

PROJECT MANUAL

Issue for Bid – Early Procurement

17 March 2025

**North Carolina State
University**



Mann Hall Renovation

Raleigh, North Carolina

PW Project #:	820937.001
NCSU Project #:	202220021
State ID #:	22-24500-02C

Perkins&Will

411 W. Chapel Hill Street., Suite 200, Durham, NC 27701 | 919.433.5300

PROJECT MANUAL

North Carolina State University



Mann Hall Renovation

Raleigh, North Carolina

Issue for Bid – Early Procurement

17 March 2025

Owner

North Carolina State University
Facilities Division Design & Construction
2601 Wolf Village Way, Suite 331
Raleigh, North Carolina 27695-7520

Design Project Manager:

Telephone: 919-513-7239
Contact: Mike Bell
Electronic Mail: jmbell@ncsu.edu

Construction Project Manager:

Telephone: 919.513.2752
Contact: Mark Michaelson
Electronic Mail: mark_michaelson@ncsu.edu

Facility

Mann Hall Renovation
2501 Stinson Drive
Raleigh, North Carolina 27607

Architect

Perkins&Will
411 W. Chapel Hill Street, Suite 200
Durham, North Carolina 27701
Telephone: 919-433-5300
Contact: Scott Hefner
Electronic Mail: scott.hefner@perkinswill.com

Structural Engineers

Lynch Mykins Structural Engineers
301 N. West Street, Suite 105
Raleigh, North Carolina 27609
Telephone: 919-782-1853
Contact: Jeff Morrison
Electronic Mail: jmorrison@lynchmykins.com

Civil Engineers

NV5 Engineers & Consultants
3300 Regency Parkway Suite 100
Cary, North Carolina 27518
Telephone: 919-836-4800
Contact: Michael Allen
Electronic Mail: michael.allen@nv5.com

Mechanical / Electrical / Plumbing / Fire Protection Engineers

Salas O'Brien
1620 Midtown Place
Raleigh, North Carolina 27609
Telephone: 919-832-8118
Contact: Chris M. Martin Jr.
Electronic Mail: chris.martin@salasobrien.com

Contractor / Construction Manager

Holder Construction Group
6210 Ardrey Kell Road Suite 400
Charlotte, North Carolina 28277
Telephone: 704 357 4200
Contact: Shaun Haycock
Electronic Mail: shaycock@holder.com

Audio/Visual

NV5 Engineers & Consultants
4905 Professional Court
Raleigh, North Carolina 27609
Telephone: 919 876 9799
Contact: Mark Grassi
Electronic Mail: mark.grassi@nv5.com

Lighting

Available Light
5700 Six Forks Road, Suite 203
Raleigh, North Carolina 27609
Telephone: 212 977 2611
Contact: Brigid Hardiman
Electronic Mail: brigid@availablelight.com

Sustainability

Ecoimpact Consulting
8022 Providence Road Suite 500-203
Charlotte, North Carolina 28277
Telephone: 212 977 2611
Contact: Summer Minchew
Electronic Mail: sminchew@ecoimpactsite.com

Exhaust Plume

CPP Wind Engineering Consultants
7365 Greendale Road
Windsor, Colorado 80550
Telephone: 970 221 3371

Code

The Fire Consultants, Inc.
2890 North Main Street, Suite 210
Walnut Creek, California 94597
Telephone: 925 979 9993

Cost Consultant

Palacio Collaborative, Inc.
400 Galleria Parkway SE, Suite 1500
Atlanta, Georgia 30339
Telephone: 404 609 9006
Contact: Michael Palacio
Electronic Mail: mpalacio@palaciocollaborative.com

Project Numbers

PW Project #: 820937.001
NCSU Project #: 202220021
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END OF DOCUMENT

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PROFESSIONAL SEALS PAGE

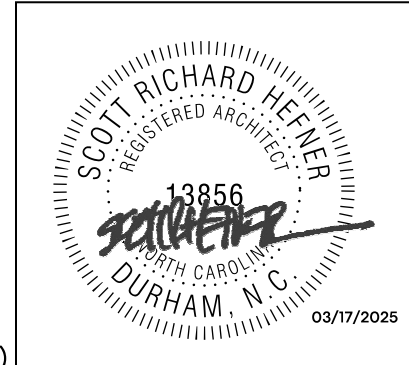
The following Documents and Specification Sections have been prepared by or under the direct supervision of the Architect:

ARCHITECT

Perkins&Will
411 W. Chapel Hill Street, Suite 200
Durham, North Carolina 27701
919.433.5300

DIVISION 00 – PROCUREMENT AND CONTRACTING REQUIREMENTS

00 26 00 Procurement Substitution Procedures
Substitution Request Form (Procurement)



DIVISION 01 – GENERAL REQUIREMENTS

01 10 00 Summary
01 11 16 Work by Owner
01 14 00 Work Restrictions
01 22 00 Unit Prices
01 23 00 Alternates
01 25 00 Substitution Procedures
01 26 00 Contract Modification Procedures (CMAR)
01 26 13 Request for Interpretation (RFI)
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01 35 23 NCSU Safety Requirements
01 35 73 Delegated Design Requirements
01 40 00 Quality Requirements
01 42 00 References
01 43 39 Mockups
01 50 00 Temporary Facilities
01 51 00 Temporary Utilities
01 55 00 Vehicular Access & Parking
01 56 26 Temporary Fencing
01 57 00 Temporary Controls
01 58 00 Project Identification

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01 73 00 Execution
01 74 19 Construction Waste Management and Disposal
01 77 00 Closeout
01 78 23 Operation and Maintenance Data
01 78 39 Project Record Documents
01 78 46 Maintenance Materials & Attic Stock
01 79 00 Demonstration and Training
01 81 13.14 Sustainable Design Requirements – LEED v4 BD+C
01 91 13 General Commissioning Requirements

DIVISION 02 – EXISTING CONDITIONS

02 41 19 Selective Demolition

DIVISION 03 – CONCRETE

03 15 13 Waterstops
03 15 19 Under Slab Vapor Retarders

DIVISION 04 – MASONRY

04 20 00 Unit Masonry

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

06 10 53 Miscellaneous Rough Carpentry
06 16 43 Gypsum Sheathing

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

07 01 50.01 Roof Removal
07 13 26 Self-Adhering Sheet Waterproofing
07 54 19 Polyvinyl-Chloride (PVC) Roofing
07 54 23 Thermoplastic Polyolefin (TPO) Roofing
07 62 00 Sheet Metal Flashing and Trim
07 71 00 Roof Specialties
07 72 00 Roof Accessories
07 92 00 Joint Sealants

DIVISION 14 – CONVEYING EQUIPMENT

14 24 00 Hydraulic Elevators

END OF DOCUMENT

North Carolina State University
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Raleigh, North Carolina
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PROFESSIONAL SEALS PAGE

The following Specification Sections have been prepared by or under the direct supervision of the Structural Engineer:

STRUCTURAL ENGINEER

Lynch Mykins Structural Engineers
301 N. West Street, Suite 105
Raleigh, NC 27603
919-782-1833



DIVISION 03 – CONCRETE

03 10 00 Concrete Forming and Accessories
03 20 00 Concrete Reinforcing
03 30 00 Cast-in-Place Concrete

DIVISION 05 – METALS

05 12 00 Structural Steel Framing
05 31 00 Steel Decking
05 40 00 Cold-Formed Metal Framing

ADVERTISEMENT FOR BIDS

Sealed proposals will be received until 3:00 PM
(Time)

on 12/27/2024, in Location TBD & Virtually to TBD,
(Date) (Location)

for the construction of The Mann Hall - Renovation Project

at which time and place bids will be opened and read.

Complete plans and specifications for this project can be
obtained from:

Perkins&Will 411 W Chapel Hill Street, Suite 200 Durham, NC 27701
(Designer Name and Address)

during normal office hours after 11/27/2024 (Date)

Plan Deposit Not Applicable

The state reserves the unqualified right to reject any and all
proposals.

Signed: _____
(Owner)

NOTICE TO BIDDERS

Sealed proposals will be received by the North Carolina State University Facilities Division, Design & Construction in Raleigh NC, in the office of Mike Bell 2601 Wolf Village Way, Suite 331 up to 3:00 pm on December 27, 2024 and immediately thereafter publicly opened and read for the furnishing of labor, material and equipment entering into the construction of

----- Mann Hall – Renovation-----

----- The "Mann Hall - Renovation" project includes a complete interior abatement and demolition scope of the existing building followed by construction of fully re-programmed classroom, academic and study spaces, fourth floor laboratory space, and an Esports arena on NC State's main campus. To support the re-programming of this building, a new mechanical penthouse will be constructed to feed the 4th floor labs and a new elevator shaft will be installed (in addition to replacing the existing cab within a separate shaft). New electrical and mechanical equipment will be required, including replacing the existing transformer, and new fiber will be pulled from the existing manhole to support Esports needs. -----

Bids will be received for Lump Sum Subcontracts: Abatement & Demolition, General Trades. All proposals shall be lump sum.

Pre-Bid Meeting

An open pre-bid meeting will be held for all interested bidders on December 4, 2024 --- 4:30 PM --- McKimmon Center. The meeting will address project specific questions, issues, bidding procedures and bid forms.

Complete plans, specifications and contract documents will be open for inspection in the offices of Perkins&Will and in the plan rooms of the Associated General Contractors, Carolinas Branch, Raleigh in the local North Carolina offices of McGraw-Hill Dodge Corporation, and in the Eastern Regional Office of Reed Construction Data in Norcross, GA and in Minority Plan Rooms in

Hispanic Contractors Association of the Carolinas (HCAC) in Winston-Salem, Charlotte and Raleigh Areas – 877-227-1680

NCIMED Plan & Resource Center, 114 West Parrish Street, 6th Floor, Durham, NC 27701, 919-956-8889 or 919-287-3036

or may be obtained by those qualified as prime bidders, upon deposit of Not Applicable dollars (\$ -) in cash or certified check. The full plan deposit will be returned to those bidders provided all documents are returned in good, usable condition within ten (10) days after the bid date.

If a contractor is bidding under the dual system both as a single prime contractor and as a separate prime contractor, he must submit the bids on separate forms and in separate envelopes. Bidders should clearly indicate on the outside of the bid envelope which contract(s) they are bidding.

NOTE: The bidder shall include with the bid proposal the form *Identification of Minority Business Participation* identifying the minority business participation it will use on the project and shall include either *Affidavit A* or *Affidavit B* as applicable. Forms and instructions are included within the Proposal Form in the bid documents. Failure to complete these forms is grounds for rejection of the bid. (GS143-128.2c Effective 1/1/2002.)

All contractors are hereby notified that they must have proper license as required under the state laws governing their respective trades.

General contractors are notified that Chapter 87, Article 1, General Statutes of North Carolina, will be observed in receiving and awarding general contracts. General contractors submitting

bids on this project must have license classification for _____
(set forth the license classification required by the NC General Contractors Licensing Board under G.S. 87-1)

NOTE--SINGLE PRIME CONTRACTS: Under GS 87-1, a contractor that superintends or manages construction of any building, highway, public utility, grading, structure or improvement shall be deemed a "general contractor" and shall be so licensed. Therefore a single prime project that involves other trades will require the single prime contractor to hold a proper General Contractors license. **EXCEPT:** On public buildings being bid single prime, where the total value of the general construction does not exceed 25% of the total construction value, contractors under GS87- Arts 2 and 4 (Plumbing, Mechanical & Electrical) may bid and contract directly with the Owner as the SINGLE PRIME CONTRACTOR and may subcontract to other properly licensed trades. [GS87-1.1- Rules .0210](#)

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 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.

A performance bond and a payment bond will be required for one hundred percent (100%) of the contract price.

Payment will be made based on 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.

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

Designer:

Perkins&Will

(Name)

411 W. Chapel Hill St., Suite 200
Durham, North Carolina 27701

(Address)

(919) 433-5300

(Phone)

Owner:

North Carolina State University
Facilities Division Design & Construction

(Agency/Institution)

2601 Wolf Village Way, Suite 331
Raleigh, North Carolina 27695-7520

(919) 513-2752

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		Asbestos Abatement Specification.....21 Oct 24
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O		Contractor’s Statement of Responsibility28 Oct 24
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O	01 35 23	NCSU Safety Requirements	23 Aug 24
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O	01 58 00	Project Identification	28 Oct 24
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O	01 74 19	Construction Waste Management and Disposal	28 Oct 24
O	01 77 00	Closeout	28 Oct 24
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DIVISION 04 – MASONRY

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DIVISION 05 – METALS

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S	05 31 00	Steel Decking	17 Jan 25
S	05 40 00	Cold-Formed Metal Framing.....	17 Jan 25

DIVISION 06 – WOOD, PLASTICS, AND COMPOSITES

A	06 10 53	Miscellaneous Rough Carpentry.....	17 Jan 25
A	06 16 43	Gypsum Sheathing	17 Jan 25

DIVISION 07 – THERMAL AND MOISTURE PROTECTION

A	07 01 50	Roof Removal	17 Jan 25
A	07 13 26	Self-Adhering Sheet Waterproofing.....	17 Jan 25
A	07 54 19	Polyvinyl-Chloride (PVC) Roofing	17 Jan 25
A	07 54 23	Thermoplastic Polyolefin (TPO) Roofing	17 Mar 25
A	07 62 00	Sheet Metal Flashing and Trim	17 Jan 25
A	07 71 00	Roof Specialties	17 Jan 25
A	07 72 00	Roof Accessories	17 Jan 25
A	07 92 00	Joint Sealants	17 Jan 25

DIVISION 08 – OPENINGS – NOT USED

DIVISION 09 – FINISHES – NOT USED

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DIVISION 10 – SPECIALTIES – NOT USED

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DIVISION 12 – FURNISHINGS – NOT USED

DIVISION 13 – SPECIAL CONSTRUCTION – NOT USED

DIVISION 14 – CONVEYING EQUIPMENT

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APPENDICIES

APPENDIX A – Form of Proposal

APPENDIX B – Guidelines for Recruitment and Selection of Minority Businesses for Participation in the University of North Carolina Construction Contracts

Identification of HUB Certified / Minority Business Participation

Affidavit A – Listing of Good Faith Efforts

Affidavit B – Intent to Perform Contract with Own Workforce

Affidavit C – Portion of the Work to be Performed by HUB Certified / Minority Businesses

Affidavit D – Good Faith Efforts

Appendix E – MBE Documentation for Contract Payments

APPENDIX C – Form of Bid Bond

APPENDIX D – Form of Construction Contract

Form of Performance Bond

Form of Payment Bond

Sheet for Attaching Power of Attorney

Sheet for Attaching Insurance Certificates

Approval of the Attorney General

Certification by the Office of State Budget and Management

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PROCUREMENT SUBSTITUTION PROCEDURES

1.1 DEFINITIONS

- A. Procurement Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Procurement and Contracting Documents, submitted prior to receipt of bids.
- B. Substitution Requests: Requests for changes in products, materials, equipment, and methods of construction from those indicated in the Contract Documents, submitted following Contract award. See Section 01 25 00 "Substitution Procedures" for conditions under which Substitution requests will be considered following Contract award.

1.2 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage a qualified testing agency to perform compatibility tests recommended by manufacturers.

1.3 PROCUREMENT SUBSTITUTIONS

- A. Procurement Substitutions, General: By submitting a bid, the Bidder represents that its bid is based on materials and equipment described in the Procurement and Contracting Documents, including Addenda. Bidders are encouraged to request approval of qualifying substitute materials and equipment when the Specifications Sections list materials and equipment by product or manufacturer name.
- B. Procurement Substitution Requests will be received and considered by Owner when the following conditions are satisfied, as determined by Architect; otherwise requests will be returned without action:
 - 1. Extensive revisions to the Contract Documents are not required.
 - 2. Proposed changes are in keeping with the general intent of the Contract Documents, including the level of quality of the Work represented by the requirements therein.
 - 3. The request is fully documented and properly submitted.

1.4 SUBMITTALS

- A. Procurement Substitution Request: Submit to Architect. Procurement Substitution Request must be made in writing in compliance with the following requirements:
 - 1. Requests for substitution of materials and equipment will be considered if received no later than seven (7) calendar days prior to date of bid opening.

2. Submittal Format: Submit three copies of each written Procurement Substitution Request, using form bound in Project Manual.
 - a. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specifications Sections and drawing numbers.
 - b. Provide complete documentation on both the product specified and the proposed substitute, including the following information as appropriate:
 - 1) Point-by-point comparison of specified and proposed substitute product data, fabrication drawings, and installation procedures.
 - 2) Copies of current, independent third-party test data of salient product or system characteristics.
 - 3) Samples where applicable or when requested by Architect.
 - 4) Detailed comparison of significant qualities of the proposed substitute with those of the Work specified. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - 5) Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - 6) Research reports, where applicable, evidencing compliance with building code in effect for Project, from ICC-ES.
 - 7) Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, which will become necessary to accommodate the proposed substitute.
 - c. Provide certification by manufacturer that the substitute proposed is equal to or superior to that required by the Procurement and Contracting Documents, and that its in-place performance will be equal to or superior to the product or equipment specified in the application indicated.
 - d. Bidder, in submitting the Procurement Substitution Request, waives the right to additional payment or an extension of Contract Time because of the failure of the substitute to perform as represented in the Procurement Substitution Request.
- B. Architect's Action:
 1. Architect may request additional information or documentation necessary for evaluation of the Procurement Substitution Request. Architect will notify all bidders of acceptance of the proposed substitute by means of an Addendum to the Procurement and Contracting Documents.

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- C. Architect's approval of a substitute during bidding does not relieve Contractor of the responsibility to submit required shop drawings and to comply with all other requirements of the Contract Documents.

1.5 ATTACHMENTS

- A. Substitution Request Form (Procurement Period).

END OF SECTION

North Carolina State University
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**SUBSTITUTION REQUEST FORM
(Procurement Period)**

To: Perkins&Will
411 W. Chapel Hill Street, Suite 200
Durham, North Carolina 27701

From:

Substitution Request No: _____ DATE: _____

Bidder hereby requests acceptance of the following product or system as a substitution in accordance with provisions of Division 01 Section "Substitution Procedures":

PROJECT SPECIFICATION

Specification Name/Number: _____
Article, Paragraph, Page Number: _____
Item/System to be Substituted: _____

REASON FOR SUBSTITUTION REQUEST

SPECIFIED PRODUCT . . .

PROPOSED PRODUCT . . .

- | | |
|--|---|
| <input type="checkbox"/> Is no longer available. | <input type="checkbox"/> Will reduce the Contract Time by _____ days. |
| <input type="checkbox"/> Is unable to meet project schedule. | <input type="checkbox"/> Will reduce the Contract Sum by \$ _____. |
| <input type="checkbox"/> Is unsuitable for the designated application. | |
| <input type="checkbox"/> Cannot interface with adjacent materials. | |
| <input type="checkbox"/> Is not compatible with adjacent materials. | |
| <input type="checkbox"/> Cannot provide the specified warranty. | |
| <input type="checkbox"/> Cannot be constructed as indicated. | <input type="checkbox"/> Is an Owner-initiated substitution. |
| <input type="checkbox"/> Other: _____ | |
| <input type="checkbox"/> Cannot be obtained due to one or more of the following: | |
| <input type="checkbox"/> Strike | <input type="checkbox"/> Bankruptcy of manufacturer or supplier |
| <input type="checkbox"/> Lockout | <input type="checkbox"/> Similar occurrence |

Explanation of each item marked above (attach documentation):

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EFFECT OF SUBSTITUTION

Proposed substitution affects other work or trades: No Yes (if yes, explain)

Proposed substitution requires dimensional revisions or redesign of architectural, structural, mechanical, electrical, plumbing, life safety, or other work:

No Yes (if yes, attach data explaining revisions)

PRODUCT COMPARISON

Provide side-by-side comparison between proposed substitution and specified product to facilitate review of Substitution Request:

SPECIFIED PRODUCT:

PROPOSED PRODUCT:

Manufacturer: _____

Name / Brand: _____

Catalog No.: _____

Supplier: _____

Features: _____

Variations: _____

(Attach additional sheets if necessary)

(Attach additional sheets if necessary)

Local Distributor or Supplier: _____

Manufacturer's Representative: _____

Maintenance Service Available: Yes No

Spare Parts Source and Location: _____

Warranty Available is equivalent to the specified warranty: Yes No _____ Years

Describe any variation from specified warranty: _____

Product Manufacturing History New 2-5 yrs 6-10 yrs More than 10 yrs old

SUPPORTING DATA ATTACHED (REQUIRED WHERE APPLICABLE)

Point-by-point comparison of performance criteria, materials, and components of specified product with proposed substitution.

Drawings Specifications Product Data Samples

Tests Reports LEED Compliance Warranty

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REFERENCED INSTALLATIONS

Identify at least **three** similar local projects on which proposed substitution was used:

PROJECT #1:

Project: _____ Date Installed: _____

Address: _____

Owner: _____

Contact: _____ Telephone: _____

Architect: _____

Contact: _____ Telephone: _____

Contractor: _____

Contact: _____ Telephone: _____

PROJECT #2:

Project: _____ Date Installed: _____

Address: _____

Owner: _____

Contact: _____ Telephone: _____

Architect: _____

Contact: _____ Telephone: _____

Contractor: _____

Contact: _____ Telephone: _____

PROJECT #3:

Project: _____ Date Installed: _____

Address: _____

Owner: _____

Contact: _____ Telephone: _____

Architect: _____

Contact: _____ Telephone: _____

Contractor: _____

Contact: _____ Telephone: _____

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 20222021
State ID #: 22-24500-02B
28 October 2024

ACKNOWLEDGEMENTS: The undersigned certify that:

- **Performance:** Proposed substitution has been fully investigated and determined to be equal or superior in all respects to the specified product, including appearance, quality, performance, code compliance, and sustainability compliance.
- **Warranty:** Same warranty will be furnished for proposed substitution as for specified product.
- **Operations and Maintenance:** Same maintenance service and source of replacement parts, as applicable, are available locally for the proposed substitution.
- **No Adverse Effect:** Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- **No Adverse Time or Cost:** Cost data and time as stated above are complete. Contractor bears all costs for labor and materials associated with fully integrating proposed substitution into the Project. Claims for additional costs or time related to accepted substitution which may subsequently become apparent are waived.
 - Payment will be made to the Owner for changes to the project design, including Architect's and Engineer's redesign fees and engineering, detailing, special inspection, and construction costs incurred by the Owner caused by acceptance of the substitution.
 - Coordination necessary to fully integrate the proposed substitution, and any associated modifications to related or adjacent Work, have been or will be performed.
- **Dimensions and Clearances:** Proposed substitution does not affect dimensions or functional clearances.
- **Conditions of Acceptance:** The Architect's recommendation for approval, if granted, relies on data submitted and the opinion and knowledge of the Architect at the time decision is rendered. The approval is conditional in nature and subject to reevaluation and reconsideration if additional data or materials are submitted, or coordination with other work is observed to invalidate claims that substitution is equal to item originally specified.

Contractor: _____
(Name of Contractor)

Date: _____ By: _____

Subcontractor: _____
(Name of Subcontractor)

Date: _____ By: _____

Note: *Substitution requests are not part of the standard submittal process and shall not be submitted as part of Shop Drawings, Product Data, or Samples submittals. Substitution requests must be filled out completely. Unresponsive or incomplete requests will be rejected and returned without review.*

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ARCHITECT'S REVIEW AND ACTION

- Substitution acceptance is recommended.
- Substitution acceptance is recommended, with the following comments: _____

- Architect's additional services proposal attached.
- Resubmit Substitution Request:
 - Provide the following: _____
 - Provide proposal indicating amount of savings / credit to Owner.
- Substitution acceptance is not recommended:
 - Substitution Request received too late.
 - Substitution Request received directly from subcontractor or supplier.
 - Substitution Request not submitted in accordance with requirements.
 - Substitution Request Form is not properly executed.
 - Substitution Request does not indicate what item is being proposed.
 - Insufficient information submitted to facilitate proper evaluation.
 - Proposed product does not appear to comply with specified requirements.
 - Design Team has no experience with product / manufacturer and is therefore unable to comment on the track record of quality, performance, or reliability.
 - Proposed product will require substantial revisions to Contract Documents.

PERKINS&WILL

Perkins&Will acknowledges its reliance upon information provided by the Contractor, and makes no claim as to the accuracy, completeness, or validity of such information. If an accepted substitution is later found to not comply with requirements of the Contract Documents, the Contractor shall be solely responsible for performance of the work in accordance with requirements of the Contract Documents.

By: _____ Date: _____

END OF FORM

GENERAL CONDITIONS OF THE CONTRACT

STANDARD FORM FOR CONSTRUCTION MANAGER-AT-RISK PROJECTS

NORTH CAROLINA

DEPARTMENT OF ADMINISTRATION

STATE CONSTRUCTION OFFICE

Form OC-15CM

This document is intended for use on State capital construction projects and shall not be used on any project that is not reviewed and approved by the State Construction Office. Extensive modification to the General Conditions by means of “Supplementary General Conditions” is strongly discouraged. State agencies and institutions may include special requirements in “Division 1 – General Requirements” of the specifications, where they do not conflict with the General Conditions.

Second Edition January 2013

Revision 1 – May 2024: Article 23.b

GENERAL CONDITIONS OF THE CONTRACT

The use or reproduction of this document or any part thereof is authorized for and limited to use on projects of the State of North Carolina, and is distributed by, through and at the discretion of the State Construction Office, Raleigh, North Carolina, for that distinct and sole purpose.

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ARTICLE 1 - DEFINITIONS

- a. The **contract documents** consist of the Request for Proposal (RFP); Construction Manager's formal response to the RFP; General Conditions of the Contract; special conditions if applicable; Supplementary General Conditions; the drawing and specifications, including all bulletins, addenda or other modifications of the drawings and specifications incorporated into the documents prior to their execution; the contract; the performance bond; the payment bond; insurance certificates; the approval of the attorney general; and the certificate of the Office of State Budget and Management. All of these items together form the contract.
- b. The **Owner** is the State of North Carolina by and through the agency or institution named in the contract..
- c. The **designer** or **project designer** means the firm or firms of architects or engineers or both (and their consultants) which have undertaken to design the project pursuant to a contract with the Owner, (hereinafter, the "design contract").
- d. The **Construction Manager-at-Risk (CM) accepts a relationship of trust and confidence between himself and the Owner and undertakes to act as the Owner's fiduciary in the handling and opening of bids in accordance with the provisions of North Carolina General Statute (N.C.G.S.) 143-128.1**. The CM agrees to furnish his best skills and his best judgment to cooperate with the Owner and Designer for undertaking all necessary action contemplated under the contract documents to (a) establish during the design phase a Guaranteed Maximum Price (GMP) to construct the project and (b) ensure timely and quality completion of the project at a cost within the GMP. Construction Manager or CM as used in the contract documents means Construction Manager-at-Risk (CM at Risk).
- e. A **subcontractor**, as the term is used herein, shall be in the case of a principal trade contractor, a general, mechanical, electrical or plumbing contractor or in the case of a specialty contractor, a trade contractor who is not a principal trade contractor, who has entered into a direct contract with a CM, and includes one who furnishes materials worked to a special design in accordance with plans and specifications covered by the contract, but does not include one who only sells or furnishes materials not requiring work so described or detailed.
- f. **Written notice** shall be defined as notice in writing delivered in person to the contractor, or to a partner of the firm in the case of a partnership, or to a member of the contracting organization, or to an officer of the organization in the case of a corporation, or sent to the last known business address of the contracting organization by registered mail.
- g. **Work**, as used herein as a noun, is intended to include materials, labor, and workmanship of the appropriate contractor as supervised by the CM.
- h. The **project** is the total construction work to be performed under the contract documents.
- i. **Construction Management Fee** shall be an all inclusive lump sum management fee which will include all Construction Manager-at-Risk home office, project site and project related costs including all Construction Manager-at-Risk overhead costs and profit.
- j. **Change order**, as used herein, shall mean a written order to the CM subsequent to the signing of the contract authorizing a change in the GMP contract. The change order shall be signed by the CM, designer and the Owner, and approved by the State Construction Office, in that order (Article 19).

- k. **Field Order**, as used herein, shall mean a written approval for the CM to proceed with the work requested by Owner prior to issuance of a formal Change Order. The field order shall be signed by the CM, designer, Owner, and State Construction Office (SCO).
- l. **Field Change**, as used herein shall mean a written approval from the Owner for the CM to proceed with work requested by the Owner to be paid for from the CM Contingency or Owner's Project Reserve within the GMP.
- m. **Time of Completion**, as stated in the contract documents, is to be interpreted as consecutive calendar days measured from the date established in the written Notice to Proceed, or such other date as may be established herein (Article 23).
- n. **Liquidated damages**, as stated in the contract documents, is an amount reasonably estimated in advance to cover the consequential damages associated with the Owner's economic loss in not being able to use the Project for its intended purposes at the end of the contract's completion date as amended by change order, if any, by reason of failure of the CM to complete the work within the time specified. Liquidated damages does not include the Owner's extended contract administration costs (including but not limited to additional fees for architectural and engineering services, testing services, inspection services, commissioning services, etc.), such other damages directly resulting from delays caused solely by the CM, or consequential damages that the Owner identified in the bid documents that may be impacted by any delay caused solely by the CM (e.g., if a multi-phased project-subsequent phases, delays in start of other projects that are dependent on the completion of this Project, extension of leases and/or maintenance agreements for other facilities).
- o. **Surety**, as used herein, shall mean the bonding company or corporate body which is bound with and for the CM, and which engages to be responsible for the CM and his acceptable performance of the work.
- p. **Routine written communications between the Designer and the Construction Manager** are any communication other than a "request for information" provided in letter, memo, or transmittal format, sent by mail, courier, electronic mail, or facsimile. Such communications cannot be identified as "request for information".
- q. **Clarification or Request for information (RFI)** is a request from the CM seeking an interpretation or clarification by the Designer relative to the contract documents. The RFI, which shall be labeled (RFI), shall clearly and concisely set forth the issue or item requiring clarification or interpretation and why the response is needed. The RFI must set forth the CM's interpretation or understanding of the contract documents requirements in question, along with reasons for such an understanding.
- r. **Approval** means written or imprinted acknowledgement that materials, equipment or methods of construction are acceptable for use in the work.
- s. **Inspection** shall mean examination or observation of work completed or in progress to determine its compliance with contract documents.
- t. **"Equal to" or "approved equal"** shall mean materials, products, equipment, assemblies, or installation methods considered equal by the bidder in all characteristics (physical, functional, and aesthetic) to those specified in the contract documents. Acceptance of equal is subject to approval of the designer and owner.

- u. **“Substitution” or “substitute”** shall mean materials, products, equipment, assemblies, or installation methods deviating in at least one characteristic (physical, functional, or aesthetic) from those specified, but which in the opinion of the bidder would improve competition and/or enhance the finished installation. Acceptance of substitution is subject to the approval of the designer and owner.
- v. **Provide** shall mean furnish and install complete in place, new, clean, operational, and ready for use.
- w. **Indicated and shown** shall mean provide as detailed, or called for, and reasonably implied in the contract documents.
- x. **Special inspector** is one who inspects materials, installation, fabrication, erection or placement of components and connections requiring special expertise to ensure compliance with the approved construction documents and referenced standards.
- y. **Commissioning** is a quality assurance process that verifies and documents that building components and systems operate in accordance to the owner’s project requirements and the project design documents.
- z. **Designer Final Inspection** is the inspection performed by the design team to determine the completeness of the project in accordance with approved plans and specifications. This inspection occurs prior to SCO final inspection.
- aa. **SCO Final Inspection** is the inspection performed by the State Construction Office to determine the completeness of the project in accordance with NC Building Codes and approved plans and specifications.
- bb. **Beneficial Occupancy** is requested by the owner and is occupancy or partial occupancy of the building after all life safety items have been completed as determined by the State Construction Office. Life safety items include but not limited to fire alarm, sprinkler, egress and exit lighting, fire rated walls, egress paths and security.
- cc. **Final Acceptance** is the date in which the State Construction Office accepts the construction as totally complete. This includes the SCO Final Inspection and certification by the designer that all punch lists are completed.

ARTICLE 2 - INTENT AND EXECUTION OF DOCUMENTS

- a. The drawings and specifications are complementary, one to the other. That which is shown on the drawings or called for in the specifications shall be as binding as if it were both called for and shown. The intent of the drawings and specifications is to establish the scope of all labor, materials, transportation, equipment, and any and all other things necessary to provide a complete job. In case of discrepancy or disagreement in the contract documents, the order of precedence shall be: Form of Contract, specifications, large-scale detail drawings, small-scale drawings.
- b. The wording of the specifications shall be interpreted in accordance with common usage of the language except that words having a commonly used technical or trade meaning shall be so interpreted in preference to other meanings.

- c. The CM shall execute each copy of the response to RFP, contract, performance bond and payment bond as follows:
 1. If the documents are executed by a sole Owner, that fact shall be evidenced by the word "Owner" appearing after the name of the person executing them.
 2. If the documents are executed by a partnership, that fact shall be evidenced by the word "Co-Partner" appearing after the name of the partner executing them.
 3. If the documents are executed on the part of a corporation, they shall be executed by either the president or the vice president and attested by the secretary or assistant secretary in either case, and the title of the office of such persons shall appear after their signatures. The seal of the corporation shall be impressed on each signature page of the documents.
 4. If the documents are made by a joint venture, they shall be executed by each member of the joint venture in the above form for sole Owner, partnership or corporation, whichever form is applicable to each particular member.
 5. All signatures shall be properly witnessed.
 6. If the construction manager's license is held by a person other than an Owner, partner or officer of a firm, then the licensee shall also sign and be a party to the contract. The title "Licensee" shall appear under his/her signature.
 7. The bonds shall be executed by an attorney-in-fact. There shall be attached to each copy of the bond a certified copy of power of attorney properly executed and dated.
 8. Each copy of the bonds shall be countersigned by an authorized individual agent of the bonding company licensed to do business in North Carolina. The title "Licensed Resident Agent" shall appear after the signature.
 9. The seal of the bonding company shall be impressed on each signature page of the bonds.
 10. The CM's signature on the performance bond and the payment bond shall correspond with that on the contract.

ARTICLE 3 - CLARIFICATIONS AND DETAIL DRAWINGS

- a. In such cases where the nature of the work requires clarification by the designer, such clarification shall be furnished by the designer with reasonable promptness by means of written instructions or detail drawings, or both. Clarifications and drawings shall be consistent with the intent of contract documents, and shall become a part thereof.
- b. The CM and the Designer shall prepare, if deemed necessary, a schedule fixing dates upon which foreseeable clarifications will be required. The schedule will be subject to addition or change in accordance with progress of the work. The Designer shall furnish drawings or clarifications in accordance with that schedule. The CM shall not proceed with the work without such detail drawings and/or written clarifications.

ARTICLE 4 - COPIES OF DRAWINGS AND SPECIFICATIONS

The Designer or owner shall furnish free of charge to the CM electronic copies of plans and specifications. If requested by the CM, up to 30 paper copies of plans and specifications will be

provide free of charge,, plus a clean set of black line prints on white paper of all appropriate drawings, upon which the CM shall clearly and legibly record all work-in-place that is at variance with the contract documents. Additional sets shall be furnished at cost, including mailing, to the CM at the request of the CM.

ARTICLE 5 - SHOP DRAWINGS, SUBMITTALS, SAMPLES, DATA

- a. Within fifteen (15) consecutive calendar days of the notice to proceed, a schedule for anticipated submission of all shop drawings, product data, samples, and similar submittals shall be prepared by the CM and provided to the designer. This schedule shall indicate the items, relevant specification sections, other related submittal data, and the date when these items will be furnished to the designer.
- b. The CM shall review, approve and submit to the Designer all Shop Drawings, Coordination Drawings, Product Data, Samples, Color Charts, and similar submittal data required or reasonably implied by the Contract Documents. Required Submittals shall bear the CM's stamp of approval, any exceptions to the Contract Documents shall be noted on the submittals, and copies of all submittals shall be of sufficient quantity for the Designer to retain up to three (3) copies of each submittal for his own use plus additional copies as may be required by the CM. Submittals shall be presented to the Designer in accordance with the schedule submitted in paragraph (a). so as to cause no delay in the activities of the Owner.
- c. The Designer shall review required submittals promptly, noting desired corrections if any, and retaining three (3) copies (1 for the Designer, 1 for the owner and 1 for SCO) for his use. The remaining copies of each submittal shall be returned to the CM not later than twenty (20) days from the date of receipt by the Designer, for the CM's use or for corrections and resubmittal as noted by the Designer. When resubmittals are required, the submittal procedure shall be the same as for the original submittals.
- d. Approval of shop drawings by the designer shall not be construed as relieving the CM from responsibility for compliance with the design or terms of the contract documents nor from responsibility of errors of any sort in the shop drawings, unless such error has been called to the attention of the designer in writing by the CM.

ARTICLE 6 - WORKING DRAWINGS AND SPECIFICATIONS AT THE JOB SITE

- a. The CM shall maintain, in readable condition at his job office, one complete set of working drawings and specifications for his work including all shop drawings. Such drawings and specifications shall be available for use by the Designer or his authorized representative, owner or State Construction Office.
- b. The CM shall maintain at the job office, a day-to-day record of work-in-place that is at variance with the contract documents. Such variations shall be fully noted on project drawings by the CM and submitted to the designer upon project completion and no later than thirty (30) days after acceptance of the project.
- c. The contractor shall maintain at the job office a record of all required tests that have been performed, clearly indicating the scope of work inspected and the date of approval or rejection.

ARTICLE 7 - OWNERSHIP OF DRAWINGS AND SPECIFICATIONS

All drawings and specifications are instruments of service and remain the property of the Owner. The use of these instruments on work other than this contract without permission of the Owner is prohibited. All copies of drawings and specifications other than contract copies shall be returned to the Owner upon request after completion of the work.

ARTICLE 8 - MATERIALS, EQUIPMENT, EMPLOYEES

- a. The CM shall, unless otherwise specified, supply & pay for all lighting, power, heat, sanitary facilities & water and shall require the Principal Trade and Specialty Contractors to, supply and pay for all labor, transportation, materials, tools, apparatus, scaffolding and incidentals necessary for the completion of his work, and to install, maintain and remove all equipment of the construction, other utensils or things, and be responsible for the safe, proper and lawful construction, maintenance and use of same. The CM shall construct in the best and most workmanlike manner, a complete job and everything incidental thereto, as shown on the plans, stated in the specifications, or reasonably implied there from, all in accordance with the contract documents.
- b. All materials shall be new and of quality specified, except where reclaimed material is authorized herein and approved for use. Workmanship shall at all times be of a grade accepted as the best practice of the particular trade involved, and as stipulated in written standards of recognized organizations or institutes of the respective trades except as exceeded or qualified by the specifications.
- c. Upon notice, the CM shall furnish evidence from the the Principal Trade and Specialty Contractors as to quality of materials.
- d. Products are generally specified by ASTM or other reference standard and/or by manufacturer's name and model number or trade name. When specified only by reference standard, the CM through the Principal Trade or Specialty Contractor may select any product meeting this standard, by any manufacturer. When several products or manufacturers are specified as being equally acceptable, the CM through the Principal Trade or Specialty Contractor has the option of using any product and manufacturer combination listed. However, the CM through the Principal Trade or Specialty Contractor shall be aware that the cited examples are used only to denote the quality standard of product desired and that they do not restrict bidders to a specific brand, make, manufacturer or specific name; that they are used only to set forth and convey to bidders the general style, type, character and quality of product desired; and that equivalent products will be acceptable. The CM shall be responsible for reviewing all substitution requests from Principal Trade or Specialty Contractors prior to submission to the Project Designer and Owner and shall track & monitor all such requests. Requests for substitution of materials, items, or equipment shall be submitted to the Project Designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Alternate materials may be requested after award if it can clearly be demonstrated that it is an added benefit to the owner and the designer and the owner approves.
- e. The CM shall obtain written approval from the designer for the use of products, materials, equipment, assemblies or installation methods claimed as equal to those specified. Such approvals must be obtained as soon after contract awards as possible and before any materials are ordered.

- f. The Designer is the judge of equality for proposed substitution of products, materials or equipment.
- g. If at any time during the construction and completion of the work covered by these contract documents, the conduct of any workman of the various crafts be adjudged a nuisance to the Owner or Designer, or if any workman be considered detrimental to the work, the CM shall order such parties removed immediately from grounds.

ARTICLE 9 - ROYALTIES, LICENSES AND PATENTS

It is the intention of the contract documents that the work covered herein will not constitute in any way infringement of any patent whatsoever unless the fact of such patent is clearly evidenced herein. The CM shall protect and save harmless the Owner against suit on account of alleged or actual infringement. The CM shall pay all royalties and/or license fees required on account of patented articles or processes, whether the patent rights are evidenced hereinafter.

ARTICLE 10 - PERMITS, INSPECTIONS, FEES, REGULATIONS

- a. The CM shall give all notices and comply with all laws, ordinances, codes, rules and regulations bearing on the conduct of the work under this contract. If the CM observes that the drawings and specifications are at variance therewith, he shall promptly notify the Designer in writing. Any necessary changes required after contract award shall be made by change order in accordance with Article 19. If the CM performs any work or authorizes any work to be performed knowing it to be contrary to such laws, ordinances, codes, rules and regulations, and without such notice to the designer, he shall bear all cost arising there from. Additional requirements implemented after bidding will be subject to equitable negotiations.
- b. All work under this contract shall conform to the North Carolina State Building Code and other State, local and national codes as are applicable. The cost of all required inspections and permits shall be the responsibility of the CM unless otherwise specified.
- c. Projects constructed by the State of North Carolina or by any agency or institution of the State are not subject to inspection by any county or municipal authorities and are not subject to county or municipal building codes. The CM shall, however, cooperate with the county or municipal authorities by obtaining building permits. Permits shall be obtained at no cost.
- d. Projects involving local funding (Community Colleges) are also subject to county and municipal building codes and inspection by local authorities. The CM shall pay the cost of these permits and inspections unless otherwise specified.

ARTICLE 11 - PROTECTION OF WORK, PROPERTY AND THE PUBLIC

- a. The CM shall be responsible for the entire site and the building or construction of the same and provide all the necessary protections, as required by the Owner or designer, and by laws or ordinances governing such conditions. The CM shall be responsible for any damage to the Owner's property or of that of others on the job, by them, their personnel, or their subcontractors, and shall make good such damages. The CM shall be responsible for and pay for any damages caused to the Owner. The CM shall have access to the project at all times.

- b. The CM shall be responsible to cover and protect all portions of the structure when the work is not in progress, provide and set all temporary roofs, covers for doorways, sash and windows, and all other materials necessary to protect all the work on the building. Any work damaged through the lack of proper protection or from any other cause, shall be repaired or replaced without extra cost to the Owner.
- c. No fires of any kind will be allowed inside or around the operations during the course of construction without special permission from the Designer.
- d. The CM shall ensure that all trees and shrubs designated to remain in the vicinity of the construction operations are protected in accordance with the requirements of the plans and specifications. All walks, roads, etc., shall be barricaded as directed by the designer to keep the public away from the construction. All trenches, excavations or other hazards in the vicinity of the work shall be well barricaded and properly lighted at night.
- e. The CM shall develop and implement a project safety plan that provides all necessary safety measures for the protection of all persons on the job, including the requirements of the A.G.C. *Accident Prevention Manual in Construction*, as amended, and shall fully comply with all state laws or regulations and North Carolina State Building Code requirements to prevent accident or injury to persons on or about the location of the work. The CM shall clearly mark or post signs warning of hazards existing, and shall barricade excavations, elevator shafts, stairwells and similar hazards. The CM shall insure that protection is provided against damage or injury resulting from falling materials and that all protective devices and signs be maintained throughout the progress of the work.
- f. The CM shall adhere to the rules, regulations and interpretations of the North Carolina Department of Labor relating to Occupational Safety and Health Standards for the Construction Industry (Title 29, Code of Federal Regulations, Part 1926, published in Volume 39, Number 122, Part II, June 24, 1974, *Federal Register*), and revisions thereto as adopted by N.C.G.S. 95-126 through 155.
- g. The CM shall designate a responsible person of his organization as safety officer/inspector to inspect the project site for unsafe health and safety hazards, to report these hazards to the contractor for correction, and whose duties also include accident prevention on the project, and to provide other safety and health measures on the project site as required by the terms and conditions of the contract. The name of the safety inspector shall be made known to the designer and owner at the time of the preconstruction conference and in all cases prior to any work starting on the project.
- h. In the event of an emergency affecting the safety of life, the protection of work, or the safety of adjoining properties, the CM is hereby authorized to act at his own discretion, without further authorization from anyone, to prevent such threatened injury or damage. Any compensation claimed by the CM on account of such action shall be determined as provided for under Article 19(b).
- i. Any and all costs associated with correcting damage caused to adjacent properties of the construction site or staging area shall be borne by the contractor. These costs shall include but not be limited to flooding, mud, sand, stone, debris, and discharging of waste products.

ARTICLE 12 - SEDIMENTATION POLLUTION CONTROL ACT OF 1973

- a. Any land-disturbing activity performed by the CM or any Principal Trade or Specialty Contractor in connection with the project shall comply with all erosion control measures set

forth in the contract documents and any additional measures which may be required in order to ensure that the project is in full compliance with the Sedimentation Pollution Control Act of 1973, as implemented by Title 15, North Carolina Administrative Code, Chapter 4, Sedimentation Control, Subchapters 4A, 4B and 4C, as amended (15 N.C.A.C. 4A, 4B and 4C).

- b. Upon receipt of notice that a land-disturbing activity is in violation of said act, the CM shall be responsible for ensuring that all steps or actions necessary to bring the project in compliance with said act are promptly taken.
- c. The CM shall be responsible for defending any legal actions instituted pursuant to N.C.G.S. 113A-64 against any party or persons described in this article.
- d. To the fullest extent permitted by law, the CM shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, civil penalties, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance of work or failure of performance of work, provided that any such claim, damage, civil penalty, loss or expense is attributable to a violation of the Sedimentation Pollution Control Act. Such obligation shall not be construed to negate, abridge or otherwise reduced any other right or obligation of indemnity which would otherwise exist as to any party or persons described in this article.

ARTICLE 13 - INSPECTION OF THE WORK

- a. It is a condition of this contract that the work shall be subject to inspection during normal working hours by the designer, designated official representatives of the Owner, State Construction Office and those persons required by state law to test special work for official approval. The CM shall therefore provide safe access to the work at all times for such inspections.
- b. All instructions to the CM will be made only by or through the designer or his designated project representative. Observations made by official representatives of the Owner shall be conveyed to the designer for review and coordination prior to issuance to the CM.
- c. The CM shall perform quality control inspections on the work of Principal Trade and Specialty Contractors to guard the Owner against defects and deficiencies in the work and shall coordinate this activity with the on-site duties of the Project Designer. The CM shall advise the Project Designer of any apparent variation and/or deviation from the intent of the Contract Documents and shall take the necessary action to correct such variations and deviations.
- d. All work shall be inspected by designer, special inspector and/or State Construction Office prior to being covered by the contractor. The CM shall give a minimum two weeks notice unless otherwise agreed to by all parties. If inspection fails, after the first re-inspection all costs associated with additional re-inspections shall be borne by the CM.
- e. Where special inspection or testing is required by virtue of any state laws, instructions of the designer, specifications or codes, the CM shall give adequate notice to the Project Designer of the time set for such inspection or test, if the inspection or test will be conducted by a party other than the Project Designer. Such special tests or inspections will be made in the presence of the Project Designer, or his authorized representative, and it shall be the CM's responsibility to serve ample notice of such tests.

- f. All laboratory tests shall be paid by the Owner unless provided otherwise in the contract documents except the CM shall pay for laboratory tests to establish design mix for concrete and for additional tests to prove compliance with contract documents where materials have tested deficient except when the testing laboratory did not follow the appropriate ASTM testing procedures.
- g. Should any work be covered up or concealed prior to inspection and approval by the Project Designer and/or (SCO) such work shall be uncovered or exposed for inspection, if so requested by the Project Designer or SCO in writing. Inspection of the work will be made promptly upon notice from the CM. All cost involved in uncovering, repairing, replacing, recovering and restoring to design condition, the work that has been covered or concealed will be paid by the CM.

ARTICLE 14 - CONSTRUCTION SUPERVISION AND SCHEDULE

- a. On-site representatives of the CM shall manage the work of the Principal Trade and Specialty Contractors and coordinate the work with the activities of the Owner and Project Designer to complete the project with the Owner's objectives of cost, time and quality. Throughout the progress of the work, the CM shall maintain a competent and adequate full-time staff approved by the Owner and Project Designer. It is understood that the designated and approved on-site representative of the CM will remain on the job and in responsible charge as long as those persons remain employed by the CM unless otherwise requested or agreed to by the Owner. The CM shall establish an on-site organization with appropriate lines of authority to act on behalf of the CM. Instructions, directions or notices given to the designated on-site authority shall be as binding as if given to the CM. However, directions, instructions, and notices shall be confirmed in writing.
- b. The CM shall examine and study the drawings and specifications and fully understand the project design, and shall provide constant and efficient supervision to the work. Should he discover any discrepancies of any sort in the drawings or specifications, he shall report them to the designer without delay. He will not be held responsible for discrepancies in the drawings and/or specifications, but shall be held responsible to report them should they become known to him.
- c. The CM shall call and preside over monthly job site progress conferences. All Principal Trade and Specialty Contractors shall be represented at these job progress conferences by both home office and project personnel. The CM shall require attendance from other subcontractors and material suppliers 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 of the project on schedule and to complete the project within the specified contract time. The CM shall be prepared to assess progress of the work and to recommend remedial measures for correction of progress as may be appropriate. The CM with assistance from the Designer shall be the coordinator of the conferences and shall preside as chairman. The CM shall turn over a copy of his daily reports to the Designer and Owner at the job site progress conference. Owner will determine daily report format.
- d. The CM shall employ an engineer or a land surveyor licensed in the State of North Carolina to lay out the work and to establish a bench mark nearby in a location where same will not be disturbed and where direct instruments sights may be taken.

- e. Prior to bidding, it shall be the responsibility of the CM to prepare an electronic and paper copy of a preliminary critical path method (CPM) schedule and submit such schedule to the Project Designer for his review and comment in sufficient time to allow revisions prior to inserting said schedule into the Principal Trade and Specialty Contractors' bid packages. After contract award but prior to thirty (30) days from the date of the notice to proceed, the CM shall obtain from the Principal Trade and Specialty Contractors their respective work activities and integrate them into a project construction schedule in CPM form. The resulting CPM schedule shall show all salient features of the work required for construction of the project from start to finish within the time allotted by the contract. The time in days between the CM's early completion date and the contractual completion date is project float time and shall be used as such by the CM unless amended by change order. The CM shall submit to the Project Designer an electronic and paper copy of the final CPM schedule after contracts are executed but within fifteen (15) days prior to the written notice to proceed. The Project Designer after reviewing and commenting on the project CPM schedule shall submit it to the Owner for approval. No application for payment will be processed until the project CPM schedule is approved by the Owner. No monthly application for payment will be processed without the submission of an electronic and paper copy of the CPM schedule attached.
- f. The CPM schedule shall be a complete computer generated network analysis showing the complete sequence of construction activities, identifying the work of separate stages and other logically grouped activities, indicating early and late start and early and late finish dates, float duration and a complete logic. Monthly updates will show the estimated completion of each activity.
- g. The CM shall distribute to the principal trade and specialty contractors the approved project CPM schedule and shall display same at the job site.
- h. The CM shall maintain the project CPM schedule, making monthly adjustments, updates, corrections, etc., which are necessary to finish the project within the time allotted by the contract. In doing so, the CM shall keep the designer as well as all Principal Trade and Specialty Contractors fully informed as to all changes and updates to the schedule. The CM shall submit to the Project Designer a monthly report of the status of all work activities. The monthly status report shall show the actual work completed to date in comparison with the original amount of work scheduled. If the work is behind schedule, the CM must indicate in writing what measures are being taken to bring the work back on schedule and ensure that the contract completion date is not exceeded. If the work is greater than thirty (30) days behind schedule and no legitimate requests for time extensions are in process, then the CM shall prepare and submit to the Project Designer a recovery schedule for review and approval. Failure of the CM to abide by the directives in this paragraph will give the Owner cause to exercise the remedies set forth in Article 29 of the General Conditions and pursue any other legal remedies allowed it by law.

ARTICLE 15 – {NOT USED}

ARTICLE 16 - PRINCIPAL TRADE AND SPECIALTY CONTRACTS AND CONTRACTORS

- a. Principal Trade and Specialty Contractors shall be pre-qualified by the CM. The prequalification criteria shall be determined by the Owner and CM to address quality, performance, the time specified in the bids for performance of the contract, the cost of construction oversight, time for completion, capacity to perform, and any other factors deemed appropriate by the Owner and/or CM. Basic qualification information from Principal Trade and Specialty Contractors shall be requested on the standard State of North Carolina

Prequalification Form approved by the State Building Commission. Only pre-qualified contractors are allowed to bid to and contract with the CM on a project.

- b. All bids for Principal Trade and Specialty Contracts shall be publically advertised and shall be opened publically in a public venue, and once opened, shall be public records under N.C.G.S. 132. The CM shall award the contract to the lowest responsible, responsive bidder, taking into consideration quality, performance, the time specified in the bids for performance of the contract, the time for completion, compliance with N.C.G.S. 143-128.2, and other factors deemed appropriate by the Owner and advertised as part of the bid solicitation. When contracts are awarded pursuant to this section, the Owner shall provide for a dispute resolution procedure as provided by N.C.G.S. 143-128(f1). Once Principal Trade and Specialty Contractors are in place, the CM shall provide copies of the contracts to the Project Designer and also provide a list of equipment and material suppliers.
- c. A CM may perform a portion of the work only if (a) bidding produces no responsible, responsive bidder for that portion of the work, or (b) the lowest responsible, responsive bidder will not execute a contract for the bid portion of the work, or the Principal Trade or Specialty Contractor defaults and a prequalified replacement cannot be obtained in a timely manner, and (c) the Owner approves performance of the work by the CM.
- d. The Designer will furnish to any Principal Trade or Specialty Contractor, upon request, evidence regarding amounts of money paid to the CM on account of the work of the Principal Trade or Specialty Contractor.
- e. The CM is and remains fully responsible for his own acts or omissions as well as those of any Principal Trade or Specialty Contractor or of any employee of either. The CM agrees that no contractual relationship exists between the Principal Trade and Specialty Contractors and the Owner in regard to the contract, and that the Principal Trade and Specialty Contractors act on this work as an agent or employee of the CM.

ARTICLE 17 - CONSTRUCTION MANAGER AND SUBCONTRACTOR RELATIONSHIPS

The CM agrees that the terms of these contract documents shall apply equally to each Principal Trade and Specialty Contractor as to the CM, and the CM agrees to take such action as may be necessary to bind each Principal Trade and Specialty Contractor to these terms. The CM further agrees to conform to the Code of Ethical Conduct as adopted by the Associated General Contractors of America, Inc., with respect to CM-subcontractor relationships, and that payments to Principal Trade and Specialty Contractors shall be made in accordance with the provisions of N.C.G.S. 143-134.1 titled "Interest on final payments due to prime contractors: payments to subcontractors".

- a. On all public construction contracts which are let by a board or governing body of the state government or any political subdivision thereof, except contracts let by the Department of Transportation pursuant to N.C. G.S. 136-28.1, the balance due the CM shall be paid in full within 45 days after respective prime contracts of the project have been accepted by the Owner, certified by the architect, engineer or designer to be completed in accordance with terms of the plans and specifications, or occupied by the Owner and used for the purpose for which the project was constructed, whichever occurs first. Provided, however, that whenever the architect or consulting engineer in charge of the project determines that delay in completion of the project in accordance with terms of the plans and specifications is the fault of the CM, the project may be occupied and used for the purposes for which it was constructed without payment of any interest on amounts withheld past the 45 day limit. Should final

payment to the CM beyond the date such contracts have been certified to be completed by the Project Designer, accepted by the Owner, or occupied by the Owner and used for the purposes for which the project was constructed, be delayed by more than 45 days, said CM shall be paid interest, beginning on the 46th day, at the rate of one percent (1%) per month or fraction thereof unless a lower rate is agreed upon on such unpaid balance as may be due. In addition to the above final payment provisions, periodic payments due the CM during construction shall be paid in accordance with the payment provisions of the contract documents or said CM shall be paid interest on any such unpaid amount at the rate stipulated above for delayed final payments. Such interest shall begin on the date the payment is due and continue until the date on which payment is made. Such due date may be established by the terms of the contract. Funds for payment of such interest on state-owned projects shall be obtained from the current budget of the owning department, institution or agency. Where a conditional acceptance of a contract exists, and where the Owner is retaining a reasonable sum pending correction of such conditions, interest on such reasonable sum shall not apply.

- b. Within seven days of receipt by the CM of each periodic or final payment, the CM shall pay the Principal Trade and Specialty Contractors based on work completed or service provided under their contract with the CM. Should any periodic or final payment to a Principal Trade or Specialty Contractor be delayed by more than seven days after receipt of periodic or final payment by the CM, the CM shall pay the Principal Trade or Specialty Contractor interest, beginning on the eighth day, at the rate of one percent (1%) per month or fraction thereof on such unpaid balance as may be due.
- c. The percentage of retainage on payments made by the CM to the Principal Trade and Specialty Contractors shall not exceed the percentage of retainage on payments made by the Owner to the CM. Any percentage of retainage on payments made by the CM to the Principal Trade or Specialty Contractors that exceeds the percentage of retainage on payments made by the Owner to the CM shall be subject to interest to be paid by the CM to the Principal Trade or Specialty Contractor at the rate of one percent (1%) per month or fraction thereof.
- d. Nothing in this section shall prevent the CM at the time of application and certification to the Owner from withholding application and certification to the Owner for payment to a Principal Trade or Specialty Contractor for unsatisfactory job progress; defective construction not remedied; disputed work; third-party claims filed or reasonable evidence that claim will be filed; failure of the Principal Trade or Specialty Contractor to make timely payments for labor, equipment and materials; damage to CM or another subcontractor; reasonable evidence that a Principal Trade or Specialty Contract cannot be completed for the unpaid balance of the subcontract sum; or a reasonable amount for retainage not to exceed the initial percentage retained by Owner.

ARTICLE 18 - DESIGNER'S STATUS

- a. The Project Designer shall provide liaison and necessary inspection of the work to ensure compliance with plans and specifications. He is the agent of the Owner only for the purpose of constructing this work and to the extent stipulated in the contract documents. He has authority to stop work or to order work removed, or to order corrections of faulty work where such action may be necessary to assure successful completion of the work.
- b. The Project Designer is the impartial interpreter of the contract documents, and, as such, he shall exercise his powers under the contract to enforce faithful performance by both the Owner and the CM, taking sides with neither.

- c. Should the Project Designer cease to be employed on the work for any reason whatsoever, then the Owner shall employ a competent replacement who shall assume the status of the former Project Designer.
- d. The Project Designer will make periodic inspections of the project at intervals appropriate to the stage of construction. He will inspect the progress, the quality and the quantity of the work.
- e. The Project Designer and the Owner shall have access to the work whenever it is in preparation and progress during normal working hours. The CM shall provide facilities for such access so the Designer may perform his functions under the contract documents.
- f. Based on the Project Designer's inspections and evaluations of the project, the Project Designer shall issue interpretations, directives and decisions as may be necessary to assist the CM in the administration of the project. His decisions relating to artistic effect and technical matters shall be final, provided such decisions are within the limitations of the contract. The CM's decisions, however, relating to means and methods, and administration of the contracts the CM holds are final.

ARTICLE 19 - CHANGES IN THE WORK

- a. The Owner may have changes made in the work covered by the contract. These changes will not invalidate and will not relieve or release the CM from any guarantee given by him pertinent to the contract provisions. These changes will not affect the validity of the guarantee bond and will not relieve the surety or sureties of said bond. All extra work shall be executed under conditions of the original contract.
- b. Except in an emergency endangering life or property, no change shall be made by the contractor except upon receipt of approved change order or written field order from the designer, countersigned by the owner and the state construction office authorizing such change. No claim for adjustments of the contract price shall be valid unless this procedure is followed.

A field order, transmitted by fax or hand-delivered, may be used where the change involved impacts the critical path of the work. A formal change order shall be issued as expeditiously as possible.

The CM may be requested to make a change to the work by the Project Designer and Owner where such work is to be funded by the CM Contingency or Project Reserve that is part of the GMP contract. Such a change must be documented in the same manner as a Change Order and must be authorized in writing by the Project Designer and Owner by a Field Change document.

In the event of emergency endangering life or property, the CM may be directed to proceed on a time and material basis whereupon the CM shall proceed and keep accurately on such form as may be required, a correct account of costs together with all proper invoices, payrolls and supporting data. Upon completion of the work the change order will be prepared as outlined under either Method "c(1)" or Method "c(2)" or both.

- c. In determining the values of changes, either additive or deductive, the CM and Principal Trade and Specialty Contractors are restricted to the use of the following methods:
 - 1. Where the extra work involved is covered by unit prices quoted in the proposal, the value of the change shall be computed by application of unit prices based on quantities,

estimated or actual as agreed of the items involved, except in such cases where a quantity exceeds the estimated quantity allowance in the contract by one hundred percent (100%) or more. In such cases, either party may elect to proceed under subparagraph c2 herein. If neither party elects to proceed under c2, then unit prices shall apply.

2. The contracting parties shall negotiate and agree upon the equitable value of the change prior to issuance of the change order, and the change order shall stipulate the corresponding lump sum adjustment to the contract price.
- d. Under Paragraph "b" and Methods "c(2)" above, the allowances for overhead and profit combined for a Principal Trade or Specialty Contractor and all multi-tier subcontractors shall not exceed fifteen percent (15%) of **net cost** of the work. No allowance for overhead and profit will be allowed for the CM until the change orders aggregate to a sum in excess of five percent (5%) of the Cost of the Work portion of the GMP. Once this threshold is met the CM may add an overhead & profit allowance not to exceed four percent (4%) of the net cost of the change order. Change orders to the GMP which authorize additional phases of a project without a change in scope of the originally intended project will not be considered in establishing the threshold for additional CM overhead & profit. Under Method "c (1)", no additional allowances shall be made for overhead and profit. In the case of deductible change orders, under Method "c(2)" and Paragraph (b) above, the contractor shall include no less than five percent (5%) profit, but no allowances for overhead.
- e. The term "net cost" as used herein shall mean the difference between all proper cost additions and deductions. The "cost" as used herein shall be limited to the following:
 1. The actual costs of materials and supplies incorporated or consumed as part of the project;
 2. The actual costs of labor expended on the project site;
 3. The actual costs of labor burden, limited to the costs of social security (FICA) and Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
 4. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the project;
 5. The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the project.

Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the Owner.

- f. Should concealed conditions be encountered in the performance of the work below grade, or should concealed or unknown conditions in an existing structure be at variance with the conditions indicated by the contract documents, the contract sum and time for completion may be equitably adjusted by change order upon claim by either party made within thirty (30) days after the condition has been identified. The cost of such change shall be arrived at by one of the foregoing methods.

All change orders shall be supported by a breakdown showing method of arriving at net cost as defined above.

- g. In all change orders, the procedure will be for the Project Designer to request proposals for the change order work in writing. The CM will require the Principal Trade and Specialty Contractors to provide such proposals and supporting data in suitable format and will review and approve such change orders prior to submission to the designer. The Project Designer shall verify correctness. Within fourteen (14) days after receipt of the CM's proposal, the Project Designer shall prepare the change order and forward to the CM for his signature or otherwise respond, in writing, to the CM's proposal. Within seven (7) days after receipt of the change order executed by the CM, the Project Designer shall, certify the change order by his signature, and forward the change order and all supporting data to the Owner for the Owner's signature. The Owner shall execute the change order and forward to the State Construction Office for final approval, within seven (7) days of receipt. The State Construction Office shall act on the change order within seven (7) days. Upon approval by the State Construction Office, one copy remains with the State Construction Office, and the remaining copies are sent to the Project Designer for distribution to the Owner(s), CM and the surety. In case of emergency or extenuating circumstances, approval of changes may be obtained verbally by telephone or field orders approved by all parties, then shall be substantiated in writing as outlined under normal procedure.
- h. At the time of signing a change order, the CM shall be required to certify as follows:

"I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this change order, and that a copy of the approved change order will be mailed upon receipt by me to my surety."
- i. A change order, when issued, shall be full compensation, or credit, for the work included, omitted or substituted. It shall show on its face the adjustment in time for completion of the project as a result of the change in the work.
- j. If, during the progress of the work, the Owner requests a change order and the CM's terms are unacceptable, the Owner, with the approval of the State Construction Office, may require the CM to perform such work on a time and material basis in accordance with paragraph "b" above. Without prejudice, nothing in this paragraph shall preclude the Owner from performing or to have performed that portion of the work requested in the change order.

ARTICLE 20 - CLAIMS FOR EXTRA COST

- a. Should the CM consider that as a result of any instructions given in any form by the designer, he is entitled to extra cost above that stated in the contract, he shall give written notice thereof to the designer within seven (7) days without delay. The written notice shall clearly state that a claim for extra cost is being made and shall provide a detailed justification for the extra cost. The CM shall not proceed with the work affected until further advised, except in emergency involving the safety of life or property, which condition is covered in Article 19(b) and Article 11(h). No claims for extra compensation will be considered unless the claim is so made. The Designer shall render a written decision within seven (7) days of receipt of claim.
- b. The CM shall not act on instructions received by him from persons other than the Project Designer, and any claims for extra compensation or extension of time on account of such instruction will not be honored. The Project Designer will not be responsible for misunderstandings claimed by the CM of verbal instructions which have not been confirmed in writing, and in no case shall instructions be interpreted as permitting a departure from the

contract documents unless such instruction is confirmed in writing and supported by a properly authorized change order.

- c. Should a claim for extra compensation that complies with the requirements of (a) above by the CM be denied by the Project Designer or Owner, and cannot be resolved by a representative of the State Construction Office, the CM may request a mediation in connection with N.C.G.S. 143-128(f1) in the dispute resolution rules adopted by the State Building Commission (1 N.C.A.C. 30H .0101 through .1001). If the CM is unable to resolve its claims as a result of mediation, then the CM may pursue his claim in accordance with the provisions of N.C.G.S. 143-135.3, or G.S. 143-135.6 where Community Colleges are the owner, and the following:
1. A CM who has not completed a contract with a state agency or institution for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the CM claims is due. The Director may deny, allow or compromise the claim, in whole or in part. A claim under this subsection is not a contested case under N.C.G.S. Chapter 150B.
 2. (a) A CM who has completed a contract with a State agency or institution for construction or repair work and who has not received the amount he claims is due under the contract may submit a verified written claim to the Director of the State Construction Office of the Department of Administration for the amount the CM claims is due. The claim shall be submitted within sixty (60) days after the CM receives a final statement of the board's disposition of his claim and shall state the factual basis for the claim.
 - (b) The Director shall investigate a submitted claim within ninety (90) days of receiving the claim, or within any longer time period upon which the Director and the CM agree. The CM may appear before the Director, either in person or through counsel, to present facts and arguments in support of his claim. The Director may allow, deny or compromise the claim, in whole or in part. The Director shall give the CM a written statement of the Director's decision on the CM's claim.
 - (c) A CM who is dissatisfied with the Director's decision on a claim submitted under this subsection may commence a contested case on the claim under Chapter 150B of the General Statutes. The contested case shall be commenced within sixty (60) days of receiving the Director's written statement of the decision.
 - (d) As to any portion of a claim that is denied by the Director, the CM may, in lieu of the procedures set forth in the preceding subsection of this section, within six (6) months of receipt of the Director's final decision, institute a civil action for the sum he claims to be entitled to under the contract by filing a verified complaint and the issuance of a summons in the Superior Court of Wake County or in the superior court of any county where the work under the contract was performed. The procedure shall be the same as in all civil actions except that all issues shall be tried by the judge, without a jury.

ARTICLE 21 - MINOR CHANGES IN THE WORK

The Project Designer will have the authority to order minor changes in the work not involving an adjustment in the contract sum or time for completion, and not inconsistent with the intent of the contract documents. Such changes shall be effected by written order, copied to the State Construction Office, and shall be binding on the Owner and the CM.

ARTICLE 22 - UNCORRECTED FAULTY WORK

Should the correction of faulty or damaged work be considered inadvisable or inexpedient by the Owner and the Project Designer, the Owner shall be reimbursed by the CM. A change order will be issued to reflect a reduction in the contract sum.

ARTICLE 23 - TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- a. The final completion date will be as determined by the Owner, Designer and CM during the pre-construction phase of the project and will be incorporated into the contract for construction services between the Owner and the CM.
- b. The CM shall commence work to be performed under this agreement on a date to be specified in a written Notice to Proceed from the Project Designer and shall fully complete all work hereunder within the time of completion specified. For each day in excess of the above number of days, the CM shall pay the Owner the sum stated as liquidated damages reasonably estimated in advance to cover the loses to be incurred by the Owner by reason of failure of the CM to complete the work within the time specified, such time being in the essence of this contract and a material consideration thereof. Should the work be delayed by both the owner and contractor, liquidated damages shall be apportioned to reflect the delays of each party. In the case of concurrent delays, contractor caused delays shall be accounted for before owner and designer caused delays.
- c. If the CM is delayed at any time in the progress of his work by any act or negligence of the Owner or the Project Designer, or by any employee of either; by changes ordered in the work; by labor disputes at the project site; by abnormal weather conditions not reasonably anticipated for the locality where the work is performed; by unavoidable casualties; by any causes beyond the contractor's control; or by any other causes which the designer and Owner determine may justify the delay, then the contract time may be extended by change order for the time which the designer and Owner may determine is reasonable.

Time extensions will not be granted for rain, wind, snow or other natural phenomena of normal intensity for the locality where work is performed. For purpose of determining extent of delay attributable to unusual weather phenomena, a determination shall be made by comparing the weather for the contract period involved with the average of the preceding five (5) year climatic range during the same time interval based on the National Oceanic and Atmospheric Administration National Weather Service statistics for the locality where work is performed and on daily weather logs kept on the job site by the CM reflecting the effect of the weather on progress of the work and initialed by the designer's representative. No weather delays shall be considered after the building is dried in unless work claimed to be delayed is on the critical path of the baseline schedule or approved updated schedule. Time extensions for weather delays, acts of God, labor disputes, fire, delays in transportation, unavoidable casualties or other delays which are beyond the control of the Owner do not entitle the Contractor to compensable damages for delays. Any contractor claim for compensable damages for delays is limited to delays caused solely by the owner or its agents. Contractor caused delays shall be accounted for before owner or designer caused delays in the case of concurrent delays.

- d. Request for extension of time shall be made in writing to the designer, copies to the owner and SCO, within twenty (20) days following cause of delay. In case of continuing cause for delay, the CM shall notify the designer copies to the owner and SCO, of the delay within twenty (20) days of the beginning of the delay and only one claim is necessary.
- e. The CM shall notify his surety in writing of extension of time granted.
- f. No claim shall be allowed on account of failure of the Project Designer to furnish drawings or instructions until twenty (20) days after demand for such drawings and/or instructions. See Article 5c. Demand must be in written form clearly stating the potential for delay unless the drawings or instructions are provided. Any delay granted will begin after the twenty (20) day demand period is concluded.

ARTICLE 24 - PARTIAL UTILIZATION/BENEFICIAL OCCUPANCY

- a. The Owner may desire to occupy or utilize all or a portion of the project when the work is substantially complete.
- b. Should the owner request a utilization of a building or portion thereof, the designer shall perform a designer final inspection of area after being notified by the contractor that the area is ready for such. After the contractor has completed designer final inspection punch list and the designer has verified, then the designer shall schedule a beneficial occupancy inspection at a time and date acceptable to the owner, contractor(s) and State Construction Office. If beneficial occupancy is granted by the State Construction Office, in such areas the following will be established:
 - 1. The beginning of guarantees and warranties period for the equipment necessary to support. in the area.
 - 2. The owner assumes all responsibilities for utility costs for entire building.
 - 3. Contractor will obtain consent of surety.
 - 4. Contractor will obtain endorsement from insurance company permitting beneficial occupancy.
- c. The Owner shall have the right to exclude the CM from any part of the project which the Project Designer has so certified to be substantially complete, but the Owner will allow the CM reasonable access to complete or correct work to bring it into compliance with the contract.
- d. Occupancy by the Owner under this article will in no way relieve the CM from his contractual requirement to complete the project within the specified time. The contractor will not be relieved of liquidated damages because of beneficial occupancy. The designer may prorate liquidated damages based on the percentage of project occupied.

ARTICLE 25 - FINAL INSPECTION, ACCEPTANCE, AND PROJECT CLOSEOUT

- a. Upon notification from the CM that the project is complete and ready for inspection, the Project Designer shall make a designer final inspection to verify that the project is complete and ready for SCO final inspection. Prior to SCO final inspection, the CM shall ensure that all items requiring corrective measures noted at the designer final inspection are complete.

The Project Designer shall schedule an SCO final inspection at a time and date acceptable to the Owner, the CM and the State Construction Office.

- b. At the SCO final inspection, the designer and his consultants shall, if job conditions warrant, record a list of items that are found to be incomplete or not in accordance with the contract documents. At the conclusion of the SCO final inspection, the designer and State Construction Office representative shall make the following determinations:
 - 1. That the project is completed and accepted.
 - 2. That the project is accepted subject to the correction of the list of discrepancies (punch list). All punch list items must be completed within thirty (30) days of SCO final inspection or the Owner may invoke Article 28, Owner's Right to Do Work.
 - 3. That the project is not complete and another date for a final inspection will be established.
- c. Within fourteen (14) days of acceptance per Paragraph c1 or within fourteen (14) days after completion of punch list per Paragraph c2 above, the Project Designer shall certify the work and issue applicable certificate(s) of compliance.
- d. Any discrepancies listed or discovered after the date of SCO final inspection and acceptance under Paragraphs c1 or c2 above shall be handled in accordance with Article 42.
- e. The date of acceptance will establish the following:
 - 1. The beginning of guarantees and warranties period.
 - 2. The date on which the CM's insurance coverage for public liability, property damage and builder's risk may be terminated.
 - 3. That no liquidated damages (if applicable) shall be assessed after this date.
 - 4. The termination date of utility cost to the CM (if applicable).
- f. **Prior to issuance of final acceptance date, the contractor shall have his authorized representatives visit the project and give full instructions to the designated personnel regarding operating, maintenance, care, and adjustment of all equipment and special construction elements. In addition, the contractor shall provide to the owner a complete instructional video (media format acceptable to the owner) on the operation, maintenance, care and adjustment of all equipment and special construction elements.**

ARTICLE 26 - CORRECTION OF WORK BEFORE FINAL PAYMENT

- a. Any work, materials, fabricated items or other parts of the work which have been condemned or declared not in accordance with the contract by the designer shall be promptly removed from the work site by the CM, and shall be immediately replaced by new work in accordance with the contract at no additional cost to the Owner. Work or property of the Owner, damaged or destroyed by virtue of such faulty work, shall be made good at the expense of the CM.
- b. Correction of condemned work described above shall commence within twenty-four (24) hours after receipt of notice from the Project Designer, and shall make satisfactory progress until completed.

- c. Should the CM fail to proceed with the required corrections, then the Owner may complete the work in accordance with the provisions of Article 28.

ARTICLE 27 - CORRECTION OF WORK AFTER FINAL PAYMENT

See Article 35, Performance Bond and Payment Bond, and Article 42, Guarantee. Neither the final certificate, final payment, occupancy of the premises by the Owner, nor any provision of the contract, nor any other act or instrument of the Owner, nor the Project Designer, shall relieve the CM from responsibility for negligence, or faulty material or workmanship, or failure to comply with the drawings and specifications. The CM shall correct or make good any defects due thereto and repair any damage resulting therefrom, which may appear during the guarantee period following final acceptance of the work except as stated otherwise under Article 42, Guarantee. The Owner will report any defects as they may appear to the CM and establish a time limit for completion of corrections by the CM. The Owner will be the judge as to the responsibility for correction of defects.

ARTICLE 28 - OWNER'S RIGHT TO DO WORK

If, during the progress of the work or during the period of guarantee, the CM fails to prosecute the work properly or to perform any provision of the contract, the Owner, after seven (7) days written notice sent by certified mail, return receipt requested, to the CM from the designer, may perform or have performed that portion of the work. The cost of the work may be deducted from any amounts due or to become due to the CM, such action and cost of same having been first approved by the Project Designer. Should the cost of such action of the Owner exceed the amount due or to become due the CM, then the CM or his surety, or both, shall be liable for and shall pay to the Owner the amount of said excess.

ARTICLE 29 - ANNULMENT OF CONTRACT

If the CM fails to begin the work under the contract within the time specified or fails to establish a GMP or obtain bids from or enter into contracts with qualified Principal Trade or Specialty Contractors within the GMP, or the progress of the work is not maintained on schedule, or the work is not completed within the time above specified, or fails to perform the work with sufficient workmen and equipment or with sufficient materials to ensure the prompt completion of said work, or shall perform the work unsuitably or shall discontinue the prosecution of the work, or if the CM shall become insolvent or be declared bankrupt or commit any act of bankruptcy or insolvency, or allow any final judgment to stand against him unsatisfied for a period of forty-eight (48) hours, or shall make an assignment for the benefit of creditors, or for any other cause whatsoever shall not carry on the work in an acceptable manner, the Owner may give notice in writing, sent by certified mail, return receipt requested, to the CM and his surety of such delay, neglect or default, specifying the same, and if the CM within a period of seven(7) days after such notice shall not proceed in accordance therewith, then the Owner shall, declare this contract in default, and, thereupon, the surety shall promptly take over the work and complete the performance of this contract in the manner and within the time frame specified. In the event the surety shall fail to take over the work to be done under this contract within seven(7) days after being so notified and notify the Owner in writing, sent by certified mail, return receipt requested, that he is taking the same over and stating that he will diligently pursue and complete the same, the Owner shall have full power and authority, without violating the contract, to take the prosecution of the work out of the hands of said CM, to appropriate or use any or all contract materials and equipment on the grounds as may be suitable and acceptable and may enter into an agreement, either by public letting or negotiation, for the completion of said contract according to the terms and provisions thereof or use such other methods as in his opinion shall be required for the completion of said contract in an acceptable manner. All costs and charges incurred by the Owner, together with the costs of completing the

work under contract, shall be deducted from any monies due or which may become due said CM and surety. In case the expense so incurred by the Owner shall be less than the sum which would have been payable under the contract, if it had been completed by said CM, then the said CM and surety shall be entitled to receive the difference, but in case such expense shall exceed the sum which would have been payable under the contract, then the CM and the surety shall be liable and shall pay to the Owner the amount of said excess.

ARTICLE 30 – CONSTRUCTION MANAGER’S RIGHT TO STOP WORK OR TERMINATE THE CONTRACT

- a. Should the work be stopped by order of a court having jurisdiction, or by order of any other public authority for a period of three months, due to cause beyond the fault or control of the CM, or if the Owner should fail or refuse to make payment on account of a certificate issued by the designer within forty-five (45) days after receipt of same, then the CM, after fifteen (15) days' written notice sent by certified mail, return receipt requested, to the Owner and the designer, may suspend operations on the work or terminate the contract.
- b. The Owner shall be liable to the CM for the cost of all materials delivered and work performed on this contract plus ten (10) percent overhead and profit and shall make such payment. The designer shall be the judge as to the correctness of such payment.

ARTICLE 31 - REQUEST FOR PAYMENT

- a. Not later than the fifth day of the month, the CM shall submit to the designer a request for payment for work done during the previous month. The request shall be in the form agreed upon between the CM and the designer, but shall show substantially the value of work done and materials delivered to the site during the period since the last payment, and shall sum up the financial status of the contract with the following information:
 1. Total of contract including change orders.
 2. Value of work completed to date.
 3. Less five percent (5%) retainage, provided however, that after fifty percent (50%) of the CM's work has been satisfactorily completed on schedule, with approval of the owner and the State Construction Office and written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule.
 4. Less previous payments.
 5. Current amount due.
- b. Prior to submitting the first payment request, the CM shall prepare a schedule showing a breakdown of the contract price into values of the various parts of the GMP contract. The Cost of the Work breakdown will be arranged so as to facilitate payments to the Principal Trade and Specialty Contractors in accordance with Article 17. The combined CM Construction Management Fee, Bonds & Insurance, CM Contingency, and Project Reserve (if any) will be shown on the Schedule of values as separate lines. The values for the CM Contingency and Project Reserve (if any) will move to appropriate lines within the Cost of the Work as those funds are committed and expended. This schedule of values will be submitted to & approved by the designer and Owner within 30 days of the Notice to Proceed.

The schedule of values shall be prepared in such form and supported by such data to substantiate its accuracy as the designer and Owner may require.

- c. Applications for payment shall be in a form agreed upon by the CM, designer and Owner and shall be prepared and supported by such data to substantiate the accuracy of the request as the designer may require.
- d. 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 GMP properly allocable to completed work as determined by multiplying the percentage completion of each portion Cost of the Work by the share of the GMP allocated to that portion of the work in the schedule of values.
 2. Add that portion of the GMP properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the work or if approved in advance by the Owner, suitably stored off site at a location agreed upon in writing.
 3. Subtract the aggregate of previous payments made by the Owner.
 4. Subtract the amount, in any, by which the CM has been previously overpaid, as evidenced by the Owner's review of the CM's documentation.
 5. Subtract amounts, if any, for which the Project Designer has withheld or nullified a certificate of payment.
 6. Subtract retainage as per paragraph (h) below.
 7. Add the amount due for the CM Construction Management Fee calculated on the basis of the percentage completion of the project or on a schedule of payment negotiated with the Owner less fifteen percent (15%) and less previous payments for CM Construction Management Fee.
- e. Payment allocated to Principal Trade and Specialty Contractors shall be subject to five percent (5%) retainage, provided, however that after fifty percent (50%) of the Cost of the Work has been satisfactorily completed on schedule, with the approval of the Owner and the State Construction Office and with written consent of the surety, further requirements for retainage will be waived only so long as work continues to be completed satisfactorily and on schedule. The balance of the CM Construction Management Fee shall be held by the Owner until satisfactory completion and close out of the project. Satisfactory completion and close out of the project means that the Owner and Project Designer are satisfied that the project has been completed in accordance with the plans and specifications and within the GMP, all general conditions of the contract pertaining to close out have been satisfied, and all Principal Trade and Specialty Contractors have satisfactorily completed their respective contracts. No retainage will be held for the cost of Bonds and Insurance
- f. When payment is made on account of stored materials and equipment, such materials must be stored on the owner's property, and the requests for payments shall be accompanied by invoices or bills of sale or other evidence to establish the owner's title to such materials and equipment. Such payments will be made only for materials that have been customized or fabricated specifically for this project. Raw materials or commodity products including but not limited to piping, conduit, CMU, metal studs and gypsum board may not be submitted. Responsibility for such stored materials and equipment shall remain with the CM regardless

of ownership title. Such stored materials and equipment shall not be removed from the owner's property. Should the space for storage on-site be limited, the CM, at his option, shall be permitted to store such materials and/or equipment in a suitable space off-site. Should the CM desire to include any such materials or equipment in his application for payment, they must be stored in the name of the owner in an independent, licensed, bonded warehouse approved by the designer, owner and the State Construction Office and located as close to the site as possible. The warehouse selected must be approved by the CM's bonding and insurance companies; the material to be paid for shall be assigned to the owner and shall be inspected by the designer. Upon approval by the designer, owner and SCO of the storage facilities and materials and equipment, payment therefore will be certified. Responsibility for such stored materials and equipment shall remain with the CM. Such stored materials and equipment shall not be moved except for transportation to the project site. Under certain conditions, the designer may approve storage of materials at the point of manufacture, which conditions shall be approved by the designer, the owner and the State Construction Office prior to approval for the storage and shall include an agreement by the storing party which unconditionally gives the State absolute right to possession of the materials at anytime. Bond, security and insurance protection shall continue to be the responsibility of the CM.

- g. In the event of beneficial occupancy, retainage of funds due the CM may be reduced with the approval of the State Construction Office to an equitable amount to cover the list of items to be completed or corrected. Retainage may not be reduced to less than two and one-half (2 1/2) times the estimated value of the work to be completed or corrected. Reduction of retainage must be with the consent and approval of the CM's bonding company.

ARTICLE 32 - CERTIFICATES OF PAYMENT AND FINAL PAYMENT

- a. Within five (5) days from receipt of request for payment from the CM, the designer shall issue and forward to the Owner a certificate for payment. This certificate shall indicate the amount requested or as approved by the designer. If the certificate is not approved by the designer, he shall state in writing to the CM and the Owner his reasons for withholding payment.
- b. No certificate issued or payment made shall constitute an acceptance of the work or any part thereof. The making and acceptance of final payment shall constitute a waiver of all claims by the Owner except:
 - 1. Claims arising from unsettled liens or claims against the CM.
 - 2. Faulty work or materials appearing after final payment.
 - 3. Failure of the contractor to perform the work in accordance with drawings and specifications, such failure appearing after payment.
 - 4. As conditioned in the performance bond and payment bond.
- c. The making and acceptance of final payment shall constitute a waiver of all claims by the CM except those claims previously made and remaining unsettled (Article 20(c)).
- d. Prior to submitting request for final payment to the designer for approval, the CM shall fully comply with all requirements specified in the "project closeout" section of the specifications. These requirements include but not limited to the following:
 - 1. Submittal of Product and Operating Manuals, Warranties and Bonds, Guarantees, Maintenance Agreements, As-Built Drawings, Certificates of Inspection or Approval

from agencies having jurisdiction. (The designer must approve the Manuals prior to delivery to the Owner).

2. Transfer of required attic stock material and all keys in an organized manner.
 3. Record of Owner's training.
 4. Resolution of any final inspection discrepancies.
 5. Granting access to Contractor's records, if Owner's internal auditors have made a request for such access pursuant to Article 52.
- e. The CM shall forward to the designer, the final application for payment along with the following documents:
1. List of minority business subcontractors and material suppliers showing breakdown of contracts amounts and total actual payments to subcontractors and material suppliers.
 2. Affidavit of Release of Liens.
 3. Affidavit from CM of payment to material suppliers and subcontractors. (See Article 36).
 4. Consent of Surety to Final Payment.
 5. Certificates of state agencies required by state law.
- f. The designer will not authorize final payment until the work under contract has been certified by Project Designer, certificates of compliance issued, and the CM has complied with the closeout requirements. The designer shall forward the CM's final application for payment to the Owner along with respective certificate(s) of compliance required by law.

ARTICLE 33 - PAYMENTS WITHHELD

- a. The designer with the approval of the State Construction Office may withhold payment for the following reasons:
1. Faulty work not corrected.
 2. The unpaid balance on the contract is insufficient to complete the work in the judgment of the designer.
 3. To provide for sufficient contract balance to cover liquidated damages that will be assessed against the CM.
- b. The Secretary of the Department of Administration may authorize the withholding of payment for the following reasons:
1. Claims filed against the CM or evidence that a claim will be filed.
 2. Evidence that Principal Trade or Specialty Contractors have not been paid.

- c. The Owner may withhold all or a portion of CM's Project Management Fee costs set forth in the approved schedule of values, if CM has failed to comply with: (1) a request to access its records by Owner's internal auditors pursuant to Article 52; (2) a request for a plan of action and/or recovery schedule under Article 14.j or provide The Owner; (3) a request to provide an electronic copies of Contractor's baseline schedule, updates with all logic used to create the schedules in the original format of the scheduling software; and (4) Contractor's failure to have its Superintendent on the Project full-time.
- d. When grounds for withholding payments have been removed, payment will be released. Delay of payment due the CM without cause will make owner liable for payment of interest to the CM in accordance with G.S. 143-134.1. As provided in G.S.143-134.1(e) the owner shall not be liable for interest on payments withheld by the owner for unsatisfactory job progress, defective construction not remedied, disputed work, or third-party claims filed against the owner or reasonable evidence that a third-party claim will be filed.

ARTICLE 34 - MINIMUM INSURANCE REQUIREMENTS

The work under this contract shall not commence until the CM has verified to the Owner that all required insurance and verifying certificates of insurance have been obtained and approved in writing by the Owner. These certificates shall contain a provision that coverage's afforded under the policies will not be cancelled, reduced in amount or coverage's eliminated until at least thirty (30) days after mailing written notice, by certified mail, return receipt requested, to the insured and the Owner of such alteration or cancellation.

a. Worker's Compensation and Employer's Liability

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall provide and maintain, during the life of the contract, workmen's compensation insurance, as required by law, as well as employer's liability coverage with minimum limits of \$100,000.

b. Public Liability and Property Damage

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall provide and maintain, during the life of the contract, comprehensive general liability insurance, including coverage for premises operations, independent contractors, completed operations, products and contractual exposures, as shall protect such contractors from claims arising out of any bodily injury, including accidental death, as well as from claims for property damages which may arise from operations under this contract, whether such operations be by the contractor or by any subcontractor, or by anyone directly or indirectly employed by either of them and the minimum limits of such insurance shall be as follows:

Bodily Injury:	\$500,000 per occurrence
Property Damage:	\$100,000 per occurrence / \$300,000 aggregate

In lieu of limits listed above, a \$500,000 combined single limit shall satisfy both conditions.

Such coverage for completed operations must be maintained for at least two (2) years following final acceptance of the work performed under the contract.

c. Property Insurance (Builder's Risk/Installation Floater)

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall purchase and maintain property insurance during the life of this contract, upon the entire work at the

site to the full insurable value thereof. This insurance shall include the interests of the Owner, the CM, and subcontractors in the work and shall insure against the perils of fire, extended coverage, and vandalism and malicious mischief. If the Owner is damaged by failure of the CM to purchase or maintain such insurance, then the CM shall bear all reasonable costs properly attributable thereto; the CM shall effect and maintain similar property insurance on portions of the work stored off the site when request for payment per articles so includes such portions.

d. Deductible

Any deductible, if applicable to loss covered by insurance provided, is to be borne by the CM and/or the Principal Trade or Specialty Contractor as applicable.

e. Other Insurance

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall obtain such additional insurance as may be required by the Owner or by the General Statutes of North Carolina including motor vehicle insurance, in amounts not less than the statutory limits.

f. Proof of Carriage

The CM shall ensure that it and all Principal Trade and Specialty Contractors shall furnish the Owner with satisfactory proof of carriage of the insurance required before written approval is granted by the Owner.

ARTICLE 35 - PERFORMANCE BOND AND PAYMENT BOND

- a. The CM shall furnish a performance bond and payment bond executed by a surety company authorized to do business in North Carolina. The bonds shall be in the full contract amount, which shall be in the amount of the GMP for the entire project. Bonds shall be executed in the form bound with the specifications
- b. All bonds shall be countersigned by an authorized agent of the bonding company who is licensed to do business in North Carolina.

ARTICLE 36 - CONTRACTOR'S AFFIDAVIT

The final payment of retained amount due the CM on account of the contract shall not become due until the CM has furnished to the Owner through the designer an affidavit signed, sworn and notarized to the effect that all payments for materials, services or subcontracted work to Principal Trade and Specialty Contractors in connection with his contract have been satisfied, and that no claims or liens exist against the CM in connection with this contract. In the event that the CM cannot obtain similar affidavits from the Principal Trade and Specialty Contractors to protect the CM and the Owner from possible liens or claims against the subcontractor, the CM shall state in his affidavit that no claims or liens exist against any subcontractor to the best of his (the CM's) knowledge, and if any appear afterward, the CM shall save the Owner harmless.

ARTICLE 37 - ASSIGNMENTS

The CM shall not assign any portion of this contract nor subcontract in its entirety. Except as may be required under terms of the performance bond or payment bond, no funds or sums of money due or become due the CM under the contract may be assigned.

ARTICLE 38 - USE OF PREMISES

- a. The CM shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, permits or directions of the designer and shall not exceed those established limits in his operations.
- b. The CM shall not load or permit any part of the structure to be loaded with a weight that will endanger its safety.
- c. The CM shall enforce the designer's and owner's instructions regarding signs, advertisements, fires and smoking.
- d. No firearms, any type of alcoholic beverages or drugs (other than those prescribed by a physician) will be permitted at the job site.

ARTICLE 39 - CUTTING, PATCHING AND DIGGING

- a. The CM shall ensure that all cutting, fitting or patching that may be required to make the work come together properly and fit it to receive or be received by work of other contractors shown upon or reasonably implied by the drawings and specifications for the completed structure, as the designer may direct.
- b. Any cost brought about by defective or ill-timed work shall be borne by the party responsible therefor.
- c. No Principal Trade or Specialty Contractor shall endanger any work of another such contractor by cutting, digging or other means, nor shall he cut or alter the work of any other such contractor without the consent of the designer and the affected contractor(s).

ARTICLE 40 - UTILITIES, STRUCTURES, SIGNS

- a. The CM shall provide necessary and adequate facilities for water, electricity, gas, oil, sewer, and other utility services, which may be necessary and required for completion of the project. If the Owner specifies that the CM is to pay all utilities, any permanent meters installed shall be listed in the CM's name until his work is fully accepted by the Owner. As stipulated in the Supplementary General Conditions, the Owner may: (1) pay utilities cost directly, (2) require the CM to pay all utilities cost, (3) or reimburse the CM for the actual cost of utilities. The Owner or CM, as applicable, may recover actual costs of metered utilities from the responsible party should delays occur in project completion. Coordination of the work of the utility companies during construction is the sole responsibility of the CM.
- b. If applicable Meters shall be relisted in the Owner's name on the day following completion and acceptance of the CM's work, and the Owner shall pay for services used after that date.
- c. Prior to the operation of permanent systems, the CM will provide temporary power, lighting, water, and heat to maintain space temperature above freezing, as required for construction operations.
- d. The CM shall ensure that the permanent building systems are in sufficient readiness for furnishing temporary climatic control at the time a building is enclosed and secured. The HVAC systems shall maintain climatic control throughout the enclosed portion of the building sufficient to allow completion of the interior finishes of the building. A building shall be considered enclosed and secured when windows, doorways (exterior, mechanical, and

electrical equipment rooms), and hardware are installed; and other openings have protection, which will provide reasonable climatic control. The appropriate time to start the mechanical systems and climatic condition shall be jointly determined by the CM and the designer. Use of the equipment in this manner shall in no way affect the warranty requirements of the CM.

- e. The CM shall coordinate the work so that the building's permanent power wiring distribution system shall be in sufficient readiness to provide power as required by the HVAC contractor for temporary climatic control.
- f. The CM shall coordinate the work so that the building's permanent lighting system shall be ready at the time interior painting and finishing begins and shall provide adequate lighting in those areas where interior painting and finishing is being performed.
- g. The CM shall be responsible for his permanently fixed service facilities and systems in use during progress of the work. The following procedures shall be strictly adhered to:
 - 1. Prior to acceptance of work by the State Construction Office, the CM shall coordinate the removal and replacement of any parts of the permanent building systems damaged through use during construction.
 - 2. Temporary filters as recommended by the equipment manufacturer in order to keep the equipment and ductwork clean and free of dust and debris shall be installed in each of the heating and air conditioning units and at each return grille during construction. New filters shall be installed in each unit prior to the Owner's acceptance of the work.
 - 3. Extra effort shall be maintained to keep the building and the site adjacent to the building clean and under no circumstances shall air systems be operated if finishing and site work operations are creating dust in excess of what would be considered normal if the building were occupied.
 - 4. It shall be understood that any warranty on equipment presented to the Owner shall extend from the day of final acceptance by the Owner. The cost of warranting the equipment during operation in the finishing stages of construction shall be borne by the contractor whose system is utilized.
 - 5. The CM shall ensure that all lamps are in proper working condition at the time of final project acceptance.
- h. The CM shall provide, if required and where directed, a shed for toilet facilities and shall furnish and install in this shed all water closets required for a complete and adequate sanitary arrangement. These facilities will be available to other contractors on the job and shall be kept in a neat and sanitary condition at all times. Chemical toilets are acceptable.
- i. The CM shall, if required by the Supplementary General Conditions and where directed, erect a temporary field office, complete with lights, telephone, heat and air conditioning. A portion of this office shall be partitioned off, of sufficient size, for the use of a resident inspector, should the designer so direct.
- j. On multi-story construction projects, the CM shall either provide or ensure that temporary elevators, lifts, or other necessary special equipment is available for the general use of all contractors. The cost for such elevators, lifts or other special equipment and the operation thereof shall either be included in the CM Construction Management Fee or specified as part of the work of a Principal Trade or Specialty Contractor and paid for as a part of the Cost of the Work.

- k. The CM will erect one sign on the project if required. The sign shall be of sound construction, and shall be neatly lettered with black letters on white background. The sign shall bear the name of the project, and the CM's name, and the name of the designer and consultants. Directional signs may be erected on the Owner's property subject to approval of the Owner with respect to size, style and location of such directional signs. Such signs may bear the name of the contractor and a directional symbol. No other signs will be permitted except by permission of the Owner.

ARTICLE 41 - CLEANING UP

- a. The CM shall ensure that the building and surrounding area is reasonably free from rubbish at all times, and shall remove debris from the site on a timely basis or when directed to do so by the designer. The CM shall provide an on-site refuse container(s) for the use of all Principal Trade and Specialty Contractors. The CM shall ensure that each Principal Trade and Specialty Contractor removes their rubbish and debris from the building on a daily basis. The CM shall ensure that the building is broom cleaned as required to minimize dust and dirt accumulation.
- b. The CM shall provide and maintain suitable all-weather access to the building.
- c. Before final inspection and acceptance of the building, the CM shall ensure that all portions of the work are clean, including glass, hardware, fixtures, masonry, tile and marble (using no acid), clean and wax all floors as specified, and completely prepare the building for use by the Owner, with no cleaning required by the Owner.

ARTICLE 42 - GUARANTEE

- a. The CM shall unconditionally guarantee materials and workmanship against patent defects arising from faulty materials, faulty workmanship or negligence for a period of twelve (12) months following the date of final acceptance of the work or beneficial occupancy and shall replace such defective materials or workmanship without cost to the Owner.
- b. Where items of equipment or material carry a manufacturer's warranty for any period in excess of twelve (12) months, then the manufacturer's warranty shall apply for that particular piece of equipment or material. The CM shall replace such defective equipment or materials, without cost to the Owner, within the manufacturer's warranty period.
- c. Additionally, the Owner may bring an action for latent defects caused by the negligence of the CM, which is hidden or not readily apparent to the Owner at the time of beneficial occupancy or final acceptance, whichever occurred first, in accordance with applicable law.
- d. Guarantees for roof, equipment, materials, and supplies shall be stipulated in the specifications sections governing such roof, equipment, materials, or supplies.

ARTICLE 43 - CODES AND STANDARDS

Wherever reference is given to codes, standard specifications or other data published by regulating agencies including, but not limited to, national electrical codes, North Carolina State Building Codes, federal specifications, ASTM specifications, various institute specifications, etc., it shall be understood that such reference is to the latest edition including addenda published prior to the date of the contract documents.

ARTICLE 44 - INDEMNIFICATION

To the fullest extent permitted by law, the CM shall indemnify and hold harmless the Owner, the designer and the agents, consultants and employees of the Owner and designer, from and against all claims, damages, losses and expenses, including, but not limited to, attorneys' fees, arising out of or resulting from the performance or failure of performance of the work, provided that any such claim, damage, loss or expense (1) is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the work itself) including the loss of use resulting therefrom, and (2) is caused in whole or in part by any negligent act or omission of the CM, the CM's subcontractor, or the agents of either the CM or the CM's subcontractor. Such obligation shall not be construed to negate, abridge or otherwise reduce any other right or obligation of indemnity which would otherwise exist as to any party or person described in this article.

ARTICLE 45 - TAXES

- a. Federal excise taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3442(3)).
- b. Federal transportation taxes do not apply to materials entering into state work (Internal Revenue Code, Section 3475(b) as amended).
- c. North Carolina sales tax and use tax, as required by law, do apply to materials entering into state work and such costs shall be included in the bid proposal and contract sum.
- d. Local option sales and use taxes, as required by law, do apply to materials entering into state work as applicable and such costs shall be included in the bid proposal from Principal Trade and specialty Contractors and contract sum.
- e. Accounting Procedures for Refund of County Sales & Use Tax

Amount of county sales and use tax paid per CM's statements:

CM's performing contracts for state agencies shall ensure that the Principal Trade and Specialty Contractors provide information to allow the CM to give the state agency for whose project the materials, supplies, fixtures and/or equipment was purchased a signed statement containing the information listed in N.C.G.S. 105-164.14(e).

The Department of Revenue has agreed that in lieu of obtaining copies of sales receipts from contractors, an agency may obtain a certified statement from the contractors setting forth the date, the type of property and the cost of the property purchased from each vendor, the county in which the vendor made the sale and the amount of local sales and use taxes paid thereon. If the property was purchased out-of-state, the county in which the property was delivered should be listed. The contractor should also be notified that the certified statement may be subject to audit.

In the event the contractors make several purchases from the same vendor, such certified statement must indicate the invoice numbers, the inclusive dates of the invoices, the total amount of the invoices, the counties, and the county sales and use taxes paid thereon.

Name of taxing county: The position of a sale is the retailer's place of business located within a taxing county where the vendor becomes contractually obligated to make the sale. Therefore, it is important that the county tax be reported for the county of sale rather than the county of use.

When property is purchased from out-of-state vendors and the county tax is charged, the county should be identified where delivery is made when reporting the county tax.

Such statement must also include the cost of any tangible personal property withdrawn from the contractor's warehouse stock and the amount of county sales or use tax paid thereon by the CM.

Contractors are not to include any tax paid on supplies, tools and equipment which they use to perform their contracts and should include only those building materials, supplies, fixtures and equipment which actually become a part of or annexed to the building or structure.

ARTICLE 46 - EQUAL OPPORTUNITY CLAUSE

The non-discrimination clause contained in Section 202 (Federal) Executive Order 11246, as amended by Executive Order 11375, relative to equal employment opportunity for all persons without regard to race, color, religion, sex or national origin, and the implementing rules and regulations prescribed by the Secretary of Labor, are incorporated herein.

ARTICLE 47 - EMPLOYMENT OF INDIVIDUALS WITH DISABILITIES

The CM agrees not to discriminate against any employee or applicant for employment because of physical or mental handicap in regard to any position for which the employee or applicant is qualified. The CM agrees to take affirmative action to employ, advance in employment and otherwise treat qualified handicapped individuals without discrimination based upon their physical or mental handicap in all employment practices.

ARTICLE 48 - ASBESTOS-CONTAINING MATERIALS (ACM)

The State of North Carolina has attempted to address all asbestos-containing materials that are to be disturbed in the project. However, there may be other asbestos-containing materials in the work areas that are not to be disturbed and do not create an exposure hazard. Construction Managers are reminded of the requirements of instructions under General Conditions of the Contract, titled Examination of Conditions. Statute 130A, Article 19, amended August 3, 1989, established the Asbestos Hazard Management Program that controls asbestos abatement in North Carolina. The latest edition of *Guideline Criteria for Asbestos Abatement* from the State Construction Office is to be incorporated in all asbestos abatement projects for the Capital Improvement Program.

ARTICLE 49 - MINORITY BUSINESS PARTICIPATION

N.C.G.S. 143-128.2 establishes a ten percent (10%) goal for participation by minority businesses in total value of work for each State building project and requires documentation of good faith efforts for meeting that goal. The document, *Guidelines for Recruitment and Selection of Minority Businesses for Participation in State Construction Contracts* including Affidavits and Appendix F are hereby incorporated into and made a part of this contract.

The CM shall identify and define contract packages (the value of which shall total to at least ten percent (10%) of the GMP) that remove barriers to participation commonly experienced by Historically Underutilized Businesses and Minority Business Enterprises as those terms are defined in North Carolina General Statute 143-128.2, hereinafter referred to as Reduced Barrier Packages (RBP). Such contract packages will be submitted to the Owner for review. As an example, RBP's may require no performance or payment bond, or may offer the participation of the CM as a guarantor or surety in the financing of material purchases by the Principal Trade and/or Specialty Contractors, provided that the CM may condition such financing participation upon the

issuance of joint checks or other similar arrangements to allow the CM to verify that timely payments are made to suppliers furnishing credit. The CM may propose other and/or additional provisions for reducing barriers to participation.

The Owner shall require the CM to submit a plan for compliance with N.C.G.S.143-128.2 by approval by the Owner prior to soliciting bids for the Principal Trade and Specialty Contracts. The CM and Principal Trade and Specialty Contractors shall make a good faith effort to recruit and select minority businesses for participation in contracts pursuant to N.C.G.S. 143-128.2.

ARTICLE 50 – CONTRACTOR EVALUATION

The CM's overall work performance on the project shall be fairly evaluated in accordance with the State Building Commission policy and procedures, for determining qualifications to compete for future capital improvement projects for institutions and agencies of the State of North Carolina. In addition to final evaluation, interim evaluation may be prepared during the progress of project. The document, Construction Manager Evaluation Procedures, is hereby incorporated and made a part of this contract. The Owner may request the CM's comments to evaluate the designer.

ARTICLE 51 – GIFTS

Pursuant to N.C. Gen. Stat. § 133-32, it is unlawful for any vendor or contractor (i.e. architect, bidder, contractor, construction manager, design professional, engineer, subcontractor, supplier, vendor, etc.), to make gifts or to give favors to any State employee. This prohibition covers those vendors and contractors who: (1) have a contract with a governmental agency; or (2) have performed under such a contract within the past year; or (3) anticipate bidding on such a contract in the future. For additional information regarding the specific requirements and exemptions, vendors and contractors are encouraged to review G.S. Sec. 133-32.

During the construction of the Project, the Contractor is prohibited from making gifts to any of the Owner's employees, Owner's project representatives (architect, engineers, construction manager and their employees), employees of the State Construction Office and/or any other State employee that may have any involvement, influence, responsibilities, oversight, management and/or duties that pertain to and/or relate to the contract administration, financial administration and/or disposition of claims arising from and/or relating to the Contract and/or Project.

ARTICLE 52 – AUDITING-ACCESS TO PERSONS AND RECORDS

In accordance with N.C. General Statute 147-64.7, the State Auditor shall have access to Contractor's officers, employees, agents and/or other persons in control of and/or responsible for the Contractor's records that relate to this Contracts for purposes of conducting audits under the referenced statute. The Owner's internal auditors shall also have the right to access and copy the Contractor's records relating to the Contract and Project during the term of the Contract and within two years following the completion of the Project/close-out of the Contract to verify accounts, accuracy, information, calculations and/or data affecting and/or relating to Contractor's requests for payment, requests for change orders, change orders, claims for extra work, requests for time extensions and related claims for delay/extended general conditions costs, claims for lost productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost

escalation, pass-through claims of subcontractors and/or suppliers, and/or any other type of claim for payment or damages from Owner and/or its project representatives.

ARTICLE 53 – NORTH CAROLINA FALSE CLAIMS ACT

The North Carolina False Claims Act (“NCFCA”), N.C Gen. Stat. § 1-605 through 1-618, applies to this Contract. The Contractor should familiarize itself with the entire NCFCA and should seek the assistance of an attorney if it has any questions regarding the NCFCA and its applicability to any requests, demands and/or claims for payment its submits to the State through the contracting state agency, institution, university or community college.

The purpose of the NCFCA “is to deter persons from knowingly causing or assisting in causing the State to pay claims that are false or fraudulent and to provide remedies in the form of treble damages and civil penalties when money is obtained from the State by reason of a false or fraudulent claim.” (Section 1-605(b).) A contractor’s liability under the NCFCA may arise from, but is not limited to: requests for payment, invoices, billing, claims for extra work, requests for change orders, requests for time extensions, claims for delay damages/extended general conditions costs, claims for loss productivity, claims for loss efficiency, claims for idle equipment or labor, claims for price/cost escalation, pass-through claims of subcontractors and/or suppliers, documentation used to support any of the foregoing requests or claims, and/or any other request for payment from the State through the contracting state agency, institution, university or community college. The parts of the NCFCA that are most likely to be enforced with respect to this type of contract are as follows:

- A “claim” is “[a]ny request or demand, whether under a contract or otherwise, for money or property and whether or not the State has title to the money or property that (i) is presented to an officer, employee, or agent of the State or (ii) is made to a contractor ... if the money or property is to be spent or used on the State's behalf or to advance a State program or interest and if the State government: (a) provides or has provided any portion of the money or property that is requested or demanded; or (b) will reimburse such contractor ... for any portion of the money or property which is requested or demanded.” (Section 1-606(2).)
- "Knowing" and "knowingly." – Whenever a person, with respect to information, does any of the following: (a) Has actual knowledge of the information; (b) Acts in deliberate ignorance of the truth or falsity of the information; and/or (c) Acts in reckless disregard of the truth or falsity of the information. (Section 1-606(4).) Proof of specific intent to defraud is not required. (Section 1-606(4).)
- "Material" means having a natural tendency to influence, or be capable of influencing, the payment or receipt of money or property. (Section 1-606(4).)
- Liability. – “Any person who commits any of the following acts shall be liable to the State for three times the amount of damages that the State sustains because of the act of that person[:] ... (1) Knowingly presents or causes to be presented a false or fraudulent claim for payment or

approval. (2) Knowingly makes, uses, or causes to be made or used, a false record or statement material to a false or fraudulent claim. (3) Conspires to commit a violation of subdivision (1), (2) ...” (Section 1-607(a)(1), (2).)

- The NCFCA shall be interpreted and construed so as to be consistent with the federal False Claims Act, 31 U.S.C. § 3729, et seq., and any subsequent amendments to that act. (Section 1-616(c).)

Finally, the contracting state agency, institution, university or community college may refer any suspected violation of the NCFCA by the Contractor to the Attorney General’s Office for investigation. Under Section 1-608(a), the Attorney General is responsible for investigating any violation of NCFCA, and may bring a civil action against the Contractor under the NCFCA. The Attorney General’s investigation and any civil action relating thereto are independent and not subject to any dispute resolution provision set forth in this Contract. (See Section 1-608(a).)

ARTICLE 54 – TERMINATION FOR CONVENIENCE

- a. Owner may at any time and for any reason terminate CM’s services and work at Owner's convenience. Upon receipt of such notice, CM shall, unless the notice directs otherwise, immediately discontinue the work and placing of orders for materials, facilities and supplies in connection with the performance of this Agreement.
- b. Upon such termination, CM shall be entitled to payment only as follows: (1) the actual cost of the work completed in conformity with this Agreement; plus, (2) such other costs actually incurred by CM as are permitted by the prime contract and approved by Owner; (3) plus ten percent (10%) of the cost of the work referred to in subparagraph (1) above for overhead and profit. There shall be deducted from such sums as provided in this subparagraph the amount of any payments made to CM prior to the date of the termination of this Agreement. CM shall not be entitled to any claim or claim of lien against Owner for any additional compensation or damages in the event of such termination and payment.

DOCUMENT 00 73 00

**SUPPLEMENTARY GENERAL CONDITIONS
(Construction Manager at Risk)**

PART 1 - GENERAL

1.1 SUPPLEMENTARY GENERAL CONDITIONS

- A. North Carolina Department of Administration's State Construction Office Form OC-15CM, in its entirety, shall constitute the General Conditions of the Contract for Construction (the "General Conditions"). These Supplementary General Conditions of the Contract for Construction ("Supplementary Conditions") are attached to, and made a part of, the Contract Documents and are intended to modify and/or supplement the General Conditions. Capitalized terms used herein but not defined herein shall have the same meanings as in the General Conditions.

1.2 ARTICLE 1 – DEFINITIONS

- A. Subparagraph b.: Revise the first sentence to read as follows:

The owner is the State of North Carolina through North Carolina State University.

- B. Subparagraph v.: Revise the first sentence to read as follows:

Provide shall mean purchase, deliver, and install, new, clean, and completely operations, fully tested and ready for use.

1.3 ARTICLE 23 – TIME OF COMPLETION, DELAYS, EXTENSION OF TIME

- A. Subparagraph a.: Revise the paragraph to read as follows:

Subject to adjustments of the Contract Time as provided in the Contract Documents, the Contractor shall achieve Final Acceptance of the entire work not later than 182 calendar days from the date provided on the Notice to Proceed issued by the Designer. Contractor, upon notice of award of contract, shall prepare a construction schedule to complete the project within this time as required by Article 14.

- B. Subparagraph b.: Revise the second sentence to read as follows:

For each day in excess of the above number of days, the Contractor shall pay the owner, as liquidated damages and not as a penalty, a sum of \$250 dollars per day by which the actual date of Final Acceptance exceeds the Contract Time.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid – Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID #: 22-24500-02C
30 January 2025

1.4 ARTICLE 38 – USE OF PREMISES

- A. Subparagraph d.: Add a second sentence to read as follows:

Contractor shall post a sign indicating Firearms are prohibited on the construction site.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF DOCUMENT

DOCUMENT 00 31 26

EXISTING ASBESTOS INFORMATION

1.1 SUMMARY

- A. This document includes information pertaining to existing asbestos information within the facility.

1.2 INVESTIGATION

- A. An investigation of asbestos materials at the building was authorized by the Owner, and was subsequently performed by Matrix Health & Safety Consultants, LLC.
 - 1. Asbestos Abatement Specifications by Matrix Health & Safety Consultants, LLC, dated October 21, 2024.

1.3 REPORT

- A. The Asbestos Investigation Report bound herein is for Bidder's convenience and information only and is not a warranty of conditions.
- B. The complete text of the Report may also be examined by qualified Bidders at the office of the Architect, and where documents are on file for bidding purposes.
- C. The Report is made available for Bidder's information only and is not a Contract Document.

1.4 RESPONSIBILITY

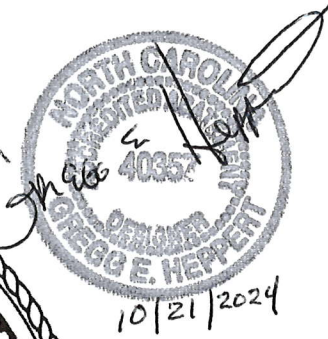
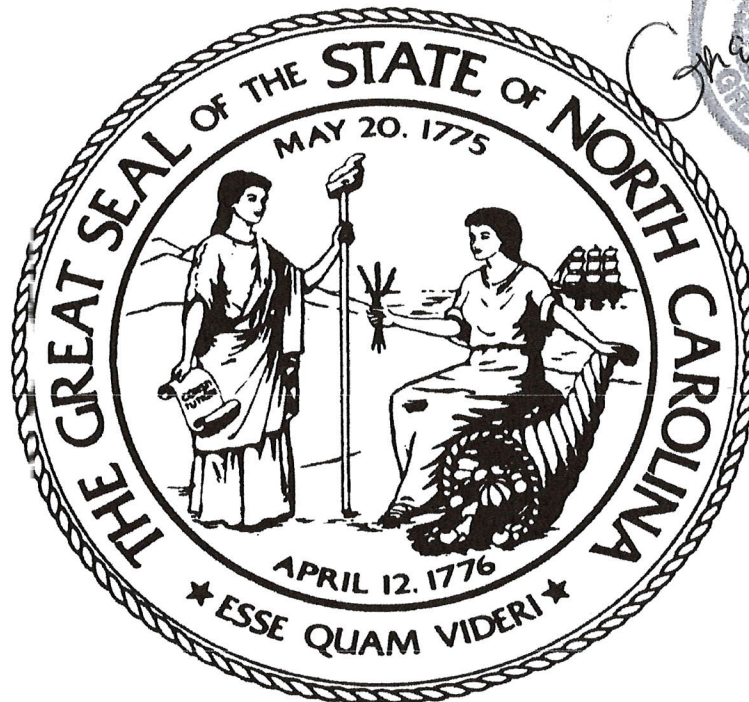
- A. Bidders are expected to examine the building and investigation report and then decide for themselves the character of the materials to be encountered.
- B. The Architect and Owner assume no responsibility for variations in conditions, or for the presence materials.
- C. The Architect and Owner assume no responsibility for Bidder's interpretation of data contained in the Report.

END OF DOCUMENT

STATE OF NORTH CAROLINA

North Carolina State University

Mann Hall



ASBESTOS ABATEMENT SPECIFICATIONS

For Construction

October 21, 2024

MATRIX HEALTH & SAFETY CONSULTANTS, LLC

Gregg E. Heppert

NC Asbestos Designer No 40357

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SECTION 01043

PROJECT COORDINATION

1.01 GENERAL

- A. All asbestos abatement contractors will be licensed general contractors in either the specialty interior, building, unclassified or asbestos categories by the North Carolina Licensing Board of General Contractors and limited for the bid amount.
- B. The contractor shall be responsible for inspecting the site prior to bidding to confirm the scope of the work. Any quantities listed by the designer in the plans, specifications or survey are done so as approximations. The actual quantities of asbestos-containing material to be encountered is the responsibility of the contractor.
- C. The contractor shall furnish and is responsible for all costs including, but not limited to: permit fees, containment preparation, labor, materials, services, insurance, bonding, and equipment necessary to carry out the abatement operations and disposal of all asbestos material in accordance with the plans and specifications, the EPA and OSHA regulations, and any applicable state and local government regulations.
- D. The contractor/employer has and assumes the responsibility of proceeding in such a manner that he offers his employees a workplace free of recognized hazards causing or likely to cause death or serious injury. The contractor shall be responsible for performing this abatement and disposal so that airborne asbestos fiber levels do not exceed established levels.
- E. The contractor will be responsible for all costs associated with employee monitoring to meet the OSHA requirements.
- F. The contractor is responsible for all costs, including additional visits, should the designer and/or the industrial hygiene firm determine that the contractor failed a final inspection. Notification and scheduling of the final inspection during the project is the responsibility of the contractor. The contractor will allow a minimum notice of 72 hours unless a different time frame is agreed upon by the designer and the contractor.
- G. Contractor shall coordinate all asbestos removal activities with the owner and designer. Owner shall have continuous use of areas not included in the scope of this project.

1.02 PERSONNEL

A. Supervisor

1. All supervisors shall be accredited by the Health Hazards Control Unit (HHCU).
2. All supervisors on the project shall have five years experience in the administration and supervision of asbestos abatement projects including work practices, protective measures for building and personnel, disposal procedures, etc.
3. One supervisor shall be provided for every 10 workers inside the containment. A minimum of one supervisor shall be provided per project.
4. The contractor shall have at least one employee on the job site in either a foreman or supervisor's position who is bilingual in the appropriate languages when employing workers who do not speak fluent English.
5. A minimum of one supervisor per company shall have attended a 24 hour respiratory protection course.
6. The abatement contractor shall also be a North Carolina Certified Renovator in accordance with the standards of the Lead-Based Paint Renovation, Repair and Painting Program (EPA CFR Part 745).

B. Worker

1. All workers shall be accredited by the HHCU.

C. Competent Person

1. A competent person, as defined in the OSHA asbestos standard 29 CFR 1926.1101, employed by the contractor must be outside the work area at all times to monitor activity, ensure containment security, provide information to visitors, and provide access to the work area.

D. Employees

1. The contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, any of his employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the owner or designer, the contractor shall remove them immediately from the project.
2. The contractor shall be responsible for compliance with the following concerning employee behavior:
 - a. Under no circumstances are alcohol, drugs or any other type of controlled substances permitted on state property.

- b. All workers are restricted to the construction project site only.
 - c. All vehicles must be parked in areas prearranged with the owner.
 - d. All workers must conform to the following basic dress code when in public areas of the project confines: long pants, shirts, no tank tops, no shorts, no bare backs.
 - e. The contractor is responsible for disposal of all trash brought on state property by his employees, including drink cans, bottles or other food containers and wrappers.
3. Failure to adhere to these rules could result in criminal prosecution and/or removal from the State property.

1.03 MEETINGS

- A. A pre-bid conference will be held by the owner. All remediation contractors submitting a bid are required to attend, visit the site and ask questions concerning the plans and specifications.
- B. Pre-construction - Prior to beginning work on the project, an asbestos pre-construction meeting will be held at the site. The purpose of the pre-construction meeting shall be to coordinate scheduling, operation, and overall logistics for execution of the project. Contractor's project manager and supervisor are required to attend.

1.04 PRE-JOB SUBMITTALS

- A. Submit three complete, bound sets of pre-job submittals to the designer at least 10 days prior to start of work. Work is prohibited until submittal package has been reviewed and approved by designer. A copy of the approved submittals shall be kept in a three-ring binder (project log) by the contractor at the project site in the clean room or in the on-site office of the contractor.
 - 1. Notifications: Provide copies of Asbestos Permit Application and Notification for Demolition/Renovation (DEHNR 3768), which provide written notice to all required agencies, including North Carolina HHC. Provide notification letters to local EMS, fire and police departments.
 - 2. Employee List: Provide copies of lists of supervisors and workers, along with their accreditation and Social Security numbers, to be utilized on the project.
 - 3. Permits: Provide copies of approval of a waste disposal site in compliance with 40 CFR 61.154.
 - 4. Medical: Include individually signed forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.

5. Respirator Training: Copies of most recent fit testing records, individually signed for each worker to be utilized on the project.
6. Project Schedule: Time schedule for the project, outlining the proposed start, setup, clearances, etc. for the project.
7. Initial Exposure Assessment: As required by the OSHA construction asbestos standard 29 CFR 1926.1101.
8. Any other programs or training as outlined by the OSHA and EPA standards.

1.05 POST-JOB SUBMITTALS

- A. Submit three complete, bound sets of post-job submittals to the designer following the final completion of the work. Requests for final payment will not be approved until the submittal package has been reviewed and approved by the designer.
 1. Affidavits: Contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of surety company to final payment.
 2. Manifest: North Carolina Asbestos Waste Shipment Record (DEHNR 3787) receipt from landfill operator which acknowledges the contractor's delivery(s) of waste material. Include date, quantity of material delivered and signature of authorized representative of landfill. Also, include name of waste transporter.
 3. Daily Log: A copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for all persons entering the work area, employee's daily air monitoring data as required by the OSHA standard and written comments by inspectors, industrial hygienists, designers and visitors.
 4. Worker Submittals: Provide copies of accreditations, social security numbers, and medicals for all new workers utilized on the project.
 5. Special Reports: All documents generated under Section 01043.1.06.

1.06 SPECIAL REPORTS

- A. General: Except as otherwise indicated, submit special reports to designer within one day of occurrence requiring special report, with copies to others affected by occurrence. Also keep a copy in the project log book.
- B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site (examples: failure of negative pressure system, rupture of temporary enclosures), prepare and submit a special report to the designer immediately, listing chain of events, persons participating, response by contractor's personnel, evaluation of results or effects, and similar pertinent information. When such events are known or predictable in advance, advise designer in advance at earliest possible date.

- C. Reporting Accidents: Prepare and submit reports of significant accidents, at site and anywhere else work is in progress. Record and document date and actions; comply with industry standards for reporting accidents. For this purpose, a significant accident is defined to include events where personal injury is sustained, or property loss of substance is sustained, or where the event posed a significant threat of loss or personal injury.

1.07 CONTINGENCY PLAN

- A. Contingency Plan: Prepare a contingency plan for emergencies including fire, accident, power failure, negative pressure system failure, supplied air system failure (if applicable), evacuation of injured persons for both life threatening and non-life threatening, or any other event that may require modification or abridgment of decontamination or work area isolation procedures. Include in plan specific procedures for decontamination or work area isolation. Note that nothing in this specification should impede safe exiting or providing of adequate medical attention in the event of an emergency. Keep these plans in the on-site office.
- B. Post outside/in clean room of Personnel Decontamination Unit:
 - 1. Telephone numbers and locations of emergency services including but not limited to, fire, ambulance, doctor, hospital, police, power company, telephone company and the North Carolina HHCU.
 - 2. A copy of Material Safety Data Sheets (MSDS) for any chemicals used during the asbestos project.
 - 3. The contractor shall post asbestos signs in each appropriate language as per the OSHA 29 CFR 1926.1101 standard.

SECTION 01092

CODES AND REGULATIONS

1.01 REFERENCE SPECIFICATIONS

The contractor shall assume full responsibility and liability for compliance with all applicable federal, state and local regulations pertaining to work practices, hauling, disposal, and protection of workers, visitors to the site, and persons occupying areas adjacent to the site.

Unless modified by these project specifications, all specifications for stripping, removal, repair and disposal work shall conform to the following specifications and standards, as applicable, as if completely reproduced herein.

- A. The following regulations published by the Environmental Protection Agency (EPA):
 - 1. "National Emissions Standards for Hazardous Air Pollutants Asbestos," 40 CFR Part 61, Subpart M.
 - 2. "General Provisions," 40 CFR Part 61, Subpart A.
 - 3. "Guidance for Controlling Asbestos-Containing Materials in Buildings" June 1985. (EPA # 560/5-85-024).
 - 4. "Asbestos-Containing Materials in Schools," 40 CFR Part 763, Subpart E including appendices.

- B. The following regulations published by the U.S. Department of Labor, OSHA:
 - 1. "Occupational Exposure to Asbestos, Tremolite, Anthophyllite, and Actinolite; Final Rules," Title 29, Part 1910, Section 1001 and Part 1926, Section 1101 of the Code of Federal Regulations.
 - 2. "Respiratory Protection," Title 29, Part 1910, Section 134 of the Code of Federal Regulations.
 - 3. Construction Industry, Title 29, Part 1926, of the Code of Federal Regulations.
 - 4. "Access to Employee Exposure and Medical Records," Title 29, Part 1910, Section 20 of the Code of Federal Regulations.
 - 5. "Hazard Communication," Title 29, Part 1926, Section 59 of the Code of Federal Regulations.
 - 6. "Specifications for Accident Prevention Signs and Tags," Title 29, Part 1910, Section 145 of the Code of Federal Regulations.

- C. The following regulations published by North Carolina state agencies:
1. North Carolina Asbestos Hazard Management Program Rules as adopted by 15A NCAC 19C .0600.
 2. "North Carolina Occupational Safety and Health Standards for the Construction Industry," 29 CFR Part 1926 as adopted by T13 NCAC 07F .0201, and shipyard T13:07F.0500.
 3. North Carolina General Statutes, Chapter 95, 97, 130.
- D. The following documents published by the American National Standards Institute:
1. "Fundamentals Governing the Design and Operation of Local Exhaust Systems," Z9.2-1979.
 2. "American National Standard for Respiratory Protection Respiratory Use - Physical Qualifications for Personnel," Z88.6-1984.
 3. "Practices for Respiratory Protection," Z88.2-1992.

1.02 NOTICES

- A. The contractor shall notify the following offices in writing within the time frame specified by the NESHAP regulations prior to beginning any asbestos removal operations.

1. State Agencies

NC Department of Health and Human Services – OEEB
 Division of Public Health
 Health Hazard Control Unit
(Regular Mail)

1912 Mail Service Center
 Raleigh, N.C. 27699-1912
 Phone: (919) 733-0820
 Fax: (919) 733-8493

(UPS, Fed Ex, etc.)
 NCDHHS
 Health Hazard Control Unit
 NCDHHS/Public Health
 Room D-1
 5505 Six Forks Road
 Raleigh, N.C. 27609-3806

N.C. Department of Labor
 Division of Occupational Safety and Health
 319 Chapanoke Road, Suite 105
 Raleigh, N.C. 27603-3432
 Telephone: 1-800-LABOR-NC or (919) 662-4602
 Fax: (919) 662-4625

2. Emergency Departments

Notify the local emergency medical services, police and fire departments in writing of the type and scope of work being performed and request these departments make an inspection prior to beginning the work.

3. Licenses

Maintain current licenses for contractor and accreditation for workers and supervisors as required by applicable State or local jurisdictions for the removal, transporting, disposal or other regulated activity relative to the work of this contract.

4. Contractor is responsible for payment of all permit fees required for this project.

SECTION 01410

AIR MONITORING - INDUSTRIAL HYGIENE FIRM

1.01 GENERAL

- A. The owner shall be responsible for the coordination and contracting of an industrial hygiene firm. Services of the industrial hygiene firm will be paid by the owner.
- B. Air monitoring shall be done under the direct supervision of a North Carolina accredited supervising air monitor (SAM), except for sampling performed by the contractor to satisfy OSHA requirements.
- C. SAM shall be accredited per the Asbestos Hazard Management Program rules.
- D. Air monitor shall be accredited as per the Asbestos Hazard Management Program rules and work under the direct supervision of a SAM.
- E. The SAM representing each firm shall have taken a 24-hour respiratory protection course that is either NIOSH, AIHA or HHCU recognized.
- F. The industrial hygiene firm shall submit copies of their N.C. accreditation's and documentation on respiratory protection training to the designer prior to the award of the contract.
- G. If specific project activities are assigned to an air monitor, the SAM is expected to be in direct control and responsible for industrial hygiene work completed on the project. The SAM shall approve and sign all air monitoring results performed by the air monitor. The SAM signature must be an original. No rubber stamp signature shall be accepted.
- H. Employees of the HHCU shall have right of entry into the project. The HHCU's SAM shall have final authority over the industrial hygiene firm on the project.

1.02 DESCRIPTION OF WORK

- A. The industrial hygiene firm shall offer expertise to the designer and contractor, but is not directly responsible for the performance of the job.
- B. At the job site, the industrial hygiene firm is expected to observe, be aware, and comment on general work site conditions and activities as they relate to the specifications and profession of industrial hygiene, and make recommendations in writing to the designer and contractor.
- C. The industrial hygiene firm is responsible for overseeing the protection of the environment from contamination, protection of persons in adjacent areas, and assurance that the areas are acceptable for occupancy.

- D. The industrial hygiene firm has the authority to direct the contractor relative to safety and environmental concerns. This includes stopping the work if necessary. All directions and comments made by the industrial hygiene firm to the contractor shall be written with a copy to the designer.
- E. The industrial hygiene firm shall furnish the contractor a copy of his field report within 24 hours of the visit. Copies of field notes and reports of observations shall be kept in project log book.
- F. The SAM shall review and make comments to the designer on the submittals listed in Section 01043.
- G. The SAM shall approve any change in contractor's respiratory protection. This includes a review of the historical data.
- H. The industrial hygiene firm is to conform to the contractor's schedule and shall respond to necessary changes, provided an advance notice is given as outlined in Section 01043.
- I. The industrial hygiene firm's project monitor shall furnish designer and contractor with a pager or mobile phone number where he can be reached quickly at all times.
- J. The industrial hygiene firm shall notify the designer and contractor, in writing, of any failed clearance visits.
- K. At the completion of the project, the industrial hygiene firm shall prepare a report describing the assessment of the project, all air monitoring data, acceptance letters, calibration records, and a description of the project as it proceeded to completion and submit four copies of the report to the designer.

1.03 AIR MONITORING

- A. Ambient Air Monitoring: The purpose of ambient air monitoring by the industrial hygiene firm will be to detect discrepancies in the work area isolation such as:
 - 1. Contamination of the building outside of the work area with airborne asbestos fibers.
 - 2. Failure of filtration or rupture in the negative pressure system.
 - 3. Confirm the work practices established by the contractor and respiratory protection provided for employees are adequate.
- B. Work Area Airborne Fiber Levels: The owner's industrial hygiene firm will monitor airborne fiber levels in the work area. The purpose of this air monitoring will be to detect airborne fiber levels which may challenge the ability of the work area isolation procedures to protect the balance of the building or outside of the building from contamination by airborne fibers.

- C. Work Area Clearance: To determine if the elevated airborne fiber levels encountered during abatement operations have been reduced to an acceptable level, the industrial hygiene firm will sample and analyze air per Section 01714.
- D. In accordance with AHMB Program Rules, the SAM shall develop an Abatement Project Monitoring Plan which complies with EPA and OSHA analytical criteria and will provide a valid representation of airborne fiber concentrations both inside and outside the work area. This program is not intended to satisfy the contractor's requirement for sampling under the OSHA regulation. All personnel and area sampling conducted by the industrial hygiene firm shall be personally observed. Air sampling pumps shall not be left unattended for extended periods of time.
1. The SAM shall submit a written project monitoring plan to the designer with a copy to the contractor. The following information shall be required for the submittal.
 - a. The name, address and telephone number of the industrial hygiene firm.
 - b. The name, address, telephone number and NIOSH's PAT designation and proficiency data for the laboratory analyzing the air samples. Analysis of all samples collected shall be by a laboratory currently proficient in NIOSH's "Proficiency Analytical Testing Program for Laboratory Quality Control" for asbestos. The acceptable sampling and analysis method is NIOSH 7400, latest revision.

Persons performing phase contrast microscopy (PCM) analysis at the asbestos removal location shall be proficient in the American Industrial Hygiene Association's Asbestos Analyst Registry Program [AAR].
 - c. A proposed air sampling strategy which shall include: a projected number of air samples, locations, the types of air samples to be collected (personal, area, ambient), how the air samples are to be collected (TWA, ceiling, other), the equipment to be used (pumps, calibration equipment, filters, other), and how the samples will be transported to the laboratory.
 1. All personal air samples will be collected in such a manner as to comply with OSHA collection and analytical regulations and to provide a valid representation of airborne fiber levels. The samples collected by the industrial hygiene firm on personnel do not satisfy the contractor's responsibility under OSHA.
 2. All final area air sampling will comply with all State and Federal requirements in measuring airborne asbestos following an abatement action.

3. Air samples will be analyzed and results made available as per the AHMB Program Rules. Copies of all air sampling results shall be signed by the SAM and a copy posted at the job site. These copies shall include the following: sample number, sample location, activity represented by sample, flow rate, sample time, comments and sample results. A statement will be included on each submission that the requirements of this contract have been met as they apply to the activities of the SAM.
 4. If TWA samples are being collected by the contractor for the purpose of reducing respiratory protection requirements, the industrial hygiene firm shall directly observe the conditions and work practices represented by each sample and make appropriate notes in the bound book on site. The SAM shall review all TWA air sampling results which are used for reducing respiratory protection requirements before accepting the results.
- E. Supplemental air monitoring may be conducted inside and outside the work area by the HHCU. This supplemental sampling does not fulfill air monitoring responsibilities required by OSHA, EPA or this contract.

SECTION 01503

TEMPORARY FACILITIES

1.01 GENERAL

- A. Provide temporary connection to existing building utilities or provide temporary facilities as required herein or as necessary to carry out the work.
- B. Use qualified tradesmen for installation of temporary services and facilities. Locate, modify and extend temporary services and facilities where they will serve the project adequately and result in minimum interference with the performance of the work.
- C. The owner's maintenance personnel shall lock and tag out all electrical and HVAC equipment in the asbestos abatement area. The contractor shall verify that the power and HVAC have been locked and tagged out prior to beginning work.
- D. The owner shall move all furniture, books, computers, records, equipment, etc. prior to the contractor's arrival date as specified.

1.02 WATER SERVICE

- A. Owner shall supply a source of water. Contractor bears all expense of heating and getting water to the work and decontamination areas.
- B. Supply hot and cold water to the decontamination unit in accordance with Section 01563. Hot water shall be supplied at a minimum temperature of 100 degrees Fahrenheit.
- C. After completion of use, connections and fittings shall be removed without damage or alteration to existing water piping and equipment.

1.03 ELECTRICAL SERVICE

- A. General: Comply with applicable NEMA, NEC and UL standards and governing state and local regulations for materials and layout of temporary electric service.
- B. Ground Fault Protection: Provide receptacle outlets equipped with ground fault circuit interrupters, reset button and pilot light, for plug-in connection of power tools and equipment.
- C. Provide a weatherproof, grounded temporary electric power service and distribution system of sufficient size, capacity and power characteristics to accommodate performance of work during the construction period.
- D. Install temporary lighting adequate to provide sufficient illumination for safe work and traffic conditions in every area of work.

- E. Provide services of an electrician, on a standby basis, to service electrical needs during the abatement process.
- F. Provide additional power service and distribution service, consisting of individual dedicated 15 amp 120 volt circuits to electrical drops with receptacle outlets equipped with ground fault interrupt protection, color coded for the exclusive use of the industrial hygiene firm. Provide a minimum of five drops per containment inside work area.

1.04 FIRST AID

- A. A minimum of one first aid kit shall be located in the clean room. Additional first aid kits as the contractor feels is adequate or is required by law shall be located throughout the work area.

1.05 FIRE EXTINGUISHERS

- A. Comply with the applicable recommendations of NFPA Standard 10 - "Standard for Portable Fire Extinguishers." Locate fire extinguishers where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher in each work area equipment room and one in the clean room of the personnel decontamination unit.

1.06 TOILET FACILITIES

- A. Provide temporary toilet facilities to be used by contractor's employees. Location of toilet facilities shall be approved by owner.

1.07 PARKING

- A. Park only in areas designated by the owner.

1.08 BUILDING SECURITY

- A. Maintain personnel on-site at all times any portion of the work areas are open or not properly secured. Secure work areas completely at the end of each day.

1.09 STORAGE

- A. Supply temporary storage required for storage of equipment and materials for duration of project. Trailer and storage dumpsters will be maintained in areas designated by the owner.

SECTION 01513

NEGATIVE PRESSURE SYSTEM

1.01 GENERAL

- A. High efficiency particulate air (HEPA) filter exhaust systems equipped with new HEPA filters for each containment shall be used. Exhaust equipment and systems shall comply with ANSI Z9.2-79 and used according to manufacturer's recommendations.
- B. A system of HEPA-equipped air filtration devices shall be configured so that a pressure differential is established between the work area and the surrounding area (-0.02 to -0.04" water column). A continuous chart-recorded manometer shall be used to confirm this condition.
- C. Additional air filtration devices shall be provided inside the work area for emergency standby as well as for circulation of dead air spaces.
- D. The pressure differential is maintained at all times after preparation is complete and until the final visual inspection and air tests confirm the area is clean and acceptable for occupancy and the designer confirms verbally with written follow-up to discontinue the use of the negative pressure system.
- E. Air shall be exhausted outside the building. Any variations must be approved by the designer. Locations of negative air exhaust shall be approved by owner and designer. Contractor shall install templates (5/8" fire rated plywood) for exhaust of negative air. Contractor is responsible for removal and replacement of windows required for negative air exhaust.
- F. The contractor shall check daily for leaks and log his checks in the bound log book. This includes checks internal to air-moving devices.
- G. There shall be a minimum of four air changes per hour in any containment.

SECTION 01526

WORK AREA PREPARATION

1.01 GENERAL

- A. Before work begins in an area, a decontamination unit must be in operation as outlined in Section 01563.
- B. Completely isolate the work area from other parts of the building so as to prevent contamination beyond the isolated area.
- C. Temporary facilities shall be addressed as outlined in Section 01503.

Full Containment (Interior)

Spray-Applied Ceiling Texture
Asbestos-Containing Spline Ceiling Tiles
Asbestos-Containing Floor Tile and Associated Mastic
Asbestos-Containing Floor Tile Mastic
Thermal System Pipe Insulation
Asbestos-Containing Door Caulk

- D. The contractor shall set up a work area, load out, and decontamination area as described in the specifications. Any variations must be approved by the designer. The decontamination facility outside of the work area shall consist of a change room, shower room and equipment room as described in Section 01563.
- E. Critical Barriers: The contractor shall thoroughly seal (2-layers of 6-mil polyethylene sheeting) the work area for the duration of the work by completely sealing off all individual openings and fixtures in the work area, including, but not limited to, heating and ventilation ducts, doorways, corridors, windows, skylights and lighting, with polyethylene sheeting taped securely in place. If the contractor is using sealant materials to fill in small holes or cracks, the material shall have appropriate fire ratings.
- F. The contractor shall wet clean and/or HEPA vacuum all items and equipment in the work area suspected of being contaminated with asbestos, but not in direct contact with the asbestos material and either secure these items in place with polyethylene sheeting or have them removed from the work area.
- G. Floors: Where flooring does not exist for removal, apply two layers of 6 mil (minimum) polyethylene plastic sheeting with joints overlapped 24 inches and taped securely. Plastic shall be carried up walls a minimum of 12 inches and secured.
- H. Walls: Apply two layers of 6 mil (minimum) polyethylene plastic sheeting with joints lapped 24 inches and taped securely. Plastic shall be lapped over floor (if applicable) coverings and taped securely (exclude wall scheduled for demolition).

- I. Floors and walls shall be installed in such a manner that they may be removed independently of each other and the critical barriers.
- J. Entrances and exits from the work area will have triple barriers of polyethylene plastic sheeting so that the work area is always closed off by one barrier when workers enter or exit.
- K. No water may be left standing on the floor at the end of the work day.
- L. Floor surfaces, walls, finishes or coverings, etc., that in the contractor's opinion will likely be damaged by water or that may become contaminated with asbestos, shall have additional protective preparation as the contractor sees appropriate, at his cost, to protect the original condition of the surfaces.
- M. Any costs associated with physical damage caused by water or securing polyethylene sheeting to areas inside or outside the abatement area shall be the contractor's responsibility.
- N. The contractor shall establish and mark emergency and fire exits from the work area. Emergency procedures shall have priority over established decontamination entry and exit procedures. Audible and visible fire and emergency evacuation alarms shall be installed so as to be heard and seen throughout the entire work area.
- O. Integrity of these seals shall be regularly checked and maintained by the contractor.
- P. After work area preparation, the contractor shall notify the designer verbally with written follow-up that he is ready for a prework inspection.

Glovebag Removal of Thermal System Insulation

- A. The contractor shall isolate the work areas utilizing appropriate barrier tape and signage.
- B. Contractor shall install 6-mil polyethylene sheeting on floors below areas of asbestos removal.
- C. Entrances and exits from the work area will have triple barriers of polyethylene plastic sheeting so that the work area is always closed off by one barrier when workers enter or exit. Contractor shall affix appropriate signage to entrance/exit.
- D. Contractor shall utilize local air filtration devices in areas where asbestos abatement is performed.
- E. The contractor shall wet clean and/or HEPA vacuum all items and equipment in the work area suspected of being contaminated with asbestos, but not in direct contact with the asbestos material and either secure these items in place with polyethylene sheeting or have them removed from the work area.

- F. No water may be left standing on the floor at the end of the work day.
- G. Floor surfaces, walls, finishes or coverings, etc., that in the contractor's opinion will likely be damaged by water or that may become contaminated with asbestos, shall have additional protective preparation as the contractor sees appropriate, at his cost, to protect the original condition of the surfaces.
- H. Any costs associated with physical damage caused by water or securing polyethylene sheeting to areas inside or outside the abatement area shall be the contractor's responsibility.
- I. The contractor shall establish and mark emergency and fire exit from the work area. Emergency procedures shall have priority over established decontamination entry and exit procedures. Audible and visible fire and emergency evacuation alarms shall be installed so as to be heard and seen throughout the entire work area.
- J. Integrity of these seals shall be regularly checked and maintained by the contractor.
- K. After work area preparation, the contractor shall notify the designer verbally with written follow-up that he is ready for a prework inspection.

Non-Friable, Non-regulated Removal (Door Caulking and Window Glazing)

- A. Asbestos abatement contractor shall isolate the work area utilizing appropriate barrier tape and signage.
- B. Contractor shall install 6-mil polyethylene sheeting on floors/ground below areas of asbestos removal.
- C. Contractor shall install 6-mil polyethylene sheeting on opposite side of the windows and doors scheduled to be removed.
- D. Asbestos abatement contractor shall apply duct tape or equal to secure window glazing in place during window removal.

SECTION 01560

WORKER PROTECTION

1.01 GENERAL

- A. Provide worker protection as required by OSHA, state and local standards applicable to the work. Contractor is solely responsible for enforcing worker protection requirements at least equal to those specified in this Section.
- B. Each time the work area is entered the contractor shall require all persons to remove all street clothes in the changing room of the personnel decontamination unit and put on new disposable coverall, new head cover, and a clean respirator. Proceed through shower room to equipment room and put on work boots.
- C. Workers shall not eat, drink, smoke, chew gum or chew tobacco in the work area, the equipment room, the load out area, or the clean room.

1.02 WORKER TRAINING

- A. Train all workers in accordance with 29 CFR 1926 and North Carolina state regulations regarding the dangers inherent in handling asbestos, breathing asbestos dust, proper work procedures and personal and area protective measures.

1.03 MEDICAL EXAMINATIONS

- A. Provide medical examinations for all workers. Examination shall as a minimum meet OSHA requirements as set forth in 29 CFR 1926 and N.C. Workmen's Compensation Act Dusty Trades Examination Record (DEHNR Form 2796).

1.04 PROTECTIVE CLOTHING

- A. Provide disposable full-body coveralls and disposable head covers, and require that they be worn by all workers in the work area. Provide a sufficient number for all required changes, for all workers in the work area.
- B. Boots: Provide work boots with non-skid soles and, where required by OSHA, foot protection for all workers.
- C. Gloves: Provide work gloves to all workers and require that they be worn at the appropriate times. Do not remove gloves from work area. Dispose of work gloves as asbestos-contaminated waste at the completion of the project.

1.05 ADDITIONAL PROTECTIVE EQUIPMENT

- A. Type C respirators, disposable coveralls, head covers and footwear covers shall be provided by the contractor for the owner, the designer, Industrial hygiene firm and other authorized representatives who may inspect the job site.

1.06 DECONTAMINATION PROCEDURES

- A. Require that all workers use the following decontamination procedure as a minimum requirement whenever leaving the work area:
 - 1. Remove disposable coveralls, disposable head covers, and disposable footwear covers or boots in the equipment room.
 - 2. Still wearing respirators, proceed to showers. Showering is mandatory. Care must be taken to follow reasonable procedures in removing the respirator to avoid asbestos fibers while showering. The following procedure is required as a minimum:
 - a. Thoroughly wet body including hair and face.
 - b. With respirator still in place thoroughly wash body, hair, respirator face piece, and all exterior parts of the respirator.
 - c. Take a deep breath, hold it and/or exhale slowly, completely wet hair, face and respirator. While still holding breath, remove respirator and hold it away from face before starting to breathe.
 - d. Carefully wash face piece of respirator inside and out.
 - e. Shower completely with soap and water; rinse thoroughly.
 - f. Rinse shower room walls and floor prior to exit.
 - g. Proceed from shower to changing (clean) room and change into street clothes or new disposable work items.
 - 3. After showering, each employee shall inspect, clean and repair his respirator as needed. The respirator shall be dried, placed in a suitable storage bag and properly stored.

SECTION 01562

RESPIRATORY PROTECTION

1.01 DESCRIPTION OF WORK

- A. Instruct and train each worker involved in asbestos abatement in proper respirator use and require that each worker always wear a respirator, properly fitted on the face, in the work area from the start of any operation which may cause airborne asbestos fibers until the work area is completely decontaminated. Use respiratory protection appropriate for the fiber level encountered in the workplace or as required for other toxic or oxygen-deficient situations encountered.

1.02 GENERAL

- A. Provide workers with personally issued and marked respiratory equipment approved by NIOSH and MSHA and suitable for the asbestos exposure level in the work areas according to OSHA Standard 29 CFR 1926.1101 and other possible contaminants employees might be exposed to during the project.
- B. Provide respiratory protection from the time the first operation involved in the project requires contact with asbestos-containing materials (including construction of decontamination units, construction of airtight barriers/barricades, and placing of plastic sheeting on walls) until acceptance of final air clearance test results by the industrial hygiene firm.
- C. The minimum respiratory protection for the project during gross removal of friable materials shall be a full-face powered air purifying respirator.
- D. The designer may, under certain circumstances, allow the contractor to downgrade respiratory protection during the final cleaning phase. However, the eight-hour TWA air sampling data must document the exposure level, and the SAM must write a letter to the designer allowing the contractor to reduce respiratory protection.
- E. Respirator fit testing shall be performed as a minimum at the beginning of the project, at any change in respiratory protection equipment, and at any time during the project if requested by the employee or SAM. Fit testing is to be performed by one of the methods listed in the 29 CFR 1926.1101, Appendix C.
- F. If supplied air respirators are used, the contractor shall provide a minimum of Grade "D" breathing air as set forth in the Compressed Gas Association's "Commodity Specifications for Air," G-7.1. The contractor shall test for Grade "D" breathing air initially and daily thereafter. Daily testing is not needed if the contractor has an air purification system which has CO and organic purging capabilities as well as a continuous CO monitor and alarm calibrated at 10 ppm. The system must be calibrated at least once a week or when it is moved.

- G. Provide emergency backup air supply, egress SCBA or egress HEPA filters for each worker in work area at all times when Type-C (supplied air) respirators are required. Breathing air system shall provide one hour of reserve air, calculated for maximum crew size for emergency evacuation.
- H. Where Type C respirators are utilized, the contractor is required to have an employee in the vicinity of the source of air. The contractor shall take into account the location of the fresh air intake to ensure no pollutant source is in the vicinity. The audible alarm shall be located where the employees inside and outside containment can hear the alarm.
- I. Do not allow the use of single-use, disposable or quarter-face respirators for any purpose.
- J. The contractor may submit a new exposure assessment (as per 29 CFR 1926.1101) to the SAM with a request to downgrade to less protective respirators. The SAM will make a recommendation to the designer, who will issue a decision in writing to the contractor approving or denying his request. If the contractor disagrees with the decision, then the representative air sampling data may be reviewed by the HHCU for a final decision.

SECTION 01563

DECONTAMINATION UNITS

1.01 DESCRIPTION OF WORK

- A. Provide separate personnel and equipment/loadout decontamination facilities. Require that the personnel decontamination unit be the only means of ingress and egress for the work area. Require that all materials exit the work area through the equipment/loadout decontamination unit. Contractor shall comply with 29 CFR 1926.1101, specifically paragraph (j) Hygiene facilities and practices for employees.

1.02 GENERAL

Provide separate personnel decontamination units and equipment/loadout decontamination units when practical. When personnel decontamination units and equipment / loadout decontamination units are located outside the building, the decontamination units shall be constructed inside a plywood shell. The plywood shell shall be constructed of UL-labeled, fire-treated lumber and plywood. 5/8" non-com ptd. MDO plywood on 3-5/8" non-com studs.

- A. Personnel Decontamination Unit
 1. Provide a Personnel Decontamination Unit consisting of a serial arrangement of connected rooms or spaces, changing room, shower room, equipment room. Each shall be separated by a minimum of three curtain doorways. Require all persons without exception to pass through this decontamination unit for entry into and exiting from the work area for any purpose. Do not allow parallel routes for entry or exit. Do not remove equipment or materials through Personnel Decontamination Unit.
 2. Provide temporary lighting within decontamination units as necessary to reach an adequate lighting level.
 3. Maintain floor of changing room dry and clean at all times. Do not allow the overflow water from the shower to escape the shower room.
 4. Damp wipe all surfaces twice after each shift change with a disinfectant solution.
 5. Provide hot and cold water, drainage and standard fixtures including an elevated shower head as necessary for a complete and operable shower. A water hose and bucket is not an acceptable shower.
 6. Arrange water shut off and drain pump operation controls so that a single individual can shower without assistance from either inside or outside of the work area.

