a pre-qualified independent testing laboratory and / or consultant.

QUALITY ASSURANCE:

Qualifications of testing laboratory: The testing laboratory will be qualified to the Architect's approval in accordance with ASTM E-329-70 "Recommended Practice for Inspection and Testing Agencies for Concrete and Steel Used in Construction".

Codes and Standards: Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

PRODUCT HANDLING:

Promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

PART 2: PRODUCTS

PAYMENT FOR TESTING SERVICES:

Initial Services: All initial testing services shall be paid for by the Owner.

Retesting: When initial tests indicate non-compliance with the contract documents, all subsequent retesting occasioned by the non-compliance shall be performed by the same testing laboratory and the costs thereof will be paid for by the Contractor and not charged to the Owner for Testing.

PART 3: EXECUTION

COOPERATION WITH TESTING LABORATORY:

Representatives of the testing laboratory shall have access to the work at all times; provide facilities for such access in order that the laboratory may properly perform its function.

SCHEDULES FOR TESTING:

Establishing Schedule: By advance discussion with the testing laboratory selected by the Owner, determine the time required for the laboratory to perform its tests and to issue each of its finding.

Provide all required testing time within the construction schedule.

Revising Schedule: When changes of construction schedule are necessary during construction coordinate all such changes of schedule with the testing laboratory as required.

Adherence to Schedule: When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of work, all extra costs for testing attributable to the delay may be back-charged to the Contractor and shall not be charged to the Owner.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide a Project Sign for each site to be purchased by the Contractor with the project cash allowance specified in 01056, constructed and painted as indicated, and erected on the site in a location selected by the Architect. The project sign shall be maintained by the Contractor until completion of the Project, and repaired and/or relocated as required during the construction period. No other signs will be allowed on the site - the General Contractor will be responsible for enforcing this provision.

END OF SECTION

ABBREVIATIONS AND NAMES: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of date of contract documents:

AA	Aluminum Association 818 Connecticut Ave. NW; Washington DC 20006; 202/862-5100
AAMA	Architectural Aluminum Manufacturers Association 35 E. Southern Bldg.; Washington DC 20005; 202/737-4060
AAN	American Association of Nurserymen 230 Southern Bldg.; Washington, DC 20005; 202/737-4060
AASHTO	American Association of State Highway and Transportation Officials 444 North Capital St.; Washington DC 20001; 202/624-5800
AATCC	American Association of Textile Chemists and Colorists P. O. Box 12215; Research Triangle Park, NC 27709; 919/549-8141
ACI	American Concrete Institute P. O. Box 19150; Detroit, MI 48219; 313/532-2600
ACIL	American Council of Independent Laboratories 1725 K St., NW; Washington DC 20006 202/659-3766
ADC	Air Diffusion Council 230 N. Michigan Aven.; Chicago, IL 60601; 312/372-9800
AGA	American Gas Association 1515 Wilson Blvd., Arlington, VA 22209; 703/841-8400
AHAM	Association of Home Appliance Manufacturers 20 N. Wacker Dr.; Chicago, IL 60606 312/984-5800
AI	Asphalt Institute Asphalt Inst. Bldg.; College Park, MD 20740 301/277-4258
AIA	American Institute of Architects 1735 New York Ave., NW; Washington, DC 20006; 202/626-7474
A.I.A.	American Insurance Association 85 John St.; New York, NY 10038;

212/699-0400

AISC American Institute of Steel Construction
400 N. Michigan Ave.; Chicago, IL 60611;
312/670-2400

AISI American Iron and Steel Institute
1000 16th St., NW; Washington, DC 20036;
202/452-7100

AITC American Institute of Timber Construction
333 W. Hampden Ave.; Englewood, CO 80110;
303/761-3212

AMCA Air Movement and Control Association
30 W. University Dr.; Arlington Heights, IL 60004;
312/394-0150

ANSI American National Standards Institute
1430 Broadway; New York, NY 10018;
212/354-3300

APA American Plywood Association
P. O. Box 11700; Tacoma, WA 98411;
206/565-6600

ARI Air Conditioning and Refrigeration Institute
1815 N. Fort Myer Dr.; Arlington, VA 22209;
703/524-8800

ASC Adhesive and Sealant Council
1600 Wilson Blvd.; Arlington, VA 22209;
703/841-1112

ASHRAE American Society of Heating, Refrigerating and Air-Conditioning Engineers
1791 Tullie Circle, NE; Atlanta, Ga 30329
404/636-8400

ASME American Society of Mechanical Engineers
345 East 47th St.; New York, NY 10017;
212/705-7722

ASPE American Society of Plumbing Engineers
15233 Ventura Blvd.; Sherman Oaks, Ca. 91403
213/783-4845

ASSE American Society of Sanitary Engineering
P. O. Box 9712; Bay Village, OH 44140
216/835-3040

ASTM American Society for Testing and Materials
1916 Race St..; Philadelphia, CA 19103
215/299-5400

AWI	Architectural Woodwork Institute 2310 S. Walter Reed Dr.; Arlington, VA 22206 703/671-9100
AWPA	American Wood-Preserver's Association 7735 Old Georgetown Rd.; Bethesda, MD 20814 301/652-3109
AWPB	American Wood Preservers Bureau P. O. Box 6085; Arlington, VA 22206 703/931-8180
AWS	American Welding Society P. O. Box 351040; Miami, FL 33135 305/642-7090
AWWA	American Water Works Association 6666 W. Quincy Ave., Denver, CO 80235 303/794-7711
BHMA	Builders' Hardware Manufacturers Association (c/o TGAM) 60 East 42nd St.; New York, NY 10017 212/682-8142
BIA	Brick Institute of America 1750 Old Meadow Rd.; McLean, VA. 22102 703/893-4010
CDA	Copper Development Association 405 Lexington Ave.; New York, NY 10174 212/953-7300
CE	Corps of Engineers (U.S. Dept. of the Army) Washington, DC 20314
CFR	Code of Federal Regulations Available from Government Printing Office; Washington, DC 20402 (usually first published in Federal Register)
CISPI	Cast Iron Soil Pipe Institute 1499 Chain Bridge Rd., McLean, VA. 22101 703/827-9177
CRIGLP	CRI Green Label Plus 730 College Drive Dalton, GA 30720 706-278-3176
CRSI	Concrete Reinforcing Steel Institute 933 Plum Grove Rd., Schamburg, IL 60195 312/372-5059
CS	Commercial Standard of NBS (U.S. Dept. of Commerce)

Government Printing Office; Washington, DC 20402

DHI — Door and Hardware Institute
7711 Old Springhouse Rd., McLean, VA. 22102
703/556-3990

EIA — Electronic Industries Association
2001 Eye St., NW; Washington, DC 20006
202/457-4900

FAA — Federal Aviation Administration (U. S. Dept. of Transportation)
800 Independence Ave., SW; Washington, DC 20590

FCC — Federal Communications Commission
1919 M St., NW; Washington, D C 20554
202/632-7000

FCI — Fluid Controls Institute
U.S. Highway One, Plaza 222; Tequesta, FL 33458;
305/746-6466

FGMA — Flat Glass Marketing Association
33l0 Harrison; Topeka, KS 666ll;
9l3/266-7013

FHA — Federal Housing Administration (U. S. Dept. of HUD)
451 - 7th St., SW; Washington, D C 20201

FM — Factory Mutual Engineering Corp.
1151 Boston-Providence Turnpike; Norwood, MA 02062
6l7/762-4300

FS — Federal Specification (General Services Admin.) Obtain from
your Regional GSA Office, or purchase from GSA Specifications Unit (WFSIS);
7th and D Streets, SW; Washington, DC 20406;
202/472-2205 or 2140

FTI — Facing Tile Institute
c/o Box 8880; Canton, OH 44711;
216/488-1211

GA — Gypsum Association
1603 Orrington Aven.; Evanston, IL 60201
312/491-1744

HPMA — Hardwood Plywood Manufacturers Association
P. O. Box 2789, Reston, VA. 22090
703/435-2900

IEEE — Institute of Electrical and Electronic Engineers, Inc.
345 E. 47th St.; New York, NY 10017;
212/705-790

IESNA — Illuminating Engineering Society of North America

345 E. 47th St.; New York, NY 10017
212/705-7926

ILI — Indiana Limestone Institute of America
Stone City Bank Bldg.; Bedford, IN 47421;
812/275-4425

IRI — Industrial Risk Insurers
85 Woodland St.; Hartford, CT 06102;
203/525-260l

ISA — Instrument Society of America
P. O. Box 12277; Research Triangle Park, NC 27709;
919/549-8411

LEED — Leadership in Energy and Environmental Design
U. S. Green Building Council
1800 Massachusetts Avenue NW, Suite 300
Washington , DC 20036
(800) 795-1747

MCAA — Mechanical Contractors Association of America
5530 Wisconsin Aven.; Chevy Chase, MD 20815
202/654-7960

MIA — Marble Institute of America
33505 State St.; Farmington, MI 48024
313/476-5558

MIL — Military Standardization Documents (U.S. Dept. of Defense)
Naval Publications and Forms Center
5801 Tabor Ave.; Philadelphia, PA 19120

ML/SFA — Metal Lath/Steel Framing Association
221 N. LaSalle St.; Chicago, IL 60601
312/346-1600

MSS — Manufacturers Standardization Society of the Valve and Fittings Industry
5203 Leesburg Pike; Falls Church, VA 22041;
703/998-7996

NAAMM — National Association of Architectural Metal Manufacturers
221 N. Lasalle St.; Chicago, IL 60601
312/346-1600

NAPF — National Association of Plastic Fabricators
1701 N. St., NW; Washington, DC 20036;
202/233-2504

NBGQA — National Building Granite Quarries Association
c/o H. E. Fletcher Co.; West Chelmsford, MA 01863

NBS — National Bureau of Standards (U.S. Dept. of Commerce)
Gaithersburg, MD 20234

301/921-1000

NCMA National Concrete Masonry Association
P. O. Box 781; Herndon, VA 22070
703/435-4900

NEC National Electrical Code (by NFPA)

NEII National Elevator Industry, Inc.
600 Third Aven.; New York, NY 10016
212/986-1545

NECA National Electrical Contractors Association
7315 Wisconsin Aven.; Bethesda, MD 20814
301/657-3110

NEII National Elevator Industry, Inc.
600 Third Avenue; New York, NY 10016
212/986-1545

NEMA National Electrical Manufacturers Association
2101 L St., NW; Washington, DC 20037
202/457-8400

NFPA National Fire Protection Association
Batterymarch Park; Quincy, MA 02269
617/328-9290

NFPA National Forest Products Association
1619 Massachusetts Aven.; NW; Washington, DC 20036
202/797-5800

NHLA National Hardwood Lumber Association
P. O. box 34518; Memphis, TN 38104;
901/377-1818

NPA National Particleboard Association
2306 Perkins Pl.; Silver Spring, MD 20910;
30l/587-2204

NRCA National Roofing Contractors Association
8600 Bryn Marr Aven.; Chicago, Il. 60631
312/693-0700

NSF National Sanitation Foundation
P. O. Box 1468; Ann Arbor, MI 48106
313/769-8010

NSSEA National School Supply and Equipment Association
1500 Wilson Blvd.; Arlington, VA. 22209
703/524-8819

NTMA National Terrazzo and Mosaic Association
3166 Des Plains Ave.; Des Plains, IL 60018

312/635-7744

NWMA National Wood Manufacturers Association
205 West Touhy Avenue; Park Ridge, IL 60068;
312/823-6747

OSHA Occupational Safety Health Administration (U.S.Dept. of Labor)
Government Printing Office; Washington, DC 20402

PCI Prestressed Concrete Institute
20 N. Wacker Dr., Chicago, IL 60606
312/346-4071

PDI Plumbing and Drainage Istitute
5342 Blvd., Pl.; Indianapolis, IN 46208
317/251-5298

PEI Porcelain Enamel Institute
1911 N. Fort Myer; Arlington, VA 22209
703/527-5257

PS Product Standard of NBS (U.S. Dept. of Commerce)
Government Printing Office; Washington, DC 20402

RFCI Resilient Floor Covering Institute
1030 15th St.; NW; Washington, DC 20005
202/833-2635

RIS Redwood Inspection Service (Grading Rules)
627 Montgomery; San Francisco, CA 94111

SAMA Scientific Apparatus Makers Association
110l 16th St., NW; Washington, DC 20036
202/223-1360

SCAQMD South Coast Air Quality Management District
21865 Copley Drive
Diamond Bar, CA 91765
(909) 396-2000

SDI Steel Deck Institute
P. O. Box 3812; St. Louis, MO 63122
314/965-1741

SDI Steel Door Institute
712 Lakewood Cnt. N.; Cleveland, OH 44107
216/226-7700

SHLMA Southern Hardwood Lumber Manufacturers Association
805 Sterick Bld.; Memphis, TN. 38103
901/525-8221

SIGMA Sealed Insulating Glass Manufacturers Association

	111 E. Wacker Dr.; Chicago, IL. 60601 312/644-6610
SJI	Steel Joist Institute 1703 Parham Rd.; Richmond, VA 23229 804/288-3071
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association P. O. Box 70; Merrifield, VA 22116
SPIB	Southern Pine Inspection Bureau (Grading Rules) 4709 Scenic Hwy.; Pensacola, FL 32504; 904/434-2611
SSPC	Steel Structures Painting Council 4400 5th Avenue; Pittsburgh, PA 15213; 412/578-3327
TCA	Tile Council of America P. O. Box 326, Princeton, NJ 08540; 609/921-7050
TIMA	Thermal Insulation Manufacturers Association 7 Kirby Plaza; Mt. Kisco, NY 10549; 914/241-2284
TPI	Truss Plate Institute 100 W. Church St., Frederick, MD 21701; 301/694-6100
UL	Underwriters Laboratories 333 Pfingsten Rd.; Northbrook, IL 60062; 312/272-8800
WCLIB	West Coast Lumber Inspection Bureau (Grading Rules) P. O. Box 2315; Portland, OR 97223; 503/639-0651
WIC	Woodwork Institute of California 1833 Broadway; Fresno, CA 93773; 209/233-9035
WRI	Wire Reinforcement Institute 7900 Westpark drive; McLean, VA. 22102; 703/790-9790
WSFI	Wood and Synthetic Flooring Institute 2400 E. Devon; Des Plaines, Il 60018; 312/635-7700
WWPA	Western Wood Products Association (Grading Rules) 1500 Yeon Bldg.; Portland, OR 97204; 503/224-3930

WWPA Woven Wire Products Association
108 W. Lake St.; Chicago, IL 6060l;
312/332-6502

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 - GENERAL

RELATED DOCUMENTS:

Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division-1 Specification Sections, apply to work of this section.

DESCRIPTION OF WORK:

Extent of demolition is shown on the Drawings. Refer to all Drawings and project phasing requirements.

Demolition may require the removal and subsequent off-site disposal of the following, but is not limited to:

Removal of asphalt or concrete paving, with curb and guttering.

Removal of building structures and structural elements, complete with foundations – including concrete floors/walks and exterior canopies.

Removal of building exterior wall and roof components.

Removal of interior walls and components.

Removal of partitions and doors.

Removal of windows and window walls.

Removal of ceiling systems, floor finishes and wall finishes.

Removal of underground elements and components; piping and accessories.

Removal of plumbing, electrical and mechanical equipment.

Cutting concrete floors, masonry walls and ceilings for piping, ducts, and conduit is included with the work of the respective mechanical and electrical Divisions 15 and 16 Specification Sections.

Locating and identification of existing underground utilities.

SUBMITTALS:

Demolition Schedule: Submit schedule indicating proposed methods and sequence of operations for selective demolition work to Owner's Representative for review prior to commencement of work. Include coordination for shut-off, capping, and continuation of utility services as required, together with details for dust and noise control protection.

Incorporate all selective demolition and abatement operations and phases into the Project CPM Schedule.

Coordinate with Owner’s continuing occupation of portions of existing building.

JOB CONDITIONS:

Occupancy: Owner will be continuously occupying the building immediately adjacent to areas of selective demolition. Conduct selective demolition work in a manner that will minimize need for disruption of Owner's normal operations. Provide minimum of 72 hours advance notice to Owner of demolition activities which will severely impact Owner's normal operations.

Condition of Structures: Owner assumes no responsibility for actual condition of items or structures to be demolished.

Protections: Provide temporary barricades and other forms of protection as required to protect personnel and general public from injury due to demolition work.

Provide interior and exterior shoring, bracing or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or work to remain.

Protect from damage existing finish work that is to remain in place and becomes exposed during demolition operations.

Protect all floors, new or existing, with suitable coverings when necessary. Example: protect flooring finishes from damage from overhead welding or torch work.

Construct temporary insulated solid dustproof partitions where required to separate areas where noisy or extensive dirt or dust operations are performed. Equip partitions with dustproof doors and security locks if required.

Provide temporary weather protection during interval between demolition and removal of existing construction on exterior surfaces, and installation of new construction to insure that no water leakage or damage occurs to structure or interior areas of existing building.

Remove protections at completion of work.

Damages: Promptly repair damages caused to adjacent facilities by demolition work at no cost to Owner.

Traffic: Conduct selective demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.

Do not close, block or otherwise obstruct streets, walks or other occupied or used facilities without written permission from authorities having jurisdiction. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

Explosives: Use of explosives will not be permitted.

Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.

Environmental Controls: Use water sprinkling, temporary enclosures, and other suitable methods to limit dust and dirt rising and scattering in air to lowest practical level. Comply with governing regulations pertaining to environmental protection.

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

HAZARDOUS MATERIALS

If necessary, asbestos abatement will be performed by a separate prime contractor, paid from a 01056 Allowances hazardous material abatement allowance, with which the General Contractor shall coordinate with. Master project construction schedule shall incorporate abatement operations. Refer to and coordinate with the approved project construction schedule and the Supplementary General Conditions.

LEAD PAINT

If the building is constructed before 1978, all contractors are to assume that all painted surfaces inside the existing building may contain lead paint. The contractors are required to comply with OSHA Lead Construction Standard 29 CFR 1926.62.

All demolition debris can be disposed of at C&D landfill as long as the painted surfaces matrix has not been disturbed. For patching against the painted surfaces and painting, sanding, cutting etc. should be done by company who has received RRP certification for disturbing lead paint in a closed environment where children 6 years of age and under can enter the space during or after the work is completed. Information for RRP certification can be obtained from N. C. Health Hazard Control Unit, Raleigh, NC. Phone No. (919) 707-5950 / Don Chaney at (919) 707-5974.

Lead-Based Paint Renovation, Repair, and Painting: Firms and renovators who perform renovations in housing or child occupied facilities built before 1978 must be certified by the Health Hazards Control Unit (HHCU).

All work shall comply with requirements as published by the EPA Lead-Based Paint Renovation, Repair and Painting Rule in the Code of Federal Regulations.

Samples: For determining whether components are free of lead-based paint, certified renovators may collect paint chip samples and submit samples to a laboratory recognized by NLLAP for analysis. Required paint chip samples documentation shall be prepared and maintained by the certified renovator for three years.

At interior and exterior areas suspected to be or are tested positive for lead based paints, provide vertical containment consisting of a minimum of plastic sheeting or other impermeable material on a rigid frame, or an equivalent system of containing the work area. Vertical containment shall comply with requirements as published by the EPA Lead-Based Paint Renovation, Repair and Painting Rule in the Code of Federal Regulations.

HEPA vacuum cleaners must be designed so that all the air drawn into the machine is expelled through a HEPA filter with no air leaking past or around the filter.

Machines used to remove paint or other surface coatings through high speed operation such as sanding, grinding, power planning, abrasive blasting, or sandblasting, is prohibited on painted surfaces unless such machines have shrouds or containment systems and are equipped with a HEPA vacuum attachment to collect dust and debris at the point of generation. Machines must be operated so that no visible dust or release of air occurs outside the shroud or containment system.

PART 2 - PRODUCTS (Not Applicable)

PART 3 – EXECUTION

INSPECTION:

Prior to commencement of demolition work, inspect areas in which work will be performed. Photograph existing conditions of structure, surfaces, equipment or of surrounding properties which could be

misconstrued as damage resulting from selective demolition work; file with Owner's Representative prior to starting work.

LOCATING EXISTING UNDERGROUND UTILITIES:

Prior to commencement of groundbreaking work, contractor shall provide for and retain a private utilities locating firm. All underground utilities within the construction limits shall be located, marked and identified by the private utility location service, prior to any ground breaking. All information shall be documented in a contractor's As-Built drawings format.

PREPARATION:

Provide interior and exterior shoring, bracing, or support to prevent movement, settlement or collapse of structures to be demolished and adjacent facilities to remain.

Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered. Take precautions to support structure until determination is made for continuing operations.

Cover and protect furniture, equipment and fixtures to remain from soiling or damage when demolition work is performed in rooms or areas from which such items have not been removed.

Erect and maintain dust-proof partitions and closures as required to prevent spread of dust or fumes to occupied portions of the building.

Where selective demolition occurs immediately adjacent to occupied portions of the building, construct dust-proof partitions of minimum 4" studs, 5/8" drywall (joints taped) on occupied side, ½" fire-retardant plywood on demolition side, and fill partition cavity with sound-deadening insulation.

Provide weatherproof closures for exterior openings resulting from demolition work.

Locate, identify, stub off and disconnect utility services that are not indicated to remain.

DEMOLITION:

Perform demolition work in a systematic manner. Use such methods as required to complete work indicated on Drawings in accordance with demolition schedule and governing regulations.

Demolish concrete and masonry in small sections. Cut concrete and masonry at junctures with construction to remain using power-driven masonry saw or hand tools; do not use power-driven impact tools.

Locate demolition equipment throughout structure and promptly remove debris to avoid imposing excessive loads on supporting walls, floors or framing.

Provide services for effective air and water pollution controls as required by local authorities having jurisdiction.

If unanticipated mechanical, electrical or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict. Submit report to Owner's Representative in written, accurate detail. Pending receipt of directive from Owner's Representative re-arrange selective demolition schedule as necessary to continue overall job progress without delay.

DISPOSAL OF DEMOLISHED MATERIALS:

The Owner reserves salvage rights to equipment and material, items to be determined at pre-construction conference. At request of the Owner, Contractor shall coordinate the scheduled removal of designated material to be salvaged and place said material outside of building, on site, for removal by Owner.

Remove all debris, rubbish and other materials resulting from demolition operations and not salvaged by the Owner from building site. Transport and legally dispose of materials off-site.

Hazardous materials disposal during demolition operations, shall comply with all applicable regulations, laws, and ordinances, concerning removal, handling and protection against exposure or environmental pollution.

Burning of removed materials is not permitted on project sites.

CLEAN-UP AND REPAIR:

Upon completion of demolition work, remove tools, equipment and demolished materials from site. Remove protections and leave interior areas broom clean.

Repair demolition performed in excess of that required. Return structures and surfaces to remain to condition existing prior commencement of demolition work. Repair adjacent construction or surfaces soiled or damaged by demolition work to like new condition.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Clearing and protection of vegetation.

B. Removal of existing debris.

C. Removal of root mat.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Topsoil removal.

B. Section 02200 - Grading: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

C. Section 02230 - Fill: Fill material for filling holes, pits, and excavations generated as a result of removal operations.

1.3 PROJECT CONDITIONS

A. Comply with the approved Erosion and Sedimentation Plan.

B. Conform to applicable regulations relating to environmental requirements and disposal of debris.

C. Coordinate clearing work with utility companies.

D. Protect utilities to remain from damage.

E. Protect trees, plants and other features designated to remain as final landscaping.

F. Protect bench marks, survey control points, and existing structures from damage or displacement.

PART 2 EXECUTION

2.1 SITE CLEARING

A. Comply with other requirements specified in Section 017000.

B. Minimize production of dust due to clearing operations; do not use water if that will result in ice, flooding, sedimentation of public waterways or storm sewers, or other pollution.

2.2 PREPARATION

A. Locate and identify utilities to remain.

2.3 CLEARING

A. Clear areas required for access to site and execution of Work.

B. Remove trees, shrubs, and stumps within marked areas.

C. Remove roots to a depth of 18 inches.

D. Clear undergrowth and deadwood without disturbing subsoil.

2.4 REMOVAL

A. Remove debris from site.

2.5 EXISTING UTILITIES AND BUILT ELEMENTS

A. Coordinate work with utility companies; notify before starting work and comply with their requirements; obtain required permits.

B. Protect existing utilities to remain from damage.

C. Do not disrupt public utilities without permit from authority having jurisdiction.

D. Protect existing structures and other elements that are not to be removed.

2.6 VEGETATION

A. Do not remove or damage vegetation beyond the limits indicated on drawings.

B. Install substantial, highly visible fences at least 3 feet high to prevent inadvertent damage to vegetation to remain:
   1. At vegetation removal limits.

C. Vegetation Removed: Do not burn, bury, landfill, or leave on site, except as indicated.
   1. Chip, grind, crush, or shred vegetation for mulching, composting, or other purposes; preference should be given to on-site uses.
   2. Trees: Sell if marketable; if not, treat as specified for other vegetation removed; remove stumps and roots to depth of 18 inches.
   3. Sod: Re-use on site if possible; otherwise sell if marketable, and if not, treat as specified for other vegetation removed.

D. Restoration: If vegetation outside removal limits or within specified protective fences is damaged or destroyed due to subsequent construction operations, replace at no cost to Owner.

2.7 DEBRIS

A. Remove debris, junk, and trash from site.

B. Leave site in clean condition, ready for subsequent work.

C. Clean up spillage and wind-blown debris from public and private lands.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Removal and storage of topsoil.

B. Rough grading the site for roadways, drives, parking lots and building pads and stormwater ponds..

C. Finish grading .

1.2 RELATED REQUIREMENTS

A. Section 02110 - Site Clearing.

B. Section 02220 - Excavation.

C. Section 02230 - Fill: Filling and compaction.

D. Section 02210 - Trenching: Trenching and backfilling for utilities.

1.3 PROJECT CONDITIONS

A. Protect above- and below-grade utilities that remain.

B. Protect plants, lawns, and other features to remain as a portion of final landscaping.

C. Protect bench marks, survey control points, and paving from grading equipment and vehicular traffic.

PART 2 PRODUCTS

2.1 MATERIALS

A. Topsoil: Topsoil excavated on-site.

B. Other Fill Materials: See Section 02230

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum.

B. Stake and flag locations of known utilities.

C. Locate, identify, and protect from damage above- and below-grade utilities to remain.

D. Notify utility company to remove and relocate utilities.

3.3 ROUGH GRADING

A. Remove topsoil from areas to be further excavated, re-landscaped, or re-graded, without mixing with foreign materials.

B. Do not remove topsoil when wet.

C. Remove subsoil from areas to be further excavated, re-landscaped, or re-graded.

D. Benching Slopes: Horizontally bench existing slopes greater than 1:4 to key fill material to slope for firm bearing.

E. Stability: Replace damaged or displaced subsoil to same requirements as for specified fill.

3.4 SOIL REMOVAL

A. Stockpile excavated topsoil on site.

B. Stockpile topsoil to be re-used on site; remove remainder from site.

C. Stockpiles: Use areas designated on site; pile depth not to exceed 8 feet; protect from erosion.

3.5 FINISH GRADING

A. Before Finish Grading:
   1. Verify building and trench backfilling have been inspected.
   2. Verify subgrade has been contoured and compacted.

B. Remove debris, roots, branches, stones, in excess of 1/2 inch in size. Remove soil contaminated with petroleum products.

C. Where topsoil is to be placed, scarify surface to depth of 3 inches.

D. In areas where vehicles or equipment have compacted soil, scarify surface to depth of 3 inches.

E. Place topsoil in areas where seeding are indicated.

F. Place topsoil during dry weather.

G. Remove roots, weeds, rocks, and foreign material while spreading.

H. Near plants spread topsoil manually to prevent damage.

I. Fine grade topsoil to eliminate uneven areas and low spots. Maintain profiles and contour of subgrade.

J. Lightly compact placed topsoil.

3.6 FIELD QUALITY CONTROL

A. See Section 02230 for compaction density testing.

3.7 CLEANING

A. Remove unused stockpiled topsoil. Grade stockpile area to prevent standing water.

B. Leave site clean and raked, ready to receive landscaping.

END OF SECTION

SECTION 02210 - TRENCHING

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Site grading.

B. Section 02220 - Excavation: Building and foundation excavating.

C. Section 02230 - Fill: Backfilling at building and foundations.

D. Section 02700 - Water Distribution System.

E. Section 02710 - Sanitary Sewer Piping.

F. Section 02720 - Storm Drainage System.

1.3 REFERENCES

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

F. ASTM D2487 - Standard Practice for Classification of Soils for Engineering Purposes (Unified Soil Classification System); 2011.

G. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

H. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.4 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where designated.
   1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
   2. Prevent contamination.
   3. Protect stockpiles from erosion and deterioration of materials.

C. Verify that survey bench marks and intended elevations for the Work are as indicated.

D. Protect bench marks, survey control points, and paving from excavating equipment and vehicular traffic.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. General Fill - Fill Type 1: Subsoil excavated on-site.

B. Structural Fill - Fill Type 2: Subsoil excavated on-site.

C. Granular Fill - Fill Type 3: No. 57 Stone, conforming to State of North Carolina Department of Transportation Standard Specifications for Roads and Structures.

D. Sand - Fill Type 4: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

3.2 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

B. Locate, identify, and protect utilities that remain and protect from damage.

D. Protect bench marks, survey control points, and paving from excavating equipment and vehicular traffic.

3.3 TRENCHING

A. Notify The Cullipher Group, PA of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

B. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

C. Do not interfere with 45 degree bearing splay of foundations.

D. Cut trenches wide enough to allow inspection of installed utilities.

E. Remove large stones and other hard matter that could damage piping or impede consistent backfilling or compaction.

F. Remove excavated material that is unsuitable for re-use from site.

G. Stockpile excavated material to be re-used in area designated on plans.

H. Remove excess excavated material from site.

3.4 DEWATERING

A. The Contractor shall remove by pumping, bailing or otherwise any water which may accumulate or be found in the trench and other excavations and shall form all dams, flumes or other work necessary to keep them entirely clear of water while the pipes, foundations and structures are being constructed. Water from the trenches and excavations shall be disposed of in such a manner as will not cause injury to the work completed or in progress, to the public health, to public or private property, nor cause any interference with the use of the same by the public

B. When it is necessary to excavate a drainage trench from an excavation site to a natural watercourse in lieu of pumping or bailing, such trenching work shall be done by the Contractor at his own expense

C. The Contractor shall provide silt fences or other erosion control devices which may be required by the Engineer

D. Well points shall be furnished by the Contractor if required for dewatering. The cost of well points shall be included in the price bid for project.

3.5 SHORING

A. The Contractor shall furnish, put in place and maintain such sheeting, bracing, etc., as may be required to support the excavation and to prevent any movement which can in any way injure the masonry, or otherwise injure or delay the work or endanger adjacent building or other structures or create undue hazards to workmen employed therein. If the Engineer is of the opinion that at any point sufficient or proper supports have not been provided, he may order additional supports put in at the expense of the Contractor, and the compliance with such orders shall not release the Contractor from his responsibility for the sufficiency of such support. Care

shall be taken to prevent voids outside of the sheeting, but if voids are formed, they shall be immediately filled and rammed to the satisfaction of the Engineer. All sheeting and bracing that is removed from the backfill shall be removed in such a manner as not to endanger the constructed pipe of other structures, utilities or property, whether public or private. All voids left or caused by the withdrawal of sheeting shall be immediately refilled with earth as directed by the Engineer

3.6 PREPARATION FOR UTILITY PLACEMENT

A. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill for waterline installation and a minimum of 6" stone bedding under the sewer. Additional bedding for soft or wet spots shall be included in the unit price for pipe installation.

B. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

C. Until ready to backfill, maintain excavations and prevent loose soil from falling into excavation.

3.7 BACKFILLING

A. Backfill to contours and elevations indicated using unfrozen materials.

B. Fill up to subgrade elevations unless otherwise indicated.

C. Employ a placement method that does not disturb or damage other work.

D. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

E. Maintain optimum moisture content of fill materials to attain required compaction density.

F. Granular Fill: Place and compact materials in equal continuous layers not exceeding 8 inches compacted depth.

G. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

H. Correct areas that are over-excavated.
   1. Thrust bearing surfaces: Fill with concrete.
   2. Other areas: Use select fill, flush to required elevation, compacted to minimum 97 percent of maximum dry density.

I. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

J. Reshape and re-compact fills subjected to vehicular traffic.

3.8 BEDDING AND FILL AT SPECIFIC LOCATIONS

A. At Pipe Culverts and Storm Drains:
   1. At areas to be paved, fill up to subgrade with granular fill, Type 3, as directed by the Engineer. Compact in 8 inch lifts to 97 % of maximum dry density.
   2. At areas not to be paved fill up to finish grade with general fill, Type 1.
   3. Compact in maximum 8 inch lifts to 95 percent of maximum dry density.

B. At Gravity Sewer Pipes:
   1. Bedding:
      a. PVC Pipe: Minimum of 6" of #57 stone under pipe, then bedded to top of pipe
      b. DIP: Minimum of 6" of number 57 stone under the pipe, the bedded to the top of the pipe.
   2. Final Backfill:
      a. At areas to be paved, use select fill. Compact in 8 inch lifts to 97 % of maximum dry density
      b. At areas not to be paved, use general fill, type 1
   3. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.

C. At Water Pipes:
   1. Bedding: Use select fill as directed by the Engineer.
   2. Cover with [select fill] as directed by the Engineer.
   3. At areas to be paved, fill up to subgrade with select fill as directed by the Engineer. Compact in 8 inch lifts to 97 % of maximum dry dry density.
   4. At areas not to be paved fill up to finish grade with general fill, Type 1
   5. Compact in maximum 8 inch (200 mm) lifts to 95 percent of maximum dry density.

3.9 TOLERANCES

A. Top Surface of General Backfilling: Plus or minus 2 inch from required elevations.

B. Top Surface of Backfilling Under Paved Areas: Plus or minus 1/2 inch from required elevations.

3.10 SURFACE RESTORATION

A. The surfacing of all roads, yards or ditches, etc., that is disturbed or damaged by any of the contractors operations shall be restored to it's original state. Surfacing shall be taken to mean clay, gravel, grass, hardtop or any other specially treated surfaces. Natural ground surfaces shall be graded so as to prevent ponding of water

3.11 FIELD QUALITY CONTROL

A. If at any time, the Engineer is of the opinion that the compaction requirements are not being met, he may order a compaction test to be conducted by a qualified soils testing lab. Initial density tests will be at the expense of the owner. If the tests fail, subsequent density tests will be at the expense of the contractor.

1. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017, when directed by the engineer..
2. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.
3. If tests indicate work does not meet specified requirements, remove work, replace and retest.

3.12 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Excavating for paving and site structures.

B. Trenching for utilities outside the building to utility main connections.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Grading.

B. Section 02230 - Fill: Fill materials, filling, and compacting.

C. Section 02210 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.3 PROJECT CONDITIONS

A. Verify that survey bench mark and intended elevations for the Work are as indicated.

B. Protect plants, lawns, and other features to remain.

C. Protect bench marks, survey control points, and paving from excavating equipment and vehicular traffic.

PART 2 EXECUTION

2.1 PREPARATION

A. Identify required lines, levels, contours, and datum locations.

2.2 EXCAVATING

A. Excavate to accommodate new structures and construction operations.

B. Notify The Cullipher Group, PA of unexpected subsurface conditions and discontinue affected Work in area until notified to resume work.

C. Slope banks of excavations deeper than 4 feet to angle of repose or less until shored.

D. Correct areas that are over-excavated and load-bearing surfaces that are disturbed;

E. Remove excavated material that is unsuitable for re-use from site.

F. Stockpile excavated material to be re-used in area designated on site plans.

G. Remove excess excavated material from site.

2.3 PROTECTION

A. Prevent displacement of banks and keep loose soil from falling into excavation; maintain soil stability.

B. Protect bottom of excavations and soil adjacent to and beneath foundation from freezing.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Filling, backfilling, and compacting for paving and site structures, and sidewalks.

B. Backfilling and compacting for utilities outside the building to utility main connections.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Site grading.

B. Section 02220 - Excavation: Removal and handling of soil to be re-used.

C. Section 02210 - Trenching: Excavating for utility trenches outside the building to utility main connections.

1.3 REFERENCE STANDARDS

A. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.

B. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

C. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

D. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

E. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

F. ASTM D2922 - Standard Test Methods for Density of Soil and Soil-Aggregate in Place by Nuclear Methods (Shallow Depth); 2005.

G. ASTM D3017 - Standard Test Method for Water Content of Soil and Rock in Place by Nuclear Methods (Shallow Depth); 2005.

1.4 DEFINITIONS

A. Finish Grade Elevations: Indicated on drawings.

B. Subgrade Elevations: Indicated on drawings.

1.5 SUBMITTALS

A. Fill Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

B. Compaction Density Test Reports.

1.6 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. When fill materials need to be stored on site, locate stockpiles where indicated.
1. Separate differing materials with dividers or stockpile separately to prevent intermixing.
2. Prevent contamination.
3. Protect stockpiles from erosion and deterioration of materials.

PART 2 PRODUCTS

2.1 FILL MATERIALS

A. General Fill - Fill Type 1: Imported borrow or on site subsoil complying with ASTM D 2487, Types SW, SP, SM, SC. .

B. General Fill - Fill Type 2: Subsoil excavated on-site.

C. Structural Fill - Fill Type 3: Conforming to State of North Carolina Highway Department of Transportation Standard for Specifications for Roads and Structures standard..

D. Granular Fill: Coarse aggregate, conforming to State of North Carolina Highway Department standard.

E. Sand - Fill Type 4: Natural river or bank sand; washed; free of silt, clay, loam, friable or soluble materials, and organic matter.

F. Topsoil: Topsoil excavated on-site.

2.2 SOURCE QUALITY CONTROL

A. Where fill materials are specified by reference to a specific standard, test and analyze samples for compliance before delivery to site.

B. If tests indicate materials do not meet specified requirements, change material and retest.

C. Provide materials of each type from same source throughout the Work.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the Work are as indicated.

B. Identify required lines, levels, contours, and datum locations.

3.2 PREPARATION

A. Scarify and proof roll subgrade surface to a depth of 6 inches to identify soft spots.

B. Cut out soft areas of subgrade not capable of compaction in place. Backfill with general fill.

C. Compact subgrade to density equal to or greater than requirements for subsequent fill material.

D. Until ready to fill, maintain excavations and prevent loose soil from falling into excavation.

3.3 FILLING

A. Fill to contours and elevations indicated using unfrozen materials.

B. Employ a placement method that does not disturb or damage other work.

C. Systematically fill to allow maximum time for natural settlement. Do not fill over porous, wet, frozen or spongy subgrade surfaces.

D. Maintain optimum moisture content of fill materials to attain required compaction density.

E. Granular Fill: Place and compact materials in equal continuous layers not exceeding 6 inches compacted depth.

F. Soil Fill: Place and compact material in equal continuous layers not exceeding 8 inches compacted depth.

G. Compaction Density Unless Otherwise Specified or Indicated:
   1. Under paving, slabs-on-grade, and similar construction: 97 percent of maximum dry density.
   2. At other locations: 95 percent of maximum dry density.

H. Reshape and re-compact fills subjected to vehicular traffic.

3.4 FILL AT SPECIFIC LOCATIONS

A. Use general fill unless otherwise specified or indicated by the Geotechnical Engineering report.

3.5 TOLERANCES

A. Top Surface of General Filling: Plus or minus 1 inch from required elevations.

3.6 FIELD QUALITY CONTROL

A. Perform compaction density testing on compacted fill in accordance with ASTM D1556, ASTM D2167, ASTM D2922, or ASTM D3017.

B. Evaluate results in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor"), ASTM D1557 ("modified Proctor"), or AASHTO T 180.

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: See Geotechnical Engineering report.

E. Proof roll compacted fill at surfaces that will be under slabs-on-grade and paving.

3.7 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Provide soil treatment for termite control, as herein specified.

QUALITY ASSURANCE:

In addition to requirements of these specifications, comply with manufacturer's instructions and recommendations for work, including preparation of substrate and application.

Engage a professional pest control operator, licensed in accordance with regulations of governing authorities for application of soil treatment solution.

JOB CONDITIONS:

Restrictions: Do not apply soil treatment solution until excavating, filling and grading operations are completed, except as otherwise required in construction operations.

To insure penetration, do not apply soil treatment to frozen or excessively wet soils or during inclement weather. Comply with handling and application instructions of the soil toxicant manufacturer.

SUBMITTALS:

Product Data: Submit manufacturer's technical data and application instructions.

SPECIFIC PRODUCT WARRANTY:

Furnish written warranty certifying that applied soil poisoning treatment will prevent infestation of subterranean termites and, that if subterranean termite activity is discovered during warranty period, Contractor will re-treat soil and repair or replace damage caused by termite infestation.

Provide warranty for a period of 5 years from date of treatment, signed by Applicator and Contractor.

PART 2: PRODUCTS

SOIL TREATMENT SOLUTION:

The pest control operator will submit the Safety Data Sheet and label of the termiticide he will use on the project. The termicide must be currently approved as a termiticide by the N. C. Structural Pest Control Committee.

PART 3: EXECUTION

APPLICATION:

Surface Preparation: Remove foreign matter which could decrease effectiveness of treatment on areas to be treated. Loosen, rake, and level soil to be treated, except previously compacted areas under slabs and foundations. Toxicants may be applied before placement of compacted fill under slabs, if recommended by toxicant manufacturer.

All treatments (excluding the rate of application and treating techniques) must be performed as outlined on the termiticide's label.

All treatments in regards to rate of application and treatment technique will be performed as outlined in the N. C. Structural Pest Control Committee's Rules and Regulations as currently applies to treatment of commercial buildings under construction.

All treatments performed pursuant to Rule. -506 shall be performed at the label recommended rate and concentration only.

Minimum Treatment Requirements:

1. Establish a vertical barrier in the soil along inside of the main foundation wall; the entire perimeter of all multiple masonry chimney bases, pillars, pilasters, and piers; and both sides of partition or inner walls with a termiticide from the top of the grade to the top of the footing.

2. After a building or structure has been completed and the excavation filled and leveled, so that the final grade has been reached along the outside of the main foundation wall, establish a vertical barrier in the soil adjacent to the outside of the main foundation wall with a termiticide from the top of the grade to the top of the footing, according to the label; except that, where drain tile, trench drains or other foundation drainage systems present a hazard of contamination outside the treatment zone, treatment shall be performed in a manner that will not introduce termiticide into the drainage system.

3. Establish a horizontal barrier in the soil within 3' of the main foundation, under slabs, such as patios, walkways, driveways, terraces, gutters, etc. Treatment shall be performed before slab is poured, but after fill material or fill dirt has been spread.

4. Establish a vertical barrier in the soil around all critical areas, such as expansion and construction joints and plumbing and utility conduits, at their point of penetration of the slab of floor or, for crawl space construction, at the point of contact with the soil.

Reapply soil treatment solution to areas distributed by subsequent excavation or other construction activities following application.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Prevention of erosion due to construction activities.

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

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

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

1.2 RELATED REQUIREMENTS

A. Section 02510 - Aggregate Base Courses: Temporary and permanent roadways.

1.3 PERFORMANCE REQUIREMENTS

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

B. Also comply with all more stringent requirements of State of North Carolina Erosion and Sedimentation Control Manual.

C. Develop and follow an Erosion and Sedimentation Prevention Plan and submit periodic inspection reports.

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

E. Timing: Put preventive measures in place as soon as possible after disturbance of surface cover and before precipitation occurs.

F. Storm Water Runoff: Control increased storm water runoff due to disturbance of surface cover due to construction activities for this project.
   1. Prevent runoff into storm and sanitary sewer systems, including open drainage channels, in excess of actual capacity or amount allowed by authorities having jurisdiction, whichever is less.
   2. Anticipate runoff volume due to the most extreme short term and 24-hour rainfall events that might occur in 10 years.

G. Erosion On Site: Minimize wind, water, and vehicular erosion of soil on project site due to construction activities for this project.
   1. Control movement of sediment and soil from temporary stockpiles of soil.
   2. Prevent development of ruts due to equipment and vehicular traffic.
   3. If erosion occurs due to non-compliance with these requirements, restore eroded areas at no cost to Owner.

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

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

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

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

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

M. Record Keeping: Install rain gauge on-site and record rain events and maintenance activity in accordance with NCDEQ Division of Environment, Mineral and Land Resources, Sedimentation and Erosion Control Permit.

PART 2 PRODUCTS

2.1 MATERIALS

A. Mulch: Use one of the following:
   1. Straw or hay.
   2. Wood waste, chips, or bark.
   3. Erosion control matting or netting.

B. Grass Seed For Temporary Cover: Select a species appropriate to climate, planting season, and intended purpose. If same area will later be planted with permanent vegetation, do not use

species known to be excessively competitive or prone to volunteer in subsequent seasons. See Construction Plans for seeding schedule.

C. Bales: Air dry, rectangular straw bales.
   1. Cross Section: 14 by 18 inches, minimum.
   2. Bindings: Wire or string, around long dimension.

D. Bale Stakes: One of the following, minimum 3 feet long:
   1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.
   2. Wood, 2 by 2 inches in cross section.

E. Silt Fence Fabric: Polypropylene geotextile resistant to common soil chemicals, mildew, and insects; non-biodegradable; in longest lengths possible; fabric including seams with the following minimum average roll lengths:
   1. Average Opening Size: 30 U.S. Std. Sieve, maximum, when tested in accordance with ASTM D4751.
   2. Permittivity: 0.05 sec^-1, minimum, when tested in accordance with ASTM D4491.
   3. Ultraviolet Resistance: Retaining at least 70 percent of tensile strength, when tested in accordance with ASTM D4355/D4355M after 500 hours exposure.
   4. Tensile Strength: 100 lb-f, minimum, in cross-machine direction; 124 lb-f, minimum, in machine direction; when tested in accordance with ASTM D4632/D4632M.
   5. Elongation: 15 to 30 percent, when tested in accordance with ASTM D4632/D4632M.
   6. Tear Strength: 55 lb-f, minimum, when tested in accordance with ASTM D4533.
   7. Color: Manufacturer's standard, with embedment and fastener lines preprinted.

F. Silt Fence Posts: One of the following, minimum 5 feet long:
   1. Steel U- or T-section, with minimum mass of 1.33 lb per linear foot.

PART 3 EXECUTION

3.1 EXAMINATION

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

3.2 PREPARATION

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

3.3 SCOPE OF PREVENTIVE MEASURES

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

B. Construction Entrances: Traffic-bearing aggregate surface.
   1. Width: As required; 20 feet, minimum.
   2. Length: 50 feet, minimum.
   3. Provide at each construction entrance from public right-of-way.
   4. Where necessary to prevent tracking of mud onto right-of-way, provide wheel washing area out of direct traffic lane, with drain into sediment trap or basin.

C. Linear Sediment Barriers: Made of silt fences.
   1. Provide linear sediment barriers:
      a. Along downhill perimeter edge of disturbed areas, including soil stockpiles.
      b. Along the top of the slope or top bank of drainage channels and swales that traverse disturbed areas.
      c. Along the toe of cut slopes and fill slopes.
      d. Perpendicular to flow across the bottom of existing and new drainage channels and swales that traverse disturbed areas or carry runoff from disturbed areas; space at maximum of 200 feet apart.
      e. Across the entrances to culverts that receive runoff from disturbed areas.
   2. Space sediment barriers with the following maximum slope length upslope from barrier:
      a. Slope of Less Than 2 Percent: 100 feet..
      b. Slope Between 2 and 5 Percent: 75 feet.
      c. Slope Between 5 and 10 Percent: 50 feet.
      d. Slope Between 10 and 20 Percent: 25 feet.
      e. Slope Over 20 Percent: 15 feet.

D. Storm Drain Curb Inlet Sediment Trap: Protect each curb inlet using one of the following measures:
   1. Filter fabric wrapped around hollow concrete blocks blocking entire inlet face area; use one piece of fabric wrapped at least 1-1/2 times around concrete blocks and secured to prevent dislodging; orient cores of blocks so runoff passes into inlet.
   2. Straw bale row blocking entire inlet face area; anchor into pavement.

E. Storm Drain Drop Inlet Sediment Traps: As detailed on drawings.

F. Temporary Splash Pads: Stone aggregate over filter fabric; size to suit application; provide at downspout outlets and storm water outlets.

G. Soil Stockpiles: Protect using one of the following measures:
   1. Cover with polyethylene film, secured by placing soil on outer edges.
   2. Cover with mulch at least 4 inches thickness of pine needles, sawdust, bark, wood chips, or shredded leaves, or 6 inches of straw or hay.

H. Mulching: Use only for areas that may be subjected to erosion for less than 6 months.
   1. Wood Waste: Use only on slopes 3:1 or flatter; no anchoring required.

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

3.4 INSTALLATION

A. Traffic-Bearing Aggregate Surface:
   1. Excavate minimum of 6 inches.
   2. Place geotextile fabric full width and length, with minimum 12 inch overlap at joints.
   3. Place and compact at least 6 inches of 1.5 to 3.5 inch diameter stone.

B. Silt Fences:
   1. Store and handle fabric in accordance with ASTM D4873.
   2. Where slope gradient is less than 3:1 or barriers will be in place less than 6 months, use nominal 16 inch high barriers with minimum 36 inch long posts spaced at 6 feet maximum, with fabric embedded at least 4 inches in ground.

3. Where slope gradient is steeper than 3:1 or barriers will be in place over 6 months, use nominal 28 inch high barriers, minimum 48 inch long posts spaced at 6 feet maximum, with fabric embedded at least 6 inches in ground.
4. Where slope gradient is steeper than 3:1 and vertical height of slope between barriers is more than 20 feet, use nominal 32 inch high barriers with woven wire reinforcement and steel posts spaced at 4 feet maximum, with fabric embedded at least 6 inches in ground.
5. Install with top of fabric at nominal height and embedment as specified.
6. Do not splice fabric width; minimize splices in fabric length; splice at post only, overlapping at least 18 inches, with extra post.
7. Fasten fabric to steel posts using wire, nylon cord, or integral pockets.
8. Wherever runoff will flow around end of barrier or over the top, provide temporary splash pad or other outlet protection; at such outlets in the run of the barrier, make barrier not more than 12 inches high with post spacing not more than 4 feet.

C. Straw Bale Rows:
1. Install bales in continuous rows with ends butting tightly, with one bale at each end of row turned uphill.
2. Install bales so that bindings are not in contact with the ground.
3. Embed bales at least 4 inches in the ground.
4. Anchor bales with at least two stakes per bale, driven at least 18 inches into the ground; drive first stake in each bale toward the previously placed bale to force bales together.
5. Fill gaps between ends of bales with loose straw wedged tightly.
6. Place soil excavated for trench against bales on the upslope side of the row, compacted.

D. Mulching Over Large Areas:
1. Dry Straw and Hay: Apply 2-1/2 tons per acre; anchor using dull disc harrow or emulsified asphalt applied using same spraying machine at 100 gallons of water per ton of mulch.
2. Wood Waste: Apply 6 to 9 tons per acre.
3. Erosion Control Matting: Comply with manufacturer's instructions.

E. Mulching Over Small and Medium Areas:
1. Dry Straw and Hay: Apply 4 to 6 inches depth.
2. Wood Waste: Apply 2 to 3inches depth.
3. Erosion Control Matting: Comply with manufacturer's instructions.

F. Temporary Seeding:
1. When hydraulic seeder is used, seedbed preparation is not required.
2. When surface soil has been sealed by rainfall or consists of smooth undisturbed cut slopes, and conventional or manual seeding is to be used, prepare seedbed by scarifying sufficiently to allow seed to lodge and germinate.
3. If temporary mulching was used on planting area but not removed, apply nitrogen fertilizer at 1 pound per 1000 sq ft.
4. On soils of very low fertility, apply 10-10-10 fertilizer at rate of 12 to 16 pounds per 1000 sq ft.
5. Incorporate fertilizer into soil before seeding.
6. Apply seed uniformly; if using drill or cultipacker seeders place seed 1/2 to 1 inch deep.
7. Irrigate as required to thoroughly wet soil to depth that will ensure germination, without causing runoff or erosion.
8. Repeat irrigation as required until grass is established.

3.5 MAINTENANCE

A. Inspect preventive measures weekly, within 24 hours after the end of any storm that produces 0.5 inches or more rainfall at the project site, and daily during prolonged rainfall.

B. Repair deficiencies immediately.

C. Silt Fences:
   1. Promptly replace fabric that deteriorates unless need for fence has passed.
   2. Remove silt deposits that exceed one-third of the height of the fence.
   3. Repair fences that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

D. Straw Bale Rows:
   1. Promptly replace bales that fall apart or otherwise deteriorate unless need has passed.
   2. Remove silt deposits that exceed one-half of the height of the bales.
   3. Repair bale rows that are undercut by runoff or otherwise damaged, whether by runoff or other causes.

E. Clean out temporary sediment control structures weekly and relocate soil on site.

F. Place sediment in appropriate locations on site; do not remove from site.

3.6 CLEAN UP

A. Remove temporary measures after permanent measures have been installed, unless permitted to remain by The Cullipher Group, PA.

B. Clean out temporary sediment control structures that are to remain as permanent measures.

C. Where removal of temporary measures would leave exposed soil, shape surface to an acceptable grade and finish to match adjacent ground surfaces.

END OF SECTION

Erosion and Sedimentation Control Narrative

Erosion and Sedimentation Control Measures

The following measures are proposed for the site. If it becomes evident that additional erosion and sedimentation control measures are needed, they shall be installed immediately. It is intended that all grading and excavation activities within a certain area will be protected as soon as that activity is complete.

1. Sediment Fence – Sediment fence will be utilized as necessary in locations as shown on plans or as deemed necessary by the engineer to ensure that off-site sedimentation is controlled.
2. Seeding – All disturbed areas will be seeded within 7-14 days following construction in accordance with the seeding schedule shown on the plans.
3. Stone Construction Entrance – Existing gravel and asphalt on site to take the place of a stone construction entrance. One will only be provided if erosion becomes transporting sediment offsite becomes an issue.
4. Skimmer Basin – The skimmer basin will be constructed in the initial sequence to trap sediment from moving off-site.
5. Temporary Diversion Ditches – Temporary diversion ditches to be installed temporarily to transport runoff from the site to the constructed skimmer basin. Ditches shall remain in place until site is stabilized and engineer approves removal of skimmer basin and ditches. They shall then be mucked out, returned to original grade and stabilized.

Erosion Control Specifications

1. Temporary Gravel Construction Entrance:
    a. Clear the area of vegetation and grade for positive drainage.
    b. Install geotextile fabric and place stone to the required dimensions.
    c. Use 2” to 3” stones, free of fines.
2. Silt Fence
    a. Use a synthetic filter fabric of at least 95% by weight of polyolefins or polyester, which is certified by the manufacturer or supplier as conforming to the requirements in ASTM D 6461.
    b. Posts for sediment fences should be 1.25 lb/linear foot minimum steel with a minimum length of 5 feet and projections to facilitate fastening the fabric.
    c. For reinforcement of standard strength filter fabric, use wire fence with a minimum 14 gauge and a maximum mesh spacing of 6 inches.

Specifications for Sediment Fence Fabric:

Temporary Silt Fence Material Property Requirements*					
	Test Material	Units	Supported Silt Fence	Un-Supported Silt Fence	Type of Value
Grab Strength	ASTM D 4632	N(lbs)			
Machine Direction			400	550	MARV
			(90)	(90)	
X-Machine Direction			400	450	MARV
			(90)	(90)	
Permittivity	ASTM D 4491	Sec-1	0.05	0.05	MARV
Opening Size	ASTM D 4751	mm	0.60	0.60	Max.ARV
		(US Sieve #)	(30)	(30)	
Ultraviolent Stability	ASTM D 4355	% Retained Strength	70% After 500h of Exposure	70% After 500h of Exposure	Typical

*From Erosion and Sedimentation Control Manual Table 6.62b

Maintenance Plan

1. All erosion and sediment control measures shall be checked for stability and effective operations following every runoff producing rainfall event or at least once per week. Repairs required shall be completed immediately to the dimension and functions indicated on the plans.
2. Sediment shall be removed from behind the sediment fencing when it becomes 0.5 feet deep at the fence. The fence shall be replaced or repaired as necessary to maintain a barrier.
3. All seeded areas shall be fertilized, seeded and mulched within 7 days of disturbance. Disturbed areas shall be fertilized, reseeded and mulched as necessary to establish and maintain a dense vegetative cover.

STABILIZATION TIMEFRAMES
(Effective Aug. 3, 2011)

SITE AREA DESCRIPTION	STABILIZATION	TIMEFRAME EXCEPTIONS
 Perimeter dikes, swales, ditches, slopes	7 days	None
 High Quality Water (HQW) Zones	7 days	None
 Slopes steeper than 3:1	7 days	If slopes are 10' or less in length and are not steeper than 2:1, 14 days are allowed.
 Slopes 3:1 or flatter	14 days	7 days for slopes greater than 50' in length.
 All other areas with slopes flatter than 4:1	14 days	None, except for perimeters and HQW Zones.

Construction Sequence

1. Install construction entrance and silt fencing as shown on plans.
2. Install temporary diversions and storm drainage with inlet protection.
3. Install water/sewer services.
4. Fine grade site and construct building pads.
5. Seed and mulch all areas of disturbance not to be paved within 7 days of land disturbance.
6. Fine grade drives and parking area; place stone base course.
7. Construct building(s).
8. Pave drives and parking area.
9. Perform final grading, seed and mulch all remaining disturbed areas.

RELATED DOCUMENTS:

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

GENERAL LANDSCAPE REQUIREMENTS AND ONE YEAR WARRANTY:

Provide fully grown-in grass turf throughout. At ALL areas disturbed, restore finish grading to like new condition with fully grown-in grass turf. Maintain and warranty complete installation for one year following acceptance.

PRE-EMERGENT HERBICIDE TREATMENT:

Prior to permanent seeding, apply herbicide as recommended by the seed supplier, in accordance with published recommendations.

SEEDING PLAN:

PERMANENT SEEDING AFTER APRIL 15 AND BEFORE SEPTEMBER 15:

Seeding Mixture:

1. Centipede, applied at the rate of 10 lbs. Per acre.
2. Common Bermuda, applied at the rate of 100 lbs. Per acre.

PERMANENT SEEDING AFTER SEPTEMBER 15 AND BEFORE APRIL 15:

Seeding Mixture:

1. Common Bermuda (unhulled), applied at the rate of 100 lbs. Per acre.
2. Annual Rye Grass or Fescue, applied at the rate of 50 lb. Per acre.

SOIL AMENDMENTS

Apply 3000 lb. / acre ground agricultural limestone and 1,000 lb. / acre of 10-10-10 fertilizer.

MULCH

Use jute, excelsior matting, or other effective channel lining material to cover the bottom of channels, ditches, and swales as required to prevent erosion and promote turf establishment. Extend lining above the highest calculated depth of flow. On channel side slopes above this height, and in drainages not requiring temporary lining, apply 4000 lb. / acre grain straw by stapling netting over the top.

All other lawn areas shall be mulched with 2,000 lb. / acre grain straw, stitched into ground with a disc harrow with blades set straight

TURF ESTABLISHMENT, MAINTENANCE, AND SPECIAL RIGHT OF OWNER TO TAKE CORRECTIVE ACTION

Turf establishment and maintenance includes sufficient irrigation and frequent mowing to promote turf grow-in and to prevent the growth and proliferation of weeds. In addition, the contractor shall re-seed, re-fertilize and mulch immediately following erosion or other damage, which is to be expected. Should the Owner determine that the grounds in part or as a whole lack proper maintenance in accordance with this

paragraph, the Owner or his designated agent (the Architect or Engineer) may provide written notice to the Contractor to take corrective action. If the Contractor does not respond with corrective action or otherwise in an acceptable manner to the Owner within five (5) calendar days, the Owner may, at his option, undertake such corrective action with his own or other forces, and deduct the full cost from the Contract amount of the Contractor.

PLANTING GENERAL LAWNS:

Where topsoil has been stripped, redistribute a minimum 3” layer of stockpiled topsoil, add specified soil amendments and mix thoroughly into top 4" of soil, tilling surface to a level, fine texture.

Cultivate to a depth of 6" in areas where topsoil has not been stripped, add specified soil amendments, and mix thoroughly into top 4" of soil, tilling surface to a level, fine texture.

Grade and roll prepared lawn surface. Water thoroughly but do not create muddy soil condition.

Broadcast seed mix uniformly in two directions in the quantity specified in the Seeding Plan Schedule. Water thoroughly with fine spray until grown in and established.

When electing to Hydro-Seed, broadcast uniformly in two directions in the quantity recommended by the seed producer, and water thoroughly with fine spray until grown in and established.

Protect seeded areas against erosion by stitching straw mulching with a disc harrow with blades set straight. Immediately after seeding, protect the area against traffic or other use by erecting barricades as required until final acceptance.

FINAL ACCEPTANCE:

Final Inspection and Acceptance: At the end of the turf establishment period, final inspection will be made upon written request at least 10 days prior to the anticipated date. Final acceptance will be based upon a full stand of turf of the species specified.

Turf establishment period shall be defined as minimum three mowing cycles, or as required to produce a stand of turf. Contractor is responsible for irrigation and mowing as required.

Re-planting: In areas which do not have a satisfactory stand of turf or sod, replace sod or replant, mulch, re-fertilize and irrigate within specified planting dates.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 PRODUCTS

1.1 FORM MATERIALS

A. Wood form material, profiled to suit conditions.

1.2 CONCRETE MATERIALS

A. Obtain cementitious materials from same source throughout.

B. Concrete Materials: Provide in accordance with State of North Carolina Highways standards.

1.3 ACCESSORIES

A. CONCRETE MIX DESIGN
   1. Proportioning Normal Weight Concrete: Comply with ACI 211.1 recommendations.
   2. Concrete Properties:
      a. Compressive strength, when tested in accordance with ASTM C39/C39M at 28 days; 3000 psi.
      b. Water-Cement Ratio: Maximum 40 percent by weight.
      c. Total Air Content: 4 percent, determined in accordance with ASTM C173/C173M.
      d. Maximum Slump: 4 inches.
   3. MIXING

PART 2 EXECUTION

2.1 SUBBASE

A. Prepare subbase in accordance with State of North Carolina Highways standards.

2.2 PREPARATION

A. Moisten base to minimize absorption of water from fresh concrete.

B. Coat surfaces of manhole frames with oil to prevent bond with concrete pavement.

C. Notify The Cullipher Group, PA minimum 24 hours prior to commencement of concreting operations.

2.3 FORMING

A. Place and secure forms to correct location, dimension, profile, and gradient.

B. Assemble formwork to permit easy stripping and dismantling without damaging concrete.

C. Place joint filler vertical in position, in straight lines. Secure to formwork during concrete placement.

2.4 COLD AND HOT WEATHER CONCRETING

A. Follow recommendations of ACI 305R when concreting during hot weather.

B. Follow recommendations of ACI 306R when concreting during cold weather.

C. Do not place concrete when base surface temperature is less than 40 degrees F, or surface is wet or frozen.

2.5 PLACING CONCRETE

A. Place concrete in accordance with State of North Carolina Highways standards.

B. Do not place concrete when base surface is wet.

C. Ensure reinforcement, inserts, embedded parts, formed joints are not disturbed during concrete placement.

2.6 JOINTS

A. Align curb, gutter, and sidewalk joints.

B. Place 3/8 inch wide expansion joints at 20 foot intervals and to separate paving from vertical surfaces and other components and in pattern indicated.

C. Saw cut contraction joints 3/16 inch wide at an optimum time after finishing. Cut 1/3 into depth of slab.

2.7 FINISHING

A. Sidewalk Paving: Light broom, texture perpendicular to direction of travel with troweled and radiused edge 1/4 inch radius.

B. Curbs and Gutters: Light broom, texture parallel to pavement direction.

2.8 FIELD QUALITY CONTROL

A. Compressive Strength Tests: ASTM C39/C39M; for each test, mold and cure three concrete test cylinders. Obtain test samples for every 100 cu yd or less of each class of concrete placed.
   1. Take one additional test cylinder during cold weather concreting, cured on job site under same conditions as concrete it represents.
   2. Perform one slump test for each set of test cylinders taken.

B. Maintain records of placed concrete items. Record date, location of pour, quantity, air temperature, and test samples taken.

2.9 PROTECTION

A. Immediately after placement, protect pavement from premature drying, excessive hot or cold temperatures, and mechanical injury.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Preparation of site for base course.

B. Section 02230 - Fill: Compacted fill under base course.

C. Section 02520 - Asphalt Paving: Binder and finish asphalt courses.

1.3 REFERENCE STANDARDS

A. AASHTO M 147 - Standard Specification for Materials for Aggregate and Soil-Aggregate Subbase, Base and Surface Courses; 1965 (2004).

B. AASHTO T 180 - Standard Specification for Moisture-Density Relations of Soils Using a 4.54 kg (10-lb) Rammer and a 457 mm (18 in.) Drop; 2010.

C. ASTM C136/C136M - Standard Test Method for Sieve Analysis of Fine and Coarse Aggregates; 2014.

D. ASTM D698 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Standard Effort (12,400 ft-lbf/ft3 (600 kN-m/m3)); 2012.

E. ASTM D1556 - Standard Test Method for Density and Unit Weight of Soil in Place by the Sand-Cone Method; 2007.

F. ASTM D1557 - Standard Test Methods for Laboratory Compaction Characteristics of Soil Using Modified Effort (56,000 ft-lbf/ft3 (2,700 kN m/m3)); 2012.

G. ASTM D2167 - Standard Test Method for Density and Unit Weight of Soil in Place by the Rubber Balloon Method; 2008.

H. ASTM D4318 - Standard Test Methods for Liquid Limit, Plastic Limit, and Plasticity Index of Soils; 2010.

1.4 SUBMITTALS

A. Aggregate Composition Test Reports: Results of laboratory tests on proposed and actual materials used.

B. Compaction Density Test Reports.

1.5 CONSTRUCTION STAKING

A. All construction staking shall be provided by the Contractor. Control points will be provided by the engineer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. When necessary, store materials on site in advance of need.

B. Verify that survey bench marks and intended elevations for the Work are as indicated.

PART 2 PRODUCTS

2.1 MATERIALS

A. Coarse Aggregate : Coarse aggregate, conforming to State of North Carolina Department of Transportation Standard Specifications For Roads and Structures.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that survey bench marks and intended elevations for the work are as indicated.

B. Verify substrate has been inspected, gradients and elevations are correct, and is dry.

3.2 PREPARATION

A. Correct irregularities in substrate gradient and elevation by scarifying, reshaping, and re-compacting.

B. Do not place aggregate on soft, muddy, or frozen surfaces.

3.3 INSTALLATION

A. Place aggregate in maximum 4 inch layers and roller compact to specified density.

B. Level and contour surfaces to elevations and gradients indicated.

C. Add small quantities of fine aggregate to coarse aggregate as appropriate to assist compaction.

D. Add water to assist compaction. If excess water is apparent, remove aggregate and aerate to reduce moisture content.

E. Use mechanical tamping equipment in areas inaccessible to compaction equipment.

3.4 FIELD QUALITY CONTROL

A. Compaction density testing will be performed on compacted aggregate base course in accordance with ASTM D1556.

B. Results will be evaluated in relation to compaction curve determined by testing uncompacted material in accordance with ASTM D698 ("standard Proctor").

C. If tests indicate work does not meet specified requirements, remove work, replace and retest.

D. Frequency of Tests: 1 test per 200 feet of roadway, or as needed to meet NCDOT requirements.

E. Proof roll compacted aggregate at surfaces that will be under slabs-on-grade, paving, and curb and gutter.

3.5 CLEANING

A. Remove unused stockpiled materials, leave area in a clean and neat condition. Grade stockpile area to prevent standing surface water.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Aggregate base course.

B. Single course bituminous concrete paving.

C. Double course bituminous concrete paving.

1.2 RELATED REQUIREMENTS

A. Section 02200 - Grading: Preparation of site for paving and base.

B. Section 02230 - Fill: Compacted subgrade for paving.

C. Section 02510 - Aggregate Base Courses: Aggregate base course.

1.3 REFERENCE STANDARDS

A. ASTM D946 - Standard Specification for Penetration-Graded Asphalt Cement for Use in Pavement Construction; 2009a.

B. NCDOT Standard Specifications for Roads and Structures, latest edition.

1.4 CONSTRUCTION STAKING

A. All construction staking shall be provided by the Contractor. Control points will be provided by the engineer.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with State of North Carolina Highways standard.

B. Mixing Plant: Conform to State of North Carolina Highways standard.

C. Obtain materials from same source throughout.

1.6 FIELD CONDITIONS

A. Do not place asphalt when ambient air or base surface temperature is less than 40 degrees F, or surface is wet or frozen.

PART 2 PRODUCTS

2.1 MATERIALS

A. Asphalt Cement: ASTM D946.

B. Aggregate for Base Course: In accordance with State of North Carolina Highways standards.

C. Aggregate for Wearing Course: In accordance with State of North Carolina Highways standards.

D. Primer: In accordance with State of North Carolina Highways standards.

2.2 ASPHALT PAVING MIXES AND MIX DESIGN

A. Base Course: State of North Carolina Highways standards.

B. Wearing Course: Type SF 9.5A State of North Carolina Highways standards.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that compacted subgrade is dry and ready to support paving and imposed loads.

B. Verify gradients and elevations of base are correct.

3.2 BASE COURSE

A. Place and compact base course.

3.3 PREPARATION - TACK COAT

A. Apply tack coat in accordance with manufacturer's instructions.

B. Apply tack coat on asphalt or concrete surfaces over subgrade surface at uniform rate of 1/3 gal/sq yd.

3.4 PLACING ASPHALT PAVEMENT - SINGLE COURSE

A. Install Work in accordance with State of North Carolina Highways standards.

B. Install manhole frames in correct position and elevation.

C. Compact pavement by rolling to specified density. Do not displace or extrude pavement from position. Hand compact in areas inaccessible to rolling equipment.

D. Perform rolling with consecutive passes to achieve even and smooth finish without roller marks.

3.5 TOLERANCES

A. Flatness: Maximum variation of 1/4 inch measured with 10 foot straight edge.

B. Compacted Thickness: Within 1/4 inch of specified or indicated thickness.

C. Variation from True Elevation: Within 1/2 inch.

3.6 FIELD QUALITY CONTROL

A. Provide field inspection and testing. Take samples and perform tests in accordance with AL MS -2 Compaction tests are to be made every 200 feet, minimum.

END OF SECTION

PART 1 – GENERAL

SCOPE:

A. The Contractor shall provide all labor, material, equipment and services necessary for the proper completion of a bank of asphalt tennis courts with acrylic paint finish surface.
B. The Contractor shall refer to the Drawings and Specifications for the required dimensions and locations of the court.

RELATED SECTIONS:

02110 Site Clearing

02200 Earthwork

02513 Asphalt Paving

02830 Chain Link Fencing & Gates

PART 2 – PRODUCTS

WARRANTY: The Contractor shall provide a five-year warranty on materials and workmanship for the completed system.

PART 3 – INSTALLATION

MATERIAL SEQUENCE FOR BATTERY OF TENNIS COURT COMPLEX

Demolition: Where indicated on Drawings, complete demolition of existing tennis courts; Reference 02070 Selective Demolition.

Site Clearing: All vegetation and organic material shall be removed, reference Section 02110 Site Clearing.

Sub-Base: Sub base shall be graded with a slope of 1" every ten (10) feet. Sub base shall be graded to provide an area of at least 320' x 130'. Fill material shall be applied in eight (8") inch layers and compacted. Compact each layer of backfill or fill material at 95% maximum dry density optimum moisture, per ASTM D698, to within 6" of surface. From 6" deep to finish grade, compact to 100% maximum density in accordance with AASHTO-T99; reference Section 02200 Earthwork. Testing provided per Section 01062 - Testing Laboratory Services.

Wood Curb: Provide a permanent treated wood 2x6 perimeter curb installed around the perimeter of the courts anchored with 2x4 wood stakes at eight (8) feet on centers.

Stone Base: Minimum of compacted six (6) inch ABC stone base shall be placed with laser assisted equipment. Reclaimed asphalt demolition material may be utilized at Contractor's discretion.

Net Posts: Install net posts prior to asphalting

Asphalt: Asphalt shall be 1 ½" thick meeting DOT S9.5-A specification.

Surface Preparation: Prior to the application of the surfacing system, the new asphalt surface shall be checked for any areas that show a deviation in grade greater than 1/8" over a distance of 10'; these areas, along with any areas that can be considered "bird baths", shall be patched with a suitable material.

The entire surface shall be swept with stiff push brooms or a mechanical sweeper, paying particular attention to remove any areas of loose asphalt. All dirt and dust shall then be blown off court surfaces. Before the new surfacing system or coatings are to be applied over newly laid asphalt, the asphalt shall be allowed to cure for a minimum of fourteen (14) days.

PREVENTIVE MAINTENANCE:

Vehicular traffic shall not be allowed on court surfaces. Paths for equipment crossing the courts can be provided by the use of conveyor mats or plywood. The perimeter of the courts should be sprayed regularly with herbicide to prevent the incursion of grass onto the court surface. Sprinklers incorporated in field irrigation systems should be directed in such a manner as to not spray water on the court. Dirt should be periodically remove using a blower. Proper drainage of surrounding areas should be maintained.

SURFACE COATS FOR TENNIS COURTS:

Provide one coat acrylic re-surfacer, three coats acrylic sand fortified paint by Latxite or equal.

END OF SECTION

PART 1 – GENERAL

SCOPE:

The Contractor shall provide all labor, material, equipment and services necessary for the proper completion of all pavement surfacing and markings indicating on the Drawings and specified herein. The tennis court shall be marked and measured by a professional court striper using specifications and guidelines approved by the NFSHSA. The paint colors shall be final approved by the Owner and Architect.

The Contractor shall refer to the Drawings and the Specifications for the required dimensions, details and location of pavement marking.

SUBMITTALS: For review, the Contractor shall submit data to the Architect and Owner prior to construction for the following items specified in this section:

1. Certificate of Conformance and manufacturer's data for the paint for tennis event marking.

2. Court striping plan for equal size courts showing markings for all events that conform to NFSHSA requirements. Prior to preparing plan, Contractor shall consult with tennis coach and Architect for specific striping requirements and colors.

3. Certification of marking layout – (5) copies upon completion of painting.

PART 2 – PRODUCTS

MATERIALS:

Paint shall be an acrylic latex type recommended by LATEXITE, or approved equivalent for use over asphalt surface materials in a tennis court exterior application, in the colors selected. Owner shall final confirm color selections.

Base Coat: Acrylic resurfacer
Finish Coats: Three (3) coats acrylic paint

Water shall be fresh and clear.

PART 3 – EXECUTION

Cleaning prior to painting: Prior to the application of the line paint, the surface course shall be cleaned of dirt and other loose or deleterious substances by sweeping, with a power broom supplemented by hand brooms, air pressure or other means as required.

Do no apply line paint until the surface course is acceptable to the Architect.

Paint Application: Court surface, lines, and event markings for the tennis events shall be accurately positioned and marked in accordance with the approved layout dimensions for the events specified.

Court surfaces, lines and markings shall be painted with the specified paint by skilled mechanics in a workmanlike manner in accordance with the paint manufacturer's recommendations.

The paint shall be non-glaring, non-chalking and shall not crack, craze or peel. Tennis event surface and marking colors shall be as required by the NFSHSA rules and the Owner.

Apply paint with mechanical equipment:

1. Provide uniform straight edges. Adjacent color changes shall be clean, uniform straight edges without overlap, overspray or bleeding.

2. Paint application shall be made in number of coats in accordance with the manufacturer's recommended rate for application over the surface material. However, additional coats shall be applied at no additional cost to the Owner; when, upon recommendation of the paint manufacturer and as directed by the Architect, the applied coatings application does not provide sufficient coverage for durability of the paint, to prevent bleeding through of the surface material or to provide distinctive line markings.

Clean and Protection: After completion of the painting operation, clean surfaces of excess or spilled paint materials and remove painting accessories and materials to the Architect's satisfaction.

After the application of the paint, protect the surface from damage until dry and cured.

During paint application, protect existing and new surfaces and structures from the painting operation. Prevent overspray and drifting due to wind and inadequate protection or equipment by using covers and adequate protection. Promptly remove excess or spilled paint materials.

Certification of Marking Lay-Out: Upon completion of the markings, the Contractor shall furnish the Architect five copies of a certification signed and sealed by a Registered Land Surveyor licensed in the State of North Carolina, which certifies that the court lines, and event markings for the tennis events as marked, conform to the dimensions and lay-out shown on the Drawings and specified herein.

END OF SECTION

PART 1 – GENERAL

SCOPE:

The Contractor shall provide all labor, material, equipment and services necessary for the proper installation of all tennis court accessories indicated on the Drawings and specified herein. The tennis court accessories shall be marked and measured by a professional track striper using specifications and guidelines approved by the NFSHSA. The paint shall be selected by Owner.

The Contractor shall refer to the Drawings and these Specifications for the required location of accessories applications.

Product Handling: Materials shall be delivered to the job in their original, unbroken packages or containers and such packages and containers shall be clearly labeled.

SUBMITTALS:

For review, the Contractor shall submit data to the Architect for the following items specified in this section:

1. Manufacturer's data for tennis court equipment.

Regulations: Accessories shall meet all applicable rules and regulations governing track and field events as established by the National Federation of State High School Associations.

PART 2 – PRODUCTS

Hardware, Connectors, Accessories: Hardware and connectors shall be stainless steel, chromium plated or galvanized for corrosion resistance.

Connections and attachments shall be flush, blind or otherwise hidden to prevent injury.

Other accessories shall be as required for support and attachment, corrosion resistance, and to provide a complete assembly.

Tennis Net Posts: Proline by Lee Tennis with removable handles, or equal.

Nets: By Lee Tennis, Grand Master, or equal. Provide 5-year warranty.

PAINT:

Paint for accessories shall be white, or as otherwise noted, suitable for exterior use over the types of materials noted. Paint shall be non-glaring and non-chalking,

Paint for field event line marking shall be an acrylic latex paint which will be non-glaring, non-chalking type which will not crack, craze or peel. Paint for use on asphaltic or latex surface materials shall conform to Section 02620 – Tennis Court Surfacing and Markings.

Other paint requirements shall conform to Section 02620 – Tennis Court Surfacing and Markings.

PART 3 – EXECUTION

All tennis accessories shall be installed by a installer with significant experience and record of tennis equipment installations, with project references available.

Install accessories in compliance with manufacturer's installation instructions, guidelines, and recommendations.

Install accessories in compliance with standards of the National Federation of State High School Associations.

Event paint markings shall conform to the requirements of Section 02620 – Tennis Court Surfacing and Markings.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pipe and fittings for site water lines including domestic water lines.

B. Valves and Fire hydrants.

1.2 RELATED REQUIREMENTS

A. Section 02220 - Excavation: Excavating of trenches.

B. Section 02210 - Trenching: Excavating, bedding, and backfilling.

C. Section 02230 - Fill: Bedding and backfilling.

1.3 REFERENCES

A. ASTM D2466 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe Fittings, Schedule 40; 2013.

B. ASTM D3139 - Standard Specification for Joints for Plastic Pressure Pipes using Flexible Elastomeric Seals; 1998 (Reapproved 2011).

C. AWWA C502 - Dry-Barrel Fire Hydrants; 2014.

D. AWWA C509 - Resilient-Seated Gate Valves for Water Supply Service; 2009.

E. AWWA C900 - Polyvinyl Chloride (PVC) Pressure Pipe, 4 In. Through 12 In. (100 mm Through 300 mm), for Water Transmission and Distribution; 2007.

F. AWWA C901 - Polyethylene (PE) Pressure Pipe and Tubing, 1/2 In. (13 mm) Through 3 In. (76 mm), for Water Service; 2008.

G. UL 246 - Hydrants for Fire-Protection Service; Current Edition, Including All Revisions.

1.4 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Product Data: Provide data on pipe materials, pipe fittings, valves and accessories.

C. Manufacturer's Certificate: Certify that products meet the Owner’s specified requirements.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with municipality requirements.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store valves in shipping containers with labeling in place.

PART 2 PRODUCTS

2.1 WATER PIPE

A. Ductile Iron Pipe Class 50 cement lined and asphalt coated: AWWA C151:
   1. Fittings: Ductile iron, standard thickness.

B. PVC Pipe: ASTM D2241 SDR 21 for 200 psig rating.
   1. Fittings: Shall be ductile iron mechanical, joint fittings. All fittings shall be cement lined and asphalt coated. All fittings including vertical fittings, shall be provided with both adequate blocking and grip rings or tie rods & eye eyebolts.
   2. Joints: Shall be of integral bell, rubber ring, locked in gasket type.
   3. Furnished in nominal twenty-foot (20') lengths

C. Polyethylene Pipe: AWWA C901:
   1. Fittings: AWWA C901, molded or fabricated.
   2. Joints: Compression.

D. Trace Wire: Insulated 14 gauge solid copper wire. Magnetic detectable conductor, clear plastic covering, imprinted with "Water Service " in large letters.

2.2 VALVES

A. Valves: Manufacturer's name and pressure rating marked on valve body.

B. Gate Valves 3 Inches and Over:
   1. AWWA C509, iron body, bronze trim, non-rising stem with two - inch square nut, single wedge, resilient seat, flanged ends, control rod, post indicator, valve key, and extension box.
   2. Product: American Flow Control, Series 2500 Resilient Wedge Gate Valve.

2.3 HYDRANTS

A. Hydrants: Type as required by utility company, American Flow Control, 3-way, 5-1/4" valve opening, counterclockwise to open with the length of the barrel such that the bottom of the pumper outlet is a minimum of 12 " off the ground.

2.4 SERVICES

A. A. One(1)inch Corporation Stops: Shall be bronze body with (AWWA) CC tapered threaded inletand compression connection outlet. Stops shall be Ford F1000-4. All corporation stops shall be machine installed in accordance with the manufacturers recommended procedures.

B. B. Service Saddles: Shall be made of materials conforming to AWWA copper alloy No. C83600with one (1) inch (AWWA) CC outlet thread and an O-Ring cemented in a confined groove. Service saddles shall be only those listed below.
   1. PVC(IPS - 2" Dia.)
      a. Ford Model S70
   2. ACP/DIP/CIP (4" - 12")
      a. Ford Model F101
   3. PVC (C-900, 4" - 12")
      a. Ford S90 Series
   4. PVC (Sch 40 & IPS), Steel Pipe (4" - 12")
      a. Ford S70 Series

C. Three-quarter (3/4) inch Angle Ball Valve Meter Stops: Shall be bronze body with compression seal inlet connection and threaded outlet for meter connection.
   1. Ford BA43-342W

D. One (1) inch Angle Ball Valve Meter Stops: Shall be bronze body with compression seal inlet connection and threaded outlet for meter connection.
   1. Ford BA43-444W

E. Service Pipe: See above.
   1. Minimum service tubing size from the water main to the angle meter stop is 1" diameter.
   2. PVC pipe sleeves/casing will be provided for all service tubing crossing roads.

F. Meters
   1. Nepture E-Coder AMR radio read meters with MXU, 1000 gallon read, brass bonnet and bottom and set to Owner’s frequency
      a. Size: 3/4" or 1" meters
   2. Meters to be provided to the Owner

G. Water Meter Boxes: Shall be manufactured of class 30 cast iron in conformance with ASTM-A48. The manufacturer's name and part number shall be cast into each component. Boxes shall be Vulcan Foundry G8404-1 frame.
   1. Lid
      a. Nikor, Inc. 10 x 19 oval read-rite polymer lid
      b. Dimensions: 19-1/4" x 9-5/8"
      c. "WATER METER" shall be molded into the lid
      d. Color: Black
      e. Lockable

2.5 BACKFLOW PREVENTION DEVICES

A. Control devices shall be limited to those approved by the Foundation for Cross-connection control and Hydraulic Research, University of Southern California.

B. Reduced Pressure Detector Assembly Backflow Preventers (RPDA): Shall consist independently operating, spring loaded, Y pattern check valves and one (1) hydraulically dependent differential relief valve. The device shall automatically reduce the pressure in the "zone" between the check valves to at least 5 psi lower than inlet pressure. Should the differential between upstream of the zone of the unit drop to two (2) psi, the differential relief shall open and maintain proper differential.

C. Leak detectors shall be 5/8" Neptune E-Coder with Series 3000 MTU, nicor connection and set to Owner's frequency.

2.6 ACCESSORIES

A. Concrete for Thrust Restraints

B. Master Meter: 4"meter Neptune E-Coder AMR radio read meters with MXU, 1000 gallon read, brass bonnet and bottom set to Owner's frequency.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building service connection and municipal utility water main size, location, and invert are as indicated.

3.2 PREPARATION

A. Cut pipe ends square, ream pipe and tube ends to full pipe diameter, remove burrs.

B. Remove scale and dirt on inside and outside before assembly.

C. Prepare pipe connections to equipment with flanges or unions.

3.3 TRENCHING

A. See the sections on excavation and fill for additional requirements.

B. Hand trim excavation for accurate placement of pipe to elevations indicated.

C. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.4 INSTALLATION - PIPE

A. Maintain separation of water main from sewer piping in accordance with NCDNR Public Water Supply code.

B. Establish elevations of buried piping to ensure not less than 3 ft of cover.

C. Install ductile iron piping and fittings to AWWA C600.

D. Route pipe in straight line.

E. Install pipe to allow for expansion and contraction without stressing pipe or joints.

F. Slope water pipe and position drains at low points.

G. Install trace wire as required by the Owner.

3.5 INSTALLATION - VALVES AND HYDRANTS

A. Set valves on solid bearing.

B. Center and plumb valve box over valve. Set box cover flush with finished grade.

C. Set hydrants plumb; locate pumper nozzle perpendicular to and facing roadway.

D. Set hydrants to grade, with nozzles at least 20 inches above ground.

E. Locate control valve 4 inches away from hydrant.

F. Provide a drainage pit 36 inches square by 24 inches deep filled with 2 inches washed gravel. Encase elbow of hydrant in gravel to 6 inches above drain opening. Do not connect drain opening to sewer.

G. Paint hydrants in accordance with the requirements of Carteret County Schools.

3.6 ALIGNMENT

A. All water lines, valves, fittings, hydrants, etc. shall be constructed to the line and grade shown on the approved construction drawings. No deviation from line and grade shall be made without written permission from the Engineer.

B. Establish elevations of buried piping to ensure not less than 3 ft of cover.

C. Separation from Sewer Mains:
   1. Water mains shall be laid at least ten (10) feet, horizontally, from any existing or proposed sewers. Should local conditions prevent a lateral separation of ten (10) feet, water mains may be laid closer than ten (10) feet to a sewer if, the elevations of the top (crown) of the sewer is at least eighteen (18) inches below the bottom (invert) of the water main and if:
      a. Water main is laid in a separate trench, or if:
      b. Water main is laid in the same trench as the sewer with the water main located at one side on a bench of undisturbed earth.
   2. Whenever water mains must cross above sewers, the water mains shall be laid at such an elevation that the bottom of the water main is at least eighteen (18) inches above the top of the sanitary sewer.
   3. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, both the water main and sewer shall be constructed of mechanical joint ductile iron pipe for a distance of ten (10) feet each side of the point of intersection. One (1) full length of water main shall be centered on the sewer.

D. Install pipe to allow for expansion and contraction without stressing pipe or joints.

3.7 ENCASEMENT PIPE INSTALLATION

A. Encasement pipe shall be installed by the boring and jacking method. Procedure for installation shall comply with POLICIES AND PROCEDURES FOR ACCOMMODATING UTILITIES ON HIGHWAY RIGHTS-OF-WAY. Following is an excerpt from same. "Smooth wall or spiral weld pipe may be jacked through dry bores slightly larger than the pipe bored progressively ahead of the leading edge of the advancing pipe as spoil is mucked by the auger back through the pipe.

As the dry boring operation progresses, each new section of the encasement pipe shall be butt welded to the section previously jacked into place."

B. If voids are encountered or occur outside the encasement pipe, grout holes shall be installed in the top section of the encasement pipe at ten (10) feet centers and the voids filled with 1:3 Portland cement grout at sufficient pressure to fill all voids before moving to another boring site.

C. The carrier pipe shall be installed in the casing with casing spacers to prevent damage to the pipe and bell joints during installation and to provide proper long-term waterline support. The casing spacers should be affixed to the carrier pipe with stainless steel hardware and should support the pipe in the middle of the casing. A minimum of five (5) casing spacers is required for PVC pipe, three (3) for DI pipe; one located behind the bell, one at the make-up line on the pipe and the others distributed equally down the length of the pipe. Rubber end caps shall be provided at both ends of the casing. The end caps shall be sized to fit snuggly around both the casing and the carrier pipe and shall be affixed with stainless steel clamps.

3.8 FINAL INSPECTION AND TESTING

A. When the construction of the water line is complete, the Contractor shall follow the test sequence outlined below unless otherwise directed by the Engineer. All testing and sampling must be observed by the Engineer or his designated representative.
   1. Perform pretest inspection
   2. Clean the main.
   3. Perform the hydrostatic test.
   4. Apply the proper dosage of chlorine.
   5. Allow chlorine solution to remain in the water main a minimum of twenty four (24) hours.
   6. Flush the main.
   7. Obtain bacteriological samples.

B. Pretest inspection
   1. Prior to hydrostatic testing and chlorination, the Engineer or designated Representative and the Town or his designated Representative shall be contacted to request scheduling of inspection and testing. A Town's Representative shall visually inspect the project to insure that all fire hydrants, valves and other appurtenances are properly located, operable, and installed at the proper grade. All defects shall be corrected prior to testing.

C. Cleaning of the main – Only if necessary due to failed Hydrostatic Test or repeated failed Bacteriological Test
   1. Mains shall be cleaned only in the presence of the Engineer and town representative. No valves or hydrants owned by the Town shall be operated without the express permission of the Town
   2. Cleaning of Water Mains Smaller than 4" in Diameter:
      a. Mains shall be cleaned by flushing. Flushing velocity shall be adequate to remove all debris and other undesirable material and a minimum of 2 1/2 feet per second.
   3. Cleaning of Water Mains 4" and Larger in Diameter:
      a. Mains shall be cleaned only in the presence of a Town Representative. No valves or hydrants owned by the Town shall be operated without the express permission of the Town. Cleaning shall be accomplished by passing through the pipe a polyurethane "pig" of the appropriate size and density (as manufactured by Poly-Pig or approved equal.) Pig(s) shall be furnished by the Contractor and procedure shall be as follows:
         1) The Contractor shall prepare the main for the installation and removal of pig(s) as required:

(a) Consists of furnishing all equipment, material and labor to satisfactorily install and remove the pig(s).
(b) Prior to scheduling a preconstruction conference, a "pigging" plan shall be submitted to the Town for approval.
(c) Where expulsion of the pig is required through a dead end main, the Contractor shall prevent the backflow of purged water into the main after expulsion of the pig. For pipe twelve inches (12") or less in diameter, purged water can be prevented from re-entering into the pipe by the temporary installation of pipe and fittings as required to provide a riser with an above ground discharge. On larger pipe, additional excavation of the trench may serve the same purpose.
(d) After expulsion of the pig, completion of flushing, and at the direction of the Town, the Contract shall complete work at openings by plugging, blocking, backfilling and completions of all appurtenant work necessary to secure the system.

2) Under supervision of the Town's Representative, pig(s) shall be propelled via water pressure through the main(s) from point of insertion to point of expulsion. Where mains are in the form of a loop the Contractor shall "pig" the complete system.
3) As an alternative to "pigging" dead end pipes less than 100 feet in length may be cleaned by flushing in accordance with 3.08 C.3.2.

D. Hydrostatic Test:
1. The Contractor shall provide all necessary equipment and shall perform all work required in connection with the tests. Unless otherwise permitted, testing shall be performed between each main line valve in accordance with AWWA C600. The Engineer, except when certain circumstances dictate otherwise, permit the length of test sections to be a maximum of fifteen hundred (1500) feet in subdivisions or other areas where the new main has closely spaced valves. Testing shall only be done in the presence of the Engineer or his representative and the Town. The testing shall be performed by the use of a suitable pump and an accurate gauge graduated in 1.0 psi increments. The section of the main being tested shall be subjected to a test pressure of 150 psi for a period of two (2) hours. The leakage of each test section shall be accurately determined and compared to the table below. All visible leaks shall be repaired regardless of the amount of leakage.
a. 2" Dia. - 0.16 gals./hr./1000 feet of pipe
b. 4" Dia. - 0.33 gals./hr./1000 feet of pipe
c. 6" Dia. - 0.50 gals./hr./1000 feet of pipe
d. 8" Dia. - 0.66 gals./hr./1000 feet of pipe
e. 10" Dia. - 0.83gals./hr./1000 feet of pipe
f. 12" Dia. - 0.99 gals./hr./1000 feet of pipe
g. If the leakage is greater than the allowable leakage as given by the above table, the Contractor shall replace any defective materials and perform all necessary work to insure that the installation is acceptable and a retest shall be performed subsequent to any repair work performed. Remedial repair work and retesting shall be repeated until the leakage occurring during the test period is less than or equal to the allowable leakage compared to the table above.

E. Disinfection:
1. All water supply mains shall be sterilized by the Contractor. Chlorination shall be performed only in the presence of a representative of the Engineer and the Town and shall be performed only after the line is complete and has tested satisfactorily for leakage. No extra payment will be provided as this work is considered to be an element of the work units. The sterilization process shall be in conformance with the standards of the North Carolina State Board of Health and AWWA Standard C-601, latest edition. Chlorine Taps

will be made within five (5) pipe diameters of the water main control valve at the upstream end of the line and at all extremities of the line.

2. The system shall be disinfected with a one hundred (100) ppm dosage of chlorine. Treated water shall be retained in the lines for not less than twenty four (24) hours and shall produce not less than ten (10) ppm free chloride concentration in the extreme ends of the distribution system at the conclusion of the retention period. Calcium hypochlorite may be used. During the chlorination process all valves and accessories shall be operated. After the required retention period has been met the main shall be flushed under the direction of a representative of the Engineer and the Town. The flushing shall be considered complete when the free chlorine is the lesser of one (1) part per million (ppm) or equal to the free chlorine concentration within the existing main to which the extension has been connected.
3. The Contractor shall be responsible for insuring that high-strength chlorine solution is contained on-site and not allowed to make its way to any watercourse, stream, creek, lake or other body of water.
4. Services shall be chlorinated at the same time and by the same method utilized for the main.
5. Extreme care shall be taken to prevent contamination of existing water mains during the test period. If, in the opinion of the town, an existing water main is contaminated, the section of main subjected to the possible contamination shall be flushed and chlorinated in accordance with the requirements for new mains.

F. Bacteriological Testing:

1. After completion of chlorination and flushing, the Contractor shall obtain sufficient bacteriological samples. The Town will determine the location and number of samples required to provide a test group which is representative of the section of main being tested. The Contractor shall submit the samples to a laboratory which has been approved by the NC State Laboratory of Public Health for testing. A failure of any sample of a test group shall constitute failure of the entire test group from which the sample was taken. Such failure shall require two (2) successive passing test groups to substantiate that the main has satisfactorily been chlorinated. The Contractor may, at his option, rechlorinate and retest the section of water main upon failure of the test group. If two (2) successive bacteriological test groups fail, the section of main which fails shall be rechlorinated and retested until the main is shown to be properly chlorinated.

3.9 FIELD QUALITY CONTROL

A. Pressure test water piping to 150 psi for 2 hours.

B. If tests indicate Work does not meet specified requirements, remove Work, replace and retest at no cost to Owner.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Sanitary sewerage drainage piping, fittings, and accessories.

1.2 GUARANTEE

A. The Contractor shall guarantee all materials and workmanship for a period of one (1) year from the date of acceptance by Carteret County Schools. During this period the Town reserves the right to inspect the sewer using TV camera equipment or other means. Any defect revealed by such inspection or any failure occurring during the one (1) year period shall be repaired by the Contractor at his own expense.

1.3 RELATED REQUIREMENTS

A. Section 02210 - Trenching: Excavating, bedding, and backfilling.

1.4 REFERENCE STANDARDS

A. ANSI A21.11 - Rubber Gasket Joints For Cast Iron and Ductile Iron Pressure Pipe and Fittings; current edition.

B. ASTM A 48 - Standard Specification for Gray Iron Castings; 1994a.

C. ASTM A 139 - Standard Specification for Electric-Fusion (Arc)-Welded Steel Pipe (NPS 4 and Over); 1993a.

D. ASTM C425 - Standard Specification for Compression Joints for Vitrified Clay Pipe and Fittings; 2004 (Reapproved 2013).

E. ASTM C443 - Standard Specification for Joints for Concrete Pipe and Manholes, Using Rubber Gaskets; 2012.

F. ASTM C 478 - Standard Specification for Precast Reinforced Concrete Manhole Sections; 1996.

G. ASTM C 923 - Standard Specification for Resilient Connectors Between Reinforced Concrete Manhole Structures, Pipes and Laterals; 1996.

H. ASTM D1785 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Pipe, Schedules 40, 80, and 120; 2015.

I. ASTM D 2665 - Standard Specification for Poly(Vinyl Chloride) (PVC) Plastic Drain, Waste, and Vent Pipe and Fittings; 1996.

J. ASTM D 2680 - Standard Specification for Acrylonitrile-Butadiene-Styrene (ABS) and Poly(Vinyl Chloride) (PVC) Composite Sewer Piping; 1995a.

K. ASTM D2321 - Standard Practice for Underground Installation of Thermoplastic Pipe for Sewers and Other Gravity-Flow Applications; 2014.

L. ASTM D3034 - Standard Specification for Type PSM Poly(Vinyl Chloride) (PVC) Sewer Pipe and Fittings; 2015.

M. AWWA C151/A21.51 - American National Standard for Ductile-Iron Pipe, Centrifugally Cast, for Water or Other Liquids; 1996.

N. AWWA C105/A21.5 - American National Standard for Polyethylene Encasement for Ductile-Iron Pipe Systems; 1993.

1.5 PRECONSTRUCTION CONFERENCE

A. No work shall begin until a preconstruction conference has been held. The Engineer will notify the Contractor of the time and place for the preconstruction conference. Attendees shall include:
   1. Carteret County Schools
   2. The Cullipher Group, PA
   3. The Contractor

1.6 SUBMITTALS

A. Product Data: Provide data indicating pipe, pipe accessories, and Manholes.

B. Project Record Documents:
   1. The Contractor will keep one (1) record copy of all Specifications, Drawings, Addenda, Modifications and Shop Drawings at the site in good order. The Contractor will be responsible for measuring the distance between all items which cannot be easily measured by the Surveyor (Engineer) following backfill of trenches etc. The surveyor (Engineer) will be responsible for final as builts to be furnished to the Owner along with an executed Project Closeout for Carteret County Schools form as required.

1.7 REGULATORY REQUIREMENTS

A. All work shall be performed in complete conformance to the standards and requirements of the requirements of the Owner.

1.8 PROJECT CONDITIONS

A. Underground Utilities and Structures:
   1. Utilities and other existing underground structures shown on the drawings are shown for the purpose of indicating the existence of such utility or structure and no guarantee is given as to the exact location or the completeness of the information shown. It shall be the responsibility of the Contractor to locate all such utilities and structures and to maintain service or promptly restore service, at his own expense, in the event interruption is caused by his operation.
   2. All utilities and structures that are uncovered by the excavation process and left in the trench shall be carefully supported and protected from injury by the Contractor's operation.

3. Any utility structure or facility damaged by the Contractor shall be replaced or repaired in a manner which meets the approval of the Owner of such facilities or any governing bodies having jurisdiction.
4. At least forty eight (48) hours prior to beginning construction the Contractor shall notify ONE-Call Center, Inc. (NC ONE-CALL CENTER) - Telephone 1-800-632-4949 in order that existing utilities in the area may be flagged and staked. Location of existing utilities by NC ONE-CALL CENTER is valid for only ten (10) days after the date of location.

B. Working Hours: No work shall be performed except in the presence of the Engineer, Inspector or a representative of the Owner without permission of the Engineer. The Contractor shall schedule his work during normal working hours unless special permission to work outside normal hours is obtained from the Engineer and the Owner. The preceding requirement may be waived if an emergency arises where the suspension of work would endanger the work or where such suspension would endanger life or property.

C. Operation of Existing Facilities:
1. The Contractor shall contact the Owner's Representative whenever operation of the Town's valves or hydrants is neccessary to request scheduling of such operation. The Town will require the Contractor to estimate the length of time service will be interrupted and the number of customers affected.
2. Facilities and equipment belonging to the Town may not be operated or adjusted without express permission of the Town's Representative. In the case of any emergency, the Contractor shall be allowed to take such steps with valves and hydrants as necessary for the protection of life and property.
3. Valves which control networks not yet accepted but which are connected to the existing system shall be considered system valves. Valves within a network not yet accepted and which do not control flow of water between new and existing systems are not considered system valves and do not require permission to operate.
4. Notification to the Town must be made by the Contractor upon breakage of any Town maintained water or sewer linear appurtenance thereof. Repair of the Commission's facilities shall be made by the Contractor upon approval of the Town Representative. Any repairs made with Town forces will be billed to the Contractor at cost.
5. Where interruption of service is required, the Town shall be notified to request approval and subsequent scheduling of such interruption. The Town will notify the affected customers should the interruption be approved. A minimum of forty-eight (48) hours notice shall be given to the affected customers.

D. Connection of New Sewers to Existing Facilities:
1. No connection to , or alteration of any existing facilities owned or maintained by the Town shall be permitted without the express permission of the Town and, where required, the presence of the Towns Representative except as directed by the Town.
2. Connection of new sewers to existing manholes shall be by machine coring and the installation of a flexible connector meeting the requirements of Section 3.05 below.

E. Construction Safety: The Town has no responsibility nor authority to enforce job safety requirements. The Contractor shall comply with all applicable laws and regulations of any public body having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss; and shall erect and maintain all necessary safeguards for such safety and protection. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connections with the work. The Contractor shall take all necessary precautions for the safety of, and shall provide the necessary protection to prevent damage, injury or loss to:
1. All employees on the work and other persons and organizations who may be affected thereby.

2. All the work and materials and equipment to be incorporated therein, whether in storage on or off the site.
3. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures, utilities and underground facilities not designated for removal, relocation or replacement in the course of construction.

F. Salvage of Town Owned Facilities: When project work results in removal of Town owned facilities and equipment, the Contractor shall be required to deliver those facilities or equipment undamaged to the Town's Operation Center, if requested to do so by the Town.

G. Construction Staking: Staking will be provided by the Contractor in accordance with the Town Manual For the Design and Construction of Water and Wastewater System Extensions.

PART 2 PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Plastic Pipe: ASTM D 3034, Type PSM, Poly(Vinyl Chloride) (PVC) material SDR 35; inside nominal diameter of 8-18 inches, integral bell, rubber ring locked in gasket type. All PVC pipe shall be free of any visual defects. Joints and fabricated fittings shall be elastomeric (gasket) joints and shall be assembled in accordance with the manufacturers recommendations and Specification D3212. Gaskets shall meet the requirements of ASTM F477. Minimum cell class shall be 12454B. PVC pipe shall be supplied in 13.0 foot lengths.

B. Ductile Iron Pipe: Class 51 conforming to the most recent revision of AWWA Standard C-151 (ANSI A 21.51). Pipe shall be cement mortar lined with an asphaltic coating and exterior coated with 1.0 mil bituminous material in accordance with AWWA C-151. Standard length shall be eighteen (18) - twenty (20) foot lengths. Pipe joints shall be "push-on" manufactured in accordance with ANSI 21.11. Service from ductile iron pipe shall be made with ductile iron wyes meeting requirements for water main fittings. Polyethylene encasement shall be applied to all underground ductile pipe. Ductile iron mechanical joint sleeves with appropriate gaskets will be provided at all locations requiring couplings for pipe transitions. Material and installation procedure shall be in accordance with AWWA C105/A21.5. FERNCO type couplings will NOT be allowed for ductile iron pipe.

C. Service fittings for use on PVC (SDR35) pipe shall be a standard gasketed wye manufactured or approved by the pipe manufacturer and shall conform to the requirements of ASTM D3034.Service wyes for use with PVC composite pipe shall be PVC gasket wyes manufactured or approved by the pipe manufacturer and shall conform to the requirements as ASTM D2680.

D. Sewer Service Pipe and Cleanouts: Sewer service pipe shall be Schedule 40 PVC-Drain, Waste and Vent (DWV) pipe in accordance with ASTM D 2665 and ASTM D 1785. Cleanouts shall be a two way cleanout constructed of pipe and fittings which also meet the ASTM requirements for Schedule 40 PVC DWV pipe. Cleanout caps shall be SCH40 screw on cap except cleanouts in paved locations shall be constructed of cast iron and have a brass plug.

E. Manhole rings and covers shall be manufactured in the USA of class 30, gray cast iron conforming to the requirements of ASTM A 48 (latest revision thereof). The manufacturer's name and part number shall be cast into each component and the words "Sanitary Sewer" shall be cast into the cover. Pick holes shall be the non-penetrating type. Bearing surfaces of both ring and cover shall be machined to insure proper fit and to prevent rattling. In all cases the cover is to be a watertight cover provided with a rubber gasket or o-ring seal Type E (130#) or Type F (145#). When required to be lockable, covers shall contain a locking device which

functions in the manner of a quarter turn fastener. All castings shall meet industry standards in regard to appearance and tolerances for dimension and weight. Castings do not have to be painted.

1. Inside 100-yr flood plain, watertight (flood proof) manhole frames shall be attached to the manhole with Red-Head expansion bolts or similar connectors with CAMLOCK. The frame is to have "Ram-Nek" or other approved sealing mechanism between the frame and manhole to provide a watertight seal.
2. Outside 100-yr flood plain, an unbolted frame, US Foundry Model USF 753 Ring MV-ORS Cover with CAMLOCK, with a watertight grout seal and Infi-Shield Uni-band on the outside of the manhole sealing the joint between the ring and the manhole. In all cases, the cover is to be a watertight cover provided with a rubber gasket.

F. Manholes shall be precast and have monolithic bottom sections. Manholes shall conform to latest ASTM C 478 specifications. Top slabs when used, shall be satisfactory for H-20 highway loading. Joints shall be watertight and conform to either the latest ASTM C 443 specifications for "O" ring joints or the latest ASTM C-478 specifications for section joints designed for cold applied sealing compound, i.e. "Ram-Nek" preformed plastic rope. Sealing compound shall be CPS-210 as manufactured by Concrete Products Supply Company or CS 102 as manufactured by Concrete Sealants. Flat top manholes will not be allowed without prior written approval from the Town. Manholes with a depth greater than 6' shall have eccentric cones. Manholes with a depth of 6' or less shall have either eccentric or concentric cones. Points of exit and entry for all pipe smaller than 8", including services, shall be provided with flexible manhole sleeves and all stainless steel take up clamps in accordance with ASTM C-923. Pipe connections 8" and larger shall utilize double stainless steel strap boots. All pipes shall extend through the manhole walls a minimum of two (2) inches. Manholes with preformed invert channels and benches may be utilized. Preformed invert channels must have a minimum elevation difference between the "invert in" and the "invert out" of 0.1 feet. All manhole bottoms shall have an extended base extending a minimum of 9" around the base of the manhole. Bedding under the manhole shall consist of a minimum of 12" thick of #57 stone and extending 12" minimum outside the manhole base in all directions. All pinholes, joints, lifting holes and imperfections shall be filled with non-shrink grout.

G. Infi-Shield Premium Seal Wrap (8"wide) shall be used on the outside of all manhole joints prior to backfilling.

H. Manhole steps shall be one-half (½) inch or larger steel, Grade 60, reinforcing bar encased in a plastic coating and shall meet Federal Specifications RR-F-621C. Maximum vertical step spacing shall be sixteen (16) inches on center and shall extend from the top to bottom of manhole.

I. All connections into a manhole shall be by core drilling the concrete only.

J. Transition Couplings: Pipe material changes between manholes may be permitted provided there is not a substantial difference in inside diameters, a smooth uniform flow line is maintained, and a watertight rubber sleeve, mechanical coupler conforming to ASTM C-425 is used to make the transition. Ductile iron mechanical joint sleeves with appropriate gaskets will be provided at all locations requiring couplings for pipe transitions.

K. Nonshrink nonmetallic grout shall be USM "Upon", Master Builders "Masterflow LL-713". Sauereisen Cements "F-100 Level Fill Grout" or U. S. Grout "Five Star Grout" or approved equal.

2.2 PIPE ACCESSORIES

A. Locating Wire: Insulated 14 gauge solid copper wire shall be installed above all plastic/non-metallic pipe. Locating tape may be substituted with Town approval.

2.3 BEDDING AND COVER MATERIALS

A. Pipe Bedding Material: As specified in Section 02230.

B. Pipe Cover Material: As specified in Section 02230.

PART 3 EXECUTION

3.1 TRENCHING

A. See Section 02210 for additional requirements.

3.2 INSTALLATION - PIPE

A. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

B. Without permission from the Engineer no more than three hundred (300) feet of trench may be opened in advance the completed work in any section, and in all cases, the work of excavating, pipe laying and backfilling must move forward at approximately equal rate of progress.

C. Sewers shall be laid at least ten (10) feet, horizontally, from any existing or proposed water mains. Should local conditions prevent a lateral separation of ten (10) feet, a sewer may be laid closer than ten (10) feet to a water main if the elevation of the top (crown) of the sewer is at least eighteen (18) inches below the bottom of the water main. When the elevations of the sewer cannot be varied to meet the above requirements, the water main shall be relocated to provide this separation. When it is impossible to obtain proper horizontal and vertical separation as stipulated above, both the water main and sewer shall be constructed of ductile iron pipe for a distance to ten (10) feet each side of the point of intersection. One (1) full length of water main shall be centered on the sewer.

D. Separation from Storm Sewers:
   1. Lateral Separation - 10 feet minimum.
   2. Vertical Separation - 12 inches.

E. Sewer mains and manholes shall be laid to the line and grade shown on the plans. No deviations from line and grade shall be made unless they have been approved by the Engineer.

F. Pipe cutting, where permitted, shall be done in conformance with the specific recommendations of the pipe manufacturer. Only factory cut ends shall be used for solvent weld joints.

G. Laser equipment shall be used by the Contractor for maintaining proper grade for laying pipe in lieu of batter boards.

H. The sewer pipe installation shall start at the outlet end and proceed upstream to the termination of the project as shown on the plans.

I. While working on any part of an existing sewer main or manhole, the Contractor shall maintain the existing sewage flow.

J. After the trench foundations have been properly graded, the pipe shall be carefully lowered into the trench with approved methods. Under no circumstances shall the pipe or accessories be dropped or dumped into the trench. All damaged pipe shall be properly repaired or replaced at the Contractor's expense.

K. The pipe interior shall be kept clean before and after laying. Pipe ends shall be plugged at the end of each work day or when work is temporarily stopped. The plugs shall be watertight so that water and debris will be kept out.

L. Where conditions are, in the opinion of the Engineer or Inspector, unsuitable for laying pipe because of weather or trench conditions, the Contractor shall be required to cease work until permission is given for work to commence again.

3.3 SEWER SERVICE LATERALS

A. Services shall be installed at right angles to the gravity sewer.

B. The maximum cleanout spacing as measured along the service line centerline shall be seventy-five (75) feet for four (4) inch and six (6) inch services.

C. All four (4) and six (6) inch PVC pipe shall be laid with a minimum allowable grade of 1%. Each sewer lateral shall be installed from the main to the street right of way line or easement line as shown on the drawings. The laterals shall be sealed at the property line with an approved watertight plug. Each service shall be provided with a cleanout located at the street right of way line or property line.

D. Trench support, bedding and backfill for laterals shall conform to the same specifications as those for sewer mains. Bedding and haunching with no. 57 crushed stone is required. A minimum of four (4) inches of No. 57 stone is required at all services.

E. Sewer laterals six (6) inches in diameter shall be connected to the main by means of a wye type saddle at an angle of forty five (45) degrees, with respect to direction flow. The hole, if a saddle wye is used, shall be cut with a mechanical hole cutter and template designed for the particular use and rendering a smooth, uniform cut with no damage to the main. The cost for such cut ins shall be included in the cost for the lateral.

F. Services to proposed manholes shall be installed with flexible rubber sleeves and all stainless steel take-up clamps in accordance with ASTM C 923.

G. Cleanouts located in nontraffic unpaved areas shall be constructed of PVC. Cleanouts located in traffic or paved areas shall be installed with a sewer cleanout box set to finish grade. All cleanouts shall be two way

3.4 MANHOLES

A. Manhole construction shall conform to the typical details as shown on the plans.

B. Manholes shall be constructed on a base of NO. 57 crushed stone, twelve (12) inches minimum thickness and extended a minimum of 12" outside the base of the manhole. When unstable material is encountered at the bottom of the excavation, the unstable material shall be removed to the depth as may be required by the Town and replaced with No. 57 crushed stone. This shall be in addition to the twelve (12) inches stone base.

C. All joints shall be filled using non-shrink grout applied in accordance with manufacturers instructions.

D. Points of exit and entry for all pipe including services; shall be provided with flexible manhole sleeves and all stainless steel take up clamps in accordance with ASTM C-923. Manholes exceeding twenty-three feet in depth shall require a certification from the manufacturer that the flexible sleeves provided are capable of withstanding a hydrostatic pressure equal to the depth of the installed manhole. Points of entry for mains or services which are added after fabrication of the manhole shall be provided by coring and installation of a flexible sleeve. All pipes shall extend through the manhole walls a minimum of two (2) inches.

E. Cold weather construction shall be confined to those days when the temperature is a minimum of thirty four (34) degrees F. and rising unless approval to the contrary is given by the Inspector. Approval to work in no way relieves the Contractor of liability for damage due to freezing.

F. The Contractor shall adjust manhole tops to final grade at the time designated by the Engineer. No additional compensation will be made for manhole adjustments.

G. All manhole inverts shall be constructed with a width and height equal to that of the effluent pipe and shall be brushed and trilled such that a minimum energy loss occurs within the manhole.

H. Completed manholes and wet wells shall not vary more than 0.5 feet from planned horizontal position. The manhole or wet-well vertical alignment shall not vary from plumb more than 0.1 feet per 10 feet of depth.

3.5 INSTALLATION - CLEANOUTS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Form and place cast-in-place concrete base pad, with provision for sanitary sewer pipe end sections.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top cone section to elevation indicated.

3.6 CLEAN UP

A. Upon completion of each section of line. it shall be the responsibility of the Contractor to "clean up" the construction site. Clean up shall consist of removing all rubbish, debris, unused materials, etc. from the construction site, leveling the area and, as far as practical, restoring the area to its "original condition". The entire project site clean-up area shall be accomplished to the satisfaction of the Engineer.

3.7 FIELD QUALITY CONTROL

A. No pipe shall be laid except in the presence of either the Engineer or the Town Representative, unless otherwise directed by the Town. The Contractor shall be expected to co-operate fully with the Inspector in regard to time and duration of pipe laying. Except in cases of emergency, where the ground is treacherous and in situations where suspension of the work would cause extra delay or damage to the sewer line, work requiring the presence of the Inspector shall be confined to the usual working hours of the day. In cases noted above, work may be extended for longer periods or made continuous, provided permission of the Town is first secured.

B. Each manhole shall be tested for leakage immediately after assembly and prior to backfilling. The test method shall be the vacuum test. The Contractor shall provide all materials, labor and equipment necessary to perform the testing. The Town shall be contacted prior to testing to schedule the time such that a representative of the Town may be present during all testing. All lift holes shall be plugged with an approved non-shrink grout. All pipes entering the manhole shall be plugged. The test head shall be placed at the inside of the top of the cone sections and the seal inflated according to the manufacturer's recommendations. A vacuum test of ten (10) inches of mercury shall be drawn and the pump shut off. With the valves closed, the time shall be measured for the vacuum to drop to nine (9) inches. The manhole shall pass the vacuum test if the time is greater than sixty (60) seconds for forty eight (48) inches and ninety (90) seconds for seventy two (72) inches diameter manholes. If the manhole fails the initial test, necessary repairs shall be with a non-shrink grout while the vacuum is still being drawn.

C. Infiltration/exfiltration: All construction of sewer facilities shall be of such quality that there shall be no perceptible infiltration/exfiltration of water at any single location. The total infiltration/exfiltration shall in no case exceed fifty (50) gallons per inch of diameter, per mile of pipe per day.

D. Final Testing and Inspection Procedures: When the construction of the sewer is complete, the Contractor shall clean and pretest the sewer system. When this has been done, the Contractor shall notify the Engineer and the Town that the sewer is ready for final inspection. The final inspection and testing will be done in accordance with the following sequence: (1) Perform a visual inspection; (2) Correct defects revealed by visual inspection; (3) Perform air pressure testing;(4) Make any necessary repairs;(5) Make the necessary retests.
   1. Visual Inspection: Sewer lines shall be visually inspected from every manhole by use of mirrors, television cameras, or other devices for visual inspections and the lines shall all exhibit a fully circular pattern when viewed from one manhole to the next. Lines which do not exhibit a true line and grade or have structural defects shall be corrected to meet these specifications.
   2. Air Pressure Testing: All test apparatus shall be furnished by the Contractor. All air used for testing shall pass through a single above ground control panel visible to the inspector. The test pressure shall be 4.0 psig, plus an adjustment for ground water. The ground water elevations shall be determined at 1,000 feet intervals unless otherwise permitted or required by the Town. Determination of ground water elevations shall be made by installing a six (6) inch diameter pipe beside the manhole such that the pipe extends into the stone bedding of the manhole. The test pressure shall be increased 0.43 psig per foot of ground water above the pipe invert. The test pressure shall be maintained for a minimum of two (2) minutes by throttling the air supply. The air supply shall then be disconnected and allowed to drop. At any convenient point at which the internal air pressure is greater than 3.5 psi (plus ground water adjustment), timing shall be commenced. The time shall be measured with a stop watch or other timing device at least 99.89% accurate. The time required for the pressure to drop 1.0 psi shall be recorded. The minimum acceptable time for the acceptable pressure drop shall be as follows:
      a. 8 Inch Pipe:
         1) 250 ft. length or less - 7min. 34 sec.

2) 300 ft. - 7 min. 36 sec.
3) 350 ft. - 8 min. 52 sec.
4) 400 ft. - 10 min. 08 sec.
5) 450 ft. - 11min 24 sec.

b. 10 Inch Pipe
1) 200 ft. - 9 min. 26 sec.
2) 250 ft. - 9 min. 53 sec.
3) 300 ft. - 11 min. 52 sec.
4) 350 ft. - 13 min. 51 sec.
5) 400 ft. - 15 min. 49 sec.
6) 450 ft. - 17 min. 48 sec.

c. All visible leaks shall be corrected regardless of the results of testing.

3. Mandrel testing for SDR 35 pipe:
a. The mandrel testing device shall be cylindrical in shape and constructed with a minimum of nine (9) evenly spaced arms or prongs. Mandrels with less than nine (9) arms will not be allowed for testing. The dimensions of the mandrel shall be as listed below:
1) 8" Nominal Diameter - Contact Length, 8"; Mandrel Diameter, 7.28"
2) 10" Nominal Diameter - Contact Length, 10"; Mandrel Diameter, 9.08"
3) 12" Nominal Diameter - Contact Length, 10"; Mandrel Diameter, 10.79"

b. The mandrel shall have a tolerance of plus or minus 0.01 inch in the diameter. Allowance for piping wall thickness tolerances or ovality (from heat, shipping, poor production, etc.) shall be deducted from the average inside dimension (see ASTM 3034) and shall not be counted as a part of the 5% of lesser deflection allowance.

c. The Contractor shall hand pull the mandrel through all sewer lines in the presence of the Engineer or his representative. Any sections of the sewer not passing the mandrel test shall be uncovered and rerounded or replaced to the satisfaction of the Engineer. Once the repairs have been made the line shall then be retested. Mandrel testing shall be conducted no earlier than thirty (30) days after reaching final trench backfill grade

d. Contact length shall be measured between points of contact of the mandrel arm. This length shall not be less than that shown in the table above. Proving rings shall be provided by the Contractor to check dimensions of the mandrels.

e. The mandrel device shall be as manufactured by H and H Fabricating of Fairfield, Ohio; Wortco, Inc. of Franklin, Ohio; Cherne Industries of Minneapolis, Minnesota: or approved equal.

4. Video Inspection (at request of the Owner)
a. After lines have been cleaned a VHS video will be taken of the entire line and will have a visual line length counter and a verbal description of features encountered.

E. Any material used to correct deficiencies revealed by tests and inspection shall not be reused. Pipe removed due to faulty grade shall be replaced with new pipe.

F. Whenever pipe laying is stopped either for the night or for any other reason, the end of the pipe shall be securely closed to prevent the entrance of water, mud and other matter.

3.8 PROJECT CLOSEOUT

A. Prefinal Inspection:
1. Upon completion of construction, testing, and disinfection; the contractor shall notify The Cullipher Group, PA to schedule a pre-final inspection. The pre-final inspection will be performed by the Town Representative in the presence of The Cullipher Group, PA Representative and the Contractor. Any deficiencies discovered will be recorded by the

Town Representative and a copy will be furnished to the Contractor and to The Cullipher Group, PA. All defective items noted shall be corrected prior to the final inspection.

B. Final Inspection:
   1. When the "punch list" is completed the Contractor shall notify The Cullipher Group, PA Representative who will schedule the final inspection. At the scheduled final inspection, the Town Representative will perform a visual inspection in the presence of The Cullipher Group, PA Representative and the Contractor. The Cullipher Group, PA Representative will prepare a detailed punch list of any deficiencies discovered and provide copies to the Contractor and the Town. Any defective items noted shall be corrected along with an executed Project Closeout for Carteret County Schools form prior to acceptance .

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Storm drainage piping, fittings, and accessories.
B. Connection of drainage system to stormwater lift station.
C. Site surface drainage and drop inlets.
D. Stormwater lift station.

1.2 RELATED REQUIREMENTS

A. Section 31 2316 - Excavation: Excavating of trenches.
B. Section 31 2316.13 - Trenching: Excavating, bedding, and backfilling.
C. Section 31 2323 - Fill: Bedding and backfilling.

1.3 DEFINITIONS

A. Bedding: Fill placed under, beside and directly over pipe, prior to subsequent backfill operations.

PART 2 PRODUCTS

2.1 SEWER PIPE MATERIALS

A. Plastic Pipe: ASTM D3350, High Density Polyethylene (HDPE) corrugated wall pipe with integrally formed smooth liner; inside nominal diameter of 12 inch, meeting the requirements of AASHTO M 252, Type S, for diameters between 3 inches and 10 inches and AASHTO M 294, Type S, for diameters between 12 inches and 60 inches, soil-tight, bell and spigot joints with rubber gaskets, with pipe and fittings manufactured from virgin PE compounds with cell classification 3254420C.

2.2 CATCH BASIN & FRAME

A. Basic Materials: NCDOT Section 840-2
   1. Precast Drop Inlet and Grates per NCDOT
B. Drop Inlet Grate and Frame
   1. Standard for unpaved areas: U.S. Foundry-USF 4137-6238
   2. Standard for paved areas: U.S. Foundry-USF 4137-6237
   3. Low Profile: U.S. Foundry-USF 4130-6230

2.3 BEDDING AND COVER MATERIALS

A. Bedding: As specified in Section 31 2323.
B. Cover: As specified in Section 31 2316.13.

PART 3 EXECUTION

3.1 TRENCHING

A. See Section 31 2316.13 for additional requirements.

B. Backfill around sides and to top of pipe with cover fill, tamp in place and compact, then complete backfilling.

3.2 INSTALLATION - PIPE

A. Verify that trench cut is ready to receive work and excavations, dimensions, and elevations are as indicated on layout drawings.

B. Install pipe, fittings, and accessories in accordance with manufacturer's instructions. Seal watertight.
   1. Plastic Pipe: Also comply with ASTM D2321.

C. Lay pipe to slope gradients noted on layout drawings; with maximum variation from true slope of 1/8 inch in 10 feet.

3.3 INSTALLATION – DROP NLETS

A. Form bottom of excavation clean and smooth to correct elevation.

B. Install precast drop inlet, mount frame and grate level in grout to elevation indicated.

C. Establish elevations and pipe inverts for inlets and outlets as indicated.

D. Mount lid and frame level in grout, secured to top section to elevation indicated.

3.4 PROTECTION

A. Protect pipe and bedding cover from damage or displacement until backfilling operation is in progress.

END OF SECTION

RELATED DOCUMENTS:

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

CHAIN LINK FENCING AND WELDED GATES:

Provide chain link fences and welded gates as complete units controlled by a single source including necessary erection accessories, fittings, fastenings and weldments.

Product Data: Submit manufacturer's technical product data, and installation instructions for metal fencing, fabric, gates and accessories.

Submit manufacturer's technical product data, installation instructions, and samples of wind screening product.

Dimensions indicated for pipe, roll-formed, and H-sections are outside dimensions, exclusive of coatings.

