

SAGE HALL FOUNDATION WATERPROOFING

Project Manual & Specifications

March 8, 2023

Owner

**Cornell University
Ithaca, New York 14853**

Architect

**Mesick Cohen Wilson Baker Architects, LLP
388 Broadway
Albany, New York 12207**

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INSTRUCTIONS TO BIDDERS

Project: Sage Hall Foundation Waterproofing

Owner: Cornell University
Ithaca, New York 14853

Architect: Mesick, Cohen, Wilson, Baker Architects, LLP
388 Broadway
Albany, New York 12207

1. BID DOCUMENTS

The Bid Documents provided electronically by the Owner will consist of the following:

- (1) Instructions to Bidders.
- (2) Bid Proposal Certification Form.
- (3) General Conditions of the Contract and Division 1 - "General Requirements", and Supplemental Conditions.
- (4) Drawings and Specifications.
- (5) Addenda and/or bulletins issued prior to date of opening of Proposals.

Bid Documents are available electronically in the eBuilder Bid Portal under the Bid Package Invitation – Invitation Documents Tab.

Dataflow, Inc. maintains the current set of Documents and all addenda and is the contracted supplier for printed plans and specifications for this project. Contact Dataflow at CUProjects@goDataflow.com.

Bid Documents Terms of Use / Disclaimer - By accessing and/or using the Cornell University Document Files, You accept without limitation or qualifications, the following Terms of Use:

- a. Cornell University grants You the permission to use and view the Document Files subject to these Terms of Use.

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2. EXAMINATION OF SITE AND CONTRACT DOCUMENTS

- a. Each Bidder shall acquaint themselves with location conditions as they exist, as well as the character of the necessary work to be carried out under the proposed Contract. A Pre-Bid Zoom meeting will be scheduled and include: a review of project related information, an opportunity to ask and receive responses to Bidder questions, and make such inquiries as are necessary to fully understand the subject facilities, physical conditions and/or restrictions attendant to the work under the Contract.
- b. Boring information, water levels, indications of sub-surface conditions and similar information given on the Drawings or in the Specifications are furnished only for the convenience of the Bidders. The Owner, Architect and Consulting Engineer make no representation regarding the character and extent of the soil data or other sub-surface conditions to be encountered during the work and no guarantee as to the accuracy or validity of interpretation of such data or conditions is made or intended.
- c. Each Bidder shall also thoroughly examine and become familiar with the Drawings, Specifications and associated Bid Documents.
- d. By submitting a Bid, the Bidder covenants and affirms that the Bidder has carefully examined all of the Bid Documents including Drawings, Specifications, and the Addenda and Bulletins, if any, as well as posed any questions associated with the Site, and that Bidder is satisfied as to the nature and location of the work, the general and local conditions, and all matters which may in any way affect the work or its performance.

3. DISCREPANCIES

- a. Should a Bidder find discrepancies in or omissions from the Drawings, Specifications and associated Bid Documents, or be in doubt as to their meaning, Bidder shall at once enter the item in the Q&A Board of the eBuilder Bid Portal and an Addenda with written instructions will be sent to all bidders. Neither the Owner nor the Architect will be responsible for oral instructions. Every request for such interpretation should be in writing and entered into the eBuilder Bid Portal Q&A Board. Inquiries received in advance of the deadline established at the Pre-Bid conference will be given consideration.

4. PRE-BID CONFERENCE

- a. A pre-bid conference has been scheduled for 10:00 AM, March 30, 2023, in Room 133 of Humphreys Service Building or via Zoom at:

<https://cornell.zoom.us/j/93363321091?pwd=S25vNkVOT0JNTZMc3Y4S0FjalJVUT09&from=addon>

A Pre-bid walkthrough will follow, please meet at the west stair on Sage Avenue which is behind the building.

The Pre-Bid Conference is designed to assist Bidders in understanding the Contract Documents, the opportunity to pose clarifying questions or make inquiries regarding Contract Documents. Results will be published in an Addendum.

5. BID SUBMISSION

Bid Submissions must include the following:

- a. Base Bid entered into the eBuilder Portal broken down per the Bid Scope Tab Schedule of Values (Step 1: Bid Form of the Response Form tab).
- b. Additional Required Information:
 1. Bid Proposal Certification Form
 2. Bid Bond
 3. Bond Surety Company
 4. Bonding Rate for Change Orders
 5. Proposed Project Team and Resumes
 6. Proposed Project Schedule
 7. Substitutions
- c. Bid Proposal Certification Form: The Bid Proposal Certification Form shall be signed by the Principal(s) or Officer(s) legally authorized to bind the Bidder, and to execute such documents on behalf of their respective firms or organizations, and the Certificates included in the Bid Proposal Certification Form shall be completed accordingly. Bidder's legal name should be fully and accurately stated. Completed form shall be without interlineation, alterations, or erasures unless initialed and dated by the signer; Owner expressly reserves the right to accept or reject any or all bids, and to waive irregularities or informalities in its sole and reasonable discretion.

- d. Bid Bond: Each Bidder will be required to furnish a Bid Bond electronically via the eBuilder Bid Portal in the amount of 10% of the Bid Amount. Such Bid Bond shall guarantee that the Bidder will execute the Contract if it is awarded to him in conformity with his Proposal. Such Proposal Guarantee Bond shall include a statement that the Insurer shall, at the option of the Bidder, be willing to provide to the Bidder the Contract Bonds as described in 13 below.

6. SALES AND USE TAX EXEMPTION

- a. The Owner, Cornell University, a non-profit educational institution, is exempt from payment of certain Sales and Use Taxes.

7. FEDERAL EXCISE TAX

- a. The Owner, Cornell University, a non-profit educational institution, is exempt from payment of certain Federal Excise Taxes.

8. TAX EXEMPT STATUS

- a. Bidders shall inform all prospective subcontractors and suppliers from whom they expect to obtain proposals or quotations of the tax-exempt status of the Owner as set forth above and request that they reflect anticipated tax credits in their proposals or quotations.

9. EXEMPTION CERTIFICATES

- a. At the Contractor's request, following the award of a Contract, Contractor exempt purchase certificates will be furnished by the Owner to the Contractor with respect to such tax-exempt articles or transactions as may be applicable under the Contract.

10. TRADE SUBCONTRACTORS, MATERIAL SUPPLIERS

- a. Each portion of the work shall be performed by an organization equipped and experienced to do work in that particular field, and no portion of the work shall be reserved by the Bidder to himself unless he is so equipped and experienced. Subcontracts shall be awarded only to parties satisfactory to the Owner and the Architect. Each subcontractor and materials supplier shall be approved individually.
- b. In the spaces provided in the eBuilder Bid Portal Bid Scope form, the Bidder shall list all portions of the work he proposes to perform directly with his own forces.
- c. A list of names from which the Bidder proposes to select subcontractors, materials suppliers, and/or manufacturers for the principal trades or subdivisions of the work is required as part of the Proposal.
- d. In the Bid Scope Tab in the eBuilder Bid Portal, a list of the principal trades or subdivisions of the work for which such a listing is required, together with the provisions which govern the listing, selection and approval of principal subcontractors.

11. UNIT PRICES

The Bidder agrees, if awarded the Contract, to perform work "In addition to" or "deducted from" the scope of the Contract Documents as directed by the Owner and/or Architect, computed in accordance with the unit prices, which prices include all overhead, profit and other expense items in connection therewith, subject to the terms of the Contract Documents.

- a. Certain Unit Prices may be requested. If requested, a form will be attached to these instructions and will need to be completed and uploaded to the eBuilder Bidding Portal Response Form – Step 3 – Additional Required Information Custom Fields. All Bidders are required to bid on all Unit Prices without exception.
- b. All unit prices include the installation or omission, complete for each item, together with all work in connection therewith and shall include all shoring, bracing, dewatering and other incidental work.
- c. Unit prices shall be the total compensation for the item and includes all overhead, profit and any other charges of the Contractor and/or subcontractor in connection therewith.
- d. Adjustments will be computed on net variation of total quantities of like items.
- e. The Owner reserves the right to accept or reject any or all of the unit prices listed below prior to the execution of the Contract.

12. SUBSTITUTIONS

- a. Proposals shall conform to the requirements of the Bid Documents.
- b. The Bidder may offer substitutions for any item of material or equipment, element of work, or method of construction set forth in the Bid Documents, with the exception of Form of Contract, General Conditions and General Requirements - Division 1, are to be entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields by listing each proposed substitution, together with the amount to be deducted from the Base Bid if the substitution is accepted on the form supplied with these instructions. However, the Bidder is cautioned to make his base proposal on the materials and items specified by name or other particular reference.

13. ALTERNATE PROPOSALS

- a. Certain Alternate Proposals may be requested by the Owner and are included in the General Requirements. They will be listed in the Bid Scope Tab in the eBuilder Bid Portal. All Bidders are required to bid on all Alternates without exception.
- b. Alternate Proposals shall include all overhead, profit and other expenses in connection therewith.

14. METHOD OF SUBMISSION

- a. Base Bid shall be prepared and electronically submitted via the eBuilder Bid Portal. All required fields and attachments in the eBuilder Bid Portal must be completed.
- b. Bid Proposal Certification Form shall be prepared electronically submitted as an attachment via the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields.

- c. Completed and responsive Bid Proposals shall be submitted through the eBuilder Bid Portal no later than 2:00 PM on April 17, 2023.
- d. Bid Proposals shall not contain any recapitulation of the work to be done. No oral, written, electronic or telephonic proposals, or modifications will be considered.

15. BID OPENING

- a. Completed and responsive Bid Proposals will be opened electronically via eBuilder Bid Portal. Responsive Bid results will be posted to the Facilities Contracts website at: <https://finance.fs.cornell.edu/contracts/pob/projects.cfm> The Owner reserves the right to postpone the date and time of opening of proposals at any time prior to the date and time announced in this Instruction to Bidders or amendments thereto.

16. AWARD OF CONTRACT

- a. It is the intent of the Owner to enter into a Contract with one General Contractor for the entire project. All labor and services and materials and supplies, etc. are to be provided in accordance with the Contract.
- b. Award of the Contract shall be made to the bidder submitting the lowest responsive and responsible base bid who, in the opinion of the Owner, is qualified to perform the work. The competence and responsibility of the Bidders' proposed principal subcontractors will be considered in making the Award.
- c. The Owner reserves the right to reject any or all Proposals, and to waive any informalities in Bidding. Contract award shall be subject to approval of Cornell University's Contractors Qualification Statement.
- d. Bidder expressly warrants and commits that its Proposal shall remain unchanged and in full force and effect at the Owner's option for a period of not less than ninety (90) calendar days following the bid opening date.
- e. Bidders may submit, recall, modify, resubmit or withdraw their Bids through the eBuilder Bid Portal up until the Bid Due Date and Time.
- f. The Owner reserves the right to accept any of the Alternate Proposals listed within sixty (60) calendar days following the award of a construction contract or such other time as may be agreed to by the Owner and Contractor.

17. SCHEDULE OF VALUES

- a. The successful Bidder shall submit a complete "Schedule of Values" showing the amounts allocated to the various trades, suppliers, subcontractors, installers and General Contractor's work, aggregating the total sum of the Contract. If requested by the Owner or Architect, the complete "Schedule of Values" shall be submitted prior to award of Contract.

18. PERFORMANCE AND LABOR AND MATERIALS PAYMENT BONDS

Prior to commencement of on-site construction activities, the successful Bidder shall furnish the Owner with "Performance" and "Labor and Material Payment Bonds", each in the amount of 100% of the Contract Price. Each of these Bonds are to be in a form with such sureties as the Owner may approve. The cost of such bonds shall be included in the Bidders Proposal.

19. START OF WORK

- a. Work at the site shall be started within seven (7) calendar days from the date of issuance of written authorization to proceed and shall achieve substantial completion of the project no later than October 20, 2023.
 - 1. NOTE: Prior to commencement of any on-site construction activities, the successful Bidder shall:
 - i. Furnish the Owner with fully executed and satisfactory Payment and Performance bonds. No on-site construction activities may commence until executed and satisfactory bonds are in place for the subject project.
 - ii. Furnish the Owner with safety plan related to COVID-19 pandemic.
- b. The construction schedule and completion are critical. The Contractor shall provide adequate labor and equipment in the Bid to ensure that no slippage of the schedule will occur.

20. ADDENDA AND BULLETINS

- a. Bidders must acknowledge in Step 3 of the Bid Response in the eBuilder Bid Portal each Addendum and/or Bulletin issued during the bidding period.

21. REQUIRED POST-AWARD SUBMISSIONS BY THE APPARENT LOW BIDDER

- a. Within fourteen days after bid opening:
 - (1) Six-Month Workforce Projection
- b. Upon Execution of Contract:
 - (1) Insurance Certificate
 - (2) Performance Bond
 - (3) Labor and Material Payment Bond
 - (4) Schedule of Work (bar chart)
 - (5) Federal Tax Identification Number

END OF SECTION

SAGE HALL FOUNDATION WATERPROOFING

Cornell University, Ithaca, New York

BID PROPOSAL CERTIFICATION FORM

Vendor Name:	
Type of Firm, State of Incorporation if Applicable	
Street Address, City, State, Zip	

Having carefully examined the Instructions to Bidders, the "Conditions of the Contract" (General, Division 1 - "General Requirements"), Supplemental Conditions, the Drawings, Specifications and associated Bid Documents dated March 8, 2023 prepared by Mesick, Cohen, Wilson, Baker, LLP, 388 Broadway, Albany, New York 12207, as well as the premises and conditions affecting the work, proposes to furnish all material, equipment, labor, plant, machinery, tools, supplies, services, applicable taxes and specified insurance necessary to perform the entire work, as set forth in, and in accordance with the said documents.

1. Receipt of the Addenda to the Terms and Conditions, Drawings or Specifications has been acknowledged in the eBuilder Bid Portal.
2. Minority and Women's Business Enterprises (M/WBEs)

Facilities and Campus Services supports Cornell University's ongoing commitment to encourage business opportunities and diversity among its vendor community by promoting minority owned and controlled business' development as a shared responsibility. The University's intention is to create and expand opportunities for minority, women, veteran, LGBTQ, small and locally owned businesses through construction labor opportunities and the procurement of goods and services.

Positive good faith efforts to advance the University's objectives shall be made by all Contractors, engaging, and maximizing these diverse enterprise goals, and to positively drive Cornell's economic impact.

Cornell University Diversity Council Statement:

"Cultivate partnerships with the widest spectrum of Off-Campus entities and include a fully diverse range of Off-Campus participants in Cornell's events, contracts, services, and initiatives."

3. Milestone Dates
 - a. The undersigned agrees, if awarded the Contract, to commence work at the site within seven (7) calendar days after date of issuance of written notice to proceed and to achieve substantial completion of the project no later than October 20, 2023.
 - b. The Contractor shall provide adequate labor and equipment in the Bid to ensure that no slippage of the schedule will occur. Contractor shall attach a Project Duration Schedule to this form that meets the duration established.

- c. Following are additional Milestone Dates:

--

- a. The undersigned agrees, if awarded the Contract, to furnish a "Construction Progress Schedule" consistent with the agreed upon Construction Duration showing the starting and completion dates for all principal trades and subdivisions of the Work, together with such additional information related thereto as may reasonably be required. Such schedule shall be in conformance with General Requirements, Section 01 32 16, 1.3, A.

4. Proposed Principal Subcontractors

- a. The undersigned agrees, if awarded the Contract, to employ subcontractors from the list submitted in the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields subject to the following provisions:
- i. The Owner and Architect reserve the right to review the list of "Proposed Principal Subcontractors" prior to the award of the Contract, and to delete from it the name or names of any to whom they may have a reasonable objection. The Contractor may make the final selection of principal subcontractors at his option from the resulting list after the award of the Contract.

5. Contractor Team:

- a. The Owner reserves the right to reject the names of any Project Manager or Superintendent provide in the eBuilder Bid Portal submission to whom they have a reasonable objection.

6. Bonds

- a. Bid Bond. A Bid Bond in the amount of a minimum of 10% of Bid Amount is attached to the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields.
- b. Performance and Payment Bonds. Prior to commencement of any on-site construction activities, the undersigned expressly agrees if awarded the Contract, to deliver to Owner executed "Performance" and "Labor and Material Payment Bonds" in such forms as are acceptable to the Owner and in an amount equal to 100% of the Contract Sum.
- c. Such bonds will be furnished by the Surety entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields
- d. Bonding Rate for Change Orders has been entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields

7. Bid Scope - Schedule of Values

- a. The undersigned agrees, prior to the award of a construction contract and upon the request of the Architect or Owner, to submit a complete, itemized and detailed "Schedule of Values" including Alternates elected, if any, showing the amount allocated to the various trades and subdivisions of the work, aggregating to the total Contract Sum submitted in the eBuilder Bid Portal.

8. Substitutions

- a. The Base Bid is predicated on compliance with the Drawings and Specifications without substitutions.
- b. The Bidder may offer substitutions for any item noted in the Specifications, with the exception of Form of Contract, General Conditions and General Requirements - Division 1.
- c. Any Substitutions are to be entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields by listing each proposed substitution, together with the amount to be deducted from the Base Bid if the substitution is accepted.
- d. The Owner reserves the right to accept or reject any proposed substitution.
- e. The sum stated includes any modifications of work or additional work that may be required by reason of acceptance of substitution. Substitute materials must be approved and accepted by the Owner in writing before same may be used in lieu of those named in the Specifications.

9. Unit Price Schedule

- a. The undersigned agrees, if awarded the Contract, to perform work "In addition to" or "deducted from" the scope of the Contract Documents as directed by the Owner and/or Architect, computed in accordance with the unit prices form uploaded in the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields, which prices include all overhead, profit and other expense items in connection therewith, subject to the terms of the Contract Documents.
- b. All unit prices include the installation or omission, complete for each item, together with all work in connection therewith and shall include all shoring, bracing, dewatering and other incidental work.
- c. Adjustments will be computed on net variation of total quantities of like items.
- d. The Owner reserves the right to accept or reject any or all of the unit prices entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields prior to the execution of the Contract.

10. Acceptance

- a. The undersigned agrees that the amount submitted for the Base Bid and any Alternates and Unit Pricing along with the required attachments in the Response Form – Step 3 – Additional Required Information Custom Fields submitted in the eBuilder Bid Portal have been reviewed and are accurate.
- b. It is understood and agreed that the Owner expressly reserves the right to accept or reject any or all bids, and to waive irregularities or informalities in its sole and reasonable discretion.
- c. Upon acceptance of Bidder's Proposal, Bidder expressly agrees and affirms to hold its unchanged Bid Proposal for ninety (90) calendar days. The undersigned will execute an Agreement between Contractor and Owner, amended and/or supplemented, if required, in accordance with the Proposal as accepted. Nothing contained herein shall preclude Bidder and Owner from mutually agreeing upon a Contract based upon the unchanged Bid Proposal if the time elapsed from Award is in excess of ninety (90) calendar days.

- d. The undersigned acknowledges the following Addendum(s) (if applicable):

Addendum No. __ dated ____.

- e. It is understood and agreed that award of the Contract shall be made to the bidder submitting the lowest responsive and responsible bid who, in the opinion of the Owner, is qualified to perform the work.
- f. The undersigned agrees to furnish Owner satisfactory and executed Performance and Payment Bonds prior to the commencement of any Work on-site.
- g. The undersigned acknowledges as Contractor to be and remain exclusively in control of the Project site and Work, as well as the Project's Health & Safety Plan, measures, and/or protocols, for the duration of construction activities.
 - i. The undersigned acknowledges receipt of **Supplemental Conditions** to the Contract surrounding Contractor Response and Health & Safety Protocols for COVID-19, or other viral, bacterial, or microbial presence (as applicable).
 - ii. The undersigned acknowledges that no one will be permitted on the job site until the Health & Safety Plan has been submitted.
- h. Alternates:
 - 1. The undersigned, if awarded the Contract, proposes to perform work in addition to or in place of the scope of the work shown and specified herein associated with the Base Bid in accordance with the Alternate Proposals, which amounts are to be added or deducted to the amount of the Base Bid as indicated for the Alternates specified in Division 1 of the Specifications.

2. It is understood that the Owner reserves the right to accept or reject any of the Alternate Proposals provided in the eBuilder Bid Portal within sixty (60) calendar days following the award of a construction contract or such other time as may be agreed to by the Owner and Contractor.

The following documentation is required to be submitted electronically in the eBuilder Bidding Portal Response Form – Step 3 – Additional Required Information Custom Fields

- ☐ This Form with Proposed Milestone Schedule – signed and executed
- ☐ Bid Bond
- ☐ Proposed Project Team Resumes

(Bidder)

By: _____

Title: _____

Business Address: _____

Dated: _____

CERTIFICATE OF NON-COLLUSION

By submission of this bid, each bidder and each person signing on behalf of any bidder certifies, and in the case of a joint bid each party thereto certifies as to its own organization, under penalty of perjury, that to the best of its knowledge and belief:

a. The prices in this bid have been arrived at independently without collusion, consultation, communication, or agreement, for the purpose of restricting competition, as to any matter relating to such prices with any other bidder or with any competitor.

b. Unless required by law, the prices that have been quoted in this bid have not been knowingly disclosed, directly or indirectly, by the bidder and will not knowingly be disclosed by the bidder to any other bidder or any competitor prior to opening.

c. No attempt has been made or will be made by the bidder to induce any other persons, partnership, or corporation to submit or not submit a bid for the purpose of restricting competition.

(Bidder)

By: _____

Title: _____

Dated: _____

CERTIFICATE AS TO CORPORATE BIDDER

I, _____, certify that I am the
_____ of the Corporation named as Bidder within this Bid Form for General
Contractors; that _____, who signed said Bid Form on behalf of the
bidder was then _____ of said Corporation; that I know his signature; that
his signature thereto is genuine and that said Bid Form and attachments thereto were duly signed and
executed for and on behalf of said Corporation by authority of its governing body.

(Secretary-Clerk)

Dated: _____

GENERAL CONDITIONS

FOR

**SAGE HALL
FOUNDATION WATERPROOFING**

**CORNELL UNIVERSITY
ITHACA, NEW YORK**

GENERAL CONDITIONS

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EXHIBITS

A		Change Order Documentation Instructions
		Construction Contract Change Order Request
		Construction Contract Change Order Summary
B		Final Release
C		Guarantee
D	Form I	MWBE Utilization Plan
	Form II	Contractor's Affirmative Action Plan
	Form III	Affirmative Action Workforce Report
E		Labor Rate Breakdown
F		Stored Materials Invoicing Documentation
G		Contractor Performance Evaluation

ARTICLE 1 -- INTERPRETATION OF CONTRACT DOCUMENTS

Section 1.01 - Owner

A. The Owner is Cornell University as identified in the Agreement and referred to throughout the Contract Documents as the "Owner" or "Cornell University".

B. Ownership of Documents: All drawings, specifications, computations, sketches, test data, survey results, photographs, renderings and other material relating to the Work, whether furnished to or prepared by the Contractor, are the property of Cornell University. The Contractor shall use such materials or information therefrom only in connection with the Work of this Contract. When requested, the Contractor shall deliver such materials to Cornell University.

C. The Owner shall give all orders and directions contemplated under the Contract relative to the execution of the Work. The Owner shall determine the amount, quality, acceptability, and fitness of the Work and shall decide all questions which may arise in relation to said Work. The Owner's estimates and decisions shall be final except as otherwise expressly provided.

D. Any differences or conflicts concerning performance which may arise between the Contractor and other Contractors performing Work for the Owner shall be adjusted and determined by the Owner.

E. The table of contents, titles, captions, headings, running headlines, and marginal notes contained herein and in said documents is intended to facilitate reference to various provisions of the Contract Documents and in no way affect the interpretation of the provisions to which they refer.

Section 1.02 - Meaning and Intent of Specifications, Plans and Drawings

The meaning and intent of all specifications, plans and drawings shall be determined in a manner approved by the Owner.

Section 1.03 - Order of Precedence

A. Should a conflict occur in or between or among any parts of the Contract Documents that are entitled to equal preference, the more expensive way of doing the Work, the sounder technique or workmanship, or better quality or greater quantity of material shall govern, unless the Owner directs otherwise so directs in writing.

B. Drawings and specifications are reciprocal. Anything shown on the plans and not mentioned in the specifications, or mentioned in the specifications and not shown on the plans, shall have the same effect as if shown or mentioned in both.

C. Requirements of reference standards form a part of these specifications to the extent indicated by the reference thereto. When provisions of reference standards conflict with provisions in these specifications, the specifications shall govern.

ARTICLE 2 -- CONTRACTOR

Section 2.01 - Contractor's Obligations

A. The Contractor shall, in good workmanlike manner, perform all the Work required by the Contract within the time specified in the Contract. The Contractor shall comply with all terms of the Contract, and shall do, carry on, and complete the entire Work to the satisfaction of the Owner.

1. All labor for this project which is normally under the jurisdiction of one of the local unions as covered in the contract between the Tompkins-Cortland Building Trades Council, Maintenance Division and Cornell University shall be performed by Union labor.

B. The Contractor shall furnish, erect, maintain, and remove such construction plant and such temporary Work as may be required.

C. The Contractor shall provide and pay for all labor, material, tools, equipment, machinery, as well as utility connections, transportation, and all other facilities and services necessary for the proper execution and completion of the Work, except as otherwise specified elsewhere in the Contract Documents.

D. Whenever a provision of the Specifications conflicts with agreements or regulations in force among members of trade associations, unions, or councils which regulate or distinguish what work shall or shall not be included in the work of a particular trade, the Contractor shall make all necessary arrangements to reconcile such conflict without delay, damage, or cost to the Owner and without recourse to the Architect or the Owner. In case progress of the Work is affected by undue delay in furnishing or installing items of material or equipment required under the Contract because of a conflict involving such agreement or regulations, the Owner or the Architect may require that other material or equipment of equal kind and quality be provided at no additional cost to the Owner.

Section 2.02 - Contractor's Title to Materials

A. The Contractor warrants that the Contractor has full, good and clear title to all materials and supplies used by the Contractor in the Work, free from all liens, claims or encumbrances.

B. All materials, equipment and articles which become the property of the Owner shall be new unless specifically stated otherwise.

Section 2.03 - "Or Equal" Clause

A. Whenever a material, article or piece of equipment or method is identified on the plans or in the specifications by reference to manufacturers' or vendors' names, trade name, catalogue number, or make, no others or alternatives may be substituted. Any and all other "Or Equal" considerations will be handled under this Section in accordance with General Requirements, Section 01 25 00.

B. Where the Architect approves a product proposed by the Contractor and said proposed product requires a revision or redesign of any part of the Work covered by this Contract, or the Work covered by other contracts, all said revision(s) or redesign(s), and all new drawings and details required thereto shall be provided by the Contractor and shall be approved by the Architect. All time spent by the Architect or its agents to evaluate the proposed substitution and or necessary engineering cost to accommodate the requested change shall be reimbursed to the Owner by the Contractor via the Change Order procedure.

Section 2.04 - Quality, Quantity and Labeling

A. The Contractor shall furnish materials and equipment of the quality and quantity specified in the Contract. Unless otherwise provided, all materials and articles incorporated into the Work shall be new and of the most suitable grade of their respective kinds for the purpose. When required by the Contract Documents or when directed by the Owner, the Contractor shall supply the Owner's Representative, for their acceptance, full information concerning any material which the Contractor contemplates incorporating into the Work. Materials and articles installed or used without such acceptance shall be at the risk of subsequent rejection.

B. When materials are specified to conform to any standard, the Owner may require that the materials delivered to the Site shall bear manufacturer's labels stating that the materials meet said standards.

C. The above requirements shall not restrict or affect the Owner's right to test materials as provided in the Contract.

D. Whenever several alternative materials or items are specified by name or other particular reference for one use, the Owner's Representative may require the Contractor to submit in writing a list of the particular materials or items the Contractor intends to use before the Contract is executed.

Section 2.05 - Superintendence by Contractor

A. The Contractor shall employ a full-time effective, responsive and competent construction superintendent and necessary staff; the construction superintendent shall devote full time to the Work and shall have full authority to act for the Contractor at all times. The Contractor shall provide the Owner with the names and authority of such personnel in writing.

B. If at any time the superintendent is not satisfactory to the Owner, the Contractor shall, if requested by the Owner, replace said superintendent with another superintendent satisfactory to the Owner. There shall be no change in superintendent without the Owner's approval.

C. The Contractor shall remove from the Work any employee of the Contractor or of any Subcontractor when so directed by the Owner.

Section 2.06 - Subsurface or Site Conditions

A. The Contractor acknowledges that it has assumed the risk and that the Contract consideration includes such provision as the Contractor deems appropriate and adequate to account for all subsurface conditions as the Contractor could reasonably anticipate encountering from the provisions of the Contract Documents, borings, rock cores, topographical maps and such other information as the Owner made available to the Contractor or from their own inspection and examination of the site prior to the Owner's receipt of Contractor bids.

B. In the event that the Contractor encounters subsurface physical conditions at the site differing substantially from those shown on or described or indicated in the Contract Documents and which could not have been reasonably anticipated from the aforesaid information made available by the Owner or from the Contractor's inspection and examination of the site, the Contractor shall give immediate notice to the Owner of such conditions before they are disturbed. Such notice shall include probable cost and/or any impact to the Project Schedule. The Owner will thereupon promptly investigate the conditions and if Owner finds that they do substantially differ from that which should have been reasonably anticipated by the Contractor, the Owner shall make such changes in the drawings and specifications as may be necessary and a change order shall be issued.

Section 2.07 - Representations of Contractor

The Contractor represents and warrants:

A. That the Contractor is financially solvent, sufficiently stable to secure the required payment and performance bonds, and is sufficiently experienced in and competent to perform the subject Work or retain qualified subcontractors to perform elements of the Work pursuant to the Project's plans and specifications;

B. That the Contractor is familiar with all Federal, State, or other laws, ordinances, orders, building codes, rules and regulations, which may in any way affect the Work;

C. That any temporary and permanent Work required by the Contract can be safely and satisfactorily constructed.

D. That the Contractor has carefully examined the Contract and the Site of the Work and that, from the Contractor's own investigations is satisfied as to the nature and location of the Work, the character, quality and quantity of surface and subsurface materials likely to be encountered, the character of equipment and other facilities needed for the performance of the Work, accounted for weather days, the general and local conditions, and all other materials or items which may affect the Work. The Contractor has correlated those observations with the requirements of the Contract Documents and has made all other investigations essential to a full understanding of the Work and the difficulties which may be encountered in performing the Work.

Section 2.08 - Verifying Dimensions and Site Conditions

A. The Contractor shall take all measurements at the Site and shall verify all dimensions and site conditions at the Site before proceeding with the Work. If said dimensions or conditions are found to be in conflict with the Contract, the Contractor immediately shall refer said conflict to the Owner.

B. During the progress of Work, the Contractor shall verify all field measurements prior to fabrication of building components and equipment, and proceed with the fabrication to meet field conditions.

C. The Contractor shall consult all Contract Documents to determine exact location of all Work and verify spatial relationships of all Work. Any question concerning said location or spatial relationships shall be submitted in a manner approved by the Owner.

D. Specific locations for equipment, pipelines, ductwork and other such items of Work, where not dimensioned on plans, shall be determined in consultation with the Owner and other affected Contractors and Subcontractors.

E. The Contractor shall be responsible for the proper fitting of the Work in place.

F. Should Contractor's failure to perform services under this section result in additional costs to the Owner, the Contractor shall be responsible for such additional costs.

Section 2.09 - Copies of Contract Documents for Contractors

A. The Contractor will have access to view and download the Bid Documents in eBuilder.

B. All drawings, specifications, and copies thereof furnished by the Owner are the property of the Owner. They are not to be used on other work with the exception of the signed Contract Set, are to be returned to the Owner along with the As-Builts at the completion of the Work.

Section 2.10 - Meetings

The Contractor and all subcontractors as requested shall attend all meetings as directed by the Owner or the Owner's Representative.

Section 2.11 - Related Work

The Contractor shall examine the Contract for related work to ascertain the relationship of said work to the Work under the Contract.

Section 2.12 - Surveys and Layout

Unless otherwise expressly provided in the Contract, the Owner shall furnish the Contractor all surveys of the property necessary for the Work, but the Contractor shall lay out the Work.

Section 2.13 - Errors, Omissions or Discrepancies

The Contractor shall examine the Contract thoroughly before commencing the Work and report in writing any errors or discrepancies to the Owner or the Owner's Representative.

Section 2.14 - Project Labor Rates

The Contractor shall submit to the Owner, for review and approval, within thirty (30) days after Contract is awarded all trade labor rates inclusive of fringe benefits, taxes, insurance for the duration of the individual craft agreement in accordance with Exhibit. Revised rates shall be provided within thirty (30) days of signing any new agreements with the individual crafts during this project.

Section 2.15 – Daily Reports

The Contractor's Construction Superintendent shall submit a Daily Report to the Cornell University Project Manager or the Resident Field Engineer at the job site. Such reports shall, at a minimum, contain the following information:

- Name of Project
- Project Number
- Date of Report
- Weather Conditions
- Equipment on the site
- Contractors on site including name and number of employees on site for each contractor
- Work/area and activity for each contractor
- Overtime worked and planned work progress
- Environmental problems and corrections
- Other information, such as special events, occurrences, materials delivered, accidents or injuries, recommendations, suggestions, visitors, inspections, equipment start-up and check out, occupancy, etc.

ARTICLE 3 -- INSPECTION AND ACCEPTANCE

Section 3.01 - Access to the Work

The Owner and Architect, or their duly authorized representatives, assistants, or inspectors shall at all times and for any purpose have access to the Work and the premises used by the Contractor, and the Contractor shall provide safe and proper facilities therefor. In addition, the Contractor shall, whenever so requested, give the Owner and Architect or their duly authorized representatives access to the proper invoices, bills of lading, specifications, etc., which may be required in determining the adequacy and/or quantity of materials used in completion of the Work.

Section 3.02 - Notice for Testing

If the Contract Documents, laws, ordinances, rules, regulations, or orders of any public authority having jurisdiction require any Work to be inspected, tested, accepted, or approved, the Contractor shall give the Owner timely notice of its readiness and of the date arranged so the Owner may observe such inspection, testing, or approval. The Contractor shall bear all costs of such inspection, tests, and approvals unless otherwise provided.

Section 3.03 - Inspection of Work

A. The Contractor will cooperate in all ways to facilitate the inspection and examination of the Work. The inspections and examinations will be carried out in such a manner that the Work will not be delayed.

B. All Work, all materials whether or not incorporated in the Work, all processes of manufacturer, and all methods of construction shall be, at all times and places, subject to the inspection of the Owner and the Owner shall be the final judge of the quality and suitability of the Work. Any Work not approved by the Owner shall immediately be reconstructed, made good, replaced or corrected by the Contractor including all Work of other Contractors destroyed or damaged by said removal or replacement.

C. Required certificates of inspection, testing, acceptance, or approval shall be secured by the Contractor and promptly delivered to the Owner.

Section 3.04 - Inspection and Testing

All materials and equipment used in the Work shall be subject to inspection and testing in accordance with accepted standards to establish conformance with specifications and suitability for uses intended, unless otherwise specified in the Contract. If any Work shall be covered or concealed without the approval or consent of the Owner, said Work shall, if required by the Owner, be uncovered for examination. If any test results are below specified minimums, the Owner may order additional testing. The cost of said additional testing, any additional professional services required, and any other expenses incurred by the Owner as a result of said additional testing shall be paid by the Contractor. Reexamination of any part of the Work may be ordered by the Owner, and if so ordered the Work must be uncovered by the Contractor. If said Work is found to be in accordance with the Contract, the Owner shall pay the cost of reexamination and replacement. If said Work is found not to be in accordance with the Contract, the Contractor shall pay the cost of reexamination and replacement.

Section 3.05 - Defective or Damaged Work

If, in the opinion of the Owner, it is undesirable to replace any defective or damaged materials or to reconstruct or correct any portion of the Work injured or not performed in accordance with the Contract Documents, the compensation to be paid to the Contractor shall be reduced by an amount which, in the judgment of the Owner, shall be deemed to be equitable.

Section 3.06 - Acceptance

No previous inspection shall relieve the Contractor of the obligation to perform the Work in accordance with the Contract Documents. No payment, either partial or full, by the Owner to the Contractor shall excuse any failure by the Contractor to comply fully with the Contract Documents. The Contractor shall remedy all defects, paying the cost of any damage to other Work resulting therefrom.

ARTICLE 4 -- CHANGES IN WORK

Section 4.01 - Changes

A. The Owner, without invalidating the Contract, may order and approve changes within the general scope of the Contract and the Contractor shall promptly comply with such change orders.

B. A change order is a written direction to the Contractor signed by the Owner, issued after execution of the Contract, authorizing a change in the Work, extra work, or an adjustment in the Contract price or time of performance.

C. No claims for changes, extra work or additional time to complete the Contract or an adjustment in the Contract price shall be allowed unless such change is ordered in writing by the Owner.

D. The Owner shall determine the amount by which the Contract consideration is to be increased or decreased by a change order by one (1) or more of the following methods:

1. By agreement with the Contractor.
2. By applying the applicable price or prices previously bid and approved.
 - (i) To the extent that Unit Prices are applicable, as determined by the Owner, work shall be priced and paid for or credited in accordance with such Unit Prices; except that a Unit Price shall not apply to any portion of work which is either reduced or increased by more than 25%. Said Unit Prices shall be valid for the duration of the project as applicable, unless stipulated elsewhere in the Contract Documents.
 - (ii) For Unit Price items, additions and deletion of like items shall be algebraically summed and then multiplied by the applicable Unit Prices. For Direct Labor and Material items, all additions and deletions shall be algebraically summed for each subcontractor and then multiplied by the applicable markup.
 - (iii) Unit Prices are for work complete, measured in place and cover profit and all other costs and expenses. Unit Prices include, without limit, all conditions of the contract and all general requirements such as layout, reproduction of Drawings and Specifications, testing and inspection, shop drawing and sample coordination, supervision (field and home office), small tools and expendable items, insurance, taxes, temporary facilities and services, including access and safety, "as-built" drawings, and general and administrative overhead and profit.

3. By estimating the fair and reasonable cost of:
 - (i) Labor, including all wages, required wage supplements and insurance required by law paid to employees below the rank of superintendent directly employed at the Site.
 - (ii) Materials
 - (iii) Equipment, excluding hand tools, which in the judgment of the Owner, would have been or will be employed exclusively and directly on the Work. When submitting change orders, equipment which is common to the project scope at hand is expected to be previously paid for as overhead / general conditions to the project. Special rental equipment or tools not common to the project that are required to perform the change order will be accepted as additional costs.
4. By determining the actual cost of the extra work in the same manner as in Subsection 3 except the actual costs of the Contractor shall be used in lieu of estimated costs.

E. Mark-up Percentages

1. Work performed by the Contractor: Where the Work is performed directly by the Contractor by adding to the total of such estimated costs a sum equal to fifteen percent (15%) thereof.
2. Work performed by a Subcontractor: Where the change order work is performed by a Subcontractor under contract with the Contractor, by adding a sum equal to fifteen (15%) of said costs for the benefit of said Subcontractor, and by adding for the benefit of the Contractor an additional sum equal to ten percent (10%) of said costs.
3. Work performed by a Sub-Subcontractor: Where work is performed by a Sub-Subcontractor, by adding the sum equal to fifteen percent (15%) of said costs for the benefit of said Sub-Subcontractor, by adding for the benefit of the Subcontractor an additional sum equal to five percent (5%) of said cost and by adding for the benefit of the Contractor an additional sum equal to five percent (5%) of said cost. The maximum aggregate of all mark-up percentages may not exceed twenty five percent (25%).
4. No Markup on Bonds and Insurance Costs: Change Order cost adjustments due to increases or decreases in bond or insurance costs (if applicable) shall not be subject to any Markup Percentage.
5. Overtime Pay: No mark-up shall be paid on the premium portion of overtime pay.