7. Pump shower waste water to drain. Provide 20 micron and 5 micron waste water filters in line to drain. Change filters daily or more often if necessary.
8. If the decontamination area is located within an area containing friable asbestos on overhead ceilings, ducts, piping, etc., provide the area with a minimum 5/8 inch plywood "ceiling" with two layers of polyethylene sheeting covering the top of the "ceiling."
9. Visual Barrier: Where the decontamination area is immediately adjacent to and within view of occupied areas or the exterior of the building, provide a visual barrier of opaque plastic sheeting so that worker privacy is maintained and work procedures are not visible to building occupants. Where the area adjacent to the decontamination area is accessible to the public, construct a solid barrier on the public side of the sheeting to protect the sheeting. Construct barrier with wood or metal studs, max. 16 inches on center, covered with minimum 5/8 inch fire treated plywood.
10. Exterior decontamination units shall be constructed in a manner which accommodates the entrance to be locked at the end of shifts or when contractor is not on-site.

B. Equipment Decontamination Units:

1. Provide an equipment decontamination unit consisting of a serial arrangement of rooms, clean room, holding area, and washroom, each room separated by a minimum of three curtain doorways, for removal of equipment and material from work area. Do not allow personnel to enter or exit work area through equipment decontamination unit.
2. Washroom: Provide washroom for cleaning of bagged or drummed asbestos-containing waste materials passed from the work area.
3. Holding Area: Provide holding area as a drop location for sealed drums and bagged asbestos-containing materials passed from the washroom.
4. Clean Room: Provide clean room to isolate the holding area from the building exterior or occupied areas.
5. Equipment or Material: Obtain all equipment or material from the work area through the equipment decontamination unit according to the following procedure:
 - a. When passing contaminated equipment, sealed plastic bags, drums or containers into the washroom, close all doorways of the equipment decontamination unit, other than the doorway between the work area and the washroom. Keep all outside personnel clear of the equipment decontamination unit.
 - b. Once inside the washroom, wet-clean the bags and/or equipment.

- c. When cleaning is complete, insert bagged material into a clean bag/drum during the pass between the washroom and holding area. Close all doorways except the doorway between the washroom and holding area.
- d. Workers from the building exterior enter the clean room then the holding area to remove decontaminated equipment and/or containers for disposal. Require these workers to wear full protective clothing and respiratory protection as described in Section 01562.

C. Use of Elevator:

1. **Elevator not operational**

D. Decontamination Unit Contamination:

- 1. If the air quality in the decontamination unit exceeds 0.01 fibers per cc analyzed by PCM or 70 structures per mm squared analyzed by TEM or its integrity is diminished through use as determined by the designer or industrial hygiene firm, no employee shall use the unit until corrective steps are taken and approved by the designer and industrial hygiene firm.

SECTION 01711

PROJECT DECONTAMINATION

1.01 GENERAL

- A. Carry out a first cleaning of all surfaces of the work area including plastic sheeting, tools, scaffolding and/or staging by use of damp-cleaning and mopping and/or a high efficiency particulate air (HEPA) filter vacuum until there is no visible debris from removed materials or residue on plastic sheeting or other surfaces. Do not perform dry-dusting or dry-sweeping.
- B. Equipment shall be cleaned and all contaminated materials removed before removing polyethylene from the walls and floors.
- C. The contractor shall replace all prefilters and clean the inside and outside of the HEPA exhaust units.
- D. After polyethylene sheets have been removed from walls and floors, but are still remaining on all windows, doors and the critical components, the contractor shall clean all surfaces in the work area, including ducts, electrical conduits, steel beams, roof deck, etc., with amended water and/or HEPA-filtered vacuum.
- E. After cleaning the work area, the contractor shall allow the area to thoroughly dry and then wet-clean and/or HEPA vacuum all surfaces in work area again.
- F. At the completion of the cleaning operation, the contractor's supervisor shall perform a complete visual inspection of the work area to ensure that the work area is dust- and fiber-free. If the supervisor believes he is ready for a final project decontamination inspection, he shall notify the designer.
- G. The designer shall contact the industrial hygiene firm and advise the firm of the final project decontamination inspection requested by the contractor. Work area clearance is described in section 01714.
- H. Final project decontamination inspection includes the visual inspection and air monitoring clearance.
- I. Visual inspection for acceptance shall be performed after all areas are dry.
- J. The industrial hygiene firm shall perform the final visual inspection and conduct the final air clearance. Any discrepancies found shall be documented in the form of a punch list.
- K. Final air sampling shall not commence until the visual inspection is completed and passed.
- L. If the industrial hygiene firm or the designer finds that the work area has not been adequately decontaminated, cleaning and/or air monitoring shall be repeated at

the contractor's expense, including additional industrial hygiene fees, until the work area is in compliance.

- M. After the work area is found to be in compliance, all entrances and exits shall be unsealed and the plastic sheeting, tape and any other trash and debris shall be disposed of in sealable plastic bags (6 mil minimum) and disposed of as outlined in Section 02084.
- N. Contractor shall remove all polyethylene sheeting, tape, and any trash or debris after hours or on weekends.
- O. All HEPA unit intakes and exhausts shall be wrapped with six mil polyethylene before leaving the work area.
- P. After the industrial hygiene firm has approved the final project decontamination and the contractor has completed the tear down for occupancy by others, the designer shall perform the project final inspection as outlined in the general conditions.
- Q. Any residual asbestos that may be present after removing critical barriers, that in the designer's judgment should have been cleaned during the precleaning phase prior to installing critical barriers, shall be cleaned and cleared at the contractor's expense.
- R. There shall be appropriate seals totally enclosing the inspection area to keep it separate from clean areas or other areas where abatement is or will be in progress. Once an area has been accepted and passed air tests, loss of the critical barrier integrity or escape of asbestos into an already clean area shall void previous acceptance and tests. Additional visual and final air clearance sampling shall be required at the contractor's expense.

SECTION 01714

WORK AREA CLEARANCE

1.01 GENERAL

- A. Notification and scheduling of the final inspection during the project is the responsibility of the contractor.

1.02 FINAL CLEARANCE TESTING

- A. After the second cleaning operation and after the area is completely dry, the following procedure test shall be performed:
1. A final visual inspection shall be conducted by the industrial hygiene firm. The inspection shall be conducted following the guidelines set forth in the American Society for Testing and Materials, Standard Practices for Visual Inspection of Asbestos Abatement Projects, Designation: E1368.90. If the work area is found visibly clean, air samples will be collected by the industrial hygiene firm.
 2. During the air testing, the accredited air monitor shall cause disruptive air currents as described in the EPA-AHERA regulations (40 CFR Part 763, Subpart E, Appendix A).
 3. Clearance samples analyzed by Phase Contrast Microscopy (PCM) (minimum of five samples using NIOSH 7400 Method). The maximum flow rate shall be 12 liters per minute, with a minimum sample size of 2000 liters for each sample. Clearance Criteria shall be less than 0.01 f/cc for all samples.
 4. Clearance samples analyzed by Transmission Electron Microscopy (TEM), using the Mandatory Transmission Electron Microscopy Method described in 40 CFR Part 763, Subpart E, Appendix F. Clearance criteria shall be an arithmetic mean less than or equal to 70 structures per square millimeter or a z-test less than or equal to 1.65. Clearance sample turn around shall be 24 hours after TEM samples are collected.

<u>Work Area</u>	<u>Clearance Criteria</u>
Interior - Full Containment	TEM
Glovebag Removal	TEM
Exterior – Nonfriable, Nonregulated door caulking/roofing	Visual

5. The industrial hygiene firm shall immediately report the final air sampling clearance results to the designer.

6. The use of the negative pressure system may be discontinued after the industrial hygiene firm instructs the contractor that he has passed the final project decontamination inspection.

SECTION 02080

ASBESTOS REMOVAL

1.01 GENERAL

- A. Prior to starting asbestos removal, the contractor's equipment, work area and decontamination units will be inspected and approved by the designer.
- B. All loose asbestos material removed in the work area shall be adequately wet, bagged, sealed and labeled properly before personnel breaks or end of shift.
- C. All plastic sheeting, tape, cleaning material, clothing and all other disposable material or items used in the work area shall be packed into sealable plastic bags (6 mil minimum) and treated as contaminated material.
- D. All material shall be double-bagged.
- E. All excess water (except shower water) shall be combined with removed material or other absorptive material and properly disposed of as per EPA regulations. Contractor shall not place water in storm drains, onto lawns, or into ditches, creeks, streams, rivers or oceans.

Lead-Based Paint

Lead-based painted components identified in the Limited XRF Lead-Based Paint Survey Report Dated March 24, 2024, may be disturbed during the course of asbestos abatement operations. Personnel performing renovation or demolition activities that may disturb the painted surfaces that contain any quantity of lead should comply with all current OSHA regulations (OSHA Lead in Construction Standard 29 CFR 1926.62) in order to minimize employee exposure to lead.

PCB's

PCB in excess of 50 ppm were found in exterior door caulk, exterior window caulk, exterior vent caulk, interior door caulk and interior duct mastic. PCB less than 50 ppm were found in interior block filler/paint, internal duct mastic, and window glazing. Please see attached PCB Remediation Plan.

1.02. SCOPE OF WORK

- A. The scope of work includes the removal and disposal of asbestos-containing spray applied texture from concrete beams and ceilings, floor tile, floor tile mastic, ceiling tiles, transite pipe, thermal system pipe insulation and roof drain insulation, utilizing full containments where shown on the accompanying drawings.
- B. Scope of work also includes the removal of asbestos-containing chalk board mastic, cork board mastic, door caulking, window caulking, roof flashing mastic and roof curb mastic utilizing nonfriable, nonregulated removal techniques.

C. Estimated quantities of asbestos-containing materials scheduled for removal and disposal throughout the building are listed below:

Spray Applied Ceiling Texture 20,000 Square Feet

Floor Tile and Floor Tile Mastic 26,300 Square Feet

12"x12" Spline Ceiling Tiles 33,000 Square Feet

Cementitious Pipe 100 Linear Feet

Thermal System Pipe Insulation and Fittings 2,000 Linear Feet

Drain Line Insulation 500 Linear Feet

Chalk Board Mastic 500 Square Feet

Interior Door Caulk 202 Door Frames

Sink Mastic 7 Sinks

Exterior Roof Flashing Mastic and Curbing Mastic – 100 Square Feet

Exterior Window/Door Caulk - 2 Front Entry Store Fronts

Exterior Window Glazing – South Tower Windows

PCB Storefront Caulk - 2 Exterior Front Entry Store Fronts

PCB Storefront Caulk – 4 Exterior Rear Door Complexes

PCB Window Caulk – South Tower Windows

PCB Vent Caulk – 6 Exterior Vents

PCB Door Caulk – 202 Interior Doors

1.03 ACM PRODUCTS TO BE REMOVED

A. Interior – Full Negative Pressure Enclosure.

1. Spray asbestos-containing materials with a fine mist of amended water prior to removal procedures. Do not over saturate to cause excess pooling. Mist asbestos-containing materials continuously during the removal process.
2. Contractor shall carefully remove manageable sections of asbestos-containing materials and place it directly into bags for disposal. Do not allow asbestos debris to accumulate on floor.
3. Contractor shall continue misting asbestos-containing materials with amended water throughout the removal process.
4. Where asbestos-containing spray-applied ceiling texture is removed, contractor remove ductwork, fixtures, conduit, etc. to allow access to materials for complete removal.
5. Demolition debris created to access asbestos-containing pipe insulation in chases shall be disposed of as asbestos-contaminated debris.
6. Carpet/laminate with asbestos-containing floor tile mastic adhered shall be disposed of as asbestos-contaminated material.
7. Contractor shall use a low to no odor solvent to remove asbestos-containing floor tile mastic
8. Clean work area as required by section 01711.

B. Asbestos-Containing Thermal System Insulation (Glovebag Removal)

1. Prior to start of work, the contractor shall regulate the work area with barrier tape and post asbestos signs in each appropriate language as per the OSHA 29 CFR 1926.1101 standard.
2. Place 6 mil polyethylene drop cloth beneath pipes scheduled for abatement.
3. Use two people for glovebag operations. One shall remove the insulation, the other operate the water sprayer.
4. Secure glovebag air tight to pipe insulation with tools and wand inside glovebag. Spray pipe insulation with mist of amended water. Allow amended water to saturate material to substrate. Cut bands holding preformed pipe insulation, slit jackets at seams, remove insulation and hand place in glovebag. Take care not to puncture the bag while cutting the insulation.

5. After removal of insulation, brush and wet clean pipe to remove residual material. Continue wet cleaning until surfaces are free of visible material.
 6. Spray all tools with water inside the bag and place back in pouch. Duct tape visible ends of remaining pipe insulation.
 7. Spray the inside of the glovebag with amended water and remove the watering wand, taping the water sleeve closed.
 8. Collapse the glovebag with HEPA vacuum, gooseneck glovebag with duct tape and cut glovebag away from pipe.
 9. Wet lag any exposed pipe insulation.
- C. Nonfriable, Nonregulated Removal of Door Caulking, Window Glazing, Wall Glue and Roof Flashing Mastic
1. Asbestos abatement contractor shall isolate the work area utilizing appropriate barrier tape and signage.
 2. Contractor shall install 6-mil polyethylene sheeting on ground at the foundation of the structure and interior floor. Drop cloth sheeting shall cover a sufficient area to keep debris from window removal from coming in contact with the soil or interior floors.
 3. Remove materials using manual tools and wet methods.
 4. Following removal, asbestos abatement contractor shall immediately wrap and label doors and waste for appropriate disposal.
 5. Contractor shall clean work areas in preparation for final visual inspection.

SECTION 02084

DISPOSAL OF ASBESTOS-CONTAINING WASTE MATERIAL

1.01 GENERAL

- A. All asbestos materials and miscellaneous asbestos contaminated debris shall be properly sealed and protected, and the loadout vehicle/dumpster shall be locked, while located on the facility site and then transported to a predesignated disposal site in accordance with 40 CFR 61.150 and DOT 49 CFR Parts 100-399.
- B. An enclosed vehicle will be used to haul waste material to the disposal site. No rental vehicles or trailers shall be used. Vehicle selection, vehicle covers and work practices shall assure that no asbestos becomes airborne during the loading, transport and unloading activity, and that material is placed in the waste site without breaking any seals.
- C. Waste disposal polyethylene bags (6 mil) and containers, non-porous (steel/plastic) drums or equivalent, with labels, appropriate for storing asbestos waste during transportation to the disposal site shall be used. In addition to the OSHA labeling requirements, all containers shall be labeled with the name of the waste generator and the location at which the waste was generated.
- D. The contractor shall transport the containers and bags of waste material to the approved waste disposal site. The sealed plastic bags shall be placed into the burial site unless the bags have been broken or damaged. Upon the landfill's approval damaged bags shall be left in the non-porous containers and the entire contaminated package shall be buried. Uncontaminated containers may be reused.
- E. Workers loading and unloading the asbestos will wear respirators and disposable clothing when handling material. Asbestos warning signs shall be posted during loading and unloading of asbestos waste.
- F. The contractor shall use the HHCU's Waste Shipment Record for disposal records as per 40 CFR 61.150 and distribute a copy of all waste shipment records to the designer and the HHCU after the completion of the project.

APPENDIX A

PREWORK ASBESTOS INSPECTION CHECKLIST

Name of State Facility: _____

Project Name: _____

Project ID Number: _____

Date of Inspection: _____ Pass: _____ Fail: _____

A. DOCUMENTS	YES	NO
1) Asbestos Removal Permit/NESHAP Notification	_____	_____
2) Accreditation Documents for Workers & Supervisors	_____	_____
3) Asbestos Plans and Specifications	_____	_____
4) Air Monitoring Data	_____	_____
5) Waste Shipment Records	_____	_____
6) Sign-in Sheets and Bound Book for Comments	_____	_____
7) Calibration Record for Grade "D" Air	_____	_____
8) Items listed in Section 01043 of Specification	_____	_____
B. PPE SUPPLIES		
1) Tyvek Clothing	_____	_____
2) Rubber Boots	_____	_____
3) Respirators with HEPA Filters	_____	_____
C. CLEAN ROOM		
1) Entry Curtains	_____	_____
2) Emergency Phone Numbers Posted	_____	_____
3) First Aid Kit	_____	_____
4) Asbestos Signs	_____	_____
5) Decontamination Procedures Posted	_____	_____
6) Fire Extinguisher	_____	_____
D. SHOWER ROOM		
1) Polyethylene Curtains	_____	_____
2) Hot/Cold Water & Operational	_____	_____
3) Soap & Towels	_____	_____
4) Waste Water Filter Pump Operational	_____	_____
5) Extra Five Micron Size Filters	_____	_____
6) Filtered Waste Water to Sanitary Sewer	_____	_____

E. WORK AREA	YES	NO
1) Removable Items Out of Area	_____	_____
2) Non-removable Items Protected	_____	_____
3) Critical Barriers Installed	_____	_____
4) Polyethylene Curtains	_____	_____
5) Polyethylene on Walls/Floors as Specified	_____	_____
6) HVAC off	_____	_____
7) Air Filtration Devices in Place and Operational	_____	_____
8) Air Exhausted to Outside	_____	_____
9) Electricity Locked and Tagged Out	_____	_____
10) Temporary Power Installed with GFCI	_____	_____
11) Fire Extinguishers	_____	_____
12) Emergency and Fire Exits Marked	_____	_____
13) Audible Alarms Operational	_____	_____
14) Toilet Available	_____	_____

F. EQUIPMENT		
1) Safety Equipment	_____	_____
2) HEPA Vacuums	_____	_____
3) Waste Disposal Bags	_____	_____
4) Airless Sprayer with Water Source	_____	_____
5) Cleaning Equipment	_____	_____
6) Glove Bags	_____	_____
7) Emergency Power Generator (if required)	_____	_____
8) Temporary Lighting	_____	_____

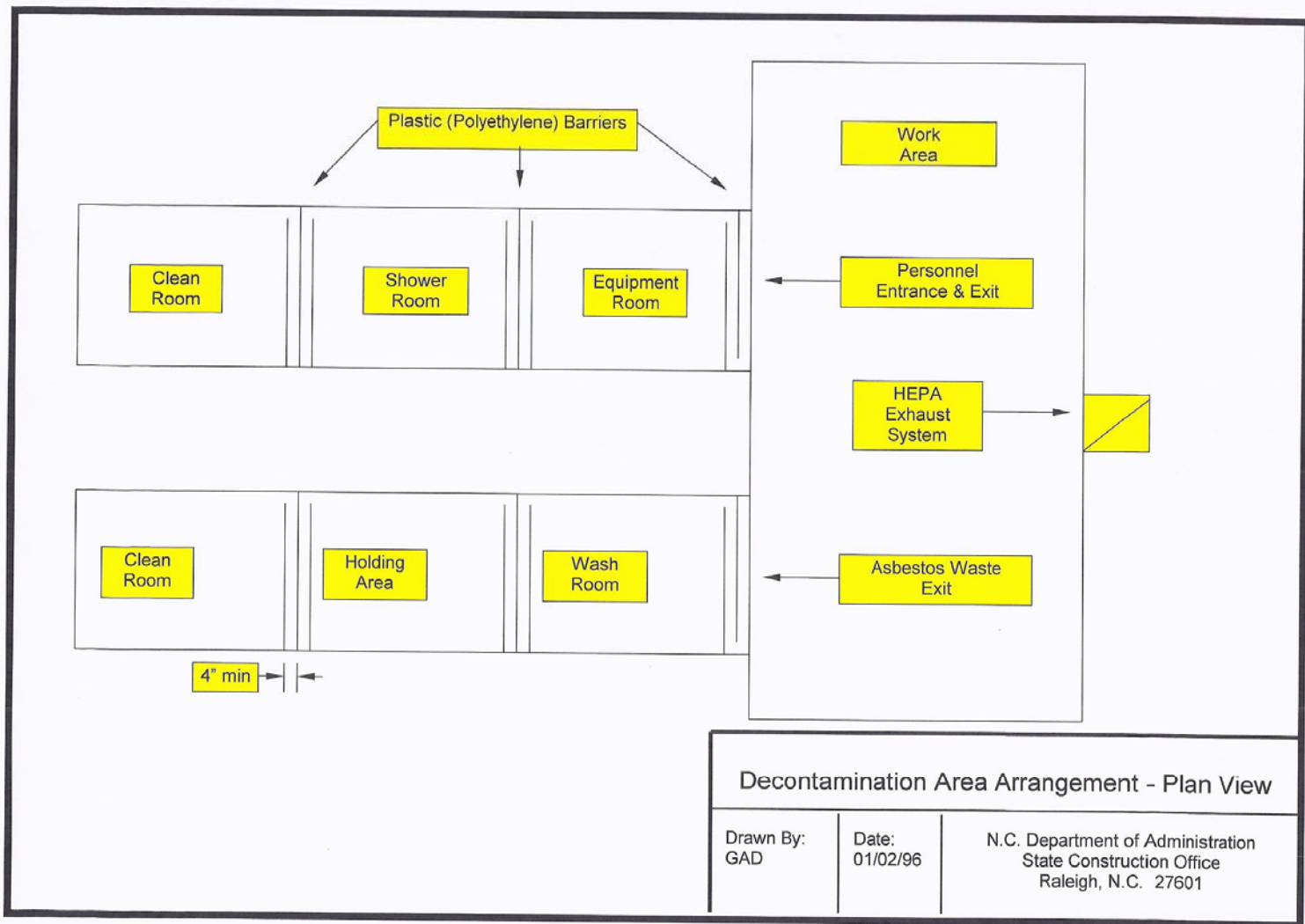
G. OTHER		
1) _____	_____	_____
2) _____	_____	_____
3) _____	_____	_____
4) _____	_____	_____

Asbestos Design Consultant

Date

Asbestos Contractor's Representative

Date



North Carolina State University

TECHNICAL SPECIFICATIONS FOR POLYCHLORINATED BIPHENYLS (PCB) BULK PRODUCT REMOVAL

MANN HALL



For Construction

October 21, 2024

MATRIX HEALTH & SAFETY CONSULTANTS, LLC.

GREGG E. HEPPERT

TECHNICAL SPECIFICATIONS FOR POLYCHLORINATED BIPHENYLS (PCB) BULK PRODUCT REMOVAL

**North Carolina State University - Mann Hall Complete Renovation
Raleigh, North Carolina**

Summary

This project consists of the removal and disposal of polychlorinated biphenyl (PCB) containing interior door caulking, interior duct mastic on fiberglass, exterior door caulking, exterior storefront caulking, exterior tower window caulking, exterior vent caulking, and block filler coating/paint as part of the Mann Hall complete renovation.

Disturbance or dislocation of PCB containing caulking materials may cause a health hazard to workers and building occupants. The remediation contractor shall inform all workers, supervisory personnel, subcontractors and consultants at the job site of the hazard and proper work procedures which must be followed.

Where remediation contractors, including supervisory personnel, subcontractors, or consultants may encounter, disturb, or otherwise function in the immediate vicinity of PCB containing caulking materials, appropriate measures shall be taken to protect all building occupants from the hazard of exposure. Such measures shall include the procedures and methods described herein, regulations of the US Occupational Safety & Health Administration (OSHA), US Environmental Protection Agency (EPA), and the State of North Carolina.

PCB Summary

PCB SURVEY RESULTS (Refer to Attached Report Dated September 7, 2021)

Sample Number	Material Description	General Location	PCB Quantity Mg/kg (ppm)
MH-1	Exterior Door Caulk Bulk Product Waste	South and West	180,000 (Aroclor-1254)
MH-6	Exterior Storefront Caulk Bulk Product Waste Storefront Caulk is also an asbestos-containing material	North	47,000 (Aroclor-1254)

Method EPA SW 846 8082A

Bold type Indicates Hazardous Material According to EPA (> 50 ppm)

PCB SURVEY RESULTS (Refer to attached PCB Lab Reports for samples collected on October 8, 2024)

Sample Number	Material Description	General Location	PCB Quantity Mg/kg (ppm)
MH-1,2,3	Exterior Duct Mastic/Glue PCB Bulk Product Waste	Throughout Building	14-27 (Aroclor-1248) 14-57 (Aroclor-1254) 1.4-94 (Aroclor-1260) 260 (Aroclor-1268)
MH-4,5,6	Interior Block Filler/Paint on Cinderblock and Plaster PCB-Containing	Throughout Building	0.45-6.0 (Aroclor-1248) 0.84-9.2 (Aroclor-1254) 0.090-1.2 (Aroclor-1260)
MH-7	Interior Tan Door Caulk PCB Bulk Product Waste Also Contains Asbestos	Throughout Building	940 (Aroclor-1248) 220 (Aroclor-1254)
MH-8	Interior Gray Door Caulk PCB Bulk Product Waste	Throughout Building	560 (Aroclor-1248) 140 (Aroclor-1254)
MH-9	Interior White Door Caulk PCB Bulk Product Waste	Throughout Building	32 (Aroclor-1248) 21 (Aroclor-1254)
MH-10	Interior Internally Line Duct Mastic/Glue PCB-Containing	Throughout Building	0.64 (Aroclor-1248) 2.7 (Aroclor-1254)
MH-11	Exterior Window Caulk PCB Bulk Product Waste	Exterior - South Tower Metal Windows	15,000 (Aroclor-1248) 31,000 (Aroclor-1254)

PCB SURVEY RESULTS (Refer to Additional PCB Lab Reports from samples collected October 8, 2024)

Sample Number	Material Description	General Location	PCB Quantity Mg/kg (ppm)
MH-12	Exterior Window Glazing PCB-Containing Also Contains Asbestos	Exterior - South Tower Metal Windows	1.7 (Aroclor-1248) 7.5 (Aroclor-1254)
MH-13	Exterior Vent Caulk PCB Bulk Product Waste	Exterior - Lower Roof Courtyard East Facing Wall	34,000 (Aroclor-1254)
MH-14	Exterior Brick Adjacent to Door Caulking PCB Remediation Waste	Exterior - Southeast Door, Left	2.3 (Aroclor-1248) 23 (Aroclor-1254)
MH-15	Exterior Brick Adjacent to Door Caulking PCB Remediation Waste	Exterior - Southeast Door, Right	2.9 (Aroclor-1248) 6.2 (Aroclor-1254)

PCB-containing caulk and glue, for example, are considered *PCB bulk product waste* if the concentration of PCBs in the caulk or glue is greater than or equal to (\geq) 50 parts per million (ppm). PCB bulk product waste, even at concentrations of PCBs greater than 50 ppm, can be disposed in a non-hazardous solid waste facility, as long as this disposal is permitted by that facility and approval is granted. Substrate PCB Remediation waste materials, such as brick, cinderblock or plaster, located adjacent to PCB bulk product, may also be disposed of as PCB bulk product waste, as long as the substrates are removed with the caulk and glue at the time of the project.

PCB WIPE RESULTS (Refer to Additional PCB Lab Reports from samples collected October 8, 2024)

Sample Number	Wipe Description	General Location	PCB Quantity ug/100cm2 (ppm)
MHW-1	Interior of Supply Duct Non-Insulation	First Floor (Basement) Pit	.45 (Aroclor-1248) .62 (Aroclor-1254) .24 (Aroclor-1260)
MHW-2	Interior of Supply Duct Non-Insulation	Room 306	.3 (Aroclor-1248) 1.2 (Aroclor-1254) .55 (Aroclor-1260)
MHW-3	Interior of Supply Duct Internally Lined	Room 306	.15 (Aroclor-1254) .094 (Aroclor-1260)
MHW-4	Interior of Supply Duct Non-Insulation	Room 207	1.4 (Aroclor-1248) .38 (Aroclor-1254)

The laboratory results indicated that all wipes collected inside the duct work were <10 ug/100cm², which is below the clearance standard for this project.

Scope of Work

These specifications are to be used in conjunction with any drawings, specifications or supplemental specifications for this project. Copies are to be maintained at the job site at all times.

Asbestos abatement and PCB removal shall be performed concurrently by North Carolina Accredited supervisors and workers.

The remediation contractor shall verify all job conditions and all material quantities prior to bid submission. All quantities listed by the designer are

approximations only. The remediation contractor is responsible for confirming all quantities of PCB material prior to bidding.

The remediation contractor shall maintain the building envelope in a watertight and weather tight condition at all times.

Scope of Work

The scope of work consists of the removal and disposal of **4 exterior metal door complexes, 2 front storefront door/window complexes, 6 exterior vents, 24 exterior window complexes at exterior south tower and 202 interior door frames** with polychlorinated biphenyl (PCB) containing caulking. Please note that the storefront caulking, interior door caulking and window glazing is asbestos-containing. Caulking may be removed and disposed of intact by removing the entire door or window complex and surround substrates with caulk attached. If surrounding substrates are not scheduled for demolition, caulking shall be removed from adjacent brick and concrete (inside and outside of building) until no visible debris is present. Metal door and window framing shall be cleaned with appropriate detergent and organic solvent prior to disposal or disposed of with the caulk attached.

If the brick/concrete surrounding door, window, and vent openings are not scheduled for demolition, the openings shall be cleaned with appropriate detergent and organic solvent. Once cleaned, the opening shall be sealed with two coats of waterproof epoxy covering the face of the openings to serve as an encapsulant over the porous concrete and brick.

The scope of work also includes the removal and disposal of exterior duct insulation with PBC mastic/glue found throughout the building.

The scope of work also includes the demolition of cinderblock and plaster walls with PCB block filler/paint.

The remediation contractor will package waste in approved containers and dispose of materials in a solid waste facility that with accept PCB bulk product waste.

Minimum Work Requirements

1. All work shall be performed in accordance with all applicable federal, state, and local regulations.
2. The remediation contractor shall be a licensed general remediation contractor in either the specialty interior, building unclassified or asbestos categories by the North Carolina Licensing Board of General Remediation contractors and limited for the bid amount.
3. The remediation contractor shall furnish and is responsible for all costs including, but not limited to: permit fees, containment preparation, labor, materials, services, insurance, bonding, and equipment necessary to carry out the abatement operations and disposal of all PCB containing material in accordance with the specifications, the EPA and OSHA regulations, and any applicable state and local government regulations.
4. All supervisors and workers shall have experience in the abatement of PCB containing materials and decontamination of PCB's in order to achieve clearance.

Hazard Communication training for PCBs that, at a minimum, meets the requirements of 29 CFR 1910.1200 and the importance of minimizing worker exposure (both inhalation and skin exposure).

All workers and supervisors shall be accredited by the North Carolina Health Hazards Control Unit (HHCU). A competent person, as defined by OSHA asbestos standard 29 CFR 1926.1101, shall be on-site at all times during asbestos abatement.

5. The doors contain lead ranging from 0.1 mg/cm² to 0.7 mg/cm². Personnel performing renovation activities that disturb the painted surfaces or leaded components that contain any quantity of lead should comply with all current OSHA regulations (**OSHA Lead in Construction Standard 29 CFR 1926.62**) in order to minimize employee exposure to lead.

6. The remediation contractor shall be responsible for all costs associated with employee monitoring to meet OSHA standards.

7. The remediation contractor shall have at least one employee on the job site in either a foreman or supervisor's position who is bilingual in the appropriate languages when employing workers who do not speak fluent English.

8. The remediation contractor is responsible for the behavior of workers within his employment. If at any time during the contracted work, any of his employees are judged to exhibit behavior unfitting for the area or judged to be a nuisance by the owner or designer, the remediation contractor shall remove them immediately from the project.

9. The remediation contractor shall be responsible for compliance with the following concerning employee behavior:

a. Under no circumstances is alcohol, drugs or any other type of controlled substances permitted on state property.

b. All workers are restricted to the construction project site only.

c. All vehicles must be parked in areas prearranged with the owner.

d. All workers must conform to the following basic dress code when in public areas of the project confines: long pants, shirts, no tank tops, no shorts, no bare backs.

e. The remediation contractor is responsible for disposal of all trash brought on state property by his employees, including drink cans, bottles or other food containers and wrappers.

10. Failure to adhere to these rules could result in criminal prosecution and/or removal from the State property.

11. PREBID

1. A pre-bid conference will be held by the owner in conjunction with the asbestos abatement project.

2. The designer will review the plans and specifications and present required techniques and safeguards for the removal of the PCB caulking.
3. Any minutes, new points or clarifications raised during the meeting will be issued by the designer prior to bids.

12. PRE-JOB SUBMITTALS

A. Submit three complete, bound sets of pre-job submittals to the designer at least 10 days prior to start of work. Work is prohibited until submittal package has been reviewed and approved by designer. A copy of the approved submittals shall be kept in a three-ring binder (project log) by the remediation contractor at the project site in the clean room or in the on-site office of the remediation contractor.

1. Employee List: Provide copies of lists of supervisors and workers, along with their PCB work experience and PCB HazCom training to be utilized on the project. Provide copies of lists of North Carolina Accredited supervisors and workers, along with their accreditation, to be utilized on the project.

2. Medical: Include individually signed and notarized forms by each worker to be utilized on the project documenting that each is actively involved in a company employee medical surveillance program.

3. Respirator Training: Copies of most recent fit testing records, individually signed for each worker to be utilized on the project.

4. Submit plan detailing measures that will be taken to re-route pedestrian traffic during door removal to ensure the safety of students, faculty and visitors.

13. POST-JOB SUBMITTALS

A. Submit three complete, bound sets of post-job submittals to the designer following the final completion of the work. Requests for final payment will not be approved until the submittal package has been reviewed and approved by the designer.

1. Affidavits: Remediation contractor's affidavit of payment of debts and claims, affidavit of release of liens, and consent of surety company to final payment.

2. Daily Log: A notarized copy of all daily logs showing the following: name, date, entering and leaving time, company or agency represented, reason for entry for all persons entering the work area, employee's daily air monitoring data as required by the OSHA standard and written comments by inspectors, industrial hygienists, designers and visitors.

3. Permits: Provide copies of approval of a waste disposal site in compliance with 40 CFR 61.154.

4. Special Reports: All documents generated under Section 01043.1.06.

14. The remediation contractor shall be trained in the proper use of PPE during PCB removal and cleanup operations. Remediation contractor shall wear appropriate PPE during All PCB containing caulk removal activities, including but not limited to chemical resistant gloves, chemical resistant full body protective coveralls and proper respiratory protection for the hazards to be encountered.

15. Remediation contractor shall provide a Health and Safety Plan specific to the work activities. All workers will follow applicable Federal and State regulations regarding work activities, including but not limited to OSHA regulations (PCB personnel air monitoring), respiratory protection, fall protection standards, ladder safety, personal protective equipment, etc.

16. Records and documents per 40CFR 761 will be generated and maintained at one location and made available to the EPA, Designer or Owner upon request.

WORK AREA PREPERATION

1. Work shall be performed inside full containments during asbestos abatement activities. For exterior work, the remediation contractor shall isolate each door, window and vent with 2 layers of 6 mil polyethylene sheeting secured in place. The remediation contractor shall isolate the work area with appropriate barrier tape and signage. The remediation contractor shall install 1 layer of 6-mil polyethylene sheeting on floors/ground below the component scheduled for removal to prevent contamination of interior building surfaces and to collect any debris that may fall during removal operations.

PCB CAULK REMOVAL

1. Abatement remediation contractor shall remove door units, window units, duct insulation and vents in their entirety from the rough opening and remove surrounding brick/concrete substrates, when feasible and only after approval by the owner. If brick/concrete substrates are scheduled to remain, thoroughly scrape all caulk/sealant using manual tools from the rough building opening substrates. PCB's shall be wetted using a low-pressure sprayer, using amended water with a wetting agent/surfactant containing fifty percent polyoxyethylene ether and fifty percent polyoxyethylene ester, or equivalent, mixed one ounce to five gallons of water. High efficiency particulate air (HEPA) filtered vacuums shall be used to clean dust and debris during PCB abatement operations.

2. Following removal of caulking from the adjacent concrete and brick substrates, clean flooring using a double wash/rinse using an appropriate solvent. The remediation contractor shall take all precautions necessary to contain runoff resulting from cleaning and to properly dispose of wastes generated during cleaning.

3. A DOT approved container shall be staged for the collection of PCB bulk product and associated wastes generated during the work activities in accordance with 40CFR 761.65. Remediation contractor shall properly label and mark waste container in accordance with 40CFR 761.40.

4. Remediation contractor shall contact industrial hygiene firm for scheduling the final visual inspection.

FINAL CLEARANCE

1. A final visual inspection shall be conducted by the industrial hygiene firm prior to disposal of door frames, window frames, duct mastic, vent mastic and sealing of rough openings with epoxy.

2. Wipe clearance sampling will be conducted on randomly selected floors following successful visual inspection and adequate drying times. Wipes will be collected from the work areas per EPA 40 CFR 761 Subpart O and Subpart M and extracted /analyzed using EPA Methods SW-846 3550C/8082A.

The clearance criteria for floors will be <10 ug/100cm². The subject area is considered sufficiently decontaminated if conducted in accordance with 40 CFR 761.79. If the standard of <10µg/100 cm² is not met for all of the wipe samples, additional decontamination procedures must be performed within the entire subject area and additional wipe samples must be collected. These procedures will be repeated until the <10µg/100 cm² standard has been achieved. Fees for failed wipe tests are the responsibility of the remediation contractor.

DISPOSAL OF PCB BULK PRODUCT WASTE MATERIAL AND ASBESTOS-CONTAINING CAULKING

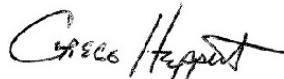
1. All PCB containing caulking, caulking debris and associated wastes (suits, cleaning supplies, etc.) and asbestos-containing caulking will be designated for disposal as PCB Bulk Product Waste in accordance with 40CFR 761.62 of TSCA.

2. All containers will be properly labeled and marked in accordance with 40CFR 761.40. Containers shall also be marked with asbestos labels. All regulated waste containers will be stored in a secure area on-site until transfer to an approved solid waste facility that will accept both asbestos and PCB bulk waste.

3. The remediation contractor shall be responsible for all packaging, labeling and record keeping associated with PCB/Asbestos waste in accordance with all federal, state and local regulations.

4. Remediation contractor shall assure that disposal of PCB bulk waste is at a facility approved to accept such waste and shall provide to the Owner and designer a tracking/manifest form signed by the landfill's owner.

Matrix Health & Safety Consultants, LLC



Gregg E. Heppert
Project Principal



Storefront door complex with asbestos-containing and PCB containing caulk



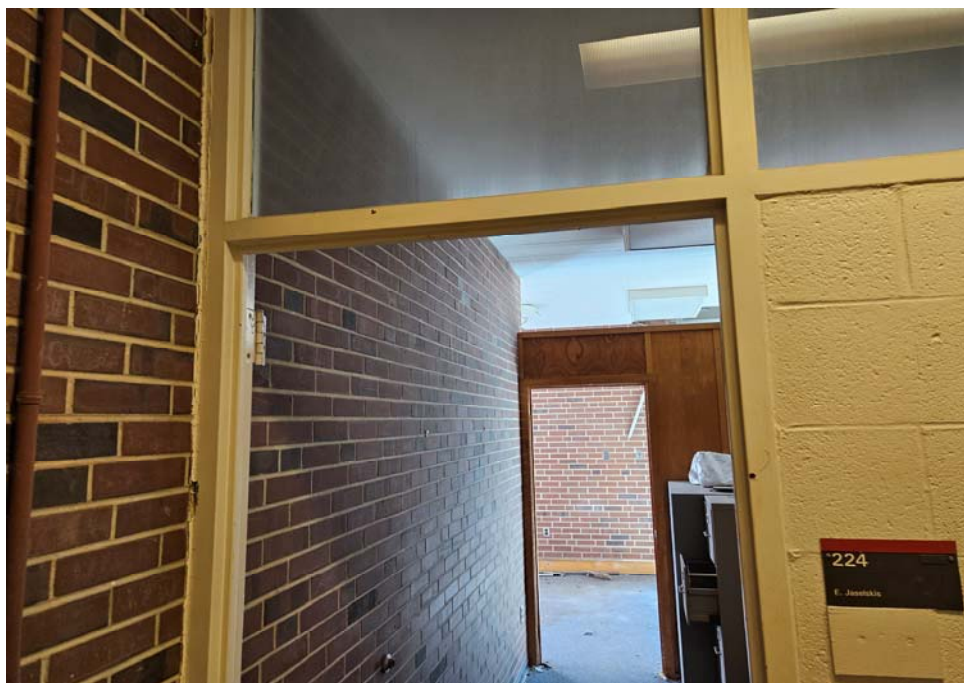
Storefront door complex with asbestos-containing and PCB containing caulk



Example of exterior of door with PCB containing caulk



Example of duct with PCB containing mastic/glue



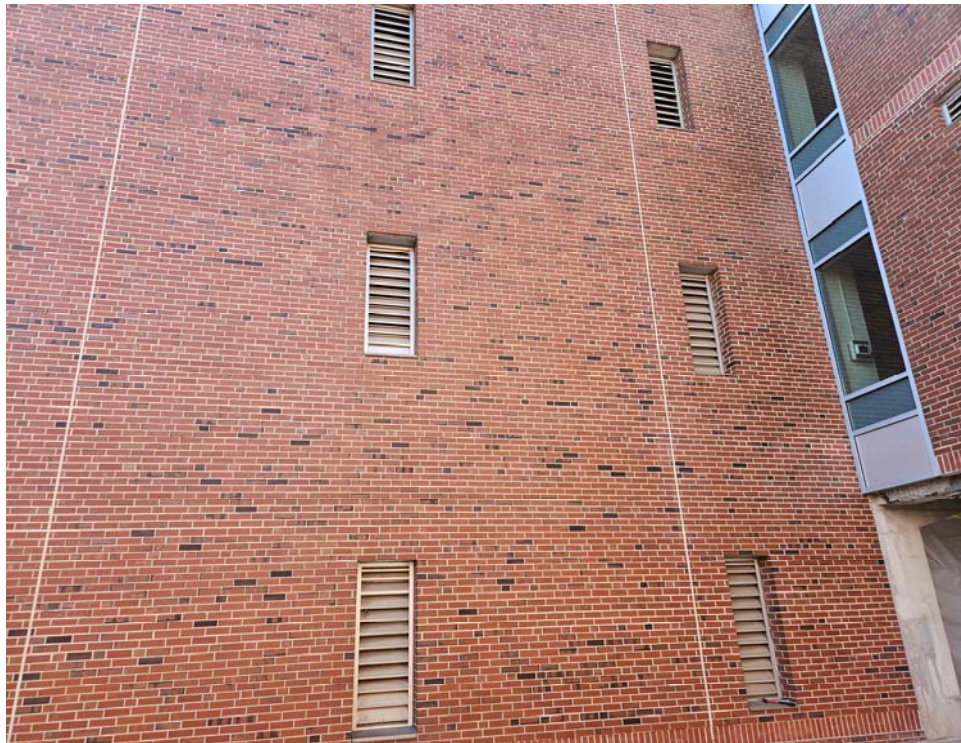
Example of door frame with PCB's and asbestos-containing caulk



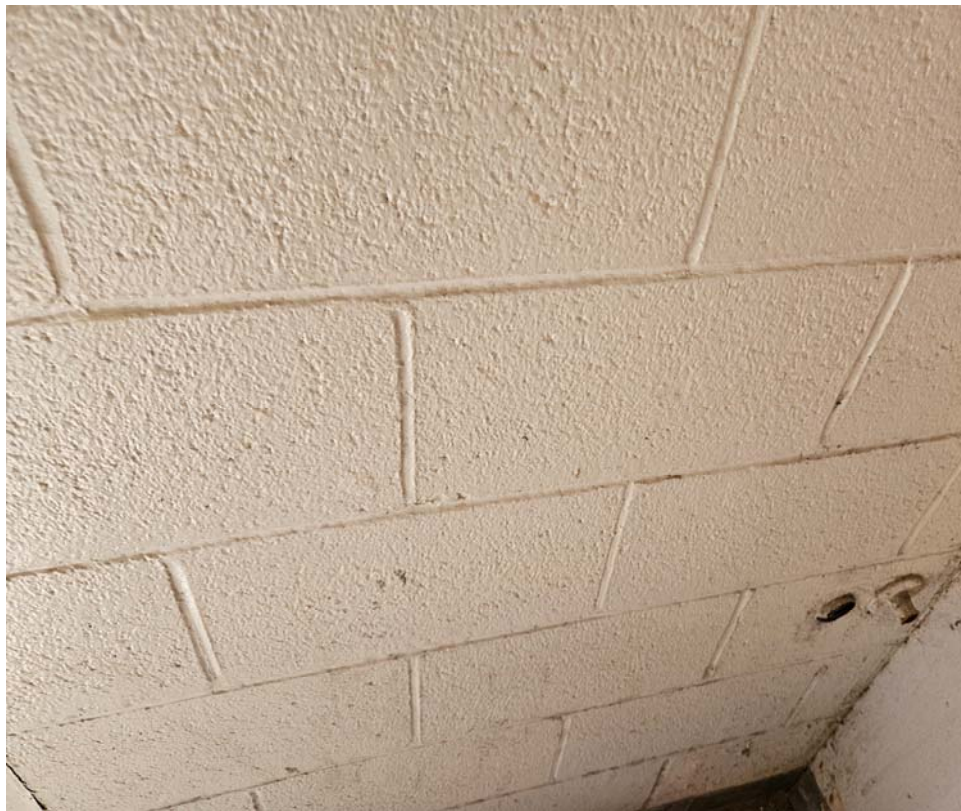
Example of window frames with PCB's and asbestos-containing glazing



Example of exterior vent with PCB's



Example of exterior vents with PCB's



Example of cinderblock walls with PCB's <50 PPM



Example of internally lined duct with PCB's <50 PPM

October 17, 2024

Gregg Heppert
Matrix Health & Safety Consultants, LLC
2900 Yonkers Road
Raleigh, NC 27604

Project Location: Raleigh, NC
Client Job Number:
Project Number: [none]
Laboratory Work Order Number: 24J1725

Enclosed are results of analyses for samples as received by the laboratory on October 11, 2024. If you have any questions concerning this report, please feel free to contact me.

Sincerely,



Jordan Zoe Ross
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Matrix Health & Safety Consultants, LLC
2900 Yonkers Road
Raleigh, NC 27604
ATTN: Gregg Heppert

REPORT DATE: 10/17/2024

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 24J1725

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Raleigh, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MHW-1 Basement Duct Internal	24J1725-01	Wipe		SW-846 8082A	
MHW-2 Duct Internal Rm 306	24J1725-02	Wipe		SW-846 8082A	
MHW-3 Internally Lined Duct Rm 306	24J1725-03	Wipe		SW-846 8082A	
MHW-4 Duct Internal Room 207	24J1725-04	Wipe		SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Lisa A. Worthington
Technical Representative

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1725

Date Received: 10/11/2024

Field Sample #: MHW-1 Basement Duct Internal

Sampled: 10/8/2024 14:30

Sample ID: 24J1725-01

Sample Matrix: Wipe

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1221 [1]	ND	0.20	0.093	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1232 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1242 [1]	ND	0.20	0.055	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1248 [2]	0.45	0.20	0.050	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1254 [2]	0.62	0.20	0.076	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1260 [1]	0.24	0.20	0.042	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1262 [1]	ND	0.20	0.052	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Aroclor-1268 [1]	ND	0.20	0.053	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:26	MEW
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		86.3	30-150						10/16/24 16:26	
Decachlorobiphenyl [2]		81.1	30-150						10/16/24 16:26	
Tetrachloro-m-xylene [1]		76.8	30-150						10/16/24 16:26	
Tetrachloro-m-xylene [2]		77.5	30-150						10/16/24 16:26	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1725

Date Received: 10/11/2024

Field Sample #: MHW-2 Duct Internal Rm 306

Sampled: 10/8/2024 14:39

Sample ID: 24J1725-02

Sample Matrix: Wipe

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1221 [1]	ND	0.20	0.093	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1232 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1242 [1]	ND	0.20	0.055	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1248 [2]	0.30	0.20	0.050	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1254 [1]	1.2	0.20	0.060	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1260 [1]	0.55	0.20	0.042	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1262 [1]	ND	0.20	0.052	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Aroclor-1268 [1]	ND	0.20	0.053	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 16:43	MEW
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		85.2	30-150						10/16/24 16:43	
Decachlorobiphenyl [2]		82.1	30-150						10/16/24 16:43	
Tetrachloro-m-xylene [1]		77.3	30-150						10/16/24 16:43	
Tetrachloro-m-xylene [2]		77.9	30-150						10/16/24 16:43	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1725

Date Received: 10/11/2024

Field Sample #: MHW-3 Internally Lined Duct Rm 306

Sampled: 10/8/2024 14:50

Sample ID: 24J1725-03

Sample Matrix: Wipe

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1221 [1]	ND	0.20	0.093	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1232 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1242 [1]	ND	0.20	0.055	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1248 [1]	ND	0.20	0.048	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1254 [1]	0.15	0.20	0.060	µg/Wipe	1	J	SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1260 [1]	0.094	0.20	0.042	µg/Wipe	1	J	SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1262 [1]	ND	0.20	0.052	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Aroclor-1268 [1]	ND	0.20	0.053	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:00	MEW
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		84.2	30-150						10/16/24 17:00	
Decachlorobiphenyl [2]		81.6	30-150						10/16/24 17:00	
Tetrachloro-m-xylene [1]		77.6	30-150						10/16/24 17:00	
Tetrachloro-m-xylene [2]		78.7	30-150						10/16/24 17:00	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1725

Date Received: 10/11/2024

Field Sample #: MHW-4 Duct Internal Room 207

Sampled: 10/8/2024 14:55

Sample ID: 24J1725-04

Sample Matrix: Wipe

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1221 [1]	ND	0.20	0.093	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1232 [1]	ND	0.20	0.049	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1242 [1]	ND	0.20	0.055	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1248 [1]	ND	0.20	0.048	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1254 [2]	1.4	0.20	0.076	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1260 [2]	0.38	0.20	0.053	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1262 [1]	ND	0.20	0.052	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Aroclor-1268 [1]	ND	0.20	0.053	µg/Wipe	1		SW-846 8082A	10/15/24	10/16/24 17:18	MEW
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		87.7	30-150						10/16/24 17:18	
Decachlorobiphenyl [2]		84.2	30-150						10/16/24 17:18	
Tetrachloro-m-xylene [1]		76.9	30-150						10/16/24 17:18	
Tetrachloro-m-xylene [2]		77.7	30-150						10/16/24 17:18	

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Sample Extraction Data

Prep Method:SW-846 3546 Analytical Method:SW-846 8082A

Lab Number [Field ID]	Batch	Initial [Wipe]	Final [mL]	Date
24J1725-01 [MHW-1 Basement Duct Internal]	B389328	1.00	10.0	10/15/24
24J1725-02 [MHW-2 Duct Internal Rm 306]	B389328	1.00	10.0	10/15/24
24J1725-03 [MHW-3 Internally Lined Duct Rm 306]	B389328	1.00	10.0	10/15/24
24J1725-04 [MHW-4 Duct Internal Room 207]	B389328	1.00	10.0	10/15/24

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389328 - SW-846 3546										
Blank (B389328-BLK1)										
Prepared: 10/15/24 Analyzed: 10/16/24										
Aroclor-1016	ND	0.20	µg/Wipe							
Aroclor-1016 [2C]	ND	0.20	µg/Wipe							
Aroclor-1221	ND	0.20	µg/Wipe							
Aroclor-1221 [2C]	ND	0.20	µg/Wipe							
Aroclor-1232	ND	0.20	µg/Wipe							
Aroclor-1232 [2C]	ND	0.20	µg/Wipe							
Aroclor-1242	ND	0.20	µg/Wipe							
Aroclor-1242 [2C]	ND	0.20	µg/Wipe							
Aroclor-1248	ND	0.20	µg/Wipe							
Aroclor-1248 [2C]	ND	0.20	µg/Wipe							
Aroclor-1254	ND	0.20	µg/Wipe							
Aroclor-1254 [2C]	ND	0.20	µg/Wipe							
Aroclor-1260	ND	0.20	µg/Wipe							
Aroclor-1260 [2C]	ND	0.20	µg/Wipe							
Aroclor-1262	ND	0.20	µg/Wipe							
Aroclor-1262 [2C]	ND	0.20	µg/Wipe							
Aroclor-1268	ND	0.20	µg/Wipe							
Aroclor-1268 [2C]	ND	0.20	µg/Wipe							
Surrogate: Decachlorobiphenyl	1.34		µg/Wipe	2.000		67.2	30-150			
Surrogate: Decachlorobiphenyl [2C]	1.29		µg/Wipe	2.000		64.3	30-150			
Surrogate: Tetrachloro-m-xylene	1.21		µg/Wipe	2.000		60.5	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	1.21		µg/Wipe	2.000		60.7	30-150			
LCS (B389328-BS1)										
Prepared: 10/15/24 Analyzed: 10/16/24										
Aroclor-1016	0.32	0.20	µg/Wipe	0.5000		63.2	40-140			
Aroclor-1016 [2C]	0.31	0.20	µg/Wipe	0.5000		61.3	40-140			
Aroclor-1260	0.35	0.20	µg/Wipe	0.5000		69.6	40-140			
Aroclor-1260 [2C]	0.32	0.20	µg/Wipe	0.5000		64.2	40-140			
Surrogate: Decachlorobiphenyl	1.29		µg/Wipe	2.000		64.6	30-150			
Surrogate: Decachlorobiphenyl [2C]	1.24		µg/Wipe	2.000		61.8	30-150			
Surrogate: Tetrachloro-m-xylene	1.16		µg/Wipe	2.000		58.2	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	1.17		µg/Wipe	2.000		58.7	30-150			
LCS Dup (B389328-BSD1)										
Prepared: 10/15/24 Analyzed: 10/16/24										
Aroclor-1016	0.38	0.20	µg/Wipe	0.5000		76.7	40-140	19.3	30	
Aroclor-1016 [2C]	0.36	0.20	µg/Wipe	0.5000		72.8	40-140	17.2	30	
Aroclor-1260	0.41	0.20	µg/Wipe	0.5000		82.0	40-140	16.4	30	
Aroclor-1260 [2C]	0.38	0.20	µg/Wipe	0.5000		75.1	40-140	15.7	30	
Surrogate: Decachlorobiphenyl	1.51		µg/Wipe	2.000		75.3	30-150			
Surrogate: Decachlorobiphenyl [2C]	1.45		µg/Wipe	2.000		72.3	30-150			
Surrogate: Tetrachloro-m-xylene	1.39		µg/Wipe	2.000		69.4	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	1.40		µg/Wipe	2.000		70.2	30-150			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MHW-1 Basement Duct Internal

SW-846 8082A

 Lab Sample ID: 24J1725-01 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	0.40	
	2	0.000	0.000	0.000	0.45	11.8
Aroclor-1254	1	0.000	0.000	0.000	0.60	
	2	0.000	0.000	0.000	0.62	3.3
Aroclor-1260	1	0.000	0.000	0.000	0.24	
	2	0.000	0.000	0.000	0.20	18.2

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MHW-2 Duct Internal Rm 306
SW-846 8082A

Lab Sample ID: 24J1725-02 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD3 Instrument ID (2): ECD3
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	0.29	
	2	0.000	0.000	0.000	0.30	3.4
Aroclor-1254	1	0.000	0.000	0.000	1.2	
	2	0.000	0.000	0.000	1.1	8.7
Aroclor-1260	1	0.000	0.000	0.000	0.55	
	2	0.000	0.000	0.000	0.47	15.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MHW-3 Internally Lined Duct Rm 30

SW-846 8082A

 Lab Sample ID: 24J1725-03 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	0.15	
	2	0.000	0.000	0.000	0.14	6.9
Aroclor-1260	1	0.000	0.000	0.000	0.094	
	2	0.000	0.000	0.000	0.081	14.9

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MHW-4 Duct Internal Room 207

SW-846 8082A

Lab Sample ID: 24J1725-04 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD3 Instrument ID (2): ECD3
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	1.3	
	2	0.000	0.000	0.000	1.4	7.4
Aroclor-1260	1	0.000	0.000	0.000	0.38	
	2	0.000	0.000	0.000	0.38	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

LCS Dup

SW-846 8082A

 Lab Sample ID: B389328-BSD1 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.38	
	2	0.000	0.000	0.000	0.36	5.4
Aroclor-1260	1	0.000	0.000	0.000	0.41	
	2	0.000	0.000	0.000	0.38	7.6

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).

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CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
<i>SW-846 8082A in Water</i>	
Aroclor-1016	CT,NH,NY,NC,ME,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1262	NH,NY,NC,ME,VA,PA
Aroclor-1262 [2C]	NH,NY,NC,ME,VA,PA
Aroclor-1268	NH,NY,NC,ME,VA,PA
Aroclor-1268 [2C]	NH,NY,NC,ME,VA,PA

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2025
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2025
NC	North Carolina Div. of Water Quality	652	12/31/2024
ME	State of Maine	MA00100	06/9/2025
VA	Commonwealth of Virginia	460217	12/14/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2025

2457725

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Matrix Health & Safety Consultants, LLC

39 Spruce Street
 East Longmeadow, MA 01028

Page 1 of 1

Company Name: Matrix Health & Safety Consultants, LLC
Address: 2900 Yonkers Road Raleigh
Phone: 919-833-2520
Project Name: NCSU Mann Hall Raleigh, NC
Address: 2900 Yonkers Road Raleigh
Project Number:
Project Manager: Gregg E. Heppert
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: Gregg E. Heppert

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	Matrix Code	Conc Code
1	MHW-1 Basement Duct Internal	10/8/2024	1430	100cm2 Wipe			X
2	MHW-2 Duct Internal Rm. 306	10/8/2024	1439	100cm2 Wipe			X
3	MHW-3 Internally Lined Duct Rm. 306	10/8/2024	1450	100cm2 Wipe			X
4	MHW-4 Duct Internal Room 207	10/8/2024	1455	100cm2 Wipe			X

Requested Turnaround Time
 7-Day 10-Day
 Due Date: 5 day TAT

Rush-Approval Required
 1-Day 3-Day
 2-Day 4-Day

Data Delivery
 Format: PDF EXCEL
 Other:

CLP Like Data Pkg Required:

Email To: _____
 Fax To #: _____

ANALYSIS REQUESTED

PCB Wipes

1 Matrix Codes:
 GW = Ground Water
 WW = Waste Water
 DW = Drinking Water
 A = Air
 S = Soil
 SL = Sludge
 SOL = Solid
 O = Other (please define)

2 Preservation Codes:
 I = Iced
 H = HCL
 M = Methanol
 N = Nitric Acid
 S = Sulfuric Acid
 B = Sodium Bisulfate
 X = Sodium Hydroxide
 T = Sodium Thiosulfate
 O = Other (please define)

3 Container Codes:
 A = Amber Glass
 G = Glass
 P = Plastic
 ST = Sterile
 V = Vial
 S = Summa Canister
 T = Tedlar Bag
 O = Other (please define)

PCB ONLY
 Soxhlet
 Non Soxhlet

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
 H - High; M - Medium; L - Low; C - Clean; U - Unknown

North Carolina Detection Limit Requirements

Program Information
 DSCA UST/Trust Fund
 SWS Landfill REC
 IHSB Orphaned Landfill
 State Lead
 Other: _____

Project Entity
 Government Municipality
 Federal Brownfield
 City School
 Other: Chromatogram MIHA-LAP, LLC

RELINQUISHED BY: (signature) _____ Date/Time: 10/9/2024
RECEIVED BY: (signature) _____ Date/Time: 10/9/24
RELINQUISHED BY: (signature) _____ Date/Time: _____
RECEIVED BY: (signature) _____ Date/Time: 10/10/24 950



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Contestlab39

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TRACKING ID

779127842011

FROM

RALEIGH, NC US

Label Created

10/9/24 10:12 AM

WE HAVE YOUR PACKAGE

RALEIGH, NC

10/9/24 4:16 PM

ON THE WAY

WINDSOR LOCKS, CT


10/10/24 7:59 AM

OUT FOR DELIVERY

WINDSOR LOCKS, CT

10/10/24 8:35 AM

Sample	Soils Jars (Circle Amb/Clear)			Ambers				Plastics						VOA Vials					Other/Fill in			
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	1 Liter	250mL	100mL	1 Liter	500mL	250mL						Unpreserved	HCl	MeOH	D.I. Water	BiSulfate	Col/Bact	
1			1																			
2																						
3																						
4																						
5																						
6																						
7																						
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DC# Title: ENV-FRM-ELON-001 v08_Sample Receiving Checklist

Effective Date: 06/11/2024

October 17, 2024

Gregg Heppert
Matrix Health & Safety Consultants, LLC
2900 Yonkers Road
Raleigh, NC 27604

Project Location: Raleigh, NC
Client Job Number:
Project Number: [none]
Laboratory Work Order Number: 24J1726

Enclosed are results of analyses for samples as received by the laboratory on October 10, 2024. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Karriem G. Marius
Project Manager

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39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

 Matrix Health & Safety Consultants, LLC
 2900 Yonkers Road
 Raleigh, NC 27604
 ATTN: Gregg Heppert

REPORT DATE: 10/17/2024

PURCHASE ORDER NUMBER:

PROJECT NUMBER: [none]

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 24J1726

The results of analyses performed on the following samples submitted to CON-TEST, a Pace Analytical Laboratory, are found in this report.

PROJECT LOCATION: Raleigh, NC

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
MH-1 External Duct Mastie 2nd Floor	24J1726-01	Product/Solid		SW-846 8082A	
MH-2 External Duct Mastie 3rd Floor	24J1726-02	Product/Solid		SW-846 8082A	
MH-3 External Duct Mastie 4th Floor	24J1726-03	Product/Solid		SW-846 8082A	
MH-4 Block Filler 2nd Floor	24J1726-04	Product/Solid		SW-846 8082A	
MH-5 Block Filler 3rd Floor	24J1726-05	Product/Solid		SW-846 8082A	
MH-6 Block Filler 4th Floor	24J1726-06	Product/Solid		SW-846 8082A	
MH-7 Tan Door Caulk South (Sticky)	24J1726-07	Caulk		SW-846 8082A Modified	
MH-8 Gray Door Caulk 2nd & 4th	24J1726-08	Caulk		SW-846 8082A Modified	
MH-9 White Door Caulk 2nd	24J1726-09	Caulk		SW-846 8082A	
MH-10 Internal Duct Mastie Rm 306	24J1726-10	Product/Solid		SW-846 8082A	
MH-11 Exterior Window Caulk Upper	24J1726-11	Caulk		SW-846 8082A Modified	
MH-12 Exterior Window Glazing Upper	24J1726-12	Product/Solid		SW-846 8082A	
MH-13 Exterior Vent Caulk East	24J1726-13	Caulk		SW-846 8082A Modified	
MH-14 Brick at Rear Door Left	24J1726-14	Brick		SW-846 8082A	
MH-15 Brick at Rear Door Right	24J1726-15	Brick		SW-846 8082A	

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

SW-846 8082A**Qualifications:****MS-21**

Matrix spike and/or spike duplicate recovery bias high due to contribution of other Aroclors present in the source sample.

Analyte & Samples(s) Qualified:**Aroclor-1016**

B389248-MS1, B389248-MSD1

Aroclor-1016 [2C]

B389248-MS1, B389248-MSD1

Aroclor-1260

B389248-MS1, B389248-MSD1

Aroclor-1260 [2C]

B389248-MS1, B389248-MSD1

S-01

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:**Decachlorobiphenyl**

24J1726-01[MH-1 External Duct Mastic 2nd Floor], 24J1726-02[MH-2 External Duct Mastic 3rd Floor], 24J1726-14[MH-14 Brick at Rear Door Left], B389248-MS1, B389248-MSD1

Decachlorobiphenyl [2C]

24J1726-01[MH-1 External Duct Mastic 2nd Floor], 24J1726-02[MH-2 External Duct Mastic 3rd Floor], 24J1726-14[MH-14 Brick at Rear Door Left], B389248-MS1, B389248-MSD1

Tetrachloro-m-xylene

24J1726-01[MH-1 External Duct Mastic 2nd Floor], 24J1726-02[MH-2 External Duct Mastic 3rd Floor], 24J1726-14[MH-14 Brick at Rear Door Left], B389248-MS1, B389248-MSD1

Tetrachloro-m-xylene [2C]

24J1726-01[MH-1 External Duct Mastic 2nd Floor], 24J1726-02[MH-2 External Duct Mastic 3rd Floor], 24J1726-14[MH-14 Brick at Rear Door Left], B389248-MS1, B389248-MSD1

SW-846 8082A Modified**Qualifications:****S-01**

The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

Analyte & Samples(s) Qualified:**Decachlorobiphenyl**

24J1726-07[MH-7 Tan Door Caulk South (Sticky)], 24J1726-11[MH-11 Exterior Window Caulk Upper], 24J1726-13[MH-13 Exterior Vent Caulk East]

Decachlorobiphenyl [2C]

24J1726-07[MH-7 Tan Door Caulk South (Sticky)], 24J1726-11[MH-11 Exterior Window Caulk Upper], 24J1726-13[MH-13 Exterior Vent Caulk East]

Tetrachloro-m-xylene

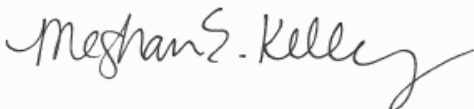
24J1726-07[MH-7 Tan Door Caulk South (Sticky)], 24J1726-11[MH-11 Exterior Window Caulk Upper], 24J1726-13[MH-13 Exterior Vent Caulk East]

Tetrachloro-m-xylene [2C]

24J1726-07[MH-7 Tan Door Caulk South (Sticky)], 24J1726-11[MH-11 Exterior Window Caulk Upper], 24J1726-13[MH-13 Exterior Vent Caulk East]

The results of analyses reported only relate to samples submitted to Con-Test, a Pace Analytical Laboratory, for testing.

I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.



Meghan E. Kelley
Reporting Specialist

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-1 External Duct Mastie 2nd Floor

Sampled: 10/8/2024 16:00

Sample ID: 24J1726-01

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	20	4.8	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1221 [1]	ND	20	9.0	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1232 [1]	ND	20	4.8	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1242 [1]	ND	20	5.4	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1248 [1]	27	20	4.7	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1254 [2]	57	20	7.4	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1260 [2]	94	20	5.2	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1262 [1]	ND	20	5.1	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Aroclor-1268 [2]	260	20	6.3	mg/Kg	200		SW-846 8082A	10/14/24	10/16/24 12:27	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		*	30-150			S-01			10/16/24 12:27	
Decachlorobiphenyl [2]		*	30-150			S-01			10/16/24 12:27	
Tetrachloro-m-xylene [1]		*	30-150			S-01			10/16/24 12:27	
Tetrachloro-m-xylene [2]		*	30-150			S-01			10/16/24 12:27	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-2 External Duct Mastie 3rd Floor

Sampled: 10/8/2024 16:10

Sample ID: 24J1726-02

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	3.5	0.87	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1221 [1]	ND	3.5	1.6	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1232 [1]	ND	3.5	0.87	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1242 [1]	ND	3.5	0.97	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1248 [1]	27	3.5	0.85	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1254 [1]	30	3.5	1.1	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1260 [2]	3.2	3.5	0.93	mg/Kg	50	J	SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1262 [1]	ND	3.5	0.92	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Aroclor-1268 [1]	ND	3.5	0.93	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 9:59	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		*	30-150			S-01			10/16/24 9:59	
Decachlorobiphenyl [2]		*	30-150			S-01			10/16/24 9:59	
Tetrachloro-m-xylene [1]		*	30-150			S-01			10/16/24 9:59	
Tetrachloro-m-xylene [2]		*	30-150			S-01			10/16/24 9:59	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-3 External Duct Mastie 4th Floor

Sampled: 10/8/2024 16:15

Sample ID: 24J1726-03

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	2.0	0.49	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1221 [1]	ND	2.0	0.92	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1232 [1]	ND	2.0	0.49	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1242 [1]	ND	2.0	0.55	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1248 [2]	14	2.0	0.50	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1254 [1]	14	2.0	0.59	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1260 [1]	1.4	2.0	0.41	mg/Kg	20	J	SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1262 [1]	ND	2.0	0.52	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Aroclor-1268 [1]	ND	2.0	0.52	mg/Kg	20		SW-846 8082A	10/16/24	10/17/24 10:58	SFM
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		64.3		30-150					10/17/24 10:58	
Decachlorobiphenyl [2]		56.0		30-150					10/17/24 10:58	
Tetrachloro-m-xylene [1]		84.7		30-150					10/17/24 10:58	
Tetrachloro-m-xylene [2]		69.7		30-150					10/17/24 10:58	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-4 Block Filler 2nd Floor

Sampled: 10/8/2024 16:22

Sample ID: 24J1726-04

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1221 [1]	ND	0.90	0.42	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1232 [1]	ND	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1242 [1]	ND	0.90	0.25	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1248 [1]	2.9	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1254 [1]	5.8	0.90	0.27	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1260 [2]	0.59	0.90	0.24	mg/Kg	10	J	SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1262 [1]	ND	0.90	0.23	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Aroclor-1268 [1]	ND	0.90	0.24	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:16	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		101	30-150						10/16/24 10:16	
Decachlorobiphenyl [2]		102	30-150						10/16/24 10:16	
Tetrachloro-m-xylene [1]		95.1	30-150						10/16/24 10:16	
Tetrachloro-m-xylene [2]		96.2	30-150						10/16/24 10:16	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-5 Block Filler 3rd Floor

Sampled: 10/8/2024 16:30

Sample ID: 24J1726-05

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.072	0.018	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1221 [1]	ND	0.072	0.033	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1232 [1]	ND	0.072	0.018	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1242 [1]	ND	0.072	0.020	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1248 [1]	0.45	0.072	0.017	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1254 [1]	0.84	0.072	0.021	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1260 [1]	0.090	0.072	0.015	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1262 [1]	ND	0.072	0.019	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Aroclor-1268 [1]	ND	0.072	0.019	mg/Kg	1		SW-846 8082A	10/14/24	10/15/24 17:29	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		106	30-150						10/15/24 17:29	
Decachlorobiphenyl [2]		101	30-150						10/15/24 17:29	
Tetrachloro-m-xylene [1]		98.3	30-150						10/15/24 17:29	
Tetrachloro-m-xylene [2]		88.4	30-150						10/15/24 17:29	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-6 Block Filler 4th Floor

Sampled: 10/8/2024 16:39

Sample ID: 24J1726-06

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.97	0.24	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1221 [1]	ND	0.97	0.45	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1232 [1]	ND	0.97	0.24	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1242 [1]	ND	0.97	0.27	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1248 [1]	6.0	0.97	0.23	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1254 [2]	9.2	0.97	0.37	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1260 [2]	1.2	0.97	0.26	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1262 [1]	ND	0.97	0.25	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Aroclor-1268 [1]	ND	0.97	0.25	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:33	SFM
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		79.1		30-150					10/16/24 10:33	
Decachlorobiphenyl [2]		81.1		30-150					10/16/24 10:33	
Tetrachloro-m-xylene [1]		76.3		30-150					10/16/24 10:33	
Tetrachloro-m-xylene [2]		76.6		30-150					10/16/24 10:33	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-7 Tan Door Caulk South (Sticky)

Sampled: 10/8/2024 17:30

Sample ID: 24J1726-07

Sample Matrix: Caulk

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1221 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1232 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1242 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1248 [2]	940	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1254 [1]	220	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1260 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1262 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Aroclor-1268 [1]	ND	72		mg/Kg	40		SW-846 8082A Modified	10/15/24	10/16/24 8:13	MEW
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		*		30-150		S-01			10/16/24 8:13	
Decachlorobiphenyl [2]		*		30-150		S-01			10/16/24 8:13	
Tetrachloro-m-xylene [1]		*		30-150		S-01			10/16/24 8:13	
Tetrachloro-m-xylene [2]		*		30-150		S-01			10/16/24 8:13	

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-8 Gray Door Caulk 2nd & 4th

Sampled: 10/8/2024 17:33

Sample ID: 24J1726-08

Sample Matrix: Caulk

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1221 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1232 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1242 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1248 [2]	560	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1254 [2]	140	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1260 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1262 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Aroclor-1268 [1]	ND	38		mg/Kg	20		SW-846 8082A Modified	10/15/24	10/15/24 15:46	MEW
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		110		30-150					10/15/24 15:46	
Decachlorobiphenyl [2]		102		30-150					10/15/24 15:46	
Tetrachloro-m-xylene [1]		110		30-150					10/15/24 15:46	
Tetrachloro-m-xylene [2]		104		30-150					10/15/24 15:46	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-9 White Door Caulk 2nd

Sampled: 10/8/2024 17:40

Sample ID: 24J1726-09

Sample Matrix: Caulk

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.78	0.19	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1221 [1]	ND	0.78	0.36	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1232 [1]	ND	0.78	0.19	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1242 [1]	ND	0.78	0.21	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1248 [2]	32	0.78	0.20	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1254 [1]	21	0.78	0.23	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1260 [1]	ND	0.78	0.16	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1262 [1]	ND	0.78	0.20	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Aroclor-1268 [1]	ND	0.78	0.20	mg/Kg	4		SW-846 8082A	10/15/24	10/16/24 12:24	SFM
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		75.0		30-150					10/16/24 12:24	
Decachlorobiphenyl [2]		75.1		30-150					10/16/24 12:24	
Tetrachloro-m-xylene [1]		89.9		30-150					10/16/24 12:24	
Tetrachloro-m-xylene [2]		90.2		30-150					10/16/24 12:24	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-10 Internal Duct Mastic Rm 306

Sampled: 10/8/2024 17:45

Sample ID: 24J1726-10

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.19	0.046	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1221 [1]	ND	0.19	0.087	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1232 [1]	ND	0.19	0.046	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1242 [1]	ND	0.19	0.052	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1248 [1]	0.64	0.19	0.045	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1254 [2]	2.7	0.19	0.071	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1260 [1]	ND	0.19	0.039	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1262 [1]	ND	0.19	0.049	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Aroclor-1268 [1]	ND	0.19	0.050	mg/Kg	2		SW-846 8082A	10/16/24	10/17/24 11:51	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		52.0	30-150						10/17/24 11:51	
Decachlorobiphenyl [2]		57.6	30-150						10/17/24 11:51	
Tetrachloro-m-xylene [1]		63.5	30-150						10/17/24 11:51	
Tetrachloro-m-xylene [2]		66.4	30-150						10/17/24 11:51	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-11 Exterior Window Caulk Upper

Sampled: 10/8/2024 17:55

Sample ID: 24J1726-11

Sample Matrix: Caulk

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1221 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1232 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1242 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1248 [1]	15000	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1254 [2]	31000	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1260 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1262 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Aroclor-1268 [1]	ND	750		mg/Kg	400		SW-846 8082A Modified	10/15/24	10/16/24 8:31	MEW
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		*		30-150		S-01			10/16/24 8:31	
Decachlorobiphenyl [2]		*		30-150		S-01			10/16/24 8:31	
Tetrachloro-m-xylene [1]		*		30-150		S-01			10/16/24 8:31	
Tetrachloro-m-xylene [2]		*		30-150		S-01			10/16/24 8:31	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-12 Exterior Window Glazing Upper

Sampled: 10/8/2024 17:57

Sample ID: 24J1726-12

Sample Matrix: Product/Solid

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.71	0.17	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1221 [1]	ND	0.71	0.33	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1232 [1]	ND	0.71	0.17	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1242 [1]	ND	0.71	0.20	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1248 [1]	1.7	0.71	0.17	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1254 [1]	7.5	0.71	0.21	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1260 [1]	ND	0.71	0.15	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1262 [1]	ND	0.71	0.18	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Aroclor-1268 [1]	ND	0.71	0.19	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 10:50	SFM
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		109		30-150					10/16/24 10:50	
Decachlorobiphenyl [2]		116		30-150					10/16/24 10:50	
Tetrachloro-m-xylene [1]		91.8		30-150					10/16/24 10:50	
Tetrachloro-m-xylene [2]		86.7		30-150					10/16/24 10:50	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-13 Exterior Vent Caulk East

Sampled: 10/8/2024 18:09

Sample ID: 24J1726-13

Sample Matrix: Caulk

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1221 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1232 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1242 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1248 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1254 [2]	34000	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1260 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1262 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Aroclor-1268 [1]	ND	3500		mg/Kg	2000		SW-846 8082A Modified	10/15/24	10/15/24 16:22	MEW
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		*		30-150		S-01			10/15/24 16:22	
Decachlorobiphenyl [2]		*		30-150		S-01			10/15/24 16:22	
Tetrachloro-m-xylene [1]		*		30-150		S-01			10/15/24 16:22	
Tetrachloro-m-xylene [2]		*		30-150		S-01			10/15/24 16:22	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-14 Brick at Rear Door Left

Sampled: 10/8/2024 17:00

Sample ID: 24J1726-14

Sample Matrix: Brick

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	3.9	0.97	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1221 [1]	ND	3.9	1.8	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1232 [1]	ND	3.9	0.96	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1242 [1]	ND	3.9	1.1	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1248 [1]	2.3	3.9	0.94	mg/Kg	50	J	SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1254 [2]	23	3.9	1.5	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1260 [1]	ND	3.9	0.81	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1262 [1]	ND	3.9	1.0	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Aroclor-1268 [1]	ND	3.9	1.0	mg/Kg	50		SW-846 8082A	10/14/24	10/16/24 11:07	SFM
Surrogates		% Recovery	Recovery Limits			Flag/Qual				
Decachlorobiphenyl [1]		*	30-150			S-01			10/16/24 11:07	
Decachlorobiphenyl [2]		*	30-150			S-01			10/16/24 11:07	
Tetrachloro-m-xylene [1]		*	30-150			S-01			10/16/24 11:07	
Tetrachloro-m-xylene [2]		*	30-150			S-01			10/16/24 11:07	

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Project Location: Raleigh, NC

Sample Description:

Work Order: 24J1726

Date Received: 10/10/2024

Field Sample #: MH-15 Brick at Rear Door Right

Sampled: 10/8/2024 17:10

Sample ID: 24J1726-15

Sample Matrix: Brick

Polychlorinated Biphenyls By GC/ECD

Analyte	Results	RL	DL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Aroclor-1016 [1]	ND	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1221 [1]	ND	0.90	0.42	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1232 [1]	ND	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1242 [1]	ND	0.90	0.25	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1248 [1]	2.9	0.90	0.22	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1254 [2]	6.2	0.90	0.34	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1260 [1]	ND	0.90	0.19	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1262 [1]	ND	0.90	0.23	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Aroclor-1268 [1]	ND	0.90	0.24	mg/Kg	10		SW-846 8082A	10/14/24	10/16/24 11:24	SFM
Surrogates		% Recovery		Recovery Limits		Flag/Qual				
Decachlorobiphenyl [1]		106		30-150					10/16/24 11:24	
Decachlorobiphenyl [2]		109		30-150					10/16/24 11:24	
Tetrachloro-m-xylene [1]		91.9		30-150					10/16/24 11:24	
Tetrachloro-m-xylene [2]		93.1		30-150					10/16/24 11:24	

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Sample Extraction Data
Prep Method:SW-846 3546 Analytical Method:SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
24J1726-09 [MH-9 White Door Caulk 2nd]	B389358	0.514	10.0	10/15/24

Prep Method:SW-846 3546 Analytical Method:SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
24J1726-01 [MH-1 External Duct Mastic 2nd Floor]	B389248	2.05	10.0	10/14/24
24J1726-02 [MH-2 External Duct Mastic 3rd Floor]	B389248	2.83	10.0	10/14/24
24J1726-04 [MH-4 Block Filler 2nd Floor]	B389248	2.21	10.0	10/14/24
24J1726-05 [MH-5 Block Filler 3rd Floor]	B389248	2.77	10.0	10/14/24
24J1726-06 [MH-6 Block Filler 4th Floor]	B389248	2.07	10.0	10/14/24
24J1726-12 [MH-12 Exterior Window Glazing Upper]	B389248	2.82	10.0	10/14/24
24J1726-14 [MH-14 Brick at Rear Door Left]	B389248	2.55	10.0	10/14/24
24J1726-15 [MH-15 Brick at Rear Door Right]	B389248	2.21	10.0	10/14/24

Prep Method:SW-846 3546 Analytical Method:SW-846 8082A

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
24J1726-03RE1 [MH-3 External Duct Mastic 4th Floor]	B389477	2.01	10.0	10/16/24
24J1726-10RE1 [MH-10 Internal Duct Mastic Rm 306]	B389477	1.91	9.00	10/16/24

Prep Method:SW-846 3540C Analytical Method:SW-846 8082A Modified

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
24J1726-07 [MH-7 Tan Door Caulk South (Sticky)]	B389208	0.0555	10.0	10/15/24
24J1726-08 [MH-8 Gray Door Caulk 2nd & 4th]	B389208	0.0520	10.0	10/15/24
24J1726-11 [MH-11 Exterior Window Caulk Upper]	B389208	0.0536	10.0	10/15/24
24J1726-13 [MH-13 Exterior Vent Caulk East]	B389208	0.0571	10.0	10/15/24

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389208 - SW-846 3540C										
Blank (B389208-BLK1)										
Prepared: 10/14/24 Analyzed: 10/16/24										
Aroclor-1016	ND	1.7	mg/Kg							
Aroclor-1016 [2C]	ND	1.7	mg/Kg							
Aroclor-1221	ND	1.7	mg/Kg							
Aroclor-1221 [2C]	ND	1.7	mg/Kg							
Aroclor-1232	ND	1.7	mg/Kg							
Aroclor-1232 [2C]	ND	1.7	mg/Kg							
Aroclor-1242	ND	1.7	mg/Kg							
Aroclor-1242 [2C]	ND	1.7	mg/Kg							
Aroclor-1248	ND	1.7	mg/Kg							
Aroclor-1248 [2C]	ND	1.7	mg/Kg							
Aroclor-1254	ND	1.7	mg/Kg							
Aroclor-1254 [2C]	ND	1.7	mg/Kg							
Aroclor-1260	ND	1.7	mg/Kg							
Aroclor-1260 [2C]	ND	1.7	mg/Kg							
Aroclor-1262	ND	1.7	mg/Kg							
Aroclor-1262 [2C]	ND	1.7	mg/Kg							
Aroclor-1268	ND	1.7	mg/Kg							
Aroclor-1268 [2C]	ND	1.7	mg/Kg							
Surrogate: Decachlorobiphenyl	36.3		mg/Kg	33.67		108	30-150			
Surrogate: Decachlorobiphenyl [2C]	35.0		mg/Kg	33.67		104	30-150			
Surrogate: Tetrachloro-m-xylene	36.7		mg/Kg	33.67		109	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	37.1		mg/Kg	33.67		110	30-150			
LCS (B389208-BS1)										
Prepared: 10/14/24 Analyzed: 10/16/24										
Aroclor-1016	35	1.7	mg/Kg	33.61		105	40-140			
Aroclor-1016 [2C]	33	1.7	mg/Kg	33.61		99.6	40-140			
Aroclor-1260	37	1.7	mg/Kg	33.61		109	40-140			
Aroclor-1260 [2C]	35	1.7	mg/Kg	33.61		104	40-140			
Surrogate: Decachlorobiphenyl	41.5		mg/Kg	33.61		124	30-150			
Surrogate: Decachlorobiphenyl [2C]	40.0		mg/Kg	33.61		119	30-150			
Surrogate: Tetrachloro-m-xylene	41.6		mg/Kg	33.61		124	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	42.1		mg/Kg	33.61		125	30-150			
LCS Dup (B389208-BSD1)										
Prepared: 10/14/24 Analyzed: 10/16/24										
Aroclor-1016	34	1.7	mg/Kg	34.54		97.7	40-140	4.41		
Aroclor-1016 [2C]	32	1.7	mg/Kg	34.54		93.8	40-140	3.31		
Aroclor-1260	35	1.7	mg/Kg	34.54		102	40-140	3.98		
Aroclor-1260 [2C]	33	1.7	mg/Kg	34.54		96.8	40-140	4.07		
Surrogate: Decachlorobiphenyl	41.4		mg/Kg	34.54		120	30-150			
Surrogate: Decachlorobiphenyl [2C]	39.8		mg/Kg	34.54		115	30-150			
Surrogate: Tetrachloro-m-xylene	40.0		mg/Kg	34.54		116	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	40.2		mg/Kg	34.54		116	30-150			

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389248 - SW-846 3546										
Blank (B389248-BLK1)										
Prepared: 10/14/24 Analyzed: 10/15/24										
Aroclor-1016	ND	0.080	mg/Kg							
Aroclor-1016 [2C]	ND	0.080	mg/Kg							
Aroclor-1221	ND	0.080	mg/Kg							
Aroclor-1221 [2C]	ND	0.080	mg/Kg							
Aroclor-1232	ND	0.080	mg/Kg							
Aroclor-1232 [2C]	ND	0.080	mg/Kg							
Aroclor-1242	ND	0.080	mg/Kg							
Aroclor-1242 [2C]	ND	0.080	mg/Kg							
Aroclor-1248	ND	0.080	mg/Kg							
Aroclor-1248 [2C]	ND	0.080	mg/Kg							
Aroclor-1254	ND	0.080	mg/Kg							
Aroclor-1254 [2C]	ND	0.080	mg/Kg							
Aroclor-1260	ND	0.080	mg/Kg							
Aroclor-1260 [2C]	ND	0.080	mg/Kg							
Aroclor-1262	ND	0.080	mg/Kg							
Aroclor-1262 [2C]	ND	0.080	mg/Kg							
Aroclor-1268	ND	0.080	mg/Kg							
Aroclor-1268 [2C]	ND	0.080	mg/Kg							
Surrogate: Decachlorobiphenyl	0.852		mg/Kg	0.7968		107	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.835		mg/Kg	0.7968		105	30-150			
Surrogate: Tetrachloro-m-xylene	0.765		mg/Kg	0.7968		96.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.679		mg/Kg	0.7968		85.2	30-150			
LCS (B389248-BS1)										
Prepared: 10/14/24 Analyzed: 10/15/24										
Aroclor-1016	0.79	0.082	mg/Kg	0.8163		97.0	40-140			
Aroclor-1016 [2C]	0.79	0.082	mg/Kg	0.8163		96.3	40-140			
Aroclor-1260	0.89	0.082	mg/Kg	0.8163		109	40-140			
Aroclor-1260 [2C]	0.91	0.082	mg/Kg	0.8163		112	40-140			
Surrogate: Decachlorobiphenyl	0.891		mg/Kg	0.8163		109	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.875		mg/Kg	0.8163		107	30-150			
Surrogate: Tetrachloro-m-xylene	0.852		mg/Kg	0.8163		104	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.762		mg/Kg	0.8163		93.3	30-150			
LCS Dup (B389248-BS1)										
Prepared: 10/14/24 Analyzed: 10/15/24										
Aroclor-1016	0.75	0.081	mg/Kg	0.8097		92.0	40-140	6.10	30	
Aroclor-1016 [2C]	0.74	0.081	mg/Kg	0.8097		91.1	40-140	6.40	30	
Aroclor-1260	0.86	0.081	mg/Kg	0.8097		107	40-140	3.00	30	
Aroclor-1260 [2C]	0.89	0.081	mg/Kg	0.8097		110	40-140	2.85	30	
Surrogate: Decachlorobiphenyl	0.857		mg/Kg	0.8097		106	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.846		mg/Kg	0.8097		104	30-150			
Surrogate: Tetrachloro-m-xylene	0.778		mg/Kg	0.8097		96.1	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.689		mg/Kg	0.8097		85.0	30-150			

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389248 - SW-846 3546										
Matrix Spike (B389248-MS1)	Source: 24J1726-14			Prepared: 10/14/24 Analyzed: 10/16/24						
Aroclor-1016	5.7	3.9	mg/Kg	0.7752	ND	730	* 40-140			MS-21
Aroclor-1016 [2C]	5.9	3.9	mg/Kg	0.7752	ND	760	* 40-140			MS-21
Aroclor-1260	25	3.9	mg/Kg	0.7752	ND	3240	* 40-140			MS-21
Aroclor-1260 [2C]	35	3.9	mg/Kg	0.7752	ND	4560	* 40-140			MS-21
Surrogate: Decachlorobiphenyl	0.00		mg/Kg	0.7752			* 30-150			S-01
Surrogate: Decachlorobiphenyl [2C]	0.00		mg/Kg	0.7752			* 30-150			S-01
Surrogate: Tetrachloro-m-xylene	0.00		mg/Kg	0.7752			* 30-150			S-01
Surrogate: Tetrachloro-m-xylene [2C]	0.00		mg/Kg	0.7752			* 30-150			S-01
Matrix Spike Dup (B389248-MSD1)	Source: 24J1726-14			Prepared: 10/14/24 Analyzed: 10/16/24						
Aroclor-1016	4.1	4.0	mg/Kg	0.8000	ND	515	* 40-140	31.5	* 30	MS-21
Aroclor-1016 [2C]	4.3	4.0	mg/Kg	0.8000	ND	533	* 40-140	32.0	* 30	MS-21
Aroclor-1260	11	4.0	mg/Kg	0.8000	ND	1370	* 40-140	78.5	* 30	MS-21
Aroclor-1260 [2C]	16	4.0	mg/Kg	0.8000	ND	2000	* 40-140	75.4	* 30	MS-21
Surrogate: Decachlorobiphenyl	0.00		mg/Kg	0.8000			* 30-150			S-01
Surrogate: Decachlorobiphenyl [2C]	0.00		mg/Kg	0.8000			* 30-150			S-01
Surrogate: Tetrachloro-m-xylene	0.00		mg/Kg	0.8000			* 30-150			S-01
Surrogate: Tetrachloro-m-xylene [2C]	0.00		mg/Kg	0.8000			* 30-150			S-01
Batch B389358 - SW-846 3546										
Blank (B389358-BLK1)	Prepared: 10/15/24 Analyzed: 10/16/24									
Aroclor-1016	ND	0.19	mg/Kg							
Aroclor-1016 [2C]	ND	0.19	mg/Kg							
Aroclor-1221	ND	0.19	mg/Kg							
Aroclor-1221 [2C]	ND	0.19	mg/Kg							
Aroclor-1232	ND	0.19	mg/Kg							
Aroclor-1232 [2C]	ND	0.19	mg/Kg							
Aroclor-1242	ND	0.19	mg/Kg							
Aroclor-1242 [2C]	ND	0.19	mg/Kg							
Aroclor-1248	ND	0.19	mg/Kg							
Aroclor-1248 [2C]	ND	0.19	mg/Kg							
Aroclor-1254	ND	0.19	mg/Kg							
Aroclor-1254 [2C]	ND	0.19	mg/Kg							
Aroclor-1260	ND	0.19	mg/Kg							
Aroclor-1260 [2C]	ND	0.19	mg/Kg							
Aroclor-1262	ND	0.19	mg/Kg							
Aroclor-1262 [2C]	ND	0.19	mg/Kg							
Aroclor-1268	ND	0.19	mg/Kg							
Aroclor-1268 [2C]	ND	0.19	mg/Kg							
Surrogate: Decachlorobiphenyl	2.66		mg/Kg	3.887			68.5	30-150		
Surrogate: Decachlorobiphenyl [2C]	3.24		mg/Kg	3.887			83.3	30-150		
Surrogate: Tetrachloro-m-xylene	3.00		mg/Kg	3.887			77.3	30-150		
Surrogate: Tetrachloro-m-xylene [2C]	3.67		mg/Kg	3.887			94.4	30-150		

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389358 - SW-846 3546										
LCS (B389358-BS1)										
Prepared: 10/15/24 Analyzed: 10/16/24										
Aroclor-1016	2.8	0.18	mg/Kg	3.687		76.9	40-140			
Aroclor-1016 [2C]	3.1	0.18	mg/Kg	3.687		83.0	40-140			
Aroclor-1260	3.2	0.18	mg/Kg	3.687		86.4	40-140			
Aroclor-1260 [2C]	3.3	0.18	mg/Kg	3.687		89.8	40-140			
Surrogate: Decachlorobiphenyl	2.58		mg/Kg	3.687		70.1	30-150			
Surrogate: Decachlorobiphenyl [2C]	3.13		mg/Kg	3.687		85.0	30-150			
Surrogate: Tetrachloro-m-xylene	2.82		mg/Kg	3.687		76.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	3.35		mg/Kg	3.687		90.9	30-150			
LCS Dup (B389358-BSD1)										
Prepared: 10/15/24 Analyzed: 10/16/24										
Aroclor-1016	2.9	0.19	mg/Kg	3.747		78.7	40-140	3.91		
Aroclor-1016 [2C]	3.1	0.19	mg/Kg	3.747		83.5	40-140	2.24		
Aroclor-1260	3.3	0.19	mg/Kg	3.747		88.8	40-140	4.45		
Aroclor-1260 [2C]	3.3	0.19	mg/Kg	3.747		88.7	40-140	0.358		
Surrogate: Decachlorobiphenyl	2.59		mg/Kg	3.747		69.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	3.06		mg/Kg	3.747		81.6	30-150			
Surrogate: Tetrachloro-m-xylene	2.97		mg/Kg	3.747		79.3	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	3.46		mg/Kg	3.747		92.4	30-150			
Batch B389477 - SW-846 3546										
Blank (B389477-BLK1)										
Prepared: 10/16/24 Analyzed: 10/17/24										
Aroclor-1016	ND	0.087	mg/Kg							
Aroclor-1016 [2C]	ND	0.087	mg/Kg							
Aroclor-1221	ND	0.087	mg/Kg							
Aroclor-1221 [2C]	ND	0.087	mg/Kg							
Aroclor-1232	ND	0.087	mg/Kg							
Aroclor-1232 [2C]	ND	0.087	mg/Kg							
Aroclor-1242	ND	0.087	mg/Kg							
Aroclor-1242 [2C]	ND	0.087	mg/Kg							
Aroclor-1248	ND	0.087	mg/Kg							
Aroclor-1248 [2C]	ND	0.087	mg/Kg							
Aroclor-1254	ND	0.087	mg/Kg							
Aroclor-1254 [2C]	ND	0.087	mg/Kg							
Aroclor-1260	ND	0.087	mg/Kg							
Aroclor-1260 [2C]	ND	0.087	mg/Kg							
Aroclor-1262	ND	0.087	mg/Kg							
Aroclor-1262 [2C]	ND	0.087	mg/Kg							
Aroclor-1268	ND	0.087	mg/Kg							
Aroclor-1268 [2C]	ND	0.087	mg/Kg							
Surrogate: Decachlorobiphenyl	0.632		mg/Kg	0.8658		73.0	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.719		mg/Kg	0.8658		83.1	30-150			
Surrogate: Tetrachloro-m-xylene	0.715		mg/Kg	0.8658		82.6	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.782		mg/Kg	0.8658		90.3	30-150			

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QUALITY CONTROL
Polychlorinated Biphenyls By GC/ECD - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B389477 - SW-846 3546										
LCS (B389477-BS1)										
					Prepared: 10/16/24 Analyzed: 10/17/24					
Aroclor-1016	0.77	0.089	mg/Kg	0.8889		86.3	40-140			
Aroclor-1016 [2C]	0.78	0.089	mg/Kg	0.8889		88.1	40-140			
Aroclor-1260	0.87	0.089	mg/Kg	0.8889		97.6	40-140			
Aroclor-1260 [2C]	0.84	0.089	mg/Kg	0.8889		95.0	40-140			
Surrogate: Decachlorobiphenyl	0.631		mg/Kg	0.8889		70.9	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.720		mg/Kg	0.8889		81.0	30-150			
Surrogate: Tetrachloro-m-xylene	0.744		mg/Kg	0.8889		83.7	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.835		mg/Kg	0.8889		94.0	30-150			
LCS Dup (B389477-BSD1)										
					Prepared: 10/16/24 Analyzed: 10/17/24					
Aroclor-1016	0.75	0.089	mg/Kg	0.8929		83.9	40-140	2.32	30	
Aroclor-1016 [2C]	0.78	0.089	mg/Kg	0.8929		87.7	40-140	0.0188	30	
Aroclor-1260	0.85	0.089	mg/Kg	0.8929		95.7	40-140	1.45	30	
Aroclor-1260 [2C]	0.84	0.089	mg/Kg	0.8929		94.4	40-140	0.188	30	
Surrogate: Decachlorobiphenyl	0.614		mg/Kg	0.8929		68.8	30-150			
Surrogate: Decachlorobiphenyl [2C]	0.716		mg/Kg	0.8929		80.2	30-150			
Surrogate: Tetrachloro-m-xylene	0.733		mg/Kg	0.8929		82.0	30-150			
Surrogate: Tetrachloro-m-xylene [2C]	0.824		mg/Kg	0.8929		92.2	30-150			

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-1 External Duct Mastic 2nd Floor

SW-846 8082A

 Lab Sample ID: 24J1726-01 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	27	
	2	0.000	0.000	0.000	23	16.0
Aroclor-1254	1	0.000	0.000	0.000	54	
	2	0.000	0.000	0.000	57	5.4
Aroclor-1260	1	0.000	0.000	0.000	91	
	2	0.000	0.000	0.000	94	3.2
Aroclor-1268	1	0.000	0.000	0.000	250	
	2	0.000	0.000	0.000	260	3.9

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-2 External Duct Mastic 3rd Floor

SW-846 8082A

Lab Sample ID: 24J1726-02 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	27	
	2	0.000	0.000	0.000	26	3.8
Aroclor-1254	1	0.000	0.000	0.000	30	
	2	0.000	0.000	0.000	28	6.9
Aroclor-1260	1	0.000	0.000	0.000	2.4	
	2	0.000	0.000	0.000	3.2	28.6

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-3 External Duct Mastic 4th Floor

SW-846 8082A

Lab Sample ID: 24J1726-03RE1 Date(s) Analyzed: 10/17/2024 10/17/2024
 Instrument ID (1): ECD1 Instrument ID (2): ECD1
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	13	
	2	0.000	0.000	0.000	14	7.4
Aroclor-1254	1	0.000	0.000	0.000	14	
	2	0.000	0.000	0.000	12	15.4
Aroclor-1260	1	0.000	0.000	0.000	1.4	
	2	0.000	0.000	0.000	3.0	72.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-4 Block Filler 2nd Floor
SW-846 8082A

 Lab Sample ID: 24J1726-04 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD10 Instrument ID (2): ECD10

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	2.9	
	2	0.000	0.000	0.000	2.4	18.9
Aroclor-1254	1	0.000	0.000	0.000	5.8	
	2	0.000	0.000	0.000	5.5	5.3
Aroclor-1260	1	0.000	0.000	0.000	0.46	
	2	0.000	0.000	0.000	0.59	24.8

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-5 Block Filler 3rd Floor
SW-846 8082A

Lab Sample ID: 24J1726-05 Date(s) Analyzed: 10/15/2024 10/15/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	0.45	
	2	0.000	0.000	0.000	0.40	11.8
Aroclor-1254	1	0.000	0.000	0.000	0.84	
	2	0.000	0.000	0.000	0.72	16.6
Aroclor-1260	1	0.000	0.000	0.000	0.090	
	2	0.000	0.000	0.000	0.077	16.7

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-6 Block Filler 4th Floor
SW-846 8082A

Lab Sample ID: 24J1726-06 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	6.0	
	2	0.000	0.000	0.000	5.1	16.2
Aroclor-1254	1	0.000	0.000	0.000	8.9	
	2	0.000	0.000	0.000	9.2	3.3
Aroclor-1260	1	0.000	0.000	0.000	0.90	
	2	0.000	0.000	0.000	1.2	28.6

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-7 Tan Door Caulk South
SW-846 8082A Modified

 Lab Sample ID: 24J1726-07 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	930	
	2	0.000	0.000	0.000	940	1.1
Aroclor-1254	1	0.000	0.000	0.000	220	
	2	0.000	0.000	0.000	220	0.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-8 Gray Door Caulk 2nd & 4th
SW-846 8082A Modified

Lab Sample ID: 24J1726-08 Date(s) Analyzed: 10/15/2024 10/15/2024
 Instrument ID (1): ECD3 Instrument ID (2): ECD3
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	560	
	2	0.000	0.000	0.000	560	0.0
Aroclor-1254	1	0.000	0.000	0.000	120	
	2	0.000	0.000	0.000	140	15.4

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-9 White Door Caulk 2nd

SW-846 8082A

 Lab Sample ID: 24J1726-09 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	29	
	2	0.000	0.000	0.000	32	9.8
Aroclor-1254	1	0.000	0.000	0.000	21	
	2	0.000	0.000	0.000	19	10.0

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-10 Internal Duct Mastic Rm 306

SW-846 8082A

 Lab Sample ID: 24J1726-10RE1 Date(s) Analyzed: 10/17/2024 10/17/2024

 Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	0.64	
	2	0.000	0.000	0.000	0.63	1.6
Aroclor-1254	1	0.000	0.000	0.000	2.3	
	2	0.000	0.000	0.000	2.7	16.0

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-11 Exterior Window Caulk Uppe

SW-846 8082A Modified

 Lab Sample ID: 24J1726-11 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	15000	
	2	0.000	0.000	0.000	14000	6.9
Aroclor-1254	1	0.000	0.000	0.000	30000	
	2	0.000	0.000	0.000	31000	3.3

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

H-12 Exterior Window Glazing Upp

SW-846 8082A

Lab Sample ID: 24J1726-12 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	1.7	
	2	0.000	0.000	0.000	1.6	6.1
Aroclor-1254	1	0.000	0.000	0.000	7.5	
	2	0.000	0.000	0.000	7.4	1.3

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-13 Exterior Vent Caulk East
SW-846 8082A Modified

 Lab Sample ID: 24J1726-13 Date(s) Analyzed: 10/15/2024 10/15/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1254	1	0.000	0.000	0.000	33000	
	2	0.000	0.000	0.000	34000	3.0

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-14 Brick at Rear Door Left
SW-846 8082A

Lab Sample ID: 24J1726-14 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	2.3	
	2	0.000	0.000	0.000	2.0	14.0
Aroclor-1254	1	0.000	0.000	0.000	22	
	2	0.000	0.000	0.000	23	4.4

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

MH-15 Brick at Rear Door Right
SW-846 8082A

Lab Sample ID: 24J1726-15 Date(s) Analyzed: 10/16/2024 10/16/2024
 Instrument ID (1): ECD10 Instrument ID (2): ECD10
 GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1248	1	0.000	0.000	0.000	2.9	
	2	0.000	0.000	0.000	2.7	7.1
Aroclor-1254	1	0.000	0.000	0.000	6.2	
	2	0.000	0.000	0.000	6.2	0.0

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

LCS

SW-846 8082A Modified

 Lab Sample ID: B389208-BS1 Date(s) Analyzed: 10/16/2024 10/16/2024

 Instrument ID (1): ECD3 Instrument ID (2): ECD3

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	35	
	2	0.000	0.000	0.000	33	5.9
Aroclor-1260	1	0.000	0.000	0.000	37	
	2	0.000	0.000	0.000	35	5.6

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IDENTIFICATION SUMMARY FOR SINGLE COMPONENT ANALYTES

LCS

SW-846 8082A

 Lab Sample ID: B389477-BS1 Date(s) Analyzed: 10/17/2024 10/17/2024

 Instrument ID (1): ECD1 Instrument ID (2): ECD1

GC Column (1): ID: (mm) GC Column (2): ID: (mm)

ANALYTE	COL	RT	RT WINDOW		CONCENTRATION	%RPD
			FROM	TO		
Aroclor-1016	1	0.000	0.000	0.000	0.77	
	2	0.000	0.000	0.000	0.78	1.3
Aroclor-1260	1	0.000	0.000	0.000	0.87	
	2	0.000	0.000	0.000	0.84	3.5

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level
	Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.
	No results have been blank subtracted unless specified in the case narrative section.
J	Detected but below the Reporting Limit (lowest calibration standard); therefore, result is an estimated concentration (CLP J-Flag).
MS-21	Matrix spike and/or spike duplicate recovery bias high due to contribution of other Aroclors present in the source sample.
S-01	The surrogate recovery for this sample is not available due to sample dilution below the surrogate reporting limit required from high analyte concentration and/or matrix interferences.

CERTIFICATIONS
Certified Analyses included in this Report

Analyte	Certifications
<i>SW-846 8082A in Product/Solid</i>	
Aroclor-1016	CT,NH,NY,NC,ME,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1262	NH,NY,NC,ME,VA,PA
Aroclor-1262 [2C]	NH,NY,NC,ME,VA,PA
Aroclor-1268	NH,NY,NC,ME,VA,PA
Aroclor-1268 [2C]	NH,NY,NC,ME,VA,PA
<i>SW-846 8082A in Water</i>	
Aroclor-1016	CT,NH,NY,NC,ME,VA,PA
Aroclor-1016 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221	CT,NH,NY,NC,ME,VA,PA
Aroclor-1221 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232	CT,NH,NY,NC,ME,VA,PA
Aroclor-1232 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242	CT,NH,NY,NC,ME,VA,PA
Aroclor-1242 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248	CT,NH,NY,NC,ME,VA,PA
Aroclor-1248 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254	CT,NH,NY,NC,ME,VA,PA
Aroclor-1254 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260	CT,NH,NY,NC,ME,VA,PA
Aroclor-1260 [2C]	CT,NH,NY,NC,ME,VA,PA
Aroclor-1262	NH,NY,NC,ME,VA,PA
Aroclor-1262 [2C]	NH,NY,NC,ME,VA,PA
Aroclor-1268	NH,NY,NC,ME,VA,PA
Aroclor-1268 [2C]	NH,NY,NC,ME,VA,PA

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Con-Test, a Pace Environmental Laboratory, operates under the following certifications and accreditations:

Code	Description	Number	Expires
CT	Connecticut Department of Public Health	PH-0821	12/31/2024
NY	New York State Department of Health	10899 NELAP	04/1/2025
NH	New Hampshire Environmental Lab	2516 NELAP	02/5/2025
NC	North Carolina Div. of Water Quality	652	12/31/2024
ME	State of Maine	MA00100	06/9/2025
VA	Commonwealth of Virginia	460217	12/14/2024
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2025

Doc # 379 Rev 1_03242017
 39 Spruce Street
 East Longmeadow, MA 01028

Page 1 of 2

2025726
<http://www.contestlabs.com>
CHAIN OF CUSTODY RECORD (North Carolina)

Phone: 413-525-2332
 Fax: 413-525-6405
 Email: info@contestlabs.com



Matrix Health & Safety Consultants, LLC

Company Name: Matrix Health & Safety Consultants, LLC
Address: 2900 Yonkers Road Raleigh
 Phone: 919.833.2520
Project Name: NCSU Mann Hall Raleigh, NC
Address: 2900 Yonkers Road Raleigh
Project Number:
Project Manager: Gregg E. Heppert
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: Gregg E. Heppert

Requested Turnaround Time
 7-Day 10-Day
 Due Date: 5 day TAT

Rush-Approval Required
 1-Day 3-Day
 2-Day 4-Day

Data Delivery
 Format: PDF EXCEL
 Other:

CLP Like Data Pkg Required:

Email To: _____
 Fax To #: _____

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	Matrix Code	Conc Code
1	MH-1 External Duct Mastic 2nd Floor	10/8/2024	1600	X			X
2	MH-2 External Duct Mastic 3rd Floor	10/8/2024	1610	X			X
3	MH-3 External Duct Mastic 4th Floor	10/8/2024	1615	X			X
4	MH-4 Block Filler 2nd Floor	10/8/2024	1622	X			X
5	MH-5 Block Filler 3rd Floor	10/8/2024	1630	X			X
6	MH-6 Block Filler 4th Floor	10/8/2024	1639	X			X
7	MH-7 Tan Door Caulk South (Sticky)	10/8/2024	1730	X			X
8	MH-8 Gray Door Caulk 2nd and 4th	10/8/2024	1733	X			X
9	MH-9 White Door Caulk 2nd	10/8/2024	1740	X			X
10	MH-10 Internal Duct Mastic Rm. 306	10/8/2024	1745	X			X

Gregg@matrixhsc.com

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
 H - High; M - Medium; L - Low; C - Clean; U - Unknown

Relinquished by: (signature) _____
 Date/Time: 10/9/2024

Received by: (signature) _____
 Date/Time: 10/9/24

Relinquished by: (signature) _____
 Date/Time: _____

Received by: (signature) _____
 Date/Time: 10/10/24

Relinquished by: (signature) _____
 Date/Time: _____

Received by: (signature) _____
 Date/Time: _____

North Carolina Detection Limit Requirements
 2L GWPC SWSL IHSB MSCC

Program Information
 DSCA UST/Trust Fund REC
 SWS Landfill
 IHSB Orphaned Landfill
 State Lead
 Other: _____

Project Entity
 Government Municipality
 Federal Brownfield
 City School

Other: NELAC and AIHA-LAP, LLC Accredited

of Containers
 2 Preservation Code
 3 Container Code

Dissolved Metals Samples
 Field Filtered
 Lab to Filter

Orthophosphate Samples
 Field Filtered
 Lab to Filter

1 Matrix Codes:
 GW = Ground Water
 WW = Waste Water
 DW = Drinking Water
 A = Air
 S = Soil
 SL = Sludge
 SOL = Solid
 O = Other (please define)

2 Preservation Codes:
 I = Iced
 H = HCL
 M = Methanol
 N = Nitric Acid
 S = Sulfuric Acid
 B = Sodium Bisulfate
 X = Sodium Hydroxide
 T = Sodium Thiosulfate
 O = Other (please define)

3 Container Codes:
 A = Amber Glass
 G = Glass
 P = Plastic
 ST = Sterile
 V = Vial
 S = Summa Canister
 T = Tedlar Bag
 O = Other (please define)

PCB ONLY
 Soxhlet
 Non Soxhlet

2457726

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD (North Carolina)

Phone: 413-525-2332
Fax: 413-525-6405
Email: info@contestlabs.com



Matrix Health & Safety Consultants, LLC

Company Name: Matrix Health & Safety Consultants, LLC
Address: 2900 Yonkers Road Raleigh
Phone: 919-833-2520

Project Name: NCSU Mann Hall Raleigh, NC

Address: 2900 Yonkers Road Raleigh

Project Number:

Project Manager: Gregg E. Heppert

Con-Test Quote Name/Number:

Invoice Recipient:

Sampled By: Gregg E. Heppert

Requested Turnaround Time
 7-Day 10-Day
 Due Date: 5 day TAT

Rush-Approval Required
 1-Day 3-Day
 2-Day 4-Day

Data Delivery
 Format: PDF EXCEL
 Other: _____
 CLP Like Data Pkg Required:
 Email To: _____
 Fax To #: _____

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	Composite	Grab	Matrix Code	Conc Code
11	MH-11 Exterior Window Caulk Upper	10/8/2024	1755	X			
12	MH-12 Exterior Window Glazing Upper	10/8/2024	1757	X			
13	MH-13 Exterior Vent Caulk East	10/8/2024	1809	X			
14	MH-14 Brick at Rear Door Left	10/8/2024	1700	X			
15	MH-15 Brick at Rear Door Right	10/8/2024	1710	X			

PCB in Bulk

ANALYSIS REQUESTED

1 Matrix Codes:
 GW = Ground Water
 WW = Waste Water
 DW = Drinking Water
 A = Air
 S = Soil
 SL = Sludge
 SOL = Solid
 O = Other (please define)

2 Preservation Codes:
 I = Iced
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 N = Nitric Acid
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 B = Sodium Bisulfate
 X = Sodium Hydroxide
 T = Sodium Thiosulfate
 O = Other (please define)

3 Container Codes:
 A = Amber Glass
 G = Glass
 P = Plastic
 ST = Sterile
 V = Vial
 S = Summa Canister
 T = Tedlar Bag
 O = Other (please define)

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
 H - High; M - Medium; L - Low; C - Clean; U - Unknown

Program Information

DSCA UST/Trust Fund
 SWS Landfill REC
 IHSB Orphaned Landfill
 State Lead
 Other: _____



North Carolina Detection Limit Requirements

2L GWPC
 SWSL IHSB
 MSCC

Other: _____

Project Entity
 Government Municipality
 Federal Brownfield
 City School

Other: _____
 Chromatogram
 AIHA-LAP, LLC

Gregg@matrixhsc.com

Relinquished by: (signature)
 Received by: (signature)
 Relinquished by: (signature)
 Relinquished by: (signature)
 Relinquished by: (signature)

10/9/2024
 10/9/2024
 10/9/2024
 10/10/2024



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Thursday

10/10/24 at 9:50 AM

Signed for by: L.ARROYO

[Obtain proof of delivery](#)

How was your delivery?



DELIVERY STATUS

Delivered

[Report missing package](#)

ADD YOUR EMAIL TO STAY UPDATED ON THIS SHIPMENT

Contestlab39

Your email is invalid.

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TRACKING ID

779127842011



FROM

RALEIGH, NC US

Label Created

10/9/24 10:12 AM

WE HAVE YOUR PACKAGE

RALEIGH, NC

10/9/24 4:16 PM

ON THE WAY


WINDSOR LOCKS, CT

10/10/24 7:59 AM

OUT FOR DELIVERY

WINDSOR LOCKS, CT

10/10/24 8:35 AM

	DC#_ Title: ENV-FRM-ELON-0001 v08_Sample Receiving Checklist
Effective Date: 06/11/2024	

Log In Back-Sheet

Login Sample Receipt Checklist – (Rejection Criteria Listing – Using Acceptance Policy) Any False statement will be brought to the attention of the Client – True or False

Client Matrix Health & Safety

Project NCSU Mann Hall

MCP/RCP Required no

Deliverable Package Requirement none

Location Raleigh, NC

PWSID# (When Applicable) no

Arrival Method:

Courier Fed Ex Walk In Other

Received By / Date / Time RL 10/10/24 0950

Back-Sheet By / Date / Time Mcm 10/11/24 0434

Temperature Method Gun # 4

WV samples: Yes (see note*) / No (follow normal procedure)

Temp < 6° C Actual Temperature 10

Rush Samples: Yes / No Notify No

Short Hold: Yes / No Notify No

	True	False
Received on Ice	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Received in Cooler	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Custody Seal: DATE TIME	<input type="checkbox"/>	<input checked="" type="checkbox"/>
COC Relinquished	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC/Samples Labels Agree	<input type="checkbox"/>	<input checked="" type="checkbox"/> <i>see notes</i>
All Samples in Good Condition	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Samples Received within Holding Time	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Is there enough Volume	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Proper Media/Container Used	<input checked="" type="checkbox"/>	<input type="checkbox"/>
Splitting Samples Required	<input type="checkbox"/>	<input checked="" type="checkbox"/>
MS/MSD	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Trip Blanks	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Lab to Filters	<input type="checkbox"/>	<input checked="" type="checkbox"/>
COC Legible	<input checked="" type="checkbox"/>	<input type="checkbox"/>
COC Included: (Check all included)		
Client <input checked="" type="checkbox"/>	Analysis <input checked="" type="checkbox"/>	Sampler Name <input checked="" type="checkbox"/>
Project <input checked="" type="checkbox"/>	IDs <input checked="" type="checkbox"/>	Collection Date/Time <input checked="" type="checkbox"/>
All Samples Proper pH: N/A <input type="checkbox"/> <input type="checkbox"/>		

Notes regarding Samples/COC outside of SOP:

* No labels... IDs written on Falcon tube caps

Additional Container Notes

*Note: West Virginia requires all samples to have their temperature taken. Note any outliers.

Sample	Soils Jars (Circle Amb/Clear)				Ambers				Plastics						VOA Vials					Other / Fill in													
	16oz Amb/Clear	8oz Amb/Clear	4oz Amb/Clear	2oz Amb/Clear	1 Liter		250mL		100mL	1 Liter			500mL			250mL						Col/Bact	Falcon Tubes										
					Unpreserved	HCL	Sulfuric	Sulfuric	Phosphoric	HCl	Unpreserved	Sulfuric	Unpreserved	Sulfuric	Unpreserved	Trizma	Sulfuric	Nitric	NaOH	Ammonium Acetate	NaOH/zinc	Unpreserved	HCl	MeOH	D.I. Water	Bisulfate							
1																																	
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19																																	
20																																	

DC#_Title: ENV-FRM-ELON-0001 v08_Sample Receiving Checklist

Effective Date: 06/11/2024





Limited XRF Lead-Based Paint Inspection

March 24, 2024

Conducted At:
North Carolina State University
Mann Hall

Prepared For:
NC State University
Design & Construction
Box 7520
2601 Wolf Village Way
Raleigh, North Carolina 27695-7520
Attn: Mike Bell, PMP, PEM

Provided by:
Matrix Health & Safety Consultants, L.L.C.
NC Certified Lead-Based Paint Firm No. FPB-00122
Brian A. Gustafson: NC Certified Lead-Based Paint Risk Assessor No. 120100

Matrix Job #240351

PROJECT INFORMATION

Matrix Health & Safety Consultants, L.L.C. (Matrix) is pleased to present this report of the limited survey to identify lead-based paint in Mann Hall located on the campus of North Carolina State University, in Raleigh, North Carolina. This inspection report includes analytical methods and limitations, discussion of XRF procedures and summary of findings.

Brian A. Gustafson (NC Certified Lead-Based Paint Risk Assessor No. 120100) performed the limited lead-based paint survey at the subject building on March 22, 2024. Only the interior of the building was included in the limited survey.

INSPECTION PROCEDURES

The Lead-Based Paint (LBP) survey began with our inspector/risk assessor walking the subject area and determining testing combinations and test locations. After the testing strategy was determined, Matrix used a Viken Pb200i Lead Paint Spectrum Analyzer (XRF) to determine the lead content (mg/cm²) of painted surfaces/components in the subject area. For the purpose of this survey, paints or components with concentrations of **1.0 mg/cm² or greater** were considered lead-based.

LEAD-BASED PAINT SURVEY RESULTS

Below you will find a chart summarizing identified lead-based paints with concentrations greater than or equal to 1.0 mg/cm² at Mann Hall. However, detectable lead quantities less than 1.0 mg/cm² may constitute a lead dust hazard even though it is not a lead-based paint as defined by Federal Standards. For a list of all surfaces tested and XRF results, refer to the attached XRF Testing Report.

NCSU – Mann Hall (XRF) Interior Results

COMPONENT	SUBSTRATE	COLOR	LOCATION	LEAD CONTENT (mg/cm ²)	CONDITION
Baseboards	Ceramic	Gray	Throughout	1.3-1.7	Intact
Elevator Door	Metal	White	Hallway (all floors)	1.3-1.4	Intact
Railings	Metal	Red	Stairwells and West Entry	1.0-6.4	Intact
Stair Riser and Stringer	Metal	Red	Stairwells	2.8-8.1	Intact
Railings	Metal	Gray	Room 100 and Room 111	2.3-16.8	Intact-Deteriorated
I-Beams / Structural Steel	Metal	Red / Yellow	Room 100	1.0	Intact

RECOMMENDATIONS

Additionally, Matrix recommends that activities that cause the disturbance of lead-based components be performed by North Carolina Certified workers and supervisors. The Occupational Safety and Health Administration (OSHA) Lead in Construction Standard states that “negative” readings (i.e. those below the HUD/EPA definition of what constitutes LBP [1.0 mg/cm²] **does not** relieve contractors from performing exposure assessments (personal air monitoring) on their employees per the OSHA Lead Standard, and should not be interpreted as lead free. Although a reading may indicate “negative”, airborne lead concentrations still may exceed the OSHA Action Level or the OSHA Permissible exposure limit (PEL) depending on the work activity. For additional information including removal requirements and worker protection refer to OSHA Standard 29 CFR 1926.62.

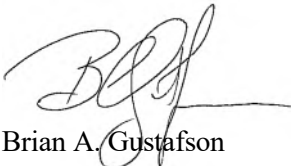
QUALIFICATIONS

This report summarizes Matrix’s evaluation of the conditions observed at the subject property during the course of the limited survey to identify lead-based paints. Our findings are based upon our observations at the property and XRF testing performed at the time of this survey. Additional lead-based paints/components may exist in other portions of the subject area but were undetected due to inaccessibility or due to an imperceptible change in paints. Any conditions discovered which deviate from the data contained in this report should be presented to us for our evaluation. This survey was not performed in order to meet requirements for lead-based paint inspections for target housing or child occupied facilities.

Matrix appreciates the opportunity to have provided these services. We would be glad to discuss any of the results contained in this report, at your convenience. If there are any questions concerning this report or results, please contact us.

Sincerely,

MATRIX HEALTH AND SAFETY CONSULTANTS, L.L.C.



Brian A. Gustafson
Project Manager

NC Certified Lead-Based Paint Risk Assessor No. 120100

XRF Testing Report



Lead-Based Paint Inspection Report

Matrix Health & Safety Consultants,
LLC
2900 Yonkers Road
Raleigh, NC 27604

INSPECTION SITE: North Carolina State University
Mann Hall

INSPECTION DATE: 3/22/2024 - 3/22/2024

INSTRUMENT TYPE: Viken Detection
Pb200i XRF Lead Paint Analyzer
3100

ACTION LEVEL: 1.0 (mg/cm²)

STATEMENT: Brian A. Gustafson NC#120100

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
 Action Level: 1.0 (mg/cm²)
 Total Readings: 25
 Unit Started: 03/22/2024 09:38:41
 Unit Ended: 03/22/2024 11:04:59

Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
1 (CAL)		Off			Calibration					1.0 mg/cm ²	Action Level
3 (CAL)		Off			Calibration					1.0 mg/cm ²	Action Level
7 📷	Positive	Off	BaseBoard	Ceramic	C	Intact	Gray	First	Hall	1.4 mg/cm ²	Action Level
14 📷	Positive	Off	elevator door	Metal	D	Intact	White	First	Hall	1.4 mg/cm ²	Action Level
17	Positive	Off	BaseBoard	Ceramic	B	Intact	Gray	First	Hall	1.7 mg/cm ²	Action Level
24 📷	Positive	Off	Railing	Metal	A	Intact	Red	First	Hall	6.4 mg/cm ²	Action Level
33	Positive	Off	BaseBoard	Ceramic	D	Intact	Gray	First	Hall	1.5 mg/cm ²	Action Level
48 📷	Positive	Off	Railing	Metal	B	Intact	Red	First	Stairwel	1.0 mg/cm ²	Action Level
49 📷	Positive	Off	Riser	Metal	B	Intact	Red	First	Stairwell	8.1 mg/cm ²	Action Level
50 📷	Positive	Off	Stringer	Metal	B	Intact	Red	First	Stairwel	2.8 mg/cm ²	Action Level
55 📷	Positive	Off	Door Lintel	Metal	B	Intact	Red	First	Hall	6.8 mg/cm ²	Action Level
62	Positive	Off	BaseBoard	Ceramic	B	Intact	Gray	First	114	1.4 mg/cm ²	Action Level
65 📷	Positive	Off	Railing	Metal	A	Deteriorated	Gray	First	111	2.3 mg/cm ²	Action Level
67 📷	Positive	Off	Railing	Metal	C	Intact	Gray	First	100	16.8 mg/cm ²	Action Level
68 📷	Positive	Off	ibeam	Metal	D	Intact	Red	First	100	1.0 mg/cm ²	Action Level
71	Positive	Off	Railing	Metal	D	Intact	Red	First	Stairwel	6.4 mg/cm ²	Action Level
73	Positive	Off	Riser	Metal	D	Intact	Red	First	Stairwell	6.7 mg/cm ²	Action Level
74	Positive	Off	Stringer	Metal	D	Intact	Red	First	Stairwel	6.7 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
 Action Level: 1.0 (mg/cm²)
 Total Readings: 25
 Unit Started: 03/22/2024 09:38:41
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
75	Positive	Off	Railing	Metal	D	Intact	Red	First	Stairwell	5.4 mg/cm ²	Action Level
79	Positive	Off	BaseBoard	Ceramic	A	Intact	Gray	Second	200	1.5 mg/cm ²	Action Level
84 🗿	Positive	Off	elevator door	Metal	D	Intact	White	Second	201	1.3 mg/cm ²	Action Level
93	Positive	Off	BaseBoard	Ceramic	C	Intact	Gray	Second	211	1.3 mg/cm ²	Action Level
125	Positive	Off	BaseBoard	Ceramic	D	Intact	Gray	Forth	Hall	1.4 mg/cm ²	Action Level
128	Positive	Off				Calibration				1.1 mg/cm ²	Action Level
129	Positive	Off				Calibration				1.0 mg/cm ²	Action Level

----- END OF READINGS -----

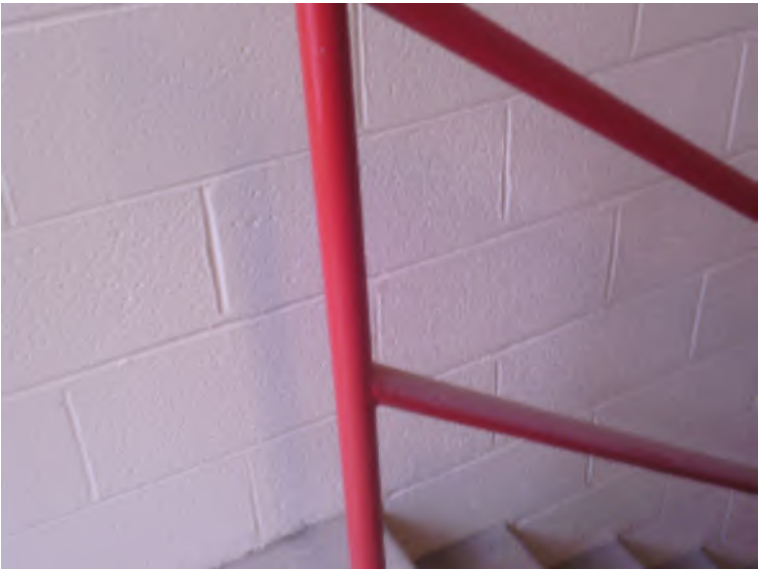
Selected images...



Reading #7



Reading #14



Reading #24



Reading #48



Reading #49



Reading #50



Reading #55



Reading #65



Reading #67



Reading #68



Reading #84



Lead-Based Paint Inspection Report

Matrix Health & Safety Consultants,
LLC
2900 Yonkers Road
Raleigh, NC 27604

INSPECTION SITE: North Carolina State University
Mann Hall

INSPECTION DATE: 3/22/2024 - 3/22/2024

INSTRUMENT TYPE: Viken Detection
Pb200i XRF Lead Paint Analyzer
3100

ACTION LEVEL: 1.0 (mg/cm²)

STATEMENT: Brian A. Gustafson NC#120100

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
 Action Level: 1.0 (mg/cm²)
 Total Readings: 129
 Unit Started: 03/22/2024 09:38:41
 Unit Ended: 03/22/2024 11:04:59

Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
1 (CAL)		Off			Calibration					1.0 mg/cm ²	Action Level
3 (CAL)		Off			Calibration					1.0 mg/cm ²	Action Level
7 📷	Positive	Off	BaseBoard	Ceramic	C	Intact	Gray	First	Hall	1.4 mg/cm ²	Action Level
8	Negative	Off	Wall	Cinderblock	C	Intact	White	First	Hall	0.0 mg/cm ²	Action Level
9	Negative	Off	Door Casing	Metal	C	Intact	White	First	Hall	0.4 mg/cm ²	Action Level
10	Negative	Off	Door	Metal	C	Intact	Red	First	Hall	0.1 mg/cm ²	Action Level
11	Negative	Off	Door	Metal	D	Intact	Red	First	Hall	0.1 mg/cm ²	Action Level
12	Negative	Off	Door Casing	Metal	D	Intact	White	First	Hall	0.2 mg/cm ²	Action Level
13	Negative	Off	elevator dr csng	Metal	D	Intact	White	First	Hall	0.5 mg/cm ²	Action Level
14 📷	Positive	Off	elevator door	Metal	D	Intact	White	First	Hall	1.4 mg/cm ²	Action Level
15	Negative	Off	Door Casing	Metal	B	Intact	White	First	Hall	0.5 mg/cm ²	Action Level
16	Negative	Off	Door	Wood	B	Intact	Stain	First	Hall	0.0 mg/cm ²	Action Level
17	Positive	Off	BaseBoard	Ceramic	B	Intact	Gray	First	Hall	1.7 mg/cm ²	Action Level
18	Negative	Off	Wall	Cinderblock	A	Intact	Gray	First	Hall	0.0 mg/cm ²	Action Level
19	Negative	Off	Wall	Cinderblock	C	Intact	Gray	First	Hall	0.1 mg/cm ²	Action Level
20	Negative	Off	Door Casing	Metal	A	Intact	White	First	Hall	0.4 mg/cm ²	Action Level
21	Negative	Off	Door	Wood	A	Intact	Stain	First	Hall	0.0 mg/cm ²	Action Level
22	Negative	Off	Door	Metal	D	Intact	Red	First	Hall	0.1 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
23	Negative	Off	Door Casing	Metal	D	Intact	White	First	Hall	0.2 mg/cm ²	Action Level
24	Positive	Off	Railing	Metal	A	Intact	Red	First	Hall	6.4 mg/cm ²	Action Level
25	Negative	Off	lockers	Metal	A	Intact	Tan	First	Hall	0.1 mg/cm ²	Action Level
26	Negative	Off	conduit	Metal	A	Intact	White	First	Hall	0.1 mg/cm ²	Action Level
27	Negative	Off	Door Casing	Metal	D	Intact	White	First	Hall	0.3 mg/cm ²	Action Level
28	Negative	Off	Door	Wood	D	Intact	Stain	First	Hall	0.0 mg/cm ²	Action Level
29	Negative	Off	Door	Metal	D	Intact	Red	First	Hall	0.0 mg/cm ²	Action Level
30	Negative	Off	Door Casing	Metal	D	Intact	White	First	Hall	0.4 mg/cm ²	Action Level
31	Negative	Off	Wall	Cinderblock	D	Intact	White	First	Hall	0.1 mg/cm ²	Action Level
32	Negative	Off	Ceiling	Concrete	D	Intact	Black	First	Hall	0.2 mg/cm ²	Action Level
33	Positive	Off	BaseBoard	Ceramic	D	Intact	Gray	First	Hall	1.5 mg/cm ²	Action Level
34	Negative	Off	Door Casing	Metal	C	Intact	White	First	Hall	0.5 mg/cm ²	Action Level
35	Negative	Off	Door	Metal	C	Intact	Red	First	Hall	0.0 mg/cm ²	Action Level
36	Negative	Off	Wall	Cinderblock	A	Intact	White	First	122	0.1 mg/cm ²	Action Level
37	Negative	Off	Door Casing	Metal	C	Intact	White	First	122	0.3 mg/cm ²	Action Level
38	Negative	Off	Door	Metal	C	Intact	White	First	122	0.2 mg/cm ²	Action Level
39	Negative	Off	Door	Metal	A	Intact	White	First	122	0.0 mg/cm ²	Action Level
40	Negative	Off	Door Casing	Metal	A	Intact	White	First	122	0.3 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
41	Negative	Off	Door Casing	Metal	A	Intact	White	First	122	0.2 mg/cm ²	Action Level
42	Negative	Off	Door	Metal	A	Intact	White	First	122	0.1 mg/cm ²	Action Level
43	Negative	Off	Cabinet	Metal	B	Intact	Green	First	122	0.0 mg/cm ²	Action Level
44	Negative	Off	Cabinet	Metal	B	Intact	Green	First	122	0.0 mg/cm ²	Action Level
45	Negative	Off	Wall	Cinderblock	B	Intact	White	First	122	0.0 mg/cm ²	Action Level
46	Negative	Off	Door Casing	Metal	B	Intact	White	First	122	0.3 mg/cm ²	Action Level
47	Negative	Off	Wall	Drywall	B	Intact	White	First	Stairwell	0.1 mg/cm ²	Action Level
48 🚩	Positive	Off	Railing	Metal	B	Intact	Red	First	Stairwel	1.0 mg/cm ²	Action Level
49 🚩	Positive	Off	Riser	Metal	B	Intact	Red	First	Stairwell	8.1 mg/cm ²	Action Level
50 🚩	Positive	Off	Stringer	Metal	B	Intact	Red	First	Stairwel	2.8 mg/cm ²	Action Level
51	Negative	Off	Door Casing	Metal	D	Intact	Red	First	Stairwell	0.4 mg/cm ²	Action Level
52	Negative	Off	Door	Metal	D	Intact	Red	First	Stairwel	0.1 mg/cm ²	Action Level
53	Negative	Off	Wall	Ceramic	D	Intact	Gray	First	mens	0.2 mg/cm ²	Action Level
54	Negative	Off	Floor	Ceramic	D	Intact	White	First	mens	0.1 mg/cm ²	Action Level
55 🚩	Positive	Off	Door Lintel	Metal	B	Intact	Red	First	Hall	6.8 mg/cm ²	Action Level
56	Negative	Off	Wall	Brick	A	Intact	White	First	118	0.2 mg/cm ²	Action Level
57	Negative	Off	Ceiling	Plaster	A	Intact	White	First	118	0.0 mg/cm ²	Action Level
58	Negative	Off	Wall	Drywall	B	Intact	White	First	114	0.0 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
59	Negative	Off	Wall	Concrete	D	Intact	White	First	114	0.2 mg/cm ²	Action Level
60	Negative	Off	Door Casing	Metal	B	Intact	White	First	114	0.1 mg/cm ²	Action Level
61	Negative	Off	Door	Wood	B	Intact	Stain	First	114	0.0 mg/cm ²	Action Level
62	Positive	Off	BaseBoard	Ceramic	B	Intact	Gray	First	114	1.4 mg/cm ²	Action Level
63	Negative	Off	Wall	Cinderblock	B	Intact	White	First	113	0.3 mg/cm ²	Action Level
64	Negative	Off	Wall	Cinderblock	A	Intact	White	First	111	0.0 mg/cm ²	Action Level
65 🚩	Positive	Off	Railing	Metal	A	Deteriorated	Gray	First	111	2.3 mg/cm ²	Action Level
66	Negative	Off	ahu	Metal	C	Intact	White	First	111	0.1 mg/cm ²	Action Level
67 🚩	Positive	Off	Railing	Metal	C	Intact	Gray	First	100	16.8 mg/cm ²	Action Level
68 🚩	Positive	Off	ibeam	Metal	D	Intact	Red	First	100	1.0 mg/cm ²	Action Level
69	Negative	Off	Wall	Cinderblock	A	Intact	White	First	102	0.0 mg/cm ²	Action Level
70	Negative	Off	Railing	Metal	D	Intact	Red	First	Stairwel	0.2 mg/cm ²	Action Level
71	Positive	Off	Railing	Metal	D	Intact	Red	First	Stairwell	6.4 mg/cm ²	Action Level
72	Negative	Off	Stringer	Metal	D	Intact	Red	First	Stairwel	0.2 mg/cm ²	Action Level
73	Positive	Off	Riser	Metal	D	Intact	Red	First	Stairwell	6.7 mg/cm ²	Action Level
74	Positive	Off	Stringer	Metal	D	Intact	Red	First	Stairwel	6.7 mg/cm ²	Action Level
75	Positive	Off	Railing	Metal	D	Intact	Red	First	Stairwell	5.4 mg/cm ²	Action Level
76	Negative	Off	Fence	Metal	D	Intact	Red	First	Stairwel	0.0 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
77	Negative	Off	Wall	Metal	D	Intact	White	First	elevator	0.2 mg/cm ²	Action Level
78	Negative	Off	Wall	Cinderblock	D	Intact	White	Second	200	0.0 mg/cm ²	Action Level
79	Positive	Off	BaseBoard	Ceramic	A	Intact	Gray	Second	200	1.5 mg/cm ²	Action Level
80	Negative	Off	Door Casing	Metal	A	Intact	Gray	Second	200	0.4 mg/cm ²	Action Level
81	Negative	Off	Door Casing	Metal	B	Intact	White	Second	201	0.2 mg/cm ²	Action Level
82	Negative	Off	Wall	Cinderblock	B	Intact	Blue	Second	201	0.1 mg/cm ²	Action Level
83	Negative	Off	elevator dr csng	Metal	D	Intact	White	Second	201	0.5 mg/cm ²	Action Level
84 🗿	Positive	Off	elevator door	Metal	D	Intact	White	Second	201	1.3 mg/cm ²	Action Level
85	Negative	Off	Door Casing	Metal	D	Intact	White	Second	Hall	0.5 mg/cm ²	Action Level
86	Negative	Off	Door	Metal	D	Intact	Red	Second	Hall	0.0 mg/cm ²	Action Level
87	Negative	Off	Door	Wood	B	Intact	Stain	Second	Hall	0.0 mg/cm ²	Action Level
88	Negative	Off	Door Casing	Metal	B	Intact	White	Second	Hall	0.4 mg/cm ²	Action Level
89	Negative	Off	Wall	Cinderblock	B	Intact	White	Second	206	0.0 mg/cm ²	Action Level
90	Negative	Off	Wall	Concrete	B	Intact	White	Second	206	0.1 mg/cm ²	Action Level
91	Negative	Off	Door	Metal	A	Intact	Red	Second	lobby	0.0 mg/cm ²	Action Level
92	Negative	Off	Door Casing	Metal	C	Intact	White	Second	211	0.4 mg/cm ²	Action Level
93	Positive	Off	BaseBoard	Ceramic	C	Intact	Gray	Second	211	1.3 mg/cm ²	Action Level
94	Negative	Off	Wall	Cinderblock	D	Intact	White	Second	210	0.0 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
95	Negative	Off	Door Casing	Metal	D	Intact	White	Second	210	0.2 mg/cm ²	Action Level
96	Negative	Off	Door	Wood	D	Intact	Stain	Second	210	0.1 mg/cm ²	Action Level
97	Negative	Off	Wall	Ceramic	D	Intact	Gray	Second	mens	0.1 mg/cm ²	Action Level
98	Negative	Off	Floor	Ceramic	D	Intact	Gray	Second	mens	0.2 mg/cm ²	Action Level
99	Negative	Off	Wall	Cinderblock	C	Intact	White	Second	Hall	0.0 mg/cm ²	Action Level
100	Negative	Off	Door Casing	Metal	C	Intact	White	Second	Hall	0.5 mg/cm ²	Action Level
101	Negative	Off	Door Casing	Metal	D	Intact	White	Third	301	0.1 mg/cm ²	Action Level
102	Negative	Off	Wall	Cinderblock	D	Intact	White	Third	301	0.0 mg/cm ²	Action Level
103	Negative	Off	Wall	Cinderblock	A	Intact	White	Third	301	0.0 mg/cm ²	Action Level
104	Negative	Off	Wall	Cinderblock	B	Intact	White	Third	306	0.0 mg/cm ²	Action Level
105	Negative	Off	Door Casing	Metal	B	Intact	White	Third	306	0.4 mg/cm ²	Action Level
106	Negative	Off	Door Casing	Metal	A	Deteriorated	White	Third	306	0.4 mg/cm ²	Action Level
107	Negative	Off	Wall	Cinderblock	B	Deteriorated	White	Third	306	0.0 mg/cm ²	Action Level
108	Negative	Off	Wall	Cinderblock	A	Intact	White	Third	Hall	0.3 mg/cm ²	Action Level
109	Negative	Off	Wall	Metal	C	Intact	White	Third	316	0.3 mg/cm ²	Action Level
110	Negative	Off	Door Casing	Metal	C	Intact	White	Third	316	0.4 mg/cm ²	Action Level
111	Negative	Off	Door Casing	Metal	C	Intact	White	Third	319	0.0 mg/cm ²	Action Level
112	Negative	Off	Wall	Drywall	C	Intact	White	Third	319	0.0 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

Inspection Date: 3/22/2024 - 3/22/2024
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Inspection Site: North Carolina State University
 Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
113	Negative	Off	Wall	Cinderblock	C	Intact	White	Third	319	0.0 mg/cm ²	Action Level
114	Negative	Off	Door Casing	Metal	D	Intact	White	Third	Hall	0.4 mg/cm ²	Action Level
115	Negative	Off	Door	Metal	D	Intact	Red	Third	Hall	0.2 mg/cm ²	Action Level
116	Negative	Off	Door Casing	Metal	A	Intact	White	Third	326	0.3 mg/cm ²	Action Level
117	Negative	Off	Wall	Cinderblock	D	Intact	White	Third	326	0.0 mg/cm ²	Action Level
118	Negative	Off	Wall	Cinderblock	D	Intact	White	Forth	Hall	0.1 mg/cm ²	Action Level
119	Negative	Off	Wall	Drywall	D	Intact	White	Forth	431	0.2 mg/cm ²	Action Level
120	Negative	Off	Wall	Cinderblock	D	Intact	White	Forth	431	0.1 mg/cm ²	Action Level
121	Negative	Off	Wall	Cinderblock	A	Intact	White	Forth	Hall	0.1 mg/cm ²	Action Level
122	Negative	Off	Door Casing	Metal	A	Intact	White	Forth	Hall	0.1 mg/cm ²	Action Level
123	Negative	Off	Door Casing	Metal	A	Intact	White	Forth	Hall	0.2 mg/cm ²	Action Level
124	Negative	Off	Door Casing	Metal	C	Intact	White	Forth	Hall	0.2 mg/cm ²	Action Level
125	Positive	Off	BaseBoard	Ceramic	D	Intact	Gray	Forth	Hall	1.4 mg/cm ²	Action Level
126	Negative	Off	Door	Metal	D	Intact	Red	Forth	Hall	0.1 mg/cm ²	Action Level
127	Negative	Off	Door Casing	Metal	D	Intact	White	Forth	Hall	0.0 mg/cm ²	Action Level
128	Positive	Off				Calibration				1.1 mg/cm ²	Action Level
129	Positive	Off				Calibration				1.0 mg/cm ²	Action Level
130	Negative	Off				Calibration				0.9 mg/cm ²	Action Level

Lead-Based Paint Inspection Report

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Inspection Site: North Carolina State University
Mann Hall

Read #	Result	RTA Present	COMPONENTS	SUBSTRATE	SIDE	CONDITION	Color	Floor	ROOM	Lead (mg/cm ²)	Mode
131	Negative	Off			Calibration					0.0 mg/cm ²	Action Level
132	Negative	Off			Calibration					0.1 mg/cm ²	Action Level
133	Negative	Off			Calibration					0.0 mg/cm ²	Action Level

----- END OF READINGS -----

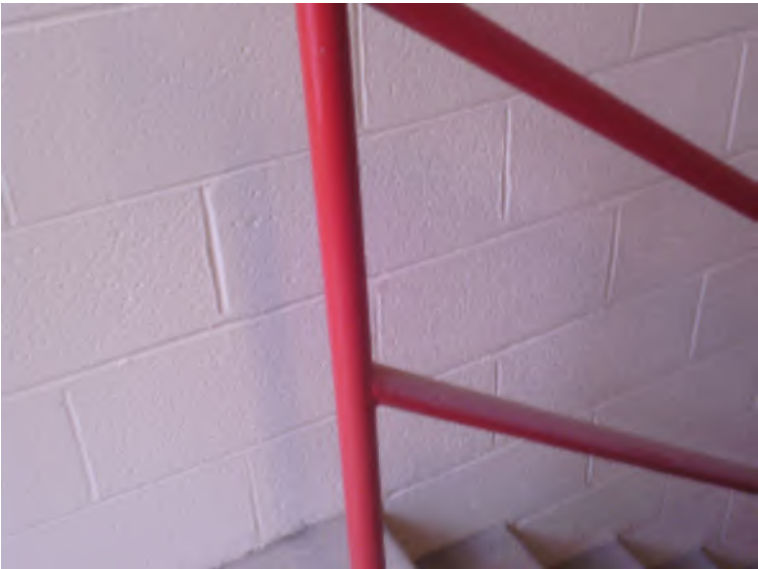
Selected images...



Reading #7



Reading #14



Reading #24



Reading #48



Reading #49



Reading #50



Reading #55



Reading #65



Reading #67



Reading #68



Reading #84

**REPORT OF LIMITED FACILITY SURVEY TO
IDENTIFY ASBESTOS-CONTAINING MATERIALS**

**NORTH CAROLINA STATE UNIVERSITY
MANN HALL
2501 STINSON DRIVE
RALEIGH, NORTH CAROLINA
EEC PROJECT NO. N-23-39**

FOR:

**NORTH CAROLINA STATE UNIVERSITY
FACILITIES DESIGN & CONSTRUCTION
2601 WOLF VILLAGE WAY
ADMINISTRATIVE SERVICES III, SUITE 331
RALEIGH, NORTH CAROLINA 27607**

BY:

**EEC, Inc.
423 FARINTOSH VALLEY LANE
DURHAM, NORTH CAROLINA 27703
Phone: 919-291-6814**



EEC, INC.

PHONE: (919) 291-6814

423 FARINTOSH VALLEY LANE, DURHAM, NORTH CAROLINA 27703

January 12, 2023

**North Carolina State University
Facilities Architect, Design & Construction
2601 Wolf Village Way
Administrative Services III, Suite 331
Raleigh, North Carolina 27607**

Attention: Mike Bell, PMP, PEM
Design & Construction

Subject: **Summary of Asbestos Bulk Sampling Results
Mann Hall
2501 Stinson Drive
Raleigh, North Carolina 27607
EEC Job No.: N-23-39**

Dear Mr. Bell:

EEC, Inc. is pleased to present this report of the survey to identify asbestos-containing building materials (ACBM) for the planned renovation of Mann Hall located at 2501 Stinson Drive, Raleigh, NC 27607 on the North Carolina State University campus. The purpose of our limited survey is to provide general information, such as the existence and type of asbestos containing materials (ACM) present in the building materials that may have to be disturbed during the demolition and renovations. Our survey included assessment of the suspect ACM samples collected that may be disturbed during demolition and renovation. This report presents known project information, survey procedures and results.

PROJECT INFORMATION

It is our understanding that NCSU plans to renovate the interior of Mann Hall which will require interior demolition. The purpose of our survey was to identify any asbestos containing materials that may be disturbed during the renovations. Any friable asbestos containing materials that would be disturbed during the renovation or demolition work must be removed before such work can begin. The NCSU project manager, Mr. Bell, asked inspection of the building including sampling and analysis of suspect

Asbestos Containing Building Materials (ACBM) present at the site. All the above project information was obtained from our conversations with Mr. Mike Bell and from observations made during our visit to the site on August 10, 2023.

SURVEY AND ANALYTICAL PROCEDURES

On September 29th, 2023, Asbestos Inspectors Donnie Mercer (N. C. Asbestos Inspector No. 11224) and Steve Halyard (N. C. Asbestos Inspector No. 12360) met with NCSU Design & Construction (NCSUDC) to gain access to all the areas of Mann Hall. It was observed that there were some rooms that were locked and inaccessible with the keys that were made available. An additional visit to the site was scheduled on October 16, 2023, for Donnie Mercer to meet with NCSUD&C to access the locked rooms with another set of keys. On October 6, 2023, Donnie Mercer was on site to survey the roof of Mann Hall. Mr. Mercer met later in a scheduled meeting with the NCSU roofing repair personnel on October 13, 2023, to assist in locating and getting the roof core sample holes patched up. Also, on the same day Mr. Mercer along with Mr. Mike Shrimanker met with Mike Bell and NCSUDC to discuss the need to suspend work being done in areas where known ACBM Ceiling Tiles were being damaged/disturbed. A narrative of the observed areas of damage was completed and sent via email to Mike Bell.

All rooms have been accessed except for Telecom Rooms 111A, 306A, and Mechanical Room 1002 (High Voltage). The surveys began with the inspectors performing visual assessments of each area of the building for the presence of materials suspected to be ACM that could be disturbed during the proposed renovations. A sampling strategy was determined, and bulk samples were obtained. Suspect materials were grouped based on material homogeneity. A homogeneous area is an area that contains materials that seem by texture, color, and wear to be uniform and applied during the same general time period. Suspect ACM that was sampled included the 1'x1' Ceiling Tiles, 2'x4' Ceiling Panels, 2"x2" Ceiling Panels, Ceiling Plaster, Wall Plaster, Chalkboard Glue Dots, Textured Wall Coatings, Sheetrock Wall Board, Wall Board Joint Compound, Spray-on Fireproofing, 2"-6" Pipe Insulation, 2"-6" Pipe Fitting Insulation, 9" Floor Tiles, 12" Floor Tiles (all various colors), Floor Tile Mastics, Interior Door Caulking, Linoleum, Lab Countertops, Roof Core Built-up Materials, Roof Flashing Sealants, and Textured Exterior Column Cementitious Finish Coat. Bulk samples of suspected ACM were delivered to AmeriSci Richmond

(AmeriSci) in Midlothian, Virginia for analysis. The AmeriSci laboratory is National Voluntary Laboratory Accreditation Program (NVLAP) accredited. AmeriSci's NVLAP accreditation number is 101904-0. Each bulk sample obtained was placed in a sealed container and labeled with a consecutive number, location, and date. This information was logged into our "Asbestos Bulk Sampling Record" database, printed, and delivered in the form of a signed chain-of-custody to AmeriSci's laboratory along with building material samples collected. Each suspect ACM sample was analyzed using Polarized Light Microscopy (PLM), coupled with Dispersion Staining as outlined in the Environmental Protection Agency's (EPA) accredited test method EPA 600/M4-82-020 that incorporates method EPA-600/R-93/116 where applicable as per 40 CFR 763.

SURVEY RESULTS

Asbestos in amounts greater than one percent (1%) was detected in the following materials:

TYPE OF MATERIAL	GENERAL LOCATION*	TYPE/PERCENT ASBESTOS	ESTIMATED QUANTITY**
1'x1' Ceiling Tiles	2 nd -4 th Floors	Amosite 2%	25,000 sq. ft.
ACBM Ceiling Spray-on	1 st Floor/Basement & Structural Lab on the Concrete Beams, Deck and Columns	Chrysotile 4%	20,000 sq. ft.
Chalkboard, Bulletin Board, Marker Board, Tack Board Glue Dots	108, 113 entry, 202, 206, 207, 209, 216A, 217, 301, 304, 306, 307, 319A, 320, 321, 323, 402, 404, 407, 409, 415, 415A, 415B & 431C	Chrysotile 3%	50 Board Locations
Pipe Insulation Mastic Layer	Roof Drains, All Floors	Chrysotile 2%	500 ft.
4" White Pipe Insulation	Lab 100 at Door 100	Amosite 25%	10 feet
5"-6" Pipe Insulation	1 st Floor Basement Corridor	Chrysotile 3%	800 ft
9" Gray/white Floor Tile & Black Mastic	2 nd -4 th Floors	Tiles: Chrysotile 2% Mastic: Chrysotile 5%	24,000 sq. ft.
Black Floor Tile Mastic	Women's Restroom 218	Chrysotile 3%	60 sq. ft,
Interior Door Caulking	1 st Floor, Room 105	Chrysotile 2%	200 Doors
Roof Flashing Sealant	Column-Lower-Level Roof	Chrysotile 5%	15 sq. ft,
12" Green Floor Tile	Room 105	Chrysotile 3%	100 sq. ft.
Transite Pipe	Lab 117, through Corr. to Lab 114, into Lab 113	Assumed	100 ft.

*Based on the results of samples analyzed, it would be reasonable to assume that ACBMs are present in these locations. ** Quantities are estimates only. TBD- To Be Determined

RECOMMENDATIONS

The ACBM must be abated before renovation/demolition activities begin. During our assessment and sampling, we determined that Asbestos is not found in 2'x4' Ceiling Panels, 2"x2" Ceiling Panels, Ceiling Plaster, Wall Plaster, Textured Wall Coatings, Sheetrock Wall Board, Wall Board Joint Compound,

Linoleum, Lab Countertops, Roof Core Built-up Materials, and Textured Exterior Column Cementitious Finish Coat. We also observed a line of fume hood cementitious pipe that we are assuming to be ACBM.