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

Galvanized Steel Fencing and Fabric:

Allied Tube and Conduit Corp.

American Fence Corp.

Anchor Fence, Inc.

Galvanized Steel Fencing:

Fabric: No. 9 ga. (0.148") finished size steel wires, 2" mesh, with top selvages knuckled for fabric 60" high and under, and both top and bottom selvages twisted and barbed for fabric over 60" high. Tennis court mesh to be 9 ga. X 1 ¾" mesh.

Furnish one piece fabric widths for fencing up to 12' high.

Fabric finish, galvanized, ASTM A 392, Class I, with not less than 1.2 oz. zinc per sq. ft. of surface.

Framework: Galvanized steel, ASTM A 120 or ASTM A 123, with not less than 1.8 oz. zinc per sq. ft. of surface.

Fittings and Accessories: Galvanized, ASTM A 153, with zinc weights per Table I.

Framing and Accessories:

End, Corner, and Pull Posts: Minimum sizes and weights as follows:

- Up to 6' fabric height, 2.375" od steel pipe, 3.65 lbs. per lin. ft., or 3.5" x 3.5" roll-formed sections, 4.85 lbs. per lin. ft.
- Over 6' fabric height, 2.875" od steel pipe, 5.79 lbs. per lin. ft., or 3.5" roll-formed sections, 4.85 lbs. per lin. ft.

Line Posts: Space 10' o.c. maximum, unless otherwise indicated, of following minimum sizes and weights.

- Up to 6' fabric height, 1.90" od steel pipe, 2.70 lbs. per lin. ft. or 1.875" x 1.625" C sections, 2.28 lbs. per lin. ft.

- Over 6' to 8' fabric height, 2.375" od steel pipe, 3.65 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 2.64" lbs. per lin. ft.

- Over 8' fabric height, 2.875" od steel pipe, 5.79 lbs. per lin. ft. or 2.25" x 1.875" H-sections, 3.26 lbs. per lin. ft.

Gate Posts: Furnish posts for supporting single gate leaf, or one leaf of a double installation, for nominal gate widths as follows:

	Leaf Width	Gate Post	lbs. / lin. ft.
•	Up to 6’	3.5" x 3.5" roll-formed section or 2.875” od pipe	4.85 5.79
•	Over 6' to 13'	4.000" od pipe	9.11
•	Over 13' to 18'	6.625" od pipe	18.97
•	Over 18'	8.625" od pipe	28.55

Top Rail: Manufacturer's longest lengths, with expansion type couplings, approximately 6" long, for each joint. Provide means for attaching top rail securely to each gate corner, pull and end post.

1.66" od pipe, 2.27 lbs. per ft. or 1.625" x 1.25" roll-formed sections, 1.35 lbs. per ft.

Tension Wire: 7-gage, coated coil spring wire, metal and finish to match fabric.

Locate at bottom of fabric.

Post Brace Assembly: Manufacturer's standard adjustable brace at end and gate posts and at both sides of corner and pull posts, with horizontal brace located at mid-height of fabric. Use same material as top rail for brace, and truss to line posts with 0.375" diameter rod and adjustable tightener.

Post Tops: Provide weathertight closure cap with loop to receive tension wire or top rail; one cap for each post.

Stretcher Bars: One-piece lengths equal to full height of fabric, with minimum cross-section of 3/16" x 3/4". Provide one stretcher bar for each gate and end post, and 2 for each corner and pull post, except where fabric is integrally woven into post.

Stretcher Bar Bands: Space not over 15" o.c., to secure stretcher bars to end, corner, pull, and gate posts.

Gates: Fabricate fully welded perimeter frames of gates from metal and finish to match fence framework. Assemble gate frames only by welding all connections, providing security against removal and breakage of connections. Provide horizontal and vertical members to ensure proper gate operation and attachment of fabric, hardware and accessories. Space frame members maximum of 8' apart unless otherwise indicated.

Provide same fabric as for fence, unless otherwise indicated. Install fabric with stretcher bars at vertical edges and at top and bottom edges. Weld attach stretcher bars to gate frame at not more than 15" o.c.

Install diagonal cross-bracing consisting of 3/8" diameter adjustable length truss rods on gates to ensure frame rigidity without sag or twist.

Where barbed wire is indicated above gates, extend end members of gate frames 1'-0" above top member. Provide necessary clips to receive and secure 3 strands of wire.

Swing Gates: Fabricate perimeter welded frames of minimum 1.90" od pipe, welded.

Gate Hardware: Provide hardware and accessories for each gate, galvanized per ASTM A 153, and in accordance with the following:

- Hinges: Size and material to suit gate size, non-lift-off type, offset to permit 180° gate opening. Provide 1-1/2 pair of hinges for each leaf over 6' nominal height.

- Latch: Forked type or plunger-bar type to permit operation from either side of gate, with padlock eye as integral part of latch.

Double Gates: Provide gate stops for double gates, consisting of mushroom type flush plate with anchors, set in concrete, and designed to engage center drop rod or plunger bar.

Include locking device and padlock eyes as integral part of latch, permitting both gate leaves to be locked with single padlock.

Gate Egress and Security Hardware: Where indicated on Drawings, provide weather resistant Surface Mount Exit Bar Kit, equal to D-6040-S by Hoover. Assembly shall include: exit bar device, 24” adjustable mounting plate, adjustable receiver bracket, lock box with solid brass keyed cylinder and two keys for 5-pin Schlage keyway, stainless steel anchors and fasteners. Silver powder coated finish.

Sliding Gates (fully welded frames): Provide manufacturer's standard heavy-duty inverted channel track, ball-bearing hanger sheaves, overhead framing and supports, guides, stays, bracing, hardware, and accessories as required.

Wire Ties: For tying fabric to line posts, use wire ties spaced 12" o.c. For tying fabric to rails and braces, use wire ties spaced 24" o.c. For tying fabric to tension wires, use hog rings spaced 24" o.c.

Manufacturer's standard procedure will be accepted if of equal strength and durability.

Concrete: Provide concrete consisting of portland cement, ASTM C 150, aggregates ASTM C 33, and clean water. Mix materials to obtain concrete with a minimum 28-day compressive strength of 2500 psi using at least 4 sacks of cement per cu. yd., 1" minimum size aggregate, maximum 3" slump, and 2% to 4% entrained air.

Excavation: If not shown on drawings, excavate holes to minimum depth and diameter as recommended by fence manufacturer.

Installation: Install in accordance with ASTM F 567 and written installation instructions of fencing manufacturer to provide secure, aligned installation.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Formwork for cast—in place concrete, with shoring, bracing and anchorage.

B. Openings for other work.

C. Form accessories.

D. Form stripping.

1.2 RELATED SECTIONS

A. Section 03200 — Concrete Reinforcement.

B. Section 03300 — Cast-in-Place Concrete.

1.3 REFERENCES

A. ACI 301 — Structural Concrete for Buildings.

B. ACI 318 — Building Code Requirements for Reinforced Concrete.

C. PS 1 — Construction and Industrial Plywood.

1.4 DESIGN REQUIREMENTS

A. Design and construct formwork, shoring and bracing to conform to design and code requirements; resultant concrete to conform to required shape, line and dimension.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 301 and 318.

B. Maintain one copy of each document on site.

1.6 REGULATORY REQUIREMENTS

A. Conform to ACI 301 and ACI 318 code for design, fabrication, erection and removal of formwork.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect and handle products to site to prevent damage.

B. Store off ground in ventilated and protected manner to prevent deterioration from moisture.

1.8 COORDINATION

A. Coordinate this Section with other Sections of work which require attachment of components to formwork.

B. If formwork is placed after reinforcement resulting in insufficient concrete cover over reinforcement before proceeding, request instructions from Architect/Engineer.

PART 2: PRODUCTS

2.1 WOOD FORM MATERIALS

A. Plywood: Douglas Fir; solid one side, tight faced undamaged sheets with clean, true edges.

2.2 MANUFACTURERS — PREFABRICATED FORMS

A. Symons or equal.

2.3 PREFABRICATED FORMS

A. Preformed Steel Forms: Minimum 16 gage, matched, tight fitting, stiffened to support weight of concrete without deflection detrimental to tolerances and appearance of finished surfaces.

B. Steel Tubular Column Type: Round, steel material, minimum 16 gage, surface treated with release agent, of sizes required.

2.4 FORMWORK ACCESSORIES

A. Form Ties: Snap—off type, galvanized metal, cone type, with waterproofing washer.

B. Form Release Agent: Colorless mineral oil which will not stain concrete, or absorb moisture.

C. Dovetail Anchor Slot: Galvanized steel, 22 gage, foam filled.

D. Flashing Reglets: Galvanized steel, 22 gage, longest possible lengths, with alignment splines for joints, foam filled,

E. Nails, Spikes, Lag Bolts, Through Bolts, Anchorages: Sized as required, of sufficient strength and character to maintain formwork in place while placing concrete.

F. Waterstops: Hydrophyllic type as manufactured by American Colloid or approved equal.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify lines, levels and centers before proceeding with formwork. Ensure that dimensions agree with drawings.

3.2 EARTH FORMS

A. Hand trim sides and bottom of earth forms. Remove loose soil, mud, and debris prior to placing concrete.

3.3 ERECTION — FORMWORK

A. Erect formwork, shoring and bracing to achieve design requirements, in accordance with requirements of ACI 301.

B. Provide bracing to ensure stability of formwork. Shore or strengthen formwork subject to over stressing by construction loads.

C. Arrange and assemble formwork to permit dismantling and stripping. Do not damage concrete during stripping. Permit removal of remaining principal shores.

D. Align joints and make watertight. Keep form joints to a minimum.

E. Obtain approval before framing openings in structural members which are not indicated on Drawings.

F. Provide chamfer strips on exposed external corners.

3.4 APPLICATION — FORM RELEASE AGENT

A. Apply form release agent on formwork in accordance with manufacturer's recommendations.

B. Apply prior to placement of reinforcing steel, anchoring devices, and embedded items.

C. Do not apply form release agent where concrete surfaces will receive special finishes or applied coverings which are affected by agent. Soak inside surfaces of untreated forms with clean water. Keep surfaces coated prior to placement of concrete.

3.5 INSERTS, EMBEDDED PARTS, AND OPENINGS

A. Provide formed openings where required for items to be embedded in passing through concrete work.

B. Locate and set in place items which will be cast directly into concrete.

C. Coordinate with work of other sections in forming and placing openings, slots, reglets, recesses, sleeves, bolts, anchors, other inserts, and components of other Work.

D. Position recessed reglets for brick veneer masonry anchors to spacing and intervals noted on drawings or specified in Section 04200.

E. Install accessories in accordance with manufacturer's instructions, straight, level, and plumb. Ensure items are not disturbed during concrete placement.

F. Install waterstops in accordance with manufacturer’s instruction continuous without displacing reinforcement.

G. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection. Locate openings at bottom of forms to allow flushing water to drain.

H. Close temporary openings with tight fitting panels, flush with inside face of forms, and neatly fitted so joints will not be apparent in exposed concrete surfaces.

3.6 FORM CLEANING

A. Clean forms as erection proceeds, to remove foreign matter within forms.

B. Clean formed cavities of debris prior to placing concrete.

C. Flush with water or use compressed air to remove remaining foreign matter. Ensure that water and debris drain to exterior through clean—out ports.

D. During cold weather, remove ice and snow from within forms. Do not use de—icing salts. Do not use water to clean out forms, unless formwork and concrete construction proceed within heated enclosure. Use compressed air or other means to remove foreign matter.

3.7 FORMWORK TOLERANCES

A. Construct formwork to maintain tolerances required by ACI 301.

3.8 FIELD QUALITY CONTROL

A. Inspect erected formwork, shoring, and bracing to ensure that work is in accordance with formwork design, and that supports, fastenings, wedges, ties, and items are secure.

3.9 FORM REMOVAL

A. Do not remove forms or bracing until concrete has gained sufficient strength to carry its own weight and imposed loads.

B. Loosen forms carefully. Do not wedge pry bars, hammers, or tools against finish concrete surfaces scheduled for exposure to view.

C. Store removed forms in manner that surfaces to be in contact with fresh concrete will not be damaged. Discard damaged forms.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall include furnishing all labor and materials required to provide all cast-in-place concrete scheduled on Drawings and as specified in this Section.

Related Work Specified Elsewhere:

Concrete Formwork (Section 03100)
Concrete Reinforcement (Section 03300)

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Industry Standards Index in Division 1.

LEED NC, U. S. Green Building Council

DELIVERY AND PROTECTION OF MATERIALS:

Store cement in weather tight structure with floor at least 12 inches off ground, and accessible for inspection in original packages.

Store fine and coarse aggregate separately. Segregate sizes and avoid getting dirt and foreign materials in concrete.

Deliver ready-mixed concrete in compliance with requirements set forth in ASTM C 94.

Provide documentation of LEED credits requirements for use of local regional materials.

SEVERE-WEATHER PROVISIONS:

Cold-Weather Concreting: (In accordance with ACI 306 and as follows):

Provide adequate equipment for heating concrete materials and protecting concrete during freezing or near-freezing weather. Do not use frozen materials, or materials containing ice.

All concrete materials and all reinforcement, forms, fillers, and around which concrete is in contact shall be free from frost.

Whenever temperature of surrounding air is below 40 degrees F., all concrete shall have temperature between 70 degrees and 80 degrees F. Provide adequate means for maintaining temperature not less than 70 degrees F. for three days, or 50 degrees F. for five days, or for as much more time as is necessary to insure curing of concrete.

Use no salt or other chemicals to prevent freezing.

Housing, covering, or other protection used in connection with curing shall remain in place, intact, at least 24 hours after artificial heat is discontinued.

Hot Weather Concreting: (In accordance with ACI 305 and as follows):

Provide adequate methods of lowering temperature of concrete ingredients so that temperature of concrete when placed does not exceed 90 degrees F.

When weather is such as to raise concrete temperature, as placed, consistently above 80 degrees F., use approved retarder.

Sprinkle all subgrade and forms with water before placing concrete. Remove all excess water before placing concrete.

Start curing as soon as practicable to prevent evaporation of water and keep forms wet. Protect flat work from dry wind, direct sun, and high temperatures.

PART 2: PRODUCTS

CEMENT:

Cement shall be standard portland cement of United States manufacture, conforming to ASTM C 150, Type I or Type III. Only one brand of commercial portland cement shall be used. Each bag shall weigh approximately 94 pounds and contain one cubic foot.

CONCRETE AGGREGATES:

Fine Aggregate: Washed sand having clean, hard, durable, uncoated grains, free from harmful substances conforming to ASTM C 33.

Coarse Aggregate for standard-weight concrete: crushed stone, gravel, or other approved inert material having clean, hard, durable uncoated particles conforming to ASTM C 33. Maximum size, in accordance with ACI 318.

Lightweight Coarse Aggregate shall conform to ASTM C 330. Lightweight aggregate shall be expanded shale or slate. Maximum size of aggregate shall be of 3/4".

WATER:

Clean and free from harmful amounts of acids, alkalies, or organic materials. No water shall be added at the site unlss delivered, documented, and approved by the batch plant and testing agency.

VAPOR BARRIER:

Vapor barrier under floor slabs on earth shall be puncture resistant polyethylene sheet not less than 15 mils thick, with permeance of less than 0.01 perms per ASTM F 1249 or ASTM E 96, and in compliance with ASTM E 1745 Class A and ACI 302. Accessories would include seam tape and vapor proofing mastic with permeance less than 0.03 perms. Provide pipe boots constructed from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer’s instructions.

EXPANSION JOINT MATERIALS:

Expansion joint material shall be asphalt-impregnated fiber strips, 1/2" thick, unless otherwise shown or noted: Flexcell by Celotex Corporation, Sealtight by W. R. Meadows, Inc., Joint Filler by Serviced Products Corporation, or approved equal.

ADMIXTURES:

Water Reducing Admixture: ASTM C 494, Type A, and contain no chloride ions.

Air Entraining Admixture: ASTM C 60 for slabs permanently exposed to weather. No air entraining admixture is to be used for concrete not exposed to weather. Air content is to be confirmed by lab tests for both air entrained and non-air entrained mixes.

CLASS OF CONCRETE:

f'c minimum 4000 psi, maximum 150 pcf (regular weight) for exposed exterior concrete.
f'c minimum 3000 psi, maximum 150 pcf (regular weight).
f'c minimum 3000 psi, maximum 120 pcf (light weight-for use in elevated slabs).
f'c minimum 3000 psi, maximum 150 pcf (regular weight pea gravel) high slump mix for concrete masonry fill.

MIX DESIGNS:

Contractor shall select a testing laboratory acceptable to Architect to verify mixes of all classes of concrete.

Contractor shall submit samples in adequate quantities for each mix verification, of all concrete materials to be used on project to designated testing laboratory.

Laboratory shall be engaged by and paid by the contractor out of the material testing allowance.

Submit four (4) copies of all mix design, aggregate test results, and compression test results to Architect prior to use on the job.

PLANT MIXING:

Proportioning Concrete:

Stresses for design of this structure are based on specified minimum 28-day compressive strength of concrete. Proportions shall be in compliance with approved design mix for each class of concrete.

Batching:

Ready-mixed concrete shall be mixed and delivered in accordance with requirements of ASTM C 94.

Producer shall furnish delivery ticket with each load of concrete delivered under this Specification. Delivery ticket shall show clearly class and strength of concrete, size of coarse aggregate, slump ordered, and date and time of departure from batching plant.

1. Stresses for design of this structure are based on specified minimum 28-day compressive strength of concrete. Proportions shall be in compliance with approved design mix for each class of concrete.

2. Regular weight 3000 psi or 4000 psi concrete shall be proportioned for a slump of 4” + or - 1”.

3. Lightweight 3000 psi concrete shall be proportioned for a slump of 6” + or - 1”.

4. Fine aggregate 3000 psi concrete masonry grout shall be proportioned for a slump of 10" + or - 2".

5. All concrete shall be proportioned for a maximum water to cement ratio 0.5.

6. Concrete not permanently exposed to weather such as concrete for foundations, interior slabs on grade, concrete unit masonry grout, and elevated slabs on composite metal deck shall not have air added by entrainment admixtures. This requirement shall be verified by the testing laboratory.

7. Concrete to be permanently exposed to weather shall have air added by entrainment admixtures. Air content shall be 5% + or – 1%. This requirement shall be verified by the testing laboratory.

CONVEYING EQUIPMENT:

Carts or buggies transporting concrete more than 50 feet shall be equipped with pneumatic tires.

Equipment for chuting or conveying concrete shall be of sufficient size to insure continuous flow of concrete at delivery and without separation of materials.

PART 3: EXECUTION

EVALUATION OF COMPRESSION TESTS:

Evaluation of results of tests for ultimate-strength design concrete shall be according to ACI 318.

Neither results of laboratory verification tests nor any provision in Contract Documents shall relieve Contractor of obligation to furnish concrete of class and strength specified.

INSPECTION OF WORK BEFORE PLACING:

Inspect work to receive concrete for deficiencies which would prevent proper execution of finished work. Do not proceed with placing until such deficiencies are corrected.

Do not place concrete on earth until fill or excavation has been prepared as set forth under applicable sections of specifications for that work as verified by the testing lab.

Before any concrete is placed in form, all pipes or sleeves, openings, or embedded items shall be in place and shall receive all tests specified for them.

Remove all grease, oil, mud or other foreign matter from forms and have reinforcing steel in proper condition and position before placement of concrete. Dowels shall be in place and tied off prior to placing concrete.

Remove hardened, or partially hardened, concrete on forms or reinforcement before placing concrete.

CONVEYING:

Convey concrete from mixer to placement by methods which will prevent separation or loss of material. No water shall be added at the site to aid placement of concrete. Concrete too stiff to be properly placed shall be rejected and removed from the site and legally disposed of at no additional cost to the owner.

Runway supports shall not bear upon reinforcing steel or fresh concrete.

If pump(s) are used for conveying concrete, there shall be no aluminum in contact with the concrete, either in pump or in conveying pipes.

Clean conveying equipment thoroughly before run of concrete at frequent intervals.

CONSTRUCTION AND EXPANSION JOINTS:

Construction Joints: Early in construction program, contractor shall review with Architect construction joints he proposes to use, not indicated on the Drawings. Contractor shall not use any construction joints not approved by Architect.

Expansion Joints: Install as indicated.

PLACING:

Deposit concrete as nearly as practicable in its final position to avoid rehandling. Do not deposit concrete on work partially hardened or contaminated by foreign material. Do not use retempered concrete. In no case use concrete when elapsed time, after addition of water and cement to batch, exceeds one hour.

Concrete shall not be dropped more than four feet. For dropping greater distances use metal chutes or tremie pipes.

Once concreting is started carry on as continuous operation until placing of section is completed. Finish top surface to true plane. When construction joints are necessary, they shall be made in accordance with article above. Do not allow cold joints to occur within pours.

Compact all concrete thoroughly by suitable means during placing, and work thoroughly around reinforcement, embedded fixtures, and into corners of forms. When vibrator is used, apply directly to concrete. Do not over vibrate.

PROTECTION

During curing period protect concrete from damaging mechanical disturbances, particularly load stresses, heavy stock, and excessive vibration. Protect all finished concrete surfaces from damage by construction equipment, materials, or methods, and by rain, running water, hot sun, or windy conditions. Do not load self supporting structures in such a way as to overstress concrete.

Coordinate with protection requirements of Section 03362 – Polished Concrete Floor Finishes.

TESTING:

Conduct strength tests of concrete in accordance with following procedures:

Secure composite samples in accordance with "Method of Sampling Fresh Concrete"
(ASTM C 172).

Mold and cure five specimens from each sample in accordance with "Method of Making and Curing Concrete Compression and Flexure Specimens in the Field" (ASTM C 31). Five specimen comprise one test.

Test Two Specimens at 7 days (ASTM C 39). Test two specimens at 28 days in accordance with "Method of Test for Compressive Strength of Molded Concrete Cylinders" (ASTM C 39). Test evaluation shall be conducted in accordance with provisions of ACI 318. Keep one Specimen in reserve.

Make one strength test for each 100 cu. yds. or fraction thereof for each mix design of concrete placed in any one day, except that in no case shall given mix design be represented by less than five tests.

Testing Laboratory shall be selected and paid by the Contractor out of the material testing allowance.

Report all test results to Architect, Structural Engineer, and Contractor on same day that tests are made.

Testing laboratory shall make and handle all test cylinders.

NON-CONFORMING MATERIAL

Any tested concrete material that fails to meet design strength at 28 days shall be removed and repoured. Substandard concrete may be allowed to remain if certified structurally adequate by a qualified independent engineer and approved by the Owner and Architect, however, the cost of the substandard material shall be deducted from the contract sum.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work shall consist of providing specified finishes to all cast-in-place concrete shown on drawings.

RELATED WORK:

Coordinate with requirements and work specified in Specification Section 03362 - Polished Concrete Floor Finishes.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Industry Standards Index in Division 1.

SUBMITTALS:

Submit (in duplicate) Manufacturer's printed instructions for application of curing compounds and floor hardeners.

Coordinate with submittal requirements in Section 03362 – Polished Concrete Floor Finishes.

PART 2: PRODUCTS

FINE AGGREGATE: ASTM C 33, fine aggregate. Natural sand
PORTLAND CEMENT: ASTM C 150, Type 1, gray.

WATER:

Potable, and free of chemicals affecting set of cement.

CURING COMPOUND AND SEALER:

Transparent, resinous sealer, in volatile, conforming to ASTM C 309.

Coordinate with products specified in Section 03362 – Polished Concrete Floor Finishes.

LIQUID CHEMICAL FLOOR HARDENER:

Colorless, aqueous solution containing blend of magnesium fluosilicate and zinc fluosilicate with wetting agent, containing not less than 2 lbs. fluosilicates per gallon. Compound shall be approved by Architect in writing.

Coordinate with products specified in Section 03362 – Polished Concrete Floor Finishes.

ABRASIVE AGGREGATE:

Ceramically bonded aluminum oxide grains 1/8" to 1/32" size. Material shall be delivered to the site in the manufacturer's original container. Submit sample and manufacturer's descriptive date for approval.

JOINT SEALANTS:

Apply interior and exterior joint sealant products required by drawings at locations indicated on drawings.

PROTECTION:

Coordinate with protection requirements specified in Section 03362 – Polished Concrete Floor Finishes.

PART 3: EXECUTION

PATCHING CONCRETE:

Concrete which is not formed as shown on Drawings, or is out of alignment or level, or shows defective surface, or shows defects which reduce structural strength of member or members, shall be considered as not conforming to intent of these specifications and shall be removed from job by Contractor at his expense, unless Architect grants permission to patch effective area. Permission to patch any such area shall not be considered a waiver of Architect's right to require complete removal of defective work if patching does not, in his opinion, satisfactorily restore quality and appearance of surface, or if patching does not restore structural strength of member or members.

After removing forms, inspect all concrete surfaces. Patch any pour joints, voids, honeycomb, stone pockets, or other defective areas permitted by Architect to be patched, and all tie holes. Where necessary, chip away defective areas to depth of not less than 1", with edges perpendicular to surface. Wet area to be patched and space at least 6" wide entirely surrounding it to prevent absorption of water from patching mortar. Brush grout of equal parts portland cement and sand (with sufficient water to produce brushing consistency) into surface, followed immediately by patching mortar. Patching mortar shall be made of same material (and of approximately same proportions) as used for concrete except that coarse aggregate shall be omitted. Mortar shall not be richer than 1 part cement to 3 parts sand. Amount of mixing water shall be as little as is consistent with requirements of handling and placing. Mortar shall be retempered without addition of water by allowing it to stand for period of one hour, during which time it shall be mixed occasionally with trowel to prevent setting.

Compact mortar thoroughly into place and screwed off to leave patch slightly higher than surrounding surface. Leave patch undisturbed for period of 1 to 2 hours to permit initial shrinkage before beginning final finishing. Finish patch in manner to match adjoining surface. On exposed surface where unlined forms have been used, obtain final finish by striking off surface with straight-edge spanning patch, held parallel to direction of form marks. All patches shall be used in accordance with curing requirements for surface in which patch occurs. Keep patch moist for not less than 3 days after installation.

Tie-holes left by withdrawal of rods, or holes, left by removal of ends of ties shall be filled solidly with mortar after first being wet thoroughly. Any excess mortar at surface of wall shall be struck off flush with cloth.

FLATNESS AND LEVELNESS:

Comply with ACI Standard No. 117 and provide floors with a flatness of F25 and a levelness of F20. Use laser guided equipment to set all forms. Use laser guided highway screed to achieve specified levelness and flatness. Use of BULLFLOATS is prohibited.

Areas of Integrally Colored and Dye Stained Polished Concrete Floor Finishes: Comply with ACI Standard No. 117 and provide floors with a flatness of minimum F50 and a minimum levelness of F30.

Use laser guided equipment to set all forms. Use laser guided highway screed to achieve specified levelness and flatness. Use of BULLFLOATS is prohibited.

TESTING:

Floors shall be tested for levelness and flatness by an independent testing agency, using a “Dipstick Floor Profiler”. Floors that do not meet specification will be removed and re-constructed.

MONOLITHIC CEMENT FINISH:

Apply steel trowel finish to surface of concrete roof and floor slabs as follows:

- For all floors where, in Finish Schedule, resilient flooring or carpet covering is called for.
- For all roof slab areas (for future use as floor).
- For all other concrete floors, stairs, platforms, or slabs where, in Finish Schedule, or shown on Drawings, exposed concrete finish is called for, unless otherwise noted.

Screed floor slabs to an even surface by use of straight-edge and screeding strips accurately to proper grade. Float concrete with laser guided highway screed in manner which will compact and produce surface free from depressions or unevenness. Floors shall be level and flat within tolerances and guidelines specified, except where drains occur (in which cases floors shall be pitched to drains). Steel trowel concrete after concrete has hardened sufficiently to prevent fine materials from working to top, and only after all water sheen has disappeared. Drying of surface moisture before troweling shall proceed naturally, and shall not be hastened by dusting on of dry sand or cement. Perform final troweling after concrete has hardened so that no mortar accumulates on trowel and ringing sound is produced as trowel is drawn over surface.

Coordinate with requirements and work specified in Specification Section 03362 - Polished Concrete Floor Finishes.

Exterior Concreted Areas:

Provide all (walks and vertical surfaces) surfaces with a unidirectional fine broom finish, with concrete walk 1/2" tooled expansion joints at 30' centers maximum and sawcut joints at 5' centers maximum. Pour sample for Architect approval.

CURING:

General Requirements for Curing:

Prevent surfaces of concrete from drying out until required curing time has elapsed. Start curing procedures immediately following initial set of concrete.

Surfaces to Receive Finishes Set in Portland Cement Setting Beds:

Cover with non-staining, reinforced kraft paper. Lap kraft paper, and keep weighted down to prevent evaporation. Do not use membrane curing compound on these surfaces.

FLOOR HARDENER:

Apply to floor surfaces to be exposed in accordance with Manufacturer's printed instructions, and at a rate of not less than 100 sq. ft. per gallon. Apply uniform coating to avoid mottled appearance.

GLOSS URETHANE FLOOR SEALER FOR EQUIPMENT PLATFORMS, BOILER ROOMS, MECHANICAL ROOMS, ELECTRICAL ROOMS, CUSTODIAL ROOMS: (Apply whether scheduled or not; typical)

After all areas are final cleaned, to include removal of all stains and exposed reinforcing fibers, apply gray gloss urethane to floor surfaces to be exposed (no floor finishes except sealer) in accordance with Manufacturer's printed instructions, and at a rate of not less than manufacture's application rate instructions and to achieve a permanent high gloss sheen. Apply uniform coating to avoid mottled appearance. Coordinate with Section 09900 requirements.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Reinforcing steel bars, wire fabric and accessories for cast-in-place concrete.

1.2 REFERENCES

A. ACI 301 - Structural Concrete for Buildings.

B. ACI 318 - Building Code Requirements For Reinforced Concrete.

C. ACI SP-66 - American Concrete Institute - Detailing Manual.

D. ANSI/ASTM A82 - Cold Drawn Steel Wire for Concrete Reinforcement.

E. ANSI/ASTM A184 - Fabricated Deformed Steel Bar Mats for Concrete Reinforcement.

F. ANSI/ASTM A185 - Welded Steel Wire Fabric for Concrete Reinforcement.

G. ANSI/ASTM A496 - Deformed Steel Wire Fabric for Concrete Reinforcement.

H. ANSI/ASTM A497 - Welded Deformed Steel Wire Fabric for Concrete Reinforcement.

I. ANSI/AWS D1.4 - Structural Welding Code for Reinforcing Steel.

J. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

K. ASTM A616 - Rail Steel Deformed and Plain Bars for Concrete Reinforcement.

L. ASTM A617 - Axle Steel Deformed and Plain Bars for Concrete Reinforcement.

M. ASTM A704 - Welded Steel Plain Bar or Rod Mats for Concrete Reinforcement.

N. ASTM A706 - Low-Alloy Steel Deformed Bars for Concrete Reinforcement.

O. ASTM A767 - Zinc-Coated (Galvanized) Bars for Concrete Reinforcement.

P. ASTM A775 - Epoxy-Coated Reinforcing Steel Bars.

Q. ASTM D3963 - Epoxy-Coated Reinforcing Steel.

R. ASTM C1116 – Standard Specification for Fiber-Reinforced Concrete and Shotcrete

S. AWS D12.1 - Welding Reinforcement Steel, Metal Inserts and Connections in Reinforced Concrete Construction.

T. CRSI - Concrete Reinforcing Steel Institute - Manual of Practice.

U. CRSI 63 - Recommended Practice For Placing Reinforcing Bars.

V. CRSI 65 - Recommended Practice For Placing Bar Supports, Specifications and Nomenclature.

1.3 SUBMITTALS

A. Shop Drawings: Indicate bar sizes, spacings, locations, and quantities of reinforcing steel and wire fabric, bending and cutting schedules, and supporting and spacing devices.

B. Manufacturer's Certificate: Certify that products meet or exceed specified requirements.

C. Submit in writing any request for deviation form the design drawings and specifications.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with CRSI 63, 65 and Manual of Practice, ACI 301, ACI SP-66, ACI 318, ANSI/ASTM A184.

B. Submit certified copies of mill test report of reinforcement materials analysis.

1.5 COORDINATION

A. Coordinate with placement of formwork, formed openings and other Work.

PART 2: PRODUCTS

2.1 REINFORCEMENT

A. Reinforcing Steel: ASTM A615, 60 ksi yield grade; deformed billet steel bars, unfinished.

B. Welded Steel Wire Fabric: ASTM A185 Plain Type; in flat sheets; unfinished. Rolled WWF shall not be acceptable for use on this job.

2.2 ACCESSORY MATERIALS

A. Tie Wire: Minimum 16 gage annealed type.

B. Chairs, Bolsters, Bar Supports, Spacers: Sized and shaped for strength and support of reinforcement during concrete placement conditions including load bearing pad on bottom to prevent vapor barrier puncture.

C. Special Chairs, Bolsters, Bar Supports, Spacers Adjacent to Weather Exposed Concrete Surfaces: Stainless steel type; size and shape as required.

2.3 FABRICATION

A. Fabricate concrete reinforcing in accordance with CRSI Manual of Practice ACI SP-66, ACI 318 ANSI/ASTM A184.

B. Locate reinforcing splices not indicated on drawings, at point of minimum stress. Indicate location of splices on shop drawings for approval by the Architect/Engineer.

PART 3: EXECUTION

3.1 HANDLING AND STORAGE

A. Provide proper equipment for safe off loading and handling of material.

B. Provide proper clean level storage area with proper skids to keep material clear of mud and water.

C. Keep material free from mud and other deleterious materials that will reduce bond and do not place any reinforcing bars that are bent, twisted, broken, pitted, or otherwise unsuitable for use on the project as determined by the architect.

D. All necessary field bending and straightening shall be accomplished without heating the material.

E. Cutting torch shall be used only for cut off of material but not for bending. All heat bent material will be rejected by the inspector and shall be promptly removed and replaced at no additional cost. Do not weld reinforcing bars.

3.2 PLACEMENT

A. Place, support and secure reinforcement against displacement. Do not deviate from required position. WWF laying on the metal deck and being manually pulled up into the fresh concrete during concrete placement operations shall not be acceptable.

B. Do not displace or damage vapor barriers. Damaged vapor barrier shall be removed and replaced at the direction of the Architect.

C. Accommodate placement of formed openings.

D. Maintain concrete cover around reinforcing as indicated on drawings.

E. Provide proper and adequate supports at maximum 3 ft x 3 ft spacing each way for support of wwf in the designated position. Tie off wwf sheets so that placement of the fresh concrete will not cause the wwf to be displaced. Pulling up of the wwf sheets into freshly placed concrete will not be an acceptable means of placing the wwf.

3.3 FIELD QUALITY CONTROL

A. Field inspection will be performed by the Architect.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION:

Work Included: The work required under this Section includes furnishing all labor, equipment, materials, and services necessary to complete the brick and masonry block work indicated on the Drawings, or specified herein.

QUALITY ASSURANCE:

Qualifications of Workmen: The masonry work shall be accomplished by experienced masons under the direct supervision of a journey man mason.

Codes and Standards: In addition to complying with all pertinent codes and regulations, material and workmanship shall comply with standards of the National Concrete Masonry Association and the Structural Clay Products Institute.

SUBMITTALS:

Samples: Within thirty (30) days after award of Contract, and before any brick or unit masonry materials are delivered to the job site, submit samples as required of the proposed brick and concrete masonry units to the Architect for his approval.

Certification: Prior to delivery of concrete unit masonry to the job site, deliver to the Architect a letter from the manufacturer of the concrete masonry units certifying that all such concrete masonry units delivered to the job site are in strict conformance with the provisions of this Section of these Specifications.

Sample Panels: Before the masonry work is started, approved sample panels approximately 5 feet long by 4 feet high and of the proper thickness shall be constructed at the job site, reviewed and approved by the Architect. One face shall show the workmanship, coursing, bond, mortar joint thickness, tooling of joints, and range of brick color and texture, all to be as specified or selected by the Architect/Engineer. Sample panel shall duplicate the wall assembly construction with the thru-wall flashing system. The finished work shall match the approved sample panel. Mock up to be maintained throughout construction for workmanship reference.

PRODUCT HANDLING:

Protection: Use all means necessary to protect brick and concrete masonry materials before, during, and after installation and to protect the installed work and materials of all other trades. Cover masonry blocks and brick to prevent excessive moisture absorption.

Portland Cement, lime, and/or pre-packaged mortar mixes shall be delivered to the site and stored in unbroken bags or other approved containers. These materials shall be stored in dry, weather tight sheds or enclosures with elevated floors, which will prevent the inclusion of foreign materials and damage by water or dampness. Masonry sand shall be delivered and stored in a manner to prevent inclusion of foreign material. Brick shall be delivered and stored on the job site on platforms or timbers, clear of the ground. Brick which are chipped, cracked, broken, or marred in other manner shall not be used where exposed to view.

PART 2: PRODUCTS

CONCRETE MASONRY UNITS:

General: All concrete masonry units shall be of sizes shown on Drawings, two-cell type, in gray or neutral color, and conforming with ASTM C-90 Standard Specification for Load Bearing Concrete Masonry Units. Provide all special shapes required or indicated, including 45-degree angled units. Provide units with bullnosed exterior corners at all exposed areas.

Standard Grey CMU:

Size: As indicated in the drawings

Color: Standard Color and Texture.

Minimum Net Area Average Compressive Strength: Average of three units 2000 PSI, no individual unit less than 1800 PSI.

Maximum Absorption: Absorption is less than 18 lbs/CF.

Weight Classification: Units shall be lightweight, blended with expanded shale, clay or slate, produced by the rotary kiln process and shall comply with ASTM C331 and ASTM C33 and shall be graded to assure consistent texture.

All units shall be free of organic impurities that will cause rusting, staining, or pop outs and shall contain no combustible material. All lightweight material to be manufactured by rotary kiln process. The use of coal burning power plants residue aggregate (bottom ash) or similar waste products will not be allowed.

The producer of the lightweight concrete masonry units shall furnish a letter of certification stating that all lightweight aggregate used In the manufacturer of the units was expanded shale, clay or slate produced by the rotary kiln process, Big River industries or approved equal conforming to ASTM C331 and ASTM C33.

Acceptable Manufacturers:
Adams Products Company - Oldcastle, Johnson Concrete Company or approved equal. Manufacturer other than approved listed shall provide submittal samples and received written approval by the Architect prior to bid.

BRICK:

Common brick to be modular size, nominal 2 ¼" x 4" x 8", and shall conform to ASTM C-62, grade MW, for use below grade and where not exposed.

Face brick shall be through body wire-cut, modular size nominal 2 ¼" x 4" x 8", and conform to ASTM C-69, grade SW, use for all exposed brick, unless otherwise noted. Provide brick as follows – to be confirmed after sample panel is laid:

- PROVIDE THREE BRICK COLORS; MATCH THE LIGHT, BROWN AND GREY BRICKS TO THE EXISTING THREE BRICK COLORS.

MORTAR:

General: Cementitious materials and aggregates shall be handled and stored in such a manner as to prevent deterioration or intrusion of foreign materials. Each material shall be of like brand; all sand shall be supplied from a single source; sand color to be approved by Architect.

Cement: Shall be Portland Cement, Type I or II, meeting Standard Specifications for Portland Cement (ASTM C-150).

Sand: Shall be clean, washed, and meet the requirements of Standard Specification for Aggregate or Masonry Mortar (ASTM C-144-76), with the gradation to satisfy paragraph 3, Grading, and with the omission of subparagraph 3.4.

Hydrated Lime: Shall meet the requirements of the Standard Specification for Hydrated Lime for Masonry Purposes (ASTM C-207), Type S.

Hydraulic Hydrated Lime: Shall meet the requirements of the Standard Specification for Hydraulic Hydrated Lime for Structural Purposes (ASTM C-141).

Color: Mortar shall be natural grey.

Water: Shall be potable.

Admixture-workability and air entraining admixtures may be utilized and shall conform to ASTM C-260.

Portland Cement: ASTM C-10, or Fed. Spec. SS-C-192, Type I, II, or III.

Aggregates: ASTM C-144, aggregate for masonry mortar.

Water: Shall be clean and free of deleterious amounts of acids, alkalies, or organic materials.

Plasticizing Agent: Shall be OMICRON by Master Builders, "Hydrocide Powder", by Sonneborn Bldg. Products, Inc., Subsidiary of DeSoto, Inc., "Hydrolox 400" by Chem-Masters Corp., or approved equal, and used in accordance with mfgrs. instructions.

Anti-Freeze Compounds: No anti-freeze liquid, salt, accelerating admixture for masonry mortar or other substance shall be in the mortar to lower the freezing point of the mixing water or accelerate the set of the cement.

Prepackaged Mortar Mixes: Prepackaged mortar mixes may be used with the prior approval of the Architect. The mortar mix shall be in accordance with the following specifications.

Type S Mortar Mix: The mortar mix shall have a compressive strength of 1800 psi minimum at 28 days when tested in accordance with ASTM C-270.

The mortar mix shall contain Portland Cement, hydrated lime, plasticizing admixtures, and/or hydraulic hydrated lime. Mortar mixes which contain other materials, including ground limestone ground slag or other cementitious and non-cementitious materials, are not acceptable.

Bag Label: Each bag of mortar mix shall have a printed label thereon which shall show the contents. Contents shall be described by the percent by volume of Portland Cement (ASTM C-150).

Hydrated Lime (ASTM C-207), Hydraulic Hydrated Lime (ASTM C-141), and Admixtures (ASTM C-260).

Instructions for mixing the mortar mix shall be clearly printed on the container. These instructions shall be by volumetric measurement and shall be limited to the method of mixing in proper proportions of washed sand to 1 bag of the prepackaged mortar mix with water to produce a flow of the proper consistency.

The mortar mix shall be composed only of Portland Cement, Hydrated lime and/or Hydraulic Hydrated Lime and workability admixtures within the following limits:

a. Maximum of 65% Portland Cement.

b. Minimum of 33% Hydrated Lime and/or Hydraulic Hydrated Lime.

c. Maximum of 2% Admixtures.

Air Content: The air content of the pre-packaged mortar mix shall be limited to 16% maximum when tested in accordance with ASTM C-91, Paragraphs I8 through 22.

Autoclave Expansion: Autoclave expansion of the mortar mix shall not exceed 1.0% when determined in accordance with ASTM Method C-151.

On-The-Job Mortar Mix:

Type S. Mortar shall have a compressive strength of 1800 psi minimum at 28 days. The mortar shall be proportioned within the following volumetric limits:

a. 1 part Portland Cement

b. 1/2 part Hydrated Lime

c. Not less than 2 1/4 and not more than 3 times the sum of the volumes of cement and lime used of washed sand measured in a damp, loose condition.

d. Plasticized per instructions of the mfgr., the quantity of which is not to exceed 2% by volume of the cement and lime combination.

Measurement and Mixing:

The method of measuring materials shall be by volume and shall be such that the specified proportions of the mortar materials can be controlled and accurately maintained. A measuring device to make consistent volume measurements shall be used throughout the project. Measurement of washed sand by shovel shall not be permitted.

Mortar Mixer shall be a paddle-type mechanical mixer. It shall be of such design and size to accommodate the mix without overloading, and be adequately powered to vigorously mix the ingredients.

The mortar mixer shall be charged in this order: Add approximately one-half the water required, one-half the washed sand, the cement and lime or prepackaged mortar mix), the remaining amount of washed sand, and then sufficient water to bring the mix to desired consistency. Mortar shall be mixed for a minimum of five minutes after all materials have been charged into the mixer with all batches being mixed to the same consistency.

Mortars that have stiffened because of evaporation of water from the mortar may be retempered by adding water as frequently as needed to restore the required consistency. Mortars shall be used and placed in their final position within 2 hours after mixing. When the temperature is over 80 degrees F., the mortar shall be used within 1 1/2 hours after mixing. Mortar not used within these time periods shall be discarded.

HORIZONTAL JOINT REINFORCEMENT STEEL:

Standards: All components shall be hot-dip galvanized to ASTM A 153 after fabrication.

Joint Reinforcement for CMU/Brick Veneer Cavity Wall: Truss type in CMU backup wall with hook and key eye; steel wire, hot dip galvanized to ASTM A 153 after fabrication, cold drawn steel wire conforming

to ASTM A82, 3/16 inch side rods with No.9 diagonal ties. Backup wall reinforcing shall be units no more than two (2) inches smaller in width than the wall thickness and shall be of deformed rods 3/16" side rods and 9 gage diagonal cross rods all galvanized. Veneer anchored with 3/16" keys and hooks, keys are 4-point flush-welded to backup wall rods. Total unit width shall be no more than two (2) inches smaller in width than the total wall thickness. Hooks shall be extended into veneer wythe 1" from exterior face. Provide Hohmann & Barnard LOX-ALL Adjusto-Flex-Mesh #AF-H Truss, Wire-Bond Series 700 adjustable tab, Dur-O-Eye by Dayton Superior or approved equivalent products.

Interior CMU wall reinforcing shall be Truss Type, as mfgd. by AA Wire Products Co., "DUR-O-WALL", Hohmann & Barnard "LOX-ALL", or other approved equal products. Provide prefabricated corners and intersections. Manufactured in accordance with Uniform Building Code Standard UBC 21-10, ASTM A951, ASTM A580 – Type 304, ACI 530/ASCE 5/TMS402 Building Code Requirements for Masonry Structures.

Reinforcing shall be units no more than two (2) inches smaller in width than the wall thickness and shall be of deformed rods 3/16" side rods and 9 gage diagonal cross rods all galvanized.

Provide prefabricated Tees and Corners at all wall intersections.

Interior block partitions shall be reinforced similar to exterior walls.

Spacing: Reinforcing for exterior and interior walls shall be 16" o.c. vertically beginning at the finish floor line and provide line of reinforcing one block course and one below all window heads and sills. Extend 16" beyond jambs on each side.

Lap all splices one full panel of reinforcing unit.

WALL TIES TO STRUCTURAL STEEL:

All exterior and interior masonry walls shall be tied to contiguous steel columns and beams with two-piece adjustable tie units such as, Hohmann and Barnard 359 Weld-On Ties; ¼" diameter x 8" long hot dip-galvanized bent wire, or equivalent column and beam anchors by Wire-Bond or Heckman, with Hohmann and Barnard VBT-Vee Byna-Tie 3/16" diameter hot-dip galvanized triangular wire ties or approved equal by Wire-Bond or Heckman.

Space wall ties to columns and beams at 16" o.c. maximum. Tie anchors shall be welded to structural steel with 4 fillet welds 1/8" x 3/4".

WALL TIES TO LIGHT GAGE METAL WALL STUDS

All exterior masonry veneer with metal stud back up shall be tied to metal studs with two piece adjustable tie units such as Heckman 12 gage 315-D, Hohmann and Barnard 12 gage DW-10HS, or 12 gage Wire-Bond Type III anchors with 3/16 diameter triangular wire ties or approved equal.

Space wall ties so that no tie is required to tie more than 2 2/3 square feet of masonry veneer or 24" oc maximum. Tie anchors shall be attached to metal studs with 2 - #12 self drilling self tapping screws.

FLASHING SYSTEM:

Thru-Wall Flashing system: 40 mil thick EPDM rubber membrane, containing no asphalt, equivalent to Sandell EPDM Rubber Thru-wall Flashing with Carlisle SecurTape splicing tape, and continuous pre-formed stainless steel drip edge. Install in compliance manufacturer's instructions.

Thru-wall flashing shall be completely secured into masonry joints or surface fully adhered throughout all wall assemblies, with all lap joints 100% sealed, in a complete continuous waterproof installation. Provide

all necessary accessory components for a complete assembly; to include required roll-on primers, spray adhesives, pressure sensitive adhesive tape, termination bars, etc. wherever necessary.

Locations: Wall flashing system shall be installed over all masonry opening heads and sills, over all lintels in exterior walls, at all weephole locations, continuous around columns, and elsewhere indicated on Drawings.

Build a mock-up installation into the masonry sample panel for review and approval by Architect.

Required Thru-Wall Flashing Accessories:

Carlisle SecurTape Splicing Tape: 3" wide x 100' long roll, double-sided, synthetic cured rubber EPDM adhesive tape, .030" thick. Features a clear poly release film. Apply to cleaned EPDM flashing lap seams and adhere tightly with roller. Primers and spray adhesives shall be applied to surfaces to receive adhesive tape.

Sando-Seal lap sealant: Apply to all exposed edges at surface applied conditions, eliminating any voids, pockets or depressions where moisture would accumulate.

Sandell's S-600 Primer: Manufacturer's special primer formulated to prepare surfaces for adhering flashing to surfaces with pressure sensitive adhesive tape.

Sandell's Self-Adhering End Dams: preformed rubberized asphalt with adhesive surface and release layer film. Install above and beneath all wall openings, all longitudinal ends of flashing, lintel ends, at column abutments, near building expansion joints, and all cavity wall conditions whenever flashing interruptions occur.

Sandell's Self-Adhering Corners: preformed rubberized asphalt with adhesive surface and release layer film. Install at exterior and interior corner conditions. Flashing membrane shall overlap pre-formed corners, adhere and form a continuous waterproof seal.

Pre-Formed Stainless Steel Drip Edge: Provide a continuous pre-formed stainless steel drip edge at all flashings. 28 gauge, dull finish Type 304 stainless steel, ASTM A-167. Minimum 1 5/8" wide with a 3/8" bent safety drip edge. Flashing membrane shall lap and adhere onto drip edge for a continuous waterproof assembly. Flashing membrane shall be terminated at ½" from face of finished wall surface.

Weeps: Plastic weep inserts shall be Cell Vent Weep-Hole Ventilator by DUR-O-WALL or equivalent. 3/8" thick x full head joint height equivalent to actual brick size height, color clear. Install at all wall flashing locations with weepholes indicated on Drawings.

PART 3: EXECUTION

SURFACE CONDITIONS:

Inspection:

Prior to all work of this Section, carefully inspect the installed work of all other trades and verify that all such work is complete to the point where this installation may properly commence.

Verify that concrete unit masonry may be completed in accordance with all pertinent codes and regulations, referenced standards, and the original design.

Discrepancies: In the event of discrepancy, immediately notify the Architect. Do not proceed with installation in areas of discrepancy until all such discrepancies have been completely resolved.

COORDINATION:

Carefully coordinate with all other trades to insure proper and adequate interface of the work of other trades with the work of this Section.

INSTALLATION OF MASONRY:

GENERAL: Lay up all walls in running bond, plumb, level, and true to the lines and dimensions indicated on the Drawings. Maintain uniform head and bed joint of 3/8" vertically and horizontally. Masonry Contractor shall use sled runner jointing tool wherever possible to maintain consistency.

Do not use chipped or broken units. If any such units are discovered in the finished wall, the Architect may require their immediate removal and replacement with new units at no additional cost to the Owner.

Bullnose CMU shall be begin at floor line, with first unit above floor at a bullnose corner being a bullnose unit, not a square corner unit.

Wetting of Brick: All brick shall be thoroughly wetted as necessary to reduce the rate of absorption of water a time of laying to not more than 0.7 of an ounce (20 grams per minute) per brick when placed on its flat side in 1/4" of water for one minute.

Brick Laying Technique:

All joints between brick shall be completely filled with mortar. Brick shall be laid in a full, lightly furrowed bed of mortar with the head joints completely filled by placing sufficient mortar on the end of the brick so that when the brick is shoved into place, the head joint will be filled. Buttering of face edge and then slushing will not be permitted. All joints, both interior and exterior shall be cut flush.

Disturbed Units: Where brick are disturbed or must be moved after the mortar has begun to lose its moisture, the brick and all adjacent mortar shall be removed and reset completely.

Tooling: Exterior and Interior brick joints shall be tooled to a uniform concave joint (unless otherwise noted) using a metal tool designed for that purpose, head joints first and then the bed joints. Interior CMU joints shall be tooled to a uniform concave joint. All joints shall be tooled at approximately the same degree of moisture content and firmness to achieve a uniform color and texture.

Where indicated provide raked tooled joints.

POINTING OF MASONRY:

At the completion of the masonry work, all holes in the exposed masonry shall be pointed. Defective joints shall be cut out and tuckpointed solidly with mortar. Pointing and tuckpointing shall be done with a pre-hydrated mortar. The mortar mix shall be controlled so that after curing of the mortar, no difference in texture or color exists with that of adjacent masonry. Where indicated, provide tuckpointing of existing masonry.

COLD WEATHER:

No bricklaying shall be performed unless the temperature of the surrounding air is 40 degrees F. and rising. The use of "anti-freeze" or accelerating admixtures is not permitted. Provide temporary protection of completed portions of masonry to insure a minimum 48 hours curing at a minimum 40 degrees F.

MASONRY OPENINGS:

The General Contractor and/or his masonry subcontractor shall be responsible for coordinating and building into all walls, the required openings necessary to permit the passage of duct work and piping by the mechanical contractors. These required openings shall be located and constructed as the work progresses. Knocking out large openings after work has been constructed will not be permitted. Structural lintels shall be furnished and installed by the General Contractor.

MASONRY CLEANING:

While laying the brick, good workmanship and job housekeeping practices shall be used so as to minimize the need for cleaning the brick. Protect the base of the wall from mud splashes and mortar droppings, protect the wall by setting scaffolds so that mortar is not deflected onto the wall, and at the end of each work day set the scaffolding boards so that they do not deflect rainfall onto newly laid masonry.

The bricklaying technique shall be such that mortar does not run down the face of the wall, or smear the mortar onto the brick face.

After the joints are tooled, cut off mortar tailings with the trowel and brush excess mortar burrs and dust from the face of brick. Do not bag or sack the wall, but use a bricklayer's brush made with medium soft hair.

Remove all large mortar particles with a hardwood scraper.

If after using the above outlined techniques, additional cleaning of the walls is found necessary, allow the walls to cure one month prior to and at the time the cleaning solution is applied.

Clean the wall only with an approved cleaning solution applied as recommended by the manufacturer. The solution shall be applied with a brush starting at the top of the wall. The use of any proprietary cleaning agents shall first be approved in writing by the manufacturer of the masonry being cleaned and the Architect. The concentration, method of application of the cleaning solution, and method of scraping shall be as outlined on the container by the manufacturer.

High pressure water and sandblasting shall not be used for cleaning.

Immediately after cleaning a small area, the wall shall be rinsed thoroughly with quantities of water.

Protect adjacent surfaces and materials during brick cleaning operations.

After the walls are cleaned, take necessary precautions to insure that other contractors and subcontractors do not damage or soil the walls. Mud protection around the base of walls shall be left in place until the final grading work is done.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Concrete masonry units.

B. Reinforcement, anchorage, and accessories.

1.2 REFERENCES

A. ACI 530-99 - Building Code Requirements for Masonry Structures.

B. ACI 530.1-99 - Specifications For Masonry Structures.

C. ASTM A82 - Cold-Drawn Steel Wire for Concrete Reinforcement.

D. ASTM A123 - Zinc (Hot-Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A525 - Steel Sheet, Zinc Coated, (Galvanized) by the Hot-Dip Process.

F. ASTM A615 - Deformed and Plain Billet Steel Bars for Concrete Reinforcement.

G. ASTM C55 - Concrete Building Brick.

H. ASTM C90 - Load-Bearing Concrete Masonry Units.

I. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Cold Weather Masonry Construction.

J. IMIAC - International Masonry Industry All-Weather Council: Recommended Practices and Guide Specification for Hot Weather Masonry Construction.

K. UL - Fire Resistance Directory.

1.3 SUBMITTALS

A. Shop Drawings: Indicate bars sizes, spacings, locations, reinforcement quantities, bending and cutting schedules, supporting and spacing devices for reinforcement, accessories.

B. Product Data: Provide data for masonry units and fabricated wire reinforcement and accessories.

C. Design Data: Indicate required mortar strength, masonry unit assembly strength in all planes, supportive test data.

D. Manufacturer's Certificate: Certify that Products meet or exceed specified requirements.

1.4 QUALITY ASSURANCE

A. Perform Work in accordance with ACI 530 and ACI 530.1.

B. Maintain one copy of each document on site.

1.5 QUALIFICATIONS

A. Manufacturer: Company specializing in manufacturing the Products specified in this section with minimum five years experience.

B. Installer: Company specializing in installing the Products specified in this section with minimum five years experience.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, protect, and handle products in workmanlike manner to avoid damage to units.

1.7 ENVIRONMENTAL REQUIREMENTS

A. Maintain materials and surrounding air temperature to minimum 40 degrees F 48 hours prior to, during, and 48 hours after completion of masonry work.

B. Cold Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Cold Weather Masonry Construction.

C. Maintain materials and surrounding air temperature to maximum 90 degrees F 48 hours prior to, during, and 48 hours after completion of masonry work.

D. Hot Weather Requirements: IMIAC - Recommended Practices and Guide Specifications for Hot Weather Masonry Construction.

PART 2: PRODUCTS

2.1 CONCRETE MASONRY UNITS

A. Hollow Load Bearing Block Units (CMU): ASTM C90, Type I - Moisture Controlled blended light weight with individual unit net area compressive strength of 1900 psi.

B. Solid Load-Bearing Block Units (CMU): ASTM C90, Type I - Moisture Controlled blended light weight with individual unit net area compressive strength of 1900 psi.

C. Concrete Brick Units: ASTM C55, Type I - Moisture Controlled blended light weight of same Grade, Type, and Weight as block units with individual unit net area compressive strength of 1900 psi.

D. Size and Shape: Nominal modular size. Provide special units for 90 and 45 degree corners, bond beams, lintels, and bullnosed corners.

2.2 REINFORCEMENT AND ANCHORAGE

A. Single and Double Wythe Joint Reinforcement: Truss type; steel wire, hot dip galvanized to ASTM A 153 after fabrication, cold drawn steel wire conforming to ASTM A82, 3/16 inch side rods with No.9 diagonal ties. Reinforcing shall be units no more than two (2) inches smaller in width than the wall thickness and shall be of deformed rods 3/16” side rods and 9 gage diagonal cross rods all hot dipped galvanized.

B. Joint Reinforcement for CMU/Brick Veneer Cavity Wall: Truss type in CMU backup wall; steel wire, hot dip galvanized to ASTM A 153 after fabrication, cold drawn steel wire conforming to ASTM A82, 3/16 inch side rods with No.9 diagonal ties. Backup wall reinforcing shall be units no more than two (2) inches smaller in width than the wall

thickness and shall be of deformed rods 3/16” side rods and 9 gage diagonal cross rods all galvanized. Veneer anchored with 3/16” keys and hooks, keys are 4-point flush-welded to backup wall rods. Total unit width shall be no more than two (2) inches smaller in width than the total wall thickness. Hooks shall be extended into veneer 1” from exterior face. Provide Hohmann & Barnard Adjusto-Flex-Mesh #AF-H Truss or equivalent.

C. Provide prefabricated Tees and Corners at all wall intersections.

D. Interior block partitions shall be reinforced similar to exterior backup walls.

E. Spacing: Reinforcing for exterior and interior walls shall be 16" o.c. vertically beginning at the finish floor line and provide line of reinforcing one block course and one below all window heads and sills. Extend 16" beyond jambs on each side.

F. Lap all splices one full panel of reinforcing unit.

2.3 WALL TIES TO STRUCTURAL STEEL:

A. All exterior and interior masonry walls shall be tied to contiguous steel columns and beams with two-piece adjustable tie units such as, Hohmann and Barnard 359 Weld-On Ties; ¼” diameter x 8” long hot dip-galvanized bent wire, or equivalent column and beam anchors by Wire-Bond or Heckman, with Hohmann and Barnard VBT-Vee Byna-Tie 3/16” diameter hot-dip galvanized triangular wire ties or approved equal by Wire-Bond or Heckman. Refer to Drawings General Notes.

B. Space wall ties to columns and beams at 16” oc maximum. Tie anchors may be welded to structural steel with 4 fillet welds 1/8” x 3/4”.

C. Reinforcing Steel: ASTM A615, 60 ksi yield grade, deformed] billet bars, uncoated finish.

D. Strap Anchors: As indicated on the drawings.

2.4 MORTAR AND GROUT

A. Mortar: Type "S".

B. Grout: Ready Mix 3000 psi pea gravel concrete as specified in Section 03300.

2.5 ACCESSORIES

A. Preformed Control Joints: Neoprene as noted on the drawings.

B. Joint Filler: Closed cell type as noted on the drawings.

C. Cleaning Solution: Non-acidic, not harmful to masonry work or adjacent materials.

2.6 LINTELS

A. Bond beam type and steel lintels as noted on the drawings. Provide steel dowels to top flanges of steel beam lintels as noted on drawings. Provide dowels in bottom flanges of beams beyond the masonry openings as noted on the drawings.

2.6 EMBEDDED BEAMS

A. Provide dowels in top and bottom flanges of beams embedded in masonry walls as noted on the drawings.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify items provided by other sections of work are properly sized and located.

C. Verify that built-in items are in proper location, and ready for roughing into masonry work.

3.2 PREPARATION

A. Direct and coordinate placement of metal anchors supplied to other Sections.

B. Provide temporary bracing during installation of masonry work. Maintain in place until building structure provides permanent bracing.

3.3 COURSING

A. Establish lines, levels, and coursing indicated. Protect from displacement.

B. Maintain masonry courses to uniform dimension. Form vertical and horizontal joints of uniform thickness.

C. Concrete Masonry Units:

1. Bond: Running.

2. Coursing: One unit and one mortar joint to equal 8 inches.

3. Mortar Joints: Concave.

3.4 PLACING AND BONDING

A. Lay solid masonry units in full bed of mortar, with full head joints, uniformly jointed with other work.

B. Lay hollow masonry units with face shell bedding on head and bed joints.

C. Buttering corners of joints or excessive furrowing of mortar joints are not permitted.

D. Remove excess mortar as Work progresses.

E. Interlock intersections and external corners unless otherwise noted on the drawings.

F. Do not shift or tap masonry units after mortar has achieved initial set. Where adjustment must be made, remove mortar and replace.

G. Perform job site cutting of masonry units with proper tools to provide straight, clean, unchipped edges. Prevent broken masonry unit corners or edges.

H. Cut mortar joints flush where wall tile is scheduled, cement parging is required, resilient base is scheduled, or bitumen damp proofing is applied.

I. Isolate masonry partitions from vertical structural framing members with a control joint as indicated on drawings.

3.5 REINFORCEMENT AND ANCHORAGE

A. Install horizontal joint reinforcement 16 inches oc.

B. Place masonry joint reinforcement in first and second horizontal joints above and below openings. Extend minimum 32 inches each side of opening.

C. Place joint reinforcement continuous in first and second joint below top of walls.

D. Lap joint reinforcement ends minimum one full panel.

E. Support and secure reinforcing vertical bars from displacement with wire rod positioners as noted on the drawings. Maintain bars position within 1/2 inch of indicated position.

F. Embed anchors attached to structural steel members. Embed anchorages in every second block joint.

3.6 LINTELS

A. Install reinforced bond beam unit masonry lintels over openings where steel lintels are not scheduled.

B. Do not splice reinforcing bars in lintels.

C. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of indicated position.

D. Place and consolidate grout fill without displacing reinforcing.

E. Allow masonry lintels to attain specified strength before removing temporary supports.

F. Maintain minimum 8 inch bearing on solid masonry or steel on each side of opening.

G. Refer to drawings for placement of control joints at ends of lintels.

3.7 GROUTED COMPONENTS

A. Reinforce 8” wide bond beams with 1 - #5 top bar and, and 1 - #5 bottom bar 1 inch clear from bottom web. Reinforce 12” wide bond beams with 2 - #5 top bars and, and 2 - #5 bottom bars 1 inch clear from bottom web.

B. Reinforce interior walls with #5 vertical bars spaced at 48" oc unless otherwise noted on the drawings. Place bars in maximum 6'-8" lifts. Lap splices 32", unless otherwise noted on the drawings.

C. Reinforce exterior walls with #6 vertical bars spaced at 24" oc unless otherwise noted on the drawings. Place bars in maximum 6'-8" lifts. Lap splices 36", unless otherwise noted on the drawings.

D. Place vertical bars in center of wythe.

E. Lap splices in horizontal bars minimum 40 bar diameters. Stagger splices in adjacent bars. Dowel horizontal bars through HSS Steel column as noted on the drawings.

F. Support and secure reinforcing bars from displacement. Maintain position within 1/2 inch of dimensioned position.

G. Place and consolidate grout fill in 80” maximum lifts in cores containing bars without

displacing reinforcing. Use water reducing plasticizers as required to maintain proper slump for grouting cells 100% solid.

H. At lintel bearing locations, fill masonry cores with grout for a minimum of 24 inches each side of opening from lintel bearing down to finish floor.

I. Grout all masonry units 100% solid below finish floor and other locations noted on the drawings.

J. Lay masonry units with core cells vertically aligned.

K. Permit mortar to cure 7 days before placing grout.

L. Reinforce masonry unit cores and cavities with reinforcement bars and grout as indicated on drawings.

M. Retain vertical reinforcement in position with wire rebar positioners spaced at 48" maximum intervals full height of masonry.

N. Wet masonry unit surfaces in contact with grout just prior to grout placement.

O. When grouting is stopped for more than one hour, terminate grout 1-1/2 inches below top of upper masonry unit to form a positive key for subsequent grout placement.

P. High Lift Grouting: High lift grouting shall not be used for this project.

3.8 CONTROL AND EXPANSION JOINTS

A. Continue horizontal joint reinforcement through control joints.

B. Do not continue horizontal joint reinforcement through expansion joints.

C. Install preformed control joint device in continuous lengths. Seal butt and corner joints in accordance with manufacturer's instructions.

D. Size control joint in accordance with Section 07900 for sealant performance.

E. Form expansion joints as detailed.

3.11 BUILT-IN WORK

A. As work progresses, install built-in metal door and glazed frames, fabricated metal frames, window frames, wood nailing strips, anchor bolts, and other items to be built-in the work and furnished by other sections.

B. Install built-in items plumb and level.

C. Bed anchors of metal door [and glazed] frames in adjacent mortar joints. Fill frame voids solid with grout. Fill adjacent masonry cores with grout minimum 24 inches from framed openings.

D. Do not build in organic materials subject to deterioration.

3.12 TOLERANCES

A. Maximum Variation From Alignment: 1/4 inch.

B. Maximum Variation From Unit to Adjacent Unit: 1/32 inch.

C. Maximum Variation from Plane of Wall: 1/4 inch in 10 ft and total 1/2 inch overall.

D. Maximum Variation from Plumb: 1/4 inch per story.

E. Maximum Variation from Level Coursing: 1/8 inch in 3 ft and 1/4 inch in 10 ft; 1/2 inch in 30 ft.

F. Maximum Variation of Joint Thickness: 1/8 inch in 3 ft.

3.13 CUTTING AND FITTING

A. Saw cut or core drill for neat fit at chases, pipes, conduit, sleeves. Coordinate with other sections of work to provide correct size, shape, and location. Fill space around penetrating devices with approved firestop materials.

B. Obtain approval prior to cutting or fitting masonry work not indicated or where appearance or strength of masonry work may be impaired.

3.14 CLEANING

A. Clean work with non acidic and non staining high pressure wash.

B. Remove excess mortar and mortar smears as work progresses.

C. Replace defective mortar. Match adjacent work.

D. Clean soiled surfaces with cleaning solution.

E. Use non-metallic tools in cleaning operations.

3.15 PROTECTION OF FINISHED WORK

A. Protect finished Work form damage.

B. Without damaging completed work, provide protective boards at exposed external corners which may be damaged by construction activities.

END OF SECTION

THE BRICK INDUSTRY ASSOCIATION

TECHNICAL NOTES on Brick Construction

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7B

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Water Penetration Resistance - Construction and Workmanship

Abstract: This *Technical Note* covers essential construction practices needed to assure water-resistant brick masonry. Procedures for preparing materials to be used in brick construction are recommended, including proper storage, handling and preparation of brick, mortar, grout and flashing. Good workmanship practices are described, including the complete filling of all mortar joints, tooling of mortar joints for exterior exposure and covering unfinished brick masonry walls to protect them from moisture.

Key Words: air space, brick, construction, flashing, initial rate of absorption, joints, mortar, tooling, weeps, workmanship.

SUMMARY OF RECOMMENDATIONS:

General
- Store materials on the job site to avoid wetting and contamination
- For drainage walls, keep the air space free of excessive mortar droppings
- Do not disturb newly laid masonry
- Cover tops of unfinished walls until adjacent construction protects them from water entry

Brick
- Pre-wet brick with a field measured initial rate of absorption (IRA) exceeding 30 g/min•30 in.^{2} (30 g/min•194 cm^2)

Mortar
- When mixing mortar, use accurate batching measurements and maximum amount of water that produces a workable mortar
- For brick with an IRA exceeding 30 g/min•30 in.^{2} (30 g/min•194 cm^2), increase water or maximize water retention by increasing lime proportions within limits of ASTM C 270
- For brick with an IRA lower than 5 g/min•30 in.^{2} (5 g/min•194 cm^2), reduce water or minimize water retention by decreasing lime proportions within limits of ASTM C 270

Joints
- In exterior wythes, completely fill all mortar joints intended to have mortar
- Minimize furrowing of bed joints and prohibit slushing of head joints
- Fill collar joints completely with grout or mortar, preferably grout; do not slush collar joints
- Tool mortar joints when thumbprint hard with a concave, "V" or grapevine jointer

Flashing and Weeps
- Do not stop flashing behind face of brickwork
- Where required, turn up flashing ends into head joint a minimum of 1 in. (25.4 mm) to form end dams
- Lap continuous flashing pieces at least 6 in. (152 mm) and seal laps
- Where installed flashing is pierced, make watertight with sealant or mastic compatible with flashing
- Install weeps immediately above flashing

INTRODUCTION

The best design, detailing and materials will not compensate for poor construction practices and workmanship. Proper construction practices, including preparation of materials and workmanship, are essential to achieve a water-resistant brick masonry wall.

This *Technical Note* discusses construction techniques and workmanship and is the third in a series of *Technical Notes* addressing water penetration resistance of brick masonry. Other *Technical Notes* in the series address brickwork design and details (7), materials (7A) and condensation (7C and 7D). Maintenance of brick masonry is addressed in *Technical Note* 46. All of these items are essential to obtain water-resistant brick masonry walls.

PREPARATION OF MATERIALS

Preparation of masonry materials before bricklaying begins is very important. Specific procedures must be followed to ensure satisfactory performance and avoid future problems. Preparation includes material storage, mixing mortar and grout and, in some cases, wetting the brick.

Storage of Materials

All materials at the jobsite should be stored to avoid contamination. Masonry units, mortar materials, ties and reinforcement should be stored off the ground, preferably in a dry location. In addition, all materials should be covered with tarpaulins or other weather-resistant materials to protect them from the elements.

Wetting Brick

Brick with an initial rate of absorption (IRA) greater than 30 g/min•30 in.² (30 g/min•194 cm²) at the time of laying tend to draw too much moisture from the mortar before initial set. As a result, construction practices should be altered when using brick with high IRA to achieve strong, water-resistant masonry. The IRA of brick in the field will typically be less than that reported in laboratory tests. Laboratory test results may be used to determine if measuring IRA in the field is necessary. ASTM C 67, Test Methods for Sampling and Testing Brick and Structural Clay Tile, includes a standard procedure for measuring IRA in the field.

A crude method of indicating whether brick need to be wetted prior to placement consists of drawing, with a wax pencil, a circle 1 in. (25.4 mm) in diameter on the brick surface that will be in contact with the mortar. A quarter can be used as a guide for the circle. With a medicine dropper, place 20 drops of water inside this circle and note the time required for the water to be absorbed. If the time exceeds 1½ minutes, the brick should not need wetting; if less than 1½ minutes, adjustments to typical construction practice are recommended.

Specification for Masonry Structures [Ref. 4] requires that brick with an IRA exceeding 30 g/min•30 in.² (30 g/min•194 cm²) be wetted prior to laying to produce an IRA less than 30 g/min•30 in.² (30 g/min•194 cm²) when the units are placed. However, execution of this method may be impractical on large-scale construction projects and the contractor may consider other alternatives, as discussed in the following section, Mixing of Mortar and Grout.

If brick are to be wetted, the method of wetting is very important. Sprinkling or dipping the brick in a bucket of water just before laying would produce the surface wet condition which may not be sufficient, as shown in Figure 1b. The units should have a saturated interior, but be surface dry at the time of laying, as shown in Figure 1d.

Satisfactory procedures for wetting the brick consist of letting water run on the cubes or pallets of brick, or placing them in a large tank of water. This should be done the day before the units are laid, or not later than several hours before the units will be used so that the surfaces have an opportunity to dry before the brick are laid. Wetting low-absorption brick or excessive wetting of brick may result in saturation, as shown in Figure 1c. This can cause “bleeding” of the mortar joints and “floating” of the brick.

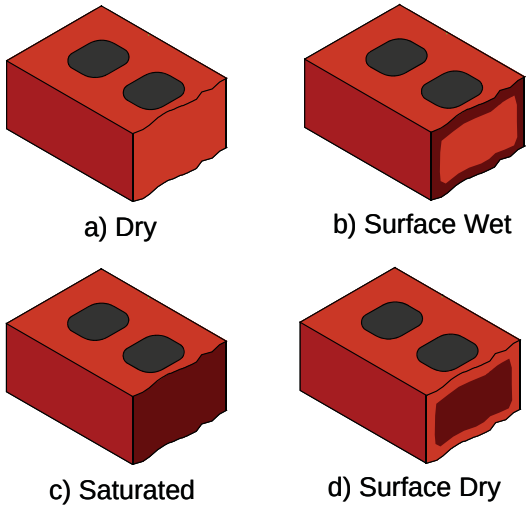

Figure 1
Moisture Content of Brick

Mixing of Mortar and Grout

Typically, a high water content in the mortar is necessary to obtain complete and strong bond between mortar and brick. In general the mortar should be mixed with the maximum amount of water that produces a workable mortar. Factors such as the jobsite environment and the IRA of the brick should be considered when determining the proper amount of water to include in the mortar.

Mortar to be used with brick that have an IRA greater than 30 g/min•30 in.² (30 g/min•194 cm²) should be mixed to maximize water retention by increasing mixing water or lime content within the limits of ASTM C 270. This is particularly important when pre-wetting the brick to reduce their IRA is impossible or impractical. Admixtures designed to increase the water retention of the mortar may also be used to improve the compatibility of mortar with high IRA brick. Only admixtures with test data showing no deleterious effects should be used.

Mortar for use with brick that have an IRA less than 5 g/min•30 in² (5 g/min•194 cm²) should be mixed with reduced amounts of water or lime to minimize water retention. Lime proportions should remain within the limits of ASTM C 270.

When brick with widely different absorption rates are used together in brickwork, it is important to maintain the correct water content in the mortar used with the different brick.

All cementitious materials and aggregates must be mixed for at least 3 minutes and not more than 5 minutes in a mechanical batch mixer. If, after initial mixing, the mortar stiffens due to the loss of water by evaporation, addi-

tional water should be added and the mortar remixed (retempered). All mortar should be used within 2½ hr (2 hr in hot weather conditions, see *Technical Note* 1) of initial mixing and grout should be used within 1½ hour of introducing water into the mix. No mortar or grout should be used after it has begun to set.

One of the most common problems with mortar is oversanding. Oversanded mortar is harsh, unworkable and results in poor extent of bond and reduced bond strength, thus increasing the potential for water penetration problems. The cause of oversanding is frequently the use of the shovel method of measuring the sand. The amount of sand that a shovel will hold varies depending on the moisture content of the sand, the person doing the shoveling and the different size of shovels used on the jobsite. To alleviate this problem, proper batching methods must be used. Measurement of sand by shovel should not be permitted without periodically gauging the shovel count using a bucket or box of known volume. *Technical Note* 8B provides detailed guidelines for various methods of more accurately batching mortar.

Blending of Brick

While not related to water penetration resistance, blending of brick at the jobsite is an important preparation task related to workmanship and the acceptable appearance of brickwork. Because brick is made from natural materials that vary in physical properties, variations in color may occur between production runs and occasionally within the same run. Modern manufacturing processes use automatic equipment which may not permit inspection of each brick, also resulting in minor color and texture variations. For these reasons, straps of brick from different cubes should be placed together around the wall. The mason should then select brick from adjacent straps when laying a given section of brickwork. By blending the brick throughout the wall in this manner, the effect of potential color variations on the finished brickwork is minimized.

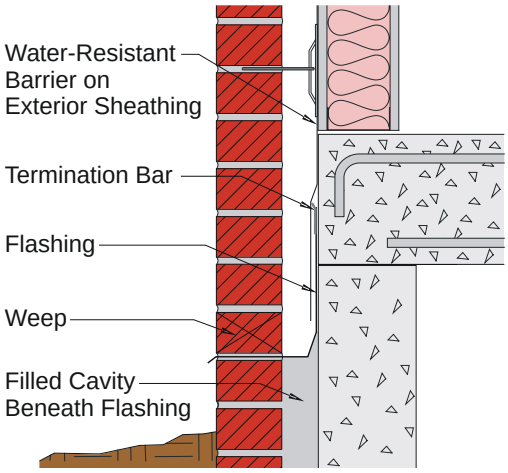

Figure 2
Wall Base Flashing Detail

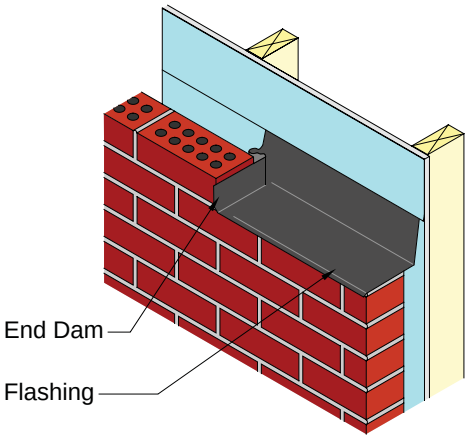

Figure 3
End Dam Detail

WORKMANSHIP

The importance of good workmanship to attain quality brickwork cannot be overemphasized. While design and the quality of materials contribute to the water penetration resistance of brickwork, workmanship is a highly important factor in the construction of water-resistant masonry.

Placing Flashing and Weeps

Flashing must be installed properly and integrated with adjacent materials to form an impervious barrier to moisture movement. The flashing should be wide enough to start outside the exterior face of the brick wythe, extend across the cavity, and turn up vertically against the backing or interior wythe at least 8 in. (203 mm). The top (vertical) edge should be placed in a mortar joint of the backing wythe, in a reglet in concrete backing, or attached to sheathing with a termination bar, as shown in Figure 2. Sections of flashing are to be overlapped at least 6 in. (152 mm) and the lap sealed with a compatible adhesive. Water-resistant sheet membranes should overlap the flashing in a shingle fashion by at least 6 in. (152 mm).

Flashing that is placed so that the outside edge projects from the face of the wall may be cut flush with the face of the brickwork. In no circumstances should the flashing be stopped behind the face of the brickwork. Continuity at corners and returns is achieved by cutting and folding straight sections or using preformed corner pieces. Discontinuous flashing should terminate with an end dam in a head joint, rising at least 1 in. (25.4 mm) as shown in Figure 3.

Flashing must be placed without punctures or tears. Openings created for reinforcement or anchors must be closed with a compatible sealant. Protection may be needed around bolts fastening shelf angles to the structure.

Weeps are required, and should be formed in mortar joints immediately above the flashing. Open head joints, formed by leaving mortar out of a joint, are the recommended type of weep. Open head joint weeps should be at least 2 in. (51 mm) high. Weep openings are permitted by most building codes to have a minimum diameter of 3/16 in. (4.8 mm). The practice of specifying the installation of weeps one or more courses of brick above the flashing can cause a backup of water and is not recommended. Noncorrosive metal, mesh or plastic screens can be installed in open head joint weeps if desired.

Spacing of open head joint weeps at no more than 24 in. (610 mm) on center is recommended. Spacing of wick and tube weeps is recommended at no more than 16 in. (406 mm) on center. Weep spacing is permitted by most building codes up to 33 in. (838 mm) on center. If other than an open head joint weep is used, be sure the weep is clear of all mortar to allow the wall to drain (see *Technical Note* 21C). Rope wicks should be flush with, or extend 1/2 in. (12.7 mm) beyond the face of the wall to promote evaporation. The rope should continue into the bottom of the air space, placed along the back of the brick and be at least 16 in. (406 mm) long.

Filling Mortar Joints

To reduce water penetration, there is no substitute for proper filling of all mortar joints that are designed to receive mortar. Improperly filled mortar joints can result in leaky walls, reduce the strength of masonry, and may contribute to disintegration and cracking due to water penetration and subsequent freezing and thawing.

A uniform bed of mortar should be spread over only a few brick, and furrowed lightly, if at all. Filled joints result when plenty of mortar is placed on the end of the brick to be laid and it is shoved into place so that mortar is squeezed out of the top of the head joint, as shown in Photo 1. After placement, mortar squeezed out of bed joint should be cut off prior to tooling, as shown in Photo 2. When placing closures, plenty of mortar is needed on the ends of brick in place and on the ends of the brick to be laid. The closure should be shoved into place without disturbing brick on either side, as shown in Photo 3.

Bed Joints. A bed joint is the horizontal layer of mortar on which a brick is laid. The length of time between placing the bed joint mortar and laying the succeeding brick influences the resulting bond. If too long a time elapses, poor extent of bond will result. Brick should be laid within 1 minute or so after the mortar is placed.

For solid brick, bed joints should be constructed without deep furrowing of the mortar, as full bed joints (covering the entire bedding surface) are an inherent requirement for water-resistant brick masonry construction. For hollow brick, bed joints may be laid with face shell bedding (mortar placed only on the front and back face shells). Both face shells must be completely covered with mortar.

Photo 1
Shoving Brick into Place

Photo 2
Cutting Excess Mortar

Photo 3
Placing the Closure

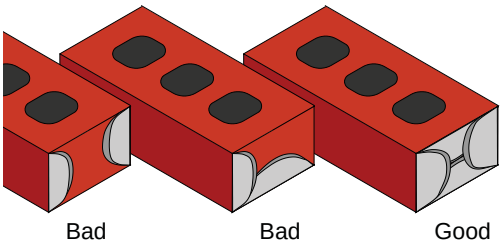

Figure 4
Head Joints

Head Joints. A head joint, sometimes called a cross joint, is the vertical mortar joint between two brick. For both solid and hollow brick it is important that head joints be completely filled. The best head joints are formed by completely buttering the ends of the brick with mortar and shoving the brick into place against previously laid brick.

Photo 4
Concave Mortar Joints

Photo 5
"V" Mortar Joints

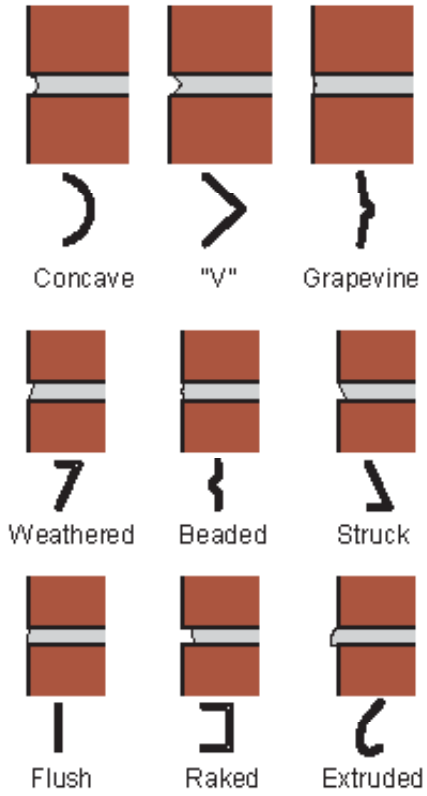

Figure 5
Typical Mortar Joints

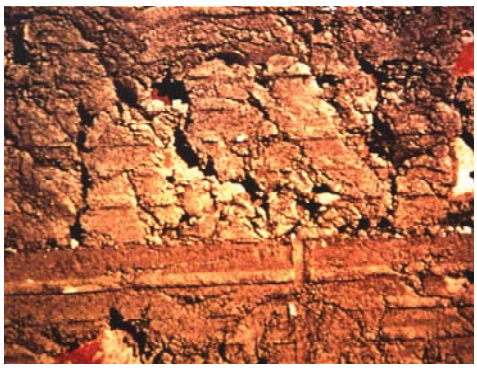

Photo 6
Poorly Filled Collar Joint

"Slushing" ("throwing" mortar into the joint with the edge of a trowel) does not adequately fill joints or compact the mortar, resulting in joints that are less resistant to water penetration. The results of head joint forming are shown in Figure 4.

Tooling of Mortar Joints

Proper tooling, or "striking", of mortar joints helps seal the wall surface against moisture penetration. Mortar joints should be tooled when they are "thumbprint" hard, (pressing the thumb into the mortar leaves an indentation, but no mortar is transferred to the thumb) with a jointer slightly larger than the joint. It is important that joints are tooled at the appropriate time as this affects both their effectiveness and appearance. Joints that are tooled too early often smear and result in rough joints. If tooling is delayed too long the surface of the joint cannot be properly compressed and sealed to the adjacent brick. Each portion of the completed brickwork should be allowed to set for the same amount of time before tooling in order to ensure a uniform mortar shade. Early tooling often results in joints of a lighter color. Later tooling results in darker shades.

Concave, "V" and grapevine joints best resist water penetration in exterior brickwork. These joints produce a more dense and weathertight surface, as the mortar is pressed against the brick, as shown in Photos 4 and 5. For interior masonry work, other joints such as the weathered, beaded, struck, flush, raked or extruded joints shown in Figure 5 can also be used.

Collar Joints

The vertical, longitudinal joint between wythes of masonry is called a collar joint. The manner in which these joints are filled is very important. Grouting is the most effective method of ensuring that collar joints are completely filled. However, grouting spaces less than ¾ in. (19.1 mm) is not permitted. Mortar protrusions (fins) that extend more than ½ in. (12.7 mm) into a cell or cavity that will be grouted must be removed prior to grouting. For mortar-filled collar joints, the outer face of the inner masonry wythe should be parged and the back of brick in the exterior wythe buttered in order to fill the collar joint.

"Slushing" of collar joints is not effective since it does not completely fill all voids in the joint, as shown in Photo 6. Frequently, the mortar is

caught and held before it reaches the bottom of the joint, leaving openings between the face brick and the backing. Even when this space is filled, there is no way to compact the mortar. The mortar does not bond with the brick over its entire surface and channels are left between the mortar and the brick. Some of these channels may allow water to reach the back of the wall. A properly constructed collar joint is completely filled with grout or mortar.

Parging

Parging is the process of applying a coat of portland cement mortar to masonry. Parging the outer face of the inner wythe of a multiwythe wall with Type M or S mortar as damp proofing may help resist rain penetration and can also reduce air leakage. Membranes or liquid-applied materials usually provide superior performance to parging, which will crack if the wythe cracks. However, parging can provide a smooth base for these materials. If parging alone is to resist water penetration, proper curing is necessary to reduce shrinkage cracks. Parging the back side of the exterior wythe is not recommended for drainage-type walls, as this may result in more debris in the air space or break the brick/mortar bond.

The face of the wall to be parged must not have any mortar protrusions. Protruding mortar can cause bond breaks in the parge coat, resulting in a leaky wall. When applied in multiple layers, each should be a minimum thickness of ¼ in. (6.4 mm). The first coat should be allowed to partially set, roughened, and allowed to cure for 24 hours. It is then moistened for application of the second coat. The parged surface should be troweled smooth so that it sheds water easily. When completed in adjacent areas, the edges of the parging should be feathered and new parging should overlap existing parging by a minimum of 6 in. (152 mm). Lap joints should be spaced no closer than 6 feet (1.83 m).

Keeping Air Spaces Clean

In a drainage wall system, such as a cavity wall or an anchored veneer wall, it is essential that the air space be kept clean. If it is not, mortar droppings may clog the weeps, protrusions may span the air space and water penetration to the interior may occur.

To the greatest extent possible, mortar droppings should be prevented from falling into the air space or cavity. An aid to prevent this is to bevel the bed joint away from the air space or cavity, as shown in Figure 6. When brick are laid on a beveled bed joint, a minimum of mortar is squeezed out of the joint, as shown in Photo 7. The mortar squeezed from the joints on the air space or cavity side may be troweled onto the units. This same procedure may be used for laying the exterior wythes of grouted and reinforced brick cavity walls.

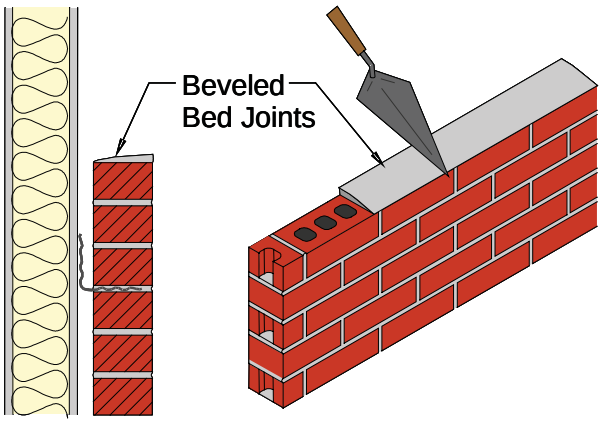

Figure 6
Beveled Bed Joints

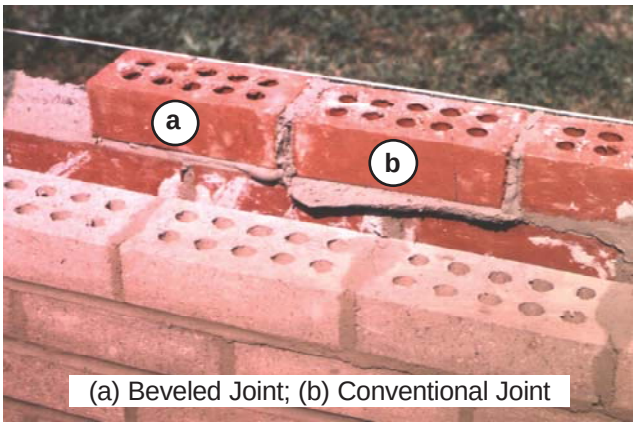

Photo 7
Beveled and Conventional Mortar Joints

Another method allows access to the base of the cavity for cleaning. When the brickwork is initially constructed, every third brick or so in the course above the flashing of the exterior wythe is omitted. Once the brickwork is complete, mortar droppings at the base of the cavity can be easily removed and weeps provided when the omitted brick are placed in the wall with mortar.

Alternately, a wooden or metal strip, slightly smaller than the cavity width, can be placed in the air space. This strip rests on the wall ties as the wall is built. Wire or rope is attached to the strip so the strip can be lifted out as the mason builds the wall. Care should be taken when raising or removing the strip to not disturb the brickwork.

Drainage materials and mortar dropping control devices may also be used to keep the air space adjacent to the weeps free from mortar. Use of these devices does not guarantee that bridging of the air space will not occur, thus the amount of mortar droppings should be limited as much as possible.

Disturbance of Newly Laid Masonry

Newly laid brick should never be pushed, shoved, tapped or otherwise disturbed once they are laid in their final position and the mortar has begun to set. Any disturbance at this point will break the bond and may lead to a leak. If adjustments are necessary, the incorrectly placed brick should be removed and re-laid in fresh mortar.

Protection of Unfinished Brickwork

Covering of masonry walls at the end of each work day, and especially in times of inclement weather, is essential for satisfactory performance. Covering unfinished walls with tarpaulins or other water-resistant materials, securely tied or weighted in position, should be rigorously enforced. Mortar boards, scaffold planks and light plastic sheets weighted with brick should not be accepted as suitable cover. Metal clamps, similar to bicycle clips, are commercially available in a variety of sizes to meet various wall thicknesses. These are used in conjunction with plastic sheets or water-repellent tarpaulins and offer excellent protection for extended periods of time.

Tops of walls should also be covered after the mason's work is finished if a permanent coping is not attached immediately after the brickwork is completed. Protection of openings in brickwork such as those for windows, movement joints, etc. should also be considered as they may allow moisture ingress from rain and snow and can lead to moisture-related problems such as efflorescence, and in some cases could affect the final mortar color.

SUMMARY

Quality construction practices and good workmanship are essential to achieve brickwork that is resistant to water penetration. This *Technical Note* does not cover all construction practices, but describes material storage and preparation procedures, construction practices and installation techniques that are indicative of high quality and, when combined with proper design, detailing and materials, result in brickwork that is resistant to water penetration.

> *The information and suggestions contained in this* Technical Note *are based on the available data and the combined experience of engineering staff and members of the Brick Industry Association. The information contained herein must be used in conjunction with good technical judgment and a basic understanding of the properties of brick masonry. Final decisions on the use of the information contained in this* Technical Note *are not within the purview of the Brick Industry Association and must rest with the project architect, engineer and owner.*

REFERENCES

1. *The BDA Guide to Successful Brickwork*, Second Edition, The Brick Development Association, Arnold (a member of the Hodder Headline Group), London, England, 2000.
2. Drysdale, R.G., Hamid, A.A., and Baker, L.R., *Masonry Structures: Behavior and Design*, Second Edition, The Masonry Society, Boulder, CO, 1999.
3. Koski, J.A., "Waterproof the Backup Wythe," *Masonry Construction*, August 1992.
4. *Specification for Masonry Structures*, ACI 530.1-05/ASCE 6-05/TMS 602-05, The Masonry Society, Boulder, CO, 2005.

RELATED DOCUMENTS:

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

PART 1: GENERAL

SECTION INCLUDES

A. Structural steel columns, beams, lintels, trusses, rod bracing, and other steel framing members.

B. Base plates, column anchor bolts,

C. Steel to steel connection bolts.

REFERENCES

A. ASTM A36, A992 –Structural Steel.

B. ASTM A53 – Grade B Hot-Dipped, Zinc-coated Welded and Seamless Steel Pipe.

C. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

D. ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products.

E. ASTM A153 - Zinc Coating (Hot Dip) on Iron and Steel Hardware.

F. ASTM A307 - Carbon Steel Externally Threaded Standard Fasteners.

G. ASTM A325 - High Strength Bolts for Structural Steel Joints.

H. ASTM A490 - Quenched and Tempered Alloy Steel Bolts for Structural Steel Joints.

I. ASTM A500 – Grade B Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Round and Rectangular Shapes.

J. ASTM A501 - Hot-Formed Welded and Seamless Carbon Steel Structural Tubing.

K. ASTM A572 - High Strength Low Alloy Columbium-Vanadium Steel of Structural Quality.

L. ASTM F1554 – Anchor Rods

M. AWS A2.0 - Standard Welding Symbols.

N. AWS D1.1 - Structural Welding Code.

O. AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings – Allowable Stress Design..

P. AISC - Specification for Architectural Exposed Structural Steel.

Q. SSPC - Steel Structures Painting Council.

SUBMITTALS

A. Shop Drawings:

1. Indicate dimensions, elevations, profiles, sizes, spacing, and locations of structural members, miscellaneous members, attachments, and fasteners.

2. Connections detailed fully.

3. Indicate welded connections with AWS A2.0 welding symbols. Indicate net weld lengths and returns.

4. All truss connections shall be fully welded all around. All truss members shall be fully closed so as not to allow moisture to collect inside.

B. Manufacturer's Mill Certificate: Certify that products meet or exceed specified requirements.

C. Mill Test Reports: Submit indicating structural strength, destructive and non-destructive test analysis.

D. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

QUALITY ASSURANCE

A. Fabricate structural steel members in accordance with AISC - Specification for the Design, Fabrication and Erection of Structural Steel for Buildings.

B. Perform Exposed Work in accordance with AISC - Specification for Architectural Exposed Structural Steel.

QUALIFICATIONS

A. Fabricator: Company specializing in performing the work of this Section with minimum five years documented experience.

B. Design connections not detailed on the Drawings under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of North Carolina.

FIELD MEASUREMENTS

A. Verify that field measurements are as shown on Drawings.

PART 2 PRODUCTS

MATERIALS

A. Structural Steel Wide Flange Members: Certified to ASTM A992 (Fy = 50 ksi).

B. Plates, Angles, Bars: Certified to ASTM A36 (Fy = 36 ksi)

C. Rods: to ASTM A36 (Fy = 36 ksi)

D. Structural Tubing: ASTM A500, Grade B (Fy = 46 ksi).

E. Pipe: ASTM A53, Grade B (Fy = 35 ksi).

F. Bolts, Nuts, and Washers: ASTM A325.

G. Anchor Rods: F1554 Grade 50.

H. Welding Materials: AWS D1.1; type required for materials being welded.

I. Headed Shear Studs: ASTM A108 Type B, Fu = 60 ksi.

J. Grout: Non-shrink type, pre-mixed compound consisting of non-metallic aggregate, cement, water reducing and plasticizing additives, capable of developing a minimum compressive strength of 7000 psi at 7 days.

K. Shop Applied Primer - Epoxy Finished Members: One coat of green solvent based inorganic zinc. Shop primer shall be certified to be compatible with the intumescent fireproofing and UL assemblies, and with epoxy systems as applicable and specified. Reference Section 09900.

L. Shop Applied Primer – Exposed and Intumescent Fireproofed Members: One coat of grey oxide alkyd. Shop primer shall be certified to be compatible with the intumescent fireproofing and UL assemblies, as applicable and specified. Reference Section 09900.

M. Shop Applied Primer – Cementitious Spray-on Fireproofed Members: Not required to be primed. Shop primer shall be certified to be compatible with the fireproofing UL assemblies.

FINISH

A. Prepare structural component surfaces required to be shop primed in accordance with SSPC SP-2, SP-3 or SP-6 as applicable for the final finish type. Reference Section 09900.

B. Shop priming is required for all building interior exposed to view structural steel members. Shop priming not required for structural steel members where steel is to be enclosed and concealed from view in walls and ceilings or encased in concrete or masonry. Shop primer shall be certified to be compatible with the intumescent fireproofing and epoxy systems and applicable UL assemblies. Apply sufficient primer to insure required dry film thicknesses specified. Reference Section 09900.

1. Members finished with epoxy systems: 2-3 mils DFT, SP-6 surface preparation
2. Members finished with alkyd systems: 2 mils DFT, SP-2 or SP-3 surface preparation

C. Unless otherwise noted, all exposed exterior structural steel members and steel framing shall be hot-dipped galvanized after fabrication to comply with ASTM A123 G60 standards, including but not limited to: steel pipe, structural steel columns (tubes or wide flanged), beams (tubes or wide flanged), connections, steel angle framing. Reference Section 09900 for paint primer and top coats.

D. Members to receive cementitious spray-on fireproofing are not required to be primed. Shop primer shall be certified to be compatible with the fireproofing UL assemblies.

E. Top flanges of beams receiving headed shear studs embedded within concrete shall not be primed.

F. Lintels in exterior walls shall be hot dip galvanized to G60 standards, after fabrication. All seams in built-up members to be hot dip galvanized such as beam and plate lintels shall be seal welded. Field paint lintels as per 09900.

PART 3 EXECUTION

EXAMINATION

A. Verify that field conditions are acceptable and are ready to receive work.

B. Verify that lay down areas are sufficient, clean, level, and of sufficient strength and stability to support safely members and handling equipment.

HANDLING AND STORAGE

A. Provide proper equipment too safely off load material to prevent damage.

B. Provide adequate dunnage and skids to keep steel from getting muddy and dirty.

C. Store steel in such a manner to prevent the accumulation of water and debris.

D. Do not erect steel that is muddy or stained with any deleterious material. Clean steel if necessary before erection.

ERECTION

A Allow for erection loads, and for sufficient temporary bracing to maintain structure safe, plumb, and in true alignment until completion of erection and installation of permanent bracing.

B. Do not field cut or alter structural members without approval of Architect/Engineer.

C. After erection, clean and prime paint welds, abrasions, and surfaces where shop primer has been disturbed, deteriorated or damaged.

D. All eaves shall be aligned to be straight and true. All joist extended ends at the eaves and all HSS outriggers at the gables shall be pulled into alignment and securely welded to the continuous edge plate or angle as applicable. Edge plates and angles shall be string lined for straightness.

E. Gable outriggers shall be accurately laid out to fit under the wide flute of the metal deck and shall be welded to the top of the affected joists. The metal deck shall be puddle welded to the top of the HSS outriggers at 12" o.c. in addition to welding to the supporting joists.

F. The bent plate ridge plate shall be aligned vertically and horizontally and shall be securely welded to the ends of the joist extended ends to form straight and level ridge.

G. The continuous eave bent plates and gable edge angles shall be butt welded straight and full strength at joints. Provide a break in the continuous bent plate and angle members over supports at maximum 40 foot intervals. The minimum length of these members shall be 20 feet. These break joints shall be over a support and shall be welded thereto.

H. Grout under column base plates to get full uniform bearing.

FIELD QUALITY CONTROL

A Field inspection will be performed by the Architect.

B. All connection bolts and field welds shall be inspected by an independent testing lab selected by the owner and paid by the contractor from the material testing allowance.

C. All steel beam to beam, beam to column, brace connections, and joist girder to column. Joists to joist girder, and joists to column connection bolts shall be tightened to AI5C turn of the nut criteria.

D. Shop welds and fabrication quality shall be certified by the materials testing laboratory. At the option of the lab the inspection may be conducted in the field after delivery or at the fabrication plant during fabrication and/or prior to shipment.

E. All structural steel members shall be inspected by the testing laboratory for sweep, camber, and twist to comply with ASTM A6 and AISC Code of Standard Practice for fabricated structural steel. Types of weld tests and frequency of tests shall comply with AWS D1.1 - Structural Welding Code, 2006 Edition.

F. All out of tolerance members shall be corrected prior to erection by the contractor.

G. All connections with misfitting bolts shall be field welded as directed by the inspector to fully compensate for the strength of the misfitting bolts.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

SECTION INCLUDES

A. Open web steel joists, joist girders, with bridging, extended ends, bolted bridging bolts, and other joist accessories.

REFERENCES

A. ASTM A36/A36M, A992 - Structural Steel.

B. ASTM A500 – Grade B

C. ASTM A242/242M - High Strength Low Alloy Structural Steel.

D. ASTM A529/529M Grade 50 - High Strength Carbon-Manganese Steel of Structural Quality.

E. ASTM A572/572M Grade 50 - High Strength Low Alloy Columbian-Vanadium Steel of Structural Quality.

F. ASTM A588/588M - High Strength Low Alloy with 50 kis Minimum Yield Point to 4 inches thick.

G. ASTM A606 - Steel Sheet and Strip, Hot Rolled and Cold Rolled High-Strength Low Alloy, with Improved Corrosion Resistance.

H. ASTM A1011/A1011M - Steel, Sheet and Strip Hot Rolled, Carbon, Structural High Strength Low-Alloy and High Strength Low Alloy with Improved Formability.

I. ASTM A1008/A1008M - Steel, Sheet Cold Rolled, Carbon, Structural High Strength Low-Alloy and High Strength Low Alloy with Improved Formability.

J. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

K. ASTM A307 - Carbon Steel Threaded Standard Fasteners.

L. ASTM A325 - High Strength Bolts for Structural Steel Joints.

M. ASTM A53 – Grade B

N. AWS D1.1 - Structural Welding Code.

O. FM - Roof Assembly Classifications.

P. SJI (Steel Joist Institute) - Specifications, Load tables, and Weight Tables for Steel Joists and Joist Girders.

Q. SSPC (Steel Structures Painting Council) - Steel Structures Painting Manual.

R. UL - Fire Resistance Directory.

W. Warnock Hersey - Certification Listings.

SUBMITTALS FOR REVIEW

A. Shop Drawings and Erection Plans and Diagrams:

1. Indicate standard designations, configuration, sizes, spacing, locations of joists, joist girders, trusses, top and bottom chord extensions, bolted connections, welded connections.

2. Coding of bridging, connections, attachments, and accessories for complete installation.

3. Cambers in adjacent members shall be uniformly controlled to be no greater than required by SJI standards.

SUBMITTALS FOR INFORMATION

A. Welders' Certificates: Submit manufacturer's certificates, certifying welders employed on the Work, verifying AWS qualification within the previous 12 months.

QUALITY ASSURANCE

A. Perform Work in accordance with SJI, Load Tables, and Weight Tables.

B. Maintain one copy of each shop drawing document on site.

C. Fabricator: Company specializing in performing the work of this section with minimum five years experience.

D. Erector: Company specializing in performing the work of this section with minimum five years experience.

E. Joists and Joist Girders and their connections not detailed on the Drawings shall be designed by Professional Engineer experienced in design of this work and licensed in the State of North Carolina and employed by the joist supplier.

DELIVERY, STORAGE, AND PROTECTION

A. Material and Equipment: Transport, handle, store, and protect products to SJI requirements so as not to damage, bend or otherwise distort members from their fabrication conditions.

PART 2 PRODUCTS

MATERIALS

A. Open Web Joists Members: SJI Type K, KCS, LH Longspan, G series Joist Girders.

B. Bolts, Nuts and Washers: ASTM A325.

C. Structural Steel For Supplementary Framing, Joist Extensions, and Joists Substitutes.

D. Welding Materials: AWS D1.1; type required for materials being welded.

E. Shop and Touch-Up Primer:
1. SSPC 15, Type 1, grey oxide alkyd for all joists. Reference 09900.
2. Joists to receive cementitious spray-on fireproofing do not require primer. Primer if used shall be certified to compatible with fireproofing UL assemblies.

FABRICATION

A. Provide bottom and top chord extensions as indicated. Top chord extensions shall be continuous smooth straight extensions of the joist top chord without bends or sweeps.

B. Fabricate to achieve minimum end bearing of 2-1/2 inches on steel for K series, 5" for LH series, 6” for G series joist girders. Refer to drawings for additional bearing requirements for sloping joists and joist girders.

C. Provide for ¾” diameter A325 connection bolts for joist to joist girder, and joist to column, and joist to beam connections. Provide field welded connections for all field bolted connections after adjustment and plumbing of the structural frame.

D. Provide ½” ASTM A307 bolts for all field bolted diagonal bridging requirements.

E. Drill or punch not burn holes in girder chords and flanges and column cap plates necessary for attachment of bolted joists.

FINISH

A. Prepare joist component surfaces to receive shop primer in accordance with SJI standards.

B. Shop prime all joists and joist accessories. Joists to receive cementitious spray-on fireproofing do not require primer. Primer if used shall be certified to compatible with fireproofing UL assemblies.

SOURCE QUALITY CONTROL AND TESTS

A. Provide shop testing in accordance with SJI standards.

PART 3 EXECUTION

EXAMINATION

A. Coordination: Verification of existing conditions prior to beginning fabrication work.

B. Production prior to approval of shop drawings shall be at contractor’s risk.

ERECTION

A. Erect and connect joists to supports.

B. Allow for erection loads. Provide sufficient temporary bracing to maintain framing safe, plumb, and in true alignment. Strictly follow all OSHA regulations for job safety.

C. Install, field weld and/or bolt joist seats to supports as erection progresses.

D. Position and field weld joist bottom chord extensions as erection progresses.

E. Frame roof openings greater than 12 x 12 inches with supplementary framing.

F. Do not permit erection of decking until completion of installation of permanent bridging and bracing.

G. Do not field cut or alter structural members without approval of joist manufacturer.

H. All joist top chord extensions at ridges and eaves shall be brought into close alignment and

securely field welded to the continuous ridge and eave angles or plates to give true and straight line to ridges and eaves.

I. After erection, prime welds, abrasions on shop primed joists.

L. After erection, clean and prime paint welds, abrasions, and surfaces where shop primer has been disturbed, deteriorated, corroded, rusted, or damaged. Remove all surface contaminants, including soiled surfaces spoiled during laydown.

ERECTION TOLERANCES

A. Maximum Variation From Plumb: 1/4 inch.

B. Maximum Offset From True Alignment: 1/4 inch.

FIELD QUALITY CONTROL

A. Field inspection will be performed by the Architect. Additional inspection of materials and connections shall be performed by an independent testing laboratory at the direction of the Architect. Payment for the testing laboratory services will be paid by the contractor out of the testing allowance.

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

SECTION INCLUDES

A. Steel roof deck and accessories.

B. Formed steel ridge strips, eave strips, valley strips, fasteners, and sound attenuation strips for acoustical deck flute filler.

REFERENCES

A. ASTM A36/A36M — Structural Steel.

B. ASTM A1008/A1008M — Primed Sheet Steel, Cold—Rolled Sheet, Carbon, Structural Quality with minimum yield strength of 33 ksi.

C. ASTM A653/A653M — Galvanized Sheet Steel, Cold—Rolled Sheet, Carbon, Structural Quality with minimum yield strength of 33 ksi.

D. AWS D1.1 — Structural Welding Code.

E. FM — Roof Assembly Classifications.

F. SDI (Steel Deck Institute) — Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution.

G. SSPC (Steel Structures Painting Council) — Painting Manual.

H. UL — Fire Resistance Directory.

I. Warnock Hersey — Certification Listings.

PERFORMANCE REQUIREMENTS

A. Design metal deck in accordance with SDI Design Manual.

B. Deck units shall be laid out in a minimum three span condition.

SUBMITTALS FOR REVIEW

A. Shop Drawings: Indicate deck plan, support locations, projections, openings, pertinent details, fastening patterns, and accessories with fastening patterns.

B. Product Data: Provide deck profile characteristics and dimensions, structural properties, finishes, and fasteners for side laps.

SUBMITTALS FOR INFORMATION

A. Certificates: Certify that Products meet or exceed specified requirements.

B. Submit manufacturer's installation instructions.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

QUALITY ASSURANCE

A. Manufacturer: Company specializing furnishing material under this specification for a minimum of five years.

B. Installer: Company specializing in performing the work of this Section with minimum five years experience.

C. Design deck layout, spans, fastening, joints, under direct supervision of a Professional Structural Engineer experienced in design of this work and licensed in the State of North Carolina.

DELIVERY, STORAGE, AND HANDLING

A. Material and Equipment: Transport, handle, store, and protect products from damage.

B. Cut plastic wrap to encourage ventilation.

C. Store deck and accessories on dry wood sleepers; slope for positive drainage.

D. Store acoustical metal deck indoors to prevent rusting of the punched deck flutes. Store sound attenuation strips when required in sealed packages indoors out of the weather.

PART 2 PRODUCTS

MATERIALS

A. Manufacturers:

1. Vulcraft 1 ½” deep type 1.5 B, 22 gage with 36 " cover. Vulcraft 3” deep type N, 22 gage with 24” cover. Regular and Acoustical Deck units.

2. Wheeling 1 ½” type B, 22 gage with 36" cover. Wheeling 3” deep type N, 22 gage with 24” cover. Regular and Acoustical Deck units.

3. United Steel Deck 1 ½” type B, 22 gage with 36" cover. United 3” deep type N, 22 gage with 24” cover. Regular and Acoustical Deck units.

B. Sheet Coating: 1 ½” type B regular and 3” type N shall be primed. Roof deck primer where cementitious spray-on fireproofing will be applied shall be certified to be compatible with the fireproofing and UL assemblies.

C. Sheet Steel: ASTM A653/653M, A1008/A1008M with minimum yield strength 33 ksi.

D. Welding Materials: AWS D1.1.

E. Shop and Touch Up Primer: SSPC 15, Type 1, grey oxide for primed deck, certified as compatible with the fireproofing and UL assemblies.

ACCESSORIES

A. Ridge Strips, Valley Strips, Eave Strips, sound attenuation strips for acoustical deck flute fills: Fabricated of metal of same type, gage and finish as deck.

PART 3 EXECUTION

EXAMINATION

A. Coordination: Verification of existing conditions prior to beginning work.

B. Fabrication prior to approval of shop drawings shall be entirely at the risk of the contractor.

INSTALLATION

A. Erect metal deck in accordance with SDI Manual and manufacturer's instructions. Deck units shall be erected in a minimum three span condition unless otherwise noted on drawings.

B. Bear deck on steel supports with 2 1/2 inch minimum bearing. Align deck units in true straight lines. Allow for minimum 3” end laps.

C. Fasten deck to steel support members at ends and intermediate supports with 3/4" diameter fusion puddle welds at 12 inches oc maximum. Weld spacing shall be enhanced to 6" centers within 12 feet of ridges, gable ends, and eaves.

D. Weld in accordance with AWS D1.1.

E. Mechanically fasten side laps at 18 inches oc maximum with #12 tek screws.

F. Place formed steel ridge strips, eave strips, valley strips in position and mechanically attach at 6" oc.

G. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch up zinc rich prime paint.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

SECTION INCLUDES

A. Steel floor deck and accessories.

B. Formed steel deck end and edge forms to contain wet concrete.

REFERENCES

A. ASTM A36/A36M - Structural Steel.

B. ASTM A108 - Steel Bars, Carbon, Cold-Finished, Standard Quality.

C. ASTM A653/(A653M) - Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, Structural Quality.

D. ASTM A525 - Steel Sheet, Zinc-Coated, Galvanized by the Hot-Dip Process.

E. ASTM A611 - Steel, Cold-Rolled Sheet, Carbon, Structural.

F. AWS D1.1 - Structural Welding Code.

G. FM - Floor Assembly Classifications.

H. SDI (Steel Deck Institute) - Design Manual for Composite Decks, Form Decks, Roof Decks, Cellular Metal Floor Deck with Electrical Distribution.

I. SSPC (Steel Structures Painting Council) - Painting Manual.

J. UL - Fire Resistance Directory.

K. Warnock Hersey - Certification Listings.

PERFORMANCE REQUIREMENTS

A. Metal deck in accordance with SDI Design Manual.

SUBMITTALS FOR REVIEW

A. Shop Drawings: Indicate deck erection piece marks on deck plan, support locations, projections, openings, welding pattern and side lap connection details and all pertinent details, and accessories.

B. Product Data: Provide deck profile characteristics and dimensions, structural properties, and finishes.

SUBMITTALS FOR INFORMATION

A. Certificates: Certify that Products meet or exceed specified requirements.

B. Submit manufacturer's installation instructions.

C. Welders Certificates: Certify welders employed on the Work, verifying AWS qualification within the previous 12 months.

QUALITY ASSURANCE

A. Manufacturer and Installer: Companies specializing in performing the work of this Section with minimum five years documented experience.

DELIVERY, STORAGE, AND HANDLING

A. Off load and handle deck in suitable manner so as not to damage deck units.

B. Store deck on dry wood sleepers. Slope decking for positive drainage.

C. Protect deck from damage and form accumulation of dust and debris.

PART 2 PRODUCTS

MATERIALS

A. Deck units shall be 3” deep, 16 gage, galvanized, Type 3 VLI composite deck units as manufactured by Vulcraft products or approved equal.

B. Sheet Steel: ASTM A653/653M Structural Quality; with G60 galvanized coating conforming to ASTM A653/653M.

C. Welding Materials: AWS D1.1.

D. Touch-Up Primer for Galvanized Surfaces: SSPC 20 Type I - Inorganic.

ACCESSORIES

A. Flute Closures at ends of deck runs or change in deck direction.

B. Provide column and beam closure plates and other closure plates as required to prevent fresh concrete leakage. Provide necessary miscellaneous framing supports around columns or other floor penetrations where required to achieve complete first class job.

FABRICATION

A. Composite Metal Floor Deck Units shall be manufactured in accordance with SDI requirements.

B. Related Deck Accessories: Metal closure strips, wet concrete stops, cover plates, of profile and size as required.

PART 3 EXECUTION

EXAMINATION

A. Verification of existing conditions prior to beginning work is required.

INSTALLATION

A. Erect metal deck in accordance with SDI Manual.

B. Bear deck on masonry or concrete support surfaces with 3 inch minimum bearing. Align deck units to be true and straight.

C. Bear deck on steel supports with 2 1/2 inch minimum bearing. Align deck units to be true and straight.

D. Fasten deck units to steel support members at ends and intermediate supports with fusion welds through deck with one 3/4" diameter puddle weld. Weld in accordance with AWS D1.1.

E. Mechanically fasten male/female side laps with TEK screws at 18 inches oc maximum. Screws to be #12 self drilling self tapping.

G. Install sheet steel closures to close openings between deck and walls, columns, and other openings.

H. Exercise proper care so as not to burn holes in deck and/or notch steel beam supports during the deck welding operations. Damaged deck and/or steel supports shall be removed and replaced at no additional cost to owner when directed by the Engineer.

I. Immediately after welding deck and other metal components in position, coat welds, burned areas, and damaged surface coating, with touch-up cold galvanizing prime paint.

J. Provide temporary shoring at mid span prior to placing concrete where recommended by deck supplier or where deck span exceeds 10’-6”. Keep shoring ¼” below deck to allow deck to “settle” down on shoring members when shoring is used.

K. Plan placement of concrete sequence so that the weight of the fresh concrete is placed on the top most sheet in the male female side lap first to prevent excess concrete leakage.

L. Avoid “piling” up fresh concrete on deck. Keep maximum fresh concrete thickness as close to final thickness as possible while placing concrete to avoid damage to deck due to excessive deck deflection.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Cold-formed structural metal stud framing at exterior and interior wall locations.

B. Framing accessories

1.2 REFERENCES

A. ASTM A36 Standard Specification for Carbon Structural Steel.
B. ASTM A123 Zinc (Hot—Dip Galvanized) Coatings on Iron and Steel Products.
C. ASTM A1003 Standard Specification for Steel Sheet, Carbon, Metallic and Nonmetallic-Coated for Cold-Formed Framing Members.
D. ASTM A525 General Requirements for Steel Sheet, Zinc—Coated (Galvanized) by the Hot—Dip Process.
E. ASTM A591 Steel Sheet, Cold—Rolled, Electrolytic Zinc—Coated.
F. ASTM C645 Non-Load (Axial) Bearing Steel Studs, Runners (Track) and Rigid Furring Channels for Screw Application of Gypsum Board.
G. ASTM C754 Installation of Steel Framing Members to Receive Screw—Attached Gypsum Wallboard, Backing Board, or Water—Resistant Backing Board.
H. ASTM C1513 Standard Specification for Steel Tapping Screws for Cold-Formed Steel Framing Connections.
I. COSP Specification for the Design of Cold-Formed Steel Structural Members, Code of Standard Practice.
J. GA 203 Installation of Screw Type Steel Framing Members to Receive Gypsum Board.
K. Metal Framing Manufacturers Association (MFMA) Guidelines for the Use of Metal Framing.
L. SSPC (Steel Structures Painting Council) Steel Structures Painting Manual.

1.3 SYSTEM DESCRIPTION

A. Metal stud framing system for exterior walls shall be 6” or 8" x 68 mil minimum structural studs, as noted on Drawings, as manufactured by Marino\Ware, Dietrich, Unimast, Clark Metal Framing Systems or approved equal. Refer to Drawings for metal stud sizes and thickness.

B. Refer to drawings for interior metal stud sizes and gages.

C. Design and size connection components to withstand dead and live loads caused by pressure and suction of wind acting normal to plane of wall as calculated in accordance with the current North Carolina State Building Code wind loading requirements.

D. Maximum Allowable Deflection: 1/600 span.

E. System to accommodate construction tolerances, deflection of building structural members, and clearances of intended openings.

F. Wall studs shall align in straight and true lines.

1.4 SUBMITTALS

A. Shop Drawings: Submit shop drawings to indicate plans, elevations, prefabricated work, component details, stud layout, framed openings, anchorage to structure, bracing, connection details, type and location of fasteners, weld lengths and locations, and accessories and finishes, or items required of other related work.

Show and describe method for securing studs to tracks, splicing, and for blocking and reinforcement to framing connections.

B. Product Data: Provide manufacturer's product data and technical data sheets describing standard framing member materials and finish, product criteria, load charts, limitations.

C. Manufacturer's Installation Instructions: Indicate special procedures, perimeter conditions requiring special attention.

D. Delegated Design Submittals: Submit structural calculations as follows:

a. Structural calculations for connections and attachments, prepared by manufacturer for approval, sealed by a professional engineer registered in the State in which the project is located.

b. Description of design criteria.

c. Selection of framing connection requirements.

d. Verification of attachments to structure and adjacent framing components.

E. Welder's current certifications for light gauge metal framing.

1.5 QUALITY ASSURANCE

A. Perform Work in accordance with MFMA and ASTM C754.

1.6 QUALIFICATIONS

A. Manufacturer:

a. Having [5] years of experience manufacturing components similar to or exceeding requirements of project.

b. Having sufficient capacity to produce and deliver required materials without causing delay in work.

B. Manufacturer's Structural Engineer:

a. Professional engineer registered in the state in which the project is located.

b. Having a minimum of five years of experience with projects of similar scope.

C. Installer: Acceptable to the manufacturer, experienced in performing the work of this section with minimum five years documented experience, and specialized in installation of work similar to that required for this project.

D. Welders: Certified by the AWS within the previous 12 months.

1.7 COORDINATION

A. Coordinate with all trades the placement of components within the stud framing system to provide a totally sound and complete system installation ready to receive sheathing and wallboard.

PART 2: PRODUCTS

2.1 STUD FRAMING MATERIALS

A. Studs: ASTM A525, ASTM A591, cold rolled steel, channel shaped, punched for utility access

1. Depth: 8", 6”, 3 5/8", and as shown on the drawings.

2. Thickness: 68 mil minimum at 8" and 6” studs and 33 mil minimum 3 5/8” studs.

3. Width minimum 1 5/8" with 1/2" stiffening return both flanges.

B. Runners: Of same material and thickness as studs unless otherwise noted.

C. Furring and Horizontal CRC Bracing Members: Of same material as studs; thickness to suit purpose.

D. Vertical Deflection Clips and Tracks: Manufacturer’s standard clips and tracks, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to studs.

E. Fasteners: Stainless steel or zinc coated #12 pan head, self-drilling, self tapping screws.

F. Anchorage Devices: Powder actuated fasteners and screws as shown on drawings.

G. Touch Up Primer for Galvanized Surfaces: SSPC — Paint 20 Type I Inorganic.

2.2 JOIST FRAMING

A. Steel Floor and Ceiling Joists: Cold-formed steel joists, of web depths indicated on Drawings, as follows:

a. Type as indicated on Drawings.

b. Minimum Base Metal Thickness: As indicated on the Drawings.

c. Section Properties: As indicated on the Drawings.

B. Steel Joist Track: Cold-formed steel joist track, of web depths indicated, unpunched, with unstiffened flanges. Type as indicated on the Drawings. Minimum Base Metal Thickness: Match steel joists. Flange Width 1 1/4 inches, minimum.

2.3 ACCESSORIES

A. Framing Connectors:
   A. Type: Steel-framing accessories fabricated from steel sheet, ASTM A1003/A1003M, 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. Web stiffeners, solid blocking, utility angles, joist hangers, gusset plates, rigid clips, breakaway clips.

C. Anchors, Clips and Fasteners

1. Steel Shapes and Clips: ASTM A36/A36M and zinc coated by hot-dip process according to ASTM A123/A123M.

2. Cold-formed Steel Connections: ASTM A653/A653M, zinc coated by hot-dip process according to ASTM A123/A123M.

3. 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 E488.

4. Powder-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 E1190 and as indicated on the drawings.

5. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping steel drill screws.

6. Welding Electrodes: Comply with AWS standards.

7. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

8. Shims: Load bearing, high-density multimonomer plastic, non-leaching.

9. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.4 FABRICATION

A. Fabricate cold-formed metal framing and accessories assemblies of framed sections to sizes and profiles required; with framing members fitted, plumb, square, and true to line, reinforced, and with connections securely fastened, and braced to suit design requirements, in accordance with referenced specification standards, and manufacturer's written instructions, and requirements in this Section.

B. Fit and assemble in largest practical sections for delivery to site, ready for installation.

C. Studs shall bear tightly against the top and bottom tracks.

D. Fabricate framing assemblies using jigs or templates.

E. Cut framing members by sawing or shearing; do not torch cut.

F. Fasten cold-formed metal framing members by welds, screw fasteners, clinch fasteners or rivets as standard with fabricator. Do not wire-tie framing members.

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.

c. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

2.5 FINISHES

A. Studs: Galvanize to G60 coating class (minimum) or as indicated on Drawings.

B. Tracks and Headers: Galvanize to G60 coating class (minimum) or as indicated on Drawings.

C. Accessories: Same finish as framing members.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verify that conditions are ready to receive work.

B. Verify that rough-in utilities are in proper location, and coordinated with framing.

3.2 ERECTION

A. General:

1. Erect in accordance with ASTM C1007 and manufacturer's installation instructions.

2. Field Welding: Per AWS D1.3, and the following:

a. Stud-to-Track Connections: 1/2 inch (13 mm) fillet weld, full length of inside flange dimension, inside each flange of stud onto track web.

b. Other Connections: Flat, plug, butt or seam.

c. Minimum Steel Thickness for Welded Connections: 18 gauge.

d. Field Fastening: Minimum of 2 self-tapping metal screws per connection, unless otherwise indicated.

B. Wall Systems:

1. Align and secure top and bottom runners.

2. Fit runners under and above openings; secure intermediate studs to same spacing as wall studs.

3. Install studs vertically uniformly at the spacings shown on the drawings.

4. Align stud web openings horizontally.

5. Secure studs to tracks using screws or welding.

6. Stud splicing not permissible.

7. Fabricate corners using a minimum of three studs.

8. Minimum double stud at wall openings, door and window jambs, not more than 2 inches from each side of openings. Refer to drawings for additional jamb and head conditions.