6. Direct and Indirect Costs Covered by Markup Percentages: As a further clarification, the agreed upon Markup Percentage is intended to cover the Contractor's profit and all indirect costs and expenses associated with the change order work. Items intended to be covered by the Markup Percentage include, without limit: home office expenses, branch office and field office overhead expense of any kind; project management; superintendents, general foremen; estimating, engineering; coordinating; expediting; purchasing; detailing; legal, accounting, data processing or other administrative expenses; reproduction of drawings and specifications; shop drawings and sample coordination; "as-built" drawings; permits; auto insurance and umbrella insurance; pick-up truck costs; parking permits; cellular phones; testing and inspection; temporary facilities; access and safety provisions; and warranty expense costs. The cost for the use of small tools and/or tools already in use on site are also to be considered covered by the Markup Percentage. Small tools shall be defined as tools and equipment (power or non-power) with an individual purchase cost of less than \$750
7. Deduct Change Orders and Net Deduct Changes: The application of the markup percentage will apply to both additive and deductive change orders. In the case of a deductive change order, the credit will be computed by applying the percentage so that a deductive change order would be computed in the same manner as an additive change order. In those instances where a change involves both additive and deductive work, the additions and deductions will be netted and the markup percentage adjustments will be applied to the net amount

F. Regardless of the method used by the Owner in determining the value of a change order, the Contractor, within thirty (30) calendar days after a request for the estimate of value shall submit to the Owner a detailed breakdown of the Contractor's estimate, including all subcontractors details, of the value of the Change Order Work, in the format detailed in Exhibit A. Each submission shall include an electronic .pdf format of all documentation.

G. Unless otherwise specifically provided for in a change order, the compensation specified therein includes and shall constitute a full payment for both the Work covered or arising from the order and for any damage or expense incurred by the Contractor by any delays, including any and all impacts, known or unknown, or delays to other Work to be done under the Contract resulting from said change order. The Contractor expressly waives all rights to any other compensation for said damage or expense.

H. The Contractor shall furnish satisfactory bills, payrolls and vouchers covering all items of cost and when requested by the Owner shall give the Owner access to accounts and records relating thereto.

Section 4.02 – Claims for Extra Work

If the Contractor claims (i) that any work it has been ordered to do is extra work or (ii) that it has performed or is going to perform extra work or (iii) that any action or omission of the Owner or the Architect is contrary to the terms and provisions of the Contract, the Contractor shall:

- A. Promptly comply with such order;
- B. Notwithstanding the provisions of this Agreement, Article 4 of these General Condition and any other provisions of the Contract documents to the contrary, file with the Owner, within fourteen (14) calendar days after being ordered to perform the work claimed by it to be extra work or within fourteen (14) calendar days after commencing performance of the extra work, whichever date shall be the earlier, or within fourteen (14) calendar days after the said action or omission on the part of the Owner or the Architect occurred, a written notice of the basis of its claim and request a determination thereof;
- C. Notwithstanding the provisions of this Agreement and any other provisions of the Contract documents to the contrary, file with the Owner, within thirty (30) calendar days after said alleged extra work was required to be performed or said alleged extra work was commenced, whichever date shall be the earlier, or said alleged action or omission by the Owner or the Architect occurred, a verified detailed statement, with documentary evidence, of the items and basis of its claim;
- D. Produce for the Owner's examination, upon notice from the Owner, all its books of account, bills, invoices, payrolls, subcontracts, time books, progress records, daily reports, bank deposit books, bank statements, checkbooks and cancelled checks, showing all of its actions and transactions in connection with or relating to or arising by reason of its claim, and submit persons in its employment and in its subcontractors' employment for examination under oath by any person designated by the Owner to investigate any claims made against the Owner under the Contract, such examination to be made at the offices of the Contractor; and
- E. Proceed diligently, pending and subsequent to the determination of the Owner with respect to any such disputed matter, with the performance of the Contract and in accordance with all instructions of the Owner and the Architect.
- F. The Contractor's failure to comply with any or all parts of Section 4.02 shall be deemed to be: (i) a conclusive and binding determination on its part that said order, work, action or omission does not involve extra work and is not contrary to the terms and provisions of the Contract; and (ii) a waiver by the Contractor of all claims for additional compensation or damages as a result of said order, work, action or omission. The provisions of Section 4.02 is to promptly afford the Owner opportunity to cancel or revise any order, change its plans, mitigate or remedy the effects or circumstances giving rise to a claim or take such other action as may seem desirable and to verify any claimed expenses or circumstances as they occur. Compliance with such provisions is essential whether or not the Owner is aware of the circumstances of any order or other circumstances which might constitute a basis for a claim and whether or not the Owner has indicated it will consider a claim in connection therewith.
- G. No person has power to waive or modify any of the foregoing provisions and, in any action against the Owner to recover any sum in excess of the sum certified by the Owner to be due under or by reason of the Contract, the Contractor must allege in its complaint and prove compliance with the provisions of this Section.

Section 4.03 - Form of Change Orders

All change orders shall be processed, executed and approved via the Owner's E-Builder Change Order Process. No payment for change order Work shall be due the Contractor unless a change order has been issued and approved as noted above and processed via E-Builder.

ARTICLE 5 -- TIME OF COMPLETION

Section 5.01 - Time of Completion

A. The Work shall be commenced at the time stated in the written order of the Owner and shall be completed no later than the dates of completion specified in the Contract. All required overtime to maintain progress schedule is included in the Base Bid.

B. The date of beginning and the times for completion of the Work, as specified in the Contract, are essential conditions of the Contract.

C. The Work shall be prosecuted diligently at such rate of progress as shall insure substantial and full completion within the time specified. It is expressly understood and agreed, that the times for the completion of the Work described herein is a reasonable time, taking into consideration the average climatic range and usual business and labor conditions prevailing in the locality of the Site.

D. Time is of the essence on each and every portion of the Work. In any instance in which additional time is allowed for the completion of any Work, the new time of completion established by said extension shall be of the essence. If in the Architect's or Owner's judgment, it becomes necessary at any time during construction to accelerate and/or complete certain areas of the project, the Contractor shall concentrate efforts and manpower on designated areas.

E. Where Work occurs within occupied areas, perform same only on the approved schedule, so as not to interfere with normal operation of occupied areas.

F. The Contractor shall not be charged with damages or any excess cost if the Owner determines that the Contractor is without fault and the Contractor's reasons for the time extension are acceptable to the Owner. The Contractor shall not be charged with damages or any excess cost for delay in completion of the work if the Owner determines that the delay is due to:

1. any preference, priority or allocation order duly issued by the Government of the United States or the State of New York;
2. unforeseeable cause beyond the control and without the fault or negligence of the Contractor, and approved by the Owner, including, but not limited to, acts of God or of public enemy, acts of the Owner, fires, epidemics, quarantine, restrictions, strikes, freight embargoes and unusually severe weather.

G. The time for completion can only be extended by change order and may be extended for:

1. all of the Work, or
2. only that portion of the Work altered by the change order.

H. Any claim for extension of time shall be made in writing to the Owner not more than ten (10) days after the commencement of the delay; otherwise it shall be waived.

ARTICLE 6 -- TERMINATION

Section 6.01 - Termination for Cause

In the event that any provision of this Contract is violated by the Contractor or by any Subcontractor of the Contractor, the Owner may serve written notice upon the Contractor, and upon the Contractor's surety, if any, of the Owner's intention to terminate the Contract. The notice shall briefly state the reasons for the termination and shall specify a termination date. If arrangements satisfactory to the Owner are not made to remove and remedy the violation, the Contract shall terminate upon the date specified by the Owner in the notice. In the event of termination, the Owner may take over and complete the Work at the expense of the Contractor. The Contractor and Contractor's surety shall be liable to the Owner for all costs thereby incurred by the Owner. In the event of such termination the Owner may take possession of and may utilize such materials, appliances, and plant as may be located on the Site and which may be necessary or useful in completing the Work.

Section 6.02 - Termination for Convenience of Owner

The Owner, at any time, may terminate the Contract in whole or in part. Any said termination shall be effected by delivering to the Contractor a notice of termination specifying the extent to which performance of Work under the Contract is terminated and the date upon which said termination becomes effective. Upon receipt of the notice of termination, the Contractor shall act promptly to minimize the expenses resulting from said termination. The Owner shall pay the Contractor for costs actually incurred by the Contractor up to the effective date of said termination, but in no event shall the Contractor be entitled to compensation in excess of the total consideration of the Contract. In the event of said termination the Owner may take over the Work and prosecute same to completion.

Section 6.03 - Owner's Right to do Work

The Owner may, after notice to the Contractor, without terminating the Contract and without prejudice to any other right or remedy the Owner may have, perform or have performed by others all of the Work or any part thereof and may deduct the cost thereof from any monies due or to become due the Contractor.

ARTICLE 7 -- DISPUTES

Section 7.01 - Disputes Procedure

A. If the Contractor claims that any Work which the Contractor has been ordered to perform will be Work which should have been authorized or directed by change order, or that any action or omission of the Owner is contrary to the terms of the Contract, the Contractor shall:

1. File a notice with the Owner which sets forth the basis of the Contractor's claim and requests a resolution of the dispute. Such notice shall be filed within fifteen (15) working days after being ordered to perform the disputed work or within fifteen (15) working days after commencing performance of the disputed work, whichever is earlier, or within fifteen (15) working days after the act or omission of the Owner which the Contractor claims is contrary to the terms of the Contract.
2. Proceed diligently with the performance of the work in accordance with the instructions of the Owner pending the resolution of the dispute by the Owner.
3. Promptly comply with the order of the Owner regarding the disputed matter.
4. Any such decision, or any other decision of the Owner in respect to a dispute, shall be final unless the Contractor, within ten (10) working days after such decision, shall deliver to the Owner a verified written statement which sets forth the Contractor's contention that the decision is contrary to a provision of the contract. Pending the decision of the Owner, the Contractor shall proceed in accordance with the original decision. The Owner shall determine the validity of the Contractor's claim and such determination shall be final. The Contractor may file a notice with the Owner reserving its rights in connection with the dispute but shall comply with the Owner's decision and complete the work as directed.

B. No claim for additional costs regarding changed or extra work shall be allowed unless the work was done pursuant to a written order of the Owner.

C. The value of claims for extra work, if allowed, shall be determined by the methods described in the Contract. Refer to Article 4 of these General Conditions.

D. The Contractor's failure to comply with any or all parts of Article 7 shall be deemed to be:

1. a conclusive and binding determination on the part of the Contractor that the order, work, action or omission is not contrary to the terms and provisions of the Contract;
2. a waiver by the Contractor of all claims for additional compensation, known or unknown, including time extensions, or damages as a result of said order, work, action, or omission.

ARTICLE 8 -- SUBCONTRACTS

Section 8.01 - Subcontracting

- A. The Contractor may utilize the services of Subcontractors.
- B. The Contractor shall submit to the Owner, in writing, the name of each proposed Subcontractor and Sub-Subcontractor, as required by the Contract. The Contractor shall not award any Work to any Subcontractor or Sub-Subcontractor without the prior written approval of the Owner.
- C. The Contractor shall be fully responsible for the Work, acts and omissions of Subcontractors, and of persons either directly or indirectly employed by Subcontractors.
- D. The Contractor shall cause appropriate provisions to be inserted in all subcontracts relative to the Work to bind Subcontractors to the Contractor by the terms of the Contract insofar as applicable to the Work of Subcontractors, indemnification and to give the Contractor the same power to terminate any subcontract that the Owner may exercise over the Contractor.
- E. The Contractor's use of Subcontractors shall not diminish the Contractor's obligation to complete the Work in accordance with the Contract. The Contractor shall control and coordinate the Work of Subcontractors.
- F. Nothing contained in the Contract shall create any contractual relationship between Subcontractors and the Owner.

ARTICLE 9 -- COORDINATION AND COOPERATION

Section 9.01 - Cooperation with Other Contractors

- A. Normally, the Work will be performed by a single Contractor. However, the Owner reserves the right to perform work related to the Work with its own forces or award separate contracts. In that event, the Contractor shall coordinate its operations with the Owner's forces or separate Contractors.
- B. The Owner cannot guarantee the responsibility, efficiency, unimpeded operations or performance of any contractor. The Contractor acknowledges these conditions and shall bear the risk of all delays including, but not limited to, delays caused by the presence or operations of other contractors.
- C. The Contractor shall keep informed of the progress and workmanship of other contractors and shall notify the Owner immediately of lack of progress or defective workmanship on the part of other contractors where said delay or defective workmanship may interfere with the Contractor's operations.
- D. Failure of a Contractor to keep so informed and failure to give notice of lack of progress or defective workmanship by others shall be construed as acceptance by the Contractor of said progress and workmanship as being satisfactory for proper coordination with the Work.

E. If the Contractor notifies the Owner, in writing, that another contractor on the Site is failing to coordinate the work of said contractor with the Work, the Owner shall investigate the charge. If the Owner finds it to be true, the Owner shall promptly issue such directions to the other contractor with respect thereto as the situation may require. The Owner shall not be liable for any damages suffered by the Contractor by reason of the other contractor's failure to promptly comply with the directions so issued by the Owner, or by reason of another contractor's default in performance.

F. If the Owner shall determine that the Contractor is failing to coordinate the Work with the work of other contractors as the Owner has directed:

1. the Owner shall have the right to withhold any payments due under the Contract until the Owner's directions are complied with by the Contractor; and
2. the Contractor shall indemnify and hold the Owner harmless from any and all claims or judgments for damages and from any costs or damages to which the Owner may be subjected or which the Owner may suffer or incur by reason of the Contractor's failure promptly to comply with the Owner's directions.

G. Should the Contractor sustain any damage through any act or omission of any other contractor having a contract with the Owner or through any act or omission of any Subcontractor of said other contractor, the Contractor shall have no claim against the Owner for said damage.

H. Should any other contractor having a Contract with the Owner sustain damage through any act or omission of the Contractor or its Subcontractor, the Contractor shall reimburse said other contractor for all said damages and shall indemnify and hold the Owner harmless from all said claims.

ARTICLE 10 -- PROTECTION OF RIGHTS, PERSONS AND PROPERTY

Section 10.01 - Accidents and Accident Prevention

A. The Contractor shall at all times take reasonable precautions for the safety of persons engaged in the performance of the Work. The Contractor shall comply fully with all applicable provisions of federal, state, and local law. The Contractor alone shall be responsible for the safety, efficiency and adequacy of the Contractor's Work, plant, appliances and methods, and for any damage which may result from the failure or the improper construction, maintenance, or operation of said Work, plant, appliances and methods.

B. The Contractor shall maintain an accurate record of all cases of death, occupational disease, public health statistics or information, and injury requiring medical attention, pursuant to government authority, or causing loss of time from work, arising out of or in the course of employment on Work under the Contract, and shall immediately notify the Owner in writing of any injury which results in hospitalization or death, or significant near miss incidents that had the potential to result in serious injury or death. The Contractor shall upload all completed Contractor and Subcontractor incident investigation forms and reports within five (5) working days of the incident. The report shall include the extent of damage or injury, the persons involved and their employers, the number of days persons are hospitalized, and any other pertinent information required by Cornell University. Such reporting shall be submitted on the e-Builder Accident Form.

C. The Contractor shall provide to the Project Manager, Material Safety Data Sheets (OSHA Form 20 or the equivalent) for all chemicals to be used on site. All chemicals requiring any precautionary measures (e.g., special storage or disposal requirements, personal protective equipment, or additional ventilation), shall be brought to the attention of Cornell University for review and approval, prior to their use on site.

1. All chemicals brought on site by the Contractor shall be clearly labeled. The label shall state the identity of the chemical, any associated hazards, and the Contractor's name.
2. All Contractor employees who are using chemicals shall be made aware of the hazards associated with their use. Safe chemical handling procedures in accordance with OSHA or other governmental agencies, and manufacturer's recommendations shall be used at all times.
3. The Contractor shall dispose of all chemicals in accordance with EPA and Cornell University requirements, regardless of the size of the container or the quantity of waste, and must receive prior approval of Cornell University.
4. A Contractor's Waste Material Disposal Plan form is required (with or without waste) to be submitted with submission of the first payment. The form can be found at:
<https://ehs.cornell.edu/sites/default/files/FRM-CWMDP-Contractor-Waste-Material-Disposal-Plan-IPDF.pdf>

D. The Contractor shall be responsible for the initiation, maintenance and supervision of safety precautions and programs in connection with the Work.

E. The Contractor shall, at all times, guard the Owner's property from injury or loss in connection with the Work. The Contractor shall, at all times, guard and protect the Contractor's Work. The Contractor shall replace or make good any said loss or injury unless said loss or injury is caused directly by the Owner.

F. The Contractor shall have full responsibility to install, protect and maintain all materials and supplies in proper condition and forthwith repair, replace and make good any damage thereto until Final Acceptance.

Section 10.02 - Adjoining Property

A. The Contractor shall be required to protect all the adjoining property and to repair or replace any such properties damaged or destroyed by the Contractor, its employees or subcontractors thereof, by reason of, or as a result of activities under, for or related to the Contract.

Section 10.03 - Emergencies

A. In case of an emergency which threatens loss or injury to persons or property, the Contractor will be allowed to act, without previous instructions from the Owner, in a diligent manner, to the extent required to avoid or limit such loss or injury, and the Contractor shall notify the Owner immediately thereafter of the action taken.

Section 10.04 - Bonds

A. Before commencing the performance of any work covered by the Contract, the Contractor shall furnish to the Owner any required Bonds. The failure of the Contractor to supply the required Bonds within ten (10) days after the Contract signing shall constitute a default on the part of the Contractor.

Section 10.05 - Risks Assumed by the Contractor

A. Indemnification. The Contractor shall defend, indemnify and hold harmless the Owner and its trustees, officers, agents and employees from and against all claims, damages, losses, fines, and expenses, including reasonable attorneys' fees, arising out of or resulting from the performance of the Work including, but not limited to, bodily or personal injury, sickness, disease, death, or injury or damage to tangible property, to the extent they arise out of or result from:

1. any negligent act or omission, or intentional or willful misconduct, violation of law, or breach of this Contract by the Contractor, or any of its subcontractors, anyone directly or indirectly employed by any of them, or anyone for whose acts any of them may be liable, or
2. any injury to an employee of the Contractor, its subcontractors, anyone directly or indirectly employed by them. The indemnification obligation under this section shall not be limited by the amount or type of damages, compensation or benefits payable by or for the Contractor under workers' compensation, disability benefit or other employee benefit laws.

B. In the event that Contractor is requested but refuses to fully comply with and honor its indemnification obligations hereunder, then the Contractor shall, in addition to all other obligations, pay the cost, including reasonable attorneys' fees, of bringing an action to enforce such indemnification obligations.

C. Neither the Owner's final acceptance of the work to be performed hereunder nor the making of any payment shall release the Contractor from its obligations under this Section. The enumeration elsewhere in the Contract of particular risks assumed by the Contractor or of particular claims for which the Contractor is responsible shall not be deemed to limit the effect of the provisions of this Section or to imply that the Contractor assumes or is only responsible for risk or claims of the type enumerated.

Section 10.06 - Contractor's Compensation and Liability Insurance

A. The Contractor shall procure and maintain, at its own cost and expense, until final acceptance by the Owner of all the work covered by this Contract, the following kinds of insurance:

1. Worker's Compensation Insurance. A policy complying with the requirements of the laws of the State of New York and any other laws that may be applicable thereto, including Coverage B - Employer's Liability with a limit of not less than \$1,000,000.

2. Contractor's Comprehensive General Liability Insurance. A standard comprehensive general liability insurance policy, with contractual, completed operations, explosion, collapse and underground property damage coverage's issued to and covering the liability of the Contractor for all work and operations under this Contract, all obligations assumed by the Contractor under this Contract and all damage to work performed by subcontractors on your behalf. The Contractor shall provide Broad Form Comprehensive General Liability Insurance, and the Owner shall be an additional insured in the policy. The policy shall include cross liability coverage and shall be endorsed to indicate that it is primary coverage. The completed operations coverage's shall be maintained for not less than two years after acceptance of the work. The coverage under such policy shall be not less than a combined single limit for Bodily Injury and Property Damage as follows, or such limits carried by the Contractor, whichever is greater:

**BODILY INJURY AND PROPERTY
DAMAGE LIABILITY (BROAD FORM)**

\$ 5,000,000	Each Occurrence
\$ 5,000,000	Aggregate

3. Automobile Liability Insurance. A policy covering the use in connection with the Work covered by the Contract Documents of all owned, non-owned and hired vehicles bearing, or, under the circumstances under which they are being used, required by the Motor Vehicle Laws of the State of New York to bear license plates. The coverage under such policy shall be not less than a combined single limit for Bodily Injury and Property Damage of:

**BODILY INJURY AND
PROPERTY DAMAGE LIABILITY**

\$ 1,000,000	Each Person
\$ 1,000,000	Each Accident

B. In addition to maintaining all of the above insurances, the Contractor shall indemnify and hold harmless the Owner and its agents and employees from and against liability, including additional premium due because of the Contractor's failure to maintain coverage limits as required under this section.

C. Insurance similar to that required of the Contractor shall be provided by or on behalf of all subcontractors to cover their own operations performed under this Contract. The Contractor shall be held responsible for any modifications in these insurance requirements as they apply to subcontractors.

D. Before commencing the performance of any work covered by the Contract, the Contractor shall furnish to the Owner a current certificate or certificates, in duplicate, of the insurance required under the foregoing provisions including copies of subcontractor's certificates. Such certificates shall be on a form prescribed by the Owner, shall list the various coverage's and shall contain, in addition to any provisions hereinbefore required, a provision that the policy shall not be changed or cancelled and that it will be automatically renewed upon expiration and continued in force until final acceptance by the Owner of all the work covered by the Contract, unless the Owner is given thirty (30) days written notice to the contrary. Upon renewal of each of the Contractor's insurance coverage's, the Owner shall be provided with a new certificate of insurance showing such renewal. Certificates and written notices shall be directed to the Office of Facilities Contracts. The Contractor shall furnish the Owner with a certified copy of each policy including any and all exclusions to such policy.

E. If at any time any of the above required insurance policies should be cancelled, terminated or modified so that insurance is not in effect as above required, then, if the Owner shall so direct, the Contractor shall suspend performance of the work covered in the Contract. If the said work is so suspended, no extension of time shall be due on account thereof. The Owner may, at its option, obtain insurance affording coverage equal to that above required, at the Contractor's expense.

Section 10.07 - Liability Insurance of the Owner

A. The Owner, at its own cost and expense, shall procure and maintain such liability insurance as will, in its opinion, protect the Owner from its contingent liability to others for damages because of bodily injury, including death, and property damage which may arise from operations under this Contract.

Section 10.08 - Owner's and Contractor's Responsibilities for Fire and Extended Coverage Insurance Hazards

A. The Contractor shall purchase and maintain in force a builders risk insurance policy on the entire work. Such insurance shall be written on a completed value form and in an amount equal to the initial contract sum and modified by any subsequent modifications to the contract sum. The insurance shall name Cornell University and the State of New York, all subcontractors and sub- subcontractors. The insurance policy shall contain a provision that the insurance will not be cancelled or allowed to expire until the Contractor has given at least thirty (30) days prior written notice to Cornell University. The insurance shall cover the entire work at the site, including reasonable compensation for Architect's services and expenses made necessary by an insured loss. Insured property shall include portions of the work located away from the site and in transit to the site. The policy shall cover the cost of removing debris and demolition as may be legally necessary. The policy shall cover any boiler or machinery loss which may be suffered during installation and until final acceptance. The insurance required shall be written to cover "all risk" of physical loss including a loss due to collapse. Any deductible shall be the responsibility of the Contractor but in no case shall the deductible be more than \$10,000 unless Cornell University has agreed to a higher deductible. The Contractor shall provide to Cornell University a certificate of insurance and a summary of coverage's including all endorsements and exclusions prior to commencement of the work. Once the policy is received, the Contractor shall provide a copy of such policy to Cornell University. There shall be a mutual waiver of recovery between Cornell University, the Contractor and all other parties to the extent such losses are covered by the builders risk policy. If Cornell University wishes to occupy the building prior to final acceptance and if the policy contains a provision which limits coverage for such partial occupancy, the parties agree work

together to obtain consent of the insurance company for such partial occupancy or use under mutually acceptable terms.

B. Losses, if any, under such insurance shall be payable to the Owner.

C. The Contractor shall be responsible for any and all loss of materials connected with the construction due to unexplainable disappearance, theft or misappropriation of any kind or nature.

D. The foregoing provisions shall not operate to relieve the Contractor and subcontractors of responsibility for any loss or damage to their own or rented property or property of their employees, of whatever kind or nature, or on account of labor performed under the Contract incidental to the repair, replacement, salvage, or restoration of such items, including but not limited to tools, equipment, forms, scaffolding, and temporary structures, including their contents, regardless of ownership of such contents, except for such contents as are to be included in and remain a part of the permanent construction. The Owner shall in no event be liable for any loss or damage to any of the aforementioned items, or any other property of the Contractor, subcontractors and the Architect, or employees, agents, or servants of same, which is not to be included in and remain a part of the permanent construction. The Contractor and subcontractors severally waive any rights of recovery they may have against the Owner and the Architect for damage or destruction of their own or rented property, or property of their employees of whatever kind or nature.

Section 10.09 - Effect of Procurement of Insurance

A. Neither the procurement nor the maintenance of any type of insurance by the Owner or the Contractor shall in any way be construed or be deemed to limit, discharge, waive or release the Contractor from any of the obligations and risks imposed upon the Contractor by the Contract or to be a limitation on the nature or extent of such obligations and risks.

Section 10.10 - No Third Party Rights

A. Nothing in the Contract shall create or give to third parties; any claim or right of action against the Contractor, the Architect, and the Owner beyond such as may legally exist irrespective of the Contract.

ARTICLE 11 -- USE OR OCCUPANCY PRIOR TO ACCEPTANCE BY OWNER

Section 11.01 – Substantial Completion

A. The term "substantial completion" means the completion of the Work to the extent that Cornell University may have uninterrupted occupancy or use of the facility or specified portion thereof for the purpose for which intended. The Contractor shall obtain all certificates of occupancy required prior to occupancy, and any electrical, mechanical and plumbing certificates, or other certificates or required approvals and acceptances by City, County, and State governments or other authority having jurisdiction.

Section 11.02 - Occupancy Prior to Acceptance

A. If, before Final Acceptance, the Owner desires Beneficial Occupancy of the Work, or any part thereof, which is completed or partly completed, or to place or install therein equipment and furnishings, the Owner shall have the right to do so, and the Contractor shall in no way interfere with or object to said Beneficial Occupancy by the Owner.

B. Said Beneficial Occupancy (1) shall not constitute acceptance of space, systems, materials or elements of the Work, nor shall said Beneficial Occupancy affect the start of any guarantee period, and (2) shall not affect the obligations of the Contractor for Work which is not in accordance with the requirements of the Contract or other obligations of the Contractor under the Contract.

C. The Contractor shall continue the performance of the Work in a manner which shall not unreasonably interfere with said use, occupancy and operation by the Owner.

ARTICLE 12 -- PAYMENT

Section 12.01 - Provision for Payment

A. The Owner agrees to pay the Contract Price to the Contractor for the performance of this Contract and the fulfillment of all the Contractor's obligations. The Contract Price means all costs reimbursable under the Contract Documents.

B. The final certificate of the Architect shall certify that the Contract has been completed within the stipulated time, and shall not be issued until all drawings and specifications have been returned to the Owner. The issuance of said certificates, however, or any payments made thereon shall not lessen the total responsibility of the Contractor to complete the work to the satisfaction of the Owner in accordance with the Contract.

C. Payments on the Contract Price shall be made each month as the work progresses in accord with the following procedure:

1. The Contractor's schedule of values, including quantities, aggregating the total Contract Price, divided so as to facilitate payments to subcontractors as specified herein, shall be the basis for monthly progress payments. This schedule, as shown in the E-Builder Schedule of Values Process, when approved by the Owner shall be used as a basis for progress payments. In applying for payments, the Contractor shall submit a statement based upon this approved schedule.

2. (a) On a date agreed upon by the Owner, Architect, and Contractor, a meeting shall be held by the Owner to review the work completed and materials on hand. This meeting shall review each item to be submitted by the Contractor in the requisition for payment.

(b) On the first day of each month, or as soon thereafter as practicable, the Contractor shall submit via the E-Builder Payment Application Process, a statement and all applicable documentation setting forth in detail the cost of the work done and materials delivered to the job site up to and including the last day of the previous month and shall make application for payment of ninety percent (90%) of the amount of said statement, less the aggregate of all previous payments made by the Owner against the Contract Price.

(c) Each statement and application shall be accompanied by an affidavit, executed by the Contractor, certifying that the statement is true and correct, and that all bills for labor, and materials incorporated in or delivered to the job, due and payable at the time of the preceding progress payment, have been paid. The Contractor shall attach a single .pdf file of certified payrolls for all employees on the project as indicated in the E-Builder Payment Application Process. Before final payment is made, the Contractor shall submit evidence that all payrolls, material bills and other indebtedness incurred in connection with the Contract have been paid, including final waivers of any liens.

3. Each such application for payment shall be subject to the review and approval of the Architect. If the Architect finds that the affidavit and application for payment are acceptable and that all the above requirements in connection therewith have been complied with, the Architect shall, within seven (7) calendar days after receiving such application for payment, certify to the Owner that the payment applied for is due and payable to the Contractor.

4. The issuance of a Certificate for Payment constitutes a representation by the Architect to the Owner, based on the date of the Application for Payment, that the work has progressed to the point indicated, that, to the best of their knowledge, information, and belief, the quality of the work is in accordance with the Contract Documents and that the Contractor is entitled to payment in the amount certified.

The Owner shall make payment in the manner provided in the Agreement within thirty (30) calendar days of receipt of the approved Certificate in E-Builder.

Approval of the Payment Application by the Architect shall not be deemed to represent that the Architect has made exhaustive or continuous on-site inspections to check the quality or quantity of the work or that the Architect has reviewed the construction means, methods, techniques, sequences, or proceedings or that the Architect has made any examination to ascertain how or for what purpose the Contractor has used the monies previously paid on account of the Contract Sum.

Section 12.02 – Stored Materials & Equipment

A. The Contractor may submit, no more than thirty (30) calendar days after contract approval and prior to the first application for payment, a written request to Cornell University for permission to invoice for critical materials and equipment ready, but not yet incorporated into the work. For the purpose of this paragraph, "critical materials and equipment" eligible for payment are defined as those items affecting project schedule or budget as determined by Cornell University's evaluation of the project schedule. This includes finished goods normally shipped to the job site in a condition ready for incorporation into the work that require significant time for delivery. Raw materials or work-in-process at a manufacturer's plant location shall not be eligible for such consideration unless the Contractor can demonstrate that Cornell University can save money by purchasing material in bulk quantities at the beginning of the project.

B. Cornell University will be under no obligation to accept such requests.

C. Payment authorized by Cornell University for such "long-lead" critical materials and equipment not yet incorporated in the work will be made provided the Contractor submits Exhibit H and complies with the following:

1. Items shall be listed in the "Total Materials Presently Stored" column on the Application for Payment.
2. Transfer of Title shall be executed and included in the Application for Payment.
3. The method used to store off-site items shall be described in the Contractor's request to invoice for such materials and equipment. Cornell University shall give prior approval of the location of off-site storage. Items requiring special environmental conditions to protect their integrity (temperature, humidity, etc.) shall be continuously stored in such an environment.
4. Items in storage shall be identified as property of Cornell University, and a description of the identification method used shall be submitted in the Application for Payment. Contractor shall maintain all necessary insurance on items in storage.
5. A written and photographic inventory of items and method used to verify such inventory, including Contractor's certification that all quantities have been received in good condition at the job site or other location acceptable to Cornell University shall be submitted with the Application for Payment.
6. A copy of the vendor's invoice is included with the Contractor's invoice. Packing lists will not be accepted.

D. Cornell University retains the right to verify storage by physical inspection prior to payment approval and at any time thereafter. Such payment shall not relieve the Contractor of the responsibility for protecting, safeguarding, and properly installing the equipment or materials. The Warranty and Guarantee period shall not commence until installation and final acceptance of the completed work by Cornell University. The Contractor shall bear the cost of transporting materials stored off-site to the site

E. Each subsequent invoice will restate the prior months' materials and equipment not incorporated in the Work and current month additions and deletions for materials and equipment incorporated into the Work.

F. Upon the making of partial payment by Cornell University, all work, materials, and equipment covered thereby shall become the sole property of Cornell University. Partial payments, however, shall not constitute acceptance of the Contractor's work by Cornell University, nor be construed as a waiver of any right or claim by Cornell University.

Section 12.03 – Retention

A. Retention in the amount of ten percent (10%) of the value of the Work done and materials furnished and installed under this Agreement shall be retained by the Owner as part security for the faithful performance of the Contractor's work within the time specified, and shall be paid as indicated in Section 12.06.

B. Cornell University in its sole discretion may, upon the Contractor's application thereof, release retention applicable to a subcontractor, provided that there are no outstanding claims associated with the subcontractor's work and the subcontractor and Contractor submit an acceptable partial or final release when submitting the payment application process. If the project is bonded, a Consent of Surety to the reduction must be attached as well.

Section 12.04 - Withholding Payments

A. The Owner may, on account of contemporaneous or subsequently discovered evidence, withhold or nullify the whole or a part of any Certificate to such extent as may be necessary to protect the Owner from loss on account of:

1. Defective work not remedied.
2. To assure payment of just claims of any persons supplying labor or materials for the work and to discharge any lien filed against the Owner's property.
3. A reasonable doubt that the Contract can be completed for the balance of the Contract Price then unpaid.
4. Damage to another Contractor.
5. Unsatisfactory prosecution of the work by the Contractor.
6. Failure to provide and maintain an acceptable Critical Path Method Network Schedule.

Section 12.05 – Documents and Conditions Precedent to Final Payment

A. As-Built Documentation

1. Prior to acceptance by the Owner of all work covered by the Contract, the Contractor shall furnish to the Owner through the Architect one (1) set of current reproducible full-size Contract Drawings on which the Contractor has recorded in a neat and workmanlike manner all instances where actual field construction differs from work as indicated on the Contract Drawings.

B. Final Documentation:

1. Prior to final payment, and before the issuance of a final certificate for payment in accordance with the provisions of these General Conditions, file the following documents with the Owner.
 - a. Warranties, Bonds, Service & Maintenance Contracts and any other extended guarantees stated in the technical sections of the Specifications.
 - b. Release or Waiver of Lien for the Contractor and Sub-Contractors in accordance with Exhibit C, attached hereto.
 - c. Project Record Documents as defined in General Requirements Section 01 78 39.
 - d. Notification that Final Punch List work has been completed.
 - e. Manufacturers Instruction and Maintenance Manuals as defined in General Requirements Section 01 78 23.
 - f. Fixed Equipment Inventory as defined in General Requirements Section 01 78 22.
2. The Contractor shall also provide a CD containing scanned .pdf format and/or Word Documents of all documentation.

Section 12.06 - Final Payment and Release

A. When the Contractor determines that the work or a designated portion thereof is substantially complete, the Contractor shall prepare for submission to the Owner a list of items to be completed or corrected. This list, prepared by the Contractor, shall constitute a complete detailed list of defects and deficiencies which, when remedied, will complete all Contract requirements. The submittal shall be accompanied by a statement to that effect.

B. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all work in accordance with the Contract Documents. When the Architect, on the basis of an inspection, determines that the work is substantially complete, the Architect will then prepare a Certificate of Substantial Completion.

C. Upon receipt of written notice that the work is ready for final inspection and acceptance, the Architect will promptly make such inspection and, when the Architect finds the work acceptable under the provisions of the Contract Documents, and the Contract fully performed, and if bonds have been required, the written Consent of the Surety to the payment of the balance due, and a satisfactory Release of Lien, attached hereto as Exhibit "C" and made a part of the Contract Documents, has been submitted by the Contractor, each subcontractor and sub-subcontractor, the Contractor will promptly issue a final Certificate for Payment, stating that to the best of their knowledge, information, and belief, and on the basis of their observations and inspections the work has been completed in accordance with the terms and conditions of the Contract Documents, and that the entire balance is due and payable.

D. All prior certificates upon which progress payments may have been made, being estimates, shall be subject to correction to the final certificate.

E. The acceptance by the Contractor of the final payment aforesaid shall constitute a general release of the Owner and its agents or representatives from all claims and liability to the Contractor.

ARTICLE 13 -- TAX EXEMPTION

Section 13.01 - Tax Exemption

A. The Owner is exempt from payment of Federal, State and local taxes, including sales and compensating use taxes on all materials and supplies incorporated into the completed Work. These taxes are not to be included in bids. This exemption does not apply to tools, machinery, equipment or other property leased by or to the Contractor or a Subcontractor, or to supplies and materials which, even though they are consumed, are not incorporated into the completed Work, and the Contractor and Subcontractors shall be responsible for and pay any and all applicable taxes, including sales and compensating use taxes, on said leased tools, machinery, equipment or other property and upon all said unincorporated supplies and materials.

B. The Contractor and Subcontractor shall obtain any and all necessary certificates or other documentation from the appropriate governmental agency or agencies, and use said certificates or other documentation as required by law, rule or regulation.

ARTICLE 14 -- GUARANTEE

Section 14.01 - Guarantee

A. The Contractor, at the convenience of the Owner, shall remove, replace and/or repair at their own costs and expense any defects in workmanship, materials, ratings, capacities or characteristics occurring in or to the work covered by Contract for the period of one (1) year or within such longer period as may otherwise be provided in the Contract, the period of such guarantee to commence with the Owner's final acceptance of all work covered under the Contract, and the Contractor, upon demand, shall pay for all damage to all other work resulting from such defects and all expenses necessary to remove, replace and/or repair such work which may be damaged in removing, replacing or repairing the said defects. Acceptance means final acceptance of the entire work, early partial occupancy notwithstanding

B. In some instances the nature of the work may require the Owner to accept various components, equipment, spaces or phase of the project. In such cases the Contractor shall submit a separate guarantee for the Owner's acceptance on the form attached hereto as Exhibit "E". Upon completion of the project, the Contractor shall submit to the Owner a guarantee for the project on the form attached hereto as Exhibit "E".

ARTICLE 15 -- STANDARD PROVISIONS

Section 15.01 - Provisions Required by Law Deemed Inserted

Each and every provision of law or clause required by law to be inserted in the Contract and made a part hereof, shall be deemed to be inserted herein and, in the event any such provision is not inserted or is not correctly inserted, then upon the application of either party, this Contract shall forthwith be physically amended to make such insertion or correction.

Section 15.02 - Laws Governing the Contract

The Contract shall be governed by the laws of the State of New York, without reference to conflict of law principles. Any and all proceedings relating to the subject matter hereof shall be maintained in New York State Supreme Court, Tompkins County or the federal district court for the Northern District of New York, which courts shall have exclusive jurisdiction for such purposes.

Section 15.03 - Assignments

The Contractor shall not assign the Contract in whole or in part without prior written consent of the Owner.

Section 15.04 - No Third Party Rights

Nothing in the Contract shall create or shall give to third parties any claim or right of action against the Owner, beyond such rights as may legally exist irrespective of the Contract.

Section 15.05 - Waiver of Rights of Owner

A. None of the provisions of the Contract will be considered waived by the Owner except when such waiver is given in writing.

Section 15.06 - Limitation on Actions

No action or proceeding shall be filed or shall be maintained by the Contractor against the Owner unless said action shall be commenced within six (6) months after receipt by the Owner of the Contractor's final requisition or, if the Contract is terminated by the Owner, unless said action is commenced within six (6) months after the date of said termination.

Section 15.07 - Owner's Representative

The Owner shall designate a representative authorized to act in its behalf with respect to the Project. The Owner or its representative shall examine documents and shall render approvals and decisions pertaining thereto promptly, to avoid unreasonable delay in the progress of the Contractor's work. Only directives from Cornell University's designated representative (Ruth Howell) shall be recognized by the Contractor.

ARTICLE 16 – MINORITY AND WOMEN BUSINESS ENTERPRISES

Section 16.01 – Definitions

The terms "Minority-owned business enterprise" ("MBE") or "Women-owned business enterprise" ("WBE") or "minority group member" shall have the same meaning as under Section 310 of the New York State Executive Law, as the same may be from time to time amended.