All ACBM materials are in fair to good condition except for the 1'x1' Ceiling Tiles at the Window Renovation Locations of the building. If the planned renovation activities are expected to disturb any ACBM, then the ACBM must be addressed in accordance with applicable Federal, State, and local regulations. **The EPA's NESHAP asbestos regulations (40 CFR 61, Subpart M, Section 61.145) require that regulated friable ACM and regulated non-friable ACM that may become friable must be removed prior to disturbance by North Carolina accredited personnel only.** The North Carolina regulations (G.S. 130A-444 through 451) require accreditation of personnel who work in the asbestos field along with notification and removal permit fees for such asbestos removal projects. Since this is a public facility, it will require an accredited designer to design the abatement project. This information can be obtained from the North Carolina Health Hazard Control Unit in Raleigh, NC.

The Occupational Safety and Health Administration (OSHA) asbestos standards (29 CFR 1910 and 1926) address general industry and construction industry employees' asbestos exposure. These standards set asbestos exposure limits that, if exceeded, require medical surveillance and training programs for the employees. Engineering controls, such as proper work practices, respiratory protection and protective clothing are also outlined to achieve compliance with exposure limits. The OSHA asbestos standards also require posting of warning signs in regulated areas and attaching warning labels on products containing asbestos and to waste containers as well as asbestos removal in compliance with North Carolina Health Hazard Control Rules and EPA NESHAP rules.

To provide asbestos abatement design, we will need as-built drawings or architectural demolition drawings to determine the scope of work for the bidding asbestos contractors and we can walkthrough with you about asbestos abatement. Our design will meet or exceed North Carolina Health Hazard Control Unit requirement, US-EPA requirements, and North Carolina OSHA requirements.

We appreciate the opportunity to provide these services. We would be glad to discuss any results or observations contained in this report, at your convenience.

If there are any questions concerning this report or results, please contact us at (919) 291-6814.

Sincerely,

EEC, INC.



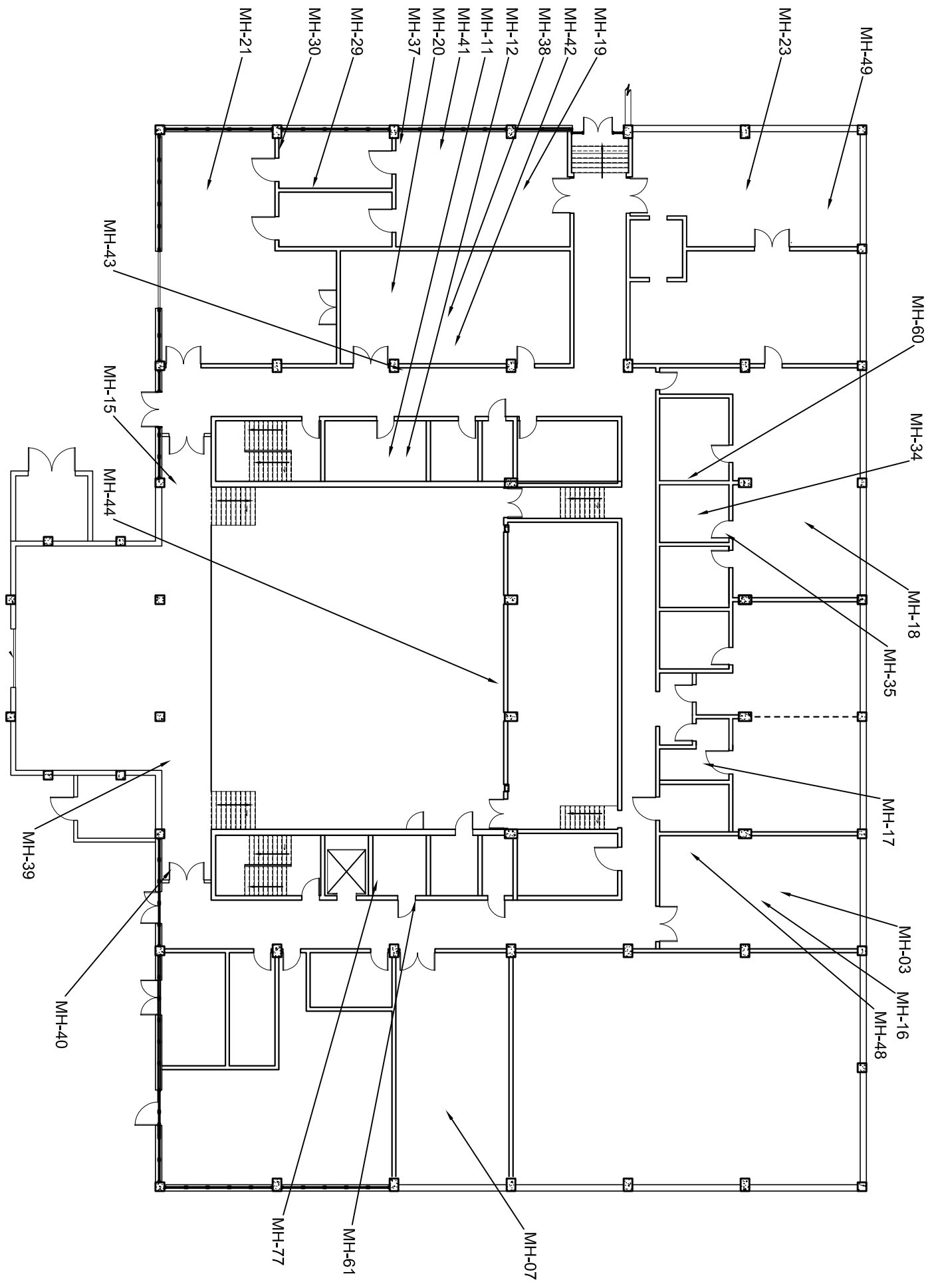
Donnie Mercer Jr.
N.C. Inspector No. 11224



Mike Shrimanker, PE, CIH, CSP
President

Attachments: Drawings with Sample Locations
Colored Hatched ACM Locations Drawings
Photographs of ACM
Asbestos Bulk Sample Summary with Estimated Asbestos Quantity
AmeriSci Richmond PLM Bulk Asbestos Report

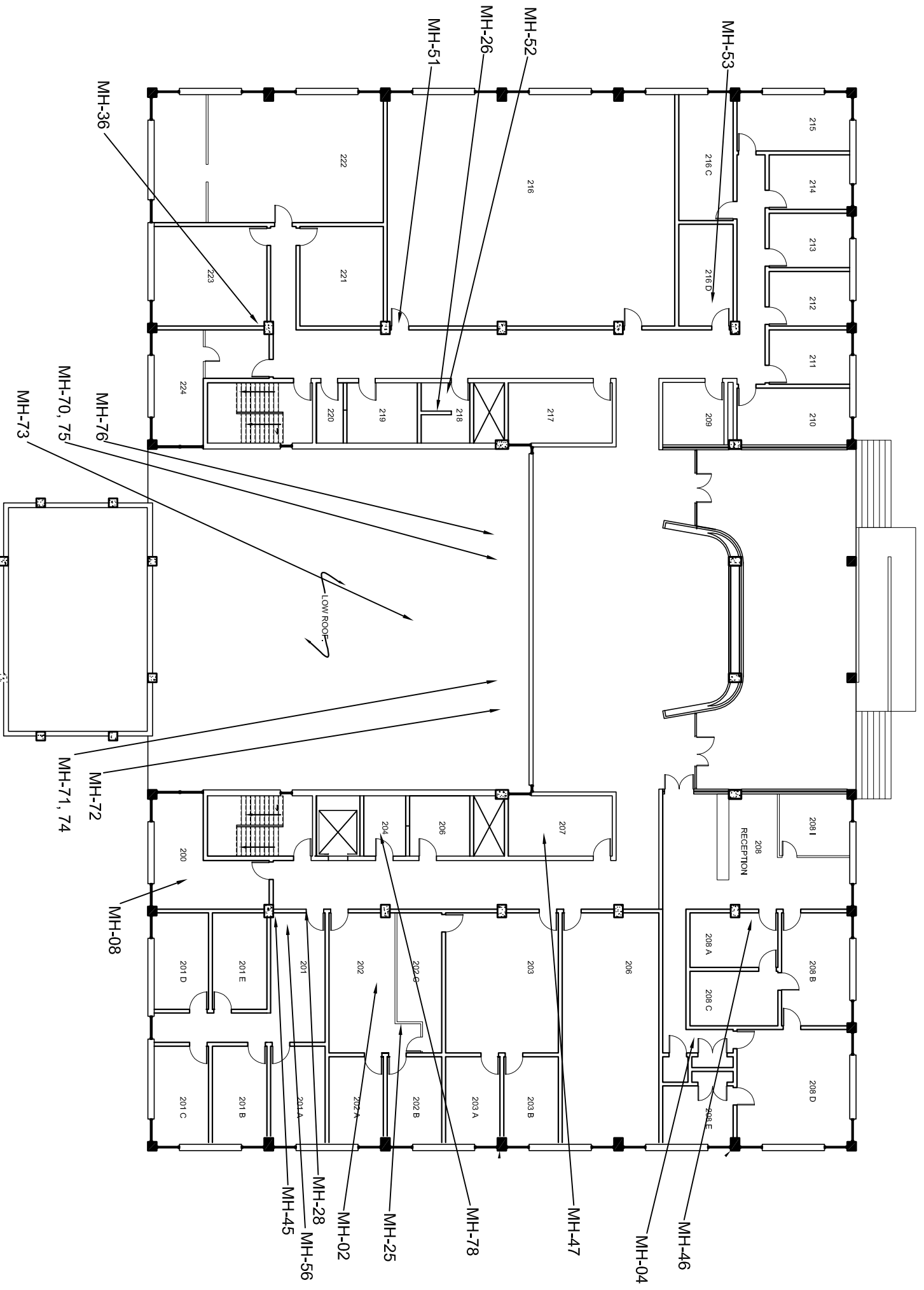
DRAWINGS WITH SAMPLE LOCATIONS



FIRST FLOOR PLAN - BASEMENT / GROUND

3/22" = 1'-0"

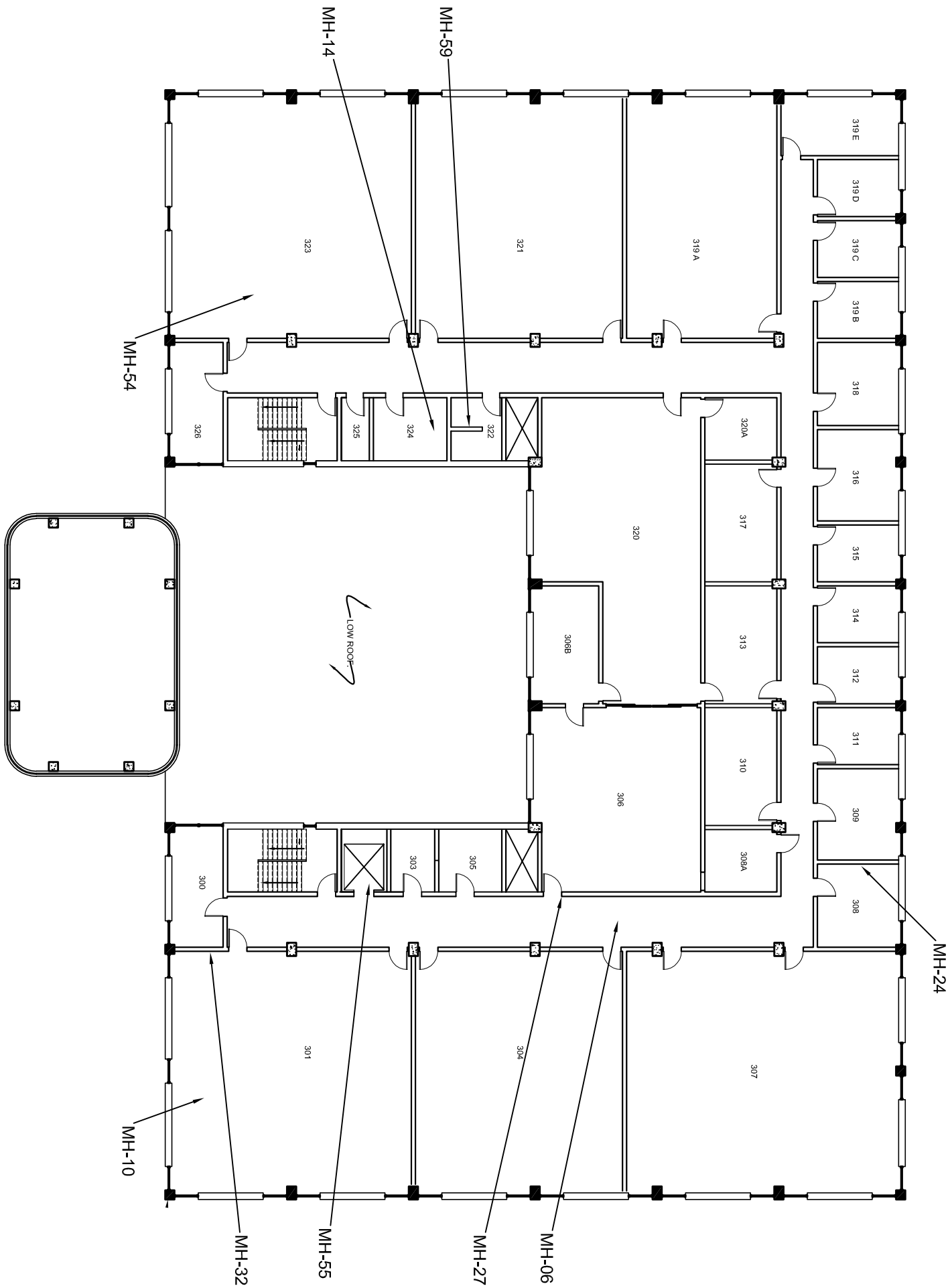




SECOND FLOOR PLAN - MAIN

3/827" = 1'-0"

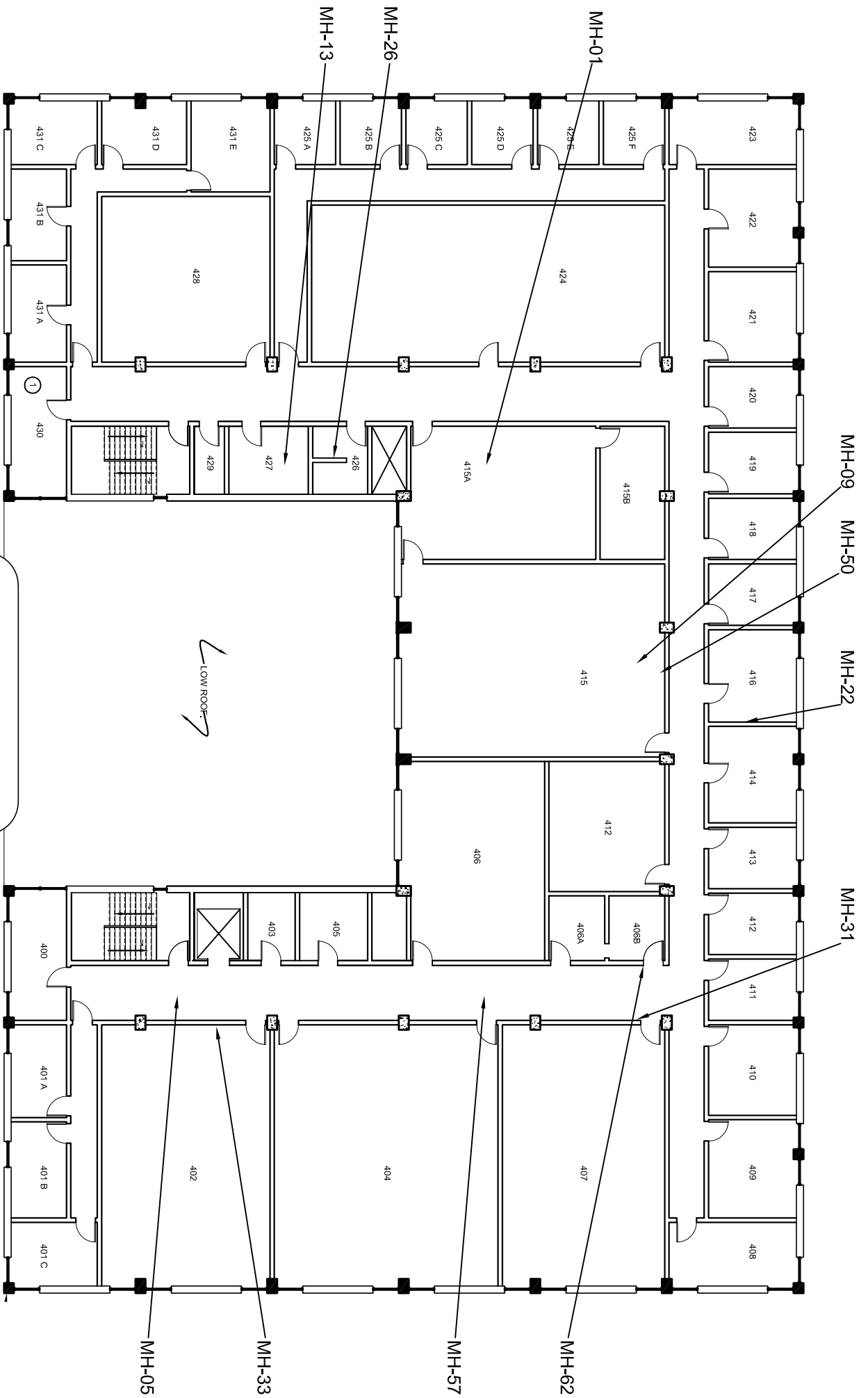




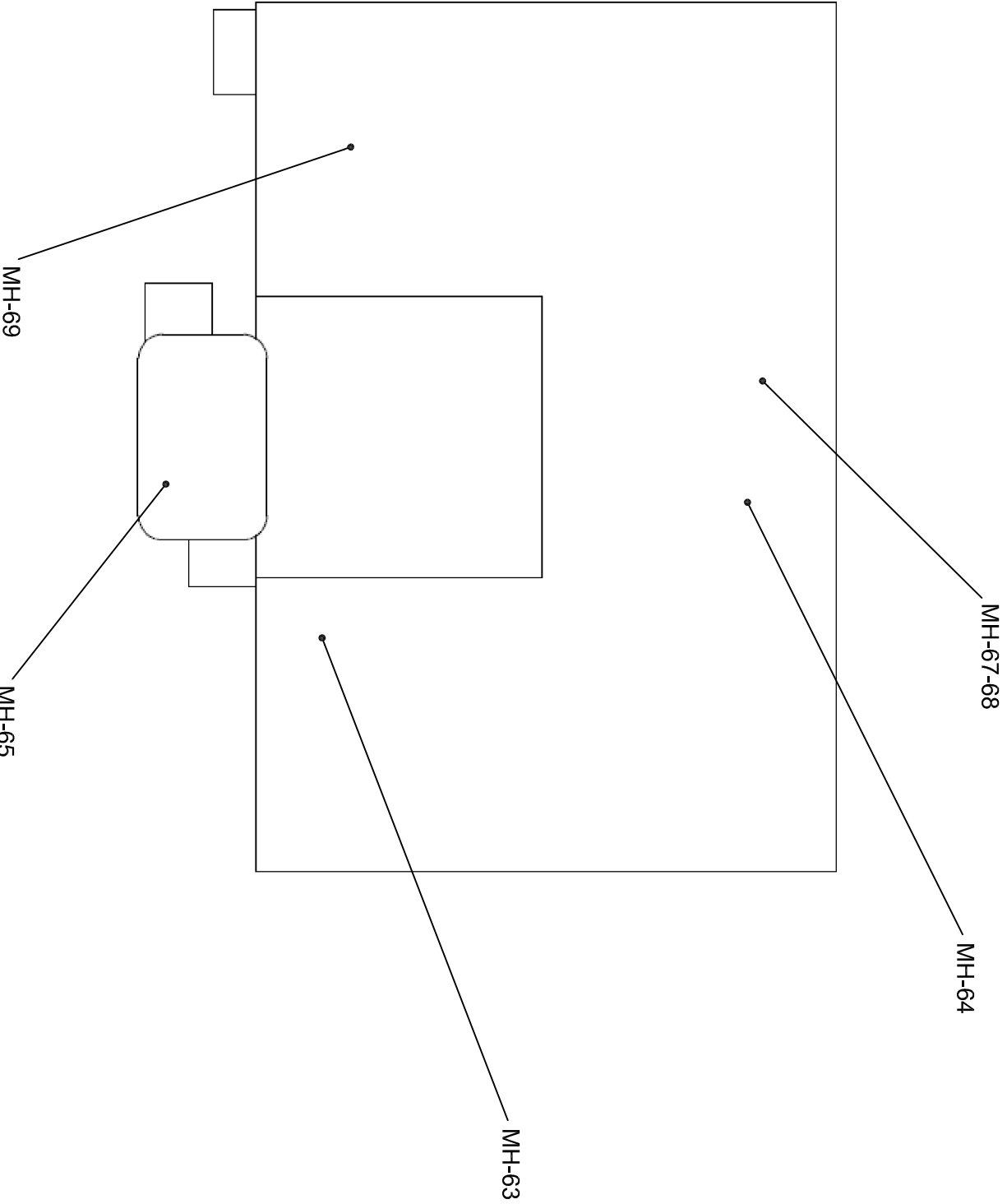
THIRD FLOOR PLAN

3/32" = 1'-0"

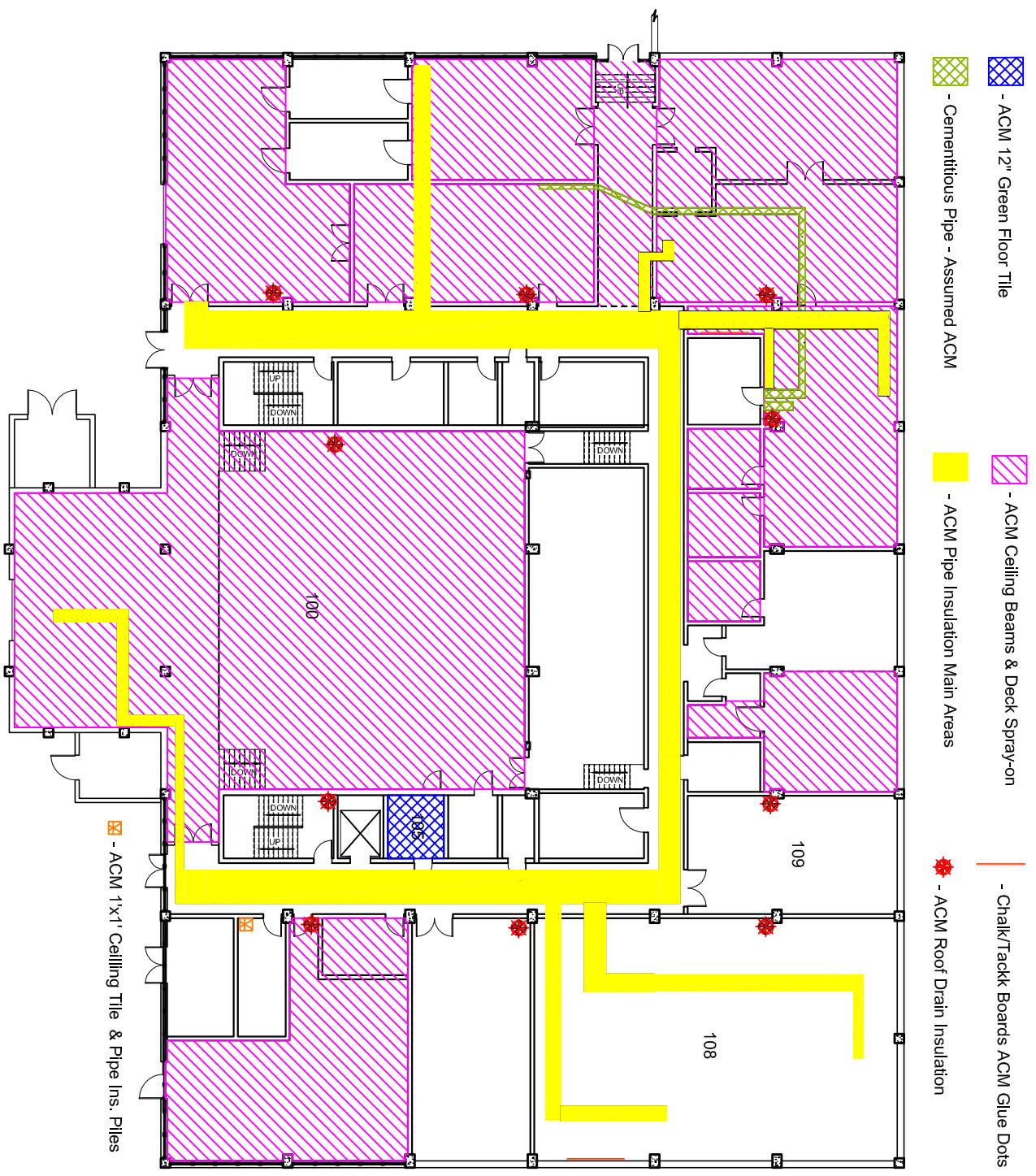




FOURTH FLOOR PLAN
 3/32" = 1'-0"



COLORED HATCHED ACM LOCATIONS DRAWINGS



- ACM 12" Green Floor Tile

- ACM Ceiling Beams & Deck Spray-on

- Chalk/Track Boards ACM Glue Dots

- Cementitious Pipe - Assumed ACM

- ACM Pipe Insulation Main Areas

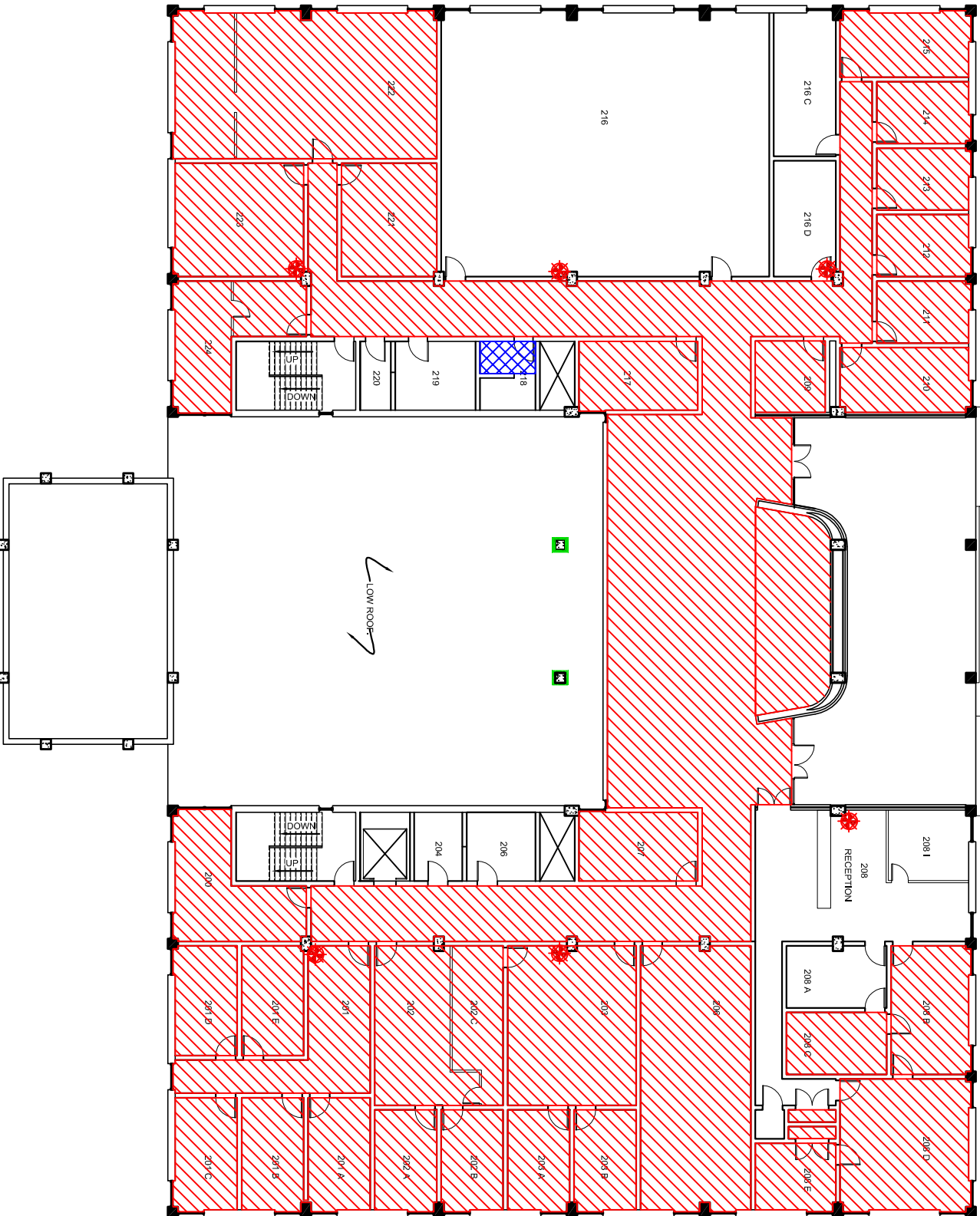
- ACM Roof Drain Insulation

- ACM 1x1' Ceiling Tile & Pipe Ins. Piles

FIRST FLOOR PLAN - BASEMENT / GROUND

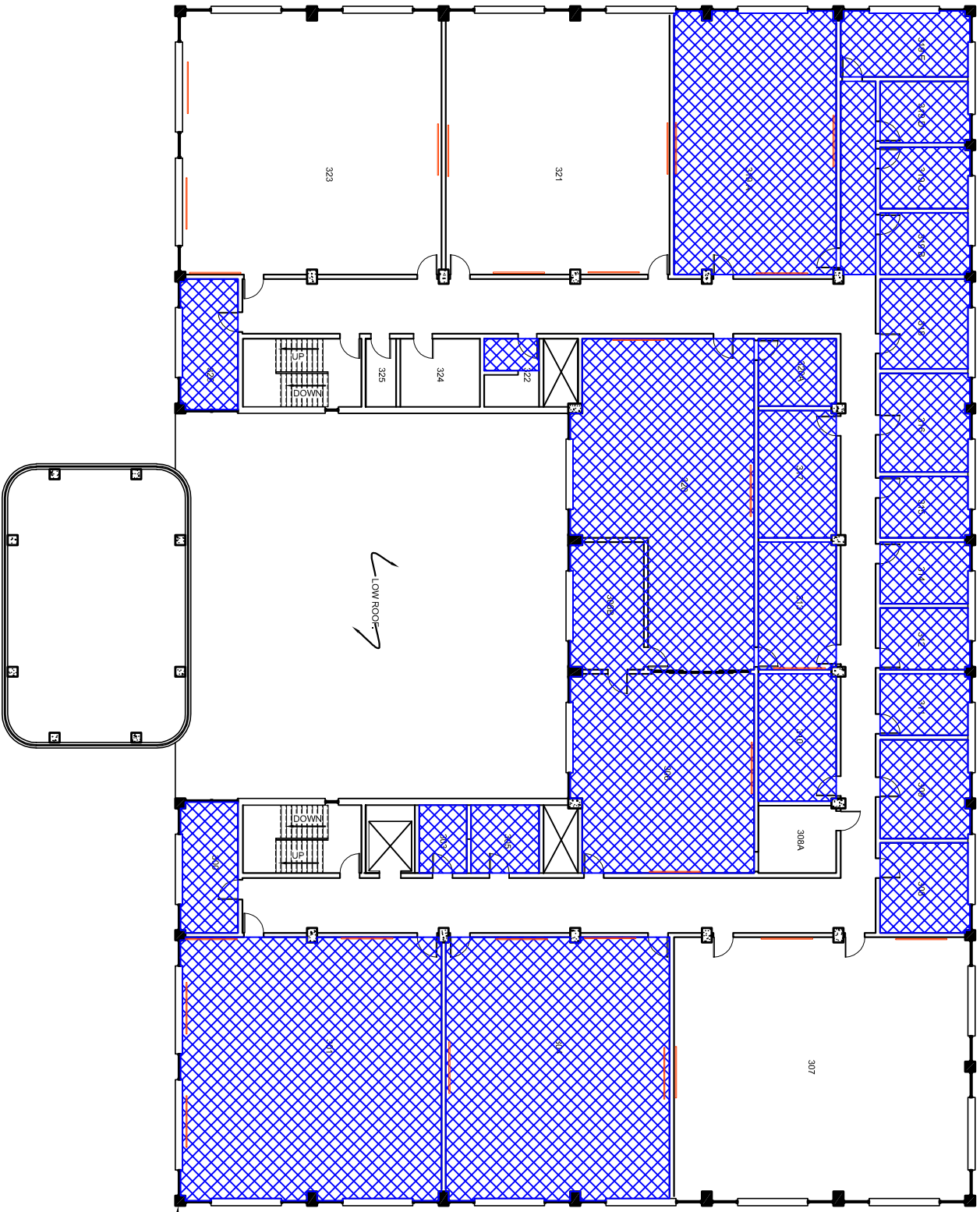
3/20" = 1'-0"

-  - ACM 1'x1' Ceiling Tiles
-  - ACM Roof Drain Insulation
-  - ACM Black Floor Tile Mastic
-  - ACM Roof Flashing Sealant



SECOND FLOOR PLAN - MAIN

3/32" = 1'-0"



 - ACM Black Floor Tile Mastic

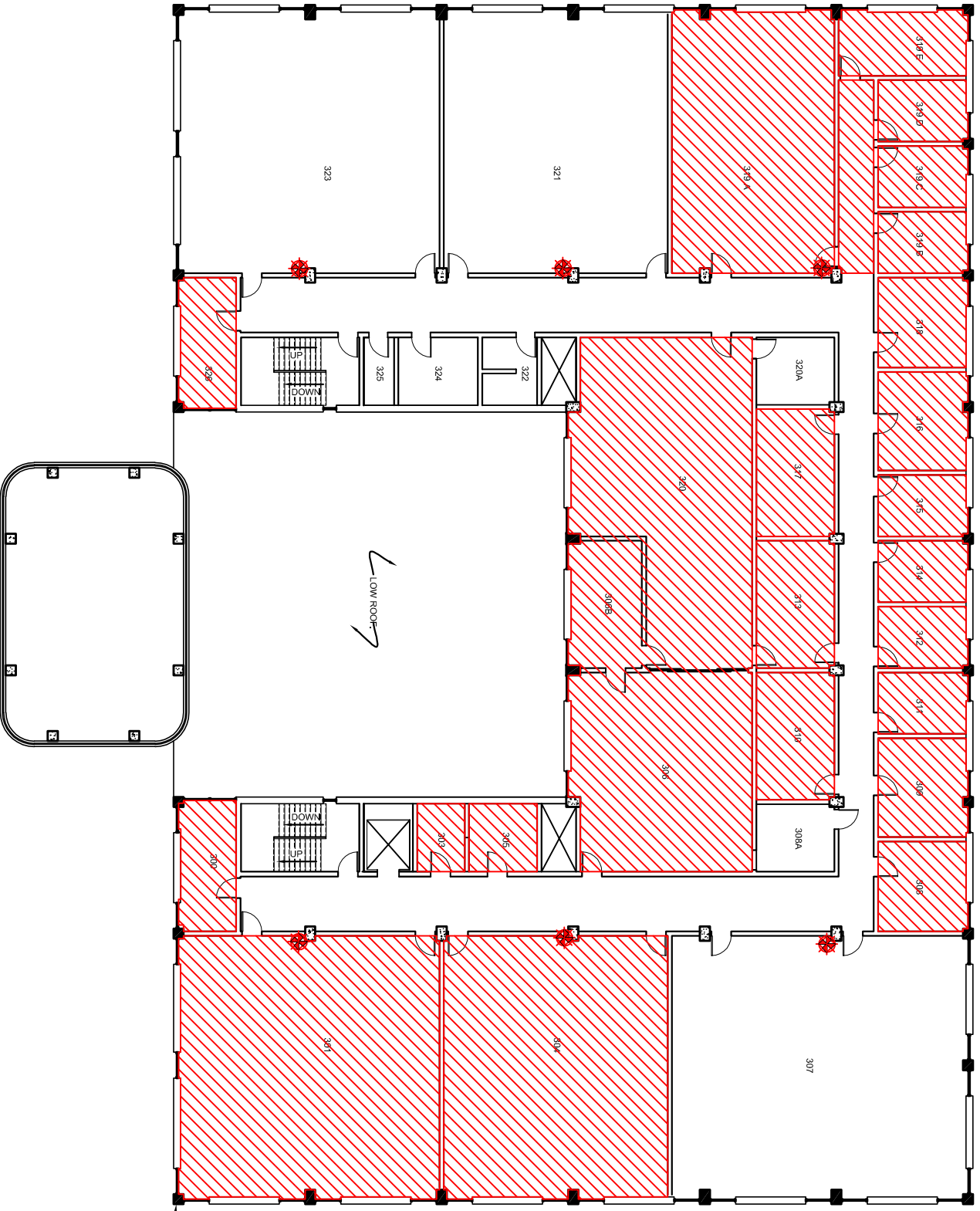
 - Chalk/Track/Bulletin Boards with ACM Glue Dots

THIRD FLOOR PLAN

3/32" = 1'-0"




▨ - ACM 1'x1' Ceiling Tiles

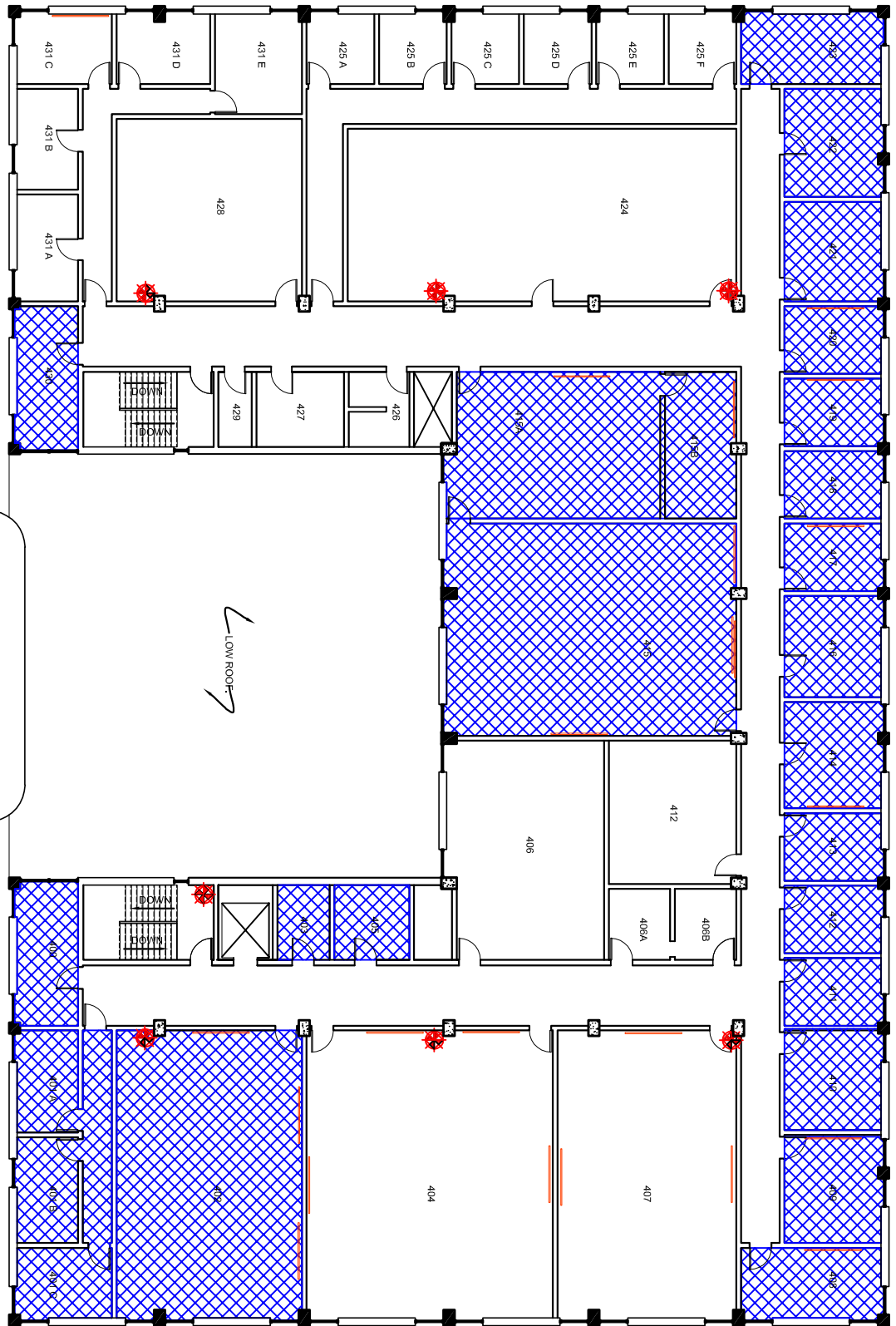
⊛ - ACM Roof Drain Insulation




THIRD FLOOR PLAN

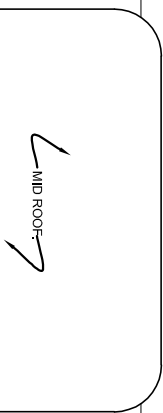
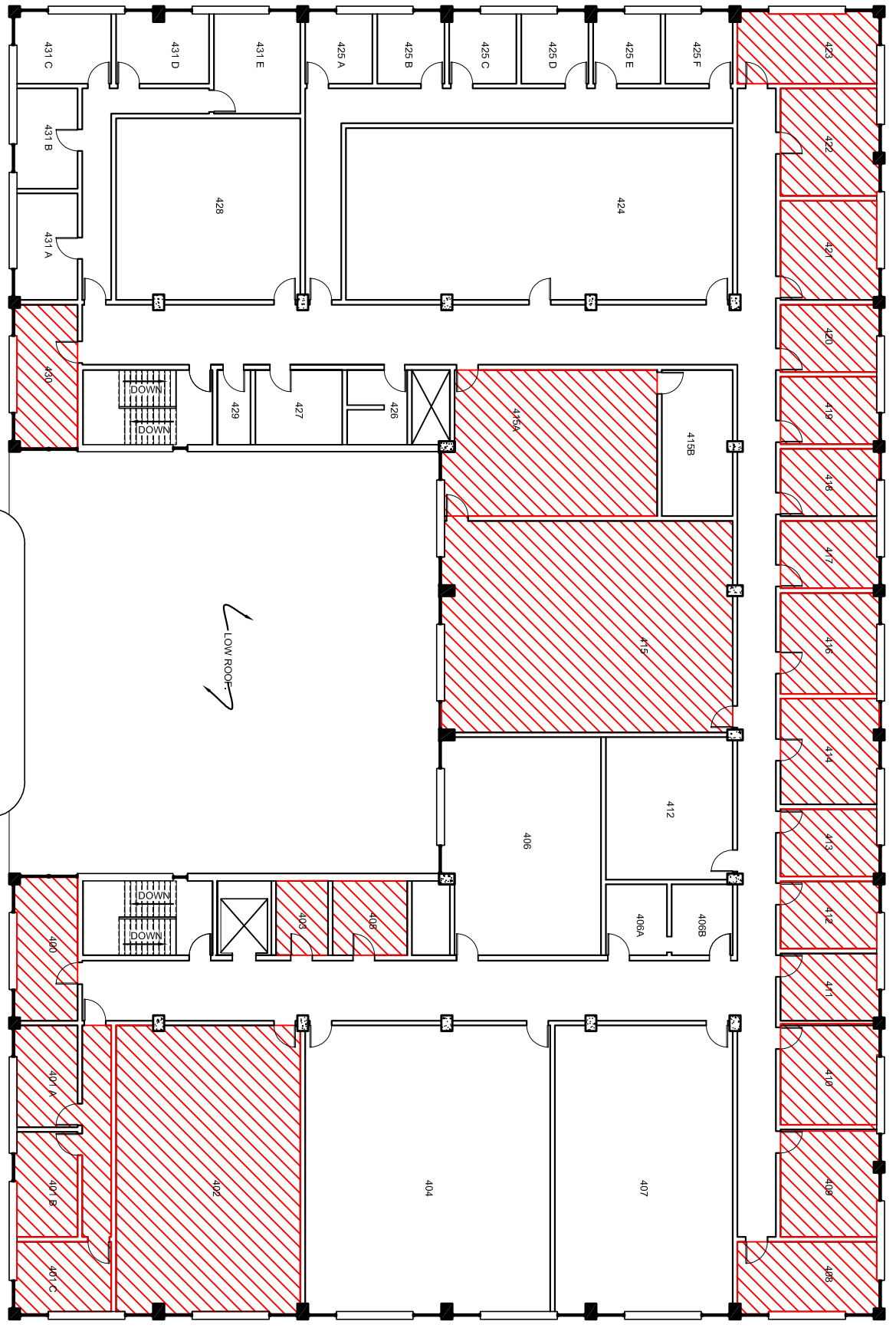
3/32" = 1'-0"

-  - ACM Roof Drain Insulation
-  - ACM Black Floor Tile Mastic
-  - Chalk/Tack/Bulletin Board ACM Glue Dots



FOURTH FLOOR PLAN
 3/32" = 1'-0"

 - ACM 1'x1' Ceiling Tiles



FOURTH FLOOR PLAN
3/32" = 1'-0"

PHOTOGRAPHS OF ACM

**PHOTOGRAPHS OF ACBM
NCSU - MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTORS: DONNIE MERCER JR. & STEVE HALYARD
EEC JOB NO.: N-23-39**



PHOTO No. 1

Typical View of ACBM 1'x1' Ceiling Tiles throughout
2nd - 4th Floors



PHOTO No. 2

Typical View of ACBM Ceiling Spray-on throughout
1st Floor/Basement on the Concrete Beams and Deck



PHOTO No. 3

Typical View of ACBM Chalkboard Glue Dots



PHOTO No. 4

Typical View of ACBM Pipe Insulation Mastic Layer
on Roof Drain Insulation

**PHOTOGRAPHS OF ACBM
NCSU - MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTORS: DONNIE MERCER JR. & STEVE HALYARD
EEC JOB NO.: N-23-39**



PHOTO No. 5
Typical View of ACBM 4" White Pipe Insulation

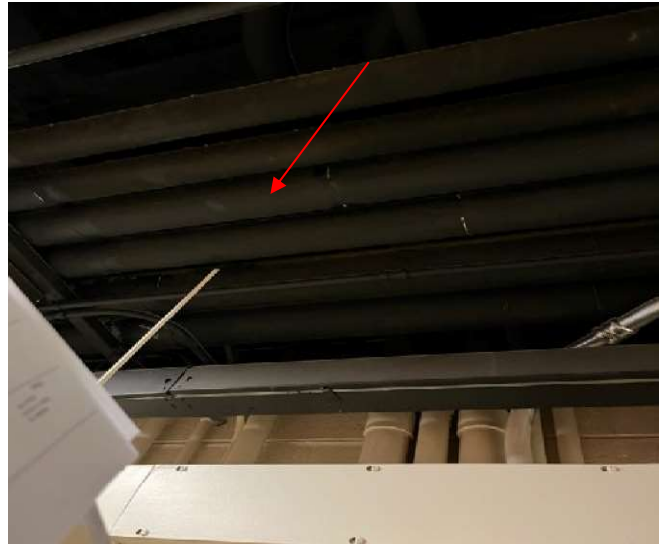


PHOTO No. 6
Typical View of ACBM 5"-6" Pipe Insulation



PHOTO No. 7
Typical View of ACBM 9" Gray/white Floor Tile &
Black Mastic



PHOTO No. 8
Typical View of ACBM Black Floor Tile Mastic

**PHOTOGRAPHS OF ACBM
NCSU - MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTORS: DONNIE MERCER JR. & STEVE HALYARD
EEC JOB NO.: N-23-39**



PHOTO No. 9
Typical View of ACBM Interior Door Caulking



PHOTO No. 10
Typical View of ACBM Roof Flashing Sealant



PHOTO No. 11
Typical View of ACBM 12" Green Floor Tile



PHOTO No. 12
Typical View of Assumed ACBM Transite Pipe in Lab 113 next to ACBM Roof Drain Line

ASBESTOS BULK SAMPLE SUMMARY

**ASBESTOS BULK SAMPLING RECORD
NORTH CAROLINA STATE UNIVERSITY
MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTOR: DONNIE MERCER
EEC JOB NO.: N-23-039**

SAMPLE NUMBER	TYPE OF MATERIAL	SAMPLE LOCATION	ASBESTOS TYPE/ PERCENTAGE
MH-01	2'x4' Ceiling Panel	RM 415A	NAD
MH-02	2'x4' Ceiling Panel	RM 202	NAD
MH-03	2'x4' Ceiling Panel	RM 109	NAD
MH-04	2'x2' Ceiling Panel	Corridor at 208G	NAD
MH-05	2'x2' Ceiling Panel	Corridor at 402	NAD
MH-06	2'x2' Ceiling Panel	Corridor at 306	NAD
MH-07	2'x2' Ceiling Panel	RM 106	NAD
MH-08	1'x1' Ceiling Tile	RM 200	2% Amosite
MH-09	1'x1' Ceiling Tile	RM 415	2% Amosite
MH-10	1'x1' Ceiling Tile	RM 301	2% Amosite
MH-11	2'x2' Hard Ceiling Panel	Restroom 120	NAD
MH-12	2'x2' Hard Ceiling Panel	Restroom 120	NAD
MH-13.1	Ceiling Plaster Skim Coat	Men's Restroom 427	NAD
MH-13.2	Ceiling Plaster Base Coat	Men's Restroom 427	NAD
MH-14.1	Ceiling Plaster Skim Coat	Men's Restroom 324	NAD
MH-14.2	Ceiling Plaster Base Coat	Men's Restroom 324	NAD
MH-15	Deck & Ceiling Beam Spray-On	RM 100	4% Chrysotile
MH-16	Deck & Ceiling Beam Spray-On	RM 109	NA/PS
MH-17	Deck & Ceiling Beam Spray-On	RM 112	4% Chrysotile
MH-18	Deck & Ceiling Beam Spray-On	RM 113	NA/PS
MH-19	Deck & Ceiling Beam Spray-On	RM 115	4% Chrysotile
MH-20	Deck & Ceiling Beam Spray-On	RM 117	NA/PS
MH-21	Deck & Ceiling Beam Spray-On	RM 122	4% Chrysotile
MH-22.1	Sheetrock Wallboard	RM 416	NAD

**ASBESTOS BULK SAMPLING RECORD
NORTH CAROLINA STATE UNIVERSITY
MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTOR: DONNIE MERCER
EEC JOB NO.: N-23-039**

SAMPLE NUMBER	TYPE OF MATERIAL	SAMPLE LOCATION	ASBESTOS TYPE/ PERCENTAGE
MH-22.2	Wall Joint Compound Mud	RM 416	NAD
MH-23.1	Sheetrock Wallboard	RM 114	NAD
MH-23.2	Wall Joint Compound Mud	RM 114	NAD
MH-24.1	Sheetrock Wallboard	RM 308	NAD
MH-25.1	Sheetrock Wallboard	RM 202	NAD
MH-25.2	Wall Joint Compound Mud	RM 202	NAD
MH-26.1	Wall Plaster Skim Coat	RM 218	NAD
MH-26.2	Wall Plaster Base Coat	RM 218	NAD
MH-27	Interior Door Caulking	@ RM 306	NAD
MH-28	Interior Door Caulking	@ RM 201	NAD
MH-29	Coating on CMU Block Walls	RM 122B	NAD
MH-30	Coating on CMU Block Walls	RM 122B	NAD
MH-31	Cork Board Glue Dots	Corridor @ RM 407	3% Chrysotile
MH-32	Chalkboard Glue Dots	RM 301	3% Chrysotile
MH-33	Chalkboard Glue Dots	RM 402	NA/PS
MH-34	Linoleum Tiles	RM 113B	NAD
MH-35	Linoleum Tiles	RM 113B	NAD
MH-36	Pipe Insulation Mastic	RM 223	2% Chrysotile
MH-37	3" Pipe Fitting Insulation	RM 115	NAD
MH-38	3" Pipe Insulation	RM 117	NAD
MH-39	4" Pipe Fitting Insulation	RM 100	NAD
MH-40	4" Pipe Insulation	RM 100 (SE Corner)	25% Amosite
MH-41	2" Pipe Insulation	RM 115	NAD
MH-42	2" Pipe Fitting Insulation	RM 117	NAD
MH-43	5-6" Pipe Insulation	Corridor @ RM 120	3% Chrysotile

**ASBESTOS BULK SAMPLING RECORD
NORTH CAROLINA STATE UNIVERSITY
MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTOR: DONNIE MERCER
EEC JOB NO.: N-23-039**

SAMPLE NUMBER	TYPE OF MATERIAL	SAMPLE LOCATION	ASBESTOS TYPE/ PERCENTAGE
MH-44	5-6" Pipe Fitting Insulation	RM 100	NAD
MH-45	Roof Drain 6" Pipe Insulation	RM 201	NAD
MH-46	Lab Countertop	RM 208A	NAD
MH-47	Lab Countertop	RM 207	NAD
MH-48	Lab Countertop	RM 109	NAD
MH-49	Lab Countertop	RM 114	NAD
MH-50.1	9" Gray Floor Tile	RM 415	2% Chrysotile
MH-50.2	Black Mastic of MH-50.1	RM 415	5% Chrysotile
MH-51.1	12" Off-white Floor Tile	RM 216	NAD
MH-51.2	Black Mastic of MH-51.1	RM 216	NAD
MH-52.1	12" White Mottled Floor Tile	Women's Restroom 218	NAD
MH-52.2	Black Mastic of MH-52.1	Women's Restroom 218	3% Chrysotile
MH-53.1	12" Mottled Tan Floor Tile	RM 216D	NAD
MH-53.2	Black Mastic of MH-53.1	RM 216D	NAD
MH-54.1	12" Off-white Floor Tile	RM 323	NAD
MH-54.2	Yellow Mastic of MH-54.1	RM 323	NAD
MH-55.1	12" Off-white Mottled Floor Tile	Elevator	NAD
MH-55.2	Yellow Mastic of MH-54.1	Elevator	NAD
MH-56.1	9" Gray Floor Tile	RM 201	2% Chrysotile
MH-56.2	Black Mastic of MH-56.1	RM 201	5% Chrysotile
MH-57	2'x2' Ceiling Panel	Corridor @ RM 404	NAD
MH-58.1	Wall Plaster Skim Coat	Women's Restroom 426	NAD
MH-58.2	Wall Plaster Base Coat	Women's Restroom 426	NAD
MH-59.1	Wall Plaster Skim Coat	Women's Restroom 322	NAD
MH-59.2	Wall Plaster Base Coat	Women's Restroom 322	NAD

**ASBESTOS BULK SAMPLING RECORD
NORTH CAROLINA STATE UNIVERSITY
MANN HALL
RALEIGH, NORTH CAROLINA
INSPECTOR: DONNIE MERCER
EEC JOB NO.: N-23-039**

SAMPLE NUMBER	TYPE OF MATERIAL	SAMPLE LOCATION	ASBESTOS TYPE/ PERCENTAGE
MH-60.1	Wall Plaster Skim Coat	RM 113A	NAD
MH-60.2	Wall Plaster Base Coat	RM 113A	NAD
MH-61	Interior Door Caulking	RM 105	2% Chrysotile
MH-62	Interior Door Caulking	RM 406B	NAD
MH-63	Roof Core	Main Roof Level – Southeast Corner	NAD
MH-64	Roof Core	Main Roof Level – North Middle	NAD
MH-65	Roof Core	Structural Lab Extension Roof	NAD
MH-66	Roof Core	Lower Main Roof Level	NAD
MH-67	Roof Flashing Sealant	Main Roof Level – NNW Penetration	NAD
MH-68	Roof Flashing Sealant	Main Roof Level – NNW Penetration	NAD
MH-69	Roof Flashing Sealant	Main Roof Level – West Penetration	NAD
MH-70	Roof Flashing Sealant	Lower Main Roof – Column North	NAD
MH-71	Roof Flashing Sealant	Lower Main Roof – Column NE	5% Chrysotile
MH-72	Roof Flashing Sealant	Lower Roof Level – NNE Penetration	NAD
MH-73	Roof Flashing Sealant	Lower Roof – Middle Penetration	NAD
MH-74	Textured Finish Coat	Lower Main Roof – Column NE	NAD
MH-75	Textured Finish Coat	Lower Main Roof – Column NW	NAD
MH-76	Roof Flashing Sealant	Lower Roof – NW Corner Penetration	NAD
MH-77A	Green Floor Tile	RM 105	3% Chrysotile
MH-78A	Mottle Off-white & Gray Floor Tile	RM 204	NAD
MH-78B	Mastic of MH-78A	RM 204	NAD

**AMERISCI RICHMOND
PLM BULK ASBESTOS REPORT**



CHAIN OF CUSTODY RECORD

AMERISCI Richmond
Job No.#

AMERISCI RICHMOND
13635 GENITO ROAD
MIDLOTHIAN, VA 23112
PHONE: (804) 763-1200
FAX: (804) 763-1800
TOLL FREE (800) 476-5227
www.amerisci.com

<h2>EEC, INC</h2>	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:		
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other			
JOB NAME: NCSU - Mann Hall Survey	TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 1	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC, Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mshrimanker@eecincorporated.com	PHONE: 919-291-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)		FAX:
COMMENTS: *Positive Stop on Samples of same HGA ID.		SITE FAX:
		PAGER/CELL:

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME	X LITERS /MIN	TOTAL VOLUME	DATE COLLECTED
1	MH-01	RM 415A / 2'x4' Ceiling Panel						9-29-23
1	MH-02	RM 202 / 2'x4' Ceiling Panel						"
1	MH-03	RM 109 / 2'x4' Ceiling Panel						"
2A	MH-04	Corridor @ 208G / 2'x2' Ceiling Panel						"
2A	MH-05	Corridor @ 402 / 2'x2' Ceiling Panel						"
2A	MH-06	Corridor @ 306 / 2'x2' Ceiling Panel						"
2B	MH-07	RM 106 / 2'x2' Ceiling Panel						"
3	MH-08	RM 200 / 1'x1' Ceiling Tiles						"
3	MH-09	RM 415 / 1'x1' Ceiling Tiles						"
3	MH-10	RM 301 / 1'x1' Ceiling Tiles						"
4	MH-11	RR 120 / 2'x2' Hard Ceiling Panel						"
4	MH-12	RR 120 / 2'x2' Hard Ceiling Panel						"
5	MR-13	Men's RR 427 / Ceiling Plaster						"
5	MR-14	Men's RR 324 / Ceiling Plaster						"
6	MR-15	RM 100 Ceiling / Fireproofing Spray-on						"
6	MR-16	RM 109 Ceiling / Fireproofing Spray-on						"
6	MR-17	RM 112 Ceiling / Fireproofing Spray-on						"
6	MR-18	RM 113 Ceiling / Fireproofing Spray-on						"
6	MR-19	RM 115 Ceiling / Fireproofing Spray-on						"
6	MR-20	RM 117 Ceiling / Fireproofing Spray-on						"

SAMPLED BY: D. Mercer & S. Halyard	DATE/TIME: 9-29-23 1441 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received in Lab By:	DATE/TIME:

PLEASE SEND COPIES OF ALL LAB RESULTS TO EMAIL: MSHRIMANKER@EECINCORPORATED.COM



CHAIN OF CUSTODY RECORD

AMERISCI Richmond
Job No.#

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13635 GENITO ROAD
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TOLL FREE (800) 476-5227
www.amerisci.com

EEC, INC	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
-----------------	---	---

PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:		
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other			
JOB NAME: NCSU - Mann Hall Survey	TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 2	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC, Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mshrimanker@eecincorporated.com	PHONE: 919-291-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)		FAX:
COMMENTS: *Positive Stop on Samples of same HGA ID.		SITE FAX:
		PAGER/CELL:

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME	X LITERS /MIN	TOTAL VOLUME	DATE COLLECTED
6	MH-21	RM 122 Ceiling / Fireproofing Spray-on						9-29-23
7	MH-22A	RM 416 / Sheetrock Wallboard						"
8	MH-22B	RM 416 / Wall Joint Compound Mud						"
7	MH-23A	RM 114 / Sheetrock Wallboard						"
8	MH-23B	RM 114 / Wall Joint Compound Mud						"
7	MH-24A	RM 308 / Sheetrock Wallboard						"
8	MH-24B	RM 308 / Wall Joint Compound Mud						"
7	MH-25A	RM 202 / Sheetrock Wallboard						"
8	MH-25B	RM 202 / Wall Joint Compound Mud						"
9	MH-26	RM 218 / Wall Plaster						"
10	MH-27	@ 306 / Interior Door Caulking						"
10	MH-28	@ 201 / Interior Door Caulking						"
11	MH-29	RM 122B / Coating on CMU Block Walls						"
11	MH-30	RM 122B / Coating on CMU Block Walls						"
12	MH-31	Corridor @ 407 / Cork Board Glue Dots						"
13	MH-32	RM 301 / Chalkboard Glue Dots						"
13	MH-33	RM 402 / Chalkboard Glue Dots						"
14	MH-34	RM 113B / Linoleum Tiles						"
14	MH-35	RM 113B / Linoleum Tiles						"
15	MH-36	RM 223 / Vertical Metal-covered Pipe Ins. Mastic						"

SAMPLED BY: D. Mercer & S. Halyard	DATE/TIME: 9-29-23 1441 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received in Lab By:	DATE/TIME:

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EEC, INC		8502 Six Forks Road, Suite 104, Raleigh, NC 27615				P.O.#						
		SPECIAL INSTRUCTIONS:										
PROJECT INFORMATION		ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:		
JOB NAME: NCSU - Mann Hall Survey		TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
		TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39		TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
		TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.		TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
		TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 3		PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:		
		PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
		OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>			
RESULTS TO: EEC Inc		INVOICE TO: EEC, Inc				RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>						
EMAIL RESULTS: <input checked="" type="checkbox"/>		EMAIL ADDRESS: mshrimanker@eecincorporated.com				PHONE: 919-291-6814						
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)		FAX:										
COMMENTS: *Positive Stop on Samples of same HGA ID.		SITE FAX:										
		PAGER/CELL:										
HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION			START TIME	STOP TIME	TOTAL TIME	X LITERS /MIN	TOTAL VOLUME	DATE COLLECTED		
16	MH-37	RM 115 / 3" Pipe Fitting Insulation								9-29-23		
17	MH-38	RM 117 / 3" Pipe Insulation								"		
16	MH-39	RM 100 / 4" Pipe Fitting Insulation								"		
17	MH-40	@ SE Corner Door to RM 100 / 4" Pipe Insulation								"		
17	MH-41	RM 117 / 2" Pipe Insulation								"		
16	MH-42	Corridor @ Men's RR 120 / 2" Pipe Fitting Ins.								"		
17	MH-43	RM 100 / 5-6" Pipe Insulation								"		
16	MH-44	RM 100 / 5-6" Pipe Fitting Insulation								"		
18	MH-45	RM 201 / Roof Drain 6" Pipe Insulation								"		
19A	MH-46	RM 208H / Lab Countertop								"		
19B	MH-47	RM 207 / Lab Countertop								"		
19C	MH-48	RM 109 / Lab Countertop								"		
19D	MH-49	RM 114 / Lab Countertop								"		
20	MH-50A	RM 415 / 9" Gray Floor Tile								"		
21	MH-50B	Black Mastic of MH-50A								"		
22	MH-51A	RM 216 / 12" Off-white Floor Tile								"		
23	MH-51B	Black Mastic of MH-51A								"		
24	MH-52A	Women's RR 218 / 12" White Mottled Floor Tile								"		
25	MH-52B	Black Mastic of MH-52A								"		
26	MH-53A	RM 216D / 12" Mottled Tan Floor Tile								"		
SAMPLED BY: D. Mercer & S. Halyard		DATE/TIME: 9-29-23 1441 Hrs.		Received By:				DATE/TIME:				
RELINQUISHED BY:		DATE/TIME:		Received in Lab By:				DATE/TIME:				

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Job No.#

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EEC, INC	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:		
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other			
JOB NAME: NCSU - Mann Hall Survey	TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 5	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC. Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mshrimanker@eecincorporated.com	PHONE: 919-291-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)		FAX:
COMMENTS: *Positive Stop on Samples of same HGA ID.		SITE FAX:
		PAGER/CELL:

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME	X LITERS /MIN	TOTAL VOLUME	DATE COLLECTED
31	MH-63	Main Roof Level - Southeast / Roof Core						10-6-23
31	MH-64	Main Roof Level - North middle / Roof Core						"
31	MH-65	Structural Lab Area - Southeast / Roof Core						"
31	MH-66	Lower (2nd Flr.) Level - Northeast / Roof Core						"
32	MH-67	Main Rf. Lvl.-NNW Pene./Roof Flash. Sealant						"
33	MH-68	Main Rf. Lvl.-NNW Pene./Roof Flash. Sealant						"
34	MH-69	Main Rf. Lvl.-West Pene./Roof Flash. Sealant						"
35	MH-70	Lwr. Lvl. Column - North / Roof Flash. Sealant						"
36	MH-71	Lwr. Lvl. Column - NE/ Roof Flash. Sealant						"
37	MH-72	Lwr. Lvl. - NNE Pene./ Roof Flash. Sealant						"
38	MH-73	Lwr. Lvl.- Middle Pen./ Roof Flash. Sealant						"
39	MH-74	Lwr. Lvl. Column - NE/ Textured Finish Coat						"
39	MH-75	Lwr. Lvl. Column - NW/ Textured Finish Coat						"
40	MH-76	Lwr. lvl.- NW corn. Pen./Roof Flash. Seal.2:09						"

SAMPLED BY: Donnie Mercer Jr.	DATE/TIME: 10-6-23 1545 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received in Lab By:	DATE/TIME:

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AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: 8047631200 FAX: 8047631800

October 12, 2023

EEC INC
Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

RE: EEC INC
Job Number 123101136
P.O. #N-23-39
N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples (Report Amended 10/12/2023)

Dear Donnie Mercer Jr:

Enclosed are the results for PLM asbestos analysis of the following EEC INC samples received at AmeriSci on Wednesday, October 4, 2023, for a 3 day turnaround:

MH-01, MH-02, MH-03, MH-04, MH-05, MH-06, MH-07, MH-08, MH-09, MH-10, MH-11, MH-12, MR-13, MR-14, MR-15, MR-16, MR-17, MR-18, MR-19, MR-20, MH-21, MH-22, MH-23, MH-24, MH-25, MH-26, MH-27, MH-28, MH-29, MH-30, MH-31, MH-32, MH-33, MH-34, MH-35, MH-36, MH-37, MH-38, MH-39, MH-40, MH-41, MH-42, MH-43, MH-44, MH-45, MH-46, MH-47, MH-48, MH-49, MH-50, MH-51, MH-52, MH-53, MH-54, MH-55, MH-56, MH-57, MH-58, MH-59, MH-60, MH-61, MH-62

The 73 samples contained in zip lock bag were shipped to AmeriSci via Fed Ex 8175 6326 3392 B 930. These samples were prepared and analyzed according to EPA PLM Method (EPA 600/R-93/116 Section 2.2). The required analytical information, analysis results, analyst signature and laboratory identification are contained in the PLM Bulk Asbestos Report. If TEM analysis was requested for selected samples the gravimetric reduction data (by Sec 2.3) and TEM Asbestos % (by Sec 2.5) are included in Table 1 along with a summary of Asbestos % by PLM for all samples analyzed.

This report relates ONLY to the sample analysis expressed as % asbestos. AmeriSci assumes no responsibility for customer supplied data such as "sample type", "location", or "area sampled". This report must not be used to claim product endorsement by AmeriSci, NVLAP or any agency of the U. S. Government. The National Institute of Standards and Technology accreditation requirements mandate that this report must not be reproduced, except in full, without the written approval of the laboratory. This report may contain specific data not covered by NVLAP or ELAP accreditations, if so identified in relevant footnotes.

AmeriSci appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

Glenn F. Massey
QA Manager | Authorized Signatory



AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

EEC INC
Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

Date Received 10/04/23
Date Examined 10/09/23

AmeriSci Job # 123101136
P.O. #
Page 1 of 14

RE: N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-01 1 Location: Rm 415A / 2'x4' Ceiling Panel	123101136-01	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 70%, Fibrous glass 10%, Non-fibrous 20%			
MH-02 1 Location: Rm 202 / 2'x4' Ceiling Panel	123101136-02	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 70%, Fibrous glass 10%, Non-fibrous 20%			
MH-03 1 Location: Rm 109 / 2'x4' Ceiling Panel	123101136-03	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 70%, Fibrous glass 10%, Non-fibrous 20%			
MH-04 2A Location: Corridor @ 208G / 2'x2' Ceiling Panel	123101136-04	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 80%, Fibrous glass 5.0%, Non-fibrous 15%			
MH-05 2A Location: Corridor @ 402 / 2'x2' Ceiling Panel	123101136-05	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 80%, Fibrous glass 5.0%, Non-fibrous 15%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
 (Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-06 2A	123101136-06 Location: Corridor @ 306 / 2'x2' Ceiling Panel	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 80%, Fibrous glass 5.0%, Non-fibrous 15%			
MH-07 2B	123101136-07 Location: Rm 106 / 2'x2' Ceiling Panel	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 80%, Fibrous glass 5.0%, Non-fibrous 15%			
MH-08 3	123101136-08 Location: Rm 200 / 1'x1' Ceiling Tiles	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types: Amosite 2.0%			
Other Material: Cellulose 13%, Fibrous glass 80%, Non-fibrous 5.0%			
MH-09 3	123101136-09 Location: Rm 415 / 1'x1' Ceiling Tiles	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types: Amosite 2.0%			
Other Material: Cellulose 13%, Fibrous glass 80%, Non-fibrous 5.0%			
MH-10 3	123101136-10 Location: Rm 301 / 1'x1' Ceiling Tiles	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types: Amosite 2.0%			
Other Material: Cellulose 13%, Fibrous glass 80%, Non-fibrous 5.0%			
MH-11 4	123101136-11 Location: RR 120/2'X2' Hard Ceiling Panel	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 5.0%, Fibrous glass 1.0%, Non-fibrous 94%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
 (Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-12 4 Location: RR 120/2'X2' Hard Ceiling Panel	123101136-12	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 5.0%, Fibrous glass 1.0%, Non-fibrous 94%			
MR-13 5 Location: Men's RR 427 / Ceiling Plaster	123101136-13.1	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster)			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MR-13 5 Location: Men's RR 427 / Ceiling Plaster	123101136-13.2	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster)			
Asbestos Types:			
Other Material: Cellulose 2.0%, Non-fibrous 98%			
MR-14 5 Location: Men's RR 324 / Ceiling Plaster	123101136-14.1	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster)			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MR-14 5 Location: Men's RR 324 / Ceiling Plaster	123101136-14.2	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster)			
Asbestos Types:			
Other Material: Cellulose 2.0%, Non-fibrous 98%			
MR-15 6 Location: Rm 100 Ceiling / Fireproofing Spray-On	123101136-15	Yes	4.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 4.0%			
Other Material: Fibrous Talc 6.0%, Non-fibrous 90%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
 (Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MR-16 6	123101136-16 Location: Rm 109 Ceiling / Fireproofing Spray-On		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
MR-17 6	123101136-17 Location: Rm 112 Ceiling / Fireproofing Spray-On	Yes	4.0% <small>(by CVES) by Eric H. Ahles on 10/09/23</small>
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 4.0% Other Material: Fibrous Talc 6.0%, Non-fibrous 90%			
MR-18 6	123101136-18 Location: Rm 113 Ceiling / Fireproofing Spray-On		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
MR-19 6	123101136-19 Location: Rm 115 Ceiling / Fireproofing Spray-On	Yes	4.0% <small>(by CVES) by Eric H. Ahles on 10/09/23</small>
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 4.0% Other Material: Fibrous glass 4.0%, Non-fibrous 92%			
MR-20 6	123101136-20 Location: Rm 117 Ceiling / Fireproofing Spray-On		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
MH-21 6	123101136-21 Location: Rm 122 Ceiling / Fireproofing Spray-On	Yes	4.0% <small>(by CVES) by Eric H. Ahles on 10/09/23</small>
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 4.0% Other Material: Fibrous glass 1.0%, Fibrous Talc 3.0%, Non-fibrous 92%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-22 7	123101136-22 Location: Rm 416 / Sheetrock Wallboard	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Non-fibrous 98%			
MH-22 8	123101136-23 Location: Rm 416 / Wall Joint Compound Mud	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-23 7	123101136-24 Location: Rm 114 / Sheetrock Wallboard	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Fibrous glass Trace, Non-fibrous 98%			
MH-23 8	123101136-25 Location: Rm 114 / Wall Joint Compound Mud	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous Talc Trace, Non-fibrous 100%			
MH-24 7	123101136-26 Location: Rm 308 / Sheetrock Wallboard	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Fibrous glass Trace, Non-fibrous 98%			
MH-24 8	123101136-27 Location: Rm 308 / Wall Joint Compound Mud		NA ¹
Analyst Description: Insufficient Material Asbestos Types: Other Material:			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-25 7	123101136-28 Location: Rm 202 / Sheetrock Wallboard	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Non-fibrous 98%			
MH-25 8	123101136-29 Location: Rm 202 / Wall Joint Compound Mud	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-26 9	123101136-30.1 Location: Rm 218 / Wall Plaster	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster) Asbestos Types: Other Material: Fibrous Talc 2.0%, Non-fibrous 98%			
MH-26 9	123101136-30.2 Location: Rm 218 / Wall Plaster	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster) Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%			
MH-27 10	123101136-31 Location: @ 306 / Interior Door Caulking	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-28 10	123101136-32 Location: @ 201 / Interior Door Caulking	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-29 11	123101136-33 Location: Rm 122B / Coating On CMU Block Walls	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-30 11	123101136-34 Location: Rm 122B / Coating On CMU Block Walls	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-31 12	123101136-35 Location: Corridor @ 407 / Cork Board Glue Dots	Yes	3.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 3.0% Other Material: Non-fibrous 97%			
MH-32 13	123101136-36 Location: Rm 301 / Chalkboard Glue Dots	Yes	3.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 3.0% Other Material: Non-fibrous 97%			
MH-33 13	123101136-37 Location: Rm 402 / Chalkboard Glue Dots		NA/PS
Analyst Description: Bulk Material Asbestos Types: Other Material:			
MH-34 14	123101136-38 Location: Rm 113B / Linoleum Tiles	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Tan, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Non-fibrous 98%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-35 14	123101136-39 Location: Rm 113B / Linoleum Tiles	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Tan, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Non-fibrous 98%			
MH-36 15	123101136-40 Location: Rm 223 / Vertical Metal-Covered Pipe Ins Mastic	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Silver/Brown/Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Chrysotile 2.0% Other Material: Cellulose 33%, Non-fibrous 65%			
MH-37 16	123101136-41 Location: Rm 115 / 3" Pipe Fitting Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Yellow, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous glass 100%			
MH-38 17	123101136-42 Location: Rm 117 / 3" Pipe Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White/Yellow, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Fibrous glass 90%, Non-fibrous 8.0%			
MH-39 16	123101136-43 Location: Rm 100 / 4" Pipe Fitting Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 5.0%, Fibrous glass 35%, Non-fibrous 60%			
MH-40 17	123101136-44 Location: @ SE Corner To Door To Rm 100 / 4" Pipe Insulation	Yes	25% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Amosite 25% Other Material: Non-fibrous 75%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-41 17	123101136-45 Location: Rm 115 / 2" Pipe Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White/Yellow/Silver, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 20%, Fibrous glass 40%, Non-fibrous 40%			
MH-42 16	123101136-46 Location: Rm 117 /2" Pipe Fitting Ins	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Silver/Black/Yellow, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 5.0%, Fibrous glass 90%, Non-fibrous 5.0%			
MH-43 17	123101136-47 Location: Corridor @ Men's RR 120 / 5-6" Pipe Insulation	Yes	3.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White/Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 3.0% Other Material: Cellulose 5.0%, Fibrous glass 2.0%, Non-fibrous 90%			
MH-44 16	123101136-48 Location: Rm 100 / 5-6" Pipe Fitting Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White/Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 5.0%, Non-fibrous 95%			
MH-45 18	123101136-49 Location: Rm 201 / Roof Drain 6" Pipe Insulation	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Silver/Black/Yellow, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 10%, Fibrous glass 80%, Non-fibrous 10%			
MH-46 19A	123101136-50 Location: Rm 208H / Lab Countertop	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
 (Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-47 19B Location: Rm 207 / Lab Countertop	123101136-51	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MH-48 19C Location: Rm 109 /Lab Countertop	123101136-52	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 100%, Non-fibrous Trace			
MH-49 19D Location: Rm 114 / Lab Countertop	123101136-53	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Cementitious, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MH-50 20 Location: Rm 415 / 9" Gray Floor Tile	123101136-54	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 2.0%			
Other Material: Non-fibrous 98%			
MH-50 21 Location: Black Mastic Of MH-50A	123101136-55	Yes	5.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 5.0%			
Other Material: Non-fibrous 95%			
MH-51 22 Location: Rm 216 / 12" Off-White Floor Tile	123101136-56	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Off-White, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-51 23	123101136-57 Location: Black Mastic Of MH-51A	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 3.0%, Non-fibrous 97%			
MH-52 24	123101136-58 Location: Women's RR 218 / 12" White Mottled Floor Tile	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-52 25	123101136-59 Location: Black Mastic Of MH-52A	Yes	3.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 3.0% Other Material: Non-fibrous 97%			
MH-53 26	123101136-60 Location: Rm 216D / 12" Mottled Tan Floor Tile	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Tan, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-53 27	123101136-61 Location: Mastic Of MH-53A	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 4.0%, Non-fibrous 96%			
MH-54 22	123101136-62 Location: Rm 323 / 12" Off-White Floor Tile	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Off-White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
 (Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-54 28	123101136-63 Location: Mastic Of MH-54A	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Yellow, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 2.0%, Non-fibrous 98%			
MH-55 29	123101136-64 Location: Elevator / 12" Off-White Mottled Floor Tile	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Off-White, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 100%			
MH-55 30	123101136-65 Location: Mastic Of MH-55A	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Yellow, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 3.0%, Non-fibrous 97%			
MH-56 20	123101136-66 Location: Rm 201 / 9" Gray Floor Tile	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 2.0%			
Other Material: Non-fibrous 98%			
MH-56 21	123101136-67 Location: Black Mastic Of MH-56A	Yes	4.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types: Chrysotile 4.0%			
Other Material: Non-fibrous 96%			
MH-57 2B	123101136-68 Location: Corridor @ 404 / 2'x2' Ceiling Panel	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Cellulose 80%, Fibrous glass 5.0%, Non-fibrous 15%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-58 9 Location: Women's RR 426 / Wall Plaster	123101136-69.1	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster) Asbestos Types: Other Material: Fibrous Talc 2.0%, Non-fibrous 98%			
MH-58 9 Location: Women's RR 426 / Wall Plaster	123101136-69.2	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster) Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%			
MH-59 9 Location: Women's RR 322 / Wall Plaster	123101136-70.1	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster) Asbestos Types: Other Material: Fibrous Talc 2.0%, Non-fibrous 98%			
MH-59 9 Location: Women's RR 322 / Wall Plaster	123101136-70.2	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster) Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%			
MH-60 9 Location: Rm 113A / Wall Plaster	123101136-71.1	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Skim Coat (Plaster) Asbestos Types: Other Material: Fibrous Talc 2.0%, Non-fibrous 98%			
MH-60 9 Location: Rm 113A / Wall Plaster	123101136-71.2	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Heterogeneous, Non-Fibrous, Cementitious, Base Coat (Plaster) Asbestos Types: Other Material: Cellulose Trace, Non-fibrous 100%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
(Report Amended 10/12/2023)

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-61 10 Location: Rm 105 / Interior Door Caulking	123101136-72	Yes	2.0% (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Chrysotile 2.0% Other Material: Non-fibrous 98%			
MH-62 10 Location: Rm 406B / Interior Door Caulking	123101136-73	No	NAD (by CVES) by Eric H. Ahles on 10/09/23
Analyst Description: White, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			

Reporting Notes:

(1) Insufficient material submitted for accurate quantitation during PLM analysis (no QC possible).

Analyzed by: Eric H. Ahles
Date: 10/9/2023



Reviewed by: Eric H. Ahles



*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis using Meiji, Model MT 6130 microscope, Serial #1410298, by EPA 600/R-93/116 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples which includes quantitation of any vermiculite observed (198.6 for NOB samples) or EPA 400 pt ct by EPA 600/M4-82-020 (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.

AmeriSci Richmond	Report Amendment Explanation Form (append to amended report)	Date Amended 10/12/2023
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Client: EEC INC

AmeriSci Job #: 123101136

Client Job: N-23-39

Analysis Type: PLM

AmeriSci Sample
#s affected: 123101136-9, 10, 17, 19, 21, 45, 47, 66, 67, 73

Amended by
(print/sign): Eric H. Ahles

Original Item(s)
Being Amended: 9, 10, 17, 19, 21, 45, 47, 66, 67, 73

Changes Made: Samples analyzed

Reason for
Changes: Client removed positive stop

Attach original sheet with incorrect item or items to be amended clearly indicated or circled.

Subject: Job no. 123101136

From: Donnie Mercer <dmercerjr@gmail.com>

Date: 10/12/2023, 11:29 AM

To: AmeriSci VA <vareults@amerisci.com>

CC: Mike Shrimanker <mshrimanker@eecincorporated.com>

Tony,

I had marked "Positive Stop" on some samples of this job that I now would like to have analyzed. They include: MH-09, MH-10, MH-17, MH-19, MH-21, MH-41, MH-43, MH-56, MH-56A, and MH-62. Could you please analyze the samples?

Thank you,
Donnie Mercer

W

Subject: Re: Job Problem - AmeriSci 123101136; N-23-39; NCSU Mann Hall Survey

From: "Donnie Ray Mercer Jr." <dmercer@eecincorporated.com>

Date: 10/4/2023, 12:57 PM

To: AmeriSci VA <vareresults@amerisci.com>

Dear Angel,

Please analyze the one sample of wall plaster as you normally would. Change the designation number on the bag to correspond with the COC as only NH-26 .

Thank you,

Donnie

On 10/4/2023 12:24 PM, AmeriSci VA wrote:

Hello

We received Job N-23-39 (123-10-1136)

Have **Bag labeled 26A and 26B**

Job Problem: 26B is not on the COC.

What would like to do?

1. Do not Analyze 26B
2. Add 26B to COC (Will need Description)

Thank you

Angel

--

Confidentiality Notice: Unless otherwise indicated, the information contained in this communication is confidential information for use of the individual named above. If the reader of this communication is not the intended recipient, you are hereby notified that any dissemination, distribution or copying of this communication is prohibited.

If you have received this communication in error, please immediately notify the sender by telephone and return the original message to the above address via the US postal Service at our expense. Samples are disposed of in 60 days unless otherwise instructed by the protocol or special instructions in writing.

Thank you for your business.

AMERISCI

AMERISCI Richmond
Job No. #

128101136

AMERISCI RICHMOND
13835 GENITO ROAD
MIDLOTHIAN, VA 23112
PHONE: (804) 783-1200
FAX: (804) 783-1800
TOLL FREE (800) 476-6227
www.amerisci.com

<h2>EEC, INC</h2>		8502 Six Forks Road, Suite 104, Raleigh, NC 27615			P.O.#		SPECIAL INSTRUCTIONS:				
PROJECT INFORMATION		ANALYSIS TYPE	TURNAROUND TIME (X)						AIR FILTER INFORMATION:		
JOB NAME: NCSU - Mann Hall Survey		TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
		TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39		TEM/7462	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
		TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.		TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
		TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 1		PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
		PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
RESULTS TO: EEC Inc		INVOICE TO: EEC, Inc			RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>						
EMAIL RESULTS: <input checked="" type="checkbox"/>		EMAIL ADDRESS: mahrimanker@eecincorporated.com			PHONE: 919-281-6814						
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)					FAX:						
COMMENTS: *Positive Stop on Samples of same HGA ID.					SITE FAX:						
					PAGER/CELL:						
HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION			START TIME	STOP TIME	TOTAL TIME X	LITERS / MIN	TOTAL VOLUME	DATE COLLECTED	
1	MH-01	RM 415A / 2'x4' Ceiling Panel								9-28-23	
1	MH-02	RM 202 / 2'x4' Ceiling Panel								"	
1	MH-03	RM 109 / 2'x4' Ceiling Panel								"	
2A	MH-04	Corridor @ 208G / 2'x2' Ceiling Panel								"	
2A	MH-05	Corridor @ 402 / 2'x2' Ceiling Panel								"	
2A	MH-06	Corridor @ 306 / 2'x2' Ceiling Panel								"	
2B	MH-07	RM 106 / 2'x2' Ceiling Panel								"	
3	MH-08	RM 200 / 1'x1' Ceiling Tiles								"	
3	MH-09	RM 415 / 1'x1' Ceiling Tiles								"	
3	MH-10	RM 301 / 1'x1' Ceiling Tiles								"	
4	MH-11	RR 120 / 2'x2' Hard Ceiling Panel								"	
4	MH-12	RR 120 / 2'x2' Hard Ceiling Panel								"	
5	MR-13	Men's RR 427 / Ceiling Plaster								"	
5	MR-14	Men's RR 324 / Ceiling Plaster								"	
6	MR-15	RM 100 Ceiling / Fireproofing Spray-on								"	
6	MR-16	RM 109 Ceiling / Fireproofing Spray-on								"	
6	MR-17	RM 112 Ceiling / Fireproofing Spray-on								"	
6	MR-18	RM 113 Ceiling / Fireproofing Spray-on								"	
6	MR-19	RM 115 Ceiling / Fireproofing Spray-on								"	
6	MR-20	RM 117 Ceiling / Fireproofing Spray-on								"	
SAMPLED BY: D. Mercer & S. Haiyard		DATE/TIME: 9-28-23 1441 Hrs.		Received By:		DATE/TIME:					
RELINQUISHED BY:		DATE/TIME:		Received In Lab By:		DATE/TIME: <u>Received</u>					

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OCT 04 2023

AM

AMERISCI

AMERISCI Richmond
Job No. #

128101186

AMERISCI RICHMOND
13836 GENITO ROAD
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PHONE: (804) 763-1200
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TOLL FREE (800) 476-6227
www.amerisci.com

<h2>EEC, INC</h2>		8502 Six Forks Road, Suite 104, Raleigh, NC 27615		P.O.#		SPECIAL INSTRUCTIONS:					
PROJECT INFORMATION		ANALYSIS TYPE	TURNAROUND TIME (X)						AIR FILTER INFORMATION:		
JOB NAME: NCSU - Mann Hall Survey		TEMAHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
		TEMLLEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39		TEM7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
		TEMBULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.		TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
		TEMWATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 2		PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
		PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
		OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
RESULTS TO: EEC Inc		INVOICE TO: EEC, Inc		RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>							
EMAIL RESULTS: <input checked="" type="checkbox"/>		EMAIL ADDRESS: mshrmanker@eecincorporated.com		PHONE: 919-291-8814							
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)				FAX:							
COMMENTS: *Positive Stop on Samples of same HGA ID.				SITE FAX:							
				PAGER/CELL:							
HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME X	LITERS MIN	TOTAL VOLUME	DATE COLLECTED			
6	MH-21	RM 122 Ceiling / Fireproofing Spray-on						9-29-23			
7	MH-22A	RM 416 / Sheetrock Wallboard						"			
8	MH-22B	RM 416 / Wall Joint Compound Mud						"			
7	MH-23A	RM 114 / Sheetrock Wallboard						"			
8	MH-23B	RM 114 / Wall Joint Compound Mud						"			
7	MH-24A	RM 308 / Sheetrock Wallboard						"			
8	MH-24B	RM 308 / Wall Joint Compound Mud						"			
7	MH-25A	RM 202 / Sheetrock Wallboard						"			
8	MH-25B	RM 202 / Wall Joint Compound Mud						"			
9	MH-26	RM 218 / Wall Plaster						"			
10	MH-27	@ 308 / Interior Door Caulking						"			
10	MH-28	@ 201 / Interior Door Caulking						"			
11	MH-29	RM 122B / Coating on CMU Block Walls						"			
11	MH-30	RM 122B / Coating on CMU Block Walls						"			
12	MH-31	Corridor @ 407 / Cork Board Glue Dots						"			
13	MH-32	RM 301 / Chalkboard Glue Dots						"			
13	MH-33	RM 402 / Chalkboard Glue Dots						"			
14	MH-34	RM 113B / Linoleum Tiles						"			
14	MH-35	RM 113B / Linoleum Tiles						"			
15	MH-36	RM 223 / Vertical Metal-covered Pipe Ins. Mastic						"			
SAMPLED BY: D. Mercer & S. Halyard		DATE/TIME: 9-29-23 1441 Hrs.		Received By:		DATE/TIME:					
RELINQUISHED BY:		DATE/TIME:		Received In Lab By:		DATE/TIME:					

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OCT 04 2023

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Job No.#

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AMERISCI RICHMOND
13636 GENITO ROAD
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<h2 style="margin:0;">EEC, INC</h2>	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other		
JOB NAME: NCSU - Mann Hall Survey	TEMP/HERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEMP/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEMP/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEMP/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEMP/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEMP/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 3	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC, Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mahrmanker@eecincorporated.com	PHONE: 919-281-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)	FAX:	
COMMENTS: *Positive Stop on Samples of same HGA ID.	SITE FAX:	
PAPER/CELLS:		

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME X	LITERS MIN	TOTAL VOLUME	DATE COLLECTED
16	MH-37	RM 115 / 3" Pipe Fitting Insulation						9-29-23
17	MH-38	RM 117 / 3" Pipe Insulation						"
16	MH-39	RM 100 / 4" Pipe Fitting Insulation						"
17	MH-40	@ SE Corner Door to RM 100 / 4" Pipe Insulation						"
17	MH-41	RM 117 / 2" Pipe Insulation						"
16	MH-42	Corridor @ Men's RR 120 / 2" Pipe Fitting Ins.						"
17	MH-43	RM 100 / 5-6" Pipe Insulation						"
16	MH-44	RM 100 / 5-6" Pipe Fitting Insulation						"
18	MH-45	RM 201 / Roof Drain 6" Pipe Insulation						"
19A	MH-46	RM 208H / Lab Countertop						"
19B	MH-47	RM 207 / Lab Countertop						"
19C	MH-48	RM 109 / Lab Countertop						"
19D	MH-49	RM 114 / Lab Countertop						"
20	MH-50A	RM 415 / 9" Gray Floor Tile						"
21	MH-50B	Black Mastic of MH-50A						"
22	MH-51A	RM 216 / 12" Off-white Floor Tile						"
23	MH-51B	Black Mastic of MH-51A						"
24	MH-52A	Women's RR 218 / 12" White Mottled Floor Tile						"
25	MH-52B	Black Mastic of MH-52A						"
26	MH-53A	RM 216D / 12" Mottled Tan Floor Tile						"

SAMPLED BY: D. Mercer & S. Halyard	DATE/TIME: 9-29-23 1441 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received in Lab By:	DATE/TIME:

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OCT 04 2023

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123101136

AMERISCI Richmond
Job No. #

AMERISCI RICHMOND
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FAX: (804) 763-1800
TOLL FREE (800) 476-5227
www.amerisci.com

<h1>EEC, INC</h1>	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
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PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:	
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other		
JOB NAME: NCSU - Mann Hall Survey	TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 4	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC, Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mahrimanker@eecincorporated.com	PHONE: 819-291-8814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)	FAX:	
COMMENTS: *Positive Stop on Samples of same HGA ID.	SITE FAX:	
PAGER/CELL:		

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME X	LITERS / MIN	TOTAL VOLUME	DATE COLLECTED
27	MH-53B	Mastic of MH-53A						9-29-23
22	MH-54A	RM 323 / 12" Off-white Floor Tile						"
28	MH-54B	Mastic of MH-54A						"
29	MH-55A	Elevator / 12" Off-white mottled Floor Tile						"
30	MH-55B	Mastic of MH-55A						"
20	MH-56A	RM 201 / 9" Gray Floor Tile						"
21	MH-56B	Black Mastic of MH-56A						"
2B	MH-57	Corridor @ 404 / 2'x2' Ceiling Panel						"
9	MH-58	Women's RR 426 / Wall Plaster						"
9	MH-59	Women's RR 322 / Wall Plaster						"
9	MH-60	RM 113A / Wall Plaster						"
10	MH-61	RM 105 / Interior Door Caulking						"
10	MH-62	RM 406B / Interior Door Caulking						"

SAMPLED BY: D. Mercer & S. Halyard	DATE/TIME: 9-29-23 1441 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received In Lab By:	DATE/TIME:

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OCT 04 2023
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AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: 8047631200 FAX: 8047631800

October 12, 2023

EEC INC
Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

RE: EEC INC
Job Number 123101325
P.O. #N-23-39
N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples - Page 5

Dear Donnie Mercer Jr:

Enclosed are the results for PLM asbestos analysis of the following EEC INC samples received at AmeriSci on Monday, October 9, 2023, for a 3 day turnaround:

MH-63, MH-64, MH-65, MH-66, MH-67, MH-68, MH-69, MH-70, MH-71, MH-72, MH-73, MH-74, MH-75, MH-76

The 14 samples contained in zip lock bag were shipped to AmeriSci via Fed Ex 8175 6326 3407 B 855. These samples were prepared and analyzed according to EPA PLM Method (EPA 600/R-93/116 Section 2.2). The required analytical information, analysis results, analyst signature and laboratory identification are contained in the PLM Bulk Asbestos Report. If TEM analysis was requested for selected samples the gravimetric reduction data (by Sec 2.3) and TEM Asbestos % (by Sec 2.5) are included in Table 1 along with a summary of Asbestos % by PLM for all samples analyzed.

This report relates ONLY to the sample analysis expressed as % asbestos. AmeriSci assumes no responsibility for customer supplied data such as "sample type", "location", or "area sampled". This report must not be used to claim product endorsement by AmeriSci, NVLAP or any agency of the U. S. Government. The National Institute of Standards and Technology accreditation requirements mandate that this report must not be reproduced, except in full, without the written approval of the laboratory. This report may contain specific data not covered by NVLAP or ELAP accreditations, if so identified in relevant footnotes.

AmeriSci appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn F. Massey".

Glenn F. Massey
QA Manager | Authorized Signatory



AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

EEC INC
Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

Date Received 10/09/23
Date Examined 10/12/23

AmeriSci Job # 123101325
P.O. #
Page 1 of 3

RE: N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
- Page 5

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-63 31 Location: Main Roof Level - Southeast / Roof Core	123101325-01	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Heterogeneous, Fibrous, Roofing Asbestos Types: Other Material: Fibrous glass 4.0%, Non-fibrous 96%			
MH-64 31 Location: Main Roof Level - North Middle / Roof Core	123101325-02	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Heterogeneous, Fibrous, Roofing Asbestos Types: Other Material: Fibrous glass 4.0%, Non-fibrous 96%			
MH-65 31 Location: Structural Lab Area - Southeast / Roof Core	123101325-03	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Heterogeneous, Fibrous, Roofing Asbestos Types: Other Material: Fibrous glass 4.0%, Non-fibrous 96%			
MH-66 31 Location: Lower (2nd Flr) Level -Northwest / Roof Core	123101325-04	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Brown / Black, Heterogeneous, Fibrous, Roofing Asbestos Types: Other Material: Fibrous glass 3.0%, Non-fibrous 97%			
MH-67 32 Location: Main Rf LvL - NNW Pene. / Roof Flash Sealant	123101325-05	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: White/ Black, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous glass 3.0%, Non-fibrous 97%			

PLM Bulk Asbestos Report

N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
- Page 5

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-68 33	123101325-06 Location: Main Rf LvL - NNW Pene. / Roof Flash Sealant	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-69 34	123101325-07 Location: Main Rf LvL - West Pene. / Roof Flash Sealant	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: White, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-70 35	123101325-08 Location: Lwr Lvl Column - North / Roof Flash Sealant	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-71 36	123101325-09 Location: Lwr Lvl Column - NE / Roof Flash Sealant	Yes	5.0% (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material Asbestos Types: Chrysotile 5.0% Other Material: Non-fibrous 95%			
MH-72 37	123101325-10 Location: Lwr Lvl Column - NNE / Roof Flash Sealant	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Cellulose 2.0%, Fibrous glass 2.0%, Non-fibrous 96%			

PLM Bulk Asbestos Report

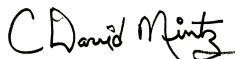
N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
- Page 5

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-73 38	123101325-11 Location: Lwr Lvl Column - Middle Pen / Roof Flash Sealant	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black/ Silver, Heterogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous glass 4.0%, Non-fibrous 96% Comment: Fiberglass-based mesh webbing and Silver Metallic Foil embedded in Tar.			
MH-74 39	123101325-12 Location: Lwr Lvl Column - NE / Textured Finish Coat	No	NAD ¹ (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Lt Beige/ Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-75 39	123101325-13 Location: Lwr Lvl Column - NW / Textured Finish Coat	No	NAD ¹ (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Lt. Beige/ Gray, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 100%			
MH-76 40	123101325-14 Location: Lwr Lvl - NW Corn Pen / Roof Flash Seal 2:09	No	NAD (by CVES) by C. David Mintz on 10/12/23
Analyst Description: Black, Homogeneous, Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous glass 3.0%, Non-fibrous 97%			

Reporting Notes:

(1) Sample homogenized by grinding to a powder prior to analysis.

Analyzed by: C. David Mintz
Date: 10/12/2023



Reviewed by: C. David Mintz



*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 microscope, Serial #210972, by EPA 600/R-93/116 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples which includes quantitation of any vermiculite observed (198.6 for NOB samples) or EPA 400 pt ct by EPA 600/M4-82-020 (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.



CHAIN OF CUSTODY RECORD

AMERISCI Richmond
Job No.#

AMERISCI RICHMOND
13635 GENITO ROAD
MIDLOTHIAN, VA 23112
PHONE: (804) 763-1200
FAX: (804) 763-1800
TOLL FREE (800) 476-5227
www.amerisci.com

123-10-1325

EEC, INC	8502 Six Forks Road, Suite 104, Raleigh, NC 27615	P.O.# SPECIAL INSTRUCTIONS:
-----------------	---	---------------------------------------

PROJECT INFORMATION	ANALYSIS TYPE	TURNAROUND TIME (X)							AIR FILTER INFORMATION:		
		6-8 HR	12 HR	24 HR	48 HR	72 HR	5 DAY	Other			
JOB NAME: NCSU - Mann Hall Survey	TEM/AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	MCE	<input type="checkbox"/>
	TEM/LEVEL II	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	PC	<input type="checkbox"/>
JOB NO.: N-23-39	TEM/7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	25-MM	<input type="checkbox"/>
	TEM/BULK	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	37-MM	<input type="checkbox"/>
JOB MANAGER: Donnie Mercer Jr.	TEM/DUST	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.45 UM	<input type="checkbox"/>
	TEM/WATER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	0.85 UM	<input type="checkbox"/>
JOB DESCRIPTION: Asbestos Survey Samples - Page 5	PLM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	OTHER:	
	PCM	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		
	OTHER	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>		

RESULTS TO: EEC Inc	INVOICE TO: EEC. Inc	RETURN SAMPLES: YES <input type="checkbox"/> NO <input checked="" type="checkbox"/>
EMAIL RESULTS: <input checked="" type="checkbox"/>	EMAIL ADDRESS: mshrimanker@eecincorporated.com	PHONE: 919-291-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com)	FAX:	
COMMENTS: *Positive Stop on Samples of same HGA ID.	SITE FAX:	
		PAGER/CELL:

HGA ID	SAMPLE ID	SAMPLE LOCATION / DESCRIPTION	START TIME	STOP TIME	TOTAL TIME X	LITERS /MIN	TOTAL VOLUME	DATE COLLECTED
31	MH-63	Main Roof Level - Southeast / Roof Core						10-6-23
31	MH-64	Main Roof Level - North middle / Roof Core						"
31	MH-65	Structural Lab Area - Southeast / Roof Core						"
31	MH-66	Lower (2nd Flr.) Level - Northeast / Roof Core						"
32	MH-67	Main Rf. Lvl.-NNW Pene./Roof Flash. Sealant						"
33	MH-68	Main Rf. Lvl.-NNW Pene./Roof Flash. Sealant						"
34	MH-69	Main Rf. Lvl.-West Pene./Roof Flash. Sealant						"
35	MH-70	Lwr. Lvl. Column - North / Roof Flash. Sealant						"
36	MH-71	Lwr. Lvl. Column - NE/ Roof Flash. Sealant						"
37	MH-72	Lwr. Lvl. - NNE Pene./ Roof Flash. Sealant						"
38	MH-73	Lwr. Lvl.- Middle Pen./ Roof Flash. Sealant						"
39	MH-74	Lwr. Lvl. Column - NE/ Textured Finish Coat						"
39	MH-75	Lwr. Lvl. Column - NW/ Textured Finish Coat						"
40	MH-76	Lwr. Lvl.- NW corn. Pen./Roof Flash. Seal.2:09						"

SAMPLED BY: Donnie Mercer Jr.	DATE/TIME: 10-6-23 1545 Hrs.	Received By:	DATE/TIME:
RELINQUISHED BY:	DATE/TIME:	Received in Lab By:	DATE/TIME:

PLEASE SEND COPIES OF ALL LAB RESULTS TO EMAIL: MSHRIMANKER@EECINCORPORATED.COM Received

OCT 09 2023
ATW



AmeriSci Richmond

13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: 8047631200 FAX: 8047631800

October 19, 2023

EEC INC

Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

RE: EEC INC
Job Number 123101706
P.O. #N-23-39
N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples - Page 6

Dear Donnie Mercer Jr:

Enclosed are the results for PLM asbestos analysis of the following EEC INC samples received at AmeriSci on Wednesday, October 18, 2023, for a 24 hour turnaround:

MH-77A, MH-77B, MH-78A, MH-78B

The 4 samples contained in zip lock bag were shipped to AmeriSci via Fed Ex 8175 6326 3418 B 925. These samples were prepared and analyzed according to EPA PLM Method (EPA 600/R-93/116 Section 2.2). The required analytical information, analysis results, analyst signature and laboratory identification are contained in the PLM Bulk Asbestos Report. If TEM analysis was requested for selected samples the gravimetric reduction data (by Sec 2.3) and TEM Asbestos % (by Sec 2.5) are included in Table 1 along with a summary of Asbestos % by PLM for all samples analyzed.

This report relates ONLY to the sample analysis expressed as % asbestos. AmeriSci assumes no responsibility for customer supplied data such as "sample type", "location", or "area sampled". This report must not be used to claim product endorsement by AmeriSci, NVLAP or any agency of the U. S. Government. The National Institute of Standards and Technology accreditation requirements mandate that this report must not be reproduced, except in full, without the written approval of the laboratory. This report may contain specific data not covered by NVLAP or ELAP accreditations, if so identified in relevant footnotes.

AmeriSci appreciates this opportunity to serve your organization. Please contact us for any further assistance or with any questions.

Sincerely,

A handwritten signature in black ink, appearing to read "Glenn F. Massey".

Glenn F. Massey
QA Manager | Authorized Signatory



AmeriSci Richmond
13635 GENITO ROAD
MIDLOTHIAN, VIRGINIA 23112
TEL: (804) 763-1200 • FAX: (804) 763-1800

PLM Bulk Asbestos Report

EEC INC
Attn: Donnie Mercer Jr
8514 Six Forks Road
Suite 101
Raleigh, NC 27615

Date Received 10/18/23
Date Examined 10/19/23

AmeriSci Job # 123101706
P.O. #
Page 1 of 2

RE: N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
- Page 6

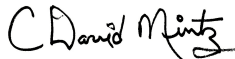
Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
MH-77A Location: RM 105/12" Greenish-White Streaks Floor Tile Analyst Description: Green, Homogeneous, Fibrous, Floor Tile Asbestos Types: Chrysotile 3.0% Other Material: Non-fibrous 97%	123101706-01	Yes	3.0% (by CVES) by C. David Mintz on 10/19/23
MH-77B Location: Mastic Of MH-77A Analyst Description: Insufficient Material Asbestos Types: Other Material:	123101706-02		NA
MH-78A Location: RM 204/12" Mottled Off-White & Gray Floor Tile Analyst Description: Off-White - Grey, Homogeneous, Non-Fibrous, Floor Tile Asbestos Types: Other Material: Non-fibrous 100%	123101706-03	No	NAD (by CVES) by C. David Mintz on 10/19/23
MH-78B Location: Mastic Of MH-78A Analyst Description: Black, Homogeneous, Fibrous, Mastic Asbestos Types: Other Material: Cellulose 3.0%, Non-fibrous 97%	123101706-04	No	NAD (by CVES) by C. David Mintz on 10/19/23

PLM Bulk Asbestos Report

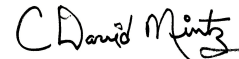
N-23-39; NCSU - Mann Hall Survey; Asbestos Survey Samples
- Page 6

Reporting Notes:

Analyzed by: C. David Mintz
Date: 10/19/2023



Reviewed by: C. David Mintz



*NAD = no asbestos detected, Detection Limit <1%, Reporting Limits: CVES = 1%, 400 Pt Ct = 0.25%, 1000 Pt Ct = 0.1%; "Present" or NVA = "No Visible Asbestos" are observations made during a qualitative analysis; NA = not analyzed; NA/PS = not analyzed / positive stop; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 microscope, Serial #210972, by EPA 600/R-93/116 per 40 CFR 763 (NVLAP Lab Code 101904-0) and ELAP PLM Analysis Protocol 198.1 for New York friable samples which includes quantitation of any vermiculite observed (198.6 for NOB samples) or EPA 400 pt ct by EPA 600/M4-82-020 (NYSDOH ELAP Lab # 10984); CA ELAP Lab # 2508; Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar NOB materials. NAD or Trace results by PLM are inconclusive, TEM is currently the only method that can be used to determine if this material can be considered or treated as non-asbestos-containing in New York State (also see EPA Advisory for floor tile, FR 59, 146, 38970, 8/1/94). NIST Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the laboratory. This PLM report relates ONLY to the items tested.



CHAIN OF CUSTODY RECORD

AMERISCI Richmond
Job No.#

123101706

AMERISCI RICHMOND
13635 GENITO ROAD
MIDLOTHIAN, VA 23112
PHONE: (804) 763-1200
FAX: (804) 763-1800
TOLL FREE (800) 476-5227
www.amerisci.com

EEC, INC
8502 Six Forks Road, Suite 104, Raleigh, NC 27615
P.O.#
SPECIAL INSTRUCTIONS:

Table with columns: PROJECT INFORMATION, ANALYSIS TYPE, TURNAROUND TIME (X), AIR FILTER INFORMATION. Rows include Job Name (NCSU - Mann Hall Survey), Job No. (N-23-39), Job Manager (Donnie Mercer Jr.), and Job Description (Asbestos Survey Samples - Page 6).

RESULTS TO: EEC Inc INVOICE TO: EEC, Inc RETURN SAMPLES: YES [] NO [x]
EMAIL RESULTS: [x] EMAIL ADDRESS: mshrimanker@eecincorporated.com PHONE: 919-291-6814
WRITTEN REPORT TO: EEC Inc. (Copies to eecinc@gmail.com & dmercerjr@gmail.com) FAX:
COMMENTS: *Positive Stop on Samples of same HGA ID. SITE FAX:
PAGER/CELL:

Main data table with columns: HGA ID, SAMPLE ID, SAMPLE LOCATION / DESCRIPTION, START TIME, STOP TIME, TOTAL TIME X, LITERS / MIN, TOTAL VOLUME, DATE COLLECTED. Contains entries for HGA IDs 41, 40, 42, and 43.

SAMPLED BY: Donnie Mercer Jr. DATE/TIME: 10-16-23 1800 Hrs. Received By: DATE/TIME:
RELINQUISHED BY: DATE/TIME: Received in Lab By: DATE/TIME: Received

PLEASE SEND COPIES OF ALL LAB RESULTS TO EMAIL: MSHRIMANKER@EECINCORPORATED.COM

OCT 18 2023
[Signature]

March 22, 2024

Matrix Health & Safety Consultants
2900 Yonkers Road
Raleigh, NC 27604

CLIENT PROJECT: Mann Hall NCSU
CEI LAB CODE: B245672

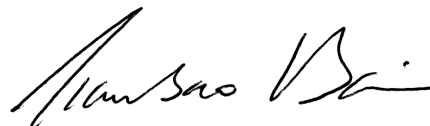
Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on March 22, 2024. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600 Method.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600 Method is <1% asbestos by weight as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,



Tianbao Bai, Ph.D., CIH
Laboratory Director



CEI

ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

Matrix Health & Safety Consultants

CLIENT PROJECT: Mann Hall NCSU

LAB CODE: B245672

TEST METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORT DATE: 03/22/24

TOTAL SAMPLES ANALYZED: 9

SAMPLES >1% ASBESTOS:



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Mann Hall NCSU

LAB CODE: B245672

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MHC-1		B245672.01	Tan,White	Door Caulking	None Detected
MHC-2		B245672.02	Tan,White	Door Caulking	None Detected
MHC-3		B245672.03	Tan,White	Door Caulking	None Detected
MHC-4		B245672.04	Tan,White	Door Caulking	None Detected
MHC-5	Layer 1	B245672.05	Tan,White	Door Caulking	None Detected
	Layer 2	B245672.05	Gray	Door Caulking	None Detected
MHC-6		B245672.06	Gray	Door Caulking	None Detected
MHC-7		B245672.07	Gray	Door Caulking	None Detected
MHC-8		B245672.08		No Sample Present in Sample Container	
MHC-9		B245672.09	White	Door Caulking	None Detected
MHC-10		B245672.10	White	Door Caulking	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Matrix Health & Safety Consultants
 2900 Yonkers Road
 Raleigh, NC 27604

Lab Code: B245672
Date Received: 03-22-24
Date Analyzed: 03-22-24
Date Reported: 03-22-24

Project: Mann Hall NCSU

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
MHC-1 B245672.01	Door Caulking	Heterogeneous Tan,White Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
MHC-2 B245672.02	Door Caulking	Heterogeneous Tan,White Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
MHC-3 B245672.03	Door Caulking	Heterogeneous Tan,White Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
MHC-4 B245672.04	Door Caulking	Heterogeneous Tan,White Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
MHC-5 Layer 1 B245672.05	Door Caulking	Heterogeneous Tan,White Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
Layer 2 B245672.05	Door Caulking	Heterogeneous Gray Non-fibrous Bound	100% <1%	Caulk Paint	None Detected
MHC-6 B245672.06	Door Caulking	Heterogeneous Gray Non-fibrous Bound	100%	Caulk	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Matrix Health & Safety Consultants
 2900 Yonkers Road
 Raleigh, NC 27604

Lab Code: B245672
Date Received: 03-22-24
Date Analyzed: 03-22-24
Date Reported: 03-22-24

Project: Mann Hall NCSU

ASBESTOS BULK PLM, EPA 600 METHOD

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
MHC-7 B245672.07	Door Caulking	Heterogeneous Gray Non-fibrous Bound	100%	Caulk	None Detected
MHC-8 B245672.08	No Sample Present in Sample Container				
MHC-9 B245672.09	Door Caulking	Heterogeneous White Non-fibrous Bound	100%	Caulk Paint	None Detected
MHC-10 B245672.10	Door Caulking	Heterogeneous White Non-fibrous Bound	100%	Caulk Paint	None Detected

LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R93 / 116 and EPA 600 / M4-82 / 020

REPORTING LIMIT: <1% by visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1% by weight

Due to the limitations of the EPA 600 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.


Information provided by customer includes customer sample ID and sample description.

ANALYST:



Jacob Cox

APPROVED BY:



Tianbao Bai, Ph.D., CIH
Laboratory Director





CEI

CHAIN OF CUSTODY

10

730 SE Maynard Road, Cary, NC 27511
 Tel: 866-481-1412; Fax: 919-481-1442

LAB USE ONLY:

CEI Lab Code: **B245672**

CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Gregg E. Heppert
Company: Matrix Health & Safety Consultants, LLC	Email / Tel: 919.868.2154
Address: 2900 Yonker s Road	Project Name: Mann Hall NCSU
Raleigh, NC 27604	Project ID#:
Email: gregg@matrixhsc.com	PO #:
Tel: 919.833.25250 Fax:	STATE SAMPLES COLLECTED IN: NC

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	1 DAY	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR (PCME)	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05 (2010)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09 (2014)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM QUALITATIVE	IN-HOUSE METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS: 3/21/24

Accept Samples
 Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<i>[Signature]</i>	3/22/24	<i>[Signature]</i>	03/22/24 9:40

Samples will be disposed of 30 days after analysis

drop-off

October 14, 2024

Matrix Health & Safety Consultants
2900 Yonkers Road
Raleigh, NC 27604

CLIENT PROJECT: Mann Hall NCSU
CEI LAB CODE: B2419771

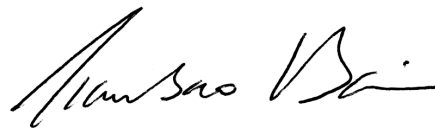
Dear Customer:

Enclosed are asbestos analysis results for PLM Bulk samples received at our laboratory on October 9, 2024. The samples were analyzed for asbestos using polarizing light microscopy (PLM) per the EPA 600/R-93/116: *Method for the Determination of Asbestos in Bulk Building Materials* and EPA 40 CFR Appendix E to Subpart E of Part 763: *Interim Method of the Determination of Asbestos in Bulk Insulation Samples*.

Sample results containing >1% asbestos are considered asbestos-containing materials (ACMs) per EPA regulatory requirements. The detection limit for the EPA 600/R-93/116 Method and EPA 40 CFR Appendix E to Subpart E of Part 763 is <1% asbestos as determined by visual estimation.

Thank you for your business and we look forward to continuing good relations.

Kind Regards,



Tianbao Bai, Ph.D., CIH
Laboratory Director



CEI

ASBESTOS ANALYTICAL REPORT

By: Polarized Light Microscopy

Prepared for

Matrix Health & Safety Consultants

CLIENT PROJECT:

Mann Hall NCSU

LAB CODE:

B2419771

TEST METHOD:

EPA 600 / R-93 / 116 and EPA 40 CFR Appendix E to
Subpart E of Part 763

REPORT DATE:

10/14/24

TOTAL SAMPLES ANALYZED:

15

SAMPLES >1% ASBESTOS:

4



CEI

Asbestos Report Summary

By: POLARIZING LIGHT MICROSCOPY

PROJECT: Mann Hall NCSU

LAB CODE: B2419771

METHOD: EPA 600 / R-93 / 116 and EPA 40 CFR Appendix E to Subpart E of Part 763

Client ID	Layer	Lab ID	Color	Sample Description	ASBESTOS %
MHA-1	Layer 1	B2419771.01	Tan	Duct Mastic	None Detected
	Layer 2	B2419771.01	Yellow	Insulation	None Detected
MHA-2	Layer 1	B2419771.02	Tan	Duct Mastic	None Detected
	Layer 2	B2419771.02	Yellow	Insulation	None Detected
MHA-3	Layer 1	B2419771.03	White,Tan	Door Caulk	None Detected
	Layer 2	B2419771.03	Gray	Door Caulk	Chrysotile 2%
MHA-4		B2419771.04	Off-white,Gray	Door Caulk	Chrysotile 2%
MHA-5	Layer 1	B2419771.05	Tan	Duct Mastic	None Detected
	Layer 2	B2419771.05	Yellow	Insulation	None Detected
MHA-6		B2419771.06	Dark Red,Gray	Window Caulking	None Detected
MHA-7		B2419771.07	Dark Red,Gray	Window Caulking	None Detected
MHA-8		B2419771.08	Dark Red,Gray	Window Glazing	Chrysotile 2%
MHA-9		B2419771.09	Dark Red,Gray	Window Glazing	Chrysotile 2%
MHA-10		B2419771.10	Gray	Vent Caulk	None Detected
MHA-11		B2419771.11	Gray	Vent Caulk	None Detected
MHA-12		B2419771.12	Tan,Gray	Terrazzo Floor	None Detected
MHA-13		B2419771.13	Tan,Gray	Terrazzo Floor	None Detected
MHA-14		B2419771.14	White,Gray	Terrazzo Floor	None Detected
MHA-15		B2419771.15	White,Gray	Terrazzo Floor	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Matrix Health & Safety Consultants
 2900 Yonkers Road
 Raleigh, NC 27604

Lab Code: B2419771
Date Received: 10-09-24
Date Analyzed: 10-14-24
Date Reported: 10-14-24

Project: Mann Hall NCSU

ASBESTOS BULK PLM, EPA 600/R-93/116 METHOD and EPA 40 CFR Appendix E Subpart E to Part 763

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
MHA-1 Layer 1 B2419771.01	Duct Mastic	Homogeneous Tan Non-fibrous Bound	100%	Mastic	None Detected
	Layer 2 B2419771.01	Insulation Homogeneous Yellow Fibrous Loosely Bound	100%	Fiberglass	None Detected
MHA-2 Layer 1 B2419771.02	Duct Mastic	Homogeneous Tan Non-fibrous Bound	100%	Mastic	None Detected
	Layer 2 B2419771.02	Insulation Homogeneous Yellow Fibrous Loosely Bound	100%	Fiberglass	None Detected
MHA-3 Layer 1 B2419771.03	Door Caulk	Heterogeneous White, Tan Non-fibrous Bound	95%	Caulk	None Detected
	Layer 2 B2419771.03	Door Caulk Homogeneous Gray Non-fibrous Bound	98%	Caulk	2% Chrysotile
MHA-4 B2419771.04	Door Caulk	Heterogeneous Off-white, Gray Non-fibrous Bound	93%	Caulk	2% Chrysotile
			5%	Paint	

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Matrix Health & Safety Consultants
 2900 Yonkers Road
 Raleigh, NC 27604

Lab Code: B2419771
Date Received: 10-09-24
Date Analyzed: 10-14-24
Date Reported: 10-14-24

Project: Mann Hall NCSU

ASBESTOS BULK PLM, EPA 600/R-93/116 METHOD and EPA 40 CFR Appendix E Subpart E to Part 763

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
MHA-5 Layer 1 B2419771.05	Duct Mastic	Homogeneous Tan Non-fibrous Bound	100%	Mastic	None Detected
	Layer 2 B2419771.05	Insulation Homogeneous Yellow Fibrous Loosely Bound	100%	Fiberglass	None Detected
MHA-6 B2419771.06	Window Caulking	Heterogeneous Dark Red, Gray Non-fibrous Bound	95% 5%	Caulk Paint	None Detected
MHA-7 B2419771.07	Window Caulking	Heterogeneous Dark Red, Gray Non-fibrous Bound	95% 5%	Caulk Paint	None Detected
MHA-8 B2419771.08	Window Glazing	Heterogeneous Dark Red, Gray Non-fibrous Bound	93% 5%	Binder Paint	2% Chrysotile
MHA-9 B2419771.09	Window Glazing	Heterogeneous Dark Red, Gray Non-fibrous Bound	93% 5%	Binder Paint	2% Chrysotile
MHA-10 B2419771.10	Vent Caulk	Homogeneous Gray Non-fibrous Bound	100%	Caulk	None Detected

ASBESTOS BULK ANALYSIS

By: POLARIZING LIGHT MICROSCOPY

Client: Matrix Health & Safety Consultants
 2900 Yonkers Road
 Raleigh, NC 27604

Lab Code: B2419771
Date Received: 10-09-24
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Date Reported: 10-14-24

Project: Mann Hall NCSU

ASBESTOS BULK PLM, EPA 600/R-93/116 METHOD and EPA 40 CFR Appendix E Subpart E to Part 763

Client ID Lab ID	Lab Description	Lab Attributes	NON-ASBESTOS COMPONENTS		ASBESTOS %
			Fibrous	Non-Fibrous	
MHA-11 B2419771.11	Vent Caulk	Homogeneous Gray Non-fibrous Bound	100%	Caulk	None Detected
MHA-12 B2419771.12	Terrazzo Floor	Heterogeneous Tan, Gray Non-fibrous Bound	60% 35% 5%	Silicates Binder Resin	None Detected
MHA-13 B2419771.13	Terrazzo Floor	Heterogeneous Tan, Gray Non-fibrous Bound	60% 35% 5%	Silicates Binder Resin	None Detected
MHA-14 B2419771.14	Terrazzo Floor	Heterogeneous White, Gray Non-fibrous Bound	65% 35%	Silicates Binder	None Detected
MHA-15 B2419771.15	Terrazzo Floor	Heterogeneous White, Gray Non-fibrous Bound	65% 35%	Silicates Binder	None Detected

LEGEND: Non-Anth = Non-Asbestiform Anthophyllite
Non-Trem = Non-Asbestiform Tremolite
Calc Carb = Calcium Carbonate

METHOD: EPA 600 / R-93 / 116 and EPA 40 CFR Appendix E to Subpart E of Part 763

REPORTING LIMIT FOR PLM: 1% by calibrated visual estimation

REPORTING LIMIT FOR POINT COUNTS: 0.25% by 400 Points or 0.1% by 1,000 Points

REGULATORY LIMIT: >1%

Due to the limitations of the EPA 600/R-93/116 method, nonfriable organically bound materials (NOBs) such as vinyl floor tiles can be difficult to analyze via polarized light microscopy (PLM). EPA recommends that all NOBs analyzed by PLM, and found not to contain asbestos, be further analyzed by Transmission Electron Microscopy (TEM). Please note that PLM analysis of dust and soil samples for asbestos is not covered under NVLAP accreditation. *Estimated measurement of uncertainty is available on request.*

This report relates only to the samples tested or analyzed and may not be reproduced, except in full, without written approval by Eurofins CEI. Eurofins CEI makes no warranty representation regarding the accuracy of client submitted information in preparing and presenting analytical results. Interpretation of the analytical results is the sole responsibility of the client. Samples were received in acceptable condition unless otherwise noted. This report may not be used by the client to claim product endorsement by NVLAP or any other agency of the U.S. Government.


Information provided by customer includes customer sample ID and sample description.

ANALYST:



Nicholas Moore

APPROVED BY:



Tianbao Bai, Ph.D., CIH
Laboratory Director





CEI

CHAIN OF CUSTODY

15

730 SE Maynard Road, Cary, NC 27511
 Tel: 866-481-1412; Fax: 919-481-1442

LAB USE ONLY:

CEI Lab Code: B2419771

CEI Lab I.D. Range:

COMPANY INFORMATION	PROJECT INFORMATION
CEI CLIENT #:	Job Contact: Gregg E. Heppert
Company: Matrix Health & Safety Consultants, LLC	Email / Tel: 919.868.2154
Address: 2900 Yonker s Road	Project Name: <u>MANO AM NOGU</u>
Raleigh, NC 27604	Project ID#:
Email: <u>gregg@matrixhsc.com</u>	PO #:
Tel: 919.833.25250 Fax:	STATE SAMPLES COLLECTED IN: NC

IF TAT IS NOT MARKED STANDARD 3 DAY TAT APPLIES.

ASBESTOS	METHOD	TURN AROUND TIME					
		4 HR	8 HR	1 DAY	2 DAY	3 DAY	5 DAY
PLM BULK	EPA 600	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (400)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM POINT COUNT (1000)	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM GRAV w POINT COUNT	EPA 600	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PLM BULK	CARB 435	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
PCM AIR	NIOSH 7400	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	EPA AHERA	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	NIOSH 7402	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR (PCME)	ISO 10312	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM AIR	ASTM 6281-15	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM BULK	CHATFIELD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST WIPE	ASTM D6480-05 (2010)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM DUST MICROVAC	ASTM D5755-09 (2014)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM SOIL	ASTM D7521-16	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM VERMICULITE	CINCINNATI METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
TEM QUALITATIVE	IN-HOUSE METHOD	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
OTHER:		<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

REMARKS / SPECIAL INSTRUCTIONS: 10/8/24

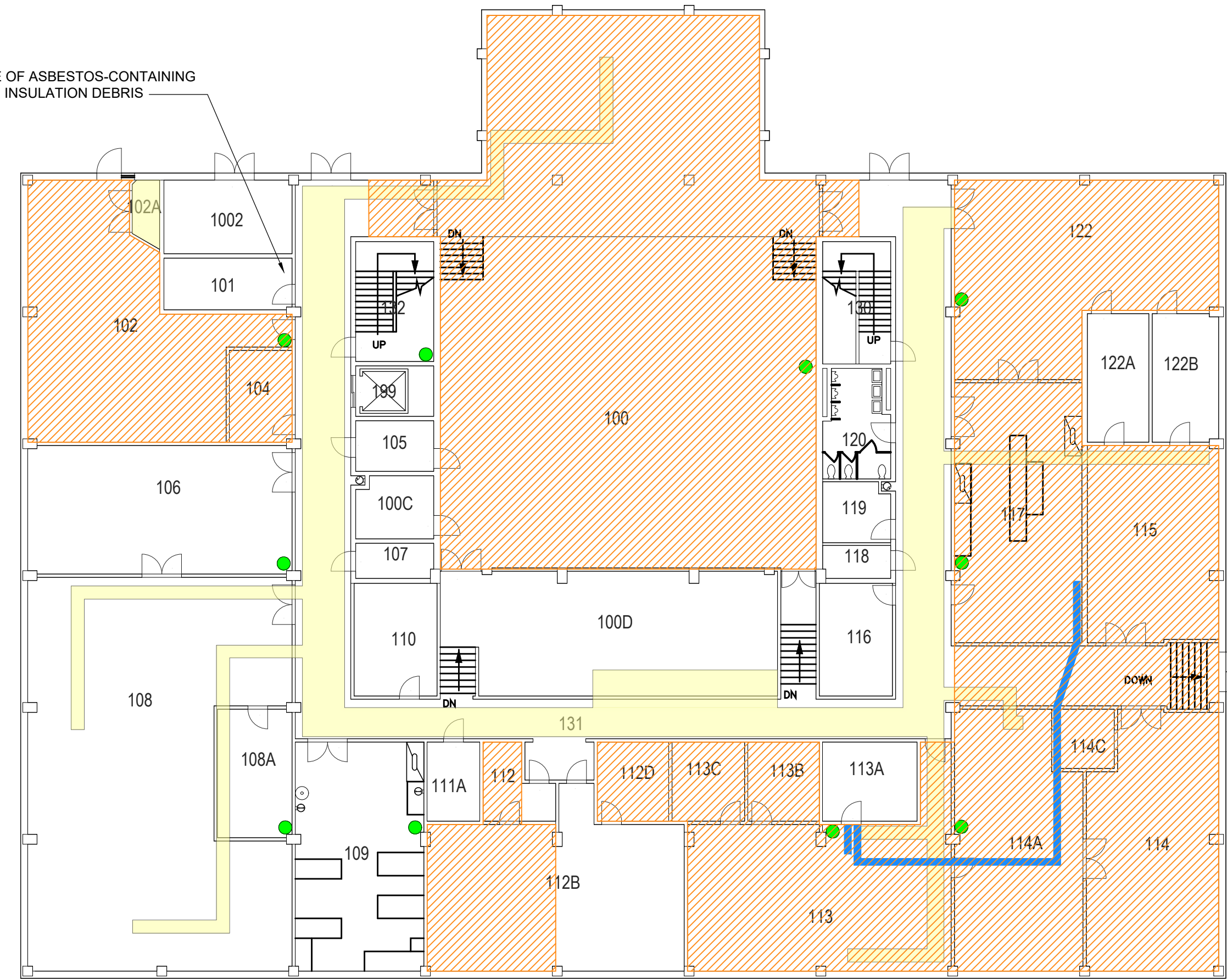
Accept Samples
 Reject Samples

Relinquished By:	Date/Time	Received By:	Date/Time
<u>[Signature]</u>	<u>10/9/24</u>	<u>BUB</u>	<u>10/9/24 11:20</u>

Samples will be disposed of 30 days after analysis

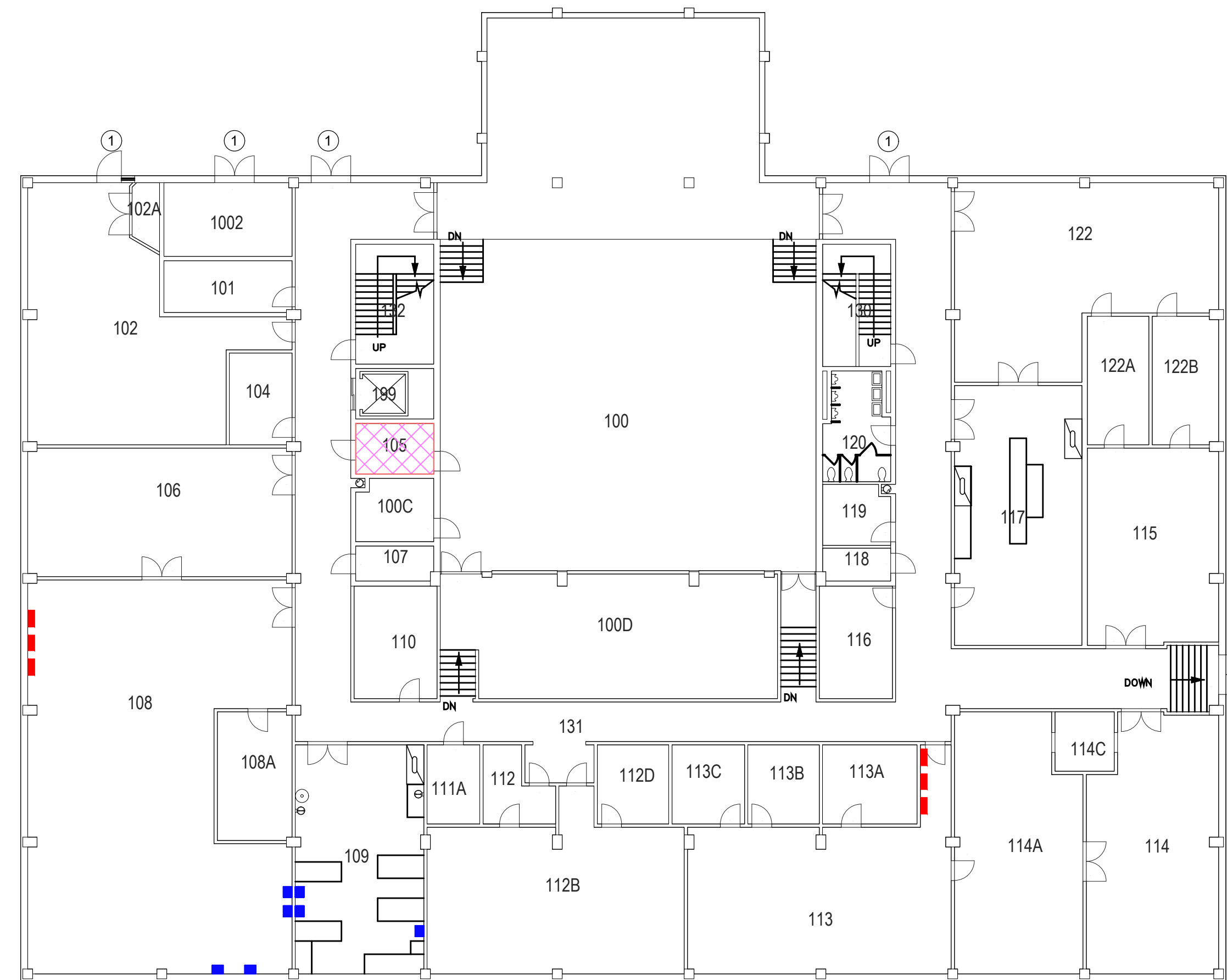
walkin

REMOVE AND DISPOSE OF ASBESTOS-CONTAINING CEILING TILE AND PIPE INSULATION DEBRIS



FIRST FLOOR - CEILING PLAN

1/16" = 1'-0"



FIRST FLOOR - FLOOR PLAN

1/16" = 1'-0"

LEGEND - MANN HALL FIRST FLOOR

- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING SPRAY APPLIED CEILING TEXTURE FROM CONCRETE BEAMS AND DECKING
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING THERMAL SYSTEM PIPE INSULATION AND FITTINGS
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING CEMENTITIOUS PIPE
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING 12"x12" GREEN FLOOR TILE FROM ROOM 105
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING AND PCB CONTAINING INTERIOR DOOR CAULK FROM ALL DOOR FRAMES AND ADJACENT SUBSTRATES.
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING CHALK BOARD/CORK BOARD MASTIC
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING DRAIN LINE INSULATION AND FITTINGS
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING SINK MASTIC
- REMOVE AND DISPOSE OF PCB DOOR CAULK ON BOTH SIDES OF DOOR

GENERAL NOTES

THE SCOPE OF WORK INCLUDES THE REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING SPRAY APPLIED TEXTURE FROM CONCRETE BEAMS AND CEILINGS, FLOOR TILE, FLOOR TILE MASTIC, CEILING TILES, TRANSITE PIPE, THERMAL SYSTEM PIPE INSULATION, ROOF DRAIN INSULATION, CHALK BOARD MASTIC, CORK BOARD MASTIC, INTERIOR DOOR CAULKING, EXTERIOR FRONT STOREFRONT CAULKING, TOWER WINDOW CAULKING AND ROOF FLASHING MASTIC.

THE SCOPE OF WORK ALSO INCLUDES REMOVAL AND DISPOSAL OF PCB DOOR CAULK, WINDOW CAULK, VENT CAULK, DUCT MASTIC, BLOCK FILLER/PAINT, AND WINDOW GLAZING AS DESCRIBED IN THE ATTACHED PCB REMEDIATION PLAN.

THIS DRAWING ACCOMPANIES ASBESTOS ABATEMENT TECHNICAL SPECIFICATIONS.

ASBESTOS ABATEMENT MUST BE PERFORMED INSIDE BOUNDARIES INDICATED ON THIS DRAWING.

THE ABATEMENT CONTRACTOR SHALL BE RESPONSIBLE FOR INSPECTING THE SITE PRIOR TO BIDDING TO CONFIRM THE SCOPE OF THE WORK. BOUNDARIES AND LOCATIONS ARE APPROXIMATE. ANY QUANTITIES LISTED BY THE DESIGNER IN THE PLANS AND SPECIFICATIONS ARE DONE SO AS APPROXIMATIONS. THE ACTUAL QUANTITIES OF ASBESTOS-CONTAINING AND PCB MATERIAL TO BE ENCOUNTERED ARE THE RESPONSIBILITY OF THE ABATEMENT CONTRACTOR.

ASBESTOS ABATEMENT MUST BE PERFORMED INSIDE THE CONTAINMENT BOUNDARIES INDICATED ON THIS DRAWING AND INSIDE FULL NEGATIVE PRESSURE ENCLOSURES.

ESTIMATED QUANTITIES OF ASBESTOS-CONTAINING MATERIALS THROUGHOUT BUILDING

- SPRAY APPLIED CEILING TEXTURE 20,000 SQUARE FEET
- FLOOR TILE AND FLOOR TILE MASTIC 26,300 SQUARE FEET
- 12"x12" SPLINE CEILING TILES 33,000 SQUARE FEET
- CEMENTITIOUS PIPE 100 LINEAR FEET
- THERMAL SYSTEM PIPE INSULATION AND FITTINGS 2,000 LINEAR FEET
- DRAIN LINE INSULATION 500 LINEAR FEET
- CHALK BOARD MASTIC 500 SQUARE FEET
- INTERIOR DOOR CAULK 202 DOOR FRAMES
- SINK MASTIC 7 SINKS
- EXTERIOR ROOF FLASHING MASTIC AND CURBING MASTIC - 100 SQUARE FEET
- EXTERIOR WINDOW/DOOR CAULK - 2 FRONT ENTRY STORE FRONTS
- EXTERIOR WINDOW GLAZING - SOUTH TOWER WINDOWS
- PCB STOREFRONT CAULK - 2 EXTERIOR FRONT ENTRY STORE FRONTS
- PCB STOREFRONT CAULK - 4 EXTERIOR REAR DOOR COMPLEXES
- PCB WINDOW CAULK - SOUTH TOWER WINDOWS
- PCB VENT CAULK - 6 EXTERIOR VENTS
- PCB DOOR CAULK - 202 INTERIOR DOORS

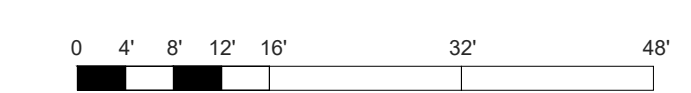
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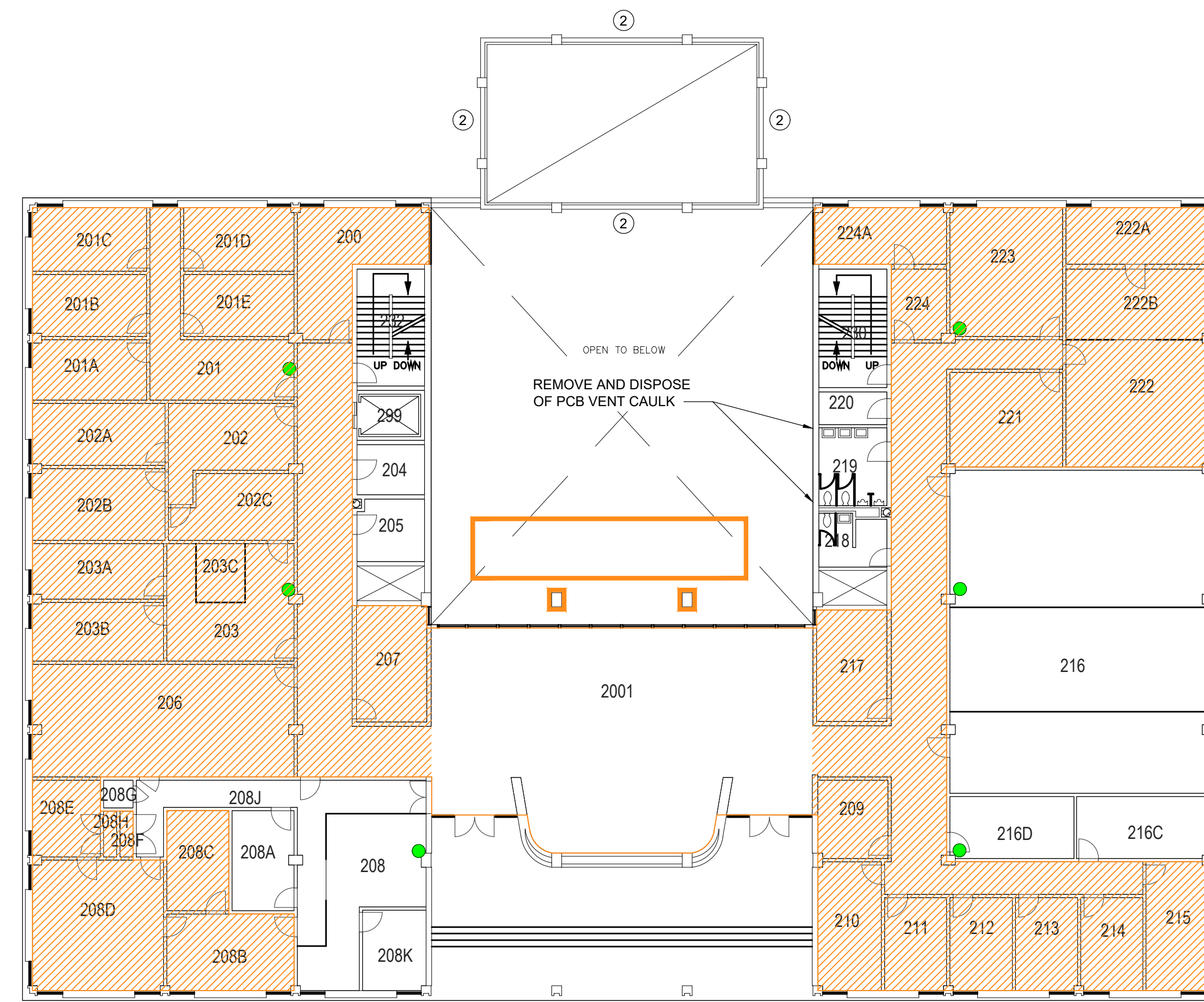
GREGG HEPPERT
 N.C. ASBESTOS DESIGNER NO.40357
 DATE: 10-22-24
 DRAWN BY: ACS
 CHECKED BY: G.E.H.
 APPROVED BY: G.E.H.

No	Revision	Date

Site: RALEIGH
 Building: MANN HALL
 Zone / Floor: FIRST
 Discipline:
 Project:
 Scale: 1/16" = 1'-0"
 TITLE:
 ASBESTOS ABATEMENT PLAN
 FIRST FLOOR

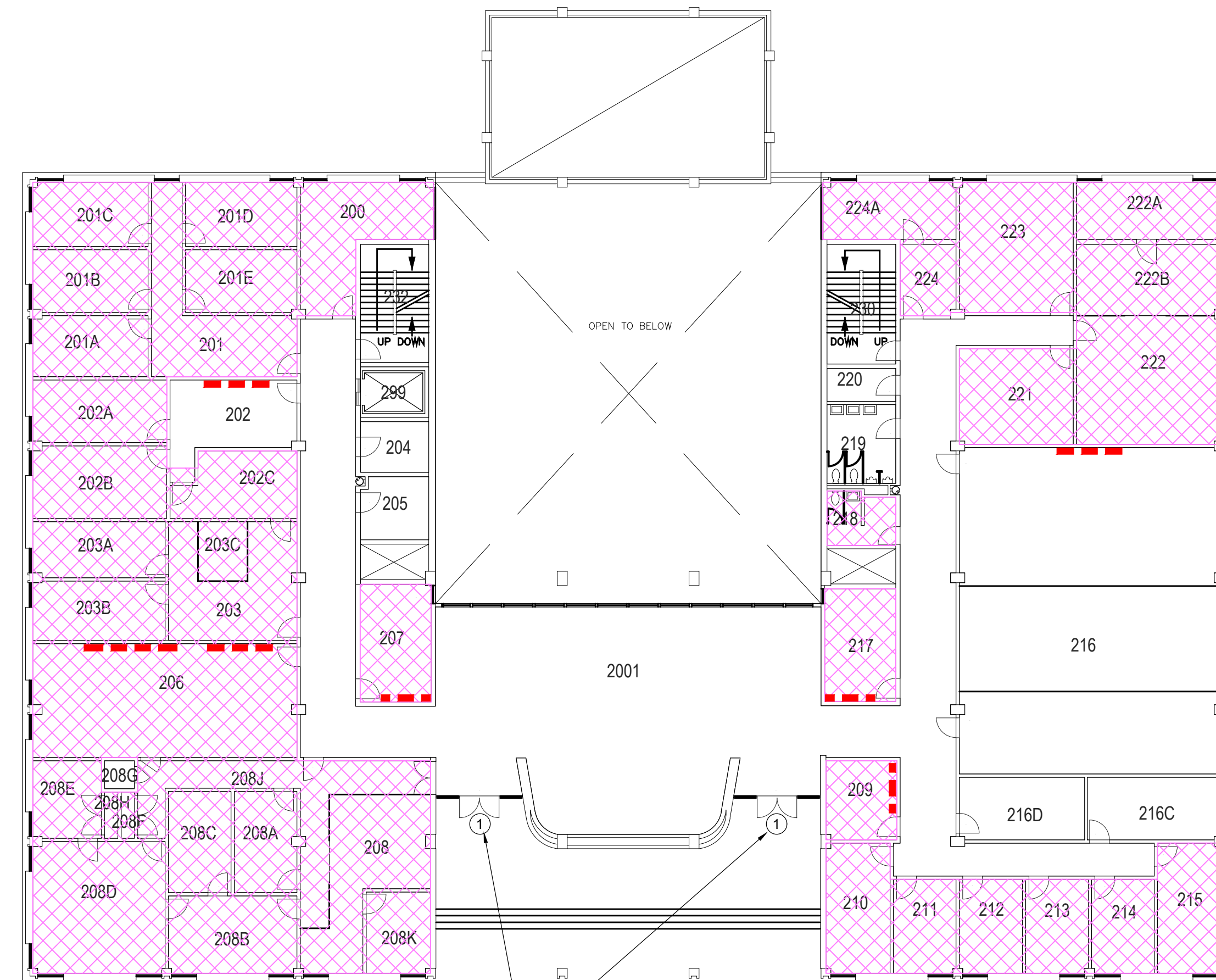
Drawing Number: **AB-1** Rev:





SECOND FLOOR - CEILING PLAN

1/16" = 1'-0"



SECOND FLOOR - FLOOR PLAN

1/16" = 1'-0"

LEGEND - MANN HALL SECOND FLOOR

- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING FLOOR TILE AND MASTIC
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING 12"x12" SPLINE CEILING TILES
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING AND PCB CONTAINING INTERIOR DOOR CAULK FROM ALL DOOR FRAMES AND ADJACENT SUBSTRATES THROUGHOUT SECOND FLOOR
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING CHALK BOARD/CORK BOARD MASTIC
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING DRAIN LINE INSULATION AND FITTINGS
- REMOVE AND DISPOSE OF PCB DUCT MASTIC FOUND ON EXTERIOR INSULATION THROUGHOUT SECOND FLOOR
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING AND PCB CONTAINING EXTERIOR WINDOW CAULK AND GLAZING FROM SOUTH TOWER WINDOWS AND ADJACENT SUBSTRATES.
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING ROOF FLASHING MASTIC AND ROOF CURBING MASTIC
- REMOVE AND DISPOSE OF PCB VENT CAULK APPROXIMATE LOCATION SHOWN ON DRAWING

GENERAL NOTES

THE SCOPE OF WORK INCLUDES THE REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING SPRAY APPLIED TEXTURE FROM CONCRETE BEAMS AND CEILINGS, FLOOR TILE, FLOOR TILE MASTIC, CEILING TILES, TRANSITE PIPE, THERMAL SYSTEM PIPE INSULATION, ROOF DRAIN INSULATION, CHALK BOARD MASTIC, CORK BOARD MASTIC, INTERIOR DOOR CAULKING, EXTERIOR FRONT STOREFRONT CAULKING, TOWER WINDOW CAULKING AND ROOF FLASHING MASTIC.

THE SCOPE OF WORK ALSO INCLUDES REMOVAL AND DISPOSAL OF PCB DOOR CAULK, WINDOW CAULK, VENT CAULK, DUCT MASTIC, BLOCK FILLER/PAINT, AND WINDOW GLAZING AS DESCRIBED IN THE ATTACHED PCB REMEDIATION PLAN.

THIS DRAWING ACCOMPANIES ASBESTOS ABATEMENT TECHNICAL SPECIFICATIONS.

ASBESTOS ABATEMENT MUST BE PERFORMED INSIDE BOUNDARIES INDICATED ON THIS DRAWING.

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ESTIMATED QUANTITIES OF ASBESTOS-CONTAINING MATERIALS THROUGHOUT BUILDING

- SPRAY APPLIED CEILING TEXTURE 20,000 SQUARE FEET
- FLOOR TILE AND FLOOR TILE MASTIC 26,300 SQUARE FEET
- 12"x12" SPLINE CEILING TILES 33,000 SQUARE FEET
- CEMENTITIOUS PIPE 100 LINEAR FEET
- THERMAL SYSTEM PIPE INSULATION AND FITTINGS 2,000 LINEAR FEET
- DRAIN LINE INSULATION 500 LINEAR FEET
- CHALK BOARD MASTIC 500 SQUARE FEET
- INTERIOR DOOR CAULK 202 DOOR FRAMES
- SINK MASTIC 7 SINKS
- EXTERIOR ROOF FLASHING MASTIC AND CURBING MASTIC - 100 SQUARE FEET
- EXTERIOR WINDOW/DOOR CAULK - 2 FRONT ENTRY STORE FRONTS
- EXTERIOR WINDOW GLAZING - SOUTH TOWER WINDOWS
- PCB STOREFRONT CAULK - 2 EXTERIOR FRONT ENTRY STORE FRONTS
- PCB STOREFRONT CAULK - 4 EXTERIOR REAR DOOR COMPLEXES
- PCB WINDOW CAULK - SOUTH TOWER WINDOWS
- PCB VENT CAULK - 6 EXTERIOR VENTS
- PCB DOOR CAULK - 202 INTERIOR DOORS

STAMP

GREGG HEPPERT
N.C. ASBESTOS DESIGNER NO.40357
DATE: 10-22-24
DRAWN BY: ACS
CHECKED BY: G.E.H.
APPROVED BY: G.E.H.