9. Brace stud framing system rigid.

10. Coordinate erection of studs with requirements of doorframes, window frames, and; install supports and attachments.

11. Coordinate installation of wood bucks, anchors, and wood blocking with electrical and mechanical work to be placed within or behind stud framing.

12. Blocking: Secure wood blocking to studs. Secure steel channels to studs. Install blocking for support of plumbing fixtures, toilet partitions, wall cabinets, toilet accessories, hardware, etc. as required by Architect.

13. Coordinate placement of insulation in stud spaces made inaccessible after stud framing erection.

14. Fabricate and install headers at openings as indicated on Drawings.

15. All multiple members shall be stitch welded together with 1" seam welds spaced at 16" oc maximum both sides of members to form a totally composite member. Multiple members in composite units shall not be spliced.

16. All connections not shown on the drawings shall be designed by the supplier to support the imposed loads.

17. Provide continuous 2” x 43 mil horizontal strap bridging at 48" maximum intervals on both flanges. Install with 1 screw per stud. Provide solid blocking using a piece of metal stud between studs at each end of bridging run and at 12' oc maximum. Terminate bridging at wall openings with solid blocking bridging as required.

18. Place one stud tightly against each side of the tubular steel columns in line with the wall. Align the face of stud flush with face of tubular columns for smooth finish application for dry wall and sheathing. Fasten stud to column with powder actuated fasteners spaced at 16" oc.

19. Touch-up field welds and damaged galvanized surfaces with primer.

C. Steel Joists:

1. Locate joist end bearing directly over load bearing studs or provide approved load-distributing member to top of stud track.

2. Provide web stiffeners at reaction points where indicated in drawings.

3. Provide joist bridging as shown in drawings.

4. Provide end blocking where joist ends are not otherwise restrained from rotation.

5. Place joists at maximum 12 inches on center and not more than 2 inches from abutting walls. Connect joists to supports using mechanical fastener method.

6. Touch-up field welds and damaged galvanized surfaces with primer.

3.3 ERECTION TOLERANCES

A. Maximum Variation From True Position: 1/4 inch.

B. Maximum Variation of any Member from Plane: 1/4 inch.

C. Maximum Variation From Plumb: 1/4 inch in 10' height.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall consist of all labor and materials required to provide all miscellaneous fabricated metal items scheduled on Drawings and specified in this Section.

Miscellaneous metal items for which drawing information is fully descriptive that are not necessarily named herein, shall be provided as shown and as required, providing complete assemblies.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by Manufacturers listed for each item.

SUBMITTALS:

Shop Drawings: Submit shop drawings in quadruplicate to Architect in accordance with GENERAL CONDITIONS for approval of all fabricated miscellaneous items. Shop drawings shall indicate following: fabrication, assembly and erection details, sizes of all members, fastenings, supports, and anchors; patterns; clearances, and all necessary connection to work of other trades.

Catalog Cuts: For standard manufactured items, catalog cuts may be submitted as specified in GENERAL CONDITIONS, providing all technical performance characteristics and other pertinent information are given.

PRODUCT HANDLING:

Handling and Storage: Handle all materials carefully to prevent damage and store at site above ground in covered, dry locations.

Replacement: Damaged items that cannot be restored to like-new conditions shall be removed and replaced at no additional cost to Owner.

PART 2: PRODUCTS

BASIC MATERIALS:

Structural Shapes: ASTM A 36/A572 Dual Certified.

Steel Pipes: ASTM A 72 welded wrought iron pipe, standard weight, Schedule 40.

Steel Pipes: ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products

Steel Tubing: ASTM A 500, Grade B.

Cast Iron: ASTM A 48j, Class 30, with minimum tensile strength of 30,000 psi.

Zinc-coated iron or Steel Sheets: ASTM A 446.

Cold-rolled Carbon Steel Sheets: ASTM A 366-66.

Exterior Lintels: ASTM A123 - Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products

Metal Bar Grating: NAAMM A202.1 Metal Bar Grating Manual

Stainless Steel Sheet: Type #304

FABRICATION:

Measurements: Verify all measurements and take all field measurements necessary before fabrication.

Fasteners: Exposed fastenings shall be compatible materials, shall generally match in color and finish, and shall harmonize with material to which fastenings are applied. Permanent connections shall be riveted, welded or bolted. Exposed welds shall be ground smooth and flush.

Components: Include materials and parts necessary to complete each item properly, even though such work may not definitely be shown or specified.

Provide and install miscellaneous bolts and anchors, supports, braces, and connections necessary for completion of work.

Drill or punch holes for bolts and screws. Poor matching of holes will be rejected. Conceal fastenings where practicable.

Painting and Protective Coating:

All ferrous metal, except stainless steel and galvanized surfaces, shall be properly cleaned and given one shop coat of red lead or zinc chromate primer.

Anchors built into masonry shall be coated with asphalt paint unless specified to be galvanized. Metal work to be encased in concrete shall be left unpainted unless specified or noted otherwise.

Where hot-dip galvanized or zinc-coated metal is specified or shown, it shall not be shop-primed unless specifically required otherwise for paint finish, which shall require bonderized or paint-grip primer. Recoat at all field welds and grindings, and where initial galvanized coating has been removed or deteriorated.

Galvanizing:

Hot-dip galvanizing or zinc coatings applied on products fabricated from rolled, pressed and forged steel shapes, plates, pipes, bars and strips shall comply with ASTM A 123-68.

Unless otherwise noted, all exposed exterior structural steel members and steel framing shall be hot-dipped galvanized after fabrication to comply with ASTM A123 G60 standards, including but not limited to: steel pipe, structural steel columns (tubes or wide flanged), beams (tubes or wide flanged), steel angle framing, connections. Reference 09900 Paint for paint primer and topcoats requirements.

Lintels in exterior walls shall be hot dip galvanized to ASTM A123 G60 standards after fabrication. Reference 09900 Paint for paint primer and topcoats requirements.

Exterior handrails shall be hot dip galvanized to ASTM A123 G90 standards, not less than .90 oz/square foot, after fabrication.

Exterior steel stair treads, unless otherwise noted, shall be hot dip galvanized to ASTM A123 G90 standards, not less than .90 oz/square foot, after fabrication.

Steel bar grating, unless otherwise indicated shall be hot dip galvanized to ASTM A123 G90 standards, not less than .90 oz/square foot, after fabrication.

MISCELLANEOUS ITEMS:

Supplementary Structural Steel: All structural framing incorporated in building design and detailed on Architectural Drawings, but not shown on Structural Steel Drawings, shall be furnished as part of miscellaneous metal work.

Miscellaneous Lintels, Shelf Angles, Beams and Plates, Brackets: Provide miscellaneous lintels and shelf angles, beams, plates, and brackets as indicated.

Lintels shall have 8" bearings at each end unless shown otherwise.

Weld or bolt members together where so indicated, to form complete composite assembly. Set beams on plates as indicated.

Where shelf angles are attached to concrete with bolts and adjustable inserts, provide slotted holes of proper size and spacing in vertical leg of shelf angles.

Miscellaneous Fasteners: Furnish all bolts, nuts, anchor bolts, plates, anchors, ties, clamps, hangers, nails, spikes, screws, straps, toggle and expansion bolts, and other items of rough hardware of sufficient size and number to tie together various parts of building and secure all of its parts in place. Such miscellaneous items shall be of same material as metals they contact.

Supports, Bracing:

Furnish and install all bracing and suspension type supports, fastened to structure, for following and additional conditions, as may be required.

1. Exterior soffits

2. Head of exterior doors and window wall

Steel Bar Grating: Provide galvanized steel bar gratings, cat-walk type, where indicated on Drawings, in accordance with ASTM A36/A36M and NAAMM A202.1 Welded. Steel bar gratings shall be hot dip galvanized to ASTM A123 G90 and ASTM A525 G90 standards. Top surface shall be serrated. Provide complete assemblies, that include all required accessories in matching galvanized materials; to include but not limited to: Fasteners and J-hooks, perimeter closures, and edge banding. Anchor in place by welding, and weld joints of intersecting metal sections. Touch up all cuts and welds with SSPC 20 Type I Inorganic, zinc rich primer.

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Handrails: Provide pipe handrails as detailed, fabricated from 1-1/2 O.D. pipe. Weld all joints and grind smooth. Fabricate entire assembly carefully in accordance with details. After installation, use wire brush, sand blast, or otherwise treat to provide completely smooth surface for application of paint. Interior wall

handrails consist of straight sections of black steel pipe, mounted on wall brackets. Install brackets with approved anchoring device. Close ends with molded end closures.

All exterior handrails shall be G-90 hot dipped galvanized. All welds and grindings to be recoated on site with a field applied zinc galvanizing coating to match.

Ladders: Where indicated, vertical wall mounted interior ladders shall be 20" wide, fabricated with 3/8"x 1-1/2" hot-rolled rails and 3/4" round steel rungs extending through rails with connection welds, provided at all roof hatch locations. Space rungs 12" o.c. Anchor ladders at bottom and top. Brackets shall be of same size as side rails and of such length as to hold ladder 7" away from wall.

Exterior ladders shall be G-60 hot-dipped galvanized.

Fold-out Escape Egress Ladder: Provide prefabricated extruded aluminum and stainless steel fold-out escape egress ladder on utility platforms where indicated on drawings, rated for 1000 lbs., 6060-T6 high-grade aluminum, pull out release pin, see Drawings. “MODUM Fire Escape Ladder”, by Modum International of Illinois Accessories include egress ladder signage, acrylic sign panels as indicated on drawings, removable chain in safety yellow.

Mount and anchor to (4) member built up metal stud post at platform level and to wall surface below platform. Adjacent ceilings to be installed in breakaway fashion to allow complete fold-out operation.

PART 3: EXECUTION

WORKMANSHIP:

Ferrous metal surfaces shall be clean and free from mill scale, flake rust and rust pitting; well formed and finished to shape and size, with sharp lines and angles and smooth surfaces.

Castings shall be of uniform quality, free from blow-holes, porosity, hard spots, shrinkage distortion or other defects. Castings shall be smooth and well cleaned by shot-blasting or other approved method. Covers subject to street or foot traffic shall have machined horizontal bearing surfaces. Provide machined bearing or contact surfaces for other joints where indicated or required.

COORDINATION: At proper time, deliver and set in place items of metal work to be built into adjoining construction.

PAINTING: Finish painting of items not factory painted shall be as specified in Section 09900.

STEEL FRAMED STAIRS:

GENERAL: Construct stairs to conform to sizes and arrangements shown; joint pieces together by welding unless otherwise indicated. Provide complete stair assemblies including metal framing, hangers, columns, railings, newels, balusters, struts, clips, brackets, bearing plates and other components necessary for the support of stairs and platforms and as required to anchor and contain the stairs on the supporting structure. Certify with drawings bearing the seal of an N. C. Registered Engineer indicating capacity to support 100 p.s.f. uniform live load or 300 pound concentrated load as required by code.

EXTERIOR STEEL FRAMED STAIRS: Exterior steel framed stairs, ships ladders, ladders shall be finished in ASTM A123 G60 hot dip galvanized. Treads shall be G90 hot dip galvanized.

STAIR FRAMING: Fabricate stringers of structural steel channels, or plates, or a combination thereof, as shown. Provide closures for exposed ends of stringers. Construct platforms of structural steel channel headers and miscellaneous framing members as shown. Bolt or weld headers to strings and newels and

framing members to strings and headers; fabricate and join so that bolts, if used, do not appear on finish surfaces.

METAL PAN RISERS, SUBTREADS, AND SUBPLATFORMS: Shape metal pans for risers and subtreads to conform to configuration shown. Provide minimum 12 gage thickness of structural steel sheet for metal pans indicated but not less than that required to support total design loading.

Form metal pans of hot-rolled or cold-rolled carbon steel sheet, unless otherwise indicated.

Attach risers and subtreads to stringers by means of brackets made of steel angles or bars. Weld brackets to strings and attach metal pans to brackets by welding, riveting or bolting.

Provide subplatforms of configuration and construction indicated, or if not indicated, of same metal as risers and subtreads and in thickness required to support design loading. Attach sub platform to platform framing members with welds.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide expansion control joint covers as shown on Drawings and specified in this Section.

Building expansion joints with joint covers specified (walls, floors and ceilings) are required at all locations where enclosed connectors meet building units.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by the C/S Group Company. Other Manufacturers who can furnish products or systems of same materials specified and equal in all respects will also be acceptable, such as Architectural Art Mfg., Balco, Inc., and M M Systems.

SUBMITTALS:

Manufacturer's Data: Submit three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2: PRODUCTS

FLOOR JOINT COVERS: Balco, Inc. Model 75FPE-1 Series or C/S Group Model SJPW Series. Coordinate with finish floor material. Floor to floor units to be complete with extruded aluminum frames, center plates and cover plates extruded from 6063T5 alloy. Frames to be anchored to slab with 1/4” (6.25 mm) diameter expansion bolt anchors. Flexible vinyl expansion filler. Floor joints to be coordinated to provide alignment with wall and ceiling expansion joint covers. All aluminum surfaces in contact with masonry shall receive a shop coat of zinc chromate primer.

WALL JOINT COVERS: C/S Group Model ASM-100 or ASM-100 W/FB Series. Extruded aluminum cover plates and snap-lock anchor clips to be 6063-T52 alloy. Cover plate to be supplied with continuous duroflex seal. Snap-lock anchor shall be secured 24" O.C., complete with serrations to assure positive adjustable anchorage. Finish shall be satin clear anodize, prime coat for field painting, Medium , dark Bronze or Kynar 500 colors, to be selected by Architect to suit condition of use.

CEILING JOINT COVERS: C/S GROUP MODEL HC OR HCW. Cover shall be dual durometer P.V.C. The vertical legs shall be a rigid material for positive anchoring. The exposed bellows shall be a flexible P.V.C. to allow for expansion and contraction of the joint cover. Color to be white.

PART 3: EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION

Install expansion joint covers at locations indicated on Architectural and / or Structural Drawings and at all locations where enclosed connectors meet building units, in accordance with Manufacturer's printed instructions and Shop Drawings, approved by Architect.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall consist of all labor and materials required to provide all rough carpentry work scheduled on Drawings and specified herein.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

CODE COMPLIANCE:

All framing to comply with the current edition of the Building Code having jurisdiction in North Carolina.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality of work under this Section, drawings and Specifications are based on products manufactured or furnished by Manufacturer listed for each product.

COORDINATION WITH OTHER TRADES: Coordinate locating of nailers, furring, grounds, and similar supports for other trades so that installation of finish work may be properly executed to fulfill design requirements.

MOISTURE CONTENT OF LUMBER: Maximum moisture content for lumber products shall be 19 percent on air dried stock, and 15 percent maximum on kiln-dried (KD) stock.

DRESSED LUMBER: Surface lumber four sides (S4S) unless specified otherwise for particular products.

DELIVERY AND STORAGE: As soon as materials are delivered to site, place under cover and protect properly from weather. Do not store or erect material in wet or damp portions of buildings or in areas where plastering or similar work is to be executed until such work has been completed and has become reasonably dry.

PART 2: PRODUCTS

FRAMING LUMBER

Various materials for framing shall be of sizes shown and shall conform to Grading Standards of SPIB. All framing material shall be #2 SYP.

Where indicated on the Drawings, provide FRT Fire Retardant Treated lumber.

PLYWOOD or ORIENTED STRAND BOARD MATERIALS: Softwood plywood or OSB sheathing shall conform to requirements of U. S. Product Standard PS 1-66, Construction and Industrial. All plywood or

OSB sheathing which has any edge or surface permanently exposed to weather shall be "EXTERIOR" type.

Where indicated on the Drawings, provide FRT Fire Retardant Treated plywood.

Where indicated on the Drawings, provide PT Preservative Treated plywood.

PRESERVATIVE TREATED WOOD PRODUCTS: Protective pressure treatment of lumber or products shall be .40 pcf retention of chromated copper arsenate as produced by Wolman, Osmose, Boliden or approved equal. Material shall be treatment grade marked, for ground contact, kiln dried not to exceed 19%, and all cut ends shall be coated with the same preservative, at job site during construction.

All lumber products in contact or fastened to concrete, concrete masonry or brick masonry to be preservative treated wood products.

FASTENING DEVICES: Anchors and fasteners for securing wood items, unless noted otherwise, shall meet following requirements:

Bolts:

- Bolts, nuts, studs and rivets shall conform to Federal Specifications FF-B-571a and FF-B-575, as applicable.
- Lag screws or lag bolts: Federal Specification FF-B-561b.
- Toggle Bolts: Federal Specification FF-B-588b.
- Screws: Federal Specification FF-S-111b.
- Nails and Staples: Federal Specification FF-N-105a.

All fastening devices used in exterior or concrete construction shall be hot-dip galvanized.

All fastening devices used in Fire Retardant Treated or Preservative Treated lumber and plywood to be corrosion resistant per manufacturer's recommendations.

Ground Anchorage: Wood plugs or nailing blocks are not acceptable for fastening grounds, furring, or blocking to concrete or masonry. Hardened steel nails, expansion screws, toggle-bolts, metal plugs, or metal inserts, as most appropriate for each type of masonry or concrete construction shall be used.

Explosive-Driven Fastenings: Explosive or powder-driven fastenings may be used only when approved by Architect.

PART 3: EXECUTION

GENERAL REQUIREMENTS FOR FRAMING AND BRACING:

Finish: Unless otherwise indicated, use S4S lumber for all framing members.

Size: Unless otherwise indicated, framing shall conform to nominal size requirements shown on Drawings.

Space framing on 16 inch centers, unless shown otherwise on Drawings.

Install required blocking, bracing, or other framing required for support of built-in equipment,

including casework.

INSTALLATION OF WOOD GROUNDS:

Location: Install permanent and temporary wood grounds as indicated for proper execution of work of all trades. Remove temporary grounds when no longer required.

Fastening: Except as otherwise required for special locations, form grounds of kiln-dried southern yellow pine, 1-1/2 inches wide, and of thickness to properly align related items of work. Securely fasten grounds into position by means of nails, brads, bolts, or other methods that will provide maximum results.

Coordination: Coordinate locations, sizes and fastenings of grounds with work of other trades. When grounds are to provide backing for fastening of grilles, fixtures, louvers, and similar items of work, exercise care in installation of grounds to provide for correct installation of those other items of work.

INSTALLATION OF WOOD BLOCKING:

Location: Install all wood blocking required to provide anchorage for other materials. Form to shapes and sizes as indicated or as may be required to accomplish particular installation. Form blocking of sizes shown or of minimum 2 inch thick nominal material.

At location of wall mounted equipment install 2"x 8" blocking unit between properly located studs at height indicated in Finish Hardware Schedule, or where indicated for wall mounted equipment. Install wood blocking behind all cabinets and toilet accessories as required.

Steel: Blocking in conjunction with steel work shall be bolted to steel with bolts, washers and nuts, countersunk where required.

Roofing: Form blocking in conjunction with gravel stops and built-up roofs to shapes as detailed. Anchor with countersunk bolts, washers and nuts.

Anchorage: Wedge, anchor and align blocking to provide rigid and secure installation of both blocking and other related work.

INSTALLATION OF WOOD FURRING:

Location: Provide all free-standing, suspended, solid-anchored, and other types of wood furring as required for receipt, alignment and complete installation of various types of finishing materials.

Spacing: Space furring members as required. Provide headers and other nailing members within furring framework. Install with faces true to line and plumb, using wood shims as necessary.

Fastening: Install furring into position by whatever means required to provide secure, rigid, and correct installation. When necessary, use nailing plugs, power-actuated anchors, toggle bolts, anchor bolts, washers and nuts, nails, and similar fastenings.

CLEANING UP: At completion, remove all excess materials and all debris resultant from operations of work of this Section. Leave entire work in neat, clean condition, satisfactory for receipt of other related items of work to be installed as part of work of other Sections.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall include furnishings all labor and materials required to provide all finish carpentry and millwork, as scheduled on Drawings and as specified herein.

Work Included This Section:

All finish carpentry, cabinetwork, and millwork, as identified on Drawings, which shall include, but not necessarily be limited to the following:

1. Cabinets (base and wall hung)
2. Interior wood trim and paneling.
3. Work Counters
4. Shelves and Slatwall
5. Hanging all wood doors as scheduled. Doors will be fabricated prefit.

Furnish all millwork and cabinet work, deliver to building, assemble, level, secure to floors and/or walls, as shown on Drawings, equipment schedule, Specifications, and processed Shop Drawings.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

AWI Quality Standard: Comply with applicable requirements of "Architectural Woodwork Quality Standards" published by the Architectural Woodwork Institute (AWI), except as otherwise indicated.

QUALITY CONTROL:

Millwork Contractor shall be approved by Architect on basis of quality of work performed during at least 10 years of manufacturing, capability to meet requirements of these specifications, reputation of performing satisfactory work on time, and completion of at least three satisfactory installations of projects of comparable size.

SUBMITTALS:

Shop Drawings: Submit shop drawings in accordance with GENERAL CONDITIONS on all items fabricated for this Project. Shop Drawings shall locate all grounds, blocking, and other anchoring devices required to properly secure the work.

Do not fabricate millwork until final Shop Drawings have been processed by Architect. Reviewing and processing shop drawings by Architect does not relieve Contractor of checking and verifying job dimensions and conditions required by details on processed Shop Drawings and Contract Drawings.

Reviewing and processing shop drawings by Architect does not authorize changes. No changes will be made without explicit written authorization.

Samples: Submit samples of following items for approval by Architect prior to preparation of Shop Drawings and deliver to Project Site.

- Submit complete and current plastic laminate colors and patterns sample chain from Formica, that includes samples of all standard and premium textures and patterns options.
- Submit complete laminate colors/pattern/textures chains from Formica, Nevamar, and Wilsonart, chains from all three manufacturers, for Architect to select from.
- Submit complete and current colors and patterns sample chain of PVC edgeband.
- Cabinet door and drawer, showing constructions.
- Shelving Wood trim countertop and backsplash (plastic laminate clad)

PRODUCT HANDLING:

Delivery: Do not deliver millwork items to job site until building is sufficiently conditioned to prevent damage by moisture, dampness, excessive humidity, extreme dryness, extreme heat or cold.

Storage: Store millwork in enclosed areas having same temperature and humidity conditions as areas in which millwork will be installed.

Damaged Items: Remove from site immediately all items damaged due to improper handling or storage.

ENVIRONMENTAL CONDITIONS:

Building Conditions: Install millwork only when normal temperature and humidity conditions approximate interior conditions that will exist when building is occupied.

Glazing shall be in place, and all exterior openings closed. All concrete, plastering, and other wet work shall be completed and dry.

Heat and Ventilation shall be provided to maintain proper conditions before, during and after completion of installing casework.

FIELD MEASURING AND COORDINATION:

Before fabrication begins, inspect and field measure all areas to receive work, as follows:

Field measure areas where the work is to be installed.

Field coordinate with adjacent electrical and data outlet locations, and adjacent equipment locations, prior to rough-in of electrical devices.

PART 2: PRODUCTS

MATERIALS:

General: Except as otherwise indicated, comply with following requirements for architectural woodwork not specifically indicated as prefabricated or prefinished standard products.

Wood Moisture Content: Provide kiln-dried (KD) lumber with an average moisture content range of 9% to 13% for exterior work and 6% to 11% for interior work. Maintain temperature and relative humidity during fabrication, storage and finishing operations so that moisture content values for woodwork at time of installation do not exceed the following:

Interior Wood Finish: 8% - 113% for damp regions (as defined by AWI).

Interior Wood for Transparent Finish:

Solid Wood: Plain-sawn premium clear red oak.

Plywood: Plain sliced premium clear red oak.

Plastic Laminate: Comply with NEMA LD-3 for type (vertical and horizontal grades), thickness, color, pattern, finish and textures indicated for each application, or if not indicated, as selected by the Architect from the manufacturer's complete line of colors and patterns, and from the manufacturer's complete line of standard and premium textures options.

Manufacturer:

Standard: For purpose of designating type and quality for plastic laminate work under this Section, Drawings and Specifications are based on products manufactured by Formica.

The basis of design is Formica's complete line of plastic laminate colors and patterns, including all of Formica's complete line of standard and premium textures options.

Submit complete and current laminate color/patterns/textures sample chains from Formica, Nevamar, and Wilsonart, all three manufacturers, for Architect to choose from.

Provide exterior grade plywood or water-resistant resin impregnated composition board countertops at all locations with a sink. Use CD exterior grade veneer plywood, fabricated with water resistant glues and adhesives.

Quality Standards: For following types of architectural woodwork; comply with indicated standards as applicable:

Casework and Countertops: AWI Section 400.

Shelving: AWI Section 600.

Design and Construction Features: Comply with details shown for profile and construction of architectural woodwork; and, where not otherwise shown, comply with applicable Quality Standards, with alternate details as Fabricator's option.

Solid Surface Countertops and Benches: Where Corian Solid Surface countertops or benches are indicated on Drawings, provide ½" Corian or equal solid surfacing material. Architect to select from manufacturer's full range of colors and patterns.

Laminated Slatwall Paneling: Where indicated on Drawings, provide 3/4 inch thick medium density fiberboard paneling, laminated with high pressure laminate, grooved to receive standard-sized fixture mounting brackets for display. Color to be selected from panel manufacturer's standard options. Grooves shall be lined with powder coated extruded aluminum inserts, color selected by Architect.

Slatwall Display Accessories: Provide 4 rows of 12" deep x ¾" thick melamine slatwall shelving, with all necessary shelf brackets, for complete shelving assemblies. Provide (2) 25-count packs of assorted slatwall peg hooks; one pack with assorted 2", 4", 6" sizes, and one pack with assorted 8", 10", 12" sizes.

INTERIOR ARCHITECTURAL WOODWORK:

Wood Casework, Transparent Finish or Plastic Laminate Clad

AWI Section: 400

Grade: Custom, with book matching of adjoining leafs with transparent finish

Construction: Reveal Overlay.

CABINET HARDWARE AND ACCESSORY MATERIALS:

Hardware Standards: Except as otherwise indicated, comply with ANSI A 156.9 "American National Standard for Cabinet Hardware". Millwork Contractor to provide slides, dual hinges, catches, standards, brackets, locks, and pulls as shown and required.

Drawer and Door Pulls: Hafele No. 151.33.203, cast aluminum, brushed finish.

Catches: Heavy-duty roller ball catches.

Catches for Tall Cabinet Door Pairs: EPCO Heavy-Duty Elbow Catch, spring-loaded, in bright nickel finish, manufactured in solid brass, with slotted screw adjustment holes.

Hinges: Reveal overlay, 5-knuckle, non-removable pin, institutional hospital type, brushed nickel finish, by Terry or Rockford Process Control, or equivalent.

Edge Band: 3mm PVC unless indicated otherwise, exposed or concealed.

Unless otherwise noted, all edges shall be banded with 3mm PVC, with all PVC edges eased with a radius.

Shelving Edge Band: Provide 3mm PVC edgebanding of shelves on front and rear edges only, with 1mm PVC edgebanding on remaining two side edges.

Countertop Support Bracket: Wall mounted bracket, powder coated A-36 steel angle, 3/8” thick x 2.5” with beveled edges, with integral steel gusset. Mount with masonry expansion anchors at masonry support wall. Equivalent to model Front Mounting PLUS Brackets by Centerline Brackets.

Glass shall be Grade A, double strength, where scheduled.

Stainless steel sinks will be furnished and installed by Plumbing Contractor in countertop openings provided by Millwork Contractor.

PART 3: EXECUTION

INSPECTION OF SURFACES:

Inspection: Before installation begins, inspect all areas to receive work, as follows:

Field measuring areas where the work is to be installed.

For any deficiency which might prevent satisfactory installation of cabinetwork, millwork, or hanging wood doors, including coordination with adjacent electrical and data outlet, and adjacent equipment locations.

For presence and proper positioning of grounds and other anchoring devices built into work as required by approved millwork Shop Drawings.

Acceptance of Surfaces: Do not start fabrication or work until deficiencies of surfaces to receive work have been corrected. Beginning of installation in any area shall constitute acceptance of that area as satisfactory to receive this work, and shall constitute acknowledgement that all areas have been field measured, and all coordination with adjacent systems have been performed. Contractor shall be fully accountable for final results and workmanship specified herein.

INSTALLATION:

Cabinetwork:

Install all cabinetwork in place, level, plumb, and accurately scribed and secured to wall and/or floor, as shown on Shop Drawings approved by Architect.

Wall cabinets shall be fastened using ¼" diameter lag bolts in lead shields with chrome finish washers @ 24" maximum spacing, minimum of 4 anchors per wall hung cabinet section, 2 anchors across top and 2 anchors across bottom.

Base cabinets shall be fastened using ¼" diameter lag bolts in lead shields @ 24" maximum spacing, minimum of 4 anchors per cabinet section.

Installation shall be complete, including all trim and fillers required.

At completion of installation leave all cabinets clean and free of defects.

Wood Doors:

Hang all wood doors according to Door Schedule and Shop Drawings approved by Architect.

Leave each door neatly hung, swinging easily, and performing all functions intended by finish hardware schedule.

CLEANUP: At completion of all Finish Carpentry, Cabinetwork and Millwork installations clean up all areas in which work was performed and leave ready for installation of related work.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall consist of furnishing all labor and materials required to insulate exterior CMU/brick cavity walls, exterior stud/brick cavity walls, interior stud walls, foundations, interior ceilings, and acoustical sound tubes all as shown on Drawings and as specified herein.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

QUALITY ASSURANCE:

Extent of insulation work is shown on drawings and indicated by provisions of this section.

Applications of insulation specified in this section include the following:

- Foundation wall board insulation (supporting backfill)
- Spray Applied Polyurethane Insulation
- Ceiling fiberglass blanket Insulation.
- Exterior Below Grade Waterproofing

QUALITY ASSURANCE:

Thermal Conductivity: Thicknesses indicated are for thermal conductivity (k-value at 75 degrees F or 24 degrees C) specified for each material. Provide adjusted thicknesses as directed for equivalent use of material having a different thermal conductivity. Where insulation is identified by "R" value, provide thickness required to achieve indicated value.

SUBMITTALS:

Product Data: Submit manufacturer's product specifications and installation instructions for each type of insulation and vapor barrier material required.

PRODUCT HANDLING:

General Protection: Protect insulation from physical damage and from becoming wet, soiled, or covered with ice or snow. Comply with manufacturer's recommendations for handling, storage and protection during installation.

PART 2: PRODUCTS

FOUNDATION / CAVITY WALL INSULATION:

Extruded Polystyrene Board Insulation: Rigid, closed-cell, extruded polystyrene insulation board with integral high-density skin and tongue and groove edges; complying with ASTM C578, Type IV, 25 psi compressive strength, R-value of 5.00 @ 75 degrees F mean temperature; 0.1% maximum water absorption; 1.5 perm-inch max. water vapor transmission; manufacturer's standard lengths and widths.

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work included, but are not limited to the following:

Manufacturer: Subject to compliance with requirements, provide products of one of the following:

- Dow Chemical Co., Midland, MI (Dupont Styrofoam XPS)
- UC Industries/U.S. Gypsum; Chicago, IL (Foamular)

Mechanical Anchors: Type and size shown or, if not shown, as recommended by insulation manufacturer for type of application and condition of substrate.

Adhesive Mastic: Type, size and spacing for each condition as recommended by insulation manufacturer for type of application and condition of substrate.

Mastic Sealer: Type recommended by insulation manufacturer for bonding edge joints between units and filling voids in work.

SPRAY APPLIED POLYURETHANE INSULATION:

Provide labor, materials, and equipment necessary to two-component, self-adhering spray-apply using blowing agent HFC-245fa, closed-cell polyurethane foam (SPF) insulation, air seal and water repellent treatment for cavity wall CMU throughout the Project. Not required at CMU surfaces to receive EIFS finish.

Spray Polyurethane Foam Insulation shall be a seamless self-adhering spray-applied rigid polyurethane foam system, forming a membrane that seals CMU surfaces. Spray apply in liquid form, to form a seamless, thermal, moisture and air barrier and envelope across CMU to structural steel surfaces, and at wall-to-roof decking transition areas.

Application: Substrate to which insulation is applied must be clean, dry as confirmed by testing, and free of frost, ice, loose debris, or contaminates that will interfere with adhesion of the spray applied insulation.

Apply primers to surfaces where required by manufacturer’s installation instructions. Spray apply to substrates when ambient air temperatures no less than 50 degrees F or as authorized by manufacturer, and when ambient humidity is within manufacturer’s guideline ranges, and following all manufacturer’s installation guidelines. Apply after the perimeter wall is in place, and rough-in plumbing and electrical penetrations inspections are completed.

Mask off all areas and surfaces to not to receive insulation. Upon completion, remove all overspray, and remove all masking materials. Shield the spray polyurethane foam from interior exposure with an approved thermal barrier.

Where damage occurs which violates the spray foam’s air seal and moisture seal, repair as needed using specified spray polyurethane material or specified foam repair kit material.

Accessories:

A. Foam Repair Kit and Materials: Provide as per manufacturer’s standard products, provided by manufacturer or equivalent kits.
B. Mineral Wool: Safing Mineral Wool Board, 4.0 lb./cu.ft. density, as manufactured by Rock Wool Manufacturing, or equivalent.

C. Moisture Detection Paper (MDP) Strips: MDP Strips manufactured by NCFI Polyurethanes or equivalent.
D. Liquid-Applied air barrier flashing, equivalent to Prosoco FastFlash, Carlisle Barrier Seal, or Tremco.

Physical Characteristics and Properties: Foamed-In-Place Wall Insulation shall equal or exceed the following:
A. Free Rise Core Density: 2.0 lbs/cu.ft. per ASTM D-1622
B. Compressive Strength: 27 psi (min) per ASTM D-1621
C. R-Value: 6.8 (min) per inch, 13 per 2 inches, per ASTM C-518
D. Moisture Vapor Transmission: 1.3 perm per inch, 0.65 perm at 2" thick, per ASTM E 283 and 2178
E. Water Resistive Barrier: No Penetration per a 6.24 psf test condition, ASTM E-331
F. Air Leakage Certification: 0 at 1.57 psf, per ASTM E-283 and 2178
G. Surface Burning Characteristics: Flame Spread Index < 25 and Smoke Developed Index < 450 per ASTM E-84

Acceptable Products:
A. InsulBloc Spray Foam System 11-017 by NCFI Polyurethanes, PO Box 1528, Mt. Airy, NC 27030
B. Equivalent products by Polymaster.
C. Equivalent products by CertainTeed.
D. Or equivalent products per information submitted to and accepted by the Architect.

Quality Assurance:
A. Compliance with AC 377 and ASTM C1029.
B. Insulation shall be installed per the manufacturer's printed instruction submitted to the Architect prior to the start of work.
C. Insulation shall be installed by a contract installer who has been trained and certified by the manufacturer. The contract installer shall have not less than three (3) years experience in the trade and be properly licensed to perform the scope of work.
D. Follow and adhere to all manufacturer's and OSHA safety guidelines.
E. Upon completion of the installation, the contract installer shall provide 4-color infrared thermal images of all exterior wall surfaces to the Architect to confirm that the spray applied cavity insulation completely covers all surfaces required to be insulated, with the required thickness. If the thermal images show voids, the contract installer shall apply foam to correct the deficiency at no added cost to the Owner.
F. Provide a one year product performance warranty by the manufacturer.

Barrier System Required in Areas Not Protected with Drywall or Masonry:
A. Areas of Spray Foam Insulation not protected with Drywall or Masonry shall be protected with an approved intumescent covering, equal to International Fireproofing Technologies, Inc., "DC-315", spray applied 21 mils wet / 14 mils dry minimum, meeting all requirements of the NC Building Code and IRC.

EXTERIOR BELOW GRADE WATERPROOFING

Where indicated on Drawings, provide hot mopped liquid asphalt on three inter-mopped layers of #30 lb. asphalt roofing felts, all bonding together and flood coated with hot liquid asphalt.

CEILING INSULATION:

Unfaced Blanket-type Glass Fiber Ceiling Insulation: Inorganic non-asbestos fibers formed into semi-rigid blankets, R-13 and R-19, 24" x 48" batt size. Do not insulate over lighting fixtures. Provide over all ceilings, unless otherwise noted.

PART 3: EXECUTION

INSPECTION AND PREPARATION:

Installer must examine substrates and conditions under which insulation work is to be performed, and must notify Contractor in writing of unsatisfactory conditions. Do not proceed with insulation work until unsatisfactory conditions have been corrected in manner acceptable to Installer.

Clean substrates of substances harmful to insulations or vapor barriers, including removal of projections which might puncture vapor barriers.

INSTALLATION:

General:

Comply with manufacturer's instructions for particular conditions of installation in each case. If printed instructions are not available or do not apply to project conditions, consult manufacturer's technical representative for specific recommendations before proceeding with work.

Extend insulation full thickness as shown over entire area to be insulated. Spray, cut and fit tightly around obstructions, and fill voids with insulation. Remove projections which interfere with placement.

END OF SECTION

PART 1 GENERAL

1.1 SECTION INCLUDES

A. Pre-Engineered Building Insulation System for New Construction.

1.2 RELATED SECTIONS

A. Section 13120 – Pre-Engineered Metal Buildings

B. Section 13900 – Fire Protection Systems

B. Division 15 - Mechanical; Rough-in utilities.

B. Division 16 - Electrical; Rough-in utilities.

1.3 REFERENCES

A. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials.

B. ASTM E 96 - Standard Test Method for Water Vapor Transmission of Materials in Sheet Form (Procedure B).

C. ASTM C 665 - Standard Specification for Mineral-Fiber Blanket Thermal Insulation for Light Frame Construction and Manufactured Housing.

D. NFPA 255 - Standard Method of Test of Surface Burning Characteristics of Building Materials.

E. UL 723 - Tests for Surface Burning Characteristics of Building Materials.

F. ASTM C 1136 - Standard Specification for Flexible, Low Permeance Vapor Retarders for Thermal Insulation.

1.4 DESIGN REQUIREMENTS

A. Thermal Resistance of Installed System: Roof R-Value of 30.

B. Insulating system shall have a continuous vapor barrier inside of building purlins, and insulation to provide complete isolation from inside conditioned air.

1.5 SUBMITTALS

A. Submit under provisions of General Conditions and General Requirements Section 01040.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage and handling requirements and recommendations.
   3. Installation instructions.

C. Shop Drawings: Indicate locations of connections and attachments, general details, anchorages and method of anchorage and installation.

D. Verification Samples: For each finish product specified, two samples, minimum size 6

inches (150 mm) square or long, representing actual products required by the manufacturer for this project.

E. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing product systems specified in this section with minimum five years documented experience.

B. Installer Qualifications: Company specializing in performing work of this section.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store products in manufacturer's unopened packaging until ready for installation.

B. Store products indoors and protect from moisture, construction traffic, and damage.

1.8 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

B. Obtain a full and complete on-site analysis of actual roof structure field conditions for manufacturer’s assessment of vapor barrier criteria for proposed product features to be submitted.

PART 2 PRODUCTS

2.1 MATERIALS

A. Provide a new construction insulation system, equivalent to Simple Saver System by Thermal Design, consisting of Batt Roof Insulation, Roof Insulation, Syseal Vapor Barrier Liner Fabric specifically designed for the roof structure in place, Thermal Breaks, Straps, and other devices and components in a complete insulation system assembly as follows:
   1. Batt Roof Insulation: Fiberglass batt or fiberglass blanket complying with ASTM C 665 and ASTM E 84 with a thermal resistance as follows:
      a. R-30; 9 inches.
   2. Vapor Barrier Liner Fabric (type subject to recommendation by the manufacturer for the actual roof structure conditions): Syseal type woven, reinforced, high-density polyethylene yarns coated on both sides with a continuous white or colored polyethylene coatings, as follows:
      a. Product complies with ASTM C 1136, Types I through Type VI.
      b. Perm rating: 0.02 for fabric and for seams in accordance with ASTM E 96.
      c. Flame/Smoke Properties:
         1) 25/50 in accordance with ASTM E 84.
         2) Self-extinguishes with field test using matches or butane lighter.
      d. Size and seaming: Manufactured in large custom pieces by extrusion welding from roll goods, and fabricated to substantially fit defined building areas with minimum practicable job site sealing.
      e. Provide with factory double, extrusion welded seams. Stapled seams or heat-melted seams are not acceptable due to degradation of fabric.
      f. Factory-folded to allow for rapid installation.
      g. Color:

1) Selected from standard colors by Architect.

3. Vapor Barrier Lap Sealant: Solvent-based, polyethylene fabric adhesive.
4. Vapor Barrier Tape: Double-sided sealant tape 3/4 inch wide by 1/32 inch thick.
5. Vapor Barrier Patch Tape: Single-sided, adhesive backed sealant tape 3 inches wide made from same material as Syseal type liner fabric.
6. Thermal Breaks:
   a. 3/16 inch thick by 3 inch wide white, closed-cell polyethylene foam with pre-applied adhesive film and peel-off backing.
   b. Polystyrene snap-on thermal blocks.
7. Straps:
   a. 100 KSI minimum yield tempered, high-tensile-strength steel.
   b. Size: Not less than 0.020 inch (0.50 mm) thick by 1 inch (25 mm) by continuous length.
   c. Galvanized, primed, and factory finish painted to match vapor barrier liner finish color on the exposed side.
8. Fasteners:
   a. For light gage steel: #12 by 3/4 inch plated Tek 2 type screws with sealing washer, painted to match color of vapor barrier and straps.
   b. For heavy gage steel: #12 by 1-1/2 inch plated Tek 4 type screws with sealing washer, painted to match color of vapor barrier and straps.
   c. For wood, concrete, other materials: As recommended by manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that building structure including all bracing and any concealed building systems are completed and approved prior to installing liner system and insulation in the structure.

B. Correct any unsatisfactory conditions before proceeding.

C. If conditions are the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.2 INSTALLATION - GENERAL

A. Install roof insulation system in accordance with manufacturer's installation instructions and the approved shop drawings.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

C. Install in exterior spaces without gaps or voids. Do not compress insulation.

D. Trim insulation neatly to fit spaces. Insulate miscellaneous gaps and voids.

E. Fit insulation tight in spaces and tight to exterior side of the sealed liner fabric and around mechanical and electrical services within plane of insulation.

3.3 ROOF INSULATION INSTALLATION

A. Straps:
   1. Cut straps to length and install in the pattern and spacings indicated on shop drawings.
   2. Tension straps to required value.

B. Vapor Barrier Fabric:
   1. Install vapor barrier fabric in large one piece custom fabricated pieces to substantially fit defined building areas with minimum practicable job site sealing.
   2. Position pre-folded fabric on the strap platform along one eave purlin.
   3. Clamp the two bottom corners at the eave and also centered on the bay.
   4. Pull the other end of the pleat-folded fabric across the building width on the strap platform, pausing only at the ridge to fasten the straps and fabric in position where plane of roof changes and to release temporary fasteners on the opposite ridge purlins.
   5. Once positioned, install fasteners from the bottom side at each strap/purlins intersection.
   6. Trim edges and seal along the rafters.
   7. All seams must be completely sealed and stapled seams not acceptable.

C. Insulation:
   1. Unpack, and shake to a thickness exceeding the specified thickness.
   2. Ensure that cavities are filled completely with insulation.
   3. Place on the vapor barrier liner fabric without voids or gaps.
   4. Place thermal block on top of purlins or bottom of purlins for retrofit work, if no other thermal break exists.
   5. Place new insulation between purlins at the required thickness for the R-value specified.

D. Seal vapor barrier fabric to the wall fabric and elsewhere as required to provide a continuous vapor barrier.

3.4 CLEANING

A. Clean dirt or exposed sealant from the exposed vapor barrier fabric.

B. Remove scraps and debris from the site.

3.5 PROTECTION

A. Protect system products until completion of installation.

B. Repair or replace damaged products before completion of insulation system installation.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

TYPE AND SEQUENCE OF CONSTRUCTION

New roof insulation over new steel roof deck. New roof system shall meet fire resistance Class A requirements and wind uplift resistance meeting ASTM E1592 and UL/FM I-90.

RELATED SECTIONS

07610 Metal Roofing

SUBMITTALS

Product Data:

1. Product data sheets.
2. Product samples.

DELIVERY, STORAGE, AND HANDLING

Deliver and store products according to general requirements for materials and equipment and Part 3 of this Section.

Provide unopened containers and packages with labels bearing producer(s) name and source of product and date of manufacture. Factory Mutual approval or Underwriters Laboratories Classification shall be on package.

Keep roof insulation protected while in storage; keep dry during application. Outdoors, store off ground on pallets protected with breathing type covers. Roof insulation which has been wet, and then dried, may be used only if approved by Architect.

ENVIRONMENTAL REQUIREMENTS

Install roof insulation only when surfaces are dry.

Do not install roof insulation if moisture content of substrate is above that acceptable to roof insulation and roof membrane producer.

PART 2: PRODUCTS

ROOF INSULATION

Vapor Barrier - 10 mil Polyethylene with lapped edges taped.

Product: Rigid polyisocyanurate board, with a coated glass-fiber facer conforming to or exceeding the requirements of ASTM C 1289, Type II, Class 1, Grade 3 (25 psi), in compliance with FM Standard 4450/4470, and UL Standard 1897 Uplift resistance.

Equivalent to: ENRGY 3 Polyisocyanurate Roof Insulation, by Johns Manville
ACFOAM-II Polyisocyanurate Roof Insulation, by Atlas

Thickness: 2 layers/courses; for a total R-25 assembly

Property	Test Method	Value
Tensile Strength:	ASTM C209	730 psf
Thermal Resistance (LTTR):	ASTM C518	R 5.7 per inch
Water Absorption:	ASTM C209	1.0% by volume, maximum
Water Vapor Permeance:	ASTM E96	1.5 perm maximum
Dimensional Stability:	ASTM 2126	2% linear change, maximum
Maximum Operating Temperature:	ASTM D 1623	-100 F to 250 F
Product Density:	ASTM D1622	Nominal 2 pcf
Compressive Strength:	ASTM D1621	Grade 3: 25 psi minimum
Flame Spread:	ASTM E84	20-30
Smoke Developed:	ASTM E84	55-250

Referenced Standards:

Section 2603, FOAM PLASTIC INSULATION, International Building Code
ASTM: ASTM C 1289, Type II, Class 1
Underwriters Laboratories: Class A for Roof System External Flame – UL Standard 790
Insulation shall meet criteria for UL 1256 for a fire classified system.
Underwriters Laboratories: UL Construction No. 263
FM Standards 4450 / 4470

Acceptable Alternate Insulation: Styrofoam Deckmate XPS extruded polystyrene, R 5.0 per inch @ 75 degrees F mean. Compressive Strength: 40 psi. Comply with ASTM C578-01, Type IV. General Contractor is responsible for monitoring the specified R-25 R-Value assembly and accounting for any change in insulation thickness, with roof metal adjustments.

PART 3: EXECUTION

ROOF INSULATION APPLICATION:

GENERAL

Cover metal roof decking with 10 mil polyethylene vapor barrier, with all joints lapped minimum of 12”, and taped.

Lay roof insulation in staggered courses parallel to roof edges.

Stagger end joints of each course, both layers.

Miter roof insulation edges at ridges, valleys, and other similar non-planar conditions. Butt edges to provide moderate contact; do not smash edges. Provided in layers specified with each layer’s joints taped.

PROTECTION

Protect roofing work from foot traffic and construction damage.

CLEAN UP

Remove excess materials, trash, debris, equipment, and parts from the Work.

Repair, or remove and replace, damage and stains caused by roofing work.

FIELD QUALITY CONTROL:

Protection: If work is stopped before completion of application of roof insulation and roofing, protect exposed insulation. Seal edges to prevent penetration of moisture. Do not lay more insulation in one working day than can be covered by roofing in same day.

Inspection: Architect shall be notified to inspect work after completion of vapor barrier and completion of roof insulation. If this examination discloses that work is not according to Specification, or that work has been damaged by traffic or other trades, Contractor shall agree to furnish additional materials necessary to make repairs and place work in acceptable condition.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Spray-apply fireproofing in required thicknesses and densities on structural steel members to produce required rate of fire resistance as scheduled in this Section and shown on plans, as outlined in UL Fire Resistance Directory Designs.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 0l068.

QUALIFICATIONS:

Manufacturers:

Standard: For purposes of designating type and quality for the work under this Section, Drawings and Specifications are based on products manufactured or furnished as indicated below and approved by the testing agency referenced on the detailed drawings.

Acceptable Manufacturers: Following manufacturers, meeting all requirements of these specifications will also be acceptable for work in this Project.

W.R. Grace Company
Pyrock
Carboline, Inc.
CAFCO SFRM

Qualifications of Applicator:

Licensed or certified by manufacturer of fireproofing materials.

Applicator shall be experienced in performing application of materials on two projects with similar quantities of sprayed fireproofing materials. Provide names of projects and contact numbers of contractor.

Requirements of Regulatory Agencies:

Current building code requirements of the State of North Carolina for fire resistance ratings of areas to receive sprayed fireproofing materials. (2018 North Carolina State Building Code – 2015 International Building Code with North Carolina Amendments)

Underwriters Laboratories Assemblies:

UL D902
UL D916
UL P741

SUBMITTALS:

Test Reports:

Submit copies of UL fire test reports of sprayed fireproofing application to substrate materials required.

Submit certified test reports of acceptable testing agencies which perform testing in accordance with ASTM E119 and E84.

RATING SCHEDULE (THICKNESSES): Submit manufacturer's UL approved design thickness attesting as to UL Designs necessary to achieve ratings.

PRODUCT HANDLING:

Delivery: Deliver materials to project site in manufacturer's original, unopened containers with manufacturer's brand name clearly marked thereon.

Storage: Store materials under cover in dry place.

PART 2: PRODUCTS

MATERIALS:

CEMENTITIOUS SPRAY FIREPROOFING SYSTEMS:

Concealed Areas:

Carboline Southwest Type 5GP
W. R. Grace Company – MK-6/HY
Carboline - Pyrolite 15-High Yield
CAFCO SFRM

Exposed Areas:

Carboline Southwest Type 5MD
W. R. Grace Company – Type Z146
Pyrocrete 40
CAFCO SFRM

Composition: Product shall contain no asbestos fiber and shall have high resistance rating to dusting, flaking, delaminating. Product shall not contain mineral fiber.

PART 3: EXECUTION

APPLICATION:

Apply strictly according to approved manufacturer's printed instructions.

Provide adequate ventilation during entire application process. Provide forced air ventilation at a rate of 3 air exchanges per hour until completely dried.

Apply manufacturer's required bond adhesive to all surfaces to receive fireproofing prior to application of fireproofing, installed as per manufacturer's installation instructions.

Apply fireproofing only after roof installation is completed and is watertight, and roof traffic has ceased.

PROTECTION:

Protect all fireproofing at all times following application until permanent covering or finish material is placed over it. Patch and repair as required after all trades have completed work that could damage fireproofing.

QUALITY ASSURANCE:

Test fireproofing for thickness and densities, per ASTM E605-93 at a frequency of 1 beam, 1 column, 1 deck (if applicable) for every 10,000 sq. ft. of floor space, or 1 per every floor.

Any fireproofing found to be deficient in thickness or densities, contractor shall repair / replace fireproofing and retest per ASTM E605-93 at contractor's expense.

RATING SCHEDULE (THICKNESSES): Provide manufacturer's UL approved design thickness schedule attesting as to UL Designs necessary to achieve ratings.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 - GENERAL

DESCRIPTION OF WORK:

Work of this Section shall consist of furnishing all labor, materials and accessories required to provide a complete tapered roof insulation system as shown on Drawings and as specified herein.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products by following:

BMCA
Atlas Roofing
Johns Manville
Georgia Pacific

SUBMITTALS:

Manufacturer's Data: Submit for approval three copies of folder containing complete Manufacturer's data and installation procedures for all materials to be used in work of this Section of Specifications.

Samples: Submit samples of insulation specified.

Layout**:** Submit tapered insulation plan drawing showing location of ridges, valleys, tapered boards and crickets, with cross sections.

Certificate of Compliance: Submit to Architect certified statement of compliance with these specifications.

PRODUCT HANDLING:

Working Area: Provide suitable working area for storage of materials and equipment.

Delivery: Deliver manufactured items to site in original sealed containers or packages bearing Manufacturer's name and brand designation. Where specified, materials shall have UL labels or Manufacturer's certification.

PROTECTION:

Adjacent Surfaces: Before starting any insulation work, protect in an approved manner paving and face of building walls adjacent to hoists and conveyors. Protection shall remain in place for duration of insulation work.

Repairs: Any work or materials damaged during insulation work shall be restored to perfect condition or shall be replaced.

PART 2 - PRODUCTS

TAPERED ROOF INSULATION:

Insulation system shall be polyisocyanurate, bonded to fiberglass facers. Thickness as shown on plans. Rigid polyisocyanurate board, with a coated glass-fiber facer conforming to or exceeding the requirements of ASTM C 1289 / FS HH-I-1972, equivalent to: EnergyGuard Ultra Polyiso by BMCA, or equivalent products by Atlas Roofing or Johns Manville.

Acceptable Alternate Insulation: Styrofoam Deckmate XPS extruded polystyrene, R 5.0 per inch. Compressive Strength: 25 psi. GC is responsible for monitoring specified R-Value and accounting for any change in insulation thickness, with roof metal adjustments.

Tapered insulation system shall provide minimum uniform 1/4" per foot sloped or as shown on drawings.

Recover Board: 1/2” overlayment mechanically attached. Overlayment board with a water-resistant gypsum core with glass fiber facers embedded on both sides. Equivalent to: GP Dens-Deck Roof Board.

Protection Board: Expanded perlite mineral aggregate board conforming to or exceeding the requirements of FS HH-I-529b, ANSI/ASTM C 728. Equivalent to: EnergyGuard Perlite, by BMCA or equivalent products by Johns Manville, or Versico.

PART 3 - EXECUTION

CONDITION OF SURFACES:

Proper Surfaces: Surfaces to which insulation is to be applied, shall be even, smooth, sound, thoroughly clean and dry, and free from all defects that might effect application.

Other Work: Installation of other work, where required, shall be complete before application of insulation is started.

Field Quality Control:

Protection: If work is stopped before completion of application of roof insulation and roofing, protect exposed insulation. Seal edges to prevent penetration of moisture. Do not lay more insulation in one working day than can be covered by roofing in same day.

Inspection: Architect reserves right to inspect work during application and upon completion. If this examination discloses that work is not according to this Specification or Drawings, or that work has been damaged by traffic or other trades, Contractor shall agree to furnish additional materials necessary to make repairs and place work in acceptable condition.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 DESCRIPTION OF WORK:

Work of this Section shall consist of furnishing all labor, materials and accessories required to provide a complete asphaltic modified bitumen roofing system and a complete tapered roof insulation system as shown on Drawings and as specified herein.

1.2 SECTION INCLUDES

A. Asphaltic modified bitumen roofing.

B. Tapered Roof Insulation.

1.3 RELATED SECTIONS

A. Section 06100: Rough Carpentry: Roof blocking installation and requirements.

B. Section 07620: Sheet Metal Flashing and Trim: Metal flashing and counter flashing installation and requirements.

C. Section 15430: Plumbing Specialties: roof drains, scuppers, gutters and downspout installation and requirements.

1.4 REFERENCES

A. Factory Mutual (FM Global) - Approval Guide.
   1. Factory Mutual Standard 4470 - Approval Standard for Class 1 Roof Covers.

B. Underwriters Laboratories (UL) - Roofing Systems and Materials Guide (TGFU R1306).

C. American Society for Testing and Materials (ASTM) - Annual Book of ASTM Standards.
   1. ASTM C 208 - Standard Specification for Cellulosic Fiber Insulating Board.
   2. ASTM C 728 - Standard Specification for Perlite Thermal Insulation Board.
   3. ASTM C 1289 - Standard Specification for Faced Rigid Cellular Polyisocyanurate Thermal Insulation Board.
   4. ASTM D 41 - Standard Specification for Asphalt Primer Used in Roofing, Dampproofing and Waterproofing.
   5. ASTM D 312 - Standard Specification for Asphalt Used in Roofing.
   6. ASTM D 1863 - Standard Specification for Mineral Aggregate Used on Built-Up Roofs.
   7. ASTM D 2178 - Standard Specification for Asphalt Glass Felt Used in Roofing and Waterproofing.
   8. ASTM D 3672 - Specification for Venting Asphalt-Saturated and Coated Inorganic Felt Base Sheet Used in Roofing.
   9. ASTM D 3909 - Standard Specification for Asphalt Roll Roofing (Glass Felt) Surfaced With Mineral Granules.
   10. ASTM D 4586 - Standard Specification for Asphalt Roof Cement, Asbestos-Free.
   11. ASTM D 4601 - Standard Specification for Asphalt-Coated Glass Fiber Base Sheet Used in Roofing.
   12. ASTM D 4897 - Standard Specification for Asphalt-Coated Glass-Fiber Venting Base Sheet Used in Roofing.
   13. ASTM D 6163 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Glass Fiber Reinforcements.

14. ASTM D 6164 - Standard Specification for Styrene Butadiene Styrene (SBS) Modified Bituminous Sheet Materials Using Polyester Reinforcements.
15. ASTM D 6222 - Standard Specification for Atactic Polypropylene (APP) Modified Bituminous Sheet Materials Using Polyester Reinforcements.

D. Sheet Metal and Air Conditioning Contractors National Association, 1nc. (SMACNA) - Architectural Sheet Metal Manual.

E. Asphalt Roofing Manufacturers Association (ARMA).

F. National Roofing Contractors Association (NRCA).

1.5 DEFINITIONS

A. Roofing Terminology: Refer to ASTM D1079 and the glossary of the National Roofing Contractors Association (NRCA) Roofing and Waterproofing Manual for definitions of roofing terms related to this section.

1.6 PERFORMANCE REQUIREMENTS

A. Provide an installed roofing membrane and base flashing system that does not permit the passage of water and will withstand the design pressures calculated in accordance with the most current revision of ASCE 7.

B. The Manufacturer shall provide all primary roofing materials that are physically and chemically compatible when installed in accordance with manufacturers current application requirements.

1.7 SUBMITTALS

A. Submit under provisions of the General Conditions and Supplementary General Conditions.

B. Product Data: Provide Product Data sheets for each type of product indicated in this section.

C. Shop Drawings: Provide manufacturers standard details and approved shop drawings for the roof system specified.

D. Samples: Provide samples of insulations, fasteners, membrane materials and accessories for verification of quality.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: Manufacturer shall provide a roofing system that meets or exceeds all criteria listed in this section.

B. Installer Qualifications:
1. Installer shall be classified as an Approved Contractor as defined and certified by manufacturer.

C. Source Limitations: Components listed shall be provided by a single manufacturer or approved by the primary roofing manufacturer.

1.9 PRE-INSTALLATION CONFERENCE

A. Prior to scheduled commencement of the roofing installation and associated work, conduct a meeting at the project site with the installer, Architect, Owner, manufacturer’s representative and any other persons directly involved with the performance of the work. The installer shall record conference discussions to include decisions, agreements and open issues and furnish copies of recorded discussions to each attending party. The primary purpose of the meeting is to review foreseeable methods and procedures related to roofing work.

1.10 REGULATORY REQUIREMENTS

A. Work shall be performed in a safe, professional manner, conforming to all federal, state and local codes.

1.11 DELIVERY, STORAGE AND HANDLING

A. Deliver roofing materials to the site in original containers, with factory seals intact. Products shall carry manufacturer's label.

B. Store pail goods in their original undamaged containers in a clean, dry location within their specified temperature range.

C. Store roll goods on end on pallets in a clean, dry, protected area. Take care to prevent damage to roll ends or edges. Do not double stack modified bitumen products.

D. Do not expose materials to moisture in any form before, during or after delivery to the site. Reject delivery of materials that show evidence of contact with moisture.

E. Remove manufacturer supplied plastic covers from materials provided with such. Use "breathable" type covers such as canvas tarpaulins to allow venting and protection from weather and moisture. Cover and protect materials at the end of each work day. Do not remove any protective tarpaulins until immediately before the material will be installed.

F. Materials shall be stored above 55 degrees F a minimum of 24 hours prior to application.

G. Store and dispose of solvent-based materials and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.12 PROJECT CONDITIONS

A. Weather:
1. Proceed with roofing only when existing and forecasted weather conditions permit.
2. Ambient temperatures shall be above 45 degrees F when applying hot asphalt or water based adhesives.

1.13 WARRANTY

A. Provide manufacturer's standard, no dollar limit, Roof System Guarantee with single source coverage where the manufacturer agrees to repair or replace components in the roof system, which cause a leak due to failure in materials or workmanship.
1. Duration: Fifteen (15) years from the date of completion.

B. Provide Manufacturers standard, no dollar limit, Labor and Material Guarantee where the manufacturer agrees to repair or replace the portion of the roofing materials, which have resulted in a leak due to a manufacturing defect or defects caused by ordinary wear and tear.
1. Duration: Fifteen (15) years from the date of completion.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by CertainTeed Commercial Roofing Systems,. Other Manufacturers who can furnish equivalent products or systems of same materials specified will also be acceptable.

B. Equivalent products will be considered in accordance with provisions of the General

Conditions and Instructions to Bidders.

2.2 TAPERED ROOF INSULATION

A. Rigid polyisocyanurate board, with a coated glass-fiber facer conforming to or exceeding the requirements of ASTM C 1289, Type II, Class 1 / FS HH-I-1972, equivalent to: FLINTBOARD ISO Polyisocyanurate. Compliance with FM Standard 4450/4470.

Tapered insulation system shall provide minimum uniform 1/8" per foot sloped or as shown on drawings.

B. Expanded perlite mineral aggregate protection board conforming to or exceeding the requirements of FS HH-I-529b, ANSI/ASTM C 728.
1. Board Density: 9 lb/cf minimum.

2.3 ROOF BOARD

A. ½" underlayment or overlayment board with a water-resistant and silicone treated gypsum core with glass fiber facers embedded on both sides. Equivalent to: GP Dens-Deck Roof Board.

2.4 INSULATION ACCESSORIES

A. Cant Strip: Factory fabricated rigid perlite strip cut at angles to provide a true 45 degree angle between horizontal and vertical surfaces.

B. Tapered Edge Strip: Factory fabricated rigid perlite strip cut at angles to provide a smooth transition between differences in elevation.

2.5 SHEET MATERIALS

A. Asphalt coated, glass fiber reinforced base sheet: for use as a base sheet for both hot and cold applied, inorganic built-up roofing systems. Conforms to or exceeds requirements of ASTM D 4601, Type II, UL Type G2. Each roll contains three (3) squares (324 sf) of material, approximately 36 inches by 108 feet; 75 lb , equivalent to GLASBASE base sheet.

B. Asphalt coated glass fiber ply sheet: strong and lightweight, for use as an interply felt for hot and cold applied, inorganic built-up roofing systems. Conforms to or exceeds requirements of ASTM D 2178 Type IV and UL Type G1. Each roll contains five (5) squares (540 sf) of material, approximately 36 inches by 180 feet, 38 lb, equivalent to FLINTGLAS Ply Sheet Type IV.

C. Fire resistant, SBS Modified bitumen mineral surfaced cap sheet: for use as the finish ply in the application of hot applied SBS modified bitumen roof system assemblies. Fabricated with high performance, non-woven polyester mat and high grade fire-retardant modified bitumen compound. Complies with ASTM D 6164, Grade G, Type I and UL approved for Class A, B, and C roof assemblies. Top Surface: Mineral granules. Back Surface: Light Sand Finish, release agent. Each roll contains one square of material, approximately 39 3/8" by 33'-11"; 105 lb, equivalent to FLINTLASTIC FR-P SBS Modified Bitumen Fire-Resistant cap sheet.
1. Color: to be selected by Owner or Architect from standard selections.
2. Technical Properties:

a.	Softening point	ASTM D36	260 degrees F
b.	Thickness:	ASTM D5147	168 mils

2.6 BITUMEN / ADHESIVE

A. Asphalt bitumen: ASTM D 312.
1. Type III.
2. Type IV.

2.7 FLASHING MATERIALS

A. Fiberglass reinforced SBS modified asphalt cap sheet: Each roll contains three squares of roofing material, approximately 39.4 inches by 97.5 feet; 67 lb, equivalent to Flintlastic Cap Sheet.

2.8 EXPANSION JOINT ASSEMBLY

A. Where indicated on Drawings, provide manufacturer's expansion joint assembly at modified bitumen membrane transitions.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify that the surfaces and site conditions are ready to receive work.

B. Verify that the deck is supported and secured.

C. Verify that the deck is clean and smooth, free of depressions, waves or projections and properly sloped to drains, valleys, eaves, scuppers or gutters.

D. Verify that the deck surfaces are dry and free of ice or snow.

E. Verify that all roof openings or penetrations through the roof are solidly set and that all flashings are tapered.

F. A moisture survey shall be performed by the contractor to determine the extent of any wet insulation and moisture entrapment.

3.2 INSTALLATION - GENERAL

A. Install CertainTeed Roofing's SBS Modified Bitumen FR-P roofing system according to all current application requirements in addition to those listed in this section.

B. Install CertainTeed Specification #: SBS-C-3 -A.

C. When the slope of the roof is 1 inch per foot or greater, install all plies parallel with the slope of the roof and install intermediate wood nailers as required for the specific roof slope. Plies shall extend over ridges and nailed on 6 inches centers

D. Start the application of membrane plies at the low point of the roof or at the drains, so that the flow of water is over or parallel to, but never against the laps.

3.3 BITUMEN

A. Do not mix different types of asphalt.

B. Use only ASTM D 312, Type III or Type IV Steep Asphalt. Type IV asphalt shall be used on all slopes greater than 1/2 inches per foot.

C. Application with hot asphalt requires continuous, uniform interply mopping rates of 25 lb +/- 15 percent per 100 square feet of roof area.

D. Application temperature of the asphalt shall be between 400 degrees F and 450 degrees F.

E. For all SBS modified asphalt flashings; the minimum application temperature of the asphalt shall be at the EVT or 425 degrees F, whichever is greater, with a rolling bank (puddle) of

mopping asphalt across the full width of the roll.

F. Do not heat the asphalt to or above its flash point or hold the asphalt at temperatures above the finished blowing temperature for more than 4 hours.

G. Do not keep heated tankers above 325 degrees F overnight.

3.4 INSULATION - GENERAL

A. Do not apply roof insulation or roofing until all other work trades have completed jobs that require them to traverse the deck on foot or with equipment. A vapor retarder coated lightly with asphalt may be applied to protect the inside of the structure prior to the insulation and final roofing installation. Before the application of the insulation, any damage or deterioration to the vapor retarder shall be repaired.

B. Do not install wet, damaged or warped insulation boards.

C. Install insulation boards with staggered board joints in one direction (unless taping joint).

D. Install insulation boards snug. Gaps between board joints shall not exceed 1/4 inch. All gaps in excess of 1/4 inch shall be filled with like insulation material.

E. Wood nailers shall be 3-1/2 inches minimum width or 1 inch wider than metal flange. They shall be of equal thickness as the insulation with a minimum 1 inch thickness. All nailers shall be securely fastened to the deck.

F. Do not kick insulation boards into place.

G. Miter and fill the edges of the insulation boards at ridges, valleys and other changes in plane to prevent open joints or irregular surfaces. Avoid breaking or crushing of the insulation at the corners.

H. Do not install insulation over old lightweight insulating concrete decks without the use of a vapor retarder. Insulation shall not be installed over new lightweight insulating concrete.

I. Cant strips shall be installed at the intersection of the roof and all walls, parapets, curbs or transitions approaching 90 degrees, to be flashed. They shall be approximately 4 inches in horizontal and 4 inches in vertical dimension. The face of the cant shall have an incline of not more than 45 degrees with the roof.

J. Roof tape, if required over insulation joints, shall be laid evenly, smoothly and embedded in a uniform coating of hot steep asphalt with 4 inches end laps. Care shall be taken to assure smooth application of tape and full embedment of the tape in the asphalt.

K. Do not install any more insulation than will be completely waterproofed each day.

3.5 INSULATION - BASE LAYER

A. Install insulation layers, maximum 4 feet by 4 feet board size, in a full and uniform mopping of hot asphalt applied at the rate of 25 lb/square +/- 20 percent. Press each board firmly into place. Stagger the joints of additional layers in relation to the insulation joints in the layer(s) below by a minimum of 6 inches to eliminate continuous vertical gaps.

3.6 INSULATION - SUBSEQUENT LAYERS

A. Install insulation layers, maximum 4 feet by 4 feet board size, in a full and uniform mopping of hot asphalt applied at the rate of 25 lb/square +/- 20 percent. Press each board firmly into place. Stagger the joints of additional layers in relation to the insulation joints in the layer(s) below by a minimum of 6 inches to eliminate continuous vertical gaps.

3.7 BASE SHEET

A. Base / Interply Sheets:
1. Type III and Type IV asphalt may be used on slopes less than 3 inches per foot. Type IV shall be used on any slopes greater than 3 inches per foot.
2. Asphalt shall be applied in a full uniform layer, at a rate of 25 lb/100 sf.
3. Base Sheet: Install full width base sheets, lapping 2 inches on the sides and 4 inches on the ends. Stagger adjacent end laps a minimum of 18 inches apart. Turn all plies up and over the cant strip by 2 inches.
4. Interply Sheet: Install interply sheet shall be installed shingle method, adhered in a full mopping of approved asphalt. Laps shall be minimum of 2” on sides and 4” on ends.

3.8 SURFACING APPLICATION

A. SBS Modified Bitumen FR-P Field Membrane Cap Sheet:
1. Begin the application of the CertainTeed FR-P Field Membrane Cap sheet at the low points of the roof so that the flow of water is never against the laps. Parallel lap lines of cap sheet shall not coincide with the lap lines of the underlying plies wherever possible. Application shall be over and parallel to the underlying roofing membrane.
2. Embed the SBS Modified Bitumen Field Membrane Cap Sheet in steep roofing asphalt applied at the nominal rate of 25 pounds per 100 square feet. Side laps shall be a minimum of 4 1/2 inches and end laps a minimum of 6 inches. End laps shall be staggered by a minimum of 3 feet. Uniformity of the separation of side laps is desirable for best appearance. Side and endlaps shall be fully adhered in a complete mopping of hot asphalt with asphalt extending approximately 3/8” beyond lap edge. All sheets shall be free of wrinkles, buckles, blisters, fishmouths or voids.
3. Brooming of the SBS Modified Bitumen Field Membrane Cap Sheet shall be performed to ensure complete adhesion. When implementing the in the flop in and fly in methods, tension shall be placed on the precut sheet as it is being set to avoid wrinkles or buckles in the sheet.

3.9 FLASHING APPLICATION

A. Sheet Metal:
1. Metal shall not be used as a component of base flashing.
2. When it is unavoidable to use metal in the roofing system (i.e., lead flange at drains, gravel stops), treated wood nailers and insulation stops, 1 inches wider than the metal flange, shall be provided for metal flange securement. Metal flanges shall always be set on top of the roof membrane with modified trowel grade cold adhesive applied material for SBS roof systems. The metal flange is then sealed using the applicable construction detail to meet applicable guarantee requirements. Metal accessories (gravel stops, counter flashing, etc.) shall be 16 oz. copper, 24 gauge galvanized or stainless steel, 2-1/2 to 4 lb lead or 0.032 inches aluminum.
3. Fabricate and install all sheet metal materials as shown in applicable construction details. Refer to SMACNA (Sheet Metal and Air Conditioning Contractors National Association, Inc.) for guidance on sheet metal treatments not addressed in this Manual.
4. Clean metal and apply asphalt primer to all sheet metal surfaces that will come into contact with asphalt or other bituminous materials; allow the primer adequate time to dry.
5. Use fastener types compatible with the sheet metal type.
   a. Copper or lead-coated copper: use copper or bronze fasteners.
   b. Lead and galvanized steel: use galvanized or cadmium-plated sheet fasteners.
   c. Aluminum: use aluminum fasteners.
   d. Stainless steel: use stainless steel fasteners.
6. Metal counter-flashing shall have a minimum 4 inches face with a drip lip. The bottom edge of the counterflashing shall cover the roofing membrane and/or base flashing by a minimum of 4 inches. Metal counter flashing used for masonry walls, wooden walls or through wall metal flashings shall be a two piece design to allow for installation and

later removal. Metal counter-flashings for stucco, EIFS, wood siding or similar materials shall be designed to receive and set as a base for those materials, such as "Z" type flashing, while providing for securement of separate metal counter-flashing to cover base flashings. Metal end joints shall be lapped 3 inches or more. Adequate fasteners shall be provided to secure against wind forces. Skirt fasteners shall be watertight.

7. Metal flanges for gravel stops, eave strips and pitch pockets to be used in conjunction with roofing shall be primed (both sides), set in modified trowel grade cold adhesive applied material for SBS roof systems. Flanges shall be a minimum of 3-1/2 inches wide for gravel stops or eave strips and 4 inches wide for projections and extensions through the roof. The gravel stop lip shall be at least 3/4 inches high. Eave strip lips shall be at least 3/8 inches high. Provisions shall be made for securing the skirt to the face of the wall. This may be wood nailer strips for masonry and metal construction. In all cases, gravel stop and eave strip nailer shall be fastened to the deck or deck system with adequate resistance against wind forces.
8. Stacks shall have metal sleeve flashing a minimum of 8 inches high. Pitch pockets for brackets, supports, pad-eyes, etc., shall have a 4 inches minimum height metal sleeve.
9. On reroofing projects, provisions shall be made for raising if necessary and reinstallation of existing sheet metal duct work, equipment, coping metal and counter-flashing removed in conjunction with the new work. Also, provide for cleaning and repairing of existing defective sheet metal and replacement of missing and irreparable sheet metal to match existing types. Light gauge sheet metal flashings which are incorporated into the SBS modified bitumen roof system are not suitable for re-use and shall be replaced with new material.
10. Conduits and piping such as electrical and gas lines shall be set on wood blocking or some other form of support. Wood blocking/supports shall be set on doubled pads (an additional layer of the roof membrane).

3.10 ROOF PROTECTION

A. Protect all partially and fully completed roofing work from other trades until completion.

B. Whenever possible, stage materials in such a manner that foot traffic is minimized over completed roof areas.

C. When it is not possible to stage materials away from locations where partial or complete installation has taken place, temporary walkways and platforms shall be installed in order to protect all completed roof areas from traffic and point loading during the application process.

D. Temporary tie-ins shall be installed at the end of each workday and removed prior to commencement of work the following day.

3.11 CLEAN-UP

A. All work areas are to be kept clean, clear and free of debris at all times.

B. Do not allow trash, waste or debris to collect on the roof. These items shall be removed from the roof on a daily basis.

C. All tools and unused materials shall be collected at the end of each workday and stored properly off of the finished roof surface and protected from exposure to the elements.

D. Dispose of or recycle all trash and excess material in a manner conforming to current EPA regulations and local laws.

E. Properly clean the finished roof surface after completion and make sure the drains and gutters are not clogged.

F. Clean and restore all damaged surfaces to their original condition.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 - GENERAL

RELATED WORK SPECIFIED ELSEWHERE:

07610 Metal Roofing
07950 Metal Roof Retrofit System
13120 Pre-Engineered Buildings

DESCRIPTION OF WORK:

Contract work of this Section shall include, but not be limited to providing following:

All sheet metal work required for complete assemblies of items specified at all areas indicated on Drawings, including but not necessarily required:

Gutters
Downspouts
Copings
All sheet metal work required for moisture control
Metal valley flashing
Metal base flashings and counterflashings
Ventilation perforated sheetmetal

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

Standards: Workmanship and methods employed for forming, anchoring, cleating, and expansion and contraction of sheet metal work shall conform to application details and description as indicated in current edition of Architectural Sheet Metal Manual, published by Sheet Metal and Air Conditioning Contractors National Association, Inc. and hereinafter referred to as "SMACNA Manual", unless otherwise noted on Contract Drawings or specified herein.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for the work under this Section, Drawings, and Specifications are based on products manufactured or furnished by Manufacturers listed under PRODUCTS.

SUBMITTALS:

Shop Drawings: Submit for approval in accordance with GENERAL CONDITIONS.

Details and layout shall show weights, gauges or thicknesses of sheet metal, joints, expansion joint spacing, and procedures to be followed during installation. Indicate bolt size and spacing, nailers or blocking required to be furnished by others for securing work of this Section.

Catalog Cuts: For Standard manufactured items, catalog cuts may be submitted as specified in GENERAL CONDITIONS.

Guarantee: Installation of all items of this Section shall be guaranteed to be leak-free for period of five years from date of acceptance of project. Any repairs or replacements required to maintain waterproof installation shall be done at no cost to Owner.

PRODUCT HANDLING:

Handling and Storage: Damaged items that cannot be restored to like-new condition shall be removed and replaced at no additional cost to Owner.

PART 2 - PRODUCTS

MATERIALS:

Flatwork, Flashings, Copings, Gutters and Gravel Stops: Pre-finished aluminum sheet, minimum yield of 50,000 PSI.

Gutter: .032" aluminum gutter. Provide pre-finished gutter spacers and brackets as shown on Drawings.

Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin

Downspouts: Downspouts, .040" and .032" pre-finished aluminum, Kynar 500 finish. Wall mounting brackets shall be matching material.

Perforated Sheetmetal: Where indicated on Drawings, provide a ventilated continuous eave trim around all eave perimeters. Provide 16 gauge (.050") thick aluminum perforated sheet metal, with a round hole pattern, 1/8" hole size, holes at 3/16" staggered centers, with 40% open area. Equivalent to McNichols. 800 237-3820, www.mcnichols.com

ACCESSORIES:

General: Provide all accessories or other items essential to completeness of sheet metal installation, though not specifically shown or specified. All such items shall be of same material or compatible to base material to which applied and gauges shall conform to SMACNA Manual recommendations.

Fasteners: All exposed screws, bolts, rivets and other fastenings for sheet metal, unless otherwise noted, shall be pre-finished stainless steel, and of size and type suitable for intended use. All concealed fasteners shall be RUSPERT metal finish coated, 3-layer corrosion protection coating.

Sealant: Elastomeric polyurethane sealant equal to Sonneborn Sonolastic NP-1. Clean all sheet metal surfaces prior to application with xylene and prime with Primer equal to Sonneborn 733 primer. Follow manufacturer's written product installation guidelines, recommendations and instructions. Color to be selected by Architect.

PART 3 - EXECUTION

CONDITION OF SURFACES:

Proper Surfaces: Surfaces to which sheet metal and flashing are applied shall be even, smooth, sound, thoroughly clean and dry and free from projections or other defects that would affect application. Defects shall be corrected by trades involved before installation of sheet metal work.

INSTALLATION:

Workmanship: Fabricate and install sheet metal with lines, arises, and angles sharp and true, and plane surfaces free from waves warps, or buckles, match existing work unless shown otherwise. Exposed edges of sheet metal shall be folded back to form 1/2 inch wide hem on side concealed from view. Finished work shall be free from water leakage under all weather conditions.

Fastenings: Unless otherwise indicated or specified, all fastenings shall be concealed. Installation of and joints of all sheet metal work, including fascia claddings, shall be in accordance with recommendations of SMACNA.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.01 DESCRIPTION

A. General

1. Furnish all labor, material, tools, equipment, and services for a complete roofing and wall panel system, and soffit panel system to include all flashings, curbs, gutters and downspouts as indicated, in accordance with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Division 1 for General Requirements.

B. Related work specified elsewhere:

1. Flashing and Sheet Metal: Section 07600.
2. Metal Roof Retrofit System Section 07950
3. Pre-Engineered Buildings Section 13120
4. Drawings Building Code Summary

1.02 QUALITY ASSURANCE

A. Applicable standards:

1. SMACNA: "Architectural Sheet Metal Manual" Sheet Metal and Air Conditioning Contractors National Association, Inc.

2. AISC: "Steel Construction Manual" American Institute of Steel Construction.

3. AISI: "Cold Form Steel Design Manual," American Iron and Steel Institute.

4. ASTM A792-AZ50: Specifications for steel sheet, aluminum-zinc alloy coated (galvanized) by the hot dip process, general requirements (galvalume).

5. Underwriters Laboratories Inc. wind uplift classification UL 90

6. 2000 International Building Code, Table 1604.5, Classification Of Buildings And Other Structures For Importance Factors, Category II Seismic, Snow and Wind Factors.

7. 2000 International Building Code, Table 1604.5, Classification Of Buildings And Other Structures For Importance Factors, Category III Seismic, Snow and Wind Factors.

8. Energy Star Roof Rating

9. Cool Metal Roof Coalition

10. Cool Roof Rating Council

B. Manufacturer's qualifications:

1. Manufacturer has a minimum of three years experience in manufacturing panels of this nature.

C. Installer's qualifications:

1. Installation of panels and accessories by installers with a minimum of two years experience in panel projects of this nature.

1.03 SUBMITTALS

A. Shop drawings:

1. Submit complete shop drawings and erection details to Architect for review. Do not proceed with manufacture prior to review of shop drawings. Do not use drawings prepared by Architect for shop or erection drawings.
2. Shop drawings show methods of erection, elevations, and plans of roof and wall panels, sections and details, anticipated loads, flashings, roof curbs, vents, sealants, interfaces with all materials not supplied and proposed identification of component parts and their finishes.
3. Certification: Manufacturer to certify that roof system submitted is in compliance with Building Category Importance Factors requirements

B. Mockups and Samples:

1. Roofing contractor to build a full-sized roof corner mockup on-site for review and approval by the Architect. Roof corner mockup to include roof metal rake intersection with eave metal gutter and fascia.

2. Submit samples and color chips for all proposed finishes.

a. Submit one 8 in. long sample of roof panel, including clips.

b. Submit one 8 in. long sample of wall panel, including clips.

c. Submit 3 in. x 5 in. color chip samples in all standard colors.

C. Warranty

1. Provide contractor’s written NDL (No Dollar Limit) weathertightness warranty twenty (20) years, against leaks in roof panels arising out of or caused by ordinary wear and tear under normal weather and atmospheric conditions. Warranty coverage shall include all curbs, flashing and miscellaneous trim and accessories. Warranty shall be non-pro-rated, signed by the metal roofing system contractor and shall provide for both labor and materials.

2. Provide manufacturer’s NDL (No Dollar Limit) written warranty for twenty (20) years against perforation of metal roof panels due to corrosion under normal weather and

atmospheric conditions. Warranty shall be signed by metal roofing system manufacturer and shall provide for complete replacement of panels and associated trim.

3. Provide manufacturer's NDL (No Dollar Limit) written paint film warranty for twenty (20) years on finish film integrity and color retention. The finish will not crack, check, peel, flake, or blister, or chalk in excess of ASTM 4214, number 8 rating, or fade in excess of 5 units per ASTM D 2244, under normal atmospheric conditions. Warranty shall be signed by metal roof system manufacturer.

4. Inspection and Report Services: Contractor shall retain independent third party agent who shall perform an inspection of the entire roof system and shall submit a written report to the Owner detailing all conditions requiring maintenance and repair by parties under the above warranties. Third party agent shall be a registered roof consultant (RRC) with minimum of 5 years as a registered roof consultant and 5 years of active project experience. Provide written certification of qualifications.

1.04 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Obtain roofing products from local regional source, within 500 miles of project site.

B. Delivery: Deliver panels to jobsite properly packaged to provide protection against transportation damage.

C. Handling: Exercise extreme care in unloading, storing and erecting panels to prevent bending, warping, twisting, and surface damage.

D. Storage: Store all material and accessories above ground on well skidded platforms. Store under water- proof covering. Provide proper ventilation to panels to prevent condensation build-up between each panel.

PART 2: PRODUCTS

2.01 MATERIALS

A. Roof panel profile: 2 in. high x 3/4 in. wide rib x 16 in. wide striated panel.

B. Panel style: Large batten, vertical leg, concealed fastener, standing seam, utilizing male and female rib configurations, with factory applied hot melt mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation.

C. Gauge: .032" aluminum (UL-90 rated - Underwriters Laboratories).

D. Substrate: Aluminum sheet, minimum yield of 50,000 PSI.

E. Recycled Content: Metal roof materials shall be 35% recycled content.

F. Floating Clip: low profile, 18 gauge stainless steel base, with 22 gauge stainless steel upper tab, with factory applied mastic (# UL-90 rated-Underwriters Laboratories). Floating clip concealed anchor fasteners shall be RUSPERT metal finish coated, 3-layer corrosion protection coating.

G. Texture: Smooth.

H. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

I. Reflectivity and Emissivity: Metal Roof Panels shall be high reflectance and high remittance in accordance with Energy Star. Initial Reflectance shall be at least 0.68 when tested with ASTM E-903. The three year aged reflectance shall be at least 0.57, when tested in accordance with ASTM E-1918 (Measured AS Solar Reflectivity, Not Visible Reflectance).

J. Color: Selected from manufacturer's standard Energy Star Rated roof colors, with Solar Reflectance Index (SRI) value equal to or greater than SRI 29.

K. Acceptable manufacturer: Metal Roofing Systems; MRS System 2500

L. Acceptable optional manufacturers:

1. Equivalent products by:
    i. MBCI
    ii. AEP Span
    iii. American Building Company
    iv. Butler Manufacturing Company
    v. McElroy Metal
    vi. Peterson Aluminum Corporation, Tite-Loc

M. Provide downspouts in profiles, shapes and materials as indicated on Drawings, .032” and .040” aluminum with Kynar 500 or Hylar 5000 resin finish. Provide straps, brackets and anchors in matching material as indicated on Drawings.

N. U-Channel Gutter Bracket Strap: Provide .050” prefinished aluminum U-bar channel gutter strap, factory powder coat painted to match roof, or optional wrapping of alum U-bar with pre-finished .032” matching aluminum break metal.

O. All exposed fasteners shall be pre-finished stainless steel.

P. All concealed fasteners shall be RUSPERT metal finish coated, 3-layer corrosion protection coating.

Q. Pipe flashing shall be Dektite, or equivalent by Master Flash, Westform Metals or IPS Roofing Products.

R. Provide roof and gutter expansion joints as indicated on Drawings, in matching Kynar 500 or Hylar 5000 resin finish.

S. All roof curbs are by metal roof contractor. Refer to mechanical drawings and coordinate curbs required with HVAC Contractor.

T. Provide special rolled / radiused panels and trim where shown on drawings.

U. Provide special shapes where shown on drawings.

V. Ribbed Wall Panels: PROFILE AND COLOR TO MATCH EXISTING

Ribbed wall panels where indicated on Drawings shall be fabricated from .032” aluminum, 70% fluoropolymer Kynar 500 factory applied paint system with a 25-year finish warranty, formed to provide a weathertight closure assembly. Panel shall be a 16” wide, concealed fastener type, smooth textured, flat profiled with pencil ribs, with 2” standing seam ribs. Provide all accessories, trims, channels and flashings for a complete assembly. Provide panels equivalent to Metal Roofing Systems (MRS) 2500 aluminum panel, or equivalent products by MBCI.

W. Metal Soffit Panels:

Metal soffit panels and trim where indicated to be .032" aluminum, flat profile and smooth textured, with a factory KYNAR 500 finish, selected from standard colors. Provide 12 inch wide solid non-vented panels with (2) stiffening beads, unless otherwise noted. Soffit system shall be equivalent to Metal Roofing Systems (MRS) Flush Seam panel, or equivalent products by MBCI or Peterson. Provide soffit panels in compliance with ASTM 1592, and the Architectural Aluminum Manufacturers Association (AAMA) Specifications 1402-86 Standard Specifications for Aluminum siding, soffit, and fascia. Provide all necessary accessories and trims for complete assemblies.

X. Perforated Sheetmetal: For ventilated continuous eave trim around all eave perimeters. Where indicated on Drawings, provide 16 Gauge (.050") thick aluminum perforated sheetmetal, with a round hole pattern, 1/8" hole size, holes at 3/16" staggered centers, with 40% open area. Equivalent to McNichols. 800 237-3820, www.mcnichols.com

Y. Self-adhering polymer modified bituminous membrane, 40 mil minimum thickness, Vycor Ice and Water Shield by W.R. Grace or equivalent products by GAF Materials Corp. or Carlisle Coatings and Waterproofing.

2.02 PRE-ENGINEERED BUILDING BID ALTERNATE

A. Roof panel profile: 2 in. high x 3/4 in. wide rib x 16 in. wide striated panel.

B. Panel style: Large batten, vertical leg, concealed fastener, standing seam, utilizing male and female rib configurations, with factory applied hot melt mastic in female rib, continuously locked together by an electrically powered mechanical seaming device during installation.

C. Gauge: 24 gauge (UL-90 rated - Underwriters Laboratories).

D. Substrate: Galvalume steel sheet, 0.5 ounces/square foot, minimum yield of 50,000 PSI.

E. Recycled Content: Metal roof materials shall be 35% recycled content.

F. Clip: Floating clip, low, 22 gauge, with factory applied mastic (# UL-90 rated-Underwriters Laboratories).

G. Texture: Smooth.

H. Finish: Premium fluorocarbon coating produced with Kynar 500 or Hylar 5000 resin (20 year warranty).

I. Color: MATCH EXISTING

J. Acceptable manufacturer: Varco Pruden SLR II (per 13120); MBCI BattenLok Series

K. Ribbed wall panels where indicated on Drawings shall be fabricated from 24 gauge galvalume steel, 70% fluoropolymer Kynar 500 factory applied paint system with a 25-year finish warranty, formed to provide a weathertight closure assembly. Panel shall be a 16" wide, concealed fastener type, smooth textured, flat profiled with pencil ribs, with 2" standing seam ribs. Provide all accessories, trims, channels and flashings for a complete assembly. Provide panels equivalent to Varco Pruden SLR II panel. PROFILE AND COLOR TO MATCH EXISTING

2.03 FABRICATION

A. Material shall be in-line tension leveled prior to roll forming finished panel profile.

B. Factory roll form panels in continuous lengths, full length of detailed runs. Field formed panels will not be accepted.

C. Standard panel length shall be no more than 45 feet.

D. Panel laps shall be 5” minimum.

E. Fabricate trim, flashing and accessories to detailed profiles.

F. Fabricate trim and flashing from same material as panel.

PART 3: EXECUTION

3.01 SURFACE CONDITIONS

A. Examination

1. Inspect installed work of other trades and verify that such work is complete to a point where this work may continue.

2. Verify that installation may be made in accordance with approved shop drawings and manufacturer's instructions.

B. Discrepancies:

1. In event of discrepancy, notify Architect.

2. Do not proceed with installation until discrepancies have been resolved.

3.02 INSTALLATION

A. Install panels so that they are weathertight, without waves, warps, buckles, fastening stresses or distortion, allowing for expansion and contraction.

B. Install panels in accordance with manufacturer's instructions and shop drawings.

C. Provide concealed anchors at all panel attachment locations.

D. Dissimilar metals shall be separated, with use of PTFE polymer resin tapes, closed cell neoprene tapes, elastomer membranes, washers or gaskets, or approved coatings.

E. Install panels plumb, level, and straight with seams and ribs/battens parallel, conforming to design as indicated.

F. Do not place scratched panels or material in the work.

G. Metal roofing contractor is responsible for cutting and sealing all roof penetrations and installations of all curbs. Refer to plumbing and mechanical drawings. Coordinate roof penetrations and curbs required with Plumbing and HVAC Contractors.

H. Install self-adhering polymer modified bituminous membrane ice and water shield, under metal roofing, to cover entire roof surface.

3.03 CLEANING, PROTECTION

A. Dispose of excess materials and remove debris from site.

B. Clean work in accordance with manufacturer's recommendations.

C. Protect work against damage until final acceptance. Replace or repair to the satisfaction of the Architect, any work that becomes damaged prior to final acceptance.

D. Scratched panels or scratched flat surfaces will not be accepted. Scratched materials shall be replaced with new matching material at contractor’s expense. Repainting to conceal surface scratches will not be accepted.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this section.

PART 1 - GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide following roof accessories, shown on Drawings and specified in this Section:

Roof Drains With Insulated Leader Piping
Downspout Nozzle

Coordinate this section with interfacing and adjoining work for proper sequence of installation.

RELATED WORK SPECIFIED ELSEWHERE

1. Selective Demolition: Section 02070
2. Asphaltic Modified Bitumen Roofing: Section 07515
3. Flexible Sheet Roofing: Section 07530
4. Flashing and Sheet Metal: Section 07600

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products fabricated by Manufacturers listed below. Other listed Manufacturer's who can furnish similar products or systems of same materials specified, will also be acceptable.

Roof Drains: Zurn
Downspout Nozzle: Zurn

SUBMITTALS:

Manufacturer's Data: Submit for approval three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work, and existing conditions.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2 - PRODUCTS

ROOF DRAINS: To be low dome, sediment type, with seepage pan and clamping flange, cast iron body with aluminum dome, sized as shown on drawings. Drains to be Zurn No. Z-100C or approved equal.

Roof drain leader piping shall be Schedule 40 PVC-DWV, as manufactured by Charlotte Pipe and Foundry or equivalent.

Roof drain leader piping shall be fully insulated. Insulation shall be a jacketed glass fiber pipe covering, Knauf 850 or equal by Owens-Corning or Shuller. Provide pre-formed jacket covers over fittings such as 90-degree L's, tees, etc.

PIPE HANGERS AND SUPPORTS:

Support Schedule 40 PVC- DWV pipe with carbon steel adjustable clevis-type hangers, 5' o.c. with 3/8" threaded rod. Chain, strap, perforated bar, or wire hangers will not be permitted. Where required, provide suitable concrete inserts in masonry or concrete during laying or placing of those materials. Acceptable manufacturers are B-line, PHD, Gulf State Hangers, and Grinnell.

ROOF DRAIN LEADER DOWNSPOUT NOZZLE: Provide Zurn Model ZANB199, all nickel bronze body, with options of threaded, slip-on, or no-hub inlet and decorative face of wall flange and outlet nozzle.

PART 3 - EXECUTION

INSPECTION:

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

Commencement of work by installer is acceptance of existing conditions.

INSTALLATION:

Install drains and insulated leader piping in accordance with manufacturer's published recommendations. Connections to roof drains shall be made by the General Contractor. General Contractor is responsible for all roof draining and connection to storm drainage.

Install all piping with 1/4" per foot slope wherever possible but with minimum slopes as follows: 3" and less - 1/4" per foot; 4" and larger - 1/8" per foot.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK :

Work of this Section shall require furnishing all labor and materials to provide sealants, non-rated caulking, fire-rated fire caulking, and related primers, including expansion joint fillers, interior and exterior, as shown on Drawings and as specified in this Section.

Caulking and primers required for installation of all work included in Sections for Window Wall, Storefront Systems shall be part of work under that Section and shall be done in accordance with the applicable portions of this Section.

Acoustical caulking for installation of gypsum board is specified in Section 09250.

Required applications of sealants and caulking include, but are not necessarily limited to, following general locations:

Flashing reglets and retainers.
Coping Members, Bed and Joints.
Interior and exterior wall joints around doors and windows perimeters.
Exterior wall control joints
Horizontal and vertical interior CMU wall and structural steel joints
Joints at penetrations of walls, decks and floors by piping and other services and equipment.
Fire-rated penetrations of walls, decks and floors by piping and other services and equipment.
Concrete walk and pavement expansion joints
Exposed interior concrete floor slab control joints

Required applications of joint fillers and gaskets include, but are not necessarily limited to, the following general types of work and locations:

Expansion joint fillers in structural concrete.

Exterior wall expansion joint fillers.

Fire-rated pipe and conduit through penetrations.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

ASTM E 814 (UL 1479) Standard Tests of Penetration Firestop Systems

ASTM E 1966 (UL 2079) Standard Test Method for Fire Resistive Joint Systems

UL - Underwriters Laboratory

ASTM C 920

Comply with 21 CFR 177.2600 for sealants in contact with food.

LEED SC, U. S. Green Building Council

SCAQMD - South Coast Air Quality Management District

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for the work under this Section, Drawings and Specifications are based on products of Sonneborn BASF Corporation and 3M Corporation.

Source: Products for use on this Project shall be of one Manufacturer, unless noted specifically otherwise.

All sealants shall comply with requirements of the South Coast Air Quality Management District (SCAQMD) Rule #1168.

SUBMITTALS:

Manufacturer's Data: For information only, submit 2 copies of Manufacturer's specifications, installation instructions and recommendations for each type of material required. Include Manufacturer's published data, certifications or laboratory test reports indicating that each material complies with requirements. Show by transmittal that copy of instructions and recommendations has been distributed to installer.

Submit applicable UL Tested Assemblies for each type of fire-rated through penetration and fire-stopping required.

Certifications: Submit written certifications that all primers, backings, and caulking materials are chemically compatible with each other and with the overcoating or topcoating materials.

Submit environmental certifications from Manufacturers of all joint sealant materials products, listing all applicable LEED credits made available by certifications.

Samples:
Caulking and Sealants: Submit samples of interior and exterior caulking compounds and related sealants required for installation. Install 12” samples in the work on site in locations requested by the Architect, for review.

Joint Fillers and Gaskets: Submit 3, 12" long samples of each joint filler or gasket which will be reviewed by Architect for color and texture only. Compliance with all other requirements is exclusive responsibility of Contractor.

Guarantee: Furnish Owner, in care of Architect, guarantee in accordance with requirements of General Conditions for period of three (3) years from date of acceptance of project against defective workmanship and materials, warranting airtightness and water tightness of exterior sealant and installation. Repairs shall be made promptly or material replaced after proper notice at no additional cost to Owner.

PRODUCT HANDLING:

Store and handle materials in strict compliance with Manufacturer's instructions.

Store in original containers until ready for use. Damaged material will be rejected and shall be removed from site.

PART 2: PRODUCTS

JOINT BACKING MATERIAL:

Non-Traffic Joints: Except where otherwise specified, packing shall be closed-cell expanded polyethylene cord or square rod conforming to ASTM D 1752, or closed-cell vinyl type conforming to ASTM D 1667, Grade VE-41.

Floor Joints: Packing shall be closed cell neoprene cord or square rod conforming to ASTM C 509-66T, with minimum shore "A" hardness of 45.

Fire-Rated Through Penetrations: non-combustible rock wool type mineral wool.

NON-RATED CAULKING COMPOUNDS /SEALANTS

Interior Joints: Caulking, other than where sealant is called for, shall be a solvent free, low modulus, one-part silyl-terminated polyether, non-sag sealant. Tack free time shall be minimum 90 minutes. Material shall be butyl-free skinning type, paintable within one hour.

Latex sealants are restricted to use only in non-moving joints in drywall construction.

Sonolastic 150 VLM manufactured by Sonneborn, or approved equal, with 7.24% of post-consumer material recycled content, VOC (volatile organic content) of 2 g/L.

MasterSeal CR-100 two-component self-leveling 100% polyurea control joint filler, for interior exposed and bare concrete floor slab control joints; for Boiler and Mechanical rooms, utility and custodial spaces. Not for use under VCT or carpeting adhered type floor finishes.

Exterior Joints: Caulking for exterior joints other than where other sealant is called for, shall be polyurethane:

Sonneborn NP-1 for walls, with 5% of post-consumer material recycled content, VOC (volatile organic content) of 43 g/L.

Sonneborn NP-2 for walls, with 5% of post-consumer material recycled content, VOC (volatile organic content) when mixed of 53-80 g/L.

Sonolastic SL-1 or SL-2 for concrete expansion joints in non-vehicular traffic areas, with 5% of post-consumer material recycled content, VOC (volatile organic content) maximum of 104 g/L.

Sonomeric 1 for concrete expansion joints in vehicular traffic areas, with 5% of post-consumer material recycled content, VOC (volatile organic content) maximum of 128 g/L.

Approved equivalent products by Tremco or Pecora are acceptable.

PRIMER:

Type: Primer, where required by Sealant Manufacturer, shall be solution or compound designed to insure adhesion of sealant and shall be compatible with sealant.

Source: Material shall be provided by Sealant or Caulking Manufacturer and shall be selected for compatibility with sealant, with substrate and shall be non-staining.

PRODUCT COMPATIBILITY: All primer, backing, and caulking materials shall be chemically compatible with each other for use as an assembly, and with all surfaces in contact with these materials.

FIRE BARRIER SEALANTS

All fire caulk sealants used for fire barriers shall have been tested and passed the criteria of ASTM E 814 (UL 1479) Standard Tests of Penetration Firestop Systems, ASTM E 1966 (UL 2079) Standard Test Method for Fire Resistive Joint Systems and CAN/ULC-S115 Standard Method of Fire Tests of Firestop Systems. All fire caulk sealants shall meet the requirements of the IBC, IRC, IPC, IMC, NFPA 5000, NEC (NFPA 70), NFPA 101 and NBCC. All fire caulks shall be listed in a tested and published through penetration UL assembly.

3M Fire Barrier Sealant FD 150+: one-component, gun grade, latex based elastomeric sealant. Paintable and repairable; firestops construction joints, and through penetrations. Not acceptable for use with CPVC pipe. VOC (volatile organic content) of <250 g/L.

3M Fire Barrier Silicone Sealant 2000+: one-component, gun grade, natural cure silicone elastomer based sealant; firestops dynamic construction joints, through penetrations, static construction joints, and blank openings. Non-paintable. VOC (volatile organic content) of <32 g/L.

3M Fire Barrier Sealant CP 25WB+: High-performance, one-component, gun-grade, latex-based, intumescent sealant. Paintable, firestops and seals single or multiple through penetrations, blank openings, and static construction joints. Not acceptable for use with CPVC pipe. VOC (volatile organic content) of <1 g/L.

3M Fire Barrier Water Tight Sealant 3000WT: High-performance, one-component, neutral cure, intumescent silicone sealant. Fully cured acts as barrier to water leakage, repairable, firestops single and multiple through penetrations, bottom-of-wall static construction joints, blank openings, VOC (volatile organic content) of <31 g/L.

Provide 3M Ultra GS Wrap Strip where required by the through penetration assembly.

PART 3: EXECUTION

Proper Surfaces: Material in contact with sealant shall be dry, full cured, and free of laitance, loose aggregate, form release agents, curing compounds, water repellents and other surface treatment that would be detrimental to adhesion of sealant.

Masonry shall be cleaned and joints raked to proper depth to receive back-up and sealant.

Concrete shall be finished joints cleaned and fins removed.

Curing: Joints in masonry, concrete and stucco work shall not be sealed until substrate has cured minimum of 28 days.

PREPARATION:

Joint Cleaning: Clean all joints thoroughly, and blow out or vacuum loose particles from joints. Surfaces with protective coatings (such as aluminum) shall be wiped with xylol or methyl ethyl ketone solvent to remove protective coatings and oil deposits.

Sheet Metal: New sheet metal shall be wiped down with copper sulphate solution or with strong acetic acid solution to etch the zinc coating and remove oil and foreign matter from surface.

Joint Design: Coordinate work of other trades so that shape of joint, dimensions, and anticipated movement shall conform to following: (Comply with manufacturer's joint design requirements)

Minimum Width: Opening not less than 1/4" wide.

Minimum Depth: Opening not less than 1/8" deep.

Maximum Movement: The width of the opening shall be at least 4 times its maximum movement.

Width Depth Ratio: Comply with manufacturer's joint design requirements. Unless otherwise required, the depth of the sealant shall be no greater than the width. Depth should be more than 1/8" and not more than 1/2" deep, unless otherwise required by manufacturer.

All caulking joints shall be recessed openings. "Fillet" type caulking into corners will not be acceptable.

Joint Packing: Packing shall be installed in all joints to receive sealant. Packing shall be sized to require 20% to 50% compression upon insertion, and placed in accordance with "Joint Design" paragraph. (In joints not of sufficient depth to allow packing, install polyethylene bond-breaking tape at back of joint). Avoid lengthwise stretching of packing material.

Masking: Apply masking tape where required to protect adjacent surfaces. Adhere tape in continuous strips in alignment with joint edge, and remove immediately after joints have been sealed and tooled.

INSTALLATION:

Application of sealants shall be as recommended by Sealant Manufacturer. Work shall be done with standard handguns or mechanical guns. Extrude sealant through nozzles of such diameter as to allow full bead of material to run into joint, but not to exceed width of joint. Force sealant into joint by tooling to insure full contact with sidewalls and backing.

Locations: Use sealants in locations hereinbefore specified for joints as specified.

Joint Finishing: Unless otherwise indicated, all joints in horizontal surfaces shall be finished flush, all joints in vertical surfaces shall be finished slightly concave in shape. Use tooling stick or knife to strike off excess material, and properly shape bead. Use xylol or tolune to prevent sealant from adhering to tooling stick. Finished bead shall be smooth, even, and free from all wrinkling, air pockets, and foreign matter.

Install expansion joint filler as recommended by Manufacturer. Filler shall be size recommended by Manufacturer for use in the expansion joint erected and shall be installed with special tool and adhesive-lubricant.

CLEAN-UP:

Excess Material: Remove all excess material adjacent to joint by mechanical means and/or with solvent (such as xylol or toluol). Leave work in neat and workmanlike manner.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work required under this Section consists of providing galvanized hollow metal doors, frames, transoms, mullions, view window frames, and related items necessary to complete work indicated on Drawings and described in these specifications. Provide galvanized steel doors and frames for all openings where reasonably inferable from plan drawings, whether specifically scheduled and detailed or not.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

Hollow Metal Manufacturers Association, HMMA

QUALITY ASSURANCE:

Manufacturers: Except as otherwise specified herein, all hollow metal doors and frames shall be products of one of following manufacturers, or an equal approved by Architect. Manufacturers shall be certified members of the Hollow Metal Manufacturers Association, HMMA. All doors and frames shall be from the same manufacturer.

- Amweld Bldg. Prod. Div.
- Ceco Corp.
- Curries Company
- Acme Steel Door Corporation
- Pioneer Fireproof Door Co.
- Steelcraft Mfg. Co.

SUBMITTALS:

Shop Drawings: Submit shop drawings, in accordance with GENERAL CONDITIONS, of all items specified herein to Architect for approval. Obtain approval of Drawings prior to proceeding with manufacturing. Shop drawings shall indicate following: elevations of each door type; details of each frame type; location in building for each item; conditions at openings with various wall thicknesses and materials; typical and special details of construction; methods of assembling sections; location and installation requirements for hardware; size, shape and thickness of materials; anchorage; joints and connections; and any additional pertinent information.

General Contractor shall field verify all door and frame sizes, door and frame prep requirements, and hardware prep requirements prior to fabrication.

Samples: Sample of door section indicating edge, top and/or bottom construction, insulation, hinge reinforcement and face stiffening. Sample of frame section showing welded corner joints, welded hinge reinforcements, dust covers and face finish.

PART 2: PRODUCTS

GALVANIZED METAL FRAMES: Except where otherwise scheduled, all frames for doors, shall be formed of galvanized steel to sizes and shapes indicated, to include but not limited to double and single rabbett frame profiles where indicated. Frames shall be combination type with integral trim and fabricated with full welded unit type construction at joints.

Type and Gauges of Metal: Metal for frames shall be commercial quality, cold-rolled, galvanized steel sheets, with clean smooth surfaces conforming to ASTM A 366. Except where other gauges are indicated or specified, frames shall be fabricated from steel, not lighter than following U.S. Standard gauges:

- Exterior frames - 14 gauge
- Interior frames to 3-0 in width - 16 gauge (generally)
- Interior frames over 3-0 in width - 14 gauge

Metal Reinforcements: Provide concealed metal reinforcements for hardware as required. Gauge of metal for reinforcement shall be in accordance with manufacturer's recommendations for type of hardware and the thickness and width of doors to be hung in frame, provided gauges used are not lighter than following:

- Hinge and pivot reinforcements - 7 gauge, 1-1/4"x 10" min. size.
- Strike reinforcements - 12 gauge.
- Flush bolt reinforcements - 12 gauge.
- Closer reinforcements - 12 gauge.
- Surface-mounted hardware reinforcements - 12 gauge.

Workmanship and Design: Finished work shall be strong and rigid, neat in appearance, and free from defects. Fabricate molded members straight and true, with corner joints well formed and in true alignment, and with fastenings concealed where practicable.

Forming Corner Joints: Joints for welded type frames shall be mitered and continuously arc-welded for full depth and width of frame and trim. All contact edges shall be closed tight and all welds on exposed surfaces dressed smooth and flush.

Provisions for Hardware: Wood doors shall be solid core, prefitted. Prepare frames at factory for installation of hardware. Frames shall be mortised, reinforced, drilled and tapped to templates to receive all mortised hardware; frames to receive surface-applied hardware shall be provided with reinforcing plates only. Where concealed overhead door closers are required in frame members, provide necessary additional space, cutouts, reinforcement and provisions for fastenings in heads of frames to receive closers. Provide cover boxes in back of all hardware cutouts. Punch doorframes to receive rubber door silencers; provide three (3) silencers on lock side of single doorframes and one silencer for each leaf in heads of double doorframes.

Wall Anchors: Provide metal anchors of shapes and sizes required for adjoining type of wall construction. Fabricate jamb anchors of steel, not lighter than gauge used for frame. Locate anchors on jambs near top and bottom of each frame and at intermediate points not over 24" apart.

For frames set in masonry provide 10” long, corrugated or other deformed type adjustable anchors at jambs, 4 per jamb.

For frames set in metal stud partitions weld jamb anchor clips to back of frames at jamb. Make provision for securing anchors to steel studs with 1/4" round-head machine screws, nuts and washers, or by welding. Furnish 4 anchors per jamb.

Floor Anchors: Provide floor clips of not less than 16-gauge steel and fasten to bottom of each jamb member for anchoring frame to floor construction. Clips shall be fixed and drilled for 3/8" diameter anchor bolts.

Shipment: Provide temporary steel spreaders fastened across bottom of frames; where construction will permit concealment, leave spreader in place after installation; otherwise remove spreaders after frames are set and anchored.

GENERAL REQUIREMENTS FOR GALVANIZED METAL DOORS:

Type and Gauges of Metal: Metal for doors shall be commercial quality, leveled, cold-rolled, galvanized steel sheets with clean, smooth surfaces, conforming to ASTM A 366-68. All units shall be galvanized. Gauges of face sheets shall be as specified for door types.

Hardware Reinforcements: Doors shall be mortised, reinforced, drilled and tapped at factory for fully templated hardware only, in accordance with approved hardware schedule and templates provided by Hardware Contractor. Where surface-mounted hardware is to be applied, doors shall have reinforcing plates only; all drilling and tapping shall be done by others. Steel doors for locksets shall have welded box reinforcements.

All hardware furnished by Hardware Supplier for single-acting doors shall be designed for beveled edges as specified.

Edge Profiles shall be provided on lock stiles of doors as follows:

- Single-acting swing doors - beveled 1/8" in 2".
- Opposite swing double doors - beveled 1/8" in 2".

Provide clearances as follows:

Between doors and frames; at head and jambs - 1/8".

At doorsills; where no threshold is scheduled - 3/8" maximum. Allow for carpet height where required.

At doorsills; where threshold is scheduled - 1/4" maximum between door bottom and threshold.

Between meeting stiles of pair of doors - 1/8".

Workmanship: Finish work shall rigid, neat in appearance, and free from defects. Form molded members straight and true, with joints coped or mitered, well formed, and in true alignment. All welded joints on exposed surfaces shall be dressed smooth so that they are invisible after finishing.

GALVANIZED FLUSH DOORS:

Construction: Construct doors of two outer steel sheets not lighter than 18 gauge, with edges welded and finished flush. Seams or joints will not be permitted on door faces or edges. Reinforce the outer face sheets with 20-gauge interlocking vertical channels of Z-shaped members spaced not over 6" apart and spot-welded to outer face sheets. All doors shall have galvanized steel faces and rails.

Cap tops of exterior doors to prevent the accumulation of water.

Reinforcement: Provide continuous reinforcing channels welded to face sheets at top and bottom of door. Place cork, fiberboard, or mineral wool board in spaces between reinforcing channels.

Moldings shall be not lighter than 18-gauge steel. Doors shall be prepared to receive hardware specified under HARDWARE Section.

Optional Construction: Continuous truss-formed inner core of sheet metal, not lighter than 28-gauge, may be substituted for reinforcing specified, provided it is spot-welded to face sheets every 2-3/4" horizontally and vertically over entire surface of both sides.

APPROVED FIRE DOORS AND FRAMES:

Provide approved hollow metal fire doors and frames at locations indicated in Door Schedule. Approved doors, frames and hardware shall be constructed and installed in accordance with requirements of Underwriter's Laboratories for Class of door opening indicated or specified.

Fire doors and frames which bear Underwriter’s label for class of opening indicated will be only basis of acceptance.

SHOP PAINTING / GALVANIZING:

All interior and exterior doors and all interior and exterior frames shall be galvanized.

Apply primed finish to all galvanized metal surfaces furnished in this Section.

Clean and chemically treat metal surfaces to assure maximum paint adherence; follow with dip or spray coat of rust-inhibitive metallic oxide, zinc chromate, or synthetic resin primer on all exposed surfaces.

Finish surfaces shall be smooth and free from irregularities and rough spots.

Approved primer shall be compatible with finish coats specified in Section 09900.

LOCATION OF HARDWARE: Location of hardware for hollow metal doors and frames shall be as specified in Section 08700.

PART 3: EXECUTION

ERECTION:

Hollow metal shall be erected by skilled workers. Frames shall be carefully plumbed and aligned. Trim and glazing stops shall be coped or mitered with hairline fit. Brace frames until permanent anchors are set. Anchor bottoms of frames to floor with expansion bolts or with power fasteners.

In application of glazing beads, or other trim parts, exercise care to avoid running screws or other fasteners tightly enough to dimple metal.

Minor damage to metal, incurred during erection, may be repaired by filling with lead or lead alloy ground smooth and flush, if strength and appearance of finish work are not impaired, and if Architect approved. Otherwise, furnish new material.

PROTECTION AND CLEANING:

Protect doors and frames from damage during transportation and at job site. Store at site under cover on wood blocking or on suitable floors.

After installation, protect doors and frames from damage during subsequent construction activities.

Damaged work will be rejected and shall be replaced with new work.

Upon completion, metal surfaces of doors and frames shall be thoroughly cleaned, ready for paint finish by others.

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall include furnishing, delivering, and storing where directed at site, the following:

Solid Core Wood Doors, as shown on drawings and specified herein. Intent of drawings and specifications is to provide all wood doors for the entire project as indicated on plans, whether specifically scheduled or not. Provide wood doors for all openings where reasonably inferable from plan drawings.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

SUBMITTALS:

Submit complete schedule indicating dimensions, cutouts, hardware sets, species, and other pertinent data, which references the individual architectural door mark number as shown on the plan sheets.

General Contractor shall field verify all door and frame sizes, door and frame prep requirements, and hardware prep requirements prior to fabrication.

Submit Manufacturer's data sheets, completely describing door construction, WDMA I.S. 1-A (formerly NWWDA) and AWI Classifications.

Door Supplier to submit written certification on the supplier's letterhead that the doors provided shall conform to every aspect of this specification.

Door physical finish samples shall accompany submittals. The samples will show the range of color variation.

Warranty statement shall accompany the submittal.

QUALITY ASSURANCE:

Flush wood veneer doors shall conform to the latest edition of the following standards: WDMA I.S. 1-A requirements for "Premium Grade".

Tolerances for warp, telegraphing, squareness, and prefitting dimensions as per the latest editions of WDMA I.S. 1-A, AWI Section 1300 and NFPA 80 1-11.4, 1999 edition.

Each door shall bear an identifying label indicating the manufacturer, door number and order number, as well as fire rating where applicable.

Where fire rated doors are required, provide doors labeled by ITS/Warnock Hersey International. Construction details and hardware application shall be as approved by the labeling agency.

Provide doors to meet UBC 7-2-1997 requirements for positive pressure opening assemblies in areas where this has been adopted by local authorities having jurisdiction.

MANUFACTURERS:

Standards: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on 5-ply door products meeting WDMA I.S. 1-A Premium Grade manufactured or furnished by Marshfield Door Systems.

Acceptable Manufacturers: Products of following manufacturers, meeting all requirements of these specifications, will also be acceptable.

- Marshfield
- Eggers Doors
- Oshkosh
- Algoma
- VT Industries

Samples: Sample corner section of door indicating edge, top/and/or bottom construction, core and hardware reinforcement.

Color Samples: Provide physical color samples in the veneer species specified, in the full range of manufacturer's standard colors.

Certificates: Provide certificate from manufacturer stating compliance with these specifications.

Guarantee: Provide guarantee for life of installation. Any defects noted during warranty period shall be corrected at no cost to the building Owner. Such corrective work shall include all labor and material for repair, replacement, refinishing and rehanging as required.

PRODUCT HANDLING:

Storage: Store doors at site so as to raise edges off floor and away from walls, letting air circulate freely. Store in enclosed area free from excessive heat, cold and humidity. Do not install scratched, dented or otherwise damaged doors in work.

Packaging: Door Manufacturer shall package doors in a manner to provide protection until they are installed.

Coordination: Provide Door Manufacturer with following:

- Two (2) copies of approved door schedule and Shop Drawings.
- Two (2) copies of the approved hardware schedule.
- One (1) copy of floor plan of building, showing Architect's marks and opening identification.
- Two (2) sets of templates for applicable locks, hinges and other finish hardware.

PART 2: PRODUCTS

SOLID CORE DOORS:

Construction: Doors shall be flush type, solid core, 5-ply, Premium Grade, Type PC-5ME. Seven-ply and non-bonded core construction not accepted. Doors shall be 1-3/4" thick and shall be widths and height shown on door schedule. All doors between use areas and corridors and all smoke doors shall be 20 minute fire rated unless required to be of higher rating.

Veneer: Face veneer to be plain sliced red oak, “A” grade, book and running matched, factory finished.

Finish: Doors to be factory stained and prefinished, delivered to job in protective wrapping. No doors shall be hung until finish work is complete.

Top and bottom rails shall be factory sealed with an approved sealer.

Core shall be of one piece slab, particle board, density 28-32 lb. per cu. ft. or greater bonded to stiles and rails with Type II adhesive, using high frequency method, then sanded as a unit. Meet particleboard standard ANSI A208.1, Grade 1-LD-2.

Vertical stiles shall be two piece 1 3/8" thick, with an inner stile of SCL laminated to outer ¼” hardwood stile, matching the veneer, to provide minimum thickness after trimming of 1 3/8". Top and bottom rails shall be of structural composite lumber (SCL) construction 1 3/8” thick before prefitting. Blocking shall be provided where mortise closers or other similar devices occur.

Composite cross bands shall be applied to core prior to application of matching hardwood stiles. Exposed cross banding is not allowed along stile edges.

Veneers are to be applied to the cross banded core in a HOT PRESS using Type I exterior water resistant adhesive. Five ply construction. Exposed veneer edges are not permitted.

Openings: Factory cut openings for glass. Flush wood glass stops required for non-rated openings, species to match veneer. 20 minute rated glass kits will utilize concealed metal glass retaining clips equal or similar to VT Industries VT Fire Clip.

Glass: 1/4" tempered glass, impact resistant as required, will be furnished and installed as per Section 08800.

COMPOSITE FIRE DOORS:

Grade: WDMA I.S. 1-A, Premium, Type FD-5

Construction shall conform to Underwriter's Laboratories Class "B" 1 Hr. and 1-1/2 Hr. and Class "C" 3/4 Hr. rating requirements and shall have been tested in accordance with ASTM E 152 for fire resistance, heat transmission, and structural integrity.

Core: Core shall be calcium silicate with non-asbestos fibers, 30.8 – 34.7 lbs./ft3 nominal density, containing no asbestos. Core shall be jointed together with tongue-and-groove joints in accordance with Underwriter's Laboratories, Inc. procedure manual. Core shall be smoothly sanded prior to application of cross band and face veneer.

Edge Bands: Outer stiles are to be of same species as veneer. Inner stiles to be structural composite lumber (SCL) for 45 minute rated doors, or GP Firestop I for 60 and 90 minute rated doors which can be warranted for use with mortise butt hinges and No. 12 – 1 ¼” steel threaded-to-head screws. The door manufacturer shall drill 5/32” diameter pilot holes for all hinges.

Rails are to be structural composite lumber (SCL) for 45 minute rated doors, or GP Firestop for 60 and 90 minute rated doors, manufacturer’s standard width.

Composite cross bands shall be applied to core prior to application of matching hardwood stiles. Exposed edge banding is not allowed along stile edges.

Veneers are to be applied to the cross banded core in a HOT PRESS using Type I exterior water resistant adhesive. Five ply construction. Exposed veneer edges are not permitted.

Where UBC 7-2-1997 requirements for positive pressure must be met, doors shall include all requirements as part of the door construction per "Category A" guidelines as published by ITS/Warnock Hersey. No intumescent is allowed on the frame. Only smoke gasketing applied around the perimeter of the frame to meet the "S" rating is permissible.

Vision panels and glass lights where indicated on plans, furnish and install vision panels glazed with 1/4" tempered or wire glass as indicated. Glass stops will be flush type and will utilize concealed metal glass retaining clips equal or similar to VT Industries VT Fire Clip. Where UBC 7-2-1997 requirements for positive pressure must be met, install a light kit labeled for UBC 7-2-1997 positive pressure applications to meet the appropriate fire rating.

Astragal sets, metal edges, or edge guards will not be allowed on positive pressure doors concealing intumescent within door structure.

FACTORY FINISHING:

AWI, catalyzed polyurethane, premium grade. Stain coat, three coats of sealer, two polyurethane topcoats finish per AWI Section 1500. AWI Types 2 and 3 are not acceptable.

Top and bottom rails shall be factory sealed.

HARDWARE PREPARATION:

Machining: Doors shall be factory machined for application of finish hardware that required cutting of door (except surface applied hardware) including pilot holes for hinge screws and lock fronts.

Coordination: Door manufacturer shall assume responsibility of properly coordinating hardware schedule, door schedule, and hollow metal frame shop drawings and shall supply machined doors individually identified for proper openings.

LOCATION OF HARDWARE: Refer to Section 08700.

PART 3: EXECUTION

CONDITION OF SURFACES:

Frames shall be set plumb and secure before installation of doors.

Responsibility: Contractor will be held responsible for correct door frame installation. Frames out of square, cocked at bottom or bowed in or out along vertical jambs more than 1/8" shall be reinstalled.

Temperature and Humidity: Doors shall not be installed until areas of installation have temperature and humidity near that of completed building.

DOOR INSTALLATION:

Fire door installation is required to be in accordance with the NFPA 80, “Standard for Fire Doors and Fire Windows”. Machined fire doors shall be provided with detailed installation instructions when doors bear a label indicating compliance to UBC 7-2-1997 or UL 10C.

Hanging: Doors shall be fitted, hung plumb, and true to within following allowable warpage tolerances: 1/4" for doors of areas 10 sq. ft. or greater, 1/8" for doors under area of 10 sq. ft. Install fire doors in accordance with NFPA Pamphlet 80 1-11.4, 1999 edition and U.L. requirements.

Non-rated clearances: Provide clearances of 1/8" at sides and top; lock edge shall have required bevel to clear frame. Provide at bottom, for specific locations, minimum adequate clearance of finish floor coverings and/or thresholds, not to exceed 3/4". Provide other undercuts as required.

Category “A” clearances between door edge and frame must be at least 1/16” and no greater than 1/8” at the head and jambs. See NFPA 80 1-11.4, 1999 edition, for clearance under door bottoms.

Factory machined doors improperly sized for opening or improperly machined for hardware by Door Manufacturer shall be rejected and returned to factory for proper replacement.

GLAZING:

Set glass against fixed molding with specific glazing compound utilizing glass retaining clips as specified.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

RELATED DOCUMENTS

Section 08418 Aluminum Storefront Framing
Section 08700 Door Hardware

DESCRIPTION OF WORK

The extent of each type of door and frame is shown on the Drawings and Schedules.

The following types of doors and frames are required:

1. SL-17 FRP fiberglass/aluminum flush doors, with 2”x5” Aluminum Frames
2. SL-14 FRP fiberglass/aluminum/glass monumental medium stile and rail doors with FRP mid-panel, with 2”x5” Aluminum Frames. (Matching Existing)
3. FRP panels and mid-panels
4. Insert frames
5. Frame capping systems
6. Door hardware
7. Built-In Concealed Electronic Access Control Devices

SYSTEM PERFORMANCE

Provide door assemblies that have been designed and fabricated to comply with requirements for system performance characteristics listed below and as indicated on Drawings, as demonstrated by testing manufacturer’s corresponding standard systems according to test methods designated.

Thermal Transmission (exterior doors): “U” value of not more than 0.09 (BTU/Hr. x sf x degrees F.) per AAMA 1503.01.

NFPA 80-16: Standard for fire Doors and Other Opening Protectives.

UL 10B: Standard for Fire Tests of Door Assemblies

UL 10C: Standard for Positive Pressure Fire Tests of Door Assemblies

NFPA 252: Fire Tests of Door Assemblies

Flame Spread/Smoke Developed: Provide FRP doors and panels with the following ratings in according with ASTM E 84: Flame Spread: Not greater than 170 (Class C). Smoke Developed: Not greater than 390 (Class C).