Section 16.02 – Participation by Minority and Women Business Enterprises

A. The Contractor shall, in addition to any other nondiscrimination provision of the Contract and at no additional cost to Owner, fully comply and cooperate with the Owner in the implementation of MBE and WBE programs. These requirements include equal employment opportunities for minority group members and women ("EEO") and contracting opportunities for certified minority and women-owned business enterprises ("MWBEs"). The Contractor's demonstration of "good faith efforts" shall be a part of these requirements. These provisions shall be deemed supplementary to, and not in lieu of, the nondiscrimination provisions required by New York State or other applicable federal, state or local laws.

B. The Contractor shall include the provisions of this Article in each and every Agreement and/or Contract in such a manner that the provisions of this Article will be binding upon each subcontractor and supplier as to work in connection with and related to this Agreement.

C. For purposes of this procurement:

Facilities and Campus Services supports Cornell University's ongoing commitment to encourage business opportunities and diversity among its vendor community by promoting minority owned and controlled business' development as a shared responsibility. The University's intention is to create and expand opportunities for minority, women, veteran, LGBTQ, small and locally owned businesses through construction labor opportunities and the procurement of goods and services.

Positive good faith efforts to advance the University's objectives shall be made by all Contractors, engaging, and maximizing these diverse enterprise goals, and to positively drive Cornell's economic impact.

Cornell University Diversity Council Statement:

"Cultivate partnerships with the widest spectrum of Off-Campus entities and include a fully diverse range of Off-Campus participants in Cornell's events, contracts, services, and initiatives."

Section 16.03 – Reports and Records

A. The following forms, attached hereto as Exhibit "D" and made a part of the Contract Documents, are to be used in submitting MBE/WBE Utilization Reports when requested by the Owner.

1. MWBE Utilization Report
2. Affirmative Action Workforce Report

B. The Contractor shall submit an Affirmative Action Workforce Report on a monthly basis, or as requested by Owner. The Contractor shall provide a single monthly report, or as requested by the Owner, inclusive of all subcontractor information for the project labor and such report must document the use of MWBE businesses in the Contract.

ARTICLE 17 -- ACCOUNTINGS, INSPECTION AND AUDIT

The Contractor agrees to keep books and records showing the actual costs incurred for the Work. Such books and records (including, without limitation, any electronic data processing files used by the Contractor in analyzing and recording the Work) shall be open for inspection and audit by the Owner and its authorized representatives at reasonable hours at the Contractor's local office or at the Owner's office, if necessary, and shall be retained by the Contractor for a period of seven years after the Work has been completed, except that if any litigation, claim or audit is started before the expiration date of the seven year period, the records shall be retained until all litigation, claims or audit findings involving the records have been resolved.. Each Sub-Contractor shall be similarly obligated to maintain, for inspection and audit by the Owner, books and records respecting the Work. If requested by the Owner, the Contractor shall furnish copies of any and all subcontracts, purchase orders and/or requisitions of any nature associated with the project.

ARTICLE 18 – CONTRACTOR PERFORMANCE EVALUATION

At project completion the Owner shall schedule a meeting to review with the Contractor their performance for the project unless performance warrants additional reviews. The Owner may schedule a meeting at fifty percent (50% completion) based on project complexity and/or duration. The Owner shall present its review based on the attached “Contractor Performance Evaluation”, Exhibit I. The Contractor shall be given the opportunity to provide input as to the findings of the evaluation after completion by the Owner.

ARTICLE 19 -- ROYALTIES AND PATENTS

The Contractor shall pay all royalties and license fees and shall defend all suits or claims for infringement of any patents, and shall save Cornell University harmless from loss on account thereof; except that Cornell University shall be responsible for all such loss when a particular process or product is specified by Cornell University unless the Contractor shall have reason to believe that the particular process or product infringes a patent, in which event it shall be responsible for loss on account thereof unless it promptly provides such information to Cornell University.

ARTICLE 20 -- CONFIDENTIALITY AND USE OF OWNER'S NAME

Section 20.01 - Release of Information

The Contractor shall not divulge information concerning the Work (including news releases, social media, internal house organizations, applications for permits, etc.) to anyone without Cornell University's prior written approval, except to subcontractors and suppliers to the extent that they need such information to perform their work. The Contractor shall require a similar agreement from each such subcontractor and supplier, requiring their compliance with the foregoing. Cornell University reserves the right to release all information, as well as to time its release and specify its form and content. The Contractor may obtain Cornell University's approval to release information by submitting such request to the Cornell University Project Manager.

Section 20.02 - Confidential Information

The term "Confidential Information" means all unpublished information obtained or received from Cornell University during the term of this Contract which relates to Cornell University's research, development, manufacturing and business affairs. The Contractor shall not disclose confidential information to any person, except to its employees and subcontractors to the extent that they require it in the performance of their Work, during the term of this Contract and until authorized by Cornell University in writing. The Contractor and its subcontractors shall hold all confidential information in trust and confidence for Cornell University, and shall use confidential information only for the purpose of this Contract. The Contractor and its subcontractors shall require all of their employees to whom confidential information is revealed to comply with these provisions. The Contractor shall have an agreement with each subcontractor, requiring their compliance with the foregoing. If it becomes necessary for the Contractor to defend in case of litigation related to its services rendered, permission shall be sought from Cornell University, who shall not unreasonably withhold such permission, before any disclosures are made. This Section does not apply to information which (1) is or becomes known in public domain or (2) is learned by the Contractor from third parties.

Section 20.03 - Use of Owner's Name on Non-Work Related Content

The Contractor shall not use or permit on the job site, in its external, advertising, marketing program, social media, or other promotional efforts, any date, pictures, or other content unrelated to the Contracted Work, or any representation of the Owner except on the specific written authorization in advance of the Owner's Representative.

ARTICLE 21 -- CORNELL UNIVERSITY STANDARDS OF ETHICAL CONDUCT

Cornell University expects all executive officers, trustees, faculty, staff, student employees, and others, when acting on behalf of the university, to maintain the highest standard of ethical conduct as per Cornell University's Policy 4.6 - Standards of Ethical Conduct, a copy of which is available at <https://fcs.cornell.edu/project-contractors-and-consultants>. This includes treating equally all persons and firms currently doing business with or seeking to do business with or for Cornell University, whether as contractors, subcontractors, or suppliers. Such persons and firms are respectfully reminded that Cornell University employees and their families may not personally benefit from Cornell University's business relationships by the acceptance of gifts or gratuities, defined as a gift in excess of \$75.00 given to a Cornell employee for personal use. Items not considered gifts/gratuities include occasional business meals, items of an advertising nature, and items that are generally distributed to all potential customers. In addition, it is expected that the Contractor's officers and employees shall conduct all business related to this Contract within the highest ethical standards, observing applicable policies, practices, regulations, law, and professional standards. All parties are expected to report violations of this policy to appropriate university personnel. You may file a report to on the web https://secure.ethicspoint.com/domain/en/report_custom.asp?clientid=6357 or contact Cornell University through EthicsPoint by dialing toll-free 1-866-293-3077.

CORNELL UNIVERSITY**Construction Contract Change Order Forms
Instructions to Change Order Documentation**

Cornell University has several standard forms related to Changes in the Work. These forms have been prepared to comply with contract requirements related to Changes in the Work. The standard Construction Contract Change Order Request and Change Order Summary Forms shall be used to facilitate preparation of change order requests in conformity with construction contract requirements.

These forms shall be used by the Contractor and by all Subcontractors in preparing their respective cost estimates for services associated with the Changed Work for the Owner's consideration and shall include all associated back-up documentation supporting the request.

Direct Cost of the Work:

- 1. Direct Labor** – Include the “wages paid” hourly direct labor and/or foreman necessary to perform the required change. “Wages paid” is the burdened labor rate documented in accordance with Section 2.14 – Project Labor Rates of the General Conditions. “Assigned Personnel or Work Crews” should be stated by trade or type of work performed not by name of person or company title. For example carpenter, mason, backhoe operator, etc. Supervisory personnel in district or home office shall not be included. Supervisory personnel on the job-site, but with broad supervisory responsibility and paid as salaried personnel, shall not be included as Direct Labor
- 2. Direct Material** – Include the acquisition cost of all materials directly required to perform the required change. Examples of “Unit of Measure” include square feet, cubic yards, linear feet, days, gallons, etc.
- 3. Equipment** – Include the rental cost of equipment items necessary to perform the change. For company-owned equipment items, include documentation of internal rental rates. Charges for small tools, and craft specific tools are not allowed.

Bond Premiums

The Contractor's actual documented bond premium rate as entered into the eBuilder Bid Portal Response Form – Step 3 – Additional Required Information Custom Fields at time of bid shall be added to all direct and indirect costs of the proposed change.

Overhead & Profit

The Contractor's overhead & profit rate shall be added to all direct and indirect costs of the proposed change in accordance with the Contract.

CONSTRUCTION CONTRACT CHANGE ORDER REQUEST

DATE: _____ COR # _____

PROJECT TITLE: _____

CONTRACT NO. _____

☐ Name of Contractor/Subcontractor performing Work: _____DESCRIPTION OF WORK: _____

_____**A. DIRECT COST OF WORK:****1 LABOR** (Attach Supporting Documentation)

ASSIGNED PERSONNEL OR WORK CREW

	HOURLY WAGE RATE PAID	HOURS WORKED	TOTAL COST
_____	_____	_____	\$0
_____	_____	_____	\$0
_____	_____	_____	\$0
_____	_____	_____	\$0
LABOR TOTAL			\$0

2 MATERIAL (Attach Supporting Documentation)

MATERIAL REQUIRED FOR CHANGE

	UNIT PRICE	UNIT OF MEASURE	REQUIRED UNITS	TOTAL COST
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
MATERIAL TOTAL				\$0

3 EQUIPMENT (Attach Supporting Documentation)

EQUIPMENT REQUIRED FOR CHANGE

	UNIT PRICE	UNIT OF MEASURE	REQUIRED UNITS	TOTAL COST
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
_____	_____	_____	_____	\$0
EQUIPMENT TOTAL				\$0

4**DIRECT COST (SUM 1, 2, 3)****\$0****5****OH&P Rate** _____**\$0****6 SUBCONTRACTOR** (Attach Supporting Documentation)

SUB-SUBCONTRACTOR REQD FOR CHANGE

	SUB-SUB COST OF WORK	SUB-SUB MARK UP %	TOTAL COST
_____	_____	_____	\$0
_____	_____	_____	\$0
_____	_____	_____	\$0
SUB-SUBCONTRACTOR TOTAL			\$0

7 OVERHEAD AND PROFIT**OH&P Rate** _____**\$0****TOTAL COST PLUS OH&P (SUM 4, 5, 6, 7)****\$0****8 BOND PREMIUM** (If applicable)**Bond Premium Rate** _____**\$0****TOTAL COR COST****\$0****TOTAL CONTRACT DAYS ADDED/DELETED FROM PROJECT SCHEDULE****0**

CONSTRUCTION CONTRACT CHANGE ORDER SUMMARY

DATE: _____

PCO # _____

PROJECT TITLE: _____

CONTRACT NO. _____

CONTRACTOR: _____

DETAILED DESCRIPTION OF WORK: _____

1 DIRECT COST OF WORK:

NAME OF CONTRACTOR/SUBCONTRACTORS
PERFORMING WORK

TOTAL
COST

TOTAL COST OF PROPOSED CHANGE ORDER ITEM \$0

TOTAL CONTRACT DAYS ADDED/DELETED FROM PROJECT SCHEDULE

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FINAL RELEASE

EXHIBIT "B"

FINAL WAIVER OF CLAIMS AND LIENS AND RELEASE OF RIGHTS

Date	_____	Contract Date	_____
Project	_____	Contract Price	_____
Address	_____	Net Extras and Deductions	_____
City	_____	Adjusted Contract Price	_____
County	_____	Amount Previously Paid	_____
State	_____	Balance Due - Final Payment	_____

The undersigned hereby acknowledges that the above Balance Due when paid represents payment in full for all labor, materials, etc., furnished by the below named Contractor or Supplier in connection with its work on the above Project in accordance with the Contract.

In consideration of the amounts and sums previously received, and the payment of \$_____ being the full and Final Payment amount due, the below named Contractor or Supplier does hereby waive and release the Owner from any and all claims and liens and rights of liens upon the premises described above, and upon improvements now or hereafter thereon, and upon the monies or other considerations due or to become due from the Owner or from any other person, firm or corporation, said claims, liens and rights of liens being on account of labor, services, materials, fixtures or apparatus heretofore furnished by the below named Contractor or Supplier to the Project. The premises as to which said claims and liens are hereby released are identified as follows:_____.

The undersigned further represents and warrants that he/she is duly authorized and empowered to sign and execute this waiver on his/her own behalf and on behalf of the company or business for which he/she is signing; that it has properly performed all work and furnished all materials of the specified quality per plans and specifications and in a good and workmanlike manner, fully and completely; that it has paid for all the labor, materials, equipment and services that it has used or supplied, that it has no other outstanding and unpaid applications, invoices, retentions, holdbacks, expenses employed in the prosecution of work, chargebacks or unbilled work or materials against the Owner as of the date of the aforementioned last and final payment application; and that any materials which have been supplied or incorporated into the above premises were either taken from its fully-paid or open stock or were fully paid for and supplied on the last and final payment application or invoice.

The undersigned further agrees to defend, indemnify and hold harmless the Owner for any losses or expenses (including without limitation reasonable attorneys' fees) should any such claim, lien or right of lien be asserted by the below named Contractor or Supplier or by any of its or their laborers, material persons or subcontractors.

In addition, for and in consideration of the amounts and sums received, the below named Contractor or Supplier hereby waives, releases and relinquishes any and all claims, rights or causes of action in equity or law whatsoever arising out of through or under the above mentioned Contract and the performance of work pursuant thereto.

The below named Contractor or Supplier further guarantees that all portions of the work furnished and installed are in accordance with the Contract and that the terms of the Contract with respect to this guarantee will remain in effect for the period specified in said Contract.

Sworn to before me this

Corporation or Business Name

_____ Day of _____ 20__

By: _____

Title: _____

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GUARANTEE

Date: _____

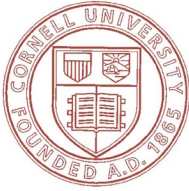
In accordance with plans and specifications and the terms and conditions of our contract with Cornell University dated _____, we hereby guarantee the _____ as found in the specifications for _____, Ithaca, New York to be free
(Project Title)
from defects in materials and workmanship for the period of ____ year(s) from _____, the date of acceptance by the Owner.
(Date)

(COMPANY)

By: _____

Title: _____

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MWBE Utilization Report

PART I – PROJECT INFORMATION

e-Builder Project No.	Project Name:	Contract Value:
Contractor Name and Address:	Primary Contact Name, Phone Number, Email:	Bid Date:
Contractor's MWBE Contact Name, Phone Number, Email:		

PART II – MWBE LIST *(Update as MWBE firms come under contract, sign and date, resubmit)*

Subcontractor Name, Address, Contact, Email, MBE or WBE <i>(List your firm if also MBE or WBE)</i>	Federal ID Number	Dollar Value of Contract or Purchase Order	Description of Work or Supplies	Subcontractor or Supplier Start and End Dates

(Update totals as MWBE firms are added/subtracted to above list)

Print Name of Principal or Officer:	Title:
Signature:	Date:

PART III – Quarterly Utilization Report *(Subcontractors & Sub-subcontractors fill this out and submit to General Contractor to compile into a single form.)* Double click on table to edit.

[illegible]

**SUMMARY OF BID ACTIVITY WITH MBE AND WBE
SUBCONTRACTORS AND VENDORS**

Please print or type all information, except where a signature is required.

PROJECT: _____

Name of Prime Contract Bidder:

Address (Street, City, State and Zip Code):

Contact Person (Name, Title and Telephone Number):

MBE and WBE							
Subcontractor/Vendor (Indicate which)	Item/ Trade	Bid Submitted:		Award Status		Date of	
		Date	Amount	Date	Amount	Elimination	

EXPLANATION OF ELIMINATION: Include meetings held for negotiation, etc.
(Use additional sheet if necessary)

OFFICER OF FIRM:

Name and Title:	Date:
_____	_____
Signature:	

[illegible]

NOTE: The Prime Contractor shall provide a single monthly report inclusive of all subcontractor information for the project.

LABOR RATE BREAKDOWN

PROJECT TITLE:

CONTRACT NO.

CONTRACTOR:

TRADE:

EFFECTIVE DATE:

EXPIRATION DATE:

Base Hourly Rate:

\$

Payroll Taxes and Insurance**% per Hour**

F.I.C.A.

Federal Unemployment (*Base on 1500 hours of work*)State Unemployment (*Base on 1500 hours of work*)

* Worker's Compensation

* Bodily Injury & Property Damage

Disability

TOTAL

%

Payroll Taxes and Insurance Rates: Base Rate (x) Total % =

\$

* Rates are net Contractor cost after premium discounts and experience modifications have been applied against manual rate.

Supplemental Benefits**\$ per Hour**

Vacation

Health & Welfare

Pension

Annuity

Education / Training

Industry

Total Hourly Fringe Benefits

\$

Hourly Labor Rate: Base Rate, Taxes/Insurance and Fringe Benefits

\$

Adjustment for a composite rate which includes apprentices:

\$

CONTRACTOR'S CERTIFICATION

I certify that the labor rates, insurance enumerations, labor fringe enumerations and expenses are correct and in accordance with actual and true cost incurred.

Signature of Authorized Representative:

Print Name:

Print Title:

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**STORED MATERIALS INVOICING
DOCUMENTATION**

PROJECT TITLE:

CONTRACTOR:

SUBCONTRACTOR:

CONTRACT NO.

REASON FOR REQUEST:

APPLICATION FOR PAYMENT NO. _____

DATE:

1 Material Identification

Description:

Quantity:

Provide Specific Location of Materials Stored:

2 Material Value

☐ Attach an Invoice or Quantified Statement of Value.

\$ _____

3 Certificate of Insurance

☐ Attach a Certificate of Insurance for the above specified materials. Certificate shall name "Cornell University" as a loss payee with respect to the specified materials.

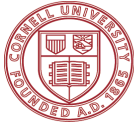
4 Transfer of Title

The Contractor hereby agrees to transfer complete ownership of all listed materials to Cornell University at the time payment is made to Contractor for the above referenced Application for Payment. The Contractor remains responsible for all contractual requirements for the above listed materials including complete installation and providing of all warranties.

Signed:

Date:

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Cornell University

**Contractor Performance
Evaluation**

Project Information

Project Name: _____

Date Of Evaluation _____

Project Number _____

Evaluators;

Project Team _____

Campus _____

Project Start Date _____

Substantial Completion _____

Contractor _____

Prequalification Status _____

Original Contract Amount _____

Total Change Order Amount _____

Contractor Project Manager _____

Initial Evaluation _____

Contractor Superintendent _____

Final Evaluation _____

Type Of Contract

Prime Contractor _____

Subcontractor _____

Construction Manager _____

Project Comments/Description

Performance Evaluation

Please give one rating for each category. Add comments as required to justify your rating.

Fails to Achieve Expectation	Needs Improvement	Fully Achieve Expectation	Freq Exceeds Expectation	Cons Exceed Expectation
1	2	3	4	5

1 Quality of Workmanship

Rate this contractor's performance in regards to quality of work

- a. Compliance with project drawings and specifications
- b. Workmanship quality and accuracy
- c. Tools- quality and sufficient quantity
- d. Equipment - sufficient quantity and operating condition
- e. Quality of jobsite craft personnel

Comments:

2 Scheduling/Productivity

Rate this contractor's performance with regard to producing and meeting contract schedules and milestones

- a. Project schedule quality and completeness
- b. Controlling of project schedule
- c. Manpower allocation for maintaining schedule
- d. Material deliveries to support project schedule
- e. Ability to meet substantial completion date and project milestones
- f. Productivity of work force
- g. Ability to deal with added work and unforeseen issues.

Comments:

3 Subcontractor Management

Rate this contractor's ability, effort and success in managing and coordinating subcontractors (if no subcontractors rate overall management performance)

Comments:

3A Major subcontractor performance(score not added in final Contractor Evaluation)

For contractor information only

- a. Plumbing Contractor overall Performance

Comments:

- b. HVAC Contractor overall Performance

Comments:

- c. Electrical Contractor overall Performance

Comments:

Fails to Achieve Expectation	Needs Improvement	Fully Achieve Expectation	Freq Exceeds Expectation	Cons Exceed Expectation
1	2	3	4	5

4 MBE/WBE Participation

Rate this contractor's MBE/WBE solicitation effort and participation for this project for, Project Team, Subcontractors, Material Vendors

Comments:

5 Safety

Rate this contractor's performance in regards to project safety

- a. Timely submission of site specific safety program
- b. Knowledge of OSHA standards
- c. Implementation of safety rules and regulations
- d. Promotion and creation of safety awareness
- e. Daily overall housekeeping
- f. Safety record
- g. Response to safety concerns
- h. Awareness of public safety

Comments:

6 Contract Administration

Rate this contractor's performance in regards to contract administration as per criteria below

- a. Timely submission of complete and correct documentation required for insurance and bond
- b. Change order processing
- c. Timely submission of RFI's, Shop Drawings, and change orders
- d. Subcontractor payments made promptly
- e. Timely submission of complete and correct payment applications
- f. Quality of paperwork

Comments:

7 Working Relationships

Rate this contractor's working relationships with other parties (Cornell, Design Team, subcontractors, ect.)

Comments:

Fails to Achieve Expectation	Needs Improvement	Fully Achieve Expectation	Freq Exceeds Expectation	Cons Exceed Expectation
1	2	3	4	5

8 Supervisory Personnel Rating

Rate the overall performance of this contractor's on site supervisory personnel and project management staff

Comments:

9 Contract Close-Out

Rate this contractor's overall ability to efficiently close out the project

- a. Timely completion of all punchlist items
- b. Timely resolution of all outstanding change orders
- c. Timely submission of all close out documents(O&M's, As-Built's, warranties, final releases and consent of surety)
- d. Quality of close out documentation and timely completion of any outstanding audit questions

Comments:

Summary Sheet

Project: _____

Contractor: _____

Performance Categories	Rating Per Category	Weight %	Scoring
1 Quality of Workmanship	0	15.00%	0
2 Scheduling	0	10.00%	0
3 Subcontractor Management	0	10.00%	0
4 MBE/WBE Participation	0	10.00%	0
5 Safety	0	10.00%	0
6 Contract Administration	0	10.00%	0
7 Working Relationships	0	10.00%	0
8 On Site Supervisory Personnel Rating	0	18.00%	0
9 Contract Close Out	0	7.00%	0

Over All Rating

0

Rating Reference	
Fails to achieve expectation	1
Needs improvement	2
Fully achieves expectation	3
Frequently exceeds expectation	4
Consistently exceeds expectatio	5

OWNER COMMENTS:

OWNER COMMENTS on 3A Ratings:

CONTRACTOR COMMENTS:

(To be completed by Contractor prior to Owner/Contractor discussion meeting)

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**HEALTH AND SAFETY PLAN REQUISITES FOR CONSTRUCTION
ACTIVITY APPLICABLE TO HIGH IMPACT RESPIRATORY PATHOGEN
PANDEMICS AND CONTAGIONS**

Contractors are required to protect the health and safety of employees, including the prevention and mitigation of high impact respiratory pathogen pandemics and contagions. One element of Contractor compliance with these obligations is the development and implementation of a **High Impact Respiratory Pathogen Pandemic Exposure Prevention, Preparedness and Response Plan** (Plan) for all project jobsites.

The Plan must be based upon information, requirements, recommendations and guidelines from civil authorities including, but not limited to, federal or New York State Executive Orders, CDC, OSHA and New York State Department of Health surrounding health and safety measures designed to eliminate or reduce the transmission of the high impact respiratory pathogen pandemics (HIRPP). Contractor may also amend the Plan based upon and consistent with articulated operational needs and requirements.

The Plan must include the following elements:

- Responsibilities of Managers and Supervisors
 - Responsibilities of Subcontractors and Suppliers to the Jobsites
 - Responsibilities of Employees
 - Jobsite Protective Measures
 - Jobsite Visitors
 - Personal Protective Equipment and Work-Related Controls
 - Jobsite Cleaning and Disinfecting
 - Jobsite Exposure Situation and Response Protocols
 - OSHA or Other Recordkeeping Related Compliance
 - Confidentiality/Privacy Protocols
 - Other Safety Responsibilities & Protocols Related to HIRPP
-

Contractors and businesses are further required to comply with any applicable and then current COVID mandatory, emergency or temporary directives, rules or health and safety practices issued by federal, state or local authorities.

- 1.0 Nothing contained herein shall alter or modify the Contractor's exclusive control over the job site, subcontractors, project labor, Health & Safety Plans, Protocols, Measures, or the Contractor's exclusive control over the methods and means associated with any and all of the foregoing elements.
 - 1.1 Cornell University possesses neither control nor any right of control over the job site, project labor, health & safety practices or programs, or methods and means of advancing the Contracted Work.
 - 1.2 These requirements are provided to the Contractor for the attainment of Contractor's fully compliant health and safety measures and practices communicated by applicable civil authorities as requirements, rules and/or guidance necessary to engage in qualifying construction activities.

- 2.0 Contractors, their subcontractors and suppliers, and workers are required to adhere to applicable and imposed federal, state, and/or local measures to prevent or limit the possible exposure or spread of COVID-19, pathogens, or contagions.
- 2.1 To that end, Contractor shall develop a written Health & Safety Plan related to the protective measures and protocols Contractor shall employ on the Project necessary to manage and mitigate the exposure or transmission of COVID-19, pathogens, or contagions (as applicable).
- 2.2 This Plan shall be submitted to the Owner prior to start of Construction Activity on the Campus. Owner's receipt of the subject Plan is to affirm measures and practices are in place, not for substantive review or approval.
- 2.3 Health and safety practices constitute a continuing compliance obligation, Contractors and their subcontractors and suppliers must remain current with, and immediately implement updated health and safety rules, protocols and practices as they are published. The Campus may request updated elements of the Contractor's written safety plan to address evolving best practices for measures and/or practices designed to prevent or limit the spread of COVID or other pathogen.
- 2.4 The Contractor must notify Cornell immediately upon discovery of any employees of their firm, subcontractors, or suppliers that are, or have been working on the Cornell Campus that have been confirmed to have COVID contagion.
- 2.5 In addition to the foregoing, these requirements may include Contractor compliance and implementation of then applicable federal, state, or local authorities' emergency and/or temporary safety precautions and protocols surrounding COVID *i.e., Federal EO 14042 and/or applicable OSHA COVID-19 Vaccination and Testing; Emergency Temporary Standard, as applicable.*
- 2.6 Further, Owner reserves the right to impose additional COVID or pathogen safety protocols and requirements warranted by worksite factors, including but not limited to, proximity to Cornell students, staff and faculty; activity duration; and jobsite location (*i.e., internal spaces*). These Owner health and safety requirements may be imposed without regard to the number of Contractor employees *i.e., less than 100 employees.*
- 3.0 Project Closure:
- 3.1 Where work is suspended on a project, contractors are directed to follow any additional project shut-down protocols as provided by the Owner. These protocols include but not limited to photographs, securing the work site, and a project status narrative.
- 4.0 Contractor expressly agrees to fully comply and remain exclusively responsible for the implementation of applicable Contractor Health and Safety Protocols and Measures. Contractor expressly agrees Contractor submission of the Plan is a condition precedent to engage in on-site construction activity.



GENERAL REQUIREMENTS

FOR

SAGE HALL FOUNDATION WATERPROOFING

**CORNELL UNIVERSITY
ITHACA, NEW YORK**

MARCH 8, 2023

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SECTION 01 11 00 SUMMARY OF WORK

1.0 GENERAL

1.1 DESCRIPTION

A. Work to be Done

1. Excavate and remove existing waterproofing and drainage piping along the entire West side and wrapping around to the halfway point on the South side. Install new waterproofing and drainage board, new foundation drain piping, clean out and spillway; backfill, finish grading, and seeding.
2. Remove existing concrete step, landing and sidewalk at West entrance. Replace with new granite steps. Remove existing south stair and salvage cheek walls for reuse. Provide new foundation to support steps and landing, install new stone steps and landing. Repair, reinstall and paint original iron handrails.
3. Excavate to expose existing tunnel structure and remove existing waterproofing and insulation. Remove, label and salvage existing stone veneer for reuse. Remove existing entrance doors, frame, transom, and hardware. Install new membrane waterproofing, drainage board, and rigid insulation over tunnel. Install new foundation piping. Reinstall existing stone veneer, light, add new scuppers, install new doors, frame, transom, and hardware. Patch and repair exiting lower concrete sidewalk.
4. Install new macro fiber re-enforced concrete sidewalks.

B. The Scope of the Work

1. The scope of the WORK in all SECTIONS of this Specification shall consist of the furnishing of all labor, materials, equipment and appliances and the performance of the Work required by the Contract Documents and/or by the conditions at the site, joining all parts of this Work with itself and the Work of others to form a complete, functioning entity.
2. Items not specifically mentioned in the Specifications or shown on the drawings, but which are inherently necessary to make a complete working installation, shall be included.

3. It is the intent and purpose of the Contract Documents to cover and include under each item all materials, machinery, apparatus, and labor necessary to properly install materials and equipment, adjust and put into perfect operation the respective portions of the installation specified and to so interconnect the various items or sections of the work as to form a complete and operating whole. Any equipment, apparatus, machinery, material and small items not mentioned in detail, and labor not hereinafter specifically mentioned, which may be found necessary to complete or perfect any portion of the installation in a substantial manner, and in compliance with the requirements stated, implied, or intended in the Contract Documents, shall be furnished without extra cost to the Owner. The Contractor shall provide the greatest quantity, highest quality, highest degree of safety, and most stringent material, equipment or Work. Should the Drawings or the Specifications disagree in themselves or with each other, the Contractor shall provide the better quality or greater quantity of work and/or materials unless otherwise directed by written addendum to the Contract.

1.2 WORK UNDER OTHER CONTRACTS

- A. The Contractor shall cooperate with other contracts performing related work, including providing labor, materials and other costs necessary to satisfactorily coordinate the Contract work with work performed under other contracts.
- B. Adjacent Work:
 1. There is a construction project happening across the street on the College of Engineering quad which will increase the amount of construction traffic at the Sage Avenue entrance.
- C. New York State Electric & Gas (NYSEG):
 1. Contractor shall be responsible for the project management of NYSEG work including coordinating any scheduling associated with the Project.
 2. The Owner shall be responsible for the cost associated with the work to be performed by NYSEG. No NYSEG costs shall be carried in the Contractor's bid.

1.3 SALVAGE ITEMS

- A. Contractor shall be responsible for the accurate salvage of items as identified in the bid documents. Salvaged items will be either reused or turned over to the Owner.
- B. Contractor to review bid documents to confirm salvage requirements. Salvage items may include but not be limited to the following:
 1. South stair handrails; light fixture at tunnel entrance; tunnel door pulls; post mounted door operator, and card reader.
 2. Tunnel stone cladding; tunnel cap stones, south stair brownstone

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 11 00*****

SECTION 01 14 00 WORK RESTRICTIONS

1.0 GENERAL

1.1 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General Conditions and Division 1 Specification Sections, apply to this Section.

1.2 CONTRACTOR USE OF PREMISES

- A. All traffic and pedestrian control measures shall be compliant with the **National Manual on Uniform Traffic Control Devices for Streets and Highways (MUTCD)** and **17 NYCRR Chapter V** (New York Supplement), (<https://www.dot.ny.gov/mutcd>) and all other local laws and regulations.
- B. The Contractor shall carry on the Work in the manner which will cause the least interruption to pedestrian and vehicular traffic and permit access of emergency vehicles at all times.
- C. The Work shall be scheduled and performed in such a manner that at least one lane of traffic will be maintained on all public streets. Two flag persons, equipped with radio communication devices, must be provided for any activity blocking a traffic lane. One lane of traffic must be maintained at all times. Where traffic must cross open trenches, the Contractor shall provide suitable bridges and railings; including pedestrian bridges.
- D. The Contractor shall maintain 20' minimum fire lane access to all facilities in the area.
- E. The Contractor shall post and maintain flag persons and suitable signs indicating that construction operations are under way and other warning signs as may be required.
- F. The Contractor shall safeguard the use by the public and Owner of all adjacent highways, roadways and footpaths, outside the Contract Limit Lines (work area), and shall conform to all laws and regulations concerning the use thereof, especially limitations on traffic and the movement of heavy equipment. Access to the site for delivery of construction materials and/or equipment shall be made only at the locations shown in the Contract Documents or approved by the Owner's Representative.
- G. The Contractor shall make every effort to keep dirt and debris from making its way to roadways. The Contractor shall immediately remove dirt and debris which may collect on permanent roadways due to the Work.
- H. The Contractor shall limit the extent of its activities to that area of the site defined on the Contract Drawings as being within the Contract Limit Lines.

- I. For that portion of the Work required under this Contract which must be performed in other than the defined areas both on-site and off, including operations involving delivery and removal of materials, the Contractor shall schedule and coordinate its activities through the Owner's Representative, to meet the approval of the Owner and minimize disruption of the normal scheduled activities of the occupants of adjacent spaces.
- J. It is the Owner's expectation that the Contractor will take protective measures to minimize damage caused by construction activities including, but not limited to, the use of personnel lifts, material handling equipment, on-site material storage, etc. All portions of the site, including the staging area and those areas affected by the work, shall be returned to their original condition after completion of Work. Such repair work shall include lawn restoration and reseeding, if required, and shall be included in the Contractor's Guarantee of Work.
- K. Routes to and from the location of the Work shall be as indicated in the Contract or as directed by the Owner's Representative. Temporary roadways shall be closed only with prior approval of the Owner's Representative.

1.3 UNIVERSITY CLOSURES

- A. In the event of University closure, the Contractor should use their judgement, follow their internal guidance on continuity of operations, and the direction of law enforcement, as to whether or not they will maintain operations on construction sites on campus. They should make this decision with the awareness that Cornell response to any project needs (shutdowns, emergencies) will not be possible and the maintenance of roads and walks will not be to normal operating standards.
- B. With your safety as a top priority, the Cornell University Police allows you the ability to take advantage of our Emergency Mass Notification System that enables your cellphone to become a personal safety device for you. Contractor's wishing to participate may text the following: **CornellAlert** to **67283** and you will be set up to receive alert messages. Be advised that you may stop receiving messages at any time by sending "stop" to **CornellAlert**. There will also be a system generated "stop" every year on August 1st at which point you will need to send the text **CornellAlert** to re-enlist.

1.4 WATER USE RESTRICTION

- A. The Contractor shall adhere to any University issued Water Use Restrictions in place at the time of construction.

1.5 PARKING

- A. The Owner may designate an area for parking of essential Contractor vehicles on the project site.
- B. The Contractor shall make all arrangements, and bear the cost, for transportation of all trade persons from the designated parking area to the construction site as necessary.

- C. It should be noted that there is a fee for all parking on the Cornell University campus. The Contractor is responsible for the payment for all parking costs imposed by the Owner. The Contractor should contact the Project Manager (Ruth Howell) for additional information. The Contractor will be required to complete a "New Construction Employee Form" for each permit requested. This form may be found at <http://finance.fs.cornell.edu/contracts/forms/contractors.cfm>.
- D. Contractor shall cooperate with Transportation Services and/or other authorities having jurisdiction, as follows:
 - 1. Ensure parking by all employees of the Contractor, subcontractors, material suppliers, and others connected with this project only within construction fence or the designated parking area.
 - 2. Prohibit employees from parking in any other areas, roads, streets, grounds, etc.
 - 3. Discharge any employee refusing to comply with these requirements.
 - 4. Ensure proper transportation of personnel between the designated parking area and the construction site.
- E. The Contractor shall remove from the parking area and staging area all temporary trailers, rubbish, unused materials, and other materials belonging to the Contractor or used under the Contractor's direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the Owner at the expense of the Contractor, and the Contractor shall be liable therefore.

1.6 CHANGEOVERS AND CONTINUITY OF SERVICES

- A. Make all changeovers, tie-ins and removals, etc., of any part of the Work that would affect the continuity of operation of the adjacent services at approved times that will not interfere with the Owner's operations. Secure approval of Owner before proceeding.
- B. Make all necessary temporary connections required to permit operation of the building services and/or equipment. Remove the connections after need has ceased.
- C. The Contractor may be permitted to make changeovers during normal working hours at the Owner's discretion. Should the Contractor perform this Work outside of normal working hours, no extra payment will be made for resulting overtime expenses.
- D. When connecting new facilities do not shut off any existing Mechanical/Electrical facilities or services without prior written approval of Owner's Representative.
- E. The Contractor shall not, except in an emergency condition, shutdown any utility without the express permission of the Owner's Representative. Major, affecting life safety or outside contract limit lines, shutdowns of utilities will be performed by Cornell University to enable Contractor to perform required work. Major shutdowns shall be defined as those affecting life safety or which are outside the project site limits.

- F. Maintain domestic water and firewater in service at all times. No service may be out for more than twenty-four (24) hours. Maintain firewater flow capability (hose, if necessary) to all buildings and coordinate with Cornell Utilities, Cornell Environmental Health and Safety (EH&S), and City of Ithaca Fire Department.
- G. All shutdowns to be scheduled a minimum of seven (7) calendar days in advance and requests shall be submitted via ePM system to the Owner's Representative.
- H. IN THE EVENT OF AN EMERGENCY WHERE THE OWNER'S REPRESENTATIVE IS NOT AVAILABLE, THE CONTRACTOR SHALL DIAL 911 IMMEDIATELY.

1.7 OBSTACLES, INTERFERENCE AND COORDINATION

A. General

- 1. Plans show general design arrangement. Install work substantially as indicated and verify exact location and elevations; DO NOT SCALE PLANS.
- 2. Due to small scale of Drawings, it is not possible to indicate all offsets, fittings, changes in elevations, interferences, etc. Make necessary changes in the Work, equipment locations, etc., after notification to the Owner's Representative and Architect. Obtain approval from same, as part of Contract, to accommodate work to obstacles and interferences encountered.
- 3. Obtain written approval for all major changes before installing. If requested, submit drawings, detailing all such deviations or changes.
- 4. Exposed to view mechanical units, ductwork, conduit, pipes or other building equipment are essential parts of the artistic effect of the building design and shall be installed in locations as shown on the drawings. Conformance to given dimensions and alignments with the structural system, walls, openings, indicated centerlines are a requirement of the Contract and the Contractor shall familiarize himself with the critical nature of proper placement of these items. The Contractor shall notify the Architect of conflicts which would cause such equipment to be installed in locations other than as indicated on the Drawings. The Contractor shall not proceed with the installation of exposed to view mechanical units, ductwork, conduit, pipes, etc. until all conflicts have been identified by the Contractor and resolutions to conflicts approved by the Architect.

B. Interference

- 1. Install work so that all items are operable and serviceable and avoid interfering with removal of rails, filters, belt guards and/or operation of doors, etc. Provide easy and safe access to valves, controllers, motor starters and other equipment requiring frequent attention.

1.8 EQUIPMENT ARRANGEMENTS

- A. Since all equipment of equal capacity is not necessarily of same arrangement, size of construction, these Plans are prepared on basis of one manufacturer as "basis-of-design equipment", even though other manufacturers' names are mentioned.

- B. If Contractor elects to use specified equipment other than "design equipment" which differs in arrangement, size, etc., the Contractor does so subject to following conditions:
 - 1. Submit detailed drawings indicating proposed installations of equipment and showing maintenance and service space required.
 - 2. If revised arrangement meets approval, make all required changes in the work of all trades, including but not limited to louvers, panels, structural supports, pads, etc. at no increase in Contract. Provide larger motors and any additional control devices, valves, fittings and other miscellaneous equipment required for proper operation of revised layout, and assumes responsibility for proper location of roughing in and connections by other trades.
 - 3. If revised arrangement does not meet approval because of increase in pressure loss, possibility of increase in noise, lack of space or headroom, insufficient clearance for removal of parts, or for any other reason, provide equipment which conforms to Contract Drawings and Specifications.