No	Revision	Date

Site: RALEIGH
Building: MANN HALL
Zone / Floor: SECOND
Discipline:
Project:
Scale: 1/16"=1'-0"
TITLE: ASBESTOS ABATEMENT PLAN
SECOND FLOOR

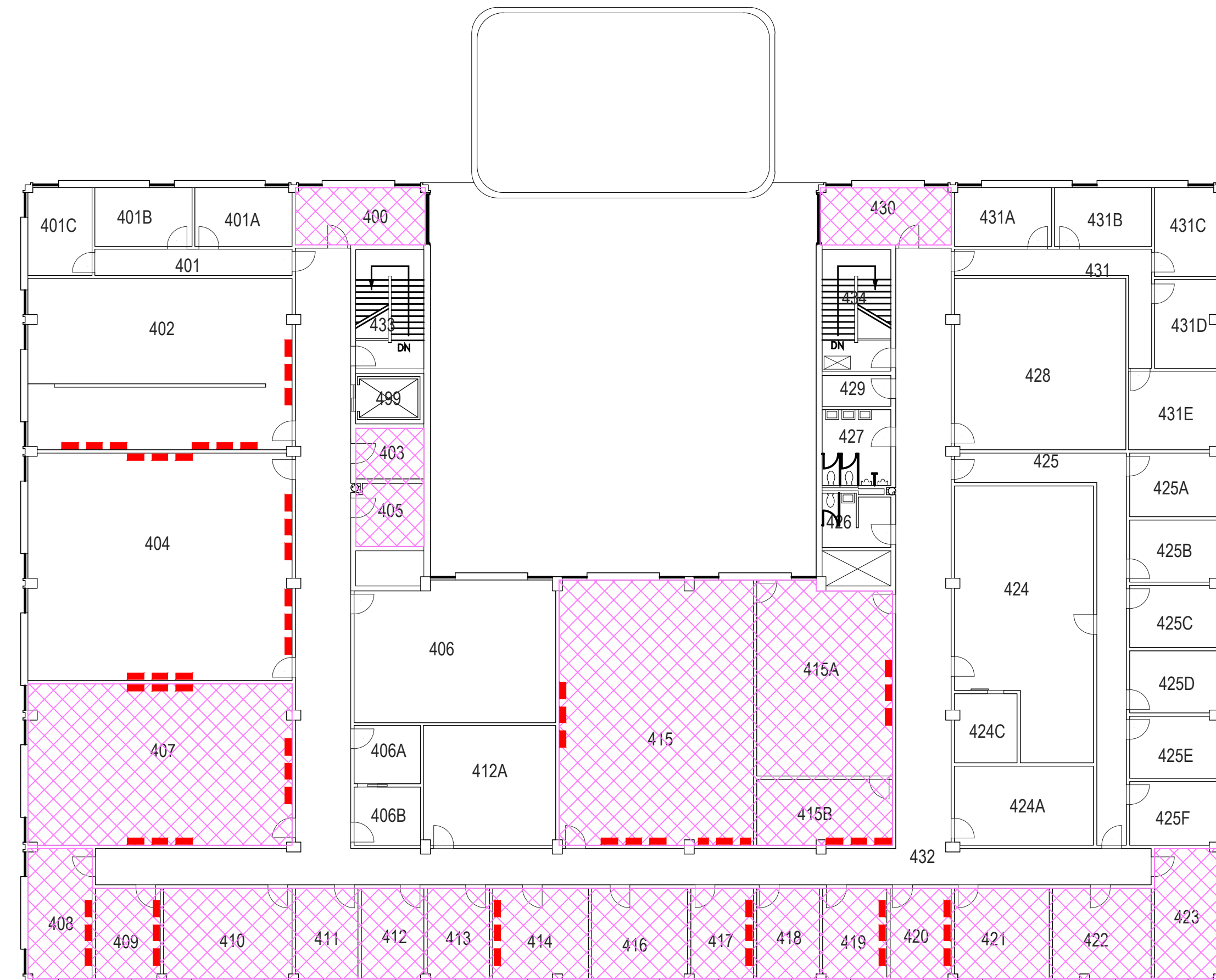
Drawing Number: **AB-2** Rev:





FOURTH FLOOR - CEILING PLAN

1/16" = 1'-0"



FOURTH FLOOR - FLOOR PLAN

1/16" = 1'-0"

LEGEND - MANN HALL FOURTH FLOOR

- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING FLOOR TILE AND MASTIC
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING 12"x12" SPLINE CEILING TILES
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING AND PCB CONTAINING INTERIOR DOOR CAULK FROM ALL DOOR FRAMES AND ADJACENT SUBSTRATES THROUGHOUT FOURTH FLOOR
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING CHALK BOARD/CORK BOARD MASTIC
- REMOVE AND DISPOSE OF ASBESTOS-CONTAINING DRAIN LINE INSULATION AND FITTINGS
- REMOVE AND DISPOSE OF PCB DUCT MASTIC FOUND ON EXTERIOR INSULATION THROUGHOUT FOURTH FLOOR
- REMOVE AND DISPOSE OF PCB VENT CAULK. APPROXIMATE LOCATION SHOWN ON DRAWING

GENERAL NOTES

THE SCOPE OF WORK INCLUDES THE REMOVAL AND DISPOSAL OF ASBESTOS-CONTAINING SPRAY APPLIED TEXTURE FROM CONCRETE BEAMS AND CEILINGS, FLOOR TILE, FLOOR TILE MASTIC, CEILING TILES, TRANSITE PIPE, THERMAL SYSTEM PIPE INSULATION, ROOF DRAIN INSULATION, CHALK BOARD MASTIC, CORK BOARD MASTIC, INTERIOR DOOR CAULKING, EXTERIOR FRONT STOREFRONT CAULKING, TOWER WINDOW CAULKING AND ROOF FLASHING MASTIC.

THE SCOPE OF WORK ALSO INCLUDES REMOVAL AND DISPOSAL OF PCB DOOR CAULK, WINDOW CAULK, VENT CAULK, DUCT MASTIC, BLOCK FILLER/PAINT, AND WINDOW GLAZING AS DESCRIBED IN THE ATTACHED PCB REMEDIATION PLAN.

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ESTIMATED QUANTITIES OF ASBESTOS-CONTAINING MATERIALS THROUGHOUT BUILDING

- SPRAY APPLIED CEILING TEXTURE 20,000 SQUARE FEET
- FLOOR TILE AND FLOOR TILE MASTIC 26,300 SQUARE FEET
- 12"x12" SPLINE CEILING TILES 33,000 SQUARE FEET
- CEMENTITIOUS PIPE 100 LINEAR FEET
- THERMAL SYSTEM PIPE INSULATION AND FITTINGS 2,000 LINEAR FEET
- DRAIN LINE INSULATION 500 LINEAR FEET
- CHALK BOARD MASTIC 500 SQUARE FEET
- INTERIOR DOOR CAULK 202 DOOR FRAMES
- SINK MASTIC 7 SINKS
- EXTERIOR ROOF FLASHING MASTIC AND CURBING MASTIC - 100 SQUARE FEET
- EXTERIOR WINDOW/DOOR CAULK - 2 FRONT ENTRY STORE FRONTS
- EXTERIOR WINDOW GLAZING - SOUTH TOWER WINDOWS
- PCB STOREFRONT CAULK - 2 EXTERIOR FRONT ENTRY STORE FRONTS
- PCB STOREFRONT CAULK - 4 EXTERIOR REAR DOOR COMPLEXES
- PCB WINDOW CAULK - SOUTH TOWER WINDOWS
- PCB VENT CAULK - 6 EXTERIOR VENTS
- PCB DOOR CAULK - 202 INTERIOR DOORS

ASBESTOS ABATEMENT PLAN
NCSU MANN HALL
RALEIGH, NORTH CAROLINA
240351

STAMP

GREGG HEPPERT
N.C. ASBESTOS DESIGNER NO.40357
DATE: 10-22-24
DRAWN BY: ACS
CHECKED BY: G.E.H.
APPROVED BY: G.E.H.

No Revision Date

Site: RALEIGH
Building: MANN HALL
Zone / Floor: FOURTH
Discipline:
Project:
Scale: 1/16"=1'-0"
TITLE:
ASBESTOS ABATEMENT PLAN
FOURTH FLOOR

Drawing Number: AB-4 Rev:





REPORT OF SUBSURFACE EXPLORATION

Mann Hall Renovations

Raleigh, North Carolina

ESP Project Number: E4A: 23-00055-10-GEO

Prepared For:

North Carolina State University
Campus Box 7520
Raleigh, NC 27695

Prepared By:

ESP Associates, Inc
2200 Gateway Centre Boulevard.
Suite 216
Morrisville, NC 27560

April 8, 2024



April 8, 2024

Mike Bell
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Reference: **REPORT OF SUBSURFACE EXPLORATION**
Mann Hall Renovations
Raleigh, North Carolina
ESP Project No. E4A: 23-00055-10-GEO

Ladies and Gentlemen:

ESP Associates, Inc. (ESP) has completed a subsurface exploration for the proposed Mann Hall stair, loading dock, and covered walkway additions in Raleigh, North Carolina. This exploration was performed in general accordance with our Proposal No. 23-00055, dated January 1, 2024, as authorized by Mike Bell with North Carolina State University.

ESP appreciates the opportunity to assist you during this phase of the project. If you should have any questions concerning this report, or if we may be of further assistance, please contact us.

Sincerely,

ESP Associates, Inc.

Benjamin Long, PE
Project Manager



Electronic submission (1)





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APPENDIX

- Field Exploration Procedures
- Laboratory Procedures
- Atterberg Limits Results
- Moisture-Density Relationship
- Single Point CBR Test
- Hand Auger Boring Location Plan, Figure 1
- Hand Auger Boring Records (HA-1 Through HA-5)

1.0 INTRODUCTION

1.1 Purpose of Services

The purpose of the exploration was to evaluate the general subsurface conditions within the proposed stairway, covered walkway, and loading dock areas. This report contains a brief description of the field and laboratory testing procedures performed for this study and a discussion of the soil conditions encountered at the site. Our findings, conclusions and recommendations for foundation and pavement design, as well as construction considerations for the proposed foundations and paved areas are presented within this report.

1.2 Site Description

The site is located on Stinson Drive in Raleigh, North Carolina. The site consists of the existing Mann Hall building with associated sidewalks. Stinson Drive is located to the north of the building and Yarborough Drive is located to the south of the building. Currently the areas to be improved contain brick sidewalks.

1.3 Project Description

We understand the project consists of renovations and additions to Mann Hall. The additions consist of an extended stairway in the front (north) of the building, a loading dock on the left rear (southwest) and covered walkway in the right rear (southeast) of the building. Structural loads were not provided but we anticipate the structures will be lightly loaded structures supported on shallow foundations. Traffic information for the loading dock area was provided to ESP for pavement design.

2.0 EXPLORATION PROCEDURES

2.1 Field

The following methods were used to evaluate the subsurface conditions of the site. Additional descriptions of the field exploration procedures are also presented in the Appendix. The test locations were located in the field by a representative from our office using the existing structures as references for measuring distances and a Handheld Global Positioning System. While in the field and where applicable, a representative of the geotechnical engineer visually examined the samples obtained or subsurface material encountered to evaluate the type of soil, soil plasticity, moisture condition, organic content, presence of lenses and seams, colors and apparent geological origin using general guidance from “ASTM D 2488 Standard Practice for Description and Identification of Soils (Visual Manual Procedures).” Test locations are shown on the attached “Hand Auger Boring Location Plan,” Figure 1.

2.1.1 Hand Auger Borings

Dynamic Cone Penetrometer (DCP) Tests were performed within Hand Auger Borings HA-1 through HA-5. The DCP test procedure used during our evaluation is as follows. The cone point of the penetrometer is first seated 2 inches into the bearing material to embed the point. The cone point is driven up to three 1 ¾ inch intervals using a 15 pound weight falling 20 inches. The penetrometer test result is the average number of blows per interval. The penetrometer test result is similar to the Standard Penetration Resistance (N-value), as defined by ASTM D 1586. When properly evaluated, the penetrometer test results provide an index for estimating soil strength and relative density. The DCP test results, are presented on the individual “Hand Auger Boring Records” included in the Appendix.

2.1.2 Dynamic Cone Penetrometer Test

Dynamic Cone Penetrometer (DCP) Tests were performed within Hand Auger Borings HA-1 through HA-5. The DCP test procedure used during our evaluation is as follows. The cone point of the penetrometer is first seated 2 inches into the bearing material to embed the point. The cone point is driven up to three 1 ¾ inch intervals using a 15 pound weight falling 20 inches. The penetrometer test result is the average number of blows per interval. The penetrometer test result is similar to the Standard Penetration Resistance (N-value), as defined by ASTM D 1586. When properly evaluated, the penetrometer test results provide an index for estimating soil strength and relative density. The DCP test results are presented on the individual “Hand Auger Boring Records” included in the Appendix.

2.2 Laboratory

Select samples of the on-site soils obtained during the field testing program were tested in the laboratory. Tests performed included:

- Atterberg limits
- Grain size distribution
- Standard Proctor Moisture-Density Relationship
- California Bearing Ratio

The results of the laboratory tests performed for this study are attached in the Appendix. A brief description of the procedures used are also presented in the Appendix.

3.0 SUBSURFACE CONDITION

3.1 Site Geology

The referenced property is located in Raleigh, North Carolina which is in the Piedmont Physiographic Province. The Piedmont Province generally consists of hills and ridges which are intertwined with an established system of draws and streams. The Piedmont Province is predominately underlain by igneous rock (formed from molten material) and metamorphic rock (formed by heat, pressure and/or chemical action), which were initially formed during the Precambrian and Paleozoic eras.

The residual soils encountered in this area are the product of in-place chemical weathering of rock which was similar to the rock presently underlying the site. In areas not altered by erosion or disturbed by the activities of man, the typical residual soil profile consists of clayey soils near the surface, where soil weathering is more advanced, underlain by sandy silts and silty sands. The boundary between soil and rock is not sharply defined. This transitional zone termed “partially weathered rock” is normally found overlying the parent bedrock. Partially weathered rock is defined, for engineering purposes, as residual material with Standard Penetration Resistances in excess of 100 blows per foot (bpf). Weathering is facilitated by fractures, joints and by the presence of less resistant rock types. Consequently, the profile of the partially weathered rock and hard rock is quite irregular and erratic, even over short horizontal distances. Also, it is common to find lenses and boulders of hard rock and zones of partially weathered rock within the soil mantle, well above the general bedrock level.

3.2 Subsurface Findings

Subsurface conditions as indicated by the hand auger borings generally consist of fill underlain by residual soils. The generalized subsurface conditions at the site are described below and are graphically depicted in the Appendix. For more detailed soil descriptions and stratifications at a particular test location, the attached “Hand Auger Boring Records” should be reviewed.

3.2.1 Surface

In all locations, the surface materials consisted of a layer of brick sidewalk underlain by an approximately 8 inch thick layer of leveling sand.

3.2.2 Fill

Fill soils are either site soils or imported soils that were manipulated and placed on the site previous to this exploration. Underlying the surface materials in all hand auger borings, fill soils were encountered. The fill consists of sandy clays. Average blows per increment (bpi) values in the fill ranged from 5 to 18 bpi. The fill extended to depths ranging between 2.5 and 3.5 feet below the existing surface.

3.2.3 Residuum

Residual soils are mineral material accumulated by the in-place chemical weathering of the underlying parent rock. Beneath the fill in all hand auger borings, except HA-3, residual soils were encountered. The residuum generally consists of silty clay and sandy silts. Average blows per increment (bpi) values in the fill ranged from 5 to 18 bpi. The residuum extends to depths ranging between 3.8 and 10 feet below the existing ground surface. Hand auger Borings HA-1, HA-2, HA-4, and HA-5 were terminated in the residual soils at depths ranging between 3.8 and 10 feet below the existing ground surface.

3.2.4 Hand Auger Refusal

Hand auger refusal is defined as material that could not be penetrated with the hand auger equipment used on the project. Hand auger refusal material may consist of gravel, rock lenses, construction debris and/ or dense soils. Borings HA-2 to HA-5 were terminated upon hand auger refusal at depths ranging between 1.8 and 4.9 feet below the existing ground surface. HA-3 was terminated at 1.8 feet after 3 attempts in the general area. The refusal appears to be due to a layer of concrete or sidewalk located under the existing brick sidewalk and thin layer of fill soils.

4.0 CONCLUSIONS AND RECOMMENDATIONS

4.1 Geotechnical Considerations

Based on the project information previously discussed, the data obtained from the field and laboratory testing program and our analysis, the following conditions should be considered and addressed in the proposed development and are further discussed in the following sections of this report.

- Soft and Variable Existing Fill
- High Plasticity Clay
- Previous Site Development

Our conclusions and recommendations are based on the project information previously discussed and on the data obtained from the field and laboratory testing program. If the structural loading, geometry or proposed structure locations are changed or significantly differ from those discussed, or if conditions are encountered during construction that differ from those encountered by the borings, ESP requests the opportunity to review our recommendations based on the new information and make any necessary changes.

4.2 Site Development

4.2.1 Soft and Variable Existing Fill

The exploration and evaluation of the subsurface conditions indicate that fill soils are present in all hand auger borings. The fill extends to depths ranging between 2 and 3.5 feet below the existing ground surface. Average DCP values in the fill ranged from 5 to 18 bpi. Based on our visual observations of the auger cuttings and our field testing, the fill encountered in the hand auger borings appear to be soft and variable.

If the structures are founded on the soft and variable fill soils excessive settlement could result causing structure and slab-on-grade distress. Also, the presence of the existing fill beneath pavement areas present the risk of increased settlement and subsequently possible increased long term maintenance of the pavement areas. ESP recommends removing the existing fill and replace with compacted, suitable structural fill.

4.2.2 High Plasticity Clay

Atterberg Limits and grain size testing were performed on select samples obtained from the hand auger cuttings. Typically, soils with a Plasticity Index (PI) less than 30 are considered to be low to moderate plasticity material. A summary of the laboratory test results are presented in the table below:

Sample Location	Depth (feet)	USCS Classification	Percent Fines (%)	Liquid Limit (%)	Plasticity Index
HA-1	0.75-3.5	CH	62.7	67	36
HA-5	2.0-3.5	CH	58.3	58	32

In addition to the laboratory testing, manual manipulation of recovered samples in the field indicates that high plasticity clays were encountered in Boring HA-2 to depths ranging from approximately 0.75 to 2.5 feet below the existing ground surface. Our experience indicates that these soils can undergo significant change in volume (shrink/swell) with changes in their moisture content. If high plasticity clay soils such as those encountered on the site become wet during or after construction, there may be an increase in their volume (swelling) and/or a reduction in their strength. In addition, if these materials are in-place during construction and subsequently dry out, there may be a decrease in their volume (shrinking) resulting in settlement. While swell testing was beyond the scope of our services, the presence of soils with plasticity indices greater than 30 within the near surface (upper 2 to 3 feet) soil profile may present an increased risk of distress to the proposed foundations, slabs-on-grade or pavements due to swell or shrinkage of these materials with variations in moisture content.

Foundations, slabs and/or pavements may not be sufficiently weighted to reduce the potential for swell and/or heave, if bearing directly on high plasticity clays. In addition, our past experience indicates that high plasticity clays may exhibit reduced long-term stability for support of pavements. To reduce the risk imposed by these materials, to the proposed foundations, slabs and pavements, we recommend removing high plasticity clay soils in the upper 3 feet of the proposed subgrade or bearing elevations, whichever is deeper, and replacing them with properly compacted, low plasticity fill soils.

A thorough field evaluation should be performed by a representative of the geotechnical engineer at the time of construction to further determine the presence of high plasticity clay soils that may adversely affect the performance of the proposed structures and pavements.

The presence of lower consistency soils may lead to excessive settlement and long term structure, and/or pavement distress. The presence and depth of the lower consistency soils were considered in the development of recommendations provided in subsequent sections of this report.

4.2.3 Previous Site Development

Since the site was previously developed and partially razed, existing underground utilities, sidewalks, and other unforeseen conditions should be expected during general site construction. We recommend the site be thoroughly evaluated by a representative of the geotechnical at the time of construction to reduce the risk associated with such conditions. The evaluation may include test pit excavations, hand auger borings with DCP testing, and/or proofrolling.

We anticipate that several underground utility lines are present within the proposed site based on its present use. We recommend all existing lines be removed and relocated outside of the proposed building areas. Additionally, all trench backfill material should be removed and the subgrade in all trench excavations be evaluated by a representative of the geotechnical engineer prior to backfilling. The subgrade evaluation should consist of visual observations, probing with a steel rod and performing hand auger borings with DCP tests to evaluate their suitability for receiving structural fill. Once all trenches are evaluated and approved, they should be backfilled with adequately compacted structural fill.

4.2.4 Site Preparation

The proposed stairway, covered walkway, and loading dock areas should have any topsoil, existing fill, high plasticity near surface soils, trash, debris and other organic materials removed prior to construction of the additions. Upon completion of the removal of any unsuitable soils, the exposed subgrade in areas to receive fill should be evaluated by a representative of the geotechnical engineer. Unsuitable soils may be

encountered between the borings during site grading or excavation for foundations. Some undercutting of the soft near surface soils and existing fill in various portions of the site, as well as the areas where high plasticity clay soils are present within the upper 3 feet of subgrade or the bearing surface should be anticipated. The extent of the undercut required should be evaluated in the field by an experienced representative of the geotechnical engineer while monitoring construction activity.

4.2.5 Fill Material and Placement

All fill used for site grading operations should consist of a clean (free of organics and debris), low plasticity soil (Plasticity Index less than 30). The proposed fill should have a maximum dry density of at least 90 pounds per cubic foot as determined by a Standard Proctor Moisture-Density Relationship test, ASTM D 698. All fill should be placed in loose lifts not exceeding 8 inches in thickness and compacted to a minimum of 95 percent of its Standard Proctor maximum dry density, with at least 100 percent achieved in the upper 12 inches. We recommend that field density tests, including one-point Proctor verification tests, be performed on the fill as it is being placed at a frequency determined by an experienced geotechnical engineer to verify the compaction criteria

Based on the results of the hand auger borings and our past experience with similar type materials, the existing fill and residual soils encountered, except for the high plasticity clay, appear suitable for re-use as structural fill.

4.2.6 Cut and Fill Slopes

For landscaping and mowing concerns, final project slopes should be designed to be 3 horizontal to 1 vertical or flatter. Slopes can be designed as steep as 2 horizontal to 1 vertical; however, soil erosion, slope sloughing and slope maintenance should be expected. If designing slopes steeper than 3 horizontal to 1 vertical, a slope stability analysis should be performed to verify stability of the slope. The tops and bases of all slopes should be located a minimum of 10 feet from structural and 5 feet from pavement limits. The fill slopes should be adequately compacted as outlined within this report, and all slopes should be seeded and maintained after construction.

4.2.7 Temporary Excavations

Excavations greater than four feet in depth should be sloped or shored in accordance with local, state, and federal regulations, including OSHA "Construction Standard for Excavations" (29 CFR Part 1926.650-652). The contractor is usually solely responsible for site safety. This information is provided only as a service and under no circumstances should ESP be assumed to be responsible for construction site safety.

4.3 Foundation Support

For satisfactory performance, the foundation for any structure must satisfy two independent design criteria. First, it must have an acceptable factor of safety against bearing failure of the foundation soils under the maximum design loads. Second, the settlement of the foundations due to consolidation of the underlying soils should be within tolerable limits for the structures.

4.3.1 Shallow Foundation Support

The results of the hand auger borings indicate that the proposed structures can be adequately supported on shallow foundations bearing on the low-plasticity residual soils, or newly placed structural fill, provided the site preparation and fill placement procedures outlined in this report are implemented. A net allowable bearing pressure of up to 2,000 pounds per square foot (psf) can be used for design of the foundations

bearing on residual soils exhibiting average DCP values of 6 or greater, or on suitable structural fill compacted to at least 95 percent of the Standard Proctor maximum dry density.

Based on the general stratigraphy in the addition areas, past experience with similar projects and the anticipated magnitude of the structural loads, it is our opinion that the total and differential settlement potentials for the additions should be on the order of 1 inch and ½ inch, respectively. This conclusion is contingent upon compliance with the site preparation and fill placement recommendations outlined in this report.

Minimum wall and column footing dimensions of 18 and 24 inches, respectively, should be maintained to reduce the possibility of a localized, punching-type shear failure. Exterior foundations and foundations in unheated areas should be designed to bear at least 18 inches below finished grade for frost protection.

We recommend that the subgrade soils be observed by a representative of the geotechnical engineer prior to foundation installation. This is to assess their suitability for foundation support and confirm their consistency with the conditions upon which our recommendations are based.

The subgrade materials can be sensitive to moisture variations; therefore, foundation excavations should be opened for a minimum amount of time, particularly during inclement weather. Soils exposed to moisture variations may become highly disturbed and require undercutting prior to placing foundations.

4.4 Pavements

We recommend that special care be given to providing adequate drainage away from pavement areas to reduce infiltration of surface water to the base course and subgrade materials in these areas. This is very important on this site due to the presence of high plasticity clay soils that have a high shrink/swell potential. If these materials are allowed to become saturated during the life of the pavement section, then there will be a strength reduction of the materials that could result in a reduced life of the pavement section. All water should be routed away from the pavement areas and adequate slopes provided to maintain drainage off site. Pavement areas should be proofrolled prior to placing structural fill and/or base course. Proofrolling procedures are outlined in subsequent sections of this report.

General Design Basis. ESP has utilized the “AASHTO Guide for Design of Pavement Structures”, dated 1993 as guidance for the analysis and design process and for selection of subgrade soil support values, structural coefficient for pavement layers and selection of recommended pavement components. The recommendations presented herein assume that the production and placement of the bituminous and base course as well as the bituminous concrete meet the requirements of the current NCDOT “Standard Specifications for Roads and Structures”.

Serviceability Index and Regional Factor. A terminal serviceability index of $P_t=2.0$ and initial serviceability index of $P_o=4.2$ were used for the pavement design analysis in conjunction with a regional factor of 1.

Design Traffic Volumes. The traffic volumes have been provided to us by the project team. Our understanding is that 2 panel trucks will pass per day and 2 front load dump trucks will pass per week.

Design of New Flexible Pavement Sections. The pavement sections required were established based on the above stated design parameters and traffic using a CBR value of 5 obtained by laboratory testing. Several combinations of base, binder and surface coarse thicknesses were calculated for the subgrade and traffic conditions. The recommended sections are presented below.



Section Type	Bituminous Concrete Surface Course, Type, S9.5 (Inches)	Bituminous Concrete Binder Course, Type, I19.5 (Inches)	Bituminous Concrete Base Course, Type, B25.0 (Inches)	Aggregate Base Course, (Inches)
Flexible Pavement	1	2	N/A	6

Design of New Rigid Pavement Sections. Based on the analysis for concrete pavement design, we recommend using the minimum concrete sections shown below. Saw joints should be provided at a 12-1/2 foot spacing or less. The subgrade materials should be prepared as indicated above. The concrete compressive strength (fc) should be at least 4000 psi, with air entrainment of 4 to 6 percent. The slab should be reinforced with a minimum 6x6-W1.4/W1.4 welded wire mesh or properly designed fiber glass reinforcement.

Section Type	Concrete Thickness (Inches)	Aggregate Base Course, (Inches)
Rigid Pavement	4	6

5.0 OTHER CONSIDERATIONS

5.1 Drainage

Soil strength and settlement potential is highly dependent upon the moisture condition of the supportive soil. Soil characteristics can change dramatically when moisture conditions change. As such, building pads, roadways, structures, and surrounding grades should be properly designed and constructed to properly control water (surface and subsurface). Building pads should be designed to shed surface water prior to building construction. Grades surrounding structures should be adequately sloped away from the structure to promote positive drainage and prevent water from ponding near or against the structure. Swales and/or storm drainage structures should be constructed to collect and remove all surface water run-off. All roof drain downspouts should be connected to drain leaders that are properly daylighted or connected to storm drainage structures such that water is removed from structural areas. Foundation drains should be designed and constructed to properly protect foundations from changing moisture conditions. Foundation drains constructed should be properly daylighted or connected to storm drain structures to remove all water from foundation areas. Roof drain lines and foundation drain lines should always remain independent of each other. Any subsurface water that may rise near structural grades should be controlled by adequately constructed subsurface drainage mechanisms.

6.0 LIMITATIONS of REPORT

This report has been prepared in accordance with generally accepted geotechnical engineering practice with regard to the specific conditions and requirements of this site. The conclusions and recommendations contained in this report were based on the applicable standards of our practice in this geographic area at the time this report was prepared. No other warranty, expressed or implied, is made.

The analysis and recommendations submitted herein are based, in part, upon the data obtained from the subsurface exploration. The nature and extent of variations between the borings will not be known until construction is underway. If variations appear evident, then we request the opportunity to re-evaluate the recommendations of this report. In the event that any changes in the nature, design, or location of the structures are planned, the conclusions and recommendations contained in this report will not be considered valid unless the changes are reviewed and conclusions modified or verified in writing by ESP.

In order to verify that earthwork and foundation recommendations are properly interpreted and implemented, we recommend that ESP be provided the opportunity to review the final plans and specifications. Any concerns observed will be brought to our client's attention in writing.

Our conclusions and recommendations are based on the project information previously discussed and on the data obtained from the field and laboratory testing program. If the structural loading, geometry or proposed structure locations are changed or significantly differ from those discussed, or if conditions are encountered during construction that differ from those encountered by the borings, ESP requests the opportunity to review our recommendations based on the new information and make any necessary changes.



FIELD EXPLORATION

Hand Auger Boring: Five (HA-1 to HA-5) hand auger borings were performed at the approximate locations shown on the attached Hand Auger Boring Location Plan, Figure 1. The borings were advanced by manually twisting an auger into the ground. The soils encountered were identified, in the field, from cuttings brought to the surface by the hand auger process. The different soil strata were noted along with the depth. Auger boring records are attached showing the soil descriptions.

Dynamic Cone Penetrometer Test: A portable Dynamic Cone Penetrometer (DCP) was used to estimate the relative density of the existing soils, as outlined in Sowers and Hedges paper "Dynamic Cone for Shallow In-Situ Penetration Testing." Several Dynamic Cone Penetrometer Tests were performed at the approximate locations shown on the attached Boring Location Plan.

The cone point is first seated two (2) inches to ensure that the cone is completely embedded. The cone point is driven up to three 1 ¼ inch intervals using a 15 pound weight falling 20 inches. The penetrometer test result is the average number of blows per interval. The penetrometer test result is similar to the Standard Penetration Resistance (N-value), as defined by ASTM D 1586. When properly evaluated, the penetrometer test results provide an index for estimating soil strength and relative density.



LABORATORY PROCEDURES

Wash # 200 Sieve: The determination of percent fines was performed on select soil samples obtained during our field investigation. Soil samples were washed over the #200 sieve to determine the percent passing. The test was conducted using general guidance from ASTM 1140. The results are presented on the attached Atterberg Limits Results.

Soil Plasticity Tests (Atterberg Limits Test): Select samples were identified for Atterberg Limits testing to determine the soil's plasticity characteristics. This test was conducted using general guidance from ASTM D 4318. The Plasticity Index (PI) is representative of this characteristic and is determined utilizing the Liquid Limit (LL) and the Plastic Limit (PL). The Liquid Limit is the moisture content at which the soil will flow as a heavy viscous. The Plastic Limit is the moisture content at which the soil transitions between the plastic and semi-solid states. The data obtained is presented on the attached Atterberg Limits Results sheet.

Standard Proctor Compaction Test: Select samples of the on-site and borrow soils were obtained from auger cuttings / test pits to determine their suitability as fill material. Standard/Modified Proctor Compaction Tests was conducted using general guidance from ASTM D 698 and were performed on these soils to determine their compaction characteristics including maximum dry density and optimum moisture content. The test results are presented on the attached Moisture-Density Relationship Sheets included in the Appendix.

California Bearing Ratio Test (CBR): The results of the compaction tests described above were utilized in compacting the samples for laboratory CBR tests. The California Bearing Ratio, usually abbreviated as CBR, is a punching shear test. It provides data that is a semi-empirical index of the strength and deflection characteristics of a soil, that has been correlated with pavement performance to establish design criteria for pavement thickness. The test is performed on a six-inch diameter, five-inch thick disc of compacted soil that is confined in a steel cylinder. Before testing, the sample is inundated in water under a confining pressure approximately equal to the weight of the future pavement in order to determine the potential swelling, and to simulate the worst possible condition that can occur in the field. A piston, approximately two inches in diameter, is then forced into the soil at a standard rate to determine the resistance to penetration. The CBR is the ratio, expressed as a percentage, of the actual load required to produce a 0.1 inch deflection to that required to produce the same deflection in a certain standard crushed stone. This test was conducted using general guidance from ASTM D 1883. The results of the CBR tests are shown on the attached California Bearing Ratio Test Results sheet included in the Appendix.



April 2, 2024

Project No. 2024-083-001

Ben Long
ESP Associates, Inc
2200 Gateway Centre Blvd. Suite 216
Morrisville, NC 27560

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Transmittal
Laboratory Test Results
Mann Hall

Please find attached the laboratory test results for the above referenced project. The tests were outlined on the Project Verification Form that was transmitted to your firm prior to the testing. The testing was performed in general accordance with the methods listed on the enclosed data sheets. The test results are believed to be representative of the samples that were submitted for testing and are indicative only of the specimens which were evaluated. We have no direct knowledge of the origin of the samples and imply no position with regard to the nature of the test results, i.e. pass/fail and no claims as to the suitability of the material for its intended use.

The test data and all associated project information provided shall be held in strict confidence and disclosed to other parties only with authorization by our Client. The test data submitted herein is considered integral with this report and is not to be reproduced except in whole and only with the authorization of the Client and Geotechnics. The remaining sample materials for this project will be retained for a minimum of 90 days as directed by the Geotechnics' Quality Program.

We are pleased to provide these testing services. Should you have any questions or if we may be of further assistance, please contact our office.

Respectively submitted,
Geotechnics, Inc.

Michael P. Smith
Regional Manager

***We understand that you have a choice in your laboratory services
and we thank you for choosing Geotechnics.***

MOISTURE - DENSITY RELATIONSHIP

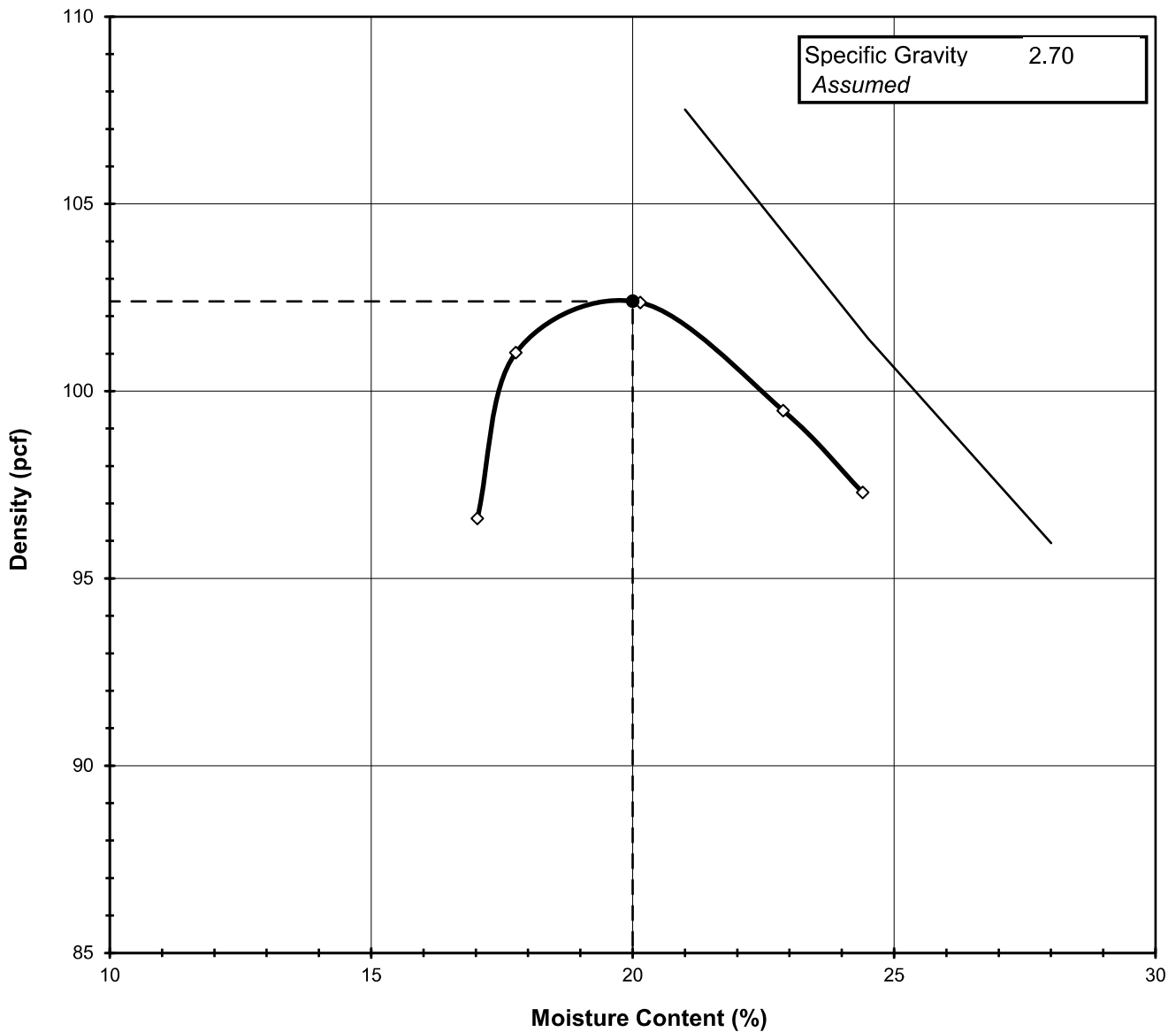
ASTM D698-12

Client: ESP Associates, Inc.
 Client Reference: Mann Hall
 Project No.: R-2024-083-001
 Lab ID: R-2024-083-001-001

Boring No.: NA
 Depth (ft): NA
 Sample No.: S-1
 Test Method: **STANDARD**

Visual Description: Orange Clay

Optimum Moisture Content (%): 20.0
Maximum Dry Density (pcf): 102.4



Tested By NS Date 3/20/24 Checked By AES Date 3/22/24

MOISTURE - DENSITY RELATIONSHIP

ASTM D698-12

Client: ESP Associates, Inc.
 Client Reference: Mann Hall
 Project No.: R-2024-083-001
 Lab ID: R-2024-083-001-001

Boring No.: NA
 Depth (ft): NA
 Sample No.: S-1

Visual Description: Orange Clay

Total Weight of the Sample (g):	38550
As Received Water Content (%):	NA
Assumed Specific Gravity:	2.70
Percent Retained on 3/4":	NA
Percent Retained on 3/8":	NA
Percent Retained on #4:	NA
Oversize Material:	Not included
Procedure Used:	C

Test Type:	STANDARD
Rammer Weight (lb):	5.5
Rammer Drop (in):	12
Rammer Type:	MECHANICAL
Machine ID:	R606
Mold ID:	R608
Mold diameter:	6"
Weight of the Mold (g):	5528
Volume of the Mold (cm ³):	2129

Mold / Specimen

Point No.	1	2	3	4	5
Weight of Mold & Wet Sample (g):	9385	9588	9725	9699	9658
Weight of Mold (g):	5528	5528	5528	5528	5528
Weight of Wet Sample (g):	3857	4059	4196	4171	4130
Mold Volume (cm ³):	2129	2129	2129	2129	2129

Moisture Content / Density

Tare Number:	719	702	434	481	489
Weight of Tare & Wet Sample (g):	420.20	384.40	419.40	447.60	425.60
Weight of Tare & Dry Sample (g):	372.39	340.20	365.71	382.69	361.37
Weight of Tare (g):	91.60	91.40	99.20	99.00	98.10
Weight of Water (g):	47.81	44.20	53.69	64.91	64.23
Weight of Dry Sample (g):	280.79	248.80	266.51	283.69	263.27

Wet Density (g/cm ³):	1.81	1.91	1.97	1.96	1.94
Wet Density (pcf):	113.0	119.0	123.0	122.2	121.0
Moisture Content (%) :	17.0	17.8	20.1	22.9	24.4
Dry Density (pcf) :	96.6	101.0	102.4	99.5	97.3

Zero Air Voids

Moisture Content (%) :	21.0	24.5	28.0
Dry Unit Weight (pcf) :	107.5	101.4	95.9

Tested By NS Date 3/20/24 Checked By AES Date 3/22/24

SINGLE POINT CBR TEST
ASTM D 1883-16

Client ESP Associates
 Client Reference Mann Hall
 Project No. 2024-083-001
 Lab ID 2024-083-001-001

Boring No. NA
 Depth(ft.) NA
 Sample No. S-1
 Visual Description ORANGE CLAY

Test Type	STANDARD		
Molding Method	C	Density	Before
Mold ID	R-432	Measurement	Soaking
Wt. of Mold (gm.)	4206.3	Wt. Mold & WS (gm.)	8199.9
Mold Volume (cc)	2123	Wt. WS (gm.)	3993.6
Surcharge (lbs.)	20	Sample Volume (cc)	2123
Piston Area (in ²)	3	Wet Density (gm./cc)	1.88
Sample Height	4.58	Wet Density (pcf)	117.4
Sample Conditions	Soaked		
Blows per Layer	25	Dry Density (pcf)	97.5
		Dry Density (gm./cc)	1.56
			After
			Soaking

Water Contents	As Rec'd	Beginning Compaction	After Compaction	Before Soaking	After Soaking	Top 1" After Soak
Tare No.	NA	476	476	476	449	414
Wt. of T+WS (gm.)	NA	267.57	267.57	267.57	866.5	748
Wt. of T+DS (gm.)	NA	239.02	239.02	239.02	728.07	627.7
Wt of Tare (gm.)	NA	98.97	98.97	98.97	145.9	146.5
Moisture Content(%)	NA	20.4	20.4	20.4	23.8	25.0

Piston Displacement (in.)	Load (lbs.)	Penetration Stress (psi.)	Swell Measurement		
			Elapsed Time (hrs)	Dial Gauge (Div)	Percent Swell
0	-0.85	-0.3			
0.025	67.83	22.6			
0.050	101.80	33.9			
0.075	129.53	43.2			
0.100	152.01	50.7	0.00	583	0.00%
0.125	170.54	56.8	23.35	613	0.66%
0.150	188.09	62.7	94.00	609	0.57%
0.175	202.12	67.4			
0.200	214.35	71.4			
0.250	237.25	79.1			
0.300	256.52	85.5			
0.350	275.10	91.7			
0.400	290.44	96.8			
0.450	304.88	101.6			
0.500	316.90	105.6			
0.550	329.99	110.0			
0.600	341.38	113.8			

1Division = 0.001 in.

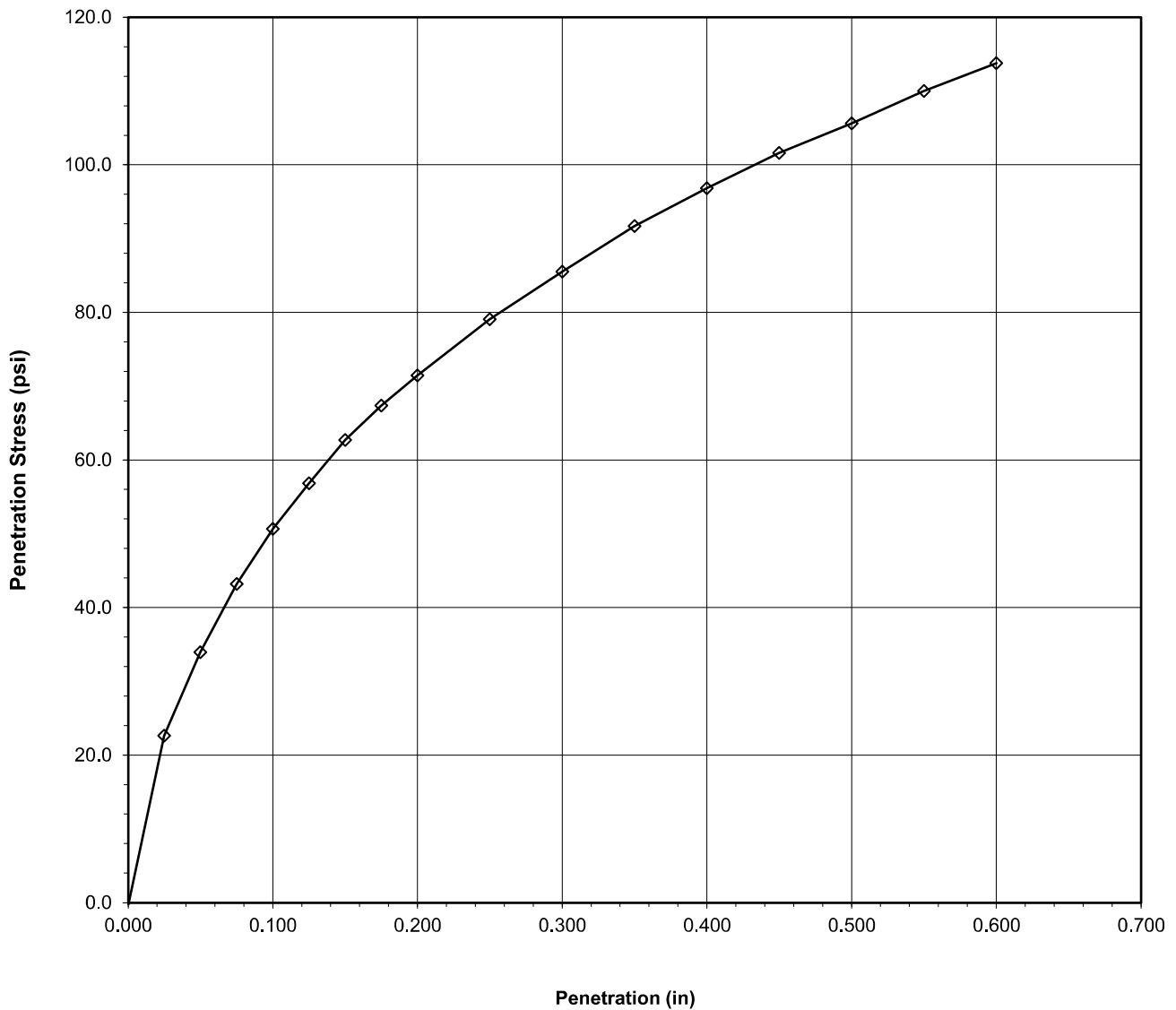
Tested By NS Date 3/28/2024 Checked By RVB Date 4/2/2024

SINGLE POINT CBR TEST
ASTM D 1883-16

Client	ESP Associates	Boring No.	NA
Client Reference	Mann Hall	Depth(ft.)	NA
Project No.	2024-083-001	Sample No.	S-1
Lab ID	2024-083-001-001	Visual Description	ORANGE CLAY

CBR VALUE (0.1") 5.1 %
CBR VALUE (0.2") 4.8 %

Penetration Stress vs. Penetration



Tested By NS *Date* 3/28/2024 *Approved by* RVB *Date* 4/2/2024



Mann Hall
23-00055-10
Raleigh, NC

HAND AUGER BORING RECORDS

DATE	HAND AUGER LOCATION	DEPTH (FEET)	SOIL DESCRIPTION	DEPTH (FEET)	BLOWS PER INCREMENT			AVERAGE
					1ST	2ND	3RD	
2/28/24	HA-1	0-.75	Fill, Gray Sand	SG	6	6	6	6
		0.75-3.5	Fill, Orange Sandy Fat Clay	-1	13	9	7	10
		3.5-6.2	Residual, Red Brown Silty Clay	-2	6	5	3	5
		6.2-10	Residual, Orange and White Silty Sand	-3	5	7	8	7
				-4	12	12	13	12
				-5	9	9	15	11
				-6	12	12	13	12
				-7	18	12	14	15
				-8	12	13	13	13
				-9	16	18	16	17
		-10	15	16	16	16		
	HA-2	0-.75	Fill, Gray Sand	SG	10	9	12	10
		-0.75	Fill, Orange Sandy Fat Clay	-1	7	8	8	8
		-2.5	Residual, Red Brown Silty Clay	-2	6	6	6	6
				-3	7	6	5	6
				-4	21	25	25	24
				-4.9	25	25	25	25
			Hand Auger Refusal at -4.9'					
	HA-3	0-.75	Fill, Gray Sand	SG	8	6	6	7
		.75-1.8	Fill, Orange Sandy Clay Auger refusal at -1.8 feet. (3) attempts were made on west side of concrete pad all with refusal at approx. -2 feet due to what appeared to be old sidewalk. (1) attempt was made to the east of concrete pad, subgrade consisted of compacted ABC that could not be excavated by hand.	-1	10	10	25	15
				-2	25	25	25	25



Mann Hall
23-00055-10
Raleigh, NC

HAND AUGER BORING RECORDS

DATE	HAND AUGER LOCATION	DEPTH (FEET)	SOIL DESCRIPTION	DEPTH (FEET)	BLOWS PER INCREMENT				AVERAGE
					1ST	2ND	3RD		
2/28/24	HA-4	0-.75	Fill, Gray Sand	SG	9	7	16	11	
		0.75-2	Fill, Orange Sandy Clay	-1	18	20	17	18	
		2-3.8	Residual, Red Brown Silty Clay	-2	25	25	25	25	
				-3	14	20	25	20	
		-3.8	Hand Auger Refusal at -3.8	25	25	25	25	25	
	HA-5	0-.75	Fill, Gray Sand	SG	11	12	11	11	
		0.75-2	Fill, Orange Sandy Clay	-1	5	4	5	5	
		2-3.5	Residual, Red Brown Fat Clay	-2	6	8	7	7	
				-3	12	19	20	17	
		3.5-5.5	Residual, Red Brown Sandy Medium Plasticity Clay	-4	10	19	25	18	
Hand Auger Refusal at -5.5'	Hand Auger Refusal at -5.5'	-5	14	25	25	21			
		-5.5	25	25	25	25			



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Fort Mill, SC 29708
803.802.2440

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800.960.7317 | www.espassociates.com

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704.793.9855

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Suite E
Greensboro, NC 27409
336.334.7724

Nashville

500 Wilson Pike Circle
Suite 310
Brentwood, TN 37027
615.760.8300

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Indianapolis, IN 46256
317.537.6979

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Cornelius, NC 28031
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Wilmington, NC 28403
910.313.6648

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Warrendale, PA 15086
724.462.6606

Albuquerque

1203 West Ella Drive
Corrales, NM 87048
505.314.1322

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Suite 216
Morrisville, NC 27560
919.678.1070

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2154 North Center Street
Suite E-503
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843.714.2040

Bradenton

518 13th Street
West Bradenton, FL 34205
941.345.5451

Birmingham

291 Cahaba Valley Parkway North
Suite A
Pelham, AL 35124
205.664.8498

Vickrey & Associates, LLC - An ESP Company

San Antonio

12970 Country Parkway
San Antonio TX 78216
210.349.3271

Austin

3600 West Parmer Lane
Suite 175
Austin, TX 78727
512.494.8014

McAllen

1216 East Jasmine Avenue
Suite C
McAllen, TX 78501
956.340.0045

CONTRACTOR'S STATEMENT OF RESPONSIBILITY

PROJECT: Mann Hall Renovation, Demolition Package _____

LOCATION: 2501 Stinson Dr., Raleigh, North Carolina 27607 _____

SCO ID#: 22-24500-02B _____

BUDGET CODE: _____ ITEM: _____ DATE: _____

OWNER: North Carolina State University _____

DESIGNER: Perkins&Will 411 W. Chapel Hill St., Suite 200 Durham, NC 27701 _____

PRIME CONTRACTOR: _____

CONTRACTOR RESPONSIBLE: _____

SYSTEM/COMPONENT: _____

I (we) acknowledge the special requirements outlined in the quality assurance plan. I (we) also acknowledge that control will be exercised to obtain conformance with the construction documents as approved by the Office of State Construction.

The following procedures will be established and strictly followed to maintain control within our organization:

The following reporting will be submitted to the Special Inspector, Owner and Office of State Construction at the following frequency:

Reporting method: _____

Frequency: _____

The following individuals(s) will be responsible for monitoring the procedures as set forth above:

Name: _____

Title: _____

Qualifications: _____

Signed this ____ day of _____

Name

Title

Designer Waste Information Form

Project Name:		
Project Designer:		Date:
This form is to be completed by the designer and included with SD documents. Waste Management Plan will be based off of this form.		
Waste Type (Condition of waste can determine category. Damaged Universal Waste can become Hazardous Waste)	Present at Site (Y/N)	Comments
Hazardous Waste and Material		
Asbestos		
Chemical Waste (liquid and solid)		
Lead Containing Paint/ Lead Based Paint Chips/ Lead Debris		
PCB containing items (ballasts, caulk, etc.)		
Mercury contaminated debris/ piping/ P-traps		
Broken fluorescent lamps		
Universal Waste		
Mercury containing items (batteries, switches, etc.)		
Batteries (all types)		
Fluorescent Lamps - Intact		
Non-Regulated Waste		
Drywall		
Insulation		
Broad loom carpet		
Vinyl composition tile		
Acoustic ceiling tile		
Treated wood and MDF		
Other Regulated Waste		
Refrigeration equipment		
Tires		
Recyclable		
White goods (lab refrigerators to be disposed of)		
Roofing materials (asphalt, shingles, gravel, metal) non-ACM or lead		
Oil		
Metal (fixtures, piping, ductwork, studs, wiring)		
Cardboard		
Untreated wood		
Aggregate, concrete, brick, asphalt		
Carpet tile		
Non-PCB ballasts		

SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS LIST



PROJECT: _____ FROM (CONTRACTOR): _____
 _____ DATE: _____
 TO (A/E): _____ A/E PROJECT NUMBER: _____
 _____ CONTRACT FOR: _____

LIST SUBCONTRACTORS AND MAJOR MATERIAL SUPPLIERS PROPOSED FOR USE ON THIS PROJECT AS REQUIRED BY THE CONSTRUCTION DOCUMENTS. ATTACH SUPPLEMENTAL SHEETS IF NECESSARY.

NUMBER SECTION	SECTION TITLE	FIRM	ADDRESS	PHONE NUMBER	CONTACT

Attachments

SIGNED BY: _____ DATE: _____

COPIES: Owner Consultants _____ _____ _____ _____ _____ _____ File

REQUEST FOR INFORMATION



PROJECT: _____	R.F.I. NUMBER: _____
_____	FROM: _____
TO: _____	DATE: _____
_____	A/E PROJECT NUMBER: _____
RE: _____	CONTRACT FOR: _____

This Clarification Notice is issued for the purpose of clarifying the Contract Documents based on an interpretation reasonably inferable from the Contract Documents, and therefore has no effect on the Contract Sum or Contract Time. Proceeding with Work in accordance with this Clarification Notice indicates acceptance with no change in the Contract Sum or Contract Time.

SPECIFICATION SECTION:	PARAGRAPH:	DRAWING REFERENCE:	DETAIL:
_____	_____	_____	_____

REQUEST:

SIGNED BY:

DATE:

RESPONSE:

Attachments

RESPONSE FROM:	TO:	DATE REC'D:	DATE RET'D:
_____	_____	_____	_____

SIGNED BY:

DATE:

COPIES: Owner Consultants _____ _____ _____ _____ File



Project Name: NC State Project Number: SCO Project Number:					Substitution Request Number: _____					
SPECIFICATION TITLE: _____ Section: _____ Page: _____				DESCRIPTION: _____ Article/Paragraph: _____						
PROPOSED SUBSTITUTION: _____										
MANUFACTURER: _____			ADDRESS: _____				PHONE: _____			
TRADE NAME: _____						MODEL NO.: _____				
INSTALLER: _____			ADDRESS: _____				PHONE: _____			
HISTORY :	<input type="radio"/> New Products			<input type="radio"/> 1-4 years old			<input type="radio"/> 5-10 years old		<input type="radio"/> Over 10 years old	
DIFFERENCES BETWEEN PROPOSED SUBSTITUTION AND SPECIFIED PRODUCT: _____ _____ _____ <input type="radio"/> Point-by-point comparison data attached										
REASON FOR NOT PROVIDING SPECIFIED ITEM: _____ _____ _____										
SIMILAR INSTALLATION										
PROJECT: _____ ADDRESS: _____ _____						ARCHITECT: _____ OWNER: _____				
WILL PROPOSED SUBSTITUTION AFFECTS OTHER PARTS OF WORK? Yes or No If yes, please explain. _____										



Project Name: _____
 NC State Project Number: _____ Substitution Request Number: _____
 SCO Project Number: _____

SAVINGS TO OWNER FOR ACCEPTING SUBSTITUTION: _____

WILL PROPOSED SUBSTITUTION CHANGE CONTRACT TIME? Yes or No If yes, please explain.

Supporting data attached		<input type="radio"/> Drawings	<input type="radio"/> Product Data
<input type="radio"/> Samples	<input type="radio"/> Tests	<input type="radio"/> Reports	<input type="radio"/> _____

The Undersigned certifies:

- Proposed substitution has been fully investigated and determined to be equal or superior in all respects to specified product.
- Same warranty will be furnished for proposed substitution as for specified product.
- Same maintenance service and source of replacement parts, as applicable, is available.
- Proposed substitution will have no adverse effect on other trades and will not affect or delay progress schedule.
- Cost data as stated above is complete. Claims for additional costs related to accepted substitution which may subsequently become apparent are to be waived.
- Proposed substitution does not affect dimensions and functional clearances.
- Payment will be made for changes to building design, including A/E design, detailing, and construction costs caused by the substitution.
- Coordination, installation, and changes in the Work as necessary for accepted substitution will be complete in all respects.

Submitted by: _____
 Signature: _____
 Firm: _____
 Address: _____
 Contact number: _____

A/E's REVIEW AND RECOMMENDATION

- Approve substitution – Make submittals in accordance with Specification Section 01-33-00 Submittal Procedures
- Approve substitution as noted – Make submittals in accordance with Specification Section 01-33-00 Submittal Procedures
- Reject substitution – Use specified materials
- Substitution Request received too late – Use specified materials



Project Name: NC State Project Number: SCO Project Number:	Substitution Request Number: _____
---	---

Signed by:	Date:
------------	-------

OWNER'S REVIEW AND ACTION

- Substitution approved – Make submittals in accordance with Specification Section 01-33-00 Submittal Procedures. Prepare change order.
- Substitution approved as noted - Make submittals in accordance with Specification Section 01-33-00 Submittal Procedures. Prepare change order.
- Substitution rejected – Use specified materials

Signed by:	Date:
------------	-------

Additional Comments Attached	
------------------------------	--

<input type="radio"/> Contractor	<input type="radio"/> Subcontractor	<input type="radio"/> Supplier	<input type="radio"/> Manufacturer	<input type="radio"/> A/E
----------------------------------	-------------------------------------	--------------------------------	------------------------------------	---------------------------

Change Order Request #

Contractor's Change Order Request Summary (Sheet "A")

Item: _____ Code: _____ N.C.S.U. Project # _____

(Project Name)

Company name Street Address City, State Zip

(Line 17.) on sheet "B"

C.O.R. Request Total*	\$	-
<small>* Do Not Round Off Numbers</small>		

Signature: _____

Date: _____

Print Name: _____

|

|

|

|

Contractor Summary - (Sheet "B")

C.O.R. #

Project Name
NCSU Project #
SCO #
Code: Item:

Summary of Contractor's Self Performed Work

(1.) (= line e. from Sheet "C").	Total Material*	\$	-
(2.) (=Line e. from Sheet "D").	Total Labor*	\$	-
(3.) (= line e. from Sheet "E").	Total Equipment*	\$	-
(4.) (=lines 1 + 2 + 3)	Total of Self Performed Work*	\$	-

Summary of Quoted Work (subcontractors)

(5.)	Quote - Subcontractor #1 (company name)	Quote #1 Total* (without General Contractor OH&P)	\$	-
(6.)	Quote - Subcontractor #2 (company name)	Quote #2 Total* (without General Contractor OH&P)	\$	-
(7.)	Quote - Subcontractor #3 (company name)	Quote #3 Total* (without General Contractor OH&P)	\$	-
(8.)	Quote - Subcontractor #4 (company name)	Quote #4 Total* (without General Contractor OH&P)	\$	-
(9.) (lines 5 + 6 + 7 + 8)	Subtotal - Quoted (subcontract) Work* (w/o Gen Contractor OH&P)		\$	-

(10.) (on line 9.) _____ 5% max (or as negotiated) _____ %OH&P \$ _____ -

(11.) (lines 9 + 10) **Total Quoted (subcontractor) Work (with Gen Contractor OH&P)** \$ _____ -

(13.) (lines 4 + 11) **Total All Work* (without bond and ins)** \$ _____ -

(14.) (on line 13.) _____ %Bond* \$ _____ -

(15.) (on line 13) _____ % Ins.* \$ _____ -

(16.) (lines 14 + 15) **Bonds & Insurance*** \$ _____ -

(17.) (lines 13 + 16) **Grand Total All Work*** \$ _____ -

* Do Not Round Off Numbers

Material Break Down - (Sheet "C")

Material Description	Quantity	Unit	Price	Unit	Extension*
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		ea.	@	\$ - /	ea. = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		lin. feet	@	\$ - /	lin. foot = \$ -
		sq. yds	@	\$ - /	sq. yd = \$ -
		sq. yds	@	\$ - /	sq. yd = \$ -
		sq. yds	@	\$ - /	sq. yd = \$ -
		sq. yds	@	\$ - /	sq. yd = \$ -
		cu. yds.	@	\$ - /	cu. yd. = \$ -
		cu. yds.	@	\$ - /	cu. yd. = \$ -
		cu. yds.	@	\$ - /	cu. yd. = \$ -
		tons	@	\$ - /	ton = \$ -
		tons	@	\$ - /	ton = \$ -
		gals	@	\$ - /	gal = \$ -
		gals	@	\$ - /	gal = \$ -
		gals	@	\$ - /	gal = \$ -
		a. Total Materials*		\$	-
(on line a.)		b.	%	Sales Tax	\$ -
(lines a. + b.)		c.		Subtotal*	\$ -
(on line c.) - max 10% (or as negotiated)		d.	%	O.H.&P.	\$ -
(lines c. + d.)		e.		Total Material*	\$ -

* Do Not Round Off Numbers

Labor Break Down (Sheet "D")

Labor Description	Time	Unit	Cost	Unit	Extension*
Foreman	_____	/hr	@ \$ -	/hr	= \$ -
Tradesman	_____	/hr	@ \$ -	/hr	= \$ -
Tradesman	_____	/hr	@ \$ -	/hr	= \$ -
Tradesman	_____	/hr	@ \$ -	/hr	= \$ -
Tradesman	_____	/hr	@ \$ -	/hr	= \$ -
Tradesman	_____	/hr	@ \$ -	/hr	= \$ -
Journey Man	_____	/hr	@ \$ -	/hr	= \$ -
Journey Man	_____	/hr	@ \$ -	/hr	= \$ -
Journey Man	_____	/hr	@ \$ -	/hr	= \$ -
Journey Man	_____	/hr	@ \$ -	/hr	= \$ -
Journey Man	_____	/hr	@ \$ -	/hr	= \$ -
Laborer	_____	/hr	@ \$ -	/hr	= \$ -
Laborer	_____	/hr	@ \$ -	/hr	= \$ -
Laborer	_____	/hr	@ \$ -	/hr	= \$ -
Laborer	_____	/hr	@ \$ -	/hr	= \$ -
Apprentice	_____	/hr	@ \$ -	/hr	= \$ -
Apprentice	_____	/hr	@ \$ -	/hr	= \$ -
Apprentice	_____	/hr	@ \$ -	/hr	= \$ -
Apprentice	_____	/hr	@ \$ -	/hr	= \$ -
(a.) Subtotal Labor*					\$ -
(on Line a.) max 30%	(b.) _____	%	Burden	\$	-
(lines a. + b.) (c.)					Subtotal* \$ -
(on Line c.) max 10% (or as negotiated)	(d.) _____	%	O.H.&P.	\$	-
(lines c. + d.) (e.) Total Labor					\$ -

* **Do Not Round Off Numbers**

Equipment Break Down (Sheet "E")

Equipment Type	Rental Per Hour		Rental Per Day		Rental Per Week		Extension*
	# Hour(s)	Charge	# Day(s)	Charge	# Week(s)	Charge	
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	hr(s)	@ \$ - /hr	day(s)	@ \$ - /day	wk(s)	@ \$ - /wk(s)	\$ -
	a. Subtotal Equipment*					\$	-
(No sales tax charge on contractor owned equipment)			(on line a.)			b. %	Sales Tax \$ -
			(lines a. + b.)			c.	Subtotal* \$ -
maximun 10% (or as negotiated)			(on Line c.)			d. %	O.H.&P. \$ -
	e. Total Equipment*					\$	-

* Do Not Round Off Numbers

Change Order Minority Participation

Code /Item:	Code: XXXXX Item:XXX
NCSU Project #:	072044
Contractor:	XXXXXXXXXXXXXX
C.O. Number	G-X
C.O. Scope of Work:	XXXXXXXXXXXXXX
C.O. Cost:	

HUB Subcontractor	Minority Category ¹	Contractor Trade ²	C.O. Dollar Value	Revised Contract Total
	N/A	N/A	N/A	N/A

¹ Black, African American (B), Hispanic (H), Asian American (A), American Indian (I), Female (F), Economically & Socially Disadvantaged (D)

² Contractor Trade - Select number (i.e. "2" for General - Demolition)

Contractor Trades			
1. Div 1 – General Contractor	55. Div 6 – Wood & Plastics – Architectural Woodwork	5. Div 10 – Specialties – Fire Extinguishers and Cabinets	24. Div 15A – Plumbing – Pipe & Pipe Fittings
2. Div 1 – General – Demolition	56. Div 6 – Wood & Plastics – Carpentry	6. Div 10 – Specialties – Identification Devices (Signage, etc.)	25. Div 15A – Plumbing – Pipe Insulation
3. Div 1 – General – Cleaning	57. Div 7 – Thermal/Moisture Protection – Building Insulation	7. Div 10 – Specialties – Toilet Accessories	26. Div 15B – Mechanical – Controls Work
4. Div 1 – General – Temp Facilities (fencing, trailers, etc)	58. Div 7 – Thermal/Moisture Protection – Fireproofing	8. Div 10 – Specialties – Toilet Partitions	27. Div 15B – Mechanical – Ductwork
40. Div 2 – Site Work – Grading	59. Div 7 – Thermal/Moisture Protection – Joint Sealing/Caulking	9. Div 11 – Equipment – Audio-visual (Projectors, Screens, etc.)	28. Div 15B – Mechanical – Mechanical Equipment
41. Div 2 – Site Work – Hauling	60. Div 7 – Thermal/Moisture Protection – Roofing	10. Div 11 – Equipment – Food Service	29. Div 15B – Mechanical – Pipe Duct Insulation
42. Div 2 – Site Work – Landscaping (seeding, planting, etc.)	61. Div 7 – Thermal/Moisture Protection – Waterproofing	11. Div 11 – Equipment – Residential	30. Div 15B – Mechanical – Pipe & Pipe Fittings
43. Div 2 – Site Work – Paving	62. Div 8 – Doors/Windows – Doors	12. Div 12 – Furnishings – Floor Mats	31. Div 15B – Mechanical/HVAC General
44. Div 2 – Site Work – Soil/Sediment Erosion & Control	63. Div 8 – Doors/Windows – Finish Hardware	13. Div 12 – Furnishings – Systems Furniture	32. Div 16 – Electrical – High/Medium Voltage (Transformers, Switches, etc.)
45. Div 2 – Site Work – Water/Sewer System	64. Div 8 – Doors/Windows – Glass & Glazing	14. Div 12 – Furnishings – Window Treatments	33. Div 16 – Electrical – Conduit
46. Div 3 – Concrete – Plain Concrete (sidewalks, curb & gutter, etc.)	65. Div 8 – Doors/Windows – Windows	15. Div 13 – Special Construction – Fire Protection (Sprinklers, etc.)	34. Div 16 – Electrical – Fire Alarm & Smoke Detection Systems
47. Div 3 – Concrete – Pre-cast Concrete	66. Div 9 – Finishes – Acoustic Panel Ceilings	16. Div 13 – Special Construction – Hazardous Materials Abatement	35. Div 16 – Electrical – General
48. Div 3 – Concrete – Structural Concrete	67. Div 9 – Finishes – Carpet	17. Div 13 – Special Construction – Security Systems	36. Div 16 – Electrical – Lighting Fixtures
49. Div 4 – Masonry – General	68. Div 9 – Finishes – Gypsum Drywall	18. Div 14 – Conveying Systems – Elevators	37. Div 16 – Electrical – Site Lighting
50. Div 4 – Masonry – Labor Only	69. Div 9 – Finishes – Hard Flooring (tiles, slate, etc.)	19. Div 14 – Conveying Systems – Escalators	38. Div 16 – Electrical – Telecommunications Systems
51. Div 5 – Metals – Architectural Metal (railings, etc.)	70. Div 9 – Finishes – Painting/Wallcoverings	20. Div 15A – Plumbing – Exterior Work	39. Div 16 – Electrical – Wiring & Wiring Devices
52. Div 5 – Metals – Light Gauge Metal (decking, etc.)	71. Div 9 – Finishes – Plaster	21. Div 15A – Plumbing – Fixtures	
53. Div 5 – Metals – Structural Steel	72. Div 9 – Finishes – Soft tile Flooring	22. Div 15A – Plumbing – Fuel Gas Piping & Equipment	
54. Div 5 – Metals – Structural Steel Erection	73. Div 9 – Finishes – Wood Flooring	23. Div 15A – Plumbing – General	

State Construction Office

Field Order # _____

Project: _____

Location: _____

Project ID: _____

Description of Change: _____

Justification of Change: _____

CONTRACTOR:

A total cost change not to exceed a lump sum cost is \$ _____ or a unit cost of _____ extended using estimated quantities to not exceed is \$ _____. The contractor will need a maximum number of _____ days time extension to the contract. The actual cost, not to exceed stated cost, shall be based on a realistic estimate based on current acceptable market values submitted with change order for approval by designer, owner, and State Construction Office.

DESIGNER:

The quoted price and need for the change are in the best interests of the owner to have the work accomplished. A formal change order will be prepared for contractor's signature within seven (7) days.

OWNING AGENCY:

The owning agency agrees to the change as being in the owner's best interest. Adequate funds are available to pay the cost for the change.

STATE CONSTRUCTION OFFICE:

The State Construction Office approves the request for the change.

SIGNATURES:

Contractor:

Date:

Designer:

Date:

Owning Agency:

Date:

State Construction Office:

Date:



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NC State University
Design and Construction
NC State's Requirements

Request for Designers Pre-Final Inspection Checklist

Project Name: _____

NC State Project Number: _____

NC State Code / Item: _____

SCO Project Number: _____

All items must be complete and verified by the Designer. Once items are verified as complete, Designer shall note the date complete and initial the line. If items are not applicable to the project, Designer shall note "N/A" in the date line.

Item	Date	Initials
Contractors Statement of Completion with Request for Designers Inspection, include Contractors Completion List		
Initial Submission of the TAB Report		
Pre-Functional Testing Report		
Operation & Maintenance Submittal Log showing all required O&M's have been approved		
Schedule of Owner Trainings		
Certification all Fire Extinguishers have been installed or delivered to N.C. State		
Demonstration of the operation of fire pumps to the N.C. State Fire Marshall		
Final Clean is Complete		
Laboratory Hood Certification by Contractors 3rd Party Inspector (if applicable)		
Roof & Window Water Test Reports (if applicable)		

Designers Approval: _____
Name
Signature
Date



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Design and Construction
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Request for Final Inspection Checklist

Project Name: _____

NC State Project Number: _____

NC State Code / Item: _____

SCO Project Number: _____

All items must be complete and verified by the Designer. Once items are verified as complete, Designer shall note the date complete and initial the line. If items are not applicable to the project, Designer shall note "N/A" in the date line.

_____ (Designer of Record) provides information to the Owner and the State Construction Office that the project has been evaluated and field inspected to assure Life Safety Construction involving Fire Protection Systems (Fire Alarm, Sprinkler, etc.), egress, fire rated walls, and egress travel distances are constructed in accordance with the Contract Documents for Final Inspection to allow occupancy by the Owner.

Designer's Representative

Item	Date	Initials
Contractors Statement of Completion with Request for Designers Inspection, include Contractors Completion List		
Designer's Pre-Final Punch List Inspection		
SCO Final Inspection Scheduled for _____		
SCO Electrical Inspection (Certificate of Electrical Completion)		
Installer's Fire Alarm System Record of Completion (Certification) as required by NFPA 72		
Installers Sprinkler System Material & Test Reports:		
NFPA 13 (Sprinkler Systems)		
NFPA 14 (Standpipe & Hose Systems)		
NFPA 20 (Centrifugal Fire Pumps)		
NFPA 22 (Water Tanks for Private Fire Protection)		
NFPA 24 (Private Fire Service Mains)		
SCO Approval Letter for Sprinkler System		
Engineer's Approval of Battery Powered Emergency Devices		
Engineer's Approval Emergency and Standby Generator NFPA 110 Tests		
Engineer's Approval Electrical Service Ground Test Report		
Department of Labor Approval for Elevator		
Department of Labor Approval for Boiler & Pressure Vessels		
Department of Agriculture Approval for Fuel Tanks		



North Carolina
State Construction Office

PROJECT APPROVAL AUTHORIZATION
PARTIAL UTILIZATION: (BENEFICIAL OCCUPANCY)

Project: _____

SCO Identification Number: _____ Contract Completion Date: _____

Project Owning Agency: _____

Owning Agency's Requester: _____ Date: _____

Designer's Statement:

_____ (Designer's Firm Name) provides information to the owner and the State Construction Office that the project has been evaluated and field inspected to assure that construction meets contract requirements for partial utilization and/or occupancy by the owning agency.

Designer's Representative Name

Project Description: _____

Project Partial Utilization Description: _____

BACK-UP DATA:
CONTRACTOR'S APPROVAL DOCUMENTS:

General Construction Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Electrical Construction Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Mechanical Construction Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Plumbing Construction Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Sprinkler Installation Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Asbestos Removal Contractor's Approval:	Date _____	N/A <input type="checkbox"/>
Other: _____	Date _____	N/A <input type="checkbox"/>
Other: _____	Date _____	N/A <input type="checkbox"/>
Other: _____	Date _____	N/A <input type="checkbox"/>
Certificate of Occupancy by Local Authority Having Jurisdiction (Community College):	Date _____	N/A <input type="checkbox"/>



**North Carolina
State Construction Office**

Beneficial Occupancy Inspection:	Date _____	N/A <input type="checkbox"/>
Beneficial Occupancy Punch List to be completed:	Date _____	N/A <input type="checkbox"/>
Owner's Assumption of Responsibility for Maintenance, Heat, Utilities, and Insurance: Comments: _____	Date _____	N/A <input type="checkbox"/>
Established Date for Guarantees and Warranties. Comments: _____	Date _____	N/A <input type="checkbox"/>
Consent of Surety:	Date _____	N/A <input type="checkbox"/>
Insurance Company Permitting Occupancy:	Date _____	N/A <input type="checkbox"/>
SCO Electrical Inspection (Certificate of Electrical Completion):	Date _____	N/A <input type="checkbox"/>
Installer's Fire Alarm System Record of Completion (Certification) as required by NFPA 72:	Date _____	N/A <input type="checkbox"/>
Installer's Sprinkler System Material and Test Reports as required by:		
NFPA 13-(Sprinkler Systems)	Date _____	N/A <input type="checkbox"/>
NFPA 14-(Standpipe and Hose Systems)	Date _____	N/A <input type="checkbox"/>
NFPA 20-(Centrifugal Fire Pumps)	Date _____	N/A <input type="checkbox"/>
NFPA 22-(Water Tanks for Private Fire Protection)	Date _____	N/A <input type="checkbox"/>
NFPA 24-(Private Fire Service Mains)	Date _____	N/A <input type="checkbox"/>
Other: SCO Approval Letter Sprinkler System	Date _____	N/A <input type="checkbox"/>
Engineer's Approval of Battery Powered Emergency Devices:	Date _____	N/A <input type="checkbox"/>
Engineer's Approval Emergency and Standby Generator NFPA 110 Tests:	Date _____	N/A <input type="checkbox"/>
Engineer's Approval Electrical Serv Ground Test Report:	Date _____	N/A <input type="checkbox"/>
Dept. of Labor Approval for Elevator:	Date _____	N/A <input type="checkbox"/>
Dept. of Labor Approval for Boiler & Pressure Vessels:	Date _____	N/A <input type="checkbox"/>
Dept. of Agriculture Approval for Fuel Tanks:	Date _____	N/A <input type="checkbox"/>
Health Dept. Inspection and Acceptance for Use:	Date _____	N/A <input type="checkbox"/>



**North Carolina
State Construction Office**

Domestic Water Test Report and Acceptance for Use:	Date _____	N/A <input type="checkbox"/>
Laboratory Hood Certification:	Date _____	N/A <input type="checkbox"/>
Engineer's Approval of Test and Balance Report:	Date _____	N/A <input type="checkbox"/>
Engr's. Verification Letter Fire Damper Operation:	Date _____	N/A <input type="checkbox"/>
Agreement & Means for Separation of Owner Occupied Area from Construction Work Area:	Date _____	N/A <input type="checkbox"/>
Designer's Inspection to Assure Life Safety Construction involving Fire Protection Systems (Fire Alarm, Sprinkler, etc.), egress, fire rated walls and egress travel distances are constructed in accordance with contract documents:	Date _____	N/A <input type="checkbox"/>
Backflow Preventer Certification:	Date _____	N/A <input type="checkbox"/>
Engineer's Approval Stair/Ramp Survey:	Date _____	N/A <input type="checkbox"/>
Engineer's Approval Site Survey (DENR):	Date _____	N/A <input type="checkbox"/>
Metal Building Manufacturer's Warranty:	Date _____	N/A <input type="checkbox"/>
Roofing Manufacturer's Warranty:	Date _____	N/A <input type="checkbox"/>
Commissioning Engineer's Approval:	Date _____	N/A <input type="checkbox"/>
Lightning Protection UL Master Label:	Date _____	N/A <input type="checkbox"/>
Special Inspector's Final Report/Resolutions:	Date _____	N/A <input type="checkbox"/>

Designer's Approval: Date: _____ Printed Name: _____

Owning Agency Approval: Date: _____ Printed Name: _____

SCO Approval: Date: _____ Printed Name: _____



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Design and Construction
NC State's Requirements

Final Acceptance Checklist

Project Name: _____

NC State Project Number: _____

NC State Code / Item: _____

SCO Project Number: _____

Item	Date	Initials
Signed Request for Final Inspection Checklist		
SCO Beneficial Occupancy Form(s) for Project's Phases		
Designer's statement to Owner the Designer's Punch List has been Completed		
SCO Final Acceptance Inspection		
SCO Final Acceptance Punch List Issued		
Contractors Work Plan for SCO Final Acceptance Punch List		
Owner's Assumption of Responsibility for Maintenance, Heat, Utilities, and Insurance		
Cancellation of Contractors Insurance Carriers Public Liability, Property Damage, and Builders Risk		
Established Date for Guarantees and Warranties		
Insurance Company Permitting Occupancy		
Record of Owner's Trainings: Plumbing HVAC/Controls Electrical Fire Alarm		
NCSU Fire Marshall's inspection of life safety systems (FAS, Sprinkler System, Emergency Generator, Fire Pumps etc)		
NCSU Lock Shop to installed permanent lock cores on Project's doors		

Date of Project's Final Acceptance: _____

Designers Approval: _____

Name	Signature	Date
------	-----------	------

NCSU Approval: _____

Name	Signature	Date
------	-----------	------

SCO Approval: _____

Name	Signature	Date
------	-----------	------

STATE OF NORTH CAROLINA
 COUNTY SALES AND USE TAX REPORT
 SUMMARY TOTALS AND CERTIFICATION

CONTRACTOR: _____

Page _____ of _____

PROJECT: _____

FOR PERIOD: _____

	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL FOR COUNTY OF:	TOTAL ALL COUNTIES
CONTRACTOR							
SUBCONTRACTOR(S)*							
COUNTY TOTAL							

* Attach subcontractor(s) report(s)
 ** Must balance with Detail Sheet(s)

I certify that the above figures do not include any tax paid on supplies, tools and equipment which were used to perform this contract and only includes those building materials, supplies, fixtures and equipment which actually became a part of or annexed to the building or structure. I certify that, to the best of my knowledge, the information provided here is true, correct, and complete.

Sworn to and subscribed before me,

This the _____ day of _____, 19____

 Signed

 Notary Public

My Commission Expires: _____

 Print or Type Name of Above

Seal

NOTE:
 This certified statement may be subject to audit

STATE OF NORTH CAROLINA
SALES AND USE TAX REPORT DETAIL

CONTRACTOR: _____

Page ____ of ____

SUBCONTRACTOR _____

FOR PERIOD: _____

PROJECT: _____

PURCHASE DATE	VENDOR NAME	INVOICE NUMBER	TYPE OF PROPERTY	INVOICE TOTAL	COUNTY TAX PAID	COUNTY OF SALE *
				\$	\$	
				TOTAL:	\$	

* If this is an out-of-state vendor, the County of Sale should be the county to which the merchandise was shipped.



FACILITIES DIVISION

REQUEST FOR UTILITY INTERRUPTION WORK SHEET

REQUESTOR

NAME : _____

DATE : _____

DEPT : _____

PHONE : _____

WORK REQ # : _____ ACCT # : _____

CAMPUS BOX : _____

BUILDING INFORMATION / DATE & TIME

BUILDING(s) : _____

ENTIRE BLDG or
SPECIFIC ROOM : _____

BEGIN DATE : _____

END DATE : _____

BEGIN TIME : _____

END TIME: _____

DISCONNECT INFORMATION

POWER

Primary

Secondary

RUNNING WATER

Hot

Cold

Distilled

FIRE ALARM

Disconnect

Testing

Sprinkler Operational Yes / No

HEATING

STEAM SYSTEMS

AIR CONDITIONING
(Chilled Water)

PROPANE/NATURAL GAS

OTHER : _____

For all Fire Alarm / Sprinkler Disconnects or Testing, please first obtain approval from the Electronics Shop: <http://facilities.ofa.ncsu.edu/fire-alarm-disconnect/>(separate form).

REASON FOR INTERRUPTION (Scope of Work):

Shop Supervisor Signature: _____

Date: _____

Addtl. Supervisor (s) Signature: _____

POLICY # 806 – ROUTINE UTILITY INTERRUPTION REQUEST – ADV NOTIFICATION PERIODS

Primary (Total Building) Power – 10 working days

Secondary Power Feeders – 4 working days

Cold/Hot Water Interruption – 4 working days

A/C/Heat Interruption – 4 working days

*Fire Alarm Disconnect/Testing – 3 working days

Distilled Water Interruption – 3 working days

Steam Interruption – 5 working days

Gas Interruption – 5 working days

Lab Air Interruption – 4 working days

Sanitary/Storm Sewer – 3 working days

PLEASE NOTE: The Customer Service Center will make notifications for the disconnect if it is submitted within the appropriate number of days. The CSC will also make notifications for Emergency disconnects. If it is not submitted within the appropriate number of days, it is the Requestor's responsibility to make the notifications to all personnel.

Method of Procedure

Requested Start Date: DD/MM/YYYY

Requested Work Window: XX hours or YY days

Backup Dates:

1.0 **Purpose / Scope of Work**

1.1 The purpose of this procedure is to [description of the work to be performed].

2.0 **Personnel**

2.1 **Contractors Personnel**

2.1.1 [List Name, Title, and Contact Information for the Contractors Personnel]

2.2 **NC State Personnel**

2.2.1 [List Name, Title, and Contact Information for the Contractors Personnel]

2.3 **Other Personnel**

2.3.1 [List Name, Title, and Contact Information for the Contractors Personnel]

3.0 **Planned Impact to Environment / Equipment**

3.1 [Describe the intended impact of the work].

4.0 **Risks & Potential Hazards**

4.1 [List the risks and potential hazards associated with the work]

5.0 **Stakeholders Impacted**

5.1 [List the stakeholders impacted by the work]

6.0 **Contingency Plan**

6.1 [Describe the contingencies planned by the contractor to mitigate risks associated with the work not going according to plan.]

7.0 **Attachments & References**

7.1 [List the attachments associated with the MOP.]

7.2 [List the reference documents & details associated with the MOP.]

8.0 **Prerequisites**

8.1 [Description of Prerequisite #1.]

Prerequisite #1 is complete.

[ENTITY]:

Signature

Print Name

Date

8.2 [Description of Prerequisite #2.]

9.0 Prerequisite #2 is complete.

[ENTITY]:

Signature

Print Name

Date

PROJECT NAME
NCSU Project Number
Building Name: XYZ Hall
MOP-XXX

10.0 **Procedure**

10.1 [Step 1]

10.2 [Step 2]

10.3 [Step 3]



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PRECONSTRUCTION MEETING AGENDA

Project Name: _____

Project number: _____ Code: _____ Item: _____ SCO ID #: _____

Date and location of Meeting: _____

Attendees:

1.) Introductions

2.) Correspondence Protocol;

- a. All correspondence shall have the NCSU Project Name and Number as indicated on SCO's letter of award.
- b. Owner and Contractor will endeavor to direct all communications through the Design Representative.
- c. Correspondence from Designer to Owner will be addressed to the NCSU Project Manager.
- d. Correspondence between Designer and Contractor requires copy to the NCSU Project Manager.
- e. Correspondence from Owner and Contractor to Designer will be addressed to the Design Representative.

3.) Schedule

- a. Bar chart, Network plots. Project schedule, signed by all major subcontractors, is due to the designer within 30 calendar days of the notice to proceed. A Schedule of Values shall be submitted within 30 calendar days of the notice to proceed.
- b. Monthly schedule updates, signed by all major subcontractors, shall be required with each payment application.
- c. Milestones:

Notice to Proceed Date: _____

Project Start Date: _____

Duration: _____

Project Completion Date: _____

Adjustment(s) to the completion of a project will only be allowed by a justifiable change order approved by the designer, the owning agency and the State Construction Office.



One copy of the approved schedule is to be posted at the project site and marked daily showing actual progress of the work.

The submission of an approved schedule and schedule of values to the designer shall occur prior to submitting the first request for payment. The schedule of Values shall include dollar value of each subcontractor and shall identify MBE subcontract work.

A list of subcontractors and material suppliers are to be provided to the designer with a copy for the State Construction Office within 14 days of the notice to proceed in accordance with article 16 of the general conditions.

- d. Weather Delays: The general conditions states the contractual method by which the contractors were to use to establish the expected number of weather days to include in the contract(s). For weather impact greater than what is in the contract, the contract is due to be adjusted. The contractors' project administrators should develop a daily log on construction events covering construction progress and daily weather conditions that affect the construction progress. Copies of the logs should be directed to the designer's representative on a weekly basis for his initial. Copies of the logs should be turned in to the designer on a monthly basis with a request for weather time extensions if justifiable. The requests will be evaluated and approved by the designer, owning agency and State Construction Office if deemed valid. The designer shall keep a running total of time of weather relating delays for granting one change order per prime contract at the end of the project for contract adjustment to the date of completion of the project.
- e. Liquidated Damages: The contract contains a clause allowing an assessment of a sum of _____ dollars per day as liquidated damages for each calendar day the project construction is delayed beyond the adjusted scheduled completion date.
- f. It is important all prime contractors become familiar with the general and the supplementary general conditions of the contract(s).

4.) Progress Meetings

- a. SCO/Owner's/Designer's Regular monthly progress meetings will be held on:

Location: _____

Time: _____

Prime contractors shall be represented by office and project representatives having the authority to make bindings contractual decisions on the contract. The meetings are open to subcontractors, material suppliers and others that may contribute to the progress toward project completion. The meetings are to enhance coordination, to enhance cooperation, to assist the support of the project schedule, to facilitate in the resolution of problems, and to review pending changed conditions.

- b. Contractor's regular weekly progress meetings will be held on:

Location: _____

Time: _____

Meeting Agenda. A sample agenda for these meetings is included in the Project Manual.

5.) Change Orders

For Changes in the Work - follow General Conditions Article 19 and see Attachment 2:

- a. Provide breakdown of materials, labor rates, and correct OH&P

- b. Each request will be identified as "change proposal" or "change request" and will be number consecutively.
- c. Designer will prepare field orders to the Contract on State Construction Office forms.
- d. Owner and Designer will prepare change orders to the Contract on State Construction Office forms or using SCO Interscope Website to process electronically.
- e. Designer shall maintain a change order log.
- f. ***Time extension requests must be supported by a marked-up schedule showing the impact of the delay(s) on the critical path.***
- g. The University requires 6 original change orders for processing.
- h. Only the designer has the authority to issue change orders to change the work of Contractor
- i. All User or other departmental requests for changes in the work will be channeled through the N.C.S.U. Project Manager to the designer as necessary.

6.) Pay Applications/Schedule of Values:

- a. Shall be submitted on *AIA G702 forms*. Applications submitted on any different format will be returned *NOT APPROVED*. The University requires three originals only.
- b. A copy of *NC Sales Tax Report* shall be included with each pay application.
- c. Contractor will submit pay applications to the Designer for approval.
- d. Submittal date to designer will be: _____.
- e. Schedule of values *must be approved by Designer and Owner* prior to first pay application.
- f. Pay applications must clearly identify the type of contract (general, mechanical, plumbing, electrical, etc.). Project name, code and item number, NCSU project number, and SCO ID number must be shown.
- g. All Pay Applications must be accompanied by a *Consent of Surety* and up to date *MBE (HUB) Form*.
- h. Contractor's pay applications are due at Capital Project Management by the fifth of each month.
- i. A copy of the payment application will be submitted to the SCO Project Monitor.

7.) Project Close-Out:

The following must all be complete and included:

- a. As-Builts, including registered survey and certification of stairs.
- b. O&M Manuals
- c. Special Inspections Report
- d. Consent of Surety
- e. Affidavit of Payment of Debts and Claims and Lien waivers
- f. Special warranties/bonds, certificates of completion and compliance
- g. Certification of equipment demonstrations and training for Owner personnel.
- h. Commissioning of building systems if required
- i. Contractor and Designer evaluations

8.) Personnel Conduct

- a. Zero tolerance for harassment of any sort of any member of the University community.
- b. Smoking Policy - No smoking inside of existing facility or addition.
- c. Protection/Safety
 - 1.) OSHA Regulations:
 - a) Fire control
 - b) Barricades - work areas, excavation, pedestrian access, etc.
 - c) Housekeeping - keep site clean, keep mud off streets daily
 - 2.) Working in and around occupied facilities - must be sensitive to the needs of occupants. Coordinate with Project Manager. Noise hours.
 - 3.) Scheduling of cutting of floors in occupied spaces. Precaution to protect activities in floors below
 - 4.) Hot Work Permits: Fire Marshals Office: 515-2568
 - 5.) Contractors shall familiarize themselves with article 11 of the general conditions. The requirements are a mandatory part of the contract.
- d. Accident Reports - Owner requires copy of First Report of Injury.
- e. It is illegal for any person to have firearms at the project site, any type of alcoholic beverages, or drugs other than prescribed by a physician. Everyone at the project site is expected to exhibit proper behavior. Indecent language, acts or dress will not be accepted. Anyone in violation of proper behavior will be ejected from the construction site by the proper authorities.

9.) Temporary Services and Facilities:

- 1.) Sanitary:
- 2.) Water:
- 3.) Power:
- 4.) Heat:
- 5.) Telephone:
- 6.) Trailers:
- 7.) Job Sign:
- 8.) Parking:
- 9.) Waste Disposal Dumpster:
- 10.) Restroom facilities are to be:
- b. Service Continuity:
 - 1.) All interruption of services will be coordinated through the NCSU project manager
 - 2.) Contractor will not interrupt existing services, i.e., Owner will throw switches, turn valves, etc.
 - 3.) 5 days minimum notice, longer for major utility outages, up to 10 days for high voltage or building electricity interruptions.
- c. Cleaning of Streets - any mud, debris, etc., will be removed by Contractor daily.

- d. Site Considerations:
 - 1.) Project limits and staging - see drawings.
 - 2.) Store materials properly.
 - 3.) Erosion control.
 - 4.) Tree protection.
 - 5.) Concrete wash-down areas - keep clean - do not wash out near trees, storm drain inlets.
 - 6.) Pre-Excavation Process:
 - a) The Contractor shall lay out excavations.
 - b) The Contractor shall be responsible for having existing utilities located.
 - c) The Contractor may start excavation only when all known utilities have been located or verified as per the specifications.

10.) Special Requirements of the Owner:

- a. Asbestos:
 - 1.) If applicable, Owner will survey for, and deal with asbestos removal prior to work on this contract commencing.
 - 2.) If the Contractor encounters any material that is suspected to be asbestos, work will cease immediately in the area, and the area will be barricaded, etc.
 - 3.) Owner shall be notified immediately if the presence of asbestos is suspected.
- b. Submittals:
 - 1.) Submit ___ copies to Designer. NCSU requires one full set of approved submittals at the end of the project.
 - 2.) Submittals to be numbered consecutively and specification section will be referenced.
 - 3.) Contractor approval stamp required prior to submission to the Designer.
 - 4.) Designer shall maintain submittal log.
 - 5.) *See Attachment 3 for a list of Submittals to be reviewed by the owner.*
- c. Requests For Information:
 - 1.) Contractor is responsible for thoroughly reviewing contract documents prior to request for information.
 - 2.) Designer shall maintain a RFI (request for information) log.
- d. Normal working Hours: _____

11.) Final Inspections:

- a. State Inspections must be complete and approved. (SCO Electrical, NFPA Testing, and DOL: elevator, boilers, pressure vessels, etc.)
- b. Satisfactory review of project completeness by the Designer.
- c. The designer shall coordinate and notify all parties of the time and date of the formal final inspection.

- d. Upon correction by the contractor and verification by the designer that the work has been completed, a formal final inspection shall be coordinated and performed by the designer in cooperation with the contractor in the present of the owning agency and the State Construction Office.

12.) As-Built Drawing:

- a. Contractor to keep record set of drawings on site for record drawing purposes exclusively.
- b. Designer and Owner will review the record drawings once a month at construction meeting.

13.) State Construction Office Requirements: Show project SCO ID on all correspondence. Provide a copy of all designers' weekly inspection reports to the project monitor.



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NC State's Requirements

MONTHLY MEETING AGENDA

Project Name: _____
Project number: _____ Code: _____ Item: _____ SCO ID #: _____

Date and location of Meeting: _____

Attendees:

- 1.) Review previous minutes of the meeting and resolve any corrections.
- 2.) Work performed in the last 30 days.
- 3.) Work to be performed in the next 30 days.
 - a. Review Project Schedule Summary and attach to the meeting minutes.
 - b. Review updated schedule and attach to the meeting minutes.
 - c. Review Monthly Progress Summary and attach to the meeting minutes.
- 4.) Requests for Proposals.
- 5.) Review Pending Change Orders. Attach an updated Change Order Log to the meeting minutes.
- 6.) Review Requests for Information. Attach an updated RFI log to the meeting minutes.
- 7.) Review Submittals. Attach an updated Submittal Log to the meeting minutes.
- 8.) Discuss Coordination Issues.
- 9.) Designer Weekly Inspection Reports.
- 10.) Erosion Control & Tree Protection Review.
- 11.) Site Cleanliness.
- 12.) Safety.
- 13.) Open Discussion.
- 14.) Attach photos of work progress, taken within two days of the meeting, to the meeting minutes.



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PROJECT SCHEDULE SUMMARY

Notice to Proceed Date _____

Contract Completion Date _____

Contract Calendar Days _____

Number of Contract Calendar Days Expended to Date
Thru __/__/__ _____

Percentage of Contract Time Expended to Date
Thru __/__/__ (Days Expended/Contract Duration) _____

Previous Percentage of Contract Time Expended to Date _____

Pending Time Extensions (Weather – Calendar Days) _____

Pending Time Extensions (Scope – Calendar Days) _____

Approved Time Extensions (Weather – Calendar Days) _____

Approved Time Extensions (Scope – Calendar Days) _____

Completion Date per Updated Schedule _____

Actual Percentage Complete (Work in Place less stored Materials)
thru __/__/__ _____

Previous Percentage Complete _____



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MONTHLY CONSTRUCTION PROGRESS REPORT

Designer		Address	
Location		Date	
Job Title		Starting Date	
SCO ID#			

PERCENT COMPLETION

	% Previous Month	% This Month	% Total to Date	% Scheduled	Completion Date
General Contract					
Plumbing Contract					
Mechanical Contract					
Electrical Contract					

Change Orders Since Last Report:

Change Order Number	Amount	Purpose

Insurance up to Date: Yes ___ No ___
Explanation (if no):

Financial Status:	Previously Authorized	Authorized This Month	Total Contract Inc. Extras	% of Total Authorization
General				
Plumbing				
Mechanical				
Electrical				
Totals				

If work is behind schedule, what action has been taken?



June 14, 2024

NC State University
Design and Construction
NC State's Requirements

WEEKLY MEETING AGENDA

Project Name: _____
Project number: _____ Code: _____ Item: _____ SCO ID #: _____

Date and location of Meeting: _____

Attendees:

- 1.) Contractor's Construction Schedule:
 - a. Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - b. Review schedule for the upcoming two-week period.
 - c. Discuss long-term schedule needs as necessary.
- 2.) Safety, hazards and risks.
- 3.) Change Order Requests and Change Orders.
- 4.) Request for Information.
- 5.) Submittals.
- 6.) Designer Inspection Reports.
- 7.) Erosion & Sedimentation Update (if applicable).
- 8.) Review condition of tree protection (if applicable).
- 9.) Progress cleaning and site cleanliness.
- 10.) Changes to Site Logistics or Emergency Action Plan.
- 11.) Sequence of operations.
- 12.) Resolution of BIM component conflicts.
- 13.) Status of upcoming samples and/or mockups, and location for review.
- 14.) Deliveries.
- 15.) Off-site fabrication.
- 16.) Access.
- 17.) Site utilization.



June 14, 2024

NC State University
Design and Construction
NC State's Requirements

- 18.) Temporary facilities and controls.
- 19.) Atypical work hours.
- 20.) Quality and work standards.
- 21.) Pending changes
- 22.) Pending claims and disputes.
- 23.) Documentation of information for payment requests.
- 24.) Testing and inspection requirements.
- 25.) Other business relating to the Work.

NC State University Lift Plan Approval Request

Date Submitted: _____

Submitted by: _____

NCSU Group Leading Project: _____

Lift Date: _____

-
- The identity of the controlling entity, meaning the employer with the overall responsibility for construction operations associated with the crane lift.
 - Identify a lift director (i.e. primary signal person) and method of communication (hand signals, radio, etc.).
 - Contractors conducting crane operations are required to obtain required FAA permits according to 14.CFR Part 77; to be submitted with the lift plan.
 - Equipment positioning locations, including load staging and movement and paths to and from the working position
 - Equipment specifications including load and reach capacities
 - Current qualifications, certifications, and licenses of operator(s) and rigger(s)
 - For lifts involving more than one crane, the lift plan shall encompass all cranes.
 - Fall Zone: The contractor shall identify the Fall Zone. The Fall Zone is the area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall. Spaces within the Fall Zone (including buildings, foot traffic, vehicle traffic, etc.) shall be barricaded to control access. The Fall Zone shall be cleared of personnel not participating in the lift.
 - Wind limitations
 - Ground and subsurface stability at crane and load placement locations. The contractor must ensure a qualified person evaluates the crane set-up location to ensure ground conditions are sufficient.
 - Other conditions or factors that may affect the safety of the lift
 - A pre-lift meeting must be completed immediately before the lift and shall include all personnel involved with the lift and a thorough review of the elements and specifics of the lift plan and personnel assignments.
 - Specify distance to closest energized lines and applicable minimum approach distance of any lift component.
 - Where items positioned by a crane lift are rigged at heights above easy reach height, the lift plan shall include safe attachment and de-attachment procedures and the control of exposure to fall hazards
 - The contractor must provide documentation of annual and monthly inspections for the previous 3 months. 1926.1412(f) & .1412(e)

Reviewed by: _____

Review Date _____

- **Approved**
- **More Information Needed**
- **Denied**



C&D WASTE AND RECYCLING TRACKING FORM

The University requires 75% of the waste produced from each project be diverted from the landfill

Project Name & ID: _____

Name of Contractor: _____

Project Manager Name: _____

Contractor Phone #: _____

For assistance completing this form contact Adam Bensley, NCSU Waste Reduction & Recycling (919) 515-0661

Name of Person Completing Form: _____

It is required to attach weight tickets and/or invoices to this form.

Please check one: Weight tickets attached Weight tickets not attached. Provide explanation: _____

Date	Waste Hauler/Contractor Name	Material Description	Weight (lbs or tons)	Estimate Weight if no Ticket	Recycling or Landfill Facility Hauled to

Project Totals (Contractor to Calculate)

Total Weight Landfill: _____

Total Weight Diverted (Recycled + Salvaged): _____

Percent of Project Waste Diverted from Landfill
(Total Weight Diverted / Total Project Weight) x 100

Total Weight Recycled: _____

Total Project Weight (Recycled + Salvaged + Landfilled): _____

_____ %

Instructions for completing this form

1. NCSU project manager to provide info.
2. Contractor to provide this information, including name of person completing this form.
3. Check a box indicating whether weight tickets are attached to this form. If they are not, provide an explanation.
4. Complete one line for each instance of hauling.
 - A. List the date material was hauled.
 - B. Provide name of waste hauler or contractor who disposed or recycled the material.
 - C. List the type of material disposed of or recycled. Ex. Mixed C&D waste, scrap metal, concrete, asphalt shingles, etc.
 - D. List the actual weight of the material, in pounds or tons, as recorded by a scale.
 - E. If material is not weighed by a scale, provide an estimate of the weight in pounds or tons (keep units consistent throughout).
 - F. List the facility the material was delivered to.
5.
 - A. Provide the total weight of all materials that went to a landfill. *Note:* For Waste Industries Raleigh View Road C&D Processing Facility *only* - 20% of each load is recycled. Multiply the weight recorded at this facility by .80 to get the weight landfilled by Waste Industries.
 - B. Provide the total weight of materials that were recycled. *Note:* For Waste Industries Raleigh View Road C&D Processing Facility *only* - 20% of each load is recycled. Multiply the weight recorded at this facility by .20 to get the weight recycled by Waste Industries.
 - C. Total weight recycled (B) plus total weight salvaged (*#8 on Salvaged Material form*).
 - D. Total weight of all material generated by the project (A+B+C).
 - E. Divide the total weight diverted by the total project weight, then multiply by 100 to get the diversion rate as a percent $((C/D) \times 100)$.



C&D WASTE AND RECYCLING TRACKING FORM

The University requires 75% of the waste produced from each project be diverted from the landfill

1. Project Name & ID: _____

Project Manager Name: _____

2. Name of Contractor: _____

Contractor Phone #: _____

Name of Person Completing Form: _____

For assistance completing this form contact Adam Bensley, NCSU Waste Reduction & Recycling (919) 515-0661

It is required to attach weight tickets and/or invoices to this form.

3. Please check one: Weight tickets attached Weight tickets not attached. Provide explanation: _____

4.

Date	Waste Hauler/Contractor Name	Material Description	Weight (lbs or tons)	Estimate Weight if no Ticket	Recycling or Landfill Facility Hauled to
A	B	C	D	E	F

Project Totals (Contractor to Calculate)

5. Total Weight Landfill: **A** _____ Total Weight Diverted (Recycled + Salvaged): **C** _____ Percent of Project Waste Diverted from Landfill (Total Weight Diverted / Total Project Weight) x 100

Total Weight Recycled: **B** _____ Total Project Weight (Recycled + Salvaged + Landfilled): **D** _____ **E** _____%

Description Of Program: The University has established a program to salvage building materials, parts and furnishings that would otherwise be considered construction and demolition waste. Prior to the beginning of construction and renovations projects on campus, Facilities Operations and other Donees will have an opportunity to reclaim C&D materials for reuse.

Facilities Operations Trade shops will have first priority in the invitation to salvage materials from construction and renovation projects. Other donees, such as Habitat for Humanity may receive donation of reusable materials. The following conditions and procedure must be met in order to participate in the salvaged material/ reuse program.

Criteria:

Clear understanding of the purpose of the salvaged material/ reuse program.

Tracking the salvaged materials is extremely important to protect all participants from possible liability claims or false acquisition of materials by shops or donees.

Shop or donee is responsible for removal and transportation of materials.

Shop or donee has adequate second use or storage for the materials.

Shop or donee takes responsibility for the timely and lawful surplus or disposal of materials if an adequate reuse is not identified in an appropriate amount of time.

Questions? Contact WRR at 919.515.9421 or recycling@ncsu.edu

Return completed form to Waste Reduction and Recycling. Campus Box 7516 or recycling@ncsu.edu



CONSTRUCTION & DEMOLITION SALVAGED MATERIAL FORM

Project Name & ID: _____

Project Manager Name: _____

For assistance completing this form contact Adam Bensley, NCSU Waste Reduction & Recycling (919) 515-0661

Date	Material Description	Quantity	Weight Each Item (lbs or tons)	Estimated Donation Value	Released By (NCSU)	Released To & Phone #

Total Salvaged Material Weight: _____

Instructions for completing this form

- 6. NCSU project manager to provide info.
- 7. Complete one line for each item salvaged for reuse.
 - A. List the date salvaged material was turned over to the receiving party.
 - B. Describe the material being salvaged for reuse.
 - C. Quantity of a particular item was salvaged.
 - D. Weight of each item, either actual or estimated.
 - E. Estimate the value of the material. If you are unsure, leave this blank.
 - F. List the name of the person at NCSU who is releasing the material.
 - G. List the name and phone number of the person who is receiving the material.
- 8. Add up the total weight of material salvaged. Keep the units (tons or pounds) consistent with those used on C&D waste tracking form, as this number will be used in the diversion rate equation.



CONSTRUCTION & DEMOLITION SALVAGED MATERIAL FORM

6. Project Name & ID: _____
 Project Manager Name: _____

For assistance completing this form contact Adam Bensley, NCSU Waste Reduction & Recycling (919) 515-0661

7.

Date	Material Description	Quantity	Weight Each Item (lbs or tons)	Estimated Donation Value	Released By (NCSU)	Released To & Phone #
A	B	C	D	E	F	G

8. Total Salvaged Material Weight: _____

SECTION 01 10 00

SUMMARY

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Project Information.
 - 2. Work covered by Contract Documents.
 - 3. Codes and Standards.
 - 4. Specification and drawing conventions.
 - 5. Miscellaneous provisions.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to the Work of all Sections in the Specifications. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all.
- B. Conflicts or discrepancies among the Contract Documents shall be resolved in the following order of priority:
 - 1. The Form of Contract, as modified by Contract modifications (Change Orders). Change Orders of later date take precedence over those instruments of earlier date;
 - 2. The General Conditions, as modified by the Supplementary General Conditions;
 - 3. Specifications;
 - a. Specifications govern Drawings for quality and performance.
 - 4. Drawings.
 - a. Drawings govern Specifications for quantity and location.
 - b. In the event of a conflict between small-scale detail drawings (e.g. less detailed, 1/8"=1'-0" scale) and large-scale detail drawings (e.g. more detailed, 1-1/2" = 1'-0" scale), the largest scaled drawings take precedence.
- C. In the event of ambiguity or conflicts between Specifications and Drawings, the greater quantity and the better quality shall govern.

1.3 PROJECT INFORMATION

- A. Project Identification: Mann Hall Renovation, Demolition Package.
 - 1. Project Location: 2501 Stinson Drive, Raleigh, North Carolina 27607.
- B. Project Directory: Refer to Specification Section 00 01 03 "Project Directory".
- C. Project Web Site: A Project Web Site administered by Contractor will be used for purposes of managing communication and documents during the construction stage.
 - 1. See Section 01 31 00 "Project Management and Coordination" for requirements for establishing, administering, and using the Project Web Site.

1.4 WORK COVERED BY CONTRACT DOCUMENTS

- A. The Work of Project is defined by the Contract Documents and consists of:
 - 1. Mann Hall Renovation project will transform the existing building into a new academic hub on North Campus to support the College of Engineering growth and provide a new and vibrant home for Esports at NC State.
 - 2. The Early Procurement scope includes: structural demolition of slabs, new foundations within building envelope, structure for mechanical penthouse, roof with associated accessories and specialties.

1.5 CODES AND STANDARDS

- A. All references to codes, specifications and standards referred to in the Contract Documents shall mean, and are intended to be, the edition referenced in the Appendix B as noted in the Project Drawings.
- B. In addition to the codes, specifications and standards referred to in the Contract Documents all work provided under this Contract shall comply with the applicable provisions of the following, where standards conflict the more stringent shall apply:
 - NC State Facilities – Design and Construction Guidelines - <https://facilities.ofa.ncsu.edu/resources/guidelines/construction-guidelines/>
 - 1. Electrical Utility: Not Applicable
 - 2. Gas Utility: Not Applicable
 - 3. Water Utility: Not Applicable
 - 4. Sewer: Not Applicable
 - 5. Stormwater: Not Applicable
 - 6. Zoning: Not Applicable

1.6 SPECIFICATION AND DRAWING CONVENTIONS

- A. Specifications Format: The Specifications are organized into Divisions and Sections using CSI/CSC's "MasterFormat 2020" 50-Division numbering system.

1. Section Identification: Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence, without all numbers included in the sequence. Consult the Table of Contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.
 2. The order of articles, paragraphs, subparagraphs, and sub-subparagraphs within the text of any specification section is defined by a sequence of indentations.
 - a. Article, paragraph and subparagraph titles, and other identifications of subject matter in the specifications are intended as an aid in locating and recognizing various requirements in the beginning words of a sentence.
 - b. Specification text governs over titling and is understood to be interpreted as a whole. Where a title establishes the subject, the titles are subordinate to and do not define, limit, or otherwise restrict the specification text.
 3. The captions and headings of various subdivisions of the Contract Documents are intended only as a matter of reference and convenience for describing the Work and in no way define, prescribe, or limit the scope or intent of the Contract Documents or any subdivision thereof.
- B. Specification Content: The Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows:
1. Abbreviated Language: Language used in the specifications and other Contract Documents is abbreviated. Words and meanings are to be interpreted as appropriate. Words implied, but not stated, are to be inferred as the sense requires. Singular words are to be interpreted as plural, and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.
 2. Imperative mood and streamlined language are generally used in the specifications. Requirements expressed in imperative mood are to be performed by Contractor. Occasionally, the indicative or subjunctive mood may be used in the section text for clarity to describe responsibilities that must be fulfilled indirectly by Contractor or by others when noted.
 - a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
 - b. Contract Documents may omit modifying words such as "all" or "any," and articles such as "the" or "an." The absence of a modifier or article from one statement that appears in another is not intended to affect the interpretation of either statement.
 3. Specification requirements are to be performed by Contractor unless specifically stated otherwise.
 4. The specifications do not:
 - a. Establish trade jurisdictions or divisions of responsibility.
 - b. Define subcontract scopes of work.

5. Division 01 General Requirements: Requirements of sections in Division 01 apply to the Work of all sections in the specifications.
 6. Work specified in any one section is related to, and dependent upon, Work specified in other sections, whether specific reference is made to the Work of other sections or not. Cross-references in the specifications are general references intended as a matter of convenience for aiding in the location general information and are not all-inclusive.
 7. Names, telephone numbers, and website addresses and other contact information listed in the Contract Documents are for convenience only, are subject to change, and are believed to be accurate and up to date as of the printing of the Contract Documents.
 8. Use of the word "including," when following any general statement, is not to be construed to limit such statement to specific items or matters listed, whether or not non-limiting language (such as "without limitation," "but not limited to," or other words of similar import) is used with reference thereto; but rather, deemed to refer to all other items or matters that could reasonably fall within the broadest possible scope of such general statement.
- C. Drawing Coordination: Requirements for materials and products identified on Drawings are described in detail in the Specifications. One or more of the following are used on Drawings to identify materials and products:
1. Terminology: Materials and products are identified by the typical generic terms used in the individual Specifications Sections.
 2. Abbreviations: Materials and products are identified by abbreviations published as part of the U.S. National CAD Standard and scheduled on Drawings.
 3. Keynoting: Materials and products are identified by reference keynotes referencing Specification Section numbers found in this Project Manual.

1.7 MISCELLANEOUS PROVISIONS

- A. Special Insurance: Contractor's Commercial General Liability insurance shall contain no exclusion that would deny coverage for any claim arising out of or contributed to by any fungus, mildew, mold, or resulting allergens. If such exclusion exists and cannot be removed by endorsement, Contractor shall submit proof of coverage for fungus, mildew, mold, or resulting allergens under a Pollution Legal Liability or Contractor's Pollution Liability policy.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 11 16

WORK BY OWNER

PART 1 – GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Owner Furnished equipment for Contractor Installation (OFCI).
 - 2. Owner Furnished and Owner Installed equipment (OFOI).
 - 3. Owner performed work.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 INSURANCE AND SAFETY

- A. Work performed by Owner and/or Owner's Contractors must abide by the Contractor's insurance and safety requirements. Owner and Contractor shall coordinate logistics and schedule to ensure the safe installation of OFOI work.

PART 2 – PRODUCTS

2.1 OWNER FURNISHED EQUIPMENT FOR CONTRACTOR INSTALLATION

- A. Work includes receiving, unloading, handling, storing, protecting, and installing Owner-furnished products and making building service connections.
- B. Owner Responsibilities include arranging for shop drawings, product data, and samples and deliver to Contractor. Arrange and pay for delivery of Owner-furnished items according to the Contractor's construction schedule.
- C. Division 11 - Equipment
 - 1. Biosafety Cabinets.

2.2 OWNER FURNISHED AND OWNER INSTALLED EQUIPMENT

- A. None.

PART 3 - EXECUTION

3.1 OWNER PERFORMED WORK

- A. Division 01 – General Requirements
 - 1. All existing valves and circuits must be operated by NC State personnel.
 - 2. Various fittings not included in the specifications.
- B. Division 11 – Equipment
 - 1. Equipment.
 - 2. Laboratory equipment.
- C. Division 12 – Furnishings
 - 1. Furniture.
- D. Division 26 – Electrical
 - 1. High voltage power lines through the duct bank to transformer.
- E. Division 27 – Telecommunications
 - 1. Low Voltage systems.
- F. Division 28 – Security & Access Control
 - 1. Low Voltage systems.

END OF SECTION

SECTION 01 14 00

WORK RESTRICTIONS

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section Includes:
 - 1. Owner’s Representative.
 - 2. Employee Screening.
 - 3. Behavior Policy.
 - 4. Working Hours.
 - 5. Use of Premises.
 - 6. Utility Interruptions.
 - 7. Fire Alarm Shutdowns.
 - 8. Hot Work Permits
 - 9. Miscellaneous restrictions.
- B. Related Sections include the following:
 - 1. Section 00 60 00 “Project Forms” for the Outage Request Form and Method of Procedure Form to be submitted by the Contractor when requesting Utility Interruptions.
 - 2. Section 01 55 00 “Vehicular Access & Parking” for additional requirements on access and parking.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 OWNER’S REPRESENTATIVE

- A. NC State has designated a Project Manager to act as the Owner’s Representative in all matters pertaining to construction contracts. All official contacts, decisions, directions, problem resolution, coordination and other liaison activities required from NC State will be through the Project Manager. This requirement does not modify the responsibilities of the Designer as stated in the General Conditions of the Contract. The Project Manager for this project is listed in the Project Directory.

1.4 BEHAVIOR POLICY

- A. All construction personnel shall be respectful of all members of the NC State community.
- B. Any incidents of disrespect, verbal abuse, threatening statements, unwelcome comments, unwelcome interaction or any form of harassment from any construction personnel toward any member of NC State community is strictly prohibited. Any such act shall constitute sufficient cause for NC State to remove any individual permanently from the project and all NC State property.
- C. Any of the Contractor(s) project personnel who ignore or refuse to take action on any requirements of the contract documents or ignore or refuse to take immediate action to correct any endangerment to the health and safety of the public (as solely determined by NC State) shall be permanently removed from the project and NC State property.
- D. If in the sole determination of NC State, it is in the best interest of the project and NC State to have any of the Contractor(s) personnel removed from the project, then the Contractor shall do so upon request by NC State. Such actions taken by NC State shall not constitute grounds for a delay claim. NC State will not be responsible for any delays caused to the project due to any individual being removed from the project by NC State.

1.5 WORKING HOURS

- A. The Contractor may establish a work schedule of his own choosing. There are no restrictions regarding work hours, except as noted herein. The Contractor shall submit to NC State and to the Designer his regular daily work schedule and shall notify NC State in writing one week in advance of any deviations from the schedule.
- B. NC State reserves the right to limit the Contractor's activities when they conflict with NC State operations at no additional cost or delay to the project. During times in which construction operations conflict with NC State operation, NC State may require the Contractor to cease all construction activities, limit activities to on-site only, modify working hours, make accommodations for access, restrict noise-making activities, or other limitations as determined by NC State. Instances in which construction operations may conflict with NC State operations include, but are not limited to, the following:
 - 1. Refer to NC State University website <https://studentservices.ncsu.edu/calenders/> for calendars regarding academic, exam, events and closings.
 - 2. Study and Examination periods;
 - a. Spring 2025: Thursday thru Wednesday, April 24th – 30th.
 - b. Summer Session 2025: Wednesday, June 18th; Friday, June 20th; Monday & Tuesday, July 28-29;

- c. Contractor may perform "light work" on these dates, provided it does not impact adjacent classroom buildings. No deliveries should be scheduled during these dates, unless specifically approved by NC State.
- 3. Graduation; Saturday, May 3, 2025
- 4. Athletic or Special events.
- 5. Student move in/move out days.
- 6. University Holiday Schedule:

Calendar Year 2025

New Year's Day	Wednesday, Jan. 1
MLK Jr. Day	Monday, Jan. 20
Memorial Day	Monday, May 26
Independence Day	Friday, July 4
Labor Day	Monday, Sept. 1
Thanksgiving	Thursday, Nov. 27
Day after Thanksgiving	Friday, Nov. 28
Winter Break	Wednesday, Dec. 24
Winter Break	Thursday, Dec. 25
Winter Break	Friday, Dec 26
Winter Break	Monday, Dec. 29
Winter Break	Tuesday, Dec. 30
Winter Break	Wednesday, Dec. 31

1.6 USE OF PREMISES

A. Parking & Staging Areas

- 1. Parking is extremely limited at NC State. Parking for personal vehicles on campus is not provided by NC State and is the responsibility of the Contractor. Contractors must limit parking of company vehicles and storage of materials to within the limits of the construction site and staging area.
- 2. The Contractor is required to follow NC State Transportation's Contractor Parking Policies as described online at:
<https://transportation.ncsu.edu/construction-parking-information/>.
 - a. Contractor parking will be coordinated by permits through the NCSU Transportation office. These costs will be incurred by the contractor.
- 3. Reserved Spaces & Staging Areas must be approved in advance by NC State's Project Manager and NC State Transportation. A current logistics plan must be submitted by the Contractor to NC State in order for any reserved spaces or staging areas to be approved. Contractor staging area as shown on the Drawings includes existing employee/staff parking which will be taken offline, the cost of which will be paid by Owner.

B. Traffic Movement & Interruptions

- 1. The Contractor shall make requests for approval for any street, alley, driveway or any access way to be closed at least fifteen (15) workdays prior to the date for the desired closing.

- a. The request shall be accompanied by a proposed traffic control plan prepared by the Contractor detailing all signage and detour routes in accordance with MUTCD current revision requirements.
- b. The plan must be reviewed and approved by Designer and NC State.
2. The Contractor shall close no street, alley, driveway or access-way without prior approval by NC State. Contractor shall only install a blockage after NC State has provided written approval of the proposed blockage.
 - a. All blockages and detours shall be planned, subject to approval by NC State, considering handicapped access.
3. The Contractor shall install warning signs, barricades, and detour information signs to maintain traffic flow as directed by NC State, and in accordance with MUTCD requirements. If required, flagmen provided by the Contractor shall direct traffic around the construction area or detour area.
 - a. At all times, pedestrian and vehicle traffic wayfinding around the construction limits must be maintained in a clean and safe condition.
4. NC State is a handicap accessible campus. All barricades, temporary walkways, excavations, and stockpiled materials shall be placed and/or constructed in such a manner as to accommodate, adequately warn, and protect all members of the campus community, as well as the general public. Contractor shall not block accessible pathways without providing suitable alternative accessible pathways as agreed upon by Designer and NC State. Owner reserves the right to reject or modify Contractor's Site Logistics Plan as necessary to ensure handicap accessibility throughout campus.
5. No excavations shall take place prior to placing proper barricades, lighting, and other devices as shall be required.

1.7 UTILITY INTERRUPTIONS

- A. The Contractor shall ensure all campus utilities and other campus services are maintained throughout the Project, except for scheduled interruptions.
- B. The Project anticipates, at a minimum, the following outages to occur:
 1. Electrical: The switch serving Mann Hall will need to be opened to deenergize the existing transformer and primary conductors. This will not impact any building beyond Mann Hall.
 2. Potable Water: The Contractor should be able to complete the proposed wet tap without cutting off service to the rest of campus.
 3. Sanitary Sewer: The proposed connections in Yarbrough should be completed with minimal downtime to the existing sewer.
 4. Storm Drainage: The proposed connections in Yarbrough should be completed with minimal downtime to the existing storm.
 5. TeleComm Ductbank: The installation of the new ductbank can be completed without any downtime but unsure about the switch from the old ductbank to the new ductbank. Expected to be minimal.

- C. The Contractor shall submit an Outage Request to NC State's Project Manager at least fourteen (14) calendar days in advance for minor outages and thirty (30) calendar days in advance for major outages. While the Outage Request Form provided in Section 00 60 00 "Project Forms" lists shorter durations, the durations listed herein are required so all communication, collaboration, and coordination can occur to ensure a successful Outage.
1. No utility interruption, regardless of the advance notice given, shall be undertaken without written approval from NC State.
 2. All Outage Requests for a utility interruption must include an Outage Request Form and a Method of Procedure (MOP) describing the sequence of operations for the work to be performed by the Contractor during the outage. Incomplete Outage Requests will not be processed.
 3. Upon receipt of the Outage Request Form and MOP, NC State will notify the Contractor that the Contractor can schedule a coordination meeting with NC State's Project Manager and appropriate personnel from the NC State Zone Shop or Department, and other interested parties, to discuss the Outage Request and the MOP.
 - a. No outage will be scheduled without a coordination meeting.
 4. NC State may determine the utility service cannot be interrupted for the length of time or frequency requested by the Contractor.
 5. NC State will determine if an outage is considered major or minor.
 6. Examples of major outages include, but are not limited to, outages impacting:
 - a. An entire building;
 - b. An entire floor of a building;
 - c. All or parts of several buildings;
 - d. All or parts of an area;
 - e. Any high voltage outage.
- D. If requested by NC State, utility outages shall be performed after hours and/or at night, or over the weekend, or during holidays. No extra payment will be made for such work. Anticipated off-hour outages on the project are as follows:
1. Electrical: The switch serving Mann Hall will need to be opened to deenergize the existing transformer and primary conductors. This will not impact any building beyond Mann Hall.
 2. Potable Water: The Contractor should be able to complete the proposed wet tap without cutting off service to the rest of campus.
 3. Sanitary Sewer: The proposed connections in Yarbrough should be completed with minimal downtime to the existing sewer.
 4. Storm Drainage: The proposed connections in Yarbrough should be completed with minimal downtime to the existing storm.
 5. TeleComm Ductbank: The installation of the new ductbank can be completed without any downtime but unsure about the switch from the old ductbank to the new ductbank. Expected to be minimal.
- E. Certain activities of utility outages must be performed by NC State and cannot be performed by the Contractor. Examples of activities to be performed by NC State include, but are not limited to:

1. Operating existing electrical switches;
 2. Turning existing water, chilled water, and steam valves;
 3. Placing existing building systems back in operation;
 4. Operating existing fire alarm systems.
- F. While NC State will provide reasonable support to the Project at no cost to the Contractor, when the Contractor requires an additional or extra outage to complete their work because of a shortage of or improper materials, shortage of labor, poor coordination, failure to finish the work during the outage scheduled length of time, the Contractor will pay all expenses incurred for NC State's services for an additional outage(s) via deductive Change Order.
- G. Signs and barricades (if applicable) for utility outage notice shall be written and placed as directed by NC State seven (7) workdays prior to the outage. No outage shall take place until signs and barricades (if applicable) are in place to notify and/or protect the public. Signs and barricades (if applicable) must be maintained throughout the outage.
1. Signs shall be neat and legible, hand-made signs are not acceptable.
- H. The Contractor shall include in his base bid provisions for temporary utility equipment and services for the duration of the outage(s) required to complete the Project. Anticipated equipment and services for shutdowns on the project are as follows:
1. Sewer Pump Arounds
 2. Powering systems by generator
 3. Temporary HVAC
- 1.8 FIRE ALARM SHUTDOWNS
- A. The Contractor shall schedule all fire alarm shutdowns to support the Project with NC State's Project Manager at least five (5) workdays in advance. Fire Alarm shutdowns must be conducted by NC State.
- B. If at any time the fire alarm system is not in operation after normal working hours then the Contractor shall be required to employ a Fire Watch for the unprotected portion of the building, using a Fire Watch company approved by NC State's Fire Marshal.
- 1.9 HOT WORK PERMITS
- A. When the Contractor is performing work that produces heat, flame, or sparks on or in an existing building or other structure the Contractor is required to obtain a "hot work" permit from NC State Environmental Health and Public Safety, Fire Protection Department. The department's requirements for the hot work program and permit can be found at the web link on the first page of this document. The EH&PS Hot Work Policy (rev. May 1, 2022) is appended to the end of this section.
- <https://policies.ncsu.edu/regulation/reg-04-15-02/>

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1.10 MISCELLANEOUS RESTRICTIONS

- A. Controlled Substances: Use of tobacco products and other controlled substances on NC State's campus is not permitted. Refer to REG 04.20.03 – Smoking Regulation for University Facilities. <https://policies.ncsu.edu/regulation/reg-04-20-03/>
 - 1. Exception: Controlled substances as prescribed by a doctor are allowable provided appropriate documentation that does not violate HIPPA requirements is available.
- B. Firearms are prohibited on all university property. Refer to REG 04.20.10 - Firearms, <https://policies.ncsu.edu/regulation/reg-04-20-10-firearms/>

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

WORK RESTRICTIONS

01 14 00 - 7

SECTION 01 22 00

UNIT PRICES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for unit prices.
- B. Related Sections include the following:
 - 1. Section 01 21 00 "Quantity Allowances" for procedures for using unit prices to adjust quantity allowances.
 - 2. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Unit price is an amount incorporated in the Agreement, applicable during the duration of the Work as a price per unit of measurement for materials, equipment or services, or a portion of the Work, added to or deducted from the Contract Sum by appropriate modification, if the scope of the Work or estimated quantities of Work required by the Contract Documents are increased or decreased.

1.4 PROCEDURES

- A. Unit prices include all necessary material, plus cost for delivery, installation, insurance, applicable taxes, overhead, and profit.
- B. Measurement and Payment: Refer to individual Specification Sections for work that requires establishment of unit prices. Methods of measurement and payment for unit prices are specified in those Sections.
- C. Owner reserves the right to reject Contractor's measurement of work-in-place that involves use of established unit prices and to have this work measured, at Owner's expense, by an independent entity acceptable to Contractor.
- D. List of Unit Prices: A schedule of unit prices is included in Part 3 of this Section. Specification Sections referenced in the schedule contain requirements for materials described under each unit price.

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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SCHEDULE OF UNIT PRICES

- A. Unit Price 1: Moisture Vapor Emission Control System: Refer to Section 09 05 61.13 - Moisture Vapor Emission Control.
 - 1. Description: Provide cost per square foot for complete system, including shot-blasting concrete substrate, application of penetrant, post-application moisture and alkalinity testing, application of cementitious underlayment, and manufacturer's 15-year warranty.
 - 2. Unit of Measurement: Square foot.
- B. Unit Price No. 2: Cement-Based Underlayment: Refer to Section 03 54 16 - Cement-Based Underlayment.
 - 1. Description: Provide cost per square foot for cement-based, polymer-modified, self-leveling underlayment for leveling of existing and new concrete flooring scheduled to receive finish flooring.
 - 2. Unit of Measurement: Square foot.

END OF SECTION

SECTION 01 23 00

ALTERNATES

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for alternates.
- B. Related Sections include the following:
 - 1. Section 01 26 00 "Contract Modification Procedures" for procedures for submitting and handling Change Orders.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Alternate: An amount proposed by bidders and stated on the Bid Form for certain work defined in the bidding requirements that may be added to or deducted from the base bid amount if Owner decides to accept a corresponding change either in the amount of construction to be completed or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.
 - 1. Alternates described in this Section are part of the Work only if enumerated in the Agreement.
 - 2. The cost or credit for each alternate is the net addition to or deduction from the Contract Sum to incorporate alternate into the Work. No other adjustments are made to the Contract Sum.

1.4 PROCEDURES

- A. Coordination: Revise or adjust affected adjacent work as necessary to completely integrate work of the alternate into Project.
 - 1. Include as part of each alternate, miscellaneous devices, accessory objects, and similar items incidental to or required for a complete installation whether or not indicated as part of alternate.
- B. Execute accepted alternates under the same conditions as other work of the Contract.

- C. Schedule: A schedule of alternates is included at the end of this Section. Specification Sections referenced in schedule contain requirements for materials necessary to achieve the work described under each alternate.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION

3.1 SCHEDULE OF PREFERRED BRAND ALTERNATES (NOT USED)

3.2 SCHEDULE OF ALTERNATES

- A. Alternate #3: Demolition of Roof leaders and Storm Sewer System
1. Base Bid: Maintain active storm sewer control system by keeping roof drains and roof leaders intact throughout demolition stage. Provide temporary support for roof leaders where existing supporting elements are noted to be demolished. Maintain active storm sewer piping from roof drain to campus stormwater utility invert.
 2. Alternate Bid: Demolish roof leaders and storm sewer system, and provide a temporary storm system until the changeover to the permanent new system occurs in future phases.
 3. References:
 - a. Drawing Sheets: P04-00, P04-01
- B. Alternate #4: Polyvinyl-Chloride Roofing
1. Base Bid: Provide Thermoplastic Polyolefin (TPO) Roofing (07 54 23) as specified.
 2. Alternate Bid: Provide Polyvinyl-Chloride Roofing (07 54 19) and associated specialties in lieu of Thermoplastic Polyolefin (TPO) Roofing (07 54 23) as specified.
 3. References:
 - a. Drawing Sheets: A00-10, A11-06
 - b. Specification Sections:
 - 1) 07 54 23 - Thermoplastic Polyolefin (TPO) Roofing
 - 2) 07 54 19 - Polyvinyl-Chloride Roofing
- C. Alternate #5: Roof Dunnage for Future Photovoltaics
1. Base Bid: Provide structural steel for roof beams and girders as shown in drawings.
 2. Alternate Bid: Provide structural steel posts and roof penetrations as shown in structural drawings and architectural drawings.
 - a. References:
 - 1) Drawing Sheets: S00-01, S16-01, A11-06, A32-04.

END OF SECTION

SECTION 01 25 00

SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for substitutions.
- B. Related Sections:
 - 1. Section 00 60 00 "Project Forms" for the Substitution Request Form.
 - 2. Section 00 72 00 "General Requirements" for requirements on when Substitutions are allowable.
 - 3. Section 01 60 00 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.
 - 4. Section 01 33 00 "Submittal Procedures" for administrative requirements for submittals.
 - 5. Divisions 02 through 49 Sections for specific requirements and limitations for substitutions.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. Requests for substitution of materials, items, or equipment shall be submitted to the Project Designer for approval or disapproval; such approval or disapproval shall be made by the designer prior to the opening of bids. Substitutions after bidding are only allowed if it can clearly be demonstrated that the substitution is for the sole benefit of the Owner, and the Designer and Owner approve of the substitution.

1.3 DEFINITIONS

- A. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.
 - 1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, as limited to the following conditions:
 - a. Unavailability of product within the Contract Duration;
 - b. Regulatory or significant manufacturing changes that prevent the manufacture or delivery the product;

- c. Net savings to the project, either in Contract Duration or Project Cost. If there is a time savings, the Contractor must also return to Owner the corresponding savings to General Conditions. Contractor is responsible for Designers time to detail the substitution, which may negate Contractors proposed savings and be a net addition to the project cost, in which case the substitution would not be allowable.
2. Substitutions for Convenience: All other changes proposed by Contractor. Substitutions for convenience are not allowed.

1.4 ACTION SUBMITTALS

- A. Substitution Requests: Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 1. Substitution requests must be submitted by the Contractor in a timely manner so the request can be reasonably evaluated so as not to impact the Project Schedule. Delays resulting from the Substitution Request process shall not relieve the Contractor from its obligation to complete the project within the duration specified in the Contract Documents.
 2. Substitution Request Form: Use "Substitution Request" form provided in Section 00 60 00 "Forms."
 3. Documentation: Show compliance with requirements for substitutions and the following, as applicable:
 - a. Provide Contractor Name, address, and contact information for individual responsible for the substitution request.
 - b. Provide Project Name, NC State Project Number, and SCO Project Number.
 - c. Provide product specified, the specification section where specified, and the drawings where the product is indicated.
 - d. Provide a statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
 - e. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by Owner and separate contractors, necessary to accommodate proposed substitution.
 - f. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
 - g. Product Data, including drawings and descriptions of proposed products and fabrication and installation procedures.
 - h. Samples, where applicable or required.
 - i. Certificates and qualification data, where applicable or requested.

- j. List of similar installations for completed projects with project names and addresses and names, email, and phone number, of architects and owners.
 - k. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
 - l. Research reports evidencing compliance with building code in effect for Project.
 - m. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
 - n. Cost information, including a proposal of change, if any, in the Contract Sum.
 - o. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
 - p. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.
4. Designers Action: If necessary, Designer will request additional information or documentation for evaluation within seven (7) calendar days of receipt of a request for substitution. Designer will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) calendar days of receipt of request, or seven (7) calendar days of receipt of additional information or documentation, whichever is later. Owner is to approve all substitution requests with Designer prior to Designer notifying Contractor of acceptance.
- a. Forms of Acceptance: Change Order, Construction Change Directive, or Bulletin for minor changes in the Work.
 - b. Use product specified if Designer does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

- A. Compatibility of Substitutions: Investigate and document compatibility of proposed substitution with related products and materials. Engage qualified testing agency to perform compatibility tests recommended by manufacturers.
- B. In proposing items for consideration, Contractor assumes all risk, costs, and responsibility for item's final acceptance, compliance with Contract Documents, integration into the Work, and performance.

1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately upon discovery of need for change, but not later than fifteen (15) calendar days prior to time required for preparation and review of related submittals as defined by the submittal schedule.
 - 1. Conditions: Designer will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Designer will return requests without action, except to record noncompliance with these requirements:
 - a. Requested substitution is consistent with the Contract Documents and will produce indicated results; meets or exceeds level of quality of specified product, equipment, assembly or system.
 - b. If the Project has identified a sustainable certification goal, the requested substitution provides sustainable design characteristics that specified product provided for achieving sustainable certification prerequisites and credits.
 - c. The Substitution request is fully documented and properly submitted.
 - d. Requested substitution will not adversely affect Contractor's construction schedule.
 - e. Requested substitution does not affect dimensions or functional clearances.
 - f. Requested substitution has received necessary approvals of authorities having jurisdiction.
 - g. Requested substitution is compatible with other portions of the Work.
 - h. Requested substitution has been coordinated with other portions of the Work; including coordinated installation and changes to other work at no additional cost to the Owner.
 - i. Requested substitution provides specified warranty.
 - j. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.
 - k. Waives claims for additional costs or time extension that may subsequently become apparent.
- B. Substitutions for Convenience: Not allowed unless otherwise indicated by NC State.

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PART 3 - EXECUTION (NOT USED)

END OF SECTION

SUBSTITUTION PROCEDURES

01 25 00 - 5

SECTION 01 26 00

CONTRACT MODIFICATION PROCEDURES - CMAR PROJECTS

PART 1 – GENERAL

1.1 SUMMARY

- A. This section includes:
 - 1. Minor Changes in the Work
 - 2. Owner Initiated Proposal Requests
 - 3. Unit Price Change Orders (General Conditions Article 19 "Method c(1)")
 - 4. Equitable Value Change Orders (General Conditions Article 19 "Method c(2)")
 - 5. Change Order Procedures
 - 6. Field Orders
 - 7. Weather Delays
- B. Related Requirements:
 - 1. Section 01 25 00 "Substitution Procedures" for administrative procedures for handling requests for substitutions made after the Contract award.
 - 2. Section 01 29 00 "Payment Procedures" for administrative procedures for submitting and processing payment applications.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Overhead: Contractors cost to perform the General Conditions of the Contract and all general requirements detailed in Division 01 of the Specifications, including, but not limited to: project management, scheduling, home office expense, engineering and layout, reproduction expenses, shop drawing processing and coordination, supervision, coordination, small tools, all vehicle expenses, temporary facilities, safety provisions, as built drawings, estimating, and general overhead.
- B. Labor Burden: actual costs of labor burden, limited to including the following. Labor Burden shall not exceed thirty percent (30%) of the actual costs of labor.
 - 1. Actual costs of Social Security (FICA) and Medicare/Medicaid taxes;
 - 2. Unemployment insurance;
 - 3. Health, dental, and vision insurance premiums;

4. Paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of thirty (30) days per year;
 5. Retirement contributions;
 6. Worker's compensation insurance premiums;
 7. Costs of general liability insurance when premiums are computed on payroll amounts
- C. Rain Day (current definition):
1. Any day that rain exceeds one tenth of one inch (0.1").
- D. Weather Day (potential definitions):
1. Precipitation that prevents work on the critical path from being performed for more than four (4) hours in a given day;
 2. Project Site conditions, as a result of precipitation (regardless of whether such precipitation occurred on that day or a prior day), such as mud, pooling of water, ice, standing snow, or wet building component surfaces to the extent such site conditions prevent the performance of Work activities on the critical path;
 3. Wind speeds, as measured by a project site gauge, exceeding those permissible to use equipment or to perform certain tasks safely (such as not being able to safely use or operate cranes or other aerial equipment) that prevent the performance of Work on the critical path;
 4. Installation of temporary protection measures and/or dismantling of equipment necessary to prepare the Project Site for extreme weather events, such as named storms and flooding; removal of temporary protections, clean-up, and restoration of Project Site that prevent the performance of critical path activities.

1.4 ACTION SUBMITTALS

- A. Five Year Climatic Average: No later than fifteen (15) workdays prior to mobilization, submit a five (5) year climatic range average based on statistics kept by the National Weather Service at Raleigh-Durham International Airport.

1.5 MINOR CHANGES IN THE WORK

- A. Designer may issue supplemental instructions authorizing minor changes in the Work, not involving adjustment to the Contract Sum or the Contract Time, on "Bulletin" form included in Section 00 60 00 "Project Forms."

1.6 OWNER INITIATED PROPOSAL REQUESTS:

- A. Designer will issue a detailed description of proposed changes in the Work that may require adjustment to the Contract Sum or the Contract Time on "Proposal Request" form included in Section 00 60 00 "Project Forms". If necessary, the description will include supplemental or revised Drawings and Specifications.

1. Bulletins with "Designers Request for Contractor's Proposal" indicated, issued by Designer are not instructions either to stop work in progress or to execute the proposed change.
 - B. Within seven (7) calendar days after receipt of Bulletin, or within a duration mutually agreed upon in writing by Owner, Designer, and Contractor, the Contractor shall submit a written proposal to Owner estimating cost adjustments to the Contract Sum and the Contract Time necessary to execute the change.
 - C. Owner Initiated Proposal Request Format:
 1. Use "Change Order Request" Form included in Section 00 60 00 "Project Forms" or similar form approved by Designer and Owner as a cover page for the Change Order Request.
 2. Backup to support the Change Order Request conforming to the requirements of Unit Price Change Orders or Equitable Value Change Orders as described herein.
 3. Complete "HUB Change Order Form" included in Section 00 60 00 "Project Forms".
 4. Contractor's Schedule Update Report conforming to the requirements of Section 01 32 16 "Construction Progress Schedule". In the narrative portion of the Schedule Update Report, describe the effect of the changes requested, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 5. Completed "HUB Utilization Form" as included in Section 00 21 26 "Guidelines for Recruitment and Selection of Minority Businesses for Participation in the University of North Carolina Construction Contracts".
 6. Surety Certification: In the Change Order Request, Contractor shall include a signed statement that states: "I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this Change Order, and that a copy of the approved Change Order will be mailed upon receipt by me to my surety." Contractor shall only notify Surety of change in contract value after a Change Order has been issued but shall include the statement in each Change Order Request.
- 1.7 CONTRACTOR INITIATED PROPOSALS:
- A. If latent or changed conditions require modifications to the Contract, Contractor may initiate a claim by submitting a Change Order Request to Designer and Owner. Claims must be submitted by the Contractor to NC State and Designer within seven (7) calendar days in accordance with Article 20 of the General Conditions.
 1. Use "Change Order Request" Form included in Section 00 60 00 "Project Forms" or similar form approved by Designer and Owner as a cover page for the Change Order Request.

2. A written description outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and the Contract Time.
 3. Backup to support the Change Order Request conforming to the requirements of Unit Price Change Orders or Equitable Value Change Orders as described herein.
 4. Complete "HUB Change Order Form" included in Section 00 60 00 "Project Forms".
 5. Contractor's Schedule Update Report conforming to the requirements of Section 01 32 16 "Construction Progress Schedule". In the narrative portion of the Schedule Update Report, describe the effect of the changes requested, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float before requesting an extension of the Contract Time.
 6. Completed "HUB Utilization Form" as included in Section 00 21 26 "Guidelines for Recruitment and Selection of Minority Businesses for Participation in the University of North Carolina Construction Contracts".
 7. Surety Certification: In the Change Order Request, Contractor shall include a signed statement that states: "I certify that my bonding company will be notified forthwith that my contract has been changed by the amount of this Change Order, and that a copy of the approved Change Order will be mailed upon receipt by me to my surety." Contractor shall only notify Surety of change in contract value after a Change Order has been issued but shall include the statement in each Change Order Request.
 8. If the Contractor is requesting to use Contractor Controlled Contingency to fund the change, include a "CM Contingency Request" Form included in Section 00 60 00 "Project Forms".
 9. If the Contractor is requesting to use Reserve Contingency (also referred to as "Bid Savings") to fund the change, include a "Reserve Contingency Request" Form included in Section 00 60 00 "Project Forms".
 10. If the Contractor is requesting to use Owners Contingency to fund the change, include a "Owners Contingency Request" Form included in Section 00 60 00 "Project Forms".
- 1.8 UNIT PRICE CHANGE ORDERS - ARTICLE 19 OF THE GENERAL CONDITIONS, METHOD C(1)
- A. Description and estimated quantities of unit prices for the project are specified in Section 01 22 00 "Unit Prices". The value of each unit price is indicated on the Form of Proposal incorporated into the Contract Documents.
 - B. Value of the change shall be computed by the application of unit prices based on mutually agreed upon quantities.

1. If the mutually agreed upon quantities exceed the estimated quantity allowance described in Section 01 22 00 "Unit Prices", then either party may elect to proceed with an Equitable Value Change Order in lieu of a Unit Price Change Order. If neither party elects to proceed with an Equitable Value Change Order, then the unit prices shall apply.
2. No Additional markups for Overhead and Profit shall be included in Unit Price Change Orders, as the value of the Unit Prices already includes Contractors Overhead and Profit.

1.9 EQUITABLE VALUE CHANGE ORDERS – ARTICLE 19 OF THE GENERAL CONDITIONS, METHOD C(2)

- A. When the method of determining the value of a change order is considered to be an equitable value for the work instead of being controlled by predetermined unit prices, the Contractor, Designer, and Owner shall negotiate and agree upon the equitable value of the change prior to issuance of the Change Order.
- B. The change order cost breakdown shall differentiate between work performed by the General Contractor and work performed by Subcontractors.
- C. The Change Order shall be organized in a manner consistent with the Schedule of Values of the contract, as detailed in Paragraph 1.5.B of Section "01 29 00" Payment Procedures".
- D. The change order cost breakdown shall include the following items:
 1. Labor
 - a. Number of hours worked
 - b. Unburdened Labor Rate for each worker
 - c. Actual cost of Labor Burden (not to exceed 30%)
 - d. Overtime, or extra pay for holidays or weekends, may only be a cost item if approved by Owner.
 2. Material
 - a. Quantity
 - b. Unit cost of materials, including supporting invoices from material suppliers for all materials being submitted for
 - c. Sales tax
 3. Tools & Equipment
 - a. Quantity
 - b. Unit prices for rental for tools (excluding hand tools), equipment, machinery, fuel (if required) and temporary facilities required for the work, including supporting invoices from tool & equipment suppliers for all tools & equipment being submitted for.
 - c. Equipment already on site for the project, and owned by a contractor on site, can not be billed for in a change order.
 4. Bonds, Insurance, & Permitting
 - a. Actual costs of premiums for bonds, insurance, and permit fees.
 5. Markups for Overhead & Profit

- a. All allowance for overhead and profit combined for Construction Manager, prime subcontractors, and all mult-tier subcontractors shall not exceed fifteen percent (15%) of the net cost of the work.
 - b. No allowance for overhead and profit (hereafter referred to as "fee") will be allowed for the Construction Manager until the Change Orders aggregate to a sum in excess of five percent (5%) of the Cost of the Work portion of the GMP. Once this threshold is met, the Construction Manager may add fee not to exceed four percent (4%) of the net cost of the change order. Change Orders to the GMP which authorize additional phases of a project without a change in scope of the originally intended project will not be considered in establishing the threshold for additional Construction Manager fee. In the case of deductible change orders, the Construction Manager shall include no less than five percent (5%) fee.
6. Net Cost
- a. The actual costs of materials and supplies incorporated or consumed as part of the project;
 - b. The actual costs of labor expended on the project site;
 - c. Medicare/Medicaid taxes; unemployment insurance costs; health/dental/vision insurance premiums; paid employee leave for holidays, vacation, sick leave, and/or petty leave, not to exceed a total of 30 days per year; retirement contributions; worker's compensation insurance premiums; and the costs of general liability insurance when premiums are computed based on payroll amounts; the total of which shall not exceed thirty percent (30%) of the actual costs of labor;
 - d. The actual costs of rental for tools, excluding hand tools; equipment; machinery; and temporary facilities required for the project;
 - e. The actual costs of premiums for bonds, insurance, permit fees and sales or use taxes related to the project;
 - f. Overtime and extra pay for holidays and weekends may be a cost item only to the extent approved by the Owner.
7. Time
- a. In the event that the Change Order Request includes a change to the project duration, the Change Order Request shall include the revised project duration and revised dates of Substantial Completion and Final Acceptance.
 - b. Not all time extensions are compensatory. Extended General Conditions for the Contractor will only be allowed in specific circumstances as described in Section 00 72 00 "General Conditions" Article 23.
- E. Subcontractors pricing and backup shall conform to the "Change Order Request" Form included in Section 00 60 00 "Project Forms" or similar form approved by Designer and Owner, with the inclusion of the Subcontractors letterhead.
- F. For change orders that delete any part of the work within the change order and/or contain deductive costs, the back up shall show the original material and labor for the deleted work or costs.

- G. If the change order contains both adds and deducts for the same type of work then the material unit and labor unit costs shown on the back up for the deleted work and the added work shall be the same and the net difference shown.
- H. Deductive change orders shall show the proper reduction in OH&P and the bond.
- I. Failure by the Contractor to provide the information requested in this paragraph shall result in rejection of the change order by the designer and a request for re-submittal. Delay in the processing of the change order due to lack of proper submittal by the Contractor in accordance with this paragraph, or due to errors in the change order calculations shall not constitute grounds for a time extension or basis for a claim.

1.10 CHANGE ORDER PROCEDURES

- A. Submission of Change Order Request
 - 1. The Contractor shall prepare a Change Order Request conforming to the requirements herein for either an Owner Requested Proposal Request or a Contractor Initiated Proposal and submit the Change Order Request to the Designer for review.
- B. Review of Change Order Request
 - 1. The designer shall review the Change Order Request to verify correctness and determine if the Contractor's proposed costs are equitable.
 - 2. If the Designer determines the Change Order Request is correct and agrees to its accuracy, the Designer will forward the Change Order Request to NC State for their review.
 - 3. If NC State determines that the cost is equitable then NC State shall notify the Designer of their acceptance.
 - 4. If either the Designer or NC State determines the Change Order Request is incorrect, or the cost has not been agreed upon by the designer and NC State then the Designer shall notify the Contractor that the proposal is rejected and the proposal shall be resubmitted.
- C. Interscope / Issuance of Change Order
 - 1. Once Change Order Requests have been reviewed and approved by the Contractor, Designer and NC State, the Designer shall initiate a Change Order in the State Construction Office (SCO) web-based Interscope program to incorporate the, or multiple, Change Order Request(s) into the Contract Documents. All Change Orders shall be processed for signatures electronically through Interscope. Directions for using Interscope shall be provided at the Preconstruction Conference.

1.11 FIELD ORDER

- A. Designer may issue a Field Order on "Field Order" Form included in Section 00 60 00 "Project Forms".

- B. Field Order instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order. Field Order contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum or the Contract Time.
- C. Contractor shall maintain detailed records on a time and material basis of work required by the Field Order. After completion of change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.

1.12 WEATHER DELAYS

- A. The Contractors Superintendent shall maintain Daily Weather Logs kept at the jobsite showing the effect of the weather on the progress of the critical path work and the critical path schedule, both initialed by the designer's project representative. All contract time extension requests must incorporate these work logs.
- B. The Contractor may only be entitled to an extension of the contract period for the number of rain days that exceed the normal number of rain days for any given month.
- C. For the purpose of determining extent of delay attributable to unusual weather, a determination shall be made by comparing the Five Year Climatic Average submittal to the Daily Weather Logs prepared by the Contractor.
- D. Time extensions for weather delays do not entitle the Contractor to "extended overhead" recovery and are in all other ways non-compensable.
- E. Not all rain days above the normal number of rain days will warrant a contract time extension. Justification for the request for rain related contract time extensions must also be based on the effect of the rain on critical path work activity in progress during the period of the request and additionally be predicated on the Contractor's diligent prosecution of the work.
 - 1. No additional rain days shall be granted for building projects after the building has been "dried-in" as determined by the designer.
- F. Requests for contract time extensions based on rain days must be received by the designer on or before the 20th day of the month immediately following the month in which the rain occurred. The request must include all required documentation. All parties to this contract agree that the Contractor has no right to claim a contract time extension if the request is not received by the designer in strict accordance with the procedure set forth in this paragraph.
- G. For other types of weather delays, the Contractor is granted one (1) day of contract extension for each day NC State is closed due to weather, however no additional General Conditions will be granted to the Contractor.

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PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 26 13

REQUEST FOR INTERPRETATION (RFI)

PART 1 – GENERAL

1.1 REQUEST(S) FOR INTERPRETATION (RFI)

- A. General: A Request for Interpretation (RFI) is a Contractor initiated, Owner or Designer formatted, written instrument related to the execution of the Work that is addressed to the Designer. The RFI shall be used by the Contractor as the means for it to ask questions related to the Work; subject to the conditions contained within this article.
1. An RFI which fails to conform to the requirements stated herein, (i.e, is incomplete or contains numerous errors) shall be returned to the Contractor for its completion/rectification without benefit of the Designer's response, in addition, no adjustments for Contract Time or Contract Sum shall be granted for an RFI failing to conform to the requirements stated herein.
 2. Each RFI shall be submitted with such promptness as to cause no delay in the Contractor's own work and in that of any subcontractor. No adjustments of Contract Time or Contract Sum will be granted because of failure to have an RFI submitted with sufficient time to allow for the orderly processing of a response by the Designer.
- B. Immediately on discovery of the need for additional information or interpretation of the Contract Documents, Contractor shall prepare and submit an RFI in a prompt manner to avoid delays in Contractor's work or the work of its Subcontractors.
- C. Authorship:
1. Each RFI shall originate solely from the Contractor. An RFI submitted to the Designer by an entity, or individual, other than the Contractor (i.e. a Subcontractor) shall be returned to the Contractor.
- D. Prohibitions: RFIs shall not be used for the following:
1. To solicit consideration by the Designer of a "substitution."
 2. To request an adjustment of the Contract time.
 3. To request an adjustment of the Contract sum.
 4. To solicit comment clarification(s) of any required submittal or shop drawing review that was transmitted by the Designer to the Contractor, unless the comments provided conflict with the Contract Documents.
 5. RFIs shall not be used to transfer coordination responsibility from the Contractor to the Owner or the Designer.
- E. Procedure:

1. The Contractor shall submit all RFIs on the form supplied in Section 00 60 00 "Project Forms" or on a form approved by the Designer and Owner.
2. Each blank on the RFI form shall be filled in.
3. Each RFI shall be typewritten and shall be forwarded to the Designer electronically.
4. Each RFI shall address one subject.
5. Each RFI shall contain specific reference to the drawing number(s), detail number(s), schedule type(s), bulletin number(s), specification section(s) and paragraph number(s), or other related document(s) which is (are) pertinent to the Contractor's question. The date of each referenced drawing number, bulletin, specification section or other related document shall be identified. In preparing each RFI verify the applicable dimension(s), field conditions, drawing requirements (small through large scale details), and/or specification section requirements pertaining thereto. Prior to submission of the RFI coordinate the nature of the inquiry with the requirements of other sections or trades as related thereto and responses to previous RFIs. Where supplementary sketches are required to clarify an inquiry the Contractor shall attach supplementary sketches, at large scale, illustrative of the inquiry. Sketches shall include sufficient detail, materials, dimensions, thicknesses, assembly, attachments, relation to adjoining work, structural grid references, and all other pertinent data and information for the Designer to make an informed response.
 - a. The Contractor is encouraged to suggest solution(s) to its inquiries, if applicable. Should the Contractor's solution(s) have an impact on Contract Sum or Contract time it shall be so stated within the RFI.
6. Each RFI shall be dated and sequentially numbered.
7. Each RFI shall be reviewed, and signed, by the RFI Manager prior to transmitting to the Designer.
8. Duration of RFI Response Upon Receipt: Seven (7) calendar days, pending complete information.
 - a. If Contractor requires a response within seven (7) calendar days due to the RFI impacting work on the critical path of the project, Contractor shall make all reasonable efforts to submit the RFI in a timely manner, note on the RFI that the RFI impacts work on the critical path and identify the deadline for a response, and verbally communicate (i.e. in person, or over the phone) with the Designer that the specific RFI needs to be expedited. This exception should only be utilized as necessary to ensure the timely completion of the project. Contractor shall not frequently rely on this exception to ensure timely completion of the project.
9. RFIs rejected for incomplete information shall not be logged, or shall be logged separately and clearly identified from outstanding RFIs with complete information.
10. RFIs that contain content on the prohibitions list shall be excluded from RFI logs, and be resubmitted properly or tracked in a manner applicable to the request.