Class A option for flame spread and smoke developed rating on interior faces of exterior panels and both faces of interior panel as shown. Flame spread no greater than 15, smoke developed no greater than 310 per ASTM E-84.

Additional Criteria: Provide FRP doors and panels with the following performance: ASTM D 256 Ð nominal value of 20.0 ASTM D 570 Ð nominal value of .20 to .40% ASTM D 2583 Ð nominal value of 50

Abrasion Resistance: Face sheet to have no greater than .029 average weight loss percentage after Taber Abrasion Test Ð 25 cycles at 500 gram weight with H-18 wheel.

Stain Resistance: Face sheet to be unaffected after 24 hour exposure to SVS-1 white spray enamel. Must retain DE of .57 or less with MacBeth Colorimeter. Dark Brown (Bronze) FRP to be used as a basis.

Chemical Resistance: Face sheet to be unaffected after 4 hour exposure to acetic acid (10% solution), acetone, sodium hypochlorite (5.25% solution) and hydrochloric acid (10% solution). No discoloration or panel damage will be allowed.

QUALITY ASSURANCE

Standards: Comply with the requirements and recommendations in applicable specification and standards by AAMA, except to the extent more stringent requirements are indicated.

References:

A. AAMA 1304 – Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
B. AAMA 1503-98 – Thermal Transmittance and Condensation Resistance of Windows, Doors and Glazed Wall Sections.
C. ANSI A250.4 – Test Procedure and Acceptance Criteria for Physical Endurance of Steel Doors and Hardware Reinforcing.
D. ASTM-B117 – Standard Practices for Operating Salt Spray (Fog) Apparatus.
E. ASTM-B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
F. ASTM-B221 – Standard Specification for Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
G. ASTM-C518 – Standard test Method for Steady-State Thermal Transmission Properties by Means of Heat Flow Meter Apparatus.
H. ASTM-D256 – Standard Test Methods for Determining the Pendulum Impact Resistance of Plastics.
I. ASTM-D570 – Standard Test Method for Water Absorption of Plastics.
J. ASTM-D638 – Standard Test Method for Tensile Properties of Plastics.
K. ASTM-D790 – Standard Test Methods for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
L. ASTM-D1621 – Standard Test Method for Compressive Properties of Rigid Cellular Plastics.
M. ASTM-D1622 – Standard Test Method for Apparent Density of Rigid Cellular Plastics.
N. ASTM-D1623 – Standard Test Method for Tensile and Tensile Adhesion Properties of Rigid Cellular Plastics.
O. ASTM-D2126 – Standard Test Method for Response of Rigid Cellular Plastics to Thermal and Humid Aging.
P. ASTM-D2583 – Standard Test Method for Indentation Hardness of Rigid Plastics by Means of a Barcol Impressor.
Q. ASTM-D3029 – Test Methods for Impact Resistance of Flat Rigid Plastic Specimens by Means of a Tup (Falling Weight) (Withdrawn 1995) (Replaced by ASTM-D5420).
R. ASTM-D5116 – Standard Guide for Small-Scale Environmental Chamber Determinations of Organic Emissions from Indoor Materials/ Products.

S. ASTM-D5420 – Standard Test Method for Impact Resistance of Flat, Rigid Plastic Specimen by Means of a Striker Impacted by a Falling Weight (Gardner Impact).
T. ASTM-D6670 – Standard Practice for Full-Scale Chamber Determination of Volatile Organic Emissions from Indoor Materials/ Products.
U. ASTM-E84 – Standard Test Method for Surface Burning Characteristics of Building Materials.
V. ASTM-E90 – Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions.
W. ASTM-E283 – Standard Test Method for Determining Rate of Air Leakage Through Exterior Windows, Curtain Walls, and Doors Under Specified Pressure Differences Across the Specimen.
X. ASTM-E330 – Standard Test Method for Structural Performance of Exterior Windows, Curtain Walls, and Doors by Uniform Static Air Pressure Difference.
Y. ASTM-E1886 – Standard Test Method for Performance of Exterior Windows, Curtain Walls, Doors and Storm Shutters Impacted by Missile(s) and Exposed to Cyclic Pressure Differentials.
Z. ASTM-E1996 – Standard Specification for Performance of Exterior Windows, Glazed Curtain Walls, Doors and Storm Shutters Impacted by Wind Borne Debris in Hurricanes.
AA. ASTM-F476 – Standard Test Methods for Security of Swinging Door Assemblies.
BB. ASTM-F1642-04 – Standard Test Method for Glazing Systems Subject to Air Blast Loading.
CC. NWWDA T.M. 7-90 – Cycle Slam Test Method.
DD. NFRC 100 – Procedure for Determining Fenestration Products U-Factors.
EE. NFRC 400 – Procedure for Determining Fenestration Products Air Leakage.
FF. TAS 201 – Impact Test Procedures.
GG. TAS 202 – Criteria for Testing Impact & Nonimpact Resistant Building Envelope Components Using Uniform Static Air Pressure.
HH. TAS 203 – Criteria for Testing Products Subject to Cyclic Wind Pressure Loading.

Performance: A minimum ten (10) year record of production of frames, doors and panels and completion of similar projects in type and size.

Instruction: The manufacturer or his representative will be available for consultation to all parties engaged in the project including instruction to installation personnel.

Field Measurement: Field verify all information prior to fabrication and furnishing of materials. Furnish and install materials omitted due to lack of verification at no additional cost to owner.

Regulation and Codes: Comply with the current edition in force at the project location of all local, state and federal codes and regulations, including the Americans with Disabilities Act of 1992.

SYSTEM PERFORMANCE

A. Completed assemblies shall comply with all current NC Building code requirements.

B. All test unit sizes and configurations shall conform to: Florida High Velocity Hurricane Zone (HVHZ) Protocols, ICC Compliant ASTM E 1886, ASTM E 1996, all requirements of TAS 201, TAS 202, and TAS 203.

C. Door and Aluminum Tube Frame Assembly.
1. Physical Endurance, ANSI A250.4: 25,000,000 Cycles, No Damage.
2. Salt Spray, ASTM-B117: 500 hours minimum exposure.
3. Air Leakage, NFRC 400, ASTM-E283.
    a. Opaque Swinging Door (< than 50% glass)
        1. 0.01 cfm/sqft @ 1.57 psf.
        2. 0.01 cfm/sqft @ 6.24 psf.
    b. Commercially Glazed Swinging Entrance Door (> than 50% glass)

1. 0.38 cfm/sqft @ 1.57 psf.
2. 0.73 cfm/sqft @ 6.24 psf.

4. Structural Performance, ASTM E-330.
   a. Single or Pair of Doors, 8'4" x 8'2" overall size, single point latching.
      1. ± 75 psf design pressure, pass.
5. Impact and Cycle Test, ASTM-E1886.
   a. Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
      1. 9 lbs. missile @ 50 fps, minimum 3 impacts, no rips, tears, or penetrations.
      2. ± 75 psf design pressure, pass.
6. Forced Entry, AAMA 1304.
   a. Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
      1. 300lb Pull Test, pass.
7. Impact Test, TAS 201.
   a. Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
      1. 9 lbs. missile @ 50 fps, minimum 3 impacts, no rips, tears, or penetrations.
8. Static Air Pressure, TAS 202.
   a. Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
      1. ± 65 psf design pressure, pass.
      2. Forced Entry, 300lb Pull Test, pass.
9. Cyclic Wind Pressure Loading, TAS 203.
   a. Single or Pair of Doors, 6'8" x 7'8" overall size, 3-point latching.
      1. ± 65 psf design pressure, pass.
10. Security Test, ASTM-F476: Minimum Grade 40.
11. Blast Test, ASTM-F1642.
    a. 6 psi @ 45 psi-msec, minimal hazard, operable.

D. Door and Thermally Broken Aluminum Frame Assembly.
   1. Thermal Transmittance, NFRC 100.
      a. Opaque Swinging Door (< than 50% glass)
         1. U-Factor = 0.31 Btu/hr·ft²·°F.
      b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
         1. U-Factor = 0.64 Btu/hr·ft²·°F.
   2. Air Leakage, NFRC 400, ASTM-E283.
      a. Opaque Swinging Door (< than 50% glass)
         1. 0.01 cfm/sqft @ 1.57 psf.
         2. 0.01 cfm/sqft @ 6.24 psf.
      b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
         1. 0.38 cfm/sqft @ 1.57 psf.
         2. 0.73 cfm/sqft @ 6.24 psf.
   3. Sound Transmission, ASTM-E90: STC = 30, OITC = 29.

E. Door and AF-150 Frame Assembly.
   1. Thermal Transmittance, NFRC 100.
      a. Opaque Swinging Door (< than 50% glass)
         1. U-Factor = 0.32 Btu/hr·ft²·°F.
      b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
         1. U-Factor = 0.57 Btu/hr·ft²·°F.
   2. Air Leakage, NFRC 400, ASTM-E283.
      a. Opaque Swinging Door (< than 50% glass)
         1. 0.12 cfm/sqft @ 1.57 psf.
         2. 0.06 cfm/sqft @ 6.24 psf.
      b. Commercially Glazed Swinging Entrance Door (> than 50% glass)
         1. 0.04 cfm/sqft @ 1.57 psf.
         2. 0.14 cfm/sqft @ 6.24 psf.

F. Door and Hollow Metal Steel Frame.

1. Cycle Slam, NWWDA T.M. 7-90.
    a. 5,000,000 cycles.
        1. No Operational Damage.
        2. No Hinge Separation.

SUBMITTALS

Product Data: Submit Manufacturers product data, specifications and instructions for each type of door and frame required in accordance with Section 01340 and the following:

1. Include details of core, stile and rail construction, trim for lites and all other components.

2. Include details of finish hardware mounting.

3. Include samples of each aluminum alloy to be used on this project. Where normal finish color and texture variations are expected, include two or more samples to show the range of such variations.

4. Include one sample of typical fabricated section, showing joints, fastenings, quality of workmanship, hardware and accessory items before fabrication of the work proceeds.

5. Product Data and details: Concealed proximity reader

Testing and Evaluation Reports.

Submit testing reports and evaluations provided by manufacturer conducted by and accredited independent testing agency certifying doors and frames comply with specified performance requirements listed

Submit Shop Drawings for the fabrication and installation of the doors and frames, and associated components. Details to be shown full scale. Include glazing details and finish hardware schedule.

PRODUCT DELIVERY, STORAGE AND HANDLING

Deliver materials to job site in their original, unopened packages with labels intact. Inspect materials for damage and advise manufacturer immediately of any unsatisfactory materials.

Package door assemblies in individual corrugated cartons so no portion of the door has contact with the outer shell of the container. Package and ship frames preassembled to the greatest possible extent.

PROJECT GUARANTEE

Provide a written guarantee signed by manufacturer, installer and contractor, agreeing to replace, at no cost to the owner, any doors, frames or factory hardware installation which fail in materials or workmanship, within the guarantee period. Failure of materials or workmanship includes: excessive deflection, faulty operation of entrances, deterioration of finish or construction in excess of normal weathering and defects in hardware installation. The minimum time period of guarantee is ten (10) years from acceptance.

PART 2: PRODUCTS

DOORS

Manufacturer: Subject to compliance with requirements, provide products of the following:

1. SL-17 flush FRP/aluminum door with SpecLite3E as manufactured by Special-Lite, Inc., Decatur, Michigan.

2. SL-14 Monumental Medium Stile FRP/glass/aluminum door with 12" SL-484 FRP Accent Colored Mid-Panel, with SpecLite3E as manufactured by Special-Lite, Inc., Decatur, Michigan.

Other acceptable manufacturers are:

1. Extrudart Products, Inc.

2. Cline Aluminum Doors, Inc.

3. Other pre-approved manufacturers.

MATERIALS AND ACCESSORIES

Aluminum Members: Alloy and temper as recommended by manufacturer for strength, corrosion resistance and application of required finish and control of color; ASTM B 221 for extrusions, ASTM B 209 for sheet/plate with aluminum wall thickness of 0.1259.

Components: Furnish door and frame components from the same manufacturer.

Splitting of door and frame components is not permitted.

Fasteners: Aluminum, non-magnetic stainless steel or other non-corrosive metal fasteners, guaranteed by the manufacturer to be compatible with the doors, frames, stops, panels, hardware, anchors and other items being fastened. For exposed fasteners (if any) provide Phillips head screws with finish matching the item to be
fastened.

Glazing Gaskets: For glazing factory-installed glass, and for gaskets which are factory-installed in Captive assembly of glazing stops, manufacturers standard stripping of molded neoprene, complying with ASTM D 2000 (designation 2BC415 to 3BC620), or molded PVC complying with ASTM C 509 Grade 4

Weather stripping: Manufacturer's standard pile type in replaceable rabbets for stiles; manufacturer's standard EPDM bulb type in doorframes.

Hardware:

ADA Compliant:

a. Hardware as scheduled on drawings and specified in 08700 unless otherwise noted herein

b. Heavy-Duty 3/8" adjustable continuous hinge: Pemko, McKinney, or Select Products.

c. Removable mullion at pairs of doors: Von Duprin, keyed operation.

d. SL-84 integral recessed door pull (MATCH EXISTING)

ELECTRONIC ACCESS CONTROL (EAC) DEVICES:

a. Access Control Reader: Special-Lite provided low profile proximity card reader; internally mounted. Factory prepped and installed within door, concealed behind fiberglass panel skins of door mid-rail panels. Provide HID Thinline II reader device or equivalent. Requires the use of a frame to door EPT, Special-Lite factory prepped for and provided.

b. Provide 10-year warranty for access control reader device and installation.

FABRICATION

Sizes and Profiles: The required sizes for door and frame units, and profile requirements are shown on the drawings.

Coordination of Fabrication: Field measure before fabrication, and show recorded measurements on final shop drawings.

Complete the cutting, fitting, forming, drilling and grinding of all metal work prior to assembly.

Remove burrs from cut edges, and ease edges and corners to a radius of approximately 1 /649.

No welding of doors or frames is acceptable.

Maintain continuity of line and accurate relation of planes and angles. Secure attachments and support at mechanical joints, with hairline fit at contacting members.

FIBERGLASS REINFORCED POLYESTER FRP FLUSH DOORS

Materials and Construction:

1. Construct SL-17 1 3 /4" thickness doors of 6063-T5 aluminum alloy stiles and rails minimum 2 5 /169 depth. Construct with mitered corners and provide joinery of 3 /89 diameter full width tie rods through extruded splines top and bottom as standard .1259 tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.

2. Construct SL-14 1 3 /4" thickness doors of 6063-T5 aluminum alloy stiles and rails 3 ½" width minimum. Construct with mitered corners and provide joinery of 3 /89 diameter full width tie rods through extruded splines top and bottom as standard .1259 tubular shaped stiles and rails reinforced to accept hardware as specified. Provide hex type aircraft nuts for joinery without welds, glues or other methods for securing internal door extrusions. Furnish integral reglets to accept mid-rail panel face sheet to permit a flush appearance. Rail caps or other face sheet capture methods are not acceptable.

3. Extrude top and bottom rail legs for interlocking continuous rigidity weather bar. Lock face sheet material in place with extruded interlocking edges to be flush with aluminum stiles and rails.

4. Door FRP face sheeting: .1209 thickness fiberglass reinforced polyester. SL-17 flush doors with an abuse resistant engineered surface of the standard colors: to be selected from manufacturers standard selection, minimum selection as follows: white, light gray, red, blue, green, beige, dark gray, dark bronze, black.

   12" Mid-rail panel FRP face sheeting: .1209 thickness fiberglass reinforced polyester. SL-14 monumental FRP/aluminum/glass doors with an abuse resistant engineered surface of the standard colors: to be selected from manufacturers standard selection, minimum selection as follows: white, light gray, red, blue, green, beige, dark gray, dark bronze, black. MATCH EXISTING

   a. Standard Interior and Exterior Class C 0.120" thick, pebble texture, through color with SpecLite 3® integral surfaseal film FRP sheet.

b. Flexural Strength, ASTM-D790: 21 x 103 psi.
c. Flexural Modulus, ASTM-D790: 0.7 x 106 psi.
d. Tensile Strength, ASTM-D638: 13 x 103 psi.
e. Tensile Modulus, ASTM-D638: 1.2 x 106 psi.
f. Barcol Hardness, ASTM-D2583: 55.
g. Izod Impact, ASTM-D256: 14.0 ft-lb/in.
h. Gardner Impact Strength, ASTM-D5420: 120 in-lb.
i. Water Absorption, ASTM-D570: 0.20%/24hrs at 77°F.
j. Surface Burning, ASTM-E84: Flame Spread ≤ 200, Smoke Developed ≤ 450.
k. Taber Abrasion Resistance, Taber Test: 0.007% Max Wt. Loss, cs-17 wheels, 1000g. Wt., 25 cycles.
l. Chemical Resistance.
m. Excellent Rating.
n. Acetic Acid, Concentrated.
o. Acetic Acid, 5%.
p. Bleach Solution.
q. Detergent Solution.
r. Distilled Water.
s. Ethyl Acetate.
t. Formaldehyde.
u. Heptane.
v. Hydrochloric Acid, 10%.
w. Hydrogen Peroxide, 3%.
x. Isooctane.
y. Lactic Acid, 10%.

5. Core of Door Assembly: Minimum five pounds per cubic foot density poured-in-place polyurethane free of CFC. Minimum 'R' value of 11. Ballistic rating is as indicated. Meeting stiles on pairs of doors and bottom weather bar with nylon brush weather stripping.

6. Manufacture doors with cutouts for glass vision lites, louvers or FRP panels as scheduled. Factory furnish and install all glass, louvers and panels prior to shipment.

7. Pre-machine doors in accordance with templates from the specified hardware manufacturers and approved hardware schedule, including built-in and concealed Electronic Access Control devices. Factory install hardware and devices.

LOUVERS

Special-Lite inverted 'Y' louver, clear anodized.

FRAMING SYSTEMS

Aluminum Tubular Framing:

1. Framing system from the door manufacturer of the size and type shown on Drawings, widths to match adjacent storefront framing sizes, with .1259 minimum wall thickness and type 6063-T5 aluminum alloy. .6259 high applied doorstops with screws and weather stripping. Frame members are to be box type with four (4) enclosed sides. Open back framing will not be acceptable.

2. Caulk joints before assembling frame members. Secure joints with fasteners and provide a hairline butt joint appearance. Prefit doors to frame assembly at factory prior to shipment. Field fabrication of framing using Stick material is not acceptable.

3. Applied stops for side, transom and borrowed lites and panels, with fasteners exposed on interior or unsecure portion only. Pre-machine and reinforce frame members for

hardware in accordance with manufacturer's standards and the approved hardware schedule.

4. Install with anchors appropriate for wall conditions to anchor framing to wall materials. A minimum of five anchors up to 7849 on jamb members, and one additional anchor for each foot over 7849. Secure head and sill members of transom, side lites and similar conditions.

5. Factory pre-assemble side lites to the greatest extent possible, and mark frame assemblies according to location.

Insert Framing Systems:

1. Model: SL-1031, SL-1032 or SL-1034.

2. Insert frame as shown, using an integral stop fitted with weather stripping.

3. Corner joints of miter design, secure with furnished aluminum clips, and screw into place.

4. Reinforce and pre-machine insert frame members for hardware in accordance with manufacturer's standards and the approved hardware schedule.

5. Anchors of a suitable type to fasten insert framing to existing frame materials, using a minimum of five anchors on jambs up to 7849 height, three on headers. One additional anchor for each additional lineal foot of frame.

Frame Capping:

1. Model: SL-70

2. .0939 wall thickness capping as indicated on drawings with insert frame as shown. Finish of capping to match framing.

GLAZING

Design system for Glass:

1. Manufacturers standard flush glazing system of recessed channels and captive glazing gaskets or applied stops as shown.

2. Allow for thermal expansion on exterior units.

3. Provide glass as specified in 08800 and shown, factory glazed into doors.

Security Grate Option: Security grate model SL-349 as manufactured by Special-Lite, Inc., Decatur, Michigan.

FINISHES

Anodized Surfaces: Clear, Class I, 0.7 mils.

PART 3: EXECUTION

INSTALLATION

Comply with manufacturers recommendations and specifications for the installation of the doors and frames. Factory install hardware, glass and louvers in doors. Factory assemble side lites and transoms to the greatest extent possible.

Set units plumb, level and true to line, without warp or rack of doors or frames. Anchor securely in place. Separate aluminum and other metal surfaces with bituminous coatings or other means as approved by architect.

Set thresholds in a bed of mastic and backseal.

Clean surfaces promptly after installation of doors and frames, exercising care to avoid damage to the protective coatings.

Ensure that the doors and frames will be without damage or deterioration (other than normal weathering) at the time of acceptance.

Provide owner with all adjustment tools and instruction sheets. Arrange an inservice session to owner at owner's convenience. Provide a minimum one-year written guarantee on all labor related to this section. Any workmanship, which is defective or deficient, shall be corrected to the owner's satisfaction and at no additional cost to the owner.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide the motor operated automatic closing rolling Fire-Rated Counter Shutter, as shown on the Drawings and specified in this Section.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products fabricated by Cookson.

Other listed Manufacturer's who can furnish equivalent products or systems of same materials specified, will also be acceptable:

Cornell
Clopay Building Products

PERFORMANCE:

Provide counter shutter with Underwriters' Laboratories, Inc. label for the fire rating classification, 3/4 hr.

SUBMITTALS:

Manufacturer's Product Data: Submit for approval three (3) copies of folder containing complete Manufacturer's product data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

WARRANTY

Provide Manufacturer’s “Standard Warranty”: Two years from date of shipment against defects in material and workmanship

PART 2 - PRODUCTS

FIRE-RATED ROLLING METAL CURTAIN:

Stainless-steel rolling counter fire doors, Cornell Cookson AlarmGard-Tube Motor Operated, Oversized Rolling Fire Door, Model Series ERC10. 3/4 Hour-Rated.

Curtain: To be constructed of AISI 304 #4 finish Stainless Steel, No. 1F, interlocked flat-faced slats, 1-1/2 inches high by 1/2 inch deep, minimum 22 gauge, Commercial Quality, with stainless steel bottom bar and double vinyl astragal, with UL tested brush seal.

Endlocks: Fabricate continuous interlocking slat sections with high strength galvanized steel endlocks riveted to slats per UL requirements

Smoke Seals & UL Smoke Label:

Bottom Bar: UL tested brush seal, with smoke seal.]

Guides and Head: Replaceable, UL Listed smoke seals, brush seals sealing against fascia side of curtain

Barrel: Curtain to be coiled around a steel tubing of not less than 4" diameter. Counter balancing unit to be enclosed and shall rotate on grease sealed ball bearings. Steel pipe shall be capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width.

Counterbalance Shaft Assembly: Shall consist of oil-tempered torsion springs capable of counter balancing weight of curtain, with spring balance of oil-tempered, heat-treated steel helical torsion spring assembly designed for proper balance of door to ensure that maximum effort to operate will not exceed 25 lbs. Provide wheel for applying and adjusting spring torque.

Guides: To be fabricated from minimum 12 gauge stainless steel formed shapes.

Brackets: Fabricate from reinforced steel plate with permanently lubricated ball or roller bearings at rotating support points to support counterbalance shaft assembly and form end closures, with Powder Coat finish, baked-on polyester powder coat, color as selected by Architect from manufacturer's standard color range; minimum 2.5 mils cured film.

Hood: Fabricated from 24 gauge stainless steel with reinforced top and bottom edges. Provide minimum 1/4 inch steel intermediate support brackets as required to prevent excessive sag.

Finish: Stainless Steel

Operation:

AlarmGard Advanced Tube Motor Operation:

1. AlarmGard Series Electric Tube Motor: UL listed NEMA 1 enclosure, [115v/ 60 Hz/ single phase service] [230v/ 50 Hz/ single phase service]. Provide a totally enclosed non ventilated motor, removable without affecting the setting of limit switches; thermal overload protection, planetary gear reduction, adjustable rotary limit switch mechanism and a transformer with 24v secondary output. All internal electrical components are to be prewired to terminal blocks.3548
    a. Provide a failsafe tubular motor operated fire shutter assembly requiring no ancillary or externally mounted release devices, cables, chains, pulleys, reset handles or mechanisms
    b. Provide an internal electrical failsafe release device that requires no additional wiring, external cables or mounting locations
    c. Provide an internal solenoid brake mechanism to hold the door at any position during normal door operation

d. Control automatic closure speed with an internal, totally enclosed, variable rate centrifugal governor without the use of electrical pulsation, constant rate viscosity, oscillation type or other exposed governing devices
e. Electrically activate door system automatic closure by notification from central alarm system or power outage.
f. Maintain automatic closure speed at not more than 12” (229 mm) per second.
g. Enable safety edge function during alarm gravity closing while power is present. Enable door to rest upon obstruction following this sequence.
h. Electrically reset internal failsafe release device and door operating system upon restoration of electrical power and upon clearing of the alarm signal without requiring human supervision
i. Provide selectable ability for the door system to automatically self-cycle to the fully open position following automatic reset without requiring human supervision
j. Ensure that manual resetting of spring tension, release devices, linkages or mechanical dropouts will not be required
k. Notify electrical contractor to mount control station(s) and supply the appropriate disconnect switch, all conduit and wiring per the door system wiring instructions
l. Drop test and reset door system twice by all means of activation and comply fully with NFPA 80 Section 5

PART 3 - EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION:

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

Install door and operating equipment with necessary hardware, anchors, inserts, hangers and supports.

Comply with NFPA 80 and follow manufacturer's installation instructions

Following completion of installation, including related work by others, lubricate, test, and adjust doors for ease of operation, free from warp, twist, or distortion.

Clean surfaces soiled by work as recommended by manufacturer.

Demonstrate proper operation to Owner's Representative. Instruct Owner's Representative in maintenance procedures.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide the aluminum rolling counter door for Kitchen 910, as shown on the Drawings and specified in this Section.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products fabricated by Cookson. Other listed Manufacturer's who can furnish similar products or systems of same materials specified, will also be acceptable.

SUBMITTALS:

Manufacturer's Data: Submit for approval three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with work of Kitchen Equipment Contractor.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2 - PRODUCTS

ALUMINUM ROLLING METAL COUNTER DOOR:
All aluminum manual crank operated rolling counter door, Cornell Model Series ESC10

Curtain: To be constructed of interlocked 18 gauge extruded aluminum slats (Slat No. 1F), nylon endlocks. Width of slats: 1 1/2" x 1/2" deep.

Bottom bar shall be extruded aluminum, tubular in shape 1-5/16” deep x 2-1/4” high and provided with continuous lift handles and double vinyl astragal.

Barrel: Curtain to be coiled around a steel pipe tubing of not less than 4" diameter, and capable of supporting curtain load with maximum deflection of 0.03 inches per foot of width. Counter balancing unit to be enclosed and shall rotate on grease sealed ball bearings.

Counter Balance: Shall consist of adjustable oil-tempered torsion spring assembly capable of counter balancing weight of curtain, with maximum effort to operate not to exceed 25 lbs.

Operation: Curtain shall be crank operated, with finger lifts mounted in the bottom bar.

Guides: To be fabricated from heavy duty extruded aluminum shapes, with snap-on cover to conceal fasteners. Provide polypropylene pile runners on both sides of curtain to eliminate metal to metal contact between guides and curtain.

Locking Device: Bottom bar of curtain shall be furnished with a concealed sliding bolt deadlock operated by a thumb knob.

Hood: Fabricated from .040 aluminum and shall be furnished as necessary to encase curtain roll.

Finish: All aluminum components to be 204-R1 clear anodized finish.

PART 3 - EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION:

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

Furnish all necessary materials, labor, and equipment for the complete assembly installation of the aluminum swing doors, door frames, hardware, and storefront framing system as shown on the drawings and specified herein.

1.01 SUMMARY

A. Section Includes: Aluminum Swing Doors, including:

1. YKK AP Series 50H Wide Stile Impact Resistant and Blast Mitigating Heavy Duty Swing Doors Entrances.

2. Cline Aluminum Heavy-Duty Screen Door.

B. Related Sections:

1. Glass and Glazing: Refer to Division 8 Glass and Glazing Section for glass and glazing requirements.
2. Aluminum Storefront Systems Section 08418.
3. Finish Hardware Section 08700

1.02 SYSTEM PERFORMANCE DESCRIPTION

A. Completed assemblies shall comply with all current NC Building code requirements.

B. All test unit sizes and configurations shall conform to: Florida High Velocity Hurricane Zone (HVHZ) Protocols, ICC Compliant ASTM E 1886, ASTM E 1996, all requirements of TAS 201, TAS 202, and TAS 203.

A. Performance Requirements: Provide aluminum swing doors that comply with performance requirements indicated, as demonstrated by testing manufacturers assemblies in accordance with test methods indicated.

1. Air Infiltration (Single Acting Butt Hinges or Offset Pivots): Air infiltration shall be tested in accordance with ASTM E 283 at static pressure of 1.57 PSF (75 Pa). Infiltration shall not exceed the following:

a. Pair of Doors: 1.00 CFM/SQ. FT.

b. Single Doors: 0.50 CFM/SQ. FT.

2. Water Infiltration: No uncontrolled water other than condensation on indoor face of any component tested in accordance with ASTM E 331 at a test pressure differential of 10.5 psf (503 Pa). Water test to be performed immediately after design pressure test. Standard 50H Entrances are intended for 1st floor applications.

3. Structural: Door corner structural strength shall be tested per YKK AP's dual moment test procedure and certified by an independent testing laboratory to ensure corner

integrity and weld compliance. Certified test procedures and results are available upon request.

4. Structural Uniform Load Test:

    1. Doors Positive Pressure:

        a. 90 psf – For Air Only Threshold.

        b. 70 psf - For Air and Water Threshold.

    2. Negative Pressure: 90 PSF

5. Forced Entry Resistance: Tests performed simultaneously with 300 lb. forces applied to the active door panel within 3" of the locks in the direction that would tend to open the door while 150 lb. forces are applied in both perpendicular directions to the 300 lb. force simultaneously.

1.03 PROJECT CONDITIONS / SITE CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication: show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.04 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Product Data: Submit product data for each entrance series specified

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, and finish colors.

D. Samples: Submit verification samples for colors. Minimum 2-1/2 inch by 3 inch (61 mm by 73 mm) samples on actual aluminum substrates indicating full color range expected in installed system.

E. Quality Assurance / Control Submittals:

    1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

    2. Installer Qualification Data: Submit installer qualification data.

F. Closeout Submittals:

    1. Warranty: Submit executed warranty documents specified herein, endorsed by YKK AP authorized official and installer.

        a. Warranty Period: Manufacturer’s one (1) year standard warranty commencing on the substantial date of completion for the project provided that the warranty, in no event, shall start later than six (6) months from the date of shipment by YKK AP America Inc.

2. Project Record Documents: Submit project record documents, including operation and maintenance data for installed materials in accordance with Division 1 Project Closeout (Project Record Documents) Section.

    a. Maintenance Data: Maintenance procedures for care and cleaning of entrance systems.

PART 2: PRODUCTS

2.01 MANUFACTURERS (Acceptable Manufacturers/Products)

A. Entrance Door Acceptable Manufacturers:

1. YKK AP America Inc., Austell, GA 30168, Telephone: (678) 838-6000

2. Old Castle Model Equivalent

3. EFCO Model Equivalent

B. Aluminum Screen Doors: Series 400SE Heavy-Duty Screen Door by Cline Aluminum Doors, Inc.

C. Aluminum Storefront Entrance Door Products:

1. Wide Stile Swing Doors: YKK AP Model 50H Wide Stile Impact Resistant and Blast Mitigating Entrance Swing Doors with 6” mid-rail.

    a. Description: 2 3/8” thick door x 5" Wide Door Stiles

2. Corner Construction: Fabricate door corners joined by concealed reinforcement secured with screws, and sigma deep penetration welding.

3. Glazing Stops: Manufacturer's standard snap-in glazing stops with EPDM glazing gaskets to prevent water infiltration.

4. Weather stripping: Manufacturer's standard pile type in replaceable rabbets for stiles; manufacturer's standard EPDM bulb type in doorframes.

D. Required Hardware: ADA Compliant:

a. Aluminum Threshold: Pemko 2005AV, or equivalent by National Guard or Hagar.

b. Weather stripping – perimeter wool pile: National Guard, Pemko, or Hager.

c. Continuous door sweep with drip – Pemko 345-V, or equivalent.

d. Push/Pull unless exit device indicated on Door Schedule.

e. Heavy-duty Continuous Hinge: Pemko, McKinney, or Select Products.

f. Removable mullion at pairs of doors: Von Duprin; keyed operation.

2.02 MATERIALS

A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.

B. Aluminum Sheet:

1. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050 inch (1.27 mm) minimum thickness.

2. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H14 Aluminum Alloy, 0.080 inch (1.95) mm) minimum thickness.

2.03 ACCESSORIES

A. Manufacturer's Standard Accessories:

1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color.

2. Sealant: Non-skinning type, AAMA 803.3.

3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; Glazing gaskets in accordance with ASTM C 864.

2.04 RELATED MATERIALS (Specified In Other Sections)

A. Glass: Refer to Division 8 Glass and Glazing Section for glass materials.

2.05 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with uniform hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

1. Hardware: Drill and cut to template for hardware. Reinforce frames and door stiles to receive hardware in accordance with manufacturer’s recommendations.

2. Welding: Conceal welds on aluminum members in accordance with AWS recommendations or methods recommended by manufacturer. Members showing welding bloom or discoloration on finish or material distortion will be rejected.

B. Fabrication Tolerances:

1. Material Cuts: Square to 1/32 inch (0.8 mm) off square, maximum, over largest dimension; proportionate amount of 1/32 inch (0.8 mm) on other two dimensions.

2. Maximum Offset: 1/64 inch (0.4 mm) in alignment between two consecutive members in line, end to end.

3. Maximum Offset: 1/64 inch (0.4 mm) between framing members at glazing pocket corners.

4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent member.

5. Variation (In squaring diagonals for doors and fabricated assemblies): 1/16 inch (1.6 mm).

6. Flatness (For doors and fabricated assemblies): +/- 1/16 inch (1.6 mm) off neutral plane.

2.06 FINISHES AND COLORS

A. Anodized Finish: YKK AP AMERICA Anodized Finish

1. Clear: YKK AP YS1N with clear protective composite coating.

B. Finishing: Prepare aluminum surfaces for specified finish; apply shop finish in accordance with the following:

1. Anodized Coating: Electrolytic color coating followed by an organic seal applied in accordance with the requirements of AAMA 612-02. Aluminum extrusions shall be produced from quality-controlled billets meeting AA-6063-T5.

a. Exposed surfaces shall be free of scratches and other serious blemishes.

b. Extrusion shall be given a caustic etch followed by an anodic oxide treatment and sealed with an organic electrodeposition applied protective top coating.

c. The anodized coating shall comply with all the requirements of AAMA 612-02; Voluntary Specifications, Performance Requirements and Test Procedures for Combined Coatings of Anodic Oxide and Transparent Organic Coatings on Architectural Aluminum. Testing shall demonstrate the ability of the finish to resist damage from mortar, salt spray, and chemicals commonly found on construction suites, and to resist the loss of color and gloss.

d. Overall coating thickness for finishes shall be a minimum of 0.7 mils.

C. Finishes Testing:

1. Apply 0.5% solution NaOh, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOh; Do not clean area further.

2. Submit samples with test area noted on each sample.

D. Anodized Finish Warranty: 10-year warranty commencing on Date of Substantial Completion.

PART 3: EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS / RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

1. Verify location of preset anchors, perimeter fasteners, and block-outs are in accordance with shop drawings.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

1. Aluminum Surface Protection: Protect aluminum surfaces from contact with lime, mortar, cement, acids, and other harmful contaminants.

3.04 INSTALLATION

A. General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances.

1. Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using nylon pads or bituminous coating.

2. Shim and brace aluminum system before anchoring to structure.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

3.06 ADJUSTING AND CLEANING

A. Adjusting: Adjust swing doors for operation in accordance with manufacturer's recommendations.

B. Cleaning: The General Contractor shall clean installed products in accordance with manufacturer's instructions prior to owner's acceptance, and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect the installed product's finish surfaces from damage during construction.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

PART 1: GENERAL

Furnish all necessary materials, labor, and equipment for the complete assembly installation of the aluminum storefront framing system as shown on the drawings and specified herein.

1.01 SUMMARY

A. Section Includes: Aluminum Storefront Systems

1. YKK AP Series YHS 50 TU Impact Resistant and Blast Mitigating Storefront System (Insulated Glazing) 2 1/2” x 5”.

B. Related Sections:

1. Sealants: Refer to Division 7 Joint Treatment Section for sealant requirements.

2. Glass and Glazing: Refer to Division 8 Glass and Glazing Section for impact resistant glass and glazing requirements.

3. Aluminum Swing Entrances Section 08410

1.02 SYSTEM DESCRIPTION

A. Completed assemblies shall comply with all current NC Building code requirements.

B. Performance Requirements: Provide aluminum storefront systems that meet all requirements of Florida High Velocity Hurricane Zone (HVHZ) Protocols, South Florida Building Code Protocols TAS 201, TAS 202, and TAS 203, ASTM E 1886, ASTM E 1996 and comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with test method indicated.

1. Wind Loads: Completed storefront system shall withstand wind pressure loads normal to wall plane indicated:

a. Exterior Walls:

1. Positive Pressure: 70 psf

2. Negative Pressure: 70 psf

b. Interior Walls (Pressure Acting in Either Direction):

2. Deflection: Maximum allowable deflection in any member when tested in accordance with ASTM E 330 with allowable stress in accordance with AAMA Specifications for Aluminum Structures.

a. For spans less than 13'-6: L/175 or 3/4" maximum.

b. For spans greater than 13'-6" but less than 40'-0": L/175 or L/240 + 1/4".

3. Thermal Movement:
    a. Provide for thermal movement caused by 180 degrees F. (82.2 degrees C.) surface temperature, without causing buckling stresses on glass, joint seal failure, undue stress on structural elements, damaging loads on fasteners, reduction of performance, or detrimental effects.

4. Air Infiltration: Completed storefront systems shall have 0.06 CFM/FT2 (1.10 m3/h·m2) maximum allowable infiltration when tested in accordance with ASTM E 283 at differential static pressure of 6.24 PSF (299 Pa).

5. Water Infiltration: No uncontrolled water on indoor face of any component when tested in accordance with ASTM E 331 at a test pressure of 12 PSF (575 Pa). (or when required, field tested in accordance with AAMA 503). Fastener Heads must be seated and sealed against Sill Flashing on any fasteners that penetrate through the Sill Flashing or pan.

6. Thermal Performance: When tested in accordance with AAMA 1503, and AAMA 507, as follows:

    a. Condensation Resistance Factor CRF: A minimum of 59.

    b. Thermal Transmittance U-Factor: 0.45 BTU/HR/FT2/ºF or less.

    c. U-Factor shown for system when using a 1-5/16" laminated insulating glass unit: 1/4" outer pane heat strengthened as required with 0.034 low emmissivity coating on surface #2, 1/2" air space with aluminum spacer, 9/16” inner pane of 1/4" heat strengthened / 0.090 PVB interlayer / 1/4" heat strengthened.

7. Acoustical Performance: Acoustical Performance: When tested in accordance with ASTM E 1425:

    a. Sound Transmission Class (STC) shall not be less than 39

    b. Outdoor–Indoor Transmission Class (OITC) shall not be less than 33

8. Small Missile Level A Impact Test conducted on test units in accordance with TAS 201 or ASTM E 1886/E 1996. Upon completion of the missile impact tests, the test units shall be tested in accordance with TAS 203 or ASTM E 1996 cyclic load test.

9. Large Missile Level (C or D) Impact Test conducted on test units in accordance with TAS 201 or ASTM E 1886/E 1996. Upon completion of the missile impact tests, the test units shall be tested in accordance with TAS 203 or ASTM E 1996 cyclic load test.

10. Hurricane Resistant Openings: Exterior hurricane opening assemblies to be tested according to ASTM E330, ASTM E1886, ASTM E1996 standards, and certified by a qualified independent third party testing agency acceptable to authority having jurisdiction, with labeling indicating compliance with the wind load and design pressure level requirements specified for the Project.

1.03 SUBMITTALS

A. General: Prepare, review, approve, and submit specified submittals in accordance with "Conditions of the Contract" and Division 1 Submittals Sections. Product data, shop drawings, samples, and similar submittals are defined in "Conditions of the Contract."

B. Product Data: Submit product data for each type storefront series specified.

C. Shop Drawings: Submit shop drawings showing layout, profiles, and product components, including anchorage, accessories, finish colors and textures.

D. Samples: Submit verification samples for colors on actual aluminum substrates indicating full color range expected in installed system.

1. Typical framing member
2. Bent plate aluminum sill pan

E. Quality Assurance / Control Submittals:

1. Test Reports: Submit certified test reports showing compliance with specified performance characteristics and physical properties.

2. Installer Qualification Data: Submit installer qualification data.

F. Closeout Submittals:

1. Warranty: Submit warranty documents specified herein.

2. Project Record Documents: Submit project record documents for installed materials in accordance with Division 1 Project Closeout (Project Record Documents) Section.

1.04 QUALITY ASSURANCE

A. Qualifications:

1. Installer Qualifications: Installer experienced (as determined by contractor) to perform work of this section who has specialized in the installation of work similar to that required for this project. If requested by Owner, submit reference list of completed projects.

2. Manufacturer Qualifications: Manufacturer capable of providing field service representation during construction, approving acceptable installer and approving application method.

B. Pre-Installation Meetings: Conduct pre-installation meeting to verify project requirements, substrate conditions, manufacturer's installation instructions, and manufacturer's warranty requirements.

C. Mock-Ups (Field Constructed): Install at project site a job mock-up using acceptable products and manufacturer approved installation methods. Obtain Owner’s and Architect’s acceptance of finish color, and workmanship standard.

D. Maintenance: Maintain mock-up during construction for workmanship comparison; remove and legal dispose of mock-up when no longer required.

E. Incorporation: Mock-up may be incorporated into final construction upon Owner’s approval.

F. Field Test: Conduct field test to determine water-tightness of storefront system. Conduct test in accordance with AAMA 501.2-03 at locations selected by Architect.

1.05 PROJECT CONDITIONS / SITE CONDITIONS

A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings. Coordinate field measurements, fabrication schedule with construction progress to avoid construction delays.

1.06 WARRANTY

A. Project Warranty: Refer to "Conditions of the Contract" for project warranty provisions.

B. Manufacturer's Warranty: Submit, for Owner's acceptance, manufacturer's standard warranty document executed by authorized company official. Manufacturer's warranty is in addition to, and not a limitation of, other rights Owner may have under the Contract Documents.

1. Beneficiary: Issue warranty in the legal name of the project Owner.

2. Warranty Period: 5 years commencing on Date of Substantial Completion

3. Warranty Acceptance: Owner is sole authority who will determine acceptability of manufacturer's warranty documents.

4. Anodized Finish Warranty: 10-year warranty commencing on Date of Substantial Completion.

PART: 2 PRODUCTS

2.01 MANUFACTURERS (Acceptable Manufacturers/Products)

A. Acceptable Manufacturers:

YKK AP America Inc., Austell, GA 30168, Telephone: (678) 838-6000

1. Storefront System: YKK AP YHS 50 TU Impact Resistant and Blast Mitigating Storefront System

EFCO 526 Storefront
Old Castle FG-5750T StormMax 2½” x 5”

B. Storefront Framing System:

1. Description: Center set, exterior flush glazed; jambs and vertical mullions continuous; head, sill, intermediate horizontal attached by screw spline joinery. Continuous and wept sill pan flashing.

2. Components: Manufacturer's standard extruded aluminum mullions, 0-15 degree hinged mullions, 90 degree corner posts, flexible corner posts, three-way corner posts, entrance door framing, and indicated shapes.

3. Glazing: Manufacturer's standard glazing stops with EPDM glazing gaskets to prevent water infiltration at the exterior and Dow Corning® 995 Structural Silicone Sealant with fixed stops at the interior.

4. Thermal Barrier: Provide continuous thermal barrier by means of a poured and debridged pocket consisting of a two-part, chemically curing high density polyurethane which is bonded to the aluminum. Systems employing non-structural thermal barriers are not acceptable.

5. Provide .125” thick aluminum bent plate sill pan with 3-point attachment end dams at exterior storefront systems. Profiles, sizes and shape as indicated on Drawings.

6. Doorstops to be integral fin type, snap-in type not acceptable.

7. Provide internal frame reinforcements all closer locations.

2.02 MATERIALS

A. Extrusions: ASTM B 221 (ASTM B 221M), 6063-T5 Aluminum Alloy.

B. Aluminum Sheet:

1. Anodized Finish: ASTM B 209 (ASTM B 209M), 5005-H14 Aluminum Alloy, 0.050 inch (1.27 mm) minimum thickness.

2. Painted Finish: ASTM B 209 (ASTM B 209M), 3003-H14 Aluminum Alloy, 0.080 inch (1.95 mm) minimum thickness.

2.03 ACCESSORIES

A. Manufacturer's Standard Accessories:

1. Fasteners: Zinc plated steel concealed fasteners; Hardened aluminum alloys or AISI 300 series stainless steel exposed fasteners, countersunk, finish to match aluminum color. Anchoring shall follow the details as shown on the Florida Product Approvals.

2. Sealant: Non-skinning type, AAMA 803.3

3. Glazing: Setting blocks, edge blocks, and spacers in accordance with ASTM C 864, shore durometer hardness as recommended by manufacturer; Glazing gaskets in accordance with ASTM C 864.

2.04 RELATED MATERIALS (Specified In Other Sections)

A. Glass: Refer to Division 8 Glass and Glazing Section for glass materials.

B. Metal Window Panels: Refer to Division 8 Glass and Glazing Section for metal panel materials.

2.05 FABRICATION

A. Shop Assembly: Fabricate and assemble units with joints only at intersection of aluminum members with hairline joints; rigidly secure, and sealed in accordance with manufacturer's recommendations.

B. Fabrication Tolerance:

1. Material Cuts: Square to 1/32 inch (0.8 mm) off square, over largest dimension; proportionate amount of 1/32 inch (0.8 mm) on the two dimensions.

2. Maximum Offset: 1/64 inch (0.4 mm) in alignment between two consecutive members in line, end to end.

3. Maximum Offset: 1/64 inch (0.4 mm) between framing members at glazing pocket corners.

4. Joints (Between adjacent members in same assembly): Hairline and square to adjacent member.

5. Variation (In squaring diagonals for doors and fabricated assemblies): 1/16 inch (1.6 mm).

6. Flatness (For doors and fabricated assemblies): +/- 1/16 inch (1.8 mm) off neutral plane.

2.06 FINISHES AND COLORS

A. Anodized Finish: YKK AP AMERICA Anodized Finish

1. Clear anodized finish, with clear protective composite coating.

B. Finishing: Prepare aluminum surfaces for specified finish; apply finish in accordance with the following:

1. Anodized Coating: Electrolytic color coating followed by an organic top coating applied to aluminum extrusions produced from quality-controlled billets meeting AA-6063-T5.

a. Exposed surfaces shall be free of scratches and other serious blemishes.

b. Extrusion shall be given a caustic etch followed by an anodic oxide treatment and sealed with an organic electrodeposition applied protective top coating.

c. Overall coating thickness for finishes shall be a minimum of 0.7 mils.

d. Coating shall conform to Aluminum Association Standard AAM12C22A4X. A4X designation shall signify an anodic coating of 0.4 mils minimum followed by an organic top coating of a minimum 0.3 mils.

e. In addition to the Aluminum Association Standard above, finish shall conform to the following:

i. AAMA 605.2 Mortar Resistance Test Specification; Test Method per ASTM C207, 24 Hour Pat Test.

ii. CASS Corrosion Resistance Test. CASS 240/ASTM B368 Test Method.

iii. Other AAMA 605.2 Performance Tests specified in these specifications, such as: 7.3 Dry Film; 7.8.2 Salt Spray Resistance; 7.9.1.2 Color Retention, South Florida; 7.9.1.4 Gloss Retention, South Florida.

C. Finishes Testing:

1. Apply 0.5% solution NaOh, sodium hydroxide, to small area of finished sample area; leave in place for sixty minutes; lightly wipe off NaOh; Do not clean area further.

2. Submit samples with test area noted on each sample.

D. Anodized Finish Warranty: 10-year warranty commencing on Date of Substantial Completion.

PART 3: EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS / RECOMMENDATIONS

A. Compliance: Comply with manufacturer's product data, including product technical bulletins, product catalog installation instructions, and product carton instructions.

3.02 EXAMINATION

A. Site Verification of Conditions: Verify substrate conditions (which have been previously installed under other sections) are acceptable for product installation in accordance with manufacturer's instructions.

3.03 PREPARATION

A. Adjacent Surfaces Protection: Protect adjacent work areas and finish surfaces from damage during product installation.

3.04 INSTALLATION

A. General: Install manufacturer's system in accordance with shop drawings, and within specified tolerances. Anchoring shall follow the details as shown on the Florida Product Approvals.

1. Protect aluminum members in contact with masonry, steel, concrete, or dissimilar materials using nylon pads or bituminous coating.

2. Shim and brace aluminum system before anchoring to structure.

3. Provide .125” bent plate aluminum sill pans with end dams at exterior storefront systems. Provide profiles, sizes and shape as indicated on Drawings. Extend sill pans continuous with spliced joints; set in continuous beds of waterproofing sealant.

4. Verify storefront system allows water entering system to be collected in gutters and weeped to exterior. Verify weep holes are open, and metal joints are sealed in accordance with manufacturer’s installation instructions.

5. Seal metal-to-metal storefront system joints using sealant recommended by system manufacturer.

6. All installation hardware and accessories required for a secure installation into rough openings, including shims, plates and anchors as necessary.

3.05 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Upon Owner's request, provide manufacturer's field service consisting of product use recommendations and periodic site visit for inspection of product installation in accordance with manufacturer's instructions.

B. Field Test: Conduct field test to determine water-tightness of curtain wall system. Conduct test in accordance with AAMA 501.2-03 at locations selected by Architect.

C. Perform minimum of three tests on various areas as determined by the Architect’s representative. Perform test in Architect’s presence. Field test first panels completed, then

test all panels thereafter upon completion of all fixed panels. Generate and issue test report in compliance with AAMA 501.2-03 requirements.

3.06 ADJUSTING AND CLEANING

A. Adjusting: Adjust operating items as recommended by manufacturer.

B. Cleaning: The General Contractor shall clean installed products in accordance with manufacturer's instructions prior to Owner's acceptance, and remove construction debris from project site. Legally dispose of debris.

C. Protection: The General Contractor shall protect installed product's finish surfaces from damage during construction.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall include all labor, materials, equipment, transportation, tools and storage required for complete installation of all finish hardware shown and scheduled on Drawings and specified herein. Intent of this Specification is to provide complete finishing hardware requirements for entire building project excepting hardware, which is specifically mentioned hereinafter as being furnished by others. Any openings not specifically mentioned herein shall be furnished consistent with hardware specified for similar openings.

Wood doors for Project are prefit. Coordinate with wood door manufacturer in furnishing hardware templates and schedules at earliest possible time.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 0l068.

QUALITY ASSURANCE:

Manufacturers: Hardware listed in Hardware Schedule shall be supplied by one of following Manufacturers listed for each item or an equal. To establish quality of hardware required, catalog numbers of Manufacturers listed in Hardware Schedule have been used. Hardware furnished shall be of equal type, design, quality and function as that specified in Hardware Schedule.

Acceptable Manufacturers: Similar items manufactured or furnished by other manufacturers may be submitted for approval, subject to these Specification requirements and written approval received 7 days prior to bid date.

Supplier's Qualifications: Contractor shall select only supplier who has in his employ qualified personnel, who shall manage and coordinate complete hardware contract, and shall also be available to visit Project in order to solve or correct conditions affecting proper hardware installation or adjustment, as required.

SUBMITTALS:

Schedule: Submit Hardware Schedule to Architect in six (6) copies, as promptly as possible, showing quantities, types, catalog numbers and locations of various items of finish hardware required. Submit as specified for shop drawings in accordance with GENERAL CONDITIONS.

Job Completion Instructions: At completion of work turn over to Owner all tools, instructions, and maintenance information for his use in maintaining hardware. Furnish Owner also with two copies of Job Use Finish Hardware Schedule for his permanent records.

PRODUCT HANDLING:

Packing, Marking and Labeling: Deliver hardware to project site in manufacturer's original packages. Each article of hardware shall be neatly wrapped and individually packed in substantial carton or other container, properly marked or labeled to be readily identifiable with Hardware Schedule.

Storage: General Contractor shall furnish secure storage area for delivery by Hardware Supplier of finish hardware and storage of same. General Contractor shall be responsible for shortages due to theft and pilferage.

General Contractor shall provide in storage area adequate counters, shelves, and bins for assembly and grouping of hardware for distribution and installation.

PART 2: PRODUCTS

TYPES, SIZES AND DESCRIPTIONS:

Hardware shall be of types and sizes listed in this Section, applied with fastenings of proper size, quantity and finish.

Templates: Hardware for application on metal shall be made to standard templates. Furnish physical samples or templates, as required to Manufacturer of metal doors and frames for proper manufacturer and application.

Reinforcement: Reinforcing for hardware shall be furnished and installed by Door and Frame Manufacturer.

Modifications to hardware required by reasons of construction characteristics shall be such as to provide same operative or functional features.

Provide hardware for fire rated openings in compliance with UL, UL 10C-1998, UBC 7-2-1997, NFPA-80 and CFR Part 36 (ADA) guidelines. Provide only hardware, which has been tested and listed by UL for types and sizes of doors scheduled. All hardware shall conform to ADA requirements. These requirements take precedence over any other requirements or specifications of this section.

Category “A” Positive Pressure Installations:

Hardware located above 40” AFF to be listed and labeled in accordance with UBC 7-2-1997 and UL 10C-1998 for use in positive pressure fire rated wood doors.
In order to meet smoke requirements, a smoke seal, listed and labeled for UBC 7-2-1997 Parts 1 and 2 positive pressure installations, must be mounted around the perimeter of the doorframe.
Flat bar type astragals only will be allowed on pairs of doors with fire ratings up to 60 minutes with concealed intumescent inside the door structure.

Provide strikes with extended lips as necessary.

Provide wrought strike boxes.

Provide doors to loading platforms, boiler and mechanical rooms, stages or platforms, utility stairs, and electrical closets with knurling on inside of lever.

Locksets: Provide Grade 1 mortise locksets as scheduled, with standard 03 lever trim and full face L escutcheon. All cylinder key cores shall be interchangeable type, removable cores. Provide original manufacturer’s pins and brass key blanks.

Provide CODE required tactile warning surfaces (knurling) for all door operating hardware for doors leading to mechanical, boiler, electrical, or chemical storage areas.

KEYING REQUIREMENTS

Provide removable construction cores, Owner will change when buildings are accepted.

Keying: By the manufacturer to the existing system. All locks and cylinders to be construction master keyed, and grand master keyed to the school's existing grand master key system. Provide 4 keys per cylinder, stamped with keying symbol. All cylinders standard 6-pin type.

Keying system shall be as follows:

Hook Number	Site ID	Site	Key Number	Key System	Keyway	Alternate Hook Number
1	160	Central Service	W	Primus	EP	
2	161	Facility Support Operations	F	Primus	CP	
3	162	Transportation	G	Primus	CP	
4	163	All Physical Plants	GGM	Primus	HP	
5	165	Food Service Warehouse	163E	Old Primus		
6	304	Atlantic Elementary	A	Primus	CP	
7	306	Bogue Sound Elementary	S	Primus	CEP	
8	308	Beaufort Elementary	J	Primus	CP	
9	310	Beaufort Middle	U	Primus	CEP	
10	311	Broad Creek Middle	G	Primus	XP-CEP	
11	312	Bridges School	S	Primus	CEP	
12	313	East Carteret High School	R	Primus	XP-CEP	
13	314	Croatan High School	T	Primus	XP-CEP	
14	316	Harkers Island Elementary	C	Primus	CP	
15	317	Morehead Elementary @ Camp Glenn	B	Primus	CP	
16	318	Morehead Middle	K	Primus	CP	
17	322	Morehead Primary School	F	Primus	CP	
18	324	Newport Elementary	N	Primus	CEP	
19	326	Newport Middle	E	Primus	CP	
20	332	Down East Middle – Smyrna	L	Primus	CP	
21	344	West Carteret High School	N	Primus	XP-CEP	
22	352	White Oak Elementary	B	Primus	XP-CP	
23	N/A	Boys & Girls Club – Beaufort	FA10	Primus	CP	
24	N/A	Boys & Girls Club – Morehead	FA5	Primus	CP	
25	CPC	Carteret Pre School Center	S	Primus	EP	
		Electronic Override	163E			
		Contractor Alarm Code	15632			

Keys and cores shall be shipped direct from manufacturer to Owner, Carteret County Schools, Facility Services, Attention: LOCKSMITH.

Hardware supplier shall meet with the Architect and Owner's Hardware Leadman to receive keying instructions before preparing keying schedule for approval.

Representative from the key company is required to meet with Owner's representative prior to turning cylinders and to turn all cylinders, and set up key cabinet.

One Manufacturer: Following items within each classification shall be furnished totally by one manufacturer.

Hinges	Locksets
Exit devices	Closers

Door Stops: All doors shall be provided with wall stops or overhead stops, to suit condition. For example, doors opening onto millwork or open space shall receive overhead stops. Solid wood blocking to be installed at all gypsum wallboard wall stop locations. Provide floor stops at fire doors with magnetic hold open devices.

Fire rated openings: All fire rated openings, except classrooms, shall receive closers and ball bearing hinges, whether scheduled or not.

Coordinators: All door pairs with closers to be provided with coordinator devices as necessary for proper sequential closing operation.

Astragals: Non-fire rated door pair with flush bolts shall receive steel astragal on exterior side edge of the active leaf. Pairs of smoke or fire doors shall receive steel astragals, coordinators, and smoke seals and necessary hardware to meet fire rating designated.

Keyed Removable Mullions: All interior and exterior mullions to be removable with keyed operation, with cylinder and cores installed by the general contractor and turned by the hardware supplier.

Hinges: Unless otherwise noted, 3 butt hinges shall be provided each interior door to 36" width and 86" height. 3 heavy-duty butt hinges shall be provided for interior doors exceeding 36" width or 86" height.

Exterior hinges shall be heavy-duty continuous.

Materials and Finishes: (All products except closers, thresholds, weatherstripping to have brass or bronze base metal unless otherwise noted).

	Materials	Finishes
Continuous Hinges, Exterior Doors	6063 T6 Aluminum	Clear Anodized
Butt Hinges, Interior Doors	Steel	US 26 D
Pivots	Satin Chrome Plate	US 26 D
Exit Devices	Satin Chrome Plate	US 26 D
Cylindrical Lock Trim	Satin Chrome Plate	US 26 D
Dead Lock Trim	Satin Chrome Plate	US 26 D
O.H. Holders & Stops	Satin Chrome Plate	US 26 D
Door Stop and Holders	Satin Chrome Plate	US 26 D
Box Strikes	Wrought	Prime
Thresholds	Aluminum	Aluminum
Thresholders	Steel	Galvanized Steel
Weatherstrip	Aluminum	Aluminum
Flatgoods	Stainless	US 32 D

Fasteners:

Use concealed fasteners whenever possible.

Hardware to be installed on metal work shall be furnished with machine screws.

For exposed fasteners on interior in bronze or brass, use matching color and material for fasteners. For all other exposed fasteners on interior, use stainless steel except where noted specifically otherwise.

Furnish stainless steel screws for all exterior work.

Install fixed locking screw in strike plate for exterior locksets after final adjustments made during 6-Month Service and Adjustment Inspection.

HARDWARE ITEMS:

All Products shall be by one of the following manufacturers - no exceptions:

a. Butt Hinges: Hager, Stanley, McKinney

b. Heavy Duty Continuous Gear Hinges, all exterior doors: Select Products SL24HD, or equal heavy duty by Markar, Hager or Pemko

c. Electric Hinges: ETW electric through wire hinge, with four continuous electric conductors, full mortise ball bearing, with Molex type connectors, by Hager.

d. Surface Closers: LCN 4040XP, Closer can mount hinge side, top jamb, or parallel arm (with PA bracket) on either right or left swinging doors. Provide metal covers with set screw anchors, in matching finish. Provide ADA rated features.

e. Locksets: Schlage L9000 Series extra heavy-duty mortise locksets. Provide lever handle, full face escutcheon. Exterior door locksets shall be compatible with Locknetics entry systems.

f. Electrified Mortise Lockset: Schlage L909x Series, complete assembly with power supply, and electric thru wire ETW hinges.

g. Cylinders: Schlage Full Size Interchangeable Core, all interior and exterior cylinders to be provided with interchangeable cores

h. Exits Devices: Von Duprin 99 Series, each with a cylinder for trims and a cylinder for dogging.

i. Wherever doors are equipped with exit devices, view windows shall have concealed / flush glass beads.

j. Exit Devices at Electronic Access Control doors (Furnished and installed by the General Contractor's Division 8 Subcontractor): Von Duprin QEL, with electric ETW hinges for hinge edge power transfer for interior doors. Provide EPT-2 for exterior doors continuous hinges.

k. Removable Mullions: Von Duprin, Yale, Detex, keyed type with cylinder.

l. Overhead Holders/Stops: Glynn-Johnson, ABH Manufacturing.

m. Thresholds: National Guard, Pemko, Hager.

n. Push/Pulls: Rockwood Manufacturing, Ives, Hager.

o. Stops: Glynn-Johnson, Rockwood Manufacturing, Ives, Hager.

p. Flush Bolts: Glynn-Johnson, Rockwood Manufacturing, Ives, Hager.

q. Silencers: Glynn-Johnson, Rockwood Manufacturing, Ives.

r. Kick Plates: Rockwood Manufacturing, Ives, Hager.

s. Automatic Flush Bolts: Glynn-Johnson, Rockwood Manufacturing.

t. Coordinator: Glynn-Johnson, Rockwood Manufacturing, Trimco

u. Weather strip & Rain Drips: National Guard, Pemko, Hager, Reese.

v. Door Bottoms: National Guard, Pemko, Hager.

w. Smoke Perimeter Door Frame Gaskets: Pemko, Hager, Reese

x. Smoke Door Bottom Sweep: Pemko, Hager, Reese

y. Magnetic Door Holders: LCN SEM 7800 Series, with adjustable extension length.

Other items shall be as scheduled.

Provide the following hardware material as scheduled in the door schedule:

Hinges with closer	BB 1279 4 ½ x 4 ½
St/Stl hinges with closer	BB 1191 4 ½ x 4 ½
HD hinges with closer	BB 1168 4 ½ x 4 ½
St/Stl HD hinges w closer	BB 1199 4 ½ x 4 ½
Hinges without closer	1279 4 ½ x 4 ½
St/Stl hinges without closer	1191 4 ½ x 4 ½
HD continuous hinges	SL24HD all exterior doors
Privacy set	L9040
Staff Toilet Privacy set	L9040
Passage set	L9010
Classroom security lockset	L9071
Entrance lockset	L9050
Office lockset	L9050
Storeroom lockset	L9080
Push/Pull latchset	HL6
Exit device (interior)	99 L all interior locations (F as req'd)
Exit device (exterior)	99 NL x DT exterior doors scheduled
Exit Device at EAC	QEL with EPT where EAC (Electronic Access Control) is scheduled.
Mullion	4954 (9954 as req'd), keyed type.
Electric Strike:	Von Duprin 6000 Series
Cylinder	Standard 6-pin
Closer	4040XP, with 3049 hold-open arm at all exterior doors, metal cover
Closer with backstop	4040XP – 3077CNS, metal cover with set screws
Kick plate	1935 8 x 2 LDW
Wall stop	232 W
Floor stop	241 F
Overhead stop	9-331
Flush bolts	282 D
Threshold	Pemko 2005AV
Upper rain drip	Reese R201C
Lower rain drip/sweep	Pemko 345_V
Frame Smoke gasketing	Pemko 332CR
Door Bottom Smoke Sweep	Pemko 307AV

Perimeter gasketing	Pemko 296_R
HD Interlock gasketing	Pemko 336
Push plate	70C 4 x 16
Pull handle	107 x 70C 4 x 16
Key cabinet	Expand existing key cabinet as required for additional keys

General and Special Hardware Notes:

1. All doors to receive hinges as specified
2. All doors to receive wall or overhead stops to suit condition of use. Doors with magnetic hold opens to receive floor stops.
3. Provide closers with backstops for exterior doors and to suit condition of use.
4. All steel frames to be provided with silencers.
5. Exterior doors to be provided with weather-stripping and thresholds.
6. All exit devices to be provided with cylinders.
7. At pairs of doors, pull side, provide pull or lever right side only.
8. Provide cylinders for keyed mullions supplied by aluminum door supplier.
9. Exit devices at exterior doors to NL with pull, unless otherwise indicated.
10. Exit devices at interior doors to be classroom function with lever.

ELECTRONIC ACCESS CONTROL SYSTEM / ENTRY HARDWARE DEVICES

1. WHERE INDICATED ON DRAWINGS, PROVIDE ACCESS CONTROL SYSTEM DEVICES AND COMPONENTS LISTED, DOOR HARDWARE AND ACCESSORIES, FULLY COMPATIBLE WITH AN S2 SECURITY ACCESS CONTROL SYSTEM AND SOFTWARE PROGRAM, INCLUDING BUT NOT LIMITED TO THE FOLLOWING COMPONENTS. ALL HARDWARE / EQUIPMENT SPECS SHALL COMPLY WITH CARTERET COUNTY SCHOOL STANDARDS.

    a. FOR EXPANSION, PROVIDE AN ACCESS CONTROL SYSTEM FIELD PANEL: S2 NETWORK NODE, S2-NN-E2R-WM, HOUSING UP TO SEVEN (7) S2 APPLICATION BLADES, SUPPORTING UP TO 14 DOORS, WITH NETWORK DROP - PROVIDED BY THE DIVISION 17 ACCESS CONTROL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE ELECTRICAL POWER.

    b. DOOR CONTACTS FOR NEW DOOR/FRAMES: RECESSED DOOR SWITCH SETS, GRI 180 SERIES, 195-12WG, BY GEORGE RISK INDUSTRIES. DOUBLE POLE, DOUBLE THROW, WIDE GAP. PROVIDED BY THE DIVISION 17 ACCESS CONTROL CONTRACTOR. ELECTRICAL CONTRACTOR TO PROVIDE RACEWAY TO DOOR FRAME.

    C. CARD / PROXIMITY READER UNIT, MODEL HID THINLINE II, BUILT-IN AND CONCEALED WITHIN THE EXTERIOR FRP DOORS, ALL LOCATIONS WHERE EAC (ELECTRONIC ACCESS CONTROL) IS REQUIRED. PROVIDED BY THE FRP DOOR SUPPLIER, CONNECTED TO THE S2 SECURITY SYSTEM BY THE DIVISION 17 ACCESS CONTROL SYSTEM CONTRACTOR.

    D. FOR EAC DOORS INDICATED, VON DUPRIN QUIET ELECTRIC LATCH RETRACTION – QEL EXIT DEVICE 98/99 SERIES. PROVIDED AND INSTALLED BY DIVISION 8 DOOR HARDWARE SUPPLIER. PROVIDE HINGE EDGE POWER TRANSFER FOR EXTERIOR DOORS WITH AN EPT-2 FOR EXTERIOR DOORS CONTINUOUS HINGES.

    E. FOR EAC DOORS INDICATED, ELECTRIFIED MORTISE LOCKSET: SCHLAGE L909x SERIES. PROVIDED AND INSTALLED BY DIVISION 8 DOOR HARDWARE SUPPLIER.

    F. ELECTRIC HINGES: FOR USE WITH INTERIOR QEL EXIT DEVICES AND ELECTRIFIED MORTISE LOCKSETS; HAGER ETW ELECTRIC THROUGH WIRE HINGE, WITH FOUR CONTINUOUS ELECTRIC CONDUCTORS,

FULL MORTISE BALL BEARING, WITH MOLEX TYPE CONNECTORS, BY HAGER. PROVIDED AND INSTALLED BY DIVISION 8 DOOR HARDWARE SUPPLIER.

G. POWER SUPPLIES, FOR ALL POWERED DOOR LOCKING HARDWARE / EXIT DEVICES. PROVIDED AND INSTALLED BY DIVISION 8 DOOR HARDWARE SUPPLIER.

2. CONTROLLED ACCESS SYSTEM DEVICES PROPOSED SHALL BE COMPLETE, WITH ALL NECESSARY COMPONENTS; TO INCLUDE BUT NOT LIMITED TO POWER SUPPLIES, CABLES AND CABLING, CIRCUITS IN REQUIRED VOLTAGES, RACEWAYS, BOXES, TRANSFORMERS, CONTACTORS, RELAYS, SOLENOIDS, ELECTRIC DOOR STRIKES, ETC.

PART 3: EXECUTION

GENERAL:

Consult project drawings and details and otherwise become familiarized with work so that all items furnished will conform to openings to which applied.

Coordinate hardware with other allied trades such as carpentry, millwork, metal frames, etc.

Prepare and submit to Architect for approval as promptly as possible three (3) copies of completed detailed schedule.

Immediately after award of hardware contract, request approved shop drawings from such trades with which hardware must be coordinated.

After checking approved shop drawings, supply promptly such template information, template drawings, approved hardware schedule, etc., as may be required to facilitate progress on job.

APPLICATION:

Apply hardware in accordance with approved Shop Drawings, with fastenings of proper size, quantity, and finish, and in accordance with Manufacturer's instructions coordinate.

Operation: All items of hardware shall fit and operate properly.

HARDWARE LOCATIONS:

Door Pulls: 42" from finished floor to center of grip.

Push-Pull Bar: 42" from finished floor to center of bar of center between bars and combination.

Top Hinge: To frame Manufacturer's standard, but not greater than 10” from head of frame to centerline of hinge.

Bottom Hinge: To frame Manufacturer's standard but not greater than 12-1/2" from finished floor to centerline of hinge.

Intermediate Hinges: Equally spaced between top and bottom hinge. Doors exceeding 36” width shall be provided with 2 pair hinges.

Locks and Latches: 38” from finished floor to center of knob.

Deadlocks (with separate latch-set and/or pull): 60" from finished floor to centerline of strike.

Locate pivots in accordance with Pivot Manufacturer's requirements.

FINAL INSPECTION: After installation of all finish hardware is completed, and before building is accepted, General Contractor shall have capable representative of hardware manufacturers, minimum of an AHC, visit building to inspect and approve installation; to make all necessary adjustments; and to carefully instruct Owner in proper use, servicing, adjusting and maintaining of hardware.

SIX MONTH SERVICE AND REPORT: Six months after acceptance of each area of the project, readjust each item of hardware and restore to proper function. Install fixed locking screw in strike plate for exterior locksets after final adjustments made during 6-Month Service and Adjustment Inspection. Consult with Owner regarding recommended additions or modifications to maintenance procedures. Clean and lubricate as required. Replace items, which have deteriorated or failed due to faulty design, materials, or installation. Provide Architect with written report upon completion of above.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

PART 1: GENERAL

SUMMARY:

Provide glass, glazing, and special fire glass as indicated below, complete.

Work Included This Section:

Glass and Glazing For:

- Aluminum Entrances
- Steel and Wood Doors
- View Windows and Panels
- Exterior Windows
- Special fire glass, frames and doors

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

QUALITY ASSURANCE:

Completed assemblies shall comply with all current NC Building code requirements.

Performance Requirements: Provide exterior glazing systems that meet all requirements of Florida High Velocity Hurricane Zone (HVHZ) Protocols, South Florida Building Code Protocols TAS 201, TAS 202, and TAS 203, ASTM E 1886, ASTM E 1996 and comply with performance requirements indicated, as demonstrated by testing manufacturer's assemblies in accordance with test method indicated:

1. Small Missile Level A Impact Test conducted on test units in accordance with TAS 201 or ASTM E 1886/E 1996. Upon completion of the missile impact tests, the test units shall be tested in accordance with TAS 203 or ASTM E 1996 cyclic load test.

2. Large Missile Level (C or D) Impact Test conducted on test units in accordance with TAS 201 or ASTM E 1886/E 1996. Upon completion of the missile impact tests, the test units shall be tested in accordance with TAS 203 or ASTM E 1996 cyclic load test.

3. Hurricane Resistant Openings: Exterior hurricane opening assemblies to be tested according to ASTM E330, ASTM E1886, ASTM E1996 standards, and certified by a qualified independent third party testing agency acceptable to authority having jurisdiction, with labeling indicating compliance with the wind load and design pressure level requirements specified for the Project.

Provide safety glass (tempered, laminated, hurricane and impact rated) complying with requirements of the IBC Code, ANSI Z97.1 - American National Standard for Glazing Materials Used in Buildings -- Safety Performance Specifications and Method of Test.

Label each piece of glass designating type and thickness of glass. Do not remove label prior to installation.

Permanently identify each unit of tempered glass. Etch or ceramic fire identification on glass; identification shall be visible when unit is glazed.

Warranty: Provide manufacturer's standard 10 year warranty, including include replacement of sealed glass units exhibiting seal failure or leakage, interpane dusting or misting.

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by following manufacturers:

- American St. Gobain Corporation
- Libby-Owens-Ford Glass Company
- Mississippi Glass Company
- Pittsburg Plate Glass Company
- Technical Glass Products
- Nippon Electric Glass Co., Ltd.
- Pilkington

SUBMITTALS:

Glass and Glazing: Submit samples of each type of glass, metal insulated panel, glazing compound, sealant and tapes for Architect's approval.

Product Data: Submit copy of manufacturer's specifications and installation instructions for each type of glass and glazing material. Include test data or certification substantiating that glass complies with specified requirements and manufacturer's warranties.

Submit manufacturer's standard 10 year warranty for insulated glass units.

MANUFACTURER'S LABELS:

Labels showing Glass Manufacturer's identity, type of glass, thickness and quality will be required on each piece of glass. Labels must remain on glass until it has been set and inspected.

Containers: All glazing compounds shall arrive at project site in unopened, labeled containers.

PRODUCT HANDLING:

Sizes of glass indicated on Drawings are approximately only. Determine actual size required by measuring frames to receive glass at project site, or from guaranteed dimensions provided by Frame Supplier.

Cutting: All glass shall be cleancut. Nipping to remove flares or to reduce oversized dimensions of any type of glass will not be permitted.

Deliver glass to site in suitable containers that will protect glass from weather and from breakage. Store material in safe place to minimize breakage, but deliver sufficient glass to allow for normal breakage.

DESIGN AND PERFORMANCE REQUIREMENTS:

Watertight and airtight installation of each piece of glass is required. Each installation must withstand normal temperature changes, wind loading, impact loading (for operating doors) without failure of any kind including loss or breakage of glass, failure of sealants or gaskets to remain watertight and airtight, deterioration of glazing materials, and other defects in work.

PART 2: PRODUCTS

GLASS:

Low-E Insulating Glass: Unless otherwise noted, 1 5/16" thick impact-rated panels, 1/4" thick “neutral gray tint” plate glass to exterior, 9/16" laminated clear plate glass to interior (1/4”/ 1/16” lamination / 1/4”); Low-E shall be on the 3rd surface, with 1/2" space between glass by dessicant filled spacer and sealant device.

All exterior glazing systems shall be impact-resistant meeting requirements of IBC Chapter 1609.1.2, and ASTM E 1996 and E 1886. Indicate compliance with Large Missile Level (C or D) Impact Test conducted on test units in accordance with TAS 201 or ASTM E 1886/E 1996. Upon completion of the missile impact tests, the test units shall be tested in accordance with TAS 203 or ASTM E 1996 cyclic load test.

Provide impact resistant glass throughout where required under Chapter 24, Section 2406, North Carolina State Building Code Current Edition, Category I and II, CPSC 16 CFR Part 1201.

Fire Rated Glass: Provide fire-rated impact resistant glass for protected openings as indicated, “Pyrostop” manufactured by Technical Glass Products. Conform to UL 10 C, UBC 7-2, and UBC 7-4, UL File No. R-19207, design U533. Frame tests to pass ASTM E-119, NFPA 251, UL 263, UL 9, UL 10C, UBC 7-2 and UBC 7-4.

Exterior Aluminum and FRP Entrance Doors: 9/16" laminated “neutral gray tint” Low-E tempered plate glass (1/4”/ 1/16” lamination / 1/4”), impact resistant as required, complying with and tested with Large Missile Level (C or D) Impact Test, and cyclic load test.

Interior Doors: 1/4" clear tempered safety glass, CAT II Impact-Rated as required.

Interior Windows: 1/4" clear tempered safety glass, CAT II Impact-Rated as required.

SETTING BLOCKS AND SPACER SHIMS:

Fabricate blocks and shims from neoprene. Shape to required size and thickness. Material used for blocks and spacers must be compatible with type of compounds and sealants used and shall not cause staining or discoloration of sealant or frame.

Shore A durometer hardness of setting block and shim material shall be 70 to 90 points for setting blocks and 50 points for spacer shims, or as recommended by compound or sealant manufacturer.

GLAZING MATERIALS:

Glazing for exterior impact and hurricane rated glazing systems shall be manufacturer's standard glazing stops with EPDM glazing gaskets to prevent water infiltration at the exterior, and Dow Corning® 995 Structural Silicone Sealant with fixed stops at the interior.

Compatibility: Where combination of sealing materials is required for glazing in same frame, manufacturer shall certify that all glazing materials furnished are compatible with each other and compatible with material used for setting blocks and spacer shims.

PART 3: EXECUTION

CONDITION OF SURFACES:

Preparation: Check all frames prior to glazing. Openings shall be square, plumb, and with uniform face and edge clearances. Maintain 1/8" minimum bed clearance between glass and frame on both sides.

Clean all surfaces to be glazed with xylol, a 50-50 mixture of acetone and xylol, or other solvents recommended by compound or sealant Manufacturer. Any defects affecting satisfactory installation of glass shall be corrected before starting of glazing.

Temperature: Do not apply any compound or sealant at temperatures lower than 40 degrees F.

INSTALLATION:

Workmanship: Apply glazing compound uniformly with accurately formed corners and bevels. Remove excess compound from glass and frame. Use only recommended thinners, cleaners and solvents. Do not cut or dilute glazing compound without approval from Architect. Make good contact with glass and frame when glazing and facing off.

Cleaning: Compound shall be removed from glass before it hardens. Remove any excess sealants from glass and adjoining surfaces during working time of material, within two to three hours.

Blocks and Spacers: Where setting blocks and spacer shims are required to be set into glazing compound or sealant, they may be butted with compound or sealant, placed in position, and allowed to set firmly prior to installation of glass.

Miscellaneous Interior Glazing: Unless otherwise indicated, all interior glass shall be channel glazed with glazing compound. Apply as follows:

Apply ample back compound to rabbet so that it will ooze out when glass is pressed into position and completely cover glass in rabbet. Press glass into position.

Secure glass in place by application of stop beads. Bed stop beads against glass and bottom of rabbet with compound, leaving proper thickness between glass and stop beads. Secure stop beads in place with suitable fastenings. Strip surplus compound from both sides of glass and tool at slight angle to provide clean sight lines.

Glazing Aluminum Entrances and Window Wall System:

Glass shall be set in accordance with aluminum entrances and window walls Manufacturer's shop drawings and instructions.

Install moldings level, plumb and square. Moldings at corners shall be accurately cut, neatly fitted, and joined as recommended by Storefront manufacturer.

REPLACEMENTS AND CLEANING:

Condition: At completion of work, all glass shall be free from cracks, sealant smears and other defects.

Protection/Replacement: Protect glass surfaces and edges during the construction period. Keep glass free from contamination by materials capable of staining glass. Any glass that is defective before acceptance, or within one year warranty period, as result of manufacturing, transporting, or performance of Contractor, shall be removed and replaced with new glass without cost to Owner.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Under this Section, provide gypsum board for wall assemblies (non-fire rated and fire-rated), partitions, ceilings, ceiling access doors, fireproofing for beams and columns as indicated on drawings and as specified herein.

Note all gypsum drywall, except as noted on drawings, shall be provided with a LEVEL 4" gypsum wallboard finish.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by United States Gypsum Company.

Acceptable Manufacturers: Products of following manufacturers which meet all requirements of these specifications will be acceptable:

- U.S. Gypsum
- CertainTeed Corporation
- Georgia-Pacific
- National Gypsum Company

Source: Products for use on this Project shall be of one Manufacturer for same function, unless noted specifically otherwise herein.

SUBMITTALS:

Manufacturer's Data: Submit (in duplicate) Manufacturer's printed catalog cuts, installation instructions, and finishing instructions.

Test Reports: Submit (in duplicate) reports from Underwriter's Laboratories, Inc. or other acceptable testing agencies, on fire tests of designs referred to in Contract Documents.

Mock-up Sample: When required, fabricate a field sample mock-up of gypsum wallboard with the specified "orange peel" texture applied, for review and approval by Architect. Approved mock-up will stand on site for reference as the project standard for all orange peel textured walls.

Mock-up Sample: Fabricate a field sample mock-up of gypsum wallboard aluminum reveals, for review and approval by Architect. Approved mock-up will stand on site for reference as the project standard for all aluminum reveal walls.

PRODUCT HANDLING:

Delivery: Deliver materials in original packages, containers or bundles bearing brand name and name of manufacturer or supplier for whom product is manufactured.

Storage: Gypsum board and insulation material delivered prior to use shall be stored within completely weather tight structure, off ground, and completely enclosed within weather tight covering. Stack all board materials on 2"x 4" risers, spaced 16" o.c. Weather tight covering shall also extend completely under stacked material to prevent seepage of moisture if over uncovered ground or damp slab.

Handling: Exercise care, during handling and storage, to avoid undue sagging or damage to edges, ends, and surfaces.

ENVIRONMENTAL CONDITIONS:

Building: Application of gypsum board shall commence only after structure is completely weather -tight.

Temperature: In cold weather and during period of gypsum board application and joint finishing maintain temperatures in building uniformly within range of 55 degrees to 70 degrees F. Provide adequate ventilation to eliminate excessive moisture in building during same period.

PART 2: PRODUCTS

MATERIALS:

Gypsum Board shall be furnished in 48" widths and in lengths of at least 2" greater than height from floor to finished ceiling to permit vertical installation of all boards. Contractor shall have option to furnish boards for vertical installation full height to structure above where required in one sheet, 48" wide.

Types: Gypsum Board shall conform to following:

1. Gypsum Board shall be fire-resistive type throughout of various thicknesses indicated, equivalent to Sheetrock Brand Firecode C. Provide impact resistant gypsum wallboard at locations indicated on Drawings.

2. All 5/8" thick gypsum board shall be taper-edged, fire-resistive, conforming to ASTM C 1396.

3. Mold and Mildew Resistant Gypsum Board shall be "Sheetrock Mold Tough Gypsum Wallboard" 5/8" tapered-edge with treated manila paper finish and "Sheetrock Mold Tough Fire-code C Wallboard, 5/8" tapered-edge with treated manila paper finish for 1 hour rated partitions. Use 5/8" mold and mildew resistant gypsum board for ceilings of janitor closets, shower rooms, tub rooms.

4. Tile Backer Board: Use 5/8" tile backer board for backup of all areas scheduled to receive thin set ceramic tile. Moisture resistance silicone core reinforced with inorganic glass fiber matt. "DenShield Tile Guard" by Georgia-Pacific, or equal products by approved manufacturers.

5. Exterior Wall Sheathing Board shall be 5/8" thick fire retarding fiberglass reinforced gypsum board, with sealed and taped joints: "Dens-Glass Gold" by Georgia-Pacific, or equal products by approved manufacturers.

6. Gypsum Soffit board shall be 5/8" thick, fire coded, exterior gypsum soffit board by Bestwall, U. S. Gypsum, or equal products by approved manufacturers.

7. Wall Spray Texture: SHEETROCK Wall & Ceiling Spray Texture, SHEETROCK Wall & Ceiling Texture (TUF-TEX), SHEETROCK Wall & Ceiling Spray Texture – Ready Mixed.

8. Sheetrock Brand First Coat drywall finishing primer.

FASTENERS:

Screws for attachment of board to metal studs and metal ceiling and wall furring shall be 7/8" or 1" US Drywall Screw, Type S. All screws shall have bugle head.

METAL AND PLASTIC CORNER BEADS AND TRIM:

Interior Work:

Plastic: All external corners are to be bullnozed radius trimmed unless otherwise indicated.

Metal: Fabricate metal corner beads from galvanized steel, not lighter than 0.02" nominal thickness, in following shapes and sizes.

1. Corner Beads for all 90 degree external corners shall be equivalent to USG No. 100-Perf-A-Bead.

2. Corner Beads for all radiused external corners shall be heavy duty plastic, equivalent to No. BCB100, radiused bullnoze corner bead by Vinyl Corporation.

3. Metal Trim shall be equivalent to USG 200 Series Perf-A-Trim, sized for wallboard thickness.

4. Anodized Aluminum Reveals: Continuous anodized aluminum reveals shall be provided in profile and layout indicated on Drawings, with factory fabricated intersections. Install or provide mock-up installation samples for Architect’s review and obtaining final approval prior to proceeding with installations. Fry Reglet or equivalent.

REINFORCING TAPE AND JOINT TREATMENT (INTERIOR)

Tape shall be equivalent to "Perf-A-Tape".

Compound for embedding and fill coat application shall be equivalent to "Perf-A-Tape Joint Compound".

Compound for finishing shall be equivalent to "Perf-A-Tape Topping Compound".

ADHESIVE AND CAULKING:

Laminating Adhesive: Laminating adhesive for face layer application in double-layer systems shall be equivalent to "Perf-A-Tape Joint Compound, embedding type".

Caulking Compound: Acoustical type sealant, furnished by Gypsum Board products manufacturer.

CRACK CONTROL JOINTS:

Crack control joints shall be provided in pre-approved locations as directed by the Drawings and the Architect, at each jamb of windows exceeding 10’ in width, in walls at 40’ intervals, and in ceilings at 30’ intervals. Provide manufacturer standard metal exp/control joint material.

PART 3: EXECUTION

CONDITION OF SURFACES:

Inspection: Examine surfaces to receive gypsum board for defects, which might impair quality of finished installation. To not start work until such defects have been corrected.

Framing Spacing: Framing members to which gypsum board will be fastened shall be straight and true, and spaced as indicated on Drawings, not to exceed 16" o.c. for walls and ceilings. Framing and bridging members shall be adequate to carry design or code loading. Bridging members shall be spaced 48" o.c.

Supplemental Framing: Provide back blocking and framing as necessary for support of fixtures and all mounted equipment.

Coordination: Conduit, piping, retainers for corner guards and other items to be concealed by or penetrating, wallboard shall be installed and tested before applying wallboard.

INSTALLATION OF GYPSUM BOARD:

Cutting and Fitting:

Cut gypsum board by scoring and breaking, or by sawing. Work from face side.

Cut edges and ends of gypsum board shall be smoothed where necessary, in order to obtain neat jointing when board is erected.

Cut-outs for pipes, fixtures or other small openings shall be scored on face and back in outline before removal, or shall be cut out with saw or other suitable tools.

Where gypsum board meets projecting surfaces, scribe and cut neatly, fitting closely for caulked joint.

Application of Gypsum Board:

Apply continuous bead of Acoustical Sealant on floor at line of contact of board.

Walls: Apply gypsum board vertically, pressing into sealant, with boards in moderate contact, but not forced into place. At interval and external corners conceal cut edges of boards by overlapping covered edges of abutting boards. Arrange joints on opposite sides of partitions so as to occur on different framing members. Place long dimensions of panels parallel to furring or framing members. Panels shall be of length required to reach from 2" above ceiling line to floor line in one continuous length. Make joints over framing or furring members.

Ceilings: Apply board to ceilings with long dimension of board at right angles to furring members. At perimeters of all ceilings, edge joint shall be laid on metal trim strip against continuous bead of caulking, applied in advance of board application.

Gypsum Board End Joint at masonry walls shall be laid on metal trim strip against continuous bead of caulking, applied in advance of board application.

Corner Beads and Metal Trim: Internal corners do not require corner beads, but shall be reinforced with tape. External corners shall have corner bead fitted neatly over corner, and secured with same type fasteners used for applying wallboard.

ATTACHMENT:

Method: Space fasteners not less than 3/8" nor more than 1/2" from edge and ends of board. While fasteners are being driven, hold board in firm contact with under laying support. Application of fasteners shall proceed from central portion of board to ends and edges. If paper surface is broken by fastener in attachment, drive another fastener approximately 2" from faulty fastener.

Drive screws to provide screw head penetration just below gypsum board surface.

Spread adhesive over laminating surface of face or base layer gypsum board. Extend adhesive up to ends and edges of all board.

Spacing of Fasteners shall be as follows:

Screw Method: Space screws at maximum of 12" o.c. for ceilings and 16" o.c. for walls.

Corner Beads and Trim shall have fasteners spaced 6" o.c. driven through gypsum board into framing members.

JOINT FINISHING AND FASTENER CONCEALMENT:

Provide “LEVEL 4” gypsum wallboard finish at all areas, unless indicated otherwise.

Provide total coverage coat of Sheetrock Brand First Coat Primer or equivalent prior to paint coats. Reference 09900.

Method: Mix and use joint compound and topping compound in accordance with manufacturer's recommendations printed on bag. Apply by machine or hand tool. Allow minimum drying time of 24 hours between adhesive coats. Sand all coats as necessary after each application. Clean excess compound from surface of gypsum board as compound is applied.

Reinforcement: Reinforce wall and ceiling angles and inside vertical corner angles with tape folded to conform to adjoining surfaces, and to form straight, true angle. All gypsum board joints except joints at metal trim shall be tapered.

Embedment Coat: Apply thin, uniform layer of joint compound (embedding type) approximately 3" wide over joint to be reinforced. Center tape over joint and seat into compound; leaving sufficient compound under tape to provide proper bond. Apply skim coat of compound immediately after embedding tape.

Fill Coat: After drying, cover embedding compound with fill coat of compound. Spread evenly over and slightly beyond tapered edge area of board. Feather at edges.

Topping: Cover fill coat with topping compound. Spread evenly over and slightly beyond edge of proceeding coat. Feather with smooth, uniform finish.

Fastener Concealment: Treat dimples at fasteners (and holes where temporary fasteners are removed) with three coats of joint compound applied as each coat is applied to joints.

Conceal flanges of all corner beads and trim members by minimum of two coats of compound applied strictly in accordance with Manufacturer's directions.

Caulking:

Joints at Penetrations: Where pipes, conduits, ducts, electrical devices, etc., penetrate gypsum board, seal joint around perimeter with caulking compound.

Joints between ceilings and walls shall be sealed continuously with acoustical sealant, as specified above.

DRYWALL CEILING ACCESS DOORS: Provide 24" x 24" x 16 gauge minimum primed steel ceiling access doors each space with drywall ceiling, hinged and with key lock. Provide UL Listed fire-rated doors all locations where a rating is required. Provide USG No. 200-B metal trim on all edges of gypsum board. Finish as specified in 09900 Paint.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work under this section includes providing metal stud partition system, metal ceiling furring system, metal wall furring system and metal ceiling suspension system, for installation of gypsum board.

RELATED WORK:

Section 05400 Cold-Formed Metal Stud Framing
Section 09250 Gypsum Drywall Systems

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured or furnished by United States Gypsum Company.

Acceptable Manufacturers: Products of following manufacturers, which meet all requirements of these specifications, will also be acceptable:

- ClarkDietrich Building Systems
- MarinoWARE
- Telling Industries

Source: Products for use on this Project shall be of one manufacturer for same function, unless noted specifically otherwise herein.

SUBMITTALS:

Shop Drawings: Show complete details of construction, including gauges of metal, anchors, fastenings, special fittings, and accessories. Show ceiling framing and furring, special wall framing, and framed openings.

Manufacturer's Data: Submit (in duplicate) Manufacturer's printed data on materials and installation for work specified herein. Include reports on fire tests and physical data.

PRODUCT HANDLING:

Delivery: Deliver materials to Project site in the original packages, containers or bundles, bearing brand name, and name of manufacturer or supplier for whom product is manufactured.

Storage: Store materials to prevent damage from exposure to elements.

PART 2: PRODUCTS

METAL STUD PARTITION SYSTEM: Metal stud partition system shall be USG Metal Stud System, or approved equal, designed for screw attachment of gypsum board, furnished with required fasteners and accessories for complete system.

Steel Studs shall be C-shaped, formed from not less than 20-gauge galvanized steel sheets, USG width as shown on drawings. Stud webs shall have punched holes throughout for utility lines or wiring.

Metal Floor and Ceiling Runners shall be channel-shaped, formed from not less than 25-gauge galvanized steel sheets, with minimum 1-1/4" flanges and web-sized to nest with steel studs specified.

Screws for attachment of studs to runner and other framing fastening where specified shall be 3/8" USG Drywall Screw, Type S, pinhead.

WALL FURRING SYSTEM: Wall furring system shall be USG Drywall Wall Furring System, designed for screw attachment of gypsum board furnished with required fasteners and accessories for complete system.

Furring Channels shall be hat-shaped USG Drywall Furring Channels, or equal, roll-formed from not less than 25-gauge galvanized steel, 2-3/4" wide by 7/8" deep with 1/2" minimum wing flanges and 1-3/8" minimum crown width for gypsum board attachment.

Fasteners for attachment of furring channels (or wall furring brackets) shall be as recommended by furring manufacturer.

Brackets for furred-out utility space shall be USG adjustable wall furring brackets, formed from not less than 20-gauge galvanized steel. Horizontal leg shall have serrated edges for wire-tie of carrying channels.

Carrying Channels shall not be less than 16-gauge cold-rolled channels, 3/4" web width and 1/2" flange depth, spaced 48" on center maximum. Finish with black asphaltum.

Tie Wire shall be not less than 16-gauge soft annealed carbon steel wire.

CEILING FRAMING SYSTEM: Ceiling-framing system for furred and suspended gypsum board ceilings shall be USG Drywall Ceiling System, designed for screw attachment of gypsum board, furnished with required fasteners and accessories for complete system.

Furring Channels for gypsum board applied to ceiling framing shall be hat-shaped USG Drywall Furring Channels, roll-formed from not less than 25-gauge galvanized steel, 2-3/4" wide by 7/8" deep with 1/2" minimum wing flanges and 1-3/8" minimum crown width for gypsum board attachment. Provide cross-carrying channels as specified at 48" centers.

Furring Channels for dropped ceilings, soffits, and where indicated at expansion joints shall be C-shaped studs, formed from not less than 25-gauge galvanized steel sheets, and of sizes indicated on Drawings.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

SCOPE:

Work included in this section:

- Surface Preparation Materials
- Setting Materials
- Sloped Setting Beds
- Grout
- Flexible Sealants
- Glazed Porcelain Floor Tile
- Glazed Porcelain Wall Tile
- Tile Accessories

INDUSTRY STANDARDS:

Tile Council of North America (TCNA) Handbook for Ceramic Tile Installation – Current Edition.

Current edition of American National Standard Specifications for the installation of ceramic tile; A108 / A118 / A136.1, A137.

Current editions of ASTM C 150, ASTM C 206, ASTM C 207, ASTM C 144, ASTM C627.

Current edition of International Standards Organization (ISO) 13007; Standards for Ceramic Tiles, Grouts and Adhesives.

EJ171 Movement Joint Guidelines for Ceramic, Glass, and Stone - Tile Council of North America (TCNA) Handbook for Ceramic, Glass, and Stone Tile Installation – Current Edition.

For listing of names of industry standard agencies mentioned by abbreviation in this Section refer to Section 01068.

QUALIFICATIONS:

Manufacturers:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by the Dal-Tile Company, MAPEI Corporation, and Schluter Systems.

Other acceptable Manufacturers whose products are acceptable for this Project are:

- American Olean
- Crossville

Source: Products for use on this Project shall be of one Manufacturer for same function.

SUBMITTALS:

Samples: Submit one sample each of following materials to Architect for approval.

Panels of tile approximately 6 inches square for each pattern and type of floor or wall tile.

Samples of each tile trim shape, and each metal trim shape, and each accessory specified.

Manufacturer's Data: Submit (in duplicate) Manufacturer's printed instructions on following:

Surface preparation materials
Mortar for floors
Mortar for walls
Grout for floors
Epoxy Grout for floors
Grout for walls
Epoxy Grout for walls
Flexible Sealants
Finishing, edge protection and transition profiles for floors
Finishing and edge protection profiles for walls

Certificates: Furnish Master Grade Certificate bearing Certification Mark of Tile Council of America, signed by Manufacturer and Tile Subcontractor, stating type and quantity of material furnished for Project.

PRODUCT HANDLING:

Delivery: Deliver materials to Project site in Manufacturer's original packages, and with seals unbroken. Only tile which bears Certification Mark of Tile Council of America on each carton will be permitted. Maintain package seals until time for installation.

Storage: Store cementitious material in dry building, on platforms off floor, and in area free from wetting. Store tile and accessory material in clean, dry, covered area to prevent wetting or staining.

ENVIRONMENTAL CONDITIONS:

Temperature: Do not apply mortar to surfaces containing frost. Minimum temperature for installation of tile shall be 40 degrees F, and maintained during installation, and until fully cured in accordance with Manufacturer’s written installation instructions.

Ventilation: Control movement of air to prevent too rapid evaporation of moisture for mortar in place.

PROTECTION:

Traffic Restrictions: Spaces in which tile is being set shall be closed to traffic and other work during installation and for at least 72 hours after completion of tile work.

PART 2: PRODUCTS

MATERIALS:

Provide materials in compliance with current editions and up-to-date industry product standards cited.

Portland Cement: ASTM C 150 Type 1, white.

Hydrated Lime: ASTM C 206 Type S, or ASTM C 207 Type S

Sand: ASTM C 144 - washed clean and graded. Use fine sand passing 1/16-inch mesh screen when mixed for grouting; use white sand for white cement.

Pigment - Grout shall be colored; colors to be selected by Architect.

Water: Clean and potable.

Mortar Bed: ANSI A108.1B; equivalent to 4 to 1 Mud Bed mixed with Planicrete AC by MAPEI.

Accelerated Mortar Bed: ANSI A108.1A; equivalent to Topcem Premix by MAPEI Corporation.

Concrete Patch: equivalent to Mapecem Quickpatch concrete patch by MAPEI Corporation.

Crack Isolation Sheet Membrane: equivalent to Mapeguard CI, pee-and-stick crack isolation sheet membrane for tile installations, by MAPEI Corporation, compliant with current edition of ASTM C627 Extra heavy service rating, and current edition of ANSI A118.12. Provide the applicable MAPEI primer.

Crack Isolation Membrane: equivalent to Mapelastic CI, pre-mixed liquid rubber crack isolation membrane for tile installations, by MAPEI Corporation, compliant with current edition of ASTM C627 Extra heavy service rating, and current edition of ANSI A118.12.

Improved Modified Dry-Set Cement Mortar: ISO 13007; C2ES2P2 and ANSI A118.4HE / A118.11, ANSI A118.15HE; equivalent to Kerabond/Keralastic System by MAPEI Corporation.

Polymer-Modified Large and Heavy Tile Mortar: ISO 13007 C2TE and ANSI A118.4HTE, A118.11; equivalent to Keraflex Plus by MAPEI Corporation.

GLASS-MESH MORTAR UNITS: Dens Shield Tile Backer by Georgia Pacific.

Unsanded Grout: ISO 13007: CG2WA, ANSI A118.6 premium pre-blended polymer modified unsanded grout, equivalent to Keracolor U Unsanded Grout. For 1/16” to 1/8” joints in floor and wall surfaces.

Sanded Grout: ISO 13007: CG2WA, ANSI A118.6 premium pre-blended polymer modified sanded grout, equivalent to Keracolor S Sanded Grout. For 1/8” to 5/8” joints in floor and wall surfaces.

High-Performance Cement Grout: ANSI A118.7 and ISO 13007 CGWAF, equivalent to MAPEI, Ultracolor Plus FA. For grout joints from 1/16 inch to 3/4 inch.

Epoxy Grout: ISO 13007; R2RG and A118.3; equivalent to Kerapoxy CQ by MAPEI Corporation, provide epoxy grout at all food service/kitchen floor and wall tile areas, and shower floors and walls.

Commercial Industrial-Grade Water-Cleanable Epoxy Grout: ANSI A118.3 and ISO 13007 RG, equivalent to MAPEI Kerapoxy IEG CQ. For grout joints from 1/8 inch to 5/8 inch.

Flexible Sealant: 100%-Silicone Sealant: Rated for Heavy-traffic expansion and movement joints, horizontal and vertical complying with ASTM standards; Meets ASTM C920, Type S, Grade NS, Use T1, T2, NT, I, M, G, A, and O, conforming to C794 adhesion properties; equivalent to MAPEI Mapesil T Plus.

ACCESSORIES

Aluminum Edge Protection: Schluter – SCHIENE Model AE-100, for use with tile wall base. L-shaped aluminum profile x 1/8" thick exposed visible leg and integrated perforated anchoring leg, and grout joint spacer, with satin anodized finish. Provide with or without wall tile directly above wall tile base.

Aluminum Corner Protection: Schluter – QUADEC Model Q 100 AE, at all outside corners for use with wall tile and tile wall base. Aluminum profile with square shaped exposed surface and integrated perforated anchoring leg, and integrated grout joint spacer, with satin anodized finish. Provide caps and termination accessories.

Aluminum Floor Transition: Schluter – RENO-U Model, for floor tile transitions to carpet, VCT, linoleum tile (LT) or terrazzo floor finishes. Aluminum profile with sloped exposed surface, ADA Compliant 1/2" Max. Transition Height x 5/32" tall leading abutment edge, and integrated perforated anchoring leg, and integrated grout joint spacer, with AEU satin anodized finish.

TILE:

All tile shall conform to current editions of ANSI A108.3, .4, .5, and .6; ANSI A137.1.

Floor Tile:

Floor tile shall be 6" x 6" nominal x 5/16" thick glazed porcelain with cushion edge, Daltile "Volume 1.0 with StepWise Technology slip resistance". Provide for all floor tile areas, with exceptions of shower areas. Provide with 3/16" grout joints. Equivalent products from American Olean or Crossville are acceptable. Architect shall choose from ten (10) available standard colors.

Shower Stalls floor tile shall be Dal-tile 2"x2"" Mosaics, mesh mounted, Grade 1 mosaic tiles.

Wall base shall be 12" x 12" floor tiles split in half to 6" high x 12" wide nominal units, installed with use of Schluter SCHIENE aluminum trim cap and QUADEC aluminum outside corners, complete assemblies. All wall base vertical and horizontal joints shall align.

Wall Tile: (Field & Accent)

Wall tile shall be nominal 12" x 24" nominal x 3/8" thick glazed porcelain tile, Daltile "Volume 1.0". Vertical joints shall align with floor and wall base joints. Provide polymer modified large and heavy tile mortar and 3/16" grout joints.

Terminate top horizontal and vertical edges of wall tile with a course of 3" x 12" bullnosed wall cap.

Provide all materials as necessary for providing a complete tile installation. All trim shapes shall be same size as field tile, and vertical and horizontal joints shall align.

Wall accent tile shall be nominal 12" x 24" nominal x 3/8" thick glazed porcelain tile, Daltile "Volume 1.1". Vertical joints shall align with floor and wall base joints. Accent tile, calculated as 25% of total wall tile area, shall be selected from manufacturer's six (6) standard colors, in a pattern as directed by Architect for each space. Provide polymer modified large and heavy tile mortar and 3/16" grout joints. Provide full range of trim shapes or profiles necessary for accent complete assemblies.

MIXES:

Proportion and mix materials, and apply in accordance with manufacturer's most current written instructions and applicable ANSI standards.

PART 3: EXECUTION:

CONDITIONS OF SURFACES:

Substrates:

Examine substrate surfaces to receive tile for compliance with requirements for conditions affecting performance of the work. Refer to ANSI A108.01, ANSI A108.02 and if applicable ANSI A108.19.

Perform a substrate inspection for identification and location of all cracks within the substrate surfaces, and where needed, apply/install crack isolation products specified or equivalents, with required primers, in accordance with the written manufacturer's instructions, and current editions of ANSI 118.12 and ASTM C627, ANSI A108.01, ANSI A108.02 and if applicable ANSI A108.19.

Do not proceed with tile work until surfaces and conditions comply with requirements indicated in referenced tile installation standard and manufacturer's printed instructions.

When underlayment, patching, leveling and rendered materials are needed, they must be from the supplier of the setting materials, for improved warranty and single-sourced responsibility.

When using tiles with all edges shorter than 15 inches in length, the maximum allowable variation in the substrate –1/4 inch in 10 feet from the required plane, with no more than 1/16 inch variation in 12 inches when measured from the high points in the surface.

When using large-format tiles with at least one edge of 15 inches in length, the maximum allowable variation in the substrate is 1/8 inch in 10 feet from the required plane, and 1/16 inch variation in 24 inches when measured from the high points in the surface.

Surfaces to receive tile shall be dry, clean, free of oily or waxy films, firm, level, and plumb. Do not start work until completion of work of other trades, which are in or behind tile work.

INSTALLATION:

General Requirements for Installation of Tile:

Installation shall conform to all recommendations contained in the current edition of Tile Council of North America Handbook for Ceramic Tile Installation:

STUD WALLS:	W244-23	Thin set over backer board.
	W245-23	Thin set over glass mat backer board
MASONRY WALLS:	W202I-23	Thin set mortar over masonry/concrete.
KITCHEN MASONRY WALLS:	W202I-23	Thin set mortar over masonry/concrete, epoxy grout
SHOWER WALLS	B415-23	Thin set over cement backer board, epoxy grout
SHOWER FLOOR:	B-415-23	Thin set over mortar setting bed floor, epoxy grout.
ELEVATED SLAB PORCELAIN TILE FLOORS	F-113A-23	Thin set mortar to concrete bond coat.
SOG PORCELAIN TILE FLOORS:	F-112-23	Thin set over bonded mortar bed.
PORCELAIN TILE KITCHEN FLOORS:	F-114-23	Thin set over unbonded mortar bed, epoxy grout.

Fitting: Cut and drill tile for proper fitting around work projecting through wall allowing for escutcheons and collars to overlap cuts. Rub exposed, cut edges.

Wall tile and wall base terminations will be provided with specified Schluter trim accessories. Cut edge or square edge terminations will not be accepted.

Pattern: Lay out tile lengthwise so that no tile of less than half size occurs. For heights stated in feet and inches, maintain full courses to nearest attainable height without cutting tile.

Base: Determine level of finish floor so that bottom lip of base will not be below finish floor level. Floor level at wall shall be at constant elevation around room, and will drain water away.

Lines: Install tile to true, straight lines, with uniform joints, both vertically and horizontally.

Joints: Except where otherwise shown or specified, joints in wall tile shall be vertical and horizontal, and joints in floor tile be perpendicular and parallel to walls.

Floor Tile Installations:

All SLAB-ON-GRADE (SOG) floor tile installations will be on recessed mortar setting beds, sloped to drains. Install mortar setting bed to recessed floor substrate or fill. Screed and tamp firmly. Minimum thickness of setting bed shall be minimum 1/2" at drain fixture. Level setting bed to tolerances required for finished floors.

Slope setting beds to floor drains, continuous from room perimeters to the drain fixture grate, for continual positive drainage at all areas. Shall be flood tested for positive drainage, witnessed by the Architect and Owner.

All elevated SLAB-ON-DECK (SOD) floor tile installations will be thin-set on elevated slab substrate, without setting beds, with cast-in-place concrete slab continuously sloped to floor drains. At all areas of thin set floor tile installations without setting beds, slope concrete floor slabs from room perimeters to floor drain grates for continual positive drainage. Shall be flood tested for positive drainage, witnessed by the Architect and Owner.

Provide polymer-modified, large and heavy tile mortar for bonding all tile with a 15 inch or longer edge. All wall tile units shall be back buttered.

Install expansion joints and control joints in accordance with TCNA method EJ171.

Grouting:

Grout joints in accordance with manufacturer’s instructions and ANSI A108.06 and/or ANSI A108.10.

Remove standing water, dust, and foreign substances from joints to be grouted.

Clean and dry tile surfaces. After grouting, remove all grout residue promptly.

Install expansion and control joints in accordance with TCNA method EJ171.

Cleaning:

Clean tile thoroughly prior to sealing, using methods approved by the tile manufacturer. Use of acid or acid cleaners to clean tile is strictly prohibited.

Curing:
Floors: Protect from all traffic for at least 72 hours after installation.

Do not step on and protect the floor for at least 24 hours.

If traffic is unavoidable after initial 24-hour protection, use plywood stepping boards protection.

Protect from heavy traffic for at least 7 days after installation.

When fast-setting materials are used to allow faster occupancy, comply with manufacturer's recommendations.

Walls: Protect from impacts, vibration, and heavy hammering on adjacent and opposite walls for 14 days after installation, unless manufacturer's instructions allow a shorter period.

Protect from stain-causing food products and chemicals for at least 14 days.

Protect from freezing and total water immersion for at least 21 days after installation.

NOTE: When dealing with cement-based products, temperature and humidity during and after installation of tile affect final cure time. Low temperatures: 60 degrees F and under, and high humidity: 70% and above, will delay final cure time.

Extra Stock: Furnish Owner with extra stock in unopened boxes, 5% of each color used.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 – GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Scope of work:
   1. Providing a 3/8” thick epoxy terrazzo finish, a minimum of 800 grit polish, at new areas of terrazzo, and at terrazzo patching areas. Colors and pattern to match existing.

B. Section Includes:
   1. Thin-set Epoxy Terrazzo Flooring including preparation of substrates.
   2. Related accessories.

C. Related Sections:
   1. Division 3, Concrete, (for depressed floor slab requirements).
   2. Division 4, Masonry.
   3. Division 5, Metals.
   4. Division 7, Thermal and Moisture Protection
   5. Division 9, Finishes
   6. Division 15A, Furnishing and setting floor drains.
   7. Section 01040, Temporary heat, water and electricity.

1.03 SUBMITTALS

A. Manufacturer’s product data for each type of terrazzo and accessories.
   1. Physical properties, including vapor barrier primer.
   2. Performance properties.
   3. Specified tests.
   4. Material Safety Data Sheet.
   5. Manufacturer’s standard warranty.

B. Shop Drawings: Include terrazzo installation requirements. Include plans, elevations, sections, component details and attachments to other work. Show layout of the following:
   1. Divider strips.
   2. Control- and expansion-joint strips.
   3. Base and border strips.
   4. Abrasive strips.
   5. Terrazzo patterns.

C. Samples for Initial Selection: NTMA and Manufacturer’s color plates showing the full range of colors and patterns available for each terrazzo type indicated, using premium marble terrazzo chips from the Carolina Colors Collection.

D. Samples for Verification: Match Architect’s samples for each type, material, color and pattern of terrazzo and accessory required showing the full range of color, texture and pattern variations expected. Label each terrazzo sample to identify manufacturer’s matrix color and aggregate types, sizes and proportions. Prepare samples of same thickness and from same material to be used for the Work in size indicated below:
   a. Epoxy Terrazzo: minimum 6” x 6” (152.4 mm x 152.4 mm) sample of each color and type of terrazzo.
   b. Accessories: 6” length (152.4 mm) of each kind of divider strip, stop strip and control joint strip required.

E. Manufacturer Experience:
   a. Submit proof of Associate membership in NTMA.

b. Furnish a list of at least five (5) epoxy terrazzo projects using material being submitted for this project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.
c. Epoxy manufacturer shall have 10 years of experience in sales and manufacturing epoxy for installation with NTMA members.

F. Qualification Data: For qualified Installer.
a. Submit proof of Contractor membership in NTMA.
b. Furnish a list of at least five (5) epoxy terrazzo projects using material being submitted for this project installed during the last five (5) years of the same scope, complexity and at least 50 percent of the square footage.

G. Material Test Reports: For moisture and/or relative humidity of substrate.
H. Maintenance Data: Submit 5 copies of NTMA maintenance recommendations and 5 copies of manufacturer's instructions

1.04 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who is acceptable to Architect and epoxy terrazzo manufacturer to install manufacturer's products.
1. Engage a terrazzo contractor with at least five (5) years of satisfactory experience in installation of epoxy terrazzo. Terrazzo contractor shall demonstrate experience during last five (5) years of at least (5) projects of comparable scope and complexity of at least 50 percent of the total square footage of this project
2. Engage an installer who is a contractor member of NTMA.

B. Source Limitations:
1. Obtain primary Epoxy Terrazzo Flooring System materials including membranes, primers, vapor barrier primers, resins and hardening agents from a single manufacturer with proof of NTMA membership.
2. Obtain aggregates, divider strips, sealers, cleaners from source recommended by primary materials manufacturer.

C. Pre-installation Conference: Conduct conference at Project site to review methods and procedures related to terrazzo including, but not limited to, the following:
1. Inspect and discuss installation procedures, joint details, jobsite conditions, depressed substrate specification, vapor barrier details, vapor barrier primers, and coordination with other trades.
2. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment and facilities needed to make progress and avoid delays.
3. Review special terrazzo designs and patterns.
4. Review dust control procedures.
5. Review plans for concrete curing and site drying to enable timely achievement of suitable slab moisture conditions.

D. NTMA Standards: Comply with NTMA's "Terrazzo Specifications and Design Guide" and with written recommendations for terrazzo type indicated unless more stringent requirements are specified.
E. LEEDS NC: Submit certification from Manufacturers of all terrazzo flooring materials and accessories that products are sustainable products, listing all applicable LEED U.S. Green Building code council's credits made available by certification.
F. SCAQMD: Floor coatings shall not exceed the VOC content limits established in South Coast Air Quality Management District (SCAQMD) Rule 1113, Architectural Coatings.
G. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.
1. Build mockups for terrazzo including accessories.
a. Size: Minimum 100 sq. ft. of typical poured-in-place flooring condition for each color and pattern in locations directed by Architect.
2. Approved mockups may become part of the completed Work if undistributed at time of Substantial Completion.

1.05 DELIVERY, STORAGE AND HANDLING

A. Deliver materials to Project site in supplier's original wrappings and containers, labeled with source's or manufacturer's name, material or product brand name and lot number if any.

B. Store materials in their original, undamaged packages and containers, inside a well-ventilated area protected from weather, moisture, soiling, extreme temperatures and humidity.
   1. Storage temperatures should be between 60°F to 80°F.

1.06 PROJECT CONDITIONS

A. Terrazzo contractor shall, prior to surface preparation:
   1. Evaluate depressed slab condition, including slab moisture content and extent of repairs required, if any.
   2. Maintain the ambient room and floor temperature at 60°F or above for a period extending 72 hours before, during and after floor installation. Concrete to receive epoxy terrazzo shall have cured for at least 28 days and be free of all curing compounds. Test concrete substrate to determine acceptable moisture levels prior to installation. Testing should be conducted according to ASTM F2170 (determining relative humidity in concrete slabs using in situ probes).

B. Prior to and during each day of installation, the terrazzo contractor shall verify that the dew point is at least 5°F less than the slab and air temperature.

C. Acceptable Substrates:
   1. Depressed concrete sub-floor at all terrazzo locations, confirm and verify depth.
   2. Level tolerance: Concrete sub-floor shall be level with a maximum variation from level of 1/4" in 10 feet. Any irregularity of the surface requiring patching and/or leveling shall be done using the manufacturer's fill of selected aggregates as recommended by manufacturer.
   3. Concrete floor shall be prepared mechanically by shot blasting in accordance with ICRI Guideline No. 03732. Specifically, surface preparation results should achieve a CSP3-CSP5 profile.
   4. Concrete floor shall receive a steel trowel finish.
   5. Concrete shall be cured a minimum of 28 days. No curing agents are to be used in areas to receive terrazzo.
   6. Concrete slab shall have an efficient moisture vapor barrier directly under the concrete slab. Moisture vapor barrier shall be an approved puncture resistant polyethylene sheet not less than 15 mils thick, in compliance with 03200 requirements. Moisture barrier shall NOT be punctured.
   7. Saw cutting of control joints must be done between 12 and 24 hours after placement of the structural concrete and at a frequency compatible to ACI recommendations.

D. Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during terrazzo installation.

E. Provide protection from other trades prior to final acceptance by Owner.

PART 2 – PRODUCTS

2.01 EPOXY TERRAZZO

A. Products Systems Overview: The basis of design and specifications are an 800 grit finish product manufactured by Terroxy® Resin Systems Epoxy Matrix by Terrazzo & Marble Supply Companies, Wheeling, IL (www.tmsupply.com) Equal system by General Polymers from Sherwin Williams or Master Terrazzo Technologies or others will be accepted provided each is pre-approved by Architect in accordance with the General Conditions.

B. Materials:
   1. Vapor Barrier Primer (required throughout): Terroxy® Moisture Vapor Primer (for new or existing slabs on-grades, slab-on-decks, or light-weight and green concrete).
      a. Physical properties of moisture mitigating primer shall have a maximum of 0.3 perms with 100% RH.
   2. Flexible Reinforcing Membrane: Terroxy® Iso-Crack Epoxy Membrane, for substrate crack preparation and reflective crack reduction.
      a. Provide for a minimum of 10% for the project
      b. Reinforcement: Fiberglass scrim.
   3. Epoxy Matrix: Terroxy® Epoxy Matrix and in color required for mix indicated.

a. Physical properties without aggregates. All specimens cured for 7 days at 75°F plus or minus 2°F and 50 percent plus or minus 2 percent RH. This product shall meet the following requirements:

Property	**Test Method**	**NTMA Requirements**	**Thin-set Epoxy Terrazzo Typical Results**
Hardness	ASTM D-2240 using Shore-D Durometer	60-85	75-85
Tensile Strength	ASTM D-638	3,000 psi min.	4,800 psi min.
Compressive Strength	ASTM D-695 Specimen B cylinder	10,000 psi min.	12,000 psi min.
Flexural Strength	ASTM D-790	Not specified	4,500 psi min.
Chemical Resistance	ASTM D-1308 seven days at room temperature by immersion method	No deleterious effects: ▪ Distilled Water ▪ Mineral Oil ▪ Isopropanol ▪ Ethanol ▪ 0.025 Detergent Solution ▪ 1% Soap Solution ▪ 10% Sodium Hydroxide ▪ 10% Hydrochloric Acid ▪ 30% Sulfuric Acid ▪ 5% Acetic Acid	No deleterious effects: ▪ Distilled Water ▪ Mineral Oil ▪ Isopropanol ▪ Ethanol ▪ 0.025 Detergent Solution ▪ 1% Soap Solution ▪ 10% Sodium Hydroxide ▪ 10% Hydrochloric Acid ▪ 30% Sulfuric Acid ▪ 5% Acetic Acid

b. Physical properties with aggregates. For Epoxy Matrix blended with three volumes of Georgia White marble blended 60% #1 chip and 40% #0 chip, ground and grouted with epoxy resin according to Installation Specifications, finishing to a nominal 3/8" thickness. All specimens cured for 7 days at 75°F plus or minus 2°F and 50 percent plus or minus 2 percent RH. This finished Epoxy Matrix shall meet the following requirements:

Property	**Test Method**	**NTMA Requirements**	**Thin-set Epoxy Terrazzo Typical Results**
Flammability	ASTM D-635	Self-extinguishing, extent of burning 0. 25 inches max.	Self-extinguishing, extent of burning 0. 25 inches max.
Thermal Coefficient of Linear Expansion	ASTM D-696	$25x10^{-6}$ inches per inch per degrees to 140ºF	$25x10^{-6}$ inches per inch per degrees to 140ºF
Bond Strength	ACI COMM 403, Bulletin 59-43 (pages 1139-1141)	300 psi (100% concrete failure)	300 psi (100% concrete failure)

4. Aggregate Chips Mix: Provide an aggregate chips mix from the Carolina Colors Collection, Premium Carolina Marble Terrazzo Chips.
5. Aggregates: Complying with NTMA gradation standards for mix indicated and containing no deleterious or foreign matter.
   a. Obtain aggregates from a local regional source: Southern Aggregates, Staley, NC
   b. Abrasion and Impact Resistance: Less than 40 percent loss per ASTM C 131.
   c. 24-Hour Absorption Rate: Less than 0.74 percent.
   d. Dust Content: Less than 1.0 percent by weight.

e. Postindustrial Recycled Content: No less than NTMA minimum standard

6. Finishing Grout: Terroxy® Epoxy Matrix or Terroxy® Clear Resin as recommended by Terroxy® Resin Systems.

C. Mix: Comply with NTMA's "Terrazzo Specifications and Design Guide" and manufacturer's written instructions for matrix and aggregate proportions and mixing.
   a. Color and Pattern Schedule: When designations are indicated or scheduled, provide specified terrazzo matrices matching the Architect's approved samples:

2.02 STRIP MATERIALS

A. Thin-set Divider Strips: L-type.
   1. Material: White-zinc alloy.
   2. Guide for commonly used L-type divider strips for Thin-set Epoxy Terrazzo Systems:

System Height	Strip Height	Strip Width
3/8" System	3/8"	16 gauge 1/8" 1/4"

B. Control-Joint Strips: Separate double L-type angles back to back with minimum 1/8" width between. Fill area between strips with 100% solids epoxy filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

C. Isolation (Expansion) Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8" width between. Fill area between strips with Terroxy® Joint Filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.

D. Accessory Strips: Match divider strip width, material and color unless otherwise indicated. Use the following types of accessory strips as required to provide a complete installation:
   1. Edge-bead for exposed edges of terrazzo.

2.03 MISCELLANEAOUS ACCESSORIES

A. Strip Adhesive: 100% solids epoxy resin adhesive recommended by Terroxy® Resin Systems.
   1. Use adhesive that has a VOC content of 50g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Anchoring Devices:
   1. Strips: Provide epoxy adhesive/mechanical anchoring devises for strip materials as required for secure attachment to substrate.

C. Patching and Fill Material: Terroxy® Fill and selected aggregates as recommended by Terroxy® Resin Systems.

D. Joint Compound: Terroxy® Joint Filler, color to be selected by architect to match/compliment terrazzo.

E. Cleaner: Terroxy® Terra Clean, a neutral cleaner with pH factor between 7 and 10 specifically designed for terrazzo.

F. Surface Finish System: Level of polish shall be an 800 grit minimum finish to match Architect's approved sample, with respect to and in accordance with desired appearance and level of reflectivity.

G. Sealer: Slip- and stain-resistant sealer that is chemically neutral with a pH factor between 7 and 10, a standard coefficient of friction of 0.6 or higher, does not affect physical properties of terrazzo and complies with NTMA's "Terrazzo Specifications and Design Guide". Architect to final select from submitted data after review of manufacturer's recommendation.
   1. Terroxy® Acrylic Sealer, high performance, high gloss acrylic sealer; VOC content free, compatible with an 800 grit finish.

PART 3 – EXECUTION

3.01 EXAMINATION

A. Examine depressed slabs, substrates and areas, with Terrazzo Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance.
B. Proceed with installation only after unsatisfactory conditions, including level tolerances, have been corrected.

3.02 PREPARATION

A. Clean substrates of substances, including oil, grease and curing compounds, that might impair terrazzo bond. Provide clean, dry and neutral substrate for terrazzo application.
B. Concrete Slabs:
    1. Provide sound depressed concrete surface free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil and other contaminants incompatible with terrazzo.
        1. Prepare concrete mechanically by shot blasting. Surface preparation results should achieve a CSP3-CSP5 profile according to ICRI Guideline No. 03732.
        2. Repair or level damaged and deteriorated concrete according to Terroxy® Resin Systems Technical Bulletin 008 Substrate Leveling Requirements for Terroxy® Thin-Set Epoxy Terrazzo
        3. Repair cracks and non-expansion joints greater than 1/16” (1.6 mm) wide according to Terroxy® Resin Systems Technical Bulletin 009 Crack Detailing and Joint Treatments for Terroxy® Resin Thin-set Epoxy Terrazzo.
    2. Verify that concrete substrates are visibly dry and free of moisture.
    3. Apply Terroxy® Moisture Vapor Primer to all concrete substrate surfaces complete. Apply to terrazzo substrates in accordance with manufacturer’s written instructions.
    4. Moisture Testing:
        a. Test for moisture according to ASTM F2170 (determining relative humidity in concrete slabs using in situ probes), with an in situ probe equivalent to the “RH BluePeg” distributed by Terrazzo & Marble Supply. Proceed with installation only after substrates have a maximum relative humidity measurement reading less than 80%. Re-apply vapor barrier primer as required to achieve relative humidity measurement reading less than 80%.
C. Protect other work from dust generated by grinding operations. Control dust to prevent air pollution and comply with environmental protection regulations.
    1. Erect and maintain temporary enclosures and other suitable methods to limit dust migration and to ensure adequate ambient temperatures and ventilation conditions during installation.