1.9 EXISTING EQUIPMENT, MATERIALS, FIXTURES, ETC.

- A. Where existing equipment, piping, fittings, etc. are to be removed, Contractor shall submit complete list to Owner. All items that Owner wishes to retain shall be carefully removed and salvaged and delivered to building storage where directed by Owner. Items that Owner does not wish to retain shall be removed from the site and legally disposed.

1.10 EXAMINATION OF PREMISES, DRAWINGS, ETC.

- A. Before Submitting Proposal
 - 1. Examine all Drawings and Specifications relating to Work of all trades to determine scope and relation to other work.
 - 2. Examine all existing conditions affecting compliance with Plans and Specifications, by visiting site and/or building.
 - 3. Ascertain access to site, available storage and delivery facilities.
- B. Before Commencing Work on Any Phase or in any Area
 - 1. Verify all governing dimensions at site and/or building.
 - 2. Inspect all adjacent work.
- C. Tender of Proposal Confirms Agreement
 - 1. All items and conditions referred to herein and/or indicated on accompanying Drawings.
 - 2. No consideration, additional monies or time extensions will be granted for alleged misunderstanding.

D. Existing or Archived Drawings

1. Existing or Archived drawings of impacted buildings are appended in electronic format only for reference and informational purposes. These historic drawings are not to be considered contract drawings and are provided "FOR INFORMATION ONLY". The Owner makes no representation as to the accuracy of the drawings as representing current conditions.

1.11 STAND DOWN DATES

A. Strict and effective enforcement by Contractor's management and supervision of the following dates and hours is required.

1. **Stand-Down Dates** (No construction work and no deliveries on site):

- a. Commencement Weekend
 - Saturday, May 27, 2023
 - Sunday, May 28, 2023
- b. Reunion Weekend
 - Thursday, June 8, 2023
 - Friday, June 9, 2023
 - Saturday, June 10, 2023
 - Sunday, June 11, 2023

2. **Restricted Work Dates** (delivery & demolition restrictions but otherwise work as usual):

Friday, May 26, 2023	Commencement weekend- deliveries and work outside fence stop at noon
Thursday, Friday June 8-9, 2023	Reunion guest arrivals- no work outside fence; no demo or utility work inside fence
Friday, June 9, 2023	Reunion weekend- deliveries and work outside fence stop at noon

3. **Student and Campus Life**

Residence Halls Open

August 18, 2023

- ❖ No deliveries, no hauling materials into or out of the project site.
- ❖ All work to be contained to the fenced area of the project site.

1.12 WORKING HOURS

- A. Normal work hours are 7:00AM-5:00PM Monday-Saturday except during above noted restrictions. This means that Contractor shall not permit any noise generating activities that could disturb campus occupants or residents to take place outside of these hours. Should any conditions necessitate work to extend beyond these hours – Contractor may submit a detailed request with reasonable advance notice to Cornell. Cornell (at its sole discretion) may issue a written relaxation of the above but Contractor is advised never to assume that it will be granted.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 14 00*****

SECTION 01 25 00 SUBSTITUTIONS AND PRODUCT OPTIONS

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish and install the products specified, under the options and conditions for substitutions stated in this Section.

1.2 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 that are beyond the Contractor's control, such as unavailability of product, or regulatory changes.
 - a. Products that are not available from Contractor's preferred suppliers does not constitute unavailability of product.
 2. Substitutions for Convenience: Changes proposed by Contractor or Owner that are not required in order to meet other Project requirements but may offer advantage to Contractor or Owner.
- B. 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. Items salvaged from other projects are not considered new products. Items that are manufactured or fabricated to include recycled content materials are considered new products, unless indicated otherwise.
 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.

- C. Basis-of-Design Product Specification: A specification in which a specific manufacturer's product is named and accompanied by the words "basis-of-design product," including make or model number or other designation, to establish the significant qualities related to type, function, dimension, in-service performance, physical properties, appearance, and other characteristics for purposes of evaluating comparable products of additional manufacturers named in the specification.

1.3 ACTION SUBMITTALS

- A. Substitution Requests: Submit indicated number of copies of each Substitution Request Form, attached hereto, for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.
 - 1. In addition to submission of Substitution Request Form, substitutions shall be listed on the Bid Proposal Submission Form with description, specification references, and corresponding change in base bid.

1.4 PRODUCTS LIST

- A. Within thirty (30) days after the award of Contract, submit to the Architect five copies of a complete list of products which are proposed for installation.
- B. Tabulate the products by listing under each specification section title and number.
- C. For products specified only by reference standards, list for each such product:
 - 1. Name and address of the manufacturer.
 - 2. Trade name.
 - 3. Model or catalog designation.
 - 4. Manufacturer's data:
 - a. Reference standards.
 - b. Performance test data.

1.5 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.
- B. 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. Contractor is responsible for providing products and construction methods compatible with other products and construction methods.

2. If a dispute or compatibility issue arises over concurrently selectable but incompatible products, Architect will determine which products shall be used.

1.6 PROCEDURES

- A. Coordination: Modify or adjust affected work as necessary to integrate work of accepted substitutions and approved comparable products.

1.7 EQUIVALENTS – APPROVED EQUAL

- A. Equivalents or Approvals - General

1. The words “similar and equal to”, or “or equal”, “equivalent” and such other words of similar content and meaning shall for the purposes of this Contract be deemed to mean similar or equivalent to one of the named products. For the purposes of Paragraph A and B of this Section 1.4 and for the purposes of Bidding Documents, the word “products” shall be deemed to include the words “articles”, “materials”, “items”, “equipment” and “methods”. Whenever in the Contract documents one or more products are specified, the words “similar and equal to” shall be deemed inserted.
2. Whenever any product is specified in the Contract documents by a reference to the name, trade name, make or catalog number of any manufacturer or supplier, the intent is not to limit competition, but to establish a standard of quality which the Architect has determined is necessary for the Project. The Contractor may at its option use any product other than that specified in the Contract Documents provided the same is approved by the Architect in accordance with the procedures set forth in Paragraph B of this Section 1.4. In all cases the Architect shall be the sole judge as to whether a proposed product is to be approved and the Contractor shall have the burden of proving, at its own cost and expense, to the satisfaction of the Architect, that the proposed product is similar and equal to the named product. In making such determination the Architect may establish such objective and appearance criteria as it may deem proper that the proposed product must meet in order for it to be approved.
3. Nothing in the Contract Documents shall be construed as representing, expressly or implied, that the named product is available or that there is or there is not a product similar and equal to any of the named products and the Contractor shall have and make no claim by reason of the availability or lack of availability of the named product or of a product similar and equal to any named product.
4. The Contractor shall have and make no claim for an extension of time or for damages by reason of the time taken by the Architect or by reason of the failure of the Architect to approve a product proposed by the Contractor.
5. Request for approval of proposed equivalents will be received by the Architect only from the Contractor.

B. Equivalents or Approvals After Bidding

1. Request for approval of proposed equivalents will be considered by the Architect after bidding only in the following cases: (a) the named product cannot be obtained by the Contractor because of strikes, lockouts, bankruptcies or discontinuance of manufacturer and the Contractor makes a written request to the Architect for consideration of the proposed equivalent within ten (10) calendar days of the date it ascertains it cannot obtain the named product; or (b) the proposed equivalent is superior, in the opinion of the Architect, to the named product; or (c) the proposed equivalent, in the opinion of the Architect, is equal to the named product and its use is to the advantage of the Owner, e.g., the Owner receives an equitable credit, acceptable to it, as a result of the estimated cost savings to the Contractor from the use of the proposed equivalent or the Owner determines that the Contractor has not failed to act diligently in placing the necessary purchase orders and a savings in the time required for the completion of the construction of the Project should result from the use of the proposed equivalent; or (d) the proposed equivalent, in the opinion of the Architect, is equal to the named product and less than ninety (90) calendar days have elapsed since the Notice of Award of the Contract.
2. Where the Architect pursuant to the provisions of this Section 1.4 approves a product proposed by the Contractor and such proposed product requires a revision or redesign of any part of the work covered by this Contract, all such revision and redesign and all new Drawings and details required therefore shall be subject to approval of the Architect and shall be provided by the Contractor at its own cost and expense.
3. Where the Architect pursuant to the provisions of this Section approves a product proposed by the Contractor and such proposed product requires a different quantity and/or arrangement of duct work, piping, wiring, conduit, or any other part of the work from that specified, detailed or indicated in the Contract Documents, the contractor shall provide the same at its own cost and expense.

1.8 CONTRACTOR'S OPTIONS

- A. For products specified only by reference standard, select any product meeting that standard, by any manufacturer.
- B. For products specified by naming several products or manufacturers, select any one of products and manufacturers named.
 1. Products:
 - a. Restricted List (Products): Where Specifications include paragraphs or subparagraphs titled "Products" or that include the phrase "provide one of the following" and include a list of names of both manufacturers and products, provide one of the products listed that complies with requirements. Comparable products for Contractor's convenience will not be considered.
 - Substitutions may be considered, unless otherwise indicated.

- b. Non-restricted List (Available Products): Where Specifications include paragraphs or subparagraphs titled “Available Products” or that include the phrase “include, but are not limited to, the following”, and 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.
- 2. Manufacturers:
 - a. Restricted List (Manufacturers): Where Specifications include paragraphs or subparagraphs titled “Manufacturers” or that include the phrase “provide products by one of the following”, and include a list of manufacturers' names, provide a product by one of the manufacturers listed that complies with requirements. Comparable products for Contractor's convenience will not be considered.
 - Substitutions may be considered, unless otherwise indicated.
 - b. Non-restricted List (Available Manufacturers): Where Specifications include paragraphs or subparagraphs titled “Available Manufacturers” or that include the phrase “include, but are not limited to, the following”, and 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.
- 3. 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.
 - a. Restricted List (List of Manufacturers): Where Specifications include paragraphs or subparagraphs titled “Basis-of-Design Product”, and include a list of other manufacturers' names, provide the specified or indicated product or a comparable product by one of the other named manufacturers that complies with requirements.
 - Comply with requirements in "Comparable Products" Article for consideration of an unnamed product by one of the other named manufacturers.
 - Substitutions may be considered, unless otherwise indicated.
 - b. Non-restricted List (No List of Manufacturers): Where Specifications include paragraphs or subparagraphs titled “Basis-of-Design Product”, and do not include a list of other manufacturers' names, provide the specified or indicated product or a comparable product by another manufacturer that complies with requirements. Comply with requirements in "Comparable Products" Article for consideration of an unnamed manufacturer's product.

- C. For products specified by naming one or more products or manufacturers and stating "or equal", the Contractor shall submit a request as for substitutions, for any product or manufacturer not specifically named. Such substitution shall have been listed on Bid Proposal Submission Form as required in Instructions to Bidders. If not so listed, no substitution will be allowed.
- D. For products specified by naming only one product and manufacturer, no option and no substitution will be considered unless listed on the Bid Proposal Submission Form as provided in the Instructions to Bidders. Base Bid must include the specified product or manufacturer. Substitutions will be at the sole discretion of the Owner.

1.9 SUBSTITUTIONS

- A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than 21 days prior to time required for preparation and review of related submittals.
- B. Substitutions for Convenience: Submit requests for substitution within thirty (30) days of contract award.
- C. Submit a separate request for each substitution. Support each request with:
 - 1. Completed "Request for Substitution" form in eBuilder. A request for substitution of a product, material, or process for that specified in the Contract Documents must be formally submitted as such accompanied by evidence that the proposed substitution {1} is equal in quality and serviceability to the specified item; {2} will not entail changes in detail and construction of Other Work; {3} will be acceptable to the Architect and Owner's Design Consultant's in achieving design and artistic intent; and {4} will not result in a cost and/or schedule disadvantage.
 - 2. Complete data substantiating compliance of the proposed substitution with requirements stated in Contract Documents:
 - a. Product identification, including manufacturer's name and address.
 - b. Manufacturer's literature; identify:
 - Product description.
 - Reference standards.
 - Performance and test data.
 - c. Samples, as applicable.
 - d. Name and address of similar projects on which product has been used, and the date of each installation.
 - 3. An itemized comparison of the proposed substitution with the product specified listing any variations.
 - 4. Data relating to any changes in the construction schedule.

5. The effect of the substitution on each separate contract of the Project.
 6. List any changes required in other work or projects.
 7. Designate any required license fees or royalties.
 8. Designate availability of maintenance services, and source of replacement materials.
- D. Substitutions shall not result in additions to the Contract Sum.
- E. Substitutions will not be considered as having been accepted when:
1. They are indicated or implied on shop drawings or product data submittals without a formal request from the Contractor.
 2. They are requested by a subcontractor or supplier.
 3. The acceptance will require substantial revision of Contract Documents.
- F. Substitute products shall not be ordered or installed without written acceptance of the Owner.
- G. The Owner and the Architect shall be the sole judges of the acceptability of a proposed substitution.

1.10 COMPARABLE PRODUCTS

- A. Conditions for Consideration: Contractor's request for approval of comparable product will be considered when the following conditions are satisfied. If the following conditions are not satisfied, Architect may reject or return requests without action, except to record noncompliance with these requirements. Where products or manufacturers are specified by name, submit the following, in addition to other required submittals, to obtain approval of an unnamed product or manufacturer:
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, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the product specified.
 3. Evidence that proposed product provides specified warranty.
 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.

1.11 CONTRACTOR'S REPRESENTATION

- A. In making a formal request for a substitution the Contractor represents that:
1. By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor thereby represents that he has determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previous Shop Drawings, Product Data, or Samples and compliance with all the requirements of the Contract Documents. The accuracy of all such information is the responsibility of the Contractor.
 2. The Contractor has personally investigated the proposed product and has determined that it is equal to or superior in all respects to that specified.
 3. The Contractor will provide the same warranties or bonds for the substitution as for the product specified.
 4. The Contractor will coordinate the installation of an accepted substitution into the Work and will make such changes as may be required for the Work to be complete in all respects.
 5. The Contractor waives all claims for additional costs related to the substitution which may subsequently become apparent.

1.12 ARCHITECT'S DUTIES

- A. Review Contractor's requests for substitutions with reasonable promptness.
- B. Transmit evaluations and recommendations to the Owner, so that the Owner can notify the Contractor of the decision for acceptance or rejection of the request for substitution.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 25 00*****

SECTION 01 31 19 PROJECT MEETINGS

1.0 GENERAL

1.1 DESCRIPTION

- A. The Owner will schedule and administer pre-construction meeting, periodic progress meetings, and specially called meetings throughout the progress of the work.
 - 1. Prepare agenda for meetings.
 - 2. Distribute written notice of each meeting four days in advance of meeting date.
 - 3. Make physical arrangements for meetings.
 - 4. Preside at meetings.
 - 5. Record the minutes; include all significant proceedings and decisions.
 - 6. Duplicate and distribute copies of minutes after each meeting.
 - a. To all participants in the meeting.
 - b. To all parties affected by decisions made at the meeting.
 - c. To the Architect.
- B. Representatives of Contractor, subcontractors and suppliers attending the meetings shall be qualified and authorized to act on behalf of the entity each represents.

1.2 PRE-CONSTRUCTION MEETING

- A. Schedule at least fifteen (15) days after date of Notice to Proceed.
- B. Location: A central site, convenient for all parties.
- C. Attendance:
 - 1. Owner's Representative(s)
 - 2. Contractor(s)
 - 3. Architect and its professional consultants
 - 4. Major Subcontractors
 - 5. Major suppliers
 - 6. Safety Representatives for the Owner and Contractor

D. Minimum Agendum:

1. Distribution and discussion of:
 - a. List of major subcontractors and suppliers
 - b. Projected Construction Schedules
2. Critical work sequencing
 - a. Identification of major shutdowns and approximate schedule
3. Major equipment deliveries and priorities
4. Project Coordination
 - a. Designation of responsible personnel
5. Procedures and processing of:
 - a. Field decisions
 - b. Proposal requests
 - c. Submittals
 - d. Change Orders
 - e. Applications for Payment
 - f. Requests for Information
 - g. Daily Reports
6. Adequacy of distribution of Contract Documents
7. Procedures for maintaining Record Documents
8. Use of premises:
 - a. Office, work and storage areas
 - b. Owner's requirements
 - c. Job site personnel conduct
 - d. Building access and security
9. Temporary facilities, controls and construction aids
10. Temporary utilities

11. Safety and first-aid procedures
 - a. Contractor's Project Site Specific Plan
12. Security procedures
13. Housekeeping procedures
14. Affirmative Action Plan and Reporting requirements

1.3 PROGRESS MEETINGS

- A. Schedule regular periodic meetings on the site, not less than once every two weeks throughout the Construction period.
- B. Attendance:
 1. Architect
 2. Architect's professional consultants when, in the opinion of the Owner, needed.
 3. General Contractor, including Site Superintendent
 4. Owner's Representatives
 5. Subcontractors as appropriate to the agenda
 6. Suppliers as appropriate to the agenda
 7. Safety Representative
- C. Minimum Agenda:
 1. Review, approval of minutes of previous meeting
 2. Review percentage of work to be in place by next meeting by individual trades
 3. Review of work progress since previous meeting
 4. Field observations, problems, and conflicts
 5. Problems which impede Construction Schedule
 6. Review of off-site fabrication, delivery schedules
 7. Corrective measures and procedures to regain projected schedule.
 8. Revisions to Construction Schedule
 9. Planned progress and schedule, during succeeding work period.
 10. Coordination of schedules
 11. Review submittal schedules; expedite as required.

12. Maintenance of quality standards
 13. Review status of all issued proposal requests and change orders.
 14. Review proposed changes for:
 - a. Effect on Construction Schedule and on completion date
 - b. Effect on other contracts of the Project
 15. Other business
- D. All decisions, instructions, and interpretations given by the Architect/Engineer or its representative at these meetings shall be binding and conclusive on the Contractor.

1.4 PRE-INSTALLATION CONFERENCE(S)

- A. The Contractor to hold pre-installation conferences where required by individual specification sections or others at the discretion of the Owner. Minimum attendees would be Architect and/or their specific sub-consultant, Owner, Contractor, Subcontractor, key Suppliers, testing & inspection firm, Facilities Engineering subject matter expert, etc. Minimum agenda would include review of key submittals, RFI's, safety, logistics, material procurement, quality control, etc. Contractor to assemble and distribute the agenda minimum 48 hours prior to meeting as well as distribute meeting minutes a minimum of seven (7) calendar days after the meeting.
- B. Submit a list of pre-installation meetings with preliminary dates within fifteen (15) days of issuance of the Notice to Proceed.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

******END OF SECTION 01 31 19******

SECTION 01 31 50 ELECTRONIC PROJECT MANAGEMENT

1.0 GENERAL

1.1 SUMMARY

- A. Owner Provided System: The Contractor will utilize the Owner's electronic Project Management (e-PM) system eBuilder on this project.
 - 1. The Owner shall manage the day to day use of the Owner provided ePM system and organize the training, support and maintenance of the ePM Website System for the entire project team for the period of its use on the Project.
- B. There are no fees to utilize this system.

1.2 RELATED SECTIONS

- A. General Conditions Article 9 – Coordination and Cooperation.
- B. Section 01 33 00 – Submittal Procedures

1.3 DEFINITIONS

- A. ePM: defined as an internet-based information and project communication system that allows the entire project team to collaborate in a centralized and secured repository. All project-specific correspondence, workflow processes, and documentation will be stored and routed within the ePM system.

1.4 PROCEDURES

- A. Users will be provided a username and password. The Contractor shall log into the ePM system to enter project documentation. All documentation should be communicated through the ePM system.
- B. Training
 - 1. The Owner will provide training to familiarize team members with the system, and all Contractor staff are expected to attend one of these sessions or otherwise receive proper training on the system's use. All cost for personnel time and travel to attend the training as needed shall be included in the Contractor's proposal.
- C. The Contractor shall provide on-site personnel with personal computer(s) and personal computer equipment that will allow the Contractor's personnel to access and use the ePM system in a timely and efficient manner. At a minimum the Contractor is to provide the following equipment and software:
 - 1. Web Browser: with high-speed connection, up/downloading capability.

2. Color printer and plotter capable of full-size document production
 3. Scanner: capable of scanning a high volume of project documents clearly and quickly
 4. Digital Camera: (1) single lens reflex (SLR) type camera
 5. Portable Document Format (PDF) Reader/writer software
- D. Contractor shall log on to the ePM system on a daily basis, and as necessary to be kept fully apprised of the project developments, correspondence, assigned tasks and other matters that occur on the site. These may include but are not limited to RFI's, action items, meeting minutes, discussion threads, schedule updates, submittals, submittal log, punch list items, daily reports, site photos and/or videos and pre-construction surveys.

1.5 PROCESS OVERVIEW

- A. The Contractor is required to timely and accurately post, review, respond, and collaborate with other team members using the following features and/or workflow processes within the ePM system.
- B. Project Team Directory – Contractor shall provide an updated directory of contact information for all companies, subcontractors and project team members who are engaged on this project.
- C. Request for Information (RFI): All project RFI's will be submitted using the ePM system. The submission of a Request for Information (RFI) is the Contractor's exclusive means of requesting information from the Owner and/or Architect. Attachments to RFI's (which may include sketches, photographs, documentation, and the like, will be uploaded to the ePM system and attached to the RFI electronically.
- D. Meeting Minutes: Contractor shall enter meeting agendas, records, and minutes in the system for all applicable meetings as designated by the Owner.
- E. General Communications, memorandums, and Letters (Project Correspondence): Shall be created in or posted to the ePM system in PDF format electronically linked to action items. These action items shall include names of party (ies) required to respond, time frame within which action is to be taken and any solutions the Contractor recommends.
- F. Drawings and Specifications: The Contract Documents will be posted to the ePM system as directed by the Owner. The Owner shall retain the right to assign download rights to active CAD or model files. CAD or model files, in any format, posted to the ePM system are for viewing and printing only and cannot be edited.
- G. Submittals: All submittals shall be fully electronic. Reference Section 01 33 00.
- H. Submittal Register and Contractor shall review and update on a daily basis and shall close all approved items.

- I. Field Reporting: The Contractor shall post and/or update on a daily basis all reports required by other specification sections. These reports include, but are not limited to, daily construction reports, material location reports, unusual event reports, safety, and accident reports.
- J. Project Photographs: Contractor shall upload project photographs to the ePM system, field by date and type including but not limited to:
 - 1. General Progress Photographs
 - 2. RFI Issues
 - 3. Non-Conforming Work
 - 4. Special Events
 - 5. As required by individual Specification Sections
- K. Project Schedule: The contractor shall post, distribute, review, and/or respond to the project schedule, monthly updates, and any other schedule submittals onto the ePM in both native and PDF formats.
- L. Permits & Approvals: Contractor shall upload and maintain current copies of all permits and agency approvals that relate to the project.
- M. Issue Tracking: Contractor to log and respond to issues that are related and affect other stakeholders within the project team.
- N. Quality Assurance: The Owner and/or Architect will issue reports on conforming items in the ePM system. The Contractor is required to review and respond with corrective actions in the system.
- O. Change Management – Cost Events and Change Orders will be managed by the ePM system, and the Contractor shall be responsible for reporting potential changes and logging Requests for Change Orders in the system. The Contractor shall also upload and manage all documentation supporting Requested Change Orders.
- P. Pay Applications Requests (Invoices) – The Contractor shall create and submit both pencil and official payment applications (PA) electrically via the ePM system for review by the Owner.
- Q. Budget and Cost Management – Contractor to provide estimates and work breakdown structure (WBS) to provide Owner with accurate budget/cost analysis.

1.6 ADDITIONAL INFORMATION

- A. The Owner may change the standards for distribution and process prescribed above as required to suit the project.
- B. The Owner shall retain ownership of all data entered into either system and shall administrate and distribute all information contained therein.
- C. The Contractor shall make certain that all subcontractors performing significant work on the project shall actively participate in the ePM system. Requirements for participation in the ePM system shall be made part of each bid document and final contract.

2.0 PRODUCTS – NOT USED**3.0 EXECUTION – NOT USED**

******END OF SECTION 01 31 50******

SECTION 01 32 16 CONSTRUCTION SCHEDULE

1.0 GENERAL

1.1 SUMMARY

- A. The Contractor shall, within fourteen (14) calendar days of Notice to Proceed, prepare and submit to the Owner estimated construction progress schedules for the entire Work, with sub-schedules of related activities which are essential to the progress of the Work.
- B. Conferences will be held with the Architect, Owner and Contractor at the start of the project to agree mutually on a progress schedule which must be diligently followed.
- C. Submit revised progress schedules periodically and when requested to do so by Owner.
- D. Submit to Owner and Architect a cash flow projection in accordance with Schedule of Values.
- E. Submit electronic versions of all schedules, including updates, as well as all back-up to the submitted schedules.

1.2 FORM OF SCHEDULES

- A. Prepare Network Analysis system or prepare schedules in the form of a horizontal bar chart.
 - 1. Provide separate horizontal bar for each trade or operation.
 - 2. Horizontal time scale: Identify the first workday of each week.
 - 3. Scale and spacing: To allow space for notations and future revisions.
- B. Format of listings: The chronological order of the start of each item of work.
- C. Identification of listings: By specification section numbers.

1.3 CONTENT OF SCHEDULES

- A. Construction Progress Schedule:
 - 1. Show the complete sequence of construction by activity.
 - 2. Show the dates for the beginning, and completion of, each major element of construction. Specifically, list:
 - a. Site clearing
 - b. Site utilities

- c. Foundation work
 - d. Structural framing
 - e. Subcontractor work
 - f. Equipment installations
 - g. Finishes
 - h. Pre-Installation meetings
3. Show projected percentages of completion for each item, as of the first day of each month.
 4. Show estimated dates for the beginning and completion of work which must be completed by or coordinated with the Owner such as hazardous materials abatement, moving, training and other such items as they are identified.
- B. Submittals Schedule for Shop Drawings, Product Data and Samples: Confer with the Architect and agree on all elements of the Submittals Schedule. The schedule will be based on the understanding that minimum turn-around time in the Architect's office is ten (10) working days. Some submittals or groups of submittals may take longer to review. Submittals which do not conform to the agreed schedule may be subject to delays in processing. Show:
1. The dates for Contractor's submittals.
 2. The dates reviewed submittals will be required from the Architect.
 3. Confirmed lead time for manufacturing, production, fabrication and shipment to the project site of all materials which have an impact on the critical path of the Project's construction schedule.

1.4 PROGRESS REVISIONS

- A. Indicate progress of each activity to date of submission.
- B. Show changes occurring since previous submission of schedule:
1. Major changes in scope
 2. Activities modified since previous submission.
 3. Revised projections of progress and completion
 4. Other identifiable changes
- C. Provide a narrative report as needed to define:
1. Problem areas, anticipated delays, and the impact on the schedule.
 2. Corrective action recommended, and its effect.

3. The effect of changes on schedules of other prime contractors.

1.5 SUBMISSIONS

- A. Submit initial Construction Progress Schedules within fifteen (15) calendar days after award of Contract.
 1. Owner will review schedules and return review copy within ten (10) days after receipt.
 2. If required, resubmit within seven (7) days after return of review copy.
- B. Submit progress revision schedules to accompany each application for payment.
- C. Submit Submittals Schedule within thirty (30) calendar days after date of commencement of work.
- D. Submit one reproducible transparency and one opaque reproduction.

2.0 PRODUCTS - NOT USED

3.0 EXECUTION

3.1 DISTRIBUTION

- A. Distribute copies of the reviewed schedules to:
 1. Owner Job Site personnel
 2. Subcontractors
 3. Other concerned parties
- B. Instruct recipients to report to the Contractor, in writing, any problems anticipated by the projections of the schedule.

*****END OF SECTION 01 32 16*****

SECTION 01 32 33 PHOTOGRAPHIC DOCUMENTATION

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide existing condition photographs taken before commencement of Work, progress photographs taken periodically during progress of the Work, and final photographs upon completion and full occupancy of the building.

1.2 SUBMITTALS

- A. Progress Submittals
1. Key Plan: Submit key plan of Project area and building with notation of vantage points marked for location and direction of each photograph.
 2. Submit digital photograph electronic files, organizationally filed by week, to E-Builder within five (5) days of taking photographs.
 3. Each photograph shall be identified with project title, date, and a description of the view.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION

3.1 EXISTING CONDITION PHOTOGRAPHS

- A. Before commencement of selective demolition, take photographs of Project area and surrounding areas, including existing items to remain during construction.

3.2 PROGRESS PHOTOGRAPHS

- A. Photographs shall be taken weekly in a manner which completely documents the work.
- B. The photographs shall be submitted to the Owner at the end of the first week for review.
- C. Provide photographs of any wall, ceiling or floor assembly containing MEP, A/V or any infrastructure that will thereafter become concealed-prior to closure. Note location on Key Plan.

3.3 FINAL COMPLETION PHOTOGRAPHS

- A. Photographs shall be taken in a manner which completely documents the completed work, for submission as project record documents.

*****END OF SECTION 01 32 33*****

SECTION 01 33 00 SUBMITTAL PROCEDURES

1.0 GENERAL

1.1 DESCRIPTION

- A. Section includes administrative and procedural requirements for submittals, including the following:
 - 1. Shop Drawings
 - 2. Product Data
 - 3. Samples
 - 4. Quality Assurance and Quality Control Submittals
 - 5. Certification of Asbestos free products
 - 6. Owner audio/visual
 - 7. Owner furnishings and fixed equipment
- B. Designate in the construction schedule, and/or in a separate Submittals Schedule, the dates for submission and the dates reviewed Shop Drawings, Product Data and Samples will be needed.
- C. With the exception of physical samples and color charts, or as otherwise approved by the Owner, all submittals shall be electronic images in PDF format created electronically (saved with commenting allowed) which shall be submitted for review and approval via the electronic project management web site. PDFs shall be created directly from the native file format electronically. Scanning of paper to PDF shall be used minimally. Any non-electronic submittals shall be approved on a case-by-case basis and logged into the electronic management system as directed by a Cornell representative.

1.2 SUBMITTAL REGISTRY AND SCHEDULE

- A. The Architect shall provide a draft submittal registry in the template needed for eBuilder importation. It will be part of the contract documents and turned over to the Contractor in native format for their use. The Contractor shall be responsible for review and completion of the registry including addition of dates identified below and other information as deemed necessary by the Owner.
- B. The submittal registry and schedule shall list all submittals required by the specifications, listed in order by the specification section in which they are required. Coordinate the Submittal Schedule with the Contractor's Critical Path Method Construction Schedule and other related documents.

- C. The Submittal Registry shall include the following information:
1. Title (*by Architect for Contractor review*)
 2. Related specification section and paragraph numbers (*by Architect for Contractor review*)
 3. Subsection (*by Architect for Contractor review*)
 4. Category of Submittal (Certification, Mock-Up, Operations/Maintenance Manual, Product Data, Sample, Shop Drawing, Test Report, As Built, etc.) (*by Architect for Contractor review*)
 5. Submittal Description including description of the part of the Work covered by the submittal (*by Architect for Contractor review*)
 6. Name of Subcontractor, if applicable (*Contractor provided, optional*)
 7. Date due from Subcontractor (*Contractor provided, optional*)
 8. Date due to be submitted for review (*Contractor provided, required*)
 9. Date due for submittal review to be completed (*Contractor provided, required*)
 10. Date for transmittal to Subcontractor (*Contractor provided, optional*)
 11. Date for material or product delivery to project (*Contractor provided, required*)
 12. Priority. Low, normal or high (*Contractor provided, required*)
- D. Schedule a resubmittal for each major submittal. Except where specified otherwise in the contract documents, provide review times for submittals in accordance with Submittal Procedures and Architect's Duties below.
- E. Distribution: Initially submit the Submittal Schedule to the Owner for review via the electronic Project Management system. A submittal schedule compliant with the requirements of this section showing all submittals for the preliminary schedule submission duration shall be submitted with the Contractor's preliminary schedule submittal described in Section 01 32 16. The schedule shall also enumerate all submittals to be processed after the initial preliminary schedule submission duration period, although the date for these submittals does not have to be indicated. A final baseline submittal schedule showing all submittals for the entire project shall be included in the baseline schedule submittal described in Section 01 32 16.
- F. Updating: The Submittal Schedule shall be kept up to date by the Contractor until all submittals are approved. Failure to provide the requested information, or delay in submitting required submittals may result in the payment request being returned to the Contractor until the required schedule or submittals are received.

1.3 SHOP DRAWINGS

- A. Drawings shall be newly prepared information drawn accurately to scale by skilled draftsperson and presented in a clear and thorough manner.
 - 1. Highlight, encircle, or otherwise indicate deviations from Contract Documents.
 - 2. Do not reproduce Contract Documents or copy standard information as basis of Shop Drawings.
 - 3. Standard information prepared without specific reference to Project is not Shop Drawing.
- B. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:
 - 1. Dimensions.
 - 2. Identification of products and materials included by sheet and detail number.
 - 3. Compliance with specified standards.
 - 4. Notation of coordination requirements.
 - 5. Notation of dimensions established by field measurements.
 - 6. Submittal:
 - a. For electronic transmittal, submittals shall be distributed electronically via the electronic project management system and will be reviewed and returned electronically marked with action taken.
 - b. Maintain returned document as a "Record Document".

1.4 PRODUCT DATA

- A. Product Data includes brochures, diagrams, standard schedules, performance charts, and instructions that illustrate physical size, appearance and other characteristics of materials and equipment. All submittals shall identify all products as being asbestos free, see Section 01 35 29.
- B. Collect Product Data into a single submittal for each element of construction or system.
 - 1. Clearly mark each copy to show applicable choices and options. Failure to do so will result in rejection of the submission.
 - 2. Show performance characteristics and capacities.
 - 3. Show dimensions and clearances required.
 - 4. Show wiring or piping diagrams and controls.

5. Where Product Data includes information on products that are not required, eliminate or mark through information that does not apply.
6. Supplement standard information to provide information specifically applicable to the Work.
7. Preliminary Submittal: Submit single copy of Product Data where selection of options by Architect is required.
8. Submittals:
 - a. For electronic transmittal, submittals shall be distributed electronically via the electronic project management system and will be reviewed and returned electronically marked with action taken.
 - b. Maintain one (1) copy as a "Record Document".

1.5 SAMPLES

- A. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
- B. Office samples shall be of sufficient size and quantity to clearly illustrate:
 1. Functional characteristics of the product, with integrally related parts and attachment devices.
 2. Full range of color, texture and pattern.
- C. Field samples and mock-ups:
 1. Contractor shall erect, at the Project site, at a location acceptable to the Architect.
 2. Size or area: that specified in the respective specification section.
 3. Fabricate each sample and mock-up complete and finished.
 4. Remove mock-ups when directed by the Architect.
 5. Perform necessary work to bring any area disturbed by mock-ups to the areas original condition.
- D. Submit fully fabricated Samples cured and finished as specified and physically identical with material or product proposed.
 1. Mount or display Samples in manner to facilitate review of qualities indicated.
 2. Identify Samples with generic description, product name, and name of manufacturer.
 3. Submit Samples for review and verification of size, kind, color, pattern, and texture.

4. Where variation in color, pattern, texture, or similar characteristics is inherent in material or product represented, submit at least three (3) multiple units that show approximate limits of variations.
5. Preliminary Submittals: Submit one (1) full set of choices where Samples are submitted for Architect's selection of color, pattern, texture, or similar characteristics from a range of standard choices.
6. Submittals:
 - a. Submit four (4) sets for Architect's review. Architect will return at least one (1) set marked with action taken. Maintain sets of Samples, as returned, at Project Site, for quality comparisons throughout course of construction. Additionally, for electronic transmittal, photograph sample and its label and attached to the submittal item electronically via the electronic project management.

1.6 QUALITY ASSURANCE AND QUALITY CONTROL SUBMITTALS

- A. Quality assurance and quality control submittals include design data, test reports, certifications, manufacturer's instructions, and manufacturer's field reports.
- B. Professional design services or certifications: Where Contract Documents require professional design services or certifications by a design professional, Contractor shall cause such services or certifications to be provided by a qualified design professional, whose registration seal shall appear on drawings, calculations, specifications, certifications, Shop Drawings, and other submittals prepared by such professional. Architect shall be entitled to rely upon adequacy, accuracy, and completeness of services, certifications, or approvals performed by such design professionals.
- C. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies as specified in the Contract Documents.
- D. Manufacturer's instruction: Preprinted instructions concerning proper application or installation of system or product.
- E. Manufacturer's field reports: Reports documenting testing and verification by manufacturer's field representative to verify compliance with manufacturer's standards or instructions.
- F. Submittals:
 1. For electronic transmittal, submittals shall be distributed electronically via the electronic project management system and will be reviewed and returned electronically marked with action taken.
 2. Maintain one (1) additional copy as "Record Document".

1.7 CONTRACTOR RESPONSIBILITIES

- A. Review submittals for compliance with Contract Documents and approve submittals prior to transmitting to the Architect.

- B. Specifically record deviations from Contract Document requirements, including minor variations and limitation. Comply with requirements of Section 01 25 00 Substitutions and Product Options.
- C. Contractor's approval of submittals shall indicate that the Contractor has determined and verified materials, field measurements and field construction criteria, and has checked and coordinated information within each submittal with requirement of the Work and Contract Documents. Field conflicts which arise from the contractor's failure to fully review and approve submittals before ordering equipment, will result in the contractor being burdened with all costs to remediate the situation.
- D. Contractor shall be responsible for:
 - 1. Compliance with the Contract Documents
 - 2. Confirming and correlating quantities and dimensions
 - 3. Selecting fabrication processes and techniques of construction.
 - 4. Coordination of the work represented by each submittal with other trades.
 - 5. Performing the work in a safe and satisfactory manner.
 - 6. Compliance with the approved Construction Schedule.
 - 7. All other provisions of the agreements.
- E. It is understood that the Architect's notation on the submittals is not to be construed as an authorization for additional work or additional cost.
- F. If any notations represent a change to the Contract Sum, submit a cost proposal for the change in accordance with procedures specified before proceeding with the work.
- G. It is understood that the Architect's notation on the submittal is not to be construed as approval of colors. Make all color-related submittals at one time.
- H. Notify the Architect by letter of any notations made by the Architect which the Contractor finds unacceptable. Resolve such issues prior to proceeding with the Work.
- I. Begin no fabrication of work until all specified submittal procedures have been fulfilled.
- J. Do not submit shop drawings, product data or samples representing work for which such submittals are not specified. The Architect shall not be responsible for consequences of inadvertent review of unspecified submittals.
- K. The review of shop drawings shall not relieve the Contractor of the responsibility for proper construction and the furnishing of materials and labor required even though the same may not be indicated on the review shop drawings.
- L. Certify that only asbestos free material is used in the execution of all work. Reference Section 01 35 39.

1.8 SUBMITTAL PROCEDURES

A. Coordination

1. Coordinate submittals with performance of construction activities in accordance with the Submittal Schedule approved by the Architect and Owner.
2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals and related activities that require sequential activity.
3. Prepare and transmit each submittal in accordance with the Submittals Schedule, agreed to by all entities involved.
4. Prepare, review, approve and transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
5. Architect's Review: Allow ten (10) working days for Architect's initial processing of each submittal requiring the Architect's review and response, except for longer periods required as noted below, and where processing must be delayed for coordination with subsequent submittals. The Architect will advise the Contractor promptly when it is determined that a submittal being processed must be delayed for coordination. Allow ten (10) working days for Architect's reprocessing of each submittal. Notify the Architect when processing time for a submittal is critical to the progress of the work, and the work would be expedited if its processing time could be shortened.

An additional five (5) working days will be required for items specified in Divisions 2, 3, 5, 23 and 26, and for Architectural Woodwork, Hollow Metal Work and Hardware Schedules.

6. Allow time for delivery in addition to review.
7. Allow time for reprocessing each submittal.
8. No extension of Contract Time will be authorized because of failure to prepare submittals sufficiently in advance of Work to permit processing.
9. Submittals made which do not conform to the schedule are subject to delays in processing by the Architect.
10. Refer to Section 01 32 16 Construction Schedules for requirements of the Submittals Schedule.
11. Failure of the Contractor to obtain approval of Shop Drawings shall render all work thereafter performed to be at Contractor's sole risk, cost and expense.