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11. RFIs received by Designer after 1:00 p.m. will be considered as received the following working day.
- F. RFI Log: Prepare, maintain, and submit a tabular log of RFIs organized by RFI Number. Submit RFI Log to Designer and Owner weekly. Use RFI Log Form included in Section 00 60 00 "Project Forms", or similar form approved by Designer and Owner.

PART 2 - PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

END OF SECTION

SECTION 01 29 00
PAYMENT PROCEDURES

PART 1 – GENERAL

1.1 SUMMARY

- A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.
- B. Related Sections include the following:
 - 1. Section 00 60 00 "Project Forms" for miscellaneous forms required to be submitted with each Payment Application.
 - 2. Section 00 21 26 "UNC System MB Guidelines & Forms 2024" for HUB forms required to be submitted with Payment Applications.
 - 3. Section 01 26 00 "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
 - 4. Section 01 31 00 "Project Management & Coordination" for administrative procedures for the requirements of the Subcontractor and Vendor list.
 - 5. Section 01 32 16 "Construction Progress Schedule" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule.
 - 6. Section 01 32 33 "Photographic Documentation" for administrative requirements governing preparation and submittal of Construction Photographs.
 - 7. Section 01 35 23 "NCSU Safety Requirements" for administrative requirements governing the preparation and submittal of the Monthly Safety Report.
 - 8. Section 01 44 00 "Quality Requirements" for administrative requirements governing the Schedule of Tests and Inspections.
 - 9. Section 01 50 00 "Temporary Facilities & Controls" for administrative requirements governing the preparation of the Site Logistics Plan, Erosion-and Sedimentation-Control Plan, Fire-Safety Program, Moisture-Protection Plan, Dust-and HVAC Control Plans, and Vibration Control Plan, as required by project scope of work.
 - 10. Section 01 74 19 "Construction Waste Management & Disposal" for administrative requirements governing the preparation of Construction Waste Management Plan to be submitted by Contractor with Initial Application for Payment.
 - 11. Section 01 77 00 "Closeout Procedures" for the administration requirements for Final Acceptance and the Final Payment Checklist.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 PAYMENTWORKS

- A. N.C. State uses PaymentWorks, a third-party onboarding platform that eliminates the risk of business payments fraud and ensures regulatory compliance by automating the complex payee management process.
- B. Prior to any payment being made from N.C. State to the Contractor, Contractor must complete the PaymentWorks supplier registration process.

1.5 SCHEDULE OF VALUES

- A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.
 - 1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:
 - a. Application for Payment forms with Continuation Sheets.
 - b. Submittals Schedule.
 - c. Items required to be indicated as separate activities in Contractor's Construction Schedule.
 - 2. Submit the Schedule of Values to Owner and Designer at earliest possible date but no later than fifteen working days before the date scheduled for submittal of initial Applications for Payment.
 - a. Initial format of Schedule of Values must be approved by the Owner and Designer prior to submission of the initial Application for Payment.
- B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values.
 - 1. Identification: Include the following Project identification on the Schedule of Values:
 - a. NC State Project Name and location.
 - b. NC State Project Number, Code & Item, and State Construction Office Project Number.
 - c. Designer's name and address.
 - d. Contractor's name and address.

- e. Date of submittal.
2. Schedule of Values Organization:
 - a. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents.
 - b. Arrange the schedule of values in tabular form with separate columns to indicate the following for each item listed:
 - 1) Related specification section.
 - 2) Description of the Work.
 - 3) Name of subcontractor.
 - 4) Name of manufacturer/fabricator.
 - 5) Name of supplier.
 - 6) Change Orders that affect value.
 - 7) Dollar value of the following, as a percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
 - (a) Labor.
 - (b) Materials.
 - (c) Equipment.
 - c. Provide at least one line item for each Specification Section listed in the Table of Contents, except for Divisions 00 and 01.
 - 1) The following sections shall be used for Contractors Division 00 and 01 costs:
 - (a) General Conditions.
 - (b) Cleaning.
 - (c) Temporary Facilities.
 - (d) Builders Risk Insurance.
 - (e) Bonding.
 - (f) Insurance Programs separate from Builders Risk.
 - (g) Project Closeout.
 - (h) Fee.
 - d. When the work of a Specification Section is to be performed by multiple Subcontractors, at least one line item for each Subcontractor shall be provided.
 - e. Provide multiple line items for principal subcontract amounts in excess of five percent of Contract Sum.
 - f. Break down principal subcontract amounts into separate labor and materials items.
 - g. Breakdown of subcontractor's schedule of values must be true and accurate.
 - h. For line items associated with the minority business subcontractor or supplier as identified in Contractor's Affidavit C "Portion of the Work to be Performed by HUB Certified/Minority Businesses".
3. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

4. Schedule of Values Updating: Update and resubmit the Schedule of Values no less than seven (7) calendar days before the next Application for Payment when a Change Order(s) results in a change in the Contract Sum for either the Contractor or one of its Subcontractors. Format each change order as described throughout paragraph 1.5.B of this Section. Organize the Schedule of Values so that Change Order(s) are grouped together.
5. Include separate line items under Contractor and principal subcontracts for LEED documentation and other Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
6. Provide separate line items in the Schedule of Values for each part of the Work where Applications for Payment may include cost of submittals.
 - a. Cost for submittals shall represent true cost of submittals preparation, as evidenced by subcontractor invoices, but not to exceed 5 percent of the total value of that item of work line item.
7. Overhead Costs: Include total cost and proportionate share of general overhead and profit for each line item.
8. Closeout Costs: Include separate line items under Contractor and principal subcontracts for Project closeout requirements in an amount totaling five percent of the Contract Sum and subcontract amount.
9. Schedule of Values Revisions: Revise the schedule of values when Change Orders or Construction Change Directives result in a change in the Contract Sum. Include at least one separate line item for each Change Order and Construction Change Directive.

1.6 APPLICATIONS FOR PAYMENT

- A. Each Application for Payment package shall be organized as follows, with each section meeting all the requirements described in subsequent paragraphs herein:
 1. Signed cover letter on Contractor's letterhead describing the Payment request including, but not limited to, the NC State Project Number, Code & Item, State Construction Office Project Identification Number, the date of the request, month covered in the application and the number of the application, amount of the request, and a list of included documents.
 2. Payment Application Forms.
 3. A Consent of Surety Letter that includes the surety's consent to the progress payment and the amount of the payment.
 4. Sales Tax Forms, organized by Contractor's summary with Subcontractor backup.
 5. Updated Schedule Report, as described in Section 01 32 16, "Construction Progress Schedule".
 6. MBE Appendix "E" Form with accurate subcontract amounts and amounts paid.
 7. Stored Materials (if applicable), organized by Contractor's summary with Subcontractor backup.
 8. Waivers of Mechanic's Lien.
 9. Supplemental Information.

- B. Each Application for Payment following the initial Application for Payment shall be consistent with previous applications and payments as certified by Designer and paid for by Owner.
 - 1. Initial Application for Payment, and Application for Payment at time of Final Acceptance, involve additional requirements.
- C. Payment Application Transmission & Times: Not later than the fifth day of the month, the Contractor shall electronically submit a signed and notarized copy of each Application for Payment to Designer, transmitted within 24 hours of signature.
- D. Payment Application Forms: Use AIA Document G702 (Application & Certificate for Payment) and AIA Document G703 (Continuation Sheet) as form for Applications for Payment.
- E. Application Preparation: Complete every entry on the form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Designer will return incomplete applications without action.
 - 1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
 - 2. Include amounts of work completed following previous Application for Payment, whether or not payment has been received. Include only amounts for work completed at time of Application for Payment.
 - 3. Include amounts of Change Orders issued before the last day of construction period covered by application.
 - 4. Indicate separate amounts for work being carried out under Owner-requested project acceleration, if any.
- F. Stored Materials: Include in Application for Payment amounts applied for materials or equipment purchased or fabricated and stored, but not yet installed.
 - 1. The following requirements apply for Stored Materials:
 - a. Differentiate between items stored on-site and off-site.
 - b. Materials must be customized or fabricated specifically for the project. No raw materials (including, but not limited to piping, conduit, CMU, metal studs and gypsum board, etc.) may be billed as stored materials.
 - c. Contractor is responsible for stored materials and equipment shall remain with the Contractor regardless of ownership title.
 - d. For items stored off-site, the following conditions apply.
 - 1) Material must be stored in an independent, licensed, and bonded warehouse approved by Designer, Owner, State Construction Office, Contractors Insurance Company, and Contractors Surety.
 - 2) Material stored must be clearly identified as NC State property.
 - 3) The warehouse shall be located as close to the project site as possible.
 - 4) Designer must verify that material is stored in compliance with Stored Materials requirements herein.
 - 2. The Stored Materials backup to be included in the Payment Application is as follows:

- a. Stored Material Summary. Using the standard form provided in Section 00 60 00, provide summary documentation for stored materials indicating the following:
 - 1) Materials previously stored and included in previous Applications for Payment.
 - 2) Work completed for this Application utilizing previously stored materials.
 - 3) Additional materials stored with this application.
 - 4) Total materials remaining stored, including materials with this application.
 - b. Designer's verification of materials.
 - c. Provide description of item(s) being stored.
 - d. Location of the warehouse(s) where materials or equipment is stored, and warehouse approval letters from each of: Designer, Owner, State Construction Office, Contractor's Insurance Company, and Contractor's Surety.
 - e. Bill of sale made to Owner stating there will be no additional cost for transportation and delivery of the stored item(s).
 - f. Statement certifying that item, or any part thereof, will not be installed in any construction other than Work under this Contract.
 - g. Provide certificate of insurance, evidence of transfer of title to Owner, and consent of surety to payment for stored materials (separate from consent of surety to overall payment application).
 - h. Provide supporting documentation that verifies amount requested, such as paid invoices. Match amount requested with amounts indicated on documentation; do not include overhead and profit on stored materials.
- G. Waivers of Mechanic's Lien: With each Application for Payment, submit notarized waivers of mechanic's lien from every entity who is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.
1. Submit a current Subcontracts and Vendor List.
 2. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
 3. When an application shows completion of an item, submit final or full waivers.
 4. Owner reserves the right to designate which entities involved in the Work must submit waivers.
 5. Submit final Application for Payment with or preceded by final waivers from every entity involved with performance of the Work covered by the application who is lawfully entitled to a lien.
 6. Waiver Forms: Submit waivers of lien on forms, executed in a manner acceptable to Owner.
- H. Supplemental Information: With each Application for Payment, but as separate files, submit the following reports, logs, and submittals:

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1. Submittals Schedule updated the same day of the application. After 50% complete on the contract duration, include closeout submittals in a separate Closeout Submittal Schedule.
 2. Construction Photographs taken within 2 days of the application for payment documenting progress in the areas under construction.
 3. Change Order Log showing issued change orders and potential change orders updated the same day of the application.
 4. RFI Log updated the same day of the application.
 5. Daily Construction Reports for each workday during the application period.
 6. Meeting minutes for meetings conducted by the Contractor during the application period.
 7. Monthly Safety Report.
- I. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:
1. Copy of executed Agreement between Owner and Contractor.
 2. List of subcontractors, principal suppliers and fabricators.
 3. Schedule of values.
 4. Contractor's construction schedule.
 5. Products list (preliminary if not final).
 6. Schedule of unit prices.
 7. List of Contractor's staff assignments and principal consultants.
 8. Copies of permits submitted by Contractor (if any).
 9. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
 10. Initial progress report.
 11. Report of preconstruction conference.
 12. Certificates of insurance and insurance policies.
 13. Performance & payment bonds.
 14. Preconstruction Photographs.
 15. Submittal Schedule
 16. Construction waste management program.
 17. Site logistics & temporary security plans.
 18. Erosion- and Sedimentation Control Plan (if project scope involves site work).
 19. Fire-Safety Program.
 20. Moisture Protection Plan.
 21. Dust and HVAC Control Plan.
 22. Site Specific Safety Plan.
 23. Contractors Site Specific Quality Control Plan.
 24. Noise & Vibration Control Plan
 25. Schedule of Tests & Inspections
- J. Payment Applications During Construction: Submit changes in submittals schedule, construction schedule, and other schedules with each application for payment.

PAYMENT PROCEDURES

- K. Application for Payment at Final Acceptance: After Architect issues the Certificate of Final Acceptance, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.
 - 1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
 - 2. This application shall reflect Certificate(s) of Final Acceptance issued previously for Owner occupancy of designated portions of the Work.
 - L. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:
 - 1. Contractor's Affidavit for Release of Liens.
 - 2. Contractor's Affidavit of Payment of Debts and Claims.
 - 3. Consent of Surety for Final Payment.
 - 4. Certificate of Compliance (Completed by Designer)
 - 5. Certificate of Completion (Completed by Designer)
 - 6. Completed Tax Statement and Form.
 - 7. MBE Appendix "E" Form with accurate subcontract amounts and amounts paid.
 - 8. Survey of New and Existing Sub-Surface Utilities.
 - 9. Warranties & Guarantees required by the Contract Documents.
 - 10. Evidence of completion of Project closeout requirements, including, but not limited to:
 - a. Transmittal of required Project Record Documents to Owner.
 - b. Evidence of completion of demonstration and training.
 - c. Transmittal of Attic Stock.
 - d. Reconciliation of Allowances.
 - 11. Builders Risk Insurance Cancellation Notice.
 - 12. Certificates of State Agencies required by State Law.
 - 13. Certification all keys issued to Contractor have been returned to N.C. State Lock Shop.
 - 14. Certification of no outstanding utility bills.
 - 15. Final Completion Construction Photographs.
- 1.7 REVIEW OF APPLICATION FOR PAYMENT
- A. Draft Copy: Submit draft (pencil) copy of the Application for Payment ten days prior to due date for review by Designer.
 - B. Draft Copy Review Meeting: The Owner, Designer and Contractor shall meet prior to payment application due date to review the draft (pencil) copy of the Application for Payment, as specified in Section 01 31 19 "Project Meetings." Questions resulting from this review shall be answered by the Contractor and clarified prior to receipt of the official copy of the Application for Payment.

- C. Upon receipt of the official Application for Payment and other documentation as required by the Designer and Owner, the Designer shall review the documents received to determine if they correspond to the agreements reached during the draft copy review meeting. If necessary, the Contractor shall revise the Application for Payment to correspond to the agreements reached, execute the Certificate for Payment, and forward the executed copies to the Owner.
- D. The Owner and Designer will rely on the accuracy and completeness of the information furnished by the Contractor. Issuance of a Certificate of Payment, and subsequent payment thereof will not be deemed to represent that the Owner or Designer performed audits of the supporting data and does not waive Owner's right to audit the project.

1.8 INSPECTION & AUDIT

- A. Contractor's "records" shall upon reasonable notice be open to inspection and subject to audit and/or reproduction during normal business working hours. An NC State representative or an outside representative engaged by NC State may perform such audits. NC State or its designee may conduct such audits or inspections throughout the term of this contract and for a period of three years after final payment or longer if required by law.
- B. Contractor's records as referred to in this contract shall include all information, materials and data of every kind and character, including without limitation the following:
 - 1. Records
 - 2. Books
 - 3. Documents
 - 4. Subscriptions
 - 5. Recordings
 - 6. Agreements
 - 7. Purchase Orders
 - 8. Leases
 - 9. Contracts
 - 10. Commitments
 - 11. Arrangements
 - 12. Notes
 - 13. Daily diaries
 - 14. Superintendent reports
 - 15. Drawings
 - 16. Receipts
 - 17. Vouchers and memoranda, and
 - 18. Any and all other agreements, sources of information and matters that may in NC State's judgment have any bearing on or pertain to any matters, rights, duties or obligations under or covered by any Contract Document.

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- C. Such records shall include (hard copy, as well as computer readable data if it can be made available):
1. written policies and procedures;
 2. time sheets;
 3. payroll registers;
 4. payroll records;
 5. cancelled payroll checks;
 6. subcontract files (including proposals of successful and unsuccessful bidders, bid recaps, etc.);
 7. original estimates;
 8. estimating work sheets;
 9. correspondence;
 10. change order files (including documentation covering negotiated settlements);
 11. back charge logs and supporting documentation;
 12. invoices and related payment documentation;
 13. general ledger entries detailing cash and trade discounts earned;
 14. insurance rebates and dividends; and
 15. any other Contractor records which may have a bearing on matters of interest to NC State in connection with the Contractor's dealings with NC State (all foregoing hereinafter referred to as "records") to the extent necessary to adequately permit evaluation and verification of:
 - a. Contractor compliance with contract requirements,
 - b. Compliance with NC State's business ethics policies, and
 - c. Compliance with provisions for pricing change orders, invoices or claims submitted by the Contractor or any of his payees.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 31 00

PROJECT MANAGEMENT AND COORDINATION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for coordinating construction operations on Project including, but not limited to, the following:
 - 1. General project coordination procedures.
 - 2. Administrative and supervisory personnel.
 - 3. Coordination Drawings.
 - 4. Digital Data Files.
 - 5. Construction Management Software.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 26 13 "Requests for Information" for requirements associated with RFIs.
 - 2. Section 01 31 19 "Project Meetings" for requirements associated with project meetings.
 - 3. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule.
 - 4. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 INFORMATIONAL SUBMITTALS

- A. Subcontractor and Vendor List: Within fifteen (15) calendar days of Notice to Proceed, prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Use CSI Form 1.5A in Section 00 60 00 "Forms", or similar form approved by Designer and Owner. Include the following information in tabular form:
 - 1. Name, address, and telephone number of entity performing subcontract or supplying products.

2. Number and title of related Specification Section(s) covered by subcontract.
 3. Drawing number and detail references, as appropriate, covered by subcontract.
- B. Key Personnel Names: Within 15 days of starting construction operations, submit a list of key personnel assignments, including superintendent and other personnel in attendance at Project site. Identify individuals and their duties and responsibilities; list addresses and telephone numbers, including home, office, and cellular telephone numbers and e-mail addresses. Provide names, addresses, and telephone numbers of individuals assigned as alternates in the absence of individuals assigned to Project.
1. Post copies of list in project meeting room, in temporary field office, on Project Web site, and by each temporary telephone. Keep list current at all times.

1.4 GENERAL COORDINATION PROCEDURES

- A. Coordination: Coordinate construction operations included in various Sections of the Specifications to ensure efficient and orderly installation of each part of the Work. Coordinate construction operations, included in different Sections that depend on each other for proper installation, connection, and operation.
1. Schedule construction operations in sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
 2. Coordinate installation of different components to ensure maximum performance and accessibility for required maintenance, service, and repair.
 3. Make adequate provisions to accommodate items scheduled for later installation.
 4. Arrange pipes, ducts, conduits, and other overhead systems in an orderly manner when indicated to remain exposed.
- B. If necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and list of attendees at meetings.
1. Prepare similar memoranda for Owner and separate contractors if coordination of their Work is required.
- C. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and to ensure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:
1. Preparation of Contractor's Construction Schedule.
 2. Preparation of the Schedule of Values.
 3. Installation and removal of temporary facilities and controls.
 4. Delivery and processing of submittals.
 5. Progress meetings.
 6. Preinstallation conferences.
 7. Project closeout activities.

8. Startup and adjustment of systems.

- D. Conservation: Coordinate construction activities to ensure operations are carried out with consideration given to conservation of energy, water, and materials.
1. Salvage materials and equipment involved in performance of, but not actually incorporated into the Work. Refer to other Sections for disposition of salvaged materials that are designated as Owner's property.

1.5 ACTION SUBMITTAL - COORDINATION DRAWINGS

- A. The Contractor shall submit a BIM Execution Plan and Schedule within fifteen (15) calendar days of Notice to Proceed and develop a BIM Coordination Model that satisfies the general industry definition for Level of Detail (LOD) 300.
- B. Coordination Drawings, General: Prepare coordination drawings according to requirements in individual Sections, and additionally where installation is not completely shown on Shop Drawings, where limited space availability necessitates coordination, or if coordination is required to facilitate integration of products and materials fabricated or installed by more than one entity.
1. Contractor shall prepare MEPFP Coordination Drawings and submit to Designer and Owner within 45 days after initial coordination meeting.
 2. Content: Project-specific information, drawn accurately to a scale large enough to indicate and resolve conflicts. Do not base coordination drawings on standard printed data. Include the following information, as applicable:
 - a. Use applicable Drawings as a basis for preparation of coordination drawings. Prepare sections, elevations, and details as needed to describe relationship of various systems and components.
 - b. Coordinate the addition of trade-specific information to the coordination drawings by multiple contractors in a sequence that best provides for coordination of the information and resolution of conflicts between installed components before submitting for review.
 - c. Indicate functional and spatial relationships of components of architectural, structural, civil, mechanical, and electrical systems.
 - d. Indicate space requirements for routine maintenance and for anticipated replacement of components during the life of the installation.
 - e. Show location and size of access doors required for access to concealed dampers, valves, and other controls.
 - f. Indicate required installation sequences.
 - g. Indicate dimensions shown on the Drawings. Specifically note dimensions that appear to conflict with submitted equipment and minimum clearance requirements. Provide alternate sketches to Designer indicating proposed resolution of such conflicts. Minor dimension changes and difficult installations will not be considered changes to the Contract.
- C. Coordination Drawing Organization: Organize coordination drawings as follows:

1. Floor Plans and Reflected Ceiling Plans: Show architectural and structural elements, and mechanical, plumbing, fire-protection, fire-alarm, and electrical Work. Show locations of visible ceiling-mounted devices relative to acoustical ceiling grid. Supplement plan drawings with section drawings where required to adequately represent the Work.
2. Plenum Space: Indicate subframing for support of ceiling and wall systems, mechanical and electrical equipment, and related Work. Locate components within ceiling plenum to accommodate layout of light fixtures indicated on Drawings. Indicate areas of conflict between light fixtures and other components.
3. Mechanical Rooms: Provide coordination drawings for mechanical rooms showing plans and elevations of mechanical, plumbing, fire-protection, fire-alarm, and electrical equipment.
4. Structural Penetrations: Indicate penetrations and openings required for all disciplines.
5. Slab Edge and Embedded Items: Indicate slab edge locations and sizes and locations of embedded items for metal fabrications, sleeves, anchor bolts, bearing plates, angles, door floor closers, slab depressions for floor finishes, curbs and housekeeping pads, and similar items.
6. Mechanical and Plumbing Work: Show the following:
 - a. Sizes and bottom elevations of ductwork, piping, and conduit runs, including insulation, bracing, flanges, and support systems.
 - b. Dimensions of major components, such as dampers, valves, diffusers, access doors, cleanouts and electrical distribution equipment.
 - c. Fire-rated enclosures around ductwork.
7. Electrical Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1 inch (25.4 mm) in diameter and larger.
 - b. Light fixture, exit light, emergency battery pack, smoke detector, and other fire-alarm locations.
 - c. Panel board, switch board, switchgear, transformer, busway, generator, and motor control center locations.
 - d. Location of pull boxes and junction boxes, dimensioned from column center lines.
8. Fire-Protection System: Show the following:
 - a. Locations of standpipes, mains piping, branch lines, pipe drops, and sprinkler heads.
9. Telecommunications Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1 inch (25.4 mm) in diameter and larger.
 - b. Location of pull boxes and junction boxes, dimensioned from column center lines.
10. Audiovisual Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1 inch (25.4 mm) in diameter and larger.

- b. Location of pull boxes and junction boxes, dimensioned from column center lines.
 11. Security & Access Control Work: Show the following:
 - a. Runs of vertical and horizontal conduit 1 inch (25.4 mm) in diameter and larger.
 - b. Location of pull boxes and junction boxes, dimensioned from column center lines.
 12. Architectural Work: Show the following:
 - a. Any features identified in the Drawings as requiring coordination with other trades listed herein.
 13. Review: Designer will review coordination drawings to confirm that the Work is being coordinated, but not for the details of the coordination, which are Contractor's responsibility. If Designer or Owner determines that coordination drawings are not being prepared in sufficient scope or detail, or are otherwise deficient, Designer will so inform Contractor, who shall make changes as directed and resubmit.
 - D. Coordination Digital Data Files: Prepare coordination digital data files according to the following requirements:
 1. File Preparation Format: DWG, version within two (2) years of the Notice to Proceed, operating in Microsoft Windows operating system.
 2. File Submittal Format: Submit or post coordination drawing files using format same as file preparation format and Portable Data File (PDF) format.
 - a. Refer to Section 01 77 00 "Closeout Procedures" for additional requirements for CAD files to be included in the closeout documents.
 3. BIM File Incorporation: Develop and incorporate coordination drawing files into Building Information Model established for Project.
 - a. Perform three-dimensional component conflict analysis as part of preparation of coordination drawings. Resolve component conflicts prior to submittal. Indicate where conflict resolution requires modification of design requirements by Designer.
- 1.6 DIGITAL DATA FILES
- A. Designer will furnish Contractor one set of digital data files of Drawings for use in preparing coordination digital data files.
 1. Designer makes no representations as to the accuracy or completeness of digital data files as they relate to Drawings.
 2. Digital Data Software Program: Drawings are available in Autodesk Revit 2023.
 3. Digital data files will be provided in the software and format that is used to prepare the Contract Documents. Translations to different programs or modifications to the drawing setup will be the responsibility of the Contractor.
 4. Contractor shall execute a data licensing agreement proceeding this section.

- B. Digital Execution Conference: schedule and conduct a digital execution conference before starting construction, at a time convenient to Owner Architect, and Contractor.
 - 1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Architect, Architect's consultants, Contractor, Contractor's superintendent, major subcontractors, suppliers, and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 - 2. Agenda: Discuss items of significance that could affect the exchange of digital information, including but not limited to the following:
 - a. Electronic file transfer requirements and protocols.
 - b. Right of reliance on Architect's and Architect's Consultants digital files.
 - c. Schedule of digital file transfers and periodic updates.
 - 3. Minutes: Entity responsible for conducting meeting will record and distribute meeting minutes using PIMS.

1.7 CONSTRUCTION MANAGEMENT SOFTWARE

- A. Construction Management Software is also otherwise referenced as "PIMS" throughout the specifications.
- B. Provide, administer, and use a Construction Management Software (e.g. Plangrid, Procure, or similar) for purposes of hosting and managing project communication and documentation, that is mobile device compatible, until Final Acceptance. Construction Management Software shall include the following functions:
 - 1. Project directory.
 - 2. Project correspondence.
 - 3. Meeting minutes.
 - 4. Contract modifications forms and logs.
 - 5. Processing and tracking payment applications.
 - 6. RFI forms and logs.
 - 7. Task and issue management.
 - 8. Project communication tracking.
 - 9. Workflow planning.
 - 10. Photo documentation.
 - 11. Schedule and calendar management.
 - 12. Submittals forms and logs.
 - 13. Drawing and specification document hosting, viewing, and updating.
 - 14. Online document marking and collaboration.
 - 15. Creating and exporting editable logs.
 - 16. Reminder and tracking functions.
 - 17. Archiving functions.
- C. Provide Construction Management Software user licenses for use of the Owner, Owner's Consultants, Owner's Commissioning Authority, Designer, and Designer's consultants (up to 20 licenses). Provide eight hours of software training at agreed upon location for all PIMS users.

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Raleigh, North Carolina
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1. Provide system access privileges for Designer and their consultants to facilitate the following:
 - a. A complete process for online document collaboration during submittal reviews.
 - b. Preparation of reports from the entire database, including archived and closed items.
- D. On completion of Project, provide one complete archive copy of Construction Management Software files to Owner and to Designer in a digital storage format acceptable to Owner. Provide data in locked format to prevent further changes.
- E. Contractor, subcontractors, and other parties granted access by Contractor to Construction Management Software shall execute a data licensing agreement in the form of Agreement included in Section 00 60 00 "Project Forms".

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

North Carolina State University
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Electronic File Transfer Agreement (Contractor – BIM Files)

Name	Date:	[Publish Date]
Address	Project Name:	North Carolina Stste University Mann Hall Renovation
Description of Data:	PW Project No:	820937.001

The undersigned is a contractor (the "Contractor") performing services and/or directly or indirectly providing goods and material related to the subject project (the "Project"). The undersigned hereby requests that Perkins&Will and its consultants provide electronic files prepared by Perkins&Will and its consultants for the Project in the form of an electronic model (the "Model Files"). The undersigned acknowledges and agrees that Perkins&Will has no contractual obligation, or any other obligation, to provide the Model Files to the contractor. Perkins&Will agrees to provide the Model Files in consideration for the undertakings of the undersigned. The undersigned agrees that the Contract Documents that Perkins&Will is contractually obligated to prepare and/or deliver are hardcopy drawings and specifications only. The undersigned additionally agrees that the Model Files are not Contract Documents (as that term is defined in or understood to mean in the Owner-Contractor Agreement), do not represent Contract Document modifications, and are not intended to be a substitute for or a supplement to the hardcopy drawings and specifications, or to necessarily represent actual physical conditions on the Project site.

Model Files to be furnished include work prepared by Perkins&Will and its consultant(s) only. The Model Files were prepared by Perkins&Will using the Autodesk® Revit® software platform. Model Files will be furnished in that software platform's standard format without modifications for the Contractor's convenience. One set of electronic Model Files will be furnished to the Contractor. The Contractor assumes responsibility for distributing pertinent files to the subcontractors.

The undersigned agrees that the request to provide the Model Files is purely for the convenience of the undersigned and does not constitute the rendering of professional services. Perkins&Will has prepared the Model Files to facilitate the production of the Contract Documents, which are reasonably accurate and complete to the extent of the standard of professional care. The undersigned acknowledges that Perkins&Will does not represent the furnished Model Files as being accurate or complete, as being suitable for the Contractor's purpose, or as identifying or containing any issue, anomaly, omission, or concern with reference to the Project.

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The undersigned agrees and understands that the Model Files, except as expressly set forth above, are not fit for any particular purpose, including but not limited to quantity take-offs; pricing; clash detection; ascertainment of construction or installation tolerances and clearances; preparation of shop drawings, coordination drawings, or fabrication drawings; construction sequencing; or the manufacture of any building component or system. As such, the Model Files, and the information contained in them, and the information that may have been omitted from them, shall not be used as a basis for an increase in the Contract Sum or Contract Time.

The undersigned acknowledges that the Model Files have not necessarily been developed with the assistance or specific expertise of the individual subcontractors and installers, and therefore do not account for or incorporate means and methods required by individual subcontractors for their scope of the finished Work. Modifications to the information about the components included in the Model Files may be required and are the responsibility of the Contractor to ascertain, coordinate, and implement. All such modifications are part of the scope of Work of this Project and shall be provided at no additional cost to Owner.

The undersigned further acknowledges that Perkins&Will has made no representations to the undersigned that the Model Files are suitable for any purpose other than as expressly set forth above, or will be usable by the undersigned's systems, infrastructure, or software. The undersigned also understands and agrees that the Model Files may be subject to anomalies, errors, viruses, malware, or other unintended defects, and that Perkins&Will has not reviewed or determined whether such defects may be present in any electronic files. Use of these electronic files is solely at the risk of the undersigned.

The undersigned agrees to release any and all claims that they may have at any time against Perkins&Will or its consultants arising out of the use of the Model Files by the undersigned or by any other individual or entity. The undersigned agrees to hold harmless and indemnify Perkins&Will and its consultants from and against all claims, liabilities, losses, damages, and costs, including but not limited to attorney's fees arising from or in any way connected with the provision of the Model Files by Perkins&Will or the use, modification, misinterpretation, misuse, or reuse by others of the Model Files provided by Perkins&Will. The undersigned shall not use, modify, or reproduce any of the Model Files without first removing identifying information for Perkins&Will and its consultants that may be incorporated in the furnished Model Files.

The undersigned confirms that it will use the Model Files only with reference to the Project and shall not copy or distribute the Model Files, or permit the Model Files to be copied or distributed by others, except for use on this Project. The undersigned shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by the terms and conditions of this Agreement, and to assume toward the Contractor all the obligations and responsibilities that the Contractor, by this Agreement, assumes toward the Owner and Perkins&Will. The undersigned Contractor assumes responsibility for the breach of this Agreement by any Subcontractor to whom the Contractor distributes the Model Files.

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Upon return receipt of this signed Agreement, the Model Files will be transmitted to the undersigned through electronic mail, or be posted on the Perkins&Will file transfer protocol site or the Project web site.

This Agreement may be executed in counterpart, and the parties agree that the individual counterparts, taken together, shall constitute a binding agreement.

The undersigned agrees that they are authorized to bind the company indicated below to the obligations of this Agreement, and understands that Perkins&Will is relying upon this representation in agreeing to enter into this Agreement. In addition to any rights that Perkins&Will may have against the company, the undersigned agrees that Perkins&Will shall have rights personally against the undersigned if this apparent authority is questioned or disputed by the company in any way.

The undersigned agrees that any violation of this Agreement by the undersigned or the company, or any of the agents, representatives, officers, or employees of either, will result in irreparable harm to Perkins&Will that cannot be entirely compensated by money damages. Therefore, the undersigned and the company agree that Perkins&Will may seek any and all equitable remedies that may be available to Perkins&Will, including but not limited to a temporary or permanent injunction in the event of any breach or threatened breach of the terms of this Agreement.

The undersigned shall reimburse Perkins&Will for any cost or expense, including attorney's fees and all labor and expenses (including those of in-house counsel), related to the enforcement of the terms of this Agreement.

Perkins&Will

Acknowledged and Accepted

Signature

Signature of Recipient

Name

Name

Title

Company

Date

Title

END OF AGREEMENT

SECTION 01 31 19

PROJECT MEETINGS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative provisions for meetings regarding the Project including, but not limited to, the following:
 - 1. General Meeting Requirements
 - 2. Preconstruction Conference
 - 3. Prescheduling Conference
 - 4. Monthly Progress Meeting
 - 5. Weekly Progress Meeting
 - 6. Preinstallation Conferences
 - 7. Pay Application Review Meeting
 - 8. Project Closeout Conference
 - 9. Sustainable Design Coordination Conference
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 31 00 "Project Management and Coordination" for preparing and submitting the Subcontractor List.
 - 2. Section 01 32 00 "Construction Progress Documentation" for preparing and submitting the Contractor's Construction Schedule and schedule reports
 - 3. Section 01 73 00 "Execution" for procedures for coordinating general installation and field-engineering services, including establishment of benchmarks and control points.
 - 4. Section 01 77 00 "Closeout Procedures" for coordinating Contract closeout.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 GENERAL MEETING REQUIREMENTS

- A. Schedule and physically conduct meetings at Project site or within a safe meeting space near the Project, unless otherwise indicated.
 - 1. Use of virtual meetings is allowable, but at least one representative from each entity invited to the meeting should be in person to facilitate discussion and item resolution.

- B. Requirements herein apply to all meetings, regardless of the meeting organizer:
1. Attendees: Meeting organizer shall inform participants and others involved, and individuals whose presence is required, of date and time of each meeting.
 - a. Participants at the meeting shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Meeting organizer shall prepare the meeting agenda and distribute the agenda to all invited attendees no less than three (3) working days prior to the meeting, using PIMS.
 3. Minutes: Meeting organizer shall designate a note taker for the meeting. Record significant discussions and agreements achieved. Meeting organizer shall distribute the meeting minutes to all meeting invitees within three (3) working days of the meeting, using PIMS.
 4. Notification: Inform participants three (3) working days prior to meetings not regularly scheduled.

1.4 PRECONSTRUCTION CONFERENCE

- A. Designer shall schedule and conduct a preconstruction conference before starting construction, at a time convenient to Owner, State Construction (if applicable) and Contractor, but no later than fifteen (15) calendar days after execution of the Agreement.
1. Attendees:
 - a. Authorized representatives of Owner
 - b. Owner's Commissioning Authority
 - c. Designer, and their consultants;
 - d. Contractor and its superintendent;
 - e. major subcontractors;
 - f. manufacturers;
 - g. suppliers;
 - h. testing laboratory representatives;
 - i. Other concerned parties shall attend the conference.
 2. Agenda: Use the State Construction Office Preconstruction Conference Agenda included in Section 00 60 00 "Project Forms" as a basis for creating the agenda for the Preconstruction Meeting. Do not change the formatting or contents of items 1 through 12 of the State Construction Office Preconstruction Conference Agenda. Beginning with new note 13, discuss items of significance from the list below that could affect progress, including the following:
 - a. Review Subcontract List;
 - b. Requirements in individual Specification Sections for preconstruction responsibilities;
 - c. Attach a full Construction Schedule Report from the Contractor to the meeting notes;
 - d. Project coordination;
 - e. Site Logistics Plan;
 - f. Contractors Quality Control Plan;

- g. Erosion & Sedimentation Control Plan;
- h. Fire Safety Program;
- i. Moisture-Protection Plan;
- j. Dust and HVAC Control Plan;
- k. Phasing;
- l. Hazardous Material Remediation Plan;
- m. Critical work sequencing and long-lead items.
- n. Designation of key personnel and their duties.
- o. Lines of communication.
- p. Procedures for processing Requests for Interpretation (RFIs.)
- q. Procedures for processing Bulletins and Architects Supplemental Instructions (ASI's) and the difference between the two.
- r. Procedures for processing submittals, including electronic photography requirements and sample submittal review procedures.
- s. Procedures for processing substitution requests.
- t. Procedures for testing and inspecting.
- u. Distribution of the Contract Documents.
- v. Digital Execution Plan and associated procedures
- w. Preparation of Record Documents.
- x. Use of the premises.
- y. Work restrictions.
- z. Working hours.
- aa. Owner's occupancy requirements.
- bb. Responsibility for temporary facilities and controls.
- cc. Procedures for moisture and mold control.
- dd. Procedures for disruptions and shutdowns.
- ee. Construction waste management and recycling.
- ff. Parking availability.
- gg. Office, work, and storage areas.
- hh. Equipment deliveries and priorities.
- ii. First aid.
- jj. Security.
- kk. Progress cleaning.

1.5 SCHEDULING CONFERENCE

- A. Construction Manager shall schedule and conduct a Scheduling Conference prior to mobilization to the site.
- B. Attendees:
 - 1. Contractor's Preconstruction Manager, Project Manager, and Superintendent
 - 2. Contractor's Scheduler or Scheduling Consultant
 - 3. Authorized Representatives of the Owner (Optional)
 - 4. Designer, and their consultants (Optional)
- C. Contractor and all its subcontractors shall include a minimum of five (5) full working days in their base bid to attend the Scheduling Conference.

D. Agenda:

1. Develop the Project Schedule that conforms to the contract time.
2. Review methods and procedures related to Contractor's Construction Schedule, including, but not limited to, the following:
 - a. Review software limitations and content and format for reports.
 - b. Verify availability of qualified personnel needed to develop and update schedule.
 - c. Discuss constraints, including phasing work stages and interim milestones.
 - d. Review delivery dates for Owner-furnished products
 - e. Review schedule for work of Owner's separate contracts.
 - f. Review submittal requirements and procedures.
 - g. Review time required for review of submittals and resubmittals.
 - h. Review requirements for tests and inspections by independent testing and inspecting agencies.
 - i. Review time required for Project closeout and Owner startup procedures, including commissioning activities.
 - j. Review and finalize list of construction activities to be included in schedule.
 - k. Review procedures for updating schedule.

E. At the end of the Prescheduling Conference, the Contractor shall deliver to Owner and Designer a Project Schedule, signed by the Contractor's Project Manager and Superintendent, and each Project Manager and Superintendent for each of Contractor's Subcontractors, as identified on the Subcontract List.

1. No application for payment will be processed until this schedule is accepted by the Designer and Owner.
2. The signed original copy of the Project Schedule resulting from the Prescheduling Conference shall be displayed at the jobsite.

1.6 MONTHLY PROGRESS MEETING

A. Designer shall conduct progress meetings at monthly intervals.

1. Attendees:
 - a. Designer
 - b. Designer Consultants whose discipline is under active construction or will begin within the next month
 - c. Owner
 - d. State Construction Monitor
 - e. Contractor's Project Manager and Superintendent
 - f. The meeting is open to the following optional attendees: subcontractors, material suppliers, and any others who contribute to the progress of the project.
2. Agenda:

- a. Use Monthly Meeting Agenda included in Section 006000 "Project Forms" as a basis for the Monthly Meeting. Items should remain on the agenda until all actions associated with the note are complete.
 - b. Review and correct or approve minutes of previous progress meeting.
 - c. Contractor's Construction Schedule: Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 1) Review schedule for next period.
 - d. Review Designer's Logs and discuss issues, Information, Instructions, Proposals and Modifications.
 - e. Review any pending change orders or field orders.
 - f. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
3. Reporting:
- a. Designer shall distribute minutes of the meeting to each party present and to parties who should have been present within three (3) calendar days of the meeting.
 - b. Designer shall upload a copy of the meeting minutes into the State Construction Office InterSCOPE database as Package Documents.

1.7 WEEKLY PROGRESS MEETINGS

- A. Contractor shall conduct progress meetings at weekly intervals.
1. Coordinate dates of meetings with preparation of payment requests.
 2. Attendees:
 - a. Representatives of Owner;
 - b. Owner's Commissioning Authority;
 - c. Designer;
 - d. Contractor's Project Manager and Superintendent;
 - e. Contractor may invite their subcontractors, suppliers, and/or other entities concerned with current progress or involved in planning, coordination, or performance of future activities.
 3. Agenda: Review and correct or approve minutes of previous progress meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to status of Project.
 - a. Contractor's Construction Schedule:

- 1) Review progress since the last meeting. Determine whether each activity is on time, ahead of schedule, or behind schedule, in relation to Contractor's Construction Schedule. Determine how construction behind schedule will be expedited; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities will be completed within the Contract Time.
 - 2) Review schedule for the upcoming two-week period.
 - 3) Discuss long-term schedule needs as necessary.
 - 4) Review Upcoming Work Summary report, as described in Section 01 32 16 "Construction Progress Schedule".
- b. Review present and future needs of each entity present, including the following:
- 1) Safety, hazards and risks.
 - 2) Change Order Requests and Change Orders.
 - 3) Request for Information.
 - 4) Submittals.
 - 5) Designer Inspection Reports.
 - 6) Erosion & Sedimentation Update (if applicable).
 - 7) Review condition of tree protection (if applicable).
 - 8) Progress cleaning and site cleanliness.
 - 9) Changes to Site Logistics or Emergency Action Plan.
 - 10) Sequence of operations.
 - 11) Resolution of BIM component conflicts.
 - 12) Status of upcoming samples and/or mockups, and location for review.
 - 13) Deliveries.
 - 14) Off-site fabrication.
 - 15) Access.
 - 16) Site utilization.
 - 17) Temporary facilities and controls.
 - 18) Atypical work hours.
 - 19) Quality and work standards.
 - 20) Pending changes
 - 21) Pending claims and disputes.
 - 22) Documentation of information for payment requests.
 - 23) Testing and inspection requirements.
 - 24) Other business relating to the Work.
4. Reporting: Distribute minutes of the meeting to each party present and to parties who should have been present. Include a brief summary, in narrative form, of progress since the previous meeting and report.
- a. Schedule Updating: Revise Contractor's Construction Schedule after each progress meeting where revisions to the schedule have been made or recognized. Issue revised schedule concurrently with the report of each meeting.

1.8 PREINSTALLATION CONFERENCES

- A. Conduct all preinstallation conferences at Project site before each construction activity that requires coordination with other construction.
1. Attendees: Contractor, Subcontractor responsible for the work being discussed at the conference, Designer (architect at a minimum, consultant responsible for the design of the work to also be in attendance), NC State's Project Manager, Commission Agent (if required) and other interested and/or impacted parties within NC State.
 2. Agenda: Contractor shall prepare the meeting agenda and distribute the agenda to all invited attendees at least three (3) working days prior to the meeting. Review progress of other construction activities and preparations for the particular activity under consideration, including requirements for the following:
 - a. Contract Documents.
 - b. Options.
 - c. Related RFI.
 - d. Related Change Orders.
 - e. Purchases.
 - f. Deliveries.
 - g. Submittals.
 - h. Review of mockups.
 - i. Possible conflicts.
 - j. Compatibility requirements.
 - k. Time schedules.
 - l. Weather limitations.
 - m. Manufacturer's written instructions.
 - n. Warranty requirements.
 - o. Compatibility of materials.
 - p. Acceptability of substrates.
 - q. Temporary facilities and controls.
 - r. Space and access limitations.
 - s. Regulations of authorities having jurisdiction.
 - t. Testing and inspecting requirements.
 - u. Installation procedures.
 - v. Coordination with other work.
 - w. Required performance results.
 - x. Protection of adjacent work.
 - y. Protection of construction and personnel.
 3. Minutes: Contractor shall record significant conference discussions, agreements, and disagreements, including required corrective measures and actions. Contractor shall distribute minutes of the meeting to each party present and to other parties requiring information within three (3) working days of the meeting.

4. Notification: Conference shall occur no less than ten (10) working days prior to activity beginning.
 5. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.
- B. The following preinstallation conferences are required by NC State. Additional preinstallation conferences may be specified by the Designer within specific Specification Sections within the Contract Documents.
1. Demolition;
 2. Grading, installation of construction fence, underground utility services;
 3. Waterproofing, damp-proofing;
 4. Face brick installation;
 5. Window, Storefront, Curtain wall and other glazing installations;
 6. Landscape;
 7. Roofing installation;
 8. Flooring installation;
 9. Structural Concrete;
 10. Structural Steel;
 11. Casework/Fumehoods;
 12. Fire Alarm-Sprinkler System;
 13. Card reader/Security, Door Hardware;
 14. Audio/Visual;
 15. Replacement and New Installation of Transformers, Switches, etc.
- 1.9 PAYMENT APPLICATION MEETING
- A. Contractor shall conduct a payment application meeting at monthly intervals.
1. Meeting shall occur between submission of the pencil copy of the payment application to the Designer on the 25th day of the month and the last day of the month.
 2. Attendees:
 - a. Owners Project Manager
 - b. Designer;
 - c. Contractor's Project Manager.
 3. Agenda: Review and correct pencil copy of payment application.
- 1.10 PROJECT CLOSEOUT CONFERENCE
- A. Contractor shall schedule and conduct a project closeout conference, at a time convenient to Owner, State Construction, and Designer, but no later than 80% completion of the Contract Duration, or 90 days prior to the scheduled date of Final Acceptance, whichever is earlier.
1. Conduct the conference to review requirements and responsibilities related to Project closeout.
 2. Attendees:

- a. Authorized representatives of Owner,
 - b. Owner's Commissioning Authority,
 - c. Designer, and their consultants;
 - d. Contractor and its superintendent;
 - e. Major subcontractors;
 - f. Suppliers;
 - g. Other concerned parties shall attend the meeting.
3. Agenda: Discuss items of significance that could affect or delay Project closeout, including the following:
- a. Review Completion Schedule.
 - b. Review Final Acceptance Checklist, as included in Section 00 60 00 "Project Forms".
 - c. Preparation of record documents.
 - d. Procedures required prior to inspection for Substantial Completion and for final inspection for acceptance.
 - e. Submittal of written warranties.
 - f. Requirements for preparing operations and maintenance data.
 - g. Requirements for delivery of material samples, attic stock, and spare parts.
 - h. Requirements for demonstration and training.
 - i. Preparation of Contractor's punch list.
 - j. Requirements prior to the preparation of the Designer's punch list.
 - k. Procedures for processing Applications for Payment at Substantial Completion and for final payment.
 - l. Submittal procedures for closeout documents.
 - m. Owner's partial occupancy requirements.
 - n. Installation of Owner's furniture, fixtures, and equipment.
 - o. Responsibility for removing temporary facilities and controls.
 - p. Close of PIMS and export of data to Owner and Architect.

1.11 SUSTAINABLE DESIGN COORDINATION CONFERENCE

- A. Sustainable Design Requirements Coordination Conference: Designer will schedule and conduct a sustainable design coordination conference before starting construction, at a time convenient to Owner, Designer, and Contractor.
1. Attendees: Authorized representatives of Owner, Owner's Commissioning Authority, Designer, and their consultants; Contractor and its superintendent and sustainable design coordinator; major subcontractors; suppliers; and other concerned parties shall attend the conference. Participants at the conference shall be familiar with Project and authorized to conclude matters relating to the Work.
 2. Agenda: Discuss items of significance that could affect meeting sustainable design requirements, including the following:
 - a. Sustainable design Project checklist.
 - b. General requirements for sustainable design-related procurement and documentation.

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- c. Project closeout requirements and sustainable design certification procedures.
 - d. Role of sustainable design coordinator.
 - e. Construction waste management.
 - f. Construction operations and sustainable design requirements and restrictions.
3. Minutes: Designer will record and distribute meeting minutes.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 00
CONSTRUCTION PROGRESS DOCUMENTATION

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Daily construction reports.
 - 2. Material location reports.
 - 3. Unforeseen condition reports.
 - 4. Special reports.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 00 60 00 "Project Forms" for Daily Report and Stored Material Summary forms.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 REPORT SUBMISSION FREQUENCY

- A. Daily Construction Reports: Submit weekly.
- B. Material Location Reports: Submit at monthly intervals.
- C. Site Condition Reports: Submit at time of discovery of differing conditions.
- D. Special Reports: Submit at time of unusual event.

1.4 INFORMATION SUBMITTALS

- A. Daily Report Template: Submit a copy of Contractors Daily Report Template prior to mobilization.

1.5 DAILY CONSTRUCTION REPORTS

- A. Prepare a daily construction report recording the following information concerning events at Project site:
 - 1. Project Name, SCO Project ID #, NC State Project #

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2. Report #.
3. Date & Time report was generated.
4. Weather data: overhead conditions, precipitation (if so, type & how much), temperature (high & low), impact on progress.
5. Document Daily Safety Briefing (refer to Contractor Safety Guidelines 4.0/E).
6. Report Daily Safety Inspections (refer to Contractor Safety Guidelines 4.0/E).
7. Sediment & Erosion Control.
8. Work performed (include all major trades).
9. Total number of Contractor's workers on site.
10. List of subcontractors and the number of their workers at Project site.
11. List of Owner's personnel and the nature of their business at the Project Site.
12. List of other Owner's contractors and the number of their workers at Project site.
13. Equipment at Project site.
14. Material deliveries.
15. Transmittal of salvage or attic stock to Owner, including the list of materials and name of Owner's representative taking possession of materials.
16. Difficulties encountered that may cause delay.
17. Days of no work & reason.
18. Accidents & near misses.
19. Meetings and significant decisions.
20. Unusual events (refer to special reports).
21. Stoppages, delays, shortages, and losses.
22. Report of utility shutdowns performed by Owner at Contractor's request, including, but not limited to: start time, finish time, progress of work, and personnel involved.
23. Meter readings and similar recordings.
24. Tests and inspections, including name(s) of testing and inspection agency(ies).
25. Emergency procedures.
26. Orders and requests of authorities having jurisdiction.
27. Change Orders received and implemented.
28. Field Orders received and implemented.
29. Bulletins, Architect's Supplemental Instructions, or other sketches received.
30. Services connected and disconnected.
31. Equipment or system tests and startups.
32. Substantial Completions achieved (in part or in full) and Final Acceptances authorized.

1.6 MATERIAL LOCATION REPORTS

- A. Material Location Reports: At monthly intervals, prepare and submit a comprehensive list of materials delivered to and stored at Project site. List shall be cumulative, showing materials previously reported plus items recently delivered. Include with list a statement of progress on and delivery dates for materials or items of equipment fabricated or stored away from Project site. Indicate the following categories for stored materials:
1. Material stored prior to previous report and remaining in storage.
 2. Material stored prior to previous report and since removed from storage and installed.
 3. Material stored following previous report and remaining in storage.

1.7 UNFORSEEN CONDITION REPORTS

- A. Immediately on discovery of unforeseen conditions, prepare a detailed report using a Request for Interpretation (RFI). Include a detailed description of the differing conditions, including photos or field reports as necessary to describe and detail the unforeseen condition, together with recommendations for resolving the condition.

1.8 SPECIAL REPORTS

- A. General: Submit special reports directly to Owner within one day of an occurrence. Distribute copies of report to parties affected by the occurrence.
- B. Reporting Unusual Events: When an event of an unusual and significant nature occurs at Project site, whether or not related directly to the Work, prepare and submit a special report. List chain of events, persons participating, response by Contractor's personnel, evaluation of results or effects, and similar pertinent information. Advise Owner in advance when these events are known or predictable.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 32 16

CONSTRUCTION PROGRESS SCHEDULE

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for documenting the progress of construction during performance of the Work, including the following:
 - 1. Definitions.
 - 2. Reports.
 - 3. Quality Assurance.
 - 4. Coordination.
 - 5. Work Breakdown Structure Overview (WBS).
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 01 29 00 "Payment Procedures" for submitting the Schedule of Values.
 - 2. Section 01 31 00 "Project Management and Coordination" for submitting and distributing meeting and conference minutes.
 - 3. Section 01 33 00 "Submittal Procedures" for submitting schedules and reports.
 - 4. Section 01 40 00 "Quality Requirements" for submitting a schedule of tests and inspections.
 - 5. Section 01 77 00 "Closeout" for administrative requirements about Contractor's Statement of Completion with Request for Designers Inspection, Substantial Completion, and Final Acceptance.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Activity: A discrete part of a project that can be identified for planning, scheduling, monitoring, and controlling the construction project. Activities included in a construction schedule consume time and resources.
 - 1. Critical Activities are activities on the critical path that must start and finish on the planned early start and finish times.

2. Predecessor Activity is an activity that must be completed before a given activity can be started.
 3. Successor Activity: An activity that follows another activity in the network.
- B. CPM: Critical path method, which is a method of planning and scheduling a construction project where activities are arranged based on activity relationships. Network calculations determine when activities can be performed and the critical path of Project.
- C. Critical Path: The longest continuous chain of interdependent activities through the network schedule that establishes the minimum overall Project duration and contains no float.
- D. Event: The starting or ending point of an activity.
- E. Float: The measure of leeway in starting and completing an activity.
1. Float time is not for the exclusive use or benefit of either Owner or Contractor, but is a jointly owned, expiring Project resource available to both parties as needed to meet schedule milestones and Contract completion date.
 2. Free float is the amount of time an activity can be delayed without adversely affecting the early start of the following activity.
 3. Total float is the measure of leeway in starting or completing an activity without adversely affecting the planned Project completion date.
- F. Fagnet: A partial or fragmentary network that breaks down activities into smaller activities for greater detail.
- G. Major Area: A story of construction, a separate building, a separate wing, a major department, or a similar significant construction element.
- H. Milestone: A key or critical point in time for reference or measurement.
- I. Network Diagram: A graphic diagram of a network schedule, showing activities and activity relationships.
- J. Resource Loading: The allocation of manpower and equipment necessary for the completion of an activity as scheduled.
- K. Work Breakdown Structure (WBS): A deliverable-oriented hierarchical decomposition of the work to be executed by the project team to accomplish the project, with each descending level of the WBS representing an increasingly detailed definition of the project work.
- 1.4 INFORMATIONAL SUBMITTALS
- A. Format for Submittals: Submit required submittals in the following format, unless indicated otherwise:
1. Working electronic copy of schedule file in contractor's scheduling software utilized.
 2. PDF electronic file.

- B. Contractor's Initial Construction Schedule: Initial project construction schedule conforming to the requirements herein, submitted within fifteen (15) calendar days of Notice to Proceed. No Applications for Payment will be processed without an approved Initial Construction Schedule. Once approved, this schedule becomes the "Baseline" schedule.
1. Submit a working electronic copy of schedule, exported to Microsoft Project (.mpp) format (regardless of the software used to generate the schedule), and labeled to comply with requirements for submittals. Include type of schedule (initial or updated) and date on label.
- C. Construction Finish Schedule: At 80 percent project completion (determined by duration not value of work in place), submit a schedule illustrating tasks remaining to complete the project.
- D. Construction Schedule Update Report:
1. Submit, with each Application for Payment, an electronic copy of the Construction Schedule Update Report in .pdf format containing all requirements herein as well as a working electronic copy of the schedule in Microsoft Project (.mpp) format.
 2. Cover Letter: Cover letter shall describe the contents of the report including the following:
 - a. Project Name and NC State Project Number,
 - b. SCO Project ID Number,
 - c. Date of Report,
 - d. Contents of the Report,
 - e. Schedule compliance update and status of recovery schedule (if applicable)
 - f. Signed by the Contractor's Project Manager.
 3. Signature Page: A signature page (or pages if necessary) must be included in the Update Report, so that in addition to the Contractor's signature representing the accuracy of the updated Schedule, the Project Manager for each Subcontractor (as identified in the Subcontract List submittal) can sign to document their agreement to the updated schedule.
 - a. If a Subcontractor does not agree to the updated schedule, they shall write "Exceptions Taken" in the signature line for their company and submit to Contractor a separate written summary of their exceptions and/or inaccuracies on Subcontractors letterhead. Contractor shall include the Subcontractor's written summary, and responses to the exceptions in the Narrative section of the Schedule Update Report.
 4. Narrative: Contractor shall include, separate from the Cover Letter, a Narrative that describes what activity changes happened on the project, including the following:
 - a. Summary of work completed since the last report,
 - b. Missing data,
 - c. Recent and upcoming changes,
 - d. Documented delays,
 - e. Potential delays, and

- f. Other facts.
- 5. CPM Activity Report:
 - a. Formatting:
 - 1) Plotted to an 11x17 page with landscape orientation,
 - 2) List of all activities sorted by WBS, activity number, and then early start date, or actual start date if known.
 - 3) Include the Gantt chart in the report, scaled so all information below and the chart fit on one page width.
 - b. Each activity line in the report shall contain the following:
 - 1) Activity number,
 - 2) Activity description,
 - 3) Original duration,
 - 4) Remaining duration,
 - 5) Early start date,
 - 6) Early finish date,
 - 7) Late start date,
 - 8) Late finish date,
 - 9) Predecessor & Successor Activity Numbers, and
 - 10) Total float in working days.
- 6. Critical Path Report: Using the same format of the CPM Activity Report, generate a report showing only items on the Critical Path of the Project.
- 7. Total Float Report:
 - a. Format: 8-1/2x11, portrait orientation
 - b. List of all activities sorted by total float, Criticality (Critical: 0 days float, Near Critical: 1 to 10 days of float, and Not Critical: 11+ days of Float), WBS, then activity number.
 - c. Each activity line in the report shall contain the following:
 - 1) Activity number,
 - 2) Activity description,
 - 3) Original duration,
 - 4) Remaining duration,
 - 5) Early start date,
 - 6) Early finish date,
 - 7) Total float in working days.
- 8. Change Report, as described in Paragraph 2.2.G. of this Section.
- 9. Earnings Report: Compilation of Contractor's total earnings from the Notice to Proceed until most recent Application for Payment in tabular and chart format.
- E. Upcoming Work Summary: Prepare summary report indicating activities scheduled to occur or commence prior to submittal of next schedule update. Summarize the following issues:
 - 1. Unresolved issues.
 - 2. Unanswered RFI.
 - 3. Rejected or unreturned submittals.
 - 4. Notations on returned submittals.
 - 5. Pending modifications affecting the Work and Contract Time.

1.5 QUALITY ASSURANCE

- A. Contractors Scheduler, or Scheduling Consultant, Qualifications: Contractor shall employ, or contract with, an experienced specialist in CPM scheduling and reporting, with capability of producing CPM reports and diagrams within 24 hours of Designer's or Owner's request.
 - 1. Qualification Data: Submit the resume and/or qualifications for Contractors Scheduler or the Contractors scheduling consultant. Owner reserves the right to approve, reject, or change the Contractors Scheduler as necessary to ensure the project stays on schedule without incurring additional costs.
- B. Conduct Prescheduling conference at Project site to comply with requirements in Section 01 31 19 "Project Meetings."

1.6 COORDINATION

- A. Coordinate preparation and processing of schedules and reports with performance of construction activities and with scheduling and reporting of separate contractors.
- B. Coordinate Contractor's construction schedule with the schedule of values, list of subcontracts, submittal schedule, progress reports, payment requests, and other required schedules and reports.
 - 1. Secure time commitments for performing critical elements of the Work from parties involved.
 - 2. Coordinate each construction activity in the network with other activities and schedule them in proper sequence.
- C. Coordinate Contractor's construction schedule with Owner's construction schedule for Owner's own forces. Revise Contractor's construction schedule, if necessary, after a joint review and mutual agreement. The construction schedule shall then constitute the schedule to be used by Contractor, separate contractors, and Owner until subsequently revised.

1.7 WORK BREAKDOWN STRUCTURE (WBS) OVERVIEW

- A. All schedules prepared by the contractor shall generally conform to the following Work Breakdown Structure (WBS). Additional details for each WBS are included in subsequent paragraphs in this Section.
 - 1. Milestones.
 - 2. Inspections & Outages.
 - 3. Preconstruction.
 - 4. Construction.
 - 5. Closeout.
- B. Milestones
 - 1. Include, at a minimum, the following milestones in the schedule, within the following structure:

- a. Contract Dates (if project includes multiple phases, include the following for each phase)
 - 1) Contract Execution
 - 2) Notice to Proceed
 - 3) 15 Days after NTP (due date for various submittals)
 - 4) 30 Days after NTP (due date for various submittals)
 - 5) 80% Duration Complete
 - 6) Contractor's Statement of Completion with Request for Designer's Inspection
 - 7) Final Acceptance
 - b. Coordination Effort
 - 1) MEPFP Coordination Drawings Ready for Review (can be multiple milestones if required by the project)
 - 2) Casework & Fume Hood Submittals & Shop Drawings Ready for Review, if necessary (due within 30 calendar days from Notice to Proceed)
 - c. SCO Monthly Meeting Dates
 - d. Progress Milestones
 - 1) Chilled Water Complete.
 - 2) Footings Complete.
 - 3) Structure Complete.
 - 4) Roof Complete.
 - 5) Envelope Complete / Dry-in.
 - 6) Sitework Complete.
- C. Tests, Inspections & Outages
- 1. Contractor Tests & Inspections:
 - a. Stair & Ramp Survey (if required)
 - b. Moisture Testing for Flooring
 - c. Contractors Pre-Final Punch List
 - d. Testing, Adjusting, and Balancing
 - e. Pre-Functional Testing
 - 2. Designer Tests & Inspections:
 - a. Backflow Preventer Test (if not by Contractor)
 - b. Designer Punch List
 - c. Designer Pre-Electrical Inspection
 - 3. Designer and NC State Tests & Inspections:
 - a. In-wall Inspections
 - b. Above Ceiling Inspections
 - c. Generator Load Test
 - d. Fire Pump Test
 - e. Fire Sprinkler Main Drain Tests
 - f. Pre-Final Inspections
 - g. 100% Test of the fire detection and alarm system
 - h. Third Party materials testing / special inspections / commissioning
 - i. Piping Pressure Testing
 - j. Telecom/Data Wiring Tests & As-Built

- k. Underground piping, ductbanks, and other components prior to backfill
 - l. Fume Hood Commissioning & Testing
 - m. Final Inspection for Project Acceptance
 - 4. Include, at a minimum, the following tests & inspections, conducted by AHJ
 - a. NFPA, DOI, and DOL Tests
 - b. Final Inspections
 - 5. Include Utility Outages on the schedule, scheduled in accordance with the requirements described in Section 01 14 00 "Work Restrictions".
 - 6. General Requirements
 - a. The Contractor should include a reasonable corrective work period after each inspection so that Contractor has time to work off deficient items identified during each inspection. However, since the duration shown for each corrective work period will be at the Contractor's discretion, and the amount of corrective work needed will be relative to Contractor's quality of work, if the corrective work period takes longer than the time identified on the schedule, it does not alleviate Contractor's requirement to achieve the Contract Milestone dates.
- D. Preconstruction
- 1. Include, at a minimum, the following preconstruction items:
 - a. Procurement & Submittals (General) - repeat for each item with a procurement duration longer than six (6) weeks.
 - 1) Prepare Submittal
 - 2) A/E Review Submittal (20 calendar days)
 - 3) Fabricate / Deliver Material
 - b. Procurement & Submittals (Sprinkler)
 - 1) Prepare Submittal
 - 2) A/E Review Submittal (20 calendar days)
 - 3) North Carolina State Construction Office Review (approx. 30 calendar days)
 - 4) Fabricate / Deliver Material
 - c. BIM Coordination
 - d. Safety
 - 1) NCSU Review of Activities (Refer to Paragraph 4.0 of NCSU Safety Manual)
 - 2) NCSU Lift Plan Review (50 calendar days)
 - e. Mockups
- E. Construction
- 1. Work by Contractor - Organized at Contractor's discretion, conforming to reasonably accepted construction standards and coordinated with the Schedule of Values.
 - 2. Work by Owner - coordinate with Section 01 11 16, "Work by Owner"
 - 3. Acceptance Phase - Include a section that shows an Acceptance Phase showing all activities preparing for Final Acceptance.

- a. This Acceptance Phase shall include all activities by Contractor, Designer, Owner, and Inspectors required to complete the project. Coordinate activities with Section 01 77 00 "Closeout".
- F. Closeout
- 1. Include, at a minimum, the following activities in the closeout section:
 - a. Preparation of O&M's (listed by Division)
 - b. Review & Approval of O&M's (listed by Division)
 - c. Preparation of Warranties
 - d. Review & Approval of Warranties
 - e. Training & Demonstration activities
 - f. Attic Stock Transfer

PART 2 PRODUCTS

2.1 CONTRACTOR'S CONSTRUCTION SCHEDULE, GENERAL

- A. Time Frame: Extend schedule from date established for the Notice of Award to date of final completion.
 - 1. Contract completion date shall not be changed by submission of a schedule that shows an early completion date, unless specifically authorized by Change Order.
- B. Activities: Treat each separate area as a separate numbered activity for each principal element of the Work. Comply with the following:
 - 1. Activity Duration: Define Construction Activities so no activity is longer than fourteen (14) working days, unless specifically allowed by Owner and Designer.
 - 2. Procurement Activities: Include procurement process activities for long lead items and major items, requiring a cycle of more than 30 working days, as separate activities in schedule. Procurement cycle activities include, but are not limited to, submittals, approvals, purchasing, fabrication, and delivery.
 - 3. Submittal Review Time: Include review and resubmittal times indicated in Section 01 33 00 "Submittal Procedures" in schedule. Include selection process activities for finishes and products specified by allowances or specified to be selected during the sample review process. Coordinate submittal review times in Contractor's Construction Schedule with Submittals Schedule.
 - 4. Startup and Testing Time: Include not less than 15 days for startup and testing.
 - 5. Final Acceptance: Indicate completion in advance of date established for Final Acceptance and allow time for Designer's administrative procedures necessary for Final Acceptance.
 - 6. Punch List and Final Completion: Include not more than 60 days for completion of punch list items and final completion.

7. Demonstration and Training: Training of Owner's personnel as indicated in Section 01 77 00 "Closeout Procedures."
- C. Constraints: Include constraints and work restrictions indicated in the Contract Documents and as follows in schedule and show how the sequence of the Work is affected. No constraints, aside from those specifically listed in the Contract Documents, are allowed.
1. Phasing: Arrange list of activities on schedule by phase.
 2. Work under More Than One Contract: Include a separate activity for each contract.
 3. Work by Owner: Include a separate activity for each portion of the Work performed by Owner.
 4. Owner-Furnished Products: Include a separate activity for each product. Include delivery date indicated in Section 01 11 16 "Work by Owner". Delivery dates indicated stipulate the earliest possible delivery date.
 5. Work Restrictions: Show the effect of the following items on the schedule:
 - a. Coordination with other construction projects.
 - b. Examination periods.
 - c. Graduation.
 - d. Athletic Events (if applicable to the project).
 - e. Student Move-in & move-out (if applicable to the project).
 - f. Utility Outages.
 - g. Uninterruptible services.
 - h. Use of premises restrictions.
 - i. Provisions for future construction.
 - j. Seasonal variations or limitations.
 - k. Environmental control.
 6. Work Stages: Indicate important stages of construction for each major portion of the Work, including, but not limited to, the following:
 - a. Subcontract awards.
 - b. Submittals.
 - c. Purchases.
 - d. Mockups.
 - e. Fabrication.
 - f. Sample testing.
 - g. Deliveries.
 - h. Installation.
 - i. Tests and inspections.
 - j. Adjusting.
 - k. Curing.
 - l. Startup and placement into final use and operation.
 7. Construction Areas: Identify each major area of construction for each major portion of the Work. Indicate where each construction activity within a major area must be sequenced or integrated with other construction activities to provide for the milestones listed in Paragraph 1.7.B. of this Section.
- D. Plan of Action and Recovery Schedule:

1. A Plan of Action and Recovery Schedule shall be prepared by the Contractor when any of the following occur:
 - a. The Contractor's report indicated delays that would prevent the Contractor's ability to complete the project within the Contract Duration.
 - b. The updated construction schedule is thirty (30) days behind schedule.
 - c. The Contractor desires to make changes to the sequence of work that are, in the opinion of the Owner or Design, major in nature.
 2. The Plan of Action is due from the Contractor within two (2) calendar days of Owners written demand.
 3. Recovery schedules are due from the Contractor within five (5) calendar days of Owners written demand.
- E. Computer Scheduling Software: Prepare schedules using current version of a program that has been developed specifically to manage construction schedules. Coordinate with Designer regarding which project management software will be used on the Project. Contractor to provide Owner two (2) licensed copies of the scheduling software for the duration of the Project.
1. Allowable scheduling software's include Microsoft Project, Primavera P6, or another software approved by the Owner.
 2. Smartsheets, Google Sheets, Microsoft Excel, or similar products shall not be used to prepare or update the project schedule.

2.2 CONTRACTOR'S CONSTRUCTION SCHEDULE (CPM SCHEDULE)

- A. General: Prepare network diagrams using AON (activity-on-node) format.
- B. Startup Network Diagram: Submit diagram within 14 days of date established for the Notice to Proceed. Outline significant construction activities for the first 90 days of construction. Include skeleton diagram for the remainder of the Work and a cash requirement prediction based on indicated activities.
- C. CPM Schedule: Prepare Contractor's Construction Schedule using a time-scaled CPM network analysis diagram for the Work.
 1. Develop network diagram in sufficient time to submit CPM schedule so it can be accepted for use no later than 30 days after date established for the Notice to Proceed.
 - a. Failure to include any work item required for performance of this Contract shall not excuse Contractor from completing all work within applicable completion dates, regardless of Designer's approval of the schedule.
 2. All activities, except for "Project Start" and "Project Finish", must have at least one predecessor activity and at least one successor activity.
 3. Conduct educational workshops to train and inform key Project personnel, including subcontractors' personnel, in proper methods of providing data and using CPM schedule information.
 4. Establish procedures for monitoring and updating CPM schedule and for reporting progress. Coordinate procedures with progress meeting and payment request dates.

5. Use "one workday" as the unit of time for individual activities. Indicate nonworking days and holidays incorporated into the schedule to coordinate with the Contract Time.
- D. CPM Schedule Preparation: Prepare a list of all activities required to complete the Work. Using the preliminary network diagram, prepare a skeleton network to identify probable critical paths.
1. Activities: Indicate the estimated time duration, sequence requirements, and relationship of each activity in relation to other activities. Include estimated time frames for the following activities:
 - a. Preparation and processing of submittals.
 - b. Mobilization and demobilization.
 - c. Purchase of materials.
 - d. Delivery.
 - e. Fabrication.
 - f. Utility interruptions.
 - g. Installation.
 - h. Work by Owner that may affect or be affected by Contractor's activities.
 - i. Testing and commissioning.
 - j. Punch list and final completion.
 - k. Activities occurring following final completion.
 2. Critical Path Activities: Identify critical path activities, including those for interim completion dates. Scheduled start and completion dates shall be consistent with Contract milestone dates.
 3. Processing: Process data to produce output data or a computer-drawn, time-scaled network. Revise data, reorganize activity sequences, and reproduce as often as necessary to produce the CPM schedule within the limitations of the Contract Time.
 4. Format: Mark the critical path. Locate the critical path near center of network; locate paths with most float near the edges.
 - a. Subnetworks on separate sheets are permissible for activities clearly off the critical path.
- E. Contract Modifications: For each proposed contract modification and concurrent with its submission, prepare a time-impact analysis using a network fragment to demonstrate the effect of the proposed change on the overall project schedule.
- F. Initial Issue of Schedule: Prepare initial network diagram from a list of straight "early start-total float" sort. Identify critical activities. Prepare tabulated reports showing the following:
1. Contractor or subcontractor and the Work or activity.
 2. Description of activity.
 3. Principal events of activity.
 4. Immediately preceding and succeeding activities.
 5. Early and late start dates.
 6. Early and late finish dates.
 7. Activity duration in workdays.
 8. Total float or slack time.

9. Average size of workforce.
 10. Dollar value of activity (coordinated with the Schedule of Values).
- G. Schedule Updating: Concurrent with revising the schedule, prepare tabulated reports showing the following:
1. Identification of activities that have changed.
 2. Changes in early and late start dates.
 3. Changes in early and late finish dates.
 4. Changes in activity durations in workdays.
 5. Changes in the critical path.
 6. Changes in total float or slack time.
 7. Changes in the Contract Time.
- H. Value Summaries: Prepare two cumulative value lists, sorted by finish dates.
1. In first list, tabulate activity number, early finish date, dollar value, and cumulative dollar value.
 2. In second list, tabulate activity number, late finish date, dollar value, and cumulative dollar value.
 3. In subsequent issues of both lists, substitute actual finish dates for activities completed as of list date.
 4. Prepare list for ease of comparison with payment requests, coordinate timing with progress meetings.
 - a. In both value summary lists, tabulate "actual percent complete" and "cumulative value completed" with total at bottom.
 - b. Submit value summary printouts one week before each regularly scheduled monthly progress meeting.

PART 3 EXECUTION

3.1 CONTRACTOR'S CONSTRUCTION SCHEDULE

- A. Contractor's Construction Schedule Updating: At monthly intervals, or as requested by Owner, the Contractor shall update the project schedule to reflect actual construction progress and activities. Issue schedule three (3) calendar days before each regularly scheduled progress meeting.
1. Revise schedule immediately after each meeting or other activity where revisions have been recognized or made. Issue updated schedule concurrently with the report of each such meeting.
 2. Include a report with updated schedule that indicates every change, including, but not limited to, changes in logic, durations, actual starts and finishes, and activity durations.
 3. As the Work progresses, indicate Actual Completion percentage for each activity.
 4. Notify Owner and Designer a minimum of one week prior to issuance of updated schedule of all anticipated significant revisions to the Construction Schedule.

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- B. Distribution: Distribute copies of approved schedule to Designer, Owner, separate contractors, testing and inspecting agencies, and other parties identified by Contractor with a need-to-know schedule responsibility.
1. Post electronic copies of the updated project schedule on the project website.
 2. Post copies in Project meeting rooms and temporary field offices.
 3. When revisions are made, distribute updated schedules to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in performance of construction activities.
 4. Provide Owner electronic copy of updated schedule in Contractor's scheduling software format.

END OF SECTION

SECTION 01 32 33

PHOTOGRAPHIC DOCUMENTATION

PART 1 – GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Preconstruction photographs.
 - 2. Periodic construction photographs.
 - 3. Utility Photographs.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Construction photographs may not be used for Contractor's marketing materials or social media unless approved by Owner.

1.4 INFORMATIONAL SUBMITTALS

- A. Key Plan: Fifteen (15) days after Notice to Proceed, submit key plan of Project site and building with notation of vantage points marked for location and direction of each photograph and video recording. Indicate elevation or story of construction. Include same information as corresponding photographic documentation.
- B. Digital Photographs: Submit image files within three days of taking photographs.
 - 1. Submit photos by uploading to web-based project software site and email to Designer & NC State Project Manager. Include copy of key plan indicating each photograph's location and direction.
 - 2. Identification: Provide the following information with each image description in web-based project software site:
 - a. Name of Project.
 - b. Name and contact information for photographer.
 - c. Name of Designer.
 - d. Name of Contractor.
 - e. Date photograph was taken.
 - f. Description of location, vantage point, and direction.
 - g. Unique sequential identifier keyed to accompanying key plan.

1.5 FORMATS AND MEDIA

- A. Digital Photographs: Provide color images in JPG format, produced by a digital camera with minimum sensor size of 12 megapixels, and at an image resolution of not less than 3200 by 2400 pixels, and with vibration-reduction technology. Use flash in low light levels or backlit conditions.
- B. Digital Images: Submit digital media as originally recorded in the digital camera, without alteration, manipulation, editing, or modifications using image-editing software.
- C. Metadata: Record accurate date and time from camera.
- D. File Names: Name media files with date, Project area and sequential numbering suffix.

1.6 CONSTRUCTION PHOTOGRAPHS

- A. Photographer & Quality: Construction photographs shall be taken by a member of the Contractors Supervisory team and shall not be blurry. In the event that drone photography is to be used, Contractor shall engage with, or retain, a qualified drone operator. All drone photography must be approved in advance with N.C. State.
- B. General: Take photographs with maximum depth of field and in focus.
 - 1. Maintain key plan with each set of construction photographs that identifies each photographic location.
- C. Preconstruction Photographs: Before commencement of excavation or demolition, take photographs of Project site and surrounding properties, including existing items to remain during construction, from different vantage points, as directed by Owner or Designer.
 - 1. Flag excavation or demolition areas before taking construction photographs.
 - 2. Take a reasonably sufficient quantity of photographs to reasonably show existing conditions within and adjacent to project before starting the Work.
 - 3. Take additional photographs as required to record settlement or cracking of adjacent structures, pavements, and improvements.
 - 4. Failure to submit preconstruction photographs may result in delayed processing of the initial payment application.
- D. Post-Demolition Photographs: After completion of demolition, but before any new construction activities, take photographs of Project site and surrounding areas.
- E. Concealed Work Photographs: Before proceeding with installing work that will conceal other work, take photographs sufficient in number, with annotated descriptions, to record nature and location of concealed Work, including, but not limited to, the following:
 - 1. Underground utilities.
 - 2. Underslab services.

3. Piping.
 4. Electrical conduit.
 5. Waterproofing and weather-resistant barriers.
- F. Periodic Construction Photographs: Take a reasonably sufficient quantity of photographs coinciding with the cutoff date associated with each Application for Payment. Select vantage points to show status of construction and progress since last photographs were taken.
- G. Final Completion Construction Photographs: Take a reasonably sufficient quantity of photographs prior to Final Acceptance for submission as Project Record Documents. Owner and Designer will inform photographer of desired vantage points.
- 1.7 UTILITY PHOTOGRAPHS
- A. In conjunction with survey's required for as-builts, as required by Section 01 77 00 "Closeout Requirements", the following photographs need to be submitted by the Contractor to Owner within two weeks of the backfilling of utilities or completion of the associated construction task. Failure to take appropriate photographs will result in Contractor excavating the work at no addition cost to the Owner so that all photographs can be taken.
- B. The following outline lists the utilities to be located and the data to be collected. Photographs shall be at a minimum resolution of 2200 x 1700. Digital photographs can be submitted in TIFF, JPG, or RAW file formats. File naming shall be all lower case text. File naming shall be as follows: bldg#_ncsu project number_util_photo#.file extention. For example: 135_201300001_util_1.jpg
1. Water Lines - (Domestic, Fire Main, Chilled, Hot Water, & Reuse Waterlines)
 - a. Provide digital photographs of bends and valves.
 2. Electric and Communication Duct Banks and Direct Buried Conduit
 - a. Provide digital photographs of the tunnel and conduit configuration.
 3. Storm and Sanitary Sewer
 - a. Provide digital photographs of structures.
 4. Existing Utilities
 - a. Provide digital photographs of any crossings or conflict between new utilities and existing utilities.
 5. Deliverables for Surveys
 - a. The subsurface location data and platting shall be continuous throughout the project.
 - b. All data and plats are due to NC State within two-weeks of the backfilling of utilities or completion of the associated construction task.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02B
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PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Submittal Schedule.
 - 2. Submittal Administrative Requirements
 - 3. Submittal Procedures regarding Submitting Shop Drawings, Product Data, Samples, and other submittals.
 - 4. Schedule of Required Division 01 Submittals and associated due dates.
 - 5. Submittals to be reviewed by Owner in addition to Designer.

1.2 DEFINITIONS

- A. Action Submittals: Written and graphic information and physical samples that require Designer's responsive action. Action submittals are those submittals indicated in individual Specification Sections as action submittals.
- B. Informational Submittals: Written and graphic information and physical samples that do not require Designer's responsive action. Submittals may be rejected for not complying with requirements. Informational submittals are those submittals indicated in individual Specification Sections as informational submittals.
- C. File Transfer Protocol (FTP): Communications protocol that enables transfer of files to and from another computer over a network and that serves as the basis for standard Internet protocols. An FTP site is a portion of a network located outside of network firewalls within which internal and external users are able to access files.
- D. Portable Document Format (PDF): An open standard file format licensed by Adobe Systems used for representing documents in a device-independent and display resolution-independent fixed-layout document format.

1.3 SUBMITTAL SCHEDULE

- A. No less than fifteen (15) calendar days after Notice to Proceed, Contractors shall submit a schedule of submittals, arranged in chronological order by dates required by construction schedule. Include time required for review, ordering, manufacturing, fabrication, and delivery when establishing dates. Include additional time required for making corrections or modifications to submittals noted by the Designer and additional time for handling and reviewing submittals required by those corrections.

1. Coordinate submittal schedule with list of subcontracts, the schedule of values, and Contractor's construction schedule.
2. Initial Submittal: Submit concurrently with start-up construction schedule. Refer to Section 012900 "Payment Procedures" for requirements for submission of submittal schedule prior to application for payment. Minimum preliminary submittal shall include submittals required during the first 60 days of construction. List those submittals required to maintain orderly progress of the Work and those required early because of long lead time for manufacture or fabrication.
3. Final Submittal: Submit concurrently with the first complete submittal of Contractor's construction schedule.
 - a. Submit revised submittal schedule to reflect changes in current status and timing for submittals.
4. Format: Arrange the following information in a tabular format:
 - a. Scheduled date for first submittal.
 - b. Specification Section number and title.
 - c. Submittal category: either Action or Informational.
 - d. Name of subcontractor.
 - e. Description of the Work covered.
 - f. Scheduled date for Designer's final release or approval.
 - g. Scheduled dates for purchasing.
 - h. Scheduled dates for installation.
 - i. Activity or event number.
5. Designer reserves the right to withhold, in addition to retainage, 10 percent of each payment request until the submittal schedule is received and accepted by the Designer.

1.4 SUBMITTAL ADMINISTRATIVE REQUIREMENTS

- A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.
 1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
 2. Submit all Action and Informational submittal items required for each Specification Section concurrently unless partial submittals for portions of the Work are indicated on approved submittal schedule.
 - a. Exception: Where samples for initial selection and samples for verification are both required, submit samples for verification after initial selection has been returned by Designer.
 3. Submit action submittals and informational submittals required by the same Specification Section as separate packages under separate transmittals.
 4. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.
 - a. Designer reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

- B. Processing Time: Allow time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Designer's receipt of submittal. Designer will document on submittal the date of receipt. Submittals received by Designer after 1:00 p.m. will be considered as received the following working day. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.
1. Initial Review: Allow twenty (20) calendar days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Designer will advise Contractor when a submittal being processed must be delayed for coordination. Delaying submittals to facilitate coordination between submittals shall not constitute a delay of the Work nor shall it be the basis for an extension of time.
 2. Sequential Review: Sequential review is a submittal that requires review by more than one design discipline. Where sequential review of submittals by Designer's consultants, Owner, or other parties is required, submittal schedule shall reflect sequential review. Sequential reviews are anticipated for, but not limited to, the following:
 - a. Division 03 Sections:
 - 1) "Cast-in-Place Concrete."
 - b. Division 04 Sections:
 - 1) "Unit Masonry."
 - c. Division 05 Sections:
 - 1) "Structural Steel Framing."
 - 2) "Steel Decking."
 - 3) "Cold-Formed Metal Framing."
 - 4) "Metal Fabrications."
 - 5) Stairs and Railings of each type.
 - d. Division 06 Sections:
 - 1) "Rough Carpentry."
 - 2) "Sheathing."
 - 3) "Interior Millwork."
 - e. Division 07 Sections:
 - 1) "Joint Sealants."
 - f. Division 08 Sections:
 - 1) "Aluminum Framed Entrances and Storefronts."
 - 2) "All-Glass Entrances and Storefronts."
 - 3) "Glazed Aluminum Curtain Walls."
 - 4) "Metal Frames Skylights."
 - 5) "Door Hardware."
 - 6) "Louvers and Vents."
 - g. Division 14 Sections:
 - 1) "Hydraulic Elevators."
 - h. Facility Services Subgroup Divisions: All Sections.
 - i. Site and Infrastructure Subgroup Divisions: All Sections.
 - j. Process Equipment Subgroup Divisions: All Sections.

3. If intermediate submittal is necessary, process it in same manner as initial submittal.
 4. Allow twenty (20) calendar days for review of each resubmittal.
- C. Electronic Submittals: Identify and incorporate information in each electronic submittal file as follows:
1. Assemble complete submittal package into a single indexed file with links enabling navigation to each item.
 - a. Unique identifier, including revision number. Submittals shall be numbered with the Section number, followed by a dash, followed by a three-digit number, followed by a dash, and ending with a sequential submission number as indicated below. The numbering system shall be retained throughout all revisions.
 - 1) Section Number: Section number where submittal is specified.
 - 2) Three-Digit Number: Sequential number, beginning with "001," for each submittal transmitted to Designer for each Section.
 - 3) Submission Number: Use "00" for initial submittal, "01" for first resubmittal, "02" for second resubmittal, and so forth.
 - 4) Two-character Type Identifier followed by a dash:
 - (a) a) CT for certificate.
 - (b) b) IN for informational submittal.
 - (c) c) PD for product data.
 - (d) d) QL for qualification information.
 - (e) e) SA for samples.
 - (f) f) SD for shop drawing.
 - (g) g) TR for test report.
 - 5) Short description of the content, using material designation indicated in the Contract Documents.
 - 6) Example: 084413.001.00-SD-Curtain Wall CW-1 (Section, first submission of the Section, initial submittal).
 2. Provide means for insertion to permanently record Contractor's review and approval markings and action taken by Designer.
 3. Scanned Copies: Legible scanned PDF files of paper originals are acceptable. Scanned submittals that are not legible will be rejected.
 4. Sheet Orientation: Orient PDF sheets to a "Ready-to-Read" orientation with majority of text horizontal to the sheet with no additional adjustments or formatting required by the viewer.
 5. File Security: Do not set any permissions on the file. Protected documents will not be accepted.
 6. Metadata: Include the following information in the electronic submittal file metadata:
 - a. Title: Project title
 - b. Author: Contractor's name.
 - c. Subject: Submittal type (product data, shop drawing, report, etc.)
 - d. Keywords: Number and title of appropriate Specification Section; manufacturer name; product name/model number.

7. File Transmission: Through project website. Do not transmit submittal via email.
 - D. Options: Identify options requiring selection by Designer.
 - E. Deviations and Additional Information: Deviations to the requirements of the Contract Documents must follow the Substitution Requirements described in Section 01 25 00 "Substitution Requirements".
 - F. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.
 1. Note date and content of previous submittal.
 2. Note date and content of revision in label or title block and clearly indicate extent of revision.
 - G. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, authorities having jurisdiction, and others as necessary for performance of construction activities. Show distribution on transmittal forms.
 - H. Use for Construction: Retain complete copies of submittals on Project site. Use only final action submittals.
 - I. 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 reviewed by Designer and returned to Contractor with Designer's action stamp.
- 1.5 SCHEDULE OF DIVISION 01 SUBMITTALS AND ASSOCIATED DUE DATES
- A. Section 01 25 00 "Substitution Procedure"
 1. Substitution Requests: As needed
 - B. Section 01 26 00 "Contract Modification Procedure"
 1. Five Year Climatic Average: No less than Fifteen (15) Workdays prior to mobilization
 - C. Section 01 29 00 "Payment Procedures"
 1. Schedule of Values: No less than Fifteen (15) working days prior to submission of initial Application for Payment
 - D. Section 01 31 00 "Project Management & Coordination"
 1. Vendor & Subcontract List: due within fifteen (15) calendar days of Notice to Proceed.
 2. Key Personnel Names: due within fifteen (15) working days of mobilization.
 3. BIM Execution Plan and Schedule: due within fifteen (15) calendar days of Notice to Proceed.
 - E. Section 01 32 00 "Construction Progress Documentation"
 1. Daily Construction Reports: due weekly, template due prior to mobilization
 2. Material Location Reports: due monthly

3. Site Condition Reports: due within five (5) calendar days of discovery of differing conditions.
 4. Special Reports: due within five (5) calendar days of unusual event.
- F. Section 01 32 16 "Construction Progress Schedule"
1. Contractor's Initial Construction Schedule: due within fifteen (15) calendar days of Notice to Proceed.
 2. Construction Finish Schedule: due at 80% project completion
 3. Construction Schedule Update Report: due monthly
- G. Section 01 32 33 "Photographic Documentation"
1. Key Plan: due within fifteen (15) calendar days of Notice to Proceed.
 2. Digital Photographs: due within three (3) calendar days of taking photographs.
- H. Section 01 33 00 "Submittal Procedures"
1. Submittal Schedule: due within fifteen (15) calendar days of Notice to Proceed.
- I. Section 01 35 23 "NCSU Safety Requirements"
1. Site Specific Safety Plan: due no fewer than fifteen (15) working days prior to mobilization.
 2. Crane Plan: due no fewer than fifty (50) working days prior to the crane mobilizing.
 3. Safety Reports: due monthly.
- J. Section 01 40 00 "Quality Requirements"
1. Contractor's Site-Specific Quality Program: due not less than five (5) working days prior to preconstruction conference.
 2. Schedule of Tests & Inspections: submit prior to initial payment application.
- K. Section 01 50 00 "Temporary Facilities & Controls"
1. Site Logistics Plan: due not less than five (5) working days prior to preconstruction conference. Updated not less than monthly during construction.
 2. Fire-Safety Plan: due not less than five (5) working days prior to preconstruction conference.
- L. Section 01 51 00 "Temporary Utilities"
1. Implementation and Termination Schedule: due prior to mobilization.
- M. Section 01 57 00 "Temporary Controls"
1. Erosion & Sedimentation Control Reports: due weekly while Erosion & Sedimentation Control Plan in the Project Documents is active.
 2. Moisture & Mold Prevention Plan: due not less than five (5) working days prior to preconstruction conference.
 3. Dust & HVAC Control Plan: due not less than five (5) working days prior to preconstruction conference.
 4. Noise & Vibration Control Plan: due not less than five (5) working days prior to preconstruction conference

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

- N. Section 01 74 19 "Construction Waste Management & Disposal"
 - 1. Waste Management Plan: Due within thirty (30) calendar days of Notice to Proceed.
- O. Section 01 77 00 "Closeout"
 - 1. Closeout Submittal Log: Due at 50% completion, as determined by the project schedule.
 - 2. Contractor's Statement of Completion with Request for Designer's Inspection: Due no later than ten (10) working days prior to Request for Designer's Pre-Final Inspection.
- P. Section 01 78 46 "Maintenance Materials"
 - 1. Schedule of Maintenance Material Items: Due within five (5) working days prior to requesting an inspection for Substantial Completion.
 - 2. Maintenance Material Transmittal: Due at Substantial Completion.

1.6 SUBMITTALS TO BE REVIEWED BY NC STATE IN ADDITION TO DESIGNER

- A. N.C. State reserves the right to review the following submittals:
 - 1. Commissioning FTP
 - 2. Lift Plan (if applicable)
 - 3. Safety Plan
 - 4. Training/Warranty
 - 5. Masonry
 - 6. Lab Case Work
 - 7. Office Case/Mill Work
 - 8. Roofs
 - 9. Hardware (Keying)
 - 10. Colors (Outdoors)
 - 11. Fume Hoods
 - 12. Indoor Signs (Schedule)
 - 13. Elevators
 - 14. Fire Sprinkler System (SCO must also approve)
 - 15. Air Compressors
 - 16. Boilers
 - 17. Water Meters
 - 18. Valves
 - 19. Air Handler Units
 - 20. Chiller Water Chemicals
 - 21. Chillers
 - 22. Controls
 - 23. Mechanical Pumps
 - 24. Electrical Panels
 - 25. Power Meters
 - 26. Switch Gear/ Transformers
 - 27. Emergency Generator
 - 28. Audio Visual Systems

SUBMITTAL PROCEDURES

29. Fire Alarm System
30. Card Readers
31. Security Infrastructure
32. Telecommunications
33. Irrigation Systems
34. Landscaping

PART 2 - PRODUCTS

2.1 SUBMITTAL PROCEDURES

- A. General Submittal Procedure Requirements: Prepare and submit submittals required by individual Specification Sections. Types of submittals are indicated in individual Specification Sections.
 1. Post electronic submittals as PDF electronic files directly to Project Web site specifically established for Project. Do not post zipped files.
 - a. Designer will return annotated file. Annotate and retain one copy of file as an electronic Project record document file.
 2. Action Submittals: Submit electronic copies of each submittal, unless otherwise indicated. Designer will electronically return electronic copies. Mark up and retain one returned copy as a Project Record Document.
 3. Informational Submittals: Submit electronic copies of each submittal, unless otherwise indicated. Designer will not return copies.
 4. Closeout Submittals and Maintenance Material Submittals: Comply with requirements specified in Section 017700 "Closeout Procedures."
 5. Certificates and Certifications Submittals: Provide a statement that includes signature of entity responsible for preparing certification. Certificates and certifications shall be signed by an officer or other individual authorized to sign documents on behalf of that entity.
 6. Systems Submittals: Identify submittals for systems such as fire alarms and fire protection systems, on the transmittal and act upon the system singularly as a combined submittal. If resubmission is required, resubmit entire system submittal,
- B. Product Data: Collect information into a single submittal for each element of construction and type of product or equipment.
 1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
 2. Mark each copy of each submittal to show which products and options are applicable.
 3. Include the following information, as applicable:
 - a. Manufacturer's catalog cuts.
 - b. Manufacturer's written recommendations.
 - c. Manufacturer's product specifications.
 - d. Standard color charts.

- e. Mill reports.
 - f. Standard product operating and maintenance manuals.
 - g. Compliance with recognized trade association standards.
 - h. Compliance with recognized testing agency standards.
 - i. Application of testing agency labels and seals.
 - j. Notation of coordination requirements.
 - k. Availability and delivery time information.
4. For equipment, include the following in addition to the above, as applicable:
 - a. Wiring diagrams showing factory-installed wiring.
 - b. Printed performance curves.
 - c. Operational range diagrams.
 - d. Clearances required to other construction, if not indicated on accompanying Shop Drawings.
 5. Submit Product Data before or concurrent with Samples.
 6. Submit Product Data in the following format:
 - a. PDF electronic file.
- C. Shop Drawings: Prepare and submit Project-specific information, drawn accurately to scale. Do not reproduce, digitally or otherwise, the Contract Documents and submit as Shop Drawings. Do not use, copy or reproduce title blocks, dimensions, notes, keynotes, symbols schedules or details from Contract Drawings, digital or otherwise. Use of the Contract Drawings shall be limited to reproduction, digitally or otherwise, of the exterior wall layout, interior partition layout, grid lines, doors, and windows. Do not base Shop Drawings on standard printed data.
1. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:
 - a. Identification of products.
 - b. Fabrication and installation drawings.
 - c. Roughing-in and setting diagrams.
 - d. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring. Differentiate between manufacturer-installed and field-installed wiring.
 - e. Shopwork manufacturing instructions.
 - f. Templates and patterns.
 - g. Schedules.
 - h. Design calculations.
 - i. Compliance with specified standards.
 - j. Notation of coordination requirements.
 - k. Notation of dimensions established by field measurement.
 - l. Relationship and attachment to adjoining construction clearly indicated.
 - m. Seal and signature of professional engineer if specified.
 2. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches (279.4 mm), but no larger than size of Contract Drawings.
 3. Submit Shop Drawings in the following format:
 - a. PDF electronic file.

4. BIM File Incorporation: Develop and incorporate Shop Drawing files into Building Information Model established for Project.
 - a. Prepare Shop Drawings in the following format: Same digital data software program, version, and operating system as the original Drawings.
 - b. Refer to Section 01 31 00 "Project Management and Coordination" for requirements for coordination drawings.
- D. Samples: Submit physical units of materials or products for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.
 1. Prior to transmission of any samples, coordinate with Designer for determination of submittal review location, where samples are better reviewed on site in contractor's construction field office. Coordinate arrival of samples no less than weekly with Designer to provide advance notice of sample arrival for the following week.
 2. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 3. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 4. Identification: Attach label on unexposed side of Samples that includes the following:
 - a. Generic description of Sample.
 - b. Product name and name of manufacturer.
 - c. Sample source.
 - d. Number and title of applicable Specification Section.
 - e. Specification paragraph number and generic name of each item.
 5. Electronic Sample Submittal Requirements: Submit corresponding electronic submittal of Sample transmittal, digital image file illustrating Sample characteristics, and identification information for record. Submittals without digital photos, not submitted under the contractor's submittal, and without contractor's review stamp shall be returned without review. Criteria for acceptable photography:
 - a. Clear photo of material label. Clearly written labels or manufacturer's labels shall be acceptable.
 - b. Clear photo of label appended by the general contractor indicated for which material the product is being submitted. Utilize labels as found in the drawings on the finish legend wherever available. Utilize adhesive type labels that will not become lose with handling onsite, labeling with a marker or other easily read lettering when photographed.
 - c. Clear photos in well lit conditions without shading on the material to show visual characteristics. Where multiple corners, sides or transitions occur, provide additional photos showing different conditions.

- d. Materials to be install on the exterior of the building shall be photographed in natural sunlight to show visual characteristics. Labeling is not required to be photographed in natural light.
 - e. Sample photography for guidance will be provided by the Designer upon request.
6. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. This sample shall be held at the contractor's trailer on site, clearly labeled with the transmittal and stamped submittal, clarifying the use of the material in the project. Samples shall be required to be sorted and stored in a manner to be easily produced upon in person request. Sample sets may be used to determine final acceptance of construction associated with each set.
 - a. Samples that may be incorporated into the Work are indicated in individual Specification Sections. Such Samples must be in an undamaged condition at time of use.
 - b. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.
7. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.
 - a. Number of Samples: Submit one full set of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line.
 - b. Designer will return submittal with options selected.
 - c. Refer to Electronic Submittal Requirements for associated photography requirements for all samples.
 - d. Refer to Disposition for on site storage and labeling requirements of all samples.
8. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from the same material to be used for the Work, cured and finished in manner specified, and physically identical with the product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.
 - a. Number of Samples:
 - 1) Submit two sets of Samples.
 - 2) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
 - 3) Submit at least three sets of paired units that show approximate limits of variations if variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample.

- 4) Refer to Electronic Submittal Requirements for associated photography requirements for all samples.
 - 5) Refer to Disposition for on site storage and labeling requirements of all samples.
 - b. Designer will retain one Sample set; remainder will be returned. Mark up and retain one returned physically periodically, as feasible. The primary documentation shall be the contractor's electronic submittal, with the contractor's photograph, which will be returned electronically, unless specifically requested by the Contractor. Contractor to retain one returned sample set as a Project record sample, readily available and clearly labeled for use on site.
 9. Preparation: Mount, display, or package Samples in manner specified to facilitate review of qualities indicated. Prepare Samples to match Designer's sample where so indicated. Attach label on unexposed side that includes the following:
 - a. Generic description of Sample.
 - b. Product name or name of manufacturer.
 - c. Sample source.
 10. Submit Samples for review of kind, color, pattern, and texture for a final check of these characteristics with other elements and for a comparison of these characteristics between final submittal and actual component as delivered and installed.
 - a. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
 - b. Refer to individual Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
 - c. Refer to Electronic Submittal Requirements for associated photography requirements for all samples.
 - d. Refer to Disposition for on site storage and labeling requirements of all samples.
- E. Product Schedule or List: Prepare and submit a written summary indicating types of products required for the Work and their intended location. Include the following information in tabular form:
 1. Type of product. Include unique identifier for each product indicated in the Contract Documents or assigned by Contractor if none is indicated.
 2. Manufacturer and product name, and model number if applicable.
 3. Number and name of room or space.
 4. Location within room or space.
 5. Submit product schedule in the following format:
 - a. PDF electronic file.
- F. Application for Payment and Schedule of Values: Comply with requirements specified in Section 01 29 00 "Payment Procedures."
- G. Coordination Drawing Submittals: Comply with requirements specified in Section 01 31 00 "Project Management and Coordination."

SUBMITTAL PROCEDURES

- H. Subcontract List: Prepare and submit a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Submit on the form included in Document 00 60 00 "Forms," "Subcontractors and Major Material Suppliers List."
 - 1. Submit subcontract list in the following format:
 - a. PDF electronic file.
- I. Contractor's Construction Schedule: Comply with requirements specified in Section 01 32 00 "Construction Progress Documentation" for action required.
- J. Construction Photographs: Comply with requirements in Section 01 32 16 "Construction Progress Schedule."
- K. Daily Construction Reports: Comply with requirements specified in Section 01 32 33 "Photographic Documentation".
- L. Test and Inspection Reports and Schedule of Tests and Inspections Submittals: Comply with requirements specified in Section 01 40 00 "Quality Requirements."
- M. Certified Surveys: Comply with requirements specified in Section 01 73 00 "Execution."
- N. Closeout Submittals: Comply with requirements specified in Section 01 77 00 "Closeout Procedures."
- O. Operation and Maintenance Data: Submit written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Section 01 78 23 "Operation and Maintenance Data."
- P. Qualification Data: Submit written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names and addresses of Designers and owners, and other information specified.
- Q. Welding Certificates: Prepare and submit written certification that welding procedures and personnel comply with requirements. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.
- R. Installer Certificates: Submit written statements on manufacturer's letterhead certifying that Installer complies with requirements and, where required, where required, is authorized by manufacturer for this specific Project.
- S. Manufacturer Certificates: Submit written statements on manufacturer's letterhead certifying that manufacturer complies with requirements. Include evidence of manufacturing experience where required.
- T. Product Certificates: Submit written statements on manufacturer's letterhead certifying that product complies with requirements.

- U. Material Certificates: Submit written statements on manufacturer's letterhead certifying that material complies with requirements.
- V. Material Test Reports: Submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements.
- W. Product Test Reports: Submit written reports indicating that current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.
- X. Research Reports: Submit written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:
 - 1. Name of evaluation organization.
 - 2. Date of evaluation.
 - 3. Time period when report is in effect.
 - 4. Product and manufacturers' names.
 - 5. Description of product.
 - 6. Test procedures and results.
 - 7. Limitations of use.
- Y. Preconstruction Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements.
- Z. Compatibility Test Reports: Prepare and submit reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.
- AA. Field Test Reports: Prepare and submit reports, written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements.
- BB. Manufacturer's Field Reports: Prepare and submit written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:
 - 1. Name, address, and telephone number of factory-authorized service representative making report.
 - 2. Statement on condition of substrates and their acceptability for installation of product.
 - 3. Statement that products at Project site comply with requirements.

4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.
 7. Other required items indicated in individual Specification Sections.
- CC. Manufacturer's Instructions: Submit written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:
1. Preparation of substrates.
 2. Required substrate tolerances.
 3. Sequence of installation or erection.
 4. Required installation tolerances.
 5. Required adjustments.
 6. Recommendations for cleaning and protection.
- DD. Insurance Certificates and Bonds: Prepare and submit written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.
- EE. Material Maintenance Submittals: Comply with requirements specified in individual Sections for quantity and disposition of delivery of extra stock.
- FF. Design Data: Prepare and submit written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.
- 2.2 DELEGATED-DESIGN SERVICES
- A. Refer to Section 01 35 73 "Delegated Design Requirements" for requirements regarding Delegated Design.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

- A. Action and Informational Submittals: Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Designer.

- B. Project Closeout and Maintenance/Material Submittals: Refer to requirements in Section 01 77 00 "Closeout Procedures."
- C. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, coordinated, checked, and approved for compliance with the Contract Documents.

3.2 DESIGNER'S ACTION

- A. General: Designer will not review submittals that have not been properly transmitted, reviewed by Contractor, or do not bear Contractor's approval stamp and will return them without action.
 - 1. Submittals are reviewed for conformance with the design concept expressed in the Contract Documents. Review is not for the purpose of confirming or approving:
 - a. Deviation from the Contract Documents, including but not limited to deviation with reference to material, quantity, location, quality, dimension, or orientation (except as expressly annotated in writing by the Architect herein).
 - b. Means, methods, sequences, or techniques of construction (unless expressly called for in the Contract Documents and herein expressly highlighted for review and approval by the Architect).
 - c. Safety of the Contractor(s) work, work plan, procedures, workers or of the site.
 - d. Any clarification of a patent or latent ambiguity or defect in the Contract Documents.
 - e. Procurement or request for any labor, materials, or other expense of the contractor(s) which is in addition to that previously approved by the Owner.
- B. Action Submittals: Designer will review submittal, make marks to indicate corrections or revisions required, and return it to Contractor. Designer will stamp each submittal with an action stamp as illustrated and will mark stamp appropriately to indicate action, as follows:
 - 1. Final Unrestricted Release: When the Designer marks a submittal:
 - a. A – NO EXCEPTIONS
 - b. The Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
 - 2. Final-But-Restricted Release: When the Designer marks a submittal:
 - a. B – EXCEPTIONS AS NOTED
 - b. The Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal of requirements of the Contract Documents. Final payment depends on that compliance. Resubmittal is not required for this action.

3. Returned for Resubmittal: When the Designer marks a submittal:
 - a. C – REVISE AND RESUBMIT
 - b. Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 - c. Do not use or allow others to use, submittals marked "C – REVISE AND RESUBMIT" at the Project Site or elsewhere where Work is in progress.
4. Returned as Rejected: When the Designer marks a submittal:
 - a. D – REJECTED
 - b. Do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The submittal does not conform to the design concept or meet requirement of the Contract Documents.
 - c. Do not use or allow others to use, submittals marked "D – REJECTED" at the Project Site or elsewhere where Work is in progress.
5. Returned as received for Information Only: When the Designer marks a submittal:
 - a. E – FOR INFORMATION ONLY
 - b. Proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. The submittal is acceptable, but the Designer's affirmative action is not required.
6. Returned as Not Reviewed: When the Designer marks a submittal:
 - a. F – NOT REVIEWED
 - b. Submittal is not required by the Contract Documents.
- C. Contractor will remain responsible for the following:
 1. Compliance with the Contract Documents.
 2. Coordination of the Work.
 3. Performing the Work in a safe and satisfactory manner.
 4. Confirming and correlating quantity and dimensions.
 5. Construction Schedule.
- D. Informational Submittals: Designer will review each submittal and will not return it, or will return it if it does not comply with requirements. Designer will forward each submittal to appropriate party.
- E. Partial submittals prepared for a portion of the Work will be reviewed when use of partial submittals has received prior approval from Designer.
- F. Incomplete submittals are unacceptable, will be considered nonresponsive, and will be returned for resubmittal without review.
- G. Submittals not required by the Contract Documents will not be reviewed and may be discarded or returned marked "NOT REVIEWED."

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

- H. Substitution items received as product data, shop drawing, or sample submittals required by individual Sections will be returned to Contractor without review. Comply with requirements in Section 01 25 00 "Substitution Procedures" for submission of substitution request.

END OF SECTION

SECTION 01 35 16

ALTERATION PROJECT PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Special procedures for alteration work including the following:
 - 1. Products and installation for patching and extending Work within construction areas of existing facilities.
 - 2. Providing transition and adjustments.
 - 3. Repair of damaged surfaces and finishes.

1.2 DEFINITIONS

- A. Alteration Work: This term includes remodeling, renovation, repair, and maintenance work performed within existing spaces or on existing surfaces as part of the Project.
- B. Consolidate: To strengthen loose or deteriorated materials in place.
- C. Design Reference Sample: A sample that represents the Architect's prebid selection of work to be matched; it may be existing work or work specially produced for the Project.
- D. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.
- E. Match: To blend with adjacent construction and manifest no apparent difference in material type, species, cut, form, detail, color, grain, texture, or finish; as approved by Architect.
- F. Refinish: To remove existing finishes to base material and apply new finish to match original, or as otherwise indicated.
- G. Repair: To correct damage and defects, retaining existing materials, features, and finishes. This includes patching, piecing-in, splicing, consolidating, or otherwise reinforcing or upgrading materials.
- H. Replace: To remove, duplicate, and reinstall entire item with new material. The original item is the pattern for creating duplicates unless otherwise indicated.
- I. Replicate: To reproduce in exact detail, materials, and finish unless otherwise indicated.

- J. Reproduce: To fabricate a new item, accurate in detail to the original, and from either the same or a similar material as the original, unless otherwise indicated.
- K. Retain: To keep existing items that are not to be removed or dismantled.
- L. Strip: To remove existing finish down to base material unless otherwise indicated.

1.3 OCCUPANCY, ACCESS, AND PROTECTION

- A. Entire facility will be occupied during progress of construction for conduct of normal operations.
 - 1. Phase Work in accordance with Section 01 10 00 - Summary.
- B. Cooperate with Owner in scheduling operations to minimize conflict and to permit continuous usage. Perform work not to interfere with operations of occupied areas.
- C. Existing facilities will remain in full operation during execution of this Work. Exercise every precaution to ensure safety and protection for existing facilities, occupants, merchandise, pedestrians, and vehicles.
 - 1. Maintain safe access and egress at all times for occupants, pedestrians, and vehicles.
 - 2. Maintain exiting from facilities to provide safe passage complying with applicable codes.

1.4 COORDINATION

- A. Make arrangements with Owner and schedule Work to avoid interference with normal operations of occupied areas. Submit schedule and summary of applicable Work within occupied areas and obtain Owner approval not less than two days prior to commencement of such Work.
 - 1. Requests for use of certain existing loading docks, passageways, and other similar spaces within areas outside limits of construction operations will be limited to day-by-day basis and must be approved in advance by Owner.
- B. Coordinate access and scheduling of Work within tenant areas with Owner.
 - 1. Schedule construction operations in sequence required to obtain best Work results.
 - 2. Coordinate sequence of alteration work activities to accommodate the following:
 - a. Owner's continuing occupancy of portions of existing building.
 - b. Owner's partial occupancy of completed Work.
 - c. Other known work in progress.
 - d. Tests and inspections.
 - 3. Detail sequence of alteration work, with start and end dates.
 - 4. Utility Services: Indicate how long utility services will be interrupted. Coordinate shutoff, capping, and continuation of utility services.
 - 5. Use of elevator and stairs.

6. Equipment Data: List gross loaded weight, axle-load distribution, and wheel-base dimension data for mobile and heavy equipment proposed for use in existing structure. Do not use such equipment without certification from Contractor's professional engineer that the structure can support the imposed loadings without damage.

1.5 PROJECT MEETINGS FOR ALTERATION WORK

- A. Preliminary Conference for Alteration Work: Before starting alteration work, conduct conference at Project site.
 1. Attendees: In addition to representatives of Owner, Architect, and Contractor shall be represented at the meeting.
 2. Agenda: Discuss items of significance that could affect progress of alteration work, including review of the following:
 - a. Alteration Work Subschedule: Discuss and finalize; verify availability of materials, specialists' personnel, equipment, and facilities needed to make progress and avoid delays.
 - b. Fire-prevention plan.
 - c. Governing regulations.
 - d. Areas where existing construction is to remain and the required protection.
 - e. Hauling routes.
 - f. Sequence of alteration work operations.
 - g. Storage, protection, and accounting for salvaged and specially fabricated items.
 - h. Existing conditions, staging, and structural loading limitations of areas where materials are stored.
 - i. Qualifications of personnel assigned to alteration work and assigned duties.
 - j. Requirements for extent and quality of work, tolerances, and required clearances.
 - k. Embedded work such as flashings and lintels, special details, collection of waste, protection of occupants and the public, and condition of other construction that affects the Work or will affect the work.
 3. Reporting: Record conference results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from conference.
- B. Coordination Meetings: Conduct coordination meetings specifically for alteration work at weekly intervals. Coordination meetings are in addition to specific meetings held for other purposes, such as progress meetings and preinstallation conferences.
 1. Attendees: In addition to representatives of Owner, Architect, and Contractor, each specialist, supplier, installer, and other entity concerned with progress or involved in planning, coordination, or performance of alteration work activities shall be represented at these meetings. All participants at conference shall be familiar with Project and authorized to conclude matters relating to alteration work.

2. Agenda: Review and correct or approve minutes of previous coordination meeting. Review other items of significance that could affect progress of alteration work. Include topics for discussion as appropriate to status of Project.
 - a. Alteration Work Subschedule: Review progress since last coordination meeting. Determine whether each schedule item is on time, ahead of schedule, or behind schedule. Determine how construction behind schedule will be expedited with retention of quality; secure commitments from parties involved to do so. Discuss whether schedule revisions are required to ensure that current and subsequent activities are completed within the Contract Time.
 - b. Schedule Updating: Revise Contractor's Alteration Work Subschedule after each coordination meeting where revisions to schedule have been made or recognized. Issue revised schedule concurrently with report of each meeting.
 - c. Review present and future needs of each entity present, including review items listed in the "Preliminary Conference for Alteration Work" Paragraph in this article and the following:
 - 1) Interface requirements of alteration work with other Project Work.
 - 2) Status of submittals for alteration work.
 - 3) Access to alteration work locations.
 - 4) Effectiveness of fire-prevention plan.
 - 5) Quality and work standards of alteration work.
 - 6) Change Orders for alteration work.
3. Reporting: Record meeting results and distribute copies to everyone in attendance and to others affected by decisions or actions resulting from each meeting.

1.6 MATERIALS OWNERSHIP

- A. Historic items, relics, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, antiques, and other items of interest or value to Owner that may be encountered or uncovered during the Work, regardless of whether they were previously documented, remain Owner's property.
 1. Carefully dismantle and salvage each item or object in a manner to prevent damage and protect it from damage, then promptly deliver it to Owner where directed.
 2. Salvage and store for future reuse all commemorative plaques affixed to the building.

1.7 INFORMATIONAL SUBMITTALS

- A. Alteration Work Subschedule:
 1. Submit alteration work subschedule within seven days of date established for commencement of alteration work.

- B. Preconstruction Documentation: Show preexisting conditions of adjoining construction and site improvements that are to remain, including finish surfaces, that might be misconstrued as damage caused by Contractor's alteration work operations.
- C. Alteration Work Program: Submit 30 days before work begins.
- D. Fire-Prevention Plan: Submit 30 days before work begins.

1.8 QUALITY ASSURANCE

- A. Specialist Qualifications: An experienced firm regularly engaged in specialty work similar in nature, materials, design, and extent to alteration work as specified in each Section and that has completed a minimum of five recent projects with a record of successful in-service performance that demonstrates the firm's qualifications to perform this work.
 - 1. Field Supervisor Qualifications: Full-time supervisors experienced in specialty work similar in nature, material, design, and extent to that indicated for this Project. Supervisors shall be on-site when specialty work begins and during its progress. Supervisors shall not be changed during Project except for causes beyond the control of the specialist firm.
 - a. Construct new mockups of required work whenever a supervisor is replaced.
- B. Alteration Work Program: Prepare a written plan for alteration work for whole Project, including each phase or process and protection of surrounding materials during operations. Show compliance with indicated methods and procedures specified in this and other Sections. Coordinate this whole-Project alteration work program with specific requirements of programs required in other alteration work Sections.
 - 1. Dust and Noise Control: Include locations of proposed temporary dust- and noise-control partitions and means of egress from occupied areas coordinated with continuing on-site operations and other known work in progress.
 - 2. Debris Hauling: Include plans clearly marked to show debris hauling routes, turning radii, and locations and details of temporary protective barriers.
- C. Fire-Prevention Plan: Prepare a written plan for preventing fires during the Work, including placement of fire extinguishers, fire blankets, rag buckets, and other fire-control devices during each phase or process. Coordinate plan with Owner's fire-protection equipment and requirements. Include fire-watch personnel's training, duties, and authority to enforce fire safety.
- D. Safety and Health Standard: Comply with ANSI/ASSE A10.6.

1.9 STORAGE AND HANDLING OF SALVAGED MATERIALS

- A. Salvaged Materials:

1. Clean loose dirt and debris from salvaged items unless more extensive cleaning is indicated.
 2. Pack or crate items after cleaning; cushion against damage during handling. Label contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
- B. Salvaged Materials for Reinstallation:
1. Repair and clean items for reuse as indicated.
 2. Pack or crate items after cleaning and repairing; cushion against damage during handling. Label contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment unless otherwise indicated. Provide connections, supports, and miscellaneous materials to make items functional for use indicated.
- C. Existing Materials to Remain: Protect construction indicated to remain against damage and soiling from construction work. Where permitted by Architect, items may be dismantled and taken to a suitable, protected storage location during construction work and reinstalled in their original locations after alteration and other construction work in the vicinity is complete.
- D. Storage: Catalog and store items within a weathertight enclosure where they are protected from moisture, weather, condensation, and freezing temperatures.
1. Identify each item for reinstallation with a nonpermanent mark to document its original location. Indicate original locations on plans, elevations, sections, and photographs by annotating the identifying marks.
 2. Secure stored materials to protect from theft.
 3. Control humidity so that it does not exceed 85 percent. Maintain temperatures 5 deg F (3 deg C) or more above the dew point.
- E. Storage Space:
1. Owner will arrange for limited on-site location(s) for free storage of salvaged material. This storage space includes security and climate control for stored material.
 2. Arrange for off-site locations for storage and protection of salvaged material that cannot be stored and protected on-site.
- 1.10 FIELD CONDITIONS
- A. Survey of Existing Conditions: Record existing conditions that affect the Work by use of measured drawings, preconstruction photographs, and preconstruction videotapes.
1. Comply with requirements specified in Section 01 32 33 - Photographic Documentation.

- B. Discrepancies: Notify Architect of discrepancies between existing conditions and Drawings before proceeding with removal and dismantling work.
- C. Size Limitations in Existing Spaces: Materials, products, and equipment used for performing the Work and for transporting debris, materials, and products shall be of sizes that clear surfaces within existing spaces, areas, rooms, and openings, including temporary protection, by 12 inches (300 mm) or more.

1.11 KEYS

- A. When necessary to perform Work, Owner will issue keys to existing mechanical/electrical equipment spaces.
- B. Return keys at end of each work day; request keys on succeeding days, if necessary.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Type and Quality of Existing Products: Use products or types of construction that exist in structure, as needed to patch, extend, or match existing Work.
 - 1. Generally, Contract Documents do not define products or standards of workmanship present in existing construction.
 - 2. Determine by inspecting and testing products where necessary, referring to existing work as quality standard.
- B. New Materials: Comply with Specifications for each product involved.
 - 1. Match existing products and work for patching existing work.
- C. Materials for Temporary Fire-Rated Partitions: Comply with provisions of Section 01 50 00 - Temporary Facilities and Controls_VOID.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Discrepancies: Verify dimensions and elevations indicated in layout of existing work.
 - 1. Prior to commencing work, carefully compare and check Contract Documents for discrepancies in locations or elevations of work to be executed.
 - 2. Refer discrepancies among Drawings and existing conditions to Architect for adjustment before work affected is performed.

3. Existing conditions concealed behind accessible ceilings which are contrary to anticipated or proposed conditions, shall not be used as a basis for change order requests. Existing conditions behind in-accessible ceilings may be used as a basis for change order requests, provided it can be documented that there was no way conditions could be verified.

3.2 PROTECTION

- A. Protect persons, motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm resulting from alteration work.
 1. Use only proven protection methods, appropriate to each area and surface being protected.
 2. Provide temporary barricades, barriers, and directional signage to exclude the public from areas where alteration work is being performed.
 3. Erect temporary barriers to form and maintain fire-egress routes.
 4. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during alteration work.
 5. Contain dust and debris generated by alteration work, and prevent it from reaching the public or adjacent surfaces.
 6. Provide shoring, bracing, and supports as necessary. Do not overload structural elements.
 7. Protect floors and other surfaces along hauling routes from damage, wear, and staining.
 8. Provide supplemental sound-control treatment to isolate demolition work from other areas of the building.
- B. Temporary Protection of Materials to Remain:
 1. Protect existing materials with temporary protections and construction. Do not remove existing materials unless otherwise indicated.
 2. Do not attach temporary protection to existing surfaces except as indicated as part of the alteration work program.
- C. Comply with each product manufacturer's written instructions for protections and precautions. Protect against adverse effects of products and procedures on people and adjacent materials, components, and vegetation.
- D. Utility and Communications Services:
 1. Notify Owner, Architect, authorities having jurisdiction, and entities owning or controlling wires, conduits, pipes, and other services affected by alteration work before commencing operations.
 2. Disconnect and cap pipes and services as required by authorities having jurisdiction, as required for alteration work.
 3. Maintain existing services unless otherwise indicated; keep in service, and protect against damage during operations. Provide temporary services during interruptions to existing utilities.

- E. Existing Drains: Prior to the start of work in an area, test drainage system to ensure that it is functioning properly. Notify Architect immediately of inadequate drainage or blockage. Do not begin work in an area until the drainage system is functioning properly.
 - 1. Prevent solids such as adhesive or mortar residue or other debris from entering the drainage system. Clean out drains and drain lines that become sluggish or blocked by sand or other materials resulting from alteration work.
 - 2. Protect drains from pollutants. Block drains or filter out sediments, allowing only clean water to pass.
- F. Existing Roofing: Prior to the start of work in an area, install roofing protection, as indicated on Drawings.

3.3 PROTECTION FROM FIRE

- A. General: Follow fire-prevention plan and the following:
 - 1. Comply with NFPA 241 requirements unless otherwise indicated. Perform duties titled "Owner's Responsibility for Fire Protection."
 - 2. Remove and keep area free of combustibles, including rubbish, paper, waste, and chemicals, unless necessary for the immediate work.
 - a. If combustible material cannot be removed, provide fire blankets to cover such materials.
- B. Heat-Generating Equipment and Combustible Materials: Comply with the following procedures while performing work with heat-generating equipment or combustible materials, including welding, torch-cutting, soldering, brazing, removing paint with heat, or other operations where open flames or implements using high heat or combustible solvents and chemicals are anticipated:
 - 1. Obtain Owner's approval for operations involving use of welding or other high-heat equipment. Use of open-flame equipment is not permitted. Notify Owner at least 72 hours before each occurrence, indicating location of such work.
 - 2. As far as practicable, restrict heat-generating equipment to shop areas or outside the building.
 - 3. Do not perform work with heat-generating equipment in or near rooms or in areas where flammable liquids or explosive vapors are present or thought to be present. Use a combustible gas indicator test to ensure that the area is safe.
 - 4. Use fireproof baffles to prevent flames, sparks, hot gases, or other high-temperature material from reaching surrounding combustible material.
 - 5. Prevent the spread of sparks and particles of hot metal through open windows, doors, holes, and cracks in floors, walls, ceilings, roofs, and other openings.
 - 6. Fire Watch: Before working with heat-generating equipment or combustible materials, station personnel to serve as a fire watch at each location where such work is performed. Fire-watch personnel shall have the authority to enforce fire safety. Station fire watch according to NFPA 51B, NFPA 241, and as follows:

- a. Train each fire watch in the proper operation of fire-control equipment and alarms.
 - b. Prohibit fire-watch personnel from other work that would be a distraction from fire-watch duties.
 - c. Cease work with heat-generating equipment whenever fire-watch personnel are not present.
 - d. Have fire-watch personnel perform final fire-safety inspection each day beginning no sooner than 30 minutes after conclusion of work in each area to detect hidden or smoldering fires and to ensure that proper fire prevention is maintained.
 - e. Maintain fire-watch personnel at each area of Project site until 60 minutes after conclusion of daily work.
- C. Fire-Control Devices: Provide and maintain fire extinguishers, fire blankets, and rag buckets for disposal of rags with combustible liquids. Maintain each as suitable for the type of fire risk in each work area. Ensure that nearby personnel and the fire-watch personnel are trained in fire-extinguisher and blanket use.
- D. Sprinklers: Where sprinkler protection exists and is functional, maintain it without interruption while operations are being performed. If operations are performed close to sprinklers, shield them temporarily with guards.
1. Remove temporary guards at the end of work shifts, whenever operations are paused, and when nearby work is complete.

3.4 PROTECTION DURING APPLICATION OF CHEMICALS

- A. Protect motor vehicles, surrounding surfaces of building, building site, plants, and surrounding buildings from harm or spillage resulting from applications of chemicals and adhesives.
- B. Cover adjacent surfaces with protective materials that are proven to resist chemicals selected for Project unless chemicals being used will not damage adjacent surfaces as indicated in alteration work program. Use covering materials and masking agents that are waterproof and UV resistant and that will not stain or leave residue on surfaces to which they are applied. Apply protective materials according to manufacturer's written instructions. Do not apply liquid masking agents or adhesives to painted or porous surfaces. When no longer needed, promptly remove protective materials.
- C. Do not apply chemicals during winds of sufficient force to spread them to unprotected surfaces.
- D. Neutralize alkaline and acid wastes and legally dispose of off Owner's property.
- E. Collect and dispose of runoff from chemical operations by legal means and in a manner that prevents soil contamination, soil erosion, undermining of paving and foundations, damage to landscaping, or water penetration into building interior.

3.5 GENERAL ALTERATION WORK

- A. Have specialty work performed only by qualified specialists.
- B. Ensure that supervisory personnel are present when work begins and during its progress.
- C. Record existing work before each procedure (preconstruction), and record progress during the work. Use digital preconstruction documentation photographs or video recordings. Comply with requirements in Section 01 32 33 - Photographic Documentation.
- D. Perform surveys of Project site as the Work progresses to detect hazards resulting from alterations.
- E. Notify Architect of visible changes in the integrity of material or components whether from environmental causes including biological attack, UV degradation, freezing, or thawing or from structural defects including cracks, movement, or distortion.
 - 1. Do not proceed with the work in question until directed by Architect.

3.6 INSTALLATION

- A. Coordinate Work of alterations and renovations to expedite completion and to accommodate Owner occupancy.
- B. Remove, cut, and patch Work in manner to minimize damage and to provide means of restoring products and finishes to specified condition.
 - 1. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes.
- C. Install products as specified in individual Specification sections.
- D. Where new Work abuts or aligns with existing, perform smooth and even transition to match existing adjacent surface in texture and appearance.
 - 1. When finished surfaces are cut so that smooth transition with new Work is not possible, terminate existing surface along straight line at natural line of division and request instructions from Architect as to method of making transition.

3.7 FINISHES

- A. Finish new surfaces as specified in individual Specification sections.
- B. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

3.8 ADJUSTMENTS

- A. Where removal of partitions or walls results in adjacent spaces becoming one, rework floors, walls, and ceilings to provide smooth plane without breaks, steps, or soffits.
- B. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
- C. Fit Work at penetrations of surfaces as specified in Section 01 73 00 - Execution_VOID.

3.9 CLEANING

- A. Comply with Section 01 73 00 - Execution_VOID. Thoroughly clean areas and spaces affected by Work. Completely remove paint, mortar, oils, putty and items of similar nature.
- B. Clean Owner-occupied areas daily. Clean spillage, overspray, and heavy collection of dust in Owner-occupied areas immediately.

END OF SECTION

SECTION 013523 – NCSU SAFETY REQUIREMENTS

1.0 Purpose

- A. The purpose of this guideline is to define NC State contractor safety requirements. This guideline is intended to be a supplement to the General Conditions of the contract.
- B. The Designer or Construction Manager shall incorporate this document into the Project Manual in its entirety.
- C. Contractors and subcontractors are responsible for the safety of their employees and all persons on and around a work site. Contractors are solely responsible for the development and implementation of their safety programs. This document does not relieve the duty and responsibility of contractors, subcontractors, their agents, employees, and other persons performing portions of the work on a project to comply with federal, state, and/or local laws or regulations that relate to work site safety.

2.0 Scope

- A. This document provides contractors with the University's specific requirements that must be incorporated into the contractor's Site-Specific Safety Plan. This document is not designed or intended to replace the contractor's safety program, nor to address every possible safety, environmental, or health hazard associated with the contractor's work. In the event that the contractor's safety program includes a requirement or practice that is more stringent than set forth herein, the more stringent shall be followed. This document does not relieve the contractor of this obligation to: (1) control the means and methods by which its employees and any subcontractors perform work, and (2) independently ascertain what health and safety practices are necessary for the performance of the work.
- B. No specific requirements herein shall be construed to limit, replace, or supersede applicable provisions of federal, state, or local laws or regulations. [Occupational Safety and Health Administration \(OSHA\) Regulations; Standard Number 29 CFR 1926](#) are the foundation of these Guidelines.
- C. Deliverables
 - 1. Competent Person Designation (see attached form) (4.0/C)
 - 2. Verification of OSHA 30 or OSHA 10 compliance, based on project requirements. (4.0/D/1/b)
 - 3. Contractor Site Specific Safety Plan (SSSP). (4.0/I)
 - 4. Summary of the Daily Safety Inspections documented as part of regular project meeting minutes. For projects bid through Construction Services summaries of Daily Safety Inspections will be documented as agreed upon at the pre-construction meeting. (4.0/F/1)
 - 5. Regular (min. monthly) Safety Reports. (4.0/F/2)
 - 6. Traffic Control Plans (when impact exists) (4.0/QQ/1)

3.0 Reference Materials

- A. The following reference materials are required to be available upon request at every job site:
1. OSHA Regulations published by NC Department of Labor (DOL) (Available at (800) NC-LABOR, <http://www.nclabor.com/pubs.htm>).
 2. Safety Data Sheets (SDS) for all chemical products the contractor has brought to the worksite.
 3. The written Safety Plan of the Contractor or Subcontractor.
 4. Site inspection documentation.
 5. Worksite employee training records.
 6. Mishap reports and investigations.

4.0 General Responsibilities

- A. The contractor must notify the NC State Project Manager in writing at least 10 days prior to:
1. Utilizing powder-actuated tools
 2. Starting operations that will produce excessive odor, dust, and noise affecting occupied buildings or work near air intakes
 3. Using a combustion engine indoors
 4. Using a mobile crane or tower crane (50-day notice is required)
 5. Breaking ground for an excavation or trench
 6. Using a laser
 7. Using any source of radioactive material
 8. Working with lead or asbestos-containing materials
 9. Performing energized electrical work
 10. Working on or near active underground utility infrastructure (steam, chilled water, natural gas, water, etc.)
 11. Entering electrical distribution assets

Violation of any safety, security, or environmental requirement may result in the permanent removal of the contractor or their employees from the NC State premises.

- B. Construction Management
1. The contractor is responsible for compliance with all federal, state, and local laws, regulations, standards, executive orders, etc. applicable in part or whole pertaining to the scope of work.
 2. Contractors are responsible for compliance with all applicable NC State safety practices, procedures, policies, standards, and requirements.
 3. Contractors are responsible for providing qualified and competent personnel to perform activities under the scope of work. Contractors must provide documentation of training prior to beginning work on-site.
 4. Contractors are responsible for ensuring that subcontractors, their agents,

employees, visitors, and other persons performing portions of the work on a project comply with federal, state, and/or local laws or regulations that relate to work site safety.

5. Contractors are responsible for ensuring that subcontractors are informed of and comply with all applicable requirements within the scope of work.

C. Competent Person Designation

1. Contractors shall designate a competent person for activities as specified in OSHA 29 CFR 1926. Such activities include, but are not limited to, the following activities, as applicable to the job:

- a. general provisions
- b. ionizing/non-ionizing radiation
- c. gases, vapors, fumes, mists, dust
- d. ventilation
- e. hazard communication
- f. lead
- g. asbestos
- h. personal protective equipment
- i. hearing conservation
- j. respiratory protection
- k. rigging and material handling equipment
- l. welding, cutting, brazing
- m. electrical
- n. scaffold
- o. fall protection
- p. cranes (overhead and mobile)
- q. motor vehicles and equipment
- r. excavations
- s. concrete and masonry
- t. steel erection
- u. demolition
- v. stairways and ladders
- w. toxic and hazardous substances.

2. OSHA 29 CFR 1926.32(f) "Competent person" means one who is capable of identifying existing and predictable hazards in the surroundings or working conditions that are unsanitary, hazardous, or dangerous to employees, and who has authorization to take prompt corrective measures to eliminate them.

D. Contractor Safety Personnel

1. Safety Representative
 - a. For all projects contractors must designate a Safety Representative prior to the start of the project. The Safety Representative may be the Project Superintendent and is responsible for all safety concerns related to the construction operations.
 - b. For formally contracted projects (>\$500k), the Safety Representative must have completed, at a minimum, an OSHA 30-hour Construction

Safety Course. For informally contracted projects (<\$500k), the Safety Representative must have completed, at a minimum, an OSHA 10-hour Construction Safety Course.

- c. The Safety Representative must actively monitor the job site for safety issues on a daily basis. The Safety Representative may have additional site duties outside the scope of safety; when the safety representative is not on the project site, a competent designee must be assigned to monitor safety on the site.

2. Safety Professional

- a. **When appropriate, the contractor shall provide a full-time safety professional assigned to the project. The duties of the full-time safety professional must be strictly limited to safety-related activities, with no additional job site duties.**
- b. Safety professionals must have one or more of the following credentials: a professional certification (beyond an OSHA 30-hour course), a college or professional degree related to safety and health, or significant previous experience and skills necessary to thoroughly understand the health and safety hazard and controls relevant to the project. The designation and adequacy of qualifications of the full-time safety professional shall be reviewed and accepted by the University prior to the commencement of the work.
- c. Project-specific requirements for a full-time safety professional will be addressed in the contract documents and discussed during the Pre-Bid Meeting.

E. Daily Pre-Job Meetings

1. A pre-job meeting (i.e. "Tailgate" or "toolbox" meeting) shall be held at the beginning of each work period (normally in the morning before leaving the yard or work staging area). The pre-job meeting should include a discussion of the scope of work to be completed, associated hazards, and means and methods to mitigate the hazards. The pre-job meeting must be led by the supervisor or other competent person.

F. Safety Inspections

1. Daily Inspections: The Contractor shall perform daily job inspections and correct any unsafe conditions or actions. A summary of these inspections will be reviewed as a portion of and captured in the minutes of the weekly Owner, Designer, and Contractor job meetings.
2. Monthly Inspections: For projects with a duration of more than one calendar month (4 weeks), the safety inspection must be documented and include, at a minimum, the name of the person performing the inspection, the date, a checklist of items observed, any identified safety concerns, and actions taken to address identified concerns.
3. University Project Visits: The NC State Project Manager, or another owner representative, may perform unscheduled visits to project sites to address adherence to the Contractor Safety Requirements or Site-Specific Safety

Plans. Any safety concerns identified will be reported to the responsible contractor for prompt mitigation.

- G. Mishap Reporting: All mishaps occurring on the project site must be investigated to determine causes and actions must be taken to prevent recurrence. Mishaps resulting in a recordable injury requiring medical treatment or damage to NC State property must be reported in writing to the NC State Project Manager as soon as possible but no later than 24 hours from occurrence; the Project Manager shall be notified immediately of mishaps resulting in life-threatening injury.
- H. The Contractor shall address safety concerns at regularly scheduled meetings with subcontractors.
 - 1. Contractor Site-Specific Safety Plan (SSSP) - The Contractor must develop and implement an SSSP. The SSSP is a comprehensive safety plan for his or her employees, which covers all aspects of onsite construction operations and activities associated with the contract. This plan must comply with all applicable health and safety regulations and any project-specific requirements. The SSSP must be submitted to, reviewed, and accepted by NC State before beginning any on-site work activities.
 - 2. As applicable to the project, these items must be included in the SSSP:
 - a. Scope of Work
 - b. Emergency Procedures
 - c. 24-hour emergency points of contact
 - d. Identification of Designated Competent On-Site Personnel (per OSHA requirements)
 - e. Designated On-Site Safety Personnel
 - f. Safety orientation program
 - g. Site logistics Plan: address public (student, faculty, staff, visitor) safety, traffic plan, equipment and lay-down areas, site security, dust containment, etc.
 - h. Minimum PPE requirements
 - i. Hazard Assessment (for defined project tasks) - include hazard identification and mitigation
 - j. Mishap reporting and investigation procedures
 - k. Safety inspection/audit procedures
 - l. Sub-contractor requirements

5.0 General Requirements

- A. Asbestos - If asbestos-containing materials are uncovered during construction, NC State must be notified immediately. Do not attempt to remove the material. Contractors shall comply with provisions of the [State Construction Office Asbestos Abatement Guidelines and Policies](#) and the [NC State Asbestos Management Plan](#).
 - 1. If asbestos-containing material is present in any building material and is in good condition (i.e. non-friable) and will not be disturbed during construction, the material may be left in place. If asbestos-containing material is disturbed during construction activities, then it shall be removed; removal shall be performed by appropriately qualified and accredited personnel and in accordance with federal, state, and local regulations.

- B. Compressed Gas Cylinders
1. Compressed gas cylinders shall be properly used, stored, and maintained as per federal, state, and local requirements.
 2. Cylinders shall not be stored in a location in which they are subject to mobile equipment traffic (including vehicles) unless adequately protected.
- C. Confined Space Entry
1. Contractors required to enter a confined space at NC State must have and implement a written confined space entry program in accordance with OSHA 1926 Subpart AA Confined Spaces in Construction or OSHA 1910.146 permit required confined spaces, as applicable.
 2. Controlling contractors (those with overall responsibility for construction at the work site) must ensure space entry coordination when more than one entity enters the space.
 3. Each contractor must have a competent person who will identify confined spaces associated with the scope of their work. Before entry into a permit-required confined space, contractors must obtain the following information from the controlling contractor (when there is no controlling contractor, the contractor will obtain the information from the NC State Project Manager):
 - a. The location of each known permit space associated with the project scope;
 - b. The known hazards or potential hazards that make it a permit space;
 - c. Any precautions needed to be taken based on the known hazards or potential hazards.
 4. Each contractor performing work in a permit space must perform a hazard assessment specific to the work to be performed and establish corresponding hazard controls.
 5. A competent person from each contractor performing work in a permit space must complete and sign [Appendix F](#) to the [NC State Confined Space Entry Program](#).
- D. Contaminated Soil - If soil or any materials appear to be contaminated, the NC State Project Manager must be notified immediately. The NC State Project Manager will contact NC State EHS for assistance at (919) 515-7915.
- E. Electrical Power Lines (Overhead) - The contractor shall have a trained and knowledgeable observer (signal person) within sight of the operator and the overhead lines that will effectively provide guidance and clearance information to the operator as the equipment may approach the minimum approach distances. Advising the operator shall be the signal person's one and only task. When conducting any work with a crane, derrick, or hoist in the vicinity of any overhead electric power transmission or distribution line, the contractor shall observe all clearance requirements dictated by all applicable OSHA rules, as specifically contained within 29 CFR 1910 - Standards for General Industry, CFR 1926 - Standards for Construction, IEEE C2 - NEC, NFPA 70 - NEC, the NCSBC, ANSI standards, and other applicable NC State safety guidelines and requirements. Further, no crane, derrick, or hoist operator or contractor shall conduct any operation at any distance closer than 20 feet to any electric power line lower than 200 kV or closer than 35 feet to any electric power transmission line at voltages higher than 200 kV and lower than 250 kV, unless the requirements of OSHA 1926 Sub CC for preventing encroachment/electrocution are strictly followed.
- F. Elevators/Material Hoists
1. Any persons operating elevators/hoists must be trained to do so. Documentation

- shall be kept onsite.
2. No elevator/hoist with a defect shall be used.
 3. Elevator/hoist safety devices shall not be overridden or made inoperable.
- G. Emergency Equipment- The following shall not be moved, blocked, disabled, or rendered inaccessible unless authorized by NC State:
1. Fire equipment
 2. First aid equipment, fire blankets, stretchers, eyewash fountains, and safety showers
 3. Fire protection, hydrants, and detection systems
- H. Emergency Medical Treatment - To receive immediate assistance for emergency medical treatment call 911.
- I. Environmental and Chemical Requirements
1. Contractors must provide NC State with a list of all chemicals to be used on NC State property and maintain a copy on-site of the SDS for each chemical prior to being brought on-site. Each chemical container must be labeled clearly with the identity of the chemical and any associated hazards in accordance with the OSHA Hazard Communication Standard (1910.1200).
 2. Contractors must follow the safety procedures recommended by the manufacturer or seller of any chemicals, tools, equipment, or other materials. Contractors are to remove all empty containers, excess chemicals, and chemical waste from NC State property.
 3. For all chemical incidents, contractors shall call 911 and also notify the NC State Project Manager.
- J. Excavation and Trenches - Before doing any excavation work, the Contractor must locate all utilities by calling the local utility locator service and NC State.
- K. Excavations
1. Underground Facilities Locate. Contractors shall ensure underground installations and facilities are identified by calling 811 (Call Before You Dig) before performing any excavating activity. Note: excavation includes movement or removal of earth, rock, or other materials in or on the ground by use of manual or mechanized equipment. This is required for any project with earth-moving activities before you dig so that underground facilities can be identified and avoided. Detailed instructions and requirements can be found at nc811.org.
 2. Competent Person. Trench and excavation work must be performed under the direction of a competent person. Responsibilities include: classifying soil, inspecting protective systems, monitoring water removal, and conducting site inspections.
 3. Cave-In Protective Systems. A protective system is required by OSHA-1926 Subpart P for trenches and excavations that are 5 feet or more in-depth OR if the competent person has examined the ground and finds an indication of a potential cave-in. Protective systems typically include sloping/benching, shoring, or shielding. To determine what protective systems are appropriate, the competent person must first determine the soil type: Stable Rock, Type A, Type B, or Type C soil. Type C soil is the least cohesive and therefore, the least stable. No work shall be permitted in excavations where water has accumulated unless the integrity of the excavation has been protected.
 4. Excavations >20 feet in depth or that cannot comply with OSHA requirements require written approval by a Registered Professional Engineer (RPE).
 5. A ladder, stairway, ramp, or other means of access must be provided within the excavation when excavations are >4 feet in depth.

6. Barricades (stop-logs) shall be provided where vehicles or mobile equipment are used near or adjacent to excavations.
 7. Spoil piles must be placed a minimum of 2 feet from the edge of the excavation.
 8. Air monitoring must be performed if the excavation is >4 feet in depth and there is a potential for a hazardous atmosphere to exist.
- L. Exit Routes
1. Exit routes must be maintained at all times during construction.
 2. Lighting and marking must be adequate and appropriate.
 3. Exit routes must be kept free of explosive or highly flammable furnishings.
 4. Exit routes must be free and unobstructed. No materials or equipment may be placed, either permanently or temporarily, within the exit route. The exit access must not go through a room that can be locked, such as a bathroom, to reach an exit or exit discharge, nor may it lead into a dead-end corridor. Stairs or a ramp must be provided where the exit route is not substantially level. No materials shall be stored in a stairwell.
- M. Explosives: Blasting on university property is prohibited.
- N. Fall Prevention. A fall hazard is any condition on a walking-working surface that exposes an employee to a risk of a fall on the same level or to a lower level. Examples of fall hazards include, but are not limited to: floor openings, hoist areas, roofs, leading edges, scaffolding, ramps, etc.
1. Preventing or protecting falls from height may be necessary at any height given the circumstances, but is required when an employee is at a height of 6 feet or more above a lower level.
 2. Contractor work generally falls within construction industry applications, where acceptable methods depend on the type of work being performed: unprotected sides or edges, roof work, leading edge, etc. In all cases, contractors shall comply with the respective OSHA standards.
 3. Contractors shall ensure that every employee required to work at unprotected heights (greater than 6 feet) is trained in fall hazard recognition and prevention.
 4. **Guardrail System.** A guardrail system provides the highest level of protection and is always preferred. The system must be capable of supporting 200 lbs. in any direction and still maintain its integrity. The individual heights of the components must conform to the following minimum standards:
 - a. The top rail of the system must be at a height of 42" (+ or - 3");
 - b. the mid rail must be at a height of 21" with a 3" variation possible;
 - c. the toe board must have a minimum vertical height of 3.5".Note: The building code has more stringent requirements for permanent installations.
 5. **Personal Fall Protection Systems.** At times, it is necessary to work in areas where guardrails cannot be constructed; in these instances, a personal fall protection system must be used. Personal Fall Protection Systems are systems (including all components) that provide protection from falling or that safely arrest a fall. Examples include travel restraint and personal fall arrest. All components of this system shall meet the applicable design requirements as specified in OSHA 1910, 1926, or ANSI Z359. All components shall be inspected by the wearer prior to each use and at least annually by a competent person. No employee may use a personal fall protection system without proper training and an understanding of proper use and safe application of the system.
 - a. **Travel Restraint System.** A travel restraint system is a combination of an

anchorage, anchorage connector, lanyard (or other means of connection), and body support that the wearer uses to eliminate the possibility of going over the edge of a walking-working surface. Anchorages for travel restraint systems shall have a strength capable of sustaining static loads of at least 1,000 lbs. (per person) or two times the foreseeable forces for certified anchorages. Anchorage connectors, lanyards (or other means of connection), and body support devices shall be used in accordance with the manufacturer's requirements. The system shall be installed so that a fall cannot occur; therefore, a rescue plan is not required.

- b. **Personal Fall Arrest System.** A personal fall arrest system is a system used to safely arrest a user in a fall from a walking-working surface. It includes an anchorage, anchorage connector, and a full-body harness. The means of connection may include a lanyard, deceleration device, lifeline, or a suitable combination of these. Equipment must be worn and used in accordance with the manufacturer's requirements. Anchorages for personal fall arrest systems shall have a strength capable of sustaining static loads of at least 5,000 lbs. (per person) or two times the maximum arresting force for certified anchorages. The system shall be installed so that should a fall occur, the wearer will not contact the lower level or any other obstruction. Since there is a potential for a fall to occur, a rescue plan written by a qualified person is required.
- c. **Warning Line System.** A warning line may be used for construction roofing work when closer to the fall hazard than 15ft, but no closer than 6ft and in conjunction with one of the following: a guardrail system, a safety net system, a personal fall protection system, or a safety monitoring system. A warning line system shall conform to regulatory requirements and enclose all authorized employees conducting work protected by the Warning Line System. Refer to OSHA 1926.502(f).

O. Fire Protection and Prevention

- 1. The contractor shall be responsible for the development and maintenance of an effective fire protection and prevention program at the job site throughout all phases of the construction. Contractors shall perform inspections on fire extinguishers monthly. Contractors shall immediately replace fire extinguishers that do not pass inspection.
- 2. Fire cutoffs shall be retained in buildings undergoing alterations or demolition until operations necessitate their removal.
- 3. If work requires the disabling of Fire Protection Devices, then the Contractor must request a Fire Alarm Disconnect; through the appropriate NC State process; beginning with the Project Manager. No alarm shall be disabled at any time by the Contractor.

P. Hand and Power Tools

- 1. All hand and power tools and similar equipment, whether furnished by the employer or the employee, shall be maintained in a safe condition. Any tool found not in proper working order, or that develops a defect during use, shall be immediately removed from service and not used until properly repaired.
- 2. All tools shall be used, operated, and maintained in accordance with OSHA and manufacturer requirements.

Q. Hot Work Permits - A Hot Work Permit is required when any indoor or outdoor work will involve hot work, defined as operations including cutting, welding, thermite welding, brazing, soldering, grinding, thermal spraying, thawing pipe, installation of

torch-applied roof systems or other similar activities. Requirements for Contractors performing this work are contained in the NC State Hot Work Permit Program which is a part of the specifications package and can also be found in the [Hot Work Permit Form](#).

R. Housekeeping

1. The Contractor must maintain a clean and orderly project job site. The Contractor shall maintain NC State's pathways free of rocks, mud, and other miscellaneous construction debris. The Contractor shall prevent the accumulation of dirt, dust, and/or other debris on NC State's roadways. The Contractor shall clean the travelways on a daily basis. (Refer to project specifications for requirements.)
2. Waste material and debris must be removed from the work and access areas at least once a day. Waste material and debris should not be thrown from one level to another but should be carried down, lowered in containers, or deposited in a disposal chute.
3. Materials must be neatly piled, stacked, or otherwise stored to prevent tipping or collapsing. Materials must be carefully stacked and located so they do not block aisles, doors, fire extinguishers, safety showers, eyewash stations, fixed ladders, or stairways.
4. Material to be lifted by crane or other hoisting devices must not be stored under overhead power lines.
5. No materials may be stored on penthouses, roofs, or other areas until a specific area is assigned by NC State for a specific project.
6. Adverse Weather: If NC State becomes aware of an adverse weather event, the NC State Project Manager shall notify the construction superintendent, and the contractor shall perform a job site review to ensure any debris or construction materials are secured and protected from the elements.

S. Illumination - Construction areas, ramps, runways, corridors, offices, shops, and storage areas shall be lit to not less than the minimum illumination intensities required by OSHA.

T. Ladders - All ladders must meet OSHA requirements.

U. Lasers

1. Lasers must comply with the OSHA Construction Industry Standards.
2. Lasers must be low-power (<5mw) devices with visible beams. Lasers to be used must bear a label indicating this maximum power output. Lasers that do not bear this label shall not be used.
3. "Laser in use" signs shall be posted according to OSHA requirements.
4. Lasers must be used in a manner that will not risk exposure to others.

V. Lead

1. Lead may be found in certain painted surfaces. A check for lead presence should be conducted prior to certain activities such as grinding, sanding, or burning over painted surfaces. If lead-containing paint is disturbed or a material is questionable the NC State Project Manager must be notified immediately. Do not attempt to remove the material.
2. Hot Work over lead-painted surfaces is generally not permitted.