3.03 EPOXY TERRAZZO INSTALLATION

A. General:
    1. Comply with NTMA’s written recommendations for terrazzo and accessory installation.
    2. Place, rough grind, grout, cure grout, fine grind and finish terrazzo in accordance with manufacturer’s written instructions and NTMA’s “Terrazzo Specifications and Design Guide.”
    3. Ensure that matrix components and fluids from grinding operations do not stain terrazzo by reacting with divider and control-joint strips.
    4. Delay fine grinding until heavy trade work is complete and construction traffic through area is restricted.
B. Thickness: 3/8”; depress concrete slab substrates accordingly.
C. Flexible Reinforcing Membrane: (Provide for in bids a minimum of 10% of project square footage of crack isolation membrane)
    1. Membrane application for isolated cracking: Route out all cracks and fill with 100% solids epoxy filler. Apply Terroxy® Iso-Crack Epoxy Membrane (spread at 40 mils thickness) across the crack allowing 12 inches on either side. Imbed fiberglass scrim into wet membrane and saturate with additional membrane.
    2. Membrane application for extensive cracking or crack prevention: Route out all cracks and fill with 100% solids epoxy filler. Apply Terroxy® Iso-Crack Epoxy Membrane (spread

at 40 mils thickness) over prepared substrate to produce full substrate coverage in areas to receive terrazzo.

D. Vapor Barrier Primer: Apply to terrazzo substrates according to Terroxy® Resin Systems Vapor Barrier Primer Product Data Sheet.
E. Strip Materials:
   1. Divider and Accessory Strips:
      a. Install strips in adhesive setting bed without voids below strips or mechanically anchor strips as required to attach strips to substrate.
      b. Control-Joint Strips: Separate double L-type angles back to back with minimum 1/8" width between. Fill joint with 100% solids epoxy filler. Fill area between strips with Terroxy® Joint Filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
      c. Isolation (Expansion) Joint Strips: Separate double L-type angles, positioned back to back with minimum 1/8" width between. Fill area between strips with Terroxy® Joint Filler. Match material, thickness and color of divider strips and depth required for topping thickness indicated.
F. Placing Terrazzo:
   1. Mix epoxy matrix with chips and fillers in ratios directed by Terroxy® Resin Systems matching a sample approved by Architect.
   2. Trowel apply terrazzo mixture over epoxy primer to provide a dense flat surface to top of divider strips. Allow to cure per Terroxy® Resin Systems recommendations before rough grinding.
   3. Rough Grinding:
      a. Grind with 24 grit silicon carbide or D-36 Diamond matrix stones until all Terrazzo strips and marble chips are uniformly exposed.
      b. Follow initial grind with 80 or finer grit stones.
G. Grouting:
   1. Cleanse floor with clean water and rinse.
   2. Remove excess rinse water by wet vacuum, dry and fill voids with Terroxy® Resin Systems Epoxy Matrix or Clear Resin.
   3. Allow grout to cure. Grout may be left on terrazzo until other trades work is completed.
H. Polishing:
   1. Grind with 50 or 60, 80 to 120 grit stones and then progressively finer stones until all grout is removed from surface. Repeat rough grinding, grout coat and polishing if large terrazzo chip voids exist after initial polishing.
   2. Continue grinding and polishing surface with diamond discs and pads to achieve a surface with a minimum of 70 percent aggregate exposure, and a 200 grit minimum polish.
   3. Progressively continue polishing steps with polishing pads of 220 grit 5-passes, 400 grit 5-passes, 800 grit 5-passes, until a final 800 minimum grit polish is produced. Between grits, thoroughly clean and mop slurry water. Provide and use Terrazzo and Marble Supply ET polishing pad on a Terrco 2100 machine or equivalent products.
   4. When the terrazzo floor is dry, and has been either dust mopped or vacuumed to remove any remaining dirt, a Scotch Guard or equivalent stone protector shall be applied with a micro-fiber mop and then burnished with a 3M or appropriate equivalent purple diamond pad, until proper finish is achieved. This step should be repeated twice for two coats of stone protector.

3.04 CLEANING AND PROTECTION (800 Grit Finish)

A. Protection: Upon completion, the Work shall be ready for final inspection and acceptance by the owner or his agent. Provide final protection and maintain conditions, in a manner acceptable to Terrazzo Contractor, that ensure terrazzo is without damage or deterioration.
B. Sealers and wax coating products are not required for an 800 grit finish, and are not to be applied.
C. When needed, add back gloss by buffing with purple pads.
D. Periodic re-application of the 3-M Stone Hardener with a fiber mop may necessary, to restore gloss, then buffed.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART I GENERAL

1.1 SECTION INCLUDES

A. Acoustical wall treatments where indicated on Drawings. “Acoustical Absorption Panel” Ekko Eraser by Commercial Acoustics.

1.2 PERFORMANCE REQUIREMENTS

A. Acoustical ceiling and wall treatment components meet Class A (0-25) rating in accordance with ASTM E 84 / UL723 / NFPA 255.
B. Comply with NFPA 90A and 90B.
C. Comply with ASTM C423 Test Method for Sound Absorption

1.3 SUBMITTALS

A. Product Data: Submit manufacturer’s product data, including product specifications, installation instructions and maintenance directions.
B. Samples: Submit 12 x 12 inch sample to show core material, edge and corner details, finish and mounting hardware, for approval by Architect.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer’s original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
B. Storage: Store materials in a dry area indoors at room temperatures, protected from damage and in accordance with manufacturer’s instructions.
C. Unwrapped panels to be handled with clean gloves. Do not bend, puncture, brush, paint or otherwise misuse the Panels.

1.5 PROJECT CONDITIONS

A. Do not install ceiling and wall treatment until all wet work, such as plastering, concrete, and masonry, is completely dry, building closed in with operational HVAC system.
B. Install ceiling and wall treatment at air temperature between 60 and 85 degrees F, at maximum relative humidity of 75 percent, and in an enclosed building.

PART II PRODUCTS

2.1 MANUFACTURERS

A. Provide “Acoustical Absorption Panel” Ekko Eraser by Commercial Acoustics. 888-815-9691

B. Acceptable equivalent manufacturers:
   1. Equivalent products by Wenger Corporation.
   2. Equivalent products by Conwed Designscape.

2.2 ACOUSTICAL WALL TREATMENT

A. Flat Absorption Acoustical Wall Panels (where indicated on Drawings): 4 ft. x 8 ft. x 2 inch thick one-piece panels of 6-7 pcf noncombustible and dimensionally stable glass fiber core of borosilicate glass fibers, bonded with thermosetting resin.

Laminated with 1/8 inch high impact resistant tackable face layer, 16 – 18 pcf molded impact resistant glass fiber board, 2 inch thick molded high impact glass fiber board.

1. Edges: Square with resin-hardened edge protection, with perimeter wood frame edges.
2. Corners: Square.
3. Finish: Woven acoustically transparent polyester fabric covering the face, all edges, and a return on the back of a minimum of 1-1/2 inches, Class A Fabric meeting NFPA 101 Life Safety Code requirements
4. Mounting: Corner brackets for included mechanical wall clips on CMU walls.
5. Noise Reduction Coefficient (NRC), ASTM C 423: 1.10.
6. Colors: Architect to select colors from all manufacturer's available colors
7. Three-year warranty

PART III EXECUTION

3.1 EXAMINATION

A. Inspect areas to receive ceiling and wall treatment. Notify Architect of conditions that would adversely affect the installation or subsequent utilization of the ceiling wall treatment. Do not proceed with installation until unsatisfactory conditions are corrected.

3.2 INSTALLATION

A. Install ceiling and wall treatment at locations indicated on the drawings and in accordance with manufacturer's instructions.
B. Do not install acoustical panels until building is closed in and HVAC system is operational, and humidity is within manufacturer's specified range.
C. Install ceiling and wall treatment plumb, level, square, in alignment with adjacent work, and secure.
D.

3.3 CLEANING

A. Clean ceiling and wall treatment surfaces in accordance with manufacturer's instruction.
B. Touch up any minor finish damage. Remove and replace work that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.
B. Repair minor damaged surfaces as directed by Architect.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Provide acoustical ceiling systems, complete as shown and as specified herein, including exposed tee suspension systems and acoustical lay-in boards.

Coordinate work with installation of air conditioning grilles and diffusers specified in Division 15B and with installation of lighting fixtures specified in Division 16.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purposes of designating type and quality for work in this Section, Drawings and Specifications are based on products by following manufacturers:

Ceiling Suspension Systems shall be by Armstrong Ceiling Solutions or equivalent products by:

- Chicago Metallic Corp.
- Donn Products, Incorporated

Acoustical Tiles shall be Armstrong or equivalent products by:

- Chicago Metallic Corp
- USG

Source: Products for use on this Project shall be of one Manufacturer for each function.

Shop Drawings: Indicate following:

Layout of inserts required for ceiling suspension system.

Reflected ceiling layouts for all areas to receive acoustical ceilings. Details of all connections to work of other trades.

Submit typical layout showing size and spacing of exposed grid and hangers as related to structural frame.

Samples: Submit samples of each acoustical unit, suspension system, and accessories.

Test Reports: Submit (in triplicate) copies of certificate of Flame Spread Class 25 rating under requirements of SS-S-118A, required for all acoustical units on Project.

Manufacturer's Data: Submit (in triplicate) Manufacturer's printed installation instructions for suspension system.

Warranty: Provide 15 year “humidity no-sag” manufacturer’s warranty for tiles and grid system, warranted to replace tiles and damaged or defective system components at no cost to owner if tiles sag visibly within the warranty period. Warranty terms equivalent to Armstrong Humiguard Plus 15 year warranty.

PRODUCT HANDLING:

Delivery: Deliver acoustical ceiling boards to Project site in Manufacturer's original packages, with seals unbroken, with Manufacturer's name and contents legibly marked thereon and with testing laboratory labels where required.

Storage: Store ceiling tiles and boards in enclosed areas, with same temperature and humidity conditions as areas in which material is to be installed.

ENVIRONMENTAL CONDITIONS:

Building Conditions: Install acoustical materials only when normal temperature and humidity conditions approximate interior conditions that will exist when building is occupied. Building shall not be cold and damp, or hot and dry.

Glazing shall be in place and all exterior openings closed. All concrete, plastering and other wet work shall be complete and dry.

Provide heat and ventilation to maintain proper conditions before, during, and after acoustical work is performed.

PART 2: PRODUCTS

TYPES AND SYSTEMS: All acoustical materials shall be of types indicated by type numbers on Drawings, as follows:

Type 1: 24” x 24” x 5/8” Armstrong Yukon Humiguard Plus, no. 8770 square edge / Prelude XL Grid

Type 2: NOT USED

Type 3: 24” x 24” x 5/8” Vinyl faced gypsum panels / AL Prelude Plus Grid

Type 4: 5/8” Moisture resistant gypsum board on hat channels/cold-rolled channels framing system.

Type 5: 5/8” Firecode gypsum board on hat channels/cold-rolled channels framing system. Smoke resistant construction.

Type 6: 5/8” Gypsum board on hat channels/cold-rolled channels framing system.

HANGERS:

Wire: No. 12 gauge galvanized steel.

SUSPENSION SYSTEM:

Components: System shall consist of main support tees, cross tees, splice clips, wall angles, and hold down clips.

Design Loads: Suspension system shall be designed to support respective lay-in units and light fixtures with deflection of suspension members not to exceed 1/360 of span of member.

Exposed Grid System: Armstrong Exposed Grid System (hot dipped galvanized steel), consisting of main tees and cross tees with 15/16" exposed flange. Wall molding shall be cold-rolled galvanized steel, channel shaped, with 1" exposed face of same finish as exposed tee surfaces.

Provide all aluminum grid at AL grid locations indicated.

Provide bullnosed preformed corners for bullnosed wall corners.

Finish: Exposed surfaces of tees and of wall moldings shall be flat white, baked polyester.

PART 3: EXECUTION

INSTALLATION OF ACOUSTICAL CEILING SYSTEMS:

General Requirements:

Suspension System: Install strictly according to approved Shop Drawings layouts for spaces and manufacturer's printed instructions.

Ceiling Tile Pattern, Layout, and Type:

1. Install acoustical ceiling in patterns and types indicated on approved shop drawings and, as described in this specification.

2. Unless indicated otherwise herein or on Drawings, ceilings shall be laid out symmetrically in each space, with no less than half size panels or tiles at walls.

Installation of acoustical materials and suspension systems shall be made by experienced mechanics in strict accordance with Manufacturer's written instructions.

Fit parts neatly and accurately, true to line and plane.

Where hangers fall at structural members, install hanger clips in strict accordance with written instructions of Manufacturer of hanger clips.

Suspension system, including wall mold, shall be level to within 1/8" in 12 feet, with ceiling panels in place.

Exposed grid members shall be straight and in alignment. All exposed surfaces shall be flush and level.

General Requirements for Acoustical Ceilings:

Scribe lay-in units neatly to abutting surfaces and to penetrations or protrusions.

Exercise care to prevent soiling of ceiling tiles during installation. Leave entire system neatly and accurately fitted.

CLEANING: Following installation, clean all soiled and discolored surfaces. Remove and replace units, which are damaged or improperly installed.

EXTRA STOCK: Furnish Owner 5% of each pattern of acoustical tile installed in Project for maintenance replacements.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

DESCRIPTION

Provide cushioned wood flooring system for Gymnasiums as shown on the drawings, in colors, with images, and finished as specified herein.

RELATED SECTIONS

Section 01056 Allowances – Center Court School Mascot Image

QUALITY ASSURANCE

Supplier Qualifications: Supplier shall be an established firm experienced in the field; Robbins, Inc., or approved equivalent. Wood floor specifications are based on Robbins "Bio-Cushion Classic" floor system.

Acceptable equivalent products include: Connor NeoShok by Connor Sports.

Installer Qualifications: Flooring Contractor shall be a firm experienced in the flooring field and approved by the manufacturer.

Wood floor finishing specifications are based on Bona US products.

SUBMITTALS

Submit complete product data, samples, shop drawings, and certifications.

DELIVERY, STORAGE AND HANDLING

Materials shall not be delivered, stored or installed until all masonry, painting, plastering, tile work, marble and terrazzo work are completed. All overhead mechanical work, lighting, backstops, scoreboards shall be installed. Room temperature of at least 55 to 80 degrees and relative humidity of 35 to 50% are to be maintained. Installation / storage conditions shall be the same as those which will prevail when the building is occupied.

PART 2 - PRODUCTS

WATERPROOFING AND DAMPPROOFING

LIQUID MOISTURE VAPOR BARRIER (Gymnasium Floor Slab): CHAPCO DEFENDER EZ Moisture Vapor Barrier: Low Viscosity, one-part polymeric emulsion (2 coats) applied to gymnasium concrete slab substrate by the General Contractor, in compliance with manufacturer’s written installation instructions. Equivalent products by W. R. Meadows or Ardex are acceptable.

WATERPROOFING MEMBRANE: MEL-ROL, Rolled, Self-Adhering Waterproofing Membrane, manufactured by W. R. Meadows. General contractor to apply to all perimeter foundation walls at the Gymnasium wood floor.

GYM FLOORING MATERIALS (Gymnasium, Stage)

Vapor Barrier Membrane
6 mil polyethylene, lapped joints and taped

Bio-Cushion Classic System:

3/4" tall Bio-Cushion Isolator Pads
2 layers of 1/2" CD-Exterior Grade Fir or Southern Pine Plywood.

Flooring:

25/32" Thick x 2 1/4" width, third and better, T & G and EM, KD Northern Hard MFMA Maple Flooring as manufactured by Robbins and graded in accordance with MFMA standards. Exception: provide Select Southern Yellow Pine for Stage Area where scheduled, with Ebony stain prior to sealing and finishing.

Flooring shall be treated with Woodlife preservative.

Fasteners:

Subfloor

a. 1" coated staples or equivalent.
b. Construction adhesive PL 400 or equivalent.

Flooring:

a. 2" barbed cleats or staples.

Perimeter Base - Robbins 3" x 4" rubber, ventilating type, brown.

Finishing Materials:

1. Bona Oil Modified Stain
2. Bona SuperSport Seal, water based acrylic
3. Bona SuperCourt HD, two-component water based urethane finish
4. Bona SuperSport Paint, waterborne game line paint, or equivalent recommended by the finishing materials manufacturer compatible with the finish.

Aluminum Threshold Transitions: Where flat transitions to other floor finishes occur, including at doorways, provide Flat Saddle Thresholds, equivalent to Pemko 276, in mill finish 6063-T6 aluminum.

PART 3 - EXECUTION

GYM FLOORING EXECUTION

INSPECTION

Inspect concrete subfloors for proper tolerance and dryness, and report any discrepancies to the general contractor in writing.

INSTALLATION

General Contractor to apply 2 coats Liquid Moisture Vapor Barrier to gymnasium concrete slab substrate, in compliance with manufacturer’s written installation instructions.

Bio-Cushion Classic System:

1. Install polyethylene film with joints lapped and taped with a minimum of 6" overlaps and turned up 4” at the walls.
2. Install Robbins Bio-Cushion Isolator Pads 12" O.C. on lower plywood subfloor. Install the lower plywood subfloor perpendicular to the intended finish flooring direction. All joints shall be staggered and spaced 1/4" apart.
3. Install the upper plywood subfloor 45 degree diagonally to the lower subfloor panels, staggering joints and spacing 1/4" apart. Secure these panels using adhesive and 1" staples placed 6" O.C. at panel perimeter and 12" O.C. throughout interior.
4. Machine nail maple finish flooring (Select SY Pine at Stage) with end joints properly driven up and proper spacing provided for humidity conditions in specific regions, with expansion joints at regular interval spacing.
5. Provide 2" expansion voids at the perimeter and at all vertical obstructions.

Sanding:

Sand flooring with drum sander, edger, bugger and hand scraper. Use coarse, medium and fine grade sandpaper. After sanding with drum sander, buff entire floor using 100 grit screensback or equal grit sandpaper, with a heavy-duty buffing machine. Vacuum or tack floor before first coat of finish system.

Floor shall present a smooth surface without drum stop marks, gouges, streaks or shiners.

FINISHING

Gymnasiums:

1. Apply Bona Oil Modified Stain, colors as selected by the Architect.

2. Apply 1 coat of Bona SuperSport Seal.

3. Apply 1 to 2 coats of Bona SuperCourt HD finish.

4. Game Lines: Apply 2 coats Bona SuperSport Paint game lines and borders accurately after the seal coat and single coat of finish, after buffing and vacuuming. Layout in accordance with drawings. For game lines, use current rules of association having jurisdiction. Lines shall be straight with sharp edges. Colors selected by Architect, and final approved by the Owner.

5. Center Court Image: Apply center court image, as final approved by the Owner.

6. Apply 2 to 3 final coats of Bona SuperCourt HD finish.

Perimeter Molding: Install Robbins vent cove base anchored to walls with base and neatly mitered inside corner.

Clean up all unused materials and debris and remove same from the premises.

END OF SECTION

RELATED DOCUMENTS:

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

GENERAL:

Stone Association Publications: Comply with recommendations contained in the publications indicated below:

Submittals: With manufacturer's data and installation instructions, submit samples not less than 12" x 12" for each type, color, and finish of stonework units.

PRODUCTS:

Obtain each type of stone from one quarry, with consistent color range and texture, complying with referenced ASTM standards and other references indicated, extracted from a single bed of quarry stratum.

Bluestone Slate: Where indicated on Drawings, provide blue-gray slate window stools and benches as detailed, exposed finished surfaces flat with buffed natural cleft face, one long edge sandrubbed, gauged, and slightly rounded front edge, with exposed edges true, level and square. Equivalent to Buckingham Slate Bluestone window sill stools.

Face Finish: Natural cleft face; buffed dull sheen, without reflections. Color and finish to match Architect's sample. Seal stone with manufacturer’s recommended sealer.

Outside 90 degree corners directly adjacent to pedestrian walkway areas, shall be safety bullnosed.

Joints shall be colored mortar or grout. For colored pointing mortar, use ground granite or other sound stone to match Architect's sample.

Dry Set Thin-Set Mortar: ANSI A118.1

Prepackaged dry mortar mix with re-emulsifiable powder as additive, for mixing with water only.
Anchors: Nonferrous metal, as required to suit stone installations.

Fabrication: Precut stone units to required sizes and shapes. Use powered masonry saw for cutting units at site. Avoid use of less-than-half-size units.

INSTALLATION:

General: Do not use stone units with chips, cracks, voids, stains or other surface defects visible in finished work. Clean stone before setting by scrubbing with fiber brushes and water. Wet stone, as required, before setting. Comply with manufacturer's instructions for application of proprietary materials.

Seal exposed surfaces with manufacturer’s recommended sealer.

Installation of Interior Wall Facing and Trim: Erect interior wall facing and trim, plumb and true with joints uniform in width and accurately aligned.

Install stone to comply with requirements of referenced ANSI installation specification, and of ANSI A108.10 and TCA "Handbook for Ceramic Tile Installation", respectively, for setting bed type, TCA installation method and grout: Dry-Set Portland Cement Mortar: ANSI A108.5

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Provide FloorScore certified resilient flooring systems as indicated, complete assemblies with wall base and transitions throughout, with all necessary profiles and accessories, for all conditions, as shown on Drawings and as specified herein.

Provide rubber tile, stair tread and nosing, riser, and stringer system complete assemblies with transitions and necessary accessories, as shown on Drawings and as specified herein.

Concrete floors are specified to be finished flat and level under Division 3 requirements.

Skim coat all areas to receive resilient flooring systems complete, with self-leveling smoothing and leveling compound and prepare for installation of finish products scheduled.

At all SOG (slab-on-grade) and SOD (slab-on-deck) areas, apply a moisture barrier primer/sealer coating to all new and existing concrete floor slab substrates complete.

INDUSTRY STANDARDS:

ASTM F 710-05

FloorScore Indoor Emissions Testing Program

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

QUALITY ASSURANCE:

Standard: For purposes of designating type and quality for work under this Section, Drawings and Specifications are based on products by following manufacturers or approved equal:

1. Vinyl Composition Tile (VCT):
    a. Armstrong Cork Company

2. 100% Vulcanized Thermoset Rubber Base and Accessories:
    a. Roppe Rubber Company
    b. Flexco Division Textile Rubber Company
    c. Johnsonite Rubber Company

3. Rubber Tile, Stair Tread and Nosing, Riser, and Stringer system
    a. Johnsonite Rubber Company
    b. Roppe Rubber Company
    c. Flexco Division Textile Rubber Company

SUBMITTALS:

Samples: Submit following samples of materials proposed for use.

Tile: Three sample tiles of each color selected.

Accessories: Three 12" lengths of each of the following:

1. Wall Base
2. Transition Edge Strip
3. Carpet Transition Stop / Reducer
4. Stair Tread and Nosing, Riser, and Stringer system
5. Self Leveling Skim Coating Material

Manufacturer's Literature: Submit (in triplicate) Manufacturer's certificates, MSDS sheets, VOC product data, and printed installation instructions on following:

- Smoothing and Leveling Compound
- Moisture Barrier Primer/Sealer
- Adhesive
- Resilient Flooring Materials
- Transition Strips
- Rubber Base

CERTIFICATES:

Submit certification from Manufacturer of each specific resilient material assembly, listing adhesives, primers and sealers for subfloors as proposed for use in conjunction with resilient material of this Section. Manufacturer of specific resilient material shall state approval of materials to be used with his materials as listed in certification.

Submit certification from Manufacturer of adhesive for each resilient flooring assembly, approving all primers and sealers proposed for use on new and existing concrete subfloors.

Submit certification from Manufacturer of each resilient flooring material assembly, approving floor leveler and/or floor patch material proposed for use on concrete subfloors.

Submit certification from Manufacturers of each resilient flooring material assembly, approving dry-cleaner and approving non-alkaline cleaning solution proposed for use on resilient flooring.

Submit certification from Manufacturers of all resilient flooring material assemblies that products are sustainable FloorScore certified products.

Submit certification from Manufacturers of resilient flooring adhesives are FloorScore certified products.

PRODUCT HANDLING:

Store resilient flooring materials as packaged by Manufacturer, in undamaged condition, and with Manufacturer's seals and labels intact. Exercise care to prevent damage and freezing during delivery, handling, and storage. Store materials at Project site at least 24 hours to their installation.

ENVIRONMENTAL CONDITIONS:

Temperature: Materials and area in which materials are to be installed shall be maintained at following temperatures:

For at least 24 hours before installation of material, and continuing for at least 48 hours after installation, maintain temperature at not less than 70 degrees F. to not more than 90 degrees F.

Maintain minimum temperature of 55 degrees F after flooring is installed.

PROTECTION:

Close spaces to traffic in which all resilient flooring is being set and to other work until flooring is firmly set. Where solvent-based adhesives are used, provide safety spark-proof fans and operate. Natural ventilation is inadequate. Smoking shall be prohibited.

MAINTENANCE MANUALS: Provide 3 copies of maintenance manuals for all resilient flooring describing maintenance procedures.

PART 2: PRODUCTS

SMOOTHING AND LEVELING COMPOUND:

Smoothing and leveling compound, provide complete on all concrete subfloors scheduled for resilient flooring systems. Ardex SD-L or equivalent self-leveling product as approved by flooring Manufacturer.

MOISTURE BARRIER PRIMER/SEALER:

Moisture barrier primer/sealer, required for all concrete subfloors, shall be as recommended by adhesives and flooring Manufacturer.

ADHESIVES:

Provide high moisture level rated adhesive for all concrete subfloors, for cementing resilient flooring materials to sub-floors, as approved by flooring Manufacturer.

Low emitting adhesive for wall base shall be as recommended by base Manufacturer.

All adhesives VOC content shall be less than 50g/L when calculated according to 40 CFR 59, Subpart D (EPA method 24).

All adhesives shall comply with requirements of the South Coast Air Quality Management District (SCAQMD) Rule #1168.

VINYL COMPOSITION TILE (VCT):

Provide Vinyl Composition Tile (VCT) where indicated on Drawings.

Vinyl Composition Tile:

Provide 12 inch by 12 inch 1/8 inch thick, Class 2 thru chip color, Composition 1, Standard EXCELON by Armstrong World Industries.

Resilient flooring of each color and pattern selected in any one area shall be from same lot.

Colors and Patterns: Colors will be selected by the Architect from Manufacturer's full product lines (including premium colors). Up to three accent colors, may be selected in standard stripes, checkerboard, or block patterns as directed by Architect for each space.

Slip Retardant Resilient Tile Flooring:

Provide Slip-Retardant Tile where indicated on Drawings, and at all interior ramps.

Provide SAFETY ZONE™ Slip-Retardant Tile Flooring manufactured by Armstrong World Industries, Class 2 thru chip color , in minimum of 2 colors selected from manufacturer's standard colors, 1/8 inch, 12 inch x 12 inch, composed of polyvinyl chloride resin binder, plasticizers, fillers, pigment, and grit. Tile shall have a nominal 0.020 inch thick pattern layer containing aluminum oxide grit.

Slip retardant vinyl composition tile properties shall meet size, thickness, indentation, impact, deflection, dimensional stability, resistance to chemicals, squareness, and resistance to heat requirements of ASTM F 1066.

Slip retardant vinyl composition tile shall meet or exceed property ranges suggested by the American with Disabilities Act, and where an added measure of safety is desired.

RESILIENT BASE:

Provide Rubber Wall Base where indicated on Drawings.

100% Vulcanized Rubber Base:

ASTM F 1861, Type TS, Group 1

Set cove type on hard surface and carpet flooring, 1/8" thick, 4" high at all places. Manufacturer shall offer minimum of 30 standard colors for selection by Architect, Roppe Rubber Co. or equal. Vinyl or part vinyl composition is not acceptable.

Provide pre-molded external corners at external 90 degree shaped corners. Base may be formed with continuous runs around bullnose profiled corners.

Provide pre-molded internal corners.

Provide pre-molded end stops.

RUBBER TRANSITION / REDUCER EDGE STRIPS:

Provide complete terminations at all type flooring transitions; to include all perimeters and terminations of all flooring, such as rubber or PVC sports flooring to VCT or polished concrete, carpet to VCT, epoxy flooring to VCT, VCT or carpet to sealed or polished concrete. Vinyl profile thickness to account for actual flooring thicknesses.

Provide rubber transitions where non-level flooring surfaces meet or terminate. Must comply ADA Guidelines. Height to be coordinated with floor finishes thicknesses.

REDUCER STRIP: 1-1/4" wide with beveled edge, Johnsonite RRS-XX-D or equivalent. Color selected by Architect.

CARPET-TO-VCT TRANSITION STRIP: Johnsonite CTA-H adapter, or equivalent, color selected by Architect.

STAIR TREAD, RISER, STRINGER AND INTERMEDIATE LANDING TILE SYSTEM:

Rubber stairwell intermediate landings shall be Johnsonite or equivalent Landing Tiles with a .187 thick diamond surface, overall size 24" x 24", color to be selected from manufacturer's standard colors. Provide where indicated.

Where scheduled, provide raised profile one piece stair tread and riser combination, shall be Johnsonite or equivalent VIRTR (for visually impaired) with a 2" wide contrasting strip of carborundum at the nose of the tread. Treads to have a tapering thickness gauge of .210" to .153" across a 13" tread width with a 7" integral riser, with a square nose and 2" hinged drop to accommodate riser angle. Provide matching rubber stringers. Color and profile to selected by Architect.

STAIR TREAD NOSING:

At stair treads or floor risers receiving VCT, provide profile of nosing that applies to and conforms to the actual stair tread/riser profile, Roppe No. 1 Commercial Stair Nosing or equivalent. Apply rubber base to face of stair riser or floor to conceal face of riser surface.

PART 3: EXECUTION

CONDITION OF SURFACES:

Requirements: Surfaces to receive resilient flooring shall meet minimum requirements established by ASTM F 710-05 and Manufacturer of flooring. Do not start work until defects have been corrected.

Obtain Architect's representative inspection of substrate prior to application of adhesives and tiles. Do not start work or continue work until inspection items have been corrected.

Tolerances: Subfloor surfaces shall not vary more than ± 1/8" in any ten-foot dimension. Neither shall they vary at rate greater than 1/16" per running foot. Unacceptable conditions shall be corrected by General Contractor.

APPLICATION OF SMOOTHING AND LEVELING COMPOUND:

Apply to cover substrate completely, wall to wall. Pour mixed compound onto substrate and steel trowel and/or float to spread to manufacturer's product minimum thickness ranges. Upon full cure, sand off entire surface and vacuum all areas.

APPLICATION OF PRIMER/SEALER:

Apply moisture barrier primer/sealer to cover substrate completely. Apply at rate recommended by Manufacturer of resilient flooring.

APPLICATION OF ADHESIVE:

Mix and apply adhesive in accordance with Adhesive Manufacturer's installation instructions. Cover surface evenly with adhesive. Area covered by one application of adhesive shall not exceed maximum working area recommended by Manufacturer. Install resilient flooring within time limits recommended by Manufacturer. If adhesive films over or dries, it shall be removed and area shall be recoated.

INSTALLATION OF RESILIENT TILE FLOORING:

Lay resilient flooring true, level; and with tight, aligned joints, roll flooring in accordance with Manufacturer's directions to assume intimate contact and proper adhesion. Cut resilient flooring to and around permanent cabinets and fixtures.

Align joints with room axis. Center tile work between walls. Except as required in irregularly shaped spaces, no tile shall be less than one half tile width. Lay tile with grain in direction or pattern as directed by Architect.

Obtain Architect's representative inspection of installation during installation phases. Do not start work or continue work until inspection items have been corrected.

INSTALLATION OF BASE:

Cement base firmly to wall. Joints shall be tight. Base (throughout its entire length) shall have top and bottom edges in firm contact with walls and finish floors. Form 90 degree internal and external corners and end stops from preformed units. Scribe base accurately to trim.

INSTALLATION OF EDGE STRIPS:

Install edge strips as required at doors and at other locations to provide transition from all finish flooring types to other floor areas of dissimilar materials.

CLEANING:

Immediately upon completion of stairwell rubber tile and tread system, clean floors and adjacent surfaces with cleaner approved by Manufacturer. Remove surplus adhesive and other soiling. Rinse thoroughly with clean, cold water.

Stripping and Waxing:
After cleaning, strip to remove manufacturer's factory protectorant coat, and all stains and contaminants. Then wax and polish floors, minimum of 5 coats, with a high speed buffer, using wax recommended by School Maintenance Department. Inspect polished surfaces for defects underneath tiles, visible tile deformations, and replace defective tiles and re-wax and buff as required.

EXTRA STOCK: Furnish Owner 5% quantity in unopened boxes of tile of each color and pattern installed, to be used in maintenance replacements.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Industrial resinous flooring systems, with terminations, transitions, reducer strips.

B. Related Sections:

1. Section 07920 "Joint Sealants" for sealants installed at joints in resinous flooring systems.
2. Section 09650 Resilient Flooring, Rubber transitions/Reducer edge strips.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include manufacturer's technical data, application instructions, and recommendations for each resinous flooring component required.

B. Samples for Verification: For each resinous flooring system required, 6 inches square, applied to a rigid backing by Installer for this Project.

C. Product should match existing quality, surface texture and visual appearance of existing work.

D. Color Samples: Submit physical color samples for selection by Architect.

1.4 INFORMATIONAL SUBMITTALS

A. Installer Certificates: Signed by manufacturer certifying that installers comply with specified requirements.

B. Material Certificates: For each resinous flooring component, from manufacturer.

C. Material Test Reports: For each resinous flooring system.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For resinous flooring to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of flooring systems required for this Project.

1. Engage an installer who is certified in writing by resinous flooring manufacturer as qualified to apply resinous flooring systems indicated.

B. Source Limitations: Obtain primary resinous flooring materials, including primers, resins, hardening agents, grouting coats, and topcoats, from single source from single manufacturer. Provide secondary materials, including patching and fill material, joint sealant, and repair materials, of type and from source recommended by manufacturer of primary materials.

C. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials in original packages and containers, with seals unbroken, bearing manufacturer's labels indicating brand name and directions for storage and mixing with other components.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Comply with resinous flooring manufacturer's written instructions for substrate temperature, ambient temperature, moisture, ventilation, and other conditions affecting resinous flooring application.

B. Lighting: Provide permanent lighting or, if permanent lighting is not in place, simulate permanent lighting conditions during resinous flooring application.

C. Close spaces to traffic during resinous flooring application and for not less than 24 hours after application unless manufacturer recommends a longer period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis-of-Design Product: Subject to compliance with requirements, provide SoySTEP by Soy Resin Systems or pre-approved equivalent product.

2.2 MATERIALS

A. Epoxy should be approved under MIL-Spec MIL-D-24613 Type III and be 100% solids, non-toxic containing no solvents or thinners. ROCK to RESIN RATIO MUST BE LESS THAN 3LBS of AGGREGATE PER POUND OF EPOXY RESIN (EXCLUDING TOPCOAT).

B. Select the desired color patterns consisting of marble, silica sand and quartz.

C. Interior Adhesives and Sealants: Comply with and Meet SCAQMD #1168 and GS-36, adhesives and sealants do not contain carcinogen or reproductive toxicant components present at more than 1% of total mass as defined in the California Office of Environment Health Hazard Assessment's (OEHHA) list entitled "Chemicals Know to the Stat to Cause Cancer" or the Reproductive Toxicity, Safe Drinking Water and Toxic Enforcement Act of 1986 (PROPOSITION 65)

1. Laboratory Test Reports: For floor systems, submit documentation indicating that the products comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers".

2. Product Data for Liquid Applied Flooring Components: provide documentation including printed statement of VOC content. SoyPoxy – VOC Label must not exceed 45 g/l.

2.3 INDUSTRIAL RESINOUS FLOORING

A. Resinous Flooring: Abrasion-, impact- and chemical-resistant, industrial-aggregate-filled, resin- based, monolithic floor surfacing designed to produce a seamless floor and integral cove base.

B. System Characteristics:

1. Color and Pattern: SoySTEP by Soy Resin Systems
2. Wearing Surface: Orange-peel
3. Overall System Thickness: 1/8 inch

C. Body Coats:

1. Resin: SoyPoxy.
2. Formulation Description: 100 percent solids.
3. Application Method: Troweled.

a. Thickness of Coats: 1/8 inch.
b. Number of Coats: One.

4. Aggregates: Marble, Silica Sand and Quartz

D. Topcoat: Sealing or finish coats.

1. Resin: Urethane.
2. Formulation Description: Water based.
3. Type: Clear.
4. Finish: Epoxy.
5. Number of Coats: One.

E. System Physical Properties: Provide resinous flooring system with the following minimum physical property requirements when tested according to test methods indicated:

1. Compressive Strength: 17,800 psi after 7 days per ASTM C 579.
2. Adhesion Strength: ASTM-D-4541 >500 psi with 100% concrete failure.
3. Tensile Strength: 7,100 psi after 7 days per ASTM C 307.
4. Flexural Modulus of Elasticity: 10,000 psi after 7 days per ASTM C 580.
5. Coefficient of Linear Expansion: 2.5 x 10-5 per ASTM D-696.
6. Linear Shrinkage: ASTM C-531 <.02% Specifications for SoySTEP Flooring System
7. Water Absorption: <.2% per ASTM D-570.
8. Indentation: Shall not exceed 1 percent maximum per ASTM D-2794.
9. Impact Resistance: No chipping, cracking, or delamination per MIL-D-24613 ASTM D-2794>24,00 psi..
10. Abrasion Resistance: MIL-D-24613, MIL-STD-1623 42 mg ASTM C-501 18mg.
11. Temperature Resistance ASTM D-2794 150-200 F No visible softening, cracking or delaminating.
12. Flame Spread MIL-D-24613, MIL-STD-1623 PASSED ASTM E-84 <3 Class A Flammability ASTM D-570 Self Extinguishing Critical Rad Flux E-648 >1.07w/cm
13. Smoke Developed MIL-D-24613, MIL-STD-1623 PASSED Smoke Density ASTM E-662 <3.
14. Critical Radiant Flux: E-648 >1.07w/cm2.
15. Odor ASTM D-2794 Free from objectionable odors.
16. Weight ASTM D-2794 1.2 lbs/ft 2 @ 1/8”thickness.
17. Hardness: At 14 days Shore D 80 per ASTM D 2240.

F. Chemical Resistance

Chemical Resistance @ 25ºC (77ºF) after curing 7 days

Duration in weeks	1	2	4	8
Distilled water	+	+	+	+
Sea water	+	+	+	+
Sulfuric acid, 30%	+	+	+	+
Sulfuric acid, 70%	+	+	+	+
Hydrochloric acid, 10%	+	+	+	+
Hydrochloric acid, 20%	+	+	+	+
Acetic acid, 5%	+	+	+	+
Ammonia, 10%	+	+	+	+
Toluene	a	a	a	a
MIBK	a	a	a	a
Ethanol, 50%	a	d	d	d
Gasoline, high test	+	+	+	+
Pine oil	+	+	+	+

+ = Resistant Film thickness 12 – 16 mils
a = Affected Cure Schedule 7 days at 21ºC d = Destroyed Substrate, Sandblasted steel

G. Provide rubber transitions and/or reducer edge strips at transitions to adjacent floorings.

H. Patching and Fill Material: Resinous product of or approved by resinous flooring manufacturer and recommended by manufacturer for application indicated.

PART 3 - EXECUTION

3.1 PREPARATION

A. General: Prepare and clean substrates according to resinous flooring manufacturer's written instructions for substrate indicated. Provide clean, dry substrate for resinous flooring application.

B. Concrete Substrates: Provide sound concrete surfaces free of laitance, glaze, efflorescence, curing compounds, form-release agents, dust, dirt, grease, oil, and other contaminants incompatible with resinous flooring.

1. Repair damaged and deteriorated concrete according to resinous flooring manufacturer's written instructions.

2. Alkalinity and Adhesion Testing: Verify that concrete substrates have pH within acceptable range. Perform tests recommended by manufacturer. Proceed with application only after substrates pass testing.

C. Resinous Materials: Mix components and prepare materials according to resinous flooring manufacturer's written instructions.

D. Use patching and fill material to fill holes and depressions in substrates according to manufacturer's written instructions.

E. Treat control joints and other nonmoving substrate cracks to prevent cracks from reflecting through resinous flooring according to manufacturer's written instructions.

3.2 APPLICATION

A. General: Apply components of resinous flooring system according to manufacturer's written instructions to produce a uniform, monolithic wearing surface of thickness indicated.

1. Coordinate application of components to provide optimum adhesion of resinous flooring system to substrate, and optimum intercoat adhesion.
2. Cure resinous flooring components according to manufacturer's written instructions. Prevent contamination during application and curing processes.
3. At substrate expansion and isolation joints, comply with resinous flooring manufacturer's written instructions.

B. Vertical Application:

C. Integral Cove Base: Apply cove base mix to wall surfaces before applying flooring. Apply according to manufacturer's written instructions and details including those for taping, mixing, priming, troweling, sanding, and topcoating of cove base. Round internal and external corners.

1. Integral Cove Base: **6 inches** high.

D. Apply troweled body coats at 1/8” for flooring system. Hand or power trowel to fill voids. When cured, remove trowel marks and roughness using method recommended bymanufacturer.

E. Apply topcoats in number indicated for flooring system and at spreading rates recommended in writing by manufacturer.

F.

G. Install rubber transitions and/or reducer edge strips at transitions to adjacent floorings.

3.3 PROTECTION

A. Protect resinous flooring from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by resinous flooring manufacturer.

END OF SECTION 09671

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this Section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Furnishing and installing all carpet scheduled on Drawings and specified in this Section. All carpet specified shall be manufactured with a static control system which reduces static generation below generally accepted sensitivity threshold of 3.0 kilovolts tested 20% relative humidity at 70 degree F. by "Shuffle" test.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

CRI Green Label Plus

South Coast Air Quality Management District

LEEDS SC, U. S. Green Building Council

PRODUCTS:

Manufacturers:

Lee's "Faculty Remix" modular carpet tiles

SUBMITTALS:

Manufacturer's Data: Submit for approval three copies of folder containing complete manufacturer's data and installation procedures for all materials to be used in work of this Section of specifications.

Samples: Submit for approval sample of each color carpet specified in squares at least 18"x 24".

Shop Drawings: Submit seam layout, diagramming location of all cuts, seams, rubber edge strips, and other pertinent installation details. Do not install carpet before receipt of written approval of Architect.

Guarantee: Submit written lifetime non-prorated guarantee to Owner, Architect, and General Contractor. Guarantee shall provide for replacement of all carpet installation, failing as result of faulty workmanship or materials, and shall explicitly include seam raveling. Carpet replacement shall be done at Owner's convenience and at no extra cost to Owner. Warranty to include replacement labor costs.

Lees/Mohawk Lifetime warranty terms:

1. Wear: Lifetime of carpet. No more than ten percent (10%) face yarn loss.
2. Static: Lifetime of carpet.
3. Edge Ravel: Lifetime of carpet. Guaranteed no edge ravel in normal use.
4. Delamination: Lifetime of carpet. Guaranteed no delamination in normal use
5. Tuft Bind: Lifetime of carpet. Guaranteed not to zipper, wet or dry.

Certificate of Compliance: Submit to Architect with Shop Drawings, certificate, stating that carpet and allied products fully meet requirements of these specifications.

Submit certification from Manufacturers that carpet products are CRI Green Label Plus certified products, listing all applicable LEED credits made available by certification.

Submit certification from Manufacturers that carpet adhesives are CRI Green Label Plus certified products, listing all applicable LEED credits made available by certification.

PRODUCT HANDLING:

Deliver carpet to Project site in manufacturer's original protective wrapping.

Store carpet in area conditioned to temperature of areas scheduled to receive carpet.

PART 2: PRODUCTS

MATERIALS:

Direct Glue Down:

All materials shall be new and of domestic manufacturer. Carpet shall all be first quality. When, due to size, different dye lots are to be used, their location shall be approved by Architect.

MOHAWK GROUP MODULAR TILE; COOLY NOTED BT336:

CONSTRUCTION: Premium Grade, Textured Patterned Loop pile

TRAFFIC CLASSIFICATIONS: Heavy, Education
GAUGE: 1/12 (47 rows per 10 cm)
STITCHES PER INCH: 11.6 per inch
TUFTED WEIGHT: 17 oz/sq. yd.
DYE METHOD: Solution Dyed / Yarn Dyed
WIDTH: 24” x 24”

FACE YARN: ColorStrand Nylon with DuraTech Soil Protection

FIBER: 100% Dupont, Type 6.6 Antron ColorStrand Nylon, with Mohawk/Lee's permanent "Duracolor" Stain Resistance System and DuraTech Soil Protection by DuPont.

PILE THICKNESS: .145” average

BACKING SYSTEM: Lees ICT – Fiberglass Reinforced Thermoplastic Composite Tile – Pile tufts cast into molten thermoplastic resin, passing 20 lb. tuft bind test, carries lifetime non-prorated guarantee for edge ravel, back adhesion, and tuft bind.

Bonding Agent: 100% Renewable Bio-Based Resource (no latex or urethanes)

STATIC RESISTANCE: 3.5 KV or less under Standard Shuffle Test Method 70 degrees Fahrenheit.

COLOR: Cooly Noted, Sea Breeze

FLAMMABILITY RATING:

1. Shall pass Methenamine Pill Test DOC-FF1-70.
2. Steiner Tunnel Test/ASTM-E-84:
   Flame Spread: 45
   Fuel Contributed: 35
   Smoke Density: < 450 Flaming Mode, NBS Smoke Chamber NFPA-258
   N.F.P.A. Class 1, ASTM E-648 glue down test
3. Critical Radiant Flux Test/ASTM-E-648, NFPA 253, and FTM 372.
   Critical Radiant Flux: 0.22 or greater

ACCESSORIES:

Low Emitting Adhesives: Waterproof, non-flammable carpet adhesive recommended and approved by carpet manufacturer in writing for compatibility with carpet backing. All floor sealers, seam sealers, and adhesives shall contain no calculated solvents per OSHA Regulation 29 CFRE 1910.1200, have no calculated VOC's, be non-flammable (flame spread of 25 or less), and meet the criteria of the CRI Green Label Plus Certification Program. MSDS and samples required on product used.

Protection Paper: Fortifiber Corporation "Seekure 892", or approved heavy, reinforced, non-staining kraft laminated paper.

Low emitting seam adhesive shall be Lees Unibond Wet Set Adhesive.

Provide manufacturer’s extruded aluminum carpet stops, rubber reducer strips and rubber transition strips. Provide where carpet terminates at adjacent hard-surface floor finishes, concrete, terrazzo, and resilient flooring systems.

Apply moisture barrier primer/sealer coating to all existing concrete floor slab substrates complete. Moisture barrier primer/sealer, required for all existing concrete subfloors, shall be as recommended by adhesives and flooring Manufacturer.

Miscellaneous Materials: As recommended and approved in writing by manufacturer of carpet, and selected by Flooring Contractor to meet project circumstance and requirements.

ENVIRONMENTAL ATTRIBUTES – LEED Criteria

Environmental claims by manufacturer must comply with FTC guidelines.

Environmentally Preferred Product – Carpet must have third party certification (such as Scientific Certification Systems) in accordance with Executive Order 13101 as an Environmentally Preferred Product (EPP).

Rapidly Renewable Bio-based Materials: Carpet must contain a minimum 10% bio-based rapidly renewable material based on total product weight.

Carpet Face Yarn: In accordance with Executive Order 13101, carpet face yarn must be third party certified as an Environmentally Preferred Product (EPP).

Low Emitting Materials: Carpet and all installation components including adhesives, sealers, seam welds and seam sealers must meet the *Low Emitting Materials* standards as outlined in U.S. Green Building Council LEED criteria. Carpets should pass the CRI Green Label Plus Program in terms of VOC emissions. Adhesives must meet VOC emissions standards per South Coast Air Quality Management District Rule #1168.

End of Life Reclamation: Carpet must have an existing methodology actively in place to achieve landfill diversion. Refer to Section 3.03 of this section for specific requirements for reclamation of material.

PART 3: EXECUTION

CONDITION OF SURFACES:

Proper Surfaces: Inspect all surfaces to which carpet is scheduled to be installed. Do not start work until unsatisfactory conditions have been corrected. Starting of work in any area shall constitute acceptance of surface conditions. Carpet Contractor shall be held responsible for satisfactory installation.

INSTALLATION: (General)

Submit complete carpet mfg.'s installation instructions for approval by Architect. Carpet installation shall be supervised by a representative of the carpet mfg.

Install carpet with least seaming possible and with seams located parallel to line of traffic, where practical.

Except as otherwise approved on submitted shop drawings, all seams shall be made so that pile of adjoining pieces has same directional run, and so that seam is practically undetectable.

Cut neatly all openings in carpet for floor outlets and cover plates. Cut to minimum size, permitting cover-up by floor fixture.

SEAMING REQUIREMENT
In addition to the requirements and recommendations of the Carpet Manufacturer, the following criteria shall be adhered to:

1. Installation layout shall enable future replacement, especially in large open areas and traffic paths.
2. No carpet tile pieces smaller than 6” in width or length shall be used.
3. Seams occurring at doors of different types of carpet shall be parallel to closed door, and be centered directly under the closed door.

INSTALLATION: (Direct Glue Down)

All floors must be free of any foreign substance such as wax, oils, paint, etc. All cracks or irregularities must be smoothed with a latex base underlayment. Underlayment must be dry thoroughly before carpet is installed.

All carpeted areas shall be completely covered with an even coat of adhesive. Adhesive shall be spread with notched trowel (notches, 1/8" wide, 1/8” deep and spaced 1/8" apart) or equivalent.

All exposed edges of carpet that abut an adjacent floor surface of a different level shall be trimmed with edge stop as specified, securely fastened into subfloor.

All seams shall be trimmed filled in a workmanlike manner and shall be bonded at the time of installation with seam adhesive. This adhesive shall be applied to the cut edge of the carpet at the level of the carpet backing.

Where scheduled, carpet areas shall have a 4" high cove base.

CLEANING AND PROTECTION:
At completion of installation, carpet contractor shall clean up all debris, unusable scraps, and leave areas clean. Submit scraps to review by Architect for possible use as future replacement items.

Vacuum carpet using two motor, top loading, upright commercial machine with brush-only element, utilizing a high filtration dust bag. Remove spots in accordance with carpet manufacturer’s guidelines and replace carpet where spots cannot be removed. Remove any protruding face yarn using sharp scissors, including all loose yarns or fibers at all seams.

Following cleaning and vacuum, carefully protect the carpeting from soiling and damage until final acceptance. Protection shall be accomplished by using approved protection paper. Edges shall be lapped 6 inches and secured with non-asphaltic tape. Covering shall be kept in repair and damaged portions replaced during the construction and move-in period.

Carpet determined by the Architect to be inadequately cleaned and not restored to like new condition or damaged due to inadequate protection, will be rejected and replaced.

MAINTENANCE MATERIALS:
Deliver 5% quantity, usable, uncut carpet tiles to Owner's designated storage space, properly packaged and identified. Dispose of smaller pieces as construction waste.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

SCOPE

This specification covers labor, materials, equipment, and application necessary for, and incidental to, the complete and proper installation of intumescent fire protection for application to steel structures and supports in accordance with all applicable requirements of contract documents.

This specification shall be supplemented by the applicable requirements of building codes, insurance rating organizations and all other authorities having jurisdiction.

SECTION INCLUDES

Intumescent fire protection material.

Topcoat protective decorative finish.

RELATED SECTIONS

Section 05120 - 05313: Structural Steel, Joists, and Decking.

Section 07256: Sprayed-On Fireproofing.

Section 09900: Painting.

REFERENCES

ULI – List of Equipment and Materials.

Intertek Testing Services/Warnock Hersey Certification Listing.

Test Standards:

A. ANSI/UL 263 (ASTM E119 and NFPA 251) – Fire Tests of Building Construction and Materials.
B. ASTM E84 – Surface Burning characteristics of Building Materials.
C. ANSI/UL 1709 – Rapid Rise Fire Tests of Protection Materials for Structural Steel.

Steel Structures Painting Council (SSPC) Surface Preparation Standards.

Material manufacturer’s current published information.

SYSTEM DESCRIPTION

The intumescent fire protection materials shall be applied at the required thickness to provide the fire resistance ratings for structural elements indicated on the drawings, per ITS or ULI Testing (columns and roof structure, 1 and 2 hour minimum).

SUBMITTALS

Manufacturer's Data: Submit manufacturer's specifications, including certification as may be required to show material compliance with contract documents.

Test Data: Submit certified copies of test designs from nationally certified testing laboratory verifying for protection applied to substrates and tested in accordance with Reference 1.4.3.A. and B.

Application Instructions: Submit manufacturer's application instructions.

QUALITY ASSURANCE

Manufacturer – Company specializing in manufacturing products of this section.

Applicator – A firm with expertise in the installation of fire protection or similar materials. This firm shall be approved by the fire protection material supplier.

Product – The product shall be approved be the architect and applicable authorities having jurisdiction.

DELIVERY, STORAGE AND HANDLING

Deliver materials to the project in manufacturer's unopened packages, fully identified as to trade name, type, and other identifying data. Packaging shall bear the ULI or ITS labels and seals for fire resistance ratings.

Store materials at a temperature above 40 degrees F (4 degrees C) in a dry location, protected from the weather.

Damaged packages found unsuitable for use and any materials which have come into contact with contaminants prior to use shall be rejected and removed from the project.

PROJECT/SITE CONDITIONS

When the temperature at the job site is less than 40 degrees F a minimum substrate and ambient temperature of 40 degrees F shall be maintained prior to, during, and a minimum of 24 hours after application. If necessary for job schedule, the General Contractor shall provide enclosures and heat to maintain proper temperatures and humidity levels in the application areas.

The General Contractor shall provide normal and or mechanical ventilation to allow proper drying of the intumescent and to ensure that a safe working area is achieved, during and after application.

In enclosed areas, ventilation shall not be less than 3 complete air exchanges per hour.

Intumescent fire protection shall not be applied until concrete toppings and or roofing applications have been installed, excluding steel columns to receive intumescent enclosed in CMU walls.

Relative humidity shall not exceed 80% throughout the total period of application and drying for the intumescent fire protection material, and must not exceed 80% throughout the application and drying for the protective decorative finish coat.

SEQUENCING AND SCHEDULING

Applicator shall cooperate in the coordination and scheduling of fire protection work to avoid delays in job progress.

The installation of piping, ducts, conduit, or other suspended equipment shall not commence until the application of the sprayed fire protection is complete in that area.

PART 2 – Products

PRIMER

Primer shall be approved by the manufacturer and applied in full accordance with the primer manufacturer's written instructions. Coordinate with steel fabricator prior to primer application on steel.

INTUMESCENT FIRE PROTECTION SYSTEM

The intumescent fire protection shall be Nullifire S606 as provided by Carboline Company, St. Louis, MO., or approved equivalent. Tested in ULI designs:

X632 W-shape columns
X633 Tube columns
X634 Pipe columns

The intumescent fire protection for all exterior areas shall be Nullifire S605 exterior grade, specifically formulated and tested for exterior exposure, as provided by Carboline Company, St. Louis, MO., or approved equivalent. Tested in ULI in designs:

X630 Tube columns

Intumescent fire protection material shall be applied in accordance with drawings and/or specification, and shall have been tested in accordance with ASTM E-119 in the Underwriter's Laboratory, Inc. and listed by U.L.I., and tested in accordance with REF. 1.4.3 A and B. 9 or equivalent nationally certified testing laboratory or Warnock Hersey. ULC is not acceptable.

TOPCOAT DECORATIVE COATING

Topcoat materials shall be as required for color-coding, aesthetics or additional surface protection, as supplied by Carboline Company, St. Louis, MO., or approved equivalent products meeting all compatibility requirements the approved intumescent products and tested in ULI assemblies.

No topcoats may be applied until qualified independent testing laboratory and AHJ has inspected and accepted installation.

PART 3 – Execution

PREPARATION

All surfaces to receive fire protection material shall be clean, dry, and free of oil, grease, loose mill scale, dirt, dust, or other materials, which would impair bond of the fire protection material to the surface. Any cleaning of the surfaces to receive fire protection material shall be the responsibility of the General Contractor or steel erector, as outlined in the structural steel section.

Confirm compatibility of surfaces to receive fire protection material. Steel surfaces shall be primed with a compatible primer recommended by the fire protection material manufacturer.

All unsuitable substrates must be identified and made known to the General Contractor and corrected prior to the application of the fire protection material.

The application of fire protection material shall not commence until certification has been received by the General Contractor that all surfaces to receive fire protection material have been inspected by the applicator and are acceptable to receive fire protection material.

Provide masking, drop cloths, or other suitable coverings to prevent over spray onto surfaces not intended to be sprayed.

APPLICATION

Application of intumescent fire protection shall not begin until the General Contractor is notified by the applicator that surfaces to receive fire protection have been inspected and are acceptable.

Equipment and application shall conform to the manufacturer's written application instructions.

The fire protection material shall be applied in sufficient thickness to achieve the required fire resistance rating with as many passes as necessary.

The fire protection material and the topcoat decorative finish shall be applied by spray, brush, or roller in shop or field.

Topcoat shall be applied according to the manufacturer's recommendations.

Proper temperature and ventilation shall be maintained as specified in 1.9.

MOCK UP

Before proceeding with the work, the applicator shall apply the fire protection material to a section as a mock up. This section shall be witnessed by the architect's or owner's representative and shall be subject to their approval to be used as a guide for texture, and thickness of the finish work.

CLEAN UP AND REPAIR

The work area shall be maintained in an orderly condition.

After the completion of work, equipment shall be removed and all surfaces not to be sprayed shall be cleaned to the extent previously agreed to by the applicator and the General Contractor.

Upon completion of installation, all excess material, over spray, dropping and debris shall be cleared and removed from the job site.

All patching of and repair to fire protection material , due to damage by other trades, shall be performed under this section and paid for by the trade responsible for the damage.

INSPECTION AND TESTING

In addition to continuous wet film thickness checks performed by the applicator during application, the installed intumescent shall be inspected by a qualified independent testing laboratory for thickness in accordance with the Steel Structures Painting Council (SSPC) Dry Film Thickness Testing.

The results of the above tests shall be made available to all parties at the completion of each area and approved prior to the application of topcoat.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Extent of painting work is shown on drawings and schedules, and as herein specified.

The work includes painting and finishing of all interior and exterior exposed items and surfaces throughout project, except as otherwise indicated.

Surface preparation, priming and coats of paint specified are in addition to shop-priming and surface treatment specified under other sections of work.

"**PAINT**" as used herein means all coating systems materials, including primers, emulsions, enamels, stains, sealers and fillers, and other applied materials whether used as prime, intermediate or finish coats.

Paint all exposed surfaces, unless otherwise noted, whether or not colors are designated in "schedules", except where natural finish of material is specifically noted as a surface not to be painted. Where items or surfaces are not specifically mentioned, paint same as adjacent similar materials or areas. If color or finish is not designated, Architect will select these from standard light colors available for materials systems specified. Where indicated, "accent" colors are medium to deep shades, which shall require no more than one additional paint coat.

Following categories of work are not included as part of field-applied finish work, or are included in other sections of these specifications.

Shop Priming: Unless otherwise specified, shop priming of ferrous metal items is included under various sections for structural steel, miscellaneous metal, hollow metal work, and similar items. Also, for fabricated components such as architectural woodwork, wood casework, and shop-fabricated or factory-built mechanical and electrical equipment or accessories.

Pre-Finished Items: Unless otherwise indicated, do not include painting when factory-finishing or installer finishing is specified for such items as (but not limited to) metal toilet enclosures, prefinished partition systems, acoustic materials, architectural woodwork and casework, finished mechanical and electrical equipment including light fixture, switchgear and distribution cabinets, elevator entrance frames, doors and equipment.

Do not paint over any code-required labels, such as Underwriters' Laboratories and Factory Mutual, or any equipment identification, performance rating, name, or nomenclature plates.

SUBMITTALS:

Product Data: Submit manufacturer's technical information including paint label analysis and application instructions for each material proposed for use.

Samples: Submit samples for Architect's review of color and texture only. Provide a listing of material and application for each coat of each finish sample.

On 12"x12" hardboard, provide sample of each color and material, with texture to simulate actual conditions. On CMU face shell, provide sample of each color and material, with texture to simulate actual

conditions Resubmit samples as requested by Architect until acceptable sheen, color, and texture is achieved.

Wall Mockup: Paint 10'x10' section of wall with permanent lighting illumination for Architect's review and approval, prior to ordering paint materials.

Epoxy Paint Product Data: Epoxy paint manufacturer shall provide documentation that the epoxy product is tested and approved for application in such locations and for application on the surface material that is being used, and use is in compliance 2012 NC Building Code Sections 1210.2 and 1210.3; and in compliance with 2012 Plumbing code Sections 419.3 and 417.4.1 for providing smooth, hard non-absorbent surfaces adjacent to urinals and water closets and shower heads.

DELIVERY AND STORAGE:

Deliver materials to job site in original, new and unopened packages and containers bearing manufacturer's name and label, and following information:

- Name or title of material
- Fed. Spec. number, if applicable
- Manufacturer's stock number and date of manufacturer
- Manufacturer's name
- Contents by volume, for major pigment and vehicle constituents
- Thinning instructions
- Application instructions
- Color name and number

JOB CONDITIONS:

Apply water-base paints only when temperature of surfaces to be painted and surrounding air temperatures are between 50 degrees F (10 degrees C) and 90 degrees F (32 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Apply solvent-thinned paints only when temperature of surfaces to be painted and surrounding air temperatures are between 45 degrees F (7 degrees C) and 95 degrees F (35 degrees C), unless otherwise permitted by paint manufacturer's printed instructions.

Do not apply paint in snow, rain, fog or mist; or when relative humidity exceeds 85%; or to damp or wet surfaces; unless otherwise permitted by paint manufacturer's printed instructions.

Painting may be continued during inclement weather if areas and surfaces to be painted are enclosed and heated within temperature limits specified by paint manufacturer during application and drying periods.

PART 2: PRODUCTS

COLORS AND FINISHES:

Color Pigments: Pure, non-fading, applicable types to suit substrates and service indicated.

Paint Coordination: Provide finish coats which are compatible with prime paints used. Review other sections of these specifications in which prime paints are to be provided to ensure compatibility of total coatings system for various substrates.

Federal Specifications establish minimum acceptable quality for paint materials. Provide written certification from paint manufacturer that materials provided meet or exceed these minimums.

Provide undercoat paint produced by same manufacturer as finish coats. Use only thinners approved by paint manufacturer, and use only within recommended limits.

EXTERIOR PAINT SYSTEMS:

A. GALVANIZED METAL - (G60 Galvanized Steel; including Structural Steel Columns, Beams, Miscellaneous Structural Steel Members, Miscellaneous Steel Framing, Miscellaneous Stair & Ornamental Iron excluding treads, Catwalks excluding steel bar grating and treads, Fire Escapes, Hydrants). Note: G90 hot-dipped galvanized surfaces shall not be painted.

1. Acrylic Systems

a. Gloss Finish

i. Surface Preparation: Refer to Part 3 Surface Preparations of these specifications for Cleaning & Testing/Evaluations; Manufacturer's guidelines and recommendations stand as requirements of this work.

ii. 1st Coat: S-W Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)

iii. 2nd Coat: S-W Sher-Cryl HPA High Performance Acrylic, B66-300 Series (10 mils wet, 4 mils dry film thickness)

iv. 3rd Coat: S-W Sher-Cryl HPA High Performance Acrylic, B66-300 Series (10 mils wet, 4 mils dry film thickness)

B. METAL - (Shop Primed Metal Doors and Frames/ Panels, etc.)

1. Acrylic Systems

a. Gloss Finish

i. Surface Preparation: Manufacturer's guidelines and recommendations stand as requirements of this work

ii. 1st Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series

iii. 2nd Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series (4 mils wet, 2 mils dry per coat)

C. EXTERIOR BRICK WATERPROOFING - (Apply to Existing Exterior Brick Masonry where indicated on Drawings)

1. Silane/Siloxane Penetrating Water Repellant Sealer Systems

a. Transparent / No Gloss Finish

i. Surface Preparation: Manufacturer's guidelines and recommendations stand as requirements of this work

ii. 1st Coat: W. R. Meadows INTRAQUARD Silane/Siloxane Sealing compound (50 sq. ft. per gallon)

iii. 2nd Coat: W. R. Meadows INTRAGUARD Silane/Siloxane Sealing compound (50 sq. ft. per gallon)

INTERIOR PAINT SYSTEMS

A. MASONRY/CONCRETE - (Walls & Ceilings, Concrete Beams, Concrete Roof Decks, Poured Concrete, Precast Concrete, Unglazed Brick or Block CMU, Cement Board)

1. Acrylic Enamel Systems

a. Semi-Gloss Finish

i. 1st Coat: Loxon Block Surfacer, LX01W0200 (tinted and rolled in to fill all pits and pores completely, 16 wet mils, 8.8 dry mils).

ii. 2nd Coat: S-W Pro-Classic Waterborne Acrylic, B31-1100 Series

iii. 3rd Coat: S-W Pro-Classic Waterborne Acrylic, B31-1100 Series (4 mils wet, 1.3 mils dry per coat)

B. WET AREAS - (All Food Service Area walls, Toilets and Restrooms CMU walls, Gypsum Board Walls and Ceilings, All Shower Wall and Ceilings, High Moisture Areas). NOTE: Epoxy paint manufacturer shall provide documentation that the epoxy product is tested and approved for application in such locations and for application on the surface material that is being used.

1. Epoxy Systems

a. Gloss Finish

i. 1rst Coat for Existing Walls Oil Based Painted: S-W Extreme Bonding Primer, B51W00150 (3.1 mils wet, 0.9 mils dry)

ii. 1st Coat New CMU: S-W Loxon Block Surfacer, LX01W0200 (tinted and rolled in to fill all pits and pores completely, 16 wet mils, 8.8 dry mils).

iii. 1st Coat Gyp. Bd.: S-W ProMar 200 Zero VOC Latex Primer, B28W02600 (4 mils wet, 1.0 mils dry)

iv. 2nd Coat: S-W Water Based Catalyzed Epoxy, B73-300 Series (8 mils wet, 4 mils dry)

v. 3rd Coat: S-W Water Based Catalyzed Epoxy, B73-300 Series (8 mils wet, 4 mils dry)

C. CONCRETE FLOORS – (Auditorium Floors, Shop Floors, Utility Equipment Platforms, Custodial Spaces, Stairwells, Electrical Equipment Rooms, Boiler Rooms).

1. Urethane Systems

    a. Gloss Finish (gray pigment)

        i. 1st Coat: Pressure wash, and SSPC prep

        ii. 2nd Coat: S-W Armorseal Rexthane I, B65-60 Series (3.0 – 4.5 mils wet, 2.0 – 3.0 dry)

        iii. 3rd Coat: S-W Armorseal Rexthane I, B65-60 Series (3.0 – 4.5 mils wet, 2.0 – 3.0 dry), (shop floors with anti-slip additive)

D. METAL – (Structural Steel Columns, Joists, Trusses, Beams, Miscellaneous Structural Steel Members, Miscellaneous & Ornamental Iron, Sashes, Doors, Door Frames, Partitions, Cabinets, Lockers, Radiators, Wall Louvers, Pumps, Motors, Machines, Convectors, Ducts [Ventilating], Electrical Raceways & Conduits, Elevator Cabs, Copper, Non-Galvanized Metal)

1. Acrylic Systems

    a. Semi-Gloss Finish

        i. 1st Coat: S-W Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)

        ii. 2nd Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series

        iii. 3rd Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series (4 mils wet, 2 mils dry per coat)

2. Dryfall Alkyd Systems (EXPOSED CEILINGS; Structure, Ceilings, Ductwork, Conduits, where Scheduled)

    a. Flat Sheen Finish

        i. 1st Coat: S-W Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)

        ii. 2nd Coat: S-W Waterborne Acrylic Dry Fall, B42BW3 (9.0 mils wet, 3.5 mils dry)

        iii. 3rd Coat: S-W Waterborne Acrylic Dry Fall, B42BW3 (9.0 mils wet, 3.5 mils dry)

E. METAL - (Galvanized)

1. Acrylic Systems

    a. Gloss Finish

        i. Surface Preparation: Refer to Part 3 Surface Preparations of these specifications for Cleaning & Testing/Evaluations; Manufacturer's guidelines and recommendations stand as requirements of this work.

        ii. 1st Coat: Pro-Cryl Universal Primer, B66-310 Series (10 mils wet, 4.0 mils dry film thickness)

iii. 2nd Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series

iv. 3rd Coat: S-W Pro Industrial Multi-Surface Acrylic, B66-500 Series (4 mils wet, 2 mils dry per coat)

F. NON-TEXTURED SMOOTH DRYWALL (Walls, Ceilings, Gypsum Board, Wood Pulp Board, Plaster Board, Etc.)

1. Acrylic Enamel Systems

a. Semi-Gloss Finish (UNLESS NOTED OTHERWISE)

b. FLAT SHEEN WHITE for drywall prosceniums, bulkheads, overhead drywall ceilings

c. Base Coat: SHEETROCK Brand First Coat (drywall finishing surface coat for equalizing textures, coordinate with 09250)

i. 1st Coat: S-W Premium Wall & Wood Primer, B28W08111 (4 mils wet, 1.6 mils dry)

ii. 2nd Coat: S-W Pro-Classic Waterborne Acrylic, B31-1100 Series

iii. 3rd Coat: S-W Pro-Classic Waterborne Acrylic, B31-1100 Series (4 mils wet, 1.3 mils dry per coat)

G. CANVAS PIPE WRAP (exposed to view)

1. Latex Systems

a. Flat Finish

i. 1st Coat: S-W PrepRite 200 Latex Primer, B28W200 (add fungicidal agent) (4 mils wet, 1.2 mils dry)

ii. 2nd Coat: S-W ProMar 200 Latex Flat B30W200 Series (4 mils wet, 2 mils dry)

iii. 3rd Coat: S-W ProMar 200 Latex Flat B30W200 Series (4 mils wet, 2 mils dry)

J. BONDING PRIMER (Does not apply to existing or new “Spectraglaze” block): (Interior Hard, Slick, Glossy Surfaces such as Existing Oil Based Wall Paint, Existing Painted CMU, PVC Piping, Plastics, Glass, Laminate, Aluminum, Varnished Woodwork, Ceramic Wall Tile, Glazed Block, Fluoropolymer Coatings)

1. Acrylic Systems

b. S-W Extreme Bonding Primer, B51W00150 (3.1 mils wet, 0.9 mils dry)

PART 3: EXECUTION

INSPECTION:

Applicator must examine areas and conditions under which painting work is to be applied and notify Contractor in writing of conditions detrimental to proper and timely completion of manner acceptable to Applicator.

Starting of painting work will be construed as Applicator's acceptance of surfaces and conditions within any particular area.

Do not paint over dirt, rust, scale, grease, moisture, scuffed surfaces, or conditions otherwise detrimental to formation of a durable paint film.

SURFACE PREPARATION:

General: Perform preparation and cleaning procedures in accordance with paint manufacturer's instructions, SSPC-SP, and as herein specified, for each particular substrate condition.

SSPC-SP: Steel Structures Paint Council Surface Preparation Specification

Clean surfaces to be painted before applying paint or surface treatments. Remove oil and grease prior to mechanical cleaning. Program cleaning and painting so that contaminants from cleaning process will not fall onto wet, newly-painted surfaces.

Wood: Clean wood surfaces to be painted. Remove dirt, oil, or other foreign substances with scrapers, mineral spirits, and sandpaper, as required. Sandpaper smooth those finished surfaces exposed to view, and dust off. Scrape and clean small, dry, seasoned knots and apply a thin coat of white shellac or other recommended knot sealer, before application of priming coat. After priming, fill holes and imperfections in finish surfaces with putty or plastic wood-filler. Sandpaper smooth when dried.

Ferrous Metals: Clean ferrous surface, which are not galvanized or shop-coated, of oil, grease, dirt, loose mill scale and other foreign substances by solvent or mechanical cleaning.

Touch-up shop-applied primed coats wherever damaged or bare, where required by other sections of these specifications. Clean and touch-up with same type shop primer.

Galvanized Surfaces:

Hot-Dipped Galvanizing: Allow hot-dipped galvanized items to weather 6 months prior to surface preparations, and then steam clean per SSPC-SP 1. Do not use hydrocarbon solvents, vinegar or other mild acids for cleaning hot dipped galvanized surfaces. After cleaning, perform spot testing for any manufacturer’s pre-treatments, using the procedure from ASTM D2092, Method B201, Volume 06.01. After pre-treatments testing, apply 2’ x 2’ paint test patch for evaluation of paint surface adhesion. Evaluate the adhesion at three locations of the surface area, by performing a tape adhesion test per ASTM Method D3359. Grade the tape adhesion of the coating by following ratings as set forth in ASTM D3359-97.

Galvalume: Clean free of grease, oil, dirt, soil, and other surface contaminants with hydrocarbon free solvent cleaner. Perform a light brush blasting per SSPC-SP7 if necessary. After cleaning, apply 2’ x 2’ paint test patch for evaluation of paint surface adhesion. Evaluate the adhesion at three locations of the surface area, by performing a tape adhesion test per ASTM Method D3359. Grade the tape adhesion of the coating by following ratings as set forth in ASTM D3359-97.

Special Food Service Area Wall Preparation: Special preparation will be required to assure that required Food Service area CMU wall surfaces are pointed and patched is in strict accordance with the drawing’s CMU surface preparation General Notes for on-site approval by local Health Department. All work resulting from inspection comments and requirements are to be provided at no additional cost.

Previously Coated Surfaces:
Maintenance painting will frequently not permit or require removal of old coatings prior to repainting. However, all surface contaminants such as oil, grease, loose paint, mill scale, dirt, foreign matter, rust, mold, mildew, efflorescence, and sealers must be removed to assure sound bonding to the tightly adhering old paint. Glossy surfaces of old paint films must be clean and dulled, and/or sanded before repainting. Thorough washing with an abrasive cleaner will clean and dull in one operation, or wash thoroughly and dull by sanding. Spot prime any bare areas with appropriate primer. Adhesion to existing glossy surfaces may require bonding primers.

Adhesion Testing: Check for adhesion by applying a test patch of the recommended coating system, covering at least 2 to 3 square feet. Allow to dry one week before testing adhesion per ASTM D3359. If the coating system adhesion fails, report findings to Architect. Provide bonding primers where adhesion testing has failed or is in question.

Existing Stained Wood:
Wood must dry and cleaned of dirt, grease, wax, polish, and marks. Old finishes in poor condition should be completely removed and the surface treated as a new surface. Sand wood to a smooth surface with 100-120 grit paper. Remove sanding dust with a vacuum or tack cloth. Avoid sanding wood that has only stain on it, sanding will remove some of the stain creating an uneven appearance. Sand down bare spots and scratches, and stain to match adjacent color. Very lightly scuff sand between finish coats, 180 grit paper or finer, removing any raised graining. Perform adhesion testing, identifying any presence of any sanding sealer, which can prevent bonding and cause peeling.

SURFACE RESTORATIONS

Existing surfaces requiring restoration, including but not limited to existing steel door frames or existing window frame surfaces, require total surface cleaning complete, down to bare sound metal, in accordance with the applicable SSPC method required, and then surfaces immediately primed with applicable primer coats in DFT thicknesses required, prior to further ensuing work sequences; i.e. finish paint coats, re-glazings, frame preparations for hardware.

In addition to the Part 3 SURFACE PREPARATIONS specified, removal of all rust from existing surfaces may require sand blasting. Adhere to sandblasting requirements complying with 02070 Selective Demolition.

Once metal sections have been cleaned of all corrosion, small holes, depressions, and uneven areas resulting from rusting are to be filled with a patching material and sanded smooth to eliminate pockets where water can accumulate, and primed coated. Patching material shall be of high content steel fibers in an epoxy binder, similar to industrial steel repair or auto body patching materials

LEAD-BASED PAINT RENOVATION, REPAIR, AND PAINTING:

Applicators who perform painting renovations in housing or child occupied facilities built before 1978 must be certified by the Health Hazards Control Unit (HHCU). All work shall comply with requirements as published by the EPA Lead-Based Paint Renovation, Repair and Painting Rule in the Code of Federal Regulations.

Samples: For determining whether components are free of lead-based paint, certified applicators may collect paint chip samples and submit samples to a laboratory recognized by NLLAP for analysis. Required paint chip samples documentation shall be prepared and maintained by the certified applicator for three years.

MATERIALS PREPARATION:

Mix and prepare painting materials in accordance with manufacturer's directions.

Stir materials before application to produce a mixture of uniform density, and stir as required during application. Do not stir surface film into material. Remove film and, if necessary, strain material before using.

APPLICATION:

General: Apply paint in accordance with manufacturer's directions. Use applicators and techniques best suited for substrate and type of material being applied.

Apply additional coats when undercoats, stains or other conditions show through final coat of paint, until paint film is of uniform finish, color and appearance, and complete hide. Give special attention to insure that surfaces, including edges, corners, crevices, welds, and exposed fasteners receive a dry film thickness equivalent to that of flat surfaces.

Special Food Service Area Wall Application: Roll-in two coats of masonry block filler coating in Food Service areas as necessary to completely fill all pits and pores prior to application of top coats. Final finished topcoat in Food Service areas to be free of all pits and pores, with a smooth completely washable surface. Apply additional coats when final coat of paint does not uniformly fill all pits and pores. Provide all work described as necessary to obtain an on-site approval by local Health Department.

Finish exterior doors on tops, bottoms and side edges same as exterior faces, unless otherwise indicated.

Sand lightly between each succeeding enamel or varnish coat.

Omit first coat (primer) on metal surfaces which have been shop-primed and touch-up painted, unless otherwise indicated.

Mechanical and Electrical Work: Painting of mechanical and electrical work is limited to those items exposed in occupied spaces.

Completed Work: Match approved samples for color, texture and coverage. Remove, refinish or repaint work not in compliance with specified requirements.

CLEAN-UP AND PROTECTION:

Clean-Up: During progress of work, remove from site discarded paint materials, rubbish, cans and rags at end of each work day.

Upon completion of painting work, clean window glass and other paint-spattered surfaces. Remove spattered paint by proper methods of washing and scraping, using care not to scratch or otherwise damage finished surfaces.

Protection: Protect work of other trades, whether to be painted or not, against damage by painting and finishing work. Correct any damage by cleaning, repairing or replacing, and repainting, as acceptable to Architect.

Provide "Wet Paint" signs as required to protect newly-painted finishes. Remove temporary protective wrappings provided by others by protection of their work, after completion of painting operations.

At the completion of work of other trades, touch-up and restore all damaged or defaced painted surfaces.

EXTRA STOCK:

Furnish extra paint in manufacturer's sealed shipping containers. Provide one gallon for each type and color of paint applied in the project. Containers shall only be opened by the painter manufacturer/supplier to formulate required colors/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:

1. Paint Manufacturer
2. Product name and number
3. Mixing and color formulation
4. Painting contractor
5. Date that the paint container is put in the Owner's inventory
6. Room or area number where the paint applied was used

END OF SECTION

RELATED DOCUMENTS:

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

VINYL WALL COVERINGS:

Manufacturers:

- Koroseal
- MDC
- Genon

Vinyl Wall Coverings: Provide for corridor display boards and/or as indicated on drawings.

- Total weight 21 ounces minimum per linear yard of 54" material
- Type II, CCC-W-408A
- Fire resistance: Shall be Class A Rated for both Flame Spread and Smoke Developed. Shall pass ASTM E84 Tunnel Test.

Acoustical Wall Coverings: Provide for display cases and/or as indicated on drawings.

- Total weight 23 ounces minimum per linear yard of 54" material
- Tensile strength: Shall meet or exceed ASTM-D-1682, Warp: 100 lbs., Fill: 120 lbs.
- Tear strength: Shall meet or exceed ASTM D-2261, Warp: 23 lbs., Fill: 27 lbs.
- Composition: 100% Solution Dyed Polyester Staple fiber.
- Fire resistance: Shall be Class A Rated for both Flame Spread and Smoke Developed. Shall pass ASTM E84 Tunnel Test.

Acoustical Performance: Shall meet or exceed NRC ASTM C-423, .20 over gypsum wallboard.

Architect may select from complete manufacturer's line of products, in colors, textures, and patterns.

Job Conditions: Maintain constant minimum temperature of 60 degrees F (16 degrees C) at areas of installation for at least 72 hours before and 48 hours after installation. Remove wrappings from wall coverings and allow to acclimatize to areas of installation for at least 24 hours before installation.

ACCESSORY ITEMS:

- Adhesive/Primer/Sealer: As recommended in writing by manufacturer of wall covering for use with particular substrate and wall construction detailed; mildew-resistant and non-staining to wall covering.
- Release Coat: Oil base sealer or enamel undercoater for drywall.

PREPARATION:

Remove wall plates and surface-mounted fixtures in areas where wall covering manufacturer's instructions; apply release coat to gypsum drywall.

INSTALLATION:

Place wall covering panels consecutively in order cut from rolls; hang by reversing alternate strips except on match patterns.

Apply adhesive in accordance with manufacturer's recommendations; install seams plumb and not less than 6" from corners; horizontal seams not permitted.

Trim selvages as required to assure color uniformity and pattern match; overlap seams and double-cut for tight closure.

Install wall covering with intimate substrate bond, smooth, clean, and without wrinkles, gaps, and overlaps.

Remove excess adhesive promptly, using clean sponge and warm water; replace panels which cannot be completely cleaned.

Replace wall plates and fixtures removed to permit wall covering installation; verify cut edges of wall covering completely concealed.

END OF SECTION

PRELATED DOCUMENTS:

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

ART 1: GENERAL

DESCRIPTION OF WORK:

Extent of chalkboards, markerboards, and tackboards is shown on drawings.

Types of chalkboards, markerboards, and tackboards specified in this section include the following:

- Liquid Markerboards
- Vinyl Faced Natural Cork Tackboards

QUALITY ASSURANCE:

Manufacturer: Unless otherwise acceptable to Architect, furnish all markerboards and tackboards by one manufacturer for entire project.

Surface Burning Characteristics: Provide tackboard surfaces which are identical in composition to those with surface burning characteristics indicated below, as determined by testing in compliance with ASTM E 84. Use only tackboards which are labeled and listed by a testing and inspection agency acceptable to authorities having jurisdiction.

Flame Spread: Not more than 25

Smoke Developed: Not more than 25

SUBMITTALS:

Product Data: Submit manufacturer's technical data and installation instructions for each material and component part, including data substantiating that materials comply with requirements.

Samples: Submit full range of color samples for each type of chalkboard, tackboard, trim and accessories required. Provide 12" square samples of sheet materials and 12" lengths of trim members for color verification after selections have been made.

Shop Drawings: Submit for each type of markerboard and tackboard. Include sections of typical trim members and dimensioned elevations. Show anchors, grounds, reinforcement, accessories, and installation details.

SPECIALTY PROJECT WARRANTY:

Warranty on Porcelain Enamel Markerboards: Provide written warranty, signed by manufacturer, agreeing to replace, within the lifetime of the original installation, porcelain enamel markerboards which do not retain original writing and erasing qualities, defined to include surfaces which become slick and shiny, or exhibit crazing, cracking, or flaking; provide manufacturer's instructions for handling, installing, protecting and maintaining markerboards have been adhered to during the warranty period. Replacement is limited to material replacement only and does not include labor for removal and reinstallation.

Warranty Period: Life of original installation

PART 2: PRODUCTS

ACCEPTABLE MANUFACTURERS:

Available Manufacturers: Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include the following:

Manufacturers Markerboards and Tackboards:

- Claridge Products and Equipment
- PolyVision
- Greensteel, Inc.

MATERIALS:

Markerboards:

24 gauge porcelain enamel steel with 3.5 - 4.5 mil surface deposition, fired onto steel sheet at no less than 1500 degrees Fahrenheit. Reflectance no more than 20% and no less than 15%. Core to be ½" particleboard with aluminum moisture retardant backer sheet. Shall accept dry erase felt tip marker, grease pencil, ball point pens, pencils, and crayons, and can be cleaned with a damp cloth. Permanent marker may be removed with a mild solvent. Equivalent to Claridge "LCS24 Markerboard" – Color No. 32 LCS White

Vinyl Faced Tackboards:

Self-healing, mildew resistant textured vinyl over single layer 1/4" thick, seamless compressed cork sheet, face sanded for natural finish, complying with MS MIL-C15116, laminated to ¼" hardboard.

TRIM AND ACCESSORIES:

General: Fabricate frames and trim of not less than 0.062" thick aluminum alloy, size and shape as indicated, to suit type of installation. Provide straight, single-length units wherever possible and keep joints to minimum. Miter corners to neat, hairline closure.

Markerboard Trim: Claridge Products "Series I", 1 ½" wide frame trim, or equivalent.

Tackboard Trim: Claridge Products,5/8 " trim, or equivalent.

Retrofit Closure Trims: Claridge Products extruded aluminum closure trims, size as required to suit condition.

Aluminum Finish: Furnish exposed aluminum trim, accessories and fasteners with the following finish:

Clear Anodized Finish: Manufacturer's standard satin anodized finish with clear anodic coating complying with AIA requirements for Class II Architectural Coating (AA-A31).

Field-Applied Trim: Provide one of the following types:

- Slip-on trim, to eliminate grounds.

- Screw-on trim, with Phillips flat-head screws.

Chalkboards and Markerboards: Furnish continuous aluminum chalk troughs for each chalkboard, unless otherwise indicated, as follows: Solid extrusion box profile, manufacturer's standard ribbed section, with cast aluminum end caps.

Map Rail: Furnish map rail at top of each unit, unless otherwise indicated, with the following accessories for each map rail:

- Display Rail: Continuous cork approximately 2" wide, integral with map rail.
- End Stops: One at each end of map rails.
- Map Hooks: 2 for each 4' of map rail or fraction thereof.
- Flag holder: One for each room furnished.

FABRICATION:

Assembly: Provide factory-assembled chalkboard and tackboard units unless field-assembled units indicated.

Make joints only where total length exceeds maximum manufactured length. Fabricate with minimum number of joints, balanced around center of board, as acceptable to Architect.

Provide manufacturer's standard vertical joint system between abutting sections of chalkboard.

Provide mullion trim at joints between chalkboard and tackboard.

PART 3: EXECUTION

INSTALLATION:

Install units in locations and mounting heights as shown on drawings and in accordance with manufacturer's instructions, keeping perimeter lines straight, plumb, and level. Provide all grounds, clips, backing materials, adhesives, brackets, anchors, trim, and accessories for complete installation.

ADJUST AND CLEAN:

Verify accessories required for each unit are properly installed.

Clean units in accordance with manufacturer's instructions, breaking in only as recommended.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall include but is not limited to: provide and install all building interior and building exterior signs, exterior building letters, dedication plaques and to provide for the purchase of building equipment as determined by the Owner. Signs, plaque, shelving and equipment indicated to be purchased and installed with the allowance specified in 01056 Allowances, to include tax and freight, but not to include labor or installation, except as specifically stated below. Signs and equipment shall be installed by the Contractor in accordance with manufacturer's recommendations.

Equipment Platform egress ladder signage is not part of this allowance. Construction of masonry yard sign is not a part of this allowance. Project sign, site directional and parking signs are not part of this allowance.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

SUBMITTALS:

Manufacturer's Data: Submit for approval three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work.

PART 2: MATERIALS

PRODUCTS: (final total list of equipment to be final approved by the Owner)

Interior Signage: Interior signage panels shall be solid one-piece 1/8" thick thermoformed acrylic materials, raised ADA tactile copy, graphics and grade II braille, attached to walls with (4) screws each, at ADA compliant height. Provide Lucent Series one-piece thermoformed acrylic by Best Sign Systems or equivalent by Mohawk Signs.

Dedication Plaque (installed): Cast aluminum.

Wood Storage Shelving: Pre-Manufactured Wood Storage shelving for custodial and storage spaces, per Section 10445 Storage Shelving.

Athletic Laundry Equipment (PROVIDED BY OWNER): (2 PAIR REQUIRED IN LAUNDRY 263)
Belco Athletic Laundry Washer/Extractor - Model 60 and Belco Gas Athletic Laundry Dryer/Tumbler - Model 50, mounted on 6" steel mounting base, installed per manufacturer's recommendations. Provide where indicated on Drawings. As manufactured and distributed by BELCO Athletic Laundry Equipment Company (866) 543-6061

PART 3: EXECUTION

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION:

Install signs in accordance with Manufacturer's printed instructions and Shop Drawings, with four (4) screws, approved by Architect. Signs to be located with leading edge 10" from pull edge of door, center 60" above floor.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

Install all equipment per processed product submittals and written manufacturer’s installation instructions.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, General Requirements, and Division 1 specifications, that apply to the work specified in this section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide and install all pre-manufactured wood storage shelving, and other items not specifically described, as indicated on Drawings. Purchase and install shelving with Sections 01056 and 10440 Allowances

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

SUBMITTALS:

Manufacturer's Product Data: Submit for approval three (3) copies of folder containing complete Manufacturer's detailed product data and installation procedures for storage units to be used in work of this Section. Indicate unit construction including finishes.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work. Indicate locations, materials, thickness of parts, location and type of hardware, methods of assembly and jointing, and finishes.

Take measurements at the site for space where each item is to be placed.

PART 2: MATERIALS

PRODUCTS:

Pre-Manufactured Wood Storage Shelving:

Excalibur Shelving Systems by Palmetto Shelving Systems, Inc. (803) 781-9955; 84” high heavy duty wood shelving units (installed) – 16”, 18” and 24” widths, lengths as indicated on Drawings, 750 lb. load capacity.

A. Uprights: Hemlock or Douglas Fir (1-5/8" x 1-5/8")

    1. 3/8" x 5/8" deep plow entire length of stiles to receive shelf end channels with 3/16" drilled holes on 1" centers. Uprights to be sufficient height for shelving to be 7"-0" high
    2. Stiles are to be locked together with three or more cross members mortised glued and pinned into the stiles
    3. All components are to be machined smooth with all outside corners eased.

A. Shelves: Not less than 3/4" pine shelf materials are to be machined to accept roll formed steel end channels shaped to fit over each end of the shelf and to rest on the shelf support pins. Finger joints are not acceptable.

    1. Seven (7) shelves per section

C. Shelf Support Pins: Non rusting alloy, 3/16" diameter x 1-1/4" long, 5/16" diameter head.

D. "X" Braces: Two 18 gauge galvanized 3/4" steel straps with holes punched at each end. Rivet straps at centers. One "X" brace required every three (3) sections.

E. Back Panels: All back-to-back units for book storage to have 1/8" Abitibi S2S tempered hardboard back panels.

F. Kickboard: Provide a 4" pine kickboard for each unit.

F. Finish: Factory seal & lacquer (site finish is not acceptable)

G. Shelving shall be manufactured for wall-to-wall fit, as indicated on Drawings. Gaps in excess of 2” are not accepted.

H. Where dead corners are indicated on Drawings, solid end panels and closure panels will be required. Brace anchor all wall units.

I. Shelves shall not exceed 36” in length, and no less than ¾” thick.

DELIVERY, STORAGE AND PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation. Deliver storage units only after building is enclosed and wet operations in building are completed.

Protect finished surfaces from soiling and damage during handling and installation.

PART 3: EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

Field measure at site for space where each item is to be placed.

INSTALLATION:

Install shelving in accordance with Manufacturer's current printed instructions and Shop Drawings, approved by Architect.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

Install all shelving per processed product submittals and current written manufacturer’s installation instructions. Brace anchor all wall units.

END OF SECTION

RELATED DOCUMENTS

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

PART 1 - GENERAL

DESCRIPTION OF WORK

A. Extent of metal lockers is shown on Drawings.
B. Types of products in this section include the following:
    1. Athletic lockers.
        a. Double-tier fully ventilated lockers, fully welded.
        b. Accessories shall include:
            1) Metal filler panels.
            2) 16 gauge (min.) sloping tops

C. Provide necessary quantity of Accessible lockers per the local accessibility codes having jurisdiction.
D. Concrete base for lockers is specified in Division 3.
E. Any additional material not specifically mentioned, but necessary to provide a complete assembly and a completed installation shall also be included.

QUALITY ASSURANCE

A. Uniformity: Provide each type of metal locker as produced by a single manufacturer, including necessary mounting accessories, fittings, and fastenings for a complete assembly.

SUBMITTALS

A. Product Data: Submit manufacturer's technical data and installation instructions for metal locker units.
B. Product Data: Submit manufacturer's technical data, product data, surface preparation and paint application instructions for refurbishing existing metal locker units.
C. Samples: Submit color samples on squares of same metal to be used for fabrications of lockers.
D. Samples: Submit refurbishing paint color samples on metal chips to be used for refurbishing of existing lockers.
E. Shop Drawings: Submit shop drawings for metal lockers, verifying dimensions affecting locker installations. Show lockers in detail, method on installation, fillers, trim, base, and accessories. Include locker numbering sequence information. Shop drawings should clearly indicate the material being supplied and showing all gauges according to the enclosed specifications.
F. Sample combination locks.
G. Sample Lockers: Build mock-up sample locker of each type required, present sample for review and approval by Architect and Owner prior to fabrication.

JOB CONDITIONS

A. Do not deliver metal lockers until building is enclosed and ready for locker installation. Protect from damage during delivery, handling, storage, and installation.

PART 2 - PRODUCTS

A. Acceptable Manufacturers

1. Manufacturer: subject to compliance with specified requirements, provide products of one of the following: (All athletic full ventilated lockers must contain a 14 gauge diamond perforated welded door with full box stiffeners.
   a. De Bourgh Mfg. Co. – De Bourgh Core Athletic with three point latching.
   b. List Industries, Inc, - Superior Fully-Framed All Welded P.E. and Team Athletic Lockers
   c. Other interested suppliers must have prior written approval.

B. Materials:
1. Size:
   a. Locker Rooms:
      1) Double tier (72”), 12” wide, 12” depth, fully ventilated, fully welded, sloped tops.
2. Sheet Steel: Mild cold-rolled and leveled steel, free from buckle, scale, and surface imperfections.
3. Expanded Metal: 1/2” mesh flattened carbon steel, 13 gage minimum.
4. Fasteners: Cadmium, zinc, or nickel plated steel: exposed bolts heads, slotless type; self-locking nuts or locker washers for nuts on moving parts.
5. Equipment: Hooks and hang rods of cadmium-plated or zinc-plated steel or cast aluminum.
6. Athletic locker bodies, frame / vertical Side panels: Shall be of 13 gauge ½” flattened expanded metal framed by 16 gauge Hollow "T" tubular sections and channel frame members designed to enclose all four edges of the side panel with the entire assembly MIG welded to form a rigid frame for each locker. The channel frame members are welded to the front and rear vertical frame members to create and anchor bearing surface of 1-1/4 inches wide x the depth of the locker at each side panel.
7. Backs: Shall be 18 gauge cold rolled sheet steel, be continuous to cover a multiple framed unit and be welded to each vertical side panel frame member.
8. Doors shall be all welded construction and fabricated from single sheet prime 14 gauge with single bends at top and bottom and double bends at the sides. The channel formed by the double bend at the latch side is designed to fully conceal the lock bar. The door shall close on a 16 gauge frame member with closure strike the full height of the door and shall fit flush with the outside of the frame. No parts shall be proud of frame. The latching mechanism shall be finger lift control type constructed of 14 gauge (minimum) steel with a nylon cover that has a generous finger pull. Lock bar shall be hot dip galvanized and installed after paint to ensure proper paint coverage and lock bar operation. Spring activated nylon slide latches shall be completely enclosed in the lock channel allowing doors to close with the lock in the locked position. Locking devise shall be designed for use with either built-in combination locks or padlocks. Latch hooks shall be 11 gauge (minimum) with riveted bumpers and shall be MIG welded to vertical frame member. Doors to be perforated with 5/8” x 1-1/2” diamonds.
9. Athletic lockers shall be padlock latching with three point latch mechanism.
10. Provide two rubber door grommets on the lock side of the frame.
11. Seamless Drawn Locker Handle: All doors shall have a seamless drawn, not less than 304 stainless steel, recessed handle shaped to receive a padlock or built-in combination lock. The recessed handle shall be deep enough to have the lock be completely flush with the outer door face.
12. Hinges: Heavy-duty, not less than 0.050” thick steel, full-loop, tight pin, piano type hinge. Weld to inside of frame and secure to door completely concealed and tamperproof when door is closed.
13. Provide recessed number plates. Plates shall be numbered as directed by the Architect. Plates shall be mechanically fastened.
14. Single-Tier Locker shall have a shelf located approximately 14” below the top. Single-Tier and Double-Tier locker compartment shall have 3 zinc-plated round tipped metal coat hooks, attached to locker body.
15. Equipment: Furnish each locker with one galvanneal hat shelf, one double prong ceiling hook and a minimum of two single prong hooks.
16. Integral Frame Locker base: 14 gauge formed structural channels are MIG welded to the front and rear vertical side panel frame members to allow placement of locker bottom a minimum 2-3/4" above floor level. Locker bottom shelf located less than 2” above floor level will not be acceptable.

17. Sloped Tops: Shall be formed of one piece of 16 gauge cold rolled sheet steel and shall be an integral part MIG welded to each vertical side panel frame member and be continuous to cover the full width of a multiple framed locker unit.
18. Finish: All locker parts to be cleaned and coated after fabrication with a seven stage zinc/iron phosphate solution to inhibit corrosion, followed by a coat of high grade custom blend powder electrostatically sprayed and baked at 350 degrees Fahrenheit for a minimum of 20 minutes to provide a tough durable finish.
19. Colors: Color to be selected by Architect from manufacturer's standard list of colors. Two-Tone Color Combination: Shall be at no additional cost with the locker body, frame and trim chosen from one color and the doors may be one of any other color chosen from manufacturers standard selection.
20. Acoustical Treatment: Provide construction treatment designed to significantly reduce noise of locker operation, including protected sound-absorbing material within door, nylon or plastic coatings on operating components to prevent metal-to-metal contact, and latching mechanism designed to operate without rattling.

C. FABRICATION, GENERAL

1. Construction: Fabricate lockers square, rigid, and without warp, with metal faces flat and free of dents or distortion. Grind exposed welds flush and make all exposed metal edges safe to touch. Weld frame members and bodies together to form rigid, one-piece structure. Do not expose bolts or rivet heads on fronts of locker doors or frames. Assembly of locker bodies by means of bolts, screws, or rivets will not be permitted. Welding of knockdown type locker construction is not acceptable.

D. PORTABLE WOODEN LOCKER ROOM BENCHES

1. Provide portable 9 ½” w x 1 ¼” (72” long and 96” long per plans) thick laminated select maple movable non-fixed benches, Model BFA-09XX distributed as by Schoollockers.com, or equivalent models by DeBourgh or List Industries Superior. Length as shown on Drawings, with extra heavy duty corners and heavy duty trapezoidal shaped anodized aluminum 14 inch wide base. Holes in base bottom for an anchoring option. Bench edges and corners shall be rounded and finish shall be two factory applied coats clear lacquer sealer.

E. WARRANTY

1. Provide warranty guaranteeing the locker finish, paint cracking, flaking, peeling, blistering and chipping not due to normal wear and tear.
2. Lifetime Warranty: Provide warranty guaranteeing against all defects in materials and workmanship excluding finish, damage resulting from deliberate destruction and vandalism under this section for the lifetime of the facility.

*END OF SECTIO*N

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Provide fire extinguisher cabinets and extinguishers as shown on drawings and specified herein. Provide cabinets for all extinguishers except as noted.

QUALITY ASSURANCE:

Manufacturers: Fire extinguisher cabinets and extinguishers of following manufacturers, which meet all requirements of these Specifications and approved equal products by other manufacturers, will be acceptable for use on this Project:

- Norris Industries
- J. L. Industries
- Larsen's Mfg. Co.

SUBMITTALS:

Shop Drawings: Submit to Architect in quadruplicate Shop Drawings for approval of all items specified herein in accordance with General Conditions.

PART 2: PRODUCTS

Fire Extinguisher cabinets shall be "Clear Vu Series" model 1536G25, semi-recessed, with full clear acrylic bubble door and SAF-T-LOK feature, Fire Rated at fire-rated walls, white powder coated steel tub, stainless steel door and trim finish, as manufactured by JL Industries or approved equal. Cabinet shall accommodate and include a 10 pound, Class ABC extinguisher unless otherwise noted.

Furnish 10 pound, Class ABC extinguishers with wall mount bracket in each Custodian Room, equivalent to Cosmic 10E extinguisher.

Furnish 10 pound, Class ABC extinguishers with wall mount bracket on each Equipment Platform where indicated.

Furnish 1.8 gallon Class K extinguishers in cabinets in Kitchen, equivalent to Saturn 15 extinguisher in model 2536G25 cabinet.

Furnish one (1) 5 pound, Halon extinguisher in each Computer Lab and/or each Electronics Lab, equivalent to Mercury 5 extinguisher.

Furnish one (1) each 10 pound, Class BC extinguishers with wall mount bracket in Electrical and Boiler/Mechanical Rooms, no cabinet, equivalent to Galaxy 10 extinguisher.

PART 3: EXECUTION

INSTALLATION:

Install fire extinguisher cabinets in accordance with Manufacturer's written instructions, Catalog Cuts approved by Architect, and location pre-approved by local fire official.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 GENERAL

1.1 SUMMARY

A. Section includes: Pre-engineered and pre-finished extruded aluminum walkway covers, canopies, and sun shade awnings.

B. Related Sections:
   1. 03100-Concrete Forms and Accessories
   2. 03300-Cast-in-Place Concrete

1.2 SYSTEM DESCRIPTION

A. Design Requirements:

   1. Columns, beams, decking with flat soffit and trim shall be aluminum extrusions. Structural framing shall consist of heli-arc welded, one-piece rigid bents and bolt connected members] with interlocking deck sections secured by screws.
   2. Walkway canopies shall be self-draining from deck through bents to discharge point at ground level as shown on Drawings.
   3. Wall supported sun shade awnings shall be self-draining from deck out a built-in outer corner side discharge scupper.
   4. Building Code: IBC and North Carolina Building code current editions.
   5. Design Loads:
      a. Comply with Building Code for site location.
      b. Collateral Loads: Additional loads imposed by other materials or systems identified in contract documents.
   4. Structural Design: Prepare complete structural design calculations and detailed design for canopy members and foundations. Provide to Architect within 45 days of Contract Award to General Contractor and coordinate structural work as required with Architect.

1.3 SUBMITTALS

A. Reference Section 01330-Submittal Procedures; submit following items:
   1. Product data.
   2. Shop Drawings: Layout and erection drawings showing roof framing, deck panels, cross sections and trim details clearly indicating proper assembly, foundation design, with Structural Design Calculations,
   3. Samples: Color selection samples consisting of actual coating material or anodizing process on aluminum extrusions.
   4. North Carolina regulatory review approval: Structural design and calculations sealed by a structural engineer registered to practice in the state of North Carolina.
   5. Quality Assurance/Control Submittals:
      a. Qualifications: Letter certifying manufacturer’s required qualifications.
      b. Structural Design: Calculations sealed by a structural engineer registered to practice in the state of North Carolina.
      c. Complete design and detail drawings for canopy and foundations.
      d. Manufacturer’s Installation Instructions.

1.4 QUALITY ASSURANCE

A. Overall Standards: Structural engineering design documents shall be certified and sealed by a structural engineer registered to practice in the state of North Carolina.

B. Qualifications:
   1. Manufacturer Qualifications: Minimum ten years experience in producing covers/canopies with welded bents and of the type specified.
   2. Installer Qualifications: Minimum five years experience in erecting covers/canopies of the type specified. Installations shall be in accordance with manufacturer's shop drawings.

1.5 DELIVERY STORAGE AND HANDLING

A. Reference Section 01660-Product Storage and Handling Requirements.

B. Follow manufacturer's instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

A. Manufacturer / Basis of Design: Mapes Company (Super Lumideck with Flat Soffit system for canopies)

Equivalent products from the following manufacturers are acceptable. Reference AIA A701 Instructions To Bidders - Product Substitution Procedures.

Perfection Architectural Systems, Inc.
E.L. Burns Co., Inc.
Superior Metal Products
Peachtree Protective Covers

2.2 MATERIALS

A. Aluminum Extrusions: 6063 alloy, T-6 temper.

B. Grout: 1 part portland cement, 3 parts masonry sand; 2,000 psi (13.8 MPa) compressive strength.

C. Foam Block-Outs: Rigid foam blocks sized as required for column embedment depth and shape.

2.3 COMPONENTS

A. Columns:
   1. Radius-cornered aluminum tubular extrusions [of size shown on Drawings] [as required by structural engineering design].
   2. Grout Key: Provide two 1 ½ inch (38 mm) diameter holes in column base, one each in opposite sides.
   3. Provide clear acrylic protection coat on surfaces in contact with grout.

B. Beams: Open top aluminum tubular extrusions as required by structural engineering design.

C. Deck: Rigid-Roll-Lock extruded aluminum, 2 ¾" extruded .018" self-flashing, interlocking sections with flat soffit, as required by structural engineering design.
   1. Provide welded endplate water dams where sections terminate at other than drainage channels.

D. Hanger Rods: Powder coated to match canopy awning. Sized and attached as shown in drawings and as required by structural engineering design.

E. Fascia: Provide manufacturer's standard extruded aluminum fascia and gutter sections as shown on Drawings and as required to complete the installation resulting in a neat finished appearance.

F. Flashing: Aluminum sheet, thickness as recommended by manufacturer for specific condition.

G. Conduit Cover: Extruded aluminum pre-finished continuous cap. Anchored down to the roof deck upper section to provide a continuous watertight enclosure for routing of electrical conduits and concealed weather protected roof deck penetrations.

2.4 ACCESSORIES

A. Fasteners:
1. Deck Screws: No. 14 x 1 inch (25 mm), self tapping, Type 18-8 stainless steel with neoprene washer.
2. Trim Screws: No. 10 x ½ inch (13 mm), self tapping, Type 18-8 stainless steel.

2.5 FABRICATION

A. Shop Assembly: Fabricate cross beams and columns for field assembled bolted connections.

2.6 FINISH

A. Finish on all exposed components shall be a Fluoropolymer Coating: 70 percent PVDF resin based fluoropolymer, AA-C-12C-42R-1, selected from manufacturer's standard colors by Architect, comply with AAMA605.

B. Color: Clear Anodized

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine footings in which bents will be set and building surfaces to which canopy will connect. Verify footing locations, details and elevations comply with shop drawings.

B. Coordinate with responsible entity to perform corrective work on unsatisfactory footings or surfaces.

C. Commencement of work by installer is acceptance of existing conditions.

3.2 ERECTION

A. Erect canopy in accordance with manufacturer's installation instructions.

B. Set bents plumb, straight and true to line, adequately braced to maintain position until grout has cured.

3.3 CLEANING

A. Clean surfaces soiled by work as recommended by manufacturer.

B. Remove surplus materials and debris from the site.

3.4 PROTECTION

A. Protect finished aluminum surfaces from damage due to subsequent operations through final acceptance by the Owner.

END OF SECTION

PART 1: GENERAL

1.01 RELATED DOCUMENTS:

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.02 SUMMARY:

A. This section shall include the furnishing of all tools, equipment, and labor necessary for the following systems:

1. Manually operated, accordion folding partition - Classroom Subdividing.

B. Manufacturer shall furnish operable walls complete with hardware, tracks, hanger rods, stack jamb, soffits, soffit guide rails and all necessary mechanisms to provide complete operation.

1.03 WORK BY OTHERS:

A. All supporting structures and members at head and jambs; track enclosures including sound insulation, sound baffles, trim and finishing of same.

B. Any preparing of and/or punching of the support structures.

C. Preparation of the opening shall be by the General Contractor. Any changes to the project site conditions, contrary to the reviewed shop drawings, shall be brought to the attention of the Architect.

1.04 SYSTEM PERFORMANCE REQUIREMENTS:

A. Acoustical Performance: Operable panel systems shall have been tested by a qualified independent testing agency in a full scale opening (14 feet by 9 feet) for laboratory sound transmission loss performance according to ASTM E90-81, determined by ASTM E413 and shall be rated:

1. Classroom Dividing Accordion Folding Partition – not less than STC 42

B. Field sound performance shall have been tested on an actual field installation by an independent certified acoustical consultant in accordance with ASTM E336 and shall have achieved no less than a .70 NRC. A written test report by the acoustical consultant shall be furnished to the Architect upon request.

1.05 SUBMITTALS:

A. General: Submit the following according to the Conditions of the Contract and Division 1 Specification Sections.

Product Data on physical characteristics, durability and surface burning characteristics for each type of operable panel partitions system specified.

Shop Drawings showing location and extent of all operable panel partitions systems. Include plans, elevations, method of attachment to building structure, conditions at openings with wall thickness and materials, typical and special details of construction, location and installation requirements for hardware and operators, and all accessory items.

Template drawings prepared by the operable partition manufacturer showing location of items supported by or anchored into the building structure and wherever attachment occurs.

B. Samples for initial selection purposes in the form of manufacturers color charts showing a full range of colors, textures and patterns available for each type of panel finish indicated on the shop drawings.

C. Acoustical test report certificates indicating that the operable panel partition systems have been tested by an independent acoustical testing agency and comply with the specified minimum STC ratings.

1.06 QUALITY ASSURANCE:

A. Installer Qualifications: Engage an experienced Installer who is certified in writing by the operable panel partition manufacturer as qualified to install the manufacturer's partition systems specified herein.

B. Surface Burning Characteristics: Provide panel finish faced with the following surface burning characteristics as determined by testing identical products per ASTM E84 by UL or other testing and inspecting agencies acceptable to authorities having jurisdiction.

Flame Spread: 25 or less

Smoke Developed: 450 or less

1.07 DELIVERY, STORAGE, AND HANDLING:

A. Deliver materials to project site in original factory wrappings and containers.

B. Store panels on edge, blocked off ground to prevent sagging and warping, in original undamaged packages. Store panels in an enclosed, climatized environment. Panels shall be protected from weather, moisture, soiling, extreme temperatures and humidity.

C. Comply with instructions and recommendations of manufacturer for special delivery, storage, and handling requirements.

1:08 WARRANTY:

Partitions and suspension system shall be guaranteed against defects in materials and workmanship for one year.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS:

The operable acoustical folding partition systems specified herein are based on product as manufactured by Panelfold, Inc. Subject to complete and total compliance with this specification, the following manufacturers are also acceptable:

A. Accordian Folding Partitions (at Rooms and Classrooms being subdivided, as indicated on Drawings):

1. Panelfold "SONICWAL/66", manual, STC 42, NRC .70

2. Hufcor equivalent products

3. Modernfold equivalent products

2.02: ACOUSTICAL ACCORDIAN FOLDING PARTITION SYSTEMS:

ACOUSTICAL ACCORDION folding partitions shall be manually operated Sonicwal/66 STC 42, NRC .70, as manufactured by Panelfold, Inc., Miami, Florida USA and installed by an authorized representative in openings prepared by others to Sonicwal requirements.

2 .03 TWIN ROW PARTITION PANELS:

6-inch wide, ½-inch thick, heavy-duty, high-density twin row partitions with acoustical liners, shall be bolted to 16 gauge steel panel support brackets and suspended from the steel yoke hinged at the brackets. Multi-fingered extruded vinyl Sonicsweep seals shall be installed top and bottom both sides of the partition and shall be field adjustable.

2.04 END POSTS:

End posts shall have deep nesting aluminum nose with dual vertical sound seals and shall be equipped with Architectural grade grip pulls, latches and aluminum jamb moulds in natural anodized finish.

2.05 TRACK AND HANGERS:

Track shall be heavy-duty extruded aluminum. Four ball-bearing wheels shall be installed on each volute and a minimum of six shall be installed on each end post.

2.06 PANEL SURFACES:

Panels shall be specially laminated engineered wood core, bonded with high-pressure decorative laminate, scratch-resistant and anti-microbial, color as selected from manufacturer’s full range of available colors.

2.07 CONNECTOR HINGES:

Panels shall be hinged and edge sealed to reduce sound, light and air transmission with heavy duty dual-wall, flame-resistant, extruded vinyl. Hinges shall be securely locked into and protect the panel edges. They shall provide "Memory-Action®" causing panels to extend and stack equally, smoothly and quietly. Colors from manufacturer's selector.

2.08 TRIM: Ceilinguard head closure trim shall be supplied.

2.09 HARDWARE: Manufacture’s standard non-security latching hardware.

2.10 FIRE RETARDANCY:

STC 45 model panels shall be made up of fire retardant cores, ASTM E84-70 laboratory tunnel tested with 20 flame spread, 15 fuel contributed, 15 smoke developed.

2.11 CURVED TRACK, SWITCHES AND MULTIPLE MEETING POSTS:

Furnish to effect room division as detailed on the plans. Minimum radius 3'0" (914mm).

2.12 HANGING WEIGHT: STC 45, 6.7 lbs/ft².

PART 3: EXECUTION

3.01 EXAMINATION:

A. Examine flooring, structural support, and opening for compliance with requirements for installation tolerances and other conditions affecting performance of operable partition walls. Surfaces shall be clean and dry. Concrete surfaces shall be free of excess mortar and lumps. Wood surfaces shall be well nailed and/or glued, nail head driven flush, and wood free of voids. Metal surfaces shall be free of grease, oil, dirt, rust, corrosion and welding slag, without sharp edges. Do not proceed with installation until unsatisfactory conditions have been corrected.

B. Verify that rough opening is correct and has been prepared by others to conform to ASTM E557-75 Standard.

3.02 INSTALLATION:

A. Install accordion panel partitions and accessories complying with ASTM E557 after other finishing operations, including painting, have been completed. Install accordion panel partitions that conform to Architectural Drawings & Specifications, approved shop drawings and in strict compliance with manufacturer's written installation instructions.

B. Match accordion partitions for color and pattern by installing partitions from cartons in the same sequence as manufactured and packaged if so numbered. Broken, cracked, chipped or deformed panels are not acceptable.

C. Apply perimeter caulking and trim and required.

3.03 ADJUSTING:

A. Lubricate all system components, bearings and sliding parts, adjust to ensure smooth easy operation.

B. Adjust locking hardware for accurate fit.

3.04 CLEANING

A. Clean all wood, metal, vinyl, and plastic laminate surfaces to remove soil without using abrasive cleaners or solutions containing corrosive solvents.

B. Remove debris from worksite.

3.05 DEMONSTRATION:

A. Provide the services of factory-authorized service representative to demonstrate and train Owner's representatives. Test operation and safeties. Replace damaged equipment. Train Owner's representative on procedures and schedules related to operation, troubleshooting, servicing and preventative maintenance.

B. Deliver all operation and maintenance manuals to the owner.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

DESCRIPTION OF WORK:

Provide toilet and bath accessories as shown on drawings and as specified herein.

Provide blocking for Owner furnished/Owner installed items.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this section refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

For purpose of designating type and quality for work under this Section, Specifications are based on products manufactured by the Bobrick Co. and catalog numbers scheduled are Bobrick numbers. Equal items by McKinney/Parker, American Specialties, Inc. or Bradley will be acceptable.

SUBMITTALS:

Shop Drawings: Submit shop drawings or catalog cuts of each item required by this Section in accordance with General Conditions.

PART 2: PRODUCTS

Refer to Drawings Schedule for toilet accessory product descriptions.

PART 3: EXECUTION

INSTALLATION:

Items shall be securely anchored in place at heights and locations shown on drawings. In some areas heights and locations are not shown and accessories shall be located as directed by Architect.

Upon completion of work under this Section accessories shall be cleaned and polished in accordance with manufacturer's written instructions.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

1.1 SECTION INCLUDES

A. Solid high density polyethylene (HDPE) toilet compartments, consisting of:

1. HDPE Floor mounted overhead braced toilet compartments.

2. HDPE Floor mounted overhead braced urinal screens.

B. Compartment installation hardware.

C. Compartment door hardware.

1.2 RELATED SECTIONS

A. Section 10800 - Toilet and Bath Accessories.

1.3 SUBMITTALS

A. Submit under provisions of Section 01050.

B. Product Data: Manufacturer's printed literature indicating typical panel, pilaster, door, hardware and fastening.

C. Shop Drawings: Submit five sets of the following:

1. Dimensioned plans indicating layout of toilet compartments.

2. Dimensioned elevations indicating heights of doors, pilasters, separation partitions, and other components; indicate locations and sizes of openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; indicate floor and ceiling clearances.

3. Details indicating anchoring components and methods for project conditions; indicate components required for installation, but not supplied by toilet compartment manufacturer.

D. Samples: Two manufacturer's color cards representing manufacturer's full color palette.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store compartment components until installation in unopened cartons laid flat, with adequate support to ensure flatness and to prevent damage to prefinished surfaces.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Do not deliver materials or begin construction activities of this section until building is enclosed, with complete protection from outside weather, and building temperature maintained at a minimum of 60 degrees Fahrenheit.

1.6 SEQUENCING

A. Obtain accessory manufacturer's installation instructions and installation templates for toilet and bath accessories to be installed in compartment separation partitions; supply instructions and templates to installer before beginning construction activities of this Section.

1.7 WARRANTY

Provide manufacturer standard 15 year warranty.

PART 2: PRODUCTS

2.1 MANUFACTURERS

A. Acceptable Manufacturers: ASI Accurate, Global Partitions

B. Other manufacturers meeting the requirements of these specifications.

2.2 HDPE TOILET COMPARTMENTS

A. Shall meet NFPA 286 Criteria Test results, and ASTM E-84 / UL 723 CLASS C flame spread rating.

B. Panel:

1. Nominal thickness: 1”.

2. Core: Panels shall be solid polymer resin, High Density Polyethylene (HDPE), which is waterproof, non-absorbent and resists marking, in colors that extend throughout the surface.

3. Edges: Finished smooth.

C. Floor Mounted Overhead Braced Pilasters:

1. Nominal thickness: 1”.

2. Core: Pilasters shall be solid polymer resin, High Density Polyethylene (HDPE), which is waterproof, non-absorbent and resists marking, in colors that extend throughout the surface.

3. Edges: Finished smooth.

4. Pilaster installation hardware preparation: Two holes, diameter to accept 3/8 inch threaded rod, drilled into core at pilaster base end, parallel to pilaster vertical axis, intersecting centerlines of two holes, diameter to accept Plug-Loc® installation hardware, drilled through pilaster perpendicular to pilaster face and 1 inch from pilaster base end.

D. Doors:

1. Nominal thickness: 1”.

2. Core: Doors shall be solid polymer resin, High Density Polyethylene (HDPE), which is waterproof, non-absorbent and resists marking, in colors that extend throughout the surface.

3. Edges: Finished smooth.

E. Finish / Texture: Pebble grained texture.

F. Colors: Black

2.3 ACCESSORIES

A. Pilaster Shoes: Heavy-Duty stainless steel pilaster shoes. Furnish shoes at each pilaster.

B. Pilaster Anchors: Manufacturer's standard floor anchor with leveling adjustment assembly, concealed by pilaster shoe after installation.

C. Pilaster, Wall Panel and Urinal Screen Brackets: All wall terminations and intersections are to be manufacturer's heavy duty, bright finish anodized aluminum continuous bracket, T profile with double anchoring flanges, pre-drilled at minimum 12” o.c. and prepared for exposed tamper-resistant fastening hardware. Bracket to be full height, length equal to the total length of partition, screen and pilaster less pilaster shoe height.

D. Overhead Bracing: Continuous heavy duty .125” thick extruded aluminum head rail with anti-grip device profile, with integral reinforcing channel and curtain track. Bright anodized finish and 2” minimum height.

Provide head rail double eared female corner brackets, wall brackets, and head rail end caps, in bright polished finish.

E. Door Hardware: (Heavy-Duty Cast Stainless Steel, unless otherwise noted)

1. Door hinge: Heavy-duty 14 gauge stainless steel continuous hinge, self closing gravity type. All hinges shall be mounted a 1” thick stile member.

2. Slide Latch: Heavy-duty, non-ferrous, cast stainless steel slide latch, satin finish, through-bolted.

3. Strike and Keeper: Permitting emergency access by lifting the door until latch is clear of keeper; heavy-duty cast stainless steel, satin finish; through-bolted.

4. Pull Handles: Heavy duty cast stainless steel with satin finish.

5. Door Stops: Heavy duty cast stainless steel with satin finish.

6. Coat Hook and Bumper: Non-ferrous, heavy-duty cast stainless steel, with black rubber tip for doorstop.

7. Fastening Hardware: Manufacturer's heavy-duty, No.304 stainless steel, No.4 satin finish, through-bolts and attachment fasteners with tamper-resistant heads.

8. Hardware of chrome-plated “Zamac” is unacceptable.

F. Toilet and Bath Accessories for Installation in Compartment Separation Partitions: Specified Section 10800.

PART 3: EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Measure areas to receive compartments; verify area dimensions are in accordance with shop drawings.

2. Verify built-in framing, anchorage, bracing, and plumbing fixtures are in correct location.

B. Installer's Examination:

1. Have installer of this section examine conditions under which construction activities of this section are to be performed, then submit written notification if such conditions are unacceptable.

2. Transmit two copies of installer's report to Architect within 24 hr of receipt.

3. Beginning construction activities of this section before unacceptable conditions have been corrected is prohibited.

4. Beginning construction activities of this section indicates installer's acceptance of conditions.

3.2 PREPARATION

A. Surface Preparation:

1. Prepare openings in compartment separation partitions for toilet and bath accessories to be installed in partitions; marring of partition finish is prohibited.

2. Locate openings in accordance with shop drawings and accessory manufacturer's installation instructions and templates.

3.3 INSTALLATION

A. Install compartments to specified tolerances in accordance with shop drawings and manufacturer's printed installation instructions.

B. Attach components to adjacent materials and to other components using purpose-designed fastening devices.

C. Adjust pilaster anchors for floor variations; conceal anchors with pilaster shoes.

D. Equip each compartment door with top and bottom hinges, and door latch.

E. Install door strike keeper on pilasters in alignment with door latch.

F. Equip each compartment door with one coat hook and bumper.

G. Installation Tolerances:

1. Maximum variation from plumb or level: 1/8 inch.

2. Maximum displacement from indicated position: 1/8 inch.

3. Clearance between wall surface and panels or pilasters: 1-1/2 inch maximum.

3.4 ADJUSTING

A. Adjust door hardware for uniform clearance between doors and pilasters.

B. Adjust door hinges to attain free movement, to locate in-swinging doors in partial open position when unlatched; and to return out-swinging doors to closed position.

C. Adjust door hardware to align door strike keeper on each pilaster with door latch.

3.5 PROTECTION OF INSTALLED PRODUCTS

A. Prevent damage to product finishes by subsequent construction activities.

B. Replace components having damaged finish.

C. Remove factory protective coverings and clean finish surfaces in accordance with manufacturer's instructions before final inspection.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART 1 - GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide new basketball goals, volleyball equipment, and athletic equipment as shown on Drawings and specified in this Section.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by Performance Sports Systems, Inc. Other Manufacturers who can furnish equivalent products or systems of same materials specified will also be acceptable.

SUBMITTALS:

Manufacturer's Data: Submit for approval three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2 – PRODUCTS

BASKETBALL GOALS

Main and Side Court Folding Goals: Provide folding goals where indicated, Performance Sports Systems, Inc. Model 3103 Ceiling Suspended, forward folding goal with tempered glass backboards Model 942. Backboards to have painted targets and bolt-on safety cushion edges Model 1330. Provide breakaway goals Model 830. Provide each with electric winch Model 1194, with key switch and switch cover. Provide each with manual height adjuster Model 1130, Adjust-A-Goal Series, featuring height adjustment from 8’-0” to 10’-0” with hand held removable crank.

Main vertical mast shall be 6 5/8” O. D. pipe. Anti-sway braces shall be 2 3/8” O. D. pipe. All pipe shall meet or exceed ASTM A513 structural steel specifications. Main mast shall be offset 4” for positive locking.

Backstop shall have a rigid, hinged front brace attached to the main mast at approximately 12" to 18" above backboard. Folding brace shall be of jackknife design constructed of 1 7/8" O. D. pipe. The entire assembly shall be self-aligning and so designed as to be self-locking and self-releasing. The backstop shall be manufactured to accommodate one backboard.

Backstops shall be raised and lowered by means of 1/4" galvanized aircraft cable with a 7000 lbs. breaking strength.

Finish: Backstop units and framing shall be factory prime coated and factory pre-finished in manufacturer's top coat of powder coated **WHITE** enamel. Manufacturer to provide necessary matching touch-up paint supplies.

Volley Ball Equipment: Provide Model 6000 Series Volleyball Systems, complete system as manufactured by Performance Sports Systems, Inc., complete with 3 ½" O.D. anodized aluminum posts, heavy duty net tensioner winch, net with antennas, vinyl covered foam pads for uprights in minimum of 14 colors, cable covers. Provide in-floor base No. 6423 with 6405 cover plates. Install per manufacturers recommendations. Provide storage cart accessory.

PART 3 - EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

All wall mounted and overhead mounted equipment locations shall be fully coordinated with all adjacent systems, including mechanical, electrical, lighting and flooring, prior to installations.

INSTALLATION:

Install all specified systems in accordance with Manufacturer's printed instructions and Shop Drawings, approved by Architect.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in this field of installation work.

Provide Owner with training sessions and demonstrations, performed by fully qualified manufacturers representatives certified in this field of installation work.