B. Submittal Preparation

1. Place permanent label or title block on each submittal for identification.
2. Indicate name of entity that prepared each submittal on label or title block.

3. Provide space on label or beside title block on Shop Drawings to record Contractor's stamp, initialed or signed, certifying to review of submittal, action taken, verification of products, field measurements and field construction criteria, and coordination of the information within the submittal with requirements of the Work and of Contract Documents.
 4. Complete all fields on submittal item details in ePM system including meaningful description.
 5. Include the following information on submittal documentation:
 - a. Drawing, detail, or specification references, including section number, as appropriate to clearly identify intended use of product.
 - b. Field dimensions clearly identified as such.
 - c. Relation to adjacent or critical features of the work or materials.
 - d. Applicable standards, such as ASTM or Federal Specification numbers.
 - e. Provide a blank space for the Architect's stamps.
 - f. On transmittal, record relevant information including deviations from Contract Document requirements, including minor variations and limitations.
 6. Identification of revisions on re-submittals, other than those noted by the Architect on previous submittals.
 7. Shop drawings with the comment "by others" are not acceptable. All such work must specifically identify the related responsible subcontractor.
- C. Submittal Transmittal:
1. Transmit submittals via the electronic project management system to Architect unless otherwise noted or directed.
 2. Prepare and generate transmittal in ePM system for submission of samples. Package sample and other each submittal appropriately for transmittal and handling.

1.9 RECORD SUBMITTALS

- A. Provide a record copy of the submittal (electronic format) for the O&M Manual.

1.10 RESUBMISSION REQUIREMENTS

- A. Make any corrections or changes noted on previous submittals.
- B. Shop Drawings and Product Data:
1. Revise initial drawings or data and resubmit as specified for the initial submittal.
 2. Indicate any changes which have been made other than those noted by the Architect.

- C. Samples: Submit new samples as required for initial submittal.

1.11 ARCHITECT'S DUTIES

- A. Review submittals with reasonable promptness as identified in 1.8, paragraph 5 of this Section.
- B. Notations on the Submittal Review Stamp or eBuilder file mean the following:
1. "Approved (APP)" indicates that no deviations from the design concept have been found and Work may proceed.
 2. "Approved as Noted (AAN)" indicates that deviations from the design concept which have been found are noted, and the Contractor may proceed accordingly.
 3. "Revise and Resubmit (RAR)" indicates that Work covered by submittal, including purchasing, fabrication, delivery, or other activity may not proceed. Revise or prepare new submittal according to Architect's notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 4. "Rejected (REJ)" indicates that Work covered by submittal, including purchasing, fabrication, delivery, or other activity may not proceed. Revise or prepare new submittal according to Architect's notations; resubmit without delay. Repeat if necessary to obtain different action mark.
 5. "On Hold (ONH)" is used in a very limited capacity and means that the Contractor should not take action until the reason for hold has been cleared and may be required to revise and resubmit.
 6. "Not Reviewed (NRV)" is used for submittals that were submitted in error, duplicate, or other reason that does not require review by the Architect but need to be closed by the Contractor upon return to them.
 7. "For Record Only (FRO)": Submittals for information or record purposes, including Quality Assurance and Quality Control Submittals, and Material Safety Data Sheets (MSDS), will not require responsive action by the Architect.
 - a. Architect will forward informational submittals without action.
 - b. Architect will reject and return informational submittals not in compliance with Contract Documents.
- C. Incomplete Submittals: Architect will return incomplete submittals without action.
- D. Unsolicited Submittals: Architect will return unsolicited submittals to sender without action.
- E. Return submittals to Contractor for distribution, or for resubmission.

1.12 DISTRIBUTION

- A. Distribute reviewed Shop Drawings and copies of Product Data, when possible, via the electronic project management system to:
 - 1. Job site file
 - 2. Record Documents file
 - 3. Subcontractors
 - 4. Installers
 - 5. Suppliers
 - 6. Manufacturers
 - 7. Fabricators
 - 8. Architect
 - 9. Owner
- B. Do not permit use of unmarked copies or rejected copies of submittals in connection with construction at Project Site or elsewhere where Work is in progress.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 33 00*****

SECTION 01 35 29 GENERAL HEALTH & SAFETY

1.0 GENERAL

1.1 DESCRIPTION

- A. This Section provides requirements for general health and safety during the project. The requirements of this Section shall apply to both Contractor and all tiers of sub-contractors involved in the project.
1. General Emergency Information – It is recommended that both Contractor and all sub-tiers:
- a. Sign up for Cornell Emergency Alerts. The instructions can be found at (use the visitors section): <https://emergency.cornell.edu/alert/>
 - b. Signup for Tompkins County Emergency alerts at: <https://www2.tompkinscountyny.gov/doer/swift911alerts>
 - c. Cornell EHS has brief guidance on some emergency scenarios at: <https://emergency.cornell.edu/eag/>
- B. In addition to the requirements of this Section, all laws and regulations by applicable local, state, and federal agencies shall apply to the work of this contract. In some cases, the requirements of these Specifications may by intention exceed such legal requirements, but in no case shall this Specification be interpreted or understood to reduce or eliminate such requirements.

1.2 CONTRACTOR'S PROJECT SITE SPECIFIC PLAN

- A. Contractors are required to submit a Project Site Specific Plan (PSSP) for review by Cornell University representatives before commencement of work on the site. The PSSP should address site specific information, controls and or requirements as it relates to the entire scope of work for the project. All contractors shall use the Project Site Specific Plan Template below to develop their Project's PSSP. The template may be downloaded at:
- <https://ehs.cornell.edu/campus-health-safety/occupational-safety/contractor-safety>
- 1. Within the PSSP Template are example(s) to use as reference. The provided examples demonstrate Cornell University's expectations for providing detailed site specific information, controls and requirements.
 - 2. Project Site Specific Plan's that inadequately address site specific operations will be returned with comments for resubmission. Failure to submit a PSSP may result in delay of project and/or denial of the payment.
 - 3. All projects must have the PSSP submitted via e-Builder for review and comment.

- B. PSSP submittal should be submitted a minimum of ten (10) days prior to the commencement of work on site. The Contractor may opt to submit their PSSP in phases. The Contractor must submit a phase submission plan using the PSSP Submission table included in the PSSP template for approval by Owner's Representative with initial submission. Submit remaining phases no later than ten (10) days prior to the start of a new, predetermined project phase or milestone.
1. Projects having less than a ten (10) day turn-around shall coordinate their submittal with the Owner's Representative, who should coordinate with Occupational Health, Safety and Injury Prevention (OHSIP), the University Fire Marshall's Office and Contract College's Codes Enforcement Official, if applicable.
- C. The Contractor is responsible for its employees and its subcontractors. Subcontractors are required to submit their PSSP to the General Contractor. The General Contractor is responsible to ensure all subcontractor(s) PSSP's are adequate per their scope of work.
- D. The General Contractor is required to ensure their project's PSSP is accurately maintained throughout the duration of the contract. Resubmission is required for any new scope elements not previously addressed by the Contractor's original PSSP.
- E. Definitions:
1. Project Site Specific Plan (PSSP): A structured document that details the scope of the contract work and related site specific controls, requirements and information for University and Contractor personnel. This document is not intended to be all inclusive of all applicable local, state and federal laws and regulations for which the General Contractor and its Subcontractor(s) are expected to comply.
 2. Authority Having Jurisdiction (AHJ):
 - The organization, office or individual responsible for approving equipment, an installation or a procedure (NYS Fire Code).
 - The local government, county government or state agency responsible for the administration and enforcement of an applicable regulation or law (NYS Building Code-§202.2).
 3. Occupational Health, Safety and Injury Prevention (OHSIP): A division of Cornell University's Environmental Safety and Health Department. The OHSIP division can be contacted at (607)-255-8200 or by email at askEHS@cornell.edu
 4. SME: The University's subject matter expert.

1.3 ASBESTOS

- A. All products provided for use in construction at Cornell University are to be free of asbestos. At Substantial Completion, prior to beneficial service, the Contractor shall provide a signed certification form "Exhibit AC" stating that all Contractor supplied & installed products are 100% asbestos free. The Contractor has to attach applicable Safety Data Sheets/ Material Safety Data Sheets for each product documenting a 100% asbestos free status. The University may provide random testing of products for asbestos content. Any Contractor installed product found to contain asbestos shall be classified as defective work. Defective work shall be corrected by the Contractor as specified in the General Conditions.
- B. Attached for the Contractor's information are asbestos reports which represent samples taken within the building.
- C. Removal and disposal of asbestos containing material shall be performed by the Contractor in accordance with Division 2 specifications.

1.4 LEAD

- A. Building may contain lead based paint. The Contractor shall protect workers in accordance with OSHA regulations. The Contractor selects the means and/or methods to address the presence of lead based paint, and must concurrently protect its workers based on the Contractor's means and/or methods. The Contractor is required to submit a lead plan that is site specific, indicating that the protective measures the Contractor proposes meet the OSHA standard 1926.62 "Lead in Construction Standards". This site specific plan should address the particular methods the Contractor intends to protect its workers, the building occupants and the building structure based on its selection of addressing the presence of lead based paint.

1.5 SITE VISITS

- A. The undertaking of periodic Site Visits by Architects, Engineers or the Owner shall not be construed as supervision of actual construction, or make them responsible for the safety of any persons; or make them responsible for means, methods, techniques, sequences or procedures of construction selected by the Contractor or its Subcontractors; or make them responsible for safety programs and precautions incident to the Work, or for the safe access, visit, use, Work, travel or occupancy of any person.

1.6 CONFINED SPACE

- A. The Contractor shall be responsible for the identification of confined space in accordance with OSHA requirements.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 35 29*****



Cornell University

CONTRACTOR'S CERTIFICATION OF
ASBESTOS FREE MATERIALS
(Exhibit AC)

Distribution to:

OWNER	<input type="checkbox"/>
ARCHITECT	<input type="checkbox"/>
CONTRACTOR	<input type="checkbox"/>
FIELD	<input type="checkbox"/>
OTHER	<input type="checkbox"/>

PROJECT:

CONTRACT NUMBER:

CONTRACT FOR:

CONTRACT DATE:

DATE OF ISSUANCE:

TO OWNER: CORNELL UNIVERSITY
(Name & Address) Facilities Contracts
121 Humphreys Service Building
Ithaca, New York 14853

The undersigned hereby certifies that all materials and equipment furnished for or installed in connection with all work, labor, and services provided with respect to the performance of the Contract referenced above shall be free of asbestos and any asbestos containing material. The undersigned shall provide any and all documents supporting such certification which may reasonably be required the Owner, including where applicable Safety Data Sheets and/or Material Safety Data Sheets.

SUPPORTING DOCUMENTS ATTACHED HERETO:

- Material Safety Data Sheets

CONTRACTOR:
(Name & Address)

BY: _____
(Signature of authorized representative)

NAME: _____
(Printed name)

TITLE: _____

State of: _____)
County of: _____) ss.

Subscribed and sworn to before me this

_____ Day of _____ 20_____

March 15, 2023

Mr. Dale Houseknecht, Facilities Coordinator Projects II
Cornell University IPP – Facilities Management
FM Administration
116 Humphreys Service Building
Ithaca, New York 14853-3701

**Re: Sage Hall (3002) Foundation Repairs at North Tunnel Terminus Project
Asbestos Bulk Sampling Report
Cornell Task Authorization No. TA-463, Work Order No. 15189890
Delta Project No.: 2021.163.419**

Dear Mr. Houseknecht:

Enclosed, please find the Asbestos Bulk Sample Report Form, the associated Laboratory Analytical Result Sheets, and the Sample Location Drawing for the bulk sampling performed by Delta Certified Inspector Thomas Ferro. The sampling was performed on March 10th, 2023 and addressed the suspect materials with the potential to be impacted by the upcoming Sage Hall Foundation Repairs at North Tunnel Terminus Project. Based on the project scope of work delineated by Cornell Project Manager Ruth Howell, and a visual inspection of the suspect materials, a total of twelve (12) bulk samples were collected representing six (6) suspect homogenous materials. All twelve (12) samples collected were “Non-Friable Organically Bound” (NOB) representing the six (6) homogeneous materials and results for all samples were reported as “No Asbestos Detected”.

Based on the above, no Asbestos Containing Materials will be impacted by the Sage Hall Foundation Repairs at North Tunnel Terminus Project.

Bulk sample analysis was performed by AmeriSci New York, Inc., an independent laboratory approved / accredited by the NYS Department of Health (ELAP), the American Industrial Hygiene Association (AIHA), and the National Voluntary Laboratory Accreditation Program (NVLAP). Analysis of all Non-Friable Organically Bound (NOB) materials was initially performed by Polarized Light Microscopy (PLM) following the NYS DOH ELAP 198.6 Methodologies. If the PLM results were reported as “non-asbestos”, the sample was then analyzed by Transmission Electron Microscopy (TEM) following the NYS DOH ELAP 198.4 Methodology. “Positive Stop” sample analysis protocol was utilized for a given homogenous material set with multiple samples and based on this; all 12 of the samples collected were analyzed. Please reference the Asbestos Bulk Sample Report Form for sample particulars and details. I have also attached Delta Company, Personnel and Laboratory Licenses/ Certifications. If you have any questions, or require any other information, please feel free to contact me at your convenience.

Respectfully,

DELTA ENGINEERS, ARCHITECTS, & SURVEYORS



Stephen Prislupsky, Director of Environmental Services
Att: Project Paperwork

Attachment A

Asbestos Bulk Sample Report Form

Client: <u>Cornell University</u>	Task Authorization No.: <u>TA-463 / Work Order No.: 15189890</u>	Delta Proj. No.: <u>2018.003.419</u>
Project: <u>Sage Hall Foundation Repairs at North Tunnel Terminus Project - Asbestos Bulk Sampling</u>	Dates Sampling Performed: <u>03/10/2023</u>	Asbestos Inspector: <u>Thomas Ferro</u>
	Date of Report: <u>03/15/2023</u>	Number of Samples Collected: <u>12</u>
Building Code: <u>3002</u>	Laboratory: <u>AmeriSci Labs</u>	Number of Samples Analyzed: <u>PLM - 12 / TEM - 12</u>

Asbestos Bulk Sample Report Form

Sample Number	HA*	Floor	Bulk Sample Description / Details	Material Type	Asbestos Type	PLM Result % Asbestos	TEM Result % Asbestos
2021.163.419 - 01A	01	Ext.	Caulk, Exterior Southwest Stairs	Miscellaneous	ND	ND	ND
2021.163.419 - 01B	01	Ext.	Caulk, Exterior Southwest Stairs	Miscellaneous	ND	ND	ND
2021.163.419 - 02A	02	Ext.	Grey Seam Caulk, Cap Stone, Southwest Wall	Miscellaneous	ND	ND	ND
2021.163.419 - 02B	02	Ext.	Grey Seam Caulk, Cap Stone, Southwest Wall	Miscellaneous	ND	ND	ND
2021.163.419 - 03A	03	Ext.	Black Caulk, Base, Southwest Wall	Miscellaneous	ND	ND	ND
2021.163.419 - 03B	03	Ext.	Black Caulk, Base, Southwest Wall	Miscellaneous	ND	ND	ND
2021.163.419 - 04A	04	Ext.	Window Frame Caulk, Southwest Window	Miscellaneous	ND	ND	ND
2021.163.419 - 04B	04	Ext.	Window Frame Caulk, Southwest Window	Miscellaneous	ND	ND	ND
2021.163.419 - 05A	05	Ext.	Window Glazing Compound, Southwest Window	Miscellaneous	ND	ND	ND
2021.163.419 - 05B	05	Ext.	Window Glazing Compound, Southwest Window	Miscellaneous	ND	ND	ND
2021.163.419 - 06A	06	Ext.	Foundation Waterproofing, West	Miscellaneous	ND	ND	ND
2021.163.419 - 06B	06	Ext.	Foundation Waterproofing, West	Miscellaneous	ND	ND	ND

HA - Homogenous Area **ND** - No Asbestos Detected **NA** - Not Analyzed by Methodology **NA/PS** - Not Analyzed, Positive Stop

TSI - Thermal System Insulation **Misc** - Miscellaneous Material **Trace / < 1%** - Non-asbestos by definition

Attachment B

Laboratory Analytical Result Sheets

**AmeriSci New York**

117 EAST 30TH ST.
NEW YORK, NY 10016
TEL: (212) 679-8600 • FAX: (212) 679-3114

PLM Bulk Asbestos Report

Delta Engineers
Attn: Stephen Prislupsky
860 Hooper Road

Endwell, NY 13760

Date Received 03/13/23 **AmeriSci Job #** 223031968
Date Examined 03/13/23 **P.O. #**
ELAP # 11480 **Page** 1 of 3
RE: 2021.163.419; Cornell University; Sage Hall Foundation Repairs
Asbestos Survey

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
2021.163.419-01A 01 Location: Ext. - Exterior Southeast Stairs - Caulk Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 8.8%	223031968-01	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
2021.163.419-01B 01 Location: Ext. - Exterior Southeast Stairs - Caulk Analyst Description: Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 9.3%	223031968-02	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
2021.163.419-02A 02 Location: Ext. - Southeast Wall - Cap Stone - Grey Seam Caulk Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.7%	223031968-03	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
2021.163.419-02B 02 Location: Ext. - Southeast Wall - Cap Stone - Grey Seam Caulk Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 1.7%	223031968-04	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
2021.163.419-03A 03 Location: Ext. - Southeast Wall - Base - Black Caulk Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 6.2%	223031968-05	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23

PLM Bulk Asbestos Report

2021.163.419; Cornell University; Sage Hall Foundation
Repairs Asbestos Survey

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
2021.163.419-03B 03 Location: Ext. - Southeast Wall - Base - Black Caulk	223031968-06	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 0.5%			
2021.163.419-04A 04 Location: Ext. - Southeast Window - Window Frame Caulk	223031968-07	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 2.1%			
2021.163.419-04B 04 Location: Ext. - Southeast Window - Window Frame Caulk	223031968-08	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: Dark Brown, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 7.6%			
2021.163.419-05A 05 Location: Ext. - Southeast Window - Window Glazing Compound	223031968-09	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: White/Green, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous Talc Trace, Non-fibrous 6.3%			
2021.163.419-05B 05 Location: Ext. - Southeast Window - Window Glazing Compound	223031968-10	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: White/Green, Heterogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Fibrous Talc Trace, Non-fibrous 5.9%			
2021.163.419-06A 06 Location: Ext. - West - Foundation Waterproofing	223031968-11	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material Asbestos Types: Other Material: Non-fibrous 5.4%			

PLM Bulk Asbestos Report

2021.163.419; Cornell University; Sage Hall Foundation
Repairs Asbestos Survey

Client No. / HGA	Lab No.	Asbestos Present	Total % Asbestos
2021.163.419-06B 06	223031968-12 Location: Ext. - West - Foundation Waterproofing	No	NAD (by NYS ELAP 198.6) by Valeriu Voicu on 03/13/23
Analyst Description: Black, Homogeneous, Non-Fibrous, Bulk Material			
Asbestos Types:			
Other Material: Non-fibrous 11%			

Reporting Notes:

Analyzed by: Valeriu Voicu
Date: 3/13/2023



Reviewed by: Karol H. Lu



*NAD/NSD = no asbestos detected; NA = not analyzed; NA/PS = not analyzed/positive stop, (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; PLM Bulk Asbestos Analysis using Olympus, Model BH-2 Pol Scope, Microscope, Serial #: 229915, by Appd E to Subpt E, 40 CFR 763 quantified by either CVES or 400 pt ct as noted for each analysis (NVLAP 200546-0), ELAP PLM Method 198.1 for NY friable samples, which includes the identification and quantitation of vermiculite, or ELAP 198.6 for NOB samples, or EPA 400 pt ct by EPA 600-M4-82-020 (NY ELAP Lab 11480); Note: PLM is not consistently reliable in detecting asbestos in floor coverings and similar non-friable organically bound 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 NY State (also see EPA Advisory for floor tile, FR 59,146,38970,8/1/94) National Institute of Standards and Technology Accreditation requirements mandate that this report must not be reproduced except in full without the approval of the lab. This PLM report relates ONLY to the items tested. RI Cert AAL-094, CT Cert PH-0186, Mass Cert AA000054, NJ Lab ID #NY031.

_____END OF REPORT_____

Table I
Summary of Bulk Asbestos Analysis Results
2021.163.419; Cornell University; Sage Hall Foundation Repairs Asbestos Survey

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
01	2021.163.419-01A	01	0.149	62.9	28.3	8.8	NAD	NAD
Location: Ext. - Exterior Southeast Stairs - Caulk								
02	2021.163.419-01B	01	0.173	64.9	25.8	9.3	NAD	NAD
Location: Ext. - Exterior Southeast Stairs - Caulk								
03	2021.163.419-02A	02	0.150	74.8	23.4	1.7	NAD	NAD
Location: Ext. - Southeast Wall - Cap Stone - Grey Seam Caulk								
04	2021.163.419-02B	02	0.155	74.2	24.1	1.7	NAD	NAD
Location: Ext. - Southeast Wall - Cap Stone - Grey Seam Caulk								
05	2021.163.419-03A	03	0.196	38.2	55.5	6.2	NAD	NAD
Location: Ext. - Southeast Wall - Base - Black Caulk								
06	2021.163.419-03B	03	0.218	47.9	51.6	0.5	NAD	NAD
Location: Ext. - Southeast Wall - Base - Black Caulk								
07	2021.163.419-04A	04	0.132	71.9	26.1	2.1	NAD	NAD
Location: Ext. - Southeast Window - Window Frame Caulk								
08	2021.163.419-04B	04	0.156	69.9	22.5	7.6	NAD	NAD
Location: Ext. - Southeast Window - Window Frame Caulk								
09	2021.163.419-05A	05	0.290	9.0	84.6	6.3	NAD	NAD
Location: Ext. - Southeast Window - Window Glazing Compound								
10	2021.163.419-05B	05	0.304	9.6	84.5	5.9	NAD	NAD
Location: Ext. - Southeast Window - Window Glazing Compound								
11	2021.163.419-06A	06	0.136	88.1	6.5	5.4	NAD	NAD
Location: Ext. - West - Foundation Waterproofing								
12	2021.163.419-06B	06	0.124	69.5	19.5	11.0	NAD	NAD
Location: Ext. - West - Foundation Waterproofing								

Table I
Summary of Bulk Asbestos Analysis Results

2021.163.419; Cornell University; Sage Hall Foundation Repairs Asbestos Survey

AmeriSci Sample #	Client Sample#	HG Area	Sample Weight (gram)	Heat Sensitive Organic %	Acid Soluble Inorganic %	Insoluble Non-Asbestos Inorganic %	** Asbestos % by PLM/DS	** Asbestos % by TEM
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Analyzed by: Khaalid W. Perine
Date: 3/14/2023



Reviewed by: Karol H. Lu



**Quantitative Analysis (Semi/Full); Bulk Asbestos Analysis - PLM by Appd E to Subpt E, 40 CFR 763 or NYSDOH ELAP 198.1 for New York friable samples or NYSDOH ELAP 198.6 for New York NOB samples; TEM (Semi/Full) by EPA 600/R-93/116 (or NYSDOH ELAP 198.4; for New York samples). Analysis using Hitachi, Model H7000-Noran 7 System, Microscope, Serial #: 747-05-06. NAD = no asbestos detected during a quantitative analysis; NA = not analyzed; Trace = < 1%; (SOF-V) = Sprayed On Fireproofing containing Vermiculite; (SM-V) = Surfacing Material containing Vermiculite; Quantitation for beginning weights of <0.1 grams should be considered as qualitative only; Qualitative Analysis: Asbestos analysis results of "Present" or "NVA = No Visible Asbestos" represents results for Qualitative PLM or TEM Analysis only (no accreditation coverage available from any regulatory agency for qualitative analyses): NVLAP (PLM) 200546-0, NYSDOH ELAP Lab 11480, NJ Lab ID #NY031.

Warning Note: PLM limitation, only TEM will resolve fibers <0.25 micrometers in diameter. TEM bulk analysis is representative of the fine grained matrix material and may not be representative of non-uniformly dispersed debris for which PLM evaluation is recommended (i.e. soils and other heterogeneous materials).

Client: Cornell University	Delta Project No.: 2021.163.419	Date: 3/10/2023
Project: Sage Hall Foundation Repairs Asbestos Survey	Cornell Work Order No.:	Turnaround Time: 24 Hrs.
Collected By: Thomas Ferro		

Sample Number	Material Type	Material Condition	Floor	Description / Sample Location
2021.163.419 - 01A	Miscellaneous	Intact	Ext.	Caulk, Exterior Southeast Stairs
2021.163.419 - 01B	Miscellaneous	Intact	Ext.	Caulk, Exterior Southeast Stairs
2021.163.419 - 02A	Miscellaneous	Intact	Ext.	Grey Seam Caulk, Cap Stone, Southeast Wall
2021.163.419 - 02B	Miscellaneous	Intact	Ext.	Grey Seam Caulk, Cap Stone, Southeast Wall
2021.163.419 - 03A	Miscellaneous	Intact	Ext.	Black Caulk, Base, Southeast Wall
2021.163.419 - 03B	Miscellaneous	Intact	Ext.	Black Caulk, Base, Southeast Wall
2021.163.419 - 04A	Miscellaneous	Intact	Ext.	Window Frame Caulk, Southeast Window
2021.163.419 - 04B	Miscellaneous	Intact	Ext.	Window Frame Caulk, Southeast Window

Instructions: Analyze all non-NOB samples by NYS ELAP 198.1 PLM methodology. Analyze all NOB samples initially by NYS ELAP 198.6 PLM methodology. If all samples from a given sample set are reported as non-asbestos by 198.6, analyze by NYS ELAP 198.4 TEM methodology. Stop analysis after 1st positive for a given sample set.

Email Results to wjohnson@delta-eas.com, sprislupsky@delta-eas.com, rcherevko@delta-eas.com

Notes:

Submitted By: Thomas Ferro **Date:** 3/10/2023

Received By: *Madelyn Villalobos* **Date:**

(Signature)



860 Hooper Road, Endwell, NY 13760 Tel: 607.231.6600 Fax 607.231.6640
www.delta-eas.com

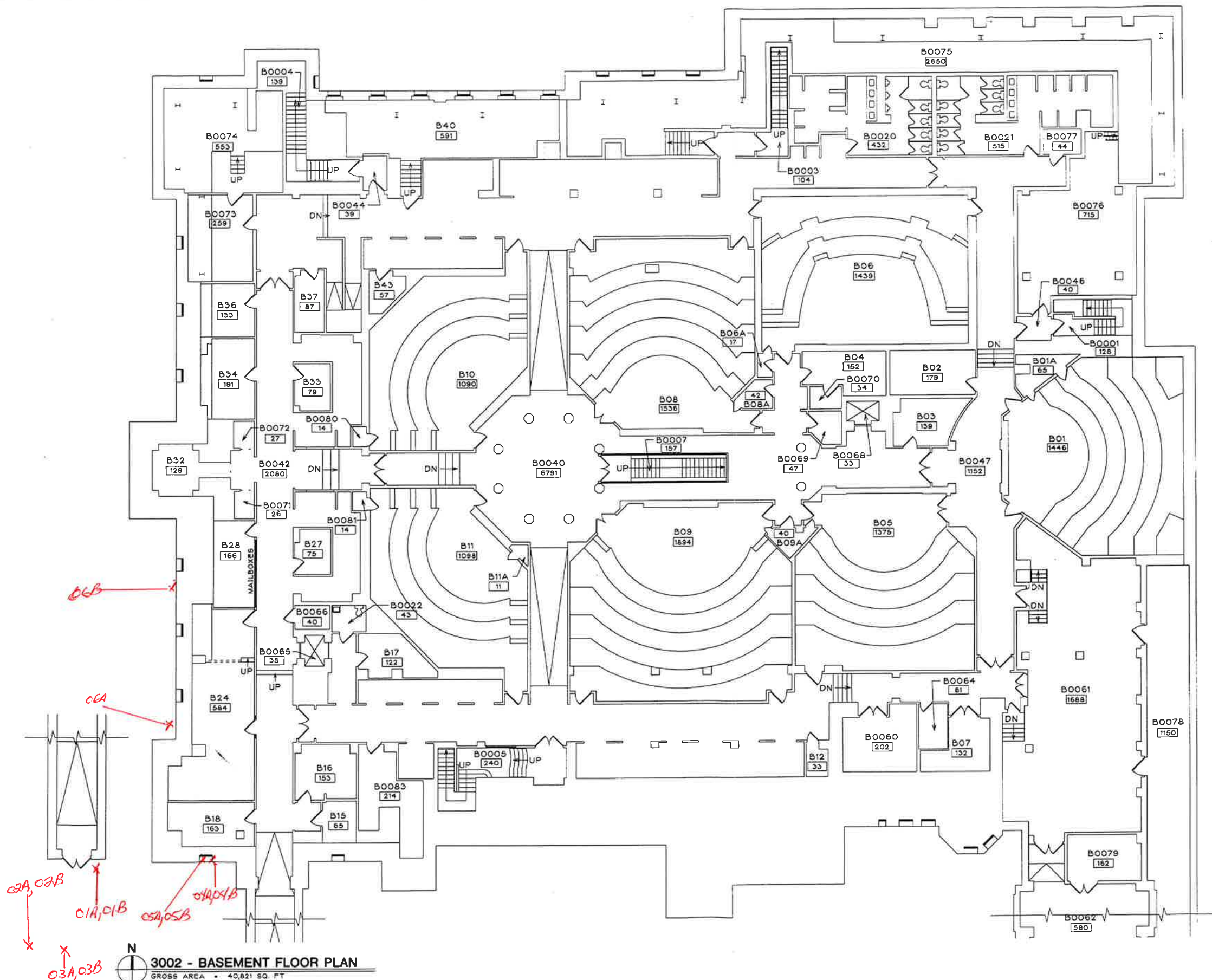
Client: Cornell University	Delta Project No.: 2021.163.419	Date: 3/10/2023
Project: Sage Hall Foundation Repairs Asbestos Survey	Cornell Work Order No.:	Turnaround Time: 24 Hrs.
Collected By: Thomas Ferro		

Sample Number		Material Type	Material Condition	Floor	Description / Sample Location
2021.163.419 - 05A	05A	Miscellaneous	Intact	Ext.	Window Glazing Compound, Southeast Window
2021.163.419 - 05B	05B	Miscellaneous	Intact	Ext.	Window Glazing Compound, Southeast Window
2021.163.419 - 06A	06A	Miscellaneous	Intact	Ext.	Foundation Waterproofing, West
2021.163.419 - 06B	06B	Miscellaneous	Intact	Ext.	Foundation Waterproofing, West

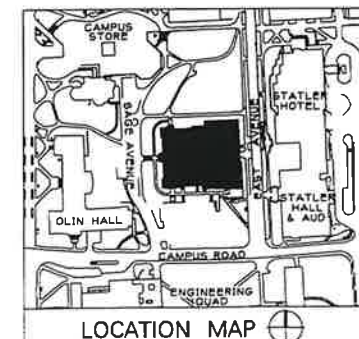
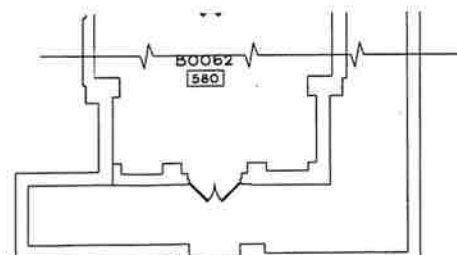
223031968

Attachment C

Sample Location Drawing



3002 - BASEMENT FLOOR PLAN
GROSS AREA - 40,821 SQ. FT.



	CORNELL UNIVERSITY FACILITIES INVENTORY J.W. HUMPHREY'S SERVICE BUILDING ITHACA, NY 14850	DRAWING DISCLAIMER THESE DRAWINGS, AND THEIR ASSOCIATED ELECTRONIC FILES HAVE BEEN PRODUCED FOR THE PURPOSE OF SPACE INVENTORY CAMPUS BUILDINGS. FEATURES SHOWN ARE INCIDENTAL TO THIS PURPOSE AND DEPICT CONDITIONS AT THE TIME THE DRAWINGS WERE PRODUCED. THESE DRAWINGS SHOULD NOT BE RELIED UPON FOR ANY OTHER PURPOSE.	REVISIONS: 1G1 1/01, 4/03 EQ, 4/06 SCALE: 0 5 10 20 1/8" = 1'-0"	DRAWN BY: ERDMAN A. CHECKED BY: AGE	DRAWING NO: 1 OF 5 DATE: 030599	PLAN LEVEL: B TOTAL BLDG GROSS SQ. FT.: 150,716	BLDG NAME: SAGE HALL 3002/3002.p0b	BLDG NO: 3002
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Attachment D

Photos



HA 01 – Caulk at Exterior Southwest Stairs, “No Asbestos detected”



HA 02 – Grey Seam Caulk, Cap Stone, “No Asbestos Detected”



HA 03 – Black Caulk, Wall Base, “No Asbestos Detected”



HA 04 – Window Frame Caulk, “No Asbestos Detected”



HA 05 – Window Glazing Compound, “No Asbestos Detected”



HA 06 – Foundation Waterproofing, “No Asbestos Detected”

Attachment E

Licenses and Certifications

WE ARE YOUR DOL



DIVISION OF SAFETY & HEALTH LICENSE AND CERTIFICATE UNIT, STATE OFFICE CAMPUS, BLDG. 12, ALBANY, NY 12226

ASBESTOS HANDLING LICENSE

Delta Engineers, Architects, Land Surveyors, & Landscape, Architects, D.P.C.
860 Hooper Road, Endwell, NY, 13760

License Number: 29322

License Class: RESTRICTED

Date of Issue: 09/29/2022

Expiration Date: 10/31/2023

Duly Authorized Representative: Stephen Prislupsky

This license has been issued in accordance with applicable provisions of Article 30 of the Labor Law of New York State and of the New York State Codes, Rules and Regulations (12 NYCRR Part 56). It is subject to suspension or revocation for a (1) serious violation of state, federal or local laws with regard to the conduct of an asbestos project, or (2) demonstrated lack of responsibility in the conduct of any job involving asbestos or asbestos material.

This license is valid only for the contractor named above and this license or a photocopy must be prominently displayed at the asbestos project worksite. This license verifies that all persons employed by the licensee on an asbestos project in New York State have been issued an Asbestos Certificate, appropriate for the type of work they perform, by the New York State Department of Labor.

Amy Phillips, Director
For the Commissioner of Labor

STATE OF NEW YORK - DEPARTMENT OF LABOR
ASBESTOS CERTIFICATE



THOMAS P FERRO

CLASS(EXPIRES)

C ATEC(12/23) D INSP(12/23)

H PM (12/23)

CERT# 99-11328
DMV# 404844888

MUST BE CARRIED ON ASBESTOS PROJECTS

EXPIRATION DATE 12/23/23



01213 006602448 05

EYES HAZ

HAIR BRO

HGT 5' 08"

IF FOUND RETURN TO:

NYSOL - L&C UNIT

ROOM 161A BUILDING 12

STATE OFFICE CAMPUS

ALBANY NY 12240

**NEW YORK STATE DEPARTMENT OF HEALTH
WADSWORTH CENTER**



Expires 12:01 AM April 01, 2023
Issued April 01, 2022

CERTIFICATE OF APPROVAL FOR LABORATORY SERVICE

Issued in accordance with and pursuant to section 502 Public Health Law of New York State

**MR. PAUL J. MUCHA
AMERICA SCIENCE TEAM NEW YORK, INC
117 EAST 30TH ST
NEW YORK, NY 10016**

NY Lab Id No: 11480

*is hereby APPROVED as an Environmental Laboratory for the category
ENVIRONMENTAL ANALYSES SOLID AND HAZARDOUS WASTE
All approved subcategories and/or analytes are listed below:*

Miscellaneous

Asbestos in Friable Material	Item 198.1 of Manual EPA 600/M4/82/020
Asbestos in Non-Friable Material-PLM	Item 198.6 of Manual (NOB by PLM)
Asbestos in Non-Friable Material-TEM	Item 198.4 of Manual

Serial No.: 64683

Property of the New York State Department of Health. Certificates are valid only at the address shown, must be conspicuously posted, and are printed on secure paper. Continued accreditation depends on successful ongoing participation in the Program. Consumers are urged to call (518) 485-5570 to verify the laboratory's accreditation status.

SECTION 01 35 43 GENERAL ENVIRONMENTAL REQUIREMENTS

1.0 GENERAL

1.1 DESCRIPTION

- A. This Section and the listed Related Sections provides minimum requirements for the protection of the environment during the project. The requirements of this Section shall apply to both Contractor and all tiers of sub-contractors involved in the project.
- B. In addition to the requirements of this Section and the listed Related Sections, all laws and regulations by applicable local, state, and federal agencies shall apply to the work of this contract. In some cases the requirements of these Specifications may by intention exceed such legal requirements, but in no case shall this Specification be interpreted or understood to reduce or eliminate such requirements.
- C. Prior to bidding, review the entire Bidding Documents and report in writing to the Owner's Representative any error, inconsistency, or omission that may have environmental impacts.

1.2 RELATED SECTIONS

- A. Section 01 35 44 – Spill Control
- B. Section 01 57 13 – Soil Erosion and Sediment Control

1.3 SUBMITTALS

- A. Submit the following in accordance with Section 01 33 00 – Submittals:
 - 1. Analytical laboratory sample results and material Certifications for all imported soil and granular materials (“borrow”).
 - 2. Contractor's Waste Material Disposal Plan.
 - 3. Weight tickets from the Borrow Material Supplier.
 - 4. Proposed methods for dewatering and construction water management.
 - 5. Analytical laboratory sample results for all waste materials.
 - 6. Copies of manifests for all waste materials disposed of off-site.

1.4 JOB SITE ADMINISTRATION

- A. In accordance with Article 2 of the General Conditions, provide a competent supervisory representative with full authority to act for the Contractor at the site.

- B. If at any time operations under the representative's supervision do not comply with this Section, or the representative is otherwise unsatisfactory to the Owner, replace, if requested by the Owner, said representative with another representative satisfactory to the Owner. There shall be no change in superintendent without the Owner's approval.
- C. Remove from the Work any employee of the Contractor or any Subcontractor when so directed by the Owner. The Owner may request the removal of any employee who does not comply with these specifications.

1.5 CLEARING, SITE PREPARATION AND SITE USE

- A. In accordance with Section 01 14 00, only that portion of the working area that is absolutely necessary and essential for the work shall be cleared for construction. All clearing should be approved and performed to provide minimum practical exposure of soils.
- B. The Contractor shall make every effort to avoid the destruction of plants, trees, shrubs, and lawns outside the area of construction so as not to unduly disturb the ecological or environmental quality of the area.
- C. Topsoil excavated as part of the Project, which can be reused as part of the Project, shall be stockpiled for future use and temporarily stabilized to prevent erosion.

1.6 SPOIL AND BORROW

- A. Spoil
 - 1. Dispose of excavated material which, in the opinion of the Owner's Representative, is unfit to be used as backfill or embankment or which is in excess of the amount required under the Contract.
 - 2. All spoil areas shall be graded and seeded to match the surrounding area.
 - 3. Spoil areas shall be covered and protected from erosion into adjacent storm sewers, drainage ways, land areas, or water bodies.
- B. Borrow Material
 - 1. Borrow material shall be provided from a clean source. Submittals of proposed borrow material shall be reviewed by the Owner prior to delivery on-site. Submittals shall include the quantity of materials, source location and certification by the material supplier that it is free of chemicals or other foreign matter.