W. Lock Out/Tag Out

1. All contractors that work on energized equipment with any hazardous energy source are required to have a hazardous energy control (i.e. lockout tagout) program. The program shall specify policies and procedures for de-energizing, verifying de-energizing, and securing the source potential using energy isolating devices and applying locks/tags or implementing other forms of hazardous

- energy control as specified in OSHA standards. Types of potential energy sources include, but are not limited to:
- a. Electrical (refer to the section of these requirements titled "Electrical")
 - b. Pneumatic
 - c. Hydraulic
 - d. Thermal
 - e. Kinetic (motion)
 - f. Hazardous gas, liquid, air
 - g. Radiation
 - h. Lasers
2. When multiple contractors are performing work on the same project, hazardous energy control procedures shall be coordinated by the controlling entity which includes establishing device standardization.
 3. Contractors shall ensure site personnel are trained on the hazardous energy control program.
 4. Central [Utility Plant \(CUP\) - Lockout Tagout Procedure](#)
 - a. Contractors with the need to perform LOTO operations within the operating CUP shall be trained in accordance with the procedure and comply with applicable sections of the procedure. The contractor is responsible for providing this training; a copy of this procedure will be provided to the contractor.
 - b. Contractor management shall ensure that authorized personnel are assigned to perform work in which they are qualified.
 - c. Contractor management shall comply with applicable sections of the procedure.
- X. Mobile Cranes, Tower Cranes, etc. (Reference OSHA 1926 Subpart CC).
1. Prior to the setup or operation of any crane on university property, the NC State Project Manager (or another point of contact) shall be notified; notification must be made with as much lead time as possible, but no fewer than fifty (50) working days
 2. Cranes shall be set up and operated in compliance with the manufacturer and applicable OSHA requirements.
 3. Contractors are responsible for ensuring ground conditions are capable of supporting the equipment and load, which will include performing underground facilities/utilities location (i.e. 811 calls) as well as factual confirmation of necessary compaction capacities. This confirmation is to be by third-party inspection services, at the expense of the contractor.
 4. No lifts may occur over occupied spaces unless a registered structural engineer evaluates and certifies that the building can withstand the impact of a load being dropped on the building as a worst-case scenario. If it is determined that the building cannot withstand the impact without compromising the structure, areas of the building within the load fall zone must be evacuated during the duration of the lift. This evacuation process must be a part of the lift plan and managed by the contractor.
 5. The crane contractor shall provide equipment documentation, including the annual inspection and the last monthly inspection. Documentation must be signed.
 6. Crane operators shall be certified by an Accredited Crane Operator Certification Agency for the type of equipment operated. Examples of such agencies, include, but are not limited to:

- a. National Commission for the Certification of Crane Operators (NCCCO)
- b. National Center for Construction Education and Research (NCCER)
- c. Operating Engineers Certification Program (OECF)
- d. Electrical Industry Certifications Association (EICA)

Additionally, the crane operator's employer must attest that the operator was evaluated to verify the operator demonstrates skills and knowledge to safely operate the equipment as well as the ability to recognize and avert risk, as required under 29 CFR 1926.1427 (f).

7. All rigging personnel and signal persons shall be qualified in accordance with OSHA 1926 Subpart CC.
8. Crane Lift Plan. A lift plan is required for any lift in a location not under the exclusive control of the contractor, including lifts affecting NC State property, structures, employees, students, or visitors. Each lift plan must be developed by a qualified person and include at least the following:
 - a. The identity of the controlling entity, meaning the employer with the overall responsibility for construction operations associated with the crane lift.
 - b. Identify a lift director (i.e. primary signal person) and method of communication (hand signals, radio, etc.).
 - c. Contractors conducting crane operations are required to obtain required FAA permits according to 14 CFR Part 77; to be submitted with the lift plan.
 - d. Equipment positioning locations, including load staging and movement and paths to and from the working position.
 - e. Equipment specifications including load and reach capacities.
 - f. Current qualifications, certifications, and licenses of operators and riggers.
 - g. For lifts involving more than one crane, the lift plan shall encompass all cranes.
 - h. Fall Zone: The contractor shall identify the Fall Zone. The Fall Zone is the area (including but not limited to the area directly beneath the load) in which it is reasonably foreseeable that partially or completely suspended materials could fall. Spaces within the Fall Zone (including buildings, foot traffic, vehicle traffic, etc.) shall be barricaded to control access. The Fall Zone shall be cleared of personnel not participating in the lift.
 - i. Wind limitations.
 - j. Ground and subsurface stability at crane and load placement locations. The contractor must ensure a qualified person evaluates the crane set-up location to ensure ground conditions are sufficient. (See X., 3. above).
 - k. Other conditions or factors that may affect the safety of the lift.
 - l. A pre-lift meeting must be completed immediately before the lift and shall include all personnel involved with the lift and a thorough review of the elements and specifics of the lift plan and personnel assignments.
 - m. Specify the distance to the closest energized lines and the applicable minimum approach distance of any lift component.
 - n. Where items positioned by a crane lift are rigged at heights above easy reach height, the lift plan shall include safe attachment and de-attachment

procedures and the control of exposure to fall hazards.

- o. The contractor must provide documentation of annual and monthly inspections for the previous 3 months. 1926.1412(f) & .1412(e).

Y. Electrical

1. Electrical Contractor shall ensure that their personnel using electrically powered equipment are trained to recognize electrical hazards, inspect and maintain electrically powered equipment, and on safe work procedures to prevent exposure to electric shock.
 2. Premises Electrical Equipment. All electrical installations must comply with the National Electrical Code® (NEC®). Work associated with electrical equipment installed in accordance with the NEC® will be conducted in accordance with the NFPA 70E® Standard for Electrical Safety in the Workplace. NC State's goal is to minimize exposure to shock and arc flash hazards during the installation, repair, maintenance, and operation of electrical equipment, components, and systems.
 - a. Electrical power sources shall be de-energized, verified, and locked out prior to working on electrical equipment except when de-energization creates a greater hazard and a properly executed Energized Electrical Work Permit (EWP) has been completed.
 - b. Contractors performing electrical work must have their own energized electrical work program that includes a permit process.
 3. Power Generation & Distribution: Work by Qualified Persons and Unqualified Persons working on or near power generation or distribution equipment is addressed in OSHA 29CFR1910.269. It includes work on or directly associated with installations used for the generation, control, transformation, transmission, and distribution of electricity. Any work involving the NC State distribution system shall be coordinated by the NC State Project Manager (or other university contact person) in collaboration with the Facilities Division Power Systems group.
 - a. Work involving the NC State electrical distribution system shall only be performed after authorization by the Facilities Division Power Systems group in accordance with the Power Systems Switching Procedure.
 - b. System Check-In/Out: Prior to entering any primary enclosure (substation, transformer, manhole, switch, switching station, etc.) of the NC State Power System the NC State Project Manager or other designated person shall send a text or email to group-powersystementry@ncsu.edu with the work location and brief description of the tasks to be performed (photos are welcomed). When exiting the enclosure, check out with NC State Power Systems using the same method. This is only for unescorted access. For example, if you're with a member of the Power Systems team there's no need to check in/out, but if that team member has to leave your work site, you're expected to check in and check out.
 4. The contractor will follow all requirements as noted in NFPA 70E.
- Z. Mobile Elevating Work Platforms (MEWPs)
1. General Requirements.
 - a. MEWPs shall be operated in accordance with the manufacturer's requirements and specifications.
 - b. Employees must always stand firmly on the floor of the MEWP and must not sit or climb on the edge of guardrails, or use planks, ladders, or other devices for a work position. The guardrail system of the platform must not

- be used to support materials, other work platforms, or employees.
- c. A personal fall arrest/restraint system shall be used in accordance with the manufacturer's requirements. A scissor lift with approved guardrails may be used without a personal fall arrest system when specified by the manufacturer, however, if there are designated anchor points, the use of a fall arrest/restraint system is required.
 - d. The MEWP must be used only in accordance with the manufacturer's operating instructions and safety rules.
 - e. The designed rated capacity for a given angle of elevation must not be exceeded.
 - f. At least 10 ft distance must be maintained away from overhead power lines with a nominal voltage of 50kV or less; 20 ft for power lines over 50kV (or if the voltage is unknown). Note: qualified workers using appropriately insulated MEWPs may approach closer than 10 ft when following provisions specified in OSHA 1910.268, 1910.269, and 1926 Subpart V, as applicable.
 - g. The manufacturer's rated load capacity must not be exceeded. The load and its distribution on the platform must be in accordance with the manufacturer's specifications. The rated load capacity must not be exceeded when loads are transferred to the platform at elevated heights. Only employees, their tools, and necessary materials must be on or in the platform.
 - h. A trained spotter with no other job duties is required when a MEWP is driven; the spotter will assess conditions that could pose a hazard to the operation (for example, drop-offs, holes, slopes, inadequate surface and support, obstructions, pedestrians, vehicles, debris, electric lines, etc.) and stop operations and alert the operator. The operator shall halt operations until hazards are adequately controlled.
2. Training
 - a. Only personnel who have received training to operate the specific type(s) of MEWPs are authorized to operate them on NC State property.
 - b. Training must include inspection, application, and operation of MEWPs (including recognition and avoiding hazards associated with their operation). Operators are only authorized to use MEWPs of the specific model for which they are trained and evaluated.
 - c. Training must be provided by a person who has knowledge regarding the laws, regulations, safe use practices, manufacturer's requirements, and recognition and avoidance of hazards, and is familiar with the specific type(s) of MEWPs. Note: Personnel may not operate rented equipment unless qualified to operate the specific equipment; the rental provider or other authorized evaluator must provide familiarization training to satisfy this requirement.
 3. Inspection, Maintenance, and Testing
 - a. Each MEWP must be inspected, maintained, repaired, and kept in proper working condition in accordance with the manufacturer's operating or maintenance and repair manual or manuals. Maintenance inspections shall be completed at intervals no less frequent than annually.
 - b. Before use, visual equipment inspections and a functional check must be performed before each shift in accordance with the manufacturer's operating manual. Any MEWP found not to be in a safe operating

condition must be removed from service until repaired. All repairs must be made by an authorized person in accordance with the manufacturer's operating or maintenance and repair manual or manuals.

- c. Before and during use, visual worksite inspections must be performed and include workplace risk assessment. The workplace risk assessment includes identifying and evaluating hazards (for example, drop-offs, holes, slopes, inadequate surface and support, obstructions, pedestrians, vehicles, debris, electric lines, etc.) and establishing effective control measures. Uncontrolled hazardous situations must be corrected prior to the initial or continued use of the MEWP.

AA. Noise/Vibration

1. Noise-producing equipment, such as power drills, jackhammers, welders, etc., can create sound levels of 80dB(A) or greater in and around a construction area. Notify the NC State Project Manager in advance to determine the appropriate times to operate high noise/vibration equipment for that project's location.
2. Appropriate personal protective equipment shall be used when working around high-noise/vibration equipment.

BB. Overhead Work

1. Work must not be performed above other personnel, including other contractor employees. Affected areas must be roped off or barricaded and marked to prohibit traffic.
2. Contractors must not climb on the heating and air-conditioning ductwork, plumbing steam piping, sprinkler piping, electrical cable trays, fixtures, or furniture or use as work platforms.
3. Contractors are expected to comply with OSHA fall protection requirements.

CC. Paints and Solvents - Contractors must provide the following safeguards:

1. Adequate ventilation must be maintained at all times when paints or solvents are being used. Refer to [NC State Odor Prevention and Dust Control in Occupied Buildings](#) for additional information.
2. Contractor personnel must use proper respiratory protection and protective clothing when the toxicity of the material requires such protection.
3. Flammable solvents and materials must be used with extreme caution when possible sources of ignition exist.
4. Flammable paints and solvents must be stored in an approved flammable liquid storage cabinet when storage is required inside buildings. Acids and flammables must never be stored together. If an approved flammable liquid storage cabinet is not available, flammable paints and solvents must be removed from the building.
5. Flammable liquids must be dispensed in a safety can with a flash screen bearing a Factory Mutual or Underwriters Laboratory (UL) approval.

DD. Personal Protective Clothing and Equipment - The contractor shall determine this minimum level of protective equipment to be worn on the job site (example: hard hat, eye protection, safety vest, gloves, and safety shoes); NC State expects contractors to conform to industry accepted minimum PPE standards, for example, hard hats, safety glasses, and protective toe footwear. Any additional safety equipment required by a specific activity shall also be worn and shall meet or exceed OSHA standards. This applies to ALL persons entering the job site.

EE. Powder-Actuated Tools

1. Powder-actuated tools are not to be used on NC State property unless specific approval is obtained from NC State prior to usage.
2. If approved, powder-actuated tools must be used in accordance with OSHA and

manufacturer regulations.

FF. Power Vehicle Equipment

1. Only trained operators are allowed to use power vehicles on NC State property. Contractor management will be expected to provide proof of training if requested.
2. Generally, LP gas-powered trucks are not to be used inside NC State buildings. Prior approval from NC State is required.
3. The design of the LP gas-fueled industrial truck for use within NC State buildings must comply with the following:
 - a. LP gas-fueled industrial trucks must comply with NFPA 505-1982.
 - b. If trucks are in continuous use in a populated area, they must be equipped with a catalytic converter.
 - c. LP gas containers must not exceed the nominal 45 pounds of LP gas.
4. The following conditions and requirements will govern the use of LP gas-fueled vehicles inside the confines of NC State buildings and structures:
 - a. LP gas-fueled trucks must be removed from the building and parked at the end of each workday and not left unattended while in use. When the job requiring the vehicle is complete, the vehicle must be removed from the job site.
 - b. Trucks and tanks must not be refueled inside buildings.
 - c. All areas where LP gas-fueled trucks are used must be well ventilated.
5. All LP cylinders must be stored outside and secured by a chain in an upright position.

GG. Roof Safety

1. The contractor shall request authorization from NC State prior to accessing a roof.
2. During all rooftop operations, the contractor must provide fall protection measures in accordance with OSHA.
3. A Hot Work Permit and at least two appropriate fire extinguishers of the correct ABC type are required when performing hot work on roofs. Other persons acting as a Fire Watch shall be in place on the roof and on the floor(s) directly below the operation.

HH. Sanitation

1. Drinking Water - An adequate supply of water, meeting the U.S. Public Health Service Drinking Water Standards, shall be provided.
2. Washing Facilities
 - a. The contractor shall provide adequate washing facilities for employees engaged in the application of paints, coating, herbicides, or insecticides, or in other operations where contaminants may be harmful to the employees. Such facilities shall be close to the work site and shall be so equipped as to enable employees to remove such substances.
 - b. Hand soap or similar cleansing agents shall be provided.
 - c. Individual hand towels, cloth or paper, warm air blowers, or clean individual sections of continuous cloth toweling, shall be provided.
3. Toilet facilities shall be provided for employees according to OSHA requirements.

II. Scaffolding

1. The contractor shall erect, use, and dismantle scaffolding in accordance with OSHA and manufacturer regulations.
2. Competent Person. Scaffolds must be erected and dismantled under the direction of a competent person. Responsibilities include, but are not limited to:
 - a. supervise and direct scaffold erection, moving, dismantling, or alteration.

- b. determine the feasibility and safety of providing fall protection for employees erecting or dismantling supported scaffolds. Employers are required to provide fall protection for employees erecting or dismantling supported scaffolds where the installation and use of such protection is feasible and does not create a greater hazard.
 - c. inspect scaffold and scaffold components for visible defects before each work shift and after any occurrence that could affect a scaffold's structural integrity and ensure identified deficiencies are corrected,
 - d. determine if it is safe for employees to work on scaffolds during storms or high winds.
 3. Access. When scaffold platforms are more than 2 feet (0.6 m) above or below a point of access, portable ladders, hook-on ladders, attachable ladders, stair towers (scaffold stairways/towers), stairway-type ladders (such as ladder stands), ramps, walkways, integral prefabricated scaffold access, or direct access from another scaffold, structure, personnel hoist, or similar surface shall be used. Cross Braces shall not be used as a means of access.
 4. Fall Protection. Each employee on a scaffold more than 10 feet (3.1 m) above a lower level shall be protected from falling to that lower level; each employee on a suspended scaffold shall be protected by a personal fall arrest system attached to an independent anchorage.
 5. Falling Object Protection. Where the potential for tools, materials, or other equipment could fall from a scaffold, the area below must be barricaded, and personnel not permitted to enter the area OR effective means shall be implemented to prevent objects from falling.
- JJ. Signs, Tags, and Barricades (references 1926 Sub G and ANSI Z535)
 1. Signs and Tags: Each sign and tag must include a signal word, symbol, and text.
 - a. Signal words:
 - (1) DANGER = the hazard will most likely result in serious injury or death;
 - (2) WARNING = the hazard could result in serious injury or death;
 - (3) CAUTION = the hazard would not likely result in serious injury or death;
 - (4) NOTICE = indicates important information, but is not directly hazard-related.Symbols or graphics are used to bridge language barriers and draw attention to the message.
 - b. Text is used to convey the safety message in a clear, concise manner.
 2. Barricades. Barricades must be installed for situations where a physical obstruction is necessary to deter the passage of people, vehicles, or equipment. When used, barricades must be installed at all points of access.
 - a. Barricades associated with traffic control in a public roadway must comply with the Federal Manual of Uniform Traffic Control Devices and the North Carolina Supplement. Coordinate with the NC State Transportation Office.
 - b. Barricades may take many forms on construction sites, but when used, they must clearly indicate the intent of the barricade. All barricades are required to include a sign that includes the name of the person responsible for the barricaded area, method for contacting the responsible person (ex. phone number), and clear and concise text describing the purpose of the barricade.

(1) CAUTION Tape Barricades should be used when the hazardous condition is not likely to cause serious physical harm but could result in injury. Standard CAUTION Tape must be used, which includes yellow tape with the word "CAUTION" in black letters. Personnel may enter the barricaded area only when implementing precautions to address the identified hazard.

(2) DANGER Tape Barricades are used when a serious or imminent danger may exist. Standard DANGER Tape must be used, which includes red tape with the word "DANGER" in black letters. Only personnel specifically authorized by the person responsible for the barricaded area may enter the barricaded area.

- KK. Silica (Respirable Crystalline Silica) – The following requirements apply to all operations involving exposure to respirable crystalline silica. Examples of such operations include: cutting, grinding, drilling, or crushing brick, block, concrete, stone, rock, mortar, and other materials that contain crystalline silica.
1. Contractors shall comply with OSHA standard 29 CFR 1926.1153 including taking all necessary steps to comply with the established exposure limits.
 2. Contractors must have a written Exposure Control Plan specific to their operations in accordance with 29 CFR 1926.1153 that includes specific details for controlling exposure to NC State personnel and the public. A copy of this plan shall be made available to NC State EHS and/or the university Project Manager upon request.
 3. Tasks performed indoors or in an enclosed area shall have effective exhaust ventilation to minimize the accumulation of visible airborne dust. In situations where ventilation is exhausted in an area with the potential to expose people to dust must incorporate effective HEPA filtration; such areas include but are not limited to, inside a building or outside where people may be present.
 4. When a building ventilation system services an area where work with the potential for generating respirable crystalline silica exists, the building air returns shall be blanked or closed while such work is in progress. Contractors must coordinate this with the university project manager.
 5. Contractors must establish a "Temporary Restricted Area" for tasks that require the use of respiratory protection in accordance with 29 CFR 1926.1153.
 - a. A *Temporary Restricted Area* is an area demarcated by the employer where an employee is required to wear respiratory protection.
 - b. *Temporary Restricted Areas* must be designated with signs, barriers, or other effective means that will ensure unauthorized persons do not enter.

If such work is performed in *occupied* buildings, dust barriers shall be installed as necessary to isolate the restricted area. Refer to [NC State Odor Prevention and Dust Control in Occupied Buildings](#) for additional information.

- LL. Smoking and Open Flames
1. Smoking is not allowed in any NC State buildings, including roofs, penthouses, electrical/mechanical rooms, and basements or within 25 feet of any building entrance or exit.
 2. The use of open flames is strictly prohibited in areas where flammable liquids, gasses, or highly combustible materials are stored, handled, or processed.
 3. The use of open flames, where allowed, requires a Hot Work Permit.

- MM. Tarpaulins - When tarpaulins are required for the deflection of hot slag, dust, paint drippings, etc., or as a security barrier, they must be flame resistant and in good condition, free of holes and worn edges.
- NN. Tar Pots (tar kettles) - Tar Pots are not allowed on roofs. The contractor must notify the NC State Project Manager prior to using tar pots and obtain a Hot Work permit.
- OO. Temporary Heating - When heaters are used in confined spaces, special care shall be taken to provide sufficient ventilation to ensure proper combustion, maintain the health and safety of workmen, and limit temperature rise in the area.
- PP. Temporary Lighting - The contractor shall submit a lighting plan for night work, underground work, and any other worksites without adequate lighting.
- QQ. Temporary Traffic Control
1. All traffic control shall be approved by NC State and meet the Institute for Transportation Research and Education (ITRE) Work Zone Safety Guidelines for Construction, Maintenance, and Utility Operations. A traffic control plan shall be provided by the contractor and approved prior to commencement.
 2. The contractor shall provide warning signs, barriers, barricades, etc., in accordance with the construction plans and specifications or whenever such protection is needed.
 3. Where signs and barricades do not provide adequate protection, particularly along a road, walkway, or main aisle, flagmen shall be used.
 4. Review with the crew, each person's responsibility regarding the traffic control set-up (e.g. sign installation, lane closure setup, etc.).
 5. Review traffic control devices to be used at the site. Assure that traffic control set-up is properly installed. The installer shall document what traffic control set-up was used (including the sign types and sign locations) and how it was installed.
- RR. Vehicle Operation
1. All equipment shall have operational backup alarms. Equipment shall not be utilized until such device is functioning properly.
 2. All vehicles shall be operated in accordance with OSHA and manufacturer regulations.
- SS. Vertical Lifts - All contractors' platforms or vertical lifts must meet OSHA and manufacturer requirements.

SECTION 01 35 73

DELEGATED DESIGN REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Administrative and procedural requirements for portions of the Work the design of which is delegated to the Contractor.

1.2 REFERENCES

- A. Abbreviations and Acronyms:
 - 1. AHJ: Authority Having Jurisdiction.
 - 2. SCO: State Construction Office
- B. Definitions:
 - 1. Delegated: Means transferred by the Designer to the Contractor.
 - 2. Design: Means the complete planning, arrangement, and coordination of a discrete portion of the work, along with its graphic and written communication, including determination and engineering of its organization and structure in response to aesthetic requirements, functional requirements, dimensional and geometric limits, and the arrangement, performance, and other criterion indicated in the Contract Documents.
 - 3. Engineering Services: Means structural engineering services performed for the design, fabrication, and installation of systems, assemblies, and components similar in material, design, complexity and extent to that indicated for the delegated design portion of the Work.

1.3 ADMINISTRATIVE REQUIREMENTS

- A. Portions of the Contract Documents may delegate the design of discrete portions of the Work to the Contractor, or may otherwise specify "delegated design requirements" in individual specification Sections. Part 3 of this Section describes the portions of work that have been delegated to the Contractor.
- B. The Contractor is professionally liable for delegated design work, including design, engineering, and conformance to specified performance requirements.
- C. Drawings of delegated design portions of the Work are diagrammatic; they do not identify or imply solutions to engineering aspects of the portions of the Work that are required to be designed by the Contractor, and are intended to only indicate:
 - 1. The design intent of final profiles, shapes and forms of the specified materials;

2. Relationships between adjacent components of the Work;
 3. Location, identification, dimension and size of components, assemblies, accessories, and other components of the Work; and
 4. Schematic joining and attachment details and diagrams of fasteners and connections.
- D. Specifications for delegated design portions of the Work are performance based, and establish the minimum qualities and performance criteria for materials, fabrications, products, systems, assemblies, and methods of execution.
- E. Architect will review informational submittals specified herein to determine whether or not the delegated component, assembly or system design complies with the following:
1. Contractor's engineering shows substantiation of the specified performance criteria;
 2. Conforms to the design intent of the delegated design portion of the Work being reviewed;
 3. Conforms to the specified graphic and specification requirements, including subsequent modifications; and
 4. Is appropriately integrated into the adjacent components of the Work and, where applicable, the overall design of the project.
 5. Review by the Architect does not relieve the Contractor from compliance with the requirements of the delegated component.
- F. In the event of a dispute regarding the Contractor's proposed delegated design solutions and the design intent of the Contract Documents, the decision of the Designer is final.

1.4 PROCEDURAL REQUIREMENTS

- A. Design Requirements: Proposed delegated design solutions are to demonstrate conformance to the original design intent of the Contract Documents, as determined by the Designer.
1. Unless otherwise defined by the Contract Documents, the appearance of exposed elements, including member sizes, profiles, and alignment of components shall be within the dimensional limits and section profiles indicated, and consistent throughout the Project where the delegated design component of the Work is to be installed.
 2. Deviation from the profiles, layouts, dimensional locations, or arrangements indicated is not permitted without prior written consent from the Designer.
 3. Deviations from the specifications are not permitted without prior written consent from the Designer.
 4. Contractor-proposed delegated design solutions that exactly follow the details indicated on the Drawings do not relieve the Contractor from liability for the design, fabrication, and performance of the delegated design portions of the Work.
- B. Engineering Requirements: Engineer delegated design portions of the Work shall;

1. Meet or exceed the specified performance and quality requirements;
 2. Conform to the dimensional and graphic requirements of the Drawings;
 3. Satisfy the requirements of the AHJ; and
 4. Provide structurally sound, leak-proof, non-corroding, and weather tight applicable, the minimum specified in-service loads, and thermal, seismic, and wind sway, or other types of movement, without incipient or catastrophic failure.
- C. Additional Requirements:
1. Fabricate, assemble and install delegated design portions of the Work to accommodate the full range of manufacturing, operating and field installation tolerances of adjacent work specified in other Sections.
 2. If required by the authorities having jurisdiction, submit shop drawings, specifications, calculations and other supporting data necessary for obtaining jurisdiction approval after they have been reviewed by the Architect and prior to beginning installation. Pay fees incurred.
- D. Regulatory Requirements: Delegated design items shall be engineered in conformance with the North Carolina State Building Code and the City of Raleigh.
- E. SCO Review: Once a Designer has approved the Delegated Design Submittal conforms with the overall design intent, the Designer shall upload the Delegated Design Submittal into Interscope for SCO review and comment. All SCO Comments must be incorporated into the submittal. SCO approval of the submittals must occur prior to starting any work associated with the Delegated Design Submittal on the project.
- 1.5 INFORMATIONAL SUBMITTALS
- A. General: Coordinate and process submittals for delegated design portions of Work in same manner as for other portions of Work.
- B. Professional Engineer's qualifications.
- C. Design Data: Submit structural engineering calculations demonstrating conformance to the requirements of the Contract Documents and of the AHJ.
1. Calculations must be legible and incorporate sufficient cross-references to shop drawings to make calculations readily understandable and reviewable.
 2. At a minimum, structural calculations must contain:
 - a. An analysis of framing members;
 - b. Section property computations for framing members;
 - c. An analysis of anchors, including anchors embedded in concrete;
 - d. The signature and seal of the professional structural engineer, licensed in the state of North Carolina, and responsible for their preparation.
 3. Test reports are not an acceptable substitute for calculations.

- D. Furnish appropriate certification from licensed fabricator shop or complete detailed inspection reports signed by each inspector performing unlicensed shop inspection to the Architect before the Work affected by these inspections is delivered to the site.

1.6 QUALITY ASSURANCE

- A. Professional Structural Engineer's Qualifications:
 - 1. Must be legally licensed or otherwise qualified to practice in the state of North Carolina, and experienced in and having a minimum of 10 consecutive years providing the type of engineering services indicated in the Contract Documents..
 - 2. Engineering services are defined as those performed for the design, fabrication and installation of components and assemblies similar in material, design, complexity and extent to those indicated in the Contract Documents for this Project.
- B. Fabricator/Installer Qualifications: Firm with a minimum of 10 consecutive years' experience in the design, testing, fabrication, assembly, installation and coordination of specified components, assemblies, and systems on projects similar in material, design, complexity and extent to this Project, and whose work has resulted in applications with a record of successful in-service performance. Submit evidence demonstrating the following:
 - 1. Ability to coordinate and work with a qualified testing agency for testing exterior building envelope assemblies utilizing the recognized test standards of the industry on projects similar in material, design, complexity and extent of this Project.
 - 2. Experience in managing, scheduling, coordinating, and maintaining on-time performance in conjunction with the successful projects and for the proposed project.
 - 3. An in-place, comprehensive quality assurance and quality control program and procedures that demonstrates how it is being applied on the project. Describe and demonstrate how the proposed comprehensive quality assurance and quality control program has been successful on other projects.
 - 4. Current resources, including currently employed personnel, to produce the Work to the specified requirements.
 - 5. Ability to produce proposal drawings, accommodate plant visits, and mockups, organization plans, project management plans and proposed schedules in conjunction with the bidding for this Project.
 - 6. Ability to warranty curtain wall systems for 5 years and the curtain wall finishes for 20 years.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide materials, fabrications, products, components, and accessories required for a complete installation, whether or not such items are indicated on the Drawings or in the Specifications.
- B. Provide anchors, attachments, inserts, fasteners, clips, bracing, framework, and similar items as required to meet specified design and performance requirements, and to securely attach delegated design Work to adjacent supports, or to adjoining work, whether or not such items are indicated on the Drawings or in the Specifications.

PART 3 - EXECUTION

3.1 DESIGN

- A. Unless otherwise indicated or specified, maintain the design intent and conform to the performance requirements indicated on the Drawings and in the Specifications, as determined by the Designer.
 - 1. In the interest of fabrication or erection methods, minor dimensional changes and detailing adjustments to the original design communicated in the Contract Documents may become necessary.
 - 2. Obtain written approval from the Designer for proposed changes and adjustments before procurement, fabrication, manufacture, assembly, or installation, as applicable.
- B. Engage a qualified professional structural engineer to design connection details and determine fastener types and sizes.
 - 1. Fasteners or connections may neither conflict with nor require revision to the finish profiles indicated for the supporting work.
 - 2. Connections may not impose eccentric loading, nor induce twisting or warping to the supporting structure.
 - 3. Connections must be designed to accommodate potential and actual misalignment of adjacent work within tolerances specified in other Sections.

3.2 DELEGATED DESIGN SCHEDULE

- A. The following sections have been preapproved as being allowed by the State Construction Office for delegated design and are included in this project:
 - 1. None in this submission.
- B. The following sections have received written approval from the State Construction Office for delegated design and are included in this project:

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

1. None in this submission.

END OF SECTION

SECTION 01 40 00
QUALITY REQUIREMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for quality assurance and quality control.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
 - 2. Specified tests, inspections, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with the Contract Document requirements.
 - 3. Requirements for Contractor to provide quality-control services required by Designer, Owner, Commissioning Authority, or authorities having jurisdiction are not limited by provisions of this Section.
 - 4. Specific test and inspection requirements are not specified in this Section.
- C. Related Sections:
 - 1. Section 01 31 00 "Project Management & Coordination" for requirements on the Construction Management Software that the Contractor will be utilizing to implement the Site-Specific Quality Program.
 - 2. Section 01 43 39 "Mockups" for specific mockup requirements.
 - 3. Section 01 73 00 "Execution" for repair and restoration of construction disturbed by testing and inspecting activities.
 - 4. Divisions 02 through 49 Sections for specific test and inspection requirements.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Designer.
- C. Preconstruction Testing: Tests and inspections performed specifically for Project before products and materials are incorporated into the Work, to verify performance or compliance with specified criteria.
- D. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- E. Source Quality-Control Testing: Tests and inspections that are performed at the source (e.g., plant, mill, factory, or shop).
- F. Field Quality-Control Testing: Tests and inspections that are performed on-site for installation of the Work and for completed Work.
- G. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.
- H. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).
- I. Experienced: When used with an entity or individual, "experienced" means having successfully completed a minimum of five previous projects similar in nature, size, and extent to this Project; being familiar with special requirements indicated; and having complied with requirements of authorities having jurisdiction.
- J. Professional Engineer: Engineer currently licensed to practice in the State of North Carolina.

1.4 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Designer for a decision before proceeding.
- B. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of requirements. Refer uncertainties to Designer for a decision before proceeding.

1.5 DELEGATED DESIGN SERVICES

- A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.
 - 1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

1.6 INFORMATIONAL SUBMITTALS

- A. Site-Specific Quality-Control Plan: For quality-assurance and quality-control activities and responsibilities.
- B. Qualification Data: For Contractor's quality-control personnel.
- C. Contractor's Statement of Responsibility: When required by authorities having jurisdiction, submit copy of written statement of responsibility sent to authorities having jurisdiction before starting work on the following systems:
 - 1. Seismic-force-resisting system, designated seismic system, or component listed in the Statement of Special Inspections..
 - 2. Main wind-force-resisting system or a wind-resisting component listed in the Statement of Special Inspections.
- D. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional, indicating that the products and systems are in compliance with performance and design criteria indicated. Include list of codes, loads, and other factors used in performing these services.

- E. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.
- F. Schedule of Tests and Inspections: Prepare in tabular form and include the following:
1. Specification Section number and title.
 2. Description of test and inspection.
 3. Identification of applicable standards.
 4. Identification of test and inspection methods.
 5. Number of tests and inspections required.
 6. Time schedule or time span for tests and inspections.
 7. Entity responsible for performing tests and inspections.
 8. Requirements for obtaining samples.
 9. Unique characteristics of each quality-control service.
- G. Testing Agency and Inspection Reports: Prepare and submit certified written reports that include the following:
1. Date of issue.
 2. Project title and number.
 3. Name, address, and telephone number of testing agency.
 4. Dates and locations of samples and tests or inspections.
 5. Names of individuals making tests and inspections.
 6. Description of the Work and test and inspection method.
 7. Identification of product and Specification Section.
 8. Complete test or inspection data.
 9. Test and inspection results and an interpretation of test results.
 10. Ambient conditions at time of sample taking and testing and inspecting.
 11. Comments or professional opinion on whether tested or inspected Work complies with the Contract Document requirements.
 12. Name and signature of laboratory inspector.
 13. Recommendations on retesting and reinspecting.
- H. Manufacturer's Technical Representative's Field Reports: Prepare written information documenting manufacturer's technical representative's tests and inspections specified in other Sections. Include the following:
1. Name, address, and telephone number of technical representative making report.
 2. Statement on condition of substrates and their acceptability for installation of product.
 3. Statement that products at Project site comply with requirements.
 4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
 5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 6. Statement whether conditions, products, and installation will affect warranty.

7. Other required items indicated in individual Specification Sections.
 - I. Factory-Authorized Service Representative's Reports: Prepare written information documenting manufacturer's factory-authorized service representative's tests and inspections specified in other Sections. Include the following:
 1. Name, address, and telephone number of factory-authorized service representative making report.
 2. Statement that equipment complies with requirements.
 3. Results of operational and other tests and a statement of whether observed performance complies with requirements.
 4. Statement whether conditions, products, and installation will affect warranty.
 5. Other required items indicated in individual Specification Sections.
 - J. Permits, Licenses, and Certificates: For Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.
- 1.7 CONTRACTOR'S SITE-SPECIFIC QUALITY PROGRAM
- A. General:
 1. Submit Contractors Site-Specific Quality Program including all components herein not less than five days prior to preconstruction conference. Submit in format acceptable to Designer and Owner. Identify personnel, procedures, controls, instructions, tests, records, and forms to be used to carry out Contractor's quality-assurance and quality-control responsibilities. Coordinate with Contractor's construction schedule.
 2. Contractors Site-Specific Quality Program must be specifically tailored to the work of the project. While a corporate Quality Manual may be submitted to supplement, or as a reference to, the Site-Specific Quality Program, the submission of a corporate Quality Manual without specific tailoring to the needs of the project will be rejected.
 - B. Quality Assurance:
 1. Goals & Objectives, including key milestones for the project.
 2. Roles & Responsibilities of Project Personnel, including an Organization Chart and Resumes of individuals.
 3. Description of the Project Management / Document Control Software / Quality Control Software(s) to be utilized on the project.
 4. Define the Projects Definable Features of Work (DFOW).
 - a. Existing commemorative plaques to be extracted and delivered to Owner..
 - b. Contractor is encouraged to define additional DFOV's as they see fit to ensure that the quality requirements of the Project Documents is successfully delivered.
 5. Describe the BIM coordination process to be followed.
 6. Describe the Preconstruction / Bidding process.

7. Describe procedures for ensuring compliance with requirements through review and management of submittal process.
- C. Quality Control:
1. Quality-Control Personnel Qualifications: Engage qualified personnel trained and experienced in managing and executing quality-assurance and quality-control procedures similar in nature and extent to those required for Project.
 2. Continuous Inspection of Workmanship: Describe process for continuous inspection during construction to identify and correct deficiencies in workmanship in addition to testing and inspection specified. Indicate types of corrective actions to be required to bring work into compliance with standards of workmanship established by Contract requirements and approved mockups. Inspections & Testing: In quality-control plan, include a comprehensive schedule of Work requiring testing or inspection, including the following:
 - a. Contractor-performed tests and inspections including subcontractor-performed tests and inspections. Include the following:
 - 1) Tests and inspections required in the Contract Documents.
 - 2) Contractor-elected tests and inspections (i.e. first-in-kind installations, material delivery inspections, weekly jobsite walks, etc.)
 - 3) Mockups
 - b. Special inspections required by authorities having jurisdiction and indicated on the "Statement of Special Inspections."
 - c. Owner-performed tests and inspections indicated in the Contract Documents, including tests and inspections indicated to be performed by the Commissioning Authority.
 3. Describe the process for Correction of Deficiencies.
 4. Submit Documentation Templates to be used by the Contractor during the Project to ensure quality requirements are being met. Include at a minimum, the following:
 - a. Daily Reports Template.
 - b. Inspection & Testing Report Forms.
 - c. Inspection checklist templates.
 - d. Material receiving reports.
 5. Describe the process for the control of Quality Records.
 - a. Maintain testing and inspection reports including log of approved and rejected results. Include work Designer has indicated as nonconforming or defective. Indicate corrective actions taken to bring nonconforming work into compliance with requirements. Comply with requirements of authorities having jurisdiction.
 6. Describe the startup process for equipment, include relevant forms to ensure work is complete prior to attempting startup.
 7. Describe the Contractor's Commissioning plan, including identifying personnel responsible for coordinating with Owner's Commissioning Party.
- D. Closeout & Project Acceptance:

1. Describe the process for completing the following items as part of the Closeout & Project Acceptance Phase. Provide draft checklists as applicable.
 - a. Contractors Completion List
 - b. Designer & Owner Punch List
 - c. Owner's Training
 - d. O&M Manuals
 - e. Attic Stock
 - f. NC State Final Acceptance Checklist
 - g. SCO Final Inspection Checklist
 - h. Warranty Phase

1.8 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required; individual Specification Sections specify additional requirements.
- B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of the system, assembly, or products that are similar to those indicated for this Project in material, design, and extent.
- C. Specialists: Certain sections of the Specifications require that specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
 1. Requirement for specialists shall not supersede building codes and similar regulations governing the Work, nor interfere with local trade-union jurisdictional settlements and similar conventions.
- D. Testing Agency Qualifications: An NRTL, an NVLAP-accredited, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented by ASTM E 329, and with additional qualifications specified in individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
 1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

1.9 QUALITY CONTROL

- A. Owner Responsibilities: Where quality-control services are indicated as Owner's responsibility, Owner will engage a qualified testing agency to perform these services.
 1. Owner will furnish Contractor with names, addresses, and telephone numbers of testing agencies engaged and a description of the types of testing and inspecting they are engaged to perform.

2. Payment for these services will be made from testing and inspecting allowances, as authorized by Change Orders.
 3. Costs for retesting and reinspecting construction that replaces or is necessitated by work that failed to comply with the Contract Documents will be charged to Contractor, and the Contract Sum will be adjusted by Change Order.
- B. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional quality-control activities required to verify that the Work complies with requirements, whether specified or not.
1. Unless otherwise indicated, provide quality-control services specified and those required by authorities having jurisdiction. Perform quality-control services required of Contractor by authorities having jurisdiction, whether specified or not.
 2. Where services are indicated as Contractor's responsibility, engage a qualified testing agency to perform these quality-control services.
 - a. Contractor shall not employ the same entity engaged by Owner, unless agreed to in writing by Owner.
 3. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 4. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 5. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 6. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
 7. Provide quality assurance and control services required due to changes in the Work proposed by or made by the Contractor.
 8. Provide quality control services for Work done contrary to the Contract Documents, without prior notice, when so specified, or without proper supervision.
 9. Overtime expenses and schedule delays accruing as a result of executing quality control services shall be the Contractor's responsibility and shall not be charged to the Owner.
- C. Retesting/Reinspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and reinspecting, for construction that revised or replaced Work that failed to comply with requirements established by the Contract Documents. Designer retains the right to require the use of a different testing agency for retesting and reinspecting.
- D. Testing Agency Responsibilities: Cooperate with Designer, Commissioning Authority and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Designer, Commissioning Authority, and Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.

2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase requirements of the Contract Documents or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
 7. Attend Project progress meetings as requested by Designer.
- E. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field-curing of test samples.
 5. Delivery of samples to testing agencies or arranging for pick-up of test samples after normal business hours.
 6. Preliminary design mix proposed for use for material mixes that require control by testing agency
 7. Security and protection for samples and for testing and inspecting equipment at Project site.
- F. Coordination: Coordinate sequence of activities to accommodate required quality-assurance and quality control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- G. Schedule of Tests and Inspections: Prepare a schedule of tests, inspections, and similar quality-control services required by the Contract Documents as a component of Contractor's quality-control plan. Coordinate and submit schedule concurrently with Contractor's Construction Schedule as specified in Section 01 32 00 "Construction Progress Documentation."
1. Distribution: Distribute schedule to Owner, Designer, Commissioning Authority, testing agencies, and each party involved in performance of portions of the Work where tests and inspections are required.

1.10 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Owner will engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner, as indicated in Statement of Special Inspections, and as follows:
1. Notifying Designer, Commissioning Authority, and Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 2. Submitting a certified written report of each test, inspection, and similar quality-control service to Designer and Commissioning Authority, with copy to Contractor and to authorities having jurisdiction.
 3. Submitting a final report of special tests and inspections prior to Final Acceptance, which includes a list of unresolved deficiencies.
 4. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 5. Retesting and reinspecting corrected work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
1. Date test or inspection was conducted.
 2. Description of the Work tested or inspected.
 3. Date test or inspection results were transmitted to Designer.
 4. Identification of testing agency or special inspector conducting test or inspection.
- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Designer's, Commissioning Authority's, and authorities having jurisdiction reference during normal working hours.
1. Submit log at Project closeout as part of Project Record Documents.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02B
28 October 2024

1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for Section 01 73 00 "Execution."
2. Protect construction exposed by or for quality-control service activities.
3. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

END OF SECTION

SECTION 01 42 00

REFERENCES

PART 1 GENERAL

1.1 DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract, without any implied meaning extending the Architect's responsibility into the Contractor's area of Contractor coordination, supervision, or means and methods of construction as outlined in the Conditions of the Contract.
 - 1. In no situation will an approval by Architect release Contractor from responsibility to fulfill requirements of the Contract Documents.
- C. "Authorities Having Jurisdiction" (AHJ): Means the agencies, either individually or collectively, charged by statute with administration and enforcement of the requirements of building codes and other regulations at the Project location.
- D. "Directed": A command or instruction by Architect. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- E. "General Requirements":
 - 1. Drawings and general provisions of the Contract, including General and Supplementary Conditions (if any) and other Division 01 General Requirement Sections, apply to all sections of the work.
 - 2. The provisions or requirements of Division 01 Sections apply to entire Work of the Contract and where so indicated, to other elements which are included in the Project.
- F. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- G. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.
- H. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

REFERENCES

01 42 00 - 1

- I. "Install": Unload, temporarily store, unpack, assemble, erect, place, anchor, apply, work to dimension, finish, cure, protect, clean, and similar operations at Project site.
- J. "Provide": Furnish and install, complete and ready for the intended use.
- K. "Installer": Means the Contractor or other entity engaged by Contractor as an employee, subcontractor, or sub-subcontractor to perform a particular construction operation at the Project site, including preparation, erection, installation, application, construction, re-installation, and similar operations required for execution of the Work.
 - 1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
 - 2. Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to trades people of the corresponding generic name.
- L. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.

1.2 INDUSTRY STANDARDS

- A. Applicability of Standards: Unless the Contract Documents include more stringent requirements, applicable construction industry standards have the same force and effect as if bound or copied directly into the Contract Documents to the extent referenced. Such standards are made a part of the Contract Documents by reference.
- B. Publication Dates: Comply with standards in effect as of date of the Contract Documents unless otherwise indicated.
- C. Copies of Standards: Each entity engaged in construction on Project should be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.
 - 1. Where copies of standards are needed to perform a required construction activity, obtain copies directly from publication source.

REFERENCES

1.3 ABBREVIATIONS AND ACRONYMS

- A. Industry Organizations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities indicated in Gale's "Encyclopedia of Associations: National Organizations of the U.S." or in Columbia Books' "National Trade & Professional Associations of the United States."
- B. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to Architect for a decision before proceeding.
 - 1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits.
 - 2. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to Architect for a decision before proceeding.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 43 39

MOCKUPS

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for mockups of the following types:
 - 1. None.
- B. Related Requirements: Refer to applicable sections of the Specifications for materials, products and components to be included in mockups.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Mockups: Full-size physical assemblies that are constructed on-site, unless indicated otherwise. Mockups are constructed to verify selections made under Sample submittals; to demonstrate aesthetic effects and, where indicated, qualities of materials and execution; to review coordination, testing, or operation; to show interface between dissimilar materials; and to demonstrate compliance with specified installation tolerances. Mockups are not Samples. Unless otherwise indicated, approved mockups establish the standard by which the Work will be judged.

1.4 ACTION SUBMITTALS

- A. Shop Drawings: For in-situ mockups, submit a markup of the plans to show where the mockup area will be located.
 - 1. Indicate manufacturer and model number of individual components.
 - 2. Provide axonometric drawings for conditions difficult to illustrate in two dimensions.

1.5 QUALITY ASSURANCE

- A. Coordinate with trades affected in completion of required mockups at location designated by Owner.

- B. Complete each item or system of the mockup by the tradesmen who will provide the actual work.
- C. Mockups, General: Before installing portions of the Work requiring mockups, build mockups for each form of construction and finish shown in the Drawings and specified in individual Sections, to comply with the following requirements, using materials indicated for the completed Work:
 - 1. Build mockups in location and of size indicated or, if not indicated, as directed by Designer.
 - 2. Notify Designer seven (7) calendar days in advance of dates and times when mockups will be constructed.
 - 3. Employ supervisory personnel who will oversee mockup construction. Employ workers that will be employed during the construction of the Work.
 - 4. Demonstrate the proposed range of aesthetic effects and workmanship.
 - 5. Obtain Designer's and NC State University Architect's Office approval of mockups before starting work, fabrication, or construction.
 - a. Allow seven days for initial review and each re-review of each mockup.
 - 6. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - 7. Demolish and remove mockups when directed, unless otherwise indicated.
- D. Use the same installation methods and materials as required for the Work. Schedule construction so that it may be reviewed, and any necessary adjustments made, prior to commencing fabrication of the Work. When accepted, mock-up shall serve as the standard for materials, workmanship, and appearance throughout the Project.
- E. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review requirements for construction of mockups, and for protecting and maintaining mockups.
 - 2. Review procedures for reviewing, changing, and approval of mockups.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 45 33

CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for special inspections required by the International Building Code.
- B. Testing and inspecting services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with the Contract Document requirements.
 - 1. Specified tests, inspections, and related actions do not limit Contractor's other quality-assurance and -control procedures that facilitate compliance with the Contract Document requirements.
 - 2. Requirements for Contractor to provide quality-assurance and -control services required by Architect, Owner or authorities having jurisdiction are not limited by provisions of this Section.

1.2 DEFINITIONS

- A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to substantiate that the construction is in compliance with the code prescribed special inspections, procedures and requirements.
- B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to substantiate that actual products incorporated into the Work and completed construction comply with the code requirements. Services do not include contract enforcement activities performed by Architect or Construction Manager.
- C. Product Testing: Tests and inspections that are performed by an NRTL, an NVLAP, or a testing agency qualified to conduct product testing and acceptable to authorities having jurisdiction, to establish product performance and compliance with specified requirements.
- D. Field Special Inspections: Tests and inspections that are performed on-site to demonstrate required documentation for code compliance of Chapter 17 of the IBC International Building Code, with amendments. Edition/ release that is consistent with the requirements of the project.
- E. Testing Agency: An entity engaged to perform special inspections, tests, inspections. Testing laboratory shall mean the same as testing agency.

- F. Installer/Applicator/Erector: Contractor or another entity engaged by Contractor as an employee, Subcontractor, or Sub-subcontractor, to perform a particular construction operation, including installation, erection, application, and similar operations.
 - 1. Use of trade-specific terminology in referring to a trade or entity does not require that certain construction activities be performed by accredited or unionized individuals, or that requirements specified apply exclusively to specific trade(s).

1.3 CONFLICTING REQUIREMENTS

- A. Referenced Standards: If compliance with two or more inspections is specified and the inspections establish different or conflicting requirements demonstrate compliance with the most stringent requirement. Refer conflicting requirements that are different, but apparently equal, to Architect for a decision before proceeding.

1.4 INFORMATIONAL SUBMITTALS

- A. Special Inspector Qualifications: Prior to the start of construction, the approved agencies shall provide written documentation to the building official demonstrating the competence and relevant experience or training of the special inspectors who will perform the special inspection and tests during construction. Experience or training shall be considered relevant where the documented experience or training is related in complexity to the same type of special inspection or testing activities for projects of similar complexity and material quantities. These qualifications are in addition to qualifications specified in other sections of the code.
- B. The approved agency and their personnel shall act as the required special inspectors for the work required by ICC (IBC) Chapter 17.
- C. Testing Agency Qualifications: For testing agencies specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include proof of qualifications in the form of a recent report on the inspection of the testing agency by a recognized authority.

1.5 REPORTS AND DOCUMENTS

- A. Inspection and Test Reports: Prepare and submit certified written reports as required by the code to achieve compliance the required special inspection requirements.
 - 1. Date of issue.
 - 2. Project title and number.
 - 3. Name, address, and telephone number of testing agency.
 - 4. Dates and locations of samples and tests or inspections.
 - 5. Names of individuals making tests and inspections.
 - 6. Description of the Work and test and inspection method.

7. Complete test or inspection data.
 8. Test and inspection results and an interpretation of test results.
 9. Comments or professional opinion attesting that the tested or inspected Work complies with the Code requirements.
 10. Name and signature of laboratory inspector.
 11. Recommendations on retesting and re-inspecting.
- B. At completion of construction, the Testing Agency shall provide a final report sealed by its Professional Engineer in responsible charge, along with standard AHJ form(s) as required by the building official.

1.6 QUALITY ASSURANCE

- A. General: Qualifications paragraphs in this article establish the minimum qualification levels required.
- B. Installer Qualifications: A firm or individual experienced in installing, erecting, or assembling work similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful in-service performance.
- C. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in jurisdiction where Project is located, serving as the special inspections engineer of record in responsible charge of the project. The engineer shall be experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for inspections of the installations of systems, assemblies, or product that are similar in material, design, and extent to those indicated for this Project.
- D. Specialists: Specific construction activities shall be performed by entities who are recognized experts in those operations. Specialists shall satisfy qualification requirements indicated and shall be engaged for the activities indicated.
1. Requirements of authorities having jurisdiction shall supersede requirements for specialists.
- E. Testing Agency Qualifications: An NRTL, an NVLAP, or an independent agency with the experience and capability to conduct testing and inspecting indicated, as documented according to the code requirements; and with additional qualifications specified in any related individual Sections; and, where required by authorities having jurisdiction, that is acceptable to authorities.
1. NRTL: A nationally recognized testing laboratory according to 29 CFR 1910.7.
 2. NVLAP: A testing agency accredited according to NIST's National Voluntary Laboratory Accreditation Program.

1.7 QUALITY CONTROL

- A. Contractor Responsibilities: Tests and inspections not explicitly assigned to Owner are Contractor's responsibility. Perform additional special inspections and code required quality-control activities required to verify that the Work complies with the Code requirements, whether specified or not.
1. Engage a qualified testing agency to perform these quality-control services.
 2. Notify testing agencies at least 24 hours in advance of time when Work that requires testing or inspecting will be performed.
 3. Where quality-control services are indicated as Contractor's responsibility, submit a certified written report, in duplicate, of each quality-control service.
 4. Testing and inspecting requested by Contractor and not required by the Contract Documents are Contractor's responsibility.
 5. Submit additional copies of each written report directly to authorities having jurisdiction, when they so direct.
- B. Retesting/Re-inspecting: Regardless of whether original tests or inspections were Contractor's responsibility, provide quality-control services, including retesting and re-inspecting, for construction that replaced Work that failed to comply with the Contract Documents.
- C. Testing Agency Responsibilities: Cooperate with Architect, Construction Manager, and Contractor in performance of duties. Provide qualified personnel to perform required tests and inspections.
1. Notify Contractor promptly of irregularities or deficiencies observed in the Work during performance of its services.
 2. Determine the location from which test samples will be taken and in which in-situ tests are conducted.
 3. Conduct and interpret tests and inspections and state in each report whether tested and inspected work complies with or deviates from requirements.
 4. Submit a certified written report, in duplicate, of each test, inspection, and similar quality-control service through Contractor.
 5. Do not release, revoke, alter, or increase the Contract Document requirements or approve or accept any portion of the Work.
 6. Do not perform any duties of Contractor.
- D. Associated Services: Cooperate with agencies performing required tests, inspections, and similar quality-control services, and provide reasonable auxiliary services as requested. Notify agency sufficiently in advance of operations to permit assignment of personnel. Provide the following:
1. Access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Adequate quantities of representative samples of materials that require testing and inspecting. Assist agency in obtaining samples.
 4. Facilities for storage and field curing of test samples.

- E. Coordination: Coordinate sequence of activities to accommodate required special inspection services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.

1.8 SPECIAL TESTS AND INSPECTIONS

- A. Special Tests and Inspections: Engage a qualified testing agency or special inspector to conduct special tests and inspections required by authorities having jurisdiction as the responsibility of Owner or Design Professional, as indicated in Statement of Special Inspections attached to this Section, and as follows:
- B. Special Tests and Inspections: Conducted by a qualified special inspector as required by authorities having jurisdiction, as indicated in individual Specification Sections and in Statement of Special Inspections attached to this Section, and as follows:
 - 1. Verifying that manufacturer maintains detailed fabrication and quality-control procedures and reviews the completeness and adequacy of those procedures to perform the Work.
 - 2. Notifying Contractor promptly of irregularities and deficiencies observed in the Work during performance of its services.
 - 3. Submitting a certified written report of each test, inspection, and similar quality-control service to authorities having jurisdiction, with a copy to the Contractor, Owner and Architect.
 - 4. Submitting a final report of special tests and inspections at Substantial Completion, which includes a list of unresolved deficiencies.
 - 5. Interpreting tests and inspections and stating in each report whether tested and inspected work complies with or deviates from the Contract Documents.
 - 6. Retesting and re-inspecting corrected work.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 TEST AND INSPECTION LOG

- A. Test and Inspection Log: Prepare a record of tests and inspections. Include the following:
 - 1. Date test or inspection was conducted.
 - 2. Description of the Work tested or inspected.
 - 3. Date test or inspection results were transmitted to Architect.
 - 4. Identification of testing agency or special inspector conducting test or inspection.

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- B. Maintain log at Project site. Post changes and revisions as they occur. Provide access to test and inspection log for Architect's, Commissioning Authority's, and Construction Manager's reference during normal working hours.

3.2 REPAIR AND PROTECTION

- A. General: On completion of testing, inspecting, sample taking, and similar services, repair damaged construction and restore substrates and finishes.
 - 1. Provide materials and comply with installation requirements specified in other Specification Sections or matching existing substrates and finishes. Restore patched areas and extend restoration into adjoining areas with durable seams that are as invisible as possible. Comply with the Contract Document requirements for cutting and patching in Section 01 73 00 "Execution"
- B. Protect construction exposed by or for quality-control service activities.
- C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for quality-control services.

Appendix: Statement of Special Inspections.

END OF SECTION

Schedule of Special Inspection Services

The following sheets comprise the required schedule of special inspections for this project. The construction divisions which require special inspections for this project are as follows.

- | | |
|--|--|
| <input checked="" type="checkbox"/> Structural Steel | <input checked="" type="checkbox"/> Sprayed Fire Resistant Material |
| <input type="checkbox"/> Cold-Formed Steel Framing | <input type="checkbox"/> Intumescent Fire-Resistant Coatings |
| <input checked="" type="checkbox"/> Concrete Construction | <input type="checkbox"/> Exterior Insulation & Finish System |
| <input checked="" type="checkbox"/> Masonry – Level 1 ^a | <input type="checkbox"/> Smoke Control |
| <input type="checkbox"/> Wood Construction | <input checked="" type="checkbox"/> Retaining Walls Exceeding 5 Feet |
| <input checked="" type="checkbox"/> Soils | <input type="checkbox"/> Wind-Resisting Components (1705.4) ^b |
| <input type="checkbox"/> Driven Deep Foundations | <input type="checkbox"/> Wind Requirements (1706) ^c |
| <input type="checkbox"/> Cast-in-Place Deep Foundations | <input type="checkbox"/> Seismic Resistance ^d |
| <input type="checkbox"/> Helical Pile Foundations | |

a. Occupancy Category IV structures, as defined by 1604.5 of the North Carolina Building Code, may require Level 2 inspection of masonry construction. The SER shall review Code sections 1704.5.1 and 1704.5.3 and adjust the Schedule of Special Inspection Services as needed.

b. Special inspections for Wind Resistance are applicable to those areas defined by 1705.4 of the North Carolina Building Code. Wind Resistance Special Inspections are only effective if the 1704.1.2 base triggers apply.

c. Special Inspections for Wind Requirements are applicable to those areas defined by 1706.1 of the North Carolina Building Code. Wind Requirements are effective even if the 1704.1.2 base triggers do not apply.

d. Special Inspections for Seismic Resistance are applicable to those structures defined by 1707.1 of the North Carolina Building Code. Seismic Requirements are only effective if the 1704.1.2 base triggers apply.

Inspection Agents	Qualifications	Address
1. Special Inspector	SI	
2. Structural Engineer of Record	SER	
3. Testing Laboratory	ITL	
4. Other		

Note: The inspection and testing agent shall be engaged by the Owner’s Agent, and not by the Contractor or Subcontractor whose work is to be inspected or tested. Any conflict of interest must be disclosed to the State Construction Office, prior to commencing work.

Seismic Design Category: A B C D

Basic Wind Speed: 90-109mph 110-119mph ≥120mph

Wind Exposure Category: B C D

Schedule of Special Inspection Services

Structural Steel

Item	Qualifications	Scope
1. Fabricator Certification/Quality Control Procedures	SI SER / SI	<ul style="list-style-type: none"> • Ensure fabricator meets the requirements of NCSBC 1704.2.2 • Collect certificate of compliance from fabricator at completion of fabrication
2. Welding	SI	<ul style="list-style-type: none"> • Continuous inspection of complete and partial joint penetration welds, multipass fillet welds, plug and slot welds, and single-pass fillet welds > 5/16" in accordance with NCSBC Table 1704.3 • Periodic inspection of single-pass fillet welds ≤ 5/16" • Collect certificate of compliance for weld filler material • Identify use of approved filler material and in accordance with AWS D1.1
3. Metal Deck	SI SER / SI	<ul style="list-style-type: none"> • Collect material data sheets for decking and connectors or fasteners • Periodic inspection of welds and / or mechanical fasteners
4. Structural Details	SER / SI	<ul style="list-style-type: none"> • Periodic inspection of steel framing and joint details
5. Bolting	SI SI SER / SI	<ul style="list-style-type: none"> • Collect material data sheets for bolts, nuts, and washers • Collect certificate of compliance from bolt supplier • Periodic inspection of snug-tight, pretensioned, and slip critical joints in accordance with NCSBC Table 1704.3 • Continuous inspection of pretensioned and slip-critical joints using turn-of-nut without matchmarking or calibrated wrench methods of installation
6. Material Certification	SI	<ul style="list-style-type: none"> • Collect certified mill test reports

Schedule of Special Inspection Services
Concrete Construction

Item	Qualifications	Scope
1. Mix Design/Material Certifications	SER / SI	<ul style="list-style-type: none"> • Collect mix designs and verify appropriate mix use during specific installation
2. Reinforcement Installation	SER / SI SI SI	<ul style="list-style-type: none"> • Periodic inspection of reinforcing steel, including prestressing tendons and welded wire fabric • Collection of certified mill test reports • Continuous inspection of reinforcing steel welding in accordance with Table 1704.3, Item 5b
3. Concrete Placement/Monitoring Fresh Concrete, Sampling & prep of test samples	SI SI / ITL SER / SI SI / ITL SI SI	<ul style="list-style-type: none"> • Continuous inspection of cast-in-place concrete placement • Continuous monitoring of sampling of fresh concrete, slump test, air content test, temperature of concrete and creation of strength test specimens • Periodic inspection of formwork • Periodic verification of concrete strength prior to removal of shores and forms from beams and structural slabs • Continuous inspection of bolts to be installed in concrete prior to and during placement • Periodic inspection of anchors installed in hardened concrete
4. Curing & Protection	SI	<ul style="list-style-type: none"> • Periodic inspections of curing techniques
5. Structural Precast Concrete Members	SER / SI	<ul style="list-style-type: none"> • Periodic inspection of attachment of precast members
6. Post-Tensioned Concrete Members	SI / ITL SI SI	<ul style="list-style-type: none"> • Periodic verification of posttensioned concrete strength (f'_{ci}) prior to force transfer • Continuous inspection of force application to prestressing tendons • Continuous inspection of grouting procedures at bonded prestressing tendons included in the lateral force resisting system

Schedule of Special Inspection Services

Masonry

Item	Qualifications	Scope
1. Material Certification	SI SI SI	<ul style="list-style-type: none"> Collect mix design for mortar Collect mix design for grout Certificates of Compliance for masonry constituents
2. Mixing of Mortar & Grout	SI SI	<ul style="list-style-type: none"> Periodic inspection of site prepared mortar, site-prepared grout, and grout for bonded tendons Continuous verification of slump flow and VSI as self-consolidating grout is delivered to the site
3. Installation of Masonry	SI SER / SI	<ul style="list-style-type: none"> Periodic inspection of construction of mortar joints, prior to beginning masonry construction and during construction Periodically verify the type, size, and location of anchors and their attachment to the structure Periodically verify size and location of structural elements
4. Reinforcement Installation	SER / SI SI SER / SI SER / SI SI	<ul style="list-style-type: none"> Verify location of reinforcement and connections to structure as construction begins Continuous inspection of reinforcing steel welding in accordance with Table 1704.3, Item 5b Prior to grouting periodically verify size, grade, and placement of reinforcement and connection of masonry to structural frame Periodically verify prestressing technique During construction, continuously monitor the application and measurement of prestressing force
5. Grouting Operations	SI SI SI	<ul style="list-style-type: none"> Prior to grouting, periodically verify conforming cleanliness of grout space and placement of the reinforcement and connectors Continuous observation of the placement of all grout Continuously observe the grouting of prestressing bonded tendons
6. Weather Protection	SI	<ul style="list-style-type: none"> Periodically verify protection techniques for construction of masonry below 40°F and above 90°F
7. Observation of the Evaluation of Masonry Strength	SI / ITL	<ul style="list-style-type: none"> Periodic observation of the preparation of grout specimens, mortar specimens and or prisms.

Schedule of Special Inspection Services
Soils

Item	Qualifications	Scope
1.Site Preparation	SI	<ul style="list-style-type: none"> • Determine that the subgrade has been prepared in accordance with the approved soils report and the construction document
2. Fill Placement	SI	<ul style="list-style-type: none"> • Periodic classification and testing of compacted fill materials • Continuous observation of materials used, densities, and lift thickness ensuring compliance with the approved soils report and the construction documents
3. Evaluation	SI / ITL	<ul style="list-style-type: none"> • Determine that the materials below shallow foundations are adequate to achieve the design bearing capacity

Schedule of Special Inspection Services
Sprayed On Fire Resistant Materials

Item	Qualification	Scope
1. Preparation	SI / ITL	<ul style="list-style-type: none"> • Periodically inspect preparation of substrate prior to installation in accordance with approved fire resistance design and approved manufacturer's written instructions
2. Application	SI / ITL	<ul style="list-style-type: none"> • Periodically inspect that substrate has minimum ambient temperature before and after application as specified by the fire resistance design and approved manufacturer's written instructions • Test thickness of sprayed on material per the instruction of Section 1704.12.4, the fire resistance design, and the approved manufacturer's written instructions • Periodically test Density of sprayed on material per fire resistance design and approved manufacturer's written instructions • Periodically test bond Strength to ensure a value greater than 150 pounds per square foot.

Schedule of Special Inspection Services
Retaining Walls Exceeding 5 Feet

Item	Qualification	Scope
1.Retaining Systems	SI / ITL / SER	<ul style="list-style-type: none">• All retaining walls exceeding 5 feet in height require special inspections. Refer to the applicable material schedules for explicit requirements
1. Application	SI / ITL	<ul style="list-style-type: none">• Periodic examination of backfill materials for compliance with the approved specifications• Confirm that all subsoil drainage piping is undamaged, drains freely to the designated outlet or structure, and has been installed per the approved engineered design

SECTION 01 50 00
TEMPORARY FACILITES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for support facilities, and security and protection facilities.
 - 1. Provide and maintain all temporary facilities and controls necessary for the performance of the Work. Locate and install all facilities and controls where acceptable to the local authorities having jurisdiction and utility owner and remove same and terminate, in a manner suitable to the utility owner, at completion of the Work or when otherwise directed. Pay all costs associated with the provision and maintenance of temporary facilities and controls including power, water, and fuel (if any) consumed until Final Acceptance.
 - 2. Notwithstanding these specifications for Temporary Facilities and Controls, the incorporation of all temporary facilities and controls into the Project shall be subject to the Owner's approval.
- B. Related Sections include the following:
 - 1. Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 2. Section 01 51 00 "Temporary Utilities" for requirements associated with temporary utilities: HVAC Equipment, Air-Filtration Units, Electrical Outlets, and Power Distribution System Circuits.
 - 3. Section 01 57 00 "Temporary Controls" for Pest Control requirements.
 - 4. Section 01 73 00 "Execution" for progress cleaning requirements.
 - 5. Section 01 74 19 "Construction Waste Management and Disposal" for waste management requirements.
 - 6. Section 01 77 00 "Closeout Procedures" for closeout requirements.
 - 7. Section 31 31 16 "Termite Control" for termite control.
 - 8. Divisions 02 through 49 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. Permanent Enclosure: As determined by Designer, includes as a minimum, the following:
1. Permanent or temporary roofing is complete, insulated, and weathertight, including parapets and roof edge terminations.
 - a. Roof insulation is fully protected from getting wet.
 - b. Roof drains are fully functional.
 2. Exterior walls are insulated, weathertight, and UV-resistant.
 3. All openings are closed with permanent construction or substantial weathertight temporary closures.
 4. Permanent enclosure envelope shall be capable of retaining controlled interior temperature and humidity levels.

1.4 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities are not chargeable to Owner or Designer and shall be included in the Contract Sum, unless otherwise indicated. Allow other entities to use temporary services and facilities without cost, including, but not limited to, the following:
1. Owner's personnel.
 2. Owner's construction forces.
 3. Designers.
 4. Commissioning Authority.
 5. Testing agencies.
 6. Personnel of authorities having jurisdiction.

1.5 INFORMATIONAL SUBMITTALS

- A. Site Logistics Plan: Using the Site Plan from the Drawings as a base, prepare and maintain a detailed logistics plan showing, at a minimum: temporary facilities, fencing, signage, utility hookups, staging areas, and parking areas for construction personnel. Additional sheets, including markup on interior sheets, or sheets wholly prepared by the Contractor, may be required to reasonably convey the current logistics plan for the project.
1. Submit initial Site Logistics Plan not less than five (5) working days prior to preconstruction conference.
 2. Update Site Logistics Plan as site conditions evolve during progress of the work, but not less than monthly.
 3. Implementation and Termination Schedule: Within 15 days of date established from commencement of the Work, submit schedule indicating implementation and termination dates of each temporary utility.
- B. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

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1. Submit Fire Safety Program not less than five (5) working days prior to preconstruction conference.

1.6 QUALITY ASSURANCE

- A. Accessible Temporary Egress: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines, and ICC/ANSI A117.1.

1.7 PROJECT CONDITIONS

- A. Conditions of Use: The following conditions apply to use of temporary facilities by all parties engaged in the Work:
 1. Keep temporary facilities clean and neat.
 2. Relocate temporary facilities as required by progress of the Work.
- B. Temporary Use of Permanent Facilities: Engage Installer of each permanent service to assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials suitable for use intended.
- B. Pavement: Comply with paving Sections.
- C. Lumber and Plywood: Comply with requirements in Section 06 10 53 "Miscellaneous Rough Carpentry."
- D. Gypsum Board: Minimum 1/2 inch (12.7 mm) thick by 48 inches (1219.2 mm) wide by maximum available lengths; regular-type panels with tapered edges. Comply with ASTM C 36.
- E. Insulation: Unfaced mineral-fiber blanket, manufactured from glass, slag wool, or rock wool; with maximum flame-spread and smoke-developed indices of 25 and 50, respectively.
- F. Polyethylene Sheet: Reinforced, fire-resistive sheet, 10 mil (0.254 mm) minimum thickness, with flame-spread rating of 15 or less per ASTM E 84 and passing NFPA 701 Test Method 2.
- G. Tarpaulins: Fire-resistive labeled with flame-spread rating of 15 or less.
- H. Dust-Control Adhesive-Surface Walk-off Mats: Provide mats minimum 36 by 60 inches (1524 mm).
- I. Water: Potable.

TEMPORARY FACILITIES

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2.2 TEMPORARY FACILITIES

- A. Field Offices: Contractor to use existing space(s) as temporary field offices in Owner approved facility. Refer to Drawings for location.
- B. Storage and Fabrication Spaces: Contractor to use existing space(s) as temporary storage at Owner approved facility. This includes space for staging, laydown area and temporary self-contained toilet units. Refer to Drawings for locations.
 - 1. Store combustible materials apart from building.

2.3 EQUIPMENT

- A. Fire Extinguishers: Hand carried, portable, UL rated; with class and extinguishing agent as required by locations and classes of fire exposures.
 - 1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.
- B. Self-Contained Toilet Units: Single-occupant units of chemical, aerated recirculation or combustion type; vented; fully enclosed with a glass-fiber-reinforced polyester shell or similar nonabsorbent material.
- C. Drinking-Water Fixtures: Containerized, tap-dispenser, bottled-water drinking-water units, including paper cup supply.
- D. Where power is accessible, provide electric water coolers to maintain dispensed water temperature at 45 to 55 degrees Fahrenheit (12.78 degrees Celsius).

PART 3 - EXECUTION

3.1 TEMPORARY FACILITIES, GENERAL

- A. Conservation: Coordinate construction and use of temporary facilities with consideration given to conservation of energy, water, and materials. Coordinate use of temporary utilities to minimize waste.
 - 1. Salvage materials and equipment involved in performance of, but not actually incorporated into, the Work. See other Sections for disposition of salvaged materials that are designated as Owner's property.

3.2 INSTALLATION, GENERAL

- A. Locate facilities where they will serve Project adequately and result in minimum interference with performance of the Work. Relocate and modify facilities as required by progress of the Work.
 - 1. Locate facilities to limit site disturbance as specified in Section 01 14 00 "Work Restrictions."

- B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed or are replaced by authorized use of completed permanent facilities.

3.3 SUPPORT FACILITIES INSTALLATION

- A. General: Comply with the following:
 - 1. Provide construction for temporary offices, shops, and sheds located within construction area or within 30 feet (914.4 cm) of building lines that is noncombustible according to ASTM E 136. Comply with NFPA 241.
 - 2. Maintain support facilities until Designer schedules Final Inspection. Remove before Final Acceptance. Personnel remaining after Substantial Completion will be permitted to use permanent facilities, under conditions acceptable to Owner.
- B. Electronic Communication Service: Provide temporary electronic communication service in common-use facilities.
 - 1. Provide broadband in primary field office.
 - 2. Provide for connection of communication devices by Owner, Architect, and Contractor by Wi-Fi, or wired connections.
- C. Waste Disposal Facilities: Comply with requirements specified in Section 01 74 19 "Construction Waste Management and Disposal."
- D. Lifts and Hoists: Provide facilities for hoisting materials and personnel. Truck cranes and similar devices used for hoisting materials are considered "tools and equipment" and not temporary facilities.
- E. Existing Elevator Use: Use of Owner's existing elevators will be permitted, provided elevators are cleaned and maintained in a condition acceptable to Owner. At Final Acceptance, restore elevators to condition existing before initial use, including replacing worn cables, guide shoes, and similar items of limited life.
 - 1. Do not load elevators beyond their rated weight capacity.
 - 2. Provide protective coverings, barriers, devices, signs, or other procedures to protect elevator car and entrance doors and frame. If, despite such protection, elevators become damaged, engage elevator Installer to restore damaged work so no evidence remains of correction work. Return items that cannot be refinished in field to the shop, make required repairs and refinish entire unit, or provide new units as required.
- F. Existing Stair Usage: Use of Owner's existing stairs will be permitted, provided stairs are cleaned and maintained in a condition acceptable to Owner. At Substantial Completion, restore stairs to condition existing before initial use.
 - 1. Provide protective coverings, barriers, devices, signs, or other procedures to protect stairs and to maintain means of egress. If stairs become damaged, restore damaged areas so no evidence remains of correction work.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Protection of Existing Facilities: Protect existing equipment, structures, utilities, and other improvements at Project site and on adjacent properties, except those indicated to be removed or altered. Repair damage to existing facilities.
 - 1. Where access to adjacent properties is required in order to affect protection of existing facilities, obtain written permission from adjacent property owner to access property for that purpose.
- B. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations and that minimize possible air, waterway, and subsoil contamination or pollution or other undesirable effects
 - 1. Comply with work restrictions specified in Section 01 14 00 "Work Restrictions."
- C. Barricades, Warning Signs, and Lights: Comply with authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting. Paint with appropriate colors and graphics to inform personnel and public of possible hazard.
- D. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.
- E. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities. Provide temporary weathertight enclosure for building exterior.
 - 1. Where heating or cooling is needed and permanent enclosure is not complete, provide insulated temporary enclosures. Coordinate enclosure with ventilating and material drying or curing requirements to avoid dangerous conditions and effects.
 - 2. Vertical Openings: Close openings of 25 sq. ft. or less with plywood or similar materials.
 - 3. Horizontal Openings: Close openings in floor or roof decks and horizontal surfaces with load-bearing construction.
 - 4. Install tarpaulins securely using fire-retardant-treated wood framing and other materials.
 - 5. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use fire-retardant-treated material for framing and main sheathing.
- F. Temporary Partitions: Provide and maintain floor-to-ceiling dustproof partitions to limit dust and dirt migration and to separate areas occupied by Owner and tenants from fumes and noise.
 - 1. Construct dustproof partitions with gypsum wallboard with joints taped on occupied side, and fire-retardant plywood on construction operations side.

2. Construct dustproof partitions with two layers of 6-mil (0.14-mm) polyethylene sheet on each side. Cover floor with two layers of 6-mil (0.14-mm) polyethylene sheet, extending sheets 18 inches (457.2 mm) up the sidewalls. Overlap and tape full length of joints. Cover floor with fire-retardant-treated plywood.
 - a. Construct vestibule and airlock at each entrance through temporary partition with not less than 48 inches (1219.2 mm) between doors. Maintain water-dampened foot mats in vestibule
 3. Where fire-resistance-rated temporary partitions are indicated or are required by authorities having jurisdiction, construct partitions according to the rated assemblies.
 4. Insulate partitions to control noise transmission to occupied areas.
 5. Seal joints and perimeter. Equip partitions with gasketed dustproof doors and security locks where openings are required.
 6. Protect air-handling equipment.
 7. Provide walk-off mats at each entrance through temporary partition.
- G. Temporary Fire Protection: Until fire-protection needs are supplied by permanent facilities, install and maintain temporary fire-protection facilities of types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 241; manage fire-prevention program.
1. Prohibit smoking in construction area.
 2. Provide fire extinguishers, installed on walls on mounting brackets, visible and accessible from space being served, with sign mounted above.
 - a. Field Offices: Class A stored-pressure water-type extinguishers.
 - b. Other Locations: Class ABC dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for exposures.
 - c. Locate fire extinguishers where convenient and effective for their intended purpose; provide not less than one extinguisher on each floor at or near each usable stairwell.
 3. Store combustible materials in containers in fire-safe locations.
 4. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for firefighting.
 5. Supervise welding operations, combustion-type temporary heating units, and similar sources of fire ignition.
 6. Permanent Fire Protection: At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility, including connected services, and place into operation and use. Instruct key personnel on use of facilities. Protect fire protection system from damage due to construction activities and environmental conditions.
 7. Develop and supervise an overall fire-prevention and first-aid fire-protection program for personnel at Project site. Review needs with local fire department and establish procedures to be followed. Instruct personnel in methods and procedures. Post warnings and information.

- 8. Provide temporary standpipes and hoses for fire protection. Hang hoses with a warning sign stating that hoses are for fire-protection purposes only and are not to be removed. Match hose size with outlet size and equip with suitable nozzles.
 - H. Pest Control: Engage pest-control service to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests and to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Final Acceptance. Perform control operations lawfully, using environmentally safe materials.
 - I. Termite Control: By Owner. Contractor to provide ten (10) working days notice prior to the treatment being required.
- 3.5 OPERATION, TERMINATION, AND REMOVAL
- A. Supervision: Enforce strict discipline in use of temporary facilities. To minimize waste and abuse, limit availability of temporary facilities to essential and intended uses.
 - B. Maintenance: Maintain facilities in good operating condition until removal. Protect from damage caused by freezing temperatures and similar elements.
 - 1. Maintain operation of temporary enclosures, heating, cooling, humidity control, ventilation, and similar facilities on a 24-hour basis where required to achieve indicated results and to avoid possibility of damage.
 - 2. Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.
 - C. Temporary Facility Changeover: Except for using permanent fire protection as soon as available, do not change over from using temporary security and protection facilities to permanent facilities until Final Acceptance.
 - D. Termination and Removal: Remove each temporary facility when need for its service has ended, when it has been replaced by authorized use of a permanent facility, or prior to Final Acceptance. Complete or, if necessary, restore permanent construction that may have been delayed because of interference with temporary facility. Repair damaged Work, clean exposed surfaces, and replace construction that cannot be satisfactorily repaired.
 - 1. Materials and facilities that constitute temporary facilities are the property of Contractor. Owner reserves right to take possession of Project identification and directional signs.
 - 2. Remove temporary paving not intended for or acceptable for integration into permanent paving. Where area is intended for landscape development, remove soil and aggregate fill that do not comply with requirements for fill or subsoil. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks at temporary entrances, as required by authorities having jurisdiction.

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3. Prior to Final Acceptance, repair, clean and renovate permanent facilities used during construction period. Comply with final cleaning requirements in Section 01 77 00 "Closeout Procedures."

END OF SECTION

SECTION 01 51 00
TEMPORARY UTILITIES

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary utilities.
 - 1. Provide and maintain all temporary utilities necessary for the performance of the Work. Locate and install all utilities where acceptable to the local authorities having jurisdiction and utility owner and remove same and terminate, in a manner suitable to the utility owner, at completion of the Work or when otherwise directed. Pay all costs associated with the provision and maintenance of temporary facilities and controls including power, water, and fuel (if any) consumed until Final Acceptance.
 - 2. Notwithstanding these specifications for Temporary Utilities, the incorporation of all temporary utilities into the Project shall be subject to the Owner's approval.
- B. Related Sections include the following:
 - 1. Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 2. Section 01 50 00 "Temporary Facilities" for requirements associated with temporary facilities.
 - 3. Section 01 73 00 "Execution" for progress cleaning requirements.
 - 4. Section 01 74 19 "Construction Waste Management and Disposal" for waste management requirements.
 - 5. Section 01 77 00 "Closeout Procedures" for closeout requirements.
 - 6. Section 31 31 16 "Termite Control" for pest control.
 - 7. Divisions 02 through 49 for temporary heat, ventilation, and humidity requirements for products in those Sections.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 USE CHARGES

- A. General: Installation and removal of and use charges for temporary facilities are not chargeable to Owner or Designer and shall be included in the Contract Sum, unless otherwise indicated. Allow other entities to use temporary services without cost, including, but not limited to, the following:
 - 1. Owner's personnel.
 - 2. Owner's construction forces.
 - 3. Designers.
 - 4. Commissioning Authority.
 - 5. Testing agencies.
 - 6. Personnel of authorities having jurisdiction.
- B. Sewer Service: No sewer service use charge by Contractor, paid for by Owner. Contractor responsible for hookup and disconnect.
- C. Water Service: No water service use charge by Contractor, paid for by Owner. Contractor responsible for hookup and disconnect.
- D. Electric Power Service: No electric power service use charge by Contractor, paid for by Owner. Contractor responsible for hookup and disconnect.
- E. Internet Service: Owner does not allow Contractor to connect to university internet service. Contractor is responsible for providing internet service in all temporary facilities.

1.4 QUALITY ASSURANCE

- A. Standards: Comply with ANSI A10.6, NECA's "Temporary Electrical Facilities," and NFPA 241.
 - 1. Electric Service: Comply with NECA, NEMA, and UL standards and regulations for temporary electric service. Install service to comply with NFPA 70.
- B. Tests and Inspections: Arrange for authorities having jurisdiction to test and inspect each temporary utility before use. Obtain required certifications and permits.

1.5 PROJECT CONDITIONS

- A. Temporary Utilities: At earliest feasible time, when acceptable to Owner, change over from use of temporary service to use of permanent service.
 - 1. Temporary Use of Permanent Utilities: Installer of each permanent service shall assume responsibility for operation, maintenance, and protection of each permanent service during its use as a construction facility before Owner's acceptance, regardless of previously assigned responsibilities.
- B. Conditions of Use: The following conditions apply to use of temporary services by all parties engaged in the Work:

1. Keep temporary services clean and neat.
2. Relocate temporary services as required by progress of the Work.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials suitable for use intended.

2.2 EQUIPMENT

- A. Electrical Outlets: Properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-V plugs into higher-voltage outlets; equipped with ground-fault circuit interrupters, reset button, and pilot light.
- B. Power Distribution System Circuits: Where permitted and overhead and exposed for surveillance, wiring circuits, not exceeding 125-V ac, 20-A rating, and lighting circuits may be nonmetallic sheathed cable.
- C. Temporary HVAC Equipment: Unless Owner authorizes use of permanent HVAC system, provide vented, self-contained, liquid-propane-gas or fuel-oil heaters with individual space thermostatic control.
 1. Use of gasoline-burning space heaters, open-flame heaters, or salamander-type heating units is prohibited.
 2. Heating Units: Listed and labeled for type of fuel being consumed, by a qualified testing agency acceptable to authorities having jurisdiction, and marked for intended location and application.
- D. Permanent HVAC System: If Owner authorizes use of permanent HVAC system for temporary use during construction after dust generating activities in areas serviced by the system are complete, provide filter with MERV of 8 at each return air grille in system and remove at end of construction and clean HVAC system as required in Section 01 77 00 "Closeout Procedures."
 1. Warranty period for the HVAC system begins at Final Acceptance, not the date in which the unit was started up.
 2. Contractor is responsible for a full duct cleaning and filter changes prior to Final Acceptance.
- E. Air-Filtration Units: Primary and secondary HEPA-filter-equipped portable units with four-stage filtration. Provide single switch for emergency shutoff. Configure to run continuously.

PART 3 - EXECUTION

3.1 TEMPORARY UTILITY INSTALLATION

- A. General: Engage appropriate local utility company to install temporary service or connect to existing service. Where utility company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with utility company recommendations.
 - 1. Arrange with utility company, Owner, and existing users for time when service can be interrupted, if necessary, to make connections for temporary services.
 - 2. Provide adequate capacity at each stage of construction. Before temporary utility is available, provide trucked-in services.
- B. Sewers and Drainage: If sewers are available, provide temporary connections to remove effluent that can be discharged lawfully. If sewers are not available or cannot be used, provide drainage ditches, dry wells, stabilization ponds, and similar facilities. If neither sewers nor drainage facilities can be lawfully used for discharge of effluent, provide containers to remove and dispose of effluent off-site in a lawful manner.
 - 1. Filter out excessive soil, construction debris, chemicals, oils, and similar contaminants that might clog sewers or pollute waterways before discharge.
 - 2. Connect temporary sewers to municipal system as directed by authorities having jurisdiction.
 - 3. Maintain temporary sewers and drainage facilities in a clean, sanitary condition. After heavy use, restore normal conditions promptly.
 - 4. Provide temporary filter beds, settlement tanks, separators, and similar devices to purify effluent to levels acceptable to authorities having jurisdiction.
- C. Water Service: Install water service and distribution piping in sizes and pressures adequate for construction until permanent water service is in use. Sterilize temporary water piping before use.
- D. Sanitary Facilities: Provide temporary toilets, wash facilities, and drinking-water for use of construction personnel. Comply with regulations and health codes for type, number, location, operation, and maintenance of fixtures and facilities.
 - 1. Disposable Supplies: Provide toilet tissue, paper towels, paper cups, and similar disposable materials for each facility. Maintain adequate supply. Provide covered waste containers for disposal of used material.
 - 2. Toilets: Install self-contained toilet units. Shield toilets to ensure privacy. Provide separate facilities for male and female personnel.
 - a. Drinking-Water Facilities: Provide bottled-water or drinking-water units. Ensure dispensed water temperature is between 45 to 55 degrees Fahrenheit (12.78 degrees Celsius).

- E. Heating and Cooling: Refer to Section 01 57 00 – Temporary Controls.
- F. Ventilation and Humidity Control: Refer to Section 01 57 00 – Temporary Controls.
- G. Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnecting means, automatic ground-fault interrupters, and main distribution switchgear.
 - 1. Install electric power service underground, unless overhead service must be used.
 - 2. Install power distribution wiring overhead and rise vertically where least exposed to damage.
- H. Lighting: Provide temporary lighting with local switching that provides adequate illumination for construction operations, observations, inspections, and traffic conditions.
 - 1. Install and operate temporary lighting that fulfills security and protection requirements without operating entire system.

END OF SECTION

SECTION 01 55 00

VEHICULAR ACCESS & PARKING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for vehicular access and parking.
- B. Related Sections include the following:
 - 1. Section 01 50 00 "Temporary Facilities" for requirements associated with temporary facilities.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SUPPORT FACILITIES INSTALLATION

- A. Temporary Use of Permanent Roads and Paved Areas: Maintain existing roads and paved areas to adequately support loads and to withstand exposure to traffic during the construction period.
 - 1. Recondition base after temporary use, including removing contaminated material, regrading, proofrolling, compacting, and testing.
 - 2. Delay installation of final course of permanent hot-mix asphalt pavement until immediately before Final Acceptance. Repair hot-mix asphalt base-course pavement before installation of final course according to Section 32 12 16 "Asphalt Paving."
- B. Traffic Controls: Provide temporary traffic controls at junction of temporary roads with public roads. Include warning signs for public traffic and "STOP" signs for entrance onto public roads. Comply with requirements of authorities having jurisdiction.
 - 1. Protect existing site improvements to remain, including curbs, pavement, and utilities.
 - 2. Maintain access for fire-fighting equipment and access to fire hydrants.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02B
28 October 2024

- C. Pedestrian Detours: Sidewalks shall remain open and accessible during construction. Should sidewalks require closure, an accessible and safe temporary (concrete, asphalt or plywood) pedestrian path around construction shall be required if an alternative accessible route is not close by. Temporary paths are shown on the contract documents clearly showing path and type of construction.
- D. Parking: Use designated areas of Owner's existing parking areas for construction personnel. Refer to NC State Transportation Guidelines for Parking, Traffic Control and Road Closures. Refer to Drawings for approved parking locations.
 - 1. NC State Transportation Guidelines:
<https://transportation.ncsu.edu/construction-parking-information/>
 - 2. Parking permits may be obtained here:
<https://transportation.ncsu.edu/specialty-permits/>
 - 3. Make provision for shuttling personnel to and from remote parking decks.

END OF SECTION

SECTION 01 56 26
TEMPORARY FENCING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for temporary fencing for security and protection of site and occupants.
 - 1. Provide and maintain all temporary fencing necessary for the performance of the Work.
- B. Related Sections include the following:
 - 1. Section 01 50 00 "Temporary Facilities" for requirements associated with temporary facilities.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. General: Provide materials suitable for use intended.
- B. Chain-Link Fencing: Minimum 2 inch (50.8 mm), 0.148 inch (3.76 mm) thick, galvanized steel, chain-link fabric fencing; minimum 6 feet (182.88 cm) high with galvanized steel pipe posts; minimum 2-3/8 inch (60 mm) OD line posts and 2-7/8 inch (73 mm) OD corner and pull posts, with 1-5/8-inch- OD continuous top and bottom rails. Provide one of the following bases for supporting posts.
 - 1. Water Filled Jersey Barriers
 - 2. Concrete Jersey Barriers
 - 3. Fence Panels with feet that need to be weighted down with concrete or sand.
 - 4. Poured concrete footings
- C. Wind Screening: An integral visual barrier or shading type material applied and maintained for the duration of the project. Wind Screening is only allowed on fences with poured concrete footings.

PART 3 - EXECUTION

3.1 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Site Enclosure Fence: Prior to commencing earthwork, install site enclosure fence as shown on plans with lockable entrance swing gates. Install in a manner that will prevent people, dogs, and other animals from easily entering site except by entrance gates.
 - 1. Extent of Fence: As required to enclose entire Project site or portion determined sufficient to accommodate construction operations.
 - 2. Provide gates in sizes and at locations necessary to accommodate delivery vehicles and other construction operations.
 - 3. Maintain security by limiting number of keys and restricting distribution to authorized personnel.
- B. Security Enclosure and Lockup: Install substantial temporary enclosure around partially completed areas of construction. Provide lockable entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security. Lock entrances at end of each workday.
- C. Barricades, Warning Signs, and Lights: Comply with requirements of authorities having jurisdiction for erecting structurally adequate barricades, including warning signs and lighting.
- D. Locks: Locks for all gates or enclosures shall be interlocked with a padlock provided by NCSU in order to allow access by NCSU or other emergency personnel in case of emergency.
- E. Temporary Egress: Maintain temporary egress from existing occupied facilities as indicated and as required by authorities having jurisdiction.

END OF SECTION

SECTION 01 57 00
TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for support facilities and protection of facilities.
 - 1. Provide and maintain all temporary facilities and controls necessary for the performance of the Work. Locate and install all facilities and controls where acceptable to the local authorities having jurisdiction and utility owner and remove same and terminate, in a manner suitable to the utility owner, at completion of the Work or when otherwise directed. Pay all costs associated with the provision and maintenance of temporary facilities and controls including power, water, and fuel (if any) consumed until Final Acceptance.
 - 2. Notwithstanding these specifications for Temporary Facilities and Controls, the incorporation of all temporary facilities and controls into the Project shall be subject to the Owner's approval.
- B. Related Sections include the following:
 - 1. Section 01 33 00 "Submittal Procedures" for procedures for submitting copies of implementation and termination schedule and utility reports.
 - 2. Section 01 51 00 "Temporary Utilities" for requirements associated with temporary utilities.
 - 3. Section 31 31 16 "Termite Control" for pest control.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 INFORMATIONAL SUBMITTALS

- A. Moisture-Protection Plan: Not less than five (5) working days prior to preconstruction conference, Contractor shall submit a Moisture Protection plan Describing procedures and controls for protecting materials and construction from water absorption and damage.
 - 1. Describe delivery, handling, and storage provisions for materials subject to water absorption or water damage.
 - 2. Indicate procedures for discarding water-damaged materials, protocols for mitigating water intrusion into completed Work, and replacing water-damaged Work.

3. Indicate sequencing of work that requires water, such as sprayed fire-resistant materials, bathroom waterproofing testing, and terrazzo grinding, and describe plans for dealing with water from these operations. Show procedures for verifying that wet construction has dried sufficiently to permit installation of finish materials.
- B. Dust- and HVAC-Control Plan: Not less than five (5) working days prior to preconstruction conference, submit coordination drawing and narrative that indicates the dust- and HVAC-control measures proposed for use, proposed locations, and proposed time frame for their operation. Identify further options if proposed measures are later determined to be inadequate. Include the following:
 1. Locations of dust-control partitions at each phase of work.
 2. HVAC system isolation schematic drawing.
 3. Location of proposed air-filtration system discharge.
 4. Waste handling procedures.
 5. Other dust-control measures.
 - C. Noise & Vibration Control Plan: Not less than five (5) working days prior to preconstruction conference, submit a Noise & Vibration Control Plan describing procedures and controls for protecting adjacent classrooms, laboratories, dormitories, common areas, and food service areas from excess noise and vibration. Pay special attention to exam and graduation periods. Include a description of how the Contractor will mitigate the following:
 1. Vibration resulting from site preparation activities that could impact active experiments or student learning.
 2. Concrete cutting method(s) to be used.
 3. Saw cutting and grinding activities.
 4. Equipment noise.
 - D. Fire-Safety Program: Show compliance with requirements of NFPA 241 and authorities having jurisdiction. Indicate Contractor personnel responsible for management of fire-prevention program.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 SECURITY AND PROTECTION FACILITIES INSTALLATION

- A. Isolation of Work Areas in Occupied Facilities: Prevent dust, fumes, and odors from entering occupied areas.
 1. Prior to commencing work, isolate the HVAC system in area where work is to be performed according to coordination drawings.
 - a. Disconnect supply and return ductwork in work area from HVAC systems servicing occupied areas.

- b. Maintain negative air pressure within work area using HEPA-equipped air-filtration units, starting with commencement of temporary partition construction, and continuing until removal of temporary partitions is complete.
 2. Maintain dust partitions during the Work. Use vacuum collection attachments on dust-producing equipment. Isolate limited work within occupied areas using portable dust-containment devices.
 3. Perform daily construction cleanup and final cleanup using approved, HEPA-filter-equipped vacuum equipment.
 - B. Heating and Cooling: Provide temporary heating and cooling required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of low temperatures or high humidity. Select equipment from that specified that will not have a harmful effect on completed installations or elements being installed.
 1. Maintain a minimum temperature of 50 degrees Fahrenheit (10 degrees Celsius) in permanently enclosed portions of building for normal construction activities, and 65 degrees Fahrenheit (18.33 degrees Celsius) for finishing activities and areas where finished Work has been installed.
 - C. Ventilation and Humidity Control: Provide temporary ventilation required by construction activities for curing or drying of completed installations or for protecting installed construction from adverse effects of high humidity. Select equipment that will not have a harmful effect on completed installations or elements being installed. Coordinate ventilation requirements to produce ambient condition required and minimize energy consumption.
 1. Provide dehumidification systems when required to reduce substrate moisture levels to level required to allow installation or application of finishes.
- 3.2 PEST CONTROL:
- A. Before deep foundation work has been completed, retain a local exterminator or pest-control company to recommend practices to minimize attraction and harboring of rodents, roaches, and other pests. Engage this pest-control service to perform extermination and control procedures at regular intervals so Project will be free of pests and their residues at Final Acceptance. Perform control operations lawfully, using environmentally safe materials.
- 3.3 MOISTURE AND MOLD CONTROL
- A. Contractor's Moisture-Protection Plan: Avoid trapping water in finished work. Document visible signs of mold that may appear during construction.
 - B. Exposed Construction Phase: Before installation of weather barriers, when materials are subject to wetting and exposure and to airborne mold spores, protect as follows:
 1. Protect porous materials from water damage.
 2. Protect stored and installed material from flowing or standing water.

3. Keep porous and organic materials from coming into prolonged contact with concrete.
 4. Remove standing water from decks.
 5. Keep deck openings covered or dammed.
- C. Partially Enclosed Construction Phase: After installation of weather barriers but before full enclosure and conditioning of building, when installed materials are still subject to infiltration of moisture and ambient mold spores, protect as follows:
1. Do not load or install drywall or other porous materials or components, or items with high organic content, into partially enclosed building.
 2. Keep interior spaces reasonably clean and protected from water damage.
 3. Periodically collect and remove waste containing cellulose or other organic matter.
 4. Discard or replace water-damaged material.
 5. Do not install material that is wet.
 6. Discard, replace, or clean stored or installed material that begins to grow mold.
 7. Perform work in a sequence that allows any wet materials adequate time to dry before enclosing the material in drywall or other interior finishes.
- D. Controlled Construction Phase of Construction: After completing and sealing of the building enclosure but prior to the full operation of permanent HVAC systems, maintain as follows:
1. Control moisture and humidity inside building by maintaining effective dry-in conditions.
 2. Use permanent HVAC system to control humidity.
 3. Comply with manufacturer's written instructions for temperature, relative humidity, and exposure to water limits.
 - a. Hygroscopic materials that may support mold growth, including wood and gypsum-based products, that become wet during the course of construction and remain wet for 48 hours are considered defective.
 - b. Measure moisture content of materials that have been exposed to moisture during construction operations or after installation. Record readings beginning at time of exposure and continuing daily for 48 hours. Identify materials containing moisture levels higher than allowed. Report findings in writing to Designer.
 - c. Remove materials that cannot be completely restored to their manufactured moisture level within 48 hours.

END OF SECTION

SECTION 01 58 00

PROJECT IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes requirements for project identification.
- B. Related Sections include the following:
 - 1. Section 01 50 00 "Temporary Facilities" for requirements associated with temporary utilities.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

PART 2 – PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PROJECT SIGNS

- A. Project Signs: Project sign(s) secured to perimeter fence is permitted following approval of location and content by Owner. Directional signs for material deliveries are allowed within the construction area, if required, and shall be 4' wide x 2' high maximum, black and white only. The NCSU Project Manager shall approve the design of the sign and the sign text.

END OF SECTION

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Administrative and procedural requirements for selection of products for use in Project; product delivery, storage, and handling; manufacturers' standard warranties on products; special warranties; and comparable products.

1.2 DEFINITIONS

- A. Products: Items obtained for incorporating into the Work, whether purchased for Project or taken from previously purchased stock. The term "product" includes the terms "material," "equipment," "system," and terms of similar intent.
 - 1. Named Products: Items identified by manufacturer's product name, including make or model number or other designation shown or listed in manufacturer's published product literature, that is current as of date of the Contract Documents.
 - 2. New Products: Items that have not previously been incorporated into another project or facility. Products salvaged or recycled from other projects are not considered new products.
 - 3. Comparable Product: Product that is demonstrated and approved through submittal process to have the indicated qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics that equal or exceed those of specified product.
- B. Basis-of-Design Product Specification: A specification in which a single manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation. Published attributes and characteristics of basis-of-design product establish salient characteristics of products.
 - 1. Evaluation of Comparable Products: In addition to the basis-of-design product description, product attributes and characteristics may be listed to establish the significant qualities related to type, function, in-service performance and physical properties, weight, dimension, durability, visual characteristics, and other special features and requirements for purposes of evaluating comparable products of additional manufacturers named in the specification. Manufacturer's published attributes and characteristics of products for purposes of evaluating comparable products.

- C. Subject to Compliance with Requirements: Where the phrase "Subject to compliance with requirements" introduces a product selection procedure in an individual Specification Section, provide products qualified under the specified product procedure. In the event that a named product or product by a named manufacturer does not meet the other requirements of the specifications, select another named product or product from another named manufacturer that does meet the requirements of the specifications; submit a comparable product request or substitution request, if applicable.
- D. Manufacturer's Warranty: Preprinted written warranty published by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
- E. Special Warranty: Written warranty required by or incorporated into the Contract Documents, either to extend time limit provided by manufacturer's warranty or to provide more rights for Owner.

1.3 ACTION SUBMITTALS

- A. Comparable Product Requests: Submit request for consideration of each comparable product. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. Identification of basis-of-design product, fabrication, or installation method to be replaced, including Specification Section number and title, and Drawing numbers and titles.
- B. Include data to indicate compliance with the requirements specified in "Comparable Products" Article.
- C. Basis-of-Design Product Specification Submittal: Comply with requirements in Section 01 33 00 - Submittal Procedures. Show compliance with requirements.
- D. Substitution: Refer to Section 01 25 00 - Substitution Procedures for definition and limitations on substitutions.

1.4 QUALITY ASSURANCE

- A. Compatibility of Options: If Contractor is given option of selecting between two or more products for use on Project, select product compatible with products previously selected, even if previously selected products were also options.
 - 1. Each Contractor is responsible for providing products and construction methods compatible with products and construction methods of other contractors.
 - 2. If a dispute arises between Contractors over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.5 COORDINATION

- A. Coordinate affected Work as necessary to integrate work of approved comparable products and approved substitutions.

1.6 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.
- B. Delivery and Handling:
 - 1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
 - 2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.
 - 3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
 - 4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.
- C. Storage:
 - 1. Provide a secure location and enclosure at Project site, at location approved by Owner for storage of materials and equipment.
 - 2. Store products to allow for inspection and measurement of quantity or counting of units.
 - 3. Store materials in a manner that will not endanger Project structure.
 - 4. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
 - 5. Store cementitious products and materials on elevated platforms.
 - 6. Protect foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
 - 7. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
 - 8. Protect stored products from damage and liquids from freezing.
 - 9. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.7 PRODUCT WARRANTIES

- A. Warranties specified in other Sections shall be in addition to, and run concurrent with, other warranties required by the Contract Documents. Manufacturer's disclaimers and limitations on product warranties do not relieve Contractor of obligations under requirements of the Contract Documents.
 - 1. Manufacturer's Warranty: Written warranty furnished by individual manufacturer for a particular product and specifically endorsed by manufacturer to Owner.
 - 2. Special Warranty: Written warranty required by the Contract Documents to provide specific rights for Owner.
- B. Special Warranties: Prepare a written document that contains appropriate terms and identification, ready for execution.
 - 1. Manufacturer's Standard Form: Modified to include Project-specific information and properly executed.
 - 2. Specified Form: When specified forms are included with the Specifications, prepare a written document using indicated form properly executed.
 - 3. See other Sections for specific content requirements and particular requirements for submitting special warranties.
- C. Submittal Time: Comply with requirements in Section 01 77 00 - Closeout Procedures.

1.8 PROHIBITION ON INCORPORATION OF HAZARDOUS MATERIALS

- A. Contractor is responsible for ascertaining that materials within the existing facility, which will be disturbed as part of the work, are free of asbestos containing materials and for performing surveys and/or providing certifications attesting regarding this.
- B. Architect and its consultants have not knowingly specified for incorporation into the work, materials or products containing hazardous materials or toxic substances (including asbestos).
- C. Contractor (including its subcontractors, sub-subcontractors, and material suppliers/fabricators under its control) is prohibited from incorporating any material or products into the work containing hazardous materials or toxic substances.
- D. As part of completed materials and products list required herein, Contractor shall assemble, for the Owner's records, the Material Safety Data Sheets (MSDS) for all materials and products incorporated into the work. These MSD sheets shall be updated upon final completion of the work to incorporate changes which have occurred during the course of the work due to approved substitution requests and other modifications. Architect will not review, nor approve, the MSD sheets. The Contractor, also as a pre-requisite to achieving final completion, shall provide a certificate to the Owner indicating that no hazardous or toxic materials or products were incorporated into the work.

- E. Architect and its consultants are not responsible for the presence of hazardous materials or toxic substances in or around the work, nor the exposure to persons who construct or subsequently occupy the work. The Architect will not provide certifications regarding the presence or absence of such materials or substances.

PART 2 PRODUCTS

2.1 PRODUCT SELECTION PROCEDURES

- A. General Product Requirements: Provide products that comply with the Contract Documents, are undamaged and, unless otherwise indicated, are new at time of installation.
1. Provide products complete with accessories, trim, finish, fasteners, and other items needed for a complete installation and indicated use and effect.
 2. Standard Products: If available, and unless custom products or nonstandard options are specified, provide standard products of types that have been produced and used successfully in similar situations on other projects.
 3. Owner reserves the right to limit selection to products with warranties not in conflict with requirements of the Contract Documents.
 4. Where products are accompanied by the term "as selected," Architect will make selection.
 5. Descriptive, performance, and reference standard requirements in the Specifications establish salient characteristics of products.
- B. Product Selection Procedures:
1. Product: Where Specifications name a single manufacturer and product, provide the named product that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
 2. Manufacturer/Source: Where Specifications name a single manufacturer or source, provide a product by the named manufacturer or source that complies with requirements. Comparable products or substitutions for Contractor's convenience will not be considered.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
 3. Products:
 - a. Restricted List: Where Specifications include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.

- b. Nonrestricted List: Where Specifications include a list of names of both available manufacturers and products, provide one of the products listed, or an unnamed product, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product.
 - 1) Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
- 4. Manufacturers:
 - a. Restricted List: Where Specifications include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products or substitutions for Contractor's convenience will be considered unless otherwise indicated.
 - b. Nonrestricted List: Where Specifications include a list of available manufacturers, provide a product by one of the manufacturers listed, or a product by an unnamed manufacturer, that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.
 - 1) Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
- 5. Available Manufacturers: Where Specification paragraphs or subparagraphs titled "Available Manufacturers" introduce a list of manufacturers' names, provide a product by one of the manufacturers listed or another manufacturer that complies with requirements. Comply with provisions in "Comparable Products" Article to obtain approval for use of an unnamed product.
- 6. Product Options: Where Specification paragraphs titled "Product Options" indicate that size, profiles, and dimensional requirements on Drawings are based on a specific product or system, provide either the specific product or system indicated or a comparable product or system by another manufacturer.
 - a. Submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.
- 7. Basis-of-Design Product: Where Specifications name a product, or refer to a product indicated on Drawings, and include a list of manufacturers, provide the specified or indicated product or a comparable product by one of the other named manufacturers. Drawings and Specifications indicate sizes, profiles, dimensions, and other characteristics that are based on the product named. Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - a. Substitutions may be considered, unless otherwise indicated, when submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.

- C. Visual Matching Specification: Where Specifications require "match Architect's sample", provide a product that complies with requirements and matches Architect's sample. Architect's decision will be final on whether a proposed product matches.
 - 1. If no product available within specified category matches and complies with other specified requirements, comply with requirements in Section 01 25 00 - Substitution Procedures for proposal of product.
- D. Visual Selection Specification: Where Specifications include the phrase "as selected by Architect from manufacturer's full range" or similar phrase, select a product that complies with requirements. Architect will select color, gloss, pattern, density, or texture from manufacturer's product line that includes both standard and premium items.
 - 1. Standard Range: Where Specifications include the phrase "standard range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that does not include premium items.
 - 2. Full Range: Where Specifications include the phrase "full range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from manufacturer's product line that includes both standard and premium items.
 - 3. Full Industry Range: Where Specifications include the phrase "full industry range of colors, patterns, textures" or similar phrase, Architect will select color, pattern, or texture from any listed manufacturer's product line that includes both standard and premium items.
 - 4. "Custom Color as selected by Architect" or "to match color on file in Architect's office", "match Architect's sample" means that the color selected is custom and requires custom formulations and submissions of color to obtain Architect's approval prior to application.

2.2 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Architect will consider Contractor's request for comparable product when the following conditions are satisfied. If the following conditions are not satisfied, Architect may return requests without action, except to record noncompliance with these requirements:
 - 1. Evidence that the proposed product does not require revisions to the Contract Documents, that it is consistent with the Contract Documents and will produce the indicated results, and that it is compatible with other portions of the Work.
 - 2. Detailed comparison of significant qualities of proposed product with those named in the Specifications. Significant qualities include attributes such as performance, weight, size, durability, visual effect, and specific features and requirements indicated.
 - 3. Evidence that proposed product provides specified warranty.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02B
28 October 2024

4. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners, if requested.
 5. Samples, if requested.
 6. LEED Requirements: Comparable products shall comply with Sustainable design requirements.
- B. Submitted in accordance with provisions of Section 01 25 00 - Substitution Procedures.

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 73 00

EXECUTION

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:
 - 1. Installation of the Work.
 - 2. Cutting and patching.
 - 3. Coordination of Owner-installed products.
 - 4. Progress cleaning.
 - 5. Starting and adjusting.
 - 6. Protection of installed construction.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. Section 02 41 19 - Selective Demolition for demolition and removal of selected portions of the building.
- C. Section 07 84 13 - Penetration Firestopping for patching penetrations in fire-rated construction.
- D. Reference Section 01 74 19 "Construction Waste Management and Disposal" for required submittals.

1.3 DEFINITIONS

- A. Cutting: Removal of in-place construction necessary to permit installation or performance of other work.
- B. Patching: Fitting and repair work required to restore construction to original conditions after installation of other work.
- C. Cutting and patching is performed for coordination of the Work, to uncover Work for access or inspection, to obtain samples for testing, to permit alterations to be performed or for other similar purposes.

- D. Restoring or removing and replacing non-complying work is specified separately from cutting-and-patching but may require cutting-and-patching operations as specified herein.

1.4 INFORMATIONAL SUBMITTALS

- A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.
- B. Cutting and Patching Plan: Submit plan describing procedures at least 10 days prior to the time cutting and patching will be performed. Include the following information:
 - 1. Coordinate with Owner if Cutting and Patching Plan will be required.
 - 2. Extent: Describe reason for and extent of each occurrence of cutting and patching.
 - 3. Changes to In-Place Construction: Describe anticipated results. Include changes to structural elements and operating components as well as changes in building appearance and other significant visual elements.
 - 4. Products: List products to be used for patching and firms or entities that will perform patching work.
 - 5. Dates: Indicate when cutting and patching will be performed.
 - 6. Utilities and Mechanical and Electrical Systems: List services and systems that cutting and patching procedures will disturb or affect. List services and systems that will be relocated and those that will be temporarily out of service. Indicate length of time permanent services and systems will be disrupted.
 - 7. Include description of provisions for temporary services and systems during interruption of permanent services and systems.

1.5 CLOSEOUT SUBMITTALS

- A. Ramp & Stair Surveys: Submit a signed survey of all ramps and stairs, interior and exterior, installed by the project.

1.6 PREINSTALLATION MEETINGS

- A. Cutting and Patching Conference: Conduct conference at Project site.
 - 1. Coordinate with Owner if Cutting and Patching Conference will be required.
 - 2. Prior to commencing work requiring cutting and patching, review extent of cutting and patching anticipated and examine procedures for ensuring satisfactory result from cutting and patching work. Inform Architect of scheduled meeting. Require representatives of each entity directly concerned with cutting and patching to attend, including the following:
 - a. Contractor's superintendent.
 - b. Trade supervisor responsible for cutting operations.
 - c. Trade supervisor(s) responsible for patching of each type of substrate.

- d. Mechanical, electrical, and utilities subcontractors' supervisors, to the extent each trade is affected by cutting and patching operations.
3. Review areas of potential interference and conflict. Coordinate procedures and resolve potential conflicts before proceeding.

1.7 QUALITY ASSURANCE

- A. Cutting and Patching: Comply with requirements for and limitations on cutting and patching of construction elements.
 1. Structural Elements: When cutting and patching structural elements, notify Designer of locations and details of cutting and await directions from Designer before proceeding. Shore, brace, and support structural elements during cutting and patching. Do not cut and patch structural elements in a manner that could change their load-carrying capacity or increase deflection
 2. Operational Elements: Do not cut and patch operating elements and related components in a manner that results in reducing their capacity to perform as intended or that results in increased maintenance or decreased operational life or safety.
 3. Other Construction Elements: Do not cut and patch other construction elements or components in a manner that could change their load-carrying capacity, that results in reducing their capacity to perform as intended, or that results in increased maintenance or decreased operational life or safety. Other construction elements include but are not limited to the following:
 - a. Water, moisture, or vapor barriers.
 - b. Membranes and flashings.
 - c. Exterior curtain-wall construction.
 - d. Sprayed fire-resistive material.
 - e. Equipment supports.
 - f. Piping, ductwork, vessels, and equipment.
 - g. Noise- and vibration-control elements and systems.
 4. Visual Elements: Do not cut and patch construction in a manner that results in visual evidence of cutting and patching. Do not cut and patch exposed construction in a manner that would, in Designer's opinion, reduce the building's aesthetic qualities. Remove and replace construction that has been cut and patched in a visually unsatisfactory manner.
- B. Manufacturer's Installation Instructions: Obtain and maintain on-site manufacturer's written recommendations and instructions for installation of products and equipment.

1.8 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during cutting and patching operations, by methods and with materials so as not to void existing warranties.

PART 2 PRODUCTS

2.1 MATERIALS

- A. General: Comply with requirements specified in other Sections.
 - 1. For projects requiring compliance with sustainable design and construction practices and procedures, use products for patching that comply with requirements in Section 01 81 13 "Sustainable Design Requirements"
- B. In-Place Materials: Use materials for patching identical to in-place materials. For exposed surfaces, use materials that visually match in-place adjacent surfaces to the fullest extent possible.
 - 1. If identical materials are unavailable or cannot be used, use materials that, when installed, will provide a match acceptable to Designer for the visual and functional performance of in-place materials.
- C. Materials to be cut and patched include those damaged by the performance of the Work.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examination of the Site and Records of Existing Construction and Conditions: Examine the site, the records of existing construction, and the conditions under which the Work is to be performed. Notify the Architect immediately if existing conditions discovered will affect the Work as shown on the Contract Documents.
- B. Existing Conditions: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction affecting the Work.
 - 1. Before beginning construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, and water-service piping, underground electrical services, and other utilities.
 - 2. Furnish location data for work related to Project that must be performed by public utilities serving Project site.

- C. Existing Conditions Depicted in the Contract Documents: The Contract Documents are based upon the information furnished to the Architect by the Owner. Such information is available from the Owner. The records are furnished for information only and may not represent all conditions that will be encountered. The records of existing construction represent conditions known to the Owner. Other construction, of which no records are available, may be encountered. Dimensions of existing construction are based on information provided to the Architect by the Owner. The Contractor and each subcontractor shall field verify dimensions of existing conditions.
- D. Examination and Acceptance of Conditions: Before proceeding with each component of the Work, examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.
 - 1. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
 - 2. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
 - 3. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
- E. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:
 - 1. Description of the Work.
 - 2. List of detrimental conditions, including substrates.
 - 3. List of unacceptable installation tolerances.
 - 4. Recommended corrections.
- F. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.
- B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

- D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents caused by differing field conditions outside the control of Contractor, submit a request for interpretation to Designer according to Section 01 26 13 "Request for Interpretation."

3.3 INSTALLATION

- A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.
 - 1. Make vertical work plumb and make horizontal work level.
 - 2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
 - 3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated. Where indicated to remain exposed, arrange overhead systems in an orderly manner.
 - 4. Maintain minimum headroom clearance of 96 inches (2438.4 mm) in occupied spaces and 90 inches (2286 mm) in unoccupied spaces.
- B. Precautions Against Movement or Settlement: The Contractor shall take precautions, including bracing, shoring, underpinning, or other retaining structures, to guard against movement or settlement of existing or new construction. Assume responsibility for the design, safety, and support of such construction, and for movement, settlement, damage, or injury resulting from the construction.
- C. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.
- D. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Final Acceptance.
- E. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions of occupancy.
- F. Sequence the Work and allow adequate clearances to accommodate movement of construction items on site and placement in permanent locations.
- G. Tools and Equipment: Do not use tools or equipment that produces harmful noise levels.
- H. Templates: Obtain and distribute to the parties involved templates for work specified to be factory prepared and field installed. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing products to comply with indicated requirements.
- I. Attachment: Provide blocking and attachment plates and anchors and fasteners of adequate size and number to securely anchor each component in place, accurately located and aligned with other portions of the Work. Where size and type of attachments are not indicated, verify size and type required for load conditions

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Designer.
 2. Allow for building movement, including thermal expansion and contraction.
 3. Coordinate installation of anchorages. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.
- J. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.
- K. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.
- L. Protect adjacent property and adjoining work, including sealant bond surfaces, from spillage or blow-over of coatings, paints, sprayed fire-resistive material, and other spray-applied products. Cover adjoining and nearby surfaces, including live plants and grass, if there is possibility of spray-applied products being deposited on surfaces.
- 3.4 EXAMINATION
- A. Examine surfaces to be cut and patched and conditions under which cutting and patching are to be performed.
1. Compatibility: Before patching, verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
 2. Proceed with installation only after unsafe or unsatisfactory conditions have been corrected.
- 3.5 PREPARATION
- A. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.
- B. Temporary Support: Provide temporary support of work to be cut.
- C. Protection: Protect in-place construction during cutting and patching to prevent damage. Provide protection from adverse weather conditions for portions of Project that might be exposed during cutting and patching operations.
- D. Adjoining Areas: Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- E. Existing Services: Where existing services are required to be removed, relocated, or abandoned, bypass such services before cutting to avoid interruption of services to occupied areas.

3.6 PERFORMANCE

- A. Cutting and Patching, General: Employ skilled workers to perform cutting and patching. Proceed with cutting and patching at the earliest feasible time, and complete without delay.
 - 1. Cut in-place construction to provide for installation of other components or performance of other construction, and subsequently patch as required to restore surfaces to their original condition.

- B. Cutting: Cut in-place construction by sawing, drilling, breaking, chipping, grinding, and similar operations, including excavation, using methods least likely to damage elements retained or adjoining construction. If possible, review proposed procedures with original Installer; comply with original Installer's written recommendations.
 - 1. In general, use hand or small power tools designed for sawing and grinding, not hammering and chopping. Cut holes and slots neatly to minimum size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. Finished Surfaces: Cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Concrete and Masonry: Cut using a cutting machine, such as an abrasive saw or a diamond-core drill. Avoid cutting steel reinforcement.
 - a. Locate steel reinforcement using Ground Penetrating Radar or Ferroskan prior to cutting or drilling reinforced concrete and masonry. If existing steel reinforcement is in proposed cut or hole location, contact Designer before proceeding with the Work.
 - 4. Excavating and Backfilling: Comply with requirements in applicable Division 31 Sections where required by cutting and patching operations.
 - 5. Mechanical and Electrical Services: Cut off pipe or conduit in walls or partitions to be removed. Cap, valve, or plug and seal remaining portion of pipe or conduit to prevent entrance of moisture or other foreign matter after cutting.
 - 6. Proceed with patching after construction operations requiring cutting are complete.

- C. Patching: Patch construction by filling, repairing, refinishing, closing up, and similar operations following performance of other work. Patch with durable seams that are as invisible as practicable, as judged by Architect. Provide materials and comply with installation requirements specified in other Sections, where applicable.
 - 1. Inspection: Where feasible, test and inspect patched areas after completion to demonstrate physical integrity of installation.
 - 2. Exposed Finishes: Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will minimize evidence of patching and refinishing.

3. Floors and Walls: Where walls or partitions that are removed extend one finished area into another, patch and repair floor and wall surfaces in the new space. Provide an even surface of uniform finish, color, texture, and appearance. Remove in-place floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Where patching occurs in a painted surface, prepare substrate and apply primer and intermediate paint coats appropriate for substrate over the patch, and apply final paint coat over entire unbroken surface containing the patch corner to corner of wall and edge to edge of ceiling. Provide additional coats until patch blends with adjacent surfaces.
 4. Ceilings: Patch, repair, or rehang in-place ceilings as necessary to provide an even-plane surface of uniform appearance.
 5. Ceramic Tile: Provide ceramic tile and grout to match existing. Remove and replace tile damaged as a result of Work of this Contract. Comply with TCNA's "Handbook for Ceramic Tile Installation" for installation method to match existing. Lay tile in grid pattern to match existing. Make joints between existing and new tile same width so patches are not apparent in finished work.
 6. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weathertight condition and ensures thermal and moisture integrity of building enclosure.
- D. Fire Rated Construction: At penetrations of fire rated walls, partitions, ceiling, or floor construction, completely seal voids with fire rated material in accordance with Section 07 84 13 - Penetration Firestopping, to full thickness of the penetrated element.
- E. Cleaning: Clean areas and spaces where cutting and patching are performed. Remove paint, mortar, oils, putty, and similar materials from adjacent finished surfaces.
- 3.7 OWNER-INSTALLED PRODUCTS
- A. Site Access: Provide access to Project site for Owner's construction forces.
 - B. Coordination: Coordinate construction and operations of the Work with work performed by Owner's construction forces.
 1. Construction Schedule: Inform Owner of Contractor's preferred construction schedule for Owner's portion of the Work. Adjust construction schedule based on a mutually agreeable timetable. Notify Owner if changes to schedule are required due to differences in actual construction progress.
 2. Preinstallation Conferences: Include Owner's construction forces at preinstallation conferences covering portions of the Work that are to receive Owner's work. Attend preinstallation conferences conducted by Owner's construction forces if portions of the Work depend on Owner's construction.

3.8 PROGRESS CLEANING

- A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer is working concurrently. Enforce requirements strictly. Dispose of materials lawfully.
 - 1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
 - 2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 degrees Fahrenheit (26.67 degrees Celsius).
 - 3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.
- B. Site: Maintain Project site free of waste materials and debris.
- C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.
 - 1. Remove liquid spills promptly.
 - 2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.
- D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.
- E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.
- F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.
- G. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted. Comply with Section 01 74 19 "Construction Waste Management and Disposal."
- H. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Final Acceptance.
- I. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.
- J. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.9 STARTING AND ADJUSTING

- A. Coordinate startup and adjusting of equipment and operating components with requirements in Section 01 91 13 "General Commissioning Requirements."
- B. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.
- C. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.
- D. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.
- E. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 01 40 00 "Quality Requirements."

3.10 PROTECTION OF INSTALLED CONSTRUCTION

- A. Provide final protection and maintain conditions that ensure installed Work is without damage or deterioration at time of Final Acceptance.
- B. Comply with manufacturer's written instructions for temperature and relative humidity.

END OF SECTION

SECTION 01 74 19

CONSTRUCTION WASTE MANAGEMENT AND DISPOSAL

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for the following:
 - 1. Salvaging, Recycling, and Disposal of nonhazardous demolition and construction waste.
 - 2. Handling and disposing of hazardous demolition and construction waste.

1.2 RELATED SECTIONS

- 1. Section 00 60 00 "Project Forms" for the Designer Waste Information Form for the project and Non-Hazardous Waste Tracking Forms.
- 2. Section 02 41 19 - Selective Demolition for disposition of waste resulting from partial demolition of buildings, structures, and site improvement

1.3 DEFINITIONS

- A. Construction Waste: Building and site improvement materials and other solid waste resulting from construction, remodeling, renovation, or repair operations. Construction waste includes packaging and waste materials (i.e. brick, concrete, asphalt, and aggregate).
- B. Demolition Waste: Building and site improvement materials resulting from demolition or selective demolition operations.
- C. Special Waste: Solid wastes that require special handling and management.
- D. Hazardous Waste: Any solid waste that is ignitable, corrosive, reactive, or toxic; a listed hazardous material or containing a listed hazardous material per Title 40 Code of Federal Regulations Parts 260-270.
- E. Universal Waste: Hazardous wastes that have been provided specific exemptions (((40 CFR 273))) to encourage recycling. Universal wastes are limited to recalled or cancelled pesticides and intact batteries, lamps, and mercury containing devices. State regulations prohibit the crushing of fluorescent lamps.
- F. Disposal: Removal off-site of demolition and construction waste and subsequent sale, recycling, reuse, or deposit in landfill or incinerator acceptable to authorities having jurisdiction.
- G. Recycle: Recovery of demolition or construction waste for subsequent processing in preparation for reuse.

- H. Salvage: Recovery of demolition or construction waste and subsequent sale or reuse in another facility.
- I. Salvage and Reuse: Recovery of demolition or construction waste and subsequent incorporation into the Work.
- J. Waste: Extra material or material that has reached the end of its useful life in its intended use. Waste includes salvageable, returnable, recyclable and reusable material.
- K. Waste Management Plan: A project-related plan for the collection, transportation and disposal of waste generated at the construction site. The purpose of the plan is to ultimately reduce the amount of material becoming landfill.

1.4 ACTION SUBMITTALS

- A. Waste Management Plan: Submit plan within 30 days of date established for the Notice to Proceed.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For waste management coordinator.

1.6 CLOSEOUT SUBMITTALS

- A. Hazardous Waste Disposal Certificates: Contractor shall provide NC State with a copy of all hazardous, universal, and special waste disposal certifications and/or manifest for all waste shipped.
- B. Construction & Demolition Waste and Recycling Tracking Forms: All reuse, recycling, and landfilled materials are to be tracked and compiled on NC State's "Construction & Demolition Waste & Recycling Tracking Form", which is included in Section 00 60 00 "Project Forms".
- C. Construction & Demolition Salvaged Material Form: All salvaged materials are to be tracked and compiled on NC State's "Construction & Demolition Salvaged Material Form" which is included in Section 00 60 00 "Project Forms".
- D. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.

1.7 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with hauling and disposal regulations of authorities having jurisdiction.

- B. Waste Management Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to waste management including, but not limited to, the following:
1. Review and discuss waste management plan including responsibilities of waste management coordinator.
 2. Review requirements for documenting quantities of each type of waste and its disposition.
 3. Review and finalize procedures for materials separation and verify availability of containers and bins needed to avoid delays.
 4. Review procedures for periodic waste collection and transportation to recycling and disposal facilities.
 5. Review waste management requirements for each trade.

1.8 WASTE MANAGEMENT PLAN

- A. General: The plan shall include details on how the hazardous and non-hazardous generated waste will be managed in accordance with local, state, and federal regulations. Contractor must also provide all materials, personnel, and protective equipment necessary to remove and store wastes in accordance with the plan. The Contractor must coordinate salvage or reuse efforts identified on the Designer Waste Information Form with NC State and/or the non-profit entity.
- B. Waste Identification: Indicate anticipated types and quantities of demolition site-clearing and construction waste generated by the Work.
- C. Waste Reduction Work Plan: List each type of waste and whether it will be salvaged, recycled, or disposed of in landfill or incinerator. Include points of waste generation, total quantity of each type of waste, quantity for each means of recovery, and handling and transportation procedures.
1. Salvaged Materials for Reuse: For materials that will be salvaged and reused in this Project, describe methods for preparing salvaged materials before incorporation into the Work in compliance with Section 02 41 19 - Selective Demolition.
 2. Salvaged Materials for Donation: For materials that will be donated to individuals and organizations, include list of their names, addresses, and telephone numbers.
 3. Recycled Materials: Include list of local receivers and processors and type of recycled materials each will accept. Include names, addresses, and telephone numbers.
 4. Disposed Materials: Indicate how and where materials will be disposed of. Include name, address, and telephone number of each landfill and incinerator facility.
- D. Handling and Transportation Procedures: Include method that will be used for separating recyclable waste including sizes of containers, container labeling, and designated location where materials separation will be performed.

- E. Cost/Revenue Analysis: Indicate total cost of waste disposal as if there were no waste management plan and net additional cost or net savings resulting from implementing waste management plan. Include the following:
1. Total quantity of waste.
 2. Estimated cost of disposal (cost per unit). Include transportation and tipping fees and cost of collection containers and handling for each type of waste.
 3. Total cost of disposal (with no waste management).
 4. Revenue from salvaged materials.
 5. Revenue from recycled materials.
 6. Savings in transportation and tipping fees by donating materials.
 7. Savings in transportation and tipping fees that are avoided.
 8. Handling and transportation costs. Include cost of collection containers for each type of waste.
 9. Net additional cost or net savings from waste management plan.

1.9 PERFORMANCE GOALS & REQUIREMENTS

- A. All hazardous and non-hazardous generated waste shall be managed in accordance with local, state, and federal regulations.
- B. Seventy-five percent (75%) of a project's non-hazardous waste must be diverted from landfill disposal through reuse and recycling.
1. Exclude excavated soil, land-clearing debris from calculations. Include materials destined for alternative daily cover (ADC) in the calculations as waste (not diversion). Include wood waste converted to fuel (bio-fuel) in the calculations; other types of waste-to-energy are not considered diversion for this credit.
 2. Divert at least four material waste streams.
 3. The waste-sorting facility provides a waste diversion percentage specific to the project's waste based on measurement of each component waste material.
- C. One hundred percent (100%) of yard waste must be diverted from landfill disposal through reuse and recycling.
- D. The Designer must complete the Designer Waste Information Form (<http://go.ncsu.edu/wasteinfoform>) and identify regulated wastes, as well as materials, fixtures, and equipment that are to be salvaged for reuse or recycled. The location of the staging area as well as the responsible party for removal, delivery, and/or pick up must also be included.
1. The completed Designer Waste Information Form has been included in Section 00 60 00 "Project Forms".

1.10 PROJECT MEETINGS

- A. Waste management plans and implementation shall be discussed at the following meetings:

1. Pre-demolition meeting.
2. Pre-construction meeting.
3. Regular job-site meetings.
4. Subcontractor toolbox meetings.

1.11 MANAGEMENT OF HAZARDOUS, UNIVERSAL, AND SPECIAL WASTES

- A. Hazardous, universal, and special wastes must be managed separately from other C&D wastes.
- B. Disposal must be coordinated with NC State Environmental Health & Safety.
- C. Special wastes include:
 1. Paints, varnish, solvents, sealers, thinners, resins, roofing cement, adhesives, lubricants, and caulk, or drums and containers that once held these materials.
 2. Treated wood including lumber, posts, ties, decks, and utility poles (creosote, arsenic, chromium, pentachlorophenol).
 3. Asbestos, PCBs, mercury, or lead containing materials
 4. Used oil
 5. Lead acid batteries
 6. Medical wastes
- D. Waste disposal responsibility falls to one of two parties: the Contractor or NC State, as defined in the NC State Environmental Health and Safety's document: Management of Building Demolition Debris available at:
<http://go.ncsu.edu/demodebris>
 1. Containers used for waste storage must be United States Department of Transportation approved. The Contractor must supply bins, tanks or tank trucks. Containers must remain closed at all times except when material is being added. NC State will provide containers for items collected by NC State.
 2. Hazardous waste containers must have labels that clearly identify waste streams. Different waste streams cannot be combined in a shared container. The Contractor must identify the initial accumulation date on the hazardous waste label when waste is first placed in the container.
 3. Waste containers must be stored in a secured, covered, and well identified area of the construction site. Hazardous waste cannot be stored for more than 90 days. Any waste stored for more than six days must be inspected, and the inspection documented, weekly.
 4. Spill response supplies must be on-site and adequate to contain 110% of any accumulated waste. Portable fire extinguishers must also be readily available. If a spill occurs, Contractor must contact NC State immediately and proceed with spill containment and clean up.
 5. The Contractor must provide NC State with a copy of all hazardous, universal, and special waste disposal certifications and/or manifests for all waste shipped.

1.12 MANAGEMENT OF NON-HAZARDOUS WASTE

- A. Priority 1 - Salvage of Construction and Demolition Waste for Reuse
1. Salvaged materials should first be evaluated for use in University construction projects. NC State Surplus Property Services should be considered if there are reusable materials that have resale value and are no longer needed by the University. Contact Waste Reduction and Recycling (recycle@ncsu.edu) for assistance with disposition. Examples of Salvageable material include:
 - a. Furniture and electronics
 - b. Cabinets and shelves that are not built-in
 - c. Sinks and water fountains
 - d. Paper towel dispensers
 - e. Newer light fixtures
 - f. Dry erase boards, chalkboards, and cork boards
 - g. Solid wood panel doors
 - h. Brick pavers
 2. Contact vendors about take-back programs to recycle materials their company provides. These materials include, but are not limited to ceiling tiles, carpet tiles, and cubicle walls.
 3. Coordinate with the Project Manager to utilize the NC State Construction Shop for the careful removal of salvageable items prior to contractor demolition. An estimate for the Construction Shop's work must be received during design and must be initiated prior to the project going out to bid.
- B. Priority 2 - Recycling of Construction and Demolition Waste
1. If materials are not salvageable for reuse, they must be source separated to the greatest extent possible and recycled.
 2. Common source separated materials for recycling include:
 - a. Cardboard
 - b. Bottles and cans
 - c. Scrap metal and wire
 - d. Rigid plastics
 - e. Untreated/unpainted dimensional lumber
 - f. Gypsum board (unpainted)
 - g. Concrete
 - h. Asphalt (pavement and shingles)
 - i. Aggregate
 - j. Brick and CMU
 - k. Carpet and Pad
 3. 100% of the following materials must be recycled:
 - a. Paper
 - b. Cardboard
 - c. Bottles and cans
 - d. Scrap metal and wire
 - e. Concrete
 - f. Asphalt (pavement and shingles)

- g. Aggregate
 - h. Brick and CMU
 - i. Plastic sheet and film
 - j. Polystyrene packaging
 - k. Wood crates
 - l. Wood pallets
 - m. Plastic pails
- C. Priority 3 - Disposal of Construction and Demolition Waste
- 1. If material/s cannot be salvaged for reuse or source separated and recycled, they must be sent to a C&D recycling and reclamation facility. Materials are not to be sent directly to a landfill or a facility that does not sort and recycle.
 - 2. Regardless of salvage/recycle goal indicated in "General" paragraph above, salvage or recycle 100% of the following construction office waste materials:
 - a. Paper
 - b. Aluminum cans
 - c. Glass containers
- D. All solid waste management facilities must be permitted to operate by NCDEQ in accordance with 15A NCAC 13B .0201.
- 1.13 DUMPSTER SERVICES
- A. Contractor is responsible for providing the dumpster for the project.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

- 3.1 PLAN IMPLEMENTATION
- A. General: Implement approved waste management plan. Provide handling, containers, storage, signage, transportation, and other items as required to implement waste management plan during the entire duration of the Contract.
 - 1. Comply with operation, termination, and removal requirements in Section 01 50 00 "Temporary Facilities and Controls."
 - B. Training: Train workers, subcontractors, and suppliers on proper waste management procedures, as appropriate for the Work.
 - 1. Distribute waste management plan to everyone concerned within three days of submittal return.
 - 2. Distribute waste management plan to entities when they first begin work on-site. Review plan procedures and locations established for salvage, recycling, and disposal.

- C. Site Access and Temporary Controls: Conduct waste management operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
 - 1. Designate and label specific areas on Project site necessary for separating materials that are to be salvaged, recycled, reused, donated, and sold.
 - 2. Comply with Section 01 50 00 "Temporary Facilities and Controls" for controlling dust and dirt, environmental protection, and noise control.

3.2 SALVAGING DEMOLITION WASTE

- A. Salvaged Items for Reuse in the Work: Salvage items for reuse and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until installation.
 - 4. Protect items from damage during transport and storage.
 - 5. Install salvaged items to comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make items functional for use indicated.
- B. Salvaged Items for Owner's Use: Salvage items for Owner's use and handle as follows:
 - 1. Clean salvaged items.
 - 2. Pack or crate items after cleaning. Identify contents of containers with label indicating elements, date of removal, quantity, and location where removed.
 - 3. Store items in a secure area until delivery to Owner.
 - 4. Transport items to Owner's storage area on-site.
 - 5. Protect items from damage during transport and storage.
- C. Doors and Hardware: Brace open end of door frames. Except for removing door closers, leave door hardware attached to doors.
- D. Equipment: Drain tanks, piping, and fixtures. Seal openings with caps or plugs. Protect equipment from exposure to weather.
- E. Plumbing Fixtures: Separate by type and size.
- F. Lighting Fixtures: Separate lamps by type and protect from breakage.
- G. Electrical Devices: Separate switches, receptacles, switchgear, transformers, meters, panelboards, circuit breakers, and other devices by type.

3.3 RECYCLING DEMOLITION AND CONSTRUCTION WASTE, GENERAL

- A. General: Recycle paper and beverage containers used by on-site workers.
- B. Recycling Incentives: Revenues, savings, rebates, tax credits, and other incentives received for recycling waste materials shall accrue to Contractor.

- C. Preparation of Waste: Prepare and maintain recyclable waste materials according to recycling or reuse facility requirements. Maintain materials free of dirt, adhesives, solvents, petroleum contamination, and other substances deleterious to the recycling process.
- D. Procedures: Separate recyclable waste from other waste materials, trash, and debris. Separate recyclable waste by type at Project site to the maximum extent practical according to approved construction waste management plan.
 - 1. Provide appropriately marked containers or bins for controlling recyclable waste until removed from Project site. Include list of acceptable and unacceptable materials at each container and bin.
 - 2. Inspect containers and bins for contamination and remove contaminated materials if found.
 - 3. Stockpile processed materials on-site without intermixing with other materials. Place, grade, and shape stockpiles to drain surface water. Cover to prevent windblown dust.
 - 4. Stockpile materials away from construction area. Do not store within drip line of remaining trees.
 - 5. Store components off the ground and protect from the weather.
 - 6. Remove recyclable waste from Owner's property and transport to recycling receiver or processor.

3.4 RECYCLING DEMOLITION WASTE

- A. Asphalt Paving: Break up and transport paving to asphalt-recycling facility.
- B. Concrete: Remove reinforcement and other metals from concrete and sort with other metals.
- C. Masonry: Remove metal reinforcement, anchors, and ties from masonry and sort with other metals.
 - 1. Clean and stack undamaged, whole masonry units on wood pallets.
- D. Wood Materials: Sort and stack members according to size, type, and length. Separate lumber, engineered wood products, panel products, and treated wood materials.
- E. Metals: Separate metals by type.
 - 1. Structural Steel: Stack members according to size, type of member, and length.
 - 2. Remove and dispose of bolts, nuts, washers, and other rough hardware.
- F. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location. Remove edge trim and sort with other metals. Remove and dispose of fasteners.
- G. Acoustical Ceiling Panels and Tile: Stack large clean pieces on wood pallets and store in a dry location.

- H. Metal Suspension System: Separate metal members including trim, and other metals from acoustical panels and tile and sort with other metals.
- I. Carpet and Pad: Roll large pieces tightly after removing debris, trash, adhesive, and tack strips.
 - 1. Store clean, dry carpet and pad in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- J. Carpet Tile: Remove debris, trash, and adhesive.
 - 1. Stack tile on pallet and store clean, dry carpet in a closed container or trailer provided by Carpet Reclamation Agency or carpet recycler.
- K. Piping: Reduce piping to straight lengths and store by type and size. Separate supports, hangers, valves, sprinklers, and other components by type and size.
- L. Conduit: Reduce conduit to straight lengths and store by type and size.

3.5 RECYCLING CONSTRUCTION WASTE

- A. Packaging:
 - 1. Cardboard and Boxes: Break down packaging into flat sheets. Bundle and store in a dry location.
 - 2. Polystyrene Packaging: Separate and bag materials.
 - 3. Pallets: As much as possible, require deliveries using pallets to remove pallets from Project site. For pallets that remain on-site, break down pallets into component wood pieces and comply with requirements for recycling wood.
 - 4. Crates: Break down crates into component wood pieces and comply with requirements for recycling wood.
- B. Wood Materials:
 - 1. Clean Cut-Offs of Lumber: Grind or chip into small pieces.
 - 2. Clean Sawdust: Bag sawdust that does not contain painted or treated wood.
- C. Gypsum Board: Stack large clean pieces on wood pallets or in container and store in a dry location.
 - 1. Clean Gypsum Board: Grind scraps of clean gypsum board using small mobile chipper or hammer mill. Screen out paper after grinding.

3.6 DISPOSAL OF WASTE

- A. General: Except for items or materials to be salvaged, recycled, or otherwise reused, remove waste materials from Project site and legally dispose of them in a landfill or incinerator acceptable to authorities having jurisdiction.
 - 1. Except as otherwise specified, do not allow waste materials that are to be disposed of accumulate on-site.
 - 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
- B. Burning: Do not burn waste materials.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Demolition Package Rev 1

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02B
28 October 2024

- C. Disposal: Remove waste materials from Owner's property and legally dispose of them.

END OF SECTION

SECTION 01 77 00

CLOSEOUT

PART 1 GENERAL

1.1 SUMMARY

- A. This Section includes administrative and procedural requirements for contract closeout including, but not limited to, the following:
 - 1. Final Acceptance / Beneficial Occupancy procedures.
 - 2. Final completion procedures.
 - 3. Final cleaning.
 - 4. Repair of the Work.
- B. Related Sections: The following Sections contain requirements that relate to this Section:
 - 1. Section 00 60 00 "Project Forms" for Completion Checklists and Project Acceptance forms.
 - 2. Section 01 29 00 "Payment Procedures" for Payment at Final Acceptance .
 - 3. Section 01 31 00 "Project Management & Coordination" for information regarding the Project Website used for the Punch List(s).
 - 4. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
 - 5. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
 - 6. Section 01 78 46 "Maintenance Materials" for submitting maintenance materials requirements.
 - 7. Section 01 79 00 "Demonstration & Training" for completing training and submitting documentation of completed training.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.3 ACTION SUBMITTALS

- A. Product Data: For cleaning agents used during Final Clean.
- B. Contractor's Pre-Final Punch List: Submitted no later than thirty (30) calendar days prior to Final Acceptance.

- C. Final Inspection Punch List: Submitted at Final Acceptance. All work must be complete within thirty (30) calendar days of the Final Inspection.

1.4 CLOSEOUT SUBMITTALS

- A. As listed in the checklists referenced in Paragraph 1.5 of this Section, and as itemized in the various Specification Sections of this Project Manual.
- B. Certificates of Release: From authorities having jurisdiction.
- C. Certificate of Insurance: For continuing coverage.
- D. Closeout Submittal Log: Contractor shall, at 50% complete, as determined by the project schedule, submit to Designer a log of schedule of all Closeout Submittals required by the Project Documents.

1.5 MAINTENANCE MATERIAL SUBMITTALS

- A. Schedule of Maintenance Material Items: For maintenance material submittal items specified in other Sections.

1.6 FINAL ACCEPTANCE PROCEDURES

- A. The checklists and timelines listed herein are organized in a manner to prepare the Project Team for SCO's Inspection for Beneficial Occupancy (if applicable) and SCO's Final Inspection for Final Acceptance. The checklists provided herein are required to be completed in the timelines provided herein in their entirety, but the checklists do not replace the SCO Forms for Beneficial Occupancy and Final Acceptance, both of which are included in Section 006000 "Project Forms" and will be uploaded by the Designer to Interscope after the milestone is achieved.
- B. Request for Designers Pre-Final Inspection: No less than ten (10) working days prior to Designer's Pre-Final Inspection, Contractor shall submit to Designer, in an organized .zip folder, the items shown on the Request for Designers Pre-Final Inspection Checklist, as included in Section 006000 "Project Forms".
- C. Request for Final Inspection: No less than ten (10) working days prior to the SCO Final Inspection, Contractor shall submit to Designer, in an organized .zip folder, the items shown on the Request for Final Inspection Checklist, as included in Section 006000 "Project Forms".
 - 1. If the project has a phase that requires Beneficial Occupancy, as noted in Article 23 of the Supplemental General Conditions, use the Request for Final Inspection Checklist to prepare for Beneficial Occupancy.
- D. Final Inspection: To achieve Final Acceptance, all items on the Final Acceptance Checklist must be complete. Contractor shall submit to Designer, in an organized .zip folder, all items shown on the Final Acceptance Checklist. Once all items on the Final Acceptance Checklist are complete, the Project has achieved Final Acceptance.

- E. Project Closeout: Prior to Final Payment, Contractor must submit all items on the Project Closeout Checklist as included in Section 006000 "Project Forms".

1.7 LIST OF INCOMPLETE ITEMS (CONTRACTORS COMPLETION / DESIGNER PUNCH LIST)

- A. Preparation: Include name and identification of each space and area affected by construction operations for incomplete items and items needing correction including, if necessary, areas disturbed by Contractor that are outside the limits of construction.
 - 1. Organize list of spaces in sequential order, proceeding from lowest floor to highest floor.
 - 2. Organize items applying to each space by major element, including categories for ceiling, individual walls, floors, equipment, and building systems.
 - 3. Include the following information at the top of each page:
 - a. NC State Project Name and location.
 - b. NC State Project Number, Code & Item, and State Construction Office Project Number.
 - c. Date.
 - d. Name of Designer.
 - e. Name of Contractor.
 - f. Page number.
- B. Submit list of incomplete items using Web-based Project Information Management Systems,. Designer will utilize agreed upon electronic tracking system (Project Website). Access shall be provided by the contractor.
 - 1. Required Functions of Web-based Project Information Management Systems:
 - a. Ability to download and sync tasks with Apple iPad over non-persistent wireless internet connection.
 - b. Drawing markup and viewing, for location identification of incomplete items.
 - c. Authorship tracking of each comment and subsequent action, including timestamps.
 - d. Sortable, filterable, itemized listing of incomplete items, by at a minimum unique issue number, date, location, issue author and responsible party.
 - e. Ability to append photos and markups on photos for the purpose of identifying incomplete items and demonstrating completeness of items.
 - f. Ability to incorporate Designer's provided list of pre-generated comments.
- C. Designer will direct all incomplete items to the attention of the Contractor, who shall identify responsible subcontractors.

- D. Contractor shall verify all items for completion prior to forwarding to Designer for action. To the maximum extent feasible, items shall be documented for closeout with clear photographs in the software, taken with context to identify the specific issue is resolved.

1.8 PROJECT RECORD DOCUMENTS

- A. Provide Project Record Documents as specified in Section 01 78 39 "Project Record Documentation".

1.9 OPERATION AND MAINTENANCE MANUALS

- A. Assemble and provide complete set of operation and maintenance data as specified in Section 01 78 23 "Operation & Maintenance Data".
- B. Submit maintenance material submittals specified in individual Sections, including tools, spare parts, extra materials, and similar items, and deliver to location designated by Architect. Label with manufacturer's name and model number where applicable.
 - 1. Schedule of Maintenance Material Items: Prepare and submit schedule of maintenance material submittal items, including name and quantity of each item and name and number of related Specification Section. Obtain Architect's signature for receipt of submittals.

1.10 SUBMITTAL OF PROJECT WARRANTIES

- A. Submit written warranties as specified in Section 01 78 23 "Operation & Maintenance Data".

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cleaning Agents: Use cleaning materials and agents recommended by the manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.
 - 1. Use cleaning products that comply with Green Seal's GS-37, or if GS-37 is not applicable, use products that comply with the California Code of Regulations maximum allowable VOC levels.

PART 3 EXECUTION

3.1 FINAL CLEANING

- A. General: Provide final cleaning. Conduct cleaning and waste-removal operations to comply with local laws and ordinances and Federal and local environmental and antipollution regulations.
- B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to condition expected in an average commercial building cleaning and maintenance program. Comply with manufacturer's written instructions.
 - 1. Complete the following cleaning operations before requesting Designers Pre-Final Inspection:
 - a. Clean Project site, yard, and grounds, in areas disturbed by construction activities, including landscape development areas, of rubbish, waste material, litter, and other foreign substances.
 - b. Sweep paved areas broom clean. Remove petrochemical spills, stains, and other foreign deposits.
 - c. Rake grounds that are not planted, mulched, or paved to a smooth, even-textured surface.
 - d. Remove tools, construction equipment, machinery, and surplus material from Project site.
 - e. Remove snow and ice to provide safe access to building.
 - f. Clean exposed hard-surfaced finishes to a dirt-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition.
 - g. Remove debris and surface dust from limited access spaces, including plenums, shafts, and similar spaces.
 - h. Sweep concrete floors broom clean in unoccupied spaces.
 - i. Vacuum carpet and similar soft surfaces, removing debris and excess nap; shampoo if visible soil or stains remain.
 - j. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other noticeable, vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Polish mirrors and glass, taking care not to scratch surfaces. Remove labels that are not meant to be permanent.
 - k. Wipe surfaces of mechanical and electrical equipment, and similar equipment. Remove excess lubrication, paint and mortar droppings, and other foreign substances.
 - l. Clean plumbing fixtures to a sanitary condition, free of stains, including stains resulting from water exposure.
 - m. Replace disposable air filters and clean permanent air filters. Clean exposed surfaces of diffusers, registers, and grills.

- n. Clean ducts, blowers, and coils if units were operated without filters during construction.
 - o. Clean light fixtures, lamps, globes, and reflectors to function with full efficiency. Replace burned-out bulbs, and those noticeably dimmed by hours of use, and defective and noisy starters in lighting fixtures to comply with requirements for new fixtures.
 - p. Leave Project clean and ready for occupancy.
- C. Pest Control: Comply with pest control requirements in Section 01 50 00 "Temporary Facilities and Controls." Prepare written report.
- D. Construction Waste Disposal: Comply with waste disposal requirements in Section 01 74 19 "Construction Waste Management and Disposal."

3.2 REPAIR OF THE WORK

- A. Complete repair and restoration operations before requesting inspection for determination of Substantial Completion.
- B. Repair or remove and replace defective construction. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment. Where damaged or worn items cannot be repaired or restored, provide replacements. Remove and replace operating components that cannot be repaired. Restore damaged construction and permanent facilities used during construction to specified condition.
- 1. Remove and replace chipped, scratched, and broken glass, reflective surfaces, and other damaged transparent materials.
 - 2. Touch up and otherwise repair and restore marred or exposed finishes and surfaces. Replace finishes and surfaces that already show evidence of repair or restoration.
 - a. Do not paint over "UL" and other required labels and identification, including mechanical and electrical nameplates. Remove paint applied to required labels and identification.
 - b. Do not paint over labels for fire resistive joints.
 - 3. Replace parts subject to operating conditions during construction that may impede operation or reduce longevity.
 - 4. Replace burned-out bulbs, bulbs noticeably dimmed by hours of use, and defective and noisy starters in fluorescent and mercury vapor fixtures to comply with requirements for new fixtures.

END OF SECTION

SECTION 01 78 23

OPERATION & MAINTENANCE DATA

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:
 - 1. Operation and maintenance documentation directory.
 - 2. Emergency procedures manuals.
 - 3. Operation manuals for systems, subsystems, and equipment.
 - 4. Product maintenance manuals.
 - 5. Systems and equipment maintenance manuals.

1.2 RELATED DOCUMENTS

- A. Section 00 60 00 "Project Forms" for forms preparing for Final Acceptance.
- B. Section 01 33 00 "Submittal Procedures" for requirements associated with the submission and approval of Submittals.
- C. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.
- D. Section 01 91 13 - General Commissioning Requirements for verification and compilation of data into operation and maintenance manuals.

1.3 DEFINITIONS

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

1.4 CLOSEOUT SUBMITTALS

- A. Manual Content: Operations and maintenance manual content is specified in individual Specification Sections to be reviewed at the time of Section submittals. Submit reviewed manual content formatted and organized as required by this Section.
 - 1. Architect and Commissioning Authority will comment on whether content of operations and maintenance submittals are acceptable.