END OF SECTION

RELATED DOCUMENTS:

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

WORK REQUIRED:

A. The work to be done under this contract shall include the furnishing of all labor, materials, equipment, and services necessary for and reasonably incidental to the proper completion of all Kitchen Equipment Construction, as shown on the plans and herein specified, excepting only work or materials specified or noted as being done or furnished by others.

B. The attention of this contractor is directed especially to the section herein referring to "CONNECTIONS TO EQUIPMENT FURNISHED AND INSTALLED BY THE CONTRACTOR".

GENERAL:

A. The General Conditions, Supplementary General Conditions, Instructions to Bidders, Drawings, and these specifications constitute the necessary documents for this part of the work, a copy of same being bound herewith. The contractor shall be bound by these, and, wherever the word "Architect" shall appear, it shall be understood that this shall include the duly accredited representative of the Architect. It should be understood that the mechanical plans are diagrammatic in character but should be adhered to as closely as possible, consistent with construction of the building. Mechanical plans should not be scaled. Secure dimensions from Architectural Drawings.

B. All work shall be executed in a workmanlike manner by skilled mechanics and shall present a neat appearance when completed.

C. The plans and these specifications are intended to completely describe, imply, and convey the materials and equipment, as well as necessary labor, required for the installation as hereinafter specified.

D. It shall be understood that, where the words "furnish" and/or "install" are used, it is intended that this Contractor shall purchase and install completely all materials required. All materials shall be new.

E. It shall be the duty of the Contractor to submit, to the Architect, within twenty (20) days following award of the contract, a complete list of materials proposed for the project, as hereinafter outlined. Where the name of a particular manufacturer is mentioned in connection with materials, this shall be construed to be for descriptive rather than restrictive purposes.

F. It substitutes are equal in every respect to those as specified, in the opinion of the Architect, they will be approved according to procedure, as outlined hereinafter. Contractor will be allowed to submit, for approval, one (1) submission of a substitute item. If the substitute items are not in compliance with the plans and specifications and are disapproved, the contractor will be required to furnish and install specified materials.

G. All materials and submittal data must be reviewed, processed and coordinated with all other Contractors, before any Contractor proceeds with installing kitchen equipment associated materials or items in the Project.

H. In some cases, it may be required that samples of materials be submitted for approval. Any such samples submitted will be returned to the Contractor or manufacturer on request.

I. This Contractor shall obtain and pay for all permits and/or fees required, give required legal notices, and notify inspection departments.

J. The drawings, which accompany these specifications, are not intended to show, in complete detail, every fitting which may be required; however, wherever reasonably implied by the nature of the work, such materials or equipment shall be installed by this contractor as a part of his contract price. Contractor shall be responsible for all drawings and all specifications, which shall include those for each allied trade involved in the construction of the project.

K. In no case will any extra charge be allowed unless authorized, in writing, by the Architect.

L. All plumbing shall be done in strict accordance with the sanitary laws and other laws of the State of North Carolina. Each fixture shall be properly trapped and vented as shown or required by Codes.

M. Piping shall be supported in place to the satisfaction of the Architect. Use approved hangers as hereinafter specified.

N. Should these specifications or the plans, which accompany them, not be entirely clear to the Contractor as to the intent or scope of work, the contractor shall request clarification, in writing, to the Architect, before the bid opening date.

O. All electrical work shall be done in strict accordance with the laws of the North Carolina State Building Code, which includes the current Edition of the National Electrical Code and the Division of this specification entitled "ELECTRICAL".

CONTIGUOUS WORK:

A. If any part of this contractor's work is dependent for its proper execution or for its subsequent efficiency or appearance, on the character or conditions of contiguous work not executed by him, the Contractor shall examine and measure such contiguous work and report to the Architect, in writing, any imperfection therein, or conditions that render it unsuitable for the reception of this work. Should the Contractor proceed without making such written report, he shall be held to have accepted such work and the existing conditions, and he shall be responsible for any defects in this work consequent thereon and will not be relieved of the obligation of any guarantee because of any such imperfection or condition.

PROTECTION OF EQUIPMENT:

A. The Contractor shall be responsible for all work damaged by him in executing the contract. Any work damaged will be replaced by him and placed in perfect working condition without extra cost. The Contractor shall, at all times, be responsible for any damaged equipment or work in conjunction with executing contract. All fixtures and fittings shall be adequately protected before and after installation.

BOILER INSPECTION:

A. It shall be the responsibility of the contractor to complete the installation of the fired and unfired pressure vessels and their safety devices, in accordance with the requirements of the latest Edition of the North Carolina Boiler Inspection Law, Rules, and Regulations. This Contractor shall have the equipment, which is installed under this contract, inspected and approved by the State of North Carolina, Department of Boiler Inspections. This contractor shall be responsible for notifying the State Boiler Inspector, in writing, at least two (2) weeks prior to the date of completion, of all equipment requiring inspection.

B. Furnish and install a suitable metal frame, having a removable glass cover, for posting the certificates of inspection furnished by the North Carolina Department of Labor, Boiler Bureau. Certificates are to be installed in frames by this contractor before requesting final inspection of the completed job by the Owner and Engineer.

C. Final payment will not be made until such a certificate has been duly posted. All fees and expenditures, necessary for this requirement, will be paid by the Contractor.

CHASES, CUTTING, AND PATCHING:

A. In new construction, chases in walls, for any work to be installed by this contractor, will be provided by the general contractor, provided full information as to the location and size of such chases and the necessary frames for openings is given to him by this contractor in such time as to cause no delay in the General Contractor's work.

B. If this Contractor should neglect to furnish the required information and, by reason of his neglect, chases and openings are not provided, this contractor shall, at his own expense, cut the required chases and openings and make such repairs as shall be necessary to restore the work to its original finish.

C. The cutting of chases, openings, or holes, in floors and ceilings, shall be done in a manner as not to endanger the stability of the structure or any part thereof. The Contractor shall not, in any case, cut or alter the work of any other contractor without the approval and under the direction of the Architect or Engineer. All repairs, resulting from cutting, shall be done under the supervision of the Superintendent of the General Contractor.

SCOPE OF WORK:

A. This Contractor shall be required to perform all work specified and shown on drawings to provide systems as shown. Kitchen Equipment Contractor shall set all equipment in place and provide all required and necessary accessories for complete assemblies. Final and terminal connections to rough-ins will be the responsibility of the Plumbing, Mechanical and Electrical Contractors. The work will consist of the following items in general:

1. SUBMITTALS: Complete a kitchen equipment submittal phase of all proposed kitchen equipment work. Submittal data shall include individual equipment product data and shop drawings clearly indicating compliance by description of properties, features, accessories, with plan drawings of equipment layout and plan drawings of equipment individual utility rough-in locations. Submit utilities schedules showing utility requirements and required connections for each kitchen equipment item; to include but not necessarily limited to: electrical service requirements, breaker and circuit sizes, water supply data, waste drain data, gas supply data with working gas pressure requirements.

   COORDINATION: Upon completion of submittals processing, Kitchen Equipment Contractor shall provide coordination copies of all processed submittals with General, Electrical, Plumbing and Mechanical Contractors. Claims from any party for additional costs, that are attributed to or due to inadequate coordination with processed submittals will not be considered.

2. Furnish and install all purchased items of kitchen equipment, with Connections to electrical and plumbing services provided by the Electrical and Plumbing Contractors.

3. Fabricate and install all items of fabricated equipment as shown on plans, with all plumbing connections to both plumbing and electrical work provided by the Electrical and Plumbing Contractors, to provide service for the equipment.

4. Plumbing Contractor shall furnish all water and waste piping terminal connections to the equipment from roughed piping, which is furnished, installed and capped or plugged at the wall or floor by the Plumbing Contractor.

5. Kitchen Equipment Contractor shall furnish all electrical control devices, and safety equipment for the kitchen equipment.

6. The Kitchen Equipment Contractor is to refer to plumbing plans, heating and air conditioning plans and electrical plans for portions of the work that are furnished and installed by the above referred Contractors. All terminal connections from the facilities and provisions described shall be provided by the Plumbing, Heating and Air Conditioning and Electrical Contractors.

7. Kitchen Equipment Contractor is to furnish and install all necessary plumbing trim including faucets and waste traps assemblies as indicated on drawings, and as specified herein.

8. Heating and Air Conditioning Contractor is to furnish and install all necessary local gas regulators necessary for maintaining required working gas pressure for gas fired kitchen equipment.

9. Prior to acceptance and use, Kitchen Equipment Contractor is to perform testing of each piece of equipment, confirming its proper operation. Kitchen Equipment Contractor shall be the responsible party to coordinate any work necessary to bring any non-compliant equipment into compliance.

TRAINING:

A. Kitchen Equipment Contractor shall have factory trained and certified product representatives provide equipment and system training sessions for the Owner for each individual kitchen equipment product and system. Sufficient training shall be provided to the extent that each Owner attendee is fully versed on the product and/or system and can be a designated “trained” participant, and that each participant can demonstrate the ability to operate each product and system in total variety of operations. Provide multiple training sessions if such is required to be certified as fully trained personnel. An Owner Training Certification is to be provided. Submit an affidavit that each required Owner training session has been performed. Submitted affidavit to include sign-up log of attendees/trainees and description of system or product, cross referenced to the specific contract document.

WASTE PIPING:

A. Unless otherwise specified or shown on plans, all waste piping shall be service weight, coated, cast iron soil pipe, conforming to CISP Std. 301-68T, no-hub above grade only, Charlotte Seal below grade. Standard galvanized steel pipe shall be used instead of cast iron, in places where 2” and under is needed.

B. All exposed soil pipe, lines and fittings to be chrome plated thick wall brass and chrome plated cast brass. To include indirect waste piping to floor sinks or floor drains. Painted piping will not be accepted.

ELKAY Continuous Waste Drain Connection for a 3 Compartment Sink with End Outlet, satin chrome plated brass 1 ½” O.D. continuous waste kit, Model LK76 or approved equivalent. Provide any necessary chrome plated soil piping extensions to floor drain or floor sink location s for indirect drains. Minimum 17 gauge brass.

ELKAY Continuous Waste Drain Connection for a 2 Compartment Sink with End Outlet, satin chrome plated brass 1 ½” O.D. continuous waste kit, Model LK53 or approved

equivalent. Provide any necessary chrome plated soil piping extensions to floor drain or floor sink location s for indirect drains. Minimum 17 gauge brass.

C. Joints shall be made in accordance with requirements of the State Plumbing Code.

D. Fittings for galvanized waste lines shall be recessed drainage iron fittings, galvanized, interior shoulder type, providing a smooth waterway of the same diameter as inside of pipe. The tappings shall be chamfered, permitting easy entrance of pipe threads. Fittings shall be tapped to pitch, 1/4" per foot. All threads shall be clear-cut and full. Fittings shall be free from rust, scale, and holes, or other imperfections. All fittings, for vent pipelines, shall be Standard, galvanized, malleable iron fittings.

E. Contractor should not that all fittings for cast iron waste piping shall be sanitary drainage type fittings. Tapped tees or tapped crosses will not be permitted for connections of waste to vertical risers or any connection to vertical risers to horizontal line.

JOINTS AND FITTINGS:

A. All changes in horizontal direction of soil and waste lines shall be made with long radius fittings or with "Y" branches and 1/8 or 1/16 bends.

B. Unions to be used in erection of all piping so that piping may be taken down without breaking fittings. Concentric reducing fittings shall be used to make reductions in all sizes of piping.

C. All cast iron pipe shall be made up with oakum and hot lead, using a minimum of one pound of lead per inch of pipe diameter, and in sufficient quantity to completely fill bell in one pouring.

D. All screw piping and shall be made up by applying pipe dope to male thread of pipe.

E. All exposed screw piping and nipples to be chrome plated or covered with chrome sleeves sized to exact required length to 100% conceal.

F. All copper piping shall be made up, using 95-5 solder.

G. 50-50 solder will not be allowed on the job for any use.

H. All connections from valves or stop valves to fixtures to be armor braided flexible connector hose type.

WATER PIPING:

A. General:

1. The Contractor shall perform all work and supply all materials required to produce an adequate supply of water to all fixtures requiring same. Distribution lines shall be installed as shown on plans.

2. All water piping, unless otherwise noted or specified hereinafter, shall be thin-walled copper water tubing, Government Type "K", soft, below ground; and Type "L" hard, above grade, conforming to ASTM Specifications B-88. The fittings shall be wrought copper of the same composition as the tubing, conforming to ASA Specifications B-1 6-22. Fittings shall be marked with manufacturer's name or trademark. Solder, used for fittings 1-1/2" and larger, shall be Silphos, Easy-Flo Phos-Copper, or approved equal. Use 95-5 solder for fittings, 1-1 /4" and smaller. 50-50 solder will not be allowed on the job for any use. One-half inch (1 /2") tubing shall be the smallest size allowed. In making soldered joints, all surfaces must be clean and shiny and coated with flux; this applies to

ends of tubing and inside of fittings. After fluxing the surfaces, the tubing shall be pushed into the fittings as far as the fitting shoulder and held there. Apply heat to joint until the flux begins to boil. After heating the fitting, apply solder to the edge of the fitting or to the solder feed hole (if fitting is furnished with one), until the solder melts and flows into the joint, continuing to feed the solder until it has penetrated to the shoulder of the fitting. Quickly, wipe off the excess solder with a brush or cloth and let fitting cool without being disturbed.

3. All exposed water supply pipe to be chrome plated brass, IPS screw threaded nipples or copper covered with chrome sleeves sized to exact required length to 100% conceal. Exposed copper lines not acceptable. Exposed copper lines painted chrome color not acceptable.

4. Pipe and fittings shall be marked with manufacturer's name or trademark.

VALVES:

A. Valves shall be installed at all points noted on drawings by Standard symbols or as required by best general practice for proper control and operation of the system.

B. Valves furnished and installed shall be the following or equal as approved in writing by the Architect/Engineer. All valves furnished shall be of the same manufacturer.

SCREWED ENDS, UNION BONNETS (Globes with Composition or Teflon, as Specified):

	Gates 125# WSP	Globes 150#WSP	Checks 125# WSP
Jenkins	62-U	106-A	92-A
WalWorth	3	95	406
Nibco	T-I 25	T-235-Y	T-413-B

SOLDER ENDS, SCREWED BONNET GATES, UNION BONNET GLOBES (Globes with Teflon Discs).

	Gates 125# WS	Globes 150# WSP	Checks 125# WSP
Lunkenheimer	2132	126	2145
Nibco	S-121	S-235-Y	S-413-B
Walworth	55 SJ	95 SJ	406 SJ

C. All valves shall be the product of one manufacturer and shall be identified by catalog number with a metal disc under the handle.

UNIONS:

A. This Contractor shall furnish and install, at necessary locations throughout the water piping system, a sufficient number of unions required to facilitate removal of pipe, equipment, or valves.

HANGERS, ETC:

A. All piping, around walls, shall be supported in a satisfactory manner, using pipe clamps as directed.

B. Hanger rods shall have sufficient threads to insure proper adjustment of pipe grades, etc. Hangers shall be installed no more than 18" from point where piping changes direction.

PLACING IN SERVICE:

A. Upon completion of the entire installation, the complete system and equipment shall be tested by actual operation to prove that same will function as intended.

B. This Contractor shall place the entire system in a satisfactory operating condition and shall furnish all assistance and instruction required by the Owner's representative during initial operating period.

CLEANING:

A. It is the kitchen equipment contractor's responsibility to turn over to the Owner all equipment in clean condition. It is the kitchen equipment contractor's responsibility to see that all pipelines are free from debris when job is turned over to the Owner. Any damage, to kitchen equipment, before final acceptance, regardless of by whom caused, shall be repaired or replaced by the Kitchen Equipment Contractor without additional cost to the Owner.

B. The Kitchen Equipment Contractor shall acquaint the Owner’s representative with the special parts required for the operation of the flush valves, furnished and installed for the project.

ELECTRIC WIRING:

A. The Electrical Contractor shall furnish service, as indicated on plans, at appropriate location, for connection to all kitchen equipment furnished by this contractor. This Contractor will furnish all materials, equipment, disconnects, safety devices, contactors, etc., necessary for operation of the equipment. All wiring will be in accordance with the electrical specifications and in general, all wiring from the outlet furnished by the Electrical Contractor to the equipment furnished by this Contractor will be the same size as the wire installed by the electrical contractor. All wiring from outlets furnished by the Electrical Contractor to the equipment in wet locations and in the center aisle under the range hood will be in weathertight Greenfield conduit with appropriate weathertight fittings.

WATER AND WASTE CONNECTIONS:

A. In general, the Plumbing Contractor will furnish and install capped or plugged waste connections of appropriate size and at appropriate locations for connections of waste from all kitchen equipment furnished by this Contractor. This Contractor will furnish all waste lever fittings, all traps, all waste piping, etc., necessary for complete connections of waste from the equipment.

B. In general, the Plumbing Contractor, when necessary, will furnish gate valve stops on water piping at the appropriate location for connection to the equipment furnished by this contractor. Where gate valves are not deemed necessary, capped copper pipe will be provided for connections to the equipment. The Kitchen Equipment Contractor will furnish all water piping from the outlet provided by the Plumbing Contractor to the equipment with final terminal connection to the equipment including all necessary faucets, trim, etc., for operation of the equipment.

KITCHEN EQUIPMENT:

A. General:

1. The Kitchen Equipment Contractor is to furnish and install all items of kitchen equipment indicated on the plans. The kitchen equipment is to be furnished and completely connected as required and ready for operation at time of final inspection. The kitchen equipment contractor will make arrangements with the kitchen equipment

manufacturers' including dishwasher to supply the necessary on-site demonstrations, instructions and operating manuals to the Owner regarding operation of the equipment.

B. Materials & Connections:

1. All equipment shall meet National Sanitation Foundation Standards and must be UL approved and must be labeled.

2. All custom-built equipment shall be designed for extra heavy use equal to make and/or details and specification hereinafter noted.

3. Description of materials herein specified are to be understood to be the minimum standards.

4. Stainless Steel: Type #302, AISI finish; to match the #3 mill finish or #100 emery grit finish.

5. White Metal: Not less than 21 % nickel with a corrosive-resisting quality similar to that of polish and buffed to a bright luster.

6. The Plumbing Contractor is to include all roughing of water and waste for kitchen equipment as required. His water connections will be roughed and equipped with globe valve stops. Waste connections will be include water and waste connections to the equipment in satisfactory operating condition.

7. The Electrical Contractor will furnish all necessary roughing of electrical services at the location indicated on the electrical plans for the kitchen equipment. In some instances the electrical contractor will rough conduit through the floor with outlet boxes or conduit through the floor for connections to the equipment. In some cases, the Electrical Contractor will rough wall outlets or wall receptacles for service to the kitchen equipment. Where conduit or outlet box connections are necessary they will be extended from the outlet furnished by the Electrical Contractor utilizing watertight Greenfield connections with complete electrical connections ready for operation to the kitchen equipment.

8. Galvanized Iron: ASTM A 93 latest edition

9. Structural Steel Shapes: As shown and/or noted.

C. Fabrication:

1. All welding done with welding rods of same composition as sheets or parts being welded. All exposed welded joints to be of same color as adjoining metal surfaces.

2. No field joints accepted.

3. All welded joints ground and polished to match adjoining surfaces.

D. Construction Methods:

1. Sink and Table Legs:

a. Legs 1 5/8" O.D. x l4 gauge stainless steel tubing with 1" O.D. x 16 ga. stainless steel tubing cross bracing located 10" above the floor.

b. Joints closely mitered and completely welded all around.

c. Bottom of legs fitted with stainless steel sanitary shape adjustable feet. Industrial Foundry No. 638. Provide not less than 1" adjustment.

E. Sink and Sink Tops:

1. 14 ga. stainless steel

2. Reinforced on underside with 14 ga. 1 " x 4" x 14 galvanized iron channel battens placed not greater than 36" o.c. short dimension. No rivet heads in top or sides.

3. Drain boards integrally welded with splash and front rim and sink. 10" high back splash with 2 holes of proper size, 8" 0. C. centered above each sink. Located at proper height to receive faucet to be furnished and installed by this contractor.

4. Front edge and ends to turn up 3" high except at sink area which shall drop to level of sink portion (14").

5. Front ends and back splash to be formed over 1 1/2" diameter die.

6. Sinks 14" deep. Each compartment to have 2" IPS threaded waste outlet of chromium plated brass with built-in 2" lever operated waste valve and removable stainless steel strainers held in place by at least two stainless steel flat head screws. Sink shall be integral part of adjacent units.

   Coordinate necessary sink depth adjustments at disposal installation locations.

7. Drain boards 1 1/2" rolled spillage type edges with splash back to match sink back.

8. Corners of sinks drain boards and dish tables shall be square with fillet beads in all welded corners.

F. Lower Shelves:

1. 16 ga. stainless steel, snap-on type, removable.

SERVING LINE:

Furnish and install the below listed food service equipment. Fiberglass body colors to be selected by Architect. Submit Shop Drawings for approval. Approved serving line manufacturer is and basis of design is: LOW TEMP INDUSTRIES/SPECLINE (formerly Colorpoint). Equivalent products by DELFIELD, RANDELL and VOLLRATH are acceptable.

Tops to be 30” wide and fabricated from 14-gauge stainless steel with square turn downs on all sides and corners fully welded, ground and polished. Tops to have #4 satin finish and all edges having #7 hi-lite finish.

Body to be seamless molded fiberglass (F.R.P.) with smooth exterior surfaces and rounded corners. All fiberglass to be flame retardant per specification ASTM-E162. All bodies are to be constructed by hand lay-up process with four layers of 1.5 oz. continuous strand fiberglass matt, plus 24 oz. layer of woven roving on the bottom for added strength. All bodies are to be open base construction with stainless steel interior seamless liners and stainless steel doors, unless otherwise specified. Open base spaces are to be available for localized capture of daily condensate or waste draining. Provide 12 gauge “U” channels to reinforce shape of fiberglass bodies. The use of the full internal channel is to insure that load stresses are placed on the channel and not on the fiberglass body. An additional external channel is to be placed between the casters and the bottom of the counter to further relieve any other purposes. Tray slides are to be constructed so not to sag as a result of the reinforced “U” channel application.

Fiberglass body colors to be selected by Architect, from manufacturer's RAL color choices, minimum of 180 color choices. Color of the fiberglass is to be confirmed by the Architect at the time of the submittal drawing presentation by awarded dealer.

Tray slides are to be 10" flat surface with parallel inverted "V" type pencil ribs, stainless steel with ends and sides turned down square and all corners fully welded, ground and polished. Support brackets are to be stainless steel fold down type and field adjustable with a screwdriver.

Casters are to be 5" diameter, ball bearing, swivel type casters, non-marking and with locking brakes on all wheels. Casters to be mounted with exterior and interior bracing for maximum stress relief.

All tables are to be furnished with line up locks. Locks to be barrel bolt and key slot design with cam locking action. Locks to be placed on opposing corners for maximum locking capability.

Hot food tables, as required, furnished with dry/moist hot food wells to be bottom mounted and have 12" x 20" die-stamped openings with ¼" raised beaded edge. Hot wells to be recessed 1" for serving. All hot food wells are to have energy saving 500 watt heat blanket wrap pans, with double poled thermostat for temperature control. Each hot food well to have a copper drain line with drain screen cover plates, plumbed to a common drain manifold with a drain cock shut-off valve for directed daily flow into a localized capture device stored within the open base space. All switches and controls are to be fully accessible. All wells are wired to a circuit breaker for current overload protection and on/off controls. All sneeze guards are to be furnished with factory installed LED lighting fixtures and wired to the central control panels to meet NSF and UL standards.

Cold Food Table, as required, to be Mechanically cooled and in compliance with NSF-7 standards for Mechanical cold pans. Pan to have removable fans that circulate cold air. Pan shall be 18-gauge stainless steel and be 9" deep, with food pans flush with counter tops. The welded watertight pan shall have Temp-est Air refrigeration system. The system to include low velocity axial fans and advanced design cold wall. Pan to be fully insulated with urethane insulation and the top shall be separated from the pan by a full perimeter breaker strip. The cold pan to have a 1" open brass drain with copper drain line to a drain cock shut-off valve for directed daily flow into a localized capture device stored within the open base space.

A cross flow ventilated compressor compartment to have two (2) stainless steel exterior frames complete with removable stainless steel louvers for service and cleaning. Interior of housing to have easy access slide-out channels to accommodate the condensing unit.

Provide countertop cutouts and case body flush-mounted convenience power outlets for countertop mounted equipment power cords or pigtails.

Tables furnished with SpecLine Quick Switch hot/cold/freeze wells are to comply with following specifications. Top perimeter of each unit is to be constructed of 14 gauge stainless steel, welded, ground and polished with a thermal break provided between the top and refrigerated interior. Interior pan is to be 18 gauge stainless steel, fully welded, ground and polished with a 3/3" open drain. To be fully insulated with 1-1/2" to 2" urethane insulation. The exterior jacket is to be constructed of heavy gauge galvanized steel.

The refrigeration system is to be 1/3 H.P. hermetically sealed compressor operating on R-507 (HFC) refrigerant, and will include controls. New energy efficient hot food wells to use digitally controlled, 500 watt heat source. All switches and controls are fully accessible and are provided with cord and plug. Units shall bear the UL classified EPH label for sanitation meeting all NSF4 and NSF 7 requirements. Wells are to be fully capable of maintaining hot temperature, cold temperature, and frozen temperature with the turn of a switch.

Cashier's Table body interior to be lined with 18-gauge stainless steel with covered vertical and horizontal corners. Provide a removable stainless steel locking cash drawer, a 110 flush-mounted convenience outlet, a slide out stainless steel storage shelf.

Buffet shields, as required, for self-service operation, to be Plexiglas sneeze guard along side with Plexiglas end closures. A removable top cap shelf mounted over the edge of the guards to be fabricated from 16-gauge stainless steel with all sides turned down square and all corners fully welded, ground and polished. Shield to have adjustable height from 6" to 12" at 1" increment without the use of tools. All buffet shields to have factory mounted and wired fluorescent lights that are wired internally to an on-off switch located in the control panel of the table.

Food protector, as required, to be curved front food protector and shall have an 18 gauge stainless steel top serving shelf with all edges turned down square and all corners fully welded, ground and polished. Edges to have #7 H9-lite finish. Ends and curved front glass to be ¼" Plexiglas having air space at top and bottom. All Plexiglas to be bound in stainless steel channel to prevent chipping. All food protectors to have factory mounted and wired fluorescent lights that are wired internally to an on-off switch located in the control panel of the table.

Two tier display, as required, with curved front stand shall have uprights constructed of 1-1/4" square stainless steel tubing with stainless steel cop and base. Shelves to be ¼" polished plate glass resting on a horizontal stainless steel framework welded to the uprights. The display stand is to be enclosed on the ends with ¼" polished plate glass curved Plexiglas on the front. Front sneeze guard to be mounted on adjustable stainless steel brackets. All tow tier display units to have factory mounted and wired fluorescent lights that are wired internally to an on off switch on the control panel of the table.

Warranty is to be five years on fiberglass bodies, two years on controllers, and one year parts and labor on all other features, by the manufacturer. Warranty period to begin after school start up and Owner demonstration training has been satisfactorily completed.

All equipment shall be listed by Underwriter's Sanitation Inc. and U.L. Sanitation Inc. and shall bear each symbol. Equipment is to be UL listed and UL certified to current ANSI/NSF sanitation standards.

Water valves and accessories shall be lead free in accordance with NSF/ANSI 372 standards.

K-1 Stainless Steel Utility Cart:
Heavy duty fully welded stainless steel utility cart, 1000 Ib. capacity, manufactured in accordance with plans and specifications; (2) 5" swivel castors with brakes, and (2) 8" fixed castors. All welds ground and polished. 14 gauge shelves, 18 gauge tubing frame. (similar to LAKESIDE 943). Other approved manufacturers: GLOBAL INDUSTRIES, ULINE, REGENCY.

K-2 Stainless Steel Utility Cart:
Heavy duty fully welded stainless steel utility cart, 1000 Ib. capacity, manufactured in accordance with plans and specifications; (2) 5" swivel castors with brakes, and (2) 8" fixed castors. All welds ground and polished. 14 gauge shelves, 18 gauge tubing frame. (similar to LAKESIDE 947). Other approved manufacturers: GLOBAL INDUSTRIES, ULINE, REGENCY.

K-3 2-Compartment Sink:
Sink to be 156" long with two 24"x24"x l4" deep compartments and drain board on each end. Sink to be furnished with 12" swing-spout mixing faucet with aerator for 8" center set, T&S Brass B-0231-EE or approved equal. Sink to be equipped with 2" lever waste on each compartment.

K-4 120" Work Table:
120" x 30" x 14 gauge stainless steel top with rolled rim edge 3 sides, and a 6" rolled edge backsplash, (5) 18 gauge s/s drawers, 18 gauge s/s sectional removable under shelves, edges rolled to contour of

cross rails, 1 5/8" O.D. 16 ga. s/s legs with adjustable bullet feet (similar to LOW- TEMP 11SS-73). Other approved manufacturers: ACE FABRICATION, STAFAB.

K-5 10' Wall Shelf / 13' Wall Shelf:
12"x120"x16 gauge and 12"x156"x 16 gauge stainless steel wall attached shelves, with rolled edges on front and ends; and turned up back (similar to LOW-TEMP WSF-102). Other approved manufacturers: ACE FABRICATION, STAFAB.

K-6 2-Door Refrigerator:
Provide two-section refrigerator with top mounted air-cooled condensing unit; exterior dial thermometer, cylinder locks and top mounted condensate evaporator, R-410A refrigerant, having following features: electrical characteristics as scheduled; 2 full-height doors; left and right hand hinges; stainless steel interior and exterior, stainless steel door liners; adjustable stainless steel legs with locking castors; standard compliment stainless steel wire shelves (similar to DELFIELD 6051XL-S) Other approved manufacturers: NORLAKE

K-7 Ice Machine / Bin Storage:
Provide an air cooled, modular ice cube machine with a 24 hour production capacity of 855 pounds of ice at 70°F air temperature. Energy Star Rated; Energy and water usage per 100 pounds of ice, 30.0 gallons of water. Machine shall utilize R-404A refrigerant. Machine shall deliver individually produced and harvested crescent shaped cubes. There shall be no moving parts under refrigeration. Evaporator shall be of stainless steel construction and produce ice on both sides of the plate. Machine is storage bin top mounted unit. UL, CUL, NSF and USDA listed. Factory stainless steel (similar to HOSHIZAKI KMD-860MAJ with Bin B-700SF). Other approved manufacturers: MANITWOC, SCOTSMAN.

K-8 Stainless Steel Counter/Table:
Provide stainless steel counter/table in accordance with plans and specifications, with rolled rim edges and 6" wall backsplash, with 18 gauge slatted stainless steel removable under shelving below with edges rolled to contour of cross rails. (10) 18 gauge stainless steel drawers, 1 5/8" O.D. 16 ga. stainless steel legs with adjustable bullet feet. Fabricated by LOW-TEMP.

K-9 Aluminum Shutter:
Provide aluminum shutter with manual crank up operation, all aluminum construction (similar to Cornell ESC10). Reference Section 08250 Rolling Curtains.

END OF SECTION

RELATED DOCUMENTS:

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

GENERAL:

The Contractor shall provide residential kitchen appliances with Cash Allowance specified Section 01056 including tax, for the purchase and installation of residential kitchen appliances for those areas indicated. These items are in addition and not related to the residential kitchen appliances scheduled for the Foods Lab 523.

Types of residential equipment required may include, but are not necessarily limited to the following:

- Upright Refrigerator/Freezers
- NSF Rated Commercial Microwaves
- Clothes Washers
- Electric Clothes Dryers; provide clothes dryer model with a “Long Vent” LV option for dryer vent system as a required feature, with minimum of 120 ft. to 160 ft. allowable length of dryer vent.

Color: Stainless Steel

Certification Labels: Provide residential equipment, which complies with standards and bears certification labels as follows:

Energy Ratings: Energy Star rated. Provide energy guide labels with energy cost analysis (annual operating costs) and energy information as required by Federal Trade Commission.

UL Standards: Provide residential equipment with UL Labels.

PRODUCT WARRANTIES:

Submit manufacturer's standard written warranty for each item of residential equipment.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Flat screen video display monitors and mounting brackets shall be provided under the cash allowance listed in Section 01056. Provide mechanical mounting brackets designed to support the video display monitors, where indicated on Drawings and specified in this Section.

Video Display Monitors (installed): Provide where indicated in the Drawings. After final purchase approval from Owner, purchase video monitors with mounting brackets and install with the cash allowance under Section 01056 Allowances.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Video Display Mounting Brackets Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on Sanus VisionMount products manufactured by Sanus Systems (800) 359-5520. Other Manufacturers who can furnish products or systems of same materials specified and equal in all respects will also be acceptable, such as Da-Lite, and Peerless.

WARRANTY:

The mounting bracket used shall be supplied with a warranty against defects in workmanship and materials for five (5) years.

SUBMITTALS:

Manufacturer's Data: Submit five (5) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2: PRODUCTS (final total list of equipment to be final approved by the Owner)

FLAT SCREEN VIDEO DISPLAY MONITOR MOUNTING BRACKETS: (provide under 01056 allowance)

The flat screen video display monitor wall bracket shall be Sanus Systems Premium Series Tilt-Mount Wall Mount, Model VLT5 (for 42" to 90" flat screens), or equivalent. Model shall be coordinated with the VDM video display monitors. Load capacity: 175 lbs. Tilt-mount screen adjustment capable. UL listed. Provide with security device: horizontal lock bar mechanism for padlock. Provide a universal fastener pack of all necessary screen attachment hardware, with mounting capabilities to wood studs/gypsum wallboard, concrete, CMU block, or metal studs/gypsum wallboard. Provide all necessary accessories for a complete installation and operable assembly.

The TV/Monitor wall bracket assemblies shall be of sufficient strength to support the weight of the flat screen Video Display Monitor for which is designed, with an adequate safety factor. It shall be installed with a wall attachment device capable of supporting the weight of the Video Display Monitor, the bracket itself. Confirm and coordinate bracket capabilities with the video display monitor size and weight. The video display monitor bracket shall wall mount and hold flat screen TV 1.25" from wall. Bracket shall be adjustable in both height and width to ensure proper fit. A locking mechanism shall hold TV securely in position.

Materials: Construction of the bracket shall be of heavy gauge steel with MIG welds, in scratch-resistant Satin Black powder coated finish.

PART 3: EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION

Brackets for Video Display Monitors shall be installed where indicated on the plans. All fasteners and components for complete assembly of the bracket shall be furnished by the manufacturers.

Provide wood wall blocking for drywall wall mounted brackets. Reference Section 06100 Rough Carpentry for wall blocking requirements.

All CMU wall brackets to be through bolted through walls with plates, nuts and washers.

Install in accordance with Manufacturer's printed instructions and Shop Drawings, approved by Architect.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

PART I: GENERAL

Work Description, Summary, Work Included: Laboratory casework and equipment, covered by this specification and accompanying drawings, are manufactured or supplied by one manufacturer to avoid divided responsibility.

Laboratory equipment contractor will furnish equipment as listed Science Equipment Schedules on Drawings. This includes delivery to the building, setting in place, leveling and scribing to walls and floors.

Unless noted otherwise, furnish plumbing, gas and electrical fixtures for science casework, as specified, and as standard with manufacturer, including faucets and trim, gas cocks, electric outlets, data outlets, stainless steel cover plates, nipples and lock nuts, etc., needed to secure each fixture to the equipment. Fixtures are furnished and installed by this Section, with final connection by other trades.

Furnish sinks and sink outlets, sink tailpieces, unless noted otherwise. Plumbing Contractor furnishes, installs and final hooks up traps.

Remove debris, dirt and rubbish accumulated as a result of this installation, leaving premises clean and orderly.

General Contractor to be responsible for covering installed casework with protective film to protect from damage and soiling until other trades have completed their work.

Related Work Not Included

Division 1 - General:
Furnish materials generally classified as maintenance or supply items.

Provide hoisting or elevator service at no charge.

Furnish security and protection during and after laboratory equipment installation.

Division 6 - Wood and Plastics:
General millwork, necessary framing, or reinforcement, of walls, floors or ceiling, to support equipment.

Division 9 - Finishes:
Furnish and install 4 inch high, cove base.

Division 15 - Mechanical:
Install and connect fume hood blower/motor furnished by casework manufacturer. All related duct work to be furnished and installed by Mechanical Contractor.

Install water, sewer and gas services and make final connections of plumbing (water and sewer) and gas fixtures provided by casework contractor.

Division 16 - Electrical:
Install and make final connections of electrical and data fixtures provided by casework contractor.

Submittals

Shop Drawings and Samples:

The casework manufacturer shall furnish shop drawings giving details and sizes, including methods of attachment and anything pertinent to the installation work, as soon as possible after the award of the Contract. He shall include full Specification requirements; include 3 color samples of finishes for the Architect's selection.

The manufacturer and supplier shall be responsible for making field measurements to insure proper fit of casework items.

Warranty

Supplier to warrant casework to be free from defects in materials and workmanship, under normal use and service, for one year from date of delivery. Within the warranty period, manufacturer shall repair or replace defective casework.

Job Conditions

Do not deliver Casework to project site until dry and heated storage space is provided. The casework specified under this Section is prefinished, and precaution must be taken to protect it against damage during installation and until final acceptance.

PART II: PRODUCTS

MANUFACTURER

Products of Campbell Rhea, Paris, TN are specified as a basis of design, quality, and layout.

Products of the following and other manufacturers will also be considered, if deviations from these specifications are specifically listed on "Substitution Sheets" attached to the bid form. If no deviations are listed, it will be assumed that these specifications are being strictly complied with. Any alterations or deviations are subject to the Architect's approval.

Leonard Peterson & Co., Inc., Auburn, AL
Sheldon Laboratory Systems, Crystal Springs, MS

Materials

Lumber
Oak lumber is red oak, grade FAS or better, air dried and kiln dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Red oak lumber exposed to view, is free of stains, splits, shakes, season checks and other similar defects.

Other hardwoods are grade FAS or better, air dried to a 6 percent moisture content, then tempered to 7-8 percent prior to fabrication. Other hardwoods are used in semi-exposed, or unexposed, areas and comply with NHLA grading for FAS or better lumber.

Plywood
Oak plywood is red oak, grade A-2, plain sliced, book-matched, cross banded, and has a solid core. The 3/4 inch red oak plywood is a minimum of 7-ply, 1/2 inch is a minimum of 5- ply,1/4 inch is minimum of 3-ply, and 3/32 inch is 3-ply.

Other hardwood plywoods are sound grade, have a solid core and are suitable for semi- exposed or unexposed areas. The 3/4 inch hardwood plywoods are a minimum of 7-ply, 1/2 inch are a minimum of 5- ply, 1/4 inch are a minimum of 3-ply, and 3/32 inch are 3-ply.

Hardboard
Hardboard is service tempered and consists of steam-exploded wood fibers, highly compressed into a hard, dense, 1/4 inch thick, homogeneous sheet, using natural resins and other added binders. Physical properties.

Average modulus of rupture is 5,300 lbs./sq. inch; density is 50 to 60 lbs./ cu. foot; and tensile strength of 3,500 lbs./sq. inch.

Particleboard
Particleboard is industrial grade, with the following physical properties : Density, 46 to 50 lbs./cu. ft.; modulus of rupture, minimum, 2,200 psi; modulus of elasticity, minimum, 450,000 psi.

Glass
DSB glass is double strength, grade "B", and 1/8 inch thick. Float glass is poured, clear glass, 1/4 inch thick, with a minimum of 88 percent clarity. Laminated safety glass consists of two outer plies of glass with a vinyl interlayer, and is either 7/32 inch or 1/4 inch thick .

Tempered safety glass is specially heat treated glass, 1/4 inch thick with a minimum of 88 percent clarity.

Drawers

Components:
Drawer front: 13/16 inch oak lumber.
Drawer sides and back: 1/2 inch, 9-ply laminated hardwood plywood.
Drawer bottom: 1/4 inch service tempered hardboard.

Construction:
All four corners of the drawer are dovetailed and glued. Edges of the drawer front are radiused to form a lip and overlap the opening 1/4 inch on all sides. Drawer fronts are one piece of lumber, whenever possible, providing consistency in color and grain within each drawer front. The back perimeter of the drawer front is routed so the drawer front is recessed into the opening and projects 13/32 of an inch. The top edge of drawer sides and back are radiused. Drawer bottom is let in on four sides, and securely glued underneath with a continuous bead of glue around the perimeter of the drawer bottom. In cabinets 24 inches or less in width, drawers have one, AL-1 aluminum pull, surface mounted with two screws, four inches on centers. In cabinets over 24 inches wide, drawers have two, AL-1 aluminum pulls. Drawers are supported on DS-1 slides which are side mounted, heavy duty, electrostatically epoxy powder coated, cold rolled steel, and have a 1501b. load capacity. Slides are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. DS-1 slides have automatic, positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools. File drawers are supported on side mounted FD-1, full extension steel slides. File drawers have an interior, screw mounted, metal bottom track and an adjustable metal file follower. Lock SL-1 is furnished when indicated.

Doors, Hinged:
Hinged solid doors, 48 inches or less in height:

Construction:
Hinged solid doors, 48 inches or less in height, are 13/16 inch thick, machine radiused on the edges to form a lip and overlap opening 1/4 inch on all sides. Solid oak rails on four edges frame a particleboard core. Core is laminated with 2 hardwood plywood crossbands. Face and back veneer are red oak. The back perimeter of the door is routed so the door is recessed into the opening and projects 13/32 inch. The left door of double doors has a center machined integral astragal.

Hinged solid doors over 48 inches in height:

Construction:
Hinged solid doors over 48 inches in height, are one inch thick, machine radiused on the edges to form a lip and overlap opening 1/4 inch on all sides. Solid oak rails on four edges frame a honeycomb core. Core is laminated with two hardwood plywood crossbands. Face and back veneer are red oak.

Base Cabinets

Frame and rails:

Horizontal front top frame member: 2-1/2 inch by 1 inch, solid oak.
Horizontal rear top frame members: 2-1/2 inch by 1 inch, solid hardwood.
Horizontal side top frame members: 1-3/4 inch by 3/4 inch, solid hardwood
Front intermediate rails: 2-1/2 inch by 3/4 inch, solid oak.
Back intermediate rails as required: 2-1/2 inch by 3/4 inch solid hardwood.

Backs:
Exposed exterior backs: 3/4 inch oak plywood.
Cabinets with exposed interiors but unexposed exteriors: backs are **1/4** inch oak plywood.
Cabinets with unexposed interiors and exteriors: backs are **1/4** inch service tempered hardboard.

End panels:
Cabinets with exposed interiors: end panels are 3/4 inch oak plywood.
Cabinets with exposed exteriors: end panels are 3/4 inch oak plywood.
Cabinets with unexposed interiors and one exposed end panel and one unexposed end panel: exposed end panel is 3/4 inch oak plywood, and unexposed end panel is 3/4 inch hardwood plywood.
Cabinets with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.

Bottom, shelves, and dividers:
Cabinets with exposed interiors: all are 3/4 inch oak plywood.
Cabinets with unexposed interiors: all are 3/4 inch hardwood plywood.
Exposed edges of end panels, bottom, shelves, & dividers are edgebanded with 1/8 inch solid oak.

**In all storage cabinets and Prep Room cabinets, each shelf shall feature a ½" high hardwood front edge lip for preventing roll off hazards.

Wall and Upper Cases:
Top panel, bottom panel:
Cases with exposed interiors: all are 1 -inch oak plywood.
Cases with unexposed interiors: all are 1 -inch hardwood plywood.

Adjustable shelves:
Cases with exposed interiors: all are 3/4 inch oak plywood with a ½" high hardwood front edge lip for prevention of roll off hazards.
Cases with unexposed interiors: all are 3/4 inch hardwood plywood with a ½" high hardwood front edge lip for prevention of roll off hazards.

**In all storage cabinets and Prep Room cabinets, each shelf shall feature a ½" high hardwood front edge lip for preventing roll off hazards.

Backs:
Cases with exposed interiors: back is 1/4 inch oak plywood.
Cases with unexposed interiors: back is 1/4 inch service tempered hardboard.

End panels:
Cases with exposed interiors: end panels are 3/4 inch oak plywood.
Cases with exposed exteriors: end panels are 3/4 inch oak plywood.
Cases with unexposed interiors and one exposed end panel and one unexposed end panel: exposed end panel is 3/4 inch oak plywood; the unexposed end panel is 3/4 inch hardwood plywood.
Cases with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.
Exposed edges of end panels and shelves are edgebanded with 1/8 inch solid oak.
Exterior hanger rails: 3 inch by 3/4 inch hardwood plywood.

Construction:
All wall and upper cases are rigidly constructed, integral units with the strongest most advanced joinery methods utilized of bored, doweled, dadoed, glued and screwed construction. Each case is completely enclosed without the use of common partitions, and has flush construction with overlapping doors, which

provides a dust resistant interior. Top panel is bored, doweled and glued into end panels. Bottom panel is bored, doweled and glued into end panels; and glued and screwed to the back. Backs are recessed and encapsulated into dadoed end panels, and further secured with glue blocks on each side. Exterior hanger rails, at the top of the back, are glued to the back and then screwed to the top panel and bored, doweled and glued into the end panels. Exterior hanger rails, at the bottom of the back, are glued to the back and then screwed to the bottom panel and end panels. Adjustable shelves are supported on heavy-duty, plastic coated, brass plated steel shelf clips, which fit into holes drilled 32 mm on centers, in the case end panels.

**In all storage cabinets and Prep Room cabinets, each shelf shall feature a ½" high hardwood front edge lip for preventing roll off hazards.

Tall Cases

Top panel:
Cases with exposed interiors: all are 1 -inch oak plywood.
Cases with unexposed interiors: all are 1 -inch hardwood plywood.

Bottom panel:
Cases with exposed interiors: all are 3/4 inch oak plywood.
Cases with unexposed interiors: all are 3/4 inch hardwood plywood.

Adjustable shelves:
Cases with exposed interiors: all are 3/4 inch oak plywood with a ½" high hardwood front edge lip for prevention of roll off hazards.
Cases with unexposed interiors: all are 3/4 inch hardwood plywood with a ½" high hardwood front edge lip for prevention of roll off hazards.

**In all storage cabinets and Prep Room cabinets, each shelf shall feature a ½" high hardwood front edge lip for preventing roll off hazards.

Backs:
Cases with exposed interiors and exposed exteriors: back is 1/4 inch oak plywood
Cases with unexposed interiors and unexposed exteriors: back is 1/4 inch service tempered hardboard.

End panels:
Cases with exposed interiors: end panels are 3/4 inch oak plywood.
Cases with exposed exteriors: end panels are 3/4 inch oak plywood.
Cases with unexposed interiors and one exposed end panel and one unexposed end panel: exposed end panel is 3/4 inch oak plywood; unexposed end panel is 3/4 inch hardwood plywood.
Cases with unexposed interiors and unexposed exteriors: end panels are 3/4 inch hardwood plywood.
Exposed edges of end panels, dividers and shelves are edgebanded with 1/8 inch solid oak.
Exterior back cross rails: 3 inches by 3/4 inch hardwood plywood.

Hardware and Accessories

Pull AL-1 is a satin lacquer finished, extruded aluminum bar in a trim, modern design. Pull is mounted with two screws, 4 inches on center and projects from the surface one inch.

Lock SL-1 is laboratory grade, cylinder cam lock, with a 5-disc tumbler mechanism, and a dull chrome plated face. Tumblers and keys are brass, while plug and cylinder are die cast zinc alloy. A 180 degree turn of the key moves the lock cam into, or out of, a slot cut to receive it. There are 500 key changes standard. Locks are keyed differently, master keyed and furnished with 2 keys per lock. Locks and corresponding keys are alpha-numerically coded for a quick match. Lock SL-1 is equipped with RemovaCore Tm keying control. If needed, with the use of a control key, the key core of the lock assembly can be removed and a new key core inserted, changing the entire locking system in a matter of minutes. Key cores can be held out of the lock assembly until the project is completed, removing the security risk of lost or stolen keys during installation and

construction. Casework manufacturer can provide control keys and replacement cores as required. Locks are furnished where indicated on Drawings.

Hinge SS-1 is heavy duty, institutional type, 5-knuckle hospital tipped, and is made from .083 inch thick stainless steel. Hinge is semi-concealed, 2-1/2 inches high and has off-set wings. Each wing has 3 screw holes, one of which is slotted for adjustability.

Catches:
Friction roller catch is a zinc plated steel catch with a positive action, spring cushioned, polyethylene roller, and a metal strike plate. Screw mounted catch and strike plate have slotted holes for adjustability.

Drawer slides DS-1 are electrostatically epoxy powder coated, cold rolled steel, heavy-duty, side mounted, and have a 1501b. load capacity. They are equipped with heavy-duty, ball bearing nylon rollers for smooth effortless operation. Slides have automatic positive stop levers to prevent drawer's accidental removal, but allow for quick removal without tools.

Shelf clips are dual pin clear polycarbonate plastic locking shelf support clips, with anti-tip feature, which fits into holes drilled 32 mm on centers. Equivalent to Allen Field No. 55536.

Leg shoes are closed-bottom style, 2-1/4 inches square, and molded of 1/8 inch black polyethylene. 10. Crossbars and Greenlaw Arms

Crossbars and Greenlaw Arms are 3/4 inch diameter, anodized aluminum rods, with ends rounded.

Upright Rods are 3/4 inch diameter, anodized aluminum, 36 inches long with a rounded top and a tapered bottom to fit rod sockets.

Clamps are 1 inch square aluminum stock, with two, 3/4 inch diameter openings, at right angles to each other, bored through sides. Openings are for upright rods and crossbars, or Greenlaw Arms. Thumb screws into each end of the clamp, tighten against the rods to hold positions .

Burette rods are 1/2 inch diameter, anodized aluminum, and either 18 or 24 inches long. Rods are furnished with a tapered aluminum adapter to fit rod socket.

Rod sockets are mushroom type, machined from a solid aluminum rod. Sockets are held in place by a heavy aluminum lock nut and washer.

Mechanical Service Fixtures

Fixtures for water, gas, steam, or other services, are vandal-resistant, triple chrome plated, have heavy-duty construction and are specifically designed for laboratory use.

Water Faucets - Hot and/or Cold: Vandal-resistant faucets are cast from red brass, and have four-arm type handles with color coded indexes. Faucets have serrated hose tips, unless specified otherwise. Faucets have patented REX unit ceramic disc cartridges, and replaceable seats. The stem is brass, with full Acme threads, and has a brass cap nut. Goosenecks are rigid. Fixture outlets are tapped 3/8 inch I.P.S. for aerators, vacuum breakers, hose connections, or other accessories. Vacuum breakers to be included on faucets.

Gas Cocks (PROVIDE AND LOCATE FOR EACH SINK): Vandal-resistant ground key cocks, double gas turrets made from high grade, brass forgings, have integral ten serration, non-slip hose tips. Wing handle has color-coded index button, is one piece construction, precision ground, and lapped to fit cock chamber. Handle operates with a 1/4 turn, and is spring-loaded for constant pressure and automatic take up. Do not use for oxygen service. When specified, needle point valves are available for high pressures and oxygen service.

Air and Vacuum Cocks (NOT REQUIRED THIS PROJECT)

Multiple Service Fixtures: Vandal-resistant triple chrome plated fixtures have one cold water faucet and two ground key cocks for gas, air, or vacuum services. Cold water valve has patented REX unit ceramic disc cartridge. Faucet has a rigid gooseneck, one four-arm handle, and serrated hose tip. Vacuum breaker furnished when specified. Faucet with integral vacuum beaker is furnished when specified. Ground key cocks have serrated non-slip hose tip, spring-loaded wing handles and color coded index buttons.

Vacuum Breakers: Watts NLF-9, or comparable, vacuum breakers are brass with polished chrome plating, screw-in type with stainless steel working parts, and durable rubber diaphragm and disc. Vacuum breaker is for hot or cold faucet and has a primary valve with a soft disc that seats against mating part. The secondary check valve utilizes a soft disc to metal seating. Vacuum breaker is tapped 3/8 inch N.P.T. Vacuum breaker is not intended for constant high pressures. Vacuum breakers are furnished when indicated.

Electrical Fixtures
Receptacles are 3-wire grounded, 20 A, 125V AC, with stainless steel cover plates and cadmium-plated steel boxes. Pedestal boxes are brushed, cast aluminum with conduit nipples and lock nuts. When specified, G.F.I., ground fault circuit interrupter, fixtures are available. G.F.I. fixtures are 20 A, 125V AC, with a brown nylon face and a LED indicator light. G.F.I. fixtures conform to UL Standard 943 Class A, and have dual slot terminal screw wiring connections and a trip time of 0.025 seconds.

Stationary teachers demonstration island shall provide a total of two mounted duplex G.F.I. electrical outlets, and (1) single receptacle data outlet.

Teachers desk return shall provide a mounted quad data outlet box.

Sinks and Sink Outlets

Epoxy resin sinks shall be drop-in style, non-glaring black, and specially modified resins, molded in one solid piece for optimum physical and chemical resistance. Inside corners shall be coved and the bottom is dished to the outlets. Outlets are polypropylene with 1 ½ inch NPS threads, unless otherwise specified. Provide sinks equivalent to products manufactured by Durcon Inc.

Tailpieces are to be acid resistant polypropylene.

Laboratory Tops (provide as scheduled)

Epoxy Resin Countertops

Filled modified epoxy resin molded into homogeneous, non-porous sheets, and has optimum physical and chemical resistance. The specially compounded and cured uniform mixture is not dependent on a surface coating for chemical or stain resistance. Color and pattern shall be consistent throughout thickness; with integral or adhesively seamed components. Provide countertops equivalent to products manufactured by Durcon Inc.

1. Flat Surface Thickness: 1 inch, nominal
2. Surface Finish: Smooth, non-glare
3. Color: Black
4. Back and End Splashes: Same material, 4 inches high, same thickness; separate for field attachment.
5. Exposed edges and corners are radiused, with a drip groove provided on under surface in areas where sinks are installed.

Fume Hoods (Where Indicated on Drawings)

Provide benchtop Fume Hood Model 2247300 47”x 25”x 53” LABCONCO Basic 47 Laboratory Hood, set on a base storage cabinet Model 9900000 47” x 22” x 36.75”, on a solid epoxy countertop Model 482803 by LABCONCO. Model shall include built-in belt-driven Integral Blower module. Comply with ASHRAE 110 standards.

Or an equivalent Campbellrhea Lab Shield Barrier Free Fume Hood.

Provide hood with superstructure to provide efficient removal of fumes, both heavy and light, with the least amount of turbulence from air entering the hood.

Provide color matching metal duct shroud and for concealment of exhaust ducts below the ceiling.

Fume hoods to be provided pre-wired and pre-plumbed.

Air Bypass: Provide bypass feature for relatively constant velocity of air through the face of the hood, regardless of the sash position.

Casework Finish

Surfaces to be Finished:
Exposed exterior and exposed interior surfaces of cabinets receive the full finishing process. The unexposed interior surfaces of cupboards, drawers, wall cases, upper cases, and tall cases receive a baked on protective coat of moisture and chemical resistant catalyzed sealer, and a top coat of clear, catalyzed, conversion varnish. Other unexposed surfaces are processed through standard finishing steps, and receive a baked on protective coat of moisture and chemical resistant catalyzed sealer.

Finishing Process:
Prior to assembly lumber for doors, drawers and cabinets, and plywood for cabinets, are machine sanded with 120 grit, 180 grit, and finally, 220 grit sand paper. Flat surfaces receive two additional machine sandings: one in a orbital crossbelt sander with 40 micron and 60 micron grit sanding belts; and, one through a rotary polisher with 150 grit sand paper. Door and drawer front edges are machine sanded to a very smooth surface through a profile edge sander utilizing a 100 grit and a 150 grit paper. After assembly, drawers, doors, and casework are thoroughly examined and fine-finished by hand to provide a consistently smooth surface. Prior to the first application in the finishing process, items are placed in the dust-off booth where compressed air is used to remove loose fibers and dust. Selected surfaces are stained with NGR stain to the desired color and allowed to dry. Next a protective coat of moisture and chemical resistant, catalyzed sealer is applied. After flash drying, items are oven baked at 130 degrees F. Following a cool down period, surfaces that receive the final top coat are carefully hand sanded and wiped clean. A top coat of clear, catalyzed, conversion varnish is applied, allowed to dry, and then oven baked at 130 degrees F. The final top coat provides chemical resistance, toughness, durability, and excellent color stability with a smooth finish and high-gloss lustre.

Chemical Resistance

Method of testing:
Non-volatile chemicals: Five drops of each reagent were applied to the surface and covered with a watch glass for sixty (60) minutes and the temperature maintained from 74 to 80 degrees F. At the end of this period, the reagents were flushed with water, the surface scrubbed with a soft bristle brush under running water, rinsed and dried. After thorough drying, the surface was evaluated.

Volatile chemicals: The test areas were cleaned with a cotton swab soaked in the solvent to be used for the test, a one inch cotton ball saturated with the test solvent was then covered by an inverted two ounce wide mouth bottle to retard evaporation. The test period was for sixty (60) minutes and the temperature maintained from 74 to 80 degrees F. Twenty-four hours after the test period, the test surface was scrubbed with a damp paper towel and dried with paper towels and evaluated. Volatile chemicals are indicated by a "bullet". The finish of exposed surfaces is capable of withstanding the following chemicals with no effect:
Acetic Acid - 50% - Methyl Ethyl Ketone
Acetic Acid - 98% - Naphtha
Acetone Nitric Acid - 1 0%

Ammonium Hydroxide - 28% Phosphoric Acid - 25%
Benzene Phosphoric Acid - 75%
Carbon Tetrachloride Potassium Hydroxide - 50%

Ethyl Acetate Sodium Carbonate - Saturate
Ethyl Alcohol Sodium Hydroxide - 10%
Ethyl Ether Sodium Hydroxide - 20%
Formaldehyde Sodium Hydroxide - 40 %
Gasoline Sulfuric Acid - 25%
Hydrochloric Acid - 1 0% - Toulene
Hydrochloric Acid - 20% Xylene
Hydrochloric Acid - 37%
Methanol (Methyl Alcohol)
Acids that have little to moderate effect on the finish of exposed surfaces are:
Nitric Acid - 30%
Sulfuric Acid - 70%

Fabrication
Factory assembly of casework in the largest components possible aids in the installation. Bored, doweled and glued construction is used for maximum strength; and the use of precision jigs and clamps ensures square corners and plumb vertical surfaces.

Fabrication of laboratory casework and equipment is completed to dimensions in the final, approved copy of shop drawings.

PART III: EXECUTION

Coordination
The General Contractor, Electrical Contractor, Plumbing Contractor and Owner shall cooperate with the laboratory casework and equipment contractor to coordinate delivery and complete installation of the product.

Installation and Adjustments
Installation of casework must be plumb, level, true and straight, with no distortions. Use concealed shims as required. When laboratory casework or equipment buffs against other finished work, scribe and cut for an accurate fit.

Demonstration
A qualified representative will demonstrate operation procedures and maintenance of the installed equipment to the Owner's personnel. This demonstration may be set at Owner's convenience; however, it must be conducted within 60 days of final installation of casework.

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, apply to the work specified in this section.

PART 1: GENERAL

DESCRIPTION OF WORK:

Work of this Section shall be to provide window treatments shown on Drawings and specified in this Section.

INDUSTRY STANDARDS:

For listing of names of industry standard agencies mentioned by abbreviation in this Section, refer to Section 01068.

QUALITY ASSURANCE:

Manufacturers:

Standard: For purpose of designating type and quality for work under this Section, Drawings and Specifications are based on products manufactured by Levolor, Inc. Other Manufacturers who can furnish similar products or systems of same materials specified will also be acceptable.

SUBMITTALS:

Manufacturer's Data: Submit for approval three (3) copies of folder containing complete Manufacturer's data and installation procedures for all products to be used in work of this Section.

Shop Drawings: Submit Shop Drawings in compliance with GENERAL CONDITIONS. These drawings shall be coordinated with adjacent work.

PRODUCT HANDLING:

Working Areas: Provide suitable areas for storage of materials and equipment.

Delivery: Deliver products to site in original sealed containers or packages bearing Manufacturer's name and brand designation.

PART 2: PRODUCTS

GENERAL:

Horizontal blinds shall be Levolor 1" "Monaco" (Contract) Blinds, Aluminum, with 1 3/16" wide x 3/4" high head channel, 5 year limited warranty, tomized steel working components, disengaging clutch type tilter. Color to be selected by Architect from manufacturer's standard colors.

HEAD CHANNEL: Head channel shall be .025” tomized steel. Channel shall be U-shaped 1 3/16" wide x 3/4” with flanged edges at top, and coated with baked on finish.

QUANTITIES:

Provide blinds for all exterior windows, including classrooms and offices, and at interior glass in hallways, lobbies and offices.

Classroom blinds layout to include not extending down and over designated egress operable windows that have egress signage, leave these operable windows exposed.

Blinds are not required for Dining, entrance lobby curtainwalls, storefront entrances, Media Center Work Room, connectors corridors, and long main corridors facing the exterior.

PART 3: EXECUTION

INSPECTION

Examine all surfaces to which products are scheduled to be installed. If unsatisfactory conditions exist, report to General Contractor and do not proceed with work until conditions have been satisfactorily corrected.

INSTALLATION:

Install window blinds in accordance with Manufacturer's printed instructions and Shop Drawings, approved by Architect.

All installations shall be performed by capable workmen under direction of foreman fully qualified by experience in each respective field of installation work.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 – GENERAL

SCOPE OF WORK

Furnish and install new manually telescoping gymnasium seating complete assemblies with all listed accessories as indicated on plans and drawings.

Clean area and leave seating operational. Site and seating to be left in a ready for use condition.

PART 2 - PRODUCTS

These specifications are based on Hussey Seating Company's Model Maxam 26. The standard Hussey Seating Company's specification shall apply as if written in full and will be the standard for comparison.

Include the “Flex Row” ADA seating system for compliance for compliance the wheelchair and companion layout indicated by the Drawings.

Other interested suppliers must provide detailed list of any deviations from these specifications.

Telescoping bleachers to be furnished in heights, lengths, widths, and number of rows as indicated on drawings, plans, and elevations. Bleachers are to be wall attached, each separate bank manually operated, closed deck design, and must meet requirements set forth in NFPA 102, ICC Section 300, and the current IBC.

Seat spacing to be 26" back to back with a 11 5/8” rise. Seat depth to be 10" minimum and seat height to be 16" minimum.

These manufacturer’s products are minimum acceptable standard products and shall incorporate all requirements of these specifications:

“Maxam” with Courtside Seat & Clear Wood Decking by Hussey Seating Company (Basis of Design)

“Universal Bleacher” with CSM Seat by Interkal LLC

“5000 Series” with seats utilizing Back Covers, End Caps, by Irwin Telescoping Seating Co.

MATERIALS

Seats shall be 18" long x 10” wide, high density polyethylene contoured modules with all reinforcing ribs to be the internal, non-exposed type. Seats shall be provided in up to three colors, to be selected by Architect, and configured to read “CMS” or similar on each bank, with shadow effect. Provide elevation drawings for review and approval.

Decking to be 5/8" nominal thickness, 5-ply exterior plywood, A-C Grades with plugged solid cross bands. Joints shall be glue tongue and groove or recessed metal spliced. Finish to be 2-coats high solids clear polyurethane both sides to seal decking. Laminated, painted finish or single side polyurethane finishes are not acceptable.

Nosing and rear riser shall be continuous formed galvanized (G-60) steel members. Painted risers are not acceptable.

Understructure structural steel shall be finished with an epoxy resin based, textured powder coat, rust inhibitive finish.

Wheels to be a minimum of 5" diameter with 1 1/4" wide soft rubber face. A minimum of eight wheels per moving row, and not less than 4 wheels per column is required.

Structural fastening shall be vibration proof, and done with nuts and bolts. Self-tapping bolts or screws are not acceptable.

Frames to be of varying sizes to accommodate load requirements and to be of channel design to allow through-bolting of brackets and finishing of frame material on all surfaces.

Lower riser deck support to be steel with Silver Gray zinc alloy plating. Painted or laminated surfaces are not acceptable.

OPERATION

Bleachers to operate on the telescopic principle with a locking system which permits the use of one or more rows.

Frames to have positive interlock at both the top and bottom.

The first moving row to be secured with both friction and mechanical locks. The front skirt board (friction lock) is to have a cylinder lock to prevent unauthorized use of bleachers.

Upper and lower track are to be designed to allow for field adjustment of row spacing, if necessary.

ACCESSORIES

Pull straps for opening telescoping bleachers.

Provide manufacturer’s standard scorer’s table, extended fit over bleacher bench row type, with enclosed undercounter leg space. one 8' x 18" x 30” scorer's table. Table top shall be Gray textured blow molded polymer 2” in thickness with eased edges for reduced pressure points and improved ergonomics. The Integral 16 Ga. cantilevered comfort C-style leg design provides ample clear space and stability during use and folds for ease of storage on the seating deck. The structure is finished in a speckled gray. The table is portable and may be used on any seating row or flat floor surface.

Provide access hatches to allow for servicing and maintenance, as required.

Provide filler panels and / or cutouts as indicated on drawings or as required by field conditions.

Provide aisles as required by code and as shown on drawings.

Front Aisle Steps: Provide at each vertical aisle location front aisle step. Front steps shall engage with front row to prevent accidental separation or movement. Steps shall be fitted with four non-skid rubber feet each 1/2" [13] in diameter. Blow molded end caps shall have full radius on all four edges.

Intermediate Aisle Steps: Intermediate aisle steps shall be of boxed fully enclosed type construction. Blow molded end caps shall have full radius on all four edges. Step shall have adhesive-backed abrasive non-slip tread surface.

Provide self-storing end rails to be 42" height above seat, with tubular supports and intermediate members designed with 4" sphere passage requirements, powder coated tubular steel. Furnished as required by the current IBC and as shown on drawings.

Intermediate Folding Aisle Handrails: Provide single pedestal mount handrails 34” high with terminating mid rail. Handrail to be permanently mounted to a rotating socket for rail storage on the intermediate aisle step.

Colored Safety Rail Systems; choose from 15 Standard colors.

Provide row letters and seat numbers. Letter and number system to be approved by Architect.

PART 3 – EXECUTION

INSTALLATION, SERVICE, INSURANCE, AND WARRANTY

Installation is to be done by Factory Certified Installers. Proof of factory training and certification must be supplied to the Architect's office prior to installation.

The Bleacher Contractor must be able to show proof of full time service capability by the Contractor's employees. Such service personnel must be employed on full-time basis.

The Bleacher Contractor must be able to provide proof of completed products liability insurance coverage of at least two million dollars ($2,000,000.00).

Manufacturer's Product Warranty: Submit manufacturer's standard warranty form for telescoping bleachers. This warranty is in addition to, and not a limitation of other rights Owner may have under Contract Documents. Warranty Period: Five years from Date of Acceptance.

END OF SECTION

RELATED DOCUMENTS

Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division-l Specifications sections apply to work specified in this section.

PART 1 - GENERAL

DESCRIPTION OF WORK:

Extent of pre-engineered buildings work is shown on drawings.

Manufacturer's standard components may be used, providing components, accessories, and complete structure conform to the specific architectural design, dimensions, and appearance shown and to specified requirements.

Manufacturer is responsible for design of complete system and conformance to the current North Carolina Building Code, and the current North Carolina Energy Conservation Code

Related Work Specified Elsewhere:

Concrete floor and foundations, and installation of anchor bolts are specified in Division 3.
07200 Building Insulation
07210 Pre-Engineered Building Roof Insulation
07610 Metal Roofing

QUALITY ASSURANCE:

Design Criteria:

For structural steel members, comply with AISC "Specification for the Design, Fabrication, and Erection of Structural Steel for Buildings".

For light gage steel members, comply with AISI "Specification for the design of Cold-Formed Steel Structural Members".

Design primary and secondary members and covering for applicable loads and combination of loads in accordance with the 2012 North Carolina Building Code.

For welded connections, comply with AWS "Structural Welding Code".

Design Loads: Basic design loads, as well as auxiliary and collateral loads, are indicated on drawings.

Design each member to withstand stresses resulting from combinations of loads that produce maximum percentage of actual to allowable stress in that member, as prescribed in MBMA "Recommended Design Practices Manual".

Provide thermal insulation as required for compliance with the 2012 North Carolina Energy Conservation Code.

Fabrication Criteria: Provide prefabricated metal buildings as produced by a manufacturer who is regularly engaged in fabrication of pre-engineered metal structures of type and quality indicated.

Clearly and legibly mark each piece and part of assembly to correspond with previously prepared erection drawings, diagrams, and instruction manuals.

SUBMITTALS:

Product Data: Submit manufacturer's product information, specifications and installation instructions for building components and accessories.

Building Design and Certification of Drawings: Submit complete drawings showing building structure design, including anchor bolts settings, sidewall, end wall, and roof framing, transverse cross sections, covering and trim details, and accessory installation details to clearly indicate proper assembly of building components. Building structure design drawings shall be prepared and sealed by a Professional Engineer, registered to practice in the State of North Carolina, and shall state that the building design meets the indicated loading requirements and codes of authorities having jurisdiction.

Provide roof thermal blocks, roof thermal insulation and vapor barrier product data and manufacturer's specification indicating compliance with the current North Carolina Energy Conservation Code, coordinated with 07200 and 07210.

Shop drawings showing locations and layout of steel support strapping for roof insulation.

Load and reaction reports for all frame members for all load cases.

Samples: Submit samples of the following:

12" long by actual width of roofing and trim panels, with required finishes.

Fasteners for application of roofing and trim panels. Sealants and closures.

Vapor Barrier: 12" x 12" sample vapor barrier fabric, painted support strapping

Maintenance Stock: Furnish at least 1% excess over required amount of nuts, bolts, screws, washers, and other required fasteners for each building. Pack in cartons and store on site where directed.

WARRANTY:

Provide manufacturer's standard warranty for:
1. Standard warranty on materials and workmanship: 3 years
2. Roof Panel paint film finish: 20 years NDL (No Dollar Limit) Manufacturer's warranty. Reference 07610.
3. Roof Panel perforation: 20 years NDL (No Dollar Limit) Manufacturer's warranty. Reference 07610.
4. Roof Weathertightness: Manufacturer's NDL (No Dollar Limit) written roof weathertightness warranty - twenty (20) years. Reference 07610.

DELIVERY, STORAGE AND HANDLING:

Deliver and store prefabricated components, sheets, panels, and other manufactured items so they will not be damaged or deformed. Stack materials on platforms or pallets, covered with tarpaulins or other suitable weather tight ventilated covering. Store metal sheets or panels so that water accumulations will drain freely. Do not store sheets or panels in contact with other materials which might cause staining.

PART 2 - PRODUCTS

MATERIALS:

Hot-Rolled Structural Shapes: ASTM A 36 or A 529.

Tubing or Pipe: ASTM A 500, Grade B; ASTM A 50l; or ASTM A 53.

Members Fabricated from Plate or Bar Stock: 42,000 psi minimum yield strength; ASTM A 529, A 570, A 572 or A 36 modified.

Members Fabricated by Cold Forming: ASTM A 607, Grade 50.

Galvanized Steel Sheet: ASTM A 446 with G 90 coating; "Class" to suit building manufacturer's standards.

STRUCTURAL FRAMING COMPONENTS:

Rigid Frames: Hot rolled structural steel. Factory welded and shop painted built-up "I". shape or open web rigid frame consisting of tapered or parallel flange beams and tapered columns. Furnish complete with attachment plates, bearing plates, and splice members. Factory drilled for bolted field assembly.

Length of span and spacing of frames as indicated except slight variations acceptable to meet manufacturer's standard.

End Wall Columns: Factory welded, built-up "I" shape or cold formed sections. Fabricate of minimum 14 ga. material. Shop painted.

Tube Steel Wind Beams: ASTM A 500, Grade B; ASTM A 50l; or ASTM A 53.

Wind Bracing: Adjustable, threaded steel rods, 1/2" diameter minimum; ASTM A 36 or A 572, Grade D.

Secondary Framing: Purlins, girts, eave struts, tube steel wind beams, end wall beams, flange and sag bracing; minimum 16 ga. rolled formed sections. Shop painted.

Base channel, sill angle, end wall structural members (except columns and beams), purlin spacers; minimum 14 ga. cold formed steel, galvanized.

Any members required for door or window openings shall be accounted for in bid.

Any members required for the mounting of specified basket ball goal backboards from the roof framing.

Bolts: ASTM A 307 or A 325 as necessary for design loads and connection details. Shop painted, except provide zinc-or cadmium-plated units when in direct contact with panels.

Fabrication: Shop fabricate to the indicated size and section, complete with base plates, bearing plates, and other plates as required for erection, welded in place, and with all required holes for anchoring or connections shop drilled or punched to template dimensions.

Shop connections power riveted, bolted, or welded.

Field connections bolted.

Shop Painting: Clean surfaces to be primed of loose mill scale, rust, dirt, oil, grease, and other matter precluding paint bond.

Follow procedures of SSPC-SP3 for power tool cleaning, SSPC-SP7 for brush-off blast cleaning, and SSPC-/SPI for solvent cleaning.

Prime structural steel primary and secondary framing members with manufacturer's standard rust-inhibitive primer having over 50% rust-inhibitive pigment, such as red-lead mixed pigment alkyd varnish (FS TT-P-86, Type II) or zinc chromate iron-oxide alkyd (TT-P-636).

PANELS:

ROOFING PANELS: Provide factory formed 24 gauge prefinished galvalume steel panel with Kynar 500 finish roofing panels, equal to 16″ wide panel with striations and 2″ high ribs equivalent to Varco Pruden SLR II standing seam roof panels, attached with UL 90 Rated panel clips at 5'-0" o.c. Provide flashings, closers, fillers, metal expansion joints, ridge covers, fascias, and other sheet metal accessories, factory formed of same material and finish as roofing and siding. Roofing system shall meet UL 580: Class 90 Uplift rating and Class A. Roofing system shall have been tested in accordance with ASTM E-1592. PROFILE AND COLOR TO MATCH EXISTING. Ridge cover shall be continuous vented type.

Make connection of roof panels to structural members, except at eaves, with clips with movable stainless steel tabs, seamed into standing seam side lap.

WALL PANELS: Ribbed wall panels where indicated on Drawings shall be fabricated from 24 gauge galvalume steel, 70% fluoropolymer Kynar 500 factory applied paint system with a 25-year finish warranty, formed to provide a weathertight closure assembly. Panel shall be a 16" wide with concealed fasteners type, smooth textured, flat profiled with 2" standing seam ribs. Provide all accessories, trims, channels and flashings for a complete assembly. Provide panels equivalent to Varco Pruden SLR II panel, or equivalent products by MBCI or Metal Roofing Systems. PROFILE AND COLOR TO MATCH EXISTING.

SOFFIT PANELS: Metal soffit panels and trim where indicated to be .032" aluminum, flat profile and smooth textured, with a factory KYNAR 500 finish, selected from standard colors. Provide 12 inch wide solid non-vented panels, unless otherwise noted. Soffit system shall be equivalent to Metal Roofing Systems (MRS) Flush Seam panel, or equivalent products by MBCI. Provide soffit panels in compliance with ASTM 1592, and the Architectural Aluminum Manufacturers Association (AAMA) Specifications 1402-86 Standard Specifications for Aluminum siding, soffit, and fascia. Provide all necessary accessories and trims for complete assemblies. PROFILE AND COLOR TO MATCH EXISTING.

SHEET METAL ACCESSORIES:

Coordinate with requirements of Section 07600 – Flashing and Sheetmetal.

General: Unless otherwise indicated, provide coated aluminum accessories and trim with coated steel roofing. Provide Kynar 500 prefinished coating, colors to match existing.

THERMAL INSULATION:

Foundation Insulation: Coordinate with Section 07200 Building Insulation.

Wall Insulation: Coordinate with Section 07200 Building Insulation.

Roof Insulation: Coordinate with Section 07210 Pre-Engineered Building Roof Insulation.

Roof Insulation Vapor barrier: Coordinate with Section 07210 Pre-Engineered Building Roof Insulation.

Roof Insulation Retainer Strips: Coordinate with Section 07210 Pre-Engineered Building Roof Insulation.

Roof Purlin Thermal Blocks: Coordinate with roof panel system and 07210 Pre-Engineered Building Roof Insulation.

Locations: Coordinate with Section 07210 Pre-Engineered Building Roof Insulation, Section 07200 Building Insulation, and Drawings.

PART 3 - EXECUTION

ERECTION:

Framing: Erect structural framing true to line, level and plumb, rigid and secure. Level base plates to a true even plane with full bearing to supporting structures.

Purlins and Girts: Provide rake or gable purlins with tight fitting closure channels and fascias. Locate and space wall girts to suit door and window arrangements and heights. Secure purlins and girts to structural framing and hold rigidly to a straight line by sag rods.

Bracing: Provide diagonal rod or angle bracing in both roof and sidewalls as indicated.

Movement resisting frames may be used in lieu of sidewall rod bracing, to suit manufacturer's standards.

Where diaphragm strength of roof or wall covering is adequate to resist wind forces, rod or other forms of bracing will not be required.

Framed Openings: Provide shapes of proper design and size to reinforce opening and to carry loads and vibrations imposed, including equipment furnished under mechanical or electrical work. Securely attach to building structural frame.

ROOFING:

Manufacturer’s standard erection guidelines meeting UL 90 requirements.

Sheet Metal Accessories: Install gutters, downspouts, ventilators, louvers, and other sheet metal accessories in accordance with manufacturer's recommendations for positive anchorage to building and weather tight mounting. Adjust operating mechanism for precise operation.

Thermal Insulation: Install in accordance with manufacturer's published directions, performed concurrently with installation of roof panels. Install blankets straight and true in one-piece lengths and both sets of tabs sealed to provide a complete vapor barrier. Install retainer strips at each longitudinal joint straight and taut, nesting with roof rib to hold insulation in place.

END OF SECTION

SECTION 13900 - WET PIPE SPRINKLER SYSTEMS

PART I - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, and North Carolina for Automatic Sprinkler Systems, apply to this Section.

1.2 SUMMARY

A. This Section provides the basic information needed to design and install a Wet-Pipe Sprinkler System for the project building.

1.3 SYSTEM DESCRIPTION

A. System to provide coverage for the entire new addition or building. See plans for areas as indicated to be sprinkled.

B. Interface system with building fire and smoke alarm system.

C. Provide system to NFPA 13 Light or Ordinary hazard, Group 1 occupancy or as required for the type occupancy if other than Light/Ordinary hazard. See architectural plans for occupancy and construction types.

D. Provide Fire Department connections as indicated. See Civil – Site plans.

1.4 SYSTEM PERFORMANCE AND DESIGN REQUIREMENTS

A. Wet pipe sprinkler subcontractor is fully responsible for the design of a complete and compliant system, certified by an North Carolina Professional Engineer or registered NICET Level III Sprinkler Designer, and responsible to obtain approval from authorities having jurisdiction for the Fire Protection Systems specified. Storage tank size, pump size, and main line sizes are indicated as basis of bid only. Subsequent to award of contract, Sprinkler contractor shall perform all necessary investigative hydraulic work and final costs / sizes of the aforementioned will be adjusted with cost credits or adds in accordance with the general and supplemental conditions of the contracts.

The Sprinkler contractor is responsible for providing the main line piping to the site contractor for installation. The Site Contractor shall install the main line piping. All parts, pieces, assemblies, and items for a complete and compliant system shall be provided.

B. Contact local utilities for fire hydrant flow tests results, as required to prepare design for hydraulically calculated systems.

C. Design installation to conform to NFPA 13, N.C. State Building Codes, and the latest issue of the "Requirements for Automatic Sprinkler Systems" and all subsequent Amendments to date, as published by the North Carolina Department of Insurance.

D. Designer is responsible for reviewing information on the plans and verifying, adjusting, or correcting sizes as necessary to meet NFPA 13 requirements and flow rates at the actual pressures available from the local utility lines at no additional cost to the contract.

1.5 SPECIAL CONDITIONS

A. Horizontal sprinkler mains and branches shall be located as high as possible above the ceiling and heads dropped down into ceiling where ceilings are indicated on architectural reflected ceiling plans..

B. All horizontal sprinkler pipes shall be located above the finished ceiling. If the ceiling is higher then the specified mounting height then provide the required risers and offsets to locate the pipe above the ceiling.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: Firms whose equipment, specialties, and accessories are listed by product name and manufacturer in UL Fire Protection Equipment Directory and FM Approval Guide and that conform to other requirements indicated.

B. Listing/Approval Stamp, Label, or Other Marking: On equipment, specialties, and accessories made to specified standards.

C. Comply with requirements of authority having jurisdiction for submittals, approvals, materials, hose threads, installation, inspections and testing.

D. Installer's Qualifications: Firms qualified to install and alter fire protection piping, equipment, specialties, and accessories, and repair and service equipment. A qualified firm is one that is experienced (minimum of 10 previous projects similar in size and scope to this Project) in such work, familiar with precautions required, and in compliance with the requirements of the authority having jurisdiction. Submit evidence of qualifications to the Architect upon request.

1.7 SUBMITTALS

A. Submit shop drawings and product data that includes detailed pipe layout, hangers and supports, components and accessories.

B. Submit shop drawings and hydraulic calculations to authority having jurisdiction and Architect/Engineer for approval. Submit Proof of Approval to Architect/Engineer.

1.8 OPERATION AND MAINTENANCE DATA

A. Submit manufacturer's Operation and Maintenance Data.

B. Include written Maintenance Data on components of system, Servicing requirements and Record Drawings.

1.9 DELIVERY, STORAGE AND HANDLING

A. Provide temporary inlet and outlet caps.

B. Maintain caps in place until installation.

1.10 EXTRA STOCK

A. Provide extra sprinkler heads under provisions of NFPA 13.

B. Provide suitable wrenches for each head type.

C. Provide metal storage cabinet in location designated.

PART II - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

A. Central Sprinkler Corporation
B. Star Sprinkler Corporation
C. Viking Corporation

2.2 PIPING MATERIALS

A. Buried Piping: Ductile iron, Class 50

B. Above Ground Inside Building Piping: Steel, Schedule 10 black. Schedule 5 or thin wall threadable pipe is not acceptable.

C. Woven mesh stainless steel flexible hose is acceptable for drops to individual sprinkler heads.

2.3 PIPING SPECIALTIES

A. Automatic Sprinkler Valve: Flow detector with alarm circuits, pressure switch, pressure retard chamber.

B. Alarm Gong: Electric type, see Fire Alarm plans.

C. Fire Department Connection: Wall type; chrome plated finish; thread size to suit fire department hardware; two way threaded dust cap and chain of same material and finish, identification plate to match finish, indicating "AUTO SPKR".

2.4 SPRINKLER HEADS

A. Suspended Ceiling Type: Standard recessed pendant type with chrome plated finish and the matching escutcheon.
B. Exposed Area Type: Standard upright type
C. Sidewall Type: Recessed chrome plated finish with matching escutcheon.
D. Fusible Link: Temperature rated for specific area hazard.

PART III - EXECUTION

3.1 WATER SUPPLY CONNECTION

A. Connect fire protection piping to water service piping of size and in location indicated on drawings.

3.2 PREPARATION

A. Coordinate all work with other trades.

B. Refer to Architectural Plans for ceiling heights and types.

3.3 INSTALLATION

A. Install sprinkler piping in accordance NFPA 13.

B. Install sprinkler piping with drains for complete system drainage.

C. Provide hangers and supports in accordance with NFPA 13.

D. Install specialty sprinkler fittings according to manufacturer's written instructions.

E. Provide alarm devices for connection, by others, to fire alarm system.

F. Locate Fire Department connection as indicated on Drawing. Provide sufficient clearance from walls, obstructions, or adjacent Siamese connectors to allow full swing of Fire Department wrench handle.

G. Locate outside alarm gong on building wall.

H. Place pipe runs to minimize obstruction to other work.

I. Place piping in concealed spaces above finished ceilings.

J. Center heads in two directions in ceiling tile and provide piping offsets as required.

3.4 SYSTEM TESTS

A. Hydrostatically test entire System.

B. Test shall be witnessed by authority having jurisdiction.

3.5 FIELD QUALITY CONTROL

A. Flush, test and inspect sprinkler piping systems according to NFPA 13 Chapter "System Acceptance".

B. Replace piping system components that do not pass test procedures specified, then re-test to demonstrate compliance. Repeat procedure until satisfactory results are obtained.

3.6 CLEANING

A. Clean dirt and debris from sprinklers.

3.7 DEMONSTRATION

A. Demonstrate equipment, specialties and accessories. Review Operating and Maintenance information.

END OF SECTION 13900

RELATED DOCUMENTS:

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

SCOPE OF WORK:

The scope of work consists of the furnishing and installing of complete plumbing (exterior and interior) and HVAC systems including miscellaneous systems. The Mechanical Contractor (hereafter referred to as "the Contractor", either Plumbing or HVAC) shall provide all supervision, labor, materials, equipment, machinery, and any and all other items necessary to complete the systems. The Contractor shall note that all items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the drawings and as required for complete systems.

It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation.

Any apparatus, appliance, material, or work not shown on the drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed by the Contractor without additional expenses to the Owner. Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's estimate, the same as if herein specified or shown.

With submission of bid, the Contractor shall give written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules, and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his proposal, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensation.

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, SUPPLEMENTARY INSTRUCTIONS, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, SPECIAL CONDITIONS, GENERAL REQUIREMENTS bound in the front of this document are included as a part of the specifications for this work.

MECHANICAL DRAWINGS AND SPECIFICATIONS:

The mechanical drawings are diagrammatic and indicate the general arrangement of fixtures, equipment, and work included in the contract. Consult the architectural, structural and electrical drawings and details for exact location and dimensions of fixtures and equipment; where same are not definitely located, obtain this information from the Architect.

The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation. If directed by the Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

The plans and these specifications are intended to describe, imply and convey the materials and equipment as well as necessary labor, required for the installation as outlined in the paragraph entitled "Scope of Work". Any omissions from either the drawings or these specifications are unintentional, and it shall be the responsibility of the this Contractor to call to the attention of the Architect or Engineer any pertinent omissions before submission of a bid. The drawings which accompany these specifications are not intended to show in complete detail every fitting which may be required; however wherever reasonable implied by the nature of

the work, any such material or equipment shall be installed by this Contractor as a part of his contract price. In no case will any extra charge be allowed unless authorized in writing by the Architect or Engineer.

The Contractor shall arrange with the General Contractor for required concrete and masonry chases, openings, and sub-bases so as not to delay progress of work. Work shall be installed sufficiently in advance of other construction to conceal piping and to permit work to be built in where required.

It shall be understood and agreed by all parties that where the words "Furnish", "Install", and / or "Provide" appear, the following definitions apply:

Furnish - to supply or give
Install - to place, establish or fix in position
Provide - to furnish and install as defined above

CODES, PERMITS, AND FEES:

The Contractor shall give all necessary notices, including electric and telephone utilities, obtain all permits, and pay all government taxes, fees, and other costs, including utility connections or extensions in connection with his work file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction; obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawing and documents) in order to comply with all applicable laws, ordinances, rules, and regulations, whether or not shown on drawings and / or specified.

Work and materials shall conform to the latest rules of the National Board of Fire Underwriter's Code and Regulations of the State Fire Marshall, and, or guarding of any moving parts, or otherwise hazardous conditions. Nothing in these specifications shall be construed to permit work not conforming to the most stringent of applicable codes.

The State Plumbing and Mechanical codes, and the mechanical requirements as established by the State and Local Fire Marshall, and rules and regulations of the local utilities serving the project are hereby made part of this specification. Should any changes be necessary in the drawings or specifications to make the work comply with these requirements, the Contractor shall notify the Architect.

VERIFICATION OF DIMENSIONS, DETAILS, EXISTING FIELD CONDITIONS:

The Contractor shall visit the premises prior to bidding, and thoroughly familiarize himself with all details of the work, working conditions, verify dimensions in the field, provide advice of any discrepancy, and submit shop drawings of any changes he proposes to make in quadruplicate for approval before starting any work. The Contractor shall install all equipment in a manner to avoid building interference. No Change Order for extra work will be considered for items that were evident during a site visit.

The locations of existing underground utilities are shown in an approximate way only and have not been independently verified by the Owner or its representative. The Contractor shall determine the exact location of all existing utilities before commencing work, and agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to exactly locate and preserve any and all underground utilities.

ACCEPTABLE MANUFACTURERS:

Acceptable manufacturers, as specified in the Contract Documents, implies that the specified manufacturer may produce acceptable products equal in quality of materials and performance to such item specified. The

Contractor will be required to provide products meeting, or exceeding the "Standard of Quality and Performance" as dictated by the product selection noted.

SHOP DRAWINGS AND EQUIPMENT SUBMITTALS:

The Contractor shall submit minimum of five (5) and maximum of seven (7) copies of the shop drawings to the Architect for approval within thirty (30) days after the award of the general contract. If such a schedule cannot be met, the Contractor may request in writing for an extension of time to the Architect. If the Contractor does not submit shop drawings in the prescribed time, the Architect has the right to select the equipment.

Shop drawings shall be submitted on all major pieces of mechanical equipment. Each item of equipment proposed shall be a standard catalog product of an established manufacturer. Certain major groups of equipment shall be provided from a singular manufacturer. The shop drawing shall give complete information on the proposed equipment. Each item of the shop drawings shall be properly labeled, indicating the intended service of the material, the job name, and the MC's name.

The shop drawings shall be neatly bound in five (5) sets and submitted to the Architect with a letter of transmittal. The letter of transmittal shall list each item submitted along with the manufacturer's name.

Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

AS-BUILT DRAWINGS:

The Contractor shall maintain accurate records of all deviations in work as actually installed from work indicated on the drawings. On completion of the project, two (2) complete sets of marked-up prints shall be delivered to the Architect.

MAINTENANCE AND OPERATING MANUALS:

Upon completion, the MC shall turn over to the Architect three (3) sets of complete maintenance manuals and parts list for all mechanical equipment used on the job. Manuals shall include equipment data, manufacturer's recommended maintenance, parts list, assembly drawings, warranties, and name, address, and phone numbers of suppliers of equipment. Indicate project name on cover and binder side.

COORDINATION WITH OTHER TRADES:

Coordinate all work required under this section with work of other sections of the specifications to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings, and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to attention in writing, prior to signing of contract; or, Contractor shall at his own expense provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interference.

INSPECTION AND CERTIFICATES:

On the completion of the entire installation, the approval of the Architect and Owner shall be secured, covering the installation throughout. The Contractor shall obtain and pay for Certificate of Approval from the public authorities having jurisdiction. A final inspection certificate shall be submitted to the Architect prior to final payment. Any and all costs incurred for fees shall be paid by the Contractor.

EQUIVALENTS:

When material or equipment is mentioned by name, it shall form the basis of the Contract. When approved by the Architect in writing, other material and equipment may be used in place of those specified, but written application for such substitutions shall be made to the Architect as described in the Bidding Documents. The difference in cost of substitute material or equipment shall be given when making such request. Approval of substitute is, of course, contingent on same meeting specified requirements and being of such design and dimensions as to comply with space requirements.

WORKMANSHIP AND MATERIALS:

All workmanship shall be of the best quality, and all equipment and materials incorporated in the work under this Contract shall be new and equal to or better than the grade specified. Deviations in workmanship or materials will be corrected by the Contractor at his expense.

WARRANTY:

The Contractor shall submit upon completion of the work, a warranty by his acceptance of the contract, that all work installed will be free from defects in workmanship and materials. If, during the period of one year, or as otherwise specified from date of Certificate of Completion and acceptance of work, any such defects in workmanship, materials, or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within reasonable time to be specified in notice from the Architect. In default, the Owner may have such work done and charge cost to Contractor.

CUTTING AND PATCHING:

The Mechanical Contractor (both Plumbing and HVAC) shall furnish sketches to the General Contractor showing the locations and sizes of all openings and chases, and furnish and locate all sleeves and inserts required for the installation of the mechanical work before the walls, floors, and roof are built. The Mechanical Contractor shall reimburse the General Contractor for the cost of cutting and patching, and shall be responsible for the cost of cutting and / or patching where any mechanical items were not installed or where incorrectly sized or located. The Contractor shall do all drilling required for the installation of his hangers. See also Section 01050, Cutting and Patching.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

1.1 DESCRIPTION

A. Basic methods and requirements for Division 15, MECHANICAL, applies to all sections of Division 15.
B. Definitions:
   1. Exposed: Piping, ductwork, and equipment exposed to view in finished rooms.
   2. Option or optional: Contractor's choice of an alternate material or method.

1.2 RELATED WORK

H. Section 15250, INSULATION.

K. Section 15980, TESTING, ADJUSTING, AND BALANCING.

L. Section 16400, SERVICE AND DISTRIBUTION.

1.3 QUALITY ASSURANCE

A. Section 15980, TESTING, ADJUSTING, AND BALANCING.

B. Equipment Vibration Tolerance:

1. The allowable vibration tolerance shall be in accordance with 1999 ASHRAE Applications Handbook, Table 1, 46.3. Equipment specifications require factory balancing of equipment to this tolerance.
2. After air balance work is completed and permanent drive sheaves are in place, perform field mechanical balancing and adjustments required to meet the specified vibration tolerance.

C. Products Criteria:

1. Standard Products: Material and equipment shall be the standard products of a manufacturer regularly engaged in the manufacture of the products for at least 3 years. See other specification sections for any exceptions.
2. Equipment Service: Products shall be supported by a service organization which maintains a complete inventory of repair parts and is located reasonably close to the site.
3. Multiple Units: When two or more units of materials or equipment of the same type or class are required, these units shall be products of one manufacturer.
4. Assembled Units: Manufacturers of equipment assemblies, which use components made by others, assume complete responsibility for the final assembled product.
5. Nameplates: Nameplate bearing manufacturer's name or identifiable trademark shall be securely affixed in a conspicuous place on equipment, or name or trademark cast integrally with equipment, stamped or otherwise permanently marked on each item of equipment.
6. Asbestos products or equipment or materials containing asbestos shall not be used.

D. Manufacturer's Recommendations: Where installation procedures or any part thereof are required to be in accordance with the recommendations of the manufacturer of the material being installed, printed copies of these recommendations shall be furnished to the Resident Engineer prior to installation. Installation of the item will not be allowed to proceed until the recommendations are received. Failure to furnish these recommendations can be cause for rejection of the material.

E. Warranty: Section 01001, GENERAL CONDITIONS.

1.4 SUBMITTALS

A. Submit in accordance with General Provisions.

B. Manufacturer's Literature and Data: Submit under the pertinent section rather than under this section.
   1. Submit belt drive with the driven equipment.
   2. Submit electric motor data and variable speed drive data with the driven equipment.
   3. Equipment and materials identification.
   4. Fire-stopping materials.
   5. Hangers, inserts, supports and bracing. Provide load calculations for variable spring and constant support hangers.
   6. Wall, floor, and ceiling plates.

C. Coordination Drawings; provide where required in accordance with Section 01001, GENERAL CONDITIONS, Article, SUBCONTRACTS AND WORK COORDINATION. Provide:
   1. Mechanical equipment rooms.
   2. Interstitial space.
   3. Hangers, inserts, supports, and bracing.
   4. Pipe sleeves.
   5. Duct or equipment penetrations of floors, walls, ceilings, or roofs.

D. Maintenance Data and Operating Instructions:
   1. Maintenance and operating manuals in accordance with Section 01010, GENERAL REQUIREMENTS, Article, INSTRUCTIONS, for systems and equipment.
   2. Provide a listing of recommended replacement parts for keeping in stock supply, including sources of supply, for equipment. Include in the listing belts for equipment: Belt manufacturer, model number, size and style, and distinguished whether of multiple belt sets.

E. Provide copies of approved HVAC equipment submittals to the Testing, Adjusting and Balancing Subcontractor.

1.5 APPLICABLE PUBLICATIONS

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. Federal Specifications (Fed. Spec.):
   FF-S-325 ..... Shield, Expansion; Nail, Expansion; and Nail, Drive Screw (Devices, Anchoring, Masonry)

C. Air Conditioning and Refrigeration Institute (ARI):
   430-89 ..... Central Station Air-Handling Units

D. American National Standard Institute (ANSI):
   B31.1-98 ..... Power Piping

E. Rubber Manufacturers Association (ANSI/RMA):
   IP-20-88 ..... Drives Using Classical V-Belts and Sheaves - Cross Sections A, B, C, D, and E
   IP-21-91 ..... Drives Using Double-V (Hexagonal) Belts (AA, BB, XX, DD Cross Sections)
   IP-22-91 ..... Drives Using Narrow Multiple V-Belts (3V, 5V, and 8V Cross Sections)

F. Air Movement and Control Association (AMCA):
   410-96 ..... Recommended Safety Practices for Air Moving Devices

G. American Society of Mechanical Engineers (ASME):
   Boiler and Pressure Vessel Code (BPVC):

SEC IX-98 ..... Qualifications Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing Operators

H. American Society for Testing and Materials (ASTM):
A36/A36M-97 ..... Carbon Structural Steel
A575-96..... Steel Bars, Carbon, Merchant Quality, M-Grades
E84-98 ..... Surface Burning Characteristics of Building Materials
E119-98..... Fire Tests of Building Construction and Materials

I. Manufacturers Standardization Society (MSS) of the Valve and Fittings Industry, Inc:
SP-58-93 ..... Pipe Hangers and Supports-Materials, Design and Manufacture
SP-69-96 ..... Pipe Hangers and Supports-Selection and Application

J. National Association of Plumbing - Heating - Cooling Contractors (NAPHCC):
1996 ..... National Standard Plumbing Code

K. National Fire Protection Association (NFPA):
90A-96..... Installation of Air Conditioning and Ventilating Systems
101-97 ..... Life Safety Code

PART 2 - PRODUCTS

2.1 BELT DRIVES

A. Type: ANSI/RMA standard V-belts with proper motor pulley and driven sheave. Belts shall be constructed of reinforced cord and rubber.

B. Dimensions, rating and selection standards: ANSI/RMA IP-20 and IP-21.

C. Minimum Horsepower Rating: Motor horsepower plus recommended ANSI/RMA service factor (not less than 20 percent) in addition to the ANSI/RMA allowances for pitch diameter, center distance, and arc of contact.

D. Maximum Speed: 5000 feet per minute.

E. Adjustment Provisions: For alignment and ANSI/RMA standard allowances for installation and take-up.

F. Drives may utilize a single V-Belt (any cross section) when it is the manufacturer's standard.

F. Multiple Belts: Matched to ANSI/RMA specified limits by measurement on a belt measuring fixture. Seal matched sets together to prevent mixing or partial loss of sets. Replacement, when necessary, shall be an entire set of new matched belts.

H. Sheaves and Pulleys:
1. Material: Pressed steel, or close grained cast iron.
2. Bore: Fixed or bushing type for securing to shaft with keys.
3. Balanced: Statically and dynamically.
4. Groove spacing for driving and driven pulleys shall be the same.

I. Drive Types, Based on ARI 435:
1. Provide adjustable-pitch or fixed-pitch drive as follows:
   a. Fan speeds up to 1800 RPM: 7.5 horsepower (10 kW) and smaller.
   b. Fan speeds over 1800 RPM: 2.2 horsepower (3 kW) and smaller.
2. Provide fixed-pitch drives for drives larger than those listed above.
3. The final fan speeds required to just meet the system CFM and pressure requirements, without throttling, shall be determined by adjustment of a temporary adjustable-pitch motor sheave or by fan law calculation if a fixed-pitch drive is used initially.

2.2 DRIVE GUARDS

A. For machinery and equipment, provide guards as shown in AMCA 410 for belts, chains, couplings, pulleys, sheaves, shafts, gears and other moving parts regardless of height above the floor. Drive

guards may be excluded where motors and drives are inside factory fabricated air handling unit casings.

B. Materials: Sheet steel, cast iron, expanded metal or wire mesh rigidly secured so as to be removable without disassembling pipe, duct, or electrical connections to equipment.

C. Access for Speed Measurement: 1” diameter hole at each shaft center.

2.3 ELECTRIC MOTORS

A. Section 15170, MOTORS, specifies the applicable requirements for electric motors. Provide special energy efficient motors as scheduled. Unless otherwise specified for a particular application use electric motors with the following requirements.

B. Single-phase Motors: Capacitor-start type for hard starting applications. Motors for centrifugal fans and pumps may be split phase or permanent split capacitor (PSC).

C. Poly-phase Motors: NEMA Design B, Squirrel cage, induction type. Each two-speed motor shall have two separate windings. Provide a time-delay (20 seconds minimum) relay for switching from high to low speed.

D. Rating: Continuous duty at 100 percent capacity in an ambient temperature of 104 degrees F; minimum horsepower as shown on drawings; maximum horsepower in normal operation not to exceed nameplate rating without service factor.

E. Insulation Resistance: Not less than one-half meg-ohm between stator conductors and frame, to be determined at the time of final inspection.

2.4 VARIABLE SPEED MOTOR CONTROLLERS

A. Removed

2.5 EQUIPMENT AND MATERIALS IDENTIFICATION

A. Use symbols, nomenclature and equipment numbers specified, shown on the drawings and shown in the maintenance manuals.

B. Interior (Indoor) Equipment: Engraved nameplates, with letters not less than 3/16” high of brass with black-filled letters, or rigid black plastic with white letters permanently fastened to the equipment. Identify unit components such as coils, filters, fans, etc.

C. Exterior (Outdoor) Equipment: Brass nameplates, with engraved black filled letters, not less that 3/16” high riveted or bolted to the equipment.

D. Control Items: Label all temperature and humidity sensors, controllers and control dampers. Identify and label each item as they appear on the control diagrams.

2.6 FIRESTOPPING

See Sheet FP – 001. FIRESTOPPING specifies an effective barrier against the spread of fire, smoke and gases where penetrations occur for piping and ductwork. Refer also to Section 15250, INSULATION, for firestop pipe and duct insulation.

2.7 GALVANIZED REPAIR COMPOUND

Mil. Spec. DOD-P-21035B, paint form.

2.8 PIPE AND EQUIPMENT SUPPORTS AND RESTRAINTS

A. Vibration Isolators: see drawing details.

B. Supports For Roof Mounted Items:
   1. Equipment: Equipment rails shall be galvanized steel, 8 gauge, with integral baseplate, continuous welded corner seams, factory installed 2 by 4 treated wood nailer, 18 gauge galvanized steel counter flashing cap with screws, built-in cant strip, (except for gypsum or tectum deck), minimum height 11 inches. For surface insulated roof deck, provide raised cant strip to start at the upper surface of the insulation.
   2. Pipe/duct pedestals: Provide a galvanized unistrut channel welded to U-shaped mounting brackets which are secured to side of rail with galvanized lag bolts.

D. For Attachment to Concrete Construction:
   1. Concrete insert: Type 18, MSS SP-58.
   2. Self-drilling expansion shields and machine bolt expansion anchors: Fed. Spec. FF-S-325, permitted in concrete not less than four inches thick. Applied load shall not exceed one-fourth the proof test load listed in Fed. Spec. FF-S-325.
   3. Power-driven fasteners: Permitted in existing concrete or masonry not less than four inches thick when approved by the Resident Engineer for each job condition. Applied load shall not exceed one-fourth the proof test load listed in Fed. Spec. FF-S-325.

F. For Attachment to Steel Construction: MSS SP-58.
   1. Welded attachment: Type 22.
   2. Beam clamps: Types 20, 21, 28 or 29. Type 23 C-clamp may be used for individual copper tubing up to 7/8-inch outside diameter.

F. Attachment to Metal Pan or Deck: As required for materials specified in Division 5.

G. For Attachment to Wood Construction: Wood screws or lag bolts.

H. Hanger Rods: See Section 15060.

J. Multiple (Trapeze) Hangers: Galvanized, cold formed, lipped steel channel horizontal member, not less than 1-5/8 inches by 1-5/8 inches**,** No. 12 gauge, designed to accept special spring held, hardened steel nuts. Not permitted for steam supply and condensate piping.
   1. Allowable hanger load: Manufacturers rating less 91kg (200 pounds).
   2. Guide individual pipes on the horizontal member of every other trapeze hanger with 6 mm (1/4-inch) U-bolt fabricated from steel rod. Provide Type 40 insulation shield, secured by two 13mm (1/2-inch) galvanized steel bands, or preinsulated calcium silicate shield for insulated piping at each hanger.

K. Pipe Hangers and Supports:
   1. Convertor and Expansion Tank Hangers: May be Type 1 sized for the shell diameter. Insulation where required will cover the hangers.
   2. Plumbing Piping (Other Than General Types):
      a. Horizontal piping: Type 1, 5, 7, 9, and 10.
      b. Chrome plated piping: Chrome plated supports.
      c. Hangers and supports in pipe chase: Prefabricated system ABS self-extinguishing material, not subject to electrolytic action, to hold piping, prevent vibration and compensate for all static and operational conditions.
      d. Blocking, stays and bracing: Angle iron or preformed metal channel shapes, 1.3 mm (18 gage) minimum.

L. Pre-insulated Calcium Silicate Shields:
   1. Provide 360 degree water resistant high density 965 kPa (140 psi) compressive strength calcium silicate shields encased in galvanized metal.
   2. Pre-insulated calcium silicate shields to be installed at the point of support during erection.
   3. Shield thickness shall match the pipe insulation.
   4. The type of shield is selected by the temperature of the pipe, the load it must carry, and the type of support it will be used with.

a. Shields for supporting chilled or cold water shall have insulation that extends a minimum of 1 inch past the sheet metal. Provide for an adequate vapor barrier in chilled lines.
b. The pre-insulated calcium silicate shield shall support the maximum allowable water filled span as indicated in MSS-SP 69. To support the load, the shields may have one or more of the following features: structural inserts 4138 kPa (600 psi) compressive strength, an extra bottom metal shield, or formed structural steel (ASTM A36) wear plates welded to the bottom sheet metal jacket.

5. Shields may be used on steel clevis hanger type supports, roller supports or flat surfaces.

M. Seismic Restraint of Piping:
1. Design criteria is as follows:
a. Piping resiliently supported: 120 percent of the weight of the systems and components and contents.
b. Piping not resiliently supported: 60 percent of the weight of the system components and contents.
c. Except as noted above, meet the more severe requirements of the Local Code and the latest Uniform Building Code for determining seismic force Fp.
2. Provide one of the following options:
a. Design and installation to meet the criteria listed above, and meet requirements of the latest Sheet Metal and Air Conditioning Contractors National Association (SMACNA), Seismic Restraint Manual Guidelines for Mechanical Systems for the prescribed Seismic Hazard Level
b. Design and installation to meet the criteria listed above, and meet the most current requirements of the National Uniform Seismic Installation Guidelines (NUSIG). Contractor shall submit all design tables and information for the design force levels, stamped and signed by a professional engineer registered in the State where project is located.
c. Where SMACNA or NUSIG requirements are not met completely, submit proposed alternate details and calculations to completely address seismic bracing requirements. Such designs shall use more severe of the Local Code and the Uniform Building Code requirements for determining seismic forces, and be performed, stamped and signed by a professional engineer registered in the State where project is located. Revise if necessary any details shown on the contract drawings for vertical support and lateral bracing, and submit for the approval of the Owner to meet the design criteria listed above.

2.9 PIPE PENETRATIONS

A. Install sleeves during construction for other than blocked out floor openings for risers in chases.
B. To prevent accidental liquid spills from passing to a lower level, provide the following:
1. For sleeves: Extend sleeve 25 mm (one inch) above finished floor and provide sealant for watertight joint.
2. For blocked out floor openings: Provide 40 mm (1-1/2 inch) angle set in silicone adhesive around opening.
3. For drilled penetrations: Provide 40 mm (1-1/2 inch) angle ring or square set in silicone adhesive around penetration.
C. Penetrations are not allowed through beams or ribs, but may be installed in concrete beam flanges. Any deviation from this requirements must receive prior approval of Resident Engineer.
D. Sheet Metal, Plastic, or Moisture-resistant Fiber Sleeves: Provide for pipe passing through floors, interior walls, and partitions, unless brass or steel pipe sleeves are specifically called for below.
E. Cast Iron or Zinc Coated Pipe Sleeves: Provide for pipe passing through exterior walls below grade. Make space between sleeve and pipe watertight with a modular or link rubber seal. Seal shall be applied at both ends of sleeve.
F. Galvanized Steel or an alternate Black Iron Pipe with asphalt coating Sleeves: Provide for pipe passing through concrete beam flanges, except where brass pipe sleeves are called for. Provide sleeve for pipe passing through floor of mechanical rooms and similar. Except in mechanical rooms, connect sleeve with floor plate.
G. Brass Pipe Sleeves: Provide for pipe passing through quarry tile, terrazzo or ceramic tile floors. Connect sleeve with floor plate.
H. Sleeves are not required for wall hydrants for fire department connections or in drywall construction.

I. Sleeve Clearance: Sleeve through floors, walls, partitions, and beam flanges shall be one inch greater in diameter than external diameter of pipe. Sleeve for pipe with insulation shall be large enough to accommodate the insulation. Interior openings shall be caulked tight with fire stopping material and sealant to prevent the spread of fire, smoke, and gases.
J. Sealant and Adhesives: Shall be as specified in Section 07920, SEALANTS AND CAULKING.

2.10 TOOLS AND LUBRICANTS

A. Furnish, and turn over to the Owner special tools not readily available commercially, that are required for disassembly or adjustment of equipment and machinery furnished.
B. Grease Guns with Attachments for Applicable Fittings: One for each type of grease required for each motor or other equipment.
C. Tool Containers: Hardwood or metal, permanently identified for in tended service and mounted, or located, where directed by the Owner.
D. Lubricants: A minimum of 0.95 L (one quart) of oil, and 0.45 kg (one pound) of grease, of equipment manufacturer's recommended grade and type, in unopened containers and properly identified as to use for each different application.

2.11 WALL, FLOOR AND CEILING PLATES

A. Material and Type: Chrome plated brass or chrome plated steel, one piece or split type with concealed hinge, with set screw for fastening to pipe, or sleeve. Use plates that fit tight around pipes, cover openings around pipes and cover the entire pipe sleeve projection.
B. Thickness: Not less than 2.4 mm (3/32-inch) for floor plates. For wall and ceiling plates, not less than 0.64 mm (0.025-inch) for up to 80 mm (3-inch pipe), 0.89 mm (0.035-inch) for larger pipe.
C. Locations: Use where pipe penetrates floors, walls and ceilings in exposed locations, in finished areas only. Use also where insulation ends on exposed water supply pipe drop from overhead. Provide a watertight joint in spaces where brass or steel pipe sleeves are specified.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Coordinate location of piping, sleeves, inserts, hangers, ductwork and equipment. Locate piping, sleeves, inserts, hangers, ductwork and equipment clear of windows, doors, openings, light outlets, and other services and utilities. Follow manufacturer's published recommendations for installation methods not otherwise specified.
B. Protection and Cleaning:
   1. Equipment and materials shall be carefully handled, properly stored, and adequately protected to prevent damage before and during installation, in accordance with the manufacturer's recommendations and as approved by the Owner. Damaged or defective items in the opinion of the Owner, shall be replaced.
   2. Protect all finished parts of equipment, such as shafts and bearings where accessible, from rust prior to operation by means of protective grease coating and wrapping. Close pipe openings with caps or plugs during installation. Tightly cover and protect fixtures and equipment against dirt, water chemical, or mechanical injury. At completion of all work thoroughly clean fixtures, exposed materials and equipment.
C. Concrete and Grout: Use concrete and shrink compensating grout 25 MPa (3000 psi) minimum, specified in Section 03300, CAST-IN-PLACE CONCRETE.
D. Install gages, thermometers, valves and other devices with due regard for ease in reading or operating and maintaining said devices. Locate and position thermometers and gages to be easily read by operator or staff standing on floor or walkway provided. Servicing shall not require dismantling adjacent equipment or pipe work.
E. Install steam piping expansion joints as per manufacturer’s recommendations.
F. Work in Existing Building:
   1. Perform as specified in Article, OPERATIONS AND STORAGE AREAS, Article, ALTERATIONS, and Article, RESTORATION of the Section 01010, GENERAL REQUIREMENTS for relocation of existing equipment, alterations and restoration of existing building(s).

2. As specified in Section 01010, GENERAL REQUIREMENTS, Article, OPERATIONS AND STORAGE AREAS, make alterations to existing service piping at times that will least interfere with normal operation of the facility.
3. Cut required openings through existing masonry and reinforced concrete using diamond core drills. Use of pneumatic hammer type drills, impact type electric drills, and hand or manual hammer type drills, will be permitted only with approval of the Owner. Locate openings that will least effect structural slabs, columns, ribs or beams. Refer to the Owner for determination of proper design for openings through structural sections and opening layouts approval, prior to cutting or drilling into structure. After Owner's approval, carefully cut opening through construction no larger than absolutely necessary for the required installation.

G. Exterior: Seal all pipe and duct penetrations with silicone sealant to prevent entrance of insects.
H. Switchgear Drip Protection: Every effort shall be made to eliminate the installation of pipe above electrical and telephone switchgear. If this is not possible, encase pipe in a second pipe with a minimum of joints.
I. Inaccessible Equipment:
   1. Where the Engineer / Owner determines that the Contractor has installed equipment not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled or remedial action performed as directed at no additional cost to the Owner.
   2. The term "conveniently accessible" is defined as capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, fans, pumps, belt guards, transformers, high voltage lines, piping, and ductwork.

3.2 PIPE AND EQUIPMENT SUPPORTS

A. Where hanger spacing does not correspond with joist or rib spacing, use structural steel channels secured directly to joist and rib structure that will correspond to the required hanger spacing, and then suspend the equipment and piping from the channels. Drill or burn holes in structural steel only with the prior approval of the Owner.
B. Use of chain, wire or strap hangers; wood for blocking, stays and bracing; or, hangers suspended from piping above will not be permitted. Replace or thoroughly clean rusty products and paint with zinc primer.
C. Use hanger rods that are straight and vertical. Turnbuckles for vertical adjustments may be omitted where limited space prevents use. Provide a minimum of 15 mm (1/2-inch) clearance between pipe or piping covering and adjacent work.
D. HVAC Horizontal Pipe Support Spacing: Refer to MSS SP-69. Provide additional supports at valves, strainers, in-line pumps and other heavy components. Provide a support within one foot of each elbow.
E. HVAC Vertical Pipe Supports:
   1. Up to 150 mm (6-inch pipe), 9 m (30 feet) long, bolt riser clamps to the pipe below couplings, or welded to the pipe and rests supports securely on the building structure.
   2. Vertical pipe larger than the foregoing, support on base elbows or tees, or substantial pipe legs extending to the building structure.
F. Plumbing horizontal and vertical pipe supports, refer to the State Plumbing Code.

3.3 MOTOR AND DRIVE ALIGNMENT

A. Belt Drive: Set driving and driven shafts parallel and align so that the corresponding grooves are in the same plane.
B. Direct-connect Drive: Securely mount motor in accurate alignment so that shafts are free from both angular and parallel misalignment when both motor and driven machine are operating at normal temperatures.

3.4 LUBRICATION

Field check and lubricate equipment requiring lubrication prior to initial operation.

3.5 STARTUP AND TEMPORARY OPERATION

Start up equipment as described in equipment specifications. Verify that vibration is within specified tolerance prior to extended operation. Temporary use of equipment is specified in Section 01010, GENERAL REQUIREMENTS, Article, TEMPORARY USE OF MECHANICAL AND ELECTRICAL EQUIPMENT.

3.6 OPERATING AND PERFORMANCE TESTS

A. Prior to the final inspection, perform required tests as specified in Section 01010, GENERAL REQUIREMENTS, Article, TESTS and submit the test reports and records to the Owner.
B. Should evidence of malfunction in any tested system, or piece of equipment or component part thereof, occur during or as a result of tests, make proper corrections, repairs or replacements, and repeat tests at no additional cost to the Owner.
C. When completion of certain work or system occurs at a time when final control settings and adjustments cannot be properly made to make performance tests, then make performance tests for heating systems and for cooling systems respectively during first actual seasonal use of respective systems following completion of work.

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

A. Design channel support systems for piping to support multiple pipes capable of supporting combined weight of supported systems, system contents, and test water.

B. Submittals: Provide Product Data for each type of pipe hanger, channel support system component, and thermal-hanger shield insert indicated.

PART II: PRODUCTS

A. Pipe Hangers, Supports, and Components: MSS SP-58, factory fabricated components.

1. Galvanized, Metallic Coatings: For piping and equipment that will not have field-applied finish.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

B. Channel Support Systems: MFMA-2, factory-fabricated components for field assembly.

1. Coatings: Manufacturer's standard finish, unless bare metal surfaces are indicated.
2. Nonmetallic Coatings: On attachments for electrolytic protection where attachments are in direct contact with copper tubing.

C. Thermal-Hanger Shield Inserts: 100-psi (690-kPa) minimum compressive strength insulation, encased in sheet metal shield.

1. Material for Cold Piping: ASTM C 552, Type I cellular glass or water-repellant-treated, ASTM C 533, Type I calcium silicate with vapor barrier.
2. Material for Hot Piping: ASTM C 552, Type I cellular glass or water-repellent-treated, ASTM C 533, Type I calcium silicate.
3. For Clevis or Band Hanger Insert and shield cover lower 180 degrees of pipe.
4. Insert Length: Extend 2 inches (50 mm) beyond sheet metal shield for piping operating below ambient air temperature.

D. Mechanical-Anchor Fasteners: Insert-type attachments with pull-out and shear capacities appropriate for supported loads and building materials where used.

E. Structural Steel: ASTM A 36/A 36M, steel plates, shapes, and bars, black and galvanized.

F. Grout ASTM C 1107, Grade B, factory-mixed and -packaged, non-shrink and nonmetallic, dry, hydraulic-cement grout.

1. Characteristics: Post hardening and volume adjusting; recommended for both interior and exterior applications.
2. Properties: Non-staining, non-corrosive, and non-gaseous.

PART III: EXECUTION

A. Specific hanger requirements are specified in Sections specifying equipment and systems.

B. Comply with MSS SP-69 for pipe hanger selections and applications that are not specified in piping system Specification Sections.

C. Horizontal-Piping Hangers and Supports: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Adjustable Steel Clevis Hangers (MSS Type 1): For suspension of non-insulated or insulated stationary pipes, NPS 1/2 to NPS 30 (DN15 to DN750).
2. -Carbon- or Alloy-Steel, Double-Bolt Pipe Clamps (MSS Type 3): For suspension of pipes, NPS 3/4 to NPS 24 (DN20 to DN600), requiring clamp flexibility and up to 4 inches (100 mm) of insulation.
3. Adjustable Steel Band Hangers (MSS Type 7): For suspension of non-insulated stationary pipes, NPS 1/2 to NPS 8 (DN15 to DN200).
4. U-Bolts (MSS Type 24): For support of heavy pipe, NPS 1/2 to NPS 30 (DN15 to DN750).

D. Hanger-Rod Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1. Steel Tumbuckles (MSS Type 13): For adjustment up to 6 inches (150 mm) for heavy loads.
2. Steel Clevises (MSS Type 14): For 120 to 450 deg F (49 to 232 deg C) piping installations.

E. Building Attachments: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1 . Top-Beam C-Clamps (MSS Type 19): For use under roof installations with bar-joist construction to attach to top flange of structural shape.
2. Side-Beam or Channel Clamps (MSS Type 20): For attaching to bottom flange of beams, channels, or angles.
3. Center-Beam Clamps (MSS Type 21): For attaching to center of bottom flange of beams.
4. Welded Beam Attachments (MSS Type 22): For attaching to bottom of beams if loads are considerable and rod sizes are large.
5. C-Clamps (MSS Type 23): For structural shapes.
6. Welded-Steel Brackets: For support of pipes from below or for suspending from above by using clip and rod. Use one of the following for indicated loads:
    a. Light (MSS Type 31): 750 lb. (340 kg).
    b. Medium (MSS Type 32):1500 lb. (675 kg).
    c. Heavy (MSS Type 33): 3000 lb. (1 350 kg).
7. Side-Beam Brackets (MSS Type 34): For sides of steel or wooden beams.
8. Plate Lugs (MSS Type 57): For attaching to steel beams if flexibility at beam is required.

F. Saddles and Shields: Unless otherwise indicated and except as specified in piping system Specification Sections, install the following types:

1 . Steel Pipe-Covering Protection Saddles (MSS Type 39): To fill interior voids with insulation that matches adjoining insulation.
2. Protection Shields (MSS Type 40): Of length recommended by manufacturer to prevent crushing insulation.

G. Pipe Hanger and Support Installation: Comply with MSS SP-69 and MSS SP-89. Install hangers, supports, clamps, and attachments as required to properly support piping from building structure.

H. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories.

1. Install hangers and supports to allow controlled thermal and seismic movement of piping systems, to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.

J. Load Distribution: Install hangers and supports so that piping live and dead loads and stresses from movement will not be transmitted to connected equipment.

K. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes and so maximum pipe deflections allowed by ASME B31.9, "Building Services Piping," is not exceeded.

L. Insulated Piping: Comply with the following:

1 Attach clamps and spacers to piping.
   a. Piping Operating above Ambient Air Temperature: Clamp may project through insulation.
   b. Piping Operating below Ambient Air Temperature: Use thermal-hanger shield insert with clamp sized to match OD of insert.
   c. Do not exceed pipe stress limits according to ASME B31.9.
2. Install MSS SP-58, Type 39 protection saddles, if insulation without vapor barrier is indicated. Fill interior voids with insulation that matches adjoining insulation.
3. Install MSS SP-58, Type 40 protective shields on cold piping with vapor barrier. Shields shall span arc of 180 degrees.
4. 'Shield Dimensions for Pipe: Not less than the following:

a. NPS 1/4 to NPS 3-1/2 (DN8 to DN90):12 inches (305 mm) long and 0.048 inch (1.22 mm) thick.

5. Insert Material: Length at least as long as protective shield.
6. Thermal-Hanger Shields: Install with insulation same thickness as piping insulation.

M. Cut, drill, and fit miscellaneous metal fabrications for heavy-duty steel trapezes and equipment supports. Fit exposed connections together to form hairline joints. Field-weld connections that cannot be shop-welded because of shipping size limitations. Comply with AWS Dl.1 procedures for shielded metal arc welding, appearance and quality of welds, and methods used in correcting welding work, and 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. Finish welds at exposed connections so no roughness shows after finishing and contours of welded surfaces match adjacent contours.

N. Adjust hangers to distribute loads equally on attachments and to achieve indicated slope of pipe.

O. Touching Up: Clean field welds and abraded areas of shop paint. Paint exposed areas immediately after erecting hangers and supports. Use same materials as used for shop painting. Comply with SSPC-PA 1 requirements for touching up field-painted surfaces. Apply paint by brush or spray to provide a minimum dry film thickness of 2.0 mils (0.05 mm).

P. Galvanized Surfaces: Clean welds, bolted connections, and abraded areas and apply galvanizing-repair paint to comply with ASTM A 780.

Q. Install all hangers and supports prior to application of fire-proofing by GC. Any fire-proofing damaged by this Contractor shall be repaired by this Contractor.

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

A. Submittals: Submit Product Data for each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

PART II: PRODUCTS

A. Pressure and Temperature Ratings: As required to suit system pressures and temperatures.

B. Sizes: Same size as upstream pipe, unless otherwise indicated.

C. Operators: Use specified operators and handwheels, except provide the following special operator features:

1. Handwheels: For valves other than quarter turn.
2. Lever Handles: For quarter-turn valves 6 inches (DN 1 50) and smaller, except for plug valves, which shall have square heads. Furnish Owner with 1 wrench for every 1 0 plug valves.

D. Threads: ASME Bl.20.1.

E. Flanges: ASME B16.1 for cast iron, ASME B16.5 for steel, and ASME B16.24 for bronze valves.

F. Solder Joint: ASME B16.18. Where soldered end connections are used, use solder having a melting point below 840 deg F (450 deg C) for gate, globe, and check valves; below 421 deg F (216 deg C) for ball valves.

G. Gate Valves, 2-1/2 Inches (DN65) and Smaller: MSS SP-80; Class 125, 200-psi (1380-kPa) cold working pressure (CWP), or Class 150, 300-psi (2070-kPa) CWP; ASTM B 62 cast-bronze body and bonnet, solid-bronze wedge, copper-silicon alloy rising stem, teflon-impregnated packing with bronze packing nut, threaded or soldered end connections; and with aluminum or malleable-iron handwheel.

H. Ball Valves, 4 Inches (DN 1 00) and Smaller: MSS SP-1 1 0, Class 150, 600-psi (4140-kPa) CWP, ASTM B 584 bronze body and bonnet, 2-piece construction; chrome-plated brass ball, standard port for 1/2-inch (DN15) valves and smaller and conventional port for 3/4-inch (DN20) valves and larger; blowout proof; bronze or brass stem; teflon seats and seals; threaded or soldered end connections:

1. Operator: Vinyl-covered steel lever handle.
2. Stem Extension: For valves installed in insulated piping.
3. Memory Stop: For operator handles.