1.7 NOISE AND VIBRATION

- A. Limit and control the nature and extent of activities at all times to minimize the effects of noise and vibrations. Take adequate measures for keeping noise levels, as produced by construction related equipment, to safe and tolerable limits as set forth by the Occupational Safety and Health Administration (OSHA), the New York State Industrial Code Guidelines and Ordinances and all City, Town and Local ordinances. Equip all construction equipment presenting a potential noise nuisance with noise-muffling devices adequate to meet these requirements

1.8 DUST CONTROL

- A. Take adequate measures for controlling dust produced by drilling, excavation, backfilling, loading, saw cutting or other means. The use of calcium chloride or petroleum-based materials for dust control is prohibited. Dust control measures are required throughout the duration of construction.
- B. If, in the opinion of the Owner's Representative, the Contractor is not adequately controlling dust, the Owner will first notify the Contractor. If the Contractor does not take adequate actions necessary, the Owner may, at the Contractor's expense, employ alternative means to control dust.
- C. Erect, maintain, and remove when appropriate barriers or other devices, including mechanical ventilation systems, as required by the conditions of the work for the protection of users of the project area, the protection of the work being done, or the containment of dust and debris. All such barriers or devices shall be provided in conformance with all applicable codes, laws, and regulations including OSHA.

1.9 PROTECTION OF THE ENVIRONMENT

- A. Construction procedures observed by the Contractor, its subcontractors and other employees shall include protection of the environment, in accordance with all pertinent Cornell standards, policies, local laws, executive orders, ordinances, and federal and state regulations. Construction procedures that are prohibited in the undertaking of work associated with this Contract include, but are not limited to:
 - 1. Dumping of spoil material or any liquid or solid pollutant into any storm or sanitary sewer, drainage way, stream sewer, any wetlands (as defined by federal and state regulations), any surface waters, or at unspecified locations.
 - 2. Indiscriminate, arbitrary, or capricious operation of equipment in any stream corridors, any wetlands, or any surface waters.
 - 3. Pumping of any silt-laden water from trenches or other excavations into any storm sewers, sanitary sewers, drainage ways, wetlands, or surface waters.
 - 4. Damaging vegetation beyond the extent necessary for construction of the facilities.
 - 5. Disposal of trees, brush, and other debris in any location on University property, unless such areas are specifically identified on the drawing or in the specifications or specifically approved by the Owner's site representative.
 - 6. Permanent or unspecified alteration of the flow line of a stream.
 - 7. Burning trash, project debris, or waste materials.
- B. Take all necessary precautions to prevent silt or waste of any kind from entering any drainage or waterways or downstream properties as a result of the Work.

- C. Runoff of potable water used for concrete curing or concrete truck, or chute cleaning operations shall not be allowed to reach the storm water system or open water due to the levels of residual chlorine (New York State water quality standards, 6 NYCRR Part 703.5) and other potential contaminants. If necessary, obtain permission from the local sewer authority and collect and pump the runoff to the sanitary sewer.
- D. Limit the nature and extent of any activities that could result in the release or discharge of pollutants. Report any such release or discharge immediately to the Owner's Representative and clean up spills immediately, as detailed in Section 01 35 44 – Spill Control Procedures.

1.10 TEMPORARY RE-ROUTING OF PIPING AND DUCTWORK

- A. Obtain approval from the Owner's Representative prior to any temporary re-routing of piping and exhaust ductwork necessary for the completion of the Work. Submit re-routing plans to the Owner's Representative in writing.

The following shall require approval of the Owner:

- 1. Temporary storm, sanitary or water line connections.
 - 2. Temporary exhaust ductwork connections where such connections may impact air emissions.
- B. Instruct all personnel to observe extreme caution when working in the vicinity of mechanical equipment and piping. Personnel shall not operate or tamper with any existing valves, switches, or other devices or equipment without prior approval by the Owner's Representative.

1.11 HAZARDOUS OR TOXIC MATERIALS

- A. Inform officers, employees, agents, contractors, subcontractors at every tier, and any other party which may come into contact with any hazardous or toxic materials as a result of its performance hereunder of the nature of such materials, and any health and safety or environmental risks associated therewith.
- B. Do not use hazardous or toxic materials in a manner that will violate Cornell University Policies or any state, federal, or municipal environmental health and safety regulations. In situations where the risks are unclear consult with Environmental Health and Safety (EH&S) for guidance.
- C. Provide complete care and treatment for any injury sustained by any parties coming into contact with any hazardous or toxic materials as a result of Contractor's performance or failure to perform hereunder.
- D. At the completion of project Contractor shall remove all unused chemical products and hazardous materials from campus. Transportation of these materials shall be in accordance with all federal, state, and local regulations. Request and receive written approval from EH&S prior to disposal of any on-site disposal.

1.12 DISPOSAL OF WASTE MATERIAL AND TITLE

- A. Prior to start of work and first payment, Contractor shall prepare and submit “Contractor Waste Material Disposal Plan” to the Owner’s Representative. The plan shall identify the waste transportation and treatment, storage or disposal (TSD) companies which will manage all waste material and any site(s) for disposal of the waste material. Contractor must use this form to document waste disposal methods and locations.
- B. The “Contractor Waste Material Disposal Plan” form, together with definitions associated with the form waste descriptions. Forms may be downloaded at:
<https://ehs.cornell.edu/sites/default/files/FRM-CWMDP-Contractor-Waste-Material-Disposal-Plan-IPDF.pdf>
- C. Contractor shall be responsible for the proper cleanup, containment, storage and disposal of any hazardous material/chemical spill occurring during its work. For Cornell University owned hazardous waste EH&S will oversee, approve or effect the proper disposal. Title, risk of loss, and all other incidents of ownership to the Waste Material, shall vest in Contractor at the time Contractor or any transporter acting on its behalf takes physical possession of Waste Material. Complete and maintain full records of the chain of custody and control, including certificates of disposal or destruction, of all Waste Materials loaded, transported and/or disposed of. Deliver all such records to the Owner in accordance with applicable laws and regulations and any instructions from the Owner in a timely manner and in any event prior to final payment(s) under this Contract.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 35 43*****

SECTION 01 35 44 SPILL CONTROL

1.0 GENERAL

1.1 SPILL PREVENTION

- A. In order to minimize the potential for discharge to the environment of oil, petroleum, or hazardous substances on site, the following requirements shall apply to all projects:
 - 1. All oil, petroleum, or hazardous materials stored or relocated temporarily on site during the construction process shall be stored in such a manner as to provide protection from vehicular damage and to provide containment of leaks or spills. Horizontal diked oil storage tanks, temporary berms or barriers, or similar methods shall be employed as appropriate at each site.
 - 2. Any on-site filling or dispensing activities shall occur within an area in which a temporary berm, boom, or similar containment barrier has been placed to prevent the inadvertent discharge to the environment of harmful quantities of any products.
 - 3. All oil, petroleum, or hazardous materials stored on site shall be located in such a manner as to minimize the potential of damage from construction operations or vehicles, away from drainage ways and environmentally sensitive areas, and in accordance with all fire and safety codes.
- B. Remove immediately from the site any storage, dispensing, or operating equipment that is leaking oil or hazardous substances or is in anyway unsuitable for the safe storage of such materials.

1.2 SPILL CONTROL PROCEDURES

All Contractor personnel working at the project site shall be knowledgeable of the potential health and safety concerns associated with petroleum and other hazardous substances that could potentially be released at the project site. Following are a list of activities that should be conducted by the Contractor in the event of an oil/petroleum spill or the release of any other hazardous substance. In the event of a large quantity spill that would require cleanup procedures that are beyond the means of the Contractor, an emergency spill cleanup contractor shall be hired by the Contractor. In the event the Contractor has the personnel necessary to clean up the spill, the following procedures shall be followed:

- A. Personnel discovering/responding to a spill shall:
 - 1. Identify and locate the source of the spill. If unsafe conditions exist, leave the area, inform nearby personnel, notify the site supervisor, and initiate spill reporting (Section 1. 3).

2. Limit the discharge of product, if safely possible, by: (1) diverting discharge to a containment area; (2) creating temporary dikes with soils or other available materials; and (3) utilizing sorbent materials. If secondary containment is present, verify that valves and drains are closed prior to diverting the product to this area.
3. The individual discovering a spill shall initiate containment procedures to prevent material from reaching a potential migratory route, through implementation of the following actions, or any other methods necessary. Methods employed shall not compromise worker safety.
 - a. Stop the spill at once (if possible).
 - b. Extinguish sources of ignition (e.g., flames, sparks, hot surfaces, cigarettes, etc.).
 - c. Clear personnel from the spill location and rope off the area.
 - d. Utilize available spill control equipment in an effort to ensure that fires, explosions, and releases do not occur, recur, or spread.
 - e. Use sorbent materials to control the spill at the source.
 - f. Construct a temporary containment dike of sorbent materials, cinder blocks, bricks, or other suitable materials to help contain the spill.
 - g. Attempt to identify the character, exact source, amount, and area of the released materials. Identification of the spilled material should be made as soon as possible so that the appropriate cleanup procedure can be identified.
 - h. Assess possible hazards to human health or the environment as a result of the release, fire, or explosion.
 - i. If spill response measures involve the temporary cessation of any operations, the Contractor shall monitor the affected equipment for: (1) leaks; (2) pressure buildup; (3) gas generation; or (4) ruptures in valves, pipes, or other equipment.

B. Spill Cleanup:

1. Following containment of the spill, the following spill cleanup procedures shall be initiated.
 - a. Use proper waste containers.
 - b. Remove bulk liquid by using vacuum, pump, sorbents, or shovel and place material in properly labeled waste container. Be sure not to collect incompatible or reactive substances in the same container.
 - c. Cleanup materials not reclaimed on-site shall be disposed of in accordance with all applicable state and federal regulations.

- d. Apply sorbent materials to pick up remaining liquid after bulk liquid has been removed. The Contractor shall not walk over spilled material. Absorbed material shall be picked up with a shovel and placed in a separate waste container, and shall not be mixed with bulk liquid.
- e. Clean spill control equipment and containers. Replace equipment in its proper location. Restock or reorder any sorbents used to clean up the spill.
- f. Carefully wash spilled product from skin and clothing using soap. Change clothes, if necessary, to avoid further contact with product.
- g. Disposal of all spilled product shall be made off-site, and shall be arranged through the Contractor.
- h. A Spill Report shall be completed, including a description of the event. A sample Spill Documentation Form is provided in Appendix B.

C. Fire or Explosion:

- 1. In the event of a fire or explosion at the site, the Contractor shall:
 - a. Verify that the local fire department and the appropriate response personnel (e.g., ambulance, police) have been notified.
 - b. Report to the scene, if safe to do so, and evaluate the situation (e.g., spill character, source, etc.). Coordinate, as necessary, with other appropriate site and emergency personnel.
 - c. Ensure that people are cleared from the area.
 - d. Ensure that fires are safely extinguished (if possible), valves closed, and other immediate actions necessary to mitigate the emergency, if safe to do so.
 - e. Initiate responsible measures necessary to prevent subsequent fires, explosions, or releases from occurring or spreading to other areas of the site. These measures include stopping processes or operations, collecting and containing released oil, or removing and isolating containers.
 - f. Take appropriate action to monitor for: (1) leaks; (2) pressure build-ups; (3) gas generation; or (4) ruptures in pipes, valves, or other equipment.

1.3 SPILL REPORTING AND DOCUMENTATION

In the event of a spill CALL CORNELL POLICE AT 255-1111 who will notify the appropriate departments within the university and coordinate with the contractor for external reporting, if required.

The contractor shall be responsible for the initiation of spill reporting and documentation procedures. All petroleum spills must be reported to **NYSDEC Spill Hotline at 1-800- 457-7362**, less than two hours following discovery. Notification must be made to Cornell Environmental Health and Safety (EH&S), 607.255.8200, within 24 hours of reporting the release. The Contractor will be expected to provide EH&S with the DEC issued spill number. Any petroleum spill must be reported to NYSDEC unless **ALL** of the following criteria apply:

TABLE 1
CRITERIA TO EXEMPT SPILL REPORTING

CRITERIA	DESCRIPTION
Quantity	The spill must be known to be less than 5 gallons.
Containment	The spill must be contained on an impervious surface or within an impervious structure, such that it cannot enter the environment.
Control	The spill must be under control and not reach a drain or leave the impervious surface.
Cleanup	The spill must be cleaned-up within two hours of occurrence.
Environment	The spill must not have already entered into the soil or groundwater or onto surface water.

A release of a “reportable quantity”¹ or unknown amount of a hazardous substance must also be immediately reported to NYSDEC Spill Hotline. Spills of reportable quantities of chemicals or “harmful quantities”² of oil to navigable waters must be reported to the federal **National Response Center, 1-800-424-8802**.

Spill Reporting Information: When making a telephone report, the caller should be prepared to provide the following information, if possible:

1. The date and time of the spill or release.
2. The identity or chemical name of the material released or spilled, including an indication of whether the material is defined as an extremely hazardous substance.
3. An estimate of the quantity of material released or spilled into the environment and the approximate duration of the event.
4. The exact location of the spill, including the name(s) of the waters involved or threatened, and/or other medium or media affected by the release or spill.
5. The source of the release or spill.
6. The name, address, and telephone number of the party in charge of, or responsible for, the facility or activity associated with the release or spill.
7. The extent of the actual and potential water pollution.

8. The name and telephone number of the person in charge of operations at the spill site.
9. The steps being taken or proposed to contain and cleanup the released or spilled material and any precautions taken to minimize impacts, including evacuation.
10. The extent of injuries, if any.
11. Any known or anticipated acute or chronic health risks associated with the emergency, and information regarding necessary medical attention for exposed individuals.
12. Assistance required, if any.

If the release of a hazardous substance or oil occurs in an amount which exceeds a reportable quantity (RQ) as defined in 40 CFR Part 110, 40 CFR Part 117, 40 CFR Part 302, or 6 NYCRR Part 597, then the Contractor shall do the following:

1. Call to the National Response Center shall be made by the person in charge of the site. The applicable phone numbers are 1-800-424-8802 or 1-202-426-2675.
2. Within 14 days of the release, submit a written description of the release. The description should include: (1) a description of the release, (2) the type of material released, (3) estimated amount of the spill; (4) the date of the release, (5) an explanation of why the release occurred; and (6) a description of the measures to be implemented to prevent and control future releases.

⁽¹⁾*Reportable Quantity:* A Reportable Quantity is the quantity of a hazardous substance or oil that triggers reporting requirements under the Comprehensive Emergency Response, Compensation, and Liability Act (CERCLA) (USEPA, September 1992). While the Contractor is legally responsible for knowing the risks of materials that are part of construction, members of the owner's spill response team have access to information that may help identify these quantities with you.

⁽²⁾*Harmful Quantity:* A Harmful Quantity of oil includes discharges that violate applicable water quality standards; cause a film, sheen, or discoloration on a water surface or adjoining shoreline; or cause a sludge or emulsion to be deposited beneath the water surface or shoreline (40 CFR 110.3).

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 35 44*****

SECTION 01 41 00 REGULATORY REQUIREMENTS

1.0 GENERAL

1.1 PERMITS AND LICENSES

- A. The Contractor shall obtain, maintain and pay for all permits and licenses necessary for the execution of the Work and for the use of such Work when completed. Such permits shall include but are not limited to building, electrical, plumbing, backflow prevention, dig safe, fill, street use and building demolition.
 - 1. City of Ithaca building permit applications shall be presented for review at the regularly scheduled Owner's meeting with the Authority Having Jurisdiction (AHJ).
- B. For any projects which include demolition of a structure or load-bearing elements of a structure, the Contractor is required to complete a "Notification of Demolition and Renovation" and provide this notification to the United State Environmental Protection Agency (EPA) in advance of the work as specified in 40 CFR 61.145. The Contractor shall also provide a copy of this notification to the Owner's Representative prior to any demolition.
- C. All Construction / Building / Hot Work and Occupancy permits shall be issued and maintained through the City of Ithaca.
- D. Ithaca Fire Department Permitting:
 - 1. A permit is required from the Ithaca Fire Department to install or substantially repair a fire suppression, fire detection, or fire alarm system as such as defined under the Uniform Code of New York State.
 - 2. If the scope of work is classified under the Existing Building Code of NYS as Alteration –Level 1; Alteration – Level 2; Alteration – Level 3; or Addition; a permit from the Ithaca Fire Department is required for all work affecting the fire suppression, fire detection, or fire alarm system for that building. A building permit is also required for this type of work.
 - 3. Work classified as a 'Repair' under the Existing Building Code of NYS does not require a permit from the Ithaca Fire Department.

1.2 INSPECTIONS

- A. Apply for and obtain all required inspections, pay all fees and charges for same, include all service charges, pavement cuts and repairs.

1.3 COMPLIANCE

- A. The Contractor shall give all notices, pay all fees and comply with all laws, rules and regulations applicable to the Work.

1.4 OWNER'S REQUIREMENTS

- A. The Contractor, Subcontractors, and employees of the Contractor and Subcontractors shall comply with all regulations governing conduct, access to the premises, operation of equipment and systems, and conduct while in or near the premises and shall perform the Work in such a manner as not to unreasonably interrupt or interfere with the conduct of business of the Owner.
- B. Upon completion of the project, the Contractor agrees to provide the Owner with a summary of municipal permit fees paid. This shall include the name of the permits secured, the permit fees paid by the Contractor and a copy of the permit. If no permit fees were required, the Contractor shall so state, in writing, upon completion of the project.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 41 00*****

SECTION 01 42 00 REFERENCES

1.0 GENERAL

1.1 INTENT OF CONTRACT DOCUMENTS

- A. Notes or instructions shown on any one Drawing, apply where applicable, to all other Drawings.
- B. All references to codes, specifications and standards referred to in the Specification Sections and on the Drawings shall mean, and are intended to be, the latest edition, amendment and/or revision of such reference standard in effect as of the date of these Contract Documents.
- C. Install All Work in Compliance with:
 - 1. NYS Uniform Code
 - a. International Building Code
 - b. International Residential Code
 - c. International Existing Building Code
 - d. International Fire Code
 - e. International Plumbing Code
 - f. International Mechanical Code
 - g. International Fuel Gas Code
 - h. International Property Maintenance Code
 - i. Uniform Code Supplement
 - 2. NYS Energy Code
 - a. International Energy Conservation Code
 - b. ASHRAE 90.1
 - c. Energy Code Supplement
 - 3. National Electric Code

4. Occupational Safety and Health Administration (OSHA).
5. Life Safety Code NFPA 101.
6. All local ordinances
7. Plans and Specifications in excess of code requirements and not contrary to same.

1.2 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and other Division 1 Specification Sections, apply to this Section.

1.3 DEFINITIONS

- A. "General": Basic Contract definitions are included in the Conditions of the Contract.
- B. "Contract Documents": The Contract Documents consist of the Agreement between Owner and Contractor, General Conditions, General Requirements, Drawings, Specifications, addenda issued before execution of the Agreement, other documents listed in the Agreement, and modifications issued after execution of the Agreement.
- C. "The Contract": The Contract Documents form the Contract for construction and represent the entire integrated Agreement between the Owner and Contractor.
- D. "The Work": The work comprises the completed construction required by the Contract Documents and includes all labor necessary to produce such construction and all materials and equipment incorporated in such construction.
- E. "Owner": Cornell University a New York corporation.
- F. "Architect/Engineer": The Architect or Engineer is the person lawfully licensed to practice architecture and/or engineering in the state of New York, identified as such in the Owner Contractor Agreement, and is referred to throughout the Contract Documents as if singular in number. The terms Architect and/or Engineer mean the Architect and/or his authorized representative.
- G. "Contractor": The Contractor, person, firm, or corporation with whom the Construction Agreement contract is made by Owner.
- H. "Subcontractor": A person, firm, or corporation, supplying labor and/or materials for work at site of the project for and under separate contract or agreement with Contractor.
- I. "As Approved" or "Approved": Architect's or Owner's approval.
- J. "As Directed": Owner's direction or instruction. Other terms including "requested," "authorized," "selected," "required," and "permitted" have the same meaning as "directed."
- K. "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."

- L. "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.
- M. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
- N. "Install": Operations at Project site including unloading, temporarily storing, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
- O. "Reinstall". To place back into a former position.
- P. "Replace". Provide a substitute for.
- Q. "Provide": Furnish and install, complete and ready for the intended use.
- R. "Concealed": Work installed in pipe shafts, chases or recesses, behind furred walls, above ceilings, either permanent or removable.
- S. "Exposed": All capital Work not identified as concealed.
- T. "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.
- U. "As-Built Documents": Drawings and other records that are maintained by the Contractor to record all conditions which exist when the building construction is completed. This includes both the elements of the project itself and existing elements that are encountered during the course of project construction.
- V. "Record Drawings": Shows construction changes in the project and the final location of all services, lines, outlets, and connections including underground and concealed items. The "record" drawings shall be compiled by the Architect based on the working as-built drawings and revised in accordance with the marked up drawings submitted by the Contractor.
- W. "Shop Drawings": Drawings, diagrams, illustrations, charts, brochures, and other data that are prepared by Contractor or any Subcontractor, manufacturer, supplier or distributor, for some portion of the work.
- X. "Samples": Physical examples furnished to illustrate materials, equipment or workmanship, and to establish standards by which the work will be judged.
- Y. "General Conditions": The standardized contractual provisions describing the responsibilities, rights and relationships of the Owner and Contractor under the construction contract.
- Z. "Contract Limit Lines": A limit line or perimeter line established on the drawings or elsewhere in the contract documents defining the boundaries of the site available to the contractor for construction purposes.
- AA. "to do", "provide", "furnish", "install", etc., in these Specifications or on Drawings are directions given to the Contractor.

1.4 OWNER AGREEMENTS

- A. Cornell University and the Tompkins-Cortland Counties Building Trades Council, Maintenance Division have entered into an agreement. The local unions which are members of the Tompkins-Cortland Counties Building Trades Council, Maintenance Division are as follows:

Local #241 - International Brotherhood of Electrical Workers
Local #267 - United Association of Plumbers and Steamfitters
Local #281 - United Brotherhood of Carpenters
Local #3NY - International Union of Bricklayers and Allied Craftworkers
Local #178 - International Union of Painters and Allied Trades
Local #112 - International Brotherhood of Sheetmetal Workers
Local #785 - Laborers International Union of North America

The definition of craft maintenance as applied to this agreement shall be as follows:

All work associated with the demolition, repair, replacement, improvement to or construction of equipment, buildings, structures, utilities, and/or system or components thereof. Craft maintenance for trades assistants shall be limited to work assigned to individuals employed as building trade laborers and which directly assists the craft work performed by other employees covered by this agreement; the Employer is free to assign such work; provided, however, such assignment does not fall within the craft performed by other employees covered by this agreement.

1.5 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.
- D. Abbreviations and Acronyms for Standards and Regulations: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the organizations responsible for the standards and regulations in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

ADAAG	Americans with Disabilities Act (ADA) Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080
CFR	Code of Federal Regulations Available from Government Printing Office www.gpoaccess.gov/cfr/index.html	(866) 512-1800 (202) 512-1800
FS	Federal Specification Available from Department of Defense Single Stock Point http://dodssp.daps.dla.mil Available from Defense Standardization Program www.dps.dla.mil Available from General Services Administration www.gsa.gov Available from National Institute of Building Sciences www.nibs.org	(215) 697-6257 (202) 619-8925 (202) 289-7800
UFAS	Uniform Federal Accessibility Standards Available from Access Board www.access-board.gov	(800) 872-2253 (202) 272-0080

1.6 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 in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

AA	Aluminum Association, Inc. (The) www.aluminum.org	(703) 358-2960
AAADM	American Association of Automatic Door Manufacturers www.aaadm.com	(216) 241-7333
AABC	Associated Air Balance Council www.aabchq.com	(202) 737-0202
AAMA	American Architectural Manufacturers Association www.aamanet.org	(847) 303-5664
AASHTO	American Association of State Highway and Transportation Officials www.transportation.org	(202) 624-5800

AATCC	American Association of Textile Chemists and Colorists (The) www.aatcc.org	(919) 549-8141
ABAA	Air Barrier Association of America www.airbarrier.org	(866) 956-5888
ABMA	American Bearing Manufacturers Association www.abma-dc.org	(202) 367-1155
ACI	ACI International (American Concrete Institute) www.aci-int.org	(248) 848-3700
ACPA	American Concrete Pipe Association www.concrete-pipe.org	(972) 506-7216
AEIC	Association of Edison Illuminating Companies, Inc. (The) www.aeic.org	(205) 257-2530
AF&PA	American Forest & Paper Association www.afandpa.org	(800) 878-8878 (202) 463-2700
AGA	American Gas Association www.aga.org	(202) 824-7000
AGC	Associated General Contractors of America (The) www.agc.org	(703) 548-3118
AHAM	Association of Home Appliance Manufacturers www.aham.org	(202) 872-5955
AI	Asphalt Institute www.asphaltinstitute.org	(859) 288-4960
AIA	American Institute of Architects (The) www.aia.org	(800) 242-3837 (202) 626-7300
AISC	American Institute of Steel Construction www.aisc.org	(800) 644-2400 (312) 670-2400
AISI	American Iron and Steel Institute www.steel.org	(202) 452-7100
AITC	American Institute of Timber Construction www.aitc-glulam.org	(303) 792-9559
ALCA	Associated Landscape Contractors of America (Now PLANET - Professional Landcare Network)	
ALSC	American Lumber Standard Committee, Incorporated www.alsc.org	(301) 972-1700

AMCA	Air Movement and Control Association International, Inc. www.amca.org	(847) 394-0150
ANSI	American National Standards Institute www.ansi.org	(202) 293-8020
AOSA	Association of Official Seed Analysts, Inc. www.aosaseed.com	(505) 522-1437
APA	APA - The Engineered Wood Association www.apawood.org	(253) 565-6600
APA	Architectural Precast Association www.archprecast.org	(239) 454-6989
API	American Petroleum Institute www.api.org	(202) 682-8000
ARI	Air-Conditioning & Refrigeration Institute www.ari.org	(703) 524-8800
ARMA	Asphalt Roofing Manufacturers Association www.asphaltroofing.org	(202) 207-0917
ASCE	American Society of Civil Engineers www.asce.org	(800) 548-2723 (703) 295-6300
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers www.ashrae.org	(800) 527-4723 (404) 636-8400
ASME	ASME International (The American Society of Mechanical Engineers International) www.asme.org	(800) 843-2763 (973) 882-1170
ASSE	American Society of Sanitary Engineering www.asse-plumbing.org	(440) 835-3040
ASTM	ASTM International (American Society for Testing and Materials International) www.astm.org	(610) 832-9585
AWI	Architectural Woodwork Institute www.awinet.org	(800) 449-8811 (703) 733-0600
AWPA	American Wood-Preservers' Association www.awpa.com	(334) 874-9800
AWS	American Welding Society www.aws.org	(800) 443-9353 (305) 443-9353

AWWA	American Water Works Association www.awwa.org	(800) 926-7337 (303) 794-7711
BHMA	Builders Hardware Manufacturers Association www.buildershardware.com	(212) 297-2122
BIA	Brick Industry Association (The) www.bia.org	(703) 620-0010
BICSI	BICSI www.bicsi.org	(800) 242-7405 (813) 979-1991
BISSC	Baking Industry Sanitation Standards Committee www.bissc.org	(866) 342-4772
CCC	Carpet Cushion Council www.carpetcushion.org	(203) 637-1312
CDA	Copper Development Association www.copper.org	(800) 232-3282 (212) 251-7200
CGA	Compressed Gas Association www.cganet.com	(703) 788-2700
CIMA	Cellulose Insulation Manufacturers Association www.cellulose.org	(888) 881-2462 (937) 222-2462
CISCA	Ceilings & Interior Systems Construction Association www.cisca.org	(630) 584-1919
CISPI	Cast Iron Soil Pipe Institute www.cispi.org	(423) 892-0137
CLFMI	Chain Link Fence Manufacturers Institute www.chainlinkinfo.org	(301) 596-2583
CPA	Composite Panel Association www.pbmdf.com	(301) 670-0604
CPPA	Corrugated Polyethylene Pipe Association www.cppa-info.org	(800) 510-2772 (202) 462-9607
CRI	Carpet & Rug Institute (The) www.carpet-rug.com	(800) 882-8846 (706) 278-3176
CRSI	Concrete Reinforcing Steel Institute www.crsi.org	(847) 517-1200
CSI	Cast Stone Institute www.caststone.org	(770) 972-3011

CSI	Construction Specifications Institute (The) www.csinet.org	(800) 689-2900 (703) 684-0300
CSSB	Cedar Shake & Shingle Bureau www.cedarbureau.org	(604) 820-7700
CTI	Cooling Technology Institute www.cti.org	(281) 583-4087
DHI	Door and Hardware Institute www.dhi.org	(703) 222-2010
EIA	Electronic Industries Alliance www.eia.org	(703) 907-7500
EIMA	EIFS Industry Members Association www.eima.com	(800) 294-3462 (770) 968-7945
EJCDC	Engineers Joint Contract Documents Committee www.ejdc.org	(703) 295-5000
EJMA	Expansion Joint Manufacturers Association, Inc. www.ejma.org	(914) 332-0040
ESD	ESD Association www.esda.org	(315) 339-6937
FMG	FM Global www.fmgglobal.com	(401) 275-3000
FSA	Fluid Sealing Association www.fluidsealing.com	(610) 971-4850
FSC	Forest Stewardship Council www.fsc.org	49 228 367 66 0
GA	Gypsum Association www.gypsum.org	(202) 289-5440
GANA	Glass Association of North America www.glasswebsite.com	(785) 271-0208
GS	Green Seal www.greenseal.org	(202) 872-6400
GSI	Geosynthetic Institute www.geosynthetic-institute.org	(610) 522-8440
HI	Hydraulic Institute www.pumps.org	(888) 786-7744 (973) 267-9700

HI	Hydronics Institute www.gamanet.org	(908) 464-8200
HPVA	Hardwood Plywood & Veneer Association www.hpva.org	(703) 435-2900
HPW	H. P. White Laboratory, Inc. www.hpwhite.com	(410) 838-6550
IBR	Institute of Boiler & Radiation Manufacturers	
ICEA	Insulated Cable Engineers Association, Inc. www.icea.net	(770) 830-0369
ICRI	International Concrete Repair Institute, Inc. www.icri.org	(847) 827-0830
IEC	International Electrotechnical Commission www.iec.ch	41 22 919 02 11
IEEE	Institute of Electrical and Electronics Engineers, Inc. (The) www.ieee.org	(212) 419-7900
IESNA	Illuminating Engineering Society of North America www.iesna.org	(212) 248-5000
IEST	Institute of Environmental Sciences and Technology www.iest.org	(847) 255-1561
IGCC	Insulating Glass Certification Council www.igcc.org	(315) 646-2234
IGMA	Insulating Glass Manufacturers Alliance www.igmaonline.org	(613) 233-1510
ILI	Indiana Limestone Institute of America, Inc. www.iliai.com	(812) 275-4426
ISO	International Organization for Standardization www.iso.ch	41 22 749 01 11
	Available from ANSI www.ansi.org	(202) 293-8020
ISSFA	International Solid Surface Fabricators Association www.issfa.net	(877) 464-7732 (702) 567-8150
ITS	Intertek www.intertek.com	(800) 345-3851 (713) 407-3500

ITU	International Telecommunication Union www.itu.int/home	41 22 730 51 11
KCMA	Kitchen Cabinet Manufacturers Association www.kcma.org	(703) 264-1690
LMA	Laminating Materials Association (Now part of CPA)	
LPI	Lightning Protection Institute www.lightning.org	(800) 488-6864 (804) 314-8955
MBMA	Metal Building Manufacturers Association www.mbma.com	(216) 241-7333
MFMA	Maple Flooring Manufacturers Association, Inc. www.maplefloor.org	(847) 480-9138
MFMA	Metal Framing Manufacturers Association www.metalframingmfg.org	(312) 644-6610
MHIA	Material Handling Industry of America www.mhia.org	(800) 345-1815 (704) 676-1190
MIA	Marble Institute of America www.marble-institute.com	(440) 250-9222
MPI	Master Painters Institute www.paintinfo.com	(888) 674-8937
MSS	Manufacturers Standardization Society of The Valve and Fittings Industry Inc. www.mss-hq.com	(703) 281-6613
NAAMM	National Association of Architectural Metal Manufacturers www.naamm.org	(312) 332-0405
NACE	NACE International (National Association of Corrosion Engineers International) www.nace.org	(800) 797-6623 (281) 228-6200
NADCA	National Air Duct Cleaners Association www.nadca.com	(202) 737-2926
NAIMA	North American Insulation Manufacturers Association www.naima.org	(703) 684-0084
NBGQA	National Building Granite Quarries Association, Inc. www.nbgqa.com	(800) 557-2848

NCAA	National Collegiate Athletic Association (The) www.ncaa.org	(317) 917-6222
NCMA	National Concrete Masonry Association www.ncma.org	(703) 713-1900
NCPI	National Clay Pipe Institute www.ncpi.org	(262) 248-9094
NCTA	National Cable & Telecommunications Association www.ncta.com	(202) 775-3550
NEBB	National Environmental Balancing Bureau www.nebb.org	(301) 977-3698
NECA	National Electrical Contractors Association www.necanet.org	(301) 657-3110
NeLMA	Northeastern Lumber Manufacturers' Association www.nelma.org	(207) 829-6901
NEMA	National Electrical Manufacturers Association www.nema.org	(703) 841-3200
NETA	International Electrical Testing Association www.netaworld.org	(888) 300-6382 (303) 697-8441
NFHS	National Federation of State High School Associations www.nfhs.org	(317) 972-6900
NFPA	NFPA (National Fire Protection Association) www.nfpa.org	(800) 344-3555 (617) 770-3000
NFRC	National Fenestration Rating Council www.nfrc.org	(301) 589-1776
NGA	National Glass Association www.glass.org	(866) 342-5642 (703) 442-4890
NHLA	National Hardwood Lumber Association www.natlhardwood.org	(800) 933-0318 (901) 377-1818
NLGA	National Lumber Grades Authority www.nlga.org	(604) 524-2393
NOFMA	NOFMA: The Wood Flooring Manufacturers Association www.nofma.org	(901) 526-5016
NRCA	National Roofing Contractors Association www.nrca.net	(800) 323-9545 (847) 299-9070

NRMCA	National Ready Mixed Concrete Association www.nrmca.org	(888) 846-7622 (301) 587-1400
NSF	NSF International (National Sanitation Foundation International) www.nsf.org	(800) 673-6275 (734) 769-8010
NSSGA	National Stone, Sand & Gravel Association www.nssga.org	(800) 342-1415 (703) 525-8788
NTMA	National Terrazzo & Mosaic Association, Inc. (The) www.ntma.com	(800) 323-9736 (540) 751-0930
NYBFU	New York Board of Fire Underwriters www.nybfu.org	(212) 227-3700
PCI	Precast/Prestressed Concrete Institute www.pci.org	(312) 786-0300
PDCA	Painting & Decorating Contractors of America www.pdca.com	(800) 332-7322 (314) 514-7322
PDI	Plumbing & Drainage Institute www.pdionline.org	(800) 589-8956 (978) 557-0720
PGI	PVC Geomembrane Institute http://pgi-tp.ce.uiuc.edu	(217) 333-3929
PLANET	Professional Landcare Network www.landcarenetwork.org	(800) 395-2522
PTI	Post-Tensioning Institute www.post-tensioning.org	(602) 870-7540
RCSC	Research Council on Structural Connections www.boltcouncil.org	(800) 644-2400 (312) 670-2400
RFCI	Resilient Floor Covering Institute www.rfci.com	(301) 340-8580
RIS	Redwood Inspection Service www.calredwood.org	(888) 225-7339 (415) 382-0662
SAE	SAE International www.sae.org	(877) 606-7323 (724) 776-4841
SBI	Steel Boiler Institute	

SDI	Steel Deck Institute www.sdi.org	(847) 458-4647
SDI	Steel Door Institute www.steeldoor.org	(440) 899-0010
SEFA	Scientific Equipment and Furniture Association www.sefalabs.com	(516) 294-5424
SGCC	Safety Glazing Certification Council www.sgcc.org	(315) 646-2234
SIA	Security Industry Association www.siaonline.org	(703) 683-2075
SJI	Steel Joist Institute www.steeljoist.org	(843) 626-1995
SMA	Screen Manufacturers Association www.smacentral.org	(561) 533-0991
SMACNA	Sheet Metal and Air Conditioning Contractors' National Association www.smacna.org	(703) 803-2980
SMPTE	Society of Motion Picture and Television Engineers www.smpte.org	(914) 761-1100
SPFA	Spray Polyurethane Foam Alliance www.sprayfoam.org	(800) 523-6154
SPIB	Southern Pine Inspection Bureau (The) www.spib.org	(850) 434-2611
SPRI	Single Ply Roofing Industry www.spri.org	(781) 647-7026
SSINA	Specialty Steel Industry of North America www.ssina.com	(800) 982-0355 (202) 342-8630
SSPC	SSPC: The Society for Protective Coatings www.sspc.org	(877) 281-7772 (412) 281-2331
STI	Steel Tank Institute www.steeltank.com	(847) 438-8265
SWI	Steel Window Institute www.steelwindows.com	(216) 241-7333
SWRI	Sealant, Waterproofing, & Restoration Institute www.swrionline.org	(816) 472-7974

TCA	Tile Council of America, Inc. www.tileusa.com	(864) 646-8453
TIA/EIA	Telecommunications Industry Association/Electronic Industries Alliance www.tiaonline.org	(703) 907-7700
TMS	The Masonry Society www.masonrysociety.org	(303) 939-9700
TPI	Truss Plate Institute, Inc. www.tpinst.org	(703) 683-1010
TPI	Turfgrass Producers International www.turfgrassod.org	(847) 649-5555
TRI	Tile Roofing Institute www.tilerroofing.org	(312) 670-4177
UFPO	Underground Facilities Protective Organization www.ufpo.org	(800) 962-7962 (800) 962-7811
UL	Underwriters Laboratories Inc. www.ul.com	(877) 854-3577 (847) 272-8800
UNI	Uni-Bell PVC Pipe Association www.uni-bell.org	(972) 243-3902
USGBC	U.S. Green Building Council www.usgbc.org	(202) 828-7422
WASTEC	Waste Equipment Technology Association www.wastec.org	(800) 424-2869 (202) 244-4700
WCSC	Window Covering Safety Council www.windowcoverings.org	(800) 506-4636
WDMA	Window & Door Manufacturers Association www.wdma.com	(800) 223-2301
WI	Woodwork Institute www.wicnet.org	(916) 372-9943
WMMPA	Wood Moulding & Millwork Producers Association www.wmmpa.com	(800) 550-7889 (530) 661-9591
WSRCA	Western States Roofing Contractors Association www.wsrca.com	(800) 725-0333 (650) 570-5441

WWPA	Western Wood Products Association www.wwpa.org	(503) 224-3930
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- B. Code Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

IAPMO	International Association of Plumbing and Mechanical Officials www.iapmo.org	(909) 472-4100
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ICC	International Code Council www.iccsafe.org	(888) 422-7233 (703) 931-4533
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ICC-ES	ICC Evaluation Service, Inc. www.icc-es.org	(800) 423-6587 (562) 699-0543
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NEC	National Electric Code	
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- C. Federal Government Agencies: Where abbreviations and acronyms are used in Specifications or other Contract Documents, they shall mean the recognized name of the entities in the following list. Names, telephone numbers, and Web sites are subject to change and are believed to be accurate and up-to-date as of the date of the Contract Documents.