2. Where applicable, clarify and update reviewed manual content to correspond to revisions and field conditions.
 - B. Format: Submit operations and maintenance manuals in the following format:
 1. PDF electronic file. Assemble each manual into a composite electronically indexed file. Submit on digital media acceptable to Architect.
 - a. Name each indexed document file in composite electronic index with applicable item name. Include a complete electronically linked operation and maintenance directory.
 - b. Enable inserted reviewer comments on draft submittals.
 - C. Initial Manual Submittal: Submit draft copy of each manual at least 30 days before commencing demonstration and training. Architect and Commissioning Authority will comment on whether general scope and content of manual are acceptable.
 - D. Final Manual Submittal: Submit each manual in final form prior to requesting inspection for Substantial Completion and at least 15 days before commencing demonstration and training. Architect and Commissioning Authority will return copy with comments.
 1. Correct or revise each manual to comply with Architect's and Commissioning Authority's comments. Submit copies of each corrected manual within 15 days of receipt of Architect's comments and prior to commencing demonstration and training.
 - E. Print one set of hard copies of the Operation and Maintenance Manuals into suitable sets of manageable size. Bind and index data in heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, with pocket inside the covers to receive folded oversized sheets. Identify each binder on front and spine with the printed title "OPERATION AND MAINTENANCE MANUAL," Project name, and subject matter of contents.
- 1.5 COORDINATION
- A. Where operation and maintenance documentation include information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

- A. Directory: Prepare a single, comprehensive directory of emergency, operation, and maintenance data and materials, listing items and their location to facilitate ready access to desired information. Include a section in the directory for each of the following:
 1. List of documents.

2. List of systems.
 3. List of equipment.
 4. Table of contents.
- B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.
- C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.
- D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.
- E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."
- 2.2 REQUIREMENTS FOR EMERGENCY, OPERATION, AND MAINTENANCE MANUALS
- A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:
1. Title page.
 2. Table of contents.
 3. Manual contents.
- B. Title Page: Include the following information:
1. Subject matter included in manual.
 2. Name and address of Project.
 3. Name and address of Owner.
 4. Date of submittal.
 5. Name and contact information for Contractor.
 6. Name and contact information for Construction Manager.
 7. Name and contact information for Architect.
 8. Name and contact information for Commissioning Authority.
 9. Names and contact information for major consultants to the Architect that designed the systems contained in the manuals.
 10. Cross-reference to related systems in other operation and maintenance manuals.
- C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.
- D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.
- E. Manuals, Electronic Files: Submit manuals in the form of a multiple file composite electronic PDF file for each manual type required.
 1. Electronic Files: Use electronic files prepared by manufacturer where available. Where scanning of paper documents is required, configure scanned file for minimum readable file size.
 2. File Names and Bookmarks: Enable bookmarking of individual documents based on file names. Name document files to correspond to system, subsystem, and equipment names used in manual directory and table of contents. Group documents for each system and subsystem into individual composite bookmarked files, then create composite manual, so that resulting bookmarks reflect the system, subsystem, and equipment names in a readily navigated file tree. Configure electronic manual to display bookmark panel on opening file.

2.3 EMERGENCY PROCEDURES MANUALS

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

2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION AND MAINTENANCE MANUALS

- A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:
1. System, subsystem, and equipment descriptions. Use designations for systems and equipment indicated on Contract Documents.
 2. Performance and design criteria if Contractor has delegated design responsibility.
 3. Operating standards.
 4. Operating procedures.
 5. Operating logs.
 6. Wiring diagrams.
 7. Control diagrams.
 8. Piped system diagrams.
 9. Noise and vibration adjustments.
 10. Precautions against improper use.
 11. License requirements including inspection and renewal dates.
- B. Descriptions: Include the following:
1. Product name and model number. Use designations for products indicated on Contract Documents.
 2. Manufacturer's name.
 3. Equipment identification with serial number of each component.
 4. Equipment function.
 5. Operating characteristics.
 6. Limiting conditions.
 7. Performance curves, and effective energy utilization.
 8. Engineering data and tests.
 9. Complete nomenclature and number of replacement parts.
- C. Operating Procedures: Include the following, as applicable:
1. Startup procedures.
 2. Equipment or system break-in procedures.
 3. Routine and normal operating instructions.
 4. Regulation and control procedures.
 5. Instructions on stopping.
 6. Normal shutdown instructions.
 7. Seasonal and weekend operating instructions.
 8. Required sequences for electric or electronic systems.
 9. Special operating instructions and procedures.
- D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

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

2.5 PRODUCT MAINTENANCE MANUALS

- A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.
- B. Source Information: List each product included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Product Information: Include the following, as applicable:
 - 1. Product name and model number.
 - 2. Manufacturer's name.
 - 3. Color, pattern, and texture.
 - 4. Material and chemical composition.
 - 5. Reordering information for specially manufactured products.
- D. Maintenance Procedures: Include manufacturer's written recommendations and the following:
 - 1. Inspection procedures.
 - 2. Types of cleaning agents to be used and methods of cleaning.
 - 3. List of cleaning agents and methods of cleaning detrimental to product.
 - 4. Schedule for routine cleaning and maintenance.
 - 5. Maintenance record forms.
 - 6. Repair instructions.
- E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.
- F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUALS

- A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

- B. Source Information: List each system, subsystem, and piece of equipment included in manual, identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual and drawing or schedule designation or identifier where applicable.
- C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:
 - 1. Standard maintenance instructions and bulletins.
 - 2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
 - 3. Identification and nomenclature of parts and components.
 - 4. List of items recommended to be stocked as spare parts.
- D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:
 - 1. Test and inspection instructions.
 - 2. Troubleshooting guide.
 - 3. Precautions against improper maintenance.
 - 4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - 5. Aligning, adjusting, and checking instructions.
 - 6. Demonstration and training video recording, if available.
- E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.
 - 1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
 - 2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.
- F. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.
- G. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.
- H. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.
 - 1. Include procedures to follow and required notifications for warranty claims.

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PART 3 EXECUTION (NOT USED)

END OF SECTION

OPERATION & MAINTENANCE DATA

01 78 23 - 8

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for submitting as-builts, record Drawings, record Specifications, and record Product Data.

1.2 RELATED DOCUMENTS

- A. Section 01 77 00 "Closeout Procedures" for administrative and procedural requirements for contract closeout.
- B. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.

1.3 DEFINITIONS

- A. As-Builts: Drawings and Specifications maintained and updated by Contractor during construction.
- B. Record Drawings: Drawings maintained and updated by Architect during construction utilizing Contractor's As-Builts.
- C. Record Specifications: Specifications maintained and updated by Architect during construction utilizing Contractor's As-Builts.

1.4 CLOSEOUT SUBMITTALS

- A. As-Builts: Comply with the following:
 - 1. Initial Submittal:
 - a. Submit consolidated PDF electronic files of most current marked-up Drawings and Specifications.
 - b. Owner and Architect will indicate whether general scope of changes, additional information recorded, and quality of drafting are acceptable.
 - 2. Final Submittal:
 - a. Submit PDF electronic files of As-Builts.
- B. Record Product Data: Submit annotated PDF electronic files and directories of each submittal. Record Product Data shall include Architect's final review and acceptance of each submittal.
 - 1. Include Record Product Data directory organized by Specification Section number and title, electronically linked to each item of Record Product Data.

- C. Miscellaneous Record Submittals: See other Specification Sections for miscellaneous record-keeping requirements and submittals in connection with various construction activities. Submit annotated PDF electronic files and directories of each submittal.
 - 1. Include miscellaneous record submittals directory organized by Specification Section number and title, electronically linked to each item of miscellaneous record submittals.

1.5 AS-BUILT DRAWINGS AND SPECIFICATIONS

- A. General: As-builts are required to show all changes in the work relative to the original contract documents; and show additional information of value to Owner's records, but not indicated in original contract documents.
- B. Maintenance of As-Built Drawings During Construction: During progress of the work, maintain a set of contract drawings along with specifications and shop drawings. Update these drawings weekly, at a minimum, with markup of actual installations, which vary from the work as originally shown.
 - 1. Mark whatever drawing is most capable of showing actual physical condition, fully and accurately, and reference all other appearances of this work to the sheet, which was updated. Include cross-reference to the official change number on the updated sheet and all additional sheets where the work is shown.
 - 2. Give particular attention to information on work concealed, which would be difficult to identify or measure and record at a later date.
 - 3. Note alternative numbers, change order numbers and similar identification for any change.
 - 4. Maintain and have available for review in conjunction with the regular project meetings, a current set of the as- built drawings and specifications marked with "as constructed" information. Availability for review, and acceptability, of both the format and the content is a prerequisite condition for certification of monthly pay requests by the Owner and Architect. Comply with Requirements in Section 01 29 00 "Payment Procedures".
- C. Supplemental Drawings: Where marked-up shop drawings are intended for inclusion in the record set, mark cross-reference on contract drawings at corresponding location. Use of shop drawings as supplements to the record as-builts is encouraged for all items which require the larger scale employed on the shop drawings in order to show the work in sufficient detail to be of future use to the Owner.
 - 1. The supplemental document shall be identified as a "Supplementary As-Built Drawing" and shall be numbered with an extension to the contract drawing it supplements in a manner acceptable to the Owner.
- D. Record/Final As-Builts: Before inspection for Certificate of Substantial Completion, submit As-Built Drawings and Specifications to Architect and Owner for review. Comply with requirements in Section 01 77 00 "Closeout Procedures".

1. Format: Annotated PDF Electronic file with comment function enabled.
2. Following the Architect and Owner's review of the As-Built files, and upon authorization by the Architect based on their belief that the marked-up information is accurate and complete, the Architect shall proceed with preparation of Record Drawings and Specifications.

1.6 PROJECT RECORD DOCUMENTS

- A. General: Store Record Documents and As-Builts in the field office apart from the Contract Documents used for construction. Do not use Record Documents and As-Builts for construction purposes. Maintain Record Documents and As-Builts in good order and in a clean, dry, legible condition, protected from deterioration and loss. Provide access to Project Record Documents and As-Builts for Architect's reference during normal working hours.
- B. Record Drawings: Maintain and submit one set of electronic Portable Document Format (.pdf) prints of Contract Drawings and Shop Drawings incorporating all modifications and changes made in As-Built Drawings.
- C. Record Specifications: Submit one copy of Project's Specifications, including addenda and contract modifications. Clearly mark copy to indicate the actual product installation where installation varies from that indicated in Specifications, addenda, and contract modifications.
 1. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 2. Mark copy with the proprietary name and model number of products, materials, and equipment furnished, including substitutions and product options selected.
 3. Note related Change Orders, Record Drawings, and Product Data, where applicable.
- D. Record Product Data:
 1. Recording: Maintain one copy of each submittal during the construction period for Project Record Document purposes. Post changes and revisions to Project Record Documents as they occur; do not wait until end of Project.
 2. Preparation: Mark Product Data to indicate the actual product installation where installation varies substantially from that indicated in Product Data submittal.
 - a. Give particular attention to information on concealed products and installations that cannot be readily identified and recorded later.
 - b. Include significant changes in the product delivered to Project site and changes in manufacturer's written instructions for installation.
 - c. Note related Change Orders, Record Drawings, where applicable.

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- E. Miscellaneous Record Submittals: Assemble miscellaneous records required by other Specification Sections such as tests and inspections, and inspections by authorities having jurisdiction. Electronically bind in Portable Document Format (.pdf) and bookmark miscellaneous records and identify each, ready for continued use and reference.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 78 46

MAINTENANCE MATERIALS AND ATTIC STOCK

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for maintenance materials (commonly referred to as "attic stock").

1.2 RELATED DOCUMENTS

- A. Section 01 77 00 "Closeout" for closeout requirements.
- B. Section 01 78 23 "Operation and Maintenance Data" for operation and maintenance manual requirements.
- C. Section 01 78 39 "Project Record Documents" for submitting record Drawings, record Specifications, and record Product Data.

1.3 CLOSEOUT SUBMITTALS

- A. Schedule of Maintenance Material and Attic Stock Items: For maintenance material submittal items listed below and as specified in other Sections. Contractor shall submit the following a minimum of 5 days prior to requesting an inspection for determining date of Final Acceptance for the Work or a designated portion thereof.
 - 1. Prepare and submit schedule of maintenance material submittal items, including tools, spare parts, extra materials, and similar items including name and quantity of each item and name and number of related Specification Section. Label with manufacturer's name and model number where applicable. Obtain Designer's signature for receipt of submittal.
- B. Maintenance Material and Attic Stock Transmittal: Prior to Final Acceptance, Contractor shall turn over all items on the Schedule of Maintenance Material Items to N.C. State. Contractor shall obtain N.C. State's recipients signature for each item received by each recipient.

PART 2 PRODUCTS

2.1 MATERIALS

- A. None.

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PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 79 00

DEMONSTRATION AND TRAINING

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:
 - 1. Instruction in operation and maintenance of systems, subsystems, and equipment.
 - 2. Demonstration and training video recordings.
 - 3. Descriptions and responsibilities for commissioning demonstration and training requirements.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.
- B. The following sections provide additional demonstration and training requirements:
 - 1. 14 24 00 - Hydraulic Elevators.

1.3 INFORMATIONAL SUBMITTALS

- A. Instruction Program: Submit outline of instructional program for demonstration and training, including a list of training modules and a schedule of proposed dates, times, length of instruction time, and instructors names for each training module. Include learning objective and outline for each training module.
 - 1. Indicated proposed training modules using manufacturer-produced demonstration and training video recordings for systems, equipment, and products in lieu of video recording of live instructional module.
- B. Qualification Data: For facilitator.

1.4 CLOSEOUT SUBMITTALS

- A. Demonstration and Training Video Recordings: Submit two (2) copies within seven (7) working days of the end of each training module.
 - 1. Identification: On each copy, provide an applied label with the following information:
 - a. Name of Project.

- b. Name and address of videographer.
 - c. Name of Designer.
 - d. Name of Construction Manager.
 - e. Name of Contractor.
 - f. Date of video recording.
2. Transcript: Prepared in PDF electronic format. Include a cover sheet with same label information as the corresponding video recording and a table of contents with links to corresponding training components. Include name of Project and date of video recording on each page.
 3. At completion of training, submit complete training manual(s) for Owner's use prepared in same paper and PDF file format required for operation and maintenance manuals specified in Section 01 78 23 "Operation and Maintenance Data."
- B. Attendance Record: For each training module, submit list of participants and length of instruction time.
- C. Evaluations: For each participant and for each training module, submit results and documentation of performance based test.

1.5 QUALITY ASSURANCE

- A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.
- B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Section 01 40 00 "Quality Requirements," experienced in operation and maintenance procedures and training.
- C. Videographer Qualifications: A competent videographer who is experienced photographing demonstration and training events similar to those required. If Contractor is to have their personnel perform the videography, Contractor must send a sample of audio and video quality to Owner and Designer for approval prior to the training being scheduled. Sample audio and video must be representative of the camera and microphone that will be used during the training.
- D. Preinstruction Conference: Conduct conference at Project site to comply with requirements in Section 01 31 00 "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:
1. Inspect and discuss locations and other facilities required for instruction.
 2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
 3. Review required content of instruction.
 4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.6 COORDINATION

- A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations and to ensure availability of Owner's personnel.
- B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.
- C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data have been reviewed and approved by Designer and Owner.

1.7 INSTRUCTION PROGRAM

- A. Program Structure: Develop an instruction program that includes individual training modules for each system and for equipment not part of a system, as required by individual Specification Sections.
- B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following as applicable to the system, equipment, or component:
 - 1. Basis of System Design, Operational Requirements, and Criteria: Include the following:
 - a. System, subsystem, and equipment descriptions.
 - b. Performance and design criteria if Contractor is delegated design responsibility.
 - c. Operating standards.
 - d. Regulatory requirements.
 - e. Equipment function.
 - f. Operating characteristics.
 - g. Limiting conditions.
 - h. Performance curves.
 - 2. Documentation: Review the following items in detail:
 - a. Emergency manuals.
 - b. Systems and equipment operation manuals.
 - c. Systems and equipment maintenance manuals.
 - d. Product maintenance manuals.
 - e. Project Record Documents.
 - f. Identification systems.
 - g. Warranties and bonds.
 - h. Maintenance service agreements and similar continuing commitments.
 - 3. Emergencies: Include the following, as applicable:
 - a. Instructions on meaning of warnings, trouble indications, and error messages.

- b. Instructions on stopping.
 - c. Shutdown instructions for each type of emergency.
 - d. Operating instructions for conditions outside of normal operating limits.
 - e. Sequences for electric or electronic systems.
 - f. Special operating instructions and procedures.
4. Operations: Include the following, as applicable:
- a. Startup procedures.
 - b. Equipment or system break-in procedures.
 - c. Routine and normal operating instructions.
 - d. Regulation and control procedures.
 - e. Control sequences.
 - f. Safety procedures.
 - g. Instructions on stopping.
 - h. Normal shutdown instructions.
 - i. Operating procedures for emergencies.
 - j. Operating procedures for system, subsystem, or equipment failure.
 - k. Seasonal and weekend operating instructions.
 - l. Required sequences for electric or electronic systems.
 - m. Special operating instructions and procedures.
5. Adjustments: Include the following:
- a. Alignments.
 - b. Checking adjustments.
 - c. Noise and vibration adjustments.
 - d. Economy and efficiency adjustments.
6. Troubleshooting: Include the following:
- a. Diagnostic instructions.
 - b. Test and inspection procedures.
7. Maintenance: Include the following:
- a. Inspection procedures.
 - b. Types of cleaning agents to be used and methods of cleaning.
 - c. List of cleaning agents and methods of cleaning detrimental to product.
 - d. Procedures for routine cleaning.
 - e. Procedures for preventive maintenance.
 - f. Procedures for routine maintenance.
 - g. Instruction on use of special tools.
8. Repairs: Include the following:
- a. Diagnosis instructions.
 - b. Repair instructions.
 - c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
 - d. Instructions for identifying parts and components.
 - e. Review of spare parts needed for operation and maintenance.

1.8 PREPARATION

- A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a training manual organized in coordination with requirements in Section 01 78 23 "Operation and Maintenance Data."
- B. Set up instructional equipment at instruction location.

1.9 INSTRUCTION

- A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.
- B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.
 - 1. Designer will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
 - 2. Owner will furnish an instructor to describe Owner's operational philosophy.
 - 3. Owner will furnish Contractor with names and positions of participants.
- C. Scheduling: Provide instruction at mutually agreed-on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.
 - 1. Schedule training with Owner with at least seven days' advance notice.
- D. Training Location and Reference Material: Conduct training on-site in the completed and fully operational facility using the actual equipment in-place. Conduct training using final operation and maintenance data submittals.
- E. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of a demonstration performance-based test.
- F. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

1.10 DEMONSTRATION AND TRAINING VIDEO RECORDINGS

- A. General: Engage a qualified commercial videographer to record demonstration and training video recordings. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.
 - 1. At beginning of each training module, record each chart containing learning objective and lesson outline.

- B. Digital Video Recordings: Provide high-resolution, digital video in MPEG format, produced by a digital camera with minimum recording quality of UHD 4k at 30 fps with vibration reduction technology. Use an external directional microphone (Rode VideoMic GO, or equivalent) to capture audio.
1. Submit video recordings on thumb drive.
 2. File Hierarchy: Organize folder structure and file locations according to Project Manual table of contents. Provide complete screen-based menu.
 3. File Names: Utilize file names based on name of equipment generally described in video segment, as identified in Project specifications.
 4. Contractor and Installer Contact File: Using appropriate software, create a file for inclusion on the equipment demonstration and training recording that describes the following for each Contractor involved on the Project, arranged according to Project Manual table of contents:
 - a. Name of Contractor/Installer.
 - b. Business address.
 - c. Business phone number.
 - d. Point of contact.
 - e. Email address.
- C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to adequately cover area of demonstration and training. Display continuous running time.
1. Film training session(s) in segments not to exceed 15 minutes.
 - a. Produce segments to present a single significant piece of equipment per segment.
 - b. Organize segments with multiple pieces of equipment to follow order of Project Manual table of contents.
 - c. Where a training session on a particular piece of equipment exceeds 15 minutes, stop filming and pause training session. Begin training session again upon commencement of new filming segment.
- D. Light Levels: Verify light levels are adequate to properly light equipment. Verify equipment markings are clearly visible prior to recording.
1. Furnish additional portable lighting as required.
- E. Narration: Describe scenes on video recording by audio narration by microphone while video recording is recorded. Include description of items being viewed.
- F. Transcript: Provide a transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.
- G. Preproduced Video Recordings: Provide video recordings used as a component of training modules in same format as recordings of live training.

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PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION (NOT USED)

END OF SECTION

SECTION 01 81 13.14

SUSTAINABLE DESIGN REQUIREMENTS - LEED V4 BD+C

PART 1 GENERAL

1.1 SUMMARY

- A. Section includes general requirements and procedures for compliance with USGBC's LEED prerequisites and credits needed for Project to obtain LEED Silver certification based on USGBC's "LEED Version 4 for Building Design and Construction for Healthcare" (hereafter, LEED v4 BD+C).
 - 1. Specific requirements for LEED are also included in other Sections.
 - 2. Other LEED prerequisites and credits needed to obtain LEED certification depend on product selections and may not be specifically identified as LEED requirements. Compliance with requirements needed to obtain LEED prerequisites and credits may be used as one criterion to evaluate substitution requests and comparable product requests.
 - 3. A copy of LEED Project checklist is attached at end of this Section for information only.
 - a. Some LEED prerequisites and credits needed to obtain indicated LEED certification depend on Architect's design and other aspects of Project that are not part of the Work of the Contract.

1.2 DEFINITIONS

- A. LEED: USGBC's "LEED v4 for Healthcare."
 - 1. Definitions that are a part of "LEED v4 for Healthcare" apply to this Section.
- B. Adequate Ventilation: Ventilation, including air circulation and air changes, required to cure materials, dissipate humidity, and prevent accumulation of dust, fumes, vapors and gases.
- C. Alternative Daily Cover (ADC): Cover material other than earthen material placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.
- D. Biobased Material: Commercial or industrial products (other than food or feed) that are composed in whole, or in significant part, of biological products, renewable agricultural materials (including plant, animal, and marine materials), or forestry materials. For the purposes of LEED, this excludes leather and other animal hides. Products meeting the Sustainable Agriculture Network's Sustainable Agriculture Standard. Raw bio-based materials must be tested using ASTM Test Method D6866 and be legally harvested, as defined by the exporting and receiving country.

- E. BUG Rating: Classification system for luminaires defined in terms of backlight (B), uplight (U), and glare (G).
- F. CARB: California Air Resources Board.
- G. CDPH: California Department of Public Health.
- H. California Department of Public Health Standard v1.1-2010: Standard method for the testing and evaluation of volatile organic chemical emissions from indoor sources using environmental chambers, emission testing method for California specification 01350.
- I. Chain-of-Custody Certificates: Certificates signed by manufacturers certifying that wood used to make products was obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001. Certificates shall include evidence that manufacturer is certified for chain of custody by an FSC-accredited certification body.
- J. Cradle to Cradle Certification: The Cradle-to-Cradle Product Standard looks at a product through five quality categories – material health, material reutilization, renewable energy and carbon management, water stewardship, and social fairness. A product receives an achievement level in each category – Basic, Bronze, Silver, Gold, or Platinum.
- K. Cradle-to-Gate Assessment: Analysis of a product's partial life-cycle from extraction (cradle) to gate (factory completion prior to distribution).
- L. Declare Label: A public disclosure through chemical analysis, raw material source location that discloses product ingredients. Declare also looks for chemicals on the Living Future Institute's Red List, which defines substances of concern in the built environment.
- M. Environmental Product Declaration (EPD): A verified document that reports environmental data of products based on life cycle assessment (LCA) and other relevant information and in accordance with the international standard ISO 14025 (Type III Environmental Declarations).
- N. FSC: Forest Stewardship Council
- O. Health Product Declaration (HPD): A standard format for transparent disclosure of building product ingredients and associated hazards to human health, overseen by the non-profit Health Product Declaration Collaborative.
- P. Inherently Non-Emitting Sources: Products that are inherently non-emitting sources of VOCs (stone, ceramic, powder-coated metals, plated or anodized metal, glass, concrete, clay brick, and unfinished or untreated solid wood flooring) are considered fully compliant without any VOC emissions testing if they do not include integral organic-based surface coatings, binders, or sealants.
- Q. LEED: USGBC's "LEED Version 4 for Building Design and Construction." Definitions that are part of this document apply to this Section.

- R. Life-Cycle Assessment: Evaluation of environmental impacts of a product from cradle to gate, defined by ISO 14040 and ISO 14044.
 - S. Life-Cycle Inventory: Database that defines environmental input and output for each step in a material or assembly's life cycle.
 - T. Recycled Content: The recycled content value of a material assembly shall be determined by weight. The recycled fraction of the assembly is then multiplied by the cost of assembly to determine the recycled content value.
 - 1. "Postconsumer" material is defined as waste material generated by households or by commercial, industrial, and institutional facilities in their role as end users of the product, which can no longer be used for its intended purpose.
 - 2. "Preconsumer" material is defined as material diverted from the waste stream during the manufacturing process. Reutilization of materials (such as rework, regrind, or scrap generated in a process and capable of being reclaimed within the same process that generated it) is excluded.
 - U. Regional Materials: Materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site. If only a fraction of a product or material is extracted/harvested/recovered and manufactured locally, then only that percentage (by weight) shall contribute to the regional value.
 - V. SCAQMD: South Coast Air Quality Management District.
 - W. Solar Reflectance Index (SRI): The measure of a constructed surface's ability to stay cool in the sun by reflecting solar radiation and emitting thermal radiation. SRI values range from zero (solid black surface) to 100 (solid white surface). SRI value of a material is calculated according to ASTM E1980 and based on the aged tested values of solar reflectance and thermal emittance.
 - X. Vertical Illuminance: Illuminance levels calculated at a point on a vertical service or plane.
- 1.3 PREINSTALLATION MEETINGS
- A. Preinstallation Conference: Conduct conference at Project site. Review LEED requirements and action plans for compliance with requirements.
- 1.4 ADMINISTRATIVE REQUIREMENTS
- A. Respond to questions and requests from Architect about USGBC's LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures, until USGBC has made its determination on Project's LEED certification application.

- B. Submit documentation to USGBC and respond to questions and requests from USGBC about its LEED prerequisites and credits that are Contractor's responsibility, that depend on product selection or product qualities, or that depend on Contractor's procedures, until USGBC has made its determination on Project's LEED certification application.
 - 1. Document correspondence with USGBC as informational submittals.

1.5 ACTION SUBMITTALS

- A. General: Submit sustainable design submittals required by other Sections.
- B. Sustainable design submittals are in addition to other submittals.
 - 1. If submitted item is identical to that proposed to comply with other requirements, include additional copy with other submittal as a record of compliance with indicated LEED requirements instead of separate sustainable design submittal. Mark additional copy "Sustainable design submittal."
 - 2. All sustainable design submittals shall include the Sustainable Design Verification Form, with all applicable information indicated on the form. The form is included at the end of this section, and a digital copy is available upon request.
- C. LEED Action Plans: Provide preliminary submittals within 14 days of date established for the Notice to Proceed indicating how the following requirements will be met.
 - 1. Prerequisite: Construction and Demolition Waste Management Planning and Credit: Construction and Demolition Waste Management must comply with Section 01 74 29, "Construction Waste Management."
 - 2. Credit: Construction IAQ Management Plan During Construction: Construction indoor air quality management plan. Reference section 01 51 51 "Construction Indoor Air Quality Management Requirements".
 - 3. List of products and estimated value of products that may contribute to the following LEED credit requirements:
 - a. MR Credit: Environmental Product Declaration
 - 1) Environmental Product Declaration
 - 2) Multi-Attribute Optimization
 - b. MR Credit: Sourcing of Raw Materials
 - 1) Raw Material Source and Extraction Reporting
 - c. Leadership Extraction Practices
 - 1) MR Credit: Optimization of Material Ingredients
 - 2) Material Ingredient Reporting
 - 3) Material Ingredient Optimization
 - 4) Product Manufacturer Supply Chain Optimization
 - 4. EQ Credit: Low Emitting Materials - Provide a list of products that contribute to the following material categories:
 - a. Wet Applied Products
 - b. Composite Wood Products
 - c. Furniture

- d. Insulation
 - e. Exterior Applied Products
- D. Sustainable Design Documentation Submittals:
1. Documentation for luminaires indicating BUG ratings, lumens emitted, and vertical illuminance values.
 2. Documentation for compliant paving materials indicating the SRI, SR, and permeability.
 3. Documentation for compliant roofing materials indicating the SRI.
 4. Product Data and certification for WaterSense-labeled water fixtures.
 5. Product Data for plumbing fixtures indicating flush or flow rate.
 6. Documentation complying with Section 01 91 13 "General Commissioning Requirements," Section 01 91 19.43 "Exterior Enclosure Commissioning," Section 21 08 00 "Commissioning of Fire Suppression," Section 22 08 00 "Commissioning of Plumbing," Section 23 08 00 "Commissioning of HVAC," and Section 26 08 00 "Commissioning of Electrical Systems."
 7. Environmental Product Declarations (EPDs) complying with LEED requirements.
 8. Documentation for products that comply with LEED requirements for multi-attribute optimization.
 - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
 - b. Include documentation for any applicable third-party certifications.
 9. Sustainability reports for products that comply with LEED requirements for raw material and source extraction reporting.
 10. Documentation for products that comply with LEED requirements for leadership extraction practices. Include the following:
 - a. Product Data and certification letter from product manufacturers, indicating participation in an extended producer responsibility program and statement of costs.
 - b. Product Data and certification for bio-based materials, indicating that they comply with requirements. Include statement of costs.
 - c. Product Data and chain-of-custody certificates for products containing certified wood. Include invoices.
 - d. Receipts for salvaged and refurbished materials used for Project, indicating sources and costs.
 - e. Product Data and certification letter from product manufacturers, indicating percentages by weight of postconsumer and preconsumer recycled content for products having recycled content. Include statement of costs.
 - f. Documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
 - 1) Documentation that all lighting is LED or otherwise compliant with LEED Credit PBT Source Reduction – Mercury.

11. Material ingredient reports for products that comply with LEED requirements for material ingredient reporting.
12. Documentation for products that comply with LEED requirements for material ingredient optimization.
13. Documentation for products that comply with LEED requirements for product manufacturer supply chain optimization.
 - a. Include documentation for regional materials, indicating location and distance from Project of material manufacturer and point of extraction, harvest, or recovery for each raw material and costs of regional materials.
14. Documentation complying with Section 01 74 19 "Construction Waste Management and Disposal."
15. Product Data for adhesives and sealants used inside weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
16. Product Data for paints and coatings used inside weatherproofing system, indicating VOC content and laboratory test reports showing compliance with requirements for low-emitting materials.
17. Laboratory test reports for flooring, indicating compliance with requirements for low-emitting materials.
18. Laboratory test reports for products containing composite wood or agrifiber products or wood glues, indicating compliance with requirements for low-emitting materials.
19. Laboratory test reports for ceilings, walls, and thermal insulation, indicating compliance with requirements for low-emitting materials.
20. Construction Indoor-Air-Quality (IAQ) Management:
 - a. Construction IAQ management plan.
 - b. Product Data for temporary filtration media.
 - c. Product Data for filtration media used during occupancy.
 - d. Construction Documentation: Six photographs at three different times during construction period, along with brief description of SMACNA approach employed, documenting implementation of IAQ management measures, including protection of ducts and on-site stored or installed absorptive materials.
21. IAQ Assessment:
 - a. Signed statement describing the building air flush-out procedures, including dates when flush-out was begun and completed and statement that filtration media was replaced after flush-out.
 - b. Product Data for filtration media used during flush-out and occupancy.
 - c. Report from testing and inspecting agency indicating results of IAQ testing and documentation that show compliance with IAQ testing procedures and requirements
22. Building Energy & Water Metering
 - a. Product Data and wiring diagrams for sensors and data collection system used to provide continuous metering of base building energy and water consumption performance over time.

23. Materials and Resources: Product Disclosure and Optimization – Environmental Product Declarations. Option 1. Environmental Product Declarations. For each product submit:
 - a. If available, provide a product-specific Type III EPD —third-party certified EPD including external verification in accordance with ISO 14025.
 - b. Alternative, submit an industry-wide (generic) EPD — products with third-party certified EPD including external verification in accordance with ISO 14025 in which the manufacturer is explicitly recognized as a participant by the program operator.
 - c. Alternative, submit product specific declaration — publicly available, critically reviewed life-cycle assessment conforming to ISO 14044 that has at least a cradle to gate scope.
24. Fundamental Refrigerant Management
 - a. Product Data for new HVAC equipment indicating absence of CFC and HCFC refrigerants, and for clean-agent fire-extinguishing systems indicating absence of CFC, HCFC and Halon.
25. Fundamental Refrigerant Management
 - a. Product Data for new HVAC equipment indicating absence of CFC and HCFC refrigerants, and for clean-agent fire-extinguishing systems indicating absence of CFC, HCFC and Halon

1.6 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Sustainability Consultant.
- B. Project Materials Cost Data: Provide statement indicating total cost for materials used for Project. Costs exclude labor, overhead, and profit. Include breakout of costs for the following categories of items:
 1. Plumbing.
 2. Mechanical.
 3. Electrical.
 4. Specialty items such as elevators and equipment.
 5. Furniture.
- C. Sustainable Design Action Plans: Provide preliminary submittals within 30 days of date established for the Notice to Proceed, indicating how the following requirements will be met:
 1. List of proposed products with EPDs.
 2. List of proposed products complying with requirements for multi-attribute optimization.
 3. List of proposed products complying with requirements for raw material and source extraction reporting.
 4. List of proposed products complying with requirements for leadership extraction practices.
 5. List of proposed products complying with requirements for material ingredient reporting.

6. List of proposed products complying with requirements for material ingredient optimization.
 7. List of proposed products complying with requirements for product manufacturer supply chain optimization.
 8. Waste management plan complying with Section 01 74 19 "Construction Waste Management and Disposal."
 9. Construction IAQ management plan.'
 10. A plan to review and update the LEED Administrator at least monthly on all LEED certification progress.
- D. Sustainable Design Progress Reports: Concurrent with each Application for Payment, submit reports comparing actual construction and purchasing activities with sustainable design action plans.
- 1.7 QUALITY ASSURANCE
- A. Sustainability Consultant: Engage an experienced LEED Accredited Professional to coordinate LEED requirements. Sustainability Consultant may also serve as waste management coordinator.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Provide products and procedures necessary to obtain LEED credits indicated as Contractor's responsibility. Although other Sections may specify some requirements that contribute to these LEED credits, Contractor shall provide additional materials and procedures necessary to obtain LEED credits indicated.
- B. At least 20 different products from at least five different manufacturers shall have EPDs that comply with LEED requirements. Industrywide (generic) EPDs shall be valued as one-half of a product.
- C. At least 50 percent, by cost, of permanently installed products for Project shall comply with LEED requirements for multi-attribute optimization.
- D. At least 20 different products from at least five different manufacturers shall have publicly released reports that comply with LEED requirements for raw material source and extraction reporting. Self-declared reports by manufacturers shall be valued as one-half of a product.
- E. At least 20 different products from at least five different manufacturers shall comply with LEED requirements for material ingredient reporting.
- F. At least 25 percent, by cost, of permanently installed products for Project shall comply with LEED requirements for material ingredient optimization.

- G. At least 25 percent, by cost, of permanently installed products for Project shall comply with LEED requirements for product manufacturer supply chain optimization.
- H. Not less than 25 percent of building materials, by cost, shall comply with LEED requirements for leadership extraction practices.
 - 1. Structure and enclosure materials shall not be more than 30 percent, by cost, of materials used to comply with this requirement.
- I. Extended Producer Responsibility Program: Not less than 25 percent of building materials, by cost, shall be manufactured by a participant in an extended producer responsibility program.
- J. Recycled Content: Building materials shall have recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content for Project constitutes a minimum of 35 percent of cost of materials used for Project.
 - 1. Cost of postconsumer recycled content plus one-half of preconsumer recycled content of an item shall be determined by dividing weight of postconsumer recycled content plus one-half of preconsumer recycled content in the item by total weight of the item and multiplying by cost of the item.
 - 2. Do not include furniture, plumbing, mechanical and electrical components, and specialty items, such as elevators and equipment, in the calculation.
- K. Certified Wood: Not less than 25 percent, by cost, of wood-based materials shall be produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001.

2.2 LOW-EMITTING MATERIALS

- A. Paints and Coatings: For field applications that are inside the weatherproofing system, paints and coatings shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
 - 1. Flat Paints and Coatings: 50 g/L.
 - 2. Nonflat Paints and Coatings: 50 g/L.
 - 3. Dry-Fog Coatings: 150 g/L.
 - 4. Primers, Sealers, and Undercoaters: 100 g/L.
 - 5. Rust-Preventive Coatings: 100 g/L.
 - 6. Zinc-Rich Industrial Maintenance Primers: 100 g/L.
 - 7. Pretreatment Wash Primers: 420 g/L.
 - 8. Clear Wood Finishes, Varnishes: 275 g/L.
 - 9. Clear Wood Finishes, Lacquers: 275 g/L.
 - 10. Floor Coatings: 50 g/L.
 - 11. Shellacs, Clear: 730 g/L.
 - 12. Shellacs, Pigmented: 550 g/L.
 - 13. Stains: 100 g/L.

- B. Paints and Coatings: For field applications that are inside the weatherproofing system, 90 percent of paints and coatings shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Adhesives and Sealants: For field applications that are inside the weatherproofing system, adhesives and sealants shall comply with VOC content limits of authorities having jurisdiction and the following VOC content limits:
1. Wood Glues: 30 g/L.
 2. Metal-to-Metal Adhesives: 30 g/L.
 3. Adhesives for Porous Materials (except Wood): 50 g/L.
 4. Subfloor Adhesives: 50 g/L.
 5. Plastic Foam Adhesives: 50 g/L.
 6. Carpet Adhesives: 50 g/L.
 7. Carpet Pad Adhesives: 50 g/L.
 8. VCT and Asphalt Tile Adhesives: 50 g/L.
 9. Cove Base Adhesives: 50 g/L.
 10. Gypsum Board and Panel Adhesives: 50 g/L.
 11. Rubber Floor Adhesives: 60 g/L.
 12. Ceramic Tile Adhesives: 65 g/L.
 13. Multipurpose Construction Adhesives: 70 g/L.
 14. Fiberglass Adhesives: 80 g/L.
 15. Contact Adhesives: 80 g/L.
 16. Structural Glazing Adhesives: 100 g/L.
 17. Wood Flooring Adhesives: 100 g/L.
 18. Structural Wood Member Adhesives: 140 g/L.
 19. Single-Ply Roof Membrane Adhesives: 250 g/L.
 20. Special-Purpose Contact Adhesives (That Are Used to Bond Melamine-Covered Board, Metal, Unsupported Vinyl, Rubber, or Wood Veneer 1/16 Inch (1.6 mm) or Less in Thickness to Any Surface): 250 g/L.
 21. Top and Trim Adhesives: 250 g/L.
 22. Plastic Cement Welding Compounds: 250 g/L.
 23. ABS Welding Compounds: 325 g/L.
 24. CPVC Welding Compounds: 490 g/L.
 25. PVC Welding Compounds: 510 g/L.
 26. Adhesive Primer for Plastic: 550 g/L.
 27. Sheet-Applied Rubber Lining Adhesives: 850 g/L.
 28. Aerosol Adhesive, General-Purpose Mist Spray: 65 percent by weight.
 29. Aerosol Adhesive, General-Purpose Web Spray: 55 percent by weight.
 30. Special-Purpose Aerosol Adhesives (All Types): 70 percent by weight.
 31. Other Adhesives: 250 g/L.
 32. Architectural Sealants: 250 g/L.
 33. Nonmembrane Roof Sealants: 300 g/L.
 34. Single-Ply Roof Membrane Sealants: 450 g/L.
 35. Other Sealants: 420 g/L.

36. Sealant Primers for Nonporous Substrates: 250 g/L.
 37. Sealant Primers for Porous Substrates: 775 g/L.
 38. Modified Bituminous Sealant Primers: 500 g/L.
 39. Other Sealant Primers: 750 g/L.
- D. Adhesives and Sealants: For field applications that are inside the weatherproofing system, 90 percent of adhesives and sealants shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- E. Flooring: Shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- F. Composite Wood, Agrifiber Products, and Adhesives: Shall be made using ultra-low-emitting formaldehyde resins as defined in California Air Resources Board's "Airborne Toxic Control Measure to Reduce Formaldehyde Emissions from Composite Wood Products" or shall be made with no added formaldehyde.
- G. Ceilings, Walls, and Thermal Insulation: Shall comply with requirements of California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 EXECUTION

3.1 NONSMOKING BUILDING

- A. Smoking is not permitted within the building or within 25 ft. (8 m) of entrances, operable windows, or outdoor-air intakes.

3.2 CONSTRUCTION WASTE MANAGEMENT

- A. Comply with Section 01 74 19 "Construction Waste Management and Disposal."

3.3 CONSTRUCTION INDOOR-AIR-QUALITY (IAQ) MANAGEMENT

- A. Comply with SMACNA's "SMACNA IAQ Guideline for Occupied Buildings under Construction."
1. If Owner authorizes use of permanent heating, cooling, and ventilating systems during construction period as specified in Section 01 50 00 "Temporary Facilities and Controls," install MERV 8 filter media at each return-air inlet for the air-handling system used during construction.
 2. Replace air filters immediately prior to occupancy with new filters specified in Section 23 41 00 "Particulate Air Filtration."

3.4 INDOOR-AIR-QUALITY (IAQ) ASSESSMENT

A. Flush-Out:

1. After construction ends, prior to occupancy and with all interior finishes installed, perform a building flush-out by supplying a total volume of 14,000 cu. ft. (4 300 000 L) of outdoor air per sq. ft. (sq. m) of floor area while maintaining an internal temperature of at least 60 deg F (16 deg C) and a relative humidity no higher than 60 percent.
2. If occupancy is desired prior to flush-out completion, the space may be occupied following delivery of a minimum of 3500 cu. ft. (1 070 000 L) of outdoor air per sq. ft. (sq. m) of floor area to the space. Once a space is occupied, it shall be ventilated at a minimum rate of 0.30 cfm per sq. ft. (1.52 L/s per sq. m) of outside air or the design minimum outside air rate, whichever is greater. During each day of the flush-out period, ventilation shall begin a minimum of three hours prior to occupancy and continue during occupancy. These conditions shall be maintained until a total of 14,000 cu. ft./sq. ft. (4 300 000 L/sq. m) of outside air has been delivered to the space.
3. At a minimum, if a full LEED Flush-Out is not performed and IAQ testing is not performed, a best practice IAQ flush shall be performed.

B. Air-Quality Testing: Engage testing agency to perform the following:

1. Conduct baseline IAQ testing, after construction ends and prior to occupancy, using testing protocols consistent with the EPA's "Compendium of Methods for the Determination of Air Pollutants in Indoor Air," and as additionally detailed in USGBC's "LEED Reference Guide for Building Design and Construction v4."
2. Demonstrate that contaminant maximum concentrations listed below are not exceeded:
 - a. Formaldehyde: 27 ppb.
 - b. Particulates (PM10): 50 mcg/cu. m.
 - c. Ozone: 0.075 ppm, according to ASTM D5149.
 - d. Total Volatile Organic Compounds (TVOC): 500 mcg/cu. m.
 - e. 4-Phenylcyclohexene (4-PH): 6.5 mcg/cu. m.
 - f. Carbon Monoxide: 9 ppm and no greater than 2 ppm above outdoor levels.
 - g. Target Chemicals in California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers," Table 4-1 (except formaldehyde).
3. For each sampling point where maximum concentration limits are exceeded, take corrective action until requirements have been met.
4. Air-sample testing shall be conducted as follows:
 - a. All measurements shall be conducted prior to occupancy but during normal occupied hours, and with building ventilation system starting at the normal daily start time and operated at the minimum outside airflow rate for the occupied mode throughout the duration of the air testing.

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- b. Building shall have all interior finishes installed including, but not limited to, millwork, doors, paint, carpet, and acoustic tiles. Nonfixed furnishings such as workstations and partitions are encouraged, but not required, to be in place for the testing.
- c. Number of sampling locations varies depending on the size of building and number of ventilation systems. For each portion of building served by a separate ventilation system, the number of sampling points shall not be less than one per 5000 sq. ft. (465 sq. m). For large open spaces, one sampling point per 50,000 sq. ft. (4654 sq. m) may be used.
- d. Air samples shall be collected between 3 and 6 ft. (0.9 and 1.8 m) from the floor to represent the breathing zone of occupants, and over a minimum four-hour period.

END OF SECTION

SECTION 01 91 13

GENERAL COMMISSIONING REQUIREMENTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. General requirements that apply to implementation of commissioning without regard to systems, subsystems, and equipment being commissioned.

1.2 DEFINITIONS

- A. BoD: Basis of Design.
- B. CxA: Commissioning Authority.
- C. OPR: Owner's Project Requirements.
- D. Systems, Subsystems, and Equipment: Where these terms are used together or separately, they shall mean "as-built" systems, subsystems, and equipment.
- E. TAB: Testing, Adjusting, and Balancing.

1.3 COMMISSIONING TEAM

- A. Members Appointed by Contractor(s): Individuals, each having authority to act on behalf of the entity he or she represents, explicitly organized to implement the commissioning process through coordinated actions. The commissioning team shall consist of, but not be limited to, representatives of Contractor, including Project superintendent and subcontractors, installers, suppliers, and specialists deemed appropriate by the CxA.
- B. Members Appointed by Owner:
 - 1. CxA: The designated person, company, or entity that plans, schedules, and coordinates the commissioning team to implement the commissioning process. Owner will engage the CxA under a separate contract.
 - 2. Representatives of the facility user and operation and maintenance personnel.
 - 3. Architect and engineering design professionals.

1.4 OWNER'S RESPONSIBILITIES

- A. Provide the OPR documentation to the CxA and Contractor for use in developing the commissioning plan; systems manual; operation and maintenance training plan; and testing plans and checklists.

- B. Assign operation and maintenance personnel and schedule them to participate in commissioning team activities including, but not limited to, the following:
 - 1. Coordination meetings.
 - 2. Training in operation and maintenance of systems, subsystems, and equipment.
 - 3. Testing meetings.
 - 4. Demonstration of operation of systems, subsystems, and equipment.
- C. Provide utility services required for the commissioning process.
- D. Provide the BoD documents, prepared by Architect and approved by Owner, to the CxA and Contractor for use in developing the commissioning plan, systems manual, and operation and maintenance training plan.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Provide utility services required for the commissioning process.
- B. Contractor shall assign representatives with expertise and authority to act on behalf of the Contractor and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 - 1. Participate in design- and construction-phase coordination meetings.
 - 2. Participate in maintenance orientation and inspection.
 - 3. Participate in operation and maintenance training sessions.
 - 4. Participate in final review at acceptance meeting.
 - 5. Certify that Work is complete and systems are operational according to the Contract Documents, including calibration of instrumentation and controls.
 - 6. Evaluate performance deficiencies identified in test reports and, in collaboration with entity responsible for system and equipment installation, recommend corrective action.
 - 7. Review and approve final commissioning documentation.
- C. Subcontractors shall assign representatives with expertise and authority to act on behalf of subcontractors and schedule them to participate in and perform commissioning team activities including, but not limited to, the following:
 - 1. Participate in design- and construction-phase coordination meetings.
 - 2. Participate in maintenance orientation and inspection.
 - 3. Participate in procedures meeting for testing.
 - 4. Participate in final review at acceptance meeting.
 - 5. Provide schedule for operation and maintenance data submittals, equipment startup, and testing to CxA for incorporation into the commissioning plan. Update schedule on a weekly basis throughout the construction period.
 - 6. Provide information to the CxA for developing construction-phase commissioning plan.
 - 7. Participate in training sessions for Owner's operation and maintenance personnel.
 - 8. Provide updated Project Record Documents to the CxA on a daily basis.

9. Gather and submit operation and maintenance data for systems, subsystems, and equipment to the CxA, as specified in Division 01 Section "Operation and Maintenance Data."
10. Provide technicians who are familiar with the construction and operation of installed systems and who shall develop specific test procedures and participate in testing of installed systems, subsystems, and equipment.

1.6 CXA'S RESPONSIBILITIES

- A. Organize and lead the commissioning team.
- B. Prepare a construction-phase commissioning plan. Collaborate with Contractor and with subcontractors to develop test and inspection procedures. Include design changes and scheduled commissioning activities coordinated with overall Project schedule. Identify commissioning team member responsibilities, by name, firm, and trade specialty, for performance of each commissioning task.
- C. Review and comment on submittals from Contractor for compliance with the OPR, BoD, Contract Documents, and construction-phase commissioning plan. Review and comment on performance expectations of systems and equipment and interfaces between systems relating to the OPR and BoD.
- D. Convene commissioning team meetings for the purpose of coordination, communication, and conflict resolution; discuss progress of the commissioning processes. Responsibilities include arranging for facilities, preparing agenda and attendance lists, and notifying participants. The CxA shall prepare and distribute minutes to commissioning team members and attendees within five workdays of the commissioning meeting.
- E. At the beginning of the construction phase, conduct an initial construction-phase coordination meeting for the purpose of reviewing the commissioning activities and establishing tentative schedules for operation and maintenance submittals; operation and maintenance training sessions; TAB Work; and Project completion.
- F. Observe and inspect construction and report progress and deficiencies. In addition to compliance with the OPR, BoD, and Contract Documents, inspect systems and equipment installation for adequate accessibility for maintenance and component replacement or repair.
- G. Prepare Project-specific test and inspection procedures and checklists.
- H. Schedule, direct, witness, and document tests, inspections, and systems startup.
- I. Compile test data, inspection reports, and certificates and include them in the systems manual and commissioning report.
- J. Certify date of acceptance and startup for each item of equipment for start of warranty periods.

- K. Review Project Record Documents for accuracy. Request revisions from Contractor to achieve accuracy. Project Record Documents requirements are specified in Section 01 78 39 - Project Record Documents_VOID.
- L. Review and comment on operation and maintenance documentation and systems manual outline for compliance with the OPR, BoD, and Contract Documents. Operation and maintenance documentation requirements are specified in Section 01 78 23 - Operation and Maintenance Data.
- M. Prepare operation and maintenance training program and provide qualified instructors to conduct operation and maintenance training. Operation and maintenance training is specified in Section 01 79 00 - Demonstration and Training
- N. Videotape and edit training sessions.
- O. Videotape construction progress including hidden shafts.
- P. Prepare commissioning reports.
- Q. Assemble the final commissioning documentation, including the commissioning report and Project Record Documents.

1.7 COMMISSIONING DOCUMENTATION

- A. Index of Commissioning Documents: CxA shall prepare an index to include storage location of each document.
- B. OPR: A written document, prepared by Owner, that details the functional requirements of Project and expectations of how it will be used and operated. This document includes Project and design goals, measurable performance criteria, budgets, schedules, success criteria, and supporting information.
- C. BoD Document: A document, prepared by Architect, that records concepts, calculations, decisions, and product selections used to meet the OPR and to satisfy applicable regulatory requirements, standards, and guidelines. The document includes both narrative descriptions and lists of individual items that support the design process.
- D. Commissioning Plan: A document, prepared by CxA, that outlines the schedule, allocation of resources, and documentation requirements of the commissioning process, and shall include, but is not limited to the following:
 - 1. Plan for delivery and review of submittals, systems manuals, and other documents and reports. Identification of the relationship of these documents to other functions and a detailed description of submittals that are required to support the commissioning processes. Submittal dates shall include the latest date approved submittals must be received without adversely affecting commissioning plan.
 - 2. Description of the organization, layout, and content of commissioning documentation (including systems manual) and a detailed description of documents to be provided along with identification of responsible parties.

3. Identification of systems and equipment to be commissioned.
 4. Description of schedules for testing procedures along with identification of parties involved in performing and verifying tests.
 5. Identification of items that must be completed before the next operation can proceed.
 6. Description of responsibilities of commissioning team members.
 7. Description of observations to be made.
 8. Description of requirements for operation and maintenance training, including required training materials.
 9. Description of expected performance for systems, subsystems, equipment, and controls.
 10. Schedule for commissioning activities with specific dates coordinated with overall construction schedule.
 11. Identification of installed systems, subsystems, and equipment, including design changes that occurred during the construction phase.
 12. Process and schedule for documenting changes on a continuous basis to appear in Project Record Documents.
 13. Process and schedule for completing prestart and startup checklists for systems, subsystems, and equipment to be verified and tested.
 14. Step-by-step procedures for testing systems, subsystems, and equipment with descriptions for methods of verifying relevant data, recording the results obtained, and listing parties involved in performing and verifying tests.
- E. Test Checklists: CxA shall develop test checklists for each system, subsystem, or equipment including interfaces and interlocks, and include a separate entry, with space for comments, for each item to be tested. Prepare separate checklists for each mode of operation and provide space to indicate whether the mode under test responded as required. Provide space for testing personnel to sign off on each checklist. Specific checklist content requirements are specified in Division 23 Section "HVAC Commissioning Requirements." Each checklist, regardless of system, subsystem, or equipment being tested, shall include, but not be limited to, the following:
1. Name and identification code of tested item.
 2. Test number.
 3. Time and date of test.
 4. Indication of whether the record is for a first test or retest following correction of a problem or issue.
 5. Dated signatures of the person performing test and of the witness, if applicable.
 6. Individuals present for test.
 7. Deficiencies.
 8. Issue number, if any, generated as the result of test.
- F. Certificate of Readiness: Certificate of Readiness shall be signed by Contractor, Subcontractor(s), Installer(s), and CxA certifying that systems, subsystems, equipment, and associated controls are ready for testing. Completed test checklists signed by the responsible parties shall accompany this certificate.

- G. Test and Inspection Reports: CxA shall record test data, observations, and measurements on test checklists. Photographs, forms, and other means appropriate for the application shall be included with data. CxA shall compile test and inspection reports and test and inspection certificates and include them in systems manual and commissioning report.
- H. Corrective Action Documents: CxA shall document corrective action taken for systems and equipment that fail tests. Include required modifications to systems and equipment and revisions to test procedures, if any. Retest systems and equipment requiring corrective action and document retest results.
- I. Issues Log: CxA shall prepare and maintain an issues log that describes design, installation, and performance issues that are at variance with the OPR, BoD, and Contract Documents. Identify and track issues as they are encountered, documenting the status of unresolved and resolved issues.
 - 1. Creating an Issues Log Entry:
 - a. Identify the issue with unique numeric or alphanumeric identifier by which the issue may be tracked.
 - b. Assign a descriptive title of the issue.
 - c. Identify date and time of the issue.
 - d. Identify test number of test being performed at the time of the observation, if applicable, for cross-reference.
 - e. Identify system, subsystem, and equipment to which the issue applies.
 - f. Identify location of system, subsystem, and equipment.
 - g. Include information that may be helpful in diagnosing or evaluating the issue.
 - h. Note recommended corrective action.
 - i. Identify commissioning team member responsible for corrective action.
 - j. Identify expected date of correction.
 - k. Identify person documenting the issue.
 - 2. Documenting Issue Resolution:
 - a. Log date correction is completed or the issue is resolved.
 - b. Describe corrective action or resolution taken. Include description of diagnostic steps taken to determine root cause of the issue, if any.
 - c. Identify changes to the OPR, BoD, or Contract Documents that may require action.
 - d. State that correction was completed and system, subsystem, and equipment is ready for retest, if applicable.
 - e. Identify person(s) who corrected or resolved the issue.
 - f. Identify person(s) documenting the issue resolution.
 - 3. Issues Log Report: On a periodic basis, but not less than for each commissioning team meeting, CxA shall prepare a written narrative for review of outstanding issues and a status update of the issues log. As a minimum, CxA shall include the following information in the issues log and expand it in the narrative:
 - a. Issue number and title.
 - b. Date of the identification of the issue.

- c. Name of the commissioning team member assigned responsibility for resolution.
 - d. Expected date of correction.
 - J. Commissioning Report: CxA shall document results of the commissioning process including unresolved issues and performance of systems, subsystems, and equipment. The commissioning report shall indicate whether systems, subsystems, and equipment have been completed and are performing according to the OPR, BoD, and Contract Documents. The commissioning report shall include, but is not limited to, the following:
 - 1. Lists and explanations of substitutions; compromises; variances in the OPR, BoD, and Contract Documents; record of conditions; and, if appropriate, recommendations for resolution. This report shall be used to evaluate systems, subsystems, and equipment and shall serve as a future reference document during Owner occupancy and operation. It shall describe components and performance that exceed requirements of the OPR, BoD, and Contract Documents and those that do not meet requirements of the OPR, BoD, and Contract Documents. It may also include a recommendation for accepting or rejecting systems, subsystems, and equipment.
 - 2. OPR and BoD documentation.
 - 3. Commissioning plan.
 - 4. Testing plans and reports.
 - 5. Corrective modification documentation.
 - 6. Issues log.
 - 7. Completed test checklists.
 - 8. Listing of off-season test(s) not performed and a schedule for their completion.
 - K. Systems Manual: CxA shall gather required information and compile systems manual. Systems manual shall include, but is not limited to, the following:
 - 1. OPR and BoD, including system narratives, schematics, and changes made throughout the Project.
 - 2. Project Record Documents as specified in Section 01 78 39 - Project Record Documents_VOID.
 - 3. Final commissioning plan.
 - 4. Commissioning report.
 - 5. Operation and maintenance data as specified in Section 01 78 23 - Operation and Maintenance Data.
- 1.8 SUBMITTALS
- A. Commissioning Plan Prefinal Submittal: CxA shall submit three hard copies of prefinal commissioning plan. Deliver one copy to Contractor, one to Owner, and one to Architect. Present submittal in sufficient detail to evaluate data collection and arrangement process. One copy, with review comments, will be returned to the CxA for preparation of the final construction-phase commissioning plan.

- B. Commissioning Plan Final Submittal: CxA shall submit three hard copies and two sets of electronically formatted information of final commissioning plan. Deliver one hard copy and one set of discs to Owner, and two copies to Architect. The final submittal must address previous review comments. The final submittal shall include a copy of the prefinal submittal review comments along with a response to each item.
 - C. Test Checklists and Report Forms: CxA shall submit sample checklists and forms to Contractor quality-control manager and subcontractors for review and comment. Submit three copies of each checklist and report form.
 - D. Certificates of Readiness: CxA shall submit Certificates of Readiness.
 - E. Test and Inspection Reports: CxA shall submit test and inspection reports.
 - F. Corrective Action Documents: CxA shall submit corrective action documents.
 - G. Prefinal Commissioning Report Submittal: CxA shall submit two hard copies of the prefinal commissioning report. Include a copy of the preliminary submittal review comments along with CxA's response to each item. CxA shall deliver one copy to Owner and one copy to Architect. One copy, with review comments, will be returned to the CxA for preparation of final submittal.
 - H. Final Commissioning Report Submittal: CxA shall submit two hard copies and two sets of electronically formatted information of the final commissioning report. CxA shall deliver one hard copy and one set of discs to Owner, and one copy to Architect. The final submittal must address previous review comments and shall include a copy of the prefinal submittal review comments along with a response to each item.
- 1.9 QUALITY ASSURANCE
- A. Instructor Qualifications: Factory-authorized service representatives, experienced in training, operation, and maintenance procedures for installed systems, subsystems, and equipment.
 - B. Test Equipment Calibration: Comply with test equipment manufacturer's calibration procedures and intervals. Recalibrate test instruments immediately whenever instruments have been repaired following damage or dropping. Affix calibration tags to test instruments. Instruments shall have been calibrated within six months prior to use.
- 1.10 COORDINATION
- A. Coordinating Meetings: CxA shall conduct biweekly coordination meetings of the commissioning team to review progress on the commissioning plan, to discuss scheduling conflicts, and to discuss upcoming commissioning process activities.

- B. Pretesting Meetings: CxA shall conduct pretest meetings of the commissioning team to review startup reports, pretest inspection results, testing procedures, testing personnel and instrumentation requirements, and manufacturers' authorized service representative services for each system, subsystem, equipment, and component to be tested.
- C. Testing Coordination: CxA shall coordinate sequence of testing activities to accommodate required quality-assurance and -control services with a minimum of delay and to avoid necessity of removing and replacing construction to accommodate testing and inspecting.
 - 1. Schedule times for tests, inspections, obtaining samples, and similar activities.
- D. Manufacturers' Field Services: CxA shall coordinate services of manufacturers' field services.

PART 2 PRODUCTS (NOT USED)

PART 3 EXECUTION

3.1 OPERATION AND MAINTENANCE TRAINING REQUIREMENTS

- A. Training Preparation Conference: Before operation and maintenance training, CxA shall convene a training preparation conference to include Owner's operation and maintenance personnel, Contractor, and subcontractors. In addition to requirements specified in Section 01 79 00 - Demonstration and Training, perform the following:
 - 1. Review the OPR and BoD.
 - 2. Review installed systems, subsystems, and equipment.
 - 3. Review instructor qualifications.
 - 4. Review instructional methods and procedures.
 - 5. Review training module outlines and contents.
 - 6. Review course materials (including operation and maintenance manuals).
 - 7. Inspect and discuss locations and other facilities required for instruction.
 - 8. Review and finalize training schedule and verify availability of educational materials, instructors, audiovisual equipment, and facilities needed to avoid delays.
 - 9. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

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- B. Training Modules: Develop an instruction program that includes individual training modules for each system, subsystem, and equipment as specified in Section 01 79 00 - Demonstration and Training.

END OF SECTION

SECTION 02 41 19

SELECTIVE DEMOLITION

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Demolition and removal of selected portions of building or structure.
- B. Salvage of existing items to be reused or recycled.

1.2 RELATED REQUIREMENTS

- A. Section 01 10 00 - Summary for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
- B. Section 01 35 16 - Alteration Project Procedures for general protection and work procedures for alteration projects.
- C. Section 01 73 00 - Execution for cutting and patching procedures.
- D. Section 02 41 20 - Waste Materials Management - Reuse, Recycling & Hazardous Waste (NC State's Requirements) for disposal of demolished materials.

1.3 DEFINITIONS

- A. Remove: Detach items from existing construction and dispose of them off-site unless indicated to be salvaged or reinstalled.
- B. Remove and Salvage: Detach items from existing construction, in a manner to prevent damage, and deliver to Owner ready for reuse.
- C. Remove and Reinstall: Detach items from existing construction, in a manner to prevent damage, prepare for reuse, and reinstall where indicated.
- D. Existing to Remain: Leave existing items that are not to be removed and that are not otherwise indicated to be salvaged or reinstalled.
- E. Dismantle: To remove by disassembling or detaching an item from a surface, using gentle methods and equipment to prevent damage to the item and surfaces; disposing of items unless indicated to be salvaged or reinstalled.

1.4 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.

- B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.
 - 1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PREINSTALLATION MEETINGS

- A. Predemolition Conference: Conduct conference at Project site.
 - 1. Inspect and discuss condition of construction to be selectively demolished.
 - 2. Review structural load limitations of existing structure.
 - 3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
 - 4. Review items to be salvaged and stored for re-use, including Owner-designated storage areas.
 - 5. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 - 6. Review areas where existing construction is to remain and requires protection.

1.6 SUBMITTALS

- A. Informational Submittals:
 - 1. Qualification Data: For refrigerant recovery technician.
 - 2. Engineering Survey: Submit engineering survey of condition of building.
 - 3. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property for environmental protection, dust control, and noise control. Indicate proposed locations and construction of barriers.
 - 4. Schedule of Selective Demolition Activities: Indicate the following:
 - a. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's, building manager's, and other tenants' on-site operations are uninterrupted.
 - b. Interruption of utility services. Indicate how long utility services will be interrupted.
 - c. Coordination for shutoff, capping, and continuation of utility services.
 - d. Use of elevator and stairs.
 - e. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.
 - 5. Predemolition Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by demolition operations. Comply with Section 01 32 33 - Photographic Documentation. Submit before Work begins.

6. Landfill Records: Indicate receipt and acceptance of hazardous wastes by a landfill facility licensed to accept hazardous wastes.
7. Statement of Refrigerant Recovery: Signed by refrigerant recovery technician responsible for recovering refrigerant, stating that all refrigerant that was present was recovered and that recovery was performed according to EPA regulations. Include name and address of technician and date refrigerant was recovered.
8. Warranties: Documentation indicating that existing warranties are still in effect after completion of selective demolition.

B. Closeout Submittals:

1. Inventory: Submit a list of items that have been removed and salvaged.

1.7 QUALITY ASSURANCE

- A. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.

1.8 FIELD CONDITIONS

- A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.
- B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.
- C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.
- D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.
 1. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.
- E. Storage or sale of removed items or materials on-site is not permitted.
- F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.
 1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

- A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials and using approved contractors so as not to void existing warranties. Notify warrantor before proceeding. Warranties will be provided by Owner.

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1. Contractor's Warranty for 'NCSU Mann Hall – Structural Repairs' project (Progressive Contracting Co, Inc).
 2. Kawneer Storefront Glazing System (NC Glazing and Fabrication).
 3. Cathodic Protection System (No Corrosion, LLC)
- B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

1.10 COORDINATION

- A. Arrange selective demolition schedule to not interfere with Owner's operations.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Standards: Comply with ASSE A10.6 and NFPA 241.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Verify that utilities have been disconnected and capped before starting selective demolition operations.
- B. Review Project Record Documents of existing construction or other existing condition and hazardous material information provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in Project Record Documents.
- C. Steel Tendons: Locate tensioned steel tendons and include recommendations for de-tensioning.
- D. Verify that hazardous materials have been remediated before proceeding with building demolition operations.
- E. Survey of Existing Conditions: Record existing conditions by use of measured drawings, preconstruction photographs or video, and templates.
1. Comply with requirements specified in Section 01 32 33 - Photographic Documentation.

2. Inventory and record the condition of items to be removed and salvaged. Provide photographs or video of conditions that might be misconstrued as damage caused by salvage operations.

3.2 PREPARATION

- A. Refrigerant: Before starting demolition, remove refrigerant from mechanical equipment according to 40 CFR 82 and regulations of authorities having jurisdiction.

3.3 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

- A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.
- B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off utility services and mechanical/electrical systems serving areas to be selectively demolished.
 1. Arrange to shut off utilities with utility companies.
 2. Notify the Architect immediately if the removal of plumbing HVAC, electrical, communications, and safety and security systems or components will adversely affect the operation of those systems outside the limits of demolition.
 3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
 4. Disconnect, demolish, and remove plumbing, and HVAC systems, equipment, and components indicated on Drawings to be removed.
 - a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
 - b. Piping to Be Abandoned in Place: Sanitary waste piping and cap or plug piping with same or compatible piping material and leave in place.
 - c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
 - d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.
 - e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
 - f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
 - g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material and leave in place.

3.4 PROTECTION

- A. Temporary Protection: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.
 - 1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
 - 2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
 - 3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
 - 4. Cover and protect furniture, furnishings, and equipment that have not been removed.
 - 5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 01 50 00 - Temporary Facilities and Controls.
- B. Temporary Shoring: Design, provide, and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.
 - 1. Strengthen or add new supports when required during progress of selective demolition.
- C. Remove temporary barricades and protections where hazards no longer exist.

3.5 SELECTIVE DEMOLITION, GENERAL

- A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:
 - 1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
 - 2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction. Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping. Temporarily cover openings to remain.
 - 3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
 - 4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain portable fire-suppression devices during flame-cutting operations.

5. Maintain fire watch during and for at least 4 hours after flame-cutting operations.
 6. Maintain adequate ventilation when using cutting torches.
 7. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
 8. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
 9. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
 10. Dispose of demolished items and materials promptly. Comply with requirements in Section 01 74 19 - Construction Waste Management and Disposal.
- B. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.
- C. Removed and Salvaged Items:
1. Clean salvaged items.
 2. Pack or crate items after cleaning. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area designated by Owner.
 5. Protect items from damage during transport and storage.
 6. Salvaged Items:
 - a. Trees on north side to be removed and milled into boards as indicated on Drawings.
 - b. Brick removed from north side as indicated on Drawings.
- D. Removed and Reinstalled Items:
1. Clean and repair items to functional condition adequate for intended reuse.
 2. Pack or crate items after cleaning and repairing. Identify contents of containers.
 3. Protect items from damage during transport and storage.
 4. Reinstall items in locations indicated. Comply with installation requirements for new materials and equipment. Provide connections, supports, and miscellaneous materials necessary to make item functional for use indicated.
- E. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.
1. Cathodic Protection to be protected from damage by construction operations and activities.
- F. Storm System: Contractor shall either provide a temporary storm system or keep the existing storm system in place while the building is under demolition and construction.

1. After the new storm system is in place, the Contractor can remove the temporary storm system or the existing storm system.

3.6 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

- A. Concrete: Demolish in small sections. Using power-driven saw, cut concrete to a depth of at least 3/4 inch (19 mm) at junctures with construction to remain. Dislodge concrete from reinforcement at perimeter of areas being demolished, cut reinforcement, and then remove remainder of concrete. Neatly trim openings to dimensions indicated.
- B. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, and then remove concrete between saw cuts.
- C. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, and then remove masonry between saw cuts.
- D. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, and then break up and remove.
- E. Resilient Floor Coverings: Remove floor coverings and adhesive according to recommendations in RFCI's "Recommended Work Practices for the Removal of Resilient Floor Coverings." Do not use methods requiring solvent-based adhesive strippers.
- F. Roofing: Remove no more existing roofing than what can be covered in one day by new roofing and so that building interior remains watertight and weathertight. See Section for new roofing requirements.
 1. Remove existing roof membrane, flashings, copings, and roof accessories.
 2. Remove existing roofing system down to substrate.

3.7 DISPOSAL OF DEMOLISHED MATERIALS

- A. Remove demolition waste materials from Project site and dispose of them in an EPA-approved construction and demolition waste landfill acceptable to authorities having jurisdiction.
 1. Do not allow demolished materials to accumulate on-site.
 2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
 3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.
 4. Comply with requirements specified in Section 01 74 19 - Construction Waste Management and Disposal.
- B. Burning: Do not burn demolished materials.

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3.8 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective demolition operations. Return adjacent areas to condition existing before selective demolition operations began.

END OF SECTION

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

- 1.1 RELATED DOCUMENTS
 - A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- 1.2 SUMMARY
 - A. Section Includes:
 - 1. Form-facing material for cast-in-place concrete.
 - 2. Shoring, bracing, and anchoring.
 - B. Related Requirements:
- 1.3 DEFINITIONS
 - A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.
 - B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.
- 1.4 PREINSTALLATION MEETINGS
 - A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review the following:
 - a. Special inspection and testing and inspecting agency procedures for field quality control.
 - b. Construction, movement, contraction, and isolation joints
 - c. Forms and form-removal limitations.
 - d. Anchor rod and anchorage device installation tolerances.
- 1.5 ACTION SUBMITTALS
 - A. Product Data: For each of the following:
 - 1. Exposed surface form-facing material.
 - 2. Concealed surface form-facing material.
 - 3. Pan-type forms.
 - 4. Void forms.
 - 5. Form ties.
 - 6. Waterstops.
 - 7. Form-release agent.
 - B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - 1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
 - 2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301 (ACI 301M).

- a. Location of construction joints is subject to approval of the Architect.
- 3. Indicate location of waterstops.
- 4. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
- C. Samples:
 - 1. For waterstops.
- 1.6 INFORMATIONAL SUBMITTALS
 - A. Qualification Data: For testing and inspection agency.
 - B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC353.
 - C. Field quality-control reports.
 - D. Minutes of preinstallation conference.
- 1.7 QUALITY ASSURANCE
 - A. Testing and Inspection Agency Qualifications: An independent agency acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - B. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.
 - 1. Subject to compliance with requirements, approved mockups may become part of the completed Work.
- 1.8 DELIVERY, STORAGE, AND HANDLING
 - A. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.
 - B. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

- 2.1 PERFORMANCE REQUIREMENTS
 - A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
 - 1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."
 - 2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.
 - a. For architectural concrete specified in Section 033300 "Architectural Concrete," limit deflection of form-facing material, studs, and walers to 0.0025 times their respective clear spans (L/400).
 - B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.
 - 1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:

- a. Wind Loads: As indicated on Drawings.
 - 1) Horizontal Deflection Limit: Not more than 1/600 of the wall height.

2.2 FORM-FACING MATERIALS

- A. As-Cast Surface Form-Facing Material:
 - 1. Provide continuous, true, and smooth concrete surfaces.
 - 2. Furnish in largest practicable sizes to minimize number of joints.
 - 3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete, and as follows:
 - a. Plywood, metal, or other approved panel materials.
 - b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
 - 1) APA HDO (high-density overlay).
 - 2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
 - 3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
 - 4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.
- B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.
 - 1. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation, with straight or tapered end forms.
- D. Void Forms: Biodegradable paper surface, treated for moisture resistance, structurally sufficient to support weight of plastic concrete and other superimposed loads.

2.3 WATERSTOPS

- A. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).

2.4 RELATED MATERIALS

- A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.
- B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.
- C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.
- D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.
- E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.
 - 1. Formulate form-release agent with rust inhibitor for steel form-facing materials.
- F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.
2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.
3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 INSTALLATION OF FORMWORK

- A. Comply with ACI 301 (ACI 301M).
- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.
- C. Limit concrete surface irregularities as follows:
 1. Surface Finish-1.0: ACI 117 Class D, 1 inch (25 mm).
 2. Surface Finish-2.0: ACI 117 Class B, 1/4 inch (6 mm).
 3. Surface Finish-3.0: ACI 117 Class A, 1/8 inch (3.0 mm).
- D. Construct forms tight enough to prevent loss of concrete mortar.
 1. Minimize joints.
 2. Exposed Concrete: Symmetrically align joints in forms.
- E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.
 1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
 2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
 3. Install keyways, reglets, recesses, and other accessories, for easy removal.
- F. Do not use rust-stained, steel, form-facing material.
- G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
 1. Provide and secure units to support screed strips
 2. Use strike-off templates or compacting-type screeds.
- H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
 1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
 2. Locate temporary openings in forms at inconspicuous locations.
- I. Chamfer exterior corners and edges of permanently exposed concrete.
- J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).
- K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 1. Determine sizes and locations from trades providing such items.
 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
- L. Construction and Movement Joints:

1. Construct joints true to line with faces perpendicular to surface plane of concrete.
 2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 3. Place joints perpendicular to main reinforcement.
 4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
 - a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings.
 - a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.
- M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
- N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
- O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
- P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.
- 3.2 INSTALLATION OF EMBEDDED ITEMS
- A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.
 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.
 4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.
 5. Clean embedded items immediately prior to concrete placement.
- 3.3 INSTALLATION OF WATERSTOPS
- A. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
1. Install in longest lengths practicable.
 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 3. Protect exposed waterstops during progress of the Work.
- 3.4 INSTALLATION OF INSULATING CONCRETE FORMS
- A. Comply with ACI 301 (ACI 301M) and manufacturer's instructions.

- B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).
 - C. Install forms in running bond pattern.
 - 1. Align joints.
 - 2. Align furring strips.
 - D. Construct forms tight to prevent loss of concrete mortar.
 - E. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
 - 1. Determine sizes and locations from trades providing such items.
 - 2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.
 - F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
 - 1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
 - 2. Close temporary ports and openings with tight fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.
 - G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.
 - H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.
 - I. Shore insulating concrete forms to ensure stability and to resist stressing imposed by construction loads.
- 3.5 REMOVING AND REUSING FORMS
- A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 24 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations. Curing and protection operations need to be maintained at unformed surfaces and applied at formed surfaces immediately after removal of forms, for the remainder of the cure period.
 - 1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved at least 70 percent of its 28-day design compressive strength.
 - 2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.
 - B. Clean and repair surfaces of forms to be reused in the Work.
 - 1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.
 - 2. Apply new form-release agent.
 - C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.
 - 1. Align and secure joints to avoid offsets.
 - 2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:
 - 1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
 - 2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION

SECTION 03 15 13

WATERSTOPS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete waterstops.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For waterstops.
 - 2. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
 - a. Indicate location of waterstops.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 PRODUCTS

2.1 WATERSTOPS

- A. Contractor's Option: Unless otherwise indicated, provide any of the waterstops specified.
- B. Chemically Resistant Flexible Waterstops: Thermoplastic elastomer rubber waterstops, for embedding in concrete to prevent passage of fluids through joints; resistant to oils, solvents, and chemicals, with factory fabricate corners, intersections, and directional changes.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. J P Specialties, Inc.
 - b. Sika Corporation.
 - 2. Profile: Ribbed with center bulb.
 - 3. Dimensions: 4 inches by 3/16 inch thick (100 mm by 4.8 mm thick); nontapered.

- C. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.
1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. BoMetals, Inc.
 - b. Sika Corporation.
 - c. Vinylex Waterstop & Accessories.
 2. Profile: Ribbed with center bulb.
 3. Dimensions: 4 inches by 3/16 inch thick (100 mm by 4.8 mm thick); nontapered.
- D. Self-Expanding Butyl Strip Waterstops: Manufactured rectangular or trapezoidal strip, butyl rubber with sodium bentonite or other hydrophilic polymers, for adhesive bonding to concrete, 3/4 by 1 inch (19 by 25 mm).
1. Manufacturers:
 - a. CETCO is a subsidiary of Minerals Technologies Inc.
 - b. Carlisle Coatings & Waterproofing Inc.
 - c. Concrete Sealants Inc.
 - d. Henry Company.
 - e. J P Specialties, Inc.
 - f. Sika Corporation.
- E. Self-Expanding Rubber Strip Waterstops: Manufactured rectangular or trapezoidal strip, bentonite-free hydrophilic polymer-modified chloroprene rubber, for adhesive bonding to concrete, 3/8 by 3/4 inch (10 by 19 mm).
1. Manufacturers:
 - a. CETCO is a subsidiary of Minerals Technologies Inc.
 - b. GCP Applied Technologies Inc.
 - c. Kryton International, Inc.
 - d. OCM, Inc.
 - e. Sika Corporation.

PART 3 EXECUTION

3.1 INSTALLATION OF WATERSTOPS

- A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.
1. Install in longest lengths practicable.
 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 03 30 00 "Cast-In-Place Concrete."
 4. Secure waterstops in correct position at 12 inches (305 mm) on center.

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5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.
 - a. Miter corners, intersections, and directional changes in waterstops.
 - b. Align center bulbs.
 6. Clean waterstops immediately prior to placement of concrete.
 7. Support and protect exposed waterstops during progress of the Work.
- B. Self-Expanding Strip Waterstops: Install in construction joints and at other locations indicated on Drawings, according to manufacturer's written instructions, by adhesive bonding, mechanically fastening, and firmly pressing into place.
1. Install in longest lengths practicable.
 2. Locate waterstops in center of joint unless otherwise indicated on Drawings.
 3. Protect exposed waterstops during progress of the Work.

END OF SECTION

SECTION 03 15 26

UNDER-SLAB SHEET VAPOR BARRIER

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Sheet materials for controlling vapor diffusion through concrete slabs on grade.

1.2 RELATED REQUIREMENTS

- A. Section 03 30 00 Cast-in-Place Concrete for concrete slab-on-grade.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Written certification from the manufacturer that the materials and their application as noted in this Specification and on the Drawings is appropriate and approved for this project.
 - 2. Product Data: Manufacturer's product data, specifications, and installation instructions. Include vapor barrier manufacturer's requirements for placement, seaming and pipe boot installation.
 - 3. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
 - 4. Submit evidence that Installer's existing company has minimum of 5-years continuous experience in application of specified materials.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: An experienced installer who is acceptable to manufacturer, who has completed applications similar in material and extent to that required for this Project, and whose work has resulted in construction with a record of successful in-service performance.
- B. Source Limitations: Vapor Barrier and components to be from one source from a single manufacturer.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly identifying product name and manufacturer.
- B. Store materials in clean, dry area in accordance with manufacturer's instructions.

- C. Protect materials during handling and application to prevent damage or contamination.
- D. Ensure membrane is stamped with manufacturer's name, product name, and membrane thickness at intervals of no more than 85-inches (220 cm).

1.6 PROJECT CONDITIONS

- A. Environmental Limitations: Comply with manufacturer's written recommendations for substrate temperature and moisture content, ambient temperature and humidity, ventilation, and other conditions affecting material performance.
- B. Close areas to traffic during installation and for time period after application recommended in writing by manufacturer.

1.7 COORDINATION

- A. Coordinate placement of sheet vapor barrier with applicable Division 03 Sections.
- B. Job Conditions: Do not install vapor barrier until below-slab fill and utility work are complete, tested, and backfilled.
- C. Coordinate installation with scheduled concrete pours to avoid delays. Make provisions for installation of work by other trades.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Sheet Vapor Barrier:
 - 1. Type: 15 mil polyolefin film meeting requirements of ASTM E1745, Class A.
 - 2. Water Vapor Transmittance (After mandatory condition per ASTM E154/E154M sections 8,11,12,13): Maximum perm rating of 0.01 as tested in accordance with ASTM E1745 Section 7.
 - 3. Strength: ASTM E1745: Class A.
 - 4. Products:
 - a. Meadows, W. R., Inc.; Perminator HP 15 mil.
 - b. Reef Industries, Inc.; Griffolyn 15 mil Green.
 - c. Stego Industries, LLC; Stego Wrap 15 mil Class A.
- B. Accessories:
 - 1. Bonding Agent: Manufacturer's approved or recommended vapor barrier bonding agent.
 - 2. Sealing and Seaming Tape: High density polyethylene tape compatible with vapor barrier membrane, and manufactured by or recommended by vapor barrier membrane manufacturer. Tape for joints shall have at least the same permeability rating as the vapor barrier specified.

3. Vapor Proofing Mastic: Manufacturer's approved or recommended vapor proofing mastic with the same permeability rating as the vapor barrier specified.
4. Pipe Boot: Construct pipe boots from vapor barrier material and pressure sensitive tape in accordance with manufacturer's instructions.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine surfaces to receive membrane. Notify Architect if surfaces are not acceptable. Do not begin surface preparation or application until unacceptable conditions have been corrected.
- B. Do not proceed until under-slab plumbing and electrical rough-in work is complete, and specified fill or subgrade material has been placed, compacted, and tested; and is smooth, level, and without voids.

3.2 PREPARATION

- A. Level or tamp or roll aggregate, sand or granular base.

3.3 VAPOR BARRIER INSTALLATION

- A. Place, protect, and repair vapor barrier sheets according to ASTM E1643 and manufacturer's written instructions.
- B. Unroll vapor barrier with the longest dimension parallel with the direction of the concrete pour.
- C. Install vapor barrier without tears, voids, and holes. Lap ends and edges as recommended by manufacturer, but not less than 6-inches over adjacent sheets. Seal laps with tape.
- D. Turn up sheets at perimeter, at footings and vertical walls, and against penetrations, and seal joints with tape.
- E. Seal joints, tears, holes, perimeter, and penetrations through vapor with tape in accordance with manufacturer's recommendations.
- F. Point exposed edges with pointing mastic to prevent water from traveling under membrane.
- G. Adhere membrane to vertical surfaces with adhesive.

3.4 PROTECTION

- A. Do not permit unnecessary foot or vehicular traffic on unprotected horizontal membrane.

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- B. Protect completed membrane from damage. Prior to pouring concrete, inspect membrane for punctures or other damage and repair as required to maintain vapor barrier integrity.

END OF SECTION

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
1. Steel reinforcement bars.
 2. Welded-wire reinforcement.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
1. Each type of steel reinforcement.
 2. Bar supports.
 3. Mechanical splice couplers.
- B. Shop Drawings: Comply with ACI SP-066:
1. Include placing drawings that detail fabrication, bending, and placement.
 2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
- C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.
1. Location of construction joints is subject to approval of Architect and Engineer.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
1. Reinforcement to Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.
- B. Material Test Reports: For the following, from a qualified testing agency:
1. Steel Reinforcement:
 - a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.
 2. Mechanical splice couplers.

- C. Field quality-control reports.
- D. Minutes of preinstallation conference.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: An independent agency acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
- B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.
- C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.
 - 1. Build panel approximately as indicated in Section 031000 "Concrete Forming and Accessories".
 - 2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage and to avoid damaging coatings on steel reinforcement.
 - 1. Store reinforcement to avoid contact with earth.

PART 2 - PRODUCTS

2.1 Manufacturers and products listed in this Section are neither recommended nor endorsed by the AIA or Deltek. Before selecting manufacturers and products, verify availability, suitability for intended applications, and compliance with minimum performance requirements. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

2.2 Product options commonly available from manufacturers are included in square brackets throughout the Section Text. Not every manufacturer listed can provide every option offered; verify availability with manufacturers. For definitions of terms and requirements for Contractor's product selection, see Section 016000 "Product Requirements."

2.3 STEEL REINFORCEMENT

- A. Reinforcing Bars: ASTM A615/A615M, Grade 60, deformed.
- B. Plain-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, plain, fabricated from as-drawn steel wire into flat sheets.

- C. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.4 REINFORCEMENT ACCESSORIES

- A. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.
 - 1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:
 - a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.
- B. Mechanical Splice Couplers: ACI 318 Type 2, same material of reinforcing bar being spliced; mechanical-lap type.
- C. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch in diameter.
 - 1. Finish: Plain.

2.5 FABRICATING REINFORCEMENT

- A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 PREPARATION

- A. Protection of In-Place Conditions:
 - 1. Do not cut or puncture vapor retarder.
 - 2. Repair damage and reseal vapor retarder before placing concrete.
- B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 INSTALLATION OF STEEL REINFORCEMENT

- A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.
- B. Accurately position, support, and secure reinforcement against displacement.
 - 1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.
 - 2. Do not tack weld crossing reinforcing bars.
- C. Preserve clearance between bars of not less than 1 inch, not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.
- D. Provide concrete coverage in accordance with ACI 318.

- E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.
- F. Splices: Lap splices as indicated on Drawings.
 - 1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches, or as indicated, whichever is greater.
 - 2. Stagger splices in accordance with ACI 318.
 - 3. Mechanical Splice Couplers: Install in accordance with manufacturer's instructions.
 - 4. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.
- G. Install welded-wire reinforcement in longest practicable lengths.
 - 1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."
 - a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches.
 - 2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches for plain wire and 8 inches for deformed wire.
 - 3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.
 - 4. Lace overlaps with wire.

3.3 JOINTS

- A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
 - 1. Place joints perpendicular to main reinforcement.
 - 2. Continue reinforcement across construction joints unless otherwise indicated.
 - 3. Do not continue reinforcement through sides of strip placements of floors and slabs.
- B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 INSTALLATION TOLERANCES

- A. Comply with ACI 117.

3.5 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- C. Inspections:

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1. Steel-reinforcement placement.
2. Steel-reinforcement mechanical splice couplers.
3. Steel-reinforcement welding.

END OF SECTION

SECTION 03 30 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 031000 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.
2. Section 032000 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.
3. Section 312000 "Earth Moving" for drainage fill under slabs-on-ground.

1.2 DEFINITIONS

- ###### A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, and other pozzolans materials subject to compliance with requirements.

- ###### B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

- ###### A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.
2. Fly ash.
3. Blended hydraulic cement.
4. Aggregates.
5. Admixtures:
 - a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

6. Vapor retarders.

7. Liquid floor treatments.
 8. Curing materials.
 9. Joint fillers.
- B. Design Mixtures: For each concrete mixture, include the following:
1. Mixture identification.
 2. Minimum 28-day compressive strength.
 3. Durability exposure class.
 4. Maximum w/cm.
 5. Calculated equilibrium unit weight, for lightweight concrete.
 6. Slump limit.
 7. Air content.
 8. Nominal maximum aggregate size.
 9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.
 10. Intended placement method.
 11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.
- C. Shop Drawings:
1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.
 - a. Location of construction joints is subject to approval of the Architect and Engineer.
- D. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:
1. Concrete Class designation.
 2. Location within Project.
 3. Exposure Class designation.
 4. Formed Surface Finish designation and final finish.
 5. Final finish for floors.
 6. Curing process.
 7. Floor treatment if any.
- 1.5 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For the following:
1. Installer: Include copies of applicable ACI certificates.
 2. Ready-mixed concrete manufacturer.
 3. Testing agency: Include copies of applicable ACI certificates.
- B. Material Certificates: For each of the following, signed by manufacturers:
1. Cementitious materials.
 2. Admixtures.
 3. Curing compounds.
 4. Floor and slab treatments.
 5. Bonding agents.
 6. Adhesives.

7. Vapor retarders.
 8. Semirigid joint filler.
 9. Joint-filler strips.
 10. Repair materials.
- C. Material Test Reports: For the following, from a qualified testing agency:
1. Portland cement.
 2. Fly ash.
 3. Slag cement.
 4. Blended hydraulic cement.
 5. Silica fume.
 6. Performance-based hydraulic cement.
 7. Aggregates.
 8. Admixtures:
 - a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.
- D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.
- E. Preconstruction Test Reports: For each mix design.
- F. Field quality-control reports.
- G. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician with experience installing and finishing concrete, incorporating permeability-reducing admixtures.
1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.
- B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.
1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."
- C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.
1. Personnel performing laboratory tests shall be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor shall be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

- D. Field Quality Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.
 - 1. Personnel conducting field tests shall be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.
 - 1. Include the following information in each test report:
 - a. Admixture dosage rates.
 - b. Slump.
 - c. Air content.
 - d. Water-Cement ratio.
 - e. Seven-day compressive strength.
 - f. 28-day compressive strength.
 - g. Standard deviation.
 - h. ACI required compressive strength
 - i. Unit weight.
 - j. Water-soluble chloride ion content determined in accordance with ASTM C1218 at age between 28 and 42 days

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Comply with ASTM C94/C94M and ACI 301.

1.9 FIELD CONDITIONS

- A. Cold-Weather Placement: Comply with ACI 301 and ACI 306.1.
 - 1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.
 - 2. When average high and low temperature is expected to fall below 40 deg F, maintain delivered concrete mixture temperature within the temperature range required by ACI 301.
 - 3. Do not use frozen materials or materials containing ice or snow.
 - 4. Do not place concrete in contact with surfaces less than 35 deg F, other than reinforcing steel.
 - 5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs
- B. Hot-Weather Placement: Comply with ACI 301 and ACI 305.1.
 - 1. Maintain concrete temperature at time of discharge to not exceed 95 deg F.
 - 2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

- a. Maintain forms, steel reinforcement, embedded items, and subgrade temperature less than 115 deg F.

1.10 WARRANTY

- A. Manufacturer's Warranty: Manufacturer agrees to furnish replacement sheet vapor retarder/termite barrier material and accessories for sheet vapor retarder/ termite barrier and accessories that do not comply with requirements or that fail to resist penetration by termites within specified warranty period.
 1. Warranty Period: 10 years from date of Substantial Completion

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

- A. ACI Publications: Comply with ACI 301 unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

- A. Source Limitations:
 1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.
 2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.
 3. Obtain aggregate from single source.
 4. Obtain each type of admixture from single source from single manufacturer.
- B. Cementitious Materials:
 1. Blended Hydraulic Cement: As Indicated
- C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.
 1. Alkali-Silica Reaction: Comply with one of the following:
 - a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.
 - b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.
 - c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. for moderately reactive aggregate or 3 lb./cu. yd. for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301.
 2. Maximum Coarse-Aggregate Size: 1-1/2 inches nominal.
 3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

- D. Lightweight Aggregate: ASTM C330/C330M, nominal maximum aggregate size as Indicated
- E. Air-Entraining Admixture: ASTM C260/C260M.
- F. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride.
 - 1. Water-Reducing Admixture: ASTM C494/C494M, Type A.
 - 2. Retarding Admixture: ASTM C494/C494M, Type B.
 - 3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.
 - 4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.
 - 5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.
 - 6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.
- G. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 VAPOR RETARDERS

- A. Sheet Vapor Retarder, Class A: ASTM E1745, Class A, except with maximum water-vapor permeance of; not less than 15 mils thick. Include manufacturer's recommended adhesive or pressure-sensitive tape.
- B. Sheet Vapor Retarder/Termite Barrier: ASTM E1745, Class A, except with maximum water-vapor permeance of 0.03 perms; complying with ICC AC380. Include manufacturer's recommended adhesive or pressure-sensitive tape.
 - 1. Low-Temperature Flexibility: Pass at minus 15 deg F; ASTM D146/D146M.
 - 2. Puncture Resistance: 224 lbf minimum; ASTM E154/E154M.
 - 3. Water Absorption: 0.1 percent weight-gain maximum after 48-hour immersion at 70 deg F; ASTM D570.
 - 4. Hydrostatic-Head Resistance: 231 feet minimum; ASTM D5385.

2.4 CURING MATERIALS

- A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.
- B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. when dry.
- C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.
 - 1. Color:
 - a. Ambient Temperature Below 50 deg F: Black.
 - b. Ambient Temperature between 50 deg F and 85 deg F: Any color.
 - c. Ambient Temperature Above 85 deg F: White.
- D. Curing Paper: 8-foot-wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

- E. Water: Potable or complying with ASTM C1602/C1602M.
- F. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.
- G. Clear, Waterborne, Membrane-Forming, Nondissipating Curing Compound: ASTM C309, Type 1, Class B.
- H. Clear, Waterborne, Membrane-Forming, Curing and Sealing Compound: ASTM C1315, Type 1, Class A.

2.5 RELATED MATERIALS

- A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber or ASTM D1752, cork or self-expanding cork.
- B. Floor Slab Protective Covering: 8-feet-wide cellulose fabric.
- C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.
- D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:
 - 1. Types I and II, nonload bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.6 REPAIR MATERIALS

- A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch and that can be feathered at edges to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand, as recommended by underlayment manufacturer.
 - 4. Compressive Strength: Not less than 4100 psi at 28 days when tested in accordance with ASTM C109/C109M.
- B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch and that can be filled in over a scarified surface to match adjacent floor elevations.
 - 1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.
 - 2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.
 - 3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch or coarse sand as recommended by topping manufacturer.
 - 4. Compressive Strength: Not less than 5000 psi at 28 days when tested in accordance with ASTM C109/C109M.

2.7 CONCRETE MIXTURES, GENERAL

- A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301.
 - 1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.
- B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:
 - 1. Fly Ash or Other Pozzolans: 25 percent by mass.
 - 2. Slag Cement: 50 percent by mass.
 - 3. Silica Fume: 10 percent by mass.
 - 4. Total of Fly Ash or Other Pozzolans, Slag Cement: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass.
 - 5. Total of Fly Ash or Other Pozzolans: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass.
- C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.
 - 1. Use water-reducing, high-range water-reducing, or plasticizing admixture in concrete, as required, for placement and workability.
 - 2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.
 - 3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50.

2.8 CONCRETE MIXTURES

- A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.
 - 1. Exposure Class: ACI 318 F0.
 - 2. Minimum Compressive Strength: 3000 psi at 28 days.
 - 3. Maximum w/cm: 0.50.
 - 4. Slump Limit: 4 inches, plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 - 5. Air Content:
 - a. 5.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-1/2-inch nominal maximum aggregate size.
 - 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- B. Class B: Normal-weight concrete used for columns and walls.
 - 1. Exposure Class: ACI 318 F2.
 - 2. Minimum Compressive Strength: 4500 psi at 28 days.
 - 3. Maximum w/cm: 0.45.
 - 4. Slump Limit: 8 inches, plus or minus 1 inch for concrete with verified slump of 3 inches plus or minus 1 inch before adding high-range water-reducing admixture or plasticizing admixture at Project site.
 - 5. Air Content:

- a. Exposure Class F2: 5.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-1/2-inch nominal maximum aggregate size.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- C. Class C: Normal-weight concrete used for interior slabs-on-ground.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: 3500 psi at 28 days.
 3. Maximum w/cm: 0.50.
 4. Minimum Cementitious Materials Content: 470 lb/cu. yd..
 5. Slump Limit: 5 inches, plus or minus 1 inch.
 6. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 7. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- D. Class D: Structural normal-weight concrete used for interior suspended slabs.
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: 4000 psi at 28 days.
 3. Calculated Equilibrium Unit Weight: 110 lb/cu. ft., plus or minus 3 lb/cu. ft. as determined by ASTM C567/C567M.
 4. Slump Limit: 5 inches, plus or minus 1 inch.
 5. Air Content:
 - a. Do not use an air-entraining admixture or allow total air content to exceed 3 percent for concrete used in trowel-finished floors.
 6. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
- E. Class E: Normal-weight concrete used for interior metal pan stairs and landings:
1. Exposure Class: ACI 318 F0.
 2. Minimum Compressive Strength: 3000 psi at 28 days.
 3. Maximum w/cm: 0.53.
 4. Minimum Cementitious Materials Content: 470 lb/cu. yd..
 5. Maximum Size Aggregate: 1/2 inch.
 6. Slump Limit: 3 inches, plus 1 inch or minus 2 inches.
 7. Air Content:
 - a. 0.5 percent, plus or minus 0.5 percent at point of delivery.
 8. Limit water-soluble, chloride-ion content in hardened concrete to 0.30 percent by weight of cement.
 9. Retarding Admixture: Not allowed.
 10. Accelerating Admixture: Not allowed.

2.9 CONCRETE MIXING

- A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M and ASTM C1116/C1116M, and furnish batch ticket information.

- B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.
1. For mixer capacity of 1 cu. yd. or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.
 2. For mixer capacity larger than 1 cu. yd., increase mixing time by 15 seconds for each additional 1 cu. yd..
 3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verification of Conditions:
1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.
 2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:
1. Daily access to the Work.
 2. Incidental labor and facilities necessary to facilitate tests and inspections.
 3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.
 4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

- A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.
1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.
 3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

- A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.
1. Install vapor retarder with longest dimension parallel with direction of concrete pour.
 2. Face laps away from exposed direction of concrete pour.
 3. Lap vapor retarder over footings and grade beams not less than 6 inches, sealing vapor retarder to concrete.
 4. Lap joints 6 inches and seal with manufacturer's recommended tape.
 5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.
 6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.
 7. Protect vapor retarder during placement of reinforcement and concrete.
 - a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches on all sides, and sealing to vapor retarder.

3.5 JOINTS

- A. Construct joints true to line, with faces perpendicular to surface plane of concrete.
- B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.
1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.
 2. Place joints perpendicular to main reinforcement.
 - a. Continue reinforcement across construction joints unless otherwise indicated.
 - b. Do not continue reinforcement through sides of strip placements of floors and slabs.
 3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches into concrete.
 4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
 5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
 6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.
 7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.
 8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

- C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-fourth of concrete thickness as follows:
 - 1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch. Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.
 - 2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch-wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.
- D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.
 - 1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.
 - 2. Terminate full-width joint-filler strips not less than 1/2 inch or more than 1 inch below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.
 - 3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.
- E. Doweled Joints:
 - 1. Install dowel bars and support assemblies at joints where indicated on Drawings.
 - 2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

3.6 CONCRETE PLACEMENT

- A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.
 - 1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.
 - 2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.
- B. Notify Architect and testing and inspection agencies 24 hours prior to commencement of concrete placement.
- C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.
 - 1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.
- E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.
1. If a section cannot be placed continuously, provide construction joints as indicated.
 2. Deposit concrete to avoid segregation.
 3. Limit concrete freefall distance to the minimum of the following:
 - a. Smallest width of formwork in horizontal dimension less than, or equal to, twenty-four inches: Ten-foot maximum freefall.
 - b. Smallest width of formwork in horizontal dimension greater than twenty-four inches, but less than thirty-six inches: Fifteen-foot maximum freefall.
 - c. Within formwork that has cross ties, spacers, rods, reinforcing, or other embedded items: Ten-foot maximum freefall.
 - d. All other conditions: Twenty-foot maximum freefall.
 4. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.
 5. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301.
 - a. Do not use vibrators to transport concrete inside forms.
 - b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches into preceding layer.
 - c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.
 - d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.
- F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.
1. Do not place concrete floors and slabs in a checkerboard sequence.
 2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.
 3. Maintain reinforcement in position on chairs during concrete placement.
 4. Screed slab surfaces with a straightedge and strike off to correct elevations.
 5. Level concrete, cut high areas, and fill low areas.
 6. Slope surfaces uniformly to drains where required.
 7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.
 8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

- A. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.
 2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.
- B. As-Cast Surface Finishes:
1. ACI 301 Surface Finish SF-1.0:
 - a. Patch voids larger than 1-1/2 inches wide or 1/2 inch deep.
 - b. Remove projections larger than 1 inch.
 - c. Tie holes do not require patching.
 - d. Surface Tolerance: ACI 117 Class D.
 - e. Apply to concrete surfaces not exposed to public view.
 2. ACI 301 Surface Finish SF-2.0: As-cast concrete texture imparted by form-facing material, arranged in an orderly and symmetrical manner with a minimum of seams.
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class B.
 - e. Apply to concrete surfaces not exposed to public view, unless otherwise noted.
 3. ACI 301 Surface Finish SF-3.0:
 - a. Patch voids larger than 3/4 inch wide or 1/2 inch deep.
 - b. Remove projections larger than 1/4 inch.
 - c. Patch tie holes.
 - d. Surface Tolerance: ACI 117 Class a.
 - e. Locations: Apply to concrete surfaces indicated to receive polished concrete finish.

3.8 FINISHING FLOORS AND SLABS

- A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.
- B. Trowel Finish:
 1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.
 2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.
 3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.
 4. Do not add water to concrete surface.
 5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.
 6. Apply a trowel finish to surfaces exposed to view orto be covered with resilient flooring, carpet, ceramic or quarry tile set over a cleavage membrane, paint, or another thin-film-finish coating system.

7. Finish and measure surface, so gap at any point between concrete surface and an unlevelled, freestanding, 10-ft.- long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/4 inch.
 - a. Slabs on Ground:
 - 1) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
 - a) Applicable to all locations unless noted otherwise.
 - 2) Specified Overall Value (SOV): FF 50 and FL 25 with minimum local value (MLV): FF 40 and FL 17.
 - a) Applicable to all locations to receive polished concrete finish.
 - b. Suspended Slabs:
 - 1) Specified overall values of flatness, FF 35; and of levelness, FL 25; with minimum local values of flatness, FF 24; and of levelness, FL 17.
 - a) Applicable to all locations unless noted otherwise.
 - 2) Specified Overall Value (SOV): FF 50 and FL 25 with minimum local value (MLV): FF 40 and FL 17.
 - a) Applicable to all locations to receive polished concrete finish.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

- A. Filling In:
 1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.
 2. Mix, place, and cure concrete, as specified, to blend with in-place construction.
 3. Provide other miscellaneous concrete filling indicated or required to complete the Work.
- B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.
- C. Equipment Bases and Foundations:
 1. Coordinate sizes and locations of concrete bases with actual equipment provided.
 2. Construct concrete bases 6 inches high unless otherwise indicated on Drawings, and extend base not less than 6 inches in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.
 3. Minimum Compressive Strength: As Indicated.
 4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch centers around the full perimeter of concrete base.
 5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.
 6. Prior to pouring concrete, place and secure anchorage devices.

- a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.
 - b. Cast anchor-bolt insert into bases.
 - c. Install anchor bolts to elevations required for proper attachment to supported equipment.
- D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.
1. Cast-in inserts and accessories, as shown on Drawings.
 2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

- A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.
1. Comply with ACI 301 and ACI 306.1 for cold weather protection during curing.
 2. Comply with ACI 301 and ACI 305.1 for hot-weather protection during curing.
 3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h, calculated in accordance with ACI 305.1, before and during finishing operations.
- B. Curing Formed Surfaces: Comply with ACI 308.1 as follows:
1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.
 2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.
 3. If forms remain during curing period, moist cure after loosening forms.
 4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:
 - a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.
 - b. Continuous Sprinkling: Maintain concrete surface continuously wet.
 - c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.
 - d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.
 - e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 1) Recoat areas subject to heavy rainfall within three hours after initial application.
 - 2) Maintain continuity of coating and repair damage during curing period.
- C. Curing Unformed Surfaces: Comply with ACI 308.1 as follows:
1. Begin curing immediately after finishing concrete.
 2. Interior Concrete Floors:

- a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.
 - b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches, and sealed by waterproof tape or adhesive.
 - a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.
 - b) Cure for not less than seven days.
 - 3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
- c. Floors to Receive Polished Finish: Contractor has option of the following:
 - 1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - a) Lap edges and ends of absorptive cover not less than 12 inches.

- b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.
 - 2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:
 - a) Water.
 - b) Continuous water-fog spray.
 - d. Floors to Receive Chemical Stain:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.
 - 2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.
 - 3) Butt sides of curing paper tight; do not overlap sides of curing paper.
 - 4) Leave curing paper in place for duration of curing period, but not less than 28 days.
 - e. Floors to Receive Urethane Flooring:
 - 1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.
 - 2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches and sealed in place.
 - 3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.
 - 4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.
 - f. Floors to Receive Curing Compound:
 - 1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Maintain continuity of coating, and repair damage during curing period.
 - 4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer.
 - g. Floors to Receive Curing and Sealing Compound:
 - 1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.
 - 2) Recoat areas subjected to heavy rainfall within three hours after initial application.
 - 3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

- A. Conform to ACI 117.

3.12 JOINT FILLING

- A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.
 - 1. Defer joint filling until concrete has aged at least one month.
 - 2. Do not fill joints until construction traffic has permanently ceased.
- B. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.
- C. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches deep in formed joints.
- D. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.13 CONCRETE SURFACE REPAIRS

- A. Defective Concrete:
 - 1. Do not repair and patch defective areas until such repair and patch is approved by Architect.
 - a. Architect will require engineered concrete repair products and details, other than those listed in this specification, where defective area affects the structural integrity of the concrete in question as determined by Structural Engineer.
 - 2. Remove and replace concrete that cannot be repaired and patched to Architect's approval.
- B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 sieve, using only enough water for handling and placing.
- C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.
 - 1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch in any dimension to solid concrete.
 - a. Limit cut depth to 3/4 inch.
 - b. Make edges of cuts perpendicular to concrete surface.
 - c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.
 - d. Fill and compact with patching mortar before bonding agent has dried.
 - e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.
 - 2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

- a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.
 - b. Compact mortar in place and strike off slightly higher than surrounding surface.
 3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.
- D. Repairing Unformed Surfaces:
 1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
 - a. Correct low and high areas.
 - b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
 2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.1 inch wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
 3. After concrete has cured at least 14 days, correct high areas by grinding.
 4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
 - a. Finish repaired areas to blend into adjacent concrete.
 5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
 - a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 - b. Feather edges to match adjacent floor elevations.
 6. Correct other low areas scheduled to remain exposed with repair topping.
 - a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch to match adjacent floor elevations.
 - b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
 7. Repair defective areas, except random cracks and single holes 1 inch or less in diameter, by cutting out and replacing with fresh concrete.
 - a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch clearance all around.
 - b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
 - c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
 - d. Place, compact, and finish to blend with adjacent finished concrete.
 - e. Cure in same manner as adjacent concrete.
 8. Repair random cracks > 1/16" and single holes 1 inch or less in diameter with patching mortar.
 - a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.
 - b. Dampen cleaned concrete surfaces and apply bonding agent.

- c. Place patching mortar before bonding agent has dried.
 - d. Compact patching mortar and finish to match adjacent concrete.
 - e. Keep patched area continuously moist for at least 72 hours.
- E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.
- F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.14 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.
- B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.
- 1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.
 - 2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.
 - 3. Testing agency shall report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.
 - a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:
 - 1) Project name.
 - 2) Name of testing agency.
 - 3) Names and certification numbers of field and laboratory technicians performing inspections and testing.
 - 4) Name of concrete manufacturer.
 - 5) Date and time of inspection, sampling, and field testing.
 - 6) Date and time of concrete placement.
 - 7) Location in Work of concrete represented by samples.
 - 8) Date and time sample was obtained.
 - 9) Truck and batch ticket numbers.
 - 10) Design compressive strength at 28 days.
 - 11) Concrete mixture designation, proportions, and materials.
 - 12) Field test results.
 - 13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.
 - 14) Type of fracture and compressive break strengths at seven days and 28 days.
- C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design

strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:

1. Headed bolts and studs.
2. Verification of use of required design mixture.
3. Concrete placement, including conveying and depositing.
4. Curing procedures and maintenance of curing temperature.
5. Verification of concrete strength before removal of shores and forms from beams and slabs.
6. Batch Plant Inspections: On a random basis, as determined by Architect.
7. Post-installed anchors in hardened concrete.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M shall be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd., but less than 25 cu. yd., plus one set for each additional 50 cu. yd. or fraction thereof.
 - a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.
2. Slump: ASTM C143/C143M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
3. Slump Flow: ASTM C1611/C1611M:
 - a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.
 - b. Perform additional tests when concrete consistency appears to change.
4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete; ASTM C173/C173M volumetric method, for structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
5. Concrete Temperature: ASTM C1064/C1064M:
 - a. One test hourly when air temperature is 40 deg F and below or 80 deg F and above, and one test for each composite sample.
6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.
 - a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.
7. Compression Test Specimens: ASTM C31/C31M:
 - a. Cast and laboratory cure two sets of three 6-inch by 12-inch or 4-inch by 8-inch cylinder specimens for each composite sample.
 - b. Cast, initial cure, and field cure two sets of three standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C39/C39M.
 - a. Test one set of three laboratory-cured specimens at seven days and one set of two specimens at 28 days.
 - b. Test one set of three field-cured specimens at seven days and one set of two specimens at 28 days.
 - c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.
 9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.
 10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi if specified compressive strength is 5000 psi, or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi.
 11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.
 12. Additional Tests:
 - a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Architect.
 - b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.
 - 1) Acceptance criteria for concrete strength to be in accordance with ACI 301, Section 1.6.6.3.
 13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.
 14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.
- F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.15 PROTECTION

- A. Protect concrete surfaces as follows:
1. Protect from petroleum stains.
 2. Diaper hydraulic equipment used over concrete surfaces.
 3. Prohibit vehicles from interior concrete slabs.
 4. Prohibit use of pipe-cutting machinery over concrete surfaces.
 5. Prohibit placement of steel items on concrete surfaces.
 6. Prohibit use of acids or acidic detergents over concrete surfaces.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid – Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID #: 22-24500-02C
30 January 2025

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.
8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

END OF SECTION

SECTION 04 20 00

UNIT MASONRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Concrete masonry units.
- B. Mortar and grout.
- C. Steel reinforcing bars.
- D. Masonry-joint reinforcement.
- E. Miscellaneous masonry accessories.
- F. Products Installed but not Furnished under This Section:
 - 1. Steel lintels in unit masonry.

1.2 DEFINITIONS

- A. CMU(s): Concrete masonry unit(s).
- B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. LEED Submittals conforming to requirements listed in Section 01 81 13 "Sustainable Design Requirements":
 - a. If published provide any of the following documentation: Product Declarations, Environmental Product Declarations (EPD's), GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED, reference "Sustainable Design Requirements."

- 2) Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices.
 - (a) Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 3. Shop Drawings: For the following:
 - a. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
 - b. Reinforcing Steel: Detail bending, lap lengths, and placement of unit masonry reinforcing bars. Comply with ACI 315. Show elevations of reinforced walls.
 - c. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.
- B. Informational Submittals:
1. List of Materials Used in Constructing Mockups: List generic product names together with manufacturers, manufacturers' product names, model numbers, lot numbers, batch numbers, source of supply, and other information as required to identify materials used. Include mix proportions for mortar and grout and source of aggregates.
 - a. Submittal is for information only. Receipt of list does not constitute approval of deviations from the Contract Documents unless such deviations are specifically brought to the attention of Architect and approved in writing.
 2. Qualification Data: For testing agency.
 3. Material Certificates: For each type and size of the following:
 - a. Masonry units.
 - 1) Include material test reports substantiating compliance with requirements.
 - b. Integral water repellent used in CMUs.
 - c. Cementitious materials. Include name of manufacturer, brand name, and type.
 - d. Mortar admixtures.
 - e. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
 - f. Grout mixes. Include description of type and proportions of ingredients.
 - g. Reinforcing bars.
 - h. Joint reinforcement.
 - i. Anchors, ties, and metal accessories.
 4. Mix Designs: For each type of mortar and grout. Include description of type and proportions of ingredients.

- a. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C109/C109M for compressive strength, ASTM C 1506 for water retention, and ASTM C91/C91M for air content.
 - b. Include test reports, according to ASTM C1019, for grout mixes required to comply with compressive strength requirement.
5. Statement of Compressive Strength of Masonry: For each combination of masonry unit type and mortar type, provide statement of average net-area compressive strength of masonry units, mortar type, and resulting net-area compressive strength of masonry determined according to TMS 602/ACI 530.1/ASCE 6.
6. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM C1093 for testing indicated.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.
- B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Deliver preblended, dry mortar mix in moisture-resistant containers. Store preblended, dry mortar mix in delivery containers on elevated platforms in a dry location or in covered weatherproof dispensing silos.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.7 FIELD CONDITIONS

- A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.
1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls, and hold cover securely in place.
 2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe, and hold cover in place.

3. Do not apply uniform floor or roof loads for at least 12 hours and concentrated loads for at least three days after building masonry walls or columns.
4. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.
 - a. Protect sills, ledges, and projections from mortar droppings.
 - b. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
5. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.
6. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in TMS 602/ACI 530.1/ASCE 6.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.
- B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

2.2 UNIT MASONRY, GENERAL

- A. Masonry Standard: Comply with TMS 402/602/ACI 530.1/ASCE 6, except as modified by requirements in the Contract Documents.
- B. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated. Do not use units where such defects are exposed in the completed Work and will be within 20 feet (6 m) vertically and horizontally of a walking surface.
- C. Fire-Resistance Ratings: Comply with requirements for fire-resistance-rated assembly designs indicated.
 1. Where fire-resistance-rated construction is indicated, units shall be listed and labeled by a qualified testing agency acceptable to authorities having jurisdiction.

2.3 CONCRETE MASONRY UNITS

- A. Regional Materials: CMUs shall be manufactured within 100 miles (160 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.
 - 1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
 - 2. Provide square-edged units for outside corners unless otherwise indicated.
- C. Integral Water Repellent: Provide units made with integral water repellent for exposed units.
 - 1. Integral Water Repellent: Liquid polymeric, integral water-repellent admixture that does not reduce flexural bond strength. Units made with integral water repellent, when tested according to ASTM E514/E514M as a wall assembly made with mortar containing integral water-repellent manufacturer's mortar additive, with test period extended to 24 hours, shall show no visible water or leaks on the back of test specimen.
 - a. Products: Subject to compliance with requirements, provide products by one of the following:
 - 1) BASF Corporation; Construction Systems; MasterPel.
 - 2) Euclid Chemical Company (The); an RPM company; Eucon Blocktite.
 - 3) GCP Applied Technologies Inc. (formerly Grace Construction Products); Dry-Block.
- D. CMUs: ASTM C90.
 - 1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
 - 2. Density Classification: Lightweight.
 - 3. Size (Width): Manufactured to dimensions 3/8 inch (10 mm) less than nominal dimensions.

2.4 CONCRETE AND MASONRY LINTELS

- A. General: Provide one of the following:
- B. Masonry Lintels: Built-in-place masonry lintels made from bond beam CMUs matching adjacent CMUs in color, texture, and density classification, with reinforcing bars placed as indicated and filled with coarse grout. Temporarily support built-in-place lintels until cured.

2.5 MORTAR AND GROUT MATERIALS

- A. Regional Materials: Aggregate for mortar and grout, cement, and lime shall be manufactured within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. Portland Cement: ASTM C150/C150M, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.
 - 1. Alkali content shall not be more than 0.1 percent when tested according to ASTM C 114.
- C. Hydrated Lime: ASTM C207, Type S.
- D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
- E. Aggregate for Mortar: ASTM C144.
 - 1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
 - 2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
 - 3. White-Mortar Aggregates: Natural white sand or crushed white stone.
 - 4. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce required mortar color.
- F. Aggregate for Grout: ASTM C404.
- G. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C494/C494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; Construction Systems; Trimix-NCA.
 - b. Euclid Chemical Company (The); an RPM company; Accelguard.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products); Morset.
- H. Water-Repellent Admixture: Liquid water-repellent mortar admixture intended for use with CMUs containing integral water repellent from same manufacturer.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. BASF Corporation; Construction Systems; Rheopel Plus Mortar Admixture.
 - b. Euclid Chemical Company (The); an RPM company; Blocktite Mortar.
 - c. GCP Applied Technologies Inc. (formerly Grace Construction Products); Dry-Block Mortar Admixture.

- I. Water: Potable.

2.6 REINFORCEMENT

- A. Uncoated-Steel Reinforcing Bars: ASTM C615/C615M or ASTM A996/A996M, Grade 60 (Grade 420).
- B. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and to hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Heckmann Building Products, Inc.; #374: Steel-Wich.
 - b. Hohmann & Barnard, Inc.; RB Rebar Positioner.
 - c. Wire-Bond, Figure 8 Rebar Positioners.
- C. Masonry-Joint Reinforcement, General: ASTM A951/A951M.
 - 1. Interior Walls: Hot-dip galvanized carbon steel.
 - 2. Exterior Walls: Hot-dip galvanized carbon steel.
 - 3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
 - 4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
 - 5. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
 - 6. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units.
- D. Masonry-Joint Reinforcement for Single-Wythe Masonry: Ladder or truss type with single pair of side rods.

2.7 MISCELLANEOUS MASONRY ACCESSORIES

- A. Compressible Filler: Premolded filler strips complying with ASTM D1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from neoprene or urethane.
- B. Preformed Control-Joint Gaskets: Made from styrene-butadiene-rubber compound, complying with ASTM D2000, Designation M2AA-805 and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.
- C. Bond-Breaker Strips: Asphalt-saturated felt complying with ASTM D226/D226M, Type I (No. 15 asphalt felt).

2.8 MASONRY CLEANERS

- A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.
1. Products: Subject to compliance with requirements, provide products by one of the following:
 - a. Diedrich Technologies, Inc.; a division of Sandell Construction Solutions; 202 New Masonry Detergent.
 - b. EaCo Chem, Inc.; NMD 80.
 - c. PROSOCO, Inc.; Sure Klean 600.

2.9 MORTAR AND GROUT MIXES

- A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.
1. Do not use calcium chloride in mortar or grout.
 2. Use portland cement-lime mortar unless otherwise indicated.
 3. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.
- B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.
- C. Mortar for Unit Masonry: Comply with ASTM C270, Proportion Specification. Provide the following types of mortar for applications stated unless another type is indicated or needed to provide required compressive strength of masonry.
1. For masonry below grade or in contact with earth, use Type M.
 2. For reinforced masonry, use Type N.
 3. For exterior, above-grade, load-bearing and nonload-bearing walls and parapet walls; for interior load-bearing walls; for interior nonload-bearing partitions; and for other applications where another type is not indicated, use Type N.
 4. For interior nonload-bearing partitions, Type O may be used instead of Type N.
- D. Grout for Unit Masonry: Comply with ASTM C476.
1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with TMS 402/602 /ACI 530.1/ASCE 6 for dimensions of grout spaces and pour height.

2. Proportion grout in accordance with ASTM C476 Table 1 or paragraph 4.2.2 for specified 28-day compressive strength indicated, but not less than 2000 psi (14 MPa).
3. Provide grout with a slump of 8 to 11 inches (200 to 280 mm) as measured according to ASTM C143/C143M.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
 1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
 2. Verify that foundations are within tolerances specified.
 3. Verify that reinforcing dowels are properly placed.
 4. Verify that substrates are free of substances that impair mortar bond.
- B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.
- B. Build chases and recesses to accommodate items specified in this and other Sections.
- C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match construction immediately adjacent to opening.
- D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.
- E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures. Mix units from several pallets or cubes as they are placed.
- F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation, do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan, do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation, do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls, do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
3. For vertical lines and surfaces, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2-inch (12-mm) maximum.
5. For lines and surfaces, do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2-inch (12-mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2-inch (12-mm) maximum.
7. For faces of adjacent exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm). Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).

5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

- A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.
- B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in running bond; do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than 2 inches (50 mm). Bond and interlock each course of each wythe at corners. Do not use units with less-than-nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.
- D. Stopping and Resuming Work: Stop work by stepping back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.
- E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.
- F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.
- G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below, and rod mortar or grout into core.
- H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
- I. Build nonload-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.
 1. Install compressible filler in joint between top of partition and underside of structure above.
 2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
 3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 07 84 43 - Joint Firestopping.

3.5 MORTAR BEDDING AND JOINTING

- A. Lay CMUs as follows:
 - 1. Bed face shells in mortar and make head joints of depth equal to bed joints.
 - 2. Bed webs in mortar in all courses of piers, columns, and pilasters.
 - 3. Bed webs in mortar in grouted masonry, including starting course on footings.
 - 4. Fully bed entire units, including areas under cells, at starting course on footings where cells are not grouted.
 - 5. Fully bed units and fill cells with mortar at anchors and ties as needed to fully embed anchors and ties in mortar.
- B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.
- C. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.
- D. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint) unless otherwise indicated.
- E. Cut joints flush where indicated to receive waterproofing unless otherwise indicated.

3.6 MASONRY-JOINT REINFORCEMENT

- A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).
 - 1. Space reinforcement not more than 16 inches (406 mm) o.c.
 - 2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
 - 3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.
- B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.
- C. Provide continuity at wall intersections by using prefabricated T-shaped units.
- D. Provide continuity at corners by using prefabricated L-shaped units.

3.7 CONTROL AND EXPANSION JOINTS

- A. General: Install control- and expansion-joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

- B. Form control joints in concrete masonry as follows:
 - 1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout, and rake out joints in exposed faces for application of sealant.
 - 2. Install preformed control-joint gaskets designed to fit standard sash block.
 - 3. Install interlocking units designed for control joints. Install bond-breaker strips at joint. Keep head joints free and clear of mortar, or rake out joint for application of sealant.
 - 4. Install temporary foam-plastic filler in head joints, and remove filler when unit masonry is complete for application of sealant.

3.8 LINTELS

- A. Install steel lintels where indicated.
- B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.
- C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.9 REINFORCED UNIT MASONRY INSTALLATION

- A. Temporary Formwork and Shores: Construct formwork and shores as needed to support reinforced masonry elements during construction.
 - 1. Construct formwork to provide shape, line, and dimensions of completed masonry as indicated. Make forms sufficiently tight to prevent leakage of mortar and grout. Brace, tie, and support forms to maintain position and shape during construction and curing of reinforced masonry.
 - 2. Do not remove forms and shores until reinforced masonry members have hardened sufficiently to carry their own weight and that of other loads that may be placed on them during construction.
- B. Placing Reinforcement: Comply with requirements in TMS 602/ACI 530.1/ASCE 6.
- C. Grouting: Do not place grout until entire height of masonry to be grouted has attained enough strength to resist grout pressure.
 - 1. Comply with requirements in TMS 602/ACI 530.1/ASCE 6 for cleanouts and for grout placement, including minimum grout space and maximum pour height.
 - 2. Limit height of vertical grout pours to not more than 60 inches (1520 mm).

3.10 FIELD QUALITY CONTROL

- A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.
- B. Inspections: Special inspections according to Level C in TMS 402/602/ACI 530/ASCE 5.
 - 1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
 - 2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
 - 3. Place grout only after inspectors have verified proportions of site-prepared grout.
- C. Testing Prior to Construction: One set of tests.
- D. Testing Frequency: One set of tests for each 5000 sq. ft. (464 sq. m) of wall area or portion thereof.
- E. Concrete Masonry Unit Test: For each type of unit provided, according to ASTM C140/C140M for compressive strength.
- F. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C780.
- G. Grout Test (Compressive Strength): For each mix provided, according to ASTM C1019.
- H. Prism Test: For each type of construction provided, according to ASTM C1314 at 7 days and at 28 days.

3.11 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.
- B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.
- D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean concrete masonry by applicable cleaning methods indicated in NCMA TEK 8-4A.

3.12 MASONRY WASTE DISPOSAL

- A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.
- B. Waste Disposal as Fill Material: Dispose of clean masonry waste, including excess or soil-contaminated sand, waste mortar, and broken masonry units, by crushing and mixing with fill material as fill is placed.
 1. Crush masonry waste to less than 4 inches (100 mm) in each dimension.
 2. Mix masonry waste with at least two parts of specified fill material for each part of masonry waste.
 3. Do not dispose of masonry waste as fill within 18 inches (450 mm) of finished grade.
- C. Masonry Waste Recycling: Return broken CMUs not used as fill to manufacturer for recycling.
- D. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above or recycled, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION

SECTION 05 12 00

STRUCTURAL STEEL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Structural steel.
 - 2. Shrinkage-resistant grout.
- B. Related Requirements:
 - 1. Section 051213 "Architecturally Exposed Structural Steel Framing" for additional requirements for architecturally exposed structural steel.
 - 2. Section 053100 "Steel Decking" for field installation of shear stud connectors through deck.

1.2 DEFINITIONS

- A. Structural Steel: Elements of the structural frame indicated on Drawings and as described in ANSI/AISC 303.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. Structural-steel materials.
 - 2. High-strength, bolt-nut-washer assemblies.
 - 3. Anchor rods.
 - 4. Threaded rods.
 - 5. Shop primer.
 - 6. Galvanized-steel primer.
 - 7. Galvanized repair paint.
 - 8. Shrinkage-resistant grout.
- B. Shop Drawings: Show fabrication of structural-steel components.
 - 1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
 - 2. Include embedment Drawings.
 - 3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld. Show backing bars

that are to be removed and supplemental fillet welds where backing bars are to remain.

4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical, high-strength bolted connections.
 5. Identify members not to be shop primed.
- 1.5 Welding Procedure Specifications (WPSs) and Procedure Qualification Records (PQRs): Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:
1. Power source (constant current or constant voltage).
 2. Electrode manufacturer and trade name, for demand-critical welds.
- 1.6 Delegated Design Submittal: For structural-steel connections indicated on Drawings to comply with design loads, include analysis data signed and sealed by the qualified professional engineer responsible for their preparation. In addition, the professional engineer responsible for connection design shall review the shop drawings prior to submittal to verify that the connections detailed comply with the calculations provided as well as the design requirements. A review letter, signed and sealed by the professional engineer responsible for connection design, shall be provided with the shop drawings and calculations submittal stating that this review and verification has been completed.
- 1.7 INFORMATIONAL SUBMITTALS
- A. Qualification Data: For Installer and fabricator.
 - B. Welding certificates.
 - C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers, certifying that shop primers are compatible with topcoats.
 - D. Mill test reports for structural-steel materials, including chemical and physical properties.
 - E. Product Test Reports: For the following:
 1. Bolts, nuts, and washers, including mechanical properties and chemical analysis.
 2. Direct-tension indicators.
 3. Tension-control, high-strength, bolt-nut-washer assemblies.
 - F. Survey of existing conditions.
 - G. Source quality-control reports.
 - H. Field quality-control reports.
- 1.8 QUALITY ASSURANCE
- A. Fabricator Qualifications: A qualified fabricator that participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category BU or is

accredited by the IAS Fabricator Inspection Program for Structural Steel (Acceptance Criteria 172).

- B. Installer Qualifications: A qualified Installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category ACSE.
- C. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.1/D1.1M.

1.9 DELIVERY, STORAGE, AND HANDLING

- A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from corrosion and deterioration.
 - 1. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.
- B. Store fasteners in a protected place in sealed containers with manufacturer's labels intact.
 - 1. Fasteners may be repackaged provided Owner's testing and inspecting agency observes repackaging and seals containers.
 - 2. Clean and relubricate bolts and nuts that become dry or rusty before use.
 - 3. Comply with manufacturers' written recommendations for cleaning and lubricating ASTM F3125/F3125M, Grade F1852 bolt assemblies and for retesting bolt assemblies after lubrication.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Comply with applicable provisions of the following specifications and documents:
 - 1. ANSI/AISC 303.
 - 2. ANSI/AISC 360.
 - 3. RCSC's "Specification for Structural Joints Using High-Strength Bolts."
- B. Connection Design Information:
 - 1. Option 3 and 3B: Design connections and final configuration of member reinforcement at connections in accordance with ANSI/AISC 303 by fabricator's qualified professional engineer.
 - a. Use Load and Resistance Factor Design; data are given at factored-load level.

2.2 STRUCTURAL-STEEL MATERIALS

- A. W-Shapes: ASTM A992/A992M.
- B. Channels, Angles: ASTM A36/A36M.

- C. Plate and Bar: ASTM A36/A36M.
- D. Cold-Formed Hollow Structural Sections: ASTM A500/A500M, Grade C structural tubing.
- E. Steel Pipe: ASTM A53/A53M, Type E or Type S, Grade B.
- F. Welding Electrodes: Comply with AWS requirements.

2.3 BOLTS AND CONNECTORS

- A. High-Strength A325 Bolts, Nuts, and Washers: ASTM F3125/F3125M, Grade A325, Type 1, heavy-hex steel structural bolts; ASTM A563, Grade DH, heavy-hex carbon-steel nuts; and ASTM F436/F436M, Type 1, hardened carbon-steel washers; all with plain finish.
- B. Shear Stud Connectors: ASTM A108, AISI C-1015 through C-1020, headed-stud type, cold-finished carbon steel; AWS D1.1/D1.1M, Type B.

2.4 RODS

- A. Headed Anchor Rods: ASTM F1554, Grade 36, straight.
 - 1. Finish: Plain.

2.5 PRIMER

- A. Steel Primer:
 - 1. Comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 2. SSPC-Paint 23, latex primer.
 - 3. Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer complying with MPI#79 and compatible with topcoat.
- B. Galvanized-Steel Primer: MPI#134.
 - 1. Etching Cleaner: MPI#25, for galvanized steel.
 - 2. Galvanizing Repair Paint: ASTM A780/A780M.

2.6 SHRINKAGE-RESISTANT GROUT

- A. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.7 FABRICATION

- A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate in accordance with ANSI/AISC 303 and to ANSI/AISC 360.
 - 1. Camber structural-steel members where indicated.
 - 2. Fabricate beams with rolling camber up.

3. Identify high-strength structural steel in accordance with ASTM A6/A6M and maintain markings until structural-steel framing has been erected.
 4. Mark and match-mark materials for field assembly.
 5. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.
- B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1/D1.1M.
- C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.
- D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.
- E. Cleaning: Clean and prepare steel surfaces that are to remain unpainted in accordance with SSPC-SP 1.
- F. Holes: Provide holes required for securing other work to structural steel and for other work to pass through steel members.
1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
 2. Baseplate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.

2.8 SHOP CONNECTIONS

- A. High-Strength Bolts: Shop install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for type of bolt and type of joint specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.

2.9 GALVANIZING

- A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel in accordance with ASTM A123/A123M.
1. Fill vent and drain holes that are exposed in the finished Work unless they function as weep holes, by plugging with zinc solder and filing off smooth.

2.10 SHOP PRIMING

- A. Shop prime steel surfaces, except the following:
1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches.
 2. Surfaces to be field welded.

3. Surfaces of high-strength bolted, slip-critical connections.
 4. Surfaces to receive sprayed fire-resistive materials (applied fireproofing).
 5. Galvanized surfaces unless indicated to be painted.
 6. Surfaces enclosed in interior construction.
- B. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:
1. SSPC-SP 2.
 2. SSPC-SP 3.
 3. SSPC-SP 7 (WAB)/NACE WAB-4.
 4. SSPC-SP 6 (WAB)/NACE WAB-3.
- C. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.
- D. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide a minimum dry film thickness of 1.5 mils. Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

2.11 SOURCE QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform shop tests and inspections.
1. Allow testing agency access to places where structural-steel work is being fabricated or produced to perform tests and inspections.
 2. Bolted Connections: Inspect shop-bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 3. Welded Connections: Visually inspect shop-welded connections in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - a. Liquid Penetrant Inspection: ASTM E165/E165M.
 - b. Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - c. Ultrasonic Inspection: ASTM E164.
 - d. Radiographic Inspection: ASTM E94/E94M.
 4. In addition to visual inspection, test and inspect shop-welded shear stud connectors in accordance with requirements in AWS D1.1/D1.1M.
 5. Prepare test and inspection reports.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Verify, with certified steel erector present, elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments for compliance with requirements.
 - 1. Prepare a certified survey of existing conditions. Include bearing surfaces, anchor rods, bearing plates, and other embedments showing dimensions, locations, angles, and elevations.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place unless otherwise indicated on Drawings.
 - 1. Do not remove temporary shoring supporting composite deck construction and structural-steel framing until cast-in-place concrete has attained its design compressive strength.

3.3 ERECTION

- A. Set structural steel accurately in locations and to elevations indicated and in accordance with ANSI/AISC 303 and ANSI/AISC 360.
- B. Baseplates Bearing Plates and Leveling Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting plates. Clean bottom surface of plates.
 - 1. Set plates for structural members on wedges, shims, or setting nuts as required.
 - 2. Weld plate washers to top of baseplate.
 - 3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of plate before packing with grout.
 - 4. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.
- C. Maintain erection tolerances of structural steel within ANSI/AISC 303.
- D. Align and adjust various members that form part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that are in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.

1. Level and plumb individual members of structure. Slope roof framing members to slopes indicated on Drawings.
 2. Make allowances for difference between temperature at time of erection and mean temperature when structure is completed and in service.
- E. Splice members only where indicated.
- F. Do not use thermal cutting during erection unless approved by Engineer. Finish thermally cut sections within smoothness limits in AWS D1.1/D1.1M.
- G. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

3.4 FIELD CONNECTIONS

- A. High-Strength Bolts: Install high-strength bolts in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts" for bolt and joint type specified.
1. Joint Type: Snug tightened.
- B. Weld Connections: Comply with AWS D1.1/D1.1M for tolerances, appearances, welding procedure specifications, weld quality, and methods used in correcting welding work.
1. Comply with ANSI/AISC 303 and ANSI/AISC 360 for bearing, alignment, adequacy of temporary connections, and removal of paint on surfaces adjacent to field welds.
 2. Remove backing bars or runoff tabs, back gouge, and grind steel smooth.
 3. Assemble and weld built-up sections by methods that maintain true alignment of axes without exceeding tolerances in ANSI/AISC 303 for mill material.

3.5 REPAIR

- A. Galvanized Surfaces: Clean areas where galvanizing is damaged or missing, and repair galvanizing to comply with ASTM A780/A780M.
- B. Touchup Painting:
1. Immediately after erection, clean exposed areas where primer is damaged or missing, and paint with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.
 - a. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
- C. Touchup Priming: Cleaning and touchup priming are specified in Section 099600 "High-Performance Coatings."

3.6 FIELD QUALITY CONTROL

- A. Special Inspections: Owner will engage a special inspector to perform the following special inspections:
1. Verify structural-steel materials and inspect steel frame joint details.

2. Verify weld materials and inspect welds.
 3. Verify connection materials and inspect high-strength bolted connections.
- B. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
1. Bolted Connections: Inspect bolted connections in accordance with RCSC's "Specification for Structural Joints Using High-Strength Bolts."
 2. Welded Connections: Visually inspect field welds in accordance with AWS D1.1/D1.1M.
 - a. In addition to visual inspection, test and inspect field welds in accordance with AWS D1.1/D1.1M and the following inspection procedures, at testing agency's option:
 - 1) Liquid Penetrant Inspection: ASTM E165/E165M.
 - 2) Magnetic Particle Inspection: ASTM E709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration are not accepted.
 - 3) Ultrasonic Inspection: ASTM E164.
 - 4) Radiographic Inspection: ASTM E94/E94M.

END OF SECTION

SECTION 05 31 00

STEEL DECKING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Roof deck.
 - 2. Noncomposite form deck.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Roof deck.
 - 2. Noncomposite form deck.
- B. Shop Drawings:
 - 1. Include layout and types of deck panels, anchorage details, reinforcing channels, pans, cut deck openings, special jointing, accessories, and attachments to other construction.

1.3 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Certificates:
 - 1. Welding certificates.
 - 2. Product Certificates: For each type of steel deck.
- C. Test and Evaluation Reports:
 - 1. Product Test Reports: For tests performed by a qualified testing agency, indicating that power-actuated mechanical fasteners comply with requirements.
 - 2. Research Reports: For steel deck, from ICC-ES showing compliance with the building code.
- D. Field Quality-Control Submittals:
 - 1. Field quality-control reports.
- E. Qualification Statements: For welding personnel and testing agency.

1.4 PREINSTALLATION MEETING

- A. Preinstallation Conference: Conduct conference at Project site.

1.5 QUALITY ASSURANCE

- A. Qualifications:
1. Welding Qualifications: Qualify procedures and personnel in accordance with SDI QA/QC and the following welding code:
 - a. AWS D1.3/D1.3M.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Store products in accordance with SDI MOC3. Stack steel deck on platforms or pallets and slope to provide drainage. Protect with a waterproof covering and ventilate to avoid condensation.

1.7 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck according to AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members."
- B. Fire-Resistance Ratings: Comply with ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Indicate design designations from UL's "Fire Resistance Directory" or from the listings of another qualified testing agency.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. AISI Specifications: Comply with calculated structural characteristics of steel deck in accordance with AISI S100.

2.2 ROOF DECK

- A. Roof Deck: Fabricate panels, without top-flange stiffening grooves, to comply with SDI RD and with the following:
1. Prime-Painted Steel Sheet: ASTM A1008/A1008M, Structural Steel (SS), Grade 33 minimum, shop primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Manufacturer's standard.
 2. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, zinc coating.
 3. Galvanized- and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33, G60 zinc coating; cleaned, pretreated, and primed with manufacturer's standard baked-on, rust-inhibitive primer.
 - a. Color: Manufacturer's standard.
 4. Deck Profile: As indicated.
 5. Profile Depth: As indicated.
 6. Design Uncoated-Steel Thickness: As indicated.
 7. Span Condition: As indicated.

8. Side Laps: Overlapped.

2.3 NONCOMPOSITE FORM DECK

- A. Noncomposite Form Deck: Fabricate ribbed-steel sheet noncomposite form-deck panels to comply with "SDI Specifications and Commentary for Noncomposite Steel Form Deck," in SDI Publication No. 31, with the minimum section properties indicated, and with the following:
1. Galvanized-Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating.
 2. Galvanized- and Shop-Primed Steel Sheet: ASTM A653/A653M, Structural Steel (SS), Grade 33 (230), G60 (Z180) zinc coating; with unpainted top surface and cleaned and pretreated bottom surface primed with manufacturer's standard gray baked-on, rust-inhibitive primer.
 3. Profile Depth: As indicated.
 4. Span Condition: As indicated.

2.4 ACCESSORIES

- A. Provide manufacturer's standard accessory materials for deck that comply with requirements indicated.
- B. Mechanical Fasteners: Corrosion-resistant, low-velocity, power-actuated or pneumatically driven carbon-steel fasteners; or self-drilling, self-threading screws.
- C. Side-Lap Fasteners: Corrosion-resistant, hexagonal washer head; self-drilling, carbon-steel screws, No. 10 minimum diameter.
- D. Flexible Closure Strips: Vulcanized, closed-cell, synthetic rubber.
- E. Miscellaneous Sheet Metal Deck Accessories: Steel sheet, minimum yield strength of 33,000 psi, not less than 0.0359-inch design uncoated thickness, of same material and finish as deck; of profile indicated or required for application.
- F. Pour Stops and Girder Fillers: Steel sheet, minimum yield strength of 33,000 psi, of same material and finish as deck, and of thickness and profile recommended by SDI standards for overhang and slab depth.
- G. Column Closures, End Closures, Z-Closures, and Cover Plates: Steel sheet, of same material, finish, and thickness as deck unless otherwise indicated.
- H. Piercing Hanger Tabs: Piercing steel sheet hanger attachment devices for use with floor deck.
- I. Weld Washers: Uncoated steel sheet, shaped to fit deck rib, 0.0598 inch (1.52 mm) thick, with factory-punched hole of 3/8-inch (9.5-mm) minimum diameter.
- J. Flat Sump Plates: Single-piece steel sheet, 0.0747 inch thick, of same material and finish as deck. For drains, cut holes in the field.
- K. Galvanizing Repair Paint: ASTM A780/A780M.
- L. Repair Paint: Manufacturer's standard rust-inhibitive primer of same color as primer.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine supporting frame and field conditions for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. Install deck panels and accessories in accordance with SDI C, SDI NC, and SDI RD, as applicable; manufacturer's written instructions; and requirements in this Section.
- B. Install temporary shoring before placing deck panels if required to meet deflection limitations.
- C. Locate deck bundles to prevent overloading of supporting members.
- D. Place deck panels on supporting frame and adjust to final position with ends accurately aligned and bearing on supporting frame before being permanently fastened. Do not stretch or contract side-lap interlocks.
- E. Place deck panels flat and square and fasten to supporting frame without warp or deflection.
- F. Cut and neatly fit deck panels and accessories around openings and other work projecting through or adjacent to deck.
- G. Provide additional reinforcement and closure pieces at openings as required for strength, continuity of deck, and support of other work.
- H. Comply with AWS requirements and procedures for manual shielded metal arc welding, appearance and quality of welds, and methods used for correcting welding work.
- I. Mechanical fasteners may be used in lieu of welding to fasten deck. Locate mechanical fasteners and install in accordance with deck manufacturer's written instructions.

3.3 INSTALLATION OF ROOF DECK

- A. Fasten roof-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated or arc seam welds with an equal perimeter that is not less than 1-1/2 inches long, and as follows:
 - 1. Weld Diameter: As indicated.
 - 2. Weld Spacing: Weld edge and interior ribs of deck units with a minimum of two welds per deck unit at each support. Space welds as indicated.
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or as indicated.

1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 2. Mechanically clinch or button punch.
 3. Fasten with a minimum of 1-1/2-inch-long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
1. End Joints: Lapped 2 inches minimum.
- D. Miscellaneous Roof-Deck Accessories: Install ridge and valley plates, finish strips, end closures, and reinforcing channels in accordance with deck manufacturer's written instructions. Weld or mechanically fasten to substrate to provide a complete deck installation.
1. Weld cover plates at changes in direction of roof-deck panels unless otherwise indicated.
- E. Flexible Closure Strips: Install flexible closure strips over partitions, walls, and where indicated. Install with adhesive in accordance with manufacturer's written instructions to ensure complete closure.

3.4 INSTALLATION OF FLOOR DECK

- A. Fasten floor-deck panels to steel supporting members by arc spot (puddle) welds of the surface diameter indicated and as follows:
1. Weld Diameter: As indicated.
 2. Weld Spacing: As indicated
- B. Side-Lap and Perimeter Edge Fastening: Fasten side laps and perimeter edges of panels between supports, at intervals not exceeding the lesser of one-half of the span or 36 inches, and as follows:
1. Mechanically fasten with self-drilling, No. 10 diameter or larger, carbon-steel screws.
 2. Mechanically clinch or button punch.
 3. Fasten with a minimum of 1-1/2-inch-long welds.
- C. End Bearing: Install deck ends over supporting frame with a minimum end bearing of 1-1/2 inches, with end joints as follows:
1. End Joints: Butted.
- D. Pour Stops and Girder Fillers: Weld steel sheet pour stops and girder fillers to supporting structure in accordance with SDI recommendations unless otherwise indicated.
- E. Floor-Deck Closures: Weld steel sheet column closures, cell closures, and Z-closures to deck, in accordance with SDI recommendations, to provide tight-fitting closures at open ends of ribs and sides of deck.

3.5 PROTECTION

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on both surfaces of deck with galvanized repair paint in accordance with ASTM A780/A780M and manufacturer's written instructions.

- B. Repair Painting:
 - 1. Wire brush and clean rust spots, welds, and abraded areas on top surface of prime-painted deck immediately after installation, and apply repair paint.
 - 2. Apply repair paint, of same color as adjacent shop-primed deck, to bottom surfaces of deck exposed to view.
 - 3. Wire brushing, cleaning, and repair painting of bottom deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 4. Wire brushing, cleaning, and repair painting of rust spots, welds, and abraded areas of both deck surfaces are included in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."
 - 5. Provide final protection and maintain conditions to ensure that steel deck is without damage or deterioration at time of Substantial Completion.

3.6 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Special inspections and qualification of welding special inspectors for cold-formed steel floor and roof deck in accordance with quality-assurance inspection requirements of SDI QA/QC.
 - a. Field welds will be subject to inspection.
 - 2. Steel decking will be considered defective if it does not pass tests and inspections.
- C. Prepare test and inspection reports.

END OF SECTION

SECTION 05 40 00

COLD-FORMED METAL FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Exterior non-load-bearing wall framing.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 ACTION SUBMITTALS

- A. Product Data: For the following:
 - 1. Cold-formed steel framing materials.
 - 2. Exterior non-load-bearing wall framing.
 - 3. Vertical deflection clips.
 - 4. Single deflection track.
 - 5. Double deflection track.
 - 6. Drift clips.
 - 7. Post-installed anchors.
 - 8. Power-actuated anchors.
- B. Shop Drawings:
 - 1. Include layout, spacings, sizes, thicknesses, and types of cold-formed steel framing; fabrication; and fastening and anchorage details, including mechanical fasteners.
 - 2. Indicate reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1.4 INFORMATIONAL SUBMITTALS

- A. Welding certificates.
- B. Product certificates.
- C. Product test reports.

1.5 QUALITY ASSURANCE

- A. Testing Agency Qualifications: Qualified according to ASTM E329 for testing indicated.

- B. Product Tests: Mill certificates or data from a qualified independent testing agency.
- C. Code-Compliance Certification of Studs and Tracks: Provide documentation that framing members are certified according to the product-certification program of the Steel Stud Manufacturers Association.
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 - 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 - 2. AWS D1.3/D1.3M, "Structural Welding Code - Sheet Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Cold-Formed Steel Framing Standards: Unless more stringent requirements are indicated, framing complies with AISI S100 and ASTM C955.

2.2 COLD-FORMED STEEL FRAMING MATERIALS

- A. Framing Members, General: Comply with ASTM C955 for conditions indicated.
- B. Steel Sheet: ASTM A1003/A1003M, Structural Grade, Type H, metallic coated, of grade and coating designation as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G90 or equivalent.
- C. Steel Sheet for Vertical Deflection Clips: ASTM A653/A653M, structural steel, zinc coated, of grade and coating as follows:
 - 1. Grade: As required by structural performance.
 - 2. Coating: G60.

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:
 - 1. Minimum Base-Metal Thickness: 0.0329 inch.
 - 2. Flange Width: 1-3/8 inches.
- B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and matching minimum base-metal thickness of steel studs.
- C. Vertical Deflection Clips, Exterior: Manufacturer's standard bypass clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.
- D. Single Deflection Track: Manufacturer's single, deep-leg, U-shaped steel track; unpunched, with unstiffened flanges, of web depth to contain studs while allowing free vertical movement, with flanges designed to support horizontal loads and transfer them to the primary structure.

- E. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.
- F. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure through positive mechanical attachment to stud web and structure.

2.4 FRAMING ACCESSORIES

- A. Fabricate steel-framing accessories from ASTM A1003/A1003M, Structural Grade, Type H, metallic coated steel sheet, of same grade and coating designation used for framing members.
- B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated.

2.5 ANCHORS, CLIPS, AND FASTENERS

- A. Steel Shapes and Clips: ASTM A36/A36M, zinc coated by hot-dip process according to ASTM A123/A123M.
- B. Anchor Bolts: ASTM F1554, Grade 36, threaded carbon-steel hex-headed bolts, carbon-steel nuts, and flat, hardened-steel washers; zinc coated by.
- C. Post-Installed Anchors: Fastener systems with bolts of same basic metal as fastened metal, if visible, unless otherwise indicated; with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC01 or ICC-ES AC308 as appropriate for the substrate.
 - 1. Uses: Securing cold-formed steel framing to structure.
 - 2. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B633 or ASTM F1941, Class Fe/Zn 5, unless otherwise indicated.
 - 3. Material for Exterior or Interior Locations and Where Stainless Steel Is Indicated: Alloy Group 1 stainless steel bolts, ASTM F593, and nuts, ASTM F594.
- D. Power-Actuated Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Mechanical Fasteners: ASTM C1513, corrosion-resistant-coated, self-drilling, self-tapping, steel drill screws.
 - 1. Head Type: Low-profile head beneath sheathing; manufacturer's standard elsewhere.

2.6 MISCELLANEOUS MATERIALS

- A. Galvanizing Repair Paint: ASTM A780/A780M.

- B. Cement Grout: Portland cement, ASTM C150/C150M, Type I; and clean, natural sand, ASTM C404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.
- C. Nonmetallic, Nonshrink Grout: Factory-packaged, nonmetallic, noncorrosive, nonstaining grout, complying with ASTM C1107/C1107M, and with a fluid consistency and 30-minute working time.
- D. Shims: Load-bearing, high-density, multimonomer, nonleaching plastic; or cold-formed steel of same grade and metallic coating as framing members supported by shims.
- E. Sill Sealer Gasket: Closed-cell neoprene foam, 1/4 inch thick, selected from manufacturer's standard widths to match width of bottom track or rim track members as required.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before sprayed fire-resistive materials are applied, attach continuous angles, supplementary framing, or tracks to structural members indicated to receive sprayed fire-resistive materials.
- B. After applying sprayed fire-resistive materials, remove only as much of these materials as needed to complete installation of cold-formed framing without reducing thickness of fire-resistive materials below that required to obtain fire-resistance ratings indicated. Protect remaining fire-resistive materials from damage.
- C. Install load-bearing shims or grout between the underside of load-bearing wall bottom track and the top of foundation wall or slab at locations with a gap larger than 1/4 inch to ensure a uniform bearing surface on supporting concrete or masonry construction.
- D. Install sill sealer gasket at the underside of wall bottom track or rim track and at the top of foundation wall or slab at stud or joist locations.

3.2 INSTALLATION, GENERAL

- A. Cold-formed steel framing may be shop or field fabricated for installation, or it may be field assembled.
- B. Install cold-formed steel framing according to AISI S200, AISI S202, and manufacturer's written instructions unless more stringent requirements are indicated.
- C. Install cold-formed steel framing and accessories plumb, square, and true to line, and with connections securely fastened.
- D. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

- E. Install temporary bracing and supports to secure framing and support loads equal to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.
- F. Do not bridge building expansion joints with cold-formed steel framing. Independently frame both sides of joints.
- G. Install insulation, specified in Section 072100 "Thermal Insulation," in framing-assembly members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.
- H. Fasten hole-reinforcing plate over web penetrations that exceed size of manufacturer's approved or standard punched openings.

3.3 INSTALLATION OF EXTERIOR NON-LOAD-BEARING WALL FRAMING

- A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure.
- B. Fasten both flanges of studs to top and bottom track unless otherwise indicated. Space studs as follows:
 - 1. Stud Spacing: 16 inches on center or as indicated on Drawings.
- C. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.
- D. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.
 - 1. Install single deep-leg deflection tracks and anchor to building structure.
 - 2. Install double deep-leg deflection tracks and anchor outer track to building structure.
 - 3. Connect vertical deflection clips to infill studs and anchor to building structure.
 - 4. Connect drift clips to cold-formed steel framing and anchor to building structure.
- E. Install horizontal bridging in wall studs, spaced vertically in rows indicated on Shop Drawings but not more than 48 inches apart. Fasten at each stud intersection.
 - 1. Channel Bridging: Cold-rolled steel channel, welded or mechanically fastened to webs of punched studs.
 - 2. Strap Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
 - 3. Bar Bridging: Proprietary bridging bars installed according to manufacturer's written instructions.
- F. Top Bridging for Single Deflection Track: Install row of horizontal bridging within 12 inches of single deflection track. Install a combination of bridging and stud or stud-track solid blocking of width and thickness matching studs, secured to stud webs or flanges.