I. Globe Valves, 2-1/2 Inches (DN65) and Smaller: MSS SP-80; Class **125,** 200-psi (1 380-kPa) CWP, or Class 150, 300-psi (2070-kPa) CWP; ASTM B 62 cast-bronze body and screwed bonnet, rubber, bronze, or teflon disc, silicon bronze-alloy stem, teflon-impregnated packing with bronze nut, threaded or soldered end connections; and with aluminum or malleable-iron handwheel.

J. Globe Valves, 3 Inches (DN80) and Larger: MSS SP-85, Class 125, 200psi (1 380-kPa) CWP, ASTM A 126 cast-iron body and bolted bonnet with bronze fittings, renewable bronze seat and disc, brass-alloy stem, outside screw and yoke, teflon-impregnated packing with cast-iron follower, flanged end connections; and with cast-iron handwheel.

PART III: EXECUTION

A. Install valves as indicated, according to manufacturers written instructions.

B. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate the general arrangement of piping, fittings, and specialties.

C. Install valves with unions or flanges at each piece of equipment arranged to allow servicing, maintenance, and equipment removal without system shutdown.

D. Locate valves for easy access and provide separate support where necessary.

E. Install valves in horizontal piping with stem at or above the center of the pipe.

F. Install valves in a position to allow full stem movement.

G. Installation of Check Valves: Install for proper direction of flow. Install in a horizontal position with hinge pin level.

H. Select valves with the following ends or types of pipe/tube connections:

1. Copper Tube Size, 2-1/2 Inches (DN65) and Smaller Solder ends, except provide threaded ends for heating hot water and low-pressure steam service.

I. General Application: Use gate, ball, and butterfly valves for shutoff duty; globe, ball, and butterfly for throttling duty. Refer to piping system Specification Sections for specific valve applications and arrangements.

J. Domestic Water Systems Applications: Use the following valve types:

1 . Gate Valves: Class 125, bronze or cast-iron body to suit piping system.
2. Ball Valves: Class 150, 600-psi (4140-kPa) CWP, with stem extension.
3. Plug Valves: Neoprene-faced plug, Buna N packing.
4. Globe Valves: Class 125, bronze or cast-iron body to suit piping system, and bronze or teflon disc.
5. Butterfly Valves: Nickel-plated ductile iron, aluminum bronze, or elastomer-coated ductile iron disc; EPDM or Buna N sleeve and stem seals.

END OF SECTION

RELATED DOCUMENTS:

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

EXCAVATING AND BACKFILLING FOR MECHANICAL WORK:

Refer to specification sections 02210 - *Trenching and Backfilling for Utilities* and 02220 - *Earthwork*

In general, DO NOT excavate for mechanical work until work is ready to proceed without delay to maintain minimum time lapse from excavation to completion of backfilling. Excavate with vertical sided excavations to greatest extent possible providing sheeting and cross-bracing to sustain sides where necessary. All shoring and sheeting required to protect the excavation shall be constructed and maintained in strict accordance with all applicable State and Federal Regulations.

Excavate trench for piping to uniform width with 18" minimum clearance both sides of piping providing adequate working room. Correct over-excavation by means of backfilling with concrete, or tamped and compacted backfill material approved for other backfilling work. All excavated materials not suitable or required for backfill shall be removed as directed or required in a lawful manner.

Whenever wet or otherwise unstable soil that is incapable of adequately supporting pipe is encountered in trench bottoms, remove such material to depth required and replace to the proper grade with selected material compacted as hereinafter specified for backfilling of pipe. Provide unit prices on Form of Proposal.

Support pipe directly on undisturbed soil. Do not excavate beyond required or indicated depth, and hand-excavate bottom cut to accurate elevations. Do not backfill until installed mechanical work has been tested and accepted. Provide 6" wide utility warning tape with magnetic detection 6 to 8" below finish grade during backfill operation over all piping exterior to building.

Conditions backfill material by either drying or adding water uniformly, necessary to facilitate compaction to required densities. Do not backfill with frozen soil materials. Backfill simultaneously on opposite sides of mechanical work and compact simultaneously without dislocating work from installed positions. Continue backfilling in 8" layers, uniformly compacted to 85% density for cohesive soils, 90% for cohesionless soils (90% for cohesive, 95% for cohesionless soils under paved surfaces) using power-driven hand-operated compaction equipment. Correct improperly backfill that has settled.

All paving and concrete removed or cut, shall be replaced or patched to satisfaction of Architect.

All landscaping (trees, shrubbery, grass, etc.) removed or damaged, shall be replaced to satisfaction of Architect.

Existing utility lines (gas, electric, communications, sewer, water, etc.) shall be protected from damage during excavation and backfilling, and, if damaged, shall be repaired by the Contractor at his expense. In the event that the Contractor damages any existing utility lines, he shall report thereof immediately. If it is determined that repairs shall be made by the Contractor, such repairs shall be ordered under terms of other sections of these specifications.

END OF SECTION

RELATED DOCUMENTS:

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

PART I - GENERAL

SCOPE:

This Section includes basic requirements for motors. It includes motors that are factory-installed as part of equipment and appliances as well as field-installed motors.

QUALITY ASSURANCE:

1. Comply with NFPA 70, “National Electrical Code.
2. Comply with NEMA MG-1, “Motors and Generators”.
3. Comply with UL 1004, “Motors, Electric”.
4. Comply with NCSBC, Volume X, Chapter 4, Section 401.2, “Electric Motors”.

PART II - PRODUCTS

A. MOTORS, GENERAL

1. General: Requirements below apply to motors covered by this Section except as otherwise indicated.

2. Motors 1 hp and larger: Polyphase.

3. Motors Smaller Than ¾” hp and less: Single-phase.

4. Frequency Rating: 60 Hz.

5. Voltage Rating: Determined by voltage of circuit to which motor is connected for the following motor voltage ratings (utilization voltages):

   a. 120V Circuit: 115V - motor rating.
   b. 208V Circuit: 200V - motor rating.
   c. 480V Circuit: 460V - motor rating.

6. Service factors indicated for motors are minimum valves and apply at frequency and utilization voltage at which motor is connected. Provide motors which will not operate in service factor range when supply voltage is within 10 percent of motor voltage rating.

7. Capacity: Sufficient to start and operate connected loads at designated speeds in indicated environment, and with indicated operating sequence, without exceeding nameplate ratings. Provide motors rated for continuous duty at 100 percent of rated capacity.

8. Temperature Rise: Based on 40 deg C ambient except as otherwise indicated.

9. Enclosure: Open dripproof.

10. Minimum full-load efficiency per tables 401.2.1 a & b of NCSBC Volume X Energy Code.

B. POLYPHASE MOTORS

1. General: Squirrel-cage induction-type conforming to the following requirements except as otherwise indicated.

2. NEMA Design Letter Designation: “b”.
3. Internal Thermal Overload protection For Motors: For motors so indicated, protection automatically opens control circuit arranged for external connection. Protection operates when winding temperature exceeds safe value calibrated to the temperature rating of the motor insulation.
4. Bearings: Double-shielded, prelubricated ball bearings suitable for radial and thrust loading of the application.
5. Rugged Duty Motors: Totally enclosed with 1.25 minimum service factor. Provide motors with regreasable bearings and equipped with capped relief vents. Insulate windings with nonhygroscopic material. External finish shall be chemical resistant paint over corrosion resistant primer. Provide integral condensate drains.

C. SINGLE-PHASE MOTORS

1. General: Conform to the following requirements except as otherwise indicated.
2. Energy Efficient Motors: One of the following types as selected to suit the starting torque and other requirements of the specific motor application.

    a. Permanent Split Capacitor.
    b. Split-Phase Start, Capacitor-Run.
    c. Capacitor-Start, Capacitor-Run.

3. Shaded-Pole Motors: Use only for motors smaller than 1/20 hp.

4. Internal Thermal Overload Protection for Motors: For motors so indicated, protection automatically opens the power supply circuit to the motor, or a control circuit arranged for external connection. Protection operates when winding temperature exceeds a safe value calibrated to the temperature returns to normal range except as otherwise indicated.

5. Bearings, belt connected motors and other motors with high radial forces on motor shaft shall be ball bearing type. Sealed, prelubricated sleeve bearings may be used for other single phase motors.

PART III - EXECUTION

INSTALLATION:

Install motors in accordance with manufacturer’s published instruction.

PART IV - COMMISSIONING

1. Check operating motors, both factory and field-installed, for unusual conditions during normal operation. Coordinate with the commissioning of the equipment for which the motor is a part.

2. Report unusual conditions.

3. Correct deficiencies of field-installed units.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 - GENERAL

DESCRIPTION OF WORK:

This section contains the requirements relating to the materials and methods used to identify items described in Division 15.

PART 2 - PRODUCTS

ENGRAVED PLASTIC-LAMINATE SIGNS:

Provide engraving stock melamine plastic laminate, in the sizes and thickness indicated, engraved with engraver's standard letter style of the sizes and wording indicated, punched for mechanical fastening except where adhesive mounting is necessary because of substrate. Plastic laminate thickness shall be 1/16" for units up to 20 square inches or 8" length; 1/8" for larger units. Provide self-tapping stainless steel screws.

PART 3 - EXECUTION

INSTALLATION REQUIREMENTS:

A. COORDINATION:

Coordinate new labeling with existing labeling through Project Manager. Where identification is to be applied to surfaces that require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, identification shall be installed after completion of covering and painting. Identification is to be installed prior to installation of acoustical ceilings and similar removable concealment.

B. DUCTWORK IDENTIFICATION:

1. General: Provide for identification of air supply, return, exhaust, intake, and relief ductwork with stenciled signs and arrows, showing ductwork service and direction of flow, in black and white.

2. Locations: Ductwork shall be identified every 20’ in spaces with removable ceilings and at each access door in spaces with hard ceilings. Exposed ductwork shall be identified every 20’ in mechanical rooms. As described above, ductwork shall be labeled on both sides of floor and wall penetrations.

C. MECHANICAL EQUIPMENT IDENTIFICATION:

Provide for engraved plastic laminate sign on or near each major item of mechanical equipment and each operational device. Provide signs for the following general categories of equipment and operational devices:

1. Main control and operating valves, including safety devices.

2. Air conditioning indoor and outdoor units.

END OF SECTION

RELATED DOCUMENTS:

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

GENERAL:

Furnish and install complete building potable water supply system from connection provided by Sitework Contractor unless indicated otherwise on the drawings. Include utility tap fee allowance specified Section 01056-1 in bid.

WATER SERVICE PIPING:

Not Used

BUILDING WATER SUPPLY PIPING AND FITTINGS:

Building water main buried in earth under concrete slab and where indicated on the plans shall be seamless hard drawn type K copper tubing, ASTM B-88, with wrought copper ASA B-16.22 fittings and silver type solder brazed joints. Water piping above ground shall be seamless hard drawn annealed type L copper tubing, ASTM B-88, with wrought copper ASA B-16.22 fittings, and 95/5 soldered joints (lead-free solder).

Unless indicated otherwise on the drawings, contractor is responsible for water meter and utility tap fees. Coordinate building ground to copper pipe with Electrical Contractor as required. Refer to Section 15150 for excavating and backfilling.

All exposed water piping to plumbing fixtures, except piping noted to be run exposed in utility areas shall be IPS chrome-plated yellow brass pipe with polished chrome-plated 125 pound screwed brass fittings. Any joints leaking shall be reconstructed with new materials. Flexible pipe or hose is not acceptable for final connection to any fixture on this project.

PIPING INSTALLATION:

Water piping in building and above grade shall be accurately cut to measurements established at the site, worked into place without springing or forcing, and shall satisfactorily clear all window, door, and other openings and obstructions. Excessive cutting or other weakening of the structure to facilitate piping installation will not be permitted. Sleeves shall be provided for pipe penetrating floors, walls, and roofs. Access doors and panels shall be provided as specified.

Piping shall generally run level with all changes in direction made with fittings. Branch connections shall be made with fittings. Branch lines may be taken off top of main, bottom of main, or side of main using such crossover fittings as may be required by structural or installation conditions. All service pipe, valves, and fittings shall be kept a sufficient distance from other work to permit finished covering not less than ½” from such other work and not less than ½” between finished covering on the different service.

No water piping shall be buried in floors unless specifically indicated on drawings or approved; when buried, pipe shall be corrosion and mechanically protected. Eccentric reducers with top level shall be provided where changes in size are made.

Soldered joints shall be made up with 95-5 (tin-antimony) solder (for piping 1-1/2” and less; joints for tubing larger than 1-1/2” shall be silver brazed with “Sil-fos,” “Easyflo” or “Phos-copper”). Surfaces to be joined shall be thoroughly cleaned with steel wool and paste type flux shall be applied evenly to fitting and tube. Tubing shall be inserted to shoulder in fitting and heat applied evenly to fitting until solder starts to flow into socket by capillary action. Excess solder starts to flow into socket by capillary action. Excess solder shall be wiped off

before joint cools. All joints between dissimilar materials shall be provided with insulated fittings. All piping showing leaks on test shall be taken down and the joints shall be remade.

Connections between ferrous and nonferrous metallic pipe shall be made with dielectric unions or flanges having metal parts separated to prevent current flow between dissimilar metals.

Piping shall have burrs removed and shall be rattled and cleaned of loose dirt and scale before erection. Open ends of piping and equipment connections shall be plugged or capped during erection. Temporary strainers shall be provided in systems and removed after flushing operation is performed. Low points of the systems shall be provided with hose end adapters for draining systems.

The Plumbing Contractor shall have a journeyman present at all times while General Contractor is either pouring concrete or constructing masonry walls to insure proper installation of work in this Contract.

VALVES:

Valves shall be provided at risers and main branches at point of takeoff from their supply or return mains, at inlets and outlets of individual equipment units, and where indicated and/or specified. Valves shall not be installed with stem below the horizontal. Install shut-off valves on all hot and cold water branches serving more than one fixture.

Ball valves shall be used in piping up through 2". Acceptable ball valve manufacturers are Apollo (No. 70-200), Watts (No. B-6001), Nibco (No. S580), and Grinnell. Ball valves shall have brass or bronze body and ball, lever handle, teflon seats and seal, and rated up to 200 psig at 250°F.

Gate or Butterfly valves shall be used in piping 2-1/2" and larger. Acceptable valve manufacturers are Grinnell, Jenkins and Hammond. Gate valves submitted for approval shall comply with MSS Standard SP-80 for bronze valves.

UNIONS:

Unions shall be bronze 150 lb. type for copper pipe applications manufactured by Mueller, Crane, Northern Indiana Brass, or approved equivalent. Unions shall be installed at each valve and at frequent intervals in each main run of pipe to facilitate removal and repair of pipe, fixtures and appurtenances.

WATER HAMMER ARRESTORS:

The flow velocity of the water distribution system shall be controlled to reduce the possibility of water hammer. A water hammer arrestor shall be installed where quick-closing valves are utilized and where indicated on the drawings. The arrestor shall be located within an effective range of the quick-closing valve. Water hammer arrestors shall conform to AWWA, ASME A112.26.1 or ASSE 1010 listed in chapter 19. Access shall be provided to water hammer arrestors. Approved manufacturers are Watts, Smith, and Zurn.

PIPE SLEEVES:

Install pipe sleeves and properly secure in place at all points where pipes pass through floors, walls, or ceilings. Pipe sleeves shall be of sufficient diameter to provide approximately 1/4 inch clearance around insulation. Pipe sleeves in walls, floors, and partitions shall be Schedule 40 black steel . Caulk annular space between pipes and insulation and sleeves, both sides, with an elastic fire-resistant compound.

PIPE HANGERS AND SUPPORTS (see also Section 15060):

Pipe hangers and supports shall be of a size to support water filled piping with a safety factor of 5 based on

hanger or support ultimate tensile strength. Hangers and supports shall be manufactured by PHD, Grinnell, B-Line Systems, or Pipe Shields, Inc. Size hangers for all insulated piping to fit over insulation with an acceptable clearance.

Hangers for hot water piping shall be equal to Grinnell Fig. 181. Vertical pipes shall be supported by wall brackets equal to Grinnell Fig. 261. Piping hanger and support installation shall allow for uniform expansion and contraction at all times. Provide 8" long 16 gauge sheet metal saddles extending 120° around bottom of insulated pipe.

PIPE INSULATION:

Insulate all hot and cold water piping. Thickness of insulation shall be per the current NC Energy Code or as described in this section, whichever is greater. Insulation shall be a jacketed glass fiber pipe covering, 1" thick for pipe sizes 2" & less, 1½" thick for pipes 2½" & above, with flame resistant vapor barrier jacket meeting ASTM E84 and UL 723. Insulation shall be Knauf 850 or equal by Owens-Corning or Schuller. Provide PVC pre-formed jacket covers over insulated fittings such as els, tees, valves, etc. and over all domestic water piping boiler room.

INSULATION INSTALLATION:

Install insulation per manufacturer"s recommendations. All insulation shall be installed in a workmanlike manner by qualified workers in the regular employ of the Contractor.

All insulation shall be applied to clean, dry surfaces butting all sections firmly together and finishing as specified hereinafter. All vapor barriers shall be sealed, and shall be continuous throughout. No staples shall be used on any vapor barrier jacket. All vapor barriers shall be of the fire retardant type.

Insulation of all insulated lines shall be interpreted as including all pipe, valves, fittings, and specialties comprising the lines, except flanged unions and screwed unions on hot piping. Insulation over fittings shall be of equal thickness as the adjoining pipe insulation . Unless otherwise specified or directed, insulation for fittings and flanges shall be of the permanent type.

Support of pipe shall be on the outside of the insulation. The insulation at each support shall be rigid and of an equal thickness and finish as the adjoining pipe insulation; the length to coincide with the saddles.

CLEANING:

All surfaces on metal, pipe, insulation covered surfaces, and other equipment furnished and installed under this section of the specifications shall be thoroughly cleaned of grease, scale, dirt and other foreign materials, and new equipment shall have a coat of first-class primer.

CHLORINATION:

Before Owner occupies building, all water piping installed under this section including shall be sterilized with chlorine. This shall be accomplished by the introduction of a chlorinating material into the lines in such quantity that the water in the lines shall contain not less that 50 parts per million of available chlorine. The chlorinating material shall be either liquid chlorine or sodium hypochlorite solution, and shall be introduced into the system in an approved manner. The sterilizing solution shall be allowed to remain in the system for a period of two hours during which time all valves and faucets shall be opened and closed several times. After sterilization, solution shall be flushed from the system with clear water until no residual chlorine remains, after which a sample shall be collected for bacterial analysis.

The entire sterilization procedure shall be in strict accordance with the requirements of the State Board of Health and, upon completion of the sterilization, the potability of the water in the system shall be checked and approved by the County Health Department.

Prior to final Payment Application, provide Engineer two copies of the Bacteriological Analysis Report for water samples taken at source and at a general tap and tested for coliform and chlorine residuals.

PRESSURE TESTING:

Test all piping and connections installed under this contract. Do testing prior to painting, backfilling, insulating or concealment within building construction. Trenches may be backfilled prior to pressure tests, but not before work has been visually inspected by the Owner. If pressure tests indicate leaks in piping, it shall be the Contractor's responsibility to determine location of leaks, excavate as required, repair leaks, and backfill at his expense.

Perform each test as specified hereinafter and continue or repeat until the lines under test are proven tight to the satisfaction of the Owner. Furnish all materials, pumps, gauges, plugs, etc., required for tests. Notify the Engineer in advance of tests so he may witness same.

Sections of the system may be tested separately, but when so tested, any defect which may develop in a section already tested and accepted shall be corrected and that section re-tested. Devices or equipment which may be harmed by test pressures shall be removed or protected during tests. After testing, test systems for complete drain-ability by draining all water from piping using permanent caps, plugs, drain valves, etc. Test building water piping at 125 psig for a minimum of 4 hours before it is witnessed by Engineer, then for an additional 24 hours. Water test all exterior water mains at 125 psig.

ACCESS PANELS AND ENCLOSURES:

Provide access panels and / or enclosures at all locations required to service inaccessible valves, hair interceptors, filters, cleanouts, etc. Access panels in finished spaces shall be stainless steel. Acceptable manufacturers include Karp, Elmdor or approved equal.

HEAT TRACING:

Furnish and install UL approved self-regulating heat tracing cable for freeze protection of all water piping outside insulation envelope including backflow preventer systems. The heat trace cable shall consist of two (2) 16 AWG nickel plated copper bus wires embedded parallel in a self-regulating polymer core that varies its power output in response to temperature along its entire length. The heat trace jacket shall be a radiation cross linked polyoelefin dielectric rated at 300 VAC at 105°F with a VW-1 flame resistance and shall have a outer braid of tinned copper for a ground path.

Heat trace shall be installed in strict accordance with manufacturer’s instructions after pressure testing and immediately before pipe insulation. The heat trace shall be resistance tested by a licensed Electrician at the expense of the Plumbing Contractor. Trace system shall be connected to GFCI protected power by the Electrical Contractor, at the expense of the Plumbing Contractor.

Domestic water heat trace cable shall be Model HSX-A-120V manufactured by Thermon or equal by RayChem.

PIPE AND VALVE IDENTIFICATION:

Furnish and install flexible, permanent, color-coded, plastic-sheet pipe markers that comply with ANSI A13.1 on all exposed piping (including piping above lay-in ceiling) not to exceed 10' o.c., equal to Seton SetMark pipe markers.

Furnish and install brass valve tags with 1/4" high letters identifying operation / maintenance of piping system, equal to Seton No. M4506.

END OF SECTION

RELATED DOCUMENTS:

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

GENERAL:

Furnish and install a complete sanitary drain, waste and vent system as shown on the drawings and as specified herein.

No waste or vent piping buried below slab shall be smaller than 2". Make any change in flow direction or grade gradually with proper curbed fittings. Make all junctions with wye branches or wye and eighth bend. Sanitary tees may be used for vertical junctions. Size pipe per drawings.

Keep piping clean during construction. Seal all clean-outs and fixture connections. Remove all earth or foreign matter. Bed, fill and compact all line trenches according to Section 15150 or as detailed on the plans to prevent strain on joints, damage or settling.

Set all water closet fittings, floor drains, clean-outs, etc., carefully, using a spirit level. Confirm final floor elevations. The Plumbing Contractor shall have a journeyman present at all times while General Contractor is pouring concrete to insure proper installation of work in this Contract.

Install all piping with 1/4" per foot slope wherever possible but with minimum slopes as follows: 3" and less - 1/4" per foot; 4" and larger - 1/8" per foot.

DRAIN, WASTE AND VENT PIPING BELOW SLAB:

Construct all building sewers and building drain lines below floor slabs and outside of building walls, unless indicated otherwise on the drawings, with Schedule 40 PVC-DWV Pipe, ASTM D-2665, marked to indicate that it complies with this standard. Pipe shall be manufactured by Charlotte Pipe and Foundry or equivalent. All installations shall conform to installation instructions of the Plastic Pipe Institute, manufacturer, and/ or local ordinances. In all cases, approved cleaner, primer and solvent cement designated for the specified material shall be used.

DRAIN, WASTE AND VENT PIPING ABOVE FLOOR SLAB:

All waste and vent piping above the floor slab shall be Schedule 40 PVC-DWV in accordance with Commercial Standards CS272-65, or CS270-65, or ASTM Standards D2665-68 or D2661-67. All plastic pipe and fittings shall bear the NSF Seal of Approval, and such other markings as required by the aforementioned standards. Fittings shall be molded, fully recessed, socket type designed for solvent welded joints. All plastic piping shall be installed and joined in strict accordance with the pipe manufacturer's instructions. Plastic waste and vent pipe shall not be used in any return air plenum unless it is fully encased in a fireproof covering or as required by any code.

TRAPS:

Provide each fixture with a trap when connection to drainage system is required. Place each trap as near to fixture as possible. No fixture shall be double trapped.

PIPE STORAGE:

If possible, pipe should be stored inside. Otherwise, store pipe on dry, level ground free from sharp objects. Protect stored pipe from ultraviolet exposure as required. Refer to manufacturer’s recommendations for rack or pallet storage and freezing temperatures.

PIPE HANGERS AND SUPPORTS:

Support Schedule 40 PVC- DWV pipe with carbon steel adjustable clevis-type hangers, 5’ o.c. with 3/8” threaded rod. Chain, strap, perforated bar, or wire hangers will not be permitted. Where required, provide suitable concrete inserts in masonry or concrete during laying or placing of those materials. Acceptable manufacturers are B-line, PHD, Gulf State Hangers, and Grinnell.

PIPE SLEEVES:

Provide pipe sleeves where all pipe passes through floors, utility platforms, walls, roofs, etc. Size sleeves for insulated pipe to accommodate both pipe and insulation. Sleeves for piping masonry or concrete walls, floors, beams, or roof, shall be of black steel pipe of standard weight, unless otherwise specified or shown. Vertical sleeves through floors shall extend at least 1" above finished floor (4” through utility platforms).

ROOF VENT FLASHING:

Vents through roof shall be flashed with 4 lbs. lead or 16 oz. copper extending 12" each way from the vent. Provide lead collar, soldered to, and extending from flashing up, around, and turned down a minimum of 1" into top of vent.

CLEAN-OUTS:

Provide clean-outs at the base of all plumbing stacks, 2'-0" above finish floor if required by local codes; at all changes in direction of all sewers; and wherever indicated on the drawings.

All cleanouts shall be as manufactured by Smith, Josam, or equal by Zurn.

FLOOR, WALL, AND CEILING PLATES:

Where pipes pass through floors, finished walls or ceilings, fit with chromium plated cast brass plates or chromium steel plates as specified hereinafter. Plates shall be large enough to completely close hole around pipes, and shall be square, octagonal , or round, with least dimension not less that 1.5 times larger than diameter of pipe. Secure plates in an approved manner. Plates shall be Beaton-Caldwell No. 3A for floor and No. 40 for walls and ceilings.

PRESSURE TESTS:

The engineer shall be notified several days before testing is to be conducted and all tests shall be conducted in presence of engineer. Prior to notifying the engineer, the Contractor shall have successfully tested the piping. The Contractor shall bear the expense of the engineer's services if the tests prove unsuccessful after the engineer has been summoned by the Contractor to observe the test.

Water test all interior soil, waste, vent, and drain piping with 10' head pressure before connecting to exterior sewers and before connecting to fixtures. Water shall remain in each system for at least 4 hours. Leaks shall be repaired and tests repeated until system fulfills this test. Systems may be tested in sections, but each joint between sections shall be tested. Do not exceed 25' head pressure on any joint.

Water test all exterior sanitary sewers with 4'-0" minimum head (above the invert) at the highest point of the sewer. Infiltration or exfiltration shall not exceed 50 gallons per inch diameter per mile per 24 hours.

Contractor shall use video camera to detect installation deficiencies such as excessive deflections, damaged pipes, leaking joints, etc. Engineer’s and / or Owner’s representative shall be on site to witness videotaping of all sewer piping. Contractor shall provide two (2) video tapes with corresponding diagrams for Owner’s record.

END OF SECTION

PART I: GENERAL

RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

A. This Section includes plumbing fixtures and trim, faucets, other fittings, and related components.

B. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 7 Section "Joint Sealants" for sealing between fixtures and walls, floors, and counters.
2. Division 15 Section "Valves" for general-duty valves used as supply stops.
3. Division 15 Section "Plumbing Specialties" for backfiow preventers and other specialties not specified in this Section.

DEFINITIONS

A. Accessible: Plumbing fixture, building, facility, or portion thereof that can be approached, entered, and used by physically handicapped, disabled, and elderly people.

B. Fitting: Device that controls flow of water into or out of plumbing fixture. Fittings specified in this Section include supplies and stops, faucets and spouts, showerheads and tub spouts, drains and tailpieces, traps and waste pipes. Pipe fittings, tube fittings, and general-duty valves are included where indicated.

SUBMITTALS

A. General: Submit each item in this Article according to the Conditions of the Contract and Division 1 Specification Sections.

B. Product Data for each plumbing fixture category and type specified. Include selected fixture, trim, fittings, accessories, appliances, appurtenances, equipment, and supports. Indicate materials and finishes, dimensions, construction details, and flow-control rates.

C. Provide wiring diagrams from manufacturer for electrically operated units.

D. Maintenance data for plumbing fixtures and components to include in the operation and maintenance manuals specified in Division 1.

QUALITY ASSURANCE

A. Source Limitations: Obtain plumbing fixtures, faucets, and other components of each category from one source and by a single manufacturer. Exception: Where fixtures, faucets, or other components are not available from a single manufacturer, obtain similar products from other manufacturers specified for this category.

B. Regulatory Requirements: Comply with requirements of CABO A117.1, "Accessible and Usable Buildings and Facilities"; Public Law 90-480, "Architectural Barriers Act'; and Public Law 101-336, "Americans with Disabilities Act"; regarding plumbing fixtures for physically handicapped people.

C. Regulatory Requirements: Comply with requirements of Architectural and Transportation Barriers Compliance Board's (ATBCB) "Uniform Federal Accessibility Standards (UFAS), 1985-494-187" regarding plumbing fixtures for physically handicapped people.

D. Energy Policy Act Requirements: Comply with requirements of Public Law 102-486, "Energy Policy Act," regarding water flow rate and water consumption of plumbing fixtures.

E. Listing and Labeling: Provide electrically operated fixtures and components specified in this Section 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.

F. Select combinations of fixtures and trim, faucets, fittings, and other components that are compatible.

G. Product Options: Drawings indicate size, profiles, dimensional requirements, and characteristics of plumbing fixtures and are based on specific types and models indicated. Other manufacturers' fixtures with equal performance characteristics may be considered. Refer to Division 1 Section "Substitutions."

DELIVERY, STORAGE, AND HANDLING

A. Deliver plumbing fixtures in manufacturers protective packing, crating, and covering.

B. Store plumbing fixtures on elevated platforms in dry location.

PROJECT CONDITIONS

A. Field Measurements: Coordinate roughing-in and final fixture locations and verify that plumbing fixtures can be installed to comply with original design and referenced standards.

PART II: PRODUCTS

PLUMBING FIXTURE STANDARDS AND ACCESSORIES

A. Comply with applicable standards below and other requirements specified.

1. Refer to the Specifications and Drawings for specific catalog numbers and required fittings.
2. Fixture Manufacturers:
   a. Vitreous China Fixtures: Kohler, American Standard, or Crane.
   b. Stainless Steel Sinks: Elkay, Just Mfg. Co., or Moen.
   c. Electric Water Coolers: Oasis, Sunroc, or Halsey-Taylor.
   d. Janitor’s Receptor: Fiat, Stern-Williams, or Creative Industries.
   e. Kitchen Stainless Steel Sinks: Elkay, Just or Moen.
3. Fittings Manufacturers:
   a. Flush Valves: Sloan, Zurn or Delany.
   b. Water closet Seats: Water closet manufacturer, Olsonite or Church.
   c. Faucets: Delta, Zurn or Kohler.
   d. Supplies and Stops (Loose Key): McGuire Mfg. Co., Dearborn, EBC or T&S.
   e. Traps: McGuire Mfg. Co., EBC, Central Brass, or Dearborn.
   f. Shower Controls: Symmons, Leonard or Acorn.

PART III: EXECUTION

EXAMINATION

A. Examine roughing-in for potable, hot- and cold-water supply piping systems; soil, waste, and vent piping systems; and supports. Verify that locations and sizes of piping and locations and types of supports

match those indicated, before installing and connecting fixtures. Use manufacturers roughing-in data when roughing-in data are not indicated.

B. Examine walls, floors, and cabinets for suitable conditions where fixtures are to be installed.

C. Do not proceed until unsatisfactory conditions have been corrected.

PLUMBING FIXTURE INSTALLATION

A. Assemble plumbing fixtures and trim, fittings, faucets, and other components according to manufacturers' written instructions.

B. Install fixtures level and plumb according to manufacturers' written instructions, roughing-in drawings, and referenced standards.

C. Install floor-mounted, floor-outlet water closets with closet flanges and gasket seals. Install wall-hanging, back-outlet water closets with carrier and support manufacturers tiling frame or setting gage.

F. Install wall-hanging, back-outlet urinals with gasket seals.

G. Install flushometer valves for accessible water closets and urinals with handle mounted on wide side of compartment. Install other actuators in locations that are easy for handicapped people to reach.

H. Fasten Wall-hanging plumbing fixtures securely to supports attached to building substrate when supports are specified, and to building wall construction where no support is indicated. Fasten floor-mounted fixtures to substrate. Fasten fixtures having holes for securing fixture to wall construction, to reinforcement built into walls. Fasten recessed, wall-mounted fittings to reinforcement built into wall. Fasten wall-mounted fittings to reinforcement built into walls. Fasten counter-mounting plumbing fixtures to casework.

M. Set mop basins in leveling bed of cement grout.

N. Secure supplies to supports or substrate within pipe space behind fixture.

O. Install an individual loose key stop valve in each water supply to fixture. Install loose key water-supply stop valves in accessible locations. Turn loose keys over to owner at project close out.

Q. Install faucet, laminar-flow fittings with specified flow rates and patterns in faucet spouts when faucets are not available with required rates and patterns. Include adapters when required. Install supply, flow-control fittings with specified flow rates in fixture supplies at stop valves.

S. Install faucet, flow-control fittings with specified flow rates and patterns in faucet spouts when faucets are not available with required rates and patterns. Include adapters when required.

T. Install shower, flow-control fittings with specified maximum flow rates in shower arms.

U. Install traps on fixture outlets. Omit traps on fixtures having integral traps. Omit traps on indirect wastes, except where otherwise indicated.

V. Install escutcheons at wall, floor, and ceiling penetrations in exposed, finished locations and within cabinets and millwork. Use deep-pattern escutcheons where required to conceal protruding pipe fittings.

W. Seal joints between fixtures and walls, floors, and counters using sanitary-type, 1 -part, mildew-resistant, silicone sealant according to sealing requirements specified in Division 7 Section "Joint Sealant." Match sealant color to fixture color; provide white, unless noted on drawings otherwise.

PART IV: COMMISSIONING

CONNECTIONS

A. Piping installation requirements are specified in other Division 15 Sections. Drawings indicate general arrangement of piping, fittings, and specialties. The following are specific connection requirements:

1. Install piping connections between plumbing fixtures and piping systems and plumbing equipment specified in other Division 15 Sections.

B. Supply and Waste Connections to Plumbing Fixtures: Refer to plumbing fixture schedules at the end of this Section for fitting sizes and connection requirements for each plumbing fixture.

C. Supply and Waste Connections to Equipment Specified in Other Sections: Connect equipment with supply inlets, supply stops, supply risers, and traps specified in this Section. Use fitting sizes required to match connected equipment. Connect fittings to plumbing piping.

D. Ground equipment.

1. Tighten electrical connectors and terminals according to manufacturers published torque-tightening values. Where manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B.

E. Arrange for electric power connections to fixtures and devices that require power. Electric power is specified in Division 16 Sections.

FIELD QUALITY CONTROL

A. Verify that installed fixtures are categories and types specified for locations where installed.

B. Check that fixtures are complete with trim, faucets, fittings, and other specified components.

C. Inspect installed fixtures for damage. Replace damaged fixtures and components.

D. Test installed fixtures after water systems are pressurized and demonstrate proper operation. Replace malfunctioning fixtures and components, then retest. Repeat procedure until units operate properly.

ADJUSTING AND CLEANING

A. Operate and adjust faucets and controls. Replace damaged and malfunctioning fixtures, fittings, and controls.

B. Operate and adjust disposers, hot-water dispensers, and controls. Replace damaged and malfunctioning units and controls.

C. Adjust water pressure at drinking fountains, electric water coolers, faucets, shower valves, and flushometer valves having controls, to produce proper flow and stream.

D. Replace washers and seals of leaking and dripping faucets and stops.

E. Clean fixtures, faucets, and other fittings with manufacturers' recommended cleaning methods and materials. Include the following:

1. Remove faucet spouts and strainers, remove sediment and debris, and reinstall strainers and spouts.
2. Remove sediment and debris from drains.

PROTECTION

A. Provide protective covering for installed fixtures and fittings.

B. Do not allow use of fixtures for temporary facilities, except when approved in writing by Owner.

END OF SECTION

PART I - GENERAL

RELATED DOCUMENTS

A. Drawings and General Provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

SUMMARY

A. This Section includes Plumbing Specialties for water distribution systems; and soil, waste and vent systems.

SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Submit product data including rated capacities of selected models and weights (shipping, installation, and operation). Indicate materials, finishes, dimensions, required clearances, and methods of assembly of components; and piping and wiring connections.

PART II - PRODUCTS

MANUFACTURERS

A. Acceptable Manufacturers:

a. Backflow Preventers:

i. Ames Co., Inc.
ii. Hersey Products, Inc., Grinnell Corp.
iii. Watts Regulator Co.
iv. Wilkins Regulator Div., Zurn Industries, Inc.

b. Water Pressure Regulators:

i. Spence Engineering Co., Inc.
ii. Watts Regulator Co.
iii. Wilkins Regulator Div., Zurn Industries, Inc.

c. Specialties:

i. Josam Co.
ii. Smith by Jay R. Smith Mfg. Co. Div., Smith Industries, Inc.
iii. Watts Regulator Co.
iv. Woodford Manufacturing Co. Div., WCM Industries, Inc.
v. Zurn by Hydromechanics Div., Zurn Industries, Inc.

CLEANOUTS

A. Exterior Surfaced Areas: Round cast nickel-bronze access frame and non-skid cover.

B. Exterior Un-Surfaced Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover.

C. Interior Finished Floor Areas: Lacquered cast iron, two piece body, round with scoriated cover in service areas and round with depressed cover to accept floor finish in finished floor areas.

D. Interior Finished Wall Areas: Line type with lacquered cast iron body and round epoxy coated gasketed cover, and round stainless steel access cover secured with machine screw.

WATER HAMMER ARRESTORS

A. ANSI A112.26.1; sized in accordance with PDI WH-201, pre-charged suitable for operation in temperature range -100 to 300 degrees F and maximum 250 psig working pressure.

TRAP SEAL PRIMER VALVE:

A. ASSE 1018; water supply fed type, fully automatic 125psig minimum working pressure, Bronze body with atmospheric vented drain chamber, ½ inch threaded or solder joint inlet and outlet connections, Chrome plated, or rough bronze finish. Unit shall be capable of being located on any active water line.

BACKFLOW PREVENTERS

A. Reduced Pressure Back-flow Preventers: ANSI/ASSE 1013; bronze body with bronze and plastic internal parts and stainless steel springs; two independently operating, spring loaded check valves; diaphragm type differential pressure relief valve located between check valves; third check valve which opens under back pressure in case of diaphragm failure; non-threaded vent outlet; assembled with two gate valves, strainer, and four test cocks.

PART III - EXECUTION

PREPARATION

A. Coordinate construction areas to receive drains to the required invert elevations.

INSTALLATION AND APPLICATION

A. Install specialties in accordance with manufacturer's instructions to permit intended performance.

B. Extend clean-outs to finished floor. Lubricate threaded clean-out plugs Teflon pipe dope. Ensure clearance at clean-out for rodding of drainage system.

C. Encase exterior clean-outs in concrete flush with grade.

D. Install water hammer arrestors complete with accessible isolation valve.

END OF SECTION 15430

PART I - GENERAL

DESCRIPTION:

Domestic water heater system complete, ready for operation including water heaters, thermometers and all necessary accessories, connections and equipment.

1.2 RELATED WORK:

A. Section 15000, GENERAL PROVISIONS (MECHANICAL).

B. Piping, Fittings, Valves and Gages: Section 15400, PLUMBING FIXTURES.

C. Preparation and finish painting Section 09900, PAINTING.

D. DIVISION 16

1.3 QUALITY ASSURANCE:

A. Comply with American Society of Heating, Refrigerating and Air- Conditioning Engineers (ASHRAE) for efficiency performance,
ASHRAE 90.1, Energy Efficient Design of New Buildings except Low-Rise Residential Buildings, ”for commercial water heaters.”

1.4 SUBMITTALS:

A. Submit manufacturer’s literature and data pertaining to the water heater in properly bound package, in accordance with Section 01340, SAMPLES AND SHOP DRAWINGS. Include the following as a minimum:

1. Water Heaters.
2. Pressure and Temperature Relief Valves.
3. Steam Control Valves.
4. Thermometers.
5. Pressure Gages.
6. Vacuum Breakers.

1.5 APPLICABLE PUBLICATIONS:

A. The publications listed below form a part of this specification to the extent referenced. The publications are referenced in the text by the basic designation only.

B. American National Standard Institute (ANSI):

Z21.22-99..... Relief Valves for Hot Water Supply systems

C. American Society Of Mechanical Engineers (ASME):

B1.20.1-83(R 1992) ..... Pipe Threads, General Purpose

B16.5-96 ..... Pipe Flanges and Flanged Fittings

B16.24-91(R 1998) ..... Cast Copper Alloy Pipe Flanges

PTC 25.3-94..... Pressure Relief Devices

Section IV-98 ..... Heating Boilers

Section VIII-98 ..... Pressure Vessels Division 1

D. National Fire Protection Association (NFPA)

70-99..... National Electric Code

E. Underwriters Laboratories, Inc. (UL):

174-1996 ..... Household Electric Storage Tank Water Heaters

1453-1994 ..... Water Heaters, Electric Booster and Commercial Storage Tank

.

PART 2 - PRODUCTS

2.1 ELECTRIC WATER HEATERS:

A. Tank Construction: Steel shell, glass lined, and ASME-Code construction with 1035 kPa (150 psig) working pressure rating.

B. Tapping (openings): Factory fabricated of materials compatible with the tank and in accordance with appropriate ASME standards for piping connection, pressure and temperature relief valve, pressure gauge, thermometer, drain valve, anode rods and controls as required.

C. Insulation: Comply with ASHRAE 90.1.
   1. 2 inch and smaller: Threaded ends according to ASME B1.20.1.
   2. 2 1/2-inch and Larger: Flanged ends according to ASME B16.5 for steel and stainless steel flanges, and according to ASME B 16.24.

D. Heating Element: double element, immersion type, thermostatically adjustable. Set thermostat for maximum water temperature of 130 degrees F. Phase and voltage as shown on the drawings.

E. Combination Pressure and Temperature Relief Valves: ASME rated, constructed of all brass or bronze with a self-closing reseating valve. Pressure setting shall be less than water heater working pressure, and relieving capacity shall not be less than heat input.

F. Electrical power requirements: Field coordinate power connect requirements with E.C. prior to ordering equipment. Provide 120/208/240V or 277/480V as required to match electrical feeders.

G. Provide water heat as manufactured by: Rudd, Rheem, State, A.O. Smith or equal. See schedule on plans for specific heater requirements.

2.2 THERMOMETERS:

Gas and Electric Water Heaters: Straight stem, iron case, red reflecting mercury thermometer approximately 175 mm (7 inches) high, 4 to 115 degrees C (40 to 240 degrees F). Install in hot water pipe close to outlet of tank.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install water heaters on concrete base where possible.

B. Install water heaters level and plumb.

C. Install and connect water heaters in accordance with manufacturer’s written instructions.

D. Pipe all pressure and temperature relief valves discharge to nearby floor drains.

E. Install thermometers on water heater inlet and outlet piping.

F. Provide and install thermal heat traps as required by current NC Energy Conservation Code.

G. Provide electric power connections to fixtures and devices that require power using licensed electrician as specified in Division 16 Sections.

H. Ground equipment - tighten electrical connectors and terminals according to manufacturers published torque-tightening values. Where manufacturers torque values are not indicated, use those specified in UL 486A and UL 486B
G. Set the thermostats for a maximum setting of 130 degrees F unless noted otherwise.

3.2 LEAKAGE TEST:

Before piping connections are made, test water heaters with hydrostatic pressure of 200 psi.

Correct any leakage or replace water heater and retest at no additional cost to the Owner.

3.3 PERFORMANCE TEST:

Ensure that all remote water outlets have a maximum of 120 degrees F water at all times. If necessary, make all correction to balance the return water system or reset the thermostat to make the system comply with design requirements.

END OF SECTION

PART I: GENERAL

Furnish and install insulation for refrigerant and air distribution systems where shown on plans and specified below.

REFRIGERANT PIPE INSULATION:

Install insulation on piping per the NC Energy Conservation Code, the Refrigerant Piping Specification and as described below.

DUCTWORK INSULATION:

Furnish and install all-service faced duct wrap consisting of a blanket of glass fibers factory-laminated to a reinforced foil / kraft (FRK) vapor retarder facing on all supply, ventilation, and non-lined return air ductwork.

Duct wrap shall comply with the current NC Energy Conservation Code and NFPA 90 performance standards. Duct wrap insulation shall be Knauf Multi-purpose, 2" thick, 1.0 lb/cf density with installed R-value = 6, or approved equal by Owens-Corning or Schuller.

PART II: EXECUTION

Install system according to manufacturer's written instructions. Drawings indicate only general arrangement of piping, fittings, and specialties

PIPE INSULATION INSTALLATION:

The Contractor shall provide all insulation as required on all piping as specified hereinafter and/or as indicated. All insulation shall be installed in a workmanlike manner by qualified workers in the regular employ of the Contractor.

Install insulation according to manufacturer’s instructions, North Carolina Energy Conservation Code and other piping related sections in this specification.

All insulation shall be applied to clean, dry surfaces butting all sections firmly together and finishing as specified hereinafter. All vapor barriers shall be sealed, and shall be continuous throughout. No staples shall be used on any vapor barrier jacket. All vapor barriers shall be of the fire retardant type.

Insulation of all insulated lines shall be interpreted as including all pipe, valves, fittings, and specialties comprising the lines, except flanged unions and screwed unions on hot piping. Insulation over fittings shall be of equal thickness as the adjoining pipe insulation. Unless otherwise specified or directed, insulation for fittings and flanges shall be of the permanent type.

PIPE INSULATION PROTECTION:

Support of pipe shall be on the outside of the insulation. The insulation at each support shall be rigid and of an equal thickness and finish as the adjoining pipe insulation; the length to coincide with the saddles.

DUCT SEALANT:

Prior to insulating, all duct joints (except gasketed joints), seams and connections shall be sealed with brush-on type water-based sealant equal to United-McGill Duct Sealant. Apply in accordance to manufacturer's instructions and / or recommendations.

DUCT INSULATION INSTALLATION:

Before applying duct wrap, sheet metal ducts shall be clean, dry, tightly sealed at all joints and seams as specified, sealant applied and inspected by Engineer.

Duct wrap insulation shall be cut to "stretch-out" dimensions as provided in instructions, and a 2" piece of insulation removed from the facing at the end of the piece of insulation to form an overlapping staple and tape flap.

Install duct wrap insulation with facing outside so that tape flap overlaps insulation and facing at other end of piece of duct wrap. Insulation shall be tightly butted. If ducts are rectangular or square, install so insulation is not excessively compressed at duct corners. Seams shall be stapled approximately 6" on center with outward clinching staples. Where a vapor barrier is required, seal with pressure-sensitive tape matching the facing, either plain foil or PRK backing stock.

Where rectangular ducts are 24" in width or greater, duct wrap insulation shall be additionally secured to the bottom of the duct with mechanical fasteners such as pins and speed clip washers, spaced on 18" centers (maximum) to prevent sagging of insulation. Adjacent sections of duct wrap insulation shall be tightly butted with the 2" tape flap overlapping. Where a vapor barrier is required, seal all tears, punctures, and other penetrations of the duct wrap insulation facing with tape or mastic to provide a vapor tight system.

DUCT LINER:

Removed from Spec, not allowed on this project.

PART III: WARRANTY

Manufacturer shall guarantee all insulation as installed to be free from manufacturing defects for a period of one year from startup not to exceed twenty-four months from shipping to job site under normal use.

PART IV: COMMISSIONING

Prior to pre-final construction review, Contractor shall repair all insulation tears and damage.

END OF SECTION

PART 1: GENERAL

1.01 SECTION INCLUDES

A. Design
B. Performance Criteria
C. Controls and control connections
D. Chilled water connections
E. Electrical power connections
F. Chiller Package

1.02 REFERENCES

A. Products shall be designed, rated and certified in accordance with applicable sections of the following Standards and Codes:

1. To comply with the most recent versions of applicable Standards and Codes of AHRI 550 / 590.

2. AHRI 370 - Standard for Sound Rating of Large outdoor Refrigerating and Air-conditioning Equipment.

3. To comply with the most recent versions of applicable Standards and Codes of ASHRAE 15.

4. Units shall meet the efficiency standards of the latest ASHRAE 90.1 Standard.

1.03 SUBMITTALS

A. Submit shop drawings and product data in accordance with the specifications.

B. Submittals shall include the following:

1. Dimensioned plan and elevation view drawings, required clearances, and location of all field connections.

2. Weights and loading document.

3. Product data indicating rated capacities, weights, specialties and accessories, electrical requirements and wiring diagrams.

1.04 OPERATION AND MAINTENANCE DATA

Include manufacturer's descriptive literature, installation checklist, start-up instructions and maintenance procedure.

1.05 REGULATORY REQUIREMENTS

A. A. UL 1995 -- Standard for Heating and Cooling Equipment.

B. Manufactured facility to be ISO 9001.

C. Factory Functional Test: The chiller shall be pressure tested, evacuated and fully charged with HFC-410A refrigerant and oil. In addition, a factory functional test to verify correct operation by cycling condenser fans, closing compressor contacts and reading data points from temperature and pressure sensors.

D. Chiller manufacturer shall have a factory trained and supported service organization that is within a 50 mile radius of the site.

E. Warranty: The manufacturer shall warrant all equipment and material of its manufacture against defects in workmanship and material for a period of one year from date of initial start-up or eighteen months from date of shipment; whichever occurs first.

F. A 5 year parts and labor warranty shall be provided on any speed increasing or decreasing compressor.

G. Provide whole unit parts warranty (less motor/transmission/compressor) for the duration of the 1st year.

H. Provide whole unit labor warranty for the duration of the 1st year.

1.06 STORAGE AND HANDLING

A. Units shall be delivered to job site fully assembled and charged with refrigerant (unless selected with nitrogen charge) and oil by the manufacturer.

B. Unit shall be stored and handled per manufacturer's instructions.

C. During shipment, provide protective covering over vulnerable components. Fit nozzles and open pipe ends with enclosures.

1.07 WARRANTY

A. Provide a full parts warranty for one year from start-up or 18 months from shipment, whichever occurs first.

B. A 5-year motor/transmission/compressor warranty shall be provided based upon the RPM of the compressors as follows:

Compressor RPM	**Warranty Term**
0 - 5000	1 year from start-up
5001 - 10,000	5 years from start-up
10,001 and above	5 years plus annual oil analysis

1.08 MAINTENANCE SERVICE

Furnish service and maintenance of complete assembly for one year starting from Date of Substantial Completion.

PART 2: PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. A. Trane Model CGAM

B. Carrier 30RB

C. McQuay AGZ

D. York YLAA

2.02 GENERAL UNIT DESCRIPTION

Factory assembled, single-piece chassis, air-cooled liquid chiller. Contained within the package shall be all factory wiring, piping, controls, and refrigerant charge (HFC-410A).

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2.03 COMPRESSORS

A. Fully hermetic scroll type compressors with R410A optimized and dedicated scroll profile.

B. Direct drive motor cooled by suction gas with only three major moving parts and a completely enclosed compression chamber which leads to increased efficiency.

C. Each compressor shall have overload protection internal to the compressor

D. Each compressor shall include: centrifugal oil pump, oil level sight glass and oil charging valve.

E. Each compressor will have crankcase heaters installed and properly sized to minimize the amount of liquid refrigerant present in the oil sump during off cycles.

2.04 EVAPORATOR

B. The evaporator shall be a high efficiency, brazed plate-to-plate type heat exchanger consisting of parallel plates. Braze plates shall be stainless steel with copper braze material.

C. The evaporator shall be protected with an etched foil heater and insulated with 1.5 inch insulation. This combination shall provide freeze protection down to -20F ambient temperatures while the heater is powered. Contractor shall provide separate power to energize heater and protect evaporator while chiller is disconnected.

D. The water side working pressure shall be rated at 150 psig and tested at 1.5 times maximum allowable water side working pressure.

E. The refrigerant side working pressure shall be rated at 460 psig (29.6 bars) and tested at 1.1 maximum allowable refrigerant side working pressure.

2.05 CONDENSER

A. The condenser coils shall consist of copper tubes mechanically bonded into plate-type aluminum fins. A subcooling coil shall be an integral part of the main condenser coil.

B. The maximum allowable working pressure of the condenser shall be 650 psig (44.8 bars). The

condensers shall be factory proof and leak tested at 715 psig (49.3 bars).

C. Low Sound Fans shall be dynamically and statically balanced, direct drive, corrosion resistant glass fiber reinforced composite blades molded into a low noise fan blade.

D. Low speed fan motors shall be three-phase with permanently lubricated ball bearings and individually protected by circuit breakers.

E. Unit shall be capable of starting and operating at outdoor ambient temperatures from 20F to 125F (-18C - 52C) for all sizes.

F. Provide factory mounted, louvered, "architecturally pleasing" panels. Panel louvers shall cover the condenser coils and protect from hail.

2.06 ENCLOSURES

A. Mount starters in a UL1995 rated panel for outdoor use.

B. The starter shall be across-the-line configuration, factory-mounted and fully pre-wired to the compressor motor(s) and control panel.

C. Unit shall have a single point power connection.

D. A control power transformer shall be factory-installed and factory-wired to provide unit control power.

E. Control panel shall be dead front construction for enhanced service technician safety.

F. Power line connection type shall be standard with a terminal block.

G. Unit wiring shall run in liquid-tight conduit.

2.07 REFRIGERANT CIRCUIT

A. Chilled fluid circuit shall be rated for 150 psig (1034 kPa) working pressure.

B. Proof of flow switch shall be provided by the equipment manufacturer and installed the correct number of pipe diameters from any elbow and in the correct orientation.

C. Flow switch shall be IFM flow monitor type.

D. Units with brazed plate evaporators shall have a water strainer that is factory provided. It shall be installed with a blowdown valve to facilitate periodic cleaning of the strainer to prevent it from becoming clogged.

E. Water pipe extensions with insulation shall be factory installed from the evaporator to the edge of the unit.

F. All major serviceable components shall be located at least 18-inches from edge of chiller. Service shutoff valves and water strainer are conveniently located to enable each service.

2.08 CONTROLS

A. A. The microprocessor-based unit controller shall be factory-installed and factory-tested.

B. The unit display shall provide the following data:

1. Water and air temperatures

2. Refrigerant levels and temperatures

3. Flow switch status

4. Compressor starts and run times

5. Display diagnostics.

C. The unit controller shall provide chilled water reset based on return water as an energy saving option.

D. Chilled water temperature control shall be microprocessor-based, proportional and integral controller to show water and refrigerant temperature, refrigerant pressure, and diagnostics. This microprocessor-based controller is to be supplied with each chiller by the chiller manufacturer. Controls shall include the following readouts and diagnostics:

1. Low evaporator refrigerant temperature and/or pressure

2. High condenser refrigerant pressure

3. Low oil flow

4. Motor current overload

5. High compressor discharge temperature

6. Electronic distribution faults: phase loss, phase imbalance, or phase reversal

E. Unit shall be shipped with factory control and power wiring installed.

F. On chiller, mount weatherproof control panel, containing starters, power and control wiring, factory wired with terminal block power connection. Provide primary and secondary fused control power transformer and a single 115 volt 60 Hz single phase connection for evaporator freeze protection heaters.

G. The unit controller shall utilize a microprocessor that will automatically take action to prevent unit shutdown due to abnormal operating conditions associated with: evaporator refrigerant temperature, high condensing pressure and motor current overload.

H. Provide the following safety controls with indicating lights or diagnostic readouts.

1. Low chilled water temperature protection.

2. High refrigerant pressure.

3. Low oil flow protection.

4. Loss of chilled water flow.

5. Contact for remote emergency shutdown.

6. Motor current overload.

7. Phase reversal/unbalance/single phasing.

8. Over/under voltage.

9. Failure of water temperature sensor used by controller.

10. Compressor status (on or off).

I. Provide the following operating controls:

1. Chilled water pump output relay that closes when the chiller is given a signal to start.

2. High ambient pressure controller that shuts off a compressor to keep head pressure under control and help prevent high pressure nuisance trip outs on days when outside ambient is above design.

3. Compressor current sensing limit that shuts off a compressor to help prevent current overload nuisance trips.

4. Auto lead-lag functions that constantly even out run hours and compressor starts automatically. If contractor cannot provide this function then cycle counter and hour meter shall be provided for each compressor so owner can be instructed by the contractor on how to manually change lead-lag on compressors and even out compressor starts and running hours.

5. Low ambient lockout control with adjustable setpoint.

J. Provide user interface that displays chilled water temperature setpoint and actual leaving chilled water temperature. Display should be on the front of panel. If display is on the inside of the panel, then a control display access door shall be provided to allow access to the display without removal of panels.

K. Provide factory installed contact closure input for initiation of ice building. Ice building termination shall be based on an adjustable entering water temperature setpoint. All compressors shall run at full load during ice building.

L. Digital Communications to BAS system shall consist of a BACnet interface via a single twisted pair wiring.

M. The chiller control panel shall provide leaving chilled water temperature reset based upon return water temperature.

N. The chiller control panel shall provide an alarm relay output that shall energize whenever a fault requiring manual reset is detected by the panel.

O. The chiller control panel shall provide input for leaving chilled water temperature setpoint based upon a 2-10VDC or 4-20mA signal from a building automation system.

P. The chiller control panel shall provide input for chiller current limit setpoint based upon a 2-10VDC or 4-20mA signal from a building automation system.

Q. The chiller control panel shall provide an output for chiller Percent Capacity via a 2-10VDC or 4-20mA signal to a building automation system.

R. On chillers that are going to be located within 20 miles of the coast or are located in a corrisie environment, provide the chiller with a corrosion resistant coating. Coat the condenser coils, components, frame, and all metal portions of the cabinet, interior and exterior. Coating shall meet or exceed ASTM B117 for a 5,000 hour spray rating.

PART 3: EXECUTION

3.01 INSTALLATION

A. A. Install in accordance with manufacturer's instructions.

B. Align chiller package on steel or concrete foundations.

C. Install units on isolators.

D. Connect to electrical service.

E. Connect to chilled water piping.

PART 4 SEQUENCE OF OPERATIONS: see drawings.

END OF SECTION

DIVISION 15B HEATING, VENTILATING, AND AIR CONDITIONING

SECTION 15735 CONDENSATE PIPING SYSTEMS

RELATED DOCUMENTS:

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

CONDENSATE PIPING:

Condensate piping shall be 1-1/4” diameter minimum PVC pipe and fittings installed in strict accordance with the Plastic Pipe Institute guidelines unless noted otherwise on the drawings. Provide copper or cast iron piping above corridor ceilings below utility platforms or in similar fire-rated assemblies. Slope pipe a minimum of 1/4” per foot and support with clevis-type hangers at 5’-0” o.c.

INSULATION:

Insulate pipe with 3/8” wall white Polymer foam insulation by IMCOA or 1/2” thick closed cell rubber pipe insulation, Armstrong AP Armaflex or equal by Rubatex, prior to making joints. Fabricate mitered covers over elbow fittings. Insulation sections shall be jointed using Armstrong 520 Adhesive. Follow all manufacturers’ installation instructions in strict accordance. Splitting insulation or the use of duct tape to join insulation sections will not be permitted on this project.

PIPE SUPPORT:

Provide clevis-type hangers on 10' centers and within 12" of elbows.

TESTING:

Fill fan coil and air handler condensate pans from utility sinks, and allow to flow into storm sewer prior to ceiling installation and pipe insulation. Repair all observed leaks as required.

PIPE IDENTIFICATION:

Furnish and install permanent color-code plastic sheet pipe markers with directional arrows. See also section 15740-4.

END OF SECTION

RELATED DOCUMENTS:

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

SCOPE OF WORK:

Provide complete systems of piping and fittings for all services, including water system piping, cold water make-up, valves, fittings, joints, hangers, supports, expansion joints, pipe guides, and insulation.

SUBMITTALS:

Shop drawings shall be submitted for the following:

a. piping & fittings
b. welding procedure & qualification specification
c. valves / strainers / flow control devices / test plugs
d. gauges

BUILDING PIPE INSTALLATION:

All pipe, valves and fittings shall comply with American Standards Association Code and/or local codes and ordinances (no foreign fittings accepted). Cut pipe accurately to measurements established at building or site, and work into place without springing or forcing, properly clearing all windows, doors and other openings or obstructions. Excessive cutting or other weakening of building to facilitate piping installation will not be permitted. Piping shall line up flanges and fittings freely and shall have adequate unions and flanges so that all equipment can be disassembled for repairs. Test all piping prior to concealing.

All welded pipe and fittings shall be delivered to job with machine beveled ends. Where necessary, beveling may be done in field by gas torch, in which case surfaces shall be thoroughly cleaned of scale and oxidation after beveling. No miter connections will be permitted in welded work.

Screwed piping shall have tapered threads cut clean and true, and shall be reamed out clean before erection. Each length of pipe, as erected, shall be upended and rapped to free it of any foreign matter. All piping shall be closed with factory installed caps until prior to installation.

Threaded fittings shall be malleable iron conforming to ANSI B16.3 (150 psig W.O.); welded fittings shall be standard weight Schedule 40 black steel conforming to ASTM A-120. Weld-o-lets may be used in lieu of fitting for branch take-offs from mains 2" or larger provided that the branch take-offs is two or more sizes smaller than the main. No "stub-ins" will be permitted. Threaded joints shall be made with Teflon sealing compound applied to the male threads only.

The Contractor shall coordinate the routing of all piping with other contractors prior to installation. Furnish and install valves as required to allow for complete system drain down.

ABOVE GROUND PIPING:

Above ground piping inside building shall be Schedule 40 black steel pipe bearing name of manufacturer and weight at regular intervals. Fittings for pipe 2-1/2" and smaller shall be malleable iron 150 lb. screwed and bonded (ASA B16.3). Fittings for pipe 3" and larger shall be welded forged carbon steel (ASTM 234) with same thickness as adjacent piping. Use only long radius elbows.

WELDING QUALITY ASSURANCE

Piping shall comply with the provisions of the latest edition of the ASME code for pressure piping, ANSI/ASME B31.1 - Power Piping.

All welding shall be performed by persons currently having an ASME license in accordance with Section IX of the ASME Code. All welding shall be performed in accordance with the North Carolina Boiler Rules. Names, identification stamps, and copy of certification of all welders on job shall be submitted to the Designer and kept for historical purposes in the project files. At the request of the Designer, this contractor shall (at his or her expense) have an independent testing agency test and qualify the welding procedures used in the construction of weldments and the performance of welders who apply these procedures.

At least two weeks before any welding is performed, the Contractor shall submit to the Designer a copy of each welding procedure specification required for the job, together with the procedure qualification record as required by Section IX of the ASME boiler and pressure vessel code.

At least two weeks before any welder shall perform any welding the Contractor shall submit to the Designer a copy of the manufacturer's record of welder or welding operator qualification tests as required by Section IX of the ASME boiler and pressure vessel code.

Welded joints shall be made by first properly beveling the surfaces to be welded, cleaning the mating surfaces, then tack-welding the joint to assure proper alignment prior to completing the weld. Weld metal shall be continuous around the joint and shall be deposited in such a manner that the sides and bottom of the surfaces or edges joined are thoroughly fused with the surface of the weld and have proper reinforcement and width.

The first weld of each welder shall be witnessed and visually inspected and approved by Engineer before further welding by that welder is permitted. Provide at least five (5) working days notice to Engineer.

Weld examination shall be in accordance with ANSI/ASME B31.1 - Power Piping. In addition, the Owner may at any time hire an independent agent to examine the welds using whatever method he or she deems suitable, whether required by ANSI/ASME B31.1 or not.

Any welds not meeting the acceptance criteria of ANSI/ASME B31.1 – Power Piping for the examination technique used shall be repaired in accordance with ANSI/ASME B31.1., at no cost to the Owner.

VALVES:

For pipe sizes 3" and larger, valves shall be threaded lug butterfly type, with ductile iron body, teflon or neoprene seat, and bronze disc; Grinnell Series 8000 or equal by Posi-Seal or DEMCO. For pipe sizes 2.5" and smaller, use ball valves non-shock pressure rated up to 400 psi equal to Grinnell Series 3500 with cast bronze body and ball. Soft solder ends at temperatures less than 470°F to prevent damage to seat. Nibco or Apollo shall be considered equal.

Check valves shall be spring loaded, manufactured by Febco, Watts or equal.

STRAINERS:

Strainers shall be placed at pumps, coils, chillers, boilers, make-up water and where indicated on the drawings. Strainer body specs shall be same as valves. Screen element shall be rated for 20 mesh/850 microns up to 1-1/2”, perforations shall not exceed 1/16” for 2” units and larger.

AUTOMATIC FLOW CONTROL VALVES / STRAINERS

Combination automatic flow control valves strainers with pressure and temperature parts shall be installed where shown on the drawings to control the water flow to the scheduled values. These valves

shall automatically control the flow of water to the units to within 5% of the indicated flow over a pressure range of not less than 14 times the minimum necessary for proper flow. All internal working parts shall be nickel plated brass or type 300 passivated stainless steel. Where indicated on drawings, provide plug blow down drain, manual air vent, add dielectric union options. See details on drawings. Flow control devices shall be Auto Flow FV-BC/SV-BC by Flow Design Inc. or Flow-ConY, orUltra-Z by Griswold.

TEST PLUGS:

Provide where shown on drawings, 1/4" brass, 1000 psi, 250 degrees F test plugs with Nordel penetrate able membrane for measuring pressure and temperature. The plug shall have a firm fitting brass cap. The case shall have a double insert of Nordel to prevent momentary leakage after long periods of penetration. Test plugs shall be manufactured by Peterson Engineering (Pete's plugs) or approved equal.

PIPE SLEEVES:

Provide pipe sleeves where pipe passes through floors, beams, walls, roofs, etc. Size sleeves for insulated pipe to accommodate both pipe and insulation. Sleeves for piping masonry or concrete walls, floors, beams, or roof, shall be of black steel pipe of standard weight, unless otherwise specified or shown. Vertical sleeves through floors shall extend at least 1" above finished floor.

PIPE HANGERS AND SUPPORTS:

Pipe hangers and supports shall be of a size to support water filled piping with a safety factor of 5 based on hanger or support ultimate tensile strength. Hangers and supports shall be manufactured by B-Line Systems or approved equal by Grinnell or PHD. Size hangers for all insulated piping to fit over insulation with an acceptable clearance.

Clevis hangers for water piping shall be equal to B-Line Fig. 3100. Roller type hangers shall be equal to B-Line Fig B-3110. Vertical pipes shall be supported by wall brackets equal to Grinnell Fig. 261. Hanger rod shall be equal to B-Line Systems Fig B-3205. Pipe insulation protection shield shall be B-Line Fig. 3151. Piping hanger and support installation shall allow for uniform expansion and contraction at all times. Use B-Line Fig. B-3050 or equal universal C-clamps for attachment to structure.

PIPE INSULATION:

See Section 15500, Mechanical Insulation.

INSULATION INSTALLATION:

See Section 15500, Mechanical Insulation.

PRESSURE TESTING:

Test <u>all</u> piping and connections installed under this contract. Do testing prior to painting, backfilling, insulating or concealment within building construction. Trenches may be backfilled prior to pressure tests, but not before work has been visually inspected by the Owner. If pressure tests indicate leaks in piping, it shall be the Contractor's responsibility to determine location of leaks, excavate as required, repair leaks, and backfill at his expense.

Perform each test as specified hereinafter and continue or repeat until the lines under test are proven tight to the satisfaction of the Owner. Furnish all materials, pumps, gauges, plugs, etc., required for tests. Notify the Engineer in advance of tests so he may witness same. Sections of the system may be tested separately, but when so tested, any defect which may develop in a section already tested and

accepted shall be corrected and that section retested. Devices or equipment which may be harmed by test pressures shall be removed or protected during tests. After testing, test systems for complete drainability by draining all water from piping using permanent caps, plugs, drain valves, etc. Test building water piping at 100 psi for a minimum of 4 hours before it is witnessed by Engineer. Final test system shall be performed at 100 psi for a minimum of 24 hours.

PIPE AND VALVE IDENTIFICATION:

Furnish and install flexible, permanent, color-coded, plastic-sheet pipe markers that comply with ANSI A13.1 on all piping (including piping above lay-in ceiling) not to exceed 15' o.c. manufactured by Seton Products, MSI, or equal. Provide directional arrows. Verify verbage with Engineer, i.e., chilled water supply or return, hot water supply and return, etc. Stencil-type spray-on pipe labels will not be accepted on this project.

Furnish and install brass valve tags with 1/4" high letters identifying operation / maintenance of piping system.

TEMPERATURE GAUGES:

Thermometer shall be a dial type, minimum 4.5" diameter black on white dial, stainless case, variable angle mount, copper bulb, with magnifying glass cover. Temperature range shall be 30°F to 240°F (-10°C to 110°C) with a 1% scale range accuracy. Approved manufacturers are Weiss, Trerice, Marsh Instruments, and Weksler.

PRESSURE GAUGES:

Pressure gauges shall have a minimum 4.5" diameter black on white dial, be stem-mounted, provided with stop locks, have a phosphor-bronze bourdon tube and a corrosion resistant brass movement with a 1% scale range accuracy. Pressure Range shall be selected by Engineer. Approved manufacturers are Trerice, Weiss, and Marsh instruments.

THERMOMETER WELLS:

Provide thermometer wells constructed of brass or stainless steel, pressure rated to match piping system design pressure. Provide 2” extension for insulated piping and cap nut with chain fastened permanently to thermometer well.

HEAT TRACING:

Furnish and install UL approved self-regulating heat tracing cable for freeze protection of all hydronic piping outside insulation envelope (unless system contains antifreeze solution). The heat trace cable shall consist of two (2) 16 AWG nickel plated copper bus wires embedded parallel in a self-regulating polymer core that varies its power output in response to temperature along its entire length. The heat trace jacket shall be a radiation cross linked polyoelefin dielectric rated at 300 VAC at 105°F with a VW-1 flame resistance and shall have a outer braid of tinned copper for a ground path.

Heat trace shall be installed in strict accordance with manufacturer’s instructions after pressure testing and immediately before pipe insulation. The heat trace shall be resistance tested and connected to GFCI protected power by a licensed Electrician at the expense of the Contractor.

Domestic water heat trace cable shall be Model HSX-A-120V manufactured by Thermon or equal by RayChem.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1 – GENERAL

SUMMARY

This Section includes pipe and fitting materials, joining methods and specialty items for the following:

1. Chilled Water piping.
2. Air control devices – air separators / expansion tanks

REFERENCE DOCUMENTS

A. ASTM F 2389-07 - Standard Specification for Pressure-rated Polypropylene (PP) Piping Systems
B. CSA B137.11 - Polypropylene (PP-R) Pipe and Fittings for Pressure Applications
C. NSF/ANSI 14 – Plastic Piping System Components and Related Materials
D. DIN-DVS 2207-11 2017 – Welding thermoplastic materials – Heated element welding of pipes, piping parts and panels made of polypropylene

DEFINITIONS

A. Definitions shall be in accordance with local mechanical codes and ASTM F 2389.

SUBMITTALS

A. Material list naming each product to be used identified by manufacturer and product number, in accordance with Division 1.

B. Warranty Information
    1. Submit documentation of 10-year warranty with coverage for parts, materials, labor, property damage, and personal injury.

PERFORMANCE REQUIREMENTS

A. Provide components and installation capable of producing hydronic piping systems with the following working-pressure ratings:
    1. Chilled Water Piping: 12 psig at 42 deg. F

QUALITY ASSURANCE

A. Material shall be certified by NSF International as complying with NSF 14, and ASTM F 2389 or CSA B137.11.

B. Material shall comply with manufacturer’s specifications.

C. Special Engineered products shall be certified by NSF International as complying with NSF 14.

D. Piping Installers: Installers of polypropylene piping shall be certified by the manufacturer of the pipes and fittings as having been trained and qualified to join polypropylene piping using fusion welding of the same type as specified in Drawings (socket).

DELIVERY STORAGE AND HANDLING

A. Inspect the pipe upon receipt to ensure that it has not been damaged during shipping.

B. Damaged pipe should be cataloged and returned for replacement following distributor's procedures for returns.

C. Protect piping, valves, fittings, etc. before installation in accordance with manufacturer's written instructions.

D. Always store the pipe on a flat surface. When storing the pipe on racks or supports on the ground always have at least four supports, evenly spaced, under a 19-ft length. Place plywood on top of the supports to prevent warping.

E. Piping shall be shipped from the factory with capped ends and stored on supports off the ground with ends covered at all times to prevent nesting of insects, birds, and other animals. Any pipe found to be without end-caps or not raised off of the ground should be cleaned by the contractor prior to installation.

F. Protect piping from accumulation of dirt and debris in and around piping/components.

G. If the pipe is removed from its bag, or the bag has been damaged do not store the pipe unprotected from UV rays (sunlight) for longer than six months. Pipe that is exposed to direct sunlight for longer than six months will not be covered under the warranty.

H. Never place the forks of a forklift into the ends of the pipe. The interior of the pipe may be damaged and can cause it to crack. Handlers may use a padded rug ram inside the pipe or use a crane or lift to handle larger pipe.

I. In cold weather, take extra care when handling the pipe. Cold temperatures reduce the pipe's flexibility, making it more susceptible to impact damage.

PART 2 – PRODUCTS

PIPE AND PIPING PRODUCTS

A. Pipe shall be manufactured from a PP-R or PP-RP(RCT) resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389 or CSA B137.11. The pipe shall contain no rework or recycled materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material. All pipe shall be made in an extrusion process. All pipe shall comply with the rated pressure requirements of ASTM F 2389 or CSA B137.11. All pipe shall be certified by NSF International as complying with NSF 14, and ASTM F 2389 or CSA B137.11.

B. Pipe shall be Aquatherm, Niron or equal.

FITTINGS

A. Fittings shall be manufactured from a PP-R resin (Fusiolen) meeting the short-term properties and long-term strength requirements of ASTM F 2389. The fittings shall contain no rework or recycled materials except that generated in the manufacturer's own plant from

resin of the same specification from the same raw material. All fittings shall be certified by NSF International as complying with NSF 14, and ASTM F 2389 or CSA B137.11.

WARRANTY

A. Manufacturer shall warrant pipe and fittings for 10 years to be free of defects in materials or manufacturing.

B. Warranty shall cover labor and material costs of repairing and/or replacing defective materials and repairing any incidental damage caused by failure of the piping system due to defects in materials or manufacturing.

C. Installers shall be trained and certified to install the pipe according to the manufacturer's guidelines. Contact your local Aquatherm representative for training.

D. Warranty shall be extended to prefabricated parts constructed by the manufacturer.

POLYPROPYLENE VALVES

A. Polypropylene Valves shall be manufactured in accordance with the manufacturer's specifications and shall comply with the performance requirements of ASTM F 2389 or CSA B137.11. The valves shall contain no rework or recycled thermoplastic materials except that generated in the manufacturer's own plant from resin of the same specification from the same raw material.

SMOKE AND FIRE RATINGS

A. Where indicated on the drawings that a Plenum-rated Piping System is needed, the pipe shall be wrapped and/or insulated with standard fiberglass or mineral wool pipe insulation, field installed, with bare fittings no closer than every 6 ft. of pipe. The pipe wrap or insulation as a system shall meet the requirements of CAN/ULC-S102.2-03 or ASTM E84. The system shall have a Flame Spread Classification of less than 25 and Smoke Development rating of less than 50.

PART 3 - EXECUTION

PIPING APPLICATIONS

Drawing plans, schematics, and diagrams indicate general location and arrangement of hydronic water piping. Indicated locations and arrangements are used to size pipe and calculate friction loss, expansion, and other design considerations. Install piping as indicated unless deviations to layout are approved prior to installation.

A. Installers shall be trained and certified to install the pipe according to the manufacturer's guidelines.

B. Install listed pipe materials and joining methods below in the following applications:

1. Aboveground: Polypropylene (PP-R) or PP-RP(RCT) piping in SDR 7.4, 9, 11, or 17.6 based on the required minimum pressure rating and use temperature, in accordance with manufacturer's instructions and ASTM F2389.

C. Installation must be accomplished with the proper tools for installing piping following manufacturer's instructions.

D. Install hydronic piping level and plumb.

E. Install piping indicated to be exposed and piping in equipment rooms and service areas at right angles or parallel to building walls. Diagonal runs are prohibited unless specifically indicated otherwise.

FUSION WELDING OF JOINTS

A. Install fittings and joints using socket-fusion, All fusion-weld joints shall be made in accordance with the pipe and fitting manufacturer's specifications and product standards.

B. Fusion-weld tooling, welding machines, and electrofusion devices shall be as specified by the pipe and fittings manufacturer.

C. Prior to joining, the pipe and fittings shall be prepared in accordance with ASTM F 2389 and the manufacturer's specifications.

D. Joint preparation, setting and alignment, fusion process, cooling times and working pressure shall be in accordance with the pipe and fitting manufacturer's specifications.

E. Data Loggers shall be used to log each joint made. Data logger shall record at least the date, time of day and person making each joint. Data logger shall also record the required pressure/leak test for manufacturer's warranty.

VALVE APPLICATIONS

A. Install gate valves close to the main on each branch and riser serving 2 or more equipment connections and where indicated.

B. Install gate or ball valves on the inlet to each equipment item and elsewhere as indicated.

C. Install drain valve at the base of each riser, at low points of horizontal runs, and where required to drain hydronic piping system.

D. Install swing check valve on the discharge side of each pump and elsewhere as indicated.

E. Install ball valves in each circulating loop and the discharge side of each pump.

HANGER AND SUPPORT INSTALLATION

A. Comply with requirements for pipe hanger, support products, and installation as listed below and in accordance with the Hangars specification.

1. Vertical Piping: MSS Type 8 or 42, clamps.

2. Individual, Straight, Horizontal Piping Runs:

a) Adjustable, steel clevis hangers.

b) Clamps on strut trapeze.

c) Clamps on strut attached to structure.

d) Clamps attached directly to the structure.

3. Base of Vertical Piping: MSS Type 52, spring hangers.

B. Support vertical piping and tubing at base and 10-ft. intervals or at each floor whichever is less. For piping 2" (63mm) or smaller, install mid-story guides.

C. Install hangers and supports at intervals specified in the applicable Plumbing Code and/or as recommended by pipe manufacturer.

D. Hangers and supports shall also be provided within 1-foot of every change of direction and within 1-foot of any pipe fittings and valves.

E. Use care when installing riser clamps to not over tighten the clamps to cause indentation of the pipe. Riser clamps shall be isolated from the building structure by placing felt or rubber pads between the clamp, the pipe and the structure.

F. All piping support materials shall be new and manufactured for the specific purpose of supporting systems, equipment, pipes and accessories. No improvised pipe support solutions shall be allowed.

G. Piping systems shall not have direct contact with the building structure.

EXPANSION AND CONTRACTION

A. Provide expansion and contraction controls, guides and anchors to take into account the expansion and contraction of the pipe. Provide expansion loops or offsets as required and as indicated in the manufacturer's literature.

1. Install anchor points at least every 120 feet.
2. Install expansion loop or offset between each anchor point. Expansion device must be able to absorb all the stresses between the two anchor points. Refer to manufacturer's published instructions, formulas and calculations at www.aquatherm.com.
3. Vertical risers shall be anchored at each floor.
4. Provide anchor point at branch take-off in vertical riser of piping.

PRESSURE/LEAK TESTING

A. While still accessible all piping shall be pressure/leak tested to the manufacturer's standards.

B. Tests shall be carried out using water, compressed air or a mixture of the two. The test pressure shall be as indicated in the pressure leak testing procedures required by the manufacturer.

C. In the event that water is not available for testing it shall be permissible to use compressed air as a testing medium. Contact the engineering department of the manufacturer for guidance. Follow all precautionary procedures recommended by the piping manufacturer

D. Any leaks detected shall be repaired at the contractor's expense by removing the leaking part and replacing with new parts welded per the pipe manufacturer's guidelines. See www.aquatherm.com for additional details and forms.

INSPECTING AND CLEANING

A. The pipes shall be flushed with cold water after finishing the installation. Flush the system until the water runs clear of debris and dirt.

B. Inspect and test piping systems following procedures of authorities having jurisdiction and as specified by the piping system manufacturer.

END OF SECTION

RELATED DOCUMENTS:

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

SCOPE OF WORK:

Contractor shall be responsible flushing, cleaning, and purging of hydronic system piping and pre-treatment of system with corrosion and deposit inhibitors plus microbiocide.

System treatment shall be performed by a competent water treatment company.

Provide a single two gallon chemical bypass feeder, ChemTreat no. 70600880 or Owner pre-approved equal by Dearborn or Calgon.

SYSTEM FLUSHING & PRE-CLEANING:

Clean and flush system before fan coil or air handler connection. After flushing system thoroughly, provide a written certification to Architect that the piping system is free of all dirt, trash, grease, oil, foreign objects, etc.

Make fan coil or air handler connection and clean and re-flush system.

Remove and clean all system strainers then replace.

SYSTEM CLEANING & PRE-TREATMENT PROCEDURE:

1. Check to verify the system has no leaks by whatever method is applicable (visual, hardness test of water from AHU condensate pans, dye, pressure monitoring, make up water meter readings, etc.).

2. Check the PRV and make up bypass valve for proper operation. Purge expansion tank and strainers to remove accumulated rust.

3. Install ball valve on strainers.

4. If the water is dirty:
    A. Drain and refill until the water clears. Purge air.
    B. If the water remains dirty after circulation, or if the system must be cleaned while on line, start a running flush (bleed off while make up maintains system pressures) until the water clears. Make sure all control valves are cycled so the entire system is flushed.
5. Add cleaners and inhibitors to the system.
    A. 5000ppm CT 30 Chill Water Systems (CT 23 may be substituted in hot water systems where there is a minimum of copper in the system.
    B. 200 ppm CL4123
    C. 200 ppm CL4400

6. Circulate system for 8-24 hours. During this time, blow down at all low points and deadlegs. Cycle all control valves to make certain the entire system is cleaned. Blow out and / or clean strainers as needed.

7. If the entire system will completely drain by gravity, turn off system. Drain and refill with clean water. Circulate water and start a running flush. If the system will not completely drain by gravity, start a running flush.

8. Continue the running flush until samples collected prior to the make up point to meet the following requirements:
    A. The pH is less than 9.0.
    B. The water is clear.
    C. Iron content is <0.5 or as low as it will go (old systems will not normally be <0.5 after cleaning).
9. Monitor the above parameters frequently. If the iron content rises on two consecutive samples and the water is clear, consider the flushing as complete.

10. Add the appropriate inhibitors:
    A. CL2871: 4500 ppm – chill water
    6000 ppm – hot water
    B. NCL2150: 250 ppm – chill water
    250 ppm – hot water (if water will not be >180 degrees F year round)

11. Use and disposal of chemicals and cleaning solutions should comply with appropriate regulations.

12. The system shall have a minimum of each of the following treatments:
    A. Molybdenum 300 ppm
    B. Sodium Nitrite 300 ppm
    C. Tolytriazole 20 ppm

WARRANTY:

Schedule water Treatment Company to take water test samples prior to 11 month warranty inspections.

Make corrections and file report to Architect.

END OF SECTION

RELATED DOCUMENTS:

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

PART I - GENERAL

Mechanical Contractor shall provide all equipment, labor, and accessories shown on drawings and specified in the following, required to install pumps with capacities as scheduled on the drawings.

PART II - PRODUCTS

BASE MOUNTED, FLEXIBLE COUPLED, END-SUCTION PUMPS:

A. Pumps shall be base mounted, single stage, end suction design with an integrally cast, foot mounted volute, capable of the impeller and bearing assembly being serviced without disturbing piping connections, pump volute or motor. The pump and motor shall be mounted on a common base plate of heavy structural steel design and securely welded cross members and open grouting area.

B. The impeller shall be bronze enclosed, single suction type, dynamically balanced, keyed to the shaft. The allowable residual unbalance in the impeller rotating assembly shall conform to ANSI Grade G6.3.

C. The liquid cavity shall be sealed off by an internally flushed mechanical seal with ceramic seat of 99.5% pure alumina oxide and hardness of 68 Rockwell C, or a tensile strength of 300,000 PSI, and carbon seal ring, suitable for continuous operation at 225 degrees F. The seals and bearings shall be capable of being serviced without disconnecting the pump from piping or disturbing the volute or motor to maintain original alignment. A replaceable bronze shaft sleeve shall completely cover the wetted area of the shaft under the seal. A stuffing box mechanical seal design with longer span between the impeller centerline and first bearing will not be allowed.

D. The pump casing shall be of Class 30 cast iron with integrally-cast pedestal support feet, suitable for 175 PSI working pressure. The pump volute shall be supplied with plugged vent, drain, and gauge tappings.

E. The pump bearings shall be regreaseable ball bearing type with provision for purging or flushing through the bearing surface.

F. A flexible type, spacer design coupler, capable of absorbing torsional vibration, shall be employed between the pump and motor. Coupler shall be shielded by an OSHA coupler guard securely fastened to the base.

G. Motor shall meet EPACT 92 requirements and NEMA specifications and shall be the size, voltage and enclosure called for on the plans. Pump and motor shall be factory aligned, and shall be realigned by mechanical contractor or by an alignment service contractor to factory recommendation.

H. Pumps shall be capable of withstanding a horizontal load of 0.5 G without adversely affecting pump operation. Pumps used in chilled water applications shall have galvanized drip pans.

I. Base-mounted end-suction pumps shall be Bell and Gossett 1510 series, Taco FM series, or Armstrong 4030 series.

IN-LINE PUMPS:

In-line pumps shall be type for installation in vertical or horizontal piping. Pump must be capable of being serviced without disturbing piping connections.

Pump body shall be class 30 cast iron, rated 175 psi working pressure, with gauge ports at nozzles, and with vent and drain ports. Impeller shall be cast bronze, enclosed type, dynamically balanced, keyed to the shaft and secured by a locking capscrew or nut. The liquid cavity shall be sealed off at the motor shaft by an internally-flushed mechanical seal with ceramic seal seat, and carbon seal ring, suitable for continuous operation at 225° F. A non-ferrous shaft sleeve shall completely cover the wetted area under the seal. Pump bearing bracket shall have oil lubricated bronze journal and thrust bearings. Bracket shaft shall be alloy steel having ground and hardened thrust bearing faces. A flexible coupling to dampen starting torque and torsional vibrations shall be employed. Motor shall meet NEMA specifications and shall be the size, voltage and enclosure called for on the plans. Each pump shall be factory tested. It shall then be thoroughly cleaned and painted with at least one coat of high-grade machinery enamel prior to shipment.

Pumps shall be capable of being serviced without disturbing piping connections. Pumps shall be rated for a minimum of 175 psig working pressure.

Horizontal in-line pump shall be Series 60 as manufactured by Bell and Gossett, or Taco 1600 or VL series, or Armstrong 4300 series.

TRIPLE DUTY VALVES:

Furnish and install triple duty valve at system pump designed to perform the functions of a non-slam check valve, throttling valve, shut-off valve and calibrated balancing valve. The valve shall be fitted with a bronze seat, replaceable bronze disc with EPDM seat insert, stainless steel stem and “chatter-preventing” stainless ‘S’ spring. The valve design shall permit repacking under full system pressure.

The triple duty valve shall be designed for quiet operation.. The triple duty valve shall have a non-slam check valve with spring-loaded weighted disc. The unit shall have a calibrated adjustment (multiple turns) for regulation of pump flow. The adjustment shall have "set-memory" position. The unit shall have positive shut-off for servicing the pump. Valve shall be sized equal to pipe branch connection.

The unit shall have gauge tappings at suction and discharge flanges for flow/pressure drop readings using read-out kit. The valve shall be constructed with the body of cast iron, disk and seat of bronze, stem and spring of stainless steel, and the packing of teflon-asbestos. The valve shall be designed to permit repacking while under full line pressure. The valve shall be suitable for 175 psi working pressure.

The valve shall be Bell & Gossett Model No. 3Ds-3S Triple Duty Valve, or Taco Multipurpose Valve or approved equal by Thrush.

SUCTION DIFFUSERS

Units shall consist of angle type body with inlet vanes in two planes to assure uniform flow. Units shall have a combination diffuser-strainer-orifice cylinder with 3/16" diameter openings for pump protection. A permanent magnet shall be located within the flow stream and shall be removable for cleaning. The orifice cylinder shall be equipped with a disposable fine mesh strainer which shall be removed after system start-up. Orifice cylinder shall be designed to withstand pressure differential equal to pump shutoff head and

shall have a free area equal to five times cross section area of pump suction opening. Vane length shall be no less than 2 1/2 times the pump connection diameter. Unit shall be provided with pressure gauge tappings to check strainer condition. Unit shall be suitable for 175 psi working pressure. Unit shall be provided with strainer blow-down connection for routine maintenance.

BRAIDED FLEXIBLE PUMP CONNECTORS:

Braided flexible metal pump connectors shall be provided on suction and discharge sides of all pumps to absorb vibration, minimize stress and reduce noise.

Flexible metal hose shall be annular, closed pitch hose of 321 stainless steel with 304 stainless steel braid shall be standard. Hose wall thickness for maximum strength and reliability shall be a minimum of .017" for connectors under 1-1/2" and a minimum of .020" for connectors 2" and above. Braid coverage shall be a minimum of 90% to insure maximum operating pressure and an extended cycle life. Pump connector shall have a maximum operating temperature of 1000 degrees Fahrenheit and be able to handle 1/8" misalignment.

AIR & SEDIMENT REMOVAL SEPARATOR

The unit shall be capable of air separation and elimination.

The unit shall have tangential inlet and outlet connections to create a low velocity vortex where air and sediments are separated.

The unit shall have a solid separation efficiency of 98% of 200 mesh sand and water solution, and be capable of heavier-than-water, undissolved sediment separation of at least 40 microns. Vessel shell diameter is to be three times the nominal inlet/outlet pipe diameter.

The air separator must be designed, constructed and stamped for 125 psig at 350 degrees F, in accordance with Section VII, Division 1 of the ASME Boiler and Pressure Vessel Code, and registered with the National Board of Boiler and Pressure Vessel Inspectors.

EXPANSION TANKS:

Furnish and install pre-charged vertical (and horizontal under ice storage alternate) steel expansion tanks as detailed on drawings.

The bladder Tank shall be pre-charged, vertical steel expansion tank with replaceable, heavy-duty Butyl rubber bladder. The tank shall have 1½" NPT system connection, a ¾" NPT drain, and a .302"-32 charging valve connection (standard tire valve) to facilitate the on-site charging of the tank to meet system requirements. The tank must be constructed in accordance with Section VIII of the ASME Boiler and Pressure Vessel Code and stamped for 125 psi working pressure. Maximum operating temperature rating shall be 240 degrees Fahrenheit. Tank shall be an ITT Bell & Gossett Series "B" or approved equal.

PART III - EXECUTION

INSTALLATION:

A. Install pumps in strict accordance with manufacturer's published instruction manual. Drawings indicate only general arrangement of piping, fittings, and specialties
B. Piping installation requirements are specified in other Division 15 Sections.
C. Install pumps to provide access for periodic maintenance, including removing motors, impellers, couplings, and accessories.
D. The contractor shall level and grout each unit according to the manufacturer's instructions before alignment and start up. Level pump by placing shims under frame as required. Inject non-shrinking grout inside pump base and grout shims.
E. Support pumps and piping separately so piping is not supported by pumps.
F. Install shutoff and check valves on inlet of pressure-operated units.
G. Install inlet strainer and valved bypass to drain at system return connection.
H. Pull and trim the pump impeller after a proportional balance has been done by the balance contractor. Hydronic systems shall be balanced in a manner to first minimize throttling losses; then the pump impeller shall be trimmed. A balance report from the installer shall be furnished to the Engineer and a copy included in the operating and maintenance manual.
I. Electrical power and control wiring and connections are specified in Division 16 Sections. Install electrical connections for power, controls, and devices. Ground equipment.

PART IV: COMMISIONING

Schedule service of factory trained representative for a period of one day to supervise testing, start-up, and instruction on operation and maintenance to Owner.

Pump manufacturer representative shall verify proper sleeve coupler parallel and angular alignment, record suction and discharge pressure, record amperage draw of motor, and complete name plate data of pump and motor.

PART V: WARRANTY

Manufacturer shall guarantee the system as installed to be free from manufacturing defects for a period of one year from startup not to exceed eighteen months from shipping to job site under normal use.

END OF SECTION

RELATED DOCUMENTS:

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

DUCTWORK:

Material and thickness: Ducts shall be rectangular and fabricated of prime quality, re-squared, tight-coat-galvanized, steel sheets. All duct construction shall equal or exceed SMACNA "'Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure.

DUCT CONSTRUCTION:

All ductwork shall be fabricated from prime, number one grade galvanized sheet metal conforming to ASTM A-924-94, G-90. Gauges for duct sizes shall be minimum as follows:

Low Pressure, <1" ESP		Medium Pressure, <2" ESP	
26 Ga.	Up to 30 inches	26 Ga.	Up to 26 inches
24 Ga.	Up to 40 inches	24 Ga.	Up to 30 inches
22 Ga.	Up to 54 inches	22 Ga.	Up to 36 inches
20 Ga.	Up to 96 inches	20 Ga.	Up to 84 inches

Standard flat slips and drives shall be used on ductwork with long dimensions not exceeding 18". On ductwork over 18" standing S cleats, Ductmate angles or equivalent reinforcing shall be used.

Ducts shall have supplemental stiffening as required to prevent drumming and to provide a structurally sound assembly. All ducts except those to which rigid board type insulation is to be applied shall have all sides cross-broken. All duct dimensions shown on drawings are "inside clear". The sizes of acoustically lined ducts shall be increased accordingly. Ducts shall be smooth on inside.

Fabricate all ductwork to prevent seams or joints being cut for installation of grilles, diffusers, or registers. All duct joints and seams shall be fabricated and installed with joints and seams made air tight.

HANGING DUCTS:

Support ducts from building structure in accordance with SMACNA "Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure.

OBSTRUCTIONS AND RESTRICTIONS:

Where possible, avoid locating any pipe, wire, structural member or other obstruction inside of duct. Take particular care to avoid obstructions in elbows. Where obstruction cannot be avoided, the rules specified by SMACNA "Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure, shall apply. Where ducts pass through non-rated walls, protect ducts and/or insulation from contact with wall by 1/2 inch filler of noncombustible material and flange perimeter of wall opening with sheet metal.

CHANGE IN DUCT SHAPE & DIRECTION:

Where the area at the end of the transformation results in an increase in area from the beginning of the transformation, the slope of the transformation shall meet SMACNA "Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure.

In general, keep changes in direction and changes in shape to minimum permitted by distribution requirements and building conditions. Make turns with ells, as conditions necessitate, in accordance with

SMACNA "'Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure.

SPLITTERS AND/OR HAND DAMPERS:

Provide splitters or butterfly dampers for adjustment of distribution to respective branches where indicated on drawings and elsewhere as required to properly balance system. Dampers shall meet SMACNA "Low Pressure Duct Construction Standards", or SMACNA "High Pressure Duct Construction Standards", depending on system pressure.

DEFLECTORS:

Provide deflectors at all branch take-offs, and elsewhere as required. Fabricate of galvanized steel sheet of same thickness as used in ductwork of corresponding size. Securely anchor vanes to duct or casing, and brace free-standing edges as specified for turning vanes in elbows.

ACCESS DOORS:

Provide access doors of suitable size where required to service equipment. Fabricate doors of 24 U. S. Gauge galvanized steel hinged to a 24 gauge galvanized mounting frame, and provide with fastening devices to give tight closure on felt gasket. Doors for insulated duct shall be double panel construction with 1" rigid insulation material between metal panels.

ACCESS PANELS:

Construct access panels as specified for access doors, and provide at all locations where any operable device occurs inside ducts, i.e., dampers, controls, filters, louvers, fire dampers, etc.

SPECIALTIES:

Where drawings or specifications require that ducts be insulated, make provision for neat insulation finish around damper operating quadrants, splitter adjusting clamps, access doors and similar operating devices. A metal collar equivalent in depth to insulation thickness (and of suitable size to which insulation may be finished) shall be mounted on duct. Insulation on duct shall extend continuously through walls, etc.

Provide extension collars for outlets, air guide vanes, and other specialties where they occur in the ducts.

AIR DISTRIBUTION DEVICES:

Diffusers, registers, and grilles shall be installed indicated or implied on drawings. All ceiling diffusers and grilles shall be designed to minimize ceiling and/or wall discoloration, and shall be model and finish as indicated on drawings. Air distribution manufacturer and Contractor shall be jointly responsible for and certify delivery or exhaust. (See Testing Section for duct system.)

Items scheduled on the drawings are used for design purposes. Similar units as manufactured by Nailor Industries, Titus, Krueger, Price and Metal*Aire shall be considered equal. Maximum dba shall be 30. If indicated on the drawings, supply and return grilles shall be equipped with volume dampers of the opposed blade type. The dampers are to be adjustable from the face. All grilles, registers and diffusers shall have white baked enamel finish, unless indicated otherwise.

DAMPERS:

Balancing dampers shall be installed at each branch run to allow for proper balance of the system. Each damper shall be supplied with a quadrant locking device which extends beyond the ductwork for external adjustment.

FLEXIBLE CONNECTIONS:

For low velocity duct work (less than 2400 FPM), provide flexible connections at inlet and outlet of each fan connected to ductwork and elsewhere as indicated. Flexible connections shall be 6 inches wide, waterproof and fireproof, and shall be 24 gauge Metaledge Ventfab, as manufactured by Ventfabrics, Inc.

DUCT SEALANT:

Prior to insulating, all duct joints (except gasketed joints), seams and connections shall be sealed with brush-on type water-based sealant equal to United-McGill Duct Sealant. Apply in accordance to manufacturer's instructions and / or recommendations.

CLEANING DUCT SYSTEM:

Upon complete installation of ducts, clean entire system of rubbish, plaster, dirt, etc., before installing any outlets. After installation of outlets and connections to fans are made, blow out entire systems with all control devices wide open.

DUCTWORK INSULATION: See Section 15500, Mechanical Insulation

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

Provide all labor, materials, accessories, and equipment required to furnish and install louvers as shown on the accompanying plans and specified in this document.

PART II: PRODUCTS

STATIONARY LOUVERS:

Louvers shall have the following features:

a. The unit shall have a rain proof exterior with a built-in backdraft damper (for exhaust applications)
b. The blades shall be constructed of not lighter than 14 gauge 6063T5 extruded aluminum @ 3” o.c.
c. Frame shall be constructed of not lighter than 12 gauge extruded aluminum.
d. Provide blade edge of vinyl or rubber to give minimum leakage shall be 1 cfm/ft^2 at 1/2” SP.
e. Furnish extended sill and insect screen
f. Finish shall be Kynar 500 with 20 year warranty or approved equal – custom color(s) selected by Architect

Louvers shall be manufactured by Ruskin, Air Balance, Vent Products, Cesco or Reliable.

Submit (3) color samples for approval by the Architect.

PART III: EXECUTION

Install in accordance with SMACNA requirements.

END OF SECTION

GENERAL:

Furnish and install fan coil (FC or FCU) with type, size, and capacity as indicated on plans. Protect coil from construction dust and debris before project closeout with temporary disposable filters at unit and at return grille.

FC's shall be completely factory assembled including water coil, condensate drain pan, fan motor, filters and controls in an insulated casing in a vertical configuration. Units shall be rated and tested in accordance with ARI standard 210. Units shall be UL listed and labeled in accordance with UL 1995 for indoor blower coil units.

Vertical fan coil units shall have ducted side return air entry option as detailed on the drawings. Filters shall be accessible from side coil access panels. Provide 1 year supply of air filters as specified.

CABINET/BLOWER:

Unit casing shall be constructed of zinc coated, heavy gauge galvanized steel. Exterior surfaces shall be cleaned, and phosphatized, painted finish is optional. Casing is completely insulated with fire-retardant, permanent, odorless glass fiber material. Knockouts shall be provided for unit electrical power, water and/or refrigerant piping connections. Captive screws shall be standard on all access panels. Provide mounting subbase for vertical floor mount configurations. Subbase shall be constructed of heavy gauge, zinc coated galvanized steel with finish to match air handler unit.

Evaporator fan shall be a double inlet, double width, forward curved, centrifugal-type fan(s) with belt drive shall be standard. Thermal overload protection shall be standard on motor. Fan and motor bearings shall be permanently lubricated. Motor efficiency shall comply with NCSBC Volume X Energy Code.

WATER COILS:

Water coils shall be specifically designed and circuited for application. Provide 2-row heating coil and four or six row chilled water coil to meet deign loads. Finned coil surface shall consist of aluminum plate fins securely bonded to seamless copper tubing. Coils shall be designed to allow drainage, designed for 150 psig working pressure, and tested at 350 psig.

Unit Drain pan shall be of corrosive resistant construction and have positive slope toward the drain. Provide and install a secondary overflow drain pan for each unit that is installed above a ceiling or on a mechanical platform. Install a float switch that will shut down the air handler and close the chilled water control valve upon activation. See control diagram and sequence of operation.

MANUFACTURER:

Units manufactured by Trane, First Co., or Magic*Aire are acceptable provided all specifications are met or exceeded.

VIBRATION ISOLATION:

Provide all equipment with vibration isolation bases equal to Vibration Mounting and Controls, Inc. (VMC), and shall be installed in strict accordance with manufacturer's instructions. Provide neoprene-in-shear mounts, VMC no. R-2 or approved equal, rated for load. Arrangement shall be in accordance with applicable details on drawings.

END OF SECTION

RELATED DOCUMENTS:

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

SCOPE OF WORK:

Furnish and install centrifugal exhaust fans, as specified herein, of sizes and capacities scheduled and in locations shown on drawings.

GENERAL:

Wall and roof exhaust fans shall be of the centrifugal, direct-drive type unless noted otherwise on plans. Construction of the fan housing shall be of heavy gauge aluminum. All spun parts shall have a rolled bead for added rigidity and shall be specially spun so as to seal the pores of the aluminum providing greater resistance against oxidation and deterioration.

The fan wheel shall be all-aluminum of the centrifugal blower type featuring backward inclined blades and a tapered inlet shroud. Wheels shall be statically and dynamically balanced. Inlet cone shall be aluminum and of the centrifugal blower type. Motor and drives shall be enclosed in weather-tight compartment, separate from the exhaust air stream. Air for cooling the motor shall be supplied to the motor compartment by way of an air passage, from an area free of contaminated exhaust fumes. Motor shall be of the heavy duty, permanently lubricated, sealed ball bearing type.

The entire drive assembly and wheel shall be removable, as a complete unit from the support structure without disassembling the external fan housing. The complete drive assembly shall be mounted on rubber vibration isolation. Units shall be of Type B construction and shall carry a one year warranty. Fans shall be licensed to bear the AMCA ratings seal for air sound performance.

Acceptable manufacturers are Greenheck, Penn, Cook, Carnes, and Acme.

END OF SECTION

RELATED DOCUMENTS:

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

GENERAL:

Furnish and install 1 year supply of 1" air filters disposable air filters in all fan coils and 2" for air handlers. One year supply consists of four (4) sets for 60 day replacement cycle and does not include first sets installed during start-up and replacement prior to Owner acceptance of building.

Provide an air filter replacement schedule indicating size and quantity for each HVAC unit with submittal for approval.

Air filters shall be medium efficiency, pleated, disposable type. Each filter shall consist of cotton and synthetic media, media support grid, and enclosing frame. The filter shall be listed and identified on the frame as Underwriters' Laboratories Class 2.

Filter shall have not less than 2.3 square feet of media per square foot of filter face area and not less than 16 pleats per linear foot of filter face area. A 96% open area media support grid of welded wire construction, coated with rust inhibitor shall be bonded to the air exiting side of the filter. The enclosing frame shall be of high wet-strength beverage board with diagonal support members bonded to the air entering and air exiting side of each pleat. The inside periphery of the enclosing frame shall be bonded to the filter pack.

Filter shall have an average efficiency of 25-30%, and an average arrestance of not less than 90% in accordance with ASHRAE Standard 52.1-1992. The minimum MERV when tested under ASHRAE 52.2 shall be no less than MERV 7. Initial resistance at 375 feet per minute approach velocity shall not exceed 0.28" iwc

A test report corresponding to each of the aforementioned ASHRAE Standards are required submittals.

MANUFACTURER:

Filters shall be Farr 30/30.

Units manufactured by Flanders and American Air Filter are acceptable provided all specifications are met or exceeded.

END OF SECTION

RELATED DOCUMENTS:

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

PART I: GENERAL

Control system contractor shall be responsible for selection of the proper control valves including line size, pressure rating, flow-coefficient, shutoff rating and allowable leakage factor. Valves will be turned over to the Division 15 Contractor for installation.

Modulating water valves shall be sized for nominal 5 psi pressure drop and close off. All 2-way valves shall have contoured or characterized throttling plugs with linear (for steam applications) or equal percentage characteristics.

The controls contractor shall calculate the required Cv for each valve. Valve Cv shall be within 100 percent to 125 percent of the Cv calculated.

Fan coil valves and AHU central station actuators shall operate from either a 0-10Vdc or a 4-20ma signal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   1. Belimo
   2. Delta
   3. Approved equal

2.2 CONTROL VALVES

A. Valves 1/2 inch through 2 inches shall be ball valve type assemblies industrial quality with bronze bodies and NPT screw type and shall be rated for 600 psig (40 bar) working pressure - or two-way and 400 psig (27 bar) for three-way. The operating fluid temperature range shall be 20' F to 2500 F (-70C to 1200C).

B. The actuator and its mounting plate shall be capable of being repositioned on the square mounting bracket in 90 degree increments parallel or perpendicular to the pipe. Non-metallic thermal isolation standoffs shall separate mounting plate from actuator with high temperature materials rated for continual use at greater than the application temperature. Valve assemblies without thermal isolation as described above are not acceptable.

C. The mounting bracket shall be of rigid structural metal incorporating a shaft of stainless steel positioned parallel and perpendicular to the packing and stem to prevent lateral or rotational forces from affecting the stem and its packing. The mounting bracket shall be positioned so as to allow the insulation of the valve body and bracket to allow removal of the actuator without disturbing the insulation. Valves shall have either ISO-5211 style mounting pads or machined mounting surfaces. The shaft shall be supported by an upper bearing.

D. All control ball valves shall be furnished with a 316 stainless steel ball & stem and carbon and graphite reinforced Teflon 0 seats and seals.

E. Ball valves for low pressure steam applications shall have 316 stainless steel ball, stem, and drive shaft and rated at a maximum of 600 psi working pressure. Valves shall be installed in the piping at 45 degree angle from vertical. Valve and actuator mounting bracket shall be fully insulated.

F. The valves shall have a blow out proof stem design.

G. Each valve shall be functionally tested by the valve manufacturer.

H. Flow type for modulation shall have equal percentage and linear flow characteristics for two-way and three-way valves, respectively.

I. Two-way stem packing shall consist of stacked 'V' ring and spring (live) loaded packing requiring no maintenance. Three-way stem packing shall consist of EPDM 0-ring requiring no maintenance and no adjustment to meet complete operating life. Valves requiring packing adjustment throughout the life of the valve are unacceptable.

J. Valves 3 inches and larger shall be butterfly valves.

K. Butterfly valves shall be threaded lug type suitable for dead-end service and for modulation to the fully-closed position, with carbon-steel bodies and noncorrosive discs, stainless steel shafts supported by bearings, have flanged-end connections, and EPDM seats suitable for temperatures from minus 20 degrees to plus 250 degrees F. All valves shall have a manual means of operation independent of the actuator. Provide valve manufacturer’s insulation casing.

L. Manufacturer shall provide a two year “no hassle" unconditional warranty from date of installation.

2.3 CONTROL VALVE ACTUATORS

A. The actuator manufacturer shall have ISO 9001 quality certification.

B. Actuators shall be Underwriters Laboratories Listed under Standard 873 and Canadian Standards Association Class 4813 02. Actuators shall have European Community (CE) certification.

C. Actuators used near outdoor air streams shall have NEMA type 2 (IP54) housings for water and moisture resistance.

D. Actuators shall be mounted on the valve by the manufacturer.

E. Actuators shall be applied according to the manufacturer's specifications.

F. Actuators shall be fully modulating or 2-position (with fail-safe mechanical spring return) as indicated on drawings.

G. The valve actuator shall be capable of providing the minimum torque required for proper valve close-off for the required application.

H. Each actuator shall have current limiting circuitry or microprocessor overload protection incorporated in its design to prevent damage to the actuator. End of travel switches are not acceptable.

I. Actuators shall have mechanical spring return for fail safe mode where specified. Battery backup units or storage capacitor type units contained within the individual actuators are not acceptable.

J. Powering shall be 24VAC, 24VDC, 120VAC, or 230VAC. Feedback signal shall be available to provide a DDC input signal or to drive a second slave or tandem actuator. The actuator shall have the capability of adding auxiliary switches or feedback potentiometer if required.

K. A release button and optional handle on the actuator shall be provided to allow for manual override on non-spring return assemblies.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Install control valves in strict accordance with manufacturer's published instruction manual.
B. Install control valves with necessary clearance around ball valve assembly.
C. Install control valves to provide access for periodic maintenance, including removal.
D. Insulate valve body, not actuator.
E. Install control valves to prevent condensate forming on valve body to travel into actuator.
F. Piping installation requirements are specified in other Division 15 Sections.
G. Electrical power and control wiring and connections are specified in other Division 15 & 16 Sections

PART 4: COMMISIONING

Schedule service of factory trained representative to inspect installation and provide instruction on maintenance to Owner.

PART V: WARRANTY

Manufacturer shall guarantee the system as installed to be free from manufacturing defects for a period of 2 years from startup not to exceed 30 months from shipping to job site under normal use.

END OF SECTION

PART I: GENERAL

SCOPE:

Furnish and install at locations shown on the plans or as specified in schedules, variable frequency drives **meeting** or exceeding the following specifications.

RELATED WORK:

a. Section 15750 Pumps
b. Section 15966 Pump Control
c. Section 15850 Air Handler Equipment
d. Division 16

REFERENCES:

a. UL 508
b. NEC

PART II: PRODUCTS

GENERAL:

a. Furnish complete variable frequency drives as specified herein for the fans and/or pumps designated on the drawing schedules to be variable speed. All standard and optional features shall be included within the VFD enclosure, unless otherwise specified. VFD shall be housed in a metal NEMA 1 enclosure.
b. The VFD shall convert incoming fixed frequency three-phase AC power into a variable frequency and voltage for controlling the speed of three phase AC motors. The motor current shall closely approximate a sine wave. Motor voltage shall be varied with frequency to maintain desired motor magnetization current suitable for centrifugal pump and fan control.
c. An advanced sine wave approximation and voltage vector control shall be used to allow operation at rated motor shaft output at nominal speed without being de-rated. This voltage vector control shall minimize harmonics to the motor to increase motor efficiency and life.
d. The VFD shall include a full-wave diode bridge rectifier and maintain a fundamental power factor near unity regardless of speed or load.
e. The VFD and options shall be tested to ANSI/UL Standard 508. The complete VFD, including all specified options, shall be Listed by a nationally recognized testing agency such as UL, CUL, ETL, or CSA
f. The FDA shall have a DC link reactor to minimize power line harmonics. VFD's without a DC link reactor shall provide a 3% impedance line reactor.
g. The VFD's full load amp rating shall meet or exceed NEC Table 430-150. The VFD shall be able to provide full rated output current continuously, 110% of rated current for 60 seconds and 220% of rated current for up to 1 second while starting.
h. An automatic energy optimization selection feature shall be provided standard in the drive. This feature shall reduce voltages when lightly loaded and provide a 3% to 10% additional energy savings.
i. Input and output power circuit switching can be done without interlocks or damage to the VFD.
j. VFD shall have a Bacnet interface card.

PROTECTIVE FEATURES:

a. Class 20 I^2t electronic motor overload protection for single motor applications and thermal-mechanical overloads for multiple motor applications.

b. Protection against input transients, loss of AC line phase, short circuit, ground fault, over voltage, under voltage, drive over temperature and motor over temperature. The VFD shall display all faults in plain English. Codes are not acceptable.
c. Protect VFD from sustained power or phase loss. The VFD shall incorporate a 5 second control power loss ride through to eliminate nuisance tripping.
d. Drive shall catch a rotating motor operating forward or reverse up to full speed.
e. VFD shall be rated for 100,000 amp interrupting capacity (AIC).

INTERFACE FEATURES:

a. Local/Hand, Stop/Reset and Remote/Auto selector switches shall be provided to start and stop the drive and determine the speed reference.
b. Digital manual speed control. Potentiometers are not acceptable.
c. Lockable, alphanumeric backlit display keypad can be remotely mounted up to 10 feet away.
d. VFD's up to 300 HP shall use the same control panel.
e. Displays shall be available in 6 languages including English, Spanish and French.
f. A quick setup menu with preset parameters shall be provided on the drive.
g. The drive shall be fitted with an RS 485 serial communications port and be supplied with software to display all monitoring, fault, alarm and status signals The software shall allow parameter changes to be made to the drive settings as well as storage of each controller's operating setup parameters.
h. Set point control interface (PID control) shall be standard in the unit.
i. Floating point control interface shall be provided to increase/decrease speed in response to switch closures.
j. An elapsed time meter and kWh meter shall be provided.
k. The following displays shall be accessible from the control panel in actual units: Reference Signal Percent, Output Frequency, Output Amps, Motor HP, Motor kW, kW/hr, Output Voltage, No Load Warning, DC Bus Voltage, Drive Temperature (%until trip) and Motor Speed in Engineering units per application (in percent speed, GPM, CFM,).
l. Drive will sense the loss of load and signal a no load/broken belt warning or fault.
m. The VFD shall store in memory the last 8 faults and record all operational data.
n. Six programmable digital inputs shall be provided for interfacing with the systems control and safety interlock circuitry.
o. Two programmable relay outputs shall be provided for remote indication of drive status.
p. Two programmable relay analog inputs shall be provided and shall accept a direct-or-reverse acting signal. Analog reference inputs accepted shall include 0-10 V dc, 0-10 mA and 4-20 mA.
q. One programmable analog outputs shall be provided for indication of drive status. These outputs shall be programmable for output speed, voltage, frequency, amps and input Kw.
r. Under fire mode conditions the VFD shall automatically default to a preset speed.
s. VFD shall receive an Enable/Disable signal from the building Energy Management System as well as an analog speed control signal.

ADJUSTMENTS:

a. VFD shall have an adjustable carrier frequency of 2 of 14 kHz through 60 HP and 2 to 4.5 kHz above 60 HP.
b. Three variable-torque V/Hz patterns shall be provided with the ability to select a constant torque start pattern for each of them.
c. Twenty preset speeds shall be provided.
d. Eight acceleration and eight deceleration ramps shall be provided. The shape of these curves shall be adjustable.
e. Four current limit settings shall be provided.
f. If VFD trips on one of the following conditions, the VFD shall be programmable for automatic or manual reset: under voltage, over voltage, current limit, inverter overload and motor overload.

g. The number of restart attempts shall be selectable from 0 through 10 and the time between attempts shall be adjustable from 0 through 10 seconds.

BYPASS:

Provide a manual bypass consisting of a door interlocked main fused disconnect pad lockable in the off position, a built-in motor starter and a four position DRIVE/OFF/LINE/TEST switch controlling three contactors. In the DRIVE position, the motor is operated at an adjustable speed from the drive. In the OFF position, the motor and drive are disconnected. In the LINE position, the motor is operated at full speed from the AC power line and power is disconnected from the drive, so that service can be performed. In the TEST position, the motor is operated at full speed from the AC line power. This allows the drive to be given an operational test while continuing to run the motor at full speed in bypass. Customer supplied normally closed dry contact shall be interlocked with the drives safety trip circuitry to stop the motor whether in DRIVE or BYPASS mode in case of an external safety fault.

SERVICE CONDITIONS:

a. Ambient temperature, -10 to 40°C (14 to 104°F).
b. 0 to 95% relative humidity, non-condensing.
c. Elevation to 3,300 feet without derating.
d. AC line voltage variation, -10 to +10% of nominal with full output.
e. No side clearance shall be required for cooling of wall mount units and all power and control wiring shall be done from the bottom.
f. Drive shall be capable of operating motor up to 1,000 feet away without derating or field modification.

QUALITY ASSURANCE:

a. To ensure quality and minimize infantile failures at the jobsite, the complete VFD shall be tested by the manufacturer. The VFD shall operate a dynamometer at full load and the load and speed shall be cycled during the test.
b. All optional features shall be functionally tested at the factory for proper operation.

SUBMITTALS:

a. Submit manufacturer's performance data including dimensional drawings, power circuit diagrams, installation and maintenance manuals, warranty description, VFD's FLA rating, certification agency file numbers and catalog information.
b. The specification lists the minimum VFD performance requirements for this project. Each supplier shall list any exceptions to the specification are identified; the supplier shall be bound by the specification.

MANUFACTURERS:

Variable frequency drives shall be manufactured by Danfoss, ABB, Sq. D, Graham Company, ITT, or other equal approved by Owner. Provide HVAC Series Model VLT or equal.

PART III: EXECUTION

START-UP SERVICE:

The manufacturer shall provide start-up commissioning of the variable frequency drive and its optional circuits by a factory certified service technician who is experienced in start-up and repair services. The commissioning personnel shall be the same personnel that will provide the factory service and warranty

repairs at the customer's site. Sales personnel and other agents who are not factory certified technicians for VFD field repair shall not be acceptable as commissioning agents. Start-up services shall include checking for verification of proper operation and installation for the VFD, its options and its interface wiring to the building automation system. Start-up shall include customer operator training at the time of the equipment commissioning.

WARRANTY:

The VFD shall be warranted by the manufactured for a period of 36 months from date of shipment. The warranty shall include parts, labor, travel costs and living expenses incurred by the manufacturer to provide factory authorized on-site service.

EXAMINATION:

a. Contractor to verify that job site conditions for installation meet factory recommended and code-required conditions for VFD installation prior to start-up, including clearance spacing, temperature, contamination, dust, and moisture of the environment. Separate conduit installation of the motor wiring, power wiring, and control wiring, and installation per the manufacturer's recommendation shall be verified.
b. The VFD is to be covered and protected from installation dust and contamination until the environment is cleaned and ready for operation. The VFD shall not be operated while the unit is covered.

END OF SECTION

GENERAL:

The Electrical Contractor shall provide all power wiring to the line side HVAC equipment disconnects, wiring troughs, junction box, etc. Unless noted otherwise, or as indicated on the drawings the HVAC Contractor shall be responsible for final connections using a licensed electrical contractor and shall furnish manufacturer's recommended HVAC fuses.

In some cases where there is a unit mounted disconnect or safety switch, the electrical contractor shall furnish and install junction boxes with slack cable for this Contractor's equipment requiring electrical service. This Contractor shall make a connection to the slack cable in the junction box, extend it from that point through the local disconnecting means and make the final connections in this equipment.

All control switches for remote equipment shall be provided with on/off indicator lights at the switch.

Ensure that all rotating equipment has a power disconnect available within sight of the equipment, regardless of whether required by the NEC.

The HVAC Contractor shall also provide all control wiring, conduit, equipment interlocks, low voltage device or motor power connections, and similar in accordance with this section or Division 16 of these specifications. Provide all necessary cabinets, panels, junction boxes, interconnecting signal cabling & associated hardware, transformers, relays, engineering support, etc. for a complete and operational system that executes the specified control sequence of operation.

MOTOR STARTERS, CONTROLLERS AND CONTACTORS:

Motor controllers and contactors shall be as indicated or specified and shall be furnished under each Section of this Division requiring such controllers unless otherwise indicated to be provided in a Motor Control Center under Division 16.

Motor controllers shall, unless otherwise specifically noted, be combination magnetic type, with thermal overload relays and heaters in each phase conductor, with operating coils for 120 volts as noted on the drawings or as required. Maximum trip rating of starters for hermetic motors shall be at least 105% of the nameplate full load current of the motor.

Starters shall be provided with build-in selector switches (H-O-A) or pushbutton stations where required. Combination starters shall be provided with sufficient auxiliary contacts or control relays for control sequence as specified, indicated or as required, and with sufficient auxiliary contacts on its circuit breaker or with control relays so that opening the circuit breaker ahead of the starter unit opens all hot control lines within the starters. All starters furnished under this Section shall be mounted in individual NEMA I enclosures, unless otherwise specified or indicated on drawings. Special requirements are specified in the separate Sections of this Division or indicated on the drawings.

Equipment shall be manufactured by Square D to match equipment furnished under Division 16

ROOM-INSTRUMENT MOUNTING:

Room instruments shall be mounted so that their switching devices are 54" maximum above the finished floor unless a clear space of 30" wide by 48" long for wheelchair access is not available, mount at 48" AFF to comply with the American Disability Act (ADA).

CONTROL WIRING:

Run control wiring in metallic raceway in masonry walls, boiler room and exposed conditions. All other signal cables shall be run on utility platform on wire management bridle hooks provided by this contract. Do not run inside raceway with power conductors. Use copper wire or control cable, #18 minimum

(except that digital signaling can be NEC class 2). The contractor shall connect to junction box(s) or other termination points provided by the Electrical Contractor for control power. See Electrical Section of these specifications for materials and installation requirements. All wiring shall be color and number coded.

RELAYS:

Indexing relays shall be 24 VAC coils “relay in a box” with pilot light & off/on switch, IDEC or equal. All line side relay wiring shall be 12 AWG and run in metallic raceway. Relays shall be installed in NEMA 1 enclosures.

CONTROL CABINETS:

Control cabinets shall be provided for mounting of control devices in utility platform and/or boiler room. Cabinet shall be UL listed lockable, code gauge gray painted steel, with knockouts, and hinged door. Enclosure shall be equal to Austin Co. CT series

Provide boiler room cabinet enclosure with swing-down table shelf for use with laptop computer.

COORDINATION OF ELECTRICAL POWER REQUIREMENTS:

Mechanical contractor shall coordinate voltage and amperage requirements for all HVAC equipment and controls devices with the Electrical Contractor prior to ordering equipment submittals. Make adjustments to equipment voltage or phase requirements as necessary to match electrical power being provided. Make engineer/architect aware of any omissions, conflicts or issues.

END OF SECTION

RELATED DOCUMENTS:

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

ADJUSTMENT AND TRIAL RUNS:

Upon completion of all work, the Contractor shall operate the plant in the presence of the engineer for the purpose of demonstrating quiet and satisfactory operation, the proper setting of controls, safety and relief valves, and cleanliness of system. Heating and cooling shall be tested separately during periods approaching the design conditions and shall fully demonstrate fulfillment of capacity requirements. Test procedures shall be in accordance with applicable portions of ASME, ASHRAE and other generally recognized test codes as far as field conditions will permit.

AIR BALANCING & TESTING:

Air Balancing and System Testing includes (1) balancing air distribution, (2) adjustment of total system to provide design quantities, (3) electrical measurement, (4) verification of performance of all equipment and controls, and (5) sound and vibration measurement. Contractor shall provide all required instrumentation and equipment required to obtain proper measurements. Contractor shall perform final test and balance of selected areas in presence of Engineer. The following procedure is adapted from the 1995 ASHRAE Applications Handbook, Ch. 34: Testing, Adjusting and Balancing, and Associated Air Balance Council:

(1) All supply and return air-duct dampers are set at full open position. All diffuser and side-wall grilles are set at full open position. Outside-air damper is set at minimum position. All Controls are checked and set for full cooling cycle. Branch liner splitter dampers are set to open position. All extractors and distribution grids are set in wide-open positions.

(2) Drill all probe holes for static-pressure readings, pitot tube traverse readings, and temperature readings. Check motor electric current supply and rated running amperage of fan motors. Check fan and motor speeds. Check available adjustment tolerance.

(3) Make first complete air-distribution run throughout entire system, recording first-run statistics. Using pitot tube traverse in all main ducts, branch ducts, and supply and return, proportion all air in required amounts to the various main-duct runs and branch runs. Make second complete air-distribution run throughout entire system for check on proper proportion of air.

(4) Using pitot tube traverse, set all main-line dampers to deliver proper amount of cfm to all areas. Using pitot tube traverse, set all branch-line dampers to deliver proper amount of cfm to diffusers amount of cfm to diffusers and side-wall supply grilles in each zone. Read cfm at each outlet and adjust to meet requirements. Test and record all items as listed on attached form.

Final air balancing form (3 copies) submitted to Engineer shall be on attached form adapted from the Associated Air Balance Council (AABC) and the National Environmental Balancing Bureau (NEBB).

END OF SECTION

AIR BALANCE REPORT

Project: _____ *System No.* _____
Contractor: _____ *CFM:* _____
Date: _____ *S.P.:* _____
Air Balanced by: _____ *Fan RPM:* _____
Instrument Mfr #: _____ *Motor Voltage:* _____
Date Calibrated: *Motor Amperage:*

			Effective	*Design Values*		*Field Test*		*Final Test*		*%*
Location	*No.*	*Model/Size*	*Area*	*FPM*	*CFM*	*FPM*	*CFM*	*FPM*	*CFM*	*DEV.*
	1									
	2									
	3									
	4									
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PROCEDURE/NOTES:

(1) Review Specification Section 15980 prior to air test & balance.
(2) Ensure fan is providing specified air volume within 5%.
(3) Set all dampers to full open position prior to first field test.
(4) Identify air distribution device nos. on HVAC as-built drawing.
(5) Adjust dampers accordingly and recheck entire system as required.
(6) Acceptable % deviation is +/-10%.