CE	Army Corps of Engineers www.usace.army.mil	
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CPSC	Consumer Product Safety Commission www.cpsc.gov	(800) 638-2772 (301) 504-7923
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DOC	Department of Commerce www.commerce.gov	(202) 482-2000
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DOD	Department of Defense http://.dodssp.daps.dla.mil	(215) 697-6257
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DOE	Department of Energy www.energy.gov	(202) 586-9220
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EPA	Environmental Protection Agency www.epa.gov	(202) 272-0167
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FAA	Federal Aviation Administration www.faa.gov	(866) 835-5322
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FCC	Federal Communications Commission www.fcc.gov	(888) 225-5322
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FDA	Food and Drug Administration www.fda.gov	(888) 463-6332
GSA	General Services Administration www.gsa.gov	(800) 488-3111
HUD	Department of Housing and Urban Development www.hud.gov	(202) 708-1112
LBL	Lawrence Berkeley National Laboratory www.lbl.gov	(510) 486-4000
NCHRP	National Cooperative Highway Research Program (See TRB)	
NIST	National Institute of Standards and Technology www.nist.gov	(301) 975-6478
OSHA	Occupational Safety & Health Administration www.osha.gov	(800) 321-6742 (202) 693-1999
PBS	Public Building Service (See GSA)	
PHS	Office of Public Health and Science www.osophs.dhhs.gov/ophs	(202) 690-7694
RUS	Rural Utilities Service (See USDA)	(202) 720-9540
SD	State Department www.state.gov	(202) 647-4000
TRB	Transportation Research Board www.nas.edu/trb	(202) 334-2934
USDA	Department of Agriculture www.usda.gov	(202) 720-2791
USPS	Postal Service www.usps.com	(202) 268-2000

2.0 PRODUCTS - NOT USED

3.0 EXECUTION - NOT USED

*****END OF SECTION 01 42 00*****

SECTION 01 45 00 QUALITY CONTROL

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall provide and maintain an effective Contractor Quality Control (CQC) program and perform sufficient inspections and tests of all items of work, including those of Subcontractors, to ensure compliance with Contract Documents. Include surveillance and tests specified in the technical sections of the Specifications. Furnish appropriate facilities, instruments, and testing devices required for performance of the quality control function. Controls must be adequate to cover construction operations and be keyed to the construction sequence. Construction shall not begin until the Owner has approved the CQC program.

1.2 CONTROL OF ON-SITE CONSTRUCTION

- A. Include a control system for the following phases of inspection:
1. Pre-Installation Meeting. For all sections where pre-installations are defined, the Contractor shall arrange for a pre-installation meeting. When practical, pre-installation meetings shall be scheduled to take place on the same day as regularly schedule progress meetings. The Contractor shall make available, during this meeting, all approved submittals and products.
 - a. Agenda to include the following:
 - i. Appointment
 - ii. Appointment of official representatives of participants in the Project.
 - iii. Review of existing conditions and affected work, and testing thereof as required.
 - iv. Review of installation procedures and requirements.
 - v. Review of environmental and site condition requirements.
 - vi. Schedule of the applicable portions of the Work.
 - vii. Schedule of submission of samples, color chips, and items for Owners consideration.
 - viii. Requirements for temporary facilities, site sign, offices, storage sheds, utilities, fences, Section 01500.
 - ix. Requirements for notification for reviews. Allow a minimum of 48 hour notice to Architect for review of the Work.

- x. Requirements for inspections and tests, as applicable. Schedule and undertake inspections and tests in accordance with Section 01410.
 - xi. Delivery schedule of specified equipment.
 - xii. Special safety requirements and procedures.
- b. The following minimum personnel shall be at the meeting:
- i. Project Manager.
 - ii. Project Field Supervisor
 - iii. Subcontractor
 - iv. Architect's Representative
 - v. Owner's Representative
 - vi. Commissioning Agent, when applicable
 - vii. Testing Agency, when applicable
2. Preparatory Inspection. Perform this inspection prior to beginning work on any definable feature of work. Include a review of contract requirements with the supervisors directly responsible for the performance of the work; check to assure that materials, products, and equipment have been tested, submitted, and approved; check to assure that provisions have been made for required control testing; examine the work area to ascertain that preliminary work has been completed; physically examine materials and equipment to assure that they conform to shop drawings and data and that the materials and equipment are on hand.
3. Initial Inspection. Perform this inspection as soon as work commences on a representative portion of a particular feature of workmanship review control testing for compliance with contract requirements.
4. Follow-up Inspections. Perform these inspections on a regular basis to assure continuing compliance with contract requirements until completion of that particular work.

1.3 CONTROL OF OFF-SITE OPERATIONS

- A. Perform factory quality control inspections for items fabricated or assembled off-site as opposed to "off-the-shelf" items. The CQC Representative at the fabricating plant shall be responsible for release of the fabricated items for shipment to the job site. The CQC Representative at the job site shall receive the item and note any damage incurred during shipment. The Contractor shall be responsible for protecting and maintaining the item in good condition throughout the period of on-site and during erection or installation. Although any item found to be faulty may be rejected before its use, final acceptance of an item by the Owner is based on its satisfactory incorporation into the work and acceptance of the completed project.

1.4 TESTING

- A. The Owner may engage the services of an independent testing laboratory to confirm that an installed item or element of work conforms to the Specification and workmanship requirements.

1.5 OWNER'S REPRESENTATIVE

- A. The Owner shall designate a Representative to monitor the progress and execution of the work. The Representative shall have the authority to call for test samples, to approve or to reject work performed and to stop work in progress, if, in its opinion, the work is not in conformance with the Contract Documents. The Representative shall not be authorized to make changes or interpretations of the Contract Documents.
 - 1. The Contractor shall maintain a project Deficiency/Issues Log in e-Builder to track non-conforming materials or sub-standard workmanship identified by Owner's Representative.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 45 00*****

SECTION 01 45 29 TESTING LABORATORY SERVICES

1.0 GENERAL

1.1 DESCRIPTION

- A. The Owner will employ and pay for the services of an Independent Testing Laboratory to perform specified services.
 - 1. Contractor shall cooperate with the laboratory to facilitate the execution of its required services.
 - 2. Employment of the laboratory shall in no way relieve Contractor's obligations to perform the Work of the Contract.
- B. Testing Laboratory services are specified in connection with work including but not limited to the following:
 - 1. New York State Building Code, Chapter 17, Special Inspections
 - 2. Cast-in-place Concrete: Section 03 30 00.

1.2 QUALIFICATIONS OF LABORATORY

- A. Meet "Recommended Requirements for Independent Laboratory Qualification", latest edition, published by American Council of Independent Laboratories.
- B. Meet basic requirements of ASTM E329-05b, "Standard Specification for Agencies Engaged in Construction Inspection and/or Testing".
- C. Authorized to operate in the State of New York.
- D. Testing and inspections shall be performed under the direction of Licensed Professional Engineer registered in the State of New York who shall be responsible for administering all testing and inspections and shall certify any local agency requirements.
- E. Submit copy of report of inspection of facilities made by Materials Reference Laboratory of National Bureau of Standards during the most recent tour of inspection, with memorandum of remedies of any deficiencies reported by the inspection.
- F. Testing Equipment:
 - 1. Calibrated at maximum 12 month intervals by devices of accuracy traceable to either:
 - a. National Bureau of Standards
 - b. Accepted values of natural physical constants.
 - 2. Submit copy of certificate of calibration made by accredited calibration agency.

1.3 LABORATORY DUTIES

- A. Cooperate with Owner, Architect and Contractor; provide qualified personnel promptly on notice.
- B. Perform specified inspections, sampling and testing of materials and methods of construction.
 - 1. Comply with specified standards, ASTM, other recognized authorities, and as specified.
 - 2. Ascertain compliance of materials with requirements of Contract Documents.
- C. Promptly notify Owner, Architect and Contractor of observed irregularities or deficiencies of work or products.
- D. Should Laboratory tests of material performed at specified intervals of time indicate that strengths do not meet Specification requirements, the Inspection Agency and Geotechnical Engineer shall IMMEDIATELY notify the Owner, Contractor, and Architect. The Architect shall determine whether remedial action is necessary.
- E. Promptly submit written report of each test and inspection; one copy each to Architect, Owner, Contractor, and one copy to Record Documents File. Each report shall include:
 - 1. Date issued.
 - 2. Project title and number.
 - 3. Testing laboratory name, address and telephone number.
 - 4. Name and signature of laboratory inspector.
 - 5. Date and time of sampling or inspection.
 - 6. Record of temperature and weather conditions.
 - 7. Date of test.
 - 8. Identification of product and specification section.
 - 9. Location of sample or test in the Project.
 - 10. Type of inspection or test.
 - 11. Observations on compliance with Contract Documents.
- F. Prepare a summary report for each category of inspection certifying that the work has been inspected and meets the Contract Documents. Specifically list all discrepancies found which have not yet been repaired or resolved.
- G. Perform additional tests as required by Architect or the Owner.

1.4 LIMITATIONS OF AUTHORITY OF TESTING LABORATORY

- A. Laboratory is not authorized to:

1. Release, revoke, alter or enlarge on requirements of Contract Documents.
2. Approve or accept any portion of the Work.
3. Perform any duties of the Contractor.

1.5 CONTRACTOR'S RESPONSIBILITIES

- A. Cooperate with laboratory personnel. Provide access to Work, and Manufacturer's operations.
- B. Secure and deliver to the laboratory adequate quantities of representative samples of materials proposed to be used and for which testing is specified.
- C. Provide to the laboratory the approved design mixes proposed to be used for concrete, and other material mixes which require control by the testing laboratory.
- D. Furnish copies of Products test reports as required.
- E. Furnish incidental labor and facilities:
 1. To provide access to Work to be tested.
 2. To obtain and handle samples at the Project site or at the source of the product to be tested.
 3. To facilitate inspections and tests.
 4. For Laboratory's exclusive use for storage and curing of test samples.
- F. Notify laboratory a minimum of 24 hours in advance of operations to allow for laboratory assignment of personnel and scheduling of tests.
 1. When tests or inspections cannot be performed after such notice, reimburse laboratory for personnel and travel expenses incurred due to Contractor's responsibility.
- G. Make arrangements with laboratory and pay for additional samples and tests required for Contractor's convenience.
- H. Employ and pay for the services of a separate, equally qualified independent testing laboratory to perform additional inspections, sampling and testing required when initial tests indicate Work does not comply with Contract Documents.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 45 29*****

SECTION 01 50 00 TEMPORARY FACILITIES AND CONTROLS

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish, install and maintain all temporary facilities and services of every kind, as required by the Contractor and by its subcontractors for their performance of the Work and compliance with the Contract Documents, and shall remove such facilities and complete such services upon the completion of all other work, or as Cornell University may direct.
- B. The Contractor shall obtain all required permits and approvals for and shall provide, construct, or install, as well as operate, maintain, service and remove temporary facilities and services.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with Federal, State and local codes and safety regulations.

2.0 PRODUCTS

2.1 MATERIALS, GENERAL

- A. Choice of materials, as suitable for the accomplishment of the intended purpose, is the Contractor's option.
- B. Materials may be new or used, but must not violate requirements of applicable codes, standards and specifications.

2.2 TEMPORARY FIRST AID FACILITIES

- A. Provide first aid equipment and supplies, with qualified personnel continuously available to render first aid at the site.
- B. Provide a sign, posted at the telephone, listing the telephone numbers for emergency medical services: Physicians, ambulance services and hospitals.

2.3 TEMPORARY FIRE PROTECTION

- A. Provide a fire protection and prevention program for employees and personnel at the site. Any fire watches as a result of construction operations are the responsibility of the Contractor. Comply with NFPA 241. Develop, manage, and supervise an overall fire-prevention and -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.

1. Impairments “Fire Code of NYS Section 901.7”. Impairment; “the removal of fire alarm devices or sprinkler system coverage in a building.” There are two different levels of impairments
 - a. Partial Impairment. The removal of fire alarm devices or sprinkler system coverage via control valve in the immediate area of where work is to be performed.
 - Basic Impairment Notification will be sent to Local Authority Having Jurisdiction and FM Global.
 - No fire watch will be required in most cases.
 - b. Full System Impairment. The complete removal of a fire alarm “system” or sprinkler “system”. Impairment of both the fire alarm system and sprinkler system at the same time is not allowed.
 - Full System Impairment Notification will be sent to local Authority Having Jurisdiction, FM Global, Ithaca Fire Department Officers, Building Manager, Maintenance Manager, and Customer Service.
 - Fire Watch will be required and will need the Fire Watch Person’s name and contact information. Cornell EH&S does not perform the fire watch, it is the responsibility of the Contractor.
- B. Equipment:
1. Provide and maintain fire extinguishing equipment ready for instant use at all areas of the Project and at specific areas of critical fire hazard.
 2. Hand extinguishers of the types and sizes recommended by the National Board of Fire Underwriters to control fires from particular hazards.
 3. Construction period use of permanent fire protection system.
 4. Water hoses connected to an adequate water pressure and supply system to reach each area or level of construction upon building enclosure or heating of the building.
 5. Maintain existing standpipes and hoses for fire protection. Provide additional temporary hoses where required to comply with requirements. 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. Provide hoses of sufficient length to protect construction areas.
 6. Maintain unobstructed access to fire extinguishers, fire hydrants, siamese connections, standpipes, temporary fire-protection facilities, stairways, and other access routes for firefighting.
 7. Where existing or temporary fire protection services are being replaced with new fire protection services, do not remove or impair existing or temporary services until new services are placed into operation and use.

8. At earliest feasible date in each area of Project, complete installation of permanent fire-protection facility and systems, including connected services, and place into operation and use. Instruct key personnel on use of facilities. Protect and maintain permanent fire protection system. Repair or replace any components damaged during construction.
- C. Enforce fire-safety discipline:
1. Store combustible and volatile materials in an isolated, protected location.
 2. Avoid accumulations of flammable debris and waste in or about the Project.
 3. Prohibit smoking in the vicinity of hazardous conditions.
 4. There is NO SMOKING allowed on construction sites located in any occupied building. Smoking is prohibited in all Cornell University buildings.
 5. Closely supervise welding and torch-cutting operations in the vicinity of combustible materials and volatile conditions.
 6. Supervise locations and operations of portable heating units and fuel.
- D. Maintain fire extinguishing equipment in working condition, with current inspection certificate attached to each extinguisher.
- E. Welding or burning operations shall be conducted under a Hot Work Permit issued in accordance with Section 01 41 00. Where such work is permitted, the Contractor shall provide an approved fire extinguisher in good operating condition within easy reach of the operating personnel. In each instance, obtain prior approval of Cornell University Environmental Health & Safety.
- F. Advise Cornell University Environmental Health & Safety of any items affecting Life Safety, e.g., road blockages, exit closing, etc.

2.4 CONSTRUCTION AIDS

- A. Provide construction aids and equipment required to assure safety for personnel and to facilitate the execution of the Work; Scaffolds, staging, ladders, stairs, ramps, runways, platforms, railings, hoists, cranes, chutes, fall protection, harness, tie-off points, and other such equipment.
- B. When permanent stair framing is in place, provide temporary treads, platforms and railings, for use by construction personnel.
- C. Maintain all equipment in a safe condition.

2.5 SUPPORTS

- A. The Contractor shall include cost of all materials and labor necessary to provide all supports, beams, angles, hangers, rods, bases, braces, etc. to properly support the Contract Work. All supports, etc. shall meet the approval of the Architect.

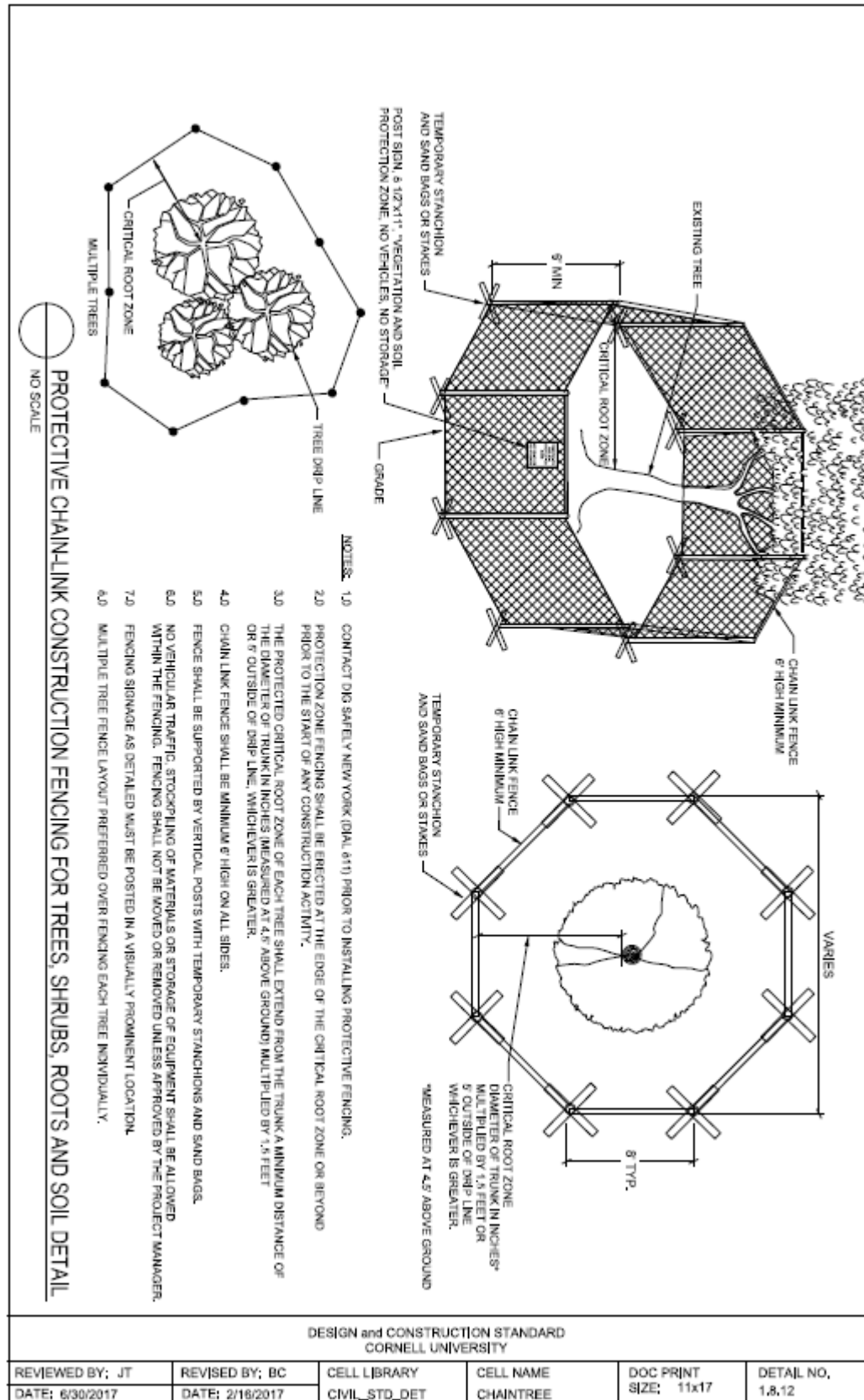
- B. Any and all supports that are of “custom” fabrication or installation shall be designed by the Contractor’s NYS licensed PE with stamped & signed shop drawings and calculations provided for same.

2.6 TEMPORARY WATER CONTROL

- A. The Contractor shall provide, maintain and operate pumps required to keep the Work free of water at all times.
- B. Dispose of all water with due care and shall not infringe on the rights of others on the Site, of adjacent property owners and of the public. All cost in connection with the removal of such water shall be paid by the Contractor.

2.7 TREE, PLANT AND LAWN PROTECTION

- A. Preserve and protect existing trees, plants and lawns at the site which are designated to remain, and those adjacent to the site.
- B. Consult with Owner and remove agreed-on roots and branches which interfere with construction.
 - 1. Employ certified arborist to remove, and to treat cuts.
- C. Provide temporary fences to a height of six feet, around each, or around each group of trees and plants. Provide temporary lawn protection to prevent soil compaction. Reference Cornell University Design Standards and Details for wood and chain fencing below.
- D. Protect root zones of trees, plants, and lawn areas:
 - 1. Do not allow vehicular traffic or parking.
 - 2. Do not store materials or products.
 - 3. Prevent dumping of refuse or chemically injurious materials or liquids.
 - 4. Prevent puddling or continuous running water.
- E. Carefully supervise excavating, grading and filling, and subsequent construction operations to prevent damage.
- F. Replace, or suitably repair, trees, plants and lawn areas designated to remain which are damaged or destroyed due to construction operations.
- G. Roots 2 inches or larger that are damaged or cut during construction are to be sawed off close to the tree side of the excavation by certified arborist.
- H. During the leafing-out period in the spring, extra care should be exercised to reduce root damage such as keeping exposed roots wet, saturating soil when backfilling around roots, and backfilling as soon as possible.
- I. Consult Cornell University Grounds Department for mitigation of root or tree damage.



2.8 PERSONNEL, PUBLIC AND EMPLOYEE PROTECTION

- A. Provide guardrails, barricades, fences, footways, tunnels and other devices necessary to protect all personnel, employees, and the public, against hazards on, adjacent to or accessing the construction site.
 - 1. Provide signs, warning lights, signals, flags and illumination as necessary to alert persons to hazards and to provide safe, adequate visibility in areas of hazards.
 - 2. Closed sidewalks need to be indicated with OSHA-approved signs, as well as, proper barricades.
 - 3. Provide flag personnel as necessary to guide vehicles, protect personnel, public and employees.

2.9 ACCESS ROADS AND PARKING AREAS

- A. Provide adequate temporary roads and walks to achieve all-weather access into the site from public thoroughfares, and within and adjacent to the site as necessary to provide uninterrupted access to field offices, work, and storage areas.
- B. Grade and provide drainage facilities to assure runoff of rainwater and to avoid blockage of flow from adjacent areas.
- C. During dry weather wet down temporary unpaved areas when necessary to prevent blowing dust.

2.10 PROJECT IDENTIFICATION AND SIGNS

- A. No Contractor signs to be displayed at the project site, unless authorized by the Owner.
- B. Owner Construction Project Sign. The Contractor shall install Owner provided project identification signage.

2.11 SECURITY

- A. The Contractor shall provide security services as required to protect the interests of the Owner.

2.12 FIELD OFFICES

- A. The Owner shall designate a space within the facility to serve as a field office for the use of the Contractor and Owner.

3.0 EXECUTION

3.1 PREPARATION

- A. Consult with Owner, review site conditions and factors which affect construction procedures and temporary facilities, including adjacent properties and public facilities which may be affected by execution of the work.
 - 1. Designate the locations and extent of temporary construction, storage, and other temporary facilities and controls required for the expeditious accomplishment of the Work.
 - 2. Allow space for use of the site by Owner and by other contractors, as required by Contract Documents.

3.2 GENERAL

- A. Comply with applicable requirements specified in sections of Division 02 through 40.
- B. Make work structurally, mechanically and electrically sound throughout.
- C. Install work in a neat and orderly manner.
- D. Maintain, clean, service and repair facilities to provide continuous usage, and to the quality specified for the original installation.
- E. Relocate facilities as required by progress of construction, by storage or work requirements, and to accommodate requirements of Owner and other contractors employed at the site.
- F. Keep the site, at all times during the progress of the Work, free from accumulation of waste matter or rubbish and shall confine its apparatus, materials and operations of its workers to the limits prescribed except as the latter may be extended with the approval of the Owner's Representative. Cleaning of the structure or structures must be performed daily and removal of waste matter or rubbish must be performed at least once a week.
- G. Contractor shall at all times keep access road and public roads clean of mud and construction debris and maintain dust control to the satisfaction of the Owner.

3.3 REMOVAL

- A. Completely remove temporary structures, materials, equipment and services:
 - 1. When construction needs can be met by use of permanent construction.
 - 2. At completion of the Project.
- B. Repair damage caused by installation or use of temporary facilities. Clean after removal.

- C. Restore existing or permanent facilities used for temporary purposes to specified, or to original condition.
 - 1. Remove foundations and underground installations for temporary construction and utilities.
 - 2. Grade the areas of the site affected by temporary installations to required elevations and slopes, and clean the area.

*****END OF SECTION 01 50 00*****

SECTION 01 51 00 TEMPORARY UTILITIES

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall furnish, install and maintain temporary utilities required by all trades for construction. Remove on completion of Work.
- B. The Contractor shall provide all labor and materials for temporary connections and distribution.

1.2 REQUIREMENTS OF REGULATORY AGENCIES

- A. Comply with National Electric Code, current edition.
- B. Comply with Federal, State and local codes and safety regulations and with utility company requirements.

2.0 PRODUCTS

2.1 MATERIALS, GENERAL

- A. Materials may be new or used but must be adequate in capacity for the required usage, must not create unsafe conditions, and must not violate requirements of applicable codes and standards.

2.2 TEMPORARY ELECTRICITY, LIGHTING AND WATER

- A. The Contractor shall have access to the Owner's water and electric power for constructing the Work. Temporary utility connections shall be made by the Contractor as close to its operations as possible as long as such connections do not over-load the capacity of the Owner's utilities or interfere with its customary utilization thereof. Utility access points shall be determined in cooperation with and acceptable to the Owner.
- B. The Contractor shall be responsible for the economic use of the Owner's Water and Power. The Owner will pay for the water and power consumed in the construction of the Work as long as economical usage of these utilities is maintained. The Owner reserves the right to meter and charge for the power and water consumed if in the opinion of the Owner the usage of these utilities is not economically conducted by the Contractor. In such an event, the Owner shall give three (3) days written notice to the Contractor of its intentions to meter and charge for temporary utilities used by the Contractor.
- C. All temporary power systems including wiring shall be removed by the Contractor when no longer required.

- D. The minimum temporary lighting to be provided is at the rate of fifty-foot candles, is to be maintained in each room and changed as required when interior walls are being erected. The required temporary lighting must be maintained for twenty-four (24) hours a day and seven (7) days a week at all stair levels and in all corridors below ground; in any and all egress; in all other spaces temporary lighting is to be maintained only during working hours. All temporary wiring and equipment shall be in conformity with the National Electric Code.
- E. The minimum temporary outdoor security lighting to be provided is as follows:
 - 1. Along the perimeter of the site fence, consisting of vandal-resistant light fixtures with HID lamps, located 150-foot center, mounted on the inside of the construction fence.
 - 2. Lighting for temporary pedestrian paths and roadways, to provide a minimum of 0.1 foot-candle on the path of travel.
- F. Three-phase temporary power circuits shall be installed as required to operate construction equipment of the various trades and to install and test equipment such as pumps and elevators. The Contractor shall install and maintain temporary or permanent service for the permanently installed building equipment such as sump pumps, boilers, boiler controls, fans, pumps, so that such equipment may be operated when required and so ordered by the Owner's Representative for drainage or for temporary heat.
- G. Except as otherwise provided in the Contract, the Contractor shall submit to the Owner or the Owner's Representative for approval a proposed schedule of all utility shutdowns and cutovers of all types which may be required in connection with the Work. Such schedule shall provide a minimum of four (4) weeks advance notice to the Owner prior to the time of the proposed shutdown and cutover. The Contractor shall be responsible for all charges relating to shutdowns.
- H. Discontinuance, Changes and Removal

The Contractor shall:
 - 1. Discontinue all temporary services required by the Contract when so directed by the Owner or the Owner's Representative. The discontinuance of any such temporary service prior to the completion of the Work shall not render the Owner liable for any additional cost entailed thereby.
 - 2. Remove and relocate such temporary facilities as directed by the Owner or the Owner's Representative and shall restore the Site and the Work to a condition satisfactory to the Owner.

2.3 TEMPORARY USE OF ELEVATOR

- A. Use of Existing Elevator
 - 1. If the Contractor elects to use the existing elevator equipment, the Contractor shall:
 - a. Provide adequate protection for such equipment and shall operate such equipment within a capacity not to exceed that allowed by law, rule or regulation.

- b. Provide for the maintenance and cleaning of the elevator equipment as approved by the Owner's Representative.
- c. Prior to start of construction, accurately record the condition of the existing elevator. Promptly repair or replace items that are damaged as a result of Contractor's use. Service calls that arise as a result of Contractor misuse will be charged to the Contractor. At Substantial Completion, restore elevators to condition existing before initial use.
- d. Use only elevators designated by Owner's Representative at dates and times designated by Owner's Representative. Dates and times available for Contractor's use shall be scheduled with, and at the convenience of, the Owner, and may vary during the course of the Project.
- e. Owner will not provide elevator operators or other monitoring of elevator use.
- f. Do not load elevators beyond their rated weight capacity.
- g. Provide code compliant 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 maintenance contractor 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.
- h. Procure and coordinate the elevator maintenance contractor to gain access to the elevator shaft as required to complete the work.

2.4 TEMPORARY CONTRACTOR TELEPHONE SERVICE

- A. Site Superintendent or their Representative shall carry a cellular telephone at all times.
- B. Provide phone number to Cornell project representatives for communication during Work.

2.5 TEMPORARY SANITARY FACILITIES

- A. Provide adequate toilet and washing facilities for the use of personnel and employees; locate convenient to workstations.
- B. Existing plumbing facilities shall not be used by construction personnel.
- C. Facilities may be portable chemical-type toilets or temporary flush toilets connected to sanitary sewer, screened for privacy.
- D. Service, clean and maintain facilities and enclosures in a neat, clean and sanitary condition.

3.0 EXECUTION

3.1 REMOVAL

- A. Completely remove temporary materials and equipment when their use is no longer required.
- B. Clean and repair damage caused by temporary installations or use of temporary facilities.
- C. Restore existing and permanent facilities used for temporary services to specified, or to original, condition.

*****END OF SECTION 01 51 00*****

SECTION 01 57 13 SOIL EROSION AND SEDIMENT CONTROL

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall be responsible for preparing and implementing an Erosion and Sediment Control Plan.
- B. This Section describes minimum standards for the prevention and control of erosion during the construction process and may not be sufficient for all sites. The Contractor shall remain responsible for the means and methods of preventing erosion and may be required to employ additional means and methods as required to prevent violations of local, state, or federal standards.

1.2 SUBMITTALS

- A. Submit an Erosion and Sediment Control Plan, as specified herein.
- B. Refer to Section 01 33 00 – Submittal Procedures.

1.3 PLAN AND IMPLEMENTATION GENERAL REQUIREMENTS

- A. Plan shall comply with design specifications in the New York Guidelines for Urban Erosion and Sediment Control, NYS Stormwater Management Design Manual, NYSDEC Technical and Operational Guidance Series, good engineering practices, and this Section.
- B. Erosion and Sediment Control Plan shall be reviewed and approved by the Environmental Health and Safety Office, and implemented prior to any site work.
- C. Maintain Erosion and Sediment Control measures throughout the course of site construction activities until vegetative growth is established to the Owner's satisfaction.
- D. At conclusion of the Project, remove all remaining temporary erosion control structures and properly dispose of accumulated sediment on-site in areas approved by the Owner.

1.4 PERFORMANCE STANDARDS

- A. At no time shall construction operations or any related disturbance of the site result in the impairment of local waterways. "Impairment" is defined by regulations as including, but not limited to, the following:
 - 1. The release of water into receiving waters that causes a substantial visible contrast to natural conditions; or
 - 2. The deposition of significant sediment into such waters.

- B. Such deficiencies shall be corrected immediately by the Contractor to prevent further impairment.
- C. In addition, and without notice to the Contractor, the Owner shall also have the right, based on the Owner's independent assessment, to stop work or engage other contractor(s) to construct or correct such work as may be necessary to prevent the impairment of waterways, and to charge all costs related to such corrective or additional actions against the Contract.
- D. Acceptance of an Erosion and Sediment Control plan shall not in any way imply that the plan will be adequate in preventing impairment of waters, or that maintenance and modification will not be necessary. Rather, acceptance of the plan authorizes the Contractor to begin installation of the control measures under the assumption the appropriate maintenance and modification will be required throughout the life of the project to meet the project requirements.
- E. The Contractor's responsibilities under this Section shall end upon final completion and payment of the Work of the entire Contract.

1.5 EROSION AND SEDIMENT CONTROL PLAN COMPONENTS

- A. The Erosion and Sediment Control Plan submitted shall specifically address project measures, features, and areas critical to proper site erosion and sediment control. The Plan shall specifically include, but are not limited to, the following:
 - 1. Site Map, to scale;
 - 2. Measures to prevent stormwater from running onto the disturbed areas of the site;
 - 3. Inlet protection for storm sewers and catch basins;
 - 4. Measures to be used for dewatering; and
 - 5. Measures to be used for soil stabilization, runoff control, and sediment control, including specific measures for the following:
 - a. Site entrance stabilization
 - b. Staging areas
 - c. Material and soil stock piles
 - d. Concrete curing operations
 - e. Disturbed areas of the site

In addition to the requirements included in these specifications, specific erosion control measures shown on the Contract Drawings, if any, shall also be required.

- B. All features shall be designed and installed in accordance with the references included in Paragraph 1.3 – Plan and Implementation General Requirements of this Section.

- C. Keep access roads and public roads clear of mud and construction debris at all times. Maintain dust control measures throughout construction.

1.6 INSPECTIONS

- A. At the sole discretion of the Owner, inspections may be performed by a third party or on-staff representative of the Owner.
 - 1. The Owner may inspect the site at any time, without prior notification, for compliance with the Erosion and Sediment Control Plan and applicable local, state and federal regulations. Any instances of non-compliances or failure to meet the performance standards found must be resolved within 24 hours, with more immediate responses as required to mitigate active erosion during storm events or similar instances.
 - 2. Modify the Erosion and Sediment Control Plan as necessary, to provide full compliance with the performance standards.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 57 13*****

SECTION 01 66 00 STORAGE AND PROTECTION

1.0 GENERAL

1.1 DESCRIPTION

- A. Receive, pile, store and handle all materials, equipment and other items incorporated or to be incorporated in the Work, including items furnished by the Owner in a careful and prudent manner and shall protect them against loss or damage from every source.
- B. Obscure from public view, in a manner acceptable to the Owner, staging and storage areas.

1.2 TRANSPORTATION AND HANDLING

- A. Transport and handle products in accordance with manufacturer's instructions; using means and methods that will prevent damage, deterioration, and loss, including theft.
- B. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction space.
- C. 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.
- D. 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 installation.
- E. Promptly inspect shipments to assure that products comply with requirements, quantities are correct and products are undamaged.
- F. Provide equipment and personnel to handle products by methods to prevent soiling, disfigurement or damage.

1.3 ON-SITE STORAGE

- A. Materials stored on the Site shall be neatly piled and protected, and shall be stored in a neat and orderly manner in locations that shall not interfere with the progress of the Work or with the daily functioning of the Institution.
- B. Materials subject to weather damage shall be protected against the weather by floored weatherproof temporary storage sheds.
- C. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.

- D. Storage piles and sheds shall be located within the area designated as the Staging Area. The Contractor shall work to insure that the condition of the staging area has no negative impact on the Campus, visually or otherwise; and that outside of that area. The Contractor has no impact at all on the Campus.
- E. Materials stored within the building shall be distributed in such a manner as to avoid overloading of the structural frame, and never shall be concentrated in such a manner as to exceed the equivalent of 50 pounds per square foot uniformly distributed loading. Stored materials shall be moved if they interfere with the progress of the work.
- F. Should it become necessary during the course of the Work to move stored materials or equipment, the Contractor, at the direction of the Owner or the Owner's Representative, shall move such materials or equipment.

1.4 CAMPUS SITE / PALM ROAD STORAGE

- A. All property including construction materials and equipment stored at the Palm Road or other Campus site, shall be stored at the Contractor's sole risk. The Contractor is solely responsible for repair or replacement of property due to any cause of loss. Due to work at the Palm Road lot, staging space is limited and not guaranteed to be provided. If staging space is needed, a request should be submitted to the Project Manager.
- B. The Contractor agrees to hold Cornell harmless from any accident or injury occurring at Palm Road storage or other assigned Campus site associated with the Contractor's storage.
- C. The Contractor understands that Cornell makes "no" warranty regarding any security at the Palm Road or other assigned Campus site.
- D. The Contractor agrees that it is solely responsible for any cleanup of any site contamination caused by the Contractor's storage or storage operations and the Contractor agrees to pay for cleanup of any contamination and restore the site back to the same condition it was found.
- E. It shall be assumed that the Contractor is responsible for site contamination unless the Contractor has reported condition prior to moving storage materials and equipment onto the site. Each Contractor shall be responsible for their own general area whether defined formally or not but in cases where pollutants have traveled or are found in the public areas used by all contractors, the Contractor agrees as follows:
 - 1. If it cannot be determined who is responsible for site contamination after an investigation, all contractors who could be responsible based upon location of the incident agree to share the expense of cleanup equally.
- F. No storage of hazardous materials or environmental contaminants is permitted at the Palm Road or any Campus site. All barrels must have labels affixed identifying contents.
- G. The Contractor will be responsible for securing and maintaining any Campus site area designated to them. All contractor trailers or storage containers located on Cornell Campus Property will need to file for a building permit with the Town of Ithaca. If the trailer/container is there longer than 180 days, the trailer/container will need to meet the Building Code requirements of a permanent structure. The trailer/container will need a means of egress that can be operated from the inside and a fire extinguisher. The contractor will also need to file for a demolition permit when the trailer/container is removed

- H. Unoccupied storage containers not within the project fence shall be labeled in the Cornell standard. Signs customized for the project shall be ordered from Ithaca Plastics, Inc., 305 West Green Street, Ithaca, New York 14850, Phone - 607.272.8232, Fax - 607.277.2579, Email – db@ithacaplastics.com.

1.5 PROTECTION

- A. The Contractor shall provide security personnel and adopt other security measures as may be necessary to adequately protect materials and equipment stored at the site. The Contractor shall be obligated to replace or pay for all materials and equipment including items furnished by the Owner which have been damaged or stolen prior to completion of the Work.
- B. Protection of Utilities
1. If during the course of the Project, it is necessary to work adjacent to existing utilities, pipelines, structures and equipment, the Contractor shall take all necessary precautions to protect existing facilities from damage.
 2. Locations of utilities as shown on the Contract Documents are approximate only. The Contractor shall excavate or otherwise locate to verify existing utilities in advance of its operation.
- C. Protective Covering
1. All finished surfaces shall be protected by the Contractor as follows:
 - a. Door and window sills and the jambs and soffits of openings used as passageways or through which material is handled, shall be cased and protected adequately against possible damage resulting from the conduct of the work of all trades.
 - b. All surfaces shall be clean and not marred upon delivery of the building to the Owner. The Contractor shall, without extra compensation, replace all blocks, gypsum board, plaster, paint, tile, and all other surfaces, whether or not protected, which are damaged, and shall refinish (including painting as specified) to satisfaction of Owner.
 - c. Tight wood sheathing shall be laid under any materials that are stored on finished concrete surfaces and planking must be laid before moving any materials over these finished areas. Wheelbarrows used over such areas shall have rubber tires on wheels.
 - d. Contractor has the responsibility for protection of carpeting and all finish flooring during all phases of the work including after installation.
 - e. All floors exposed to view as a floor finish shall be protected by overlaying with plywood in all areas subject to construction traffic within and without the building, special care shall be taken to protect all stair finish surfaces including but not limited to flooring, wood in-fill stairs, cabinetry, counters, equipment, etc.

1.6 PROTECTION AFTER INSTALLATION

- A. Protect installed products, including Owner-provided products, and control traffic in immediate area to prevent damage from subsequent operations.
- B. Provide protective coverings at walls, projections, corners, and jambs, sills, and soffits of openings in and adjacent to traffic areas.
- C. Cover walls and floors of elevator cabins, and jambs of cab doors, when elevators are used by construction personnel.
- D. Protect finish floors and stairs from dirt, wear, and damage:
 - 1. Secure heavy sheet goods or similar protective materials in place, in areas subject to foot traffic.
 - 2. Lay planking or similar rigid materials in place, in areas subject to movement of heavy objects.
 - 3. Lay planking or similar rigid materials in place, in areas where storage of products will occur.
- E. Protect waterproofed and roofed surfaces:
 - 1. Restrict use of surfaces for traffic of any kind, and for storage of products.
 - 2. When an activity is mandatory, obtain recommendations for protection of surfaces from manufacturer. Install protection and remove on completion of activity. Restrict use of adjacent unprotected areas.
- F. Restrict traffic of any kind across planted lawn and landscape areas.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 66 00*****

SECTION 01 73 29 CUTTING, PATCHING AND REPAIRING

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall be responsible for all cutting, fitting and patching, including excavation and backfill, required to complete the Work or to:
 - 1. Make its several parts fit together properly.
 - 2. Uncover portions of the Work to provide for installation of ill-timed work.
 - 3. Remove and replace defective work.
 - 4. Remove and replace work not conforming to requirements of Contract Documents.
 - 5. Remove samples of installed work as specified for testing.
 - 6. Repair or restore existing or new surfaces and finishes to match adjacent existing or new surfaces and finishes.
- B. Upon written instructions of the Owner's Representative:
 - 1. Uncover designated portions of Work for Architect's observation of covered work.
 - 2. Remove samples of installed materials for testing beyond that specified.
 - 3. Remove work to provide for the alteration of previously incorrectly installed work.
 - 4. Patch work uncovered or removed.
- C. Do not damage or endanger any work by cutting or altering the Work or any part thereof.
- D. Do not cut or otherwise alter the work of the Owner except with the written consent of the Owner's Representative.
- E. Where cutting and patching involves adding reinforcement to structural elements, submit details and engineering calculations showing integration of reinforcement with the original structure.
- F. Openings and Chases
 - 1. Build openings, including but not limited to channels, chases and flues as required to complete the Work as set forth in the Contract.
 - 2. After installation and completion of any work for which openings have been provided, build in, over, and around and finish all such openings as required to complete the Work.