1. Install solid blocking at centers indicated on Shop Drawings.

- G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, and fasteners, to provide a complete and stable wall-framing system.

3.4 INSTALLATION TOLERANCES

- A. Install cold-formed steel framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet and as follows:
1. Space individual framing members no more than plus or minus 1/8 inch from plan location. Cumulative error are not to exceed minimum fastening requirements of sheathing or other finishing materials.

3.5 REPAIRS

- A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed steel framing with galvanized repair paint according to ASTM A780/A780M and manufacturer's written instructions.

3.6 FIELD QUALITY CONTROL

- A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. Field and shop welds will be subject to testing and inspecting.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Cold-formed steel framing will be considered defective if it does not pass tests and inspections.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION

SECTION 06 10 53

MISCELLANEOUS CARPENTRY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Rooftop equipment bases and support curbs.
- B. Wood blocking, cants, and nailers.
- C. Wood furring and grounds.
- D. Plywood backing panels.
- E. In wall blocking for wall mounting equipment and accessories.

1.2 DEFINITIONS

- A. Boards or Strips: Lumber of less than 2 inches nominal (38 mm actual) size in least dimension.
- B. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater size but less than 5 inches nominal (114 mm actual) size in least dimension.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - a. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
 - b. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - c. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D5664.

- d. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
 - 2. LEED Submittals conforming to requirements listed in Section 01 81 13 "Sustainable Design Requirements":
 - a. If published provide any of the following documentation: Product Declarations, Environmental Product Declarations (EPD's), GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED; reference "Sustainable Design Requirements."
 - b. Indoor Environmental Quality Credits:
 - 1) Product Data: For adhesives and sealants, indicating VOC content.
 - 2) Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.
 - 3) Laboratory Test Reports: For composite wood products, indicating compliance with requirements for low-emitting materials.
 - c. Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices.
 - 1) Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2) Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - 3) Chain-of-Custody Certificates: For certified wood products. Include statement of costs.
 - B. Informational Submittals:
 - 1. Evaluation Reports: For the following, from ICC-ES:
 - a. Preservative-treated wood.
 - b. Fire-retardant-treated wood.
 - c. Metal framing anchors.
- 1.4 QUALITY ASSURANCE
- A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.
 - B. Certified Wood: Provide an invoice including vendor's chain-of-custody number, product cost, and entity being invoiced.
 - C. Vendor Qualifications: A vendor that is certified for chain of custody by an FSC-accredited certification body.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

- A. Regional Materials: Manufacture dimension lumber, except treated materials, within 100 miles (160 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 100 miles (160 km) of Project site.
- B. Certified Wood: Lumber and Plywood shall be certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001 and FSC STD-40-004.
- C. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. For exposed lumber indicated to receive a stained or natural finish, mark grade stamp on end or back of each piece or omit grade stamp and provide certificates of grade compliance issued by grading agency.
 - 3. Dress lumber, S4S, unless otherwise indicated.
- D. Maximum Moisture Content of Lumber: 19 percent for 2-inch nominal (38-mm actual) thickness or less; no limit for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

- A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with ground, Use Category UC3b for exterior construction not in contact with ground, and Use Category UC4a for items in contact with ground.
 - 1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.
 - 2. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not require incising, contain colorants, bleed through, or otherwise adversely affect finishes.

- B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.
- C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.
- D. Application: Treat items indicated on Drawings, and the following:
 - 1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
 - 2. Wood sills, sleepers, blocking, furring, stripping, and similar concealed members in contact with masonry or concrete.

2.3 FIRE-RETARDANT-TREATED MATERIALS

- A. General: Where fire-retardant-treated materials are indicated, materials shall comply with requirements in this article, that are acceptable to authorities having jurisdiction, and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.
- B. Fire-Retardant-Treated Lumber and Plywood by Pressure Process: Products with a flame-spread index of 25 or less when tested according to ASTM E84, and with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 mm) beyond the centerline of the burners at any time during the test.
 - 1. Treatment shall not promote corrosion of metal fasteners.
 - 2. Exterior Type: Treated materials shall comply with requirements specified above for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D2898. Use for exterior locations and where indicated.
 - 3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D3201 at 92 percent relative humidity. Use where exterior type is not indicated.
- C. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Kiln-dry plywood after treatment to a maximum moisture content of 15 percent.
- D. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
 - 1. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by inspection agency.

- E. For exposed items indicated to receive a stained or natural finish, chemical formulations shall not bleed through, contain colorants, or otherwise adversely affect finishes.

2.4 MISCELLANEOUS LUMBER

- A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:
 - 1. Blocking.
 - 2. Nailers.
 - 3. Rooftop equipment bases, support curbs and roof perimeter blocking.
 - 4. Cants.
 - 5. Furring.
 - 6. Grounds.
- B. Dimension Lumber Items: Construction or No. 2 grade lumber of any of the following species:
 - 1. Hem-fir (north); NLGA.
 - 2. Mixed southern pine or southern pine; SPIB.
 - 3. Spruce-pine-fir; NLGA.
 - 4. Spruce-pine-fir (south); NeLMA, WCLIB, or WWPA.
 - 5. Northern species; NLGA.
 - 6. Eastern softwoods; NeLMA.
- C. Concealed Boards: 19 percent maximum moisture content of any of the following species and grades:
 - 1. Mixed southern pine or southern pine, No. 3 grade; SPIB.
 - 2. Hem-fir or hem-fir (north), Standard or No. 3 Common grade; NLGA, WCLIB, or WWPA.
 - 3. Spruce-pine-fir (south) or spruce-pine-fir, Standard or No. 3 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
- D. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.
- E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.
- F. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.5 PLYWOOD BACKING PANELS

- A. Equipment Backing Panels: Plywood, DOC PS 1, Exposure 1, C-D Plugged, in thickness indicated or, if not indicated, not less than 3/4-inch (19-mm) nominal thickness.

1. Plywood shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.6 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
 1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, or in area of high relative humidity, provide fasteners with hot-dip zinc coating complying with ASTM A153/A153M.
- B. Nails, Brads, and Staples: ASTM F1667/F1667M.
- C. Screws for Fastening to Metal Framing: ASTM C954, length as recommended by screw manufacturer for material being fastened.
- D. Power-Driven Fasteners: Fastener systems with an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC70.
- E. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.
 1. Material: Carbon-steel components, zinc plated to comply with ASTM B633, Class Fe/Zn 5.

2.7 METAL FRAMING ANCHORS

- A. Manufacturers:
 1. Cleveland Steel Specialty Co.
 2. KC Metals Products, Inc.
 3. Phoenix Metal Products, Inc.
 4. Simpson Strong-Tie Co., Inc.
 5. USP Structural Connectors.
- B. Galvanized-Steel Sheet: Hot-dip, zinc-coated steel sheet complying with ASTM A 653/A 653M, G60 (Z180) coating designation.
 1. Use for interior locations unless otherwise indicated.
- C. Hot-Dip, Heavy-Galvanized Steel Sheet: ASTM A653/A653M; Structural Steel (SS), high-strength low-alloy steel Type A (HSLAS Type A), or high-strength low-alloy steel Type B (HSLAS Type B); G185 (Z550) coating designation; and not less than 0.036 inch (0.9 mm) thick.
 1. Use for wood-preservative-treated lumber and where indicated.

2.8 MISCELLANEOUS MATERIALS

- A. Adhesives for Gluing Furring and Sleepers to Concrete or Masonry: Formulation complying with ASTM D3498 that is approved for use indicated by adhesive manufacturer.
 - 1. Adhesives shall have a VOC content of 70 g/L or less.
 - 2. Adhesives shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry accurately to other construction. Locate furring, nailers, blocking, grounds, and similar supports to comply with requirements for attaching other construction.
- B. Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.
- C. Do not splice structural members between supports unless otherwise indicated.
- D. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.
 - 1. Provide metal clips for fastening gypsum board at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16-inches (406 mm) o.c.
- E. Sort and select lumber so that natural characteristics do not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.
- F. Comply with AWWA M4 for applying field treatment to cut surfaces of preservative-treated lumber.
- G. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
 - 1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

3.2 WOOD GROUND, SLEEPER, BLOCKING AND NAILER, OR METAL STRAPPING INSTALLATION

- A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.
- B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces unless otherwise indicated.
- C. Provide fire blocking in furred spaces, stud spaces, and other concealed cavities as indicated and as follows:
 - 1. Fire block furred spaces of walls, at each floor level, at ceiling, and at not more than 96-inches (2438 mm) o.c. with solid wood blocking or noncombustible materials accurately fitted to close furred spaces.
 - 2. Fire block concealed spaces of wood-framed walls and partitions at each floor level, at ceiling line of top story, and at not more than 96-inches (2438 mm) o.c. Where fire blocking is not inherent in framing system used, provide closely fitted solid wood blocks of same width as framing members and 2-inch nominal (38-mm actual) thickness.
 - 3. Fire block concealed spaces between floor sleepers with same material as sleepers to limit concealed spaces to not more than 100 sq. ft. (9.3 sq. m) and to solidly fill space below partitions.
- D. At Contractor's option, provide metal backing plates or fire treated wood blocking to support loads imposed at wall-mounted and wall-hung items that require backing plates, include, without limitation, the following:
 - 1. Toilet accessories.
 - 2. Fire protection specialties.
 - 3. Markerboards.
 - 4. Tackboards.
 - 5. Millwork.
 - 6. Wood trim.
 - 7. Metal cabinets.
 - 8. Computer equipment wall mounting brackets.
 - 9. Within walls of utility and storage rooms.
 - 10. Wall protection.
- E. Fire-treated wood blocking is required at the following locations:
 - 1. Audio / Visual equipment.
 - 2. Wall-mounted door stops.
 - 3. Wall-mounted grab bars.
 - 4. Upper wall casework units.
 - 5. Wall-mounted handrails.
 - 6. Wall-mounted ladders.

- F. Where indicated or where wood blocking is not allowed by code, utilize galvanized sheet metal backing plates. Plating shall be long enough to span across a minimum of 3 studs, unless otherwise indicated, and may be one of the following:
 - 1. Galvanized steel plate 0.053-inch (1.34-mm) thick minimum by 4-inches (102-mm) wide.
 - 2. 3-5/8 inches (92.1 mm) un-punched wide flange steel stud of 0.053 inch (1.34-mm) thick. Notch studs so that backing plate will be flush with exterior face of stud.

3.3 WOOD FURRING INSTALLATION

- A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.
 - 1. Fire block furred spaces of walls, at each floor level and at ceiling, with wood blocking or noncombustible materials accurately fitted to close furred spaces.
- B. Furring to Receive Gypsum Board: Install 1-by-2-inch nominal- (19-by-38-mm actual-) size furring vertically at 16 inches (406 mm) o.c.

3.4 PANEL PRODUCT INSTALLATION

- A. Wood Structural Panels: Comply with applicable recommendations contained in APA Form No. E30K, "APA Design/Construction Guide: Residential & Commercial," for types of structural-use panels and applications indicated.
 - 1. Comply with "Code Plus" provisions in above-referenced guide.

3.5 PLYWOOD BACKING PANELS

- A. Provide fire retardant-treated 3/4-inch (19-mm) thick plywood panels to each wall scheduled to receive electrical, telephone, communications, data, or similar equipment.
 - 1. Do not install panels within 2 feet (610 mm) of the floor nor within 2 feet (610 mm) of a door frame.
- B. Refer to Section 09 91 00 - Painting for field painting. Do not paint over at least one fire-retardant-treated label per panel.

END OF SECTION

SECTION 06 16 43

GYP SUM SHEATHING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Gypsum wall sheathing.
- B. Sheathing joint and penetration treatment.

1.2 RELATED REQUIREMENTS

- A. Section 05 40 00 - Cold-Formed Metal Framing.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review air-barrier and gypsum sheathing requirements and installation, special details, transitions, mockups, air-leakage testing, protection, and work scheduling that covers air-barrier and gypsum sheathing.
 - 2. Refer to Section 05 40 00 - Cold-Formed Metal Framing for additional information.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.
 - 2. LEED Submittals conforming to requirements listed in Section 01 81 13 "Sustainable Design Requirements":
 - a. If published provide any of the following documentation: GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED, reference "Sustainable Design Requirements."
 - b. Indoor Environmental Quality Credits:
 - 1) Product Data: For adhesives and sealants, indicating VOC content.
 - 2) Laboratory Test Reports: For adhesives, indicating compliance with requirements for low-emitting materials.

3. Shop Drawings: Comply with provisions of Section 05 40 00 - Cold-Formed Metal Framing.
 - a. Shop Drawings that are required by that Section, indicate exterior sheathing screw fastener spacing to be utilized at interior zones and corner zones of building façade, as required to ensure sheathing installation will withstand negative wind pressures imposed by design wind speeds.
 - B. Informational Submittals:
 1. Qualification Data: For Installer.
 2. Field quality-control reports, if required.
- 1.5 DELIVERY, STORAGE, AND HANDLING
- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Resistance Ratings: As tested according to ASTM E119; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
 1. Fire-Resistance Ratings: Indicated by design designations from UL (FRD) or from the listings of another qualified testing agency.

2.2 GYPSUM SHEATHING

- A. Glass-Mat Gypsum Sheathing: ASTM C1177/C1177M.
 1. Manufacturers:
 - a. CertainTeed Corporation; GlasRoc.
 - b. Georgia-Pacific Building Products; Dens-Glass Exterior Sheathing.
 - c. National Gypsum Company; Gold Bond eXP.
 - d. United States Gypsum Co.; Securock.
 - e. Substitutions: None permitted.
 2. Type and Thickness: Type X, 5/8 inch (15.9 mm) thick.
 3. Permeance: Not less than 15 perms per ASTM E96/E96M.
 4. Size: 48 by 96 inches (1219 by 2438 mm).
 5. Mold Growth: 10, per ASTM D3273.

2.3 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.
- B. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached.
 1. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, provide one of the following:
 - a. Bugle-head screws complying with ASTM C954.
 - b. Wafer-head screws complying with ASTM C1513.
 2. Minimum Fastener Head Diameter: Not less than 0.42 inch (10.7 mm), unless larger diameter is required by sheathing manufacturer.

PART 3 EXECUTION

3.1 INSTALLATION, GENERAL

- A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.
- B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.
- C. Securely attach to substrate by fastening as indicated, complying with the following:
 1. ASTM C1280, unless closer spacing is required in order for sheathing to resist pressures imposed by design wind speeds.
- D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.
- E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
- F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

- A. Comply with GA-253 and with manufacturer's written instructions.
 1. Fasten gypsum sheathing to cold-formed metal framing with bugle-head or wafer-head screws, with minimum head diameter of 0.42 inch (10.7 mm) , unless larger diameter is required by sheathing manufacturer.

2. Install panels with a 3/8 inch (9.5 mm) gap where non-load-bearing construction abuts structural elements.
 3. Install panels with a 1/4 inch (6.4 mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.
- B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.
- C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent panels without forcing. Abut ends over centers of studs, and stagger end joints of adjacent panels not less than one stud spacing. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
 - a. Decrease spacing between fasteners where required to ensure sheathing installation will withstand negative wind pressures imposed by design wind speeds, as indicated in Shop Drawings submitted under Section 05 40 00 - Cold-Formed Metal Framing.
- D. Vertical Installation: Install vertical edges centered over studs. Abut ends and edges with those of adjacent panels. Attach at perimeter and within field of panel to each stud.
1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of panels.
 - a. Decrease spacing between fasteners where required to ensure sheathing installation will withstand negative wind pressures imposed by design wind speeds, as indicated in Shop Drawings submitted under Section 05 40 00 - Cold-Formed Metal Framing.

3.3 SHEATHING JOINT-AND-PENETRATION TREATMENT

- A. Seal sheathing joints according to "Air-Barrier" manufacturer's written recommendations.
1. Apply sealant on joints and fasteners and trowel flat. Apply sufficient quantity of sealant to completely cover joints and fasteners after troweling, unless directed otherwise by "Air-Barrier" manufacturer's written instructions. Seal other penetrations and openings.
 - a. Utilize primers and tapes as recommended by sealant manufacturer at corners and joints at adjacent substrates.
 2. Taping of joints will not be accepted as an alternative or substitute for application of joint sealant.
 3. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply silicone sheet transition, so that a minimum of 3 inches (75 mm) of coverage is achieved over each substrate. Maintain 3 inches (75 mm) of full contact over firm bearing to perimeter frames, with not less than 1 inch (25 mm) of full contact.
 - a. Transition Strip: Roll firmly to enhance adhesion.

- b. Silicone Sheet Transition: Set in full bed of silicone sealant applied to walls, frame, and air-barrier material.
- 4. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of sheathing material with foam sealant.
- 5. Seal top of through-wall flashings to sheathing with an additional 6 inch- (150 mm-) wide, transition strip.
- 6. Seal exposed edges of strips at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- 7. Repair punctures, voids, and deficient lapped seams in strips and transition strips extending 6 inches (150 mm) beyond repaired areas in strip direction.

3.4 FIELD QUALITY CONTROL

- A. Testing: Owner reserves the right to engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.
- B. The following items will be subject to testing and inspecting:
 - 1. Attachment of sheathing to studs and other supplemental support framing.
 - 2. Type and size of fasteners.
 - 3. Spacing of fasteners.
- C. Testing agency will report test results promptly and in writing to Contractor and Architect.
- D. Remove and replace work where test results indicate that it does not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

END OF SECTION

SECTION 07 01 50

ROOF REMOVAL

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Full tear-off of entire roof for building renovation.
- B. Removal of base flashings.
- C. Temporary roofing.

1.2 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.
- B. Full Roof Tear-Off: Removal of existing roofing system from deck.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - 2. Shop Drawings: Include plans, sections, and details.
 - 3. Temporary Roofing Submittal: Product data and description of temporary roofing system. If temporary roof remains in place, include surface preparation requirements needed to receive permanent roof, and submit a letter from roofing manufacturer, stating acceptance of the temporary roof and that its inclusion does not adversely affect the roofing system's resistance to fire and wind or its FM Global rating.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer.
 - 2. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.
 - 3. Landfill Records: Indicate receipt and acceptance of demolished roofing materials and hazardous wastes, such as asbestos-containing materials, by a landfill facility licensed to accept them.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning roofing removal. Comply with hauling and disposal regulations of authorities having jurisdiction.
- B. Roof Removal Conference: Conduct conference at Project site.
 - 1. Review methods and procedures related to roofing system tear-off and replacement, including, but not limited to, the following:
 - a. Temporary protection requirements for existing building components that are to remain.
 - b. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
 - c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
 - d. Condition and acceptance of existing former roof deck now floor deck substrate for reuse.
 - e. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
 - f. HVAC shutdown and sealing of air intakes.
 - g. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
 - h. Governing regulations and requirements for insurance and certificates if applicable.
 - i. Existing conditions that may require notification of Architect before proceeding.

1.5 FIELD CONDITIONS

- A. Existing Roofing System: EPDM roofing.
- B. Protect building to be renovated, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.
- C. Conditions existing at time of inspection for bidding are maintained by Owner as far as practical.
- D. Weather Limitations: Proceed with roof removal preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.
 - 1. Remove only as much roofing in one day as can be made watertight in the same day.
- E. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

1. Hazardous materials will be removed by Owner before start of the Work. Existing roof will be left no less watertight than before removal.
2. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

PART 2 PRODUCTS

2.1 TEMPORARY PROTECTION MATERIALS

- A. Expanded Polystyrene (EPS) Insulation: ASTM C578.
- B. Plywood: DOC PS1, Grade CD Exposure 1.
- C. OSB: DOC PS2, Exposure 1.

2.2 TEMPORARY ROOFING MATERIALS

- A. Design and selection of materials for temporary roofing are Contractor's responsibilities.
- B. Base Sheet: ASTM D4601/D4601M, Type II, nonperforated, asphalt-impregnated and -coated, glass-fiber sheet.
- C. Glass-Fiber Felts: ASTM D 2178, Type IV, asphalt-impregnated, glass-fiber felt.
- D. Asphalt Primer: ASTM D 41/D 41M.
- E. Roofing Asphalt: ASTM D 312, Type III or IV.
- F. Base Sheet Fasteners: Capped head, factory-coated steel fasteners, listed in FM Global's "Approval Guide."

2.3 INFILL AND REPLACEMENT MATERIALS

- A. Use infill materials matching existing roofing system materials unless otherwise indicated.
 1. Infill materials are specified in Section 07 54 23 - Thermoplastic-Polyolefin (TPO) Roofing unless otherwise indicated.
- B. Wood blocking, curbs, and nailers are specified in Section 06 10 53 - Miscellaneous Carpentry.

2.4 AUXILIARY ROOFING MATERIALS

- A. General: Use auxiliary temporary roofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of existing conditions.

PART 3 EXECUTION

3.1 PREPARATION

- A. Shut off rooftop utilities and service piping before beginning the Work.
- B. Test existing roof drains that are extended, to verify that they are not blocked or restricted. Immediately notify Architect of any blockages or restrictions.
- C. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.
- D. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

3.2 ROOF TEAR-OFF

- A. General: Notify Owner each day of extent of roof tear-off proposed for that day and obtain authorization to proceed.
- B. Full Roof Tear-Off: Remove existing roofing and other roofing system components down to the deck.
 - 1. Remove light weight insulating concrete.
 - 2. Remove roof insulation and cover board.
 - 3. Remove wood blocking, curbs, and nailers. Maintain perimeter blocking and flashing as shown in roofing details on Drawings.
 - 4. Bitumen and felts that are firmly bonded to concrete decks are permitted to remain if felts are dry. Remove unadhered bitumen, unadhered felts, and wet felts.
 - 5. Remove fasteners from deck or cut fasteners off slightly above deck surface.

3.3 DECK INSPECTION

- A. Inspect deck after tear-off of roofing system.
- B. If broken or loose fasteners that secure deck panels to one another or to structure are observed, or if deck appears or feels inadequately attached, immediately notify Architect. Do not proceed with installation until directed by Architect.
- C. If deck surface is unsuitable for receiving new expansion or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.
- D. Provide additional deck securement as indicated on Drawings.

3.4 TEMPORARY ROOFING

- A. Install approved temporary roofing over area to be reroofed.
- B. Install temporary roofing over area to be reroofed. Install two glass-fiber felts, lapping each sheet 19 inches (483 mm) over preceding sheet. Embed glass-fiber felt in a solid mopping of hot roofing asphalt applied within equiviscous temperature range. Glaze-coat completed surface with hot roofing asphalt.
- C. Remove temporary roofing per manufacturer requirements for installation of new roof assembly.

3.5 BASE FLASHING REMOVAL

- A. Remove existing base flashings. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris to receive framing for building expansion.
- B. When directed by Architect, replace parapet framing, wood blocking, curbs, and nailers to comply with Section 06 10 53 - Miscellaneous Carpentry. Maintain perimeter blocking and flashing as shown in roofing details on Drawings.

3.6 DISPOSAL

- A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.
 - 1. Storage or sale of demolished items or materials on-site is not permitted.
- B. Transport and legally dispose of demolished materials off Owner's property.

END OF SECTION

SECTION 07 13 26

SELF-ADHERING SHEET WATERPROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Type A: HDPE sheet waterproofing system for horizontal (blindsided) under-slab applications and vertical (blindsided) foundation wall applications. .

1.2 RELATED REQUIREMENTS

- A. Section 03 15 19 "Under-Slab Sheet Vapor Barrier" for membrane to which waterproofing shall be sealed watertight.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review waterproofing requirements including surface preparation, substrate condition and pretreatment, minimum curing period, forecasted weather conditions, special details and sheet flashings, installation procedures, testing and inspection procedures, and protection and repairs.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, technical data, and tested physical and performance properties of waterproofing.
 - 2. Shop Drawings: Show locations and extent of waterproofing. Include details for substrate joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions.
- B. Informational Submittals:
 - 1. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
 - 2. Product Test Reports: From a qualified independent testing agency indicating and interpreting test results of waterproofing for compliance with requirements, based on comprehensive testing of current waterproofing formulations.

3. Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

C. Closeout Submittals:

1. Executed copy of Special Manufacturer's Warranty.
2. Executed copy of Special Installer's Warranty.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: A firm that is approved or licensed by waterproofing manufacturer for installation of waterproofing required for this Project.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. General: Deliver materials in manufacturer's original packaging with label indicating pertinent information identifying the item. Store materials in accordance with manufacturer's instructions in a protected dry location off ground. Do not open packaging nor remove labels until time of installation.
- B. Deliver liquid materials to Project site in original packages with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, and directions for storing and mixing with other components.
- C. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by waterproofing manufacturer.
- D. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- E. Store rolls according to manufacturer's written instructions.
- F. Protect stored materials from direct sunlight.

1.7 FIELD CONDITIONS

- A. Environmental Limitations: Apply waterproofing within the range of ambient and substrate temperatures recommended by waterproofing manufacturer. Do not apply waterproofing to a damp or wet substrate.
- B. Maintain adequate ventilation during preparation and application of waterproofing materials.

1.8 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to replace waterproofing material that does not comply with requirements or that does not remain watertight during specified warranty period.

1. Warranty does not include failure of waterproofing due to failure of substrate prepared and treated according to requirements or formation of new joints and cracks in substrate exceeding 1/16 inch (1.6 mm) in width.
 2. Warranty Period: Ten years after date of Substantial Completion.
- B. Special Installer's Warranty: Written waterproofing Installer's warranty, signed by Installer, covering Work of this Section, for warranty period of two years.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Source Limitations: Obtain waterproofing materials and molded-sheet drainage panels through one source from a single manufacturer.
1. Obtain bituminous sheet waterproofing and HDPE sheet waterproofing, and all related accessory materials for each system, through one source from a single manufacturer, to ensure compatibility of systems and continuity of manufacturer's waterproofing warranty.

2.2 PERFORMANCE REQUIREMENTS

- A. Waterproofing System: Provide waterproofing products that prevent the passage of water, are compatible with adjacent waterproofing systems with which they interface, and which have been produced and are installed to establish and maintain continuous watertight seals.

2.3 TYPE A - HDPE SHEET WATERPROOFING

- A. HDPE Sheet for Horizontal and Vertical Applications: Composite sheet membrane comprising 0.046 in (1.2 mm) of high density polyethylene film, and layers of specially formulated synthetic adhesive layers. The membrane shall form an integral and permanent bond to poured concrete to prevent water migration at the interface of the membrane and structural concrete.
- B. Physical Properties: As follows, measured per standard test methods referenced:
1. Resistance to Hydrostatic Head: 231 ft (70 m); ASTM D 5385 modified.
 2. Tensile Strength, Film: 4000 psi (27.6 MPa) minimum; ASTM D 412.
 3. Elongation: 450%; ASTM D 412, modified.
 4. Low-Temperature Flexibility: Pass at minus 20 deg F (minus 29 deg C); ASTM D 1970.
 5. Peel Adhesion to Concrete: 10 lbs/in. (1750 N/m); ASTM D 903, modified.
 6. Puncture Resistance: 225 lb. (1000 N); ASTM E 154.
 7. Vapor Permeance: 0.01 perms (0.6 ng/Pa s x sq. m); ASTM E 96, Water Method.
- C. Manufacturers:
1. Carlisle

2. GCP Applied Technologies
 3. Soprema
 4. TREMCO
 5. WR Meadows
- D. Basis of Design Product: HDPE Sheet Waterproofing:
1. "PREPRUFE 300R Plus," as manufactured by GCP Applied Technologies Inc. (formerly Grace Construction Products).
- E. Auxiliary Materials: Furnish auxiliary materials recommended by waterproofing manufacturer for intended use and compatible with HDPE sheet waterproofing.
1. Adhesive Tape: Adhesive tapes recommended by waterproofing manufacturer.
 - a. Detail Tape: Two-sided, pressure-sensitive, self-adhering reinforced tape, 4-1/2 inches (114 mm) wide, with a tack-free protective adhesive coating on one side and release film on self-adhering side.
 2. Metal Termination Bars: Aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick, predrilled at 9-inch (225-mm) centers.
- 2.4 MOLDED-SHEET DRAINAGE PANELS
- A. Nonwoven-Geotextile-Faced, Molded-Sheet Drainage Panel: Manufactured composite subsurface drainage panels consisting of a nonwoven, needle-punched geotextile facing with an apparent opening size not exceeding No. 70 (0.21-mm) sieve laminated to one side with a polymeric film bonded to the other side of a studded, nonbiodegradable, molded-plastic-sheet drainage core, with a vertical flow rate of 9 to 15 gpm per ft. (112 to 188 L/min. per m).

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
- B. HDPE Sheet Waterproofing: Verify that compacted subgrade is dry, smooth, and sound; and has been inspected and approved by Owner's Testing Laboratory.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean, prepare, and treat substrates according to manufacturer's written instructions. Provide clean, dust-free, and dry substrates for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage and overspray affecting other construction.

- C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings.
- D. Prepare, fill, prime, and treat joints and cracks in substrates. Remove dust and dirt from joints and cracks according to ASTM D 4258.
- E. Corners: Prepare, prime, and treat inside and outside corners according to ASTM D 6135.
 - 1. Install membrane strips centered over vertical inside corners. Install 3/4-inch(19-mm) fillets of liquid membrane on horizontal inside corners and as follows:
 - a. At footing-to-wall intersections, extend liquid membrane each direction from corner or install membrane strip centered over corner.
- F. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through waterproofing and at drains and protrusions according to ASTM D 6135.

3.3 TYPE A – HDPE SHEET APPLICATION

- A. Install HDPE sheets according to waterproofing manufacturer's written instructions.
- B. Place and secure drainage panels over substrate. Lap edges and ends of geotextile to maintain continuity.
- C. Vertical Applications: Install sheet membrane with HDPE face against substrate. Accurately align sheets and maintain uniform 3-inch- (75-mm-) minimum lap widths and end laps. Overlap and seal seams and stagger and tape end laps to ensure watertight installation. Mechanically fasten to substrate.
 - 1. Securely fasten top termination of membrane with continuous metal termination bar anchored into substrate and cover with detailing tape.
- D. Horizontal Applications: Install sheet membrane with HDPE face against substrate. Accurately align sheets and maintain uniform 3-inch- (75-mm-) minimum lap widths and end laps. Overlap and seal seams. Overlap, stagger, and seal end laps with detail tape to ensure watertight installation.
- E. Corners: Seal lapped terminations and cut edges of sheet waterproofing at inside and outside corners with detail tape.
- F. Seal penetrations through sheet waterproofing to provide watertight seal with detail tape patches or wraps and a liquid-membrane troweling.
- G. Install sheet waterproofing and auxiliary materials to produce a continuous watertight tie into adjacent waterproofing.
- H. Repair tears, voids, and lapped seams in waterproofing not complying with requirements. Tape perimeter of damaged or nonconforming area extending 6 inches (150 mm) beyond repaired areas in all directions. Apply a patch of sheet membrane and firmly secure with detail tape.

- I. Correct deficiencies in or remove waterproofing that does not comply with requirements, repair substrates, reapply waterproofing, and repair sheet flashings.

3.4 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install board insulation as a protection course after installing drainage panels.

3.5 FIELD QUALITY CONTROL

- A. Inspection: Arrange for manufacturer's representative to perform two field inspections, as follows:
 - 1. Perform inspection at commencement of installation, to ensure work is being performed in accordance with manufacturer's instructions.
 - 2. Inspect completed installation and provide written report that installation complies with manufacturer's written instructions.
- B. Remove and replace applications of sheet waterproofing where inspection indicates that it does not comply with specified requirements.
- C. Perform additional testing and inspecting, at Contractor's expense, to determine compliance of replaced or additional work with specified requirements.

3.6 PROTECTION AND CLEANING

- A. Do not permit foot traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect sheet waterproofing from damage due to UV light, harmful weather exposures, physical abuse, and other causes. Provide temporary coverings where insulation will be subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.
- D. Clean spillage and soiling from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

END OF SECTION

SECTION 07 54 19

POLYVINYL-CHLORIDE (PVC) ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Adhered polyvinyl chloride (PVC) roofing system.
- B. Substrate board.
- C. Roof insulation.
- D. Cover board.
- E. Walkways.

1.2 RELATED REQUIREMENTS

- A. Section 01 23 00 "Alternates" for Alternate #4: Polyvinyl-Chloride Roofing.
- B. Section 06 10 53 "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
- C. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
- D. Section 07 71 00 "Roof Specialties" for premanufactured copings and roof edge flashings.
- E. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preinstallation Roofing Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 - 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.

3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product.
 - a. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
2. LEED Submittals conforming to requirements listed in Section 01 81 13 - Sustainable Design Requirements:
 - a. If published provide any of the following documentation: GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED, reference "Sustainable Design Requirements."
 - b. Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices.
 - 1) Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2) Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - c. Construction and Demolition Waste Management. For all products submit:
 - 1) A letter stating the total weight and volume of waste diverted from landfills. Provide details of how the waste was recovered, reused or recycled.
 - d. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.

3. Shop Drawings: Include roof plans, sections, details, and attachments to other work, including the following:
 - a. Layout and thickness of insulation.
 - b. Base flashings and membrane terminations.
 - c. Flashing details at penetrations.
 - d. Tapered insulation thickness and slopes.
 - e. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 - f. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 - g. Tie-in with air barrier.
 4. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.
- B. Informational Submittals:
1. Qualification Data: For Installer, manufacturer, and testing agency.
 2. Manufacturer Certificates:
 - a. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1) Submit evidence of compliance with performance requirements.
 - b. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
 3. Product Test Reports: For roof membrane and insulation, tests performed by independent qualified testing agency indicating compliance with specified requirements.
 4. Evaluation Reports: For components of roofing system, from ICC-ES.
 5. Field Test Reports:
 - a. Concrete internal relative humidity test reports.
 - b. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
 6. Field quality-control reports.
 7. Sample Warranties: For manufacturer's special warranties.
- C. Closeout Submittals:
1. Maintenance Data: For roofing system to include in maintenance manuals.
- 1.6 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
 - 1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.
- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Final Acceptance.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, and walkway products for the following warranty period:
 - 1. Warranty Period: Five years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
 - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.
- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4470, UL 580, or UL 1897 with a safety factor of two:
 - 1. Zone 1 (Roof Area Field): As indicated on Drawings.
 - 2. Zone 2 (Roof Area Perimeter): As indicated on Drawings.
 - 3. Zone 3 (Roof Area Corners): As indicated on Drawings.
- D. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 82 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 POLYVINYL CHLORIDE (PVC) ROOFING

- A. PVC Sheet: ASTM D 4434/D 4434M, Type II, glass-fiber reinforced, smooth backed.
 - 1. Manufacturers:
 - a. Carlisle Construction Materials.
 - b. Sika.
 - c. Siplast.
 - d. Soprema.
 - 2. Thickness: 60 mils (2.0 mm).

3. Exposed Face Color: White.

B. Basis of Design Product: Sika Sarnafil G 410-60 SA Energy Smart.

2.3 AUXILIARY ROOFING MATERIALS

A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.

1. Adhesives and Sealants: Comply with VOC limits of authorities having jurisdiction.

- a. Plastic Foam Adhesives: 50 g/L.
- b. Gypsum Board and Panel Adhesives: 50 g/L.
- c. Multipurpose Construction Adhesives: 70 g/L.
- d. Fiberglass Adhesives: 80 g/L.
- e. Contact Adhesives: 80 g/L.
- f. PVC Welding Compounds: 510 g/L.
- g. Other Adhesives: 250 g/L.
- h. Single-Ply Roof Membrane Sealants: 450 g/L.
- i. Nonmembrane Roof Sealants: 300 g/L.
- j. Sealant Primers for Nonporous Substrates: 250 g/L.
- k. Sealant Primers for Porous Substrates: 775 g/L.

B. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet.

1. Coordinate with Section 07 62 00 "Sheet Metal Flashing and Trim."

C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.

D. Roof Vents: As recommended by roof membrane manufacturer.

1. Size: Not less than 4-inch (100-mm) diameter.

E. Water-Based, Fabric-Backed Membrane Adhesive: Roofing system manufacturer's standard water-based, cold-applied adhesive formulated for compatibility and use with fabric-backed membrane roofing.

F. Slip Sheet: Manufacturer's standard, of thickness required for application.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

H. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.

I. Miscellaneous Accessories: Provide preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, prefabricated PVC scupper, backer rod for site fabricated expansion joints, clean washed decorative river stone, and other accessories.

2.4 SUBSTRATE BOARDS

- A. Substrate Board: Provide the following:
 - 1. ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch (16 mm) thick.
 - a. Products:
 - 1) Georgia-Pacific Corporation; Dens Deck.
 - 2) National Gypsum Company, GoldBond Building Products; DEXcell FA Glass Mat Roof Board.
 - 3) USG Corporation; Securock Brand, Ultralight Coated Glass-Mat.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by PVC roof membrane manufacturer. Where total insulation thickness exceeds 2-inches, insulation must be applied in 2-layers minimum with joints staggered at each layer.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers:
 - a. Atlas Roofing Corporation.
 - b. Holcim Elevate.
 - c. Hunter Panels.
 - d. Johns Manville; a Berkshire Hathaway company.
 - 2. Compressive Strength: 25 psi (172 kPa).
 - 3. Size: 48 by 96 inches (1219 by 2438 mm).
 - 4. Thickness:
 - a. Base Layer: 1 1/2 inches (38 mm) minimum.
 - b. Upper Layer: As required, to achieve scheduled R-Value.
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch (6.35 mm).
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.

- B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate boards, roof insulation, and cover boards to substrate, and acceptable to roofing system manufacturer.
- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
 - 1. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
 - 2. Adhesives and sealants shall comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
 - 3. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Cover Board:
 - 1. ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) thick, factory primed.
 - a. Products:
 - 1) Georgia-Pacific Corporation; Dens Deck Prime.
 - 2) National Gypsum Company, GoldBond Building Products; DEXcell FA Glass Mat Roof Board.
 - 3) USG Corporation; Securock Brand, Ultralight Coated Glass-Mat Roof Board.

2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
 - 1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 - 2. Color: Contrasting with roof membrane.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.
 - 1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 - 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 - 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 00 - Steel Decking.
 - 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 - 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F 2170.
 - a. Test Frequency: One test probe per each 1000 sq. ft. (93 sq. m), or portion thereof, of roof deck, with not less than three tests probes.
 - b. Submit test reports within 24 hours after performing tests.
 - 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 - 7. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.

- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.
- C. Coordinate installation and transition of roofing system component serving as an air barrier with fluid-applied membrane air barrier.

3.4 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 - 2. Tightly butt substrate boards together.
 - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 4. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions. Ensure screws are not long enough to reach the bottom flute.
 - 5. Loosely lay substrate board over roof deck.

3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - d. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - e. Tape joints at each layer of insulation to prevent heat loss.

- f. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks. Ensure screws are long enough to provide 3/4 inch penetration through the top flute, but not long enough to reach the bottom flute.
 - 1) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation in both directions.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - f. Tape joints at each layer of insulation to prevent heat loss.
- D. Installation Over Concrete Decks:
 1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - d. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - e. Tape joints at each layer of insulation to prevent heat loss.
 - f. Adhere base layer of insulation to concrete roof deck according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation in both directions.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.

- c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
- d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
- e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
- f. Tape joints at each layer of insulation to prevent heat loss.
- g. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 - 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 2. At internal roof drains, conform to slope of drain sump.
 - 3. Trim cover board so that water flow is unrestricted.
 - 4. Cut and fit cover board tight to nailers, projections, and penetrations.
 - 5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps 36 inches minimum.
- D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing through solid wood blocking.
- F. Apply roof membrane with side laps shingled with slope of roof deck.

- G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 - 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.8 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.
- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.9 WALKWAY INSTALLATION

- A. Flexible Walkways:
 - 1. Install flexible walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Locations indicated on Drawings.
 - e. As required by roof membrane manufacturer's warranty requirements.
 - 2. Provide 6-inch (76-mm) clearance between adjoining pads.
 - 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.10 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Owner will engage a qualified testing agency to perform the following tests:
 - 1. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C 1153.
 - a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.
 - 2. Electrical Capacitance/Impedance Testing: Testing agency shall survey entire roof area for entrapped water within roof assembly according to ASTM D 7954/D 7954M.
 - a. Perform tests before overlying construction is placed.
 - b. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - c. Testing agency shall prepare survey report indicating locations of entrapped moisture, if any.
 - 3. Nuclear Hydrogen Detection Testing: Testing agency shall survey entire roof area for entrapped water within roof assembly according to SPRI/RCI NT-1.
 - a. Perform tests before overlying construction is placed.
 - b. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - c. Testing agency shall prepare survey report indicating locations of entrapped moisture, if any.
 - 4. Flood Testing: Flood testing of completed roofing system(s) is required. NC State shall be notified seven (7) days in advance of testing.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.11 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Final Acceptance and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.12 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS of , herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 - 1. Owner: _____.
 - 2. Address: _____.
 - 3. Building Name/Type: _____.
 - 4. Address: _____.
 - 5. Area of Work: _____.
 - 6. Acceptance Date: _____.
 - 7. Warranty Period: _____.
 - 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
 - 1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. Peak gust wind speed exceeding 72 mph (32.2 m/sec);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Issue for Bid - Early Procurement

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

- e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
 5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
 6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
 7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.
- E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.
1. Authorized Signature: _____.
 2. Name: _____.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
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Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

3. Title: _____.

END OF SECTION

SECTION 07 54 23

THERMOPLASTIC-POLYOLEFIN (TPO) ROOFING

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Adhered thermoplastic polyolefin (TPO) roofing system.
- B. Self-adhering, thermoplastic polyolefin (TPO) roofing system.
- C. Substrate board.
- D. Roof insulation.
- E. Cover board.
- F. Walkways.

1.2 RELATED REQUIREMENTS

- A. Section 01 23 00 "Alternates" for Alternate #4: Polyvinyl-Chloride Roofing.
- B. Section 06 10 53 "Miscellaneous Carpentry" for wood nailers, curbs, and blocking.
- C. Section 07 62 00 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings.
- D. Section 07 71 00 "Roof Specialties" for premanufactured copings and roof edge flashings.
- E. Section 07 92 00 "Joint Sealants" for joint sealants, joint fillers, and joint preparation.

1.3 DEFINITIONS

- A. Roofing Terminology: Definitions in ASTM D 1079 and glossary in NRCA's "The NRCA Roofing Manual: Membrane Roof Systems" apply to Work of this Section.

1.4 PREINSTALLATION MEETINGS

- A. Preliminary Roofing Conference: Before starting roof deck construction, conduct conference at Project site.

1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Review deck substrate requirements for conditions and finishes, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.
- B. Preinstallation Roofing Conference: Conduct conference at Project site.
1. Meet with Owner, Architect, Construction Manager, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, air barrier Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
 2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
 3. Review and finalize construction schedule, and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
 5. Review structural loading limitations of roof deck during and after roofing.
 6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that affects roofing system.
 7. Review governing regulations and requirements for insurance and certificates if applicable.
 8. Review temporary protection requirements for roofing system during and after installation.
 9. Review roof observation and repair procedures after roofing installation.

1.5 SUBMITTALS

A. Action Submittals:

1. Product Data: For each type of product.
 - a. For insulation and roof system component fasteners, include copy of FM Approvals' RoofNav listing.
2. LEED Submittals conforming to requirements listed in Section 01 81 13 - Sustainable Design Requirements:
 - a. If published provide any of the following documentation: GreenScreen v1.2 Benchmark, Health Product Declarations (HPD) or other documentation as defined in "Sustainable Design Requirements."
 - 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED, reference "Sustainable Design Requirements."
 - b. Materials and Resources: Product Disclosure and Optimization – Sourcing of Raw Materials. Option 2. Leadership Extraction Practices.
 - 1) Product Data: For recycled content, indicating postconsumer and preconsumer recycled content and cost.
 - 2) Product Certificates: For materials manufactured within 100 miles (160 km) of Project, indicating location of material manufacturer and point of extraction, harvest, or recovery for each raw material. Include distance to Project and cost for each raw material.
 - c. Construction and Demolition Waste Management. For all products submit:
 - 1) A letter stating the total weight and volume of waste diverted from landfills. Provide details of how the waste was recovered, reused or recycled.
 - d. Product Test Reports: For roof materials, documentation indicating that roof materials comply with Solar Reflectance Index requirements.
3. Shop Drawings: Include roof plans, sections, details, and attachments to other work, details must be project specific, not manufacturer's standard package details. Details shall be at scale of not less than 1-1/2 inches per 12 inches (1:10) and include the following:
 - a. Layout and thickness of insulation.
 - b. Base flashings and membrane termination details.
 - c. Flashing details at penetrations.
 - d. Tapered insulation layout, thickness, and slopes.
 - e. Roof plan showing orientation of steel roof deck and orientation of roof membrane, fastening spacings, and patterns for mechanically fastened roofing system.
 - f. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.
 - g. Tie-in with adjoining air barrier.

4. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.
- B. Informational Submittals:
1. Qualification Data: For Installer, manufacturer, and testing agency.
 2. Manufacturer Certificates:
 - a. Performance Requirement Certificate: Signed by roof membrane manufacturer, certifying that roofing system complies with requirements specified in "Performance Requirements" Article.
 - 1) Submit evidence of compliance with performance requirements.
 - b. Special Warranty Certificate: Signed by roof membrane manufacturer, certifying that all materials supplied under this Section are acceptable for special warranty.
 3. Product Test Reports: For roof membrane and insulation, for tests performed by a qualified testing agency, indicating compliance with specified requirements.
 4. Evaluation Reports: For components of roofing system, from ICC-ES.
 5. Field Test Reports:
 - a. Concrete internal relative humidity test reports.
 - b. Fastener-pullout test results and manufacturer's revised requirements for fastener patterns.
 6. Field quality-control reports.
 7. Sample Warranties: For manufacturer's special warranties.
- C. Closeout Submittals:
1. Maintenance Data: For roofing system to include in maintenance manuals.
- 1.6 QUALITY ASSURANCE
- A. Manufacturer Qualifications: A qualified manufacturer that is UL listed for roofing system identical to that used for this Project.
- B. Installer Qualifications: A qualified firm that is approved, authorized, or licensed by roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

1.7 DELIVERY, STORAGE, AND HANDLING

- A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.
- B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.
1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

- C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.
- D. Handle and store roofing materials, and place equipment in a manner to avoid permanent deflection of deck.

1.8 FIELD CONDITIONS

- A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.9 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace components of roofing system that fail in materials or workmanship within specified warranty period.
 - 1. Special warranty includes roof membrane, base flashings, roof insulation, fasteners, cover boards, substrate board, and other components of roofing system.
 - 2. Warranty Period: 20 years from date of Final Acceptance.
- B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of roofing system such as roof membrane, base flashing, roof insulation, fasteners, cover boards, substrate boards, and walkway products for the following warranty period:
 - 1. Warranty Period: Five years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Installed roofing system and flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.
 - 1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
 - 2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

- B. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.
- C. Wind Uplift Resistance: Design roofing system to resist the following wind uplift pressures when tested according to FM Approvals 4470, UL 580, or UL 1897 with a safety factor of two:
 - 1. Zone 1 (Roof Area Field): As indicated on Drawings.
 - 2. Zone 2 (Roof Area Perimeter): As indicated on Drawings.
 - 3. Zone 3 (Roof Area Corners): As indicated on Drawings.
- D. Solar Reflectance Index (SRI): Three-year-aged SRI not less than 64 or initial SRI not less than 82 when calculated according to ASTM E 1980, based on testing identical products by a qualified testing agency.
- E. ENERGY STAR Listing: Roofing system shall be listed on the DOE's ENERGY STAR "Roof Products Qualified Product List" for low-slope roof products.
- F. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A; for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

2.2 THERMOPLASTIC POLYOLEFIN (TPO) ROOFING

- A. TPO Sheet: ASTM D 6878/D 6878M, internally fabric- or scrim-reinforced, self-adhering TPO sheet.
 - 1. Manufacturers:
 - a. Carlisle SynTec Incorporated.
 - b. Holcim Elevate.
 - c. GAF Materials Corporation.
 - d. Johns Manville.
 - 2. Basis of Design Product: GAF EverGuard 60 mil.
 - 3. Source Limitations: Obtain components for roofing system from roof membrane manufacturer or manufacturers approved by roof membrane manufacturer.
 - 4. Thickness: 60 mils (1.5 mm), nominal.
 - 5. Exposed Face Color: Refer to Drawings.
- B. Thermal Envelope: Design, fabricate and install insulated membrane roofing system with continuous insulation to provide a thermal envelope.
 - 1. Provide thickness of insulation required to achieve a minimum effective thermal R-value as noted in the Drawings.
 - 2. Average R-Value calculations are not acceptable.

2.3 AUXILIARY ROOFING MATERIALS

- A. General: Auxiliary materials recommended by roofing system manufacturer for intended use and compatible with other roofing components.
 - 1. Adhesives and sealants shall comply with the following limits for VOC content or authorities having jurisdiction, whichever is more restrictive:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
 - 2. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- B. Sheet Flashing: Manufacturer's standard unreinforced TPO sheet flashing, 55 mils (1.4 mm) thick, minimum, of same color as TPO sheet.
- C. Prefabricated Pipe Flashings: As recommended by roof membrane manufacturer.
- D. Roof Vents: As recommended by roof membrane manufacturer.
 - 1. Size: Not less than 4-inch (100-mm) diameter.
- E. Bonding Adhesive: Manufacturer's standard.
- F. Metal Termination Bars: Manufacturer's standard, predrilled stainless steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.
- G. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roofing components to substrate, and acceptable to roofing system manufacturer.
- H. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, T-joint covers, lap sealants, termination reglets, prefabricated TPO scupper, backer rod for site fabricated expansion joints, and other accessories.

2.4 SUBSTRATE BOARDS

- A. Substrate Board:
 - 1. ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, Type X, 5/8 inch (16 mm) thick.

- a. Products:
 - 1) Georgia-Pacific Corporation; Dens Deck.
 - 2) National Gypsum Company, GoldBond Building Products; DEXcell FA Glass Mat Roof Board.
 - 3) USG Corporation; Securock Brand, Ultralight Coated Glass-Mat.
- B. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate board to roof deck.

2.5 ROOF INSULATION

- A. General: Preformed roof insulation boards manufactured or approved by TPO roof membrane manufacturer. Where total insulation thickness exceeds 2-inches, insulation must be applied in 2-layers minimum with joints staggered at each layer.
- B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 2, felt or glass-fiber mat facer on both major surfaces.
 - 1. Manufacturers:
 - a. Atlas Roofing Corporation.
 - b. Holcim Elevate.
 - c. Hunter Panels.
 - d. Johns Manville; a Berkshire Hathaway company.
 - 2. Compressive Strength: 25 psi (172 kPa).
 - 3. Size: 48 by 96 inches (1219 by 2438 mm).
 - 4. Thickness:
 - a. Base Layer: 1 1/2 inches (38 mm) minimum.
 - b. Upper Layer: As required, to achieve scheduled R-Value.
- C. Tapered Insulation: Provide factory-tapered insulation boards.
 - 1. Material: Match roof insulation.
 - 2. Minimum Thickness: 1/4 inch (6.35 mm).
 - 3. Slope:
 - a. Roof Field: 1/4 inch per foot (1:48) unless otherwise indicated on Drawings.
 - b. Saddles and Crickets: 1/2 inch per foot (1:24) unless otherwise indicated on Drawings.

2.6 INSULATION ACCESSORIES

- A. General: Roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with other roofing system components.
- B. Fasteners: Factory-coated steel fasteners with metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening substrate boards, roof insulation, and cover boards to substrate, and acceptable to roofing system manufacturer.

- C. Insulation Adhesive: Insulation manufacturer's recommended adhesive formulated to attach roof insulation to substrate or to another insulation layer as follows:
1. Full-spread, spray-applied, low-rise, two-component urethane adhesive.
 2. Adhesives and sealants shall comply with the following limits for VOC content:
 - a. Plastic Foam Adhesives: 50 g/L.
 - b. Gypsum Board and Panel Adhesives: 50 g/L.
 - c. Multipurpose Construction Adhesives: 70 g/L.
 - d. Fiberglass Adhesives: 80 g/L.
 - e. Contact Adhesives: 80 g/L.
 - f. PVC Welding Compounds: 510 g/L.
 - g. Other Adhesives: 250 g/L.
 - h. Single-Ply Roof Membrane Sealants: 450 g/L.
 - i. Nonmembrane Roof Sealants: 300 g/L.
 - j. Sealant Primers for Nonporous Substrates: 250 g/L.
 - k. Sealant Primers for Porous Substrates: 775 g/L.
 3. Adhesives and sealants shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- D. Cover Board:
1. ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch (13 mm) thick, factory primed.
 - a. Products:
 - 1) Georgia-Pacific Corporation; Dens Deck Prime.
 - 2) National Gypsum Company, GoldBond Building Products; DEXcell FA Glass Mat Roof Board.
 - 3) USG Corporation; Securock Brand, Ultralight Coated Glass-Mat Roof Board.

2.7 WALKWAYS

- A. Flexible Walkways: Factory-formed, nonporous, heavy-duty, slip-resisting, surface-textured walkway pads or rolls, approximately 3/16 inch (5 mm) thick and acceptable to roofing system manufacturer.
1. Size: Approximately 36 by 60 inches (914 by 1524 mm).
 2. Color: Contrasting with roof membrane.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that roof openings and penetrations are in place, curbs are set and braced, and roof-drain bodies are securely clamped in place.
 2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
 3. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 05 31 00 - Steel Decking.
 4. Verify that minimum concrete drying period recommended by roofing system manufacturer has passed.
 5. Verify that concrete substrate is visibly dry and free of moisture, and that minimum concrete internal relative humidity is not more than 75 percent, or as recommended by roofing system manufacturer, when tested according to ASTM F 2170.
 - a. Test Frequency: One test probe per each 1000 sq. ft. (93 sq. m), or portion thereof, of roof deck, with not less than three tests probes.
 - b. Submit test reports within 24 hours after performing tests.
 6. Verify that concrete-curing compounds that will impair adhesion of roofing components to roof deck have been removed.
 7. Verify that joints in precast concrete roof decks have been grouted flush with top of concrete.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing system installation according to roofing system manufacturer's written instructions. Remove sharp projections.
- B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

3.3 ROOFING INSTALLATION, GENERAL

- A. Install roofing system according to roofing system manufacturer's written instructions.
- B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning Work on adjoining roofing.
- C. Coordinate installation and transition of roofing system component serving as an air barrier with fluid-applied membrane air barrier.

3.4 SUBSTRATE BOARD INSTALLATION

- A. Install substrate board with long joints in continuous straight lines, with end joints staggered not less than 24 inches (610 mm) in adjacent rows.
 - 1. At steel roof decks, install substrate board at right angle to flutes of deck.
 - a. Locate end joints over crests of steel roof deck.
 - 2. Tightly butt substrate boards together.
 - 3. Cut substrate board to fit tight around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - 4. Fasten substrate board to top flanges of steel deck to resist uplift pressure at corners, perimeter, and field of roof according to roofing system manufacturers' written instructions. Ensure screws are not long enough to reach the bottom flute.
 - 5. Loosely lay substrate board over roof deck.

3.5 INSULATION INSTALLATION

- A. Coordinate installing roofing system components so insulation is not exposed to precipitation or left exposed at end of workday.
- B. Comply with roofing system and roof insulation manufacturer's written instructions for installing roof insulation.
- C. Installation Over Metal Decking:
 - 1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows and with long joints continuous at right angle to flutes of decking.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - d. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - e. Tape joints at each layer of insulation to prevent heat loss.
 - f. Mechanically attach base layer of insulation and substrate board using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to metal decks. Ensure screws are long enough to provide 3/4 inch penetration through the top flute, but not long enough to reach the bottom flute.
 - 1) Fasten insulation to resist specified uplift pressure at corners, perimeter, and field of roof.
 - 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation in both directions.

- a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - f. Tape joints at each layer of insulation to prevent heat loss.
- D. Installation Over Concrete Decks:
- 1. Install base layer of insulation with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - a. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - b. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - c. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - d. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - e. Tape joints at each layer of insulation to prevent heat loss.
 - f. Adhere base layer of insulation to concrete roof deck according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - 1) Set insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.
 - 2. Install upper layers of insulation and tapered insulation with joints of each layer offset not less than 12 inches (305 mm) from previous layer of insulation in both directions.
 - a. Install with long joints continuous and with end joints staggered not less than 12 inches (305 mm) in adjacent rows.
 - b. Trim insulation neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 - c. Make joints between adjacent insulation boards not more than 1/4 inch (6 mm) in width.
 - d. Fill gaps exceeding 1/4 inch (6 mm) with insulation.
 - e. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.
 - f. Tape joints at each layer of insulation to prevent heat loss.
 - g. Adhere each layer of insulation to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:

- 1) Set each layer of insulation in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.6 INSTALLATION OF COVER BOARDS

- A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction.
 1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
 2. At internal roof drains, conform to slope of drain sump.
 3. Trim cover board so that water flow is unrestricted.
 4. Cut and fit cover board tight to nailers, projections, and penetrations.
 5. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
 - a. Set cover board in a uniform coverage of full-spread insulation adhesive, firmly pressing and maintaining insulation in place.

3.7 ADHERED ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps 36 inches minimum.
- D. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer, and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.
- E. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing through solid wood blocking.
- F. Apply roof membrane with side laps shingled with slope of roof deck.
- G. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
 2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

- H. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.8 SELF-ADHERING ROOFING INSTALLATION

- A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.
- B. Unroll roof membrane and allow to relax before installing.
- C. Accurately align roof membrane, and maintain uniform side and end laps of minimum dimensions required by manufacturer.
 - 1. Stagger end laps 36 inches minimum.
- D. Fold roof membrane to expose half of sheet width's bottom surface.
 - 1. Remove release liner on exposed half of sheet.
 - 2. Roll roof membrane over substrate while avoiding wrinkles.
- E. Fold remaining half of roof membrane to expose bottom surface.
 - 1. Remove release liner on exposed half of sheet.
 - 2. Roll roof membrane over substrate while avoiding wrinkles.
- F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing to solid wood blocking.
- G. Apply roof membrane with side laps shingled with slope of roof deck.
- H. Seams: Clean seam areas, overlap roof membrane, and hot-air weld side and end laps of roof membrane and sheet flashings, to ensure a watertight seam installation.
 - 1. Test lap edges with probe to verify seam weld continuity.
 - 2. Apply lap sealant to seal cut edges of roof membrane and flashing sheet.
 - 3. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
 - 4. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.
- I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.9 BASE FLASHING INSTALLATION

- A. Install sheet flashings and preformed flashing accessories, and adhere to substrates according to roofing system manufacturer's written instructions.
- B. Apply bonding adhesive to substrate and underside of sheet flashing at required rate, and allow to partially dry. Do not apply to seam area of flashing.
- C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

- D. Clean seam areas, overlap, and firmly roll sheet flashings into the adhesive. Hot-air weld side and end laps to ensure a watertight seam installation.
- E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.10 WALKWAY INSTALLATION

- A. Flexible Walkways:
 - 1. Install flexible walkways at the following locations:
 - a. Perimeter of each rooftop unit.
 - b. Between each rooftop unit location, creating a continuous path connecting rooftop unit locations.
 - c. Between each roof hatch and each rooftop unit location or path connecting rooftop unit locations.
 - d. Locations indicated on Drawings.
 - e. As required by roof membrane manufacturer's warranty requirements.
 - 2. Provide 6-inch (76-mm) clearance between adjoining pads.
 - 3. Heat weld to substrate or adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.11 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and to inspect substrate conditions, surface preparation, roof membrane application, sheet flashings, protection, and drainage components, and to furnish reports to Architect.
- B. Owner will engage a qualified testing agency to perform the following tests:
 - 1. Infrared Thermography: Testing agency shall survey entire roof area using infrared color thermography according to ASTM C 1153.
 - a. Perform tests before overlying construction is placed.
 - b. After infrared scan, locate specific areas of leaks by electrical capacitance/impedance testing or nuclear hydrogen detection tests.
 - c. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - d. Testing agency shall prepare survey report of initial scan indicating locations of entrapped moisture, if any.
 - 2. Electrical Capacitance/Impedance Testing: Testing agency shall survey entire roof area for entrapped water within roof assembly according to ASTM D 7954/D 7954M.
 - a. Perform tests before overlying construction is placed.
 - b. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.

- c. Testing agency shall prepare survey report indicating locations of entrapped moisture, if any.
 3. Nuclear Hydrogen Detection Testing: Testing agency shall survey entire roof area for entrapped water within roof assembly according to SPRI/RCI NT-1.
 - a. Perform tests before overlying construction is placed.
 - b. After testing, repair leaks, repeat tests, and make further repairs until roofing and flashing installations are watertight.
 - 1) Cost of retesting is Contractor's responsibility.
 - c. Testing agency shall prepare survey report indicating locations of entrapped moisture, if any.
 4. Flood Testing: Flood testing of completed roofing system(s) is required. NC State shall be notified seven (7) days in advance of testing.
- C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion, in presence of Architect, and to prepare inspection report.
- D. Repair or remove and replace components of roofing system where inspections indicate that they do not comply with specified requirements.
- E. Additional testing and inspecting, at Contractor's expense, will be performed to determine if replaced or additional work complies with specified requirements.

3.12 PROTECTING AND CLEANING

- A. Protect roofing system from damage and wear during remainder of construction period. When remaining construction does not affect or endanger roofing system, inspect roofing system for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.
- B. Correct deficiencies in or remove roofing system that does not comply with requirements, repair substrates, and repair or reinstall roofing system to a condition free of damage and deterioration at time of Final Acceptance and according to warranty requirements.
- C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.13 ROOFING INSTALLER'S WARRANTY

- A. WHEREAS of , herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:
 1. Owner: _____.
 2. Address: _____.
 3. Building Name/Type: _____.
 4. Address: _____.
 5. Area of Work: _____.
 6. Acceptance Date: _____.

7. Warranty Period: _____.
 8. Expiration Date: _____.
- B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,
- C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period Roofing Installer will, at Roofing Installer's own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.
- D. This Warranty is made subject to the following terms and conditions:
1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:
 - a. lightning;
 - b. Peak gust wind speed exceeding 72 mph (32.2 m/sec);
 - c. fire;
 - d. failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
 - e. faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
 - f. vapor condensation on bottom of roofing; and
 - g. activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.
 2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
 3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
 4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
Construction Documents

Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 March 2025

5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

- E. IN WITNESS THEREOF, this instrument has been duly executed this _____ day of _____, _____.
1. Authorized Signature: _____.
 2. Name: _____.
 3. Title: _____.

END OF SECTION

SECTION 07 62 00

SHEET METAL FLASHING AND TRIM

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Formed low-slope roof sheet metal fabrications.
- B. Formed equipment support flashing.

1.2 COORDINATION

- A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.
- B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
 - 2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
 - 3. Review requirements for insurance and certificates if applicable.
 - 4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
 - 2. LEED Submittals:

- a. Product Data: For products having recycled content, documentation indicating percentages by weight of postconsumer and preconsumer recycled content. Include statement indicating cost for each product having recycled content.
 3. Shop Drawings: For sheet metal flashing and trim.
 - a. Include plans, elevations, sections, and attachment details.
 - b. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
 - c. Include identification of material, thickness, weight, and finish for each item and location in Project.
 - d. Include details for forming, including profiles, shapes, seams, and dimensions.
 - e. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
 - f. Include details of termination points and assemblies.
 - g. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
 - h. Include details of roof-penetration flashing.
 - i. Include details of edge conditions, including eaves, ridges, valleys, rakes, crickets, and counterflashings as applicable.
 - j. Include details of special conditions.
 - k. Include details of connections to adjoining work.
 - l. Detail formed flashing and trim at scale of not less than 1-1/2 inches per 12 inches (1:10).
 - B. Informational Submittals:
 1. Qualification Data: For fabricator.
 2. Product Test Reports: For each product, for tests performed by a qualified testing agency.
 3. Sample Warranty: For special warranty.
 - C. Closeout Submittals:
 1. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.
- 1.5 QUALITY ASSURANCE
- A. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- 1.6 DELIVERY, STORAGE, AND HANDLING
- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

1.7 WARRANTY

- A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Final Acceptance.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.
- C. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
- D. Recycled Content of Zinc-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 15 percent.
- E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.
 - 1. Finish: 4 (polished directional satin).

2.3 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
 - 3. Products:
 - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.
- B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m) minimum.

2.4 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item.
 - 1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.
 - a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
 - b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
 - 2. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

- C. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.
- D. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
- E. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
- F. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
- G. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.
- B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.
- C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.
- E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

- F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard for application, but not less than thickness of metal being secured.
- G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use. Rivet joints where necessary for strength.
- H. Do not use graphite pencils to mark metal surfaces.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

- A. Roof Edge Flashing (Gravel Stop): Fabricate in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- (3.6-m-) long sections. Furnish with 6-inch- (150-mm-) wide, joint cover plates. Shop fabricate interior and exterior corners.
 - 1. Joint Style: Butted with expansion space and 6-inch- (150-mm-) wide, concealed backup plate.
 - 2. Fabricate scuppers within gravel stop roof edge as indicated on Drawings, to dimensions required with 4-inch- (100-mm-) wide flanges and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof. Fasten gravel guard angles to base of scupper.
 - 3. Fabricate from the Following Materials:
 - a. Stainless Steel: 0.019 inch (0.48 mm) thick.
- B. Roof, Roof-to-Wall Transition, Roof-to-Roof Edge-Flashing (Gravel-Stop) Transition, and Roof-to-Roof Edge-Flashing (Gravel-Stop) and Fascia-Cap Transition Expansion-Joint Cover: Fabricate from the following materials: Shop fabricate interior and exterior corners.
 - 1. Stainless Steel: 0.025 inch (0.64 mm) thick.
- C. Base Flashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Stainless Steel: 0.019 inch (0.48 mm) thick.
- D. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:
 - 1. Stainless Steel: 0.019 inch (0.48 mm) thick.
- E. Flashing Receivers: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.
- F. Roof-Penetration Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.019 inch (0.48 mm) thick.
- G. Roof-Drain Flashing: Fabricate from the following materials:
 - 1. Stainless Steel: 0.016 inch (0.40 mm) thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

- A. Equipment Support Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch (0.48 mm) thick.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.
 1. Verify compliance with requirements for installation tolerances of substrates.
 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
 3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.
- B. Apply slip sheet, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of welds, and sealant.
 2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
 3. Space cleats not more than 12 inches (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
 4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.

5. Torch cutting of sheet metal flashing and trim is not permitted.
 6. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.
1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious or wood substrates, install underlayment and cover with slip sheet.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.
1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.
- D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.
- F. Seal joints as required for watertight construction.
1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
 2. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - Joint Sealants.
- 3.4 ROOF FLASHING INSTALLATION
- A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

- B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in cited sheet metal standard unless otherwise indicated. Interlock bottom edge of roof edge flashing with continuous cleat anchored to substrate at staggered 3-inch (75-mm) centers.
- C. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.
- D. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner by means of snap-in installation and sealant or lead wedges and sealant unless otherwise indicated.
- E. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric or butyl sealant and clamp flashing to pipes that penetrate roof.

3.5 MISCELLANEOUS FLASHING INSTALLATION

- A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

3.6 ERECTION TOLERANCES

- A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean off excess sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

North Carolina State University
Mann Hall Renovation
Raleigh, North Carolina
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Perkins&Will
PW Project #: 820937.001
NCSU Project #: 202220021
State ID#: 22-24500-02C
17 January 2025

- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 71 00

ROOF SPECIALTIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Preformed copings.
- B. Preformed roof-edge flashings.
- C. Preformed roof-edge drainage systems.
- D. Preformed reglets and counterflashings.

1.2 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Shop Drawings: For roof specialties. Include plans, elevations, expansion-joint locations, keyed details, and attachments to other work. Distinguish between plant- and field-assembled work. Include the following:
 - a. Details for expansion and contraction; locations of expansion joints, including direction of expansion and contraction.
 - b. Pattern of seams and layout of fasteners, cleats, clips, and other attachments.
 - c. Details of termination points and assemblies, including fixed points.
 - d. Details of special conditions.
 - 3. Samples for Verification: For copings, roof-edge flashings, and reglets and counterflashings made from 12-inch (300-mm) lengths of full-size components including fasteners, cover joints, accessories, and attachments.
- B. Informational Submittals:
 - 1. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for copings and roof-edge flashings.
 - a. Submit evidence that manufactured copings and roof edge flashings proposed for this Project have passed SPRI tests RE-2 and RE-3.
 - 2. Warranty: Sample of special warranty.
- C. Closeout Submittals:
 - 1. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.3 QUALITY ASSURANCE

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Meet with Owner, Architect, Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects roof specialties including installers of roofing materials and accessories.
 - 2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
 - 3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.
- B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof specialties installation.

1.5 WARRANTY

- A. Special Warranty on Painted Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:
 - a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
 - b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
 - c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.
 - 2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

- B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge flashings tested according to SPRI ES-1 and capable of resisting the following design pressures:
 - 1. Design Pressure: As indicated within related Roofing Section.
- C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
 - 1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 MANUFACTURERS

- A. Carlisle.
- B. GAF.
- C. Hickman Company, W. P.
- D. Holcim Elevate.
- E. Johns Manville.
- F. MM Systems Corporation.
- G. Petersen Aluminum Corporation.

2.3 EXPOSED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.
 - 1. Surface: Smooth, flat finish.
 - 2. Mill Finish: As manufactured.
 - 3. Exposed Coil-Coated Finishes: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
 - a. Two-Coat Fluoropolymer: AAMA 620. System consisting of primer and fluoropolymer color topcoat containing not less than 70 percent PVDF resin by weight.
 - b. Concealed Surface: Pretreat with manufacturer's standard white or light-colored acrylic or polyester backer finish, consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil (0.013 mm).

2.4 CONCEALED METALS

- A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and structural performance indicated, mill finished.
- C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.5 UNDERLAYMENT MATERIALS

- A. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
 - 1. Thermal Stability: ASTM D 1970; stable after testing at 240 deg F (116 deg C).
 - 2. Low-Temperature Flexibility: ASTM D 1970; passes after testing at minus 20 deg F (29 deg C).
 - 3. Products:
 - a. Carlisle Coatings & Waterproofing; CCW WIP 300HT.
 - b. Grace Construction Products, a unit of W. R. Grace & Co.; Ultra.
 - c. Henry Company; Blueskin PE200 HT.
 - d. Metal-Fab Manufacturing, LLC; MetShield.
 - e. Owens Corning; WeatherLock Metal High Temperature Underlayment.

2.6 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:
 - 1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
 - 2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
 - 3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.
- C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant of type, grade, class, and use classifications required by roofing-specialty manufacturer for each application.
- D. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.7 COPINGS

- A. Copings: Manufactured coping system consisting of formed-metal coping cap in section lengths not exceeding 12 feet (3.6 m), concealed anchorage; corner units, end cap units, and concealed splice plates with same finish as coping caps.
 - 1. Coping-Cap Material: Formed aluminum, thickness as required to meet performance requirements with a minimum thickness of 0.050 inch (1.27 mm).
 - a. Finish: Two-coat fluoropolymer.
 - b. Color: As selected by Architect from manufacturer's full range.
 - c. Corners: Factory mitered and mechanically clinched and sealed watertight.
 - d. Coping-Cap Attachment Method: Snap-on, fabricated from coping-cap material.
 - e. Snap-on-Coping Anchor Plates: Concealed, galvanized-steel sheet, 12 inches (300 mm) wide, with integral cleats.
 - f. Face Leg Cleats: Concealed, continuous galvanized-steel sheet.
 - 2. Acceptable Products:
 - a. Carlisle - SecureEdge 200 Cantilever Coping
 - b. GAF - Everguard Cantilever Coping
 - c. Holcim Elevate - Elevate Single-Cantilever Coping
 - d. Johns Manville - Perma-Tite Cantilever Coping
 - 3. Basis of Design Product: GAF EverGuard Cantilever Coping

2.8 ROOF-EDGE FLASHINGS

- A. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 12 feet (3.6 m) and a continuous formed- or extruded-aluminum anchor bar with integral drip-edge cleat to engage fascia cover. Provide matching corner units.
 - 1. Fascia Cover: Fabricated from the following exposed metal:
 - a. Formed Aluminum: Thickness as required to meet performance requirements with a minimum thickness of 0.050 inch (1.27 mm).
 - 2. Corners: Factory mitered and mechanically clinched and sealed watertight.
 - 3. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
 - 4. Fascia Accessories: Fascia extenders with continuous hold-down cleats, and spill out scuppers.
- B. One-Piece Gravel Stops: Manufactured, one-piece, metal gravel stop in section lengths not exceeding 12 feet (3.6 m), with a horizontal flange and vertical leg, drain-through fascia terminating in a drip edge, and concealed splice plates of same material, finish, and shape as gravel stop. Provide matching corner units.
 - 1. Fabricate from the following exposed metal:

- a. Formed Aluminum: Thickness as required to meet performance requirements with a minimum thickness of 0.050 inch (1.27 mm).
 2. Corners: Factory mitered and mechanically clinched and sealed watertight.
 3. Accessories:
 - a. Fascia extenders with continuous hold-down cleats.
 - b. Fabricate with scuppers within gravel stop roof edge as indicated on Drawings.
 4. Acceptable Products:
 - a. Carlisle - Secure Edge 300
 - b. GAF - EverGuard Gravel Stop
 - c. Holcim Elevate - Elevate Gravel Stop
 - d. Johns Manville - One Gravel Stop
- C. Aluminum Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.

2.9 ROOF-EDGE DRAINAGE SYSTEMS

- A. Parapet Scuppers: Manufactured with closure flange trim to exterior, 4-inch- (100-mm-) wide wall flanges to interior, and base extending 4 inches (100 mm) beyond cant or tapered strip into field of roof.
1. Fabricate from the following exposed metal:
 - a. Formed Aluminum: 0.032 inch (0.81 mm) thick.
- B. Aluminum Finish: Two-coat fluoropolymer.
1. Color: As selected by Architect from manufacturer's full range.

2.10 REGLETS AND COUNTERFLASHINGS

- A. Reglets: Manufactured units formed to provide secure interlocking of separate reglet and counterflashing pieces, from the following exposed metal:
1. Formed Aluminum: 0.050 inch (1.27 mm) thick.
 2. Corners: Factory mitered and mechanically clinched and sealed watertight.
 3. Surface-Mounted Type: Provide reglets with slotted holes for fastening to substrate, with neoprene or other suitable weatherproofing washers, and with channel for sealant at top edge.
 4. Masonry Type, Embedded: Provide reglets with offset top flange for embedment in masonry mortar joint.
 5. Multiuse Type, Embedded: For multiuse embedment in masonry mortar joints.
- B. Counterflashings: Manufactured units of heights to overlap top edges of base flashings by 4 inches (100 mm) and in lengths not exceeding 12 feet (3.6 m) designed to snap into reglets or through-wall-flashing receiver and compress against base flashings with joints lapped, from the following exposed metal:
1. Formed Aluminum: 0.032 inch (0.81 mm) thick.
- C. Accessories:

1. Flexible-Flashing Retainer: Provide resilient plastic or rubber accessory to secure flexible flashing in reglet where clearance does not permit use of standard metal counterflashing or where reglet is provided separate from metal counterflashing.
2. Counterflashing Wind-Restraint Clips: Provide clips to be installed before counterflashing to prevent wind uplift of counterflashing lower edge.

2.11 GENERAL FINISH REQUIREMENTS

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.
- C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

- A. Self-Adhering Sheet Underlayment: Install wrinkle free. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water. Overlap edges not less than 3-1/2 inches (90 mm). Roll laps with roller. Cover underlayment within 14 days.

3.3 INSTALLATION, GENERAL

- A. General: Install roof specialties according to manufacturer's written instructions. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete roof-specialty systems.
1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
 2. Provide uniform, neat seams with minimum exposure of solder and sealant.
 3. Install roof specialties to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
 4. Torch cutting of roof specialties is not permitted.
 5. Do not use graphite pencils to mark metal surfaces.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Coat concealed side of uncoated aluminum and stainless-steel roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
 2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of self-adhering, high-temperature sheet underlayment.
 3. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.
- C. Expansion Provisions: Allow for thermal expansion of exposed roof specialties.
1. Space movement joints at a maximum of 12 feet (3.6 m) with no joints within 18 inches (450 mm) of corners or intersections unless otherwise shown on Drawings.
 2. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures.
- D. Fastener Sizes: Use fasteners of sizes that will penetrate wood blocking or sheathing not less than 1-1/4 inches (32 mm) for nails and not less than 3/4 inch (19 mm) for wood screws substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
- E. Seal joints as required for watertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F (4 deg C).

3.4 COPING INSTALLATION

- A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor copings to meet performance requirements.
 - 1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at 30-inch (760-mm) centers.
- C. Coping Seam locations:
 - 1. Align with fascia seams, control joints, window mullions and other building elements where indicated.
 - 2. Fabricate corners as one unit with seams a minimum of two-feet from corner in each direction. Divide space between corner units evenly into lengths of 12 foot maximum.

3.5 ROOF-EDGE FLASHING INSTALLATION

- A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.
- B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.
- C. Roof-Edge Seam locations:
 - 1. Align with fascia seams, control joints, window mullions and other building elements where indicated.
 - 2. Fabricate corners as one unit with seams a minimum of two-feet from corner in each direction. Divide space between corner units evenly into lengths of 12 foot maximum.

3.6 ROOF-EDGE DRAINAGE-SYSTEM INSTALLATION

- A. General: Install components to produce a complete roof-edge drainage system according to manufacturer's written instructions. Coordinate installation of roof perimeter flashing with installation of roof-edge drainage system.
- B. Parapet Scuppers: Install scuppers through parapet where indicated. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
 - 1. Anchor scupper closure trim flange to exterior wall and seal or solder to scupper.

3.7 REGLET AND COUNTERFLASHING INSTALLATION

- A. General: Coordinate installation of reglets and counterflashings with installation of base flashings.

- B. Embedded Reglets: See Section 04 20 00 - Unit Masonry for installation of reglets.
- C. Surface-Mounted Reglets: Install reglets to receive flashings where flashing without embedded reglets is indicated on Drawings. Install at height so that inserted counterflashings overlap 4 inches (100 mm) over top edge of base flashings.
- D. Counterflashings: Insert counterflashings into reglets or other indicated receivers; ensure that counterflashings overlap 4 inches (100 mm) over top edge of base flashings. Lap counterflashing joints a minimum of 4 inches (100 mm) and bed with elastomeric sealant. Fit counterflashings tightly to base flashings.

3.8 CLEANING AND PROTECTION

- A. Clean and neutralize flux materials. Clean off excess solder and sealants.
- B. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.
- C. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 72 00

ROOF ACCESSORIES

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Roof hatches.

1.2 COORDINATION

- A. Coordinate layout and installation of roof accessories with roofing membrane and base flashing and interfacing and adjoining construction to provide a leakproof, weathertight, secure, and noncorrosive installation.
- B. Coordinate dimensions with rough-in information or Shop Drawings of equipment to be supported.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: For each type of roof accessory.
 - a. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
 - 2. Shop Drawings: For roof accessories.
 - a. Include plans, elevations, keyed details, and attachments to other work. Indicate dimensions, loadings, and special conditions. Distinguish between plant- and field-assembled work.
- B. Informational Submittals:
 - 1. Coordination Drawings: Roof plans, drawn to scale, and coordinating penetrations and roof-mounted items. Show the following:
 - a. Size and location of roof accessories specified in this Section.
 - b. Method of attaching roof accessories to roof or building structure.
 - c. Other roof-mounted items including mechanical and electrical equipment, ductwork, piping, and conduit.
 - d. Required clearances.
 - 2. Sample Warranties: For manufacturer's special warranties.
- C. Closeout Submittals:
 - 1. Operation and Maintenance Data: For roof accessories to include in operation and maintenance manuals.

PART 2 PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. General Performance: Roof accessories shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.
- B. Wind-Restraint Performance: As indicated on Drawings.

2.2 ROOF HATCH

- A. Roof Hatches: Metal roof-hatch units with lids and insulated double-walled curbs, welded or mechanically fastened and sealed corner joints, continuous lid-to-curb counterflashing and weathertight perimeter gasketing, integral metal cant, and integrally formed deck-mounting flange at perimeter bottom.
 - 1. Manufacturers:
 - a. Acudor Products, Inc.
 - b. AES Industries, Inc.
 - c. Babcock-Davis.
 - d. Bilco Company (The).
 - e. Bristolite Daylighting Systems, Inc.
 - f. Custom Solution Roof and Metal Products.
 - g. Dur-Red Products.
 - h. Hi Pro International, Inc.
 - i. JL Industries, Inc.; a division of the Activar Construction Products Group.
 - j. Metallic Products Corp.
 - k. Milcor; Commercial Products Group of Hart & Cooley, Inc.
- B. Type and Size: Single-leaf lid:
 - 1. Size: 30 by 96 inches (750 by 2440 mm).
 - 2. Basis of Design Product: Bilco Type L-50TB Thermally Broken Roof Hatch.
- C. Loads: Minimum 40-lbf/sq. ft. (1.9-kPa) external live load and 20-lbf/sq. ft. (0.95-kPa) internal uplift load.
- D. Hatch Material: Zinc-coated (galvanized) or aluminum-zinc alloy-coated steel sheet.
 - 1. Thickness: Manufacturer's standard thickness for hatch size indicated.
 - 2. Finish: Factory prime coating.
- E. Construction:
 - 1. Insulation: Glass-fiber board or polyisocyanurate board.
 - a. R-Value: 20.0 according to ASTM C 1363.

2. Hatch Lid: Opaque, insulated, and double walled, with manufacturer's standard metal liner of same material and finish as outer metal lid.
 3. Curb Liner: Manufacturer's standard, of same material and finish as metal curb.
 4. On ribbed or fluted metal roofs, form flange at perimeter bottom to conform to roof profile.
 5. Fabricate curbs to minimum height of 12 inches (305 mm) above roofing surface unless otherwise indicated.
 6. Sloping Roofs: Where slope or roof deck exceeds 1:48, fabricate curb with perimeter curb height that is tapered to accommodate roof slope so that top surfaces of perimeter curb are level. Equip hatch with water diverter or cricket on side that obstructs water flow.
- F. Hardware: Spring operators, hold-open arm, galvanized-steel spring latch with turn handles, galvanized-steel butt- or pintle-type hinge system, and padlock hasps inside and outside.
1. Provide two-point latch on lids larger than 84 inches (2130 mm).
- G. Safety Railing System: Roof-hatch manufacturer's standard system including rails, clamps, fasteners, safety barrier at railing opening, and accessories required for a complete installation; attached to roof hatch and complying with 29 CFR 1910.23 requirements and authorities having jurisdiction.
1. Height: 42 inches (1060 mm) above finished roof deck.
 2. Posts and Rails: Galvanized-steel pipe, 1-1/4 inches (31 mm) in diameter or galvanized-steel tube, 1-5/8 inches (41 mm) in diameter.
 3. Flat Bar: Galvanized steel, 2 inches (50 mm) high by 3/8 inch (9 mm) thick.
 4. Maximum Opening Size: System constructed to prevent passage of a sphere 21 inches (533 mm) in diameter.
 5. Self-Latching Gate: Fabricated of same materials and rail spacing as safety railing system. Provide manufacturer's standard hinges and self-latching mechanism.
 6. Post and Rail Tops and Ends: Weather resistant, closed or plugged with prefabricated end fittings.
 7. Provide weep holes or another means to drain entrapped water in hollow sections of handrail and railing members.
 8. Fabricate joints exposed to weather to be watertight.
 9. Fasteners: Manufacturer's standard, finished to match railing system.
 10. Finish: Manufacturer's standard.
 11. Basis of Design: Roof Hatch Fall Protection Safety Rail Model No. SP size as required by SafePro L.P., 877-723-357.

2.3 METAL MATERIALS

- A. Zinc-Coated (Galvanized) Steel Sheet: ASTM A 653/A 653M, G90 (Z275) coating designation and mill phosphatized for field painting where indicated.

1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- B. Aluminum-Zinc Alloy-Coated Steel Sheet: ASTM A 792/A 792M, AZ50 (AZM150) coated.
1. Factory Prime Coating: Where field painting is indicated, apply pretreatment and white or light-colored, factory-applied, baked-on epoxy primer coat, with a minimum dry film thickness of 0.2 mil (0.005 mm).
 2. Concealed Finish: Pretreat with manufacturer's standard white or light-colored acrylic or polyester-backer finish consisting of prime coat and wash coat, with a minimum total dry film thickness of 0.5 mil (0.013 mm).
- C. Steel Tube: ASTM A 500/A 500M, round tube.
- D. Galvanized-Steel Tube: ASTM A 500/A 500M, round tube, hot-dip galvanized according to ASTM A 123/A 123M.
- E. Steel Pipe: ASTM A 53/A 53M, galvanized.
- 2.4 MISCELLANEOUS MATERIALS
- A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items required by manufacturer for a complete installation.
- B. Glass-Fiber Board Insulation: ASTM C 726, nominal density of 3 lb/cu. ft. (48 kg/cu. m), thermal resistivity of 4.3 deg F x h x sq. ft./Btu x in. at 75 deg F (29.8 K x m/W at 24 deg C), thickness as indicated.
- C. Polyisocyanurate Board Insulation: ASTM C 1289, thickness and thermal resistivity as indicated.
- D. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.
- E. Underlayment:
1. Self-Adhering, High-Temperature Sheet: Minimum 30 to 40 mils (0.76 to 1.0 mm) thick, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.
- F. Fasteners:
1. Fasteners: Roof accessory manufacturer's recommended fasteners suitable for application and metals being fastened. Match finish of exposed fasteners with finish of material being fastened. Provide nonremovable fastener heads to exterior exposed fasteners. Furnish the following unless otherwise indicated:

2. Fasteners for Zinc-Coated or Aluminum-Zinc Alloy-Coated Steel: Series 300 stainless steel or hot-dip zinc-coated steel according to ASTM A 153/A 153M or ASTM F 2329.
 - G. Gaskets: Manufacturer's standard tubular or fingered design of neoprene, EPDM, PVC, or silicone or a flat design of foam rubber, sponge neoprene, or cork.
 - H. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant as recommended by roof accessory manufacturer for installation indicated; low modulus; of type, grade, class, and use classifications required to seal joints and remain watertight.
 - I. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for expansion joints with limited movement.
- 2.5 GENERAL FINISH REQUIREMENTS
- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
 - B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.
- B. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- C. Verify dimensions of roof openings for roof accessories.
- D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. General: Install roof accessories according to manufacturer's written instructions.
 1. Install roof accessories level; plumb; true to line and elevation; and without warping, jogs in alignment, buckling, or tool marks.
 2. Anchor roof accessories securely in place so they are capable of resisting indicated loads.

3. Use fasteners, separators, sealants, and other miscellaneous items as required to complete installation of roof accessories and fit them to substrates.
 4. Install roof accessories to resist exposure to weather without failing, rattling, leaking, or loosening of fasteners and seals.
- B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.
1. Underlayment: Where installing roof accessories directly on cementitious or wood substrates, install a course of underlayment and cover with manufacturer's recommended slip sheet.
- C. Roof-Hatch Installation:
1. Verify that roof hatch operates properly. Clean, lubricate, and adjust operating mechanism and hardware.
- D. Seal joints with elastomeric or butyl sealant as required by roof accessory manufacturer.
- 3.3 REPAIR AND CLEANING
- A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing according to ASTM A 780/A 780M.
 - B. Touch up factory-primed surfaces with compatible primer ready for field painting according to Section 09 96 00 - High-Performance Coatings.
 - C. Clean exposed surfaces according to manufacturer's written instructions.
 - D. Clean off excess sealants.
 - E. Replace roof accessories that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION

SECTION 07 92 00

JOINT SEALANTS

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. Silicone joint sealants.
- B. Nonstaining silicone joint sealants.
- C. Exterior urethane joint sealants.

1.2 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.

1.3 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data:
 - a. Joint sealants.
 - b. Joint sealant backing materials.
 - 2. Samples for Initial Selection: Manufacturer's standard color charts consisting of strips of cured sealants showing the full range of colors available for each product exposed to view.
 - 3. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
 - 4. Joint-Sealant Schedule: Include the following information:
 - a. Joint-sealant application, joint location, and designation.
 - b. Joint-sealant manufacturer and product name.
 - c. Joint-sealant formulation.
 - d. Joint-sealant color.
 - 5. LEED Submittals conforming to requirements listed in Section 01 81 13 "Sustainable Design Requirements":
 - a. If published provide any of the following documentation: Product Declaration, Environmental Product Declarations (EPD's), GreenScreen v1.2 Benchmark, Health Product Declaration (HPD) or other documentation as defined in "Sustainable Design Requirements."

- 1) Failure to provide the above documentation will disqualify products where this documentation is required for compliance to LEED, reference "Sustainable Design Requirements."
 - b. Indoor Environmental Quality Credits:
 - 1) Product Data: For sealants, indicating VOC content.
 - 2) Laboratory Test Reports: For sealants, indicating compliance with requirements for low-emitting materials.
 - B. Informational Submittals:
 1. Test and Evaluation Reports:
 - a. Preconstruction Laboratory Test Schedule: Include the following information for each joint sealant and substrate material to be tested:
 - 1) Joint-sealant location and designation.
 - 2) Manufacturer and product name.
 - 3) Type of substrate material.
 - 4) Proposed test.
 - 5) Number of samples required.
 - b. Preconstruction Laboratory Test Reports: For each joint sealant and substrate material to be tested from sealant manufacturer, indicating the following:
 - 1) Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
 - 2) Interpretation of test results and written recommendations for primers and substrate preparation are needed for adhesion.
 - c. Preconstruction Field-Adhesion-Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.
 2. Field Quality-Control Submittals:
 - a. Field-Adhesion-Test Reports: For each sealant application tested.
 3. Sample warranties.
 - C. Closeout Submittals:
 1. Warranty Documentation:
 - a. Manufacturers' special warranties.
 - b. Installer's special warranties.
- 1.4 QUALITY ASSURANCE
 - A. Qualifications:
 1. Installers: Authorized representative who is trained and approved by manufacturer.
 2. Testing Agency: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.5 MOCKUPS

- A. Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

1.6 PRECONSTRUCTION TESTING

- A. Preconstruction Laboratory Testing: Submit to joint-sealant manufacturers, for testing indicated below, samples of materials that will contact or affect joint sealants.
 - 1. Adhesion Testing: Use ASTM C794 to determine whether priming and other specific joint preparation techniques are required to obtain rapid, optimum adhesion of joint sealants to joint substrates.
 - 2. Compatibility Testing: Use ASTM C1087 to determine sealant compatibility when in contact with glazing and gasket materials.
 - 3. Stain Testing: Use ASTM C1248 to determine stain potential of sealant when in contact with masonry substrates.
 - 4. Submit manufacturer's recommended number of pieces of each type of material, including joint substrates, joint-sealant backings, and miscellaneous materials.
 - 5. Schedule sufficient time for testing and analyzing results to prevent delaying the Work.
 - 6. For materials failing tests, obtain joint-sealant manufacturer's written instructions for corrective measures, including use of specially formulated primers.
 - 7. Testing will not be required if joint-sealant manufacturers submit data that are based on previous testing, not older than 24 months, of sealant products for adhesion to, staining of, and compatibility with joint substrates and other materials matching those submitted.
- B. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:
 - 1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
 - 2. Conduct field tests for each kind of sealant and joint substrate.
 - 3. Notify Architect seven days in advance of dates and times when test joints will be erected.
 - 4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.
 - a. Test Method: Test joint sealants in accordance with Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1.1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.7 FIELD CONDITIONS

- A. Do not proceed with installation of joint sealants under the following conditions:
 1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer or are below 40 deg F (5 deg C).
 2. When joint substrates are wet.
 3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
 4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.8 WARRANTY

- A. Special Installer's Warranty: Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Two years from date of Substantial Completion.
- B. Special Manufacturer's Warranty: Manufacturer agrees to furnish joint sealants to repair or replace those joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.
 1. Warranty Period: Five years from date of Substantial Completion.
 2. Silicone Sealants Warranty Period: 20 years from date of Substantial Completion.
- C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:
 1. Movement of the structure caused by stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
 2. Disintegration of joint substrates from causes exceeding design specifications.
 3. Mechanical damage caused by individuals, tools, or other outside agents.
 4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain joint sealants from single manufacturer for each sealant type.

2.2 JOINT SEALANTS, GENERAL

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by joint-sealant manufacturer, based on testing and field experience.
- B. VOC Content: Verify sealants and sealant primers comply with the following:
 - 1. Architectural sealants have a VOC content of 250 g/L or less.
 - 2. Sealants and sealant primers for nonporous substrates have a VOC content of 250 g/L or less.
 - 3. Sealants and sealant primers for porous substrates have a VOC content of 775 g/L or less.
 - 4. Verify sealant complies with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."
- C. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 SILICONE JOINT SEALANTS (**DESIGNATION S-GP**)

- A. Silicone, S, NS, 100/50, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
 - 1. Manufacturers:
 - a. Dow Corning Corporation; 790.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SCS2700 SilPruf LM.
 - c. Tremco Construction Products Group Spectrem 1.
 - d. Sika Corporation; Sikasil WS-290.
- B. Silicone, S, NS, 50, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
 - 1. Manufacturers:
 - a. Dow Corning Corporation; 791.
 - b. GE Advanced Materials - SCS2000 SilPruf.
 - c. Pecora Corporation; PCS.

- d. Tremco Construction Products Group Spectrem 2.
 - e. Sika Corporation; Sikasil WS-295
- C. Silicone, S, NS, 100/50, T, NT: Single-component, nonsag, plus 100 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Uses T and NT.
- 1. Manufacturers:
 - a. Dow Corning Corporation; NS.
 - b. Tremco Construction Products Group Spectrem 800.
- D. Silicone, S, NS, 50, T, NT: Single-component, nonsag, plus 50 percent and minus 50 percent movement capability, traffic- and nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Uses T and NT.
- 1. Manufacturers:
 - 2. Dow Corning Corporation; 799.
 - 3. Soudal USA; RTV 50.
- 2.4 NONSTAINING SILICONE JOINT SEALANTS (**DESIGNATION S-SP**)
- A. Nonstaining Joint Sealants: No staining of substrates when tested in accordance with ASTM C1248.
- B. Silicone, Nonstaining, S, NS, 100/50, NT: Nonstaining, single-component, nonsag, plus 100 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 100/50, Use NT.
- 1. Manufacturers:
 - a. Dow Corning Corporation; 790.
 - b. Pecora Corporation; 890 NST.
 - c. Tremco Incorporated; Spectrum 1.
 - d. Sika Corporation; Sil 290 NB
- C. Silicone, Nonstaining, S, NS, 50, NT: Nonstaining, single-component, nonsag, plus 50 percent and minus 50 percent movement capability, nontraffic-use, neutral-curing silicone joint sealant; ASTM C920, Type S, Grade NS, Class 50, Use NT.
- 1. Manufacturers:
 - a. Dow Corning Corporation; 795.
 - b. GE Construction Sealants; Momentive Performance Materials Inc.; SilPruf NB
 - c. Pecora Corporation: 895NST.
 - d. Tremco Incorporated: Spectrum 2.
 - e. Sika Corporation; Sil 295 FPS NB
- 2.5 EXTERIOR URETHANE JOINT SEALANTS (**DESIGNATION U-TE**)
- A. Urethane, M, P, 25, T, NT: Multicomponent, pourable, plus 25 percent and minus 25 percent movement capability, traffic- and nontraffic-use, urethane joint sealant; ASTM C920, Type M, Grade P, Class 25, Uses T and NT.

1. Manufacturers:
 - a. Bostik, Inc.; Iso-Flex 880 GB.
 - b. Master Builders Solutions; MasterSeal-SL-2.
 - c. Pecora Corporation; Urexpan NR 200.
 - d. Sherwin-Williams Company (The); Stampede-2SL.
 - e. Tremco Incorporated; THC 900/901.

2.6 JOINT-SEALANT BACKING

- A. Sealant Backing Material, General: Nonstaining; compatible with joint substrates, sealants, primers, and other joint fillers; and approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) for all sealants, except silicone and horizontal joints. Type O (open-cell material) for silicone sealants. Provide size and density to control sealant depth and otherwise contribute to producing optimum sealant performance. Backings shall be approximately 25% larger than joint.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.7 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting performance of the Work.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:
1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.
 2. Clean, porous joint substrate surfaces by brushing, grinding, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:
 - a. Concrete.
 - b. Masonry.
 - c. Exterior insulation and finish systems.
 3. Remove laitance and form-release agents from concrete.
 4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:
 - a. Metal.
 - b. Glass.
- B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.
- C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

- A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.
- B. Sealant Installation Standard: Comply with recommendations in ASTM C1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

- C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.
 - 1. Do not leave gaps between ends of sealant backings.
 - 2. Do not stretch, twist, puncture, or tear sealant backings.
 - 3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.
- D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.
- E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:
 - 1. Place sealants so they directly contact and fully wet joint substrates.
 - 2. Completely fill recesses in each joint configuration.
 - 3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.
- F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.
 - 1. Remove excess sealant from surfaces adjacent to joints.
 - 2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
 - 3. Provide concave joint profile in accordance with Figure 8A in ASTM C1193 unless otherwise indicated.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Tests and Inspections:
 - 1. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:
 - a. Extent of Testing: Test completed, and cured sealant joints as follows:
 - 1) Perform one test for each 1000 ft. (300 m) of joint length thereafter or one test per each floor per elevation.
 - b. Test Method: Test joint sealants in accordance with Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C1193 or Method A, Tail Procedure, in ASTM C1521.
 - 1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.
 - c. Inspect tested joints and report on the following:
 - 1) Whether sealants filled joint cavities and are free of voids.

- 2) Whether sealant dimensions and configurations comply with specified requirements.
 - 3) Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion complies with sealant manufacturer's field-adhesion hand-pull test criteria.
 - d. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant material, sealant configuration, and sealant dimensions.
 - e. Repair sealants pulled from test area by applying new sealants following same procedures used originally to seal joints. Ensure that original sealant surfaces are clean and that new sealant contacts original sealant.
2. Evaluation of Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.
- C. Prepare test and inspection reports.
- 3.5 CLEANING
- A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.
- 3.6 PROTECTION
- A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out, remove, and repair damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.
- 3.7 JOINT-SEALANT SCHEDULE
- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces (**Designation S-GP**):
1. Joint Locations:
 - a. Joints in exterior insulation and finish systems.
 - b. Joints between metal panels.

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- c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - e. Control and expansion joints in soffits and other overhead surfaces.
 - f. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, S, NS, 100/50 or 50, NT, **(Designation S-GP)**.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- B. Exterior joints in vertical surfaces and horizontal nontraffic surfaces (**Designation S-SP**):
 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit masonry.
 - c. Joints in exterior insulation and finish systems.
 - d. Joints between metal panels.
 - e. Joints between different materials listed above.
 - f. Perimeter joints between materials listed above and frames of doors, windows and louvers.
 - g. Control and expansion joints in soffits and other overhead surfaces.
 - h. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, S, NS, 100/50 or 50, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.
- C. Exterior joints in horizontal traffic surfaces (**Designation U-TE**):
 1. Joint Locations:
 - a. Isolation and contraction joints in cast-in-place concrete slabs.
 - b. Joints between different materials listed above.
 - c. Other joints as indicated on Drawings.
 2. Joint Sealant: Urethane, M, P/NS, 25, T, NT.
 3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION

SECTION 14 24 00
HYDRAULIC ELEVATORS

PART 1 - GENERAL

1.1 SECTION INCLUDES

- A. Hydraulic passenger and service elevators.

1.2 RELATED REQUIREMENTS

- A. G.S. 143-59, regarding preference given to North Carolina products and citizens, and articles manufactured by State agencies; reciprocal preferences.
- B. Section 01 50 00 "Temporary Facilities and Controls" for temporary use of elevators for construction purposes.
- C. Section 03 30 00 "Cast-in-Place Concrete" for setting sleeves, inserts, and anchoring devices in concrete.
- D. Section 04 20 00 "Unit Masonry" for setting sleeves, inserts, and anchoring devices in masonry and for grouting elevator entrance frames installed in masonry walls.
- E. Section 05 50 00 "Metal Fabrications" for the following:
 - 1. Attachment plates and angle brackets for supporting guide-rail brackets.
 - 2. Divider beams.
 - 3. Hoist beams.
 - 4. Structural-steel shapes for subsills.
 - 5. Pit ladders.
 - 6. Cants made from steel sheet in hoistways.
- F. Section 05 52 13 "Pipe and Tube Railings" for railings between adjacent elevator pits.
- G. Section 09 65 19 "Resilient Tile Flooring" for finish flooring in elevator cars.
- H. Section 09 66 23 "Resinous Matrix Terrazzo Flooring" for finish flooring in elevator cars.
- I. Section 09 91 00 "Painting" for field painting of hoistway entrance doors and frames.
- J. Division 26 Sections for electrical service for elevators to and including disconnect switches at machine room door and standby power source, transfer switch, and connection from auxiliary contacts in transfer switch to controller.

- K. Division 27 Section "Communications Horizontal Cabling" for telephone service for elevators.
- L. Division 28 Section "Access Control" for security access system equipment used to restrict elevator use.
- M. Division 28 Section "Fire Detection and Alarm" for smoke detectors in elevator lobbies to initiate emergency recall operation and heat detectors in shafts and machine rooms to disconnect power from elevator equipment before sprinkler activation and for connection to elevator controllers.

1.3 DEFINITIONS

- A. Definitions in ASME A17.1/CSA B44 apply to work of this Section.
- B. Service Elevator: A passenger elevator that is also used to carry freight.

1.4 SUBMITTALS

- A. Action Submittals:
 - 1. Product Data: Include capacities, sizes, performances, operations, safety features, finishes, and similar information. Include product data for car enclosures; hoistway entrances; and operation, control, and signal systems.
 - 2. Shop Drawings:
 - a. Include plans, elevations, sections, and large-scale details indicating service at each landing; machine room layout; coordination with building structure; relationships with other construction; and locations of equipment.
 - b. Include large-scale layout of car-control station and standby-power operation control panel.
 - c. Indicate maximum dynamic and static loads imposed on building structure at points of support as well as maximum and average power demands.
 - 3. Samples for Initial Selection: For finishes involving color selection.
 - 4. Samples for Verification: For exposed car, hoistway door and frame, and signal equipment finishes, 3-inch- (75-mm-) square Samples of sheet materials and 4-inch (100-mm) lengths of running trim members.
- B. Informational Submittals:
 - 1. Qualification Data: For Installer.
 - 2. Manufacturer Certificates: Signed by elevator manufacturer, certifying that hoistway, pit, and machine room layout and dimensions, as shown on Drawings, and electrical service including standby-power generator, as shown and specified, are adequate for elevator system being provided.
 - 3. Sample Warranty: For special warranty.
- C. Closeout Submittals:

1. Operation and Maintenance Data: For elevators to include in emergency, operation, and maintenance manuals.
 - a. Submit (3) copies of manufacturer's/installer's standard operation and maintenance manual, in accordance with ASME A17.1/CSA B44 including diagnostic and repair information available to manufacturer's and Installer's maintenance personnel. One of the three manuals is to be laminated.
 - b. Manuals are to contain electrical and solid state wiring diagrams.
2. Inspection and Acceptance Certificates and Operating Permits: As required by authorities having jurisdiction for normal, unrestricted elevator use.
3. Technical support must be provided by the manufacturer of any non-proprietary elevator system over the life of the unit and within 24 hours to Owner or their representative.
4. Continuing Maintenance Proposal: Submit a continuing maintenance proposal from Installer to Owner, in the form of a standard one-year maintenance agreement, starting on date initial maintenance service is concluded. State services, obligations, conditions, and terms for agreement period and for future renewal options.
 - a. Non-proprietary components such as microprocessor based elevator control systems shall be serviceable and maintainable by any qualified elevator maintenance provider that is capable of maintaining apparatus of similar design and complexity.
5. All tools, computer hardware, software / apps, instruction manuals and other miscellaneous devices required to maintain, service, and troubleshoot the elevator system shall be furnished to Owner.
6. (3) complete sets of keys, labeled according to function and (1) elevator door key to the Owner.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Elevator manufacturer or an authorized representative who is trained and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Deliver, store, and handle materials, components and equipment in manufacturer's protective packaging. Store materials, components, and equipment off of ground, under cover, and in a dry location.

1.7 COORDINATION

- A. Coordinate installation of sleeves, block outs, elevator equipment with integral anchors, and other items that are embedded in concrete or masonry for elevator equipment. Furnish templates, sleeves, elevator equipment with integral anchors, and installation instructions and deliver to Project site in time for installation.

- B. Coordinate locations and dimensions of other work specified in other Sections that relates to hydraulic elevators, including pit ladders; sumps and floor drains in pits; entrance subsills; electrical service; and electrical outlets, lights, and switches in hoistways, pits, and machine rooms.

1.8 WARRANTY

- A. Manufacturer's Special Warranty: Manufacturer agrees to repair, restore, or replace elevator work that fails in materials or workmanship within specified warranty period.
 - 1. Failures include, but are not limited to, operation or control system failure, including excessive malfunctions; performances below specified ratings; excessive wear; unusual deterioration or aging of materials or finishes; unsafe conditions; need for excessive maintenance; abnormal noise or vibration; and similar unusual, unexpected, and unsatisfactory conditions.
 - 2. Warranty Period: Two year(s) from date of Final Acceptance.

PART 2 - PRODUCTS

2.1 HYDRAULIC ELEVATOR MANUFACTURERS

- A. Manufacturers:
 - 1. MEI.
 - 2. Mitsubishi Electric US, Inc.
 - 3. TK Elevator.
 - 4. Schumacher Elevator Company.
- B. Source Limitations: Obtain elevators from single manufacturer.
 - 1. Major elevator components, including pump-and-tank units, plunger-cylinder assemblies, controllers, signal fixtures, door operators, car frames, cars, and entrances, shall be manufactured by single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Regulatory Requirements: Comply with ASME A17.1/CSA B44.
- B. Accessibility Requirements: Comply with Section 407 in the United States Access Board's ADA-ABA Accessibility Guidelines and with ICC A117.1 .

2.3 ELEVATORS

- A. Elevator System, General: Manufacturer's standard elevator systems. Unless otherwise indicated, manufacturers' standard components shall be used, as included in standard elevator systems and as required for complete system.
- B. Passenger Elevator Description:

1. Type: Holed, conventional cylinder and plunger jack, single-acting, single cylinder.
 2. Rated Load: 3000 lb (1362 kg).
 3. Freight Loading Class for Service Elevators: Class A.
 4. Rated Speed: 200 fpm (1.0 m/s).
 5. Operation System: Single automatic operation.
 6. Auxiliary Operations:
 - a. Standby-power operation.
 - b. Standby-powered lowering.
 - c. Automatic dispatching of loaded car.
 - d. Nuisance call cancel.
 - e. Loaded-car bypass.
 - f. Automatic operation of lights and ventilation fans.
 7. Security Features: Card-reader operation.
 8. Dual Car-Control Stations: Provide two car-control stations ; equip only one with required keyswitches if any.
 9. Car Enclosures:
 - a. Inside Width: 6'-8".
 - b. Inside Depth: 4'-9".
 - c. Inside Height: 8'-0".
 - d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
 - e. Car Fixtures: Satin stainless steel, No. 4 finish.
 - f. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
 - g. Reveals: Satin stainless steel, No. 4 finish.
 - h. Door Faces (Interior): Satin stainless steel, No. 4 finish.
 - i. Door Sills: Aluminum.
 - j. Ceiling: Satin stainless steel, No. 4 finish with down lighting.
 - k. Handrails: 1/2 by 2 inches (13 by 50 mm) rectangular satin stainless steel, No. 4 finish, at sides and rear of car.
 - l. Floor recessed and prepared to receive resinous matrix terrazzo tile.
 10. Hoistway Entrances:
 - a. Width: 3'-6".
 - b. Height: 7'-0"
 - c. Type: Single-speed side sliding.
 - d. Frames: Satin stainless steel, No. 4 finish.
 - e. Doors and Transoms: Satin stainless steel, No. 4 finish.
 - f. Sills: Aluminum.
 11. Hall Fixtures: Satin stainless steel, No. 4 finish.
 12. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide clearances to meet stretcher requirements per NCBC 3002.4.
- C. Service Elevator Description:

1. Type: Holed, conventional cylinder and plunger jack, single-acting, single cylinder.
2. Rated Load: 4500 lb (2043 kg).
3. Freight Loading Class for Service Elevators: Class C3.
4. Rated Speed: 100 fpm (0.51 m/s).
5. Operation System: Single automatic operation.
6. Auxiliary Operations:
 - a. Battery-powered lowering.
 - b. Automatic dispatching of loaded car.
 - c. Nuisance call cancel.
 - d. Loaded-car bypass.
 - e. Automatic operation of lights and ventilation fans.
7. Security Features: Card-reader operation.
8. Dual Car-Control Stations: Provide two car-control stations; equip only one with required keyswitches if any.
9. Car Enclosures:
 - a. Inside Width: 5'-8".
 - b. Inside Depth: 7'-9".
 - c. Inside Height: 8'-0".
 - d. Front Walls (Return Panels): Satin stainless steel, No. 4 finish with integral car door frames.
 - e. Car Fixtures: Satin stainless steel, No. 4 finish.
 - f. Side and Rear Wall Panels: Satin stainless steel, No. 4 finish.
 - g. Reveals: Satin stainless steel, No. 4 finish.
 - h. Door Faces (Interior): Satin stainless steel, No. 4 finish.
 - i. Door Sills: Aluminum.
 - j. Ceiling: Satin stainless steel, No. 4 finish with down lighting.
 - k. Handrails: 1/2 by 2 inches (13 by 50 mm) rectangular satin stainless steel, No. 4 finish, at sides and rear of car.
 - l. Floor prepared to receive resilient flooring (specified in Section 09 65 19 "Resilient Tile Flooring").
10. Hoistway Entrances:
 - a. Width: 4'-0"
 - b. Height: 7'-0"
 - c. Type: Single-speed center sliding.
 - d. Frames: Satin stainless steel, No. 4 finish.
 - e. Doors and Transoms: Satin stainless steel, No. 4 finish.
 - f. Sills: Aluminum.
11. Hall Fixtures: Satin stainless steel, No. 4 finish.
12. Additional Requirements:
 - a. Provide inspection certificate in each car, mounted under acrylic cover with frame made from satin stainless steel, No. 4 finish.
 - b. Provide hooks for protective pads in service car and two complete set(s) of full-height protective pads.

2.4 SYSTEMS AND COMPONENTS

- A. Pump Units: Positive-displacement type with a maximum of 10 percent variation between no load and full load and with minimum pulsations.
 - 1. Pump shall be submersible type with submersible squirrel-cage induction motor, and shall be suspended inside oil tank from vibration isolation mounts.
 - 2. Motor shall have wye-delta or solid-state starting.
 - 3. Motor shall have variable-voltage, variable-frequency control.
- B. Hydraulic Silencers: System shall have hydraulic silencer containing pulsation-absorbing material in blowout-proof housing at pump unit.
- C. Piping: Size, type, and weight of piping as recommended by elevator manufacturer, with flexible connectors to minimize sound and vibration transmissions from power unit.
- D. Hydraulic Fluid: Nontoxic, biodegradable, fire-resistant fluid, made from vegetable oil with antioxidant, anticorrosive, antifoaming, and metal-passivating additives, that is approved by elevator manufacturer for use with elevator equipment.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by the following or comparable by an available manufacturer:
 - a. Hydro Safe Oil Division, Inc.
- E. Inserts: Furnish required concrete and masonry inserts and similar anchorage devices for installing guide rails, machinery, and other components of elevator work. Device installation is specified in another Section.
- F. Car Frame and Platform: Welded or bolted steel units.
- G. Guides: Roller guides. Provide guides at top and bottom of car frame.

2.5 OPERATION SYSTEMS

- A. General: Provide manufacturer's standard microprocessor operation system as required to provide type of operation indicated.
 - 1. Elevator control systems shall be non-proprietary.
- B. Auxiliary Operations:
 - 1. Single-Car Standby-Power Operation: On activation of standby power, car is returned to a designated floor and parked with doors open. Car can be manually put in service on standby power, either for return operation or for regular operation, by switches in control panel located at main lobby. Manual operation causes automatic operation to cease.
 - 2. Single-Car Standby-Powered Lowering: On activation of standby power, if car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to a preselected floor, opens its doors, and shuts down. If car is below the preselected floor, it is lowered to the next lower floor, opens its doors, and shuts down.

3. Single-Car Battery-Powered Lowering: If power fails and car is at a floor, it remains at that floor, opens its doors, and shuts down. If car is between floors, it is lowered to a preselected floor, opens its doors, and shuts down. If car is below the preselected floor, it is lowered to the next lower floor, opens its doors, and shuts down. System includes rechargeable battery and automatic recharging system.
 4. Automatic Dispatching of Loaded Car: When car load exceeds 80 percent of rated capacity, doors start closing.
 5. Nuisance Call Cancel: When car calls exceed a preset number while car load is less than a predetermined weight, all car calls are canceled. Preset number of calls and predetermined weight can be adjusted.
 6. Loaded-Car Bypass: When car load exceeds 80 percent of rated capacity, car responds only to car calls, not to hall calls.
 7. Automatic Operation of Lights and Fan: When elevator is stopped and unoccupied with doors closed, lighting, ventilation fan, and cab displays are de-energized after 5 minutes and are re-energized before car doors open.
- C. Security Features: Security features shall not affect emergency firefighters' service.
1. Card-Reader Operation: System uses card readers at car-control stations, and, and hall push-button stations to authorize calls. Security system determines which landings and at what times calls require authorization by card reader. Provide required conductors in traveling cable and panel in machine room for interconnecting card readers, other security access system equipment, and elevator controllers. Allow space for card reader in car and Provide stripe-swipe card reader integral with each car-control station .
 - a. Security access system equipment is specified in Section 28 15 00 "Access Control Hardware Devices."
 2. Keyswitch Operation: Push buttons are activated and deactivated by security keyswitches at car-control stations, and, and hall push-button stations. Key is removable only in deactivated position.
 - a. Key Switch: Best Lock system for access control to mechanical spaces or rooftop penthouse spaces.
 3. Car-to-Lobby Feature: Feature, activated by keyswitch at main lobby, that causes car to return immediately to lobby and open doors for inspection. On deactivation by keyswitch, calls registered before keyswitch activation are completed and normal operation is resumed.

2.6 DOOR-REOPENING DEVICES

- A. Infrared Array: Provide door-reopening device with uniform array of 36 or more microprocessor-controlled, infrared light beams projecting across car entrance. Interruption of one or more light beams shall cause doors to stop and reopen.
- B. Nudging Feature: After car doors are prevented from closing for predetermined adjustable time, through activating door-reopening device, a loud buzzer shall sound and doors shall begin to close at reduced kinetic energy.

2.7 CAR ENCLOSURES

- A. General: Provide enameled- or powder-coated-steel car enclosures to receive removable wall panels, with removable car roof, access doors, power door operators, and ventilation.
 - 1. Provide standard railings complying with ASME A17.1/CSA B44 on car tops where required by ASME A17.1/CSA B44.
- B. Materials and Finishes: Manufacturer's standards, but not less than the following:
 - 1. Resilient Subfloor: Exterior, underlayment-grade plywood, not less than 5/8-inch (15.9-mm) nominal thickness.
 - 2. Terrazzo Tile Subfloor: Exterior, C-C Plugged grade plywood, not less than 7/8-inch (22.2-mm) nominal thickness.
 - 3. Floor Finishes: As indicated per elevator.
 - a. Passenger Elevator: Precast Terrazzo Tile.
 - b. Service Elevator: Rubber tile with raised pattern.
 - 4. Stainless-Steel Wall Panels: Flush, formed-metal construction; fabricated from stainless-steel sheet.
 - 5. Fabricate car with recesses and cutouts for signal equipment.
 - 6. Fabricate car door frame integrally with front wall of car.
 - 7. Stainless-Steel Doors: Flush, hollow-metal construction; fabricated from stainless-steel sheet or by laminating stainless-steel sheet to exposed faces and edges of enameled- or powder-coated-steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
 - 8. Sight Guards: Provide sight guards on car doors.
 - 9. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
 - 10. Metal Ceiling: Flush panels, with four LED downlights in each panel. Align ceiling panel joints with joints between wall panels.
 - 11. Light Fixture Efficiency: Not less than 35 lumens/W.
 - 12. Ventilation Fan Efficiency: Not less than 3.0 cfm/W (1.4 L/s per W).

2.8 HOISTWAY ENTRANCES

- A. Hoistway Entrance Assemblies: Manufacturer's standard horizontal-sliding, door-and-frame hoistway entrances complete with track systems, hardware, sills, and accessories. Frame size and profile shall accommodate hoistway wall construction.
 - 1. Where gypsum board wall construction is indicated, frames shall be self-supporting with reinforced head sections.
- B. Fire-Rated Hoistway Entrance Assemblies: Door-and-frame assemblies shall comply with NFPA 80 and be listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction based on testing at as close-to-neutral pressure as possible according to NFPA 252 or UL 10B.
 - 1. Fire-Protection Rating: 1-1/2 hours.

- C. Materials and Fabrication: Manufacturer's standards, but not less than the following:
1. Steel Subframes: Formed from cold- or hot-rolled steel sheet, with factory-applied enamel or powder-coat finish or rust-resistant primer. Fabricate to receive applied finish as indicated.
 2. Stainless-Steel Frames: Formed from stainless-steel sheet.
 3. Star of Life Symbol: Identify emergency elevators with star of life symbol, not less than 3 inches (76 mm) high, on both jambs of hoistway door frames.
 4. Stainless-Steel Doors and Transoms: Flush, hollow-metal construction; fabricated from stainless-steel sheet or by laminating stainless-steel sheet to exposed faces and edges of enameled- or powder-coated-steel doors using adhesive that fully bonds metal to metal without telegraphing or oil-canning.
 5. Sight Guards: Provide sight guards on doors matching door edges.
 6. Sills: Extruded or machined metal, with grooved surface, 1/4 inch (6.4 mm) thick.
 7. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107/C 1107M.

2.9 SIGNAL EQUIPMENT

- A. General: Provide hall-call and car-call buttons that light when activated and remain lit until call has been fulfilled. Provide vandal-resistant buttons and lighted elements illuminated with LEDs.
- B. Car-Control Stations: Provide manufacturer's standard recessed car-control stations. Mount in return panel adjacent to car door unless otherwise indicated.
1. Mark buttons and switches for required use or function. Use both tactile symbols and Braille.
 2. Provide "No Smoking" sign matching car-control station, either integral with car-control station or mounted adjacent to it, with text and graphics as required by authorities having jurisdiction.
- C. Emergency Communication System: Two-way visual communication system, with visible signal, which dials preprogrammed number of monitoring station and does not require handset use. System is contained in flush-mounted cabinet, with identification, instructions for use, and battery backup power supply.
1. The car operating panel shall include communication devices which comply with section 3.27 and 2.27.1 of the 2022 ASME A17.1 Elevator Safety Code – "Car Emergency Signaling Devices." In addition to the hands free phone device, this includes a visual screen display for text messages, and a video camera feed to permit authorized responders to view the cab interior. These latter devices must be monitored 24/7. As part of this Code requirement, the elevator contractor must provide the following:
 - a. "SmartView system by RATH Co. – or specifically approved equal, tailored for this requirement, to include controller, camera, text message display screen, dedicated "yes" and "no" buttons, ethernet extenders, software and any other required accessories.

- b. Two (2) dedicated Cat 6 traveling cables to serve these devices.
 - c. A "gateway" or adapter device to enable connectivity of the SmartView system with the Owner's existing network.
 2. A "gateway" or adapter device must be compatible / function with the Owner's existing network. All programming or configuration of the contractor-provided "gateway" or adapter device at the project site, required to enable the elevator cab communications system to properly connect and communicate with the Owner's existing network must be completed by the Contractor (not the Owner.)
 3. The Elevator Contractor shall ensure that the communications equipment system is fully tested and communicating properly with the Owner's network before calling for an inspection of the elevator by NCDOL. This shall also include providing at least 2 days notice to the NCSU project representative before the inspection, to allow University staff to "practice" the protocol for receiving emergency calls from the elevator cab, and responding in the correct manner. The Contractor shall be responsible for assisting in this process to ensure that all equipment and personnel interact properly and that the overall Smartrise system is functioning correctly, prior to ordering the NCDOL inspection.
- D. Firefighters' Two-Way Telephone Communication Service: Provide flush-mounted and telephone jack in each car and required conductors in traveling cable for firefighters' two-way telephone communication service specified in appropriate Division 28 Section.
- E. Car Position Indicator: Provide illuminated, digital-type car position indicator, located above car door or above car-control station. Also, provide audible signal to indicate to passengers that car is either stopping at or passing each of the floors served. Include travel direction arrows if not provided in car-control station.
- F. Hall Push-Button Stations: Provide one hall push-button station at each landing for each single elevator or group of elevators, but not less than one station for each four elevators in a group.
 1. Provide units with flat faceplate for mounting with body of unit recessed in wall.
 2. Equip units with buttons for calling elevator and for indicating applicable direction of travel.
 3. Provide telephone jack in each unit for firefighters' two-way telephone communication service as specified in appropriate Division 28 Section.
- G. Hall Lanterns: Units with illuminated arrows; however, provide single arrow at terminal landings. Provide the following:
 1. Manufacturer's standard wall-mounted units, for mounting above entrance frames.
- H. Hall Annunciator: With each hall lantern, provide audible signals indicating car arrival and direction of travel. Signals sound once for up and twice for down.
 1. At manufacturer's option, audible signals may be placed on cars.

2. All annunciators shall be factory assembled and tested, digital voice annunciator, with female recorded voice, adjustable volume and tone controls. The recorded message shall state the floor location of the cab and the direction of travel when the cabs doors open. The audible signals of the elevator shall be replaced with the digital voice annunciator.
 - I. Hall Position Indicators: Provide illuminated, digital-display-type position indicators, located above each hoistway entrance at ground floor.
 1. Provide units with flat faceplate for mounting and with body of unit recessed in wall.
 - J. Standby-Power Elevator Selector Switches: Provide switches, as required by ASME A17.1/CSA B44, where indicated. Adjacent to switches, provide illuminated signal that indicates when normal power supply has failed. For each elevator, provide illuminated signals that indicate when they are operational and when they are at the designated emergency return level with doors open.
 - K. Fire-Command-Center Annunciator Panel: Provide panel containing illuminated position indicators for each elevator, clearly labeled with elevator designation; include illuminated signal that indicates when elevator is operational and when it is at the designated emergency return level with doors open. Provide standby-power elevator selector switch(es), as required by ASME A17.1/CSA B44, adjacent to position indicators. Provide illuminated signal that indicates when normal power supply has failed.
 - L. Emergency Pictorial Signs: Fabricate from materials matching hall push-button stations, with text and graphics as required by authorities having jurisdiction, indicating that in case of fire, elevators are out of service and exits should be used instead. Provide one sign at each hall push-button station unless otherwise indicated.
- 2.10 FINISH MATERIALS
- A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, commercial steel, Type B, exposed, matte finish.
 - B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, commercial steel, Type B, pickled.
 - C. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304.
 - D. Stainless-Steel Bars: ASTM A 276, Type 304.
 - E. Stainless-Steel Tubing: ASTM A 554, Grade MT 304.
 - F. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063.

PART 3 EXECUTION

3.1 EXAMINATION

- A. Examine elevator areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work. Verify critical dimensions and examine supporting structure and other conditions under which elevator work is to be installed.
- B. Prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Install cylinder plumb and accurately centered for elevator car position and travel. Anchor securely in place, supported at pit floor and braced at intervals as needed to maintain alignment. Anchor cylinder guides at spacing needed to maintain alignment and avoid overstressing guides.
- B. Welded Construction: Provide welded connections for installing elevator work where bolted connections are not required for subsequent removal or for normal operation, adjustment, inspection, maintenance, and replacement of worn parts. Comply with AWS workmanship and welding operator qualification standards.
- C. Sound Isolation: Mount rotating and vibrating equipment on vibration-isolating mounts to minimize vibration transmission to structure and structure-borne noise due to elevator system.
- D. Lubricate operating parts of systems as recommended by manufacturers.
- E. Alignment: Coordinate installation of hoistway entrances with installation of elevator guide rails for accurate alignment of entrances with car. Where possible, delay installation of sills and frames until car is operable in shaft. Reduce clearances to minimum, safe, workable dimension at each landing.
- F. Leveling Tolerance: 1/4 inch (6 mm), up or down, regardless of load and travel direction.
- G. Set sills flush with finished floor surface at landing. Fill space under sill solidly with nonshrink, nonmetallic grout.
- H. Locate hall signal equipment for elevators as follows unless otherwise indicated:
 - 1. Place hall lanterns either above or beside each hoistway entrance.
 - 2. Mount hall lanterns at a minimum of 72 inches (1829 mm) above finished floor.

3.3 FIELD QUALITY CONTROL

- A. Acceptance Testing: On completion of elevator installation and before permitting elevator use (either temporary or permanent), perform acceptance tests as required and recommended by ASME A17.1/CSA B44 and by governing regulations and agencies.
- B. Advise Owner, Architect, and authorities having jurisdiction in advance of dates and times that tests are to be performed on elevators.

3.4 PROTECTION

- A. Temporary Use: Limit temporary use for construction purposes to one elevator. Comply with the following requirements for each elevator used for construction purposes:
 - 1. Provide car with temporary enclosure, either within finished car or in place of finished car, to protect finishes from damage.
 - 2. Provide strippable protective film on entrance and car doors and frames.
 - 3. Provide padded wood bumpers on entrance door frames covering jambs and frame faces.
 - 4. Provide other protective coverings, barriers, devices, signs, and procedures as needed to protect elevator and elevator equipment.
 - 5. Do not load elevators beyond their rated weight capacity.
 - 6. Engage elevator Installer to provide full maintenance service. Include preventive maintenance, repair or replacement of worn or defective components, lubrication, cleanup, and adjustment as necessary for proper elevator operation at rated speed and capacity. Provide parts and supplies same as those used in the manufacture and installation of original equipment.
 - 7. Engage elevator Installer to restore damaged work, if any, so no evidence remains of correction. Return items that cannot be refinished in the field to the shop, make required repairs and refinish entire unit, or provide new units as required.

3.5 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to operate, adjust, and maintain elevator(s).
- B. Check operation of each elevator with Owner's personnel present before date of Final Acceptance and again not more than one month before end of warranty period. Determine that operation systems and devices are functioning properly.

3.6 MAINTENANCE

- A. Initial Maintenance Service: Beginning at Final Acceptance, maintenance service shall include 24 months' full maintenance by skilled employees of elevator Installer. Include monthly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper elevator operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
1. Perform maintenance during normal working hours.
 2. Include 24-hour-per-day, 7-day-per-week emergency callback service with response time of two hours or less.

END OF SECTION

FORM OF PROPOSAL

(Project) Mann Hall Renovation Contract: _____
(Institution) North Carolina State University Bidder: _____
(SCO-ID #.) 22-24500-02B 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 examined the site of 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 further declares that he and his subcontractors have fully complied with NCGS 64, Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

The Bidder proposes and agrees if this proposal is accepted to contract with the

North Carolina State University Facilities Division, Design & Construction via Holder Construction Group LLC (Prime General Contractor)

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 "Mann Hall - Renovation" project which includes a complete interior abatement and demolition scope of the existing building followed by construction of fully re-programmed classroom, academic and study spaces, fourth floor laboratory space, and an Esports arena on NC State's main campus.

To support the re-programming of this building, a new mechanical penthouse will be constructed to feed the 4th floor labs and a new elevator shaft will be installed (in addition to replacing the existing cab within a separate shaft). New electrical and mechanical equipment will be required, including replacing the existing transformer, and new fiber will be pulled from the existing manhole to support Esports needs.

in full in complete accordance with the plans, specifications and contract documents, to the full and entire satisfaction of the **State of North Carolina**, and the

North Carolina State University Facilities Division, Design & Construction

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:

SINGLE PRIME CONTRACT:

Base Bid: _____ Dollars(\$)

General Subcontractor:
_____ Lic _____

Plumbing Subcontractor:
_____ Lic _____

Mechanical Subcontractor:
_____ Lic _____

Electrical Subcontractor:
_____ Lic _____

GS143-128(d) requires all single prime bidders to identify their subcontractors for the above subdivisions of work. A contractor whose bid is accepted shall not substitute any person as subcontractor in the place of the subcontractor listed in the original bid, except (i) if the listed subcontractor's bid is later determined by the contractor to be non-responsible or non-responsive or the listed subcontractor refuses to enter into a contract for the complete performance of the bid work, or (ii) with the approval of the awarding authority for good cause shown by the contractor.

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" or "deducted from" the base bid. (Strike out "Add" or "Deduct" as appropriate.)

SCHEDULE OF ALTERNATES:

Alternate No. 1 Elevator Demolition:

Remove elevator cab, counterweights, rails, door frames, and doors. Remove elevator sump pump and all associated piping and controls.

(Add) *(Deduct)* _____ Dollars(\$)

Alternate No. 2 Demolition of North Entry:

Remove north entry doors, brick wall, ramp, and exterior stairs. Provide temporary partition.

(Add) *(Deduct)* _____ Dollars(\$)

Alternate No. 3 Demolition of Roof leaders and Storm Sewer System:

Demolish roof leaders and storm sewer system, and provide a temporary storm system until the changeover to the permanent new system occurs in future phases.

(Add) *(Deduct)* _____ Dollars(\$)

UNIT PRICES

Unit prices quoted and accepted shall apply throughout the life of the contract, except as otherwise specifically noted. Unit prices shall be applied, as appropriate, to compute the total value of changes in the base bid quantity of the work all in accordance with the contract documents.

GENERAL CONTRACT:

No. 1 (Brief Description) (Unit) Unit Price (\$)_____

PLUMBING CONTRACT:

No. 1 (Brief Description) (Unit) Unit Price (\$)_____

HVAC CONTRACT:

No. 1 (Brief Description) (Unit) Unit Price (\$)_____

ELECTRICAL CONTRACT:

No. 1 (Brief Description) (Unit) Unit Price (\$)_____

The bidder further proposes and agrees hereby to commence work under this contract on a date to be specified in a written order of the designer and shall fully complete all work thereunder within the time specified in the Supplementary General Conditions Article 23. Applicable liquidated damages amount is also stated in the Supplementary General Conditions Article 23.

MINORITY BUSINESS PARTICIPATION REQUIREMENTS

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

Note: Bidders must always submit **with their bid** the Identification of Minority Business Participation Form listing all MB contractors, vendors and suppliers that will be used. If there is no MB 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, 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:

(Proprietorship or Partnership)

By: _____

Signature

Name: _____

Print or type

Title _____

(Owner/Partner/Pres./V.Pres)

Address _____

ATTEST:

By: _____

Title: _____

(Corp. Sec. or Asst. Sec. only)

License No. _____

Federal I.D. No. _____

Email Address: _____

(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 THE UNIVERSITY OF NORTH CAROLINA
CONSTRUCTION CONTRACTS**

In accordance with G.S. 116-31.11 and G.S. 143-128.2 these guidelines establish goals for minority participation in single-prime bidding, separate-prime bidding, construction manager at risk, design-build, public-private partnership, and alternative contracting methods, on University of North Carolina construction projects in the amount of \$100,000 to \$4,000,000. The legislation provides that the State, including the University of North Carolina System, 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 State through The University of North Carolina, its constituent institutions, and/or affiliates (hereafter The University of North Carolina) as awarding authorities 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 business, minority person, and socially and economically disadvantaged individual - G.S. 143-128 (g) includes the following definitions. Any changes to G.S. 143-128 (g) are incorporated herein upon enactment:
 - (1) The term "minority business" means a business:
 - a. In which at least fifty-one percent (51%) is owned by one or more minority persons or socially and economically disadvantaged individuals, 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.
 - (2) The term "minority person" means 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, or the Pacific Islands;
 - d. American Indian, that is, a person having origins in any of the original Indian peoples of North America; or
 - e. Female.
 - (3) The term "socially and economically disadvantaged individual" means the same as defined in 15 U.S.C. 637.
2. Public Entity – The State of North Carolina and all public subdivisions and local governmental units.
3. Owner - The State of North Carolina, through the constituent institution named in the contract.

4. Designer – Any person, firm, partnership, or corporation, which has contracted with the State of North Carolina to perform architectural or engineering, work.
5. Bidder - Any person, firm, partnership, corporation, association, or joint venture seeking to be awarded a public contract or subcontract.
6. 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.
7. 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.
8. Subcontractor - A firm under contract with the prime contractor, construction manager at risk, design-builder, or private developer under public-private partnerships 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 University of North Carolina 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 University of North Carolina System Office: The University of North Carolina System Office 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 construction contracts within their awarding authority. The State through The University of North Carolina, reserves the right to reject any or all bids and to waive informalities.
 - b. Assisting constituent institutions in monitoring of contractors' compliance with minority business requirements in the contract documents during construction.
 - c. Consulting and advising institutions and affiliates regarding changes in HUB statutes, executive orders, or state procedures.
 - d. Resolving any protest and disputes arising on projects within The University of North Carolina System Office award authority.
3. Constituent Institutions and Affiliates of The University of North Carolina: Before awarding a contract, the constituent institution shall do the following:
- a. Implement The University of North Carolina 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 its efforts 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 to the University of North Carolina.
 - g. Evaluate documentation to determine good faith effort has been achieved for minority business utilization prior to recommendation of award to University of North Carolina.
 - 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, design-build, public-private partnership, 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), including the 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.
- f. Make documentation showing evidence of implementation of Designer’s responsibilities available for review by The University of North Carolina System Office and HUB Office, upon request.

5. Prime Contractor(s), CM at Risk, Design-Builder, Public-Private Partnership developer and Its First-Tier Subcontractors: Under all construction delivery 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. 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. 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.
- 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 Subcontractor responsibilities available for review by the University of North Carolina System Office 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 B) indicating bidder’s 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) and has all material and supplies required for the project. Bidder may be asked to provide additional documentation in support of the claim of self-performance and regarding the Good Faith Effort to utilize minority suppliers where possible. (2) 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; (3) if the percentage is not equal to the applicable goal, then documentation of all good faith efforts taken to meet the goal (Affidavit D). 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 for formal contracts (>\$500,000) as required in Article 31 of the General Conditions of the Contract to facilitate payments to the subcontractors.
- i. The contractor(s) on formal contracts (>\$500,000) shall submit with each monthly pay request(s) and final payment(s), “MBE Documentation for Contract Payment” – (Appendix E), for designer’s review. This documentation is also required for contracts under informal bidding, but these projects, typically of shorter duration, may have a single payment request at project completion.
- j. During the construction of a project, at any time, if it becomes necessary to replace a minority business subcontractor, immediately advise the owner, The University of North Carolina System Office, 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 that these requirements apply to all contractors and first tier subcontractor under any of the approved construction delivery methods permitted 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: EFFECTIVE DATE

These guidelines shall apply upon promulgation on university construction projects. Copies of these guidelines may be obtained from The University of North Carolina System Office
website:<https://www.northcarolina.edu/offices-and-services/finance-and-administration/capital-design-and-construction/>.

SECTION F: FORMS

In addition to these guidelines, there will be issued with each construction bid package provisions for contractual compliance providing MBE participation in State, through The University of North Carolina, 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 University of North Carolina 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 The University of North Carolina System Office website: <https://www.northcarolina.edu/offices-and-services/finance-and-administration/capital-design-and-construction/>

MINORITY BUSINESS SUBCONTRACT GOALS:

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

The bidder must identify on its bid (by using the "Identification of Minority Business Participation" form provided in the bid document), 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).

Failure to submit these documents is grounds for rejection of the bid. Bid amounts from rejected bids shall not be read aloud at public bid openings.

The lowest responsible, responsive bidder must provide:

Affidavit C, if the portion of work to be performed by minority firms is equal to or greater than 10% of the bidder's total contract price. Affidavit C includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, and lists the participating minority firms with the dollar value of their contracts.

OR

Affidavit D, if the portion of work to be performed by minority firms is less than 10% of the bidder's total contract price. Affidavit D includes a description of the portion of work to be executed by minority businesses, expressed as a percentage of the total contract price, lists the participating minority firms with the dollar value of their contracts, and must include adequate **documentation of Good Faith Effort**.

AND

Affidavit B (with bid), if the bidder does not customarily subcontract work on this type project and has all material and supplies required for the project. Bidder may be asked to provide additional documentation in support of the claim of self-performance and regarding the Good Faith Effort to utilize minority suppliers where possible.

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

Summary of required submissions: Use check boxes to assist in ensuring that all appropriate forms are submitted.

ALL BIDDERS MUST SUBMIT TWO FORMS WITH THEIR BID:

- “Identification of Minority Business Participation” form

AND EITHER

- Affidavit A – “Listing of Good Faith Efforts”

OR

- Affidavit B – “Intent to Perform Contract with Own Workforce”

The above information must be provided as required. Failure to submit these documents is grounds for rejection of the bid. Bid amounts from rejected bids shall not be read aloud at public bid openings.

=====
IN ADDITION, THE APPARENT LOWEST RESPONSIVE, RESPONSIBLE BIDDER SUBMITS:

- Affidavit C** – “Portion of the Work to be Performed by Minority Firms” if the percentage of work to be performed by minority firms is 10% or more. This form is to be submitted within 72 calendar hours of notification of being low bidder.

OR

- Affidavit D** – “Good Faith Efforts” if the percentage of work to be performed by minority firms is less than 10%. This form is to be submitted within 72 calendar hours of notification of being low bidder.

The above information is mandatory. 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 State (The University of North Carolina) 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 State (The University of North Carolina) 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 State (The University of North Carolina) whether to terminate the contract for breach.

In determining whether a contractor has made a Good Faith Effort, the University of North Carolina 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 were 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 HUB Certified/ Minority Business Participation

I, _____, do hereby certify that on
(Name of Bidder)

this project, we will use the following HUB Certified/ minority business as construction subcontractors, vendors, suppliers, or providers of professional services.

Firm Name, Address and Phone Number	Work Type	*Minority Category	**HUB Certified
			Y / N
			Y / N
			Y / N
			Y / N
			Y / N
			Y / N
			Y / N
			Y / N
			Y / N

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

** HUB Certification with the state HUB Office required to be counted toward state participation goals.

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

Attach to bid (as appropriate)

Attach to bid (as appropriate)

Attach to bid(as appropriate)

AFFIDAVIT A

Listing of Good Faith Efforts

(The University of North Carolina)

County of _____

Affidavit of _____

(Name of Bidder)

I have made a good faith effort to comply under the following areas checked:

Bidders must earn at least 50 points from the good faith efforts listed for their bid to be considered responsive.
(1 NC Administrative Code 30 I.0101)

- 1 – (10 pts)** 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 --(10 pts)** 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 – (15 pts)** Broken down or combined elements of work into economically feasible units to facilitate minority participation.
- 4 – (10 pts)** 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 – (10 pts)** Attended prebid meetings scheduled by the public owner.
- 6 – (20 pts)** Provided assistance in getting required bonding or insurance or provided alternatives to bonding or insurance for subcontractors.
- 7 – (15 pts)** 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 – (25 pts)** 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 – (20 pts)** 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 - (20 pts)** Provided quick pay agreements and policies to enable minority contractors and suppliers to meet cash-flow demands.

The undersigned, if apparent low bidder, will enter into a formal agreement with the firms listed in the Identification of Minority Business Participation schedule conditional upon scope of contract to be executed with the Owner. Substitution of contractors must be in accordance with GS143-128.2(d) Failure to abide by this statutory provision will constitute a breach of the contract.

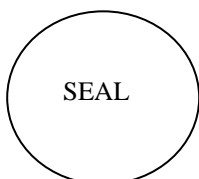
The undersigned hereby certifies that he or she has read the terms of the minority business commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20_____

Notary Public _____

My commission expires _____

Attach to bid (as appropriate)

Attach to bid (as appropriate)

Attach to bid (as appropriate)

AFFIDAVIT B
Intent to Perform Contract with Own Workforce
(The University of North Carolina)

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 Bidder agrees to make a Good Faith Effort to utilize minority suppliers where possible.

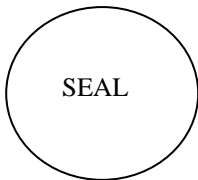
The undersigned hereby certifies that he or she has read this certification and is authorized to bind the Bidder to the commitments herein contained.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

Do not submit with bid

Do not submit with bid

Do not submit with bid

Do not submit with bid

AFFIDAVIT C

Portion of the Work to be Performed by HUB Certified/Minority Businesses (The University of North Carolina)

If the portion of the work to be executed by HUB certified/minority businesses as defined in GS143-128.2(g) and 128.4(a),(b),(e) is equal to or greater than 10% of the bidder's 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.

County of _____

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

_____ contract.
(Name of Project)

Project ID# _____ 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	**HUB Certified	Work Description	Dollar Value
		Y / N		
		Y / N		
		Y / N		
		Y / N		
		Y / N		
		Y / N		

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

** HUB Certification with the State HUB Office is required to be counted toward state participation goals.

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.

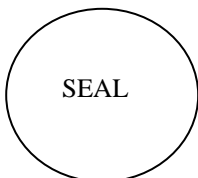
The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

AFFIDAVIT D
Good Faith Efforts
(The University of North Carolina)

This affidavit shall be provided by the apparent lowest responsible, responsive bidder within **72 hours** after notification of being low bidder.

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

County of _____

Affidavit of _____ I do hereby certify that on the

(Name of Bidder)

(Project Name)

Project ID# _____ Amount of Bid \$ _____

I will expend a minimum of _____% of the total dollar amount of the contract with HUB certified/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	**HUB Certified	Work Description	Dollar Value
		Y / N		
		Y / N		
		Y / N		
		Y / N		
		Y / N		

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

** HUB Certification with the State HUB Office required to be counted toward state participation goals.

Examples of documentation that may be required to demonstrate the Bidder's good faith efforts to meet the goals set forth in these provisions include, but are not necessarily limited to, the following:

- 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 business 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.

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.

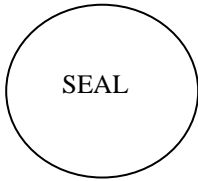
The undersigned hereby certifies that he or she has read the terms of this commitment and is authorized to bind the bidder to the commitment herein set forth.

Date: _____

Name of Authorized Officer: _____

Signature: _____

Title: _____



State of _____, County of _____

Subscribed and sworn to before me this _____ day of _____ 20____

Notary Public _____

My commission expires _____

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

**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.

MBE FIRM NAME	* INDICATE TYPE OF MBE	AMOUNT PAID THIS MONTH	TOTAL PAYMENTS TO DATE	TOTAL AMOUNT COMMITTED

* 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

Signature certifies that any minority firms not previously verified in the bid/award process have been appropriately verified, services have been rendered, and payment is due as processed.

FORM OF BID BOND

KNOW ALL MEN BY THESE PRESENTS THAT _____ as principal, and _____, as surety, who is duly licensed to act as surety in North Carolina, are held and firmly bound unto the State of North Carolina through _____ as obligee, in the penal sum of _____ DOLLARS, lawful money of the United States of America, for the payment of which, well and truly to be made, we bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

Signed, sealed and dated this ____ day of ____ 20__

WHEREAS, the said principal is herewith submitting proposal for and the principal desires to file this bid bond in lieu of making the cash deposit as required by G.S. 143-129.

NOW, THEREFORE, THE CONDITION OF THE ABOVE OBLIGATION is such, that if the principal shall be awarded the contract for which the bid is submitted and shall execute the contract and give bond for the faithful performance thereof within ten days after the award of same to the principal, then this obligation shall be null and void; but if the principal fails to so execute such contract and give performance bond as required by G.S. 143-129, the surety shall, upon demand, forthwith pay to the obligee the amount set forth in the first paragraph hereof. Provided further, that the bid may be withdrawn as provided by G.S. 143-129.1

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

_____(SEAL)

FORM OF CONSTRUCTION CONTRACT

(ALL PRIME CONTRACTS)

THIS AGREEMENT, made the _____ day of _____ in the year of 20__ by _____ and _____ between _____

hereinafter called the Party of the First Part and the *State of North Carolina, through the _____

_____ hereinafter called the Party of the Second Part.

WITNESSETH:

That the Party of the First Part and the Party of the Second Part for the consideration herein named agree as follows:

1. Scope of Work: The Party of the First Part shall furnish and deliver all of the materials, and perform all of the work in the manner and form as provided by the following enumerated plans, specifications and documents, which are attached hereto and made a part thereof as if fully contained herein: advertisement; Instructions to Bidders; General Conditions; Supplementary General Conditions; specifications; accepted proposal; contract; performance bond; payment bond; power of attorney; workmen's compensation; public liability; property damage and builder's risk insurance certificates; approval of attorney general; certificate by the Office of State Budget and Management, and drawings, titled:

Consisting of the following sheets:

Dated: _____ and the following addenda:

Addendum No. _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____ Addendum No. _____ Dated: _____

Addendum No. _____ Dated: _____ Addendum No. _____ Dated: _____

2. That the Party of the First Part shall commence work to be performed under this agreement on a date to be specified in a written order of the Party of the Second Part and shall fully complete all work hereunder within _____ consecutive calendar days

from said date. For each day in excess thereof, liquidated damages shall be as stated in Supplementary General Conditions. The Party of the First Part, as one of the considerations for the awarding of this contract, shall furnish to the Party of the Second Part a construction schedule setting forth planned progress of the project broken down by the various divisions or part of the work and by calendar days as outlined in Article 14 of the General Conditions of the Contract.

3. The Party of the Second Part hereby agrees to pay to the Party of the First Part for the faithful performance of this agreement, subject to additions and deductions as provided in the specifications or proposal, in lawful money of the United States as follows:

(\$ _____).

Summary of Contract Award:

4. In accordance with Article 31 and Article 32 of the General Conditions of the Contract, the Party of the Second Part shall review, and if approved, process the Party of the First Party's pay request within 30 days upon receipt from the Designer. The Party of the Second Part, after reviewing and approving said pay request, shall make payments to the Party of the First Part on the basis of a duly certified and approved estimate of work performed during the preceding calendar month by the First Party, less five percent (5%) of the amount of such estimate which is to be retained by the Second Party until all work has been performed strictly in accordance with this agreement and until such work has been accepted by the Second Party. The Second Party may elect to waive retainage requirements after 50 percent of the work has been satisfactorily completed on schedule as referred to in Article 31 of the General Conditions.

5. Upon submission by the First Party of evidence satisfactory to the Second Party that all payrolls, material bills and other costs incurred by the First Party in connection with the construction of the work have been paid in full, final payment on account of this agreement shall be made within thirty (30) days after the completion by the First Party of all work covered by this agreement and the acceptance of such work by the Second Party.

6. It is further mutually agreed between the parties hereto that if at any time after the execution of this agreement and the surety bonds hereto attached for its faithful performance, the Second Party shall deem the surety or sureties upon such bonds to be unsatisfactory, or if, for any reason, such bonds cease to be adequate to cover the performance of the work, the First Party shall, at its expense, within five (5) days after the receipt of notice from the Second Party so to do, furnish an additional bond or bonds in such form and amount, and with such surety or sureties as shall be satisfactory to the Second Party. In such event no further payment to the First Party shall be deemed to be due under this agreement until such new or additional security for the faithful performance of the work shall be furnished in manner and form satisfactory to the Second Party.

7. The Party of the First Part attest that it and all of its subcontractors have fully complied with all requirements of NCGS 64 Article 2 in regards to E-Verification as required by Section 2.(c) of Session Law 2013-418, codified as N.C. Gen. Stat. § 143-129(j).

IN WITNESS WHEREOF, the Parties hereto have executed this agreement on the day and date first above written in _____ counterparts, each of which shall without proof or accounting for other counterparts, be deemed an original contract.

Witness:

Contractor: (Trade or Corporate Name)

(Proprietorship or Partnership)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice Pres. only)

Attest: (Corporation)

By: _____

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

The State of North Carolina through*

(CORPORATE SEAL)

(Agency, Department or Institution)

Witness:

By: _____

Title: _____

FORM OF PERFORMANCE BOND

Date of Contract: _____

Date of Execution: _____

Name of Principal
(Contractor) _____

Name of Surety: _____

Name of Contracting
Body: _____

Amount of Bond: _____

Project

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind, ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body, identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of said contract during the original term of said contract and any extensions thereof that may be granted by the contracting body, with or without notice to the surety, and during the life of any guaranty required under the contract, and shall also well and truly perform and fulfill all the undertakings, covenants, terms, conditions and agreements of any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then, this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

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

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By: _____

Title: _____
(Owner, Partner, or Corp. Pres. or Vice
Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

FORM OF PAYMENT BOND

Date of Contract: _____
Date of Execution: _____
Name of Principal
(Contractor) _____
Name of Surety: _____
Name of Contracting
Body: _____
Amount of Bond: _____
Project _____

KNOW ALL MEN BY THESE PRESENTS, that we, the principal and surety above named, are held and firmly bound unto the above named contracting body, hereinafter called the contracting body, in the penal sum of the amount stated above for the payment of which sum well and truly to be made, we bind ourselves, our heirs, executors, administrators, and successors, jointly and severally, firmly by these presents.

THE CONDITION OF THIS OBLIGATION IS SUCH, that whereas the principal entered into a certain contract with the contracting body identified as shown above and hereto attached:

NOW, THEREFORE, if the principal shall promptly make payment to all persons supplying labor/material in the prosecution of the work provided for in said contract, and any and all duly authorized modifications of said contract that may hereafter be made, notice of which modifications to the surety being hereby waived, then this obligation to be void; otherwise to remain in full force and virtue.

IN WITNESS WHEREOF, the above-bounden parties have executed this instrument under their several seals on the date indicated above, the name and corporate seal of each corporate party being hereto affixed and these presents duly signed by its undersigned representative, pursuant to authority of its governing body.

Executed in _____ counterparts.

Witness:

(Proprietorship or Partnership)

Attest: (Corporation)

By: _____

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

(Corporate Seal)

Witness:

Countersigned:

(N.C. Licensed Resident Agent)

Name and Address-Surety Agency

Surety Company Name and N.C.
Regional or Branch Office Address

Contractor: (Trade or Corporate Name)

By: _____

Title _____
(Owner, Partner, or Corp. Pres. or Vice
Pres. only)

(Surety Company)

By: _____

Title: _____
(Attorney in Fact)

(Surety Corporate Seal)

Sheet for Attaching Power of Attorney

Sheet for Attaching Insurance Certificates

APPROVAL OF THE ATTORNEY GENERAL

**CERTIFICATION BY THE OFFICE OF STATE
BUDGET AND MANAGEMENT**

Provision for the payment of money to fall due and payable by the

under this agreement has been provided for by allocation made and is available for the purpose of carrying out this agreement.

This _____ day of _____ 20____.

Signed _____
Budget Officer