RELATED DOCUMENTS:

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

SCOPE OF WORK:

The scope of work consists of the furnishing and installing of complete electrical systems including miscellaneous systems. The Electrical Contractor (hereafter referred to as "the Contractor", or Electrical Contractor) shall provide all supervision, labor, materials, equipment, machinery, and any and all other items necessary to complete the systems. The Contractor shall note that all items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the drawings and as required for complete systems.

It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation.

Any apparatus, appliance, material, or work not shown on the drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed by the Contractor without additional expenses to the Owner.

Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's estimate, the same as if herein specified or shown.

With submission of bid, the Contractor shall give written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules, and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his proposal, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensation.

NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, SUPPLEMENTARY INSTRUCTIONS, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, SPECIAL CONDITIONS, GENERAL REQUIREMENTS bound in the front of this document are included as a part of the specifications for this work.

ELECTRICAL DRAWINGS AND SPECIFICATIONS:

The electrical drawings are diagrammatic and indicate the general arrangement of fixtures, equipment, and work included in the contract. Consult the architectural, structural, plumbing, fire alarm, integrated communications, and mechanical drawings and details for exact locations and dimensions of fixtures and equipment; where same are not definitely located, obtain this information from the Architect.

The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation. If directed by the Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

The plans and these specifications are intended to describe, imply and convey the materials and equipment as well as necessary labor, required for the installation as outlined in the paragraph entitled "Scope of Work". Any omissions from either the drawings or these specifications are unintentional, and it shall be the responsibility of this Contractor to call to the attention of the Architect or Engineer any pertinent omissions before submission of a bid. The drawings which accompany these specifications are not intended to show in complete detail every fitting which may be required; however wherever reasonable implied by the nature

of the work, any such material or equipment shall be installed by this Contractor as a part of his contract price. In no case will any extra charge be allowed unless authorized in writing by the Architect or Engineer.

The Contractor shall arrange with the General Contractor for required concrete and masonry chases, openings, and sub-bases so as not to delay progress of work. Work shall be installed sufficiently in advance of other construction to conceal piping and to permit work to be built in where required.

It shall be understood and agreed by all parties that where the words “Furnish”, “Install”, and / or “Provide” appear, the following definitions apply:

Furnish - to supply or give.
Install - to place, establish or fix in position.
Provide - to furnish and install as defined above.

CODES, PERMITS, AND FEES:

The Contractor shall give all necessary notices, including electric and telephone utilities, obtain all permits, and pay all government taxes, fees, and other costs, including utility connections or extensions in connection with his work file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction at each phase of construction as required; obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawing and documents) in order to comply with all applicable laws, ordinances, rules, and regulations, whether or not shown on drawings and / or specified.

All work and materials under this section shall be in strict compliance with more stringent requirements of the North Carolina State Building Code, including the National Electrical Code, NFPA 101-Life Safety Code, Regulations of the State Fire Marshall, UL Directory of Electrical Construction Materials, and requirements of the local utility company.

VERIFICATION OF DIMENSIONS, DETAILS, EXISTING FIELD CONDITIONS:

The Contractor shall visit the premises prior to bidding, and thoroughly familiarize himself with all details of the work, working conditions, verify dimensions in the field, provide advice of any discrepancy, and submit shop drawings of any changes he proposes to make in quadruplicate for approval before starting any work. The Contractor shall install all equipment in a manner to avoid building interference.

COORDINATION WITH EQUIPMENT PROVIDED BY OTHERS:

Electrical contractor shall coordinate voltage, phase and amperage requirements for all Plumbing, HVAC, and Kitchen equipment with the sub-contractor providing the equipment prior to ordering electrical gear submittals. Make adjustments to panels, feeders, and breakers as necessary to feed actual equipment being provided. Make engineer/architect aware of any conflicts or issues.

ACCEPTABLE MANUFACTURERS:

Acceptable manufacturers, as specified in the Contract Documents, implies that the specified manufacturer may produce acceptable products equal in quality of materials and performance to such item specified. The Contractor will be required to provide products meeting or exceeding the "Standard of Quality and Performance" as dictated by the product selection noted. However, any changes which result (from substitution of other manufacturers) in the electrical work or work of other Contractors, shall be paid for by the Contractor.

SHOP DRAWINGS:

The Contractor shall submit five (5) copies of the shop drawings to the Architect for approval within thirty (30) days after the award of the general contract. If such a schedule cannot be met, the Contractor may request in writing for an extension of time to the Architect. If the Contractor does not submit shop drawings in the prescribed time, the Architect has the right to select the equipment.

Provide manufacturer's cuts of items to be provided under this Contract. Included, but not limited to these items, are any of the following which may be required in this Contract: Fixtures, switches, outlet boxes, device plates, panelboards, transformers, conductors, pull boxes, wiring troughs, circuit breakers, disconnect switches, emergency fixtures, receptacles, etc.
The shop drawings shall be neatly bound in five (5) sets and submitted to the Architect with a letter of transmittal. The letter of transmittal shall list each item submitted along with the manufacturer's name.

Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

COORDINATION WITH OTHER TRADES:

Coordinate all work required under this section with work of other sections of the specifications to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to attention in writing, prior to signing of contract; or, Contractor shall at his own expense provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interference.

INSPECTION AND CERTIFICATES:

On the completion of the entire installation, the approval of the Architect and Owner shall be secured, covering the installation throughout. The Contractor shall obtain and pay for Certificate of Approval from the public authorities having jurisdiction. A final inspection certificate shall be submitted to the Architect prior to final payment. Any and all costs incurred for fees shall be paid by the Contractor.

EQUIVALENTS:

When material or equipment is mentioned by name, it shall form the basis of the Contract. When approved by the Architect in writing, other material and equipment may be used in place of those specified, but written application for such substitutions shall be made to the Architect as described in the Bidding Documents. The difference in cost of substitute material or equipment shall be given when making such request. Approval of substitute is, of course, contingent on same meeting specified requirements and being of such design and dimensions as to comply with space requirements.

EXCAVATING AND BACKFILLING FOR ELECTRICAL WORK: Refer to Sections 02202 & 02220.

CUTTING AND PATCHING:

On new work, the Electrical Contractor shall furnish sketches to the General Contractor showing the locations and sizes of all openings and chases, and furnish and locate all sleeves and inserts required for the installation of the electrical work before the walls, floors, and roof are built. The Electrical Contractor shall be responsible for the cost of cutting and patching where any electrical items were not installed or where incorrectly sized or located. The Contractor shall do all drilling required for the installation of his hangers. See also Section 01050.

END OF SECTION

RELATED DOCUMENTS:

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

CONDUIT SYSTEM:

Furnish and install all conduits, or other raceways, fittings, boxes, and other component parts specified or required for completion and proper operation of the conduit system shown on the drawings.

Other than as noted above, conduit shall be sized in accordance with the current NEC with NC revisions as adopted by the NC Department of Insurance. All conduit shall be neatly installed parallel to, or at right angles to beams, walls and floors of the building in a neat and workmanlike manner. All bends shall be made with standard conduit elbows or conduit bent to not less than the same radius as that of a standard conduit elbow. Conduits shall be supported at intervals not greater than 8' and within 3' of any bend, cabinet, outlet or junction box. Conduits shall be supported by approved pipe straps or clamps, secured by means of toggle bolts on hollow masonry, expansion shields and machine screws or standard pre-set inserts on concrete or solid masonry, machine screws or bolts on metal surfaces, and wood screws on wood construction.

Conduit 1/2” (minimum) and larger shall be electrical metallic tubing (EMT). EMT shall be cold-rolled steel tubing with a coating on the outside and protected on the inside by a zinc, enamel, or equivalent corrosion-resistant coating and conforming to the requirements of ANSI C 80.3-1966 or later edition. EMT may be installed in dry construction in furred spaces, in partitions other than concrete and solid plaster, or for exposed work except on mechanical structures or supports, or in refrigerated areas. EMT shall not be installed where: it will be subject to physical damage; where it will be installed nearer than 4’ from finished floor in exposed areas; where it will be subject to severe corrosive influence; where the trade size is larger than 2”; or where tubing, elbows, couplings, and fittings would be in concrete or indirect contact with the earth. Electric metallic tubing fittings shall be all plated steel hexagonal threaded compression type, with insulated throats. No pot metal, set screw, or indenter fittings shall be used.

Connections to lighting fixtures will be permitted with flexible steel conduit strapped every 6’-0”, with UL listed AC type cables, used in strict accordance with NEC Article 333. Armored Cable assembly shall encase conductors in a continuous length of galvanized cold rolled steel strip, spirally wound with adjacent strips locked to turn all edges inward. The ends shall be terminated with fiber bushings to protect conductors from sharp edges. Fittings shall be the insulated throat type, T & B 3100 series or equivalent.

All underground conduit shall be UL Listed Schedule 40 PVC conforming to Article 347 of the NEC, or rigid galvanized steel. At the Contractor's option, this installation may consist of rigid steel conduit with PVC coating, minimum of 15 mils of PVC. Where schedule 40 PVC is installed under floor slabs, the elbows required to turn the raceway up into cabinets, equipment, etc., shall be of rigid steel. A copper ground wire shall be installed in all PVC conduits . PVC conduit shall not be used above the floor slab, unless roughed-in masonry wall.

All exposed conduit to 5’- 0” above finish floor shall be rigid galvanized steel or IMC conduit. Liquid-tight flexible steel conduit with an extruded PVC jacket shall be used for connections to exterior motors and compressors. Liquid-tight flexible conduit fittings shall be insulated throat type, Appleton STB type or equal.

All permanent conduit stub-outs shall be sealed with galvanized standard water pipe caps immediately after installation. All conduits crossing expansion joints shall have approved type expansion fittings as manufactured by Crouse Hinds, Killark or Appleton. Fittings shall be of type to ensure ground continuity. Provide a 240 lb. tensile strength poly pull-wire in all empty conduits.

OUTLETS AND PULL BOXES:

All boxes shall be UL labeled or listed by an approved agency. At each location where required, an outlet box of a type to suit the intended use shall be installed. Boxes shall be fastened to building structure in an approved manner. Flush outlet, junction and pull boxes shall be pressed galvanized or sheradized steel, either square or octagonal with knockouts on tops and sides, and fitted with plaster covers where necessary to set flush with the finished surface. For use in hollow-core masonry walls, switch boxes shall be of sufficient depth to permit conduit to rise in the core with minimum cutting of block. Provide plaster rings or box extensions for flush devices with finish surface. Boxes for unplastered masonry walls shall be masonry type with device mounting ears on the interior of the box.

Convenience outlet boxes shall be generally mounted approximately 18" above floor, 48" above floor in mechanical equipment rooms and shop type areas, and 4" above counter backsplash, unless otherwise noted. Convenience outlets for drinking fountains shall be installed behind fountain enclosure so as not to be visible; coordinate with Plumbing Contractor.

Lighting switch outlet boxes shall be 4' above floor, unless noted or required otherwise. Where switches occur in 4' high tile walls, they shall be lowered by 6 inches.

Pull boxes shall be used as required in long runs of conduit to facilitate pulling of wires. All interior pull boxes shall be constructed of code gauge galvanized sheet metal, and not less than the minimum size recommended by the NEC. Boxes shall be furnished with screw-fastened covers. When several feeders pass through a common pull box they shall be tagged to indicate clearly their electrical characteristics, circuit number, and panel designation. Wire markers shall be as manufactured by W. H. Brady Co., or equal. In no case shall a pull box be installed in an inaccessible location. Boxes shall be provided with fixed or removable steel barriers for each circuit where two or more feeders pass through the box. In case of banked conduit runs consisting of more than two horizontal rows of conduits, where barriers would be impracticable, the cables for each conduit shall be tied together with heavy waxed twine and wrapped with one wrap of heavy grade tape.

Where two or more outlets are to be installed in one location, they shall be installed in gang boxes suitable for the intended purpose.

Outlet boxes for outdoor use, and for exposed use where not covered by fixture canopies, shall be cast metal suitable for the intended purpose, having integral threaded hubs, and of the weatherproof type with gasket. Provide special outlet boxes where indicated.

All junction boxes shall be marked with panel and circuit number which it contains.

END OF SECTION

RELATED DOCUMENTS:

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

CONDUCTORS FOR 600 VOLTS OR LESS:

All conductors shall be copper with a minimum conductivity of 98% and shall be delivered to the job site in their original packages, marked or tagged as follows : UL label , size, type, and insulation of the wire; name of manufacturer and trade name of the conductor: and date of manufacture. All conductors shall be insulated for 600 volts unless otherwise indicated. Furnish and install all conductors specified or required for completion and proper operation of the various systems shown on the drawings.

Conductors shall be 600 volt type THW or THWN. Branch circuit conductor shall not be smaller than No. 12 AWG, except where specifically noted otherwise. Home runs originating more than 80' at 120 volts from panel location shall be No. 10 AWG minimum size. Wires No. 10 AWG and smaller shall be solid; wires No. 8 AWG and larger shall be stranded. Where branch circuits are fed through fluorescent fixture channels, use code grade type THHN or XHHW. All AC cables where permitted shall include a separate copper ground conductor sized per phase conductors.

Provisions of Section 210-5, Color Code, NEC, shall be strictly complied with. Color coding shall include feeders and mains and be consistent throughout entire system. For 120/208 volt systems, use black, red, and blue for phases A, B, & C respectively. For 277/480 volt systems, use brown, orange, and yellow for phases A, B, & C respectively.

All conductors in vertical raceways shall be properly supported at intervals not greater than those specified in Section 300-19 of NEC.

All wire and cable except as specifically stated otherwise, shall be of one of the following makes: Anaconda Wire and Cable Co., General Cable Corp., General Electric Co., or Okonite Co.

JOINTS AND CONNECTIONS:

The Engineer reserves the right to inspect any and all joints made in wiring. If they are taped prior to being inspected, the tape shall be removed as ordered from any joint or joints for inspection. After inspection and correction of any fault found, the Contractor shall properly retape the joints.

Conductors shall be continuous without joints or splices in runs between outlet boxes. All splices shall be made at boxes only. Where stranded conductors are to be connected to any apparatus, bus work, switches or fuse blocks, they shall be connected by suitable mechanical solderless type lugs or spades. All lugs shall be permanently bolted in such position as to give maximum contact surface available. Where multiple circuits are run from same switch or panel, individual lugs for each conductor shall be used. Feeder taps in junction boxes or panel gutter shall be made with insulated cover panel guttertaps. Feeder conductors shall not be spliced, feeder conductors shall be continuous for the length of run.

Solid conductors, namely those sized #10 and #12 AWG copper, shall be spliced by using Ideal "wire-nuts", 3M Co. "Scotchlok", or T & B "Piggy" connectors for branch circuit splices in junction boxes and light fixtures, except recessed fixtures as noted above. "Sta-Kon" or other other permanent type crimp connectors shall not be used.

Stranded conductors, namely #8 AWG copper and larger, shall be spliced by approved mechanical connectors plus gum tape, plus friction or plastic tape. Solderless mechanical connectors, for splices and taps, provided with UL approved insulating covers, may be used instead of mechanical connectors plus tape.

DEVICE PLATES:

A device plate shall be provided for each outlet to suit the device installed. All plates shall be no. 302 stainless steel construction. All plates shall be “jumbo” size.

Device plates shall be of the one piece type, of suitable shape for the devices to be covered. The use of sectional device plates will not be permitted. Plates having a .375" bushed hole in the center shall be installed on all wall mounted outlets for telephones.
Devices and/or plates installed prior to painting shall be properly taped and shall be cleaned after painting, if necessary. Blank plates shall be installed on all unused outlets.

Plates shall be manufactured by Pass & Seymour, Bryant, or Hubbell. Provide sample of plates to Architect for approval.

RECEPTACLES:

Duplex convenience outlets for general use shall be rated 20 amperes, 125 volts, duplex, for standard parallel blade three-wire grounded type caps, Hubbell No. 5362-I (ivory), Leviton, Pass & Seymour or Arrow-Hart or approved equal. Color to be selected by Architect. Where outlets are installed vertically, ground plug position shall be on top and on right side where outlets are installed horizontally.

SPECIAL USE RECEPTACLES:

Provide special receptacles including receptacles with ground fault circuit interrupter protection, where needed, as required by equipment. Provide MOV-based transient voltage surge suppression devices (SS), where shown on plan. Tamper-resistant receptacles (TP) shall prevent insertion of objects other than a properly rated 2 or 3 wire plug using “floating” shutters. Equal devices by Hubbell, Leviton, Pass & Seymour or Arrow-Hart are considered acceptable.

WALL SWITCHES:

Wall switches shall be installed as shown on the drawings and shall be connected to provide control of the outlets indicated. Switches shall be rated at 20 amperes for 120 volts or 277 volts lighting circuits. Hubbell No. 1221 (or 1221-1), for single pole: Hubbell Catalog No. 1223 (or 1223-1) for 3-way; Hubbell Catalog No. 1224 (or 1224-1) for 4-way. Weather-proof switches shall be Hubbell No. 1781 single pole or Hubbell No. 1783 3-way. Provide sample of switches to Engineer for approval. Color of switches to be selected by Architect.

Automatic light switches shall have passive infra-red occupancy switch with light sensor to prevent light from switching on when daylight is above pre-set level. Switch shall be UL listed, have adjustable time delay of 30 seconds to 30 minutes, auto/off control, and minimum coverage of 900 square feet, Automatic light switch shall be UNENCO model no. D-IS.

Provide special purpose switches where noted on the drawings, or elsewhere. Equal devices by Pass & Seymour or Arrow-Hart are considered acceptable.

For wall switches indicated as dimmers on LED lighting, coordinate the exact 0-10 volt dimmer that is compatible with LED driver at 277V for the specific fixtures provided. Install the correct size wall box to accommodate the specific dimmer to be installed.

END OF SECTION

SERVICE EQUIPMENT AND POWER DISTRIBUTION:

Furnish, install and completely connect the circuit breaker type service, panelboard and distribution equipment as indicated. All construction shall meet applicable standards of ANSI, IEEE, and NEMA, and all equipment shall bear UL label insofar as it is available. Equipment shall be Square D QED, I-Line or QMB; equipment manufactured by Cutler-Hammer (Eaton) , General Electric, or ITE Siemens will be considered equal.

Provide a copper bus interior with an insulated neutral in the Main Distribution Panel. This neutral bus shall be the source for all insulated neutral conductors of the system. Jumpers shall be installed to connect the insulated neutral bus to the uninsulated grounding bus. The uninsulated grounding bus shall be the source of grounds for all grounding and bonding (not neutrals) of equipment.

Electrical contractor is responsible for providing all transformer and equipment data to gear supplier as necessary for the supplier to evaluate and coordinate any circuit breaker settings to ensure that downstream breakers trip prior to any upstream breakers.

LIGHTING AND POWER PANELBOARDS:

Panelboards shall be of the thermal-magnetic circuit-breaker type and shall consist of an assembly of single, double, and triple-pole breakers. Each circuit-breaker shall be bolted-in, removable without disturbing the adjacent units and shall have trip ratings as indicated. All multipole breakers shall be common trip. Ground fault circuit breakers shall be used as indicated on the drawings.

Each panelboard interior shall have copper bus bars and shall be installed in an appropriate cabinet of sufficient size with top 6’- 0” above finish floor and shall conform to the requirements of UL standard for cabinets and boxes. Standard cabinets with surface or flush type trim and door shall be used, as required. Cabinets shall have a minimum width of 20" unless noted otherwise. A neutral bar shall be provided in each panel with a terminal for each breaker. Grounding lugs shall be provided.

Cabinet shall be made of spot welded galvanized sheet steel not less than N.E.C. gauge with hinged door and trim of the same material. When closed, the door shall fit accurately in the opening provided and present a flush finish with the trim. The door shall be equipped with a key operated lock. Furnish one key with each lock. All door locks shall be keyed alike. Knockouts in cabinets are not acceptable. Cabinets shall be finished with manufacturer's standard painted finish.

On the inside of each door, a typewritten directory identifying each circuit shall be mounted in a suitable protective enclosure. Panelboards shall have laminated plastic designations on inside corresponding to feeder and drawing identifications.

Panelboards shall be Square D I-Line or NQOD Series or equal by Cutler-Hammer, General Electric, or Siemens.

SHUNT TRIP PROTECTION:

All electrical equipment located under a kitchen hood with a fire suppression system shall be protected by a shunt trip device that is interlocked with the suppression system. Upon activation of the suppression system the shunt device shall trip and disconnect power for the equipment under the hood. This may be done via individual shunt trip breakers or a single main breaker that is shunted upon activation of the suppression system. If a main shunt breaker is utilized no circuits should be fed from the respective distribution panel other than the circuits for the equipment under the hood. Elevator feeder circuits shall also be protected by a shut trip device if the elevator shaft and/or the elevator equipment room are protected by a fire suppression system. Coordinate with the General Contractor for final plans from the Sprinkler Design-Build Contractor.

SURGE PROTECTION:

Furnish and install transient voltage surge suppressor (TVSS) units where indicated on the drawing risers as 'SP' to protect AC electrical circuits from the detrimental effects of lightning, utility switching transients, AC motor transients, and other internal generated transients. TVSS shall comply with UL 1449, have a Category C pulse life for all protection modes (L-N, L-G or L-L where applicable), shall operate bio-directionally, and shall have a maximum single pulse current capacity of 50 KA per mode in accordance with NEMA LS1-1992. Acceptable manufacturers include Leibert, Current Technology, LEA, and United Power. Provide complete shop drawing submittal including installation instructions, dimensional drawings, clamp voltage data, and 3rd party data confirming single pulse current capacity rating. Provide on-site manufacturer's testing and start-up.

SAFETY DISCONNECT SWITCHES:

Disconnect switches shall be horsepower rated, installed where indicated and / or required by the NEC. Switches, except where shown as beined by other sections shall be furnished under this Section. Switches shall be heavy duty, fused unless otherwise noted, sized as shown, quick-make, quick-break, NEMA type "ND" with NEMA 1 enclosure, type HD, Square D. Switches to be installed outdoors shall be NEMA type 3R, with raintight conduit hubs. All switches shall be capable of being locked in the "off" position. Fuses shall be one-time, non-renewable types, dual-element, time-delay, Bussman or equal as required for application.

MOTOR STARTERS:

Motor controllers shall, unless otherwise specifically noted, be combination magnetic type, with thermal overload relays and heaters in each phase conductor, with operating coils for 120 volts as noted on the drawings or as required. Maximum trip rating of starters for hermetic motors shall be at least 105% of the nameplate full load current of the motor.

Starters shall be provided with build-in selector switches (H-O-A) or pushbutton stations where required. Combination starters shall be provided with sufficient auxiliary contacts or control relays for control sequence as specified, indicated or as required, and with sufficient auxiliary contacts on its circuit breaker or with control relays so that opening the circuit breaker ahead of the starter unit opens all hot control lines within the starters. All starters furnished under this Section shall be mounted in individual NEMA I enclosures, unless otherwise specified or indicated on drawings. Special requirements are specified in the separate Sections of this Division or indicated on the drawings.

LIGHTING CONTACTORS:

Each lighting contactor shall have heavy-duty ballast load rated contacts. Each contactor shall have mechanically held contacts, and silver cadmium oxide double break contacts. Contacts shall be field convertible with normally open and normally closed indicators. Each contactor shall be UL listed and CSA certified. All new lighting contactors for each new building shall be housed in a properly sized NEMA-1 enclosure with fully hinged and lockable door.

FIRE ALARM & HVAC CONTROLS:

Electrical contractor is responsible for all conduit and wiring required to power any fire alarm control or booster panels, magnetic door holders, and the HVAC Building Automation Controls system cabinets. There shall be at least (2) Fire Alarm and (2) HVAC control system circuits per wing of the school. Coordinate exact location and quantity of cabinets with Fire Alarm and Mechanical's Controls Sub-Contractor. Termination to Fire Alarm and HVAC controllers and to HVAC equipment shall be by controls contractor. Electrician shall use 1P-20A circuits designated as Fire Alarm or HVAC Controls on panel schedules or the closest available spare 1P-20A (120V) breakers for powering the controls system. Notify Engineer if circuits were not indicated and update panel directories on Record Drawings.

GROUNDING:

Provide a bare stranded continuous copper grounded conductor, size as indicated, from the service equipment grounding bus to the cold-water service main where it enters the building ahead of main valve on water pipe main. Also, provide a driven ground per NEC 250-81 (a). Provide all necessary grounding clamps and full-size jumpers around all valves, meters, and similar fittings between point of connection and street main. The main grounding conductor shall be connected to the neutral conductor at one location only, within and on the low voltage side of the main transformer and more specifically the equipment grounding bus associated with the main insulated neutral bus in the MDP. The insulated neutral bus must be insulated and serve to provide the neutral source for all the insulated neutral conductors of the system. Jumpers shall be installed to connect the insulated neutral bus to the uninsulated grounding bus and all grounding and bonding of equipment (not neutrals) shall be attached to the uninsulated grounding bus.

System and equipment grounds shall be checked for proper value of resistance using the Megger ground tester in accordance with the method prescribed by the manufacturer of the instruments. Resistance of ground shall not be in excess of 25 ohms, measured to include the grounding cable. The Contractor shall report the results of these tests to the Engineer in writing. If the resistance cannot be reduced to the value prescribed above, further instructions will be given the Contractor.

All equipment connected under this section shall be grounded and shall conform with the more stringent requirements of the NEC, National Electrical Safety Code, the N. C. State Building Code, or this specification.

Panels, junction boxes, safety switches, disconnect switches, contactors, starters, motors, dry transformers, bus duct and other equipment shall be bonded to the conduit system with a grounding conductor by means of grounding locknuts and bushings as required hereinafter, except where conduit terminates in threaded hub or fittings. All joints or terminations shall be made with standard tapered pipe threads drawn tight to preserve electrical continuity.

Provide grounding bushings and copper jumpers across all concentric or eccentric knockouts and on all conduits larger than 1". Elsewhere, double-lock-nuts with plastic or fiber bushings, or a single lock-nut and malleable bushing may be used. If Contractor selects to use a single locknut and malleable bushing, care shall be taken that the full number of threads project through to permit the bushing to pull tight against the ends of the conduit, after which the lock-nut shall be made up sufficiently tight to draw the bushing into firm electrical contact with the box.

Where flexible conduits are used, provide grounding conductor within flexible conduit to ensure continuity of ground. Minimum size of jumper around flex shall be No. 10.

EQUIPMENT IDENTIFICATION:

Provide black-on-white laminated plastic name plates for each switch or circuit breaker on service equipment, disconnect switches, terminal cabinets, panelboards and wiring troughs. The name plate shall be engraved to indicate the equipment controlled or identified. Name plates shall be securely fastened to equipment using two screws.

CONNECTIONS TO EQUIPMENT:

Electrical Contractor shall provide rough-in, junction box, or wiring trough as indicated. Electrical Contractor shall provide and install disconnect switches and motor starters for equipment provided under Division 16. All external disconnect switches, motor starters, and any fuses required for equipment furnished under Division 15 shall be provided by the Div 15 contractor and installed by the Electrical Contractor. Coordinate all equipment locations with all other contractors prior to installation of electrical equipment. Consult all Contract drawings which may affect location of equipment or apparatus furnished by others and make any minor adjustments as required. Electrical Contractor is responsible for all line side and load side wiring for all equipment requiring electrical power. Line side wiring is defined as the wiring from the distribution panel circuit to the point of disconnect (internal or external) for the equipment, whether provided by the contractor or

factory installed by the equipment manufacturer. Load side wiring is defined as the wiring from the point of disconnect to all equipment requiring electrical power. All final electrical terminations to the piece of equipment shall be done by the contractor providing the equipment.

Electrical Contractor must closely coordinate with the equipment supplier regarding Voltage, H. P., F. L. A., outlet mounting heights, connection cord plug-receptacle electrode configurations and other special wiring requirements.

Electrical Contractor is responsible for coordinating quantity and location of all sprinkler system devices with sprinkler contractor.

Electrical Contractor shall review the Architectural, Civil, Plumbing, Mechanical, Fire Alarm and IC plans to provide branch circuits and final connections to powered equipment furnished by others for complete and operational equipment. This is a sample list and may not represent all connections required:

1) Data Equipment Racks not in MDF or IDF rooms.
2) HVAC Controls Equipment
3) Controlled Access electrified security doors (See Door Hardware Schedule)
4) Sprinkler controls/panels
5) Projectors and associated screens
6) Hand Dryers (See Architectural plans and elevations)
7) Electric Water Heaters & Associated Recirculation Pumps (Refer to Plumbing Plans)
8) Clothes Washers and Dryers
9) Fire Pumps (Main and Jockey)
10) Fire Alarm Control Panels and Booster Panels (See FA Contractor Shop Drawings)
11) Powered Hotboxes (See Civil Site Plan for exact locations)

END OF SECTION

RELATED DOCUMENTS:

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

LIGHTING FIXTURES:

Furnish and install all lighting fixtures as indicated on the drawings. Fixtures shall be complete with globe or reflector, and lamps, and wired ready for operation at the completion of installation. All fixtures shall have UL approval under their latest rulings indicating that fixture is approved for the intended usage. This Contractor shall provide proper fixture frames to suit type and dimensions of ceilings, confirming ceiling data with Contractor prior to ordering fixtures.

All fixtures shall be self-supporting, independent of the suspended ceiling. Fixtures shall be secured to the structure at a minimum of two points at opposing ends by wire equal to gauge of wire suspending the ceiling. Where fixture channels are joined to form a continuous length, provide one hanger at each end of the run and at each joint. Damaged fixtures shall be replaced at Contractor's expense.

ELECTRONIC DRIVERS/BALLASTS:

Fluorescent ballasts shall be high power factor electronic ballasts where indicated on schedule, designed for the rapid start operation of T8 lamps. Electronic ballast shall have a frequency of operation of 20 KHZ or greater, and operate without visible flicker. Ballast shall be UL listed Class P, CSA certified, sound rated "A", withstand line transients as defined in ANSE/1EEE C62-41 Category A, and meet FCC requirements of Rules and Regulations, Part 18 for non-consumer equipment. Electronic ballast casing temperature shall not exceed a 25°C rise over 40°C ambient temperature or not exceed 85°C total. Electronic ballasts shall be by Advance Transformer Co., model Mark V or approved equal by Motorola or Magnetek.

LAMPS:

All lamps shall be as manufactured by Sylvania, Phillips, or General Electric Co.. Incandescent lamps shall be inside frosted 130V extended service unless otherwise noted. The Contractor shall be responsible for replacing **all** lamps which burn out during warranty period starting after Owner accepts project.

Unless indicated otherwise on drawings, LED and/or fluorescent lamps shall have energy saving drivers/ballasts, and a 3500 K color temperature with a color rending index of 80 or better.

High pressure sodium lamps shall be GE "Lucalox" series or equal with median value of rated life no less than 24,000 hours.

EMERGENCY LIGHTING:

Furnish and install specified battery-powered emergency lighting units where indicated on the plans. Emergency lighting unit shall comply with the State of North Carolina Department of Insurance Document entitled "Requirements for Battery Powered Emergency Lighting Units" all subsequent addenda. Fixture shall have test light and switch accessible and visible from floor.

EXIT LIGHTING:

Furnish and install LED emergency exit sign with battery backup, brown-out protection, pilot light, test switch, and regulated power supply, where indicated on the plans unless specified otherwise. Exit signs shall comply with the State of North Carolina Department of Insurance Document entitled "Requirements for Electrically Powered Exit Signs" dated 20 March 1995 and all subsequent addenda.

EXIT & EMERGENCY LIGHTING CONTROLS:

Contractor shall make provisions for Building Automation System (BAS) under Division 15 to exercise batteries on 21 to 28 day cycles. Coordinate with MC during rough-in as required with junction box for low voltage input to contactor.

LIGHTING CONTACTORS:

Each lighting contactor shall have heavy-duty ballast load rated contacts. Each contactor shall be normally closed contacts with mechanically held operators for open position, and silver cadmium oxide double break contacts. Contacts shall be field convertible with normally open and normally closed indicators. Each contactor shall be UL listed and CSA certified. All new lighting contactors for each new building shall be housed in a properly sized NEMA-1 enclosure with fully hinged and lockable door.

OUTDOOR LIGHTING CONTROLS:

For outdoor lighting applications, furnish and install contactors rated for load and photocells. Contractor shall make provisions for Building Automation System (BAS) or energy management control. Coordinate with MC during rough-in as required with junction box for low voltage input to contactor.

Photocells where indicated on drawing, shall be mounted in weather-proof enclosure under eastern facing eaves/overhangs with turn-on / off operations at 3-5 fc. Photocell shall be intermatic type K4221, for 120V and K4233 for 277V applications. Acceptable manufacturers are Tork, Intermatic, or Paragon. Photo cells shall not control luminaires directly all luminaries shall be controlled through a lighting contactor. Coordinate photocell specified with contactor coil rating.

END OF SECTION

FIRE ALARM SYSTEM EXPANSION

Furnish and install all labor, materials and programming to expand the existing fire alarm system to accommodate the new devices being added for the Renovation or Addition to have a complete and operational campus Fire Alarm system at project's end.

The Scope of Work shall include:

a. Provide and install all notification and activation appliances as indicated on the plans, required by the local AHJ and as required by the North Carolina Building Codes. Education occupancies require voice notification devices.

b. Provide a complete set of Shop drawings including wiring diagrams and battery calculations. Provide signal booster panels or battery booster panels as required for a fully functional system. Coordinate any 120V power requirements and locations with the electrical contractor.

c. Fire alarm cabling shall match existing cabling for type and class. Cables shall be in conduit. They shall be supported by a cable tray or j-hooks at a minimum of 6'-0" on center spacing to prevent droops and sags. FA cabling shall not be allowed to rest on ACT ceiling tiles, grid or lights.

d. Provide and install magnetic door holders at main corridor connections to other buildings or wings and as indicated on plans. Install a ceiling mounted smoke detector on each side of each magnetically held door. If required, coordinate any 120V power requirements and locations with the electrical contractor.

e. Notify engineer a minimum of 3 days prior to doing testing for the authority having jurisdiction.

Fire Alarm System components shall be installed by a factory-authorized service organization with minimum five years of successful public school installation experience and licensed in N.C.

Fire Alarm System equipment and devices shall be by Hochiki to match existing system equipment in the school. Equal products that are 100% compatible with the existing system shall be acceptable.

END OF SECTION

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this section.
B. Coordinate with other divisions of this specification where applicable.

1.02 CODES

A. Work covered by this section of the specifications shall conform to NFPA 70, the National Electrical Code.

1.03 STANDARDS FOR MATERIALS

A. All material shall be new and shall be listed by the Underwriters' Laboratories, Inc., as conforming to its standards in every case where such a standard has been established for the particular type of material in question or except as otherwise specified or implied herein.

1.04 SHOP DRAWINGS

A. Where equipment is specified herein or on drawings, by manufacturers' names or numbers, this shall denote minimum requirements as to quality, type, capacity, function, and performance. All equipment must have the Owner's approval before ordering. Submit with your bid not less than one (1) copies of submittal data on all equipment and materials.
B. Submittals shall include a certification of training for any programmable DSP or network equipment listed. List all materials on BOM that contractor is not a direct representative.
C. Submittals shall identify any equipment that is being proposed as an alternate from the bid package BOM. Any substitutions for speakers considered to be equal to the model specified shall include complete EASE data to prove the sound system performance. Apogee/Bogen is the original designer and agrees to back-up any performance issues at no additional cost to the owner(s). Any substitutions must carry the same assurances and a manufacturer’s representative must be on site for final commissioning of each sound system. This is to ensure the integrity of the equipment and installation being proposed.
D. System shall be capable of delivering a constant SPL level 98dB to all seats with less than 3dB difference at any seat in main auditorium/Gym and overflow area. Design placement and BOM reflects this performance criteria.

1.05 OPERATION AND MAINTENANCE INSTRUCTIONS

A. The Contractor shall furnish not less than two (2) copies of operating and maintenance instructions for all equipment he has furnished and installed. This shall include internal schematics and printed wiring diagrams, detailed to allow a technician to install, operate, maintain, calibrate and repair the equipment. These instructions shall be bound in a 3-ring binder with all manuals, drawings, and service contact information.
B. Furnish all labor, materials, tools and equipment necessary for complete installation and checkout of the system as outlined in these specifications. Items such as connectors, cables, patch cables; power strips, etc are deemed as misc. hardware and the responsibility of the installation contractor.

1.06 SERVICE FACILITIES

A. Contractor shall make available to the Owner a service department of a duly authorized distributor of the equipment manufacturer, which shall stock the manufacturer's standard parts. As part of the bid package – contractor shall submit their estimated distance from the job site, service rates (normal, after-hours, holidays) with included travel time fees, etc.

1.07 EQUIPMENT MANUFACTURER

A. The equipment specified is based on equipment as manufactured by Apogee Sound International, Bogen Communications, and other Audio/Pro Sound manufacturers.

B. Apogee Sound and Bogen are the preferred equipment for the district. Apogee Sound/Bogen will have a representative on site for final commissioning of each system. Apogee is the design vendor and will back up all speaker performance and design issues. Any speaker substitutions considered to be equal must carry the same assurances and factory representative/engineer must be present at commissioning. Any substitutions must be accompanied with EASE data to back-up design.

1.08 DESCRIPTION OF SYSTEM

A. The Sound System shall be a Full-Range, L/R design providing at least the following features and functions: See riser diagram on plans for more information and equipment model numbers.

1. Install 4ea new 12" 2-way loudspeakers – 2 pair as shown on drawings. These speakers are oriented vertically with adjustable rigging beams and flown from ceiling or wall as shown.
2. Install new equipment racks, power conditioning/sequencing, panels, hardware, etc as shown.
3. Install new 8x8 digital signal processor (DSP) for I/O mapping, presets, and room EQ.
4. Install new digital loudspeaker controller (DLC) to handle all comp/limiting, filtering, frequency roll-offs, amplifier monitoring of main speakers.
5. Install (1) new dual-channel, diversity wireless mic systems with a single handheld and single body-pack transmitter with lapel microphone. Install with front-mounted rack-kit antenna combiner in Amp rack.

1.09 SCOPE

A. Provide all labor and material for the complete installation of the equipment as hereafter specified and shown. The necessary primary power requirements are to be provided by the owner.

B. The audio system Contractor shall furnish all low voltage wiring required for a fully operational system. The equipment shall be installed by factory authorized installers, having not less than (5) five years experience in installing such systems and shall provide a list of (3) three projects of similar size and scope completed by him the last (24) twenty-four months with contact name and phone number. The Audio Equipment Contractor shall be an authorized dealer for all equipment provided under this section in order to assure availability of parts and service.

C. All system components shall be completely prewired with all field connections clearly labeled. All powered equipment shall be UL listed and shall comply with the National Electrical Code and all applicable regulations of serving utilities and governmental bodies having jurisdiction.

D. The entire system shall be fully factory tested prior to shipment and shall be guaranteed against defects in material and workmanship for one year from date of acceptance by the Owner. Speakers shall be fully warranted for a period of not less than three (3)years after acceptance by owner.

E. No equipment having a shorter warranty shall be considered and equipment purchased shall be covered by this warranty. Unspecified length of warranties shall not be acceptable.

F. Contractor shall provide for replacement of defective materials and repair of faulty workmanship at no cost to the owner during the warranty period. Labor shall carry a one (1)year warranty – normal operation hours only.

G. Manuals – Before final acceptance, the Audio System Contractor shall submit twp bound copies of instruction and maintenance manuals for the equipment. Two sets of as-built drawings shall be supplied with these manuals.

H. After installation of the equipment, the Audio System Contractor shall provide a qualified factory trained service technician to check the system and make any adjustments of modifications necessary for proper operation. Installed equipment to be operated for the approval of the Owner and their representative(s).

I. Provide left (L) and right (R) audio output to Cafeteria PA sound system.

PART 2 – PRODUCTS

2.01 GENERAL

A. Contractor shall provide and install all distribution amplifiers, mounts, cables, wiring, low voltage cable runs, connections and electrical multi-plugs to make below stated systems operational.

2.02 AUDIO MIXER

A. The digital mixing will be accomplished with the DSP processor listed below. DSP shall have addressable control knobs on the front that can be assigned to each of the input sources.

2.03 DIGITAL AUDIO PROCESSOR

A. The Digital Audio Platform shall be available in 8-in/8-out (8x8) configuration. Inputs and outputs shall be analog, with internal 24-bit A/D & D/A converters operating at a sample rate of 48 kHz. All internal processing shall be digital (DSP). Electronically balanced inputs and outputs shall be provided on plug-in barrier-strip connectors. Inputs and outputs shall be selectable between microphone or line level signals.

B. Each hardware configuration shall include six 60MHz 32-bit floating point DSPs. Software shall be provided for creating/connecting DSP system components within each hardware unit. Available system components shall include (but not be limited to) various forms of: mixers, equalizers, filters, crossovers, dynamics/gain controls, routers, delays, remote controls, meters, generators, and diagnostics. Ethernet communications shall be utilized for software control and configuration. After initial programming, systems may be controlled using either TCP/IP or RS-232 and/or RS-485 serial communication by third party control systems (such as AMX® and Crestron®), by PC computer, and/or by dedicated remote control devices. Software shall operate on a PC computer, with network card installed, running Windows®. Warranty shall be 2 years.

2.04 AUTOMATIC MIC MIXER

A. Not used for this project.

2.05 DIGITAL LOUDSPEAKER CONTROLLER

A. The Digital Loudspeaker Controller shall have 2 electronically balanced inputs and 4 electronically balanced outputs that shall be provided on XLR balanced connectors. The controller shall have a built-in database for entire Apogee Sound product line with each loudspeaker's EQ, LP/HP filters, and compression/limiting parameters. Programming and control of system shall be via RS-232 serial port from included software on any local PC or via 5-pin RS-422 port for remote network and expansion.

B. Controller shall have front panel controls for output level, phase reversal, LP filter/flat response curves. These controls shall be able to be locked out via programming and rear switch.
C. Controller shall also monitor power amplifier outputs for damaging over-current and high-distortion noise that may damage loudspeakers. The controller shall automatically reduce input levels to problem amplifier(s) if harmful over-current condition exists.
D. Controller shall allow user to also add EQ filter curves, Parametric EQ sets, and delay parameters to each of the two inputs. Controllers shall be expandable via RS-422 network loop connections.
E. Controller shall also allow for live dynamic control of system while in use via included ADAM software via any local or remote PC.

2.06 REMOTE VOLUME CONTROL

A. Not used for this project.

2.07 AUDIO POWER AMPLIFIER (MAINS/SUB)

A. The power amplifier shall provide 550 watts/channel into 8 ohms (stereo mode) and 1880 watts into 8 ohms (bridge mode).

2.08 AUDIO POWER AMPLIFIER (STAGE MONITORS/FRONT FILLS/EXPANSION AREA)

A. Not used in this project.

2.09 WIRELESS MICROPHONE SYSTEM

A. The wireless system shall be UHF with both handheld and body pack transmitters. The body pack shall be supplied with a miniature lavaliere microphone or equal from shure or Mipro/avlex.

Provide remote antenna for wireless microphones.

2.10 MAIN SPEAKER SYSTEM

A. The main speaker system shall consist of twelve distributed speakers – each with cabinets each containing a 12” woofer and 1” Horn arrayed together with adjustable rigging hardware. Frequency response shall be 61Hz to 20KHz +/-3dB with a 60 x 45-degree dispersion pattern in the HF range. Sensitivity shall be 98dB from 100Hz to 4KHz and 103 dB from 1.4KHz to 5KHz. Maximum SPL at 1M shall be 120dB continuous, 126dB program peak.

2.12 AMPLIFIER EQUIPMENT RACK

A. The wall mounted 24RU space, 19” Amplifier equipment rack shall be constructed of 16 gauge steel. Rack rails shall be 11 gage steel, tapped full hole spacing (5/8” – 5/8”-1/2”) to fit all standard equipment. Blank plates shall be provided for open rack spaces. The rack shall be 22” deep. Rack shall be located as shown on plans.
B. The equipment rack shall include two keys, a plexiglass front door, and a solid top.

2.13 RACKMOUNT POWER STRIP / LIGHT / FAN KITS

A. The single rack space power strip shall provide four (4) duplex 120VAC outlets on rear, single courtesy plug on front, 20A rating, 1RU space.

2.14 HARDWARE

A. The system provider shall be responsible for providing all necessary “miscellaneous” hardware for the installation of this system, including but not limited to the following elements: This category will include all patch cords, distribution amplifiers, mounting, rack-mounts, consoles, rack shelves, power supplies, surge suppressors, all-thread, hilti-loads, nuts, washers, bolts, kindorf, molley bolts, screws, locks, PL coatings, trims, anchors, adapters, and all other hardware and elements normally associated with any installation of a similar facility space.

2.15 LOW VOLTAGE CABLE

A. Microphone Cable; Acceptable: West Penn 291
B. Mains Speaker/Monitor Speaker Cable; Acceptable: West Penn C207
C. Distributed Speaker Cable; Acceptable: West Penn 226

2.16 CD/Cassette PLAYER & MISC HEARING IMPAIRED EQUIPMENT

A. Acceptable: Tascam CD-200BT Blue Tooth built in or equal mounted within equipment cabinet. Quantity: One (1)
B. Provide hearing impaired transmitter and 35 receivers, 9 of these receives shall be hearing aid compatible. This is based on the 2010 ADA Standards for Accessible Design. Provide remote antenna for hearing impaired system.

2.17 HEADPHONES

A. Acceptable: Sennheiser HD280 or Equal; Quantity: One (1)

2.18 HAND-HELD WIRED MICROPHONES

A. Supply unidirectional cardiod microphones with cables and stands. Acceptable: Bogen HDU250 w/Bogen SF4 stand & XLR-25, 25’ cord or Equal. Quantity: two (2)

2.19 WALL/FLOOR MIC PLATES

A. Provide 3 pin female XLR stainless steel plates where indicated.

2.20 WIRING & CABLE

A. All conductors shall be copper. Wire sizes and types shall be as indicated on the drawings and the specifications.
B. All wiring and cable installed exposed in a space, concealed inside a wall, concealed above a non-accessible ceiling or underground outside the building shall be installed in conduit. All line voltage wiring shall be installed in conduit. All low voltage wiring installed above accessible ceilings may be installed without conduit by using cable with a jacket which is U.L. listed for installation in a return air plenum when required.
C. Plenum rated cable (when required) shall be tied to the building structure at approximately 6'-0" on center using cable ties and J Hooks.
D. Plenum cable (when required) shall pass through walls by drilling a hole in the wall and installing a conduit with bushings on each end through the wall. Install the cable through the conduit and in fire or smoke rated walls seal the opening around the conduit and the hole in the conduit with a U.L. listed fire rated sealant.

PART 3 – EXECUTION

3.01 ACCURACY OF DATA

A. It shall be the sole responsibility of the Contractor to verify all dimensions, take his own field measurements, and install all work to suit conditions encountered on the job site.

B. The drawings are generally diagrammatic and except where dimensions are indicated are not intended to show exact locations of outlets, conduits, etc. All work shall be installed as nearly as possible in the locations indicated, with minor adjustments as required to avoid interferences with structure or the work of other trades.

C. Prior to beginning work, the Contractor shall carefully examine all construction drawings and the job site and report to the Owner any discrepancies or interferences are noted, the Contractor shall promptly report them to the Owner. Failure to report such discrepancies or interferences shall result in the correction of the same at the Contractor's expense. All work under this specification, which either interferes with the architectural or any other work or deviates from the drawings and specifications without prior approval of the Owner, shall be altered by the Contractor at his expense. These alterations shall clear such interferences or shall comply with the drawings and specifications as directed by the Owner.

D. All equipment must be installed in a neat and orderly fashion by competent workmen according to the manufacturer's instructions at the location shown on the drawing.

3.02 MECHANICAL

A. Except for portable equipment, all other equipment must be permanently installed. Fastenings and supports must provide a safety factor of at least three times that required for safe support. Precautions must be taken to prevent electrostatic and electromagnetic hum and radio frequency interference. All electronic must be easily accessible and have adequate ventilation.

3.03 CONNECTIONS

A. All wiring connections must be made with rosin core solder or mechanical connectors as specified. Terminations on all cable must be dressed properly with shrink tubing. All low voltage control level connections to terminal blocks are to be made with crimp on spade lugs. All crimp on connectors must be fastened with the proper tool as specified by the manufacturer. Improper crimping will be cause for rejection. All "drain" wires on microphone and line level terminations are to be properly dressed.

3.04 LABELS

A. All wiring is to be numbered on both ends with "EZ Code" type markers. Wire numbers are to be secured with transparent shrink tubing. Wire numbers are to follow a logical sequence and are to be listed on the proper document.

3.05 DOCUMENTATION

A. Upon final completion of the system a documentation package is to be turned over to the Owner and include the following items.

B. System signal flow diagram showing all components, interconnections, connector types and wire numbers of the following systems:

1. Audio System one line and detail interconnect.
2. Interconnect and wiring designation list. Wire numbers are to appear on the drawings. Pictorial drawings with dimensions showing equipment placement within the facility, and any special panels or mounting hardware as necessary. Instruction manuals as supplied by the manufacturer for all electronics.

3.06 WARRANTY

A. All equipment is to be new and warranted free of faulty workmanship and damage.
B. All electronics are to be warranted free of defects for a period of one year from day of final acceptance.
C. Replacement of defective materials and repair of faulty workmanship is to take place within 24 hours of notification by Owner- guaranteed at no cost to the Owner during the warranty period.
D. Paint and exterior finishes, fuses, lamps and owner supplied equipment are excluded from the above warranties except when damaged or failure results from defective materials or workmanship covered by warranty.
E. The minimum warranty provisions specified above shall not diminish the terms of individual equipment manufacturer's warranties.

3.07 TRAINING

A. The Audio Equipment Contractor shall provide a minimum of 4 hours instruction and training on the operation and maintenance of the systems.

3.08 CLEAN-UP

A. During construction periodically remove discarded containers and refuse from the job site. At the completion of the job, the system components and equipment areas are to be left clean and neat and all refuse removed from the site.

End of section

DATE: _____ **TIME:** _____

SERVICE ORGANIZATION

NAME: _____

ADDRESS: _____

REPRESENTATIVE: _____

LICENSE NO.: _____

TELEPHONE: _____

PROPERTY NAME (USER)

NAME: _____

ADDRESS: _____

OWNER CONTACT: _____

TELEPHONE: _____

MONITORING ENTITY

CONTACT: _____

TELEPHONE: _____

MONITORING ACCOUNT REF. NO.: _____

APPROVING AGENCY

CONTACT: _____

TELEPHONE: _____

TYPE TRANSMISSION
[ ]-McCulloh
[ ]-Multiplex
[ ]-Digital
[ ]-Reverse Priority
[ ]-RF
[ ]-Other (Specify)
_____
_____

SERVICE
[ ]-Weekly
[ ]-Monthly
[ ]-Quarterly
[ ]-Semiannually
[ ]-Annually
[ ]-Other (Specify)
_____
_____

PANEL MANUFACTURER: _____ MODEL NO.: _____

CIRCUIT STYLES: _____

NO. OF CIRCUITS: _____

SOFTWARE REV: _____

LAST DATE SYSTEM HAD ANY SERVICE PERFORMED: _____

LAST DATE THAT ANY SOFTWARE OR CONFIGURATION WAS REVISED: _____

ALARM-INITIATING DEVICES AND CIRCUIT INFORMATION

QTY OF	**CIRCUIT STYLE**	
_____	_____	MANUAL STATIONS
_____	_____	ION DETECTORS
_____	_____	PHOTO DETECTORS
_____	_____	DUCT DETECTORS
_____	_____	HEAT DETECTORS
_____	_____	WATERFLOW SWITCHES
_____	_____	SUPERVISORY SWITCHES
_____	_____	OTHER (SPECIFY): _____

_____

Figure 7-5.2.2 Inspection and Testing Form. 1996 Edition

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NATIONAL FIRE ALARM CODE **ALARM NOTIFICATION APPLIANCES AND CIRCUIT INFORMATION**

QTY OF	CIRCUIT STYLE	
_____	_____	BELLS
_____	_____	HORNS
_____	_____	CHIMES
_____	_____	STROBES
_____	_____	SPEAKERS
_____	_____	OTHER (SPECIFY): _____

NO. OF ALARM INDICATING CIRCUITS: _____

ARE CIRCUITS SUPERVISED? [ ] YES [ ] NO

SUPERVISORY SIGNAL-INITIATING DEVICES AND CIRCUIT INFORMATION

QTY OF	CIRCUIT STYLE	
_____	_____	BUILDING TEMP.
_____	_____	SITE WATER TEMP.
_____	_____	SITE WATER LEVEL
_____	_____	FIRE PUMP POWER
_____	_____	FIRE PUMP RUNNING
_____	_____	FIRE PUMP AUTO POSITION
_____	_____	FIRE PUMP OR PUMP CONTROLLER TROUBLE
_____	_____	FIRE PUMP RUNNING
_____	_____	GENERATOR IN AUTO POSITION
_____	_____	GENERATOR OR CONTROLLER TROUBLE
_____	_____	SWITCH TRANSFER
_____	_____	GENERATOR ENGINE RUNNING
_____	_____	OTHER: _____

SIGNALING LINE CIRCUITS

Quantity and style (See NFPA 72, Table 3-6) of signaling line circuits connected to system:

Quantity _____ Style(s) _____

SYSTEM POWER SUPPLIES

a. Primary (Main): Nominal Voltage _____, Amps _____
Overcurrent Protection: Type _____, Amps _____
Location (Panel Number): _____
Disconnecting Means Location: _____

b. Secondary (Standby):
_____ Storage Battery: Amp-Hr. Rating _____
Calculated capacity to operate system, in hours: _____24 _____60 _____
_____ Engine-driven generator dedicated to fire alarm system:
Location of fuel storage: _____

TYPE BATTERY

[ ] Dry Cell
[ ] Nickel-Cadmium
[ ] Sealed Lead-Acid
[ ] Lead-Acid
[ ] Other (Specify)

c. Emergencyorstandbysystemusedasabackuptoprimarypowersupply,insteadofusingasecondarypowersupply:
_____ Emergency system described in NFPA 70, Article 700
_____ Legally required standby described in NFPA 70, Article 701
_____ Optional standby system described in NFPA 70, Article 702, which also meets the performance requirements of Article 700 or 70 1.

Figure 7-5.2.2 Inspection and Testing Form *(continued).*
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PRIOR TO ANY TESTING

NOTIFICATIONS ARE MADE:	**YES**	**NO**	**WHO**	**TIME**
MONITORING ENTITY	[ ]	[ ]	_____	_____
BUILDING OCCUPANTS	[ ]	[ ]	_____	_____
BUILDING MANAGEMENT	[ ]	[ ]	_____	_____
OTHER (SPECIFY)	[ ]	[ ]	_____	_____
AHJ (NOTIFIED) OF ANY IMPAIRMENTS	[ ]	[ ]	_____	_____

SYSTEM TESTS AND INSPECTIONS

TYPE	**VISUAL**	**FUNCTIONAL**	**COMMENTS**
CONTROL PANEL	[ ]	[ ]	_____
INTERFACE EQ.	[ ]	[ ]	_____
LAMPS/LEDS	[ ]	[ ]	_____
FUSES	[ ]	[ ]	_____
PRIMARY POWER SUPPLY	[ ]	[ ]	_____
TROUBLE SIGNALS	[ ]	[ ]	_____
DISCONNECT SWITCHES	[ ]	[ ]	_____
GROUND FAULT MONITORING	[ ]	[ ]	_____
SECONDARY POWER			
TYPE	**VISUAL**	**FUNCTIONAL**	**COMMENTS**
BATTERY CONDITION	[ ]	[ ]	_____
LOAD VOLTAGE	[ ]	[ ]	_____
DISCHARGE TEST	[ ]	[ ]	_____
CHARGER TEST	[ ]	[ ]	_____
SPECIFIC GRAVITY	[ ]	[ ]	_____
TRANSIENT SUPPRESSORS	[ ]	[ ]	_____
REMOTE ANNUNCIATORS	[ ]	[ ]	_____
NOTIFICATION APPLIANCES			
AUDIBLE	[ ]	[ ]	_____
VISUAL	[ ]	[ ]	_____
SPEAKERS	[ ]	[ ]	_____
VOICE CLARITY	[ ]	[ ]	_____

INITIATING AND SUPERVISORY DEVICE TESTS AND INSPECTIONS

LOC. & S/N	**DEVICE TYPE**	**VISUAL CHECK**	**FUNC-TIONAL TEST**	**FACTORY SETTING**	**MEAS. SETTING**	**PASS**	**FAIL**
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]
_____	_____	[ ]	[ ]	_____	_____	[ ]	[ ]

COMMENTS: _____

_____

_____

Figure 7-5.2.2 Inspection and Testing Form *(continued).* 1996 Edition

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NATIONAL FIRE ALARM CODE

EMERGENCY COMMUNICATIONS EQUIPMENT	**VISUAL**	**FUNCTIONAL**	**COMMENTS**

PHONE SET	[ ]	[ ]	_____
PHONE JACKS	[ ]	[ ]	_____
OFF-HOOK INDICATOR	[ ]	[ ]	_____
AMPLIFIER(S)	[ ]	[ ]	_____
TONE GENERATOR(S)	[ ]	[ ]	_____
CALL-IN SIGNAL	[ ]	[ ]	_____
SYSTEM PERFORMANCE	[ ]	[ ]	_____

	VISUAL	**DEVICE OPERATION**	**SIMULATED OPERATION**
INTERFACE EQUIPMENT			
(SPECIFY)	[ ]	[ ]	_____
(SPECIFY)	[ ]	[ ]	_____
(SPECIFY)	[ ]	[ ]	_____
SPECIAL HAZARD SYSTEMS			
(SPECIFY)	[ ]	[ ]	_____
(SPECIFY)	[ ]	[ ]	_____
(SPECIFY)	[ ]	[ ]	_____

SPECIAL PROCEDURES: _____
_____
_____
_____

COMMENTS: _____
_____
_____
_____
_____

ON/OFF PREMISES MONITORING:	**YES**	**NO**	**TIME**	**COMMENTS**
ALARM SIGNAL	[ ]	[ ]	_____	_____
ALARM RESTORAL	[ ]	[ ]	_____	_____
TROUBLE SIGNAL	[ ]	[ ]	_____	_____
SUPERVISORY SIGNAL	[ ]	[ ]	_____	_____
SUPERVISORY RESTORAL	[ ]	[ ]	_____	_____

NOTIFICATIONS THAT TESTING IS COMPLETE:	**YES**	**NO**	**WHO**	**TIME**
BUILDING MANAGEMENT	[ ]	[ ]	_____	_____
MONITORING AGENCY	[ ]	[ ]	_____	_____
BUILDING OCCUPANTS	[ ]	[ ]	_____	_____
OTHER (SPECIFY)	[ ]	[ ]	_____	_____

THE FOLLOWING DID NOT OPERATE CORRECTLY: _____
_____
_____
_____

SYSTEM RESTORED TO NORMAL OPERATION: DATE _____ TIME _____

THIS TESTING WAS PERFORMED IN ACCORDANCE WITH APPLICABLE NFPA STANDARDS.

NAME OF INSPECTOR: _____ DATE: _____ TIME: _____
SIGNATURE: _____
NAME OF OWNER OR REPRESENTATIVE: _____
DATE: _____ TIME: _____
SIGNATURE: _____

Figure 7-5.2.2 Inspection and Testing Form *(continued)*.
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RELATED DOCUMENTS:

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

TESTS:

Test all lines to be concealed before burying or covering with new construction. Tests shall include proper operation of lights, receptacles, and equipment, continuity of conduit system, insulation leakage and impedance, elimination of motor single phasing or reverse rotation, and ground system resistance (see also Section 16400).

After the interior wiring system is completed and at such time as the Engineer or Owner's representative may direct, the Contractor shall conduct an operating test for approval. The tests shall be performed in the presence of the authorized representative of the Engineer and the installation shall be demonstrated to operate in accordance with the requirements of this specification. The Contractor shall furnish all instruments and personnel required for the test. The Contractor shall have sufficient tools and personnel available at the scheduled inspection to remove panel fronts, device plates, etc., as required for proper inspection of equipment, devices and wiring installation as may be required by the inspectors. Any material or workmanship which does not meet with approval of the engineer shall be promptly removed, repaired or replaced as directed, at no additional cost to the Owner.

ADJUSTMENTS:

Adjustments shall include load balancing of all electrical phases, at devices and panels. Balance all panelboards so that the maximum deviation of any one phase from the average of all the phases shall not exceed 10%. Re-type circuit directory as required after completion of adjustment.

CLEANING AND PAINTING:

Prior to final inspection, all equipment having factory finishes shall be thoroughly cleaned inside and outside. All damaged surfaces shall be replaced or refinished by Contractor, with paint same as original manufacturer. Engineer shall determine whether the damaged surface is to be replaced or painted.

RECORD DRAWINGS:

The Contractor shall maintain accurate records of all deviations in work as actually installed from work indicated on the drawings. On completion of the project, two (2) complete sets of marked-up prints shall be delivered to the Architect.

OPERATING AND MAINTENANCE INSTRUCTIONS:

Unless directed otherwise elsewhere in these specifications, the Contractor shall compile and bind three sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work. These instructions shall be delivered to the Engineer for approval prior to final inspection. Instructions shall include operating and testing procedures and a parts list of all equipment. The Contractor shall instruct the Owner's personnel in the proper operation of all systems and equipment. The front and side of the binder shall be titled "Electrical Operating and Maintenance Instructions", with name of the job and firm name of the Contractor.

WARRANTY:

The Contractor shall submit upon completion of the work, a warranty by his acceptance of the contract, that all work installed will be free from defects in workmanship and materials. If, during the period of one year, or as otherwise specified from date of Certificate of Completion and acceptance of work, any such defects in

workmanship, materials, or performance appear, the Contractor shall, without cost to the Owner, remedy such defects within reasonable time to be specified in notice from the Architect. In default, the Owner may have such work done and charge cost to Contractor.

END OF SECTION

END OF SPECIFICATIONS

RELATED DOCUMENTS:

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

SCOPE OF WORK:

The scope of work consists of the furnishing and installing all materials, labor, and equipment required to expand the existing Low Voltage systems (Voice, Data, Intercom, Security and Door Access Control) as indicated on the plans for complete and operational systems including other interconnected Low Voltage systems. The Technology Contractor (hereafter referred to as "the Contractor", or Technology Contractor) shall verify and certify that the complete systems are functioning properly (Existing & New). The Contractor shall note that all items of equipment are specified in the singular; however, the Contractor shall provide and install the number of items of equipment as indicated on the drawings and as required for complete systems.

DESCRIPTION OF WORK:

It is the purpose of this specification to require the furnishing of the highest quality materials, equipment, and workmanship available, to fulfill the requirements of the work specified herein.

The Technology Systems encompass the Voice/Data Network Systems, and Intercom, as specified in Division 17. The Technology System shall provide a Telephone, Classroom and Administrative Intercommunication System, and a collapsed Fiber Optic Backbone / Cat 6 Ethernet Data Infrastructure. Other Low Voltage systems shall provide HVAC scheduling via a master time clock, door access control, security camera recording and notification of break-ins according to the counties standard operational procedure. Work Included as follows:

1. The work consists of providing all labor, equipment, supplies, materials, and incidentals and in performing all operations necessary for the "TURNKEY", fully operational, and completed work for the expansion of the existing Low Voltage Technology Systems, in complete accordance with the Contract Documents.

2. The base bid work shall include, but not be limited to, the following:

    a. Provide all appropriate licenses for system as installed

    b. Coordination of the Raceway installation with Division 16 Contractor

    c. Furnish and Install specified data network system

    d. Furnish and Install all PA and Sound Intercommunication Systems. Dedicated local sound systems for Auditoriums, Gymnasiums and Cafeterias shall be provided in the electrical contract, i.e. not provided within the scope of this contract, but requires coordination and inter-connection by this contractor.

    e. Furnish and Install the VOIP Telephone equipment compatible with the existing System.

    f. Provide product demonstrations as required by the Owner

    g. Coordination with General Contractor, and all other trades.

3. Technology systems shall be bid as part of the Construction Contract.

   It is the intention of the Specifications and Drawings to call for finished work, tested and ready for operation.

   Any apparatus, appliance, material, or work not shown on the drawings but mentioned in the specifications, or vice versa, or any incidental accessories necessary to make the work complete and perfect in all respects and ready for operation, even if not particularly specified, shall be furnished, delivered, and installed by the Contractor without additional expenses to the Owner.

   Minor details not usually shown or specified, but necessary for proper installation and operation, shall be included in the Contractor's estimate, the same as if herein specified or shown.

   With submission of bid, the Contractor shall give written notice to the Architect of any materials or apparatus believed inadequate or unsuitable, in violation of laws, ordinances, rules, and any necessary items or work omitted. In the absence of such written notice, it is mutually agreed that the Contractor has included the cost of all required items in his proposal, and that he will be responsible for the approved satisfactory functioning of the entire system without extra compensation.

   NOTICE TO BIDDERS, INSTRUCTIONS TO BIDDERS, SUPPLEMENTARY INSTRUCTIONS, GENERAL CONDITIONS, SUPPLEMENTARY GENERAL CONDITIONS, SPECIAL CONDITIONS, GENERAL REQUIREMENTS bound in the front of this document are included as a part of the specifications for this work.

DRAWINGS AND SPECIFICATIONS:

These drawings are diagrammatic and indicate the general arrangement of fixtures, equipment, and work included in the contract. Consult the architectural, structural, mechanical and electrical drawings and details for exact location and dimensions of fixtures and equipment; where same are not definitely located, obtain this information from the Architect.

The Contractor shall follow drawings in laying out work and check drawings of other trades to verify spaces in which work will be installed. Maintain maximum headroom and space conditions at all points. Where headroom or space conditions appear inadequate, the Architect shall be notified before proceeding with installation. If directed by the Architect, the Contractor shall, without extra charge, make reasonable modifications in the layout as needed to prevent conflict with work of other trades or for proper execution of the work.

The plans and these specifications are intended to describe, imply and convey the materials and equipment as well as necessary labor, required for the installation as outlined in the paragraph entitled "Scope of Work". Any omissions from either the drawings or these specifications are unintentional, and it shall be the responsibility of the Contractor to call to the attention of the Architect or Engineer any pertinent omissions before submission of a bid. The drawings which accompany these specifications are not intended to show in complete detail every fitting which may be required; however wherever reasonable implied by the nature of the work, any such material or equipment shall be installed by this Contractor as a part of his contract price. In no case will any extra charge be allowed unless authorized in writing by the Architect or Engineer.

The Contractor shall arrange with the General Contractor for required concrete and masonry chases, openings, and sub-bases so as not to delay progress of work. Work shall be installed sufficiently in advance of other construction to conceal piping and to permit work to be built in where required.

WORK SCHEDULE:

The contractor will coordinate all work schedules with the General Contractor and/or Architect. All efforts should be made to complete cable installation prior to the installation of ceiling tile in new or modernized construction.

DEFINITIONS:

It shall be understood and agreed by all parties that where the following terms appear, these definitions apply:

"Furnish" - to supply or give.

"Install" - to place, establish or fix in position.

"Provide" - to furnish and install as defined above.

The term “Bidder” refers to those parties who are submitting proposals for the work set forth in this document.

The term “Contractor” refers to the successful Bidder and to any work or issues after the award of the contract.

The term “Owner” refers to the County School System or its designated agent.

GENERAL REFERENCE STANDARDS:

The installation shall comply with the following:

1. NFPA No. 70 National Electric Code (NEC), Current Edition
2. State and Local Building codes
3. National Fire Protection Agency (NFPA) No. 101, Life Safety Code, latest Edition
4. UL Directory of Electrical Construction Materials
5. BICSI Telecommunications Distribution Methods Manual

The Contractor shall include in the work, without extra cost to the Owner, any labor, materials, services, apparatus, drawings (in addition to contract drawing and documents) in order to comply with all applicable laws, ordinances, rules, and regulations, whether or not shown on drawings and / or specified.

All work and materials under this section shall be in strict compliance with more stringent requirements of the North Carolina State Building Code, including the National Electrical Code, NFPA 101-Life Safety Code, Regulations of the State Fire Marshall, and requirements of the local utility company

STANDARD FOR MATERIALS:

Furnish and install new and undamaged materials conforming to the applicable standard. The standards and publications of the following entities and applicable to materials specified herein:

1. Underwriters Laboratories (UL)

2. Institute of Electrical and Electronic Engineers (IEEE)
3. American National Standards Institute (ANSI)
4. Electronics Industry Association (EIA)
5. Telecommunications Industry Association
6. Electronics Testing Laboratories, Inc. (ETL)

Materials referenced by manufacturer or trade name are cited for the quality of the product and are not intended to limit competitive bidding. The Bidder, at their option, may bid to furnish alternative products which are equal in quality and performance; however, all substitutions must be approved by Owner.

PERMITS AND FEES:

The Contractor shall give all necessary notices, including electric and telephone utilities, obtain all permits, and pay all government taxes, fees, and other costs, including utility connections or extensions in connection with his work file all necessary plans, prepare all documents, and obtain all necessary approvals of all governmental departments having jurisdiction at each phase of construction as required; obtain all required certificates of inspection for his work and deliver same to the Architect before request for acceptance and final payment for the work.

FCC APPROVAL:

The system shall be approved for direct interconnection to the telephone utility under Part 68 of FCC rules and regulations. Systems which are not FCC approved or utilized and intermediary device for connection shall not be considered. Provide the FCC registration number of the system being proposed as a part of the proposal process.

PRODUCT DEMONSTRATIONS:

The Systems Contractor may be required to provide product demonstrations and interviews with the Owner and his representatives or may be required to provide side-by-side demonstrations with other vendors. These demonstrations may be required before a contract is issued. Contractors should be prepared to demonstrate each feature called for in these specifications.

VERIFICATION OF DIMENSIONS, DETAILS, EXISTING FIELD CONDITIONS:

The Contractor shall visit the premises prior to bidding, and thoroughly familiarize himself with all details of the work, working conditions, verify dimensions in the field, provide advice of any discrepancy, and submit shop drawings of any changes he proposes to make in quadruplicate for approval before starting any work. The Contractor shall install all equipment in a manner to avoid building interference.

Telephone Equipment
New equipment shall be fully compatible with the existing system. Field verify exact phone required for the existing system.

For reference: Current school system standard materials for telephone systems includes YEALINK IP Office Communication Manager Latest Release, with telephony components, data networking capability and WAN interface as shall meet minimum functionality required within these specifications. Telephones and handsets shall be YEALINK products for VoIP applications.

Telephones for classrooms, resource and teacher workrooms shall be YEALINK T40P, quantity as required for one device at each location.

Telephones in the Administration Area, Media center (including ancillary rooms) shall be YEALINK T42G, quantity as required for one device at each outlet location.

Provide one YEALINK T48G telephone at Administration Area secretary location.

SHOP DRAWINGS:

The Contractor shall submit a minimum of five (5) copies of the shop drawings to the Architect for approval within thirty (30) days after the award of the general contract. If such a schedule cannot be met, the Contractor may request in writing for an extension of time to the Architect. If the Contractor does not submit shop drawings in the prescribed time, the Architect has the right to select the equipment.

Provide manufacturer's cuts of items to be provided under this Contract. The shop drawings shall be neatly bound in five (5) sets and submitted to the Architect with a letter of transmittal. The letter of transmittal shall list each item submitted along with the manufacturer's name.

Approval rendered on shop drawings shall not be considered as a guarantee of measurements or building conditions. Where drawings are approved, said approval does not mean that drawings have been checked in detail; said approval does not in any way relieve the Contractor from his responsibility or necessity of furnishing material or performing work as required by the contract drawings and specifications.

SUBMITTALS:

A. Prior to proceeding with the work:

A complete schedule of ALL equipment and materials which are to be furnished for the work. Accompanying the schedule shall be manufacturer's specification or cut sheets for all major components listed in Section 2 of this specification.

1. Shop Drawings

   Complete shop drawings for all systems and assemblies specified. Each drawing shall have a descriptive title and all subparts of each drawing shall be labeled. All drawings shall have the name and location of the project and the Systems Contractor's name in the title block.

2. Cabinets & Assemblies

   Complete scaled drawings of all equipment racks, consoles, special assemblies, etc. Each drawing shall show all equipment with its manufacturer and model number.

3. Device Locations

   Complete scaled drawings detailing installation locations of all equipment, such as control panels, plug panels, TV monitors, equipment racks, speakers, etc. All conduits with cable quantities and types and all terminal block locations shall also be indicated.

4. Device Layout

   Complete scaled drawings detailing all device plates, plug panels, input/output panels, rack panels and custom components to be fabricated by the Systems Contractor. Include the same details for all custom or non-standard components to

be furnished by vendor/manufacturers of the Systems Contractor. Show all connectors, mounting devices and engraving detail on these drawings.

5. System Diagrams

   Detailed one line drawing of all systems. Each system drawing shall detail the field wiring and wiring within racks, consoles, control panels, devices, speaker assemblies, etc. Each drawing shall show proposed (and eventually as built) circuit numbers for all cables and terminal connections. Provide typical wiring termination details for all devices.

6. Systems Contractor job references and key employee résumé's, as described in the Contractor Qualifications portion of this specification.

C. Prior to proceeding with respective portions of work:

1. Diagrams for AC power low voltage control switching.

2. Details and descriptions of any other aspect of the system which differ from the contract drawings due to field conditions or due to the equipment furnished.

3. Submittal as otherwise noted on the drawings and/or as noted herein.

7. Approved shop drawings and instruction brochures, including schematic diagrams for all electronic devices, shall be present at the job site during the period set aside for system testing.

8. Notebooks of operating instructions shall be prepared for the Owner as described herein.

C. At Project Completion

1. As-Builts

   Prior to final acceptance, provide three complete sets of drawings showing all cable numbers and construction details in accordance with the actual system installation. Revise all shop drawings to represent actual installation conditions.

2. Operation and Maintenance Manuals

   Prior to final acceptance, provide three complete sets of operation and maintenance manuals for the system. The operation manual shall contain all instruction necessary for the proper operation of the installed system and manufacturers' instruction. The maintenance manual shall contain all "proof of performance" information as required in Section 3, and all manufacturers' maintenance information, and copies of non-priority computer programs and system set up disks documenting all programmable features for the installed system.

COORDINATION WITH OTHER TRADES:

Coordinate all work required under this section with work of other sections of the specifications to avoid interference. Bidders are cautioned to check their equipment against space available as indicated on drawings, and shall make sure that proposed equipment can be accommodated. If interferences occur, Contractor shall bring them to attention in writing, prior to signing of contract; or, Contractor shall at his own expense provide proper materials, equipment, and labor to correct any damage due to defects in his work caused by such interference.

INSPECTION AND CERTIFICATES:

On the completion of the entire installation, the approval of the Architect and Owner shall be secured, covering the installation throughout. The Contractor shall obtain and pay for Certificate of Approval from the public authorities having jurisdiction. A final inspection certificate shall be submitted to the Architect prior to final payment. Any and all costs incurred for fees shall be paid by the Contractor.

EQUIVALENTS:

When material or equipment is mentioned by name, it shall form the basis of the Contract. When approved by the Architect in writing, other material and equipment may be used in place of those specified, but written application for such substitutions shall be made to the Architect as described in the Bidding Documents. The difference in cost of substitute material or equipment shall be given when making such request. Approval of substitute is, of course, contingent on same meeting specified requirements and being of such design and dimensions as to comply with space requirements.

CUTTING AND PATCHING:

On new work, the Contractor shall furnish sketches to the General Contractor showing the locations and sizes of all openings and chases, and furnish and locate all sleeves and inserts required for the installation of the electrical work before the walls, floors, and roof are built. This Contractor shall be responsible for the cost of cutting and patching where any items were not installed or where incorrectly sized or located. See also Section 01050.

CONTRACTOR QUALIFICATIONS:

A. The Contractor or subcontractor must be a "Systems Contractor" who has been regularly engaged in the furnishing and installation of commercial and industrial sound, communications and telephone systems and related visual communications systems for a period of at least the last three (3) years and who can show evidence of successfully completing, with its present staff, at least three (3) projects of similar size and scope, including the media management addition. The Systems Contractor, not its employees, must meet these contractor qualifications. With the proposal, provide a list of jobs completed, with contact, address and phone number and the A/V Contractors key employees assigned to the project, listing their responsibilities during the job and the length of time with the contractor in this capacity.

B. The Systems Contractor shall demonstrate to the satisfaction of the Architect/Engineer and Owner that it has:

    1. Adequate plant and equipment to pursue the work properly and expeditiously.

    2. Adequate staff and technical experience to implement the work.

    3. Suitable financial status to meet the obligations of the work.

    4. Technically capable and factory trained service personnel at a contractor owned service facility within one hundred (100) mile radius of the project site, to provide routine and emergency service for all products used in the project.

C. The Systems Contractor shall:

    1. Be bondable.

2. Hold a SPLV Contractors License which is accepted as valid within the State of North Carolina.

3. Be a factory authorized sales and installation contractor for all products used in the project.

D. Any contractor, who intends to submit a proposal for this work and does not meet the requirements of the "Contractor Qualifications" paragraph(s) above, shall employ the services of a "Systems Contractor" who does meet the requirements and who shall furnish the equipment, shop fabricate the equipment racks and subassemblies, make all connections to equipment and equipment racks, make all connections to remote controls and connection panels, and continuously supervise the installation and connections of all system cable and equipment.

E. A subcontractor so employed as the "Systems Contractor" shall be acceptable to the Owner and/or Architect/Engineer and shall be identified in the proposal.

QUALITY ASSURANCE:

A. General

All equipment and materials required for installation under these specifications shall be new (less than 1 year from date of manufacture) and without blemish or defect.

B. Specific

Each major component of equipment shall have the manufacturer's name, address and model number on a plate securely affixed in a conspicuous place. NEMA code ratings, UL label, or other data which is die-stamped into the surface of the equipment shall be easily visible.

C. Substitutions

It is not the intent of these specifications to limit or restrict submission of proposals for products by other manufacturers but to set a baseline of operational performance and functions which all bidders must meet.

D. Where a specific piece of equipment has been discontinued and/or replaced by a new model, submission of the new model does not guarantee acceptance. Substitute items shall require evaluation by the Architect/Engineer, Owner or their agent prior to acceptance.

E. If substitute equipment is allowed even by an approved submittal, the ITS Contractor shall be completely responsible for its use and for its ability to fulfill all intended functions in the completed systems. The ITS Contractor shall replace all such equipment with equipment listed by type and model number in the specifications if there is any evidence of equipment instability and/or incompatibility.

END OF SECTION

RELATED DOCUMENTS:

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

PART 1: GENERAL

SCOPE OF WORK:

This document provides specifications to be used in conjunction with network design drawings for installation of voice and for data cabling.

The Contractor shall furnish all labor, materials, tools, equipment and services necessary for and reasonably incidental to installation of specific voice and/or data cabling communications infrastructure. Work shall include all components for both a voice and data horizontal and riser cable plant from workstation outlet termination to wire closet termination. All cable plant components such as outlets, wiring termination blocks, racks, patch cables, etc. will be furnished, installed, and tested by the Contractor. The data cable plant is designed to support a 10BASE-T Ethernet building-wide computer network.

The scope of work includes all activities needed to complete the wiring and network intelligent hub equipment installation described in this document and the drawings.

The successful Bidder must be able to provide and install new equipment and materials in compliance with specifications contained in this document and accompanying drawings.

Any and all overtime (outside school hours) required to complete the scope of work within the time frame specified shall be included in the quoted price.

VOICE AND DATA WIRING PLAN OVERVIEW:

The cable system is based on the universal cabling concept. The same cables are installed to all workstations; connectors, adapters, and interconnections determine how the cable operates.

COMMUNICATIONS DESIGN (CD) DRAWINGS:

Communications design drawings show voice and data CNO locations, cable routing, and wire closet layout plans.

WORK SCHEDULE:

The contractor will coordinate all work schedules with the Architect. All efforts should be made to complete cable installation prior to the installation of ceiling tile in new or modernized construction.

DEFINITIONS:

The term “Bidder” refers to those parties who are submitting proposals for the work set forth in this document. The term “Contractor” refers to the successful Bidder and to any work or issues after the award of the contract.

The term “Owner” refers to Pitt County Schools or its designated agent.

A “Communications Network Outlet” (CNO) refers to a specific communications termination location with “two or four port communications outlet”, defined as a CNO containing 2 or 4 modular RJ-45 connectors. A “jack” refers to one modular RJ-45 connector. A “faceplate” is a decorative cover that covers the non-exposed portion of the jack and attaches to the outlet.

"Riser" refers to the cables interconnecting the wiring closets. Please note that in most cases the riser cables are physically a horizontal run between two closets.

GENERAL REFERENCE STANDARDS:

The installation shall comply with the following:

1. National Fire Protection Agency (NFPA) No.70, National Electric Code 2005 Edition
2. State and Local Building codes
3. National Fire Protection Agency (NFPA) No. 101, Life Safety Code, latest edition.
4. TIA/EIA 568A, 568B, 606, 607, and 569.
5. Building Industry Consulting Service International's (BICSI) Telecommunications Distribution Methods Manual

CONSTRUCTION SUBMITTAL:

In addition to the submittal requirements the Contractor must submit the following information during the execution of the project.

1. The Contractor must submit the manufacturer and model number for all suggested substitution of equipment specified for the work contracted. The Owner will determine acceptability of equipment at their discretion. For all cable components, the Owner will require certification that components are accepted for use in Ethernet networks, and meet all specifications as described.
2. The Contractor shall submit for approval samples of voice and data cable, fiber optic cable, patch cords, patch panels, faceplates and jacks. Samples shall be returned upon written request. The Owner shall have the right to reject any submittal that does not meet the specifications and intended use as determined by Owner.
3. Shop drawings showing proposed cable routing, closet detail design, rack design, MDF layout and other design details not specified in this document or Communications Design Drawings shall be submitted prior to any portion of the system installation for approval and to demonstrate compliance with the contract documents. Any departures from the original contract drawings should show details of such departures including changes in related portions of the project and the reasons therefore submitted with the shop drawings. Shop drawings must be provided showing details of all proposed fire-stops for four-hour rated walls. Approved departures recommended by the Contractor shall be made at no additional cost to Owner or shall result in a net decrease in cost. The Owner shall obtain the benefits of any cost reductions of these changes.
4. The Contractor shall submit as-built design drawings of the installed cable system including any design which deviates from the specified routes. As-built drawings shall include cable routes and labeling, patch panel configurations, IDC and MDF configurations, cross connect details, riser system, patch cord details, riser system, fiber storage and labeling. As-builts shall be turned over to the Owner as each section of the work is completed.

PART 2: PRODUCTS

STANDARD FOR MATERIALS:

Furnish and install new and undamaged materials conforming to the applicable standard. The standards and publications of the following entities and applicable to materials specified herein:

1. Underwriters Laboratories (UL)
2. Institute of Electrical and Electronic Engineers (IEEE)
3. American National Standards Institute (ANSI)
4. Electronics Industry Association (EIA)
5. Telecommunications Industry Association
6. Electronics Testing Laboratories, Inc. (ETL)

Materials referenced by manufacturer or trade name are cited for the quality of the product and are not intended to limit competitive bidding. The Bidder, at their option, may bid to furnish alternative products which are equal in quality and performance; however, all substitutions must be approved by Owner.

COMPLETENESS OF WORK:

Furnish all material, labor, transportation, tools, equipment, and supervision to install and leave ready for operation a complete communications systems in accordance with these specifications and the accompanying drawings.

All offsets, bends fittings pull boxes, stems and supports for the complete installation are not indicated on the drawings. It shall be the Contractor's responsibility to furnish and install all offsets, bends, devices, raceway supports, and equipment for the complete installation.

COMPATIBILITY:

Provide products which are compatible with other components in the system with which they must interface. Components and materials must fit into the confines indicated, leaving adequate clearance as required by applicable codes or manufacturer for adjustment, repair, or replacement.

PRODUCT HANDLING, DELIVERY, STORAGE:

Ensure that all system equipment, devices, and materials arrive at the designated installation site in good condition, intact in factory package or crate. Any equipment found to be damaged will be removed from the project site and will be replaced by the Contractor at their expense.

Storage - Store all equipment, devices and materials in their factory containers or package until ready for use. Storage facilities will be a clean, dry and indoor space which provides protection against the weather. Avoid damage by condensation by providing temporary heating when required. Large reels of cable may be stored outdoors provided there is adequate protection from physical damage and the cable ends are properly sealed to prevent moisture ingress. The Bidder shall state how much space and floor loading will

be required. Storage related costs will be the responsibility of the Contractor. Coordinate all storage of materials and equipment with the Owner.

Handling - Handle all equipment, devices and materials carefully to prevent breakage, denting or scoring of the finish or cable jackets. Damaged materials will be removed from the project site, and replaced by the Contractor at no additional cost. No sheath cuts will be accepted. All cables must be installed with sheath intact to the point of termination.

The Bidders should note that strict limitations will be enforced on the size, weight, and arrangement of cable reels. In general, cable reels must be of a size to be lifted on the interior freight elevator, and fit through standard doorways.

Any cable found to be damaged or defective shall be replaced by the Contractor at no additional cost to the Owner.

DATA CABLE INFRASTRUCTURE

A. Twisted Pair Cable

1. Cabling shall be unshielded twisted pair (UTP) and shall meet EIA/TIA-568, TSB-36 requirements for Category 6 (Security/Cameras, HVAC Controllers, and Data Ports Drops) or 6A (Wireless Access Points and Access Door Control). Provide UTP cable with the following minimum features:

    a. Conductors: 24 AWG solid copper, 4 pair;

    b. Impedance: 100 ohms +/-15% at 1-100 MHz;

    c. DC Resistance: 25.7 ohms/1000 ft. maximum at 20 degrees C;

    d. Mutual Capacitance: 14 pF/ft. nominal at 1 MHz;

    e. Attenuation (per 1000 ft):

        i. 2.0 dB at 1 MHz

        ii. 3.7 dB at 4 MHz

        iii. 6.0 dB at 10 MHz

        iv. 7.6 dB at 16 MHz

        v. 8.6 dB at 20 MHz

        vi. 10.8 dB at 31.25 MHz

        vii. 15.5 dB at 62.5 MHz

        viii. 20.2 dB at 100 MHz

        ix. 25.8 dB at 155 MHz

        x. 29.8 dB at 200 MHz

        xi. 41.2 dB at 300 MHz

2. Provide one "homerun" UTP cable between each data outlet port indicated on the drawings and the appropriate Local 100/1000 Switch

3. UTP cables shall not exceed 90 meters from the data outlet port to the appropriate 100/1000 Switch

4. Provide cable sheathing in the following color schemes:
   - Security/Cameras: White
   - Data: Blue
   - Patch Cables: Blue
   - HVAC Controls: Blue
   - Wireless Access: Blue
   - Door Access Control: Yellow
   - Intercom: White
   - Fire Alarm: Red

D. Data Station Outlet

1. Face plates
   a. Provide Data Station Outlets as indicated on the drawings with the following features:

      i. Single gang, flush mountable, stainless steel construction;

      ii. Shall accept data, telephone, fiber optic, VGA, video, audio and blank insert modules;

      iii. Shall have the capability to accept up to six individual ports;

      iv. Inserts shall snap in and out from the front of the Data Station Outlet;

      v. Face plates shall be supplied with pressure-sensitive icon labels;

2. Inserts

   a. Provide Data Port inserts with the following features:

      i. RJ-45 type rated for Category 6;

      ii. RJ-45 insert shall be configured to EIA-568A wiring standards;

      iii. Attenuation through the RJ-45 port at 10/16 MHz shall be less than .015/.025 dB;

      iv. Provide 110 style IDC terminations for all eight conductors of a UTP cable;

   b. Provide Telephone Inserts with the following features:

      i. RJ-45 type rated for Category 6;

      ii. RJ-45 insert shall be configured to USOC wiring standards;

      iii. Provide 110 style IDC terminations for all six conductors of a UTP phone cable;

c. Provide HDMI & Data inserts with the following features for all new wall mounted Monitors and Teacher's Stations:

i. Premanufactured HDMI Cables and inserts

ii. RJ-45 type rated for Category 6;

E. Patch Panels

1. Patch panels shall be provided at each new IDF room and/or switch closet for termination of all UTP and fiber optic cables. Patch panels shall have the following features:

2. Patch Panels for Twisted Pair Cable

a. Panels shall be mountable in EIA standard 19" equipment racks;

b. Panels shall be rated for Category 6;

c. Each panel shall provide a minimum of twenty-four RJ-45 ports in one rack space position (1RU);

d. Each RJ-45 port shall provide 110 style IDC terminations for all eight conductors of a UTP cable;

e. RJ-45 ports shall be configured to EIA-568A wiring standards;

f. Attenuation through the RJ-45 port at 10/16 MHz shall be .015/.025 dB;

g. Clearly label each patch point with the location of its associated data station port;

3. Provide a three (3) foot minimum Category 6 UTP patch cable for every Category 6 UTP data cable terminated at a patch panel. Install and neatly route patch cables between the panel and the hubs utilizing cable management hardware.

4. Patch Panels for Fiber Optic Cables

a. Panels shall be mountable in EIA standard 19" equipment racks;

b. Panels shall provide LC-LC feed-through connectors for termination of fiber optic strands;

c. Panels shall provide space for at least three feet of fiber optic cable management and excess patch cable storage in a pull-out drawer;

d. Clearly label each fiber optic LC patch position with the location of its origin;

5. Provide a 6-foot minimum fiber optic patch cable for every fiber hub or switch port in the system. Install and neatly route patch cables between the panel and the hubs, utilizing cable management hardware.

6. Provide horizontal cable management panels between each patch panel for twisted pair cable and vertical cable management panels for each data rack. Cable management panels shall be Panduit "WMP" series, or equal.

7. Provide fiber management systems at the panel location.

F. Ethernet Switch at IDF and Switch Closet Locations or as shown on the drawings

G. Certification

1. Systems Contractor shall be factory certified to install the Data Cabling Infrastructure. The Systems Contractor shall include a copy of the factory-provided certification with his submittal.

PART 3: EXECUTION

Perform the work in accordance with acknowledged industry and professional standards and practices, and the procedures specified herein. Furnish and install all materials, devices, components, and equipment for complete operational systems.

DEVIATIONS:

No deviations shall be made from the drawings or specifications. Should the Contractor find at any time during the progress of the work, that in his judgement, conditions made desirable or necessary modifications in the requirements covering any particular item or items, he shall report such matters promptly to the Owner for his decision and instruction.

COOPERATION BETWEEN TRADES:

The communications work shall be scheduled with the work of the other trades to avoid delays, interference's, and unnecessary work. All other shall be notified of all openings, hangers, excavations and similar operations for the installation of communications work, is required under this section of the specifications. The work of other trades shall not be cut without first consulting the Owner. Any work damaged by those employed in the work under this section of the specifications shall be repaired using the services of the trade whose work is damaged at the cost of the Contractor.

The plans are diagrammatic and reference must be made to structural, architectural, and mechanical systems plans and actual construction. Work under this section shall be coordinated with the different trades so that interference between electrical raceways, piping, equipment, architectural, and structural work shall be avoided.

Clearly and completely specify all items and actions relative to the installation and operation of the proposed equipment that the Owner will be responsible for providing and/or performing.

The successful Bidder's project manager will be responsible for providing written reports to the Owner at the beginning of every week for the previous week's work completed and upcoming week's planned. Maintain a competent supervisor and supporting technical personnel, acceptable to the Owner, during the entire installation. Change of the supervisor during the project shall not be acceptable without prior written approval from the Architects.

Dress and permanently label all cables at each end using approved labels to ensure a neat and organized appearance.

Do not splice or otherwise re-terminate any cable used to fulfill the requirements of this specification other than at the main distribution frame and intermediate distribution cabinet. Riser cables will not contain intermediate splices.

Coordinate work with any other communications parties on-site, specifically, the LAN Installer, the Computer Installer, and other third parties whose work may affect or be affected by the cabling systems described herein.

During installation, the Owner and/or Representative will conduct periodic inspections to verify that cable installation is proceeding according to the guidelines specified in this document. Any deficiencies found will be properly corrected within 7 days by the Contractor at no additional expense to the Owner upon notification to the Contractor.

It is expected that overtime may be required to complete the scope of work in the time allocated. The Bidder must include all overtime in his price and no additional overtime charges will be accepted.

The Contractor will control litter at all times by keeping it in containers. The Contractor will remove any installation debris from the site and dispose of it properly. Major trash will be removed daily by the Contractor. All other cable-related trash, dust, dirt, etc. must be removed and cleaned prior to acceptance.

INSTALLATION OF SYSTEMS

A. Device Locations

Locate all apparatus requiring adjustments, cleaning, or similar attention so that is shall be accessible for such attention. Equipment racks shall be positioned to permit full access for operation and service.

B. Blank and Custom Panels

Finish of blank panels and custom assembly panels shall match adjacent equipment panels as closely as possible.

C. Markings

Switches, connectors, jacks, receptacles, outlets, cables, and cable terminations shall be logically and permanently marked. Custom panel nomenclature shall be engraved, etched, or screened. Marking for these items are purposely detailed on the drawings to ensure consistency and clarity. Verify any changes in working type size, and/or placement with the Architect prior to marking.

D. Environment

The equipment specified herein is designed to operate in environments of normal humidity, dust, and temperature. Protect equipment and related wiring during installation where extreme environmental conditions can occur.

ELECTRICAL POWER

A. Grounding

Review and coordinate electrical power system installation including grounding, with the Division 16 Prime Contractor to ensure proper operation of the system. All racks, cable tray, and devices shall be grounded to a common isolated grounding bar within each MDF or IDF. Additional grounding shall be installed where directed by the engineer.

B. Verification

Verify that all AC power circuits designated for the system are properly wired, phased, and grounded. Report in writing any discrepancies found to the Division 16 Prime Contractor for corrective action.

C. Equipment Rack

Provide distribution of electrical power within the equipment racks with a minimum of two spare AC receptacles per branch circuit, used in the racks. ICS Contractor shall provide and install 20 amp power strips in each data rack.

CLEANING

Clean all junction and terminal box interiors thoroughly before installing plates, panels, or covers.

WIRING METHODS & PRACTICES

A. Identification

All wires shall be permanently identified at each wire by marking with "E-Z" tape marker or equivalent.

B. Terminal Blocks

All terminal block connections shall be readily accessible. Not more than two wires connected to one terminal. Spare terminal blocks, equivalent to 10% of those in actual use shall be provided.

C. Splicing

Splicing of cables shall not be permitted between terminations of specified equipment.

D. Pulling Cable

Do not pull wire or cable through any box fitting or enclosure where change of raceway alignment or direction occurs. Do not bend conductors to less than recommended radius. Employ temporary guides, sheaves, rollers, and other necessary items to protect cables from excess tension, abrasion, or damaging bending during installation. All cables not in conduit shall be installed in J Hooks spaced no more that 5 feet apart.

E. Cable Tie

Form in a neat and orderly manner all conductors in enclosures and boxes, wire ways, and wiring troughs, providing circuit and conductor identification. Tie as required using T & B "Ty-Raps" (or equivalent) of appropriate size and type. Limit Spacing between ties to six inches and provide circuit and conductor identification at least once in each enclosure.

F. Service Loops

Provide ample service loops at each termination so that plates, panels, and equipment can be demounted for service and inspection.

G. Wiring Harnesses

1. All wires and cables used in assembling custom panels and equipment racks shall be formed into harnesses which are tied and supported in accordance with accepted Engineering practice.

2. Harnessed cables shall be formed in either a vertical or horizontal relationship to equipment, controls, components, or terminations.

EQUIPMENT RACKS

A. General

The equipment racks shall be considered as custom assemblies and shall be assembled, wired, and tested in a properly equipped shop maintained by the ICS Contractor. Assembly of racks on site shall not be permitted. Racks shall be B-Line model SB556084X-UFB or equal. Data closets shall have 18" B Line (or equal) ladder tray installed to allow for adequate cable support and service loops.

B. Equipment Location

Placement of equipment in equipment racks, as indicated in the drawings, is for maximum operator convenience. Verify any changes in placement prior to assembly. All system components and related wiring shall be located with due regard for the minimization of induced electromagnetic and electrostatics noise, for the minimization of wiring length, for proper ventilation, and to provide reasonable safety and convenience for the operator.

C. Rack Installation

Racks shall be installed plumb and square without twists in the frames or variations in level between adjacent racks.

D. Identification

All terminal blocks, rack mounted equipment, and active slots of card frame systems shall be clearly and logically labeled as to their function, circuit, or system as appropriate. Labeling on manufactured equipment shall be engraved plastic laminate with white lettering on black or dark background that is similar to panel finish.

PART 4: TESTING

TOOLS AND TEST EQUIPMENT

The Contractor will provide all tools and test equipment required for installation and testing work. Test equipment will be maintained in accurate calibration and will display the dates of the last calibration and next scheduled calibration. The Contractor is responsible for performing all tests indicated at the end of each section.

For all tests, the Owner or its agent must be present at the beginning of testing and at such times as the owner deems appropriate. The Contractor shall be responsible for correcting any problems or defects discovered during testing.

DATA CABLE INFRASTRUCTURE TESTING

1. Test each twisted pair cable segment (example: from the data station port through the patch bay and patch cable to the hub port connector). Publish a log of each test to verify that the cable segment passes the EIA/TIA-568 TEB-36 requirements for Category 6 compliance. Bind the test log in a booklet and turn the booklet over to the Owner. The test shall include:

    a. Connector/cable continuity – line mapping;

b. Cable segment length;

c. Dual near end cross talk (NEXT);

d. Attenuation at 100 MHz;

e. Attenuation per foot;

f. Pass/fail results of each portion of the test above.

2. Test each fiber optic strand segment (From each classroom or switch location to the MDF). Publish a log of each test to verify that the fiber segment passes the EIA/TIA-526-14 optical power loss measurement test. Bind the test log in a booklet and turn the booklet over to the Owner.

PART 5: COMMISSIONING

SYSTEM DOCUMENTATION

A. Prior to final acceptance tests, submit to the Architect, three copies of an operating and maintenance manual for the system that has been installed. These manuals shall be used during the final acceptance testing of the system. Each manual shall contain the following information:

1. As-built drawings

2. Operations and maintenance manuals

3. Single line diagrams showing levels throughout system and impedances

ACCEPTANCE TESTING

A. The Acceptance Testing shall be performed by the Owner or the Owner's agent. Coordinate this period so that free access, work lighting, and electrical power is available on the site.

B. Be prepared to verify the performance of any portion of the ICS system by demonstration, listening and viewing tests, and instrumented measurements.

C. Make additional mechanical and electrical adjustments within the scope of work and which are deemed necessary by the Owner as a result of the acceptance test.

See also Specification Section 17900: Tests, Commissioning and Project Closeout

END OF SECTION

RELATED DOCUMENTS:

The general provisions of the Contract, including General and Supplementary Conditions, and General Requirements, and Division 1 specifications that apply to the work specified in this Section.

Part 1 – General

1.01 Additional Information

A. Refer to Section 17000 for the following Part 1 General information

1) References
2) Definitions / Terms / Acronyms
3) Submittal Requirements
4) Contractor Qualifications
5) Manufacturer Qualifications
6) Bidder Qualifications
7) Testing Agency Qualifications
8) Delivery, Storage and Protection
9) Project conditions
10) Sequencing
11) Continuity of Service and Scheduling of Work
12) Protection of Work and Property
13) Warranty

1.02 Products Installed but not Supplied Under This Section

A. All conduit and EMT required for Communications cabling pathway in/out of cross connect closets and in/out of wall cavities at the work area. EMT or Conduit for pathways shall have no more than two 90 degree bends and no continuous section over 100'.

B. All core holes and poke through devices in the floor for the installation of Communications cabling.

C. All core holes and EMT sleeves between floors for the routing of Communications cabling.

D. Basket tray or ladder racking to support main pathway cable bundles.

1.03 Backbone Cabling Description

A. Backbone cabling system will provide interconnections between communications equipment rooms, main terminal space, and entrance facilities in the telecommunications cabling system structure. Cabling system consists of backbone cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for backbone-to-backbone cross-connection.

B. Backbone cabling cross-connects may be located in telecommunication rooms or at the entrance facilities.

1.04 Work Included

A. The Work of this Section shall consist of the labor, materials and equipment required for furnishing and installing backbone cabling as part of a complete and operating telecommunications cabling system.

B. All items specified or included in this section shall be furnished and installed by Telecommunications Contractor, wired and connected by Telecommunications Contractor and tested by Telecommunications Contractor, unless noted otherwise. “Contractor” as used herein shall mean Telecommunications Contractor or Telecommunications Contractor’s sub-contractor.

C. All items specified or included in this section shall be furnished and installed by Electrical Contractor, wired and connected by Electrical Contractor and tested by Electrical Contractor, unless noted otherwise. “Contractor” as used herein shall mean Electrical Contractor or Electrical Contractor’s sub-contractor.

1.05 Submittals

A. Submit for approval in accordance with specified submittal procedures:

1.06 Coordination

A. Contractor shall furnish and install the following:

1) Inside plant copper backbone cables.
2) Inside plant fiber optic backbone cables.

B. Electrical Contractor shall furnish and install the following:

1) Telecommunications raceways within the building as indicated and/or as required by the electrician’s sub-contractor for a complete and operational system.

Part 2 – Products

2.01 Multi-Pair Cables

A. Multi-pair Cable Specification - Inside Plant, Category 3 25 pair

1) Acceptable Manufacturer: Berk-Tek.

2) Cable type: Category 3 CMR.

3) Jacket Material: Fire retardant PVC

4) Jacket Markings: Manufacturer’s identification, pair count, wire AWG, sequential footage.

5) Conductors: Solid 24 AWG copper

6) Twisted pairs with varying lay lengths, quantity of pairs as indicated on Drawings.

7) Conductor Insulation:
   a. CMR – Polyolefin or PVC.

8) Industry standard color coding, with colored binder tape for cables greater than 25-pair.

9) Jacket Color: Varies per application. See schedule on IC001.

10) Electrical Characteristics: Meets TIA/EIA-568B requirements for Category 6 rated cables.

11) CMR rated cable suitable for installation in vertical risers and conduit.

2.02 Fiber Optic Cables

A. Acceptable Manufacturer: Berk-Tek.

B. Cable may be either of composite cable construction or standard cable containing single-mode fibers in one cable sheath and multi-mode fibers in a separate cable sheath. Contractor shall verify raceway fill requirements when furnishing and installing two standard cable constructions to meet composite strand count requirements.

C. Fiber Cable Specification – Contractor shall provide 6 strand OS2 Single-Mode Fiber with LC Connectors, fiber distribution enclosures, termination panels and jumpers as required.

D. Fiber Optic Cable Shipping Requirements

1) All cabled optical fibers > 1000 meters in length shall be 100% attenuation tested. The attenuation of each fiber shall be provided with each cable reel.

2) Top and bottom ends of the cable shall be available for testing on the shipping reel.

3) Both ends of the cable shall be sealed to prevent the ingress of moisture.

4) Each reel shall have a weather resistant reel tag attached identifying the reel and cable. The reel tag shall include the following information:
   a. Cable Number, Gross Weight
   b. Shipped Cable Length in Meters, Job Order Number
   c. Manufacturer Product Number, Customer Order Number
   d. Date Cable was Tested, Manufacturer Order Number
   e. Cable Length Markings, Item Number
      i Top (inside end of cable)
      ii Bottom (outside end of cable)

5) Each cable shall be accompanied by a cable data sheet. The cable data sheet shall include the following information:
   a. Manufacturer Cable Number, Manufacturer Product Number
   b. Manufacturer Factory Order Number, Customer Name
   c. Customer Purchase Order Number
   d. Mark for Information Ordered Length
   e. Maximum Billable Length, Actual Shipped Length
   f. Measured Attenuation of Each Fiber Bandwidth Specification (for lengths > 1000 m)

E. The cable manufacturer shall provide installation procedures and technical support concerning the items contained in this specification.

Part 3 – Execution

3.01 Installation

A. General

1) All cable and associated hardware shall be placed so as to make efficient use of available space in coordination with other uses. All cable and associated hardware shall be placed so as to not impair the use or capacity of other building systems, equipment, or hardware placed by others (or existing).

2) Where cable is placed in ceiling areas or other non-exposed areas, cables shall be installed in cable trays or in non-continuous cable support system. Non-continuous cable supports shall be placed at random intervals no greater than 60 inches. Cables in non-continuous support systems shall be bundled using hook and loop type fasteners. Cable sag between supports shall not exceed 3 inches. Attaching wire to pipes or other mechanical items is not permitted. Cables shall not be bundled or tied in conduits, and in cable trays above ceilings.

3) All cabling shall be routed so as to avoid interference with any other service or system, operation, or maintenance purposes such as access boxes, network equipment, mechanical equipment access doors and covers, switches or electrical panels, and lighting fixtures. Avoid crossing areas horizontally just above or below any riser conduit. Lay and dress cables to allow other cables to enter the conduit/riser at a later time by maintaining a working distance from these openings. All cable shall be installed to allow for simple installation and removal of cables in the future.

4) Unless noted, all interior wiring shall be installed in raceways, Raceway Specification No. 2, one inch minimum. Wiring above accessible ceilings may be installed in cable tray and exposed on "J" hooks.

5) All cables not in raceways shall be riser or plenum rated.

6) All cables running outside the building shall be rated for outside plant installation.

7) Backbone cables shall be grouped separately from horizontal distribution cables. Cable for other systems shall be grouped separately from cables for telephone and data.

8) All inside cable shall be installed neatly above accessible ceilings using cable tray and "J" hooks supported from building structure. Do not attach to pipes, conduits, ducts, etc. Do not allow cable to rest on pipes, conduits, ducts, ceiling tiles, etc. Do not attach to wires used for supporting suspended ceilings. Do not use tie wires or bridle rings.

9) All wires shall be marked at all junction boxes, pull boxes, cabinets, boxes and terminations. Each cable run between terminating locations shall be one continuous cable (no splices or connections).

10) The Contractor shall install cable in such a manner as to prevent stretching, kinking or sharp bends. Cable damaged during installation or not passing required testing shall be removed and replaced at no additional cost to Owner.

11) The Contractor shall replace or rework cables showing evidence of improper handling including stretches, kinks, short radius bends, over tightened bindings, loosely twisted and over twisted pairs at terminations, and too much jacket removed.

12) Minimum bend radius and maximum pulling tension for all cables shall be maintained during and after installation. Install cable in accordance with manufacturer's ratings and instructions.

13) Cables shall not be installed near power sources or other items where interference could develop. Cables shall not be placed within 18 inches of light fixtures and within 3 feet of motors, transformers, copy machines, or solid state motor starters unless cable is installed in conduit. Contractor shall furnish and install a grounding conduit system where these minimum clearances cannot be maintained.

14) In telecommunications spaces, cables shall be routed as close as possible to the ceiling, floor, or corners to insure that adequate wall or backboard space is available for

current and future equipment and for cable terminations. Cables shall not be tie-wrapped to existing electrical conduit or other equipment. Minimum bend radius shall be observed.

15) Dress and attach cables to the backboard along the shortest possible route run square (horizontal and vertical) to the backboard. Bundle similarly routed cables together and attach by means of clamps or distribution rings. Cable dress and attachment shall minimize obstruction to future installations of equipment, backboard, or other cables.

16) Cables shall be neatly bundled with hook and loop type fasteners. Nylon tire wraps are not acceptable. Cables must be neatly bundled in the telecommunications spaces and at the cable service loop.

17) Cable service loops shall be provided at both ends of backbone cable runs.
    a. At the telecommunications room, provide a minimum 6 foot service loop stored in the cable tray above the racks/cabinets.
    b. At the telecommunications room, provide sufficient slack to properly dress and terminate cables at the racks and cabinets.
        i Provide sufficient slack so that swing gate type racks and cabinets can open fully
        ii Provide sufficient slack so that cables do not catch or bind at swing gate type rack or cabinet hinge and the cables do not pull taught across the hinge or edge.
    c. A minimum 25 foot service loop shall be maintained at each building entrance and exit.

18) All interior fiber optic cables shall be installed in riser rated innerduct above accessible ceilings.
    a. Innerduct shall be installed to within 12 inches of termination enclosure.
    b. Install pull boxes, 12” x 12” minimum, as required to limit cable pulls to two 90 degree bends or 150 feet.
    c. Innerduct shall not be kinked or tightly bent in any way.

19) All exterior fiber optic cables shall be installed in innerduct.

20) A break-away link shall be used for installation of cables with a cable-puller or winch. The break-away link shall be designed to separate at or below the recommended maximum tension of the cable being installed.

21) Any damage to Owner’s existing cabling or existing cable owned by others, caused as a result of work performed under this scope, shall be brought to the Owner’s attention and repaired or replaced within 48 hours.

22) Contractor shall use only cable lubricants recommended by the manufacturer for use with the specific cable construction.

23) Should a cable become kinked, skinned or stretched during installation, the cable shall be removed and replaced at no additional cost to the Owner. Splicing at points other than those specified will not be acceptable.

3.02 Copper Cable Testing

A. Unshielded Twisted Pair Testing Equipment:

1) Cable tester will be NRTL certified for EIA/TIA TSB95.

2) The cable tester will have a wide variety of preprogrammed cable types as an integral part of its testing system and have the ability to test cables less than 6 feet (6ft.) from the test point.

3) All balanced twisted-pair field testers will be factory calibrated each calendar year by the field test equipment manufacturer as stipulated by the manuals provided with the field test unit. The calibration certificate will be provided for review prior to the start of testing.

4) Testing will be accomplished using level III or higher field tester that is loaded with the most current version of test software by the manufacturer of the test equipment.

5) Provide factory calibration report of field test equipment.

B. Testing Procedures:

1) Test each pair and shield of each cable for opens, shorts, grounds, and pair reversal. Correct grounded and reversed pairs. Examine open and shorted pairs to determine if problem is caused by improper termination. If termination is proper, tag bad pairs at both ends and note on termination sheets.

2) Test each UTP cable and passive components. Provide certification that entire installation of UTP cabling, equipment and jacks are NRTL certified meeting or exceeding a minimum of category performance specified on all four pairs of conductors.

3) Tests will be based on each pair of conductors and not the aggregate multiple pair results.

4) Test all installed cable segments end-to-end, from each telecommunications room backbone patch panel/cross-connect block panel to respective main cross connect, with a Signal Injector, Graphical Link Testing Meter and Time Domain Reflectometer (TDR) for compliance to latest TIA/EIA performance requirements, as well as NEXT, ELFEXT, structural return loss, alternating power sum, opens, shorts, continuity, cable length, and characteristic impedance.

5) Provide report indicating failures and what actions were taken to ensure a passing horizontal cable and its terminations. Any cable failing the certification test (Fail, Fail* or, Pass*) must have remedial work done to provide a full pass test result; Remediation may include retermination or replacement of the cable, which fails. No cables passing within tolerance only (Conditional Pass*) will be accepted.

C. Test results:

1) The test results information for each link will be recorded in the memory of the field tester upon completion of the test. The tester will be capable of storing test data in either internal or external memory. The external media used will be left to the discretion of the user.

2) Test results saved by the tester will be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.

3) Optional formats of data reporting are: comma separated variable (.csv), Portable Document File (.pdf) or compatible, plain text (.txt), or hypertext markup language (.html/.htm).

4) Test Results will include the following:
   a. Applicable room number of jack location (room number per Contract Documents)
   b. Applicable Telecommunications Room number
   c. Circuit I.D. number with corresponding jack identifier
   d. Wire Map – will include the following:
      i Continuity to the remote end
      ii Shorts between any two or more conductors
      iii Crossed pairs
      iv Reversed pairs
      v Split pairs
      vi Any other miswiring
   e. Length
   f. Insertion Loss
   g. Near-end Crosstalk (NEXT) Loss
   h. PS-NEXT (Power Sum Near End Cross Talk)
   i. ELFEXT (Equal Level Far End Cross Talk)
   j. PS-ELFEXT (Power Sum Equal Level Far End Cross Talk)
   k. Propagation Delay
   l. Delay Skew
   m. Return loss

5) The Owner and Engineer reserve the right to observe testing and/or randomly sample completed links for conformance to project specifications.

3.03 Fiber Optic Cable Testing

A. Fiber Optic Cable Test Equipment:

1) Cable tester will be NRTL certified for TIA/EIA TSB95.

2) Cable testers will be Optical Power Meter and High Resolution Optical Time Domain Reflectometer (OTDR). The cable tester will be NRTL certified for compliance to latest TIA/EIA Standard 568B performance requirements at 850, 1300 and 1550 nm.

3) Testers will have been calibrated at least one year prior to use on this project. Contractor to provide proof to Owner if requested.

4) All testing equipment (OTDR, Light Loss, Splicer etc.) will be owned by the Contractor. Contractor must prove ownership of equipment if requested.

B. Cable segments and links will be tested from both ends of the cable for each of the construction phases. (Verify that cable labeling matches at both ends).

C. The system will not be considered certified until the tester has acknowledged that the performance of the physical layer of the system has been fully tested and is operational at the completion of the installation phase.

D. Testing Procedures:

1) Perform each visual and mechanical inspection and electrical test, including optional procedures, stated in NETA ATS, Section 7.25. Certify compliance with test

parameters and manufacturer's written recommendations. Test optical performance with optical power meter capable of generating light at all appropriate wavelengths.

2) Prior to testing, all connectors will be properly cleaned with an approved product manufactured specifically for this purpose.

3) Prior to beginning testing, confirm that all testing equipment is fully charged or operating on building power. If the test equipment power levels drop below 50%, recharge unit or continue testing with a different (fully charged) tester.

4) Initially test optical cable with a light source and power meter utilizing procedures as stated in TIA TSB-140, ANSI/TIA/EIA-526-7, ANSI/TIA/EIA-526-14A, OFSTP-14A Optical Power Loss Measurements of Installed Multi-mode Fiber Cable Plant and ANSI/TIA/EIA-526-7 Measurement of Optical Power Loss in installed Single-Mode Fiber cable plant.

5) Measured results will be plus/minus 1 dB of submitted loss budget calculations. If loss figures are outside this range, test cable with Optical Time Domain Reflectometer (OTDR) to determine cause of variation. Correct improper splices and replace damaged cables at no charge to the Owner.

E. Multi-Mode Fiber Optic Cables:

1) Will be tested bi-directionally for length and attenuation at both the short and long wavelengths for Multi-Mode (850 and 1300 nm). This is Tier 1 testing as specified in TIA TSB-140. Test all Multi-Mode strands to ensure they are capable of transmitting 10 Gigabit Ethernet speeds.

2) The maximum insertion loss measured at 23 degrees C. will be 3.75dB/km @ 850 nm and 1.5 dB/km @ 1300 nm.

F. All cables will be tested after termination using a cable certification tester that contains the test equipment manufacturer’s most current version of firmware.

G. Test all fiber optic cable segments end-to-end from the fiber optic backbone patch panel in the Equipment Room to each fiber optic backbone patch panel in each Telecommunications Room.

H. Broken or faulty strands will not be accepted. Any cable not fully functional with all strands usable will be replaced at no cost to the Owner.

I. Upon completion of testing, all connectors will be capped with a product made for that specific function by the connecting hardware manufacturer to prevent the contamination of the fiber from construction debris or other foreign objects.

J. Test Results:

1) The test results information for each link will be recorded in the memory of the field tester upon completion of the test. The tester will be capable of storing test data in either internal or external memory. The external media used will be left to the discretion of the user.

2) Test results saved by the tester will be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.

3) The test results information for each link will be recorded in the memory of the field tester upon completion of the test. The tester will be capable of storing test data in either internal or external memory. The external media used will be left to the discretion of the user.

4) Test results saved by the tester will be transferred into a Windows based database utility that allows for maintenance, inspection and archiving of these test records. A guarantee must be made that the measurement results are transferred to the PC unaltered as well as any printed reports generated from the software application.

5) Optional formats of data reporting are: comma separated variable (.csv), Portable Document File (.pdf) or compatible, plain text (.txt), or hypertext markup language (.html/.htm).

6) Test results will include the following:
    a. Telecommunications Room number
    b. Location of fiber pull i.e. (Equipment Room # to Telecom Room #)
    c. Patch panel # and location
    d. Connector type
    e. Distance
    f. Wavelength tested
    g. Technician who performed the testing

K. The Owner and Engineer reserve the right to observe testing and/or randomly sample completed links for conformance to project specifications.

End of Section

SECURITY SYSTEM

Furnish and install all labor, materials and programming to provide complete and operational building security system.

The Scope of Work shall include:

a. Access Control Contractor shall use intrusion software compatible with existing GE Networx systems currently being utilized by the school system. Verify with owner prior to bid.

b. Access Control Contractor shall include (1) range testing device for each type of wireless security device, if wireless devices are provided, and verify all devices are within operational range of their controlling device. Make provision for supplying additional controllers as required to provide a fully operational system.

c. Provide dual technology sensors with passive infrared motion and microwave sensing where indicated on the drawings, all corridors, connectors, and dining areas

d. Receive coded signal from Fire Alarm panel (excluding “trouble status”).

e. Provide coded signal from Fire Alarm panel (excluding “trouble status”) to indicate alarm status on GFAA.

f. Communicator programmed to contact Owner’s specified monitoring service.

g. Vandal-proof controller enclosure.

h. Security Cameras shall be Panasonic to match existing cameras. Equals as approved by owner and engineer.

   a. Exterior – 360 Fixed Dome HDTV 1080 with HDMI (WV-S455OL)
   b. Interior/Hallway – Multi-Direction Selectable HDTV (WV-X4170)
   c. Vandal Resistant Dome – (WV-S2531LN)
   d. Compact Dome – (WV-S3531L)
   e. Pendant Kit (Where Necessary)
   f. Wall Mount Bracket (Where Necessary)
   g. Corner Mount Bracket (Where Necessary)

i. Provide Video Insight recorders with 24 Terra-Byte (TB) storage and software as necessary to accommodate the quantity of inputs required on the job. Include all mounting hardware and software. Also include analog to digital encoders as necessary to accommodate the existing cameras that are to remain.

The Access Control Scope of Work shall include:

a. All accessories, equipment, programming and installation needed for a door access control system capable of controlling the specific doors as indicated on the electrical/security/IC plans and in the architect’s door hardware schedule.

b. Multi-Class HID Readers, SE RP10 or equal. Black in color.

c. Single multi-conductor plenum rated cable from Nodes to doors.

d. Door Access Cable shall be Cat 6, Plenum rated and match existing in color.

e. All associated door contacts and request to exit switches. Wired normally closed.

f. A “Lock-Down” door over-ride push/pull mushroom button. Pull to activate.

Provide the following in necessary quantities to meet the requirements of the plans and schedules or a more current version of the listed equipment:

1. S2 Netbox	S2-NN-E2R-WM
2. HID Reader	S2-900PTNNEK00460-S2EC
3. Door Recessed Switch	GRI 195-12WG-W
4. Armored Door Cords	Enforcer SD-969-S18Q
5. Lock Conversion Kit	Von Duprin QEL 958003-00
6. Req to Exit Switch	Von Duprin 0502521
7. Key Lock Power Supply	Schlage PS906-KL
8. Battery Back-Up Board	Schlage 900-BB
9. Relay Board	Schlage 900-4R

Access Control and Security System shall be installed by a S2 factory-authorized service organization with minimum five years of successful public school installation experience and licensed in N.C.

Access Control System and associated components shall be by S2 to match existing school system equipment or as listed above.

END OF SECTION

INTERCOM SYSTEM

Furnish and install all labor, materials and programming to provide complete and operational building Intercom system that is tied back to the existing system.

The Scope of Work shall include:

a. Intercom Contractor shall use speaker systems matching speakers currently being utilized at the school. Verify with owner prior to bid.

b. Intercom Contractor shall provide, install, program and test any required equipment necessary to expand the existing system to accommodate the new intercom devices in the building addition. See plans.

c. Provide wire guard protection on any devices located in areas subject to damage. Including but not limited to Gyms, Multi-Purpose Rooms, Weight Rooms, Vocational Education Shops, etc.

Intercom system shall be installed by a factory-authorized service organization with minimum five years of successful public school installation experience and licensed in N.C.

Intercom System and associated components shall be Bogen “Quantum” to match existing school system equipment or as listed above.

END OF SECTION

RELATED DOCUMENTS:

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

ACCEPTANCE CRITERIA:

The Owner will verify that all required activities have been performed in a final joint walk-through with the Contractor prior to system acceptance.

There shall be no provisions for automatic acceptance. A phased acceptance test maybe performed; however, acceptance of any phase is conditional on the acceptance of the project as a whole. Full payment will only be made after full and complete acceptance of the entire system. Acceptance shall only occur based on the written notification to the Contractor from the Owner. The following criteria must be met:

1. All cables have been tested and shown as meeting all specifications to the satisfaction of the Owner. All test reports required shall have been submitted and approved by the Owner assigned project manager.

2. All outlets are completely installed and operational in the specified locations.

3. All required patch panels are installed and operational.

4. All patch cables, cross connects, and extension cables have been delivered.

5. Final as-built documentation has been provided by the contractor.

6. Training and tools have been provided to the Owner cable management personnel in the maintenance and use of the installed cabling systems.

7. Each fiber has been tested end-to-end and a written report of signal loss and continuity has been provided.

8. All fire-stops have been installed.

9. The site is clean and neat, ready for permanent use by the Owner.

After the interior wiring system is completed and at such time as the Engineer or Owner’s representative may direct, the Contractor shall conduct an operating test for approval. The tests shall be performed in the presence of the authorized representative of the Engineer and the installation shall be demonstrated to operate in accordance with the requirements of this specification. The Contractor shall furnish all instruments and personnel required for the test. The Contractor shall have sufficient tools and personnel available at the scheduled inspection to remove panel fronts, device plates, etc., as required for proper inspection of equipment, devices and wiring installation as may be required by the inspectors. Any material or workmanship which does not meet with approval of the engineer shall be promptly removed, repaired or replaced as directed, at no additional cost to the Owner.

CLEANING AND PAINTING:

Prior to final inspection, all equipment having factory finishes shall be thoroughly cleaned inside and outside. All damaged surfaces shall be replaced or refinished by Contractor, with paint same as original manufacturer. Engineer shall determine whether the damaged surface is to be replaced or painted.

RECORD DRAWINGS AND DOCUMENTATION PACKAGE:

1. Record Drawings

    a. The Contractor shall maintain accurate records of all deviations in work as actually installed from work indicated on the drawings. On completion of the project, two (2) complete sets of marked-up prints shall be delivered to the Architect.

2. Documentation package

    a. The successful bidder shall provide one (1) system documentation package on CD and one (1) system documentation paper copy for the installed integrated system. The documentation package shall provide the owner with a comprehensive guide for all operation and maintenance procedures for the “as installed” system. A system block diagram shall indicate the functional relationship between all sub-systems and all elements within individual sub-systems. A cabling schematic shall indicate interconnect wiring with respective numbering or other identification codes and termination block assignment. If requested, schematic drawings shall be provided for each active and passive circuit used in the completed system. All schematic drawings shall indicate the electrical value of each component and its circuit by use of standard electronic symbols.

TRAINING:

A. ICS System

1. Training shall include a minimum of 16 hours of user training for the end user. Training shall be provided at the school or owner designated location in a classroom setting. Training shall be divided into two (2) groups, system administrator and teacher. Training shall also include a video and/or audio format on CD-Rom and shall be formatted for use on individual CD-Rom.

B. Telephone

1. Training shall include a minimum of 8 hours of user training for the end user. Training shall be provided at the school or owner designated location in a classroom setting.

OPERATING AND MAINTENANCE INSTRUCTIONS:

Unless directed otherwise elsewhere in these specifications, the Contractor shall compile and bind two sets of all manufacturer's instructions and descriptive literature on all items of equipment furnished under this work. These instructions shall be delivered to the Engineer for approval prior to final inspection. Instructions shall include operating and testing procedures and a parts list of all equipment. The Contractor shall instruct the Owner's personnel in the proper operation of all systems and equipment. The front of the binder shall be titled "Technology Systems Operating and Maintenance Instructions", with name of the job and firm name of the Contractor.

WARRANTY:

The Contractor shall submit upon completion of the work, a warranty by his acceptance of the contract that all work installed will be free from defects in workmanship and materials. If, during the period of one year, or as otherwise specified from date of Certificate of Completion and acceptance of work, any such defects in workmanship, materials, or performance appear, the Contractor shall, without cost to the

Owner, remedy such defects within reasonable time to be specified in notice from the Architect. In default, the Owner may have such work done and charge cost to Contractor.

END OF SECTION
END OF SPECIFICATIONS