3. Furnish and install all sleeves, inserts, hangers and supports required for the execution of the Work.

1.2 SUBMITTALS

- A. Submit a written request to the Architect prior to executing any cutting, alteration or excavation which affects the work of the Owner, or which may affect the structural safety of any portion of the Project. Include:
 1. Identification of the Project.
 2. Description of the affected work.
 3. The necessity for doing the cutting, alteration or excavation.
 4. The effect on the work of the Owner's property, or on the structural integrity of the Project.
 5. Description of the proposed work:
 - a. The scope of cutting, patching, alteration, or excavation.
 - b. Contractor and trades who will execute the work.
 - c. Products proposed to be used.
 - d. The extent of refinishing to be done.
 6. Alternatives to cutting, patching or excavation.
 7. Designation of the responsibility for the cost of cutting and patching.
 8. Written permission of any separate contractor whose work will be affected.
- B. Should conditions of the work or the schedule indicate a change of products from the original installation, submit a request for substitution as specified in Section 01 25 00 - Substitutions and Product Options.
- C. Submit a written notice to the Architect and the Owner designating the date and the time the work will be uncovered.

1.3 QUALITY ASSURANCE

- A. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity for load-deflection ratio.
 1. Obtain written approval of the cutting and patching proposal before cutting and patching structural elements, including but not limited to the following:
 - a. Foundation construction
 - b. Bearing and retaining walls

- c. Structural concrete
 - d. Structural steel and lintels
 - e. Structural decking
 - f. Miscellaneous structural metals
 - g. Exterior wall back-up supports and anchoring systems
 - h. Piping, ductwork, vessels, and equipment supports
 - i. Equipment supports
- B. Operational Limitations: Do not cut and patch operating elements or related components in a manner that would result in reducing their capacity to perform as intended. Do not cut and patch operating elements or related components in a manner that would result in increased maintenance or decreased operation life or safety.
- 1. Obtain written approval of the cutting and patching proposal before cutting and patching the following operating elements or safety related systems:
 - a. Primary operational systems and equipment
 - b. Air or smoke barriers
 - c. Water, moisture, or vapor barriers
 - d. Membranes and flashings
 - e. Fire protection systems
 - f. Control systems
 - g. Communication systems
 - h. Electrical wiring systems
 - i. Operating systems of special construction in MEP work
- C. Visual Requirements: Do not cut and patch construction exposed on the exterior or in occupied spaces in a manner that would, in the Owner's opinion, reduce the building's aesthetic qualities. Do not cut and patch construction in a manner that would result in visual evidence of cutting and patching. Remove and replace construction which was cut and patched in a visually unsatisfactory manner at no expense to the Owner.
- D. Waterproofing and Water Tightness: Do not cut or alter waterproofed walls or floors or any structural members without written permission of the Owner.
- 1. Waterproofing and Roofing Membranes
 - a. Employ qualified contractors to accomplish all required cutting, patching, or repairing of existing waterproofing and roofing membranes.

- b. Before beginning cutting, patching or repairing of existing waterproofing and roofing membranes, obtain approval of all materials, methods and contractor to be used from the Owner and agency, or agencies, holding bond or guarantee/warranty in force for membrane.
- 2. Water Tightness
 - a. The Contractor shall be responsible for water tightness of product, materials, and workmanship, including work specified to be watertight and inferred by general practice to be watertight.
 - b. All floors (slabs), walls, roof, glazing, windows, doors, sleeves through foundation walls, flashings, and similar items shall be watertight.
 - c. If details or materials shown or specified are felt not satisfactory to produce water tightness, the Contractor shall inform the Owner's Representative before installation and submit proposed substitution or alternative method for review and approval. The Contractor shall execute approved change and make watertight at no additional cost to the Owner.

1.4 WARRANTIES

- A. Replace, patch, and repair material and surfaces cut or damaged by methods and with materials in such a manner as not to void any warranties required or existing.

2.0 PRODUCTS

2.1 MATERIALS

- A. Comply with the Contract Documents for each product involved.
- B. Use materials identical to in-place or existing materials. For exposed surfaces, use materials that visually match existing adjacent surfaces to the fullest extent possible. If identical materials are unavailable or cannot be used, use materials whose installed performance will equal or surpass that of in-place or existing materials, and will match visual appearance of in-place or existing materials.

3.0 EXECUTION

3.1 INSPECTION

- A. Inspect existing conditions of the Project, including elements subject to damage or to movement during:
 - 1. Cutting and patching.
 - 2. Excavation and backfilling.

- B. After uncovering work, inspect the conditions affecting the installation of products, or performance of the work.
- C. Report unsatisfactory or dubious conditions to the Architect in writing; do not proceed with the work until the Architect has provided further instructions.

3.2 PREPARATION

- A. Provide shoring, bracing and other support as necessary to assure the structural safety of that portion of the Work.
- B. Provide devices and methods to protect other portions of the Project from damage.
- C. Provide for vertical and lateral support required to protect adjacent buildings and properties.
- D. Provide protection from the elements for that portion of the Project which may be exposed by cutting and patching work, including but not limited to pumping to maintain excavations free from water.
- E. Avoid interference with use of adjoining areas or interruption of free passage to adjoining areas.
- F. Avoid cutting existing pipe, conduit, or ductwork serving the building but scheduled to be removed or relocated until provisions have been made to bypass them.

3.3 PERFORMANCE

- A. 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 existing construction to provide for installation of other components or performance of other construction activities and the subsequent fitting and patching required to restore surfaces to their original condition.
- B. Cutting: Cut existing construction using methods which will assure safety, will be least likely to damage elements retained or adjoining construction, and will provide proper surfaces to receive new work.
 - 1. In general, where cutting, use hand or small power tools designed for sawing or grinding, not hammering and chopping. Cut holes and slots as small as possible, neatly to size required, and with minimum disturbance of adjacent surfaces. Temporarily cover openings when not in use.
 - 2. To avoid marring existing finished surfaces, cut or drill from the exposed or finished side into concealed surfaces.
 - 3. Cut through concrete and masonry using a cutting machine, such as a carbon saw or a diamond-core drill.
 - 4. Comply with the requirements of applicable MEP work where cutting and patching of services is required.

- C. Patching: Patch with durable seams that are as invisible as possible. Comply with specified tolerances.
1. Where feasible, inspect and test patched areas to demonstrate integrity of the installation.
 2. Restore exposed finishes of patched areas and extend finish restoration into retained adjoining construction in a manner that will eliminate evidence of patching and refinishing.
 - a. Where patching occurs in a painted surface, apply primer and intermediate paint coats over patch and apply final paint coat over entire unbroken surface containing patch. Provide additional coats until patch blends with adjacent surfaces.
 3. Refinish entire surfaces as necessary to provide an even finish to match adjacent finishes:
 - a. For continuous surfaces, refinish to nearest intersection.
 - b. For an assembly, refinish the entire unit.
 4. When patching existing plaster finished walls and partitions, the Contractor shall utilize plaster trim, lath and other metal components to match the integrity of the existing system. All plaster finishes shall match existing finishes so as to provide a uniform visual appearance.
 5. Floors and Walls: Where walls or partitions that are demolished 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 existing floor and wall coverings and replace with new materials, if necessary, to achieve uniform color and appearance.
 - a. Patch with durable seams that are as invisible as possible. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
 6. Ceilings: Patch, repair, or re-hang existing ceilings as necessary to provide an even-plane surface of uniform appearance.
 7. Concrete Masonry Units: Patch walls by toothing-in units using salvaged or new CMU units matching in-place units for type and size. Match coursing patterns, mortar joint profiles, and other features of in-place CMU walls. Use accessory materials compatible with in-place materials.
 8. Brick and Masonry: Patch walls by toothing-in units using salvaged or new brick and masonry matching in-place brick and masonry units. Match coursing patterns, mortar joint profiles, and other features of in-place brick and masonry walls. Use accessory materials compatible with in-place materials.

9. Exterior Building Enclosure: Patch components in a manner that restores enclosure to a weather-tight condition.
 - a. Existing Roofing: Comply with requirements of existing roofing manufacturer for cutting and patching existing roofing system. Provide flashing and trim, base sheets, base flashing, adhesives, insulation, blocking, substrate boards, accessories, and other required items to patch roofing at penetrations and roof-top mounted items.
- D. Repairs: Where repairs to existing surfaces are required, patch to produce surfaces suitable for new materials.
 1. Completely fill holes and depressions in existing masonry walls that are to remain with an approved masonry patching material applied according to manufacturer's written recommendations.
- E. Execute excavating and backfilling by methods which will assure safety, will prevent settlement or damage to other work.
- F. Execute fitting and adjustment of products to provide a finished installation to comply with specified products, functions, tolerances and finishes.
- G. Restore work which has been cut or removed; install new products to provide completed work in accordance with requirements of Contract Documents.
- H. The Contractor shall replace, repair and patch all surfaces of the ground and of any structure disturbed by its operations and its Work which surfaces and structures are intended to remain even if such operations and work are outside the property lines. Such replacement, repair and patching shall be with like material and shall restore surfaces as they existed.

3.4 CLEANING

- A. Clean area and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar items. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.
- B. 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 01 73 29*****

SECTION 01 77 00 PROJECT CLOSEOUT

1.0 GENERAL

1.1 INSPECTIONS

A. Substantial Completion:

1. Within a minimum of five (5) days prior to substantial completion, when the Work has reached such a point of completion that the building or buildings, equipment and apparatus can be occupied and used for the purpose intended, the Contractor shall conduct a detailed inspection of the Work to ensure that all requirements of the Contract have been met and that the Work is complete and is acceptable. Contractor shall prepare and submit a list of items to be completed and corrected (Contractor's punch list), indicating the value of each item on the list and reasons why the Work is incomplete.
2. After receipt of the Contractor's initial punch list, the Architect will make an inspection of the Work to determine that the Work is substantially complete and that requirements of the Contract have been met and that the Work is sufficiently complete and is acceptable for use. The Architect will submit a marked-up list of items to be completed and/or corrected, inclusive of the Contractor's punch list. The Architect shall prepare a Certificate of Substantial Completion, on the basis of an inspection, when the Architect has determined that the work is substantially complete.
3. A copy of the report of the inspection will be furnished to the Contractor as the inspection progresses so that the Contractor may proceed without delay with any part of the Work found to be incomplete or defective.
4. All work performed under a Fire Protection System Installation/Alteration Operating Permit shall be inspected by the Ithaca Fire Department, or if so delegated by the Ithaca Building Department.
 - a. A member of the Ithaca Fire Department shall witness all acceptance or reacceptance testing of work performed under a Fire Protection System Installation Operating Permit. All testing and inspections shall be in compliance with the applicable NFPA codes as referenced by Section 906.1 of the Fire Code of NYS.
 - b. Work classified as a 'Repair' under the Existing Building Code does not require the Ithaca Fire Department to witness the testing of the affected systems. Systems that have been repaired must still be tested as required by the Fire Code of NYS and NFPA.
 - c. The Ithaca Fire Department Shall Witness the Acceptance or Reacceptance Testing for the Following Conditions:
 - Testing of any new installation of a fire alarm, fire suppression, or fire detection system as required by the Fire Code of New York State.

- Hydrostatic testing of sprinkler system where the modification affects more than twenty (20) sprinkler heads and the modified area can be isolated from the rest of the system
- Installation or replacement of a fire pump or drive elements of the fire pump.
- A Fire Alarm System with added or deleted components.
- A Fire Alarm System where the wiring or control circuits have been modified.
- A Fire Alarm System where the control unit (Fire Alarm Panel) has been replaced or the control unit software has been replaced.
- A smoke control system where the master control unit, individual fan control unit, or fan drive unit has been replaced or modified
- An alternative fire suppression system that has been replaced or the actuation elements have been modified. Except: fusible link replacement.
- A modification or extension of the piping for a fire standpipe system where a hydrostatic test is required by NFPA 14.

B. Final Acceptance:

1. When the items appearing on the report of inspection have been completed or corrected, the Contractor shall so advise the Architect. After receipt of this notification and Contractor's certified list of completed items, the Owner's Representative will inform the Contractor of the date and time of final inspection. A copy of the report of the final inspection containing all remaining contract exceptions, omissions and incomplete work will be furnished to the Contractor.
2. After receipt of notification of completion and all remaining contract exceptions, omissions and incomplete work from the Contractor, the Architect will make an inspection to verify completion of the exception items appearing on the report of final inspection.

1.2 SUBMITTALS

- A. Contractor's List of Incomplete Items: Initial punch list submittal at Substantial Completion.**
1. Organize list of spaces in sequential order, starting with exterior areas first and proceeding from lowest floor to highest floor, listing by room or space number. Organize items applying to each space by major element, including categories for individual exterior face elevations, ceilings, individual walls, floors, doors, roof levels, casework, equipment, and building systems.
- B. Contractor's Certified List of Completed Items: Final signed punch list submittal at Final Completion.**
- C. Certificates of Release: Occupancy permits from authorities having jurisdiction.**

1.3 FINAL CLEAN UP

- A. Upon completion of the work covered by the Contract the Contractor shall leave the completed Project ready for use and occupancy without the need of further cleaning of any kind and with all Work in new condition and in perfect order. In addition, upon completion of all Work the Contractor shall remove from the vicinity of the Work all plant, buildings, rubbish, unused materials, concrete forms and other materials belonging to him or used under its direction during construction or impairing the use or appearance of the property and shall restore such areas affected by the work to their original condition, and, in the event of its failure to do so, the same shall be removed by the Owner at the expense of the Contractor, and the Contractor and/or its surety shall be liable therefore. Final clean-up shall include but not be limited to the following:
1. All finished surfaces shall be swept, dusted, washed and polished. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective sections of the specifications.
 2. Roofs, utility tunnels, manholes and pipe trenches and spaces between the new and existing Work shall be left thoroughly cleaned.
 3. Finished flooring shall be thoroughly cleaned in accordance with the manufacturer's recommendations.
 4. Where the finish of floors has been marred or damaged in any space or area, the entire floor of that space or area shall be refinished as recommended by the manufacturers of the flooring.
 5. All equipment shall be in an undamaged, bright, clean, polished and new appearing condition.
 6. All new glass shall be washed and polished, both sides. The Contractor shall be responsible for all breakage of glass in the area of the Work from the commencement of its activities until the building is turned over to Owner. The Contractor shall replace all broken glass and deliver the entire building with all glazing intact and clean.
 7. Provide new filters for all fan convectors after final cleaning.
 8. Refer to exterior clean up. Remove paint and glazing compound from surfaces.
- B. Clean adjacent structures and improvements of dust, dirt, and debris caused by construction operations. Return adjacent areas to condition existing before construction operations began.

1.4 MAINTENANCE STOCK

- A. Turn over to Owner's Representative the maintenance stock specified. Contractor shall obtain signed receipt from Owner's Representative for all maintenance stock.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 77 00*****

SECTION 01 78 23 OPERATING AND MAINTENANCE DATA

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall compile product data and related information appropriate for Owner's maintenance and operation of products furnished under the Contract.
 - 1. Prepare operating and maintenance data as specified in this Section, as referenced in other pertinent sections of Specifications and as necessary to operate the completed work.
 - 2. Operations and maintenance data, in final format, shall be available to the Owner prior to substantial completion.
- B. Instruct Owner's personnel in the maintenance of products and in the operation of equipment and systems.

1.2 FORM OF SUBMITTALS

- A. Prepare data in the form of an instructional manual for use by Owner's personnel.
- B. Submit a CD with electronic .pdf files, upload electronic files to ePM system of complete manual in final form.
 - 1. Format:
 - a. Size: 8-1/2" x 11".
 - b. Text: Manufacturer's, scanned .pdf and/or neatly typewritten Word file.
 - c. Drawings in electronic format
 - Drawings are required in PDF format. Drawings shall be in AutoCAD v14 or higher format.
 - d. Provide fly-leaf for each separate product, and major component parts of equipment.
 - Provide type description of product, and major component parts of equipment.
 - Provide indexed PDF bookmarks.
 - Provide a series of files organized in subdirectories with a summary index with hyperlinks to the various documents.

- e. Cover: Identify each volume with title "OPERATIONS AND MAINTENANCE INSTRUCTIONS".

List:

- Title of Project
- Identity of separate structure as applicable.
- Identity of general subject matter covered in the manual.

1.3 CONTENT OF MANUAL

- A. Table of contents, typewritten, for each volume, arranged in a systematic order.
 - 1. Contractor, name of responsible principal, address and telephone number.
 - 2. A list of each product required to be included, indexed to the content of the volume.
 - 3. List, with each product, the name, address and telephone number of:
 - a. Subcontract or installer.
 - b. Maintenance contractor, as appropriate.
 - c. Identify the area of responsibility of each.
 - d. Local source of supply for parts and replacement.
 - 4. Identify each product by product name and other identifying symbols as set forth in Contract Documents.
- B. Product Data:
 - 1. Include only those sheets which are pertinent to the specific product.
 - 2. Annotate each sheet to:
 - a. Clearly identify the specific product or part installed.
 - b. Clearly identify the data applicable to the installation.
 - c. Delete reference to inapplicable information.
- C. Submittal Data:
 - 1. Include a record copy of the final, approved product submittal. Record copy shall be a clean copy (free of notes from the design professional) which has been updated to reflect the "as-installed" system.

- D. Drawings:
 - 1. Supplement product data with drawings as necessary to clearly illustrate:
 - a. Relations of component parts of equipment and systems.
 - b. Control and flow diagrams.
 - 2. Coordinate drawings with information on Record Documents to assure correct illustration of completed installation.
 - 3. Do not use Record Documents as maintenance drawings.
- E. Written text, as required to supplement product data for the particular installation:
 - 1. Organize in a consistent format under separate headings for different procedures.
 - 2. Provide a logical sequence of instructions for each procedure.
- F. Original copy of each warranty, bond and service contract issued.
 - 1. Provide information sheet for Owner's personnel, give:
 - a. Proper procedures in the event of failure.
 - b. Instances which might affect the validity of warranties or bonds.

1.4 MANUAL FOR MATERIALS AND FINISHES

- A. Submit electronic .pdf files, upload electronic files to ePM system.
- B. Content, for architectural products, applied materials and finishes:
 - 1. Manufacturer's data, giving full information on products:
 - a. Catalog number, size, and composition.
 - b. Color and texture designations.
 - c. Information required for reordering special-manufactured products.
 - d. Certification as to asbestos free
 - 2. Instructions for care and maintenance:
 - a. Manufacturer's recommendation for types of cleaning agents and methods.
 - b. Cautions against cleaning agents and methods which are detrimental to the product.
 - c. Recommended schedule for cleaning and maintenance.

- C. Content, for moisture-protection and weather-exposed products:
 - 1. Manufacturer's data, giving full information on products.
 - a. Applicable standards
 - b. Chemical composition
 - c. Details of installation
 - 2. Instructions for inspection, maintenance, and repair.
- D. Additional requirements for maintenance data: The respective sections of Specifications.

1.5 MANUAL FOR EQUIPMENT AND SYSTEMS

- A. Submit electronic .pdf files, upload electronic files to ePM system.
- B. Content, for each unit of equipment and system, as appropriate:
 - 1. Description of unit and component parts.
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of all replaceable parts.
 - 2. Operating procedures:
 - a. Start-up, break-in, routine and normal operating instructions.
 - b. Regulation, control, stopping, shut-down and emergency instructions.
 - c. Summer and winter operating instructions.
 - d. Special operating instructions.
 - 3. Maintenance Procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Alignment, adjusting and checking.
 - 4. Servicing and lubrication required:
 - a. List of lubricants required.
 - 5. Manufacturer's printed operating and maintenance instructions.

6. Description of sequence of operation by control manufacturer.
 7. Original manufacturer's parts list, illustrations, assembly drawings and diagrams required for maintenance.
 - a. Predicted life of parts subject to wear.
 - b. Items recommended to be stocked as spare parts.
 8. As-installed control diagrams by controls manufacturer.
 9. Each contractor's coordination drawings.
 - a. As-installed color coded piping diagrams.
 10. Charts of valve tag numbers, with the location and function of each valve.
 11. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 12. Other data as required under pertinent sections of Specifications.
- C. Content, for each electric and electronic system, as appropriate:
1. Description of system and component parts:
 - a. Function, normal operating characteristics, and limiting conditions.
 - b. Performance curves, engineering data and tests.
 - c. Complete nomenclature and commercial number of replaceable parts.
 2. Circuit directories of panel boards:
 - a. Electrical service.
 - b. Controls.
 - c. Communications.
 3. As-installed color coded wiring diagrams.
 4. Operating procedures:
 - a. Routine and normal operating instructions.
 - b. Sequences required.
 - c. Special operating instructions.

5. Maintenance procedures:
 - a. Routine operations.
 - b. Guide to "trouble-shooting".
 - c. Disassembly, repair and reassembly.
 - d. Adjustment and checking.
 6. Manufacturer's printed operating and maintenance instructions.
 7. List of original manufacturer's spare parts, manufacturer's current prices, and recommended quantities to be maintained in storage.
 8. Other data as required under pertinent sections of Specifications.
- D. Additional requirements for operations and maintenance data: See the respective sections of Specifications and General Conditions.

1.6 SUBMITTAL REQUIREMENTS

- A. Submit through ePM system preliminary draft of proposed formats and outlines of contents thirty (30) calendar days after approved submittals.
- B. Submit completed data in final form twenty (20) calendar days prior the Acceptance Phase of the Project.
- C. Submit specified number of copies of approved data in final form prior to final acceptance.

1.7 INSTRUCTIONS OF OWNER'S PERSONNEL

- A. Prior to final inspections or acceptance, fully instruct Owner's designated operating and maintenance personnel in the operation, adjustment and maintenance of all products, equipment and systems:
 1. Instruction time shall be sufficient to fully instruct all shifts of the Owner's operating and maintenance personnel.
- B. Operations and maintenance shall constitute the basis of instruction:
 1. Review contents of manual with personnel in full detail to explain all aspects of operations and maintenance.

- C. Submit typewritten statement, signed by each of Owner's Representatives who have been instructed, describing:
 - 1. Method of Instruction.
 - 2. Equipment and Systems Operated.
 - 3. Length of Instruction Period.
- D. Contractor is fully responsible until final acceptance, even though operated by Owner's personnel, unless otherwise agreed in writing.

1.8 OPERATING INSTRUCTIONS

- A. List under clear plastic (1/8" thick) all operating, maintenance and starting precautions and procedures to be followed by Owner for operating all systems and equipment.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 78 23*****

SECTION 01 78 36 WARRANTIES AND BONDS

1.0 GENERAL

1.1 DESCRIPTION

The Contractor shall:

- A. Compile specified warranties and bonds.
- B. Compile specified service and maintenance contracts.
- C. Co-execute submittals when so specified.
- D. Review submittals to verify compliance with Contract Documents.
- E. Submit to Architect for transmittal to Owner.

1.2 SUMMARY

- A. This Section specifies general administrative and procedural requirements for warranties and bonds required by the Contract Documents, including manufacturers standard warranties on products and special warranties.
 - 1. Refer to the General Conditions for terms of the Contractor's special warranty of workmanship and materials.
 - 2. General closeout requirements are included in Section 01 77 00 - "Project Closeout."
 - 3. Specific requirements for warranties for the Work and products and installations that are specified to be warranted, are included in the individual Sections of Divisions 2 through 40.
 - 4. Certifications and other commitments and agreements for continuing services to Owner are specified elsewhere in the Contract Documents.
- B. Disclaimers and Limitations: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products, nor does it relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

1.3 DEFINITIONS

- A. Standard Product Warranties are pre-printed written warranties published by individual manufacturers for particular products and are specifically endorsed by the manufacturer to the Owner.

- B. Special Warranties are written warranties required by or incorporated in the Contract Documents, either to extend time limits provided by standard warranties or to provide greater rights for the Owner

1.4 QUALITY ASSURANCE

- A. Use adequate care and diligence to review Contract Documents to identify detailed requirements relating to warranties and bonds.
- B. Verify that each item required for this submittal conforms with specified requirements.

1.5 WARRANTY REQUIREMENTS

- A. In addition to standard and special warranties described in Divisions 2 through 40, Contractor shall warrant Work included in this project, for a minimum period of one (1) year following acceptance of a Certificate of Substantial Completion by Owner, to cover performance, materials, workmanship and compliance with Contract Documents.
- B. Corrective Work: Provide service within thirty (30) calendar days when requested by Owner. Perform services during normal working hours, unless specifically directed otherwise by Owner. Coordinate with Owner's representative to schedule performance of corrective work. Where designated service providers cannot perform corrective work within the Owner's required time frame, engage another qualified service provider. Submit a written statement to Owner upon completion of corrective work; document work performed and list outstanding items, if any.
 - 1. When a completed breakdown of a piece of equipment occurs or the malfunction of a system affects the environment or program involving 50 or more persons at a time (employees and students combined), or creates a safety or security risk to the Owner, an EMERGENCY may be declared by the Owner. The Owner may declare an emergency as defined above at which time the service response must be within 4 hours and may require action during non-normal working hours.
 - 2. When an emergency condition occurs, the Owner may take immediate corrective action to relieve the problem by making, a minimum as possible, temporary adjustments and/or repairs when necessary to decrease the problem until the designated Contractor's representative can respond. These temporary adjustments and repairs will in no way jeopardize the existing warranty.
 - 3. The Owner's service staff will advise the Contractor's Representative of all temporary adjustments and repairs done in relation to the malfunctioning equipment or facility.
 - 4. If the Contractor fails to respond with actual service within four (4) hours, and/or the necessary repairs or adjustments are not satisfactorily complete twenty-four (24) hours, the Owner will have the authority to make the necessary repairs or adjustments and charge the Contractor for parts and labor.
 - 5. If all adjustments and repairs done by the Owner in relation to the above conditions are done by authorized district personnel, there will be no negative effect of future warranty claims.

- C. Related Damages and Losses: When correcting failed or damaged warranted Work, remove and replace other Work that has been damaged as a result of such failure or that must be removed and replaced to provide access for correction of warranted Work.
- D. Reinstatement of Warranty: When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.
- E. Replacement Cost: Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.
- F. Owner's Recourse: Expressed warranties made to the Owner are in addition to implied warranties, and shall not limit the duties, obligations, rights and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on time in which the Owner can enforce such other duties, obligations, rights, or remedies.
- G. Contractor's Procurement Obligations: Do not purchase, subcontract for, or allow others to purchase or subcontract for materials or units of Work for Project where a special project guaranty, specified product warranty, certification, or similar commitment is required until it has been determined that entities required to sign or countersign such commitments are willing to do so.
- H. Specific Warranty. Where a special warranty, certification, or similar commitment is required on such Work or part of the Work, the Owner reserves the right to refuse to accept the Work until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

1.6 SUBMITTAL REQUIREMENTS

- A. Submit written warranties to the Architect prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect or Owner.
 - 1. When a designated portion of the Work is completed and occupied or used by the Owner, by separate agreement with the Contractor during the construction period, submit properly executed warranties to the Architect and Owner within fifteen (15) days of completion of that designated portion of the Work.

- B. When a special warranty is required to be executed by the Contractor, or the Contractor and a subcontractor, supplier or manufacturer, prepare a written document that contains appropriate terms and identification, ready for execution by the required parties. Submit a draft to the Owner through the Architect for acceptance prior to final execution.

1.7 SUBMITTALS REQUIRED

- A. Submit warranties, bonds, and service and maintenance contracts as specified in the respective sections of Specifications. Submit a schedule listing all required warranties.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION

3.1 FORM OF SUBMITTALS

- A. The Warranties and Bonds shall be in electronic pdf format. Each submission shall include the title of the Project and the name of the Contractor.
- B. Provide a series of files organized in subdirectories with a summary index with hyperlinks to the various documents and or references.
- C. Assemble warranties, bonds and service and maintenance contracts, executed by each of the respective manufacturers, suppliers and subcontractors.
- D. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
 - 1. Product or work item.
 - 2. Item description.
 - 3. Notation of what the equipment serves (e.g. – Provides perimeter heat)
 - 4. Warranty Provider. Is the warranty provided by a manufacturer or installer?
 - 5. Firm, with name of principal and responsible party, address and telephone number.
 - 6. Scope.
 - 7. Duration.
 - a. Date of beginning of warranty, bond or service and maintenance contract
 - b. End date of warranty, bond or service and maintenance contract.

8. Provide information for Owner's personnel:
 - a. Proper procedure in case of failure.
 - b. Instances which might affect the validity of warranty or bond.
9. Contractor, name of responsible principal, address and telephone number.

3.2 TIME OF SUBMITTALS

- A. Make final submittals within ten (10) days after Date of Substantial Completion, prior to final request for payment.
- B. For items of work when acceptance is delayed materially beyond the Date of Substantial Completion, provide updated submittal within ten (10) days after acceptance, listing the date of acceptance as the start of the warranty period.

*****END OF SECTION 01 78 36*****

SECTION 01 78 39 RECORD DOCUMENTS

1.0 GENERAL

1.1 DESCRIPTION

- A. The Contractor shall maintain at the site, during construction, one record copy of:
 - 1. Drawings
 - 2. Specifications
 - 3. Addenda
 - 4. Change Orders and other Modifications to the Contract
 - 5. Architect's Field Orders or written instructions.
 - 6. Final Shop Drawings, Product Data and Samples
 - 7. Field Test records
 - 8. Construction photographs

1.2 MAINTENANCE OF DOCUMENTS AND SAMPLES

- A. Store documents and samples in Contractor's field office apart from documents used for construction.
 - 1. Provide files and racks for storage of documents.
 - 2. Provide cabinet or storage space for storage of samples.
- B. File documents and samples in accordance with Data Filing Format of the Uniform Construction Index.
- C. Maintain documents in a clean, dry, legible condition and in good order. Do not use record documents for construction purposes.
- D. Make documents and samples available at all times for review by the Owner's Representative and the Architect.

1.3 RECORDING

- A. Label each document "AS BUILT" in neat large printed letters.
- B. Record information concurrently with construction progress.
 - 1. Do not conceal any work until required information is recorded.

C. Survey Mapping

1. Provide an accurate topographic, planimetric, utility map of as-built conditions, and mapped locations and elevations of constructed facilities / elements including as-built and exposed underground utilities. Survey work in progress as required to accurately locate constructed facilities / elements. Survey final condition of project extents at final acceptance.
 - a. Site related elements including:
 - Sidewalks, ramps, curbs, and gutters - indicate type and surface material.
 - Streets, drive ways, parking areas, labeled with material.
 - Fences, walls, steps, handrails, signs, site furniture and light fixtures labeled with material.
 - Live trees which have a trunk diameter of three inches (3") or greater and all isolated or specimen trees. Measure tree trunk 3' above grade. Indicate approximate trunk diameter, "drip line" and common name of tree.
 - Shrubs, show outlines of shrub masses.
 - Streams and bodies of water.
 - b. Utility related elements and supporting infrastructure including:
 - Manholes, catch basins, drain inlets, cleanouts, vent stacks, tanks, underdrains, foundation drains, monitoring wells, detention/retention/filtration facilities. Label type (sanitary or storm), dimensions and material of structure and cover/grate; pipe connections; sizes, materials, direction of flow and invert elevations. Locate and identify size, material, and invert elevations for culverts.
 - Water, gas, central steam, chilled water or other pressure lines, valve boxes, meter boxes, hydrants, tanks, fittings, etc. Label type, size, material, elevations at building walls and all intersections, connections and vertical angle changes.
 - Utility poles, above and below ground lines including but not limited to power, street lighting, traffic control communication and sensors, telephone, television, communication, fire and police call boxes, public communication or display facilities. Label utility as direct buried, in conduit, or concrete encased duct. Identify elevations at building walls and all intersections, connections and vertical angle changes. Label all utilities and associated duct banks or conduits with sizes and materials.
 - Existing and abandoned utilities exposed during construction. Show ends of abandoned utilities left in place and assumed continued direction of utilities. Label with information as listed above.

2. Survey mapping shall be done under the personal supervision of a Surveyor, registered in and licensed by the State of New York, who shall certify under his/her seal the accuracy of the survey.
3. Field Survey Accuracy:
 - Horizontal and Vertical mapping shall be ACSM Second Order Class II, 1 in 20,000.
4. Coordinate base:
 - NAD83-86 geodetic system with grid values in the New York Central State Plane coordinate system in feet with elevations in NAVD '88 in feet.
5. Each different feature shall be drafted on a separate named CAD level/layer in Microstation or AutoCAD format using industry standard symbology of color, line style, line weight, and cells.
6. Provide an ASCII file list of coordinates for all survey points including control, feature, and topographic in the following comma delimited format: Point number, Northing coordinate, Easting coordinate, Elevation coordinate, Point description.
7. Topography and spot elevations:
 - a. Topographic contours shall be accurately plotted at one foot (1') contour intervals.
 - b. Record spot grade elevations as follows:
 - i. Within natural ground and lawn and planted areas, spot elevations shall be shown to one-tenth of a foot (0.1'). Within all areas of built-up improvements such as pavements, curbs, steps, walls, utility and drainage systems or other site improvements, spot elevations shall be shown to one-hundredth of a foot (0.01').
 - ii. Existing grade at building corners; and thresholds and finished floor at all entrance, exit, or access points.
 - iii. Develop road cross sections at 50-foot intervals maximum, record spot elevations for all drive centerlines and all beginning radius of street intersections. For each cross section obtain elevations for front and back of existing sidewalk, top and bottom of curb, and centerline of the street. Obtain elevations for centerline intersection of all roads.
 - iv. For trees of three inches to eighteen inches (3" - 18") in diameter, record elevation at high and low side at base of trunk. For specimen trees of eighteen inches (18") or greater diameter, indicate four (4) spot elevations on the north, south, east, and west at base of each trunk to one-hundredth (.01) foot elevation.
 - v. Base, top, corners, and at cheek walls for all steps. Indicate elevations at top and bottom of walls and curbs.

- vi. Rim elevations of all catch basins, drain inlets, manholes, valve boxes, slabs on grade. Inverts at all sewer pipes and culverts. Bottom of structure floor and sump.

D. Drawings

As built drawings shall consist of making any changes neatly and clearly on the Contract Drawings using colored ink or pencil, shall be kept current by the contractor on a day-to-day basis in concert with the progress of the work. Where applicable, the change marked on a drawing is to carry the notation "per Change Order No. X", or similar reference which cites the reason for the change. As an alternative approach the Contractor can submit a plan for producing the "As-Built" drawings via electronic mark-up in Bluebeam, Adobe Professional, or other similar program as an alternative to colored pencil or ink mark-ups. Such plan shall be subject to approval of the Owner.

The day-to-day construction as built drawings shall be made available to the Architect or Owner's Representative for review upon request. The "As built" drawings shall show all changes to the following areas of construction:

1. Architectural:

- a. Modifications to components dictated by the building code
- b. Wall, door, window locations
- c. Built in casework locations
- d. New rated door and wall schedules/ locations
- e. Material and products where submittals are requested

2. Civil and Structural

- a. Dimensions for load carrying elements, both horizontal and vertical
- b. Materials and products where submittals are requested.
- c. Load carrying elements and foundation systems.
- d. Site related elements including:
 - Building outlines, entranceways, areaways, roof overhangs, downspouts, significant architectural projections, and other pertinent data.
- e. All significant changes in foundations, columns, beams, openings, concrete reinforcing, lintels, concealed anchorages and "knock-out" panels made during construction.
- f. Building envelope systems including roofing systems and building shell systems
- g. Geotechnical subsurface information
- h. Items that will require future maintenance.

- i. Life safety critical items
- 3. Mechanical (HVAC, Plumbing and Fire Protection)
 - a. Products where submittals are requested.
 - b. Final locations of all equipment.
 - c. Final sizes and materials of piping and ductwork.
 - d. Final locations of inaccessible piping and ductwork.
 - e. Final locations of all controls equipment, including all sensors and actuators.
 - f. Final locations of all valves and dampers, including all shutoff valves, balance dampers and fire dampers.
 - g. Location of access doors for all equipment in concealed locations.
 - h. Final location and arrangement of all mechanical equipment and concealed gas, sprinkler, domestic, sanitary and drainage systems piping and other plumbing, including, but not limited to, supply and circulating mains, principal valves, meters, clean-outs, drains, pumps and controls, vent stacks, sanitary and storm water drainage.
- 4. Electrical
 - a. Products where submittals were requested.
 - b. Circuit (wire and raceway) size, number, and type.
 - c. Main circuit pathways for Fire Alarm, Emergency Power, and Access Control/Security systems.
 - d. Final locations of equipment and devices, interior and exterior luminaires, and power supplies.
 - e. Final location of electric signal system panels, final arrangement of all circuits and any significant changes made in electrical signal system design as a result of Change Order or job conditions.
- 5. Environmental
 - a. Utility related elements and supporting infrastructure
 - b. Storm water maintenance/testing access points
 - c. Location of unusual excavation findings / contaminated soil (i.e. mercury uncovered during excavation, also on-site spills during construction), including quantity excavated/disposed.

E. Specifications and Addenda

Legibly mark each section to record:

1. Manufacturer, trade name, catalog number, and Supplier of each product and item of equipment actually installed.
2. Changes made by Field Order or by Change Order.

1.4 SUBMITTAL

- A. At Contract close-out, deliver copies of all record documents to the Owner's Representative.
- B. Accompany submittal with transmittal letter in duplicate, containing:
1. Date
 2. Project title and number
 3. Contractor's name and address
 4. Title and number of each record document
 5. Certification that each document is complete and accurate
 6. Signature of Contractor or its authorized representative.

2.0 PRODUCTS – NOT USED

3.0 EXECUTION – NOT USED

*****END OF SECTION 01 78 39*****

TECHNICAL SPECIFICATIONS

FOR

SAGE HALL
FOUNDATION WATERPROOFING

CORNELL UNIVERSITY
ITHACA, NEW YORK

SECTION 024119 - SELECTIVE REMOVALS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Demolition and removal of selected portions of building or structure.
2. Demolition and removal of selected site elements.
3. Remove and salvage existing Tunnel Entrance stone veneer for reuse.
4. Remove and salvage existing ornamental metal handrail at South Entrance for reuse.
5. Remove and salvage existing sandstone steps and platform at South Entrance for Owner.

B. Related Requirements:

1. Section 011000 "Summary" for restrictions on use of the premises, Owner-occupancy requirements, and phasing requirements.
2. Section 015000 Temporary Facilities for protection procedures.
3. Section 017300 "Execution" for cutting and patching procedures.

1.2 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.

1.3 MATERIALS OWNERSHIP

- A. Unless otherwise indicated, demolition waste becomes property of Contractor.
- B. Remove and salvage the following building components:
1. Existing metal guard rails above Tunnel entrance.

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2. Existing iron stair railings and vertical supports at South entrance steps.
 3. Existing sandstone treads and landing, pack on wood pallets for removal.
 4. Mortar does not need to be removed from salvaged sandstone.
- C. 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.

1.4 PREINSTALLATION MEETINGS

- A. Pre-demolition 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 requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.
 5. Review areas where existing construction is to remain and requires protection.
 6. Review requirements for existing stone veneer to be salvaged for Owner.

1.5 INFORMATIONAL SUBMITTALS

- A. Conditions Survey: The Contractor shall preform and submit survey of Tunnel Entrance façade conditions including labeling diagram identifying each stone veneer unit. Reinstatement of each existing stone veneer unit shall be re-installed in its original location during reconstruction work.
- B. Proposed Protection Measures: Submit report, including Drawings, that indicates the measures proposed for protecting individuals and property, for environmental protection, for dust control and, for noise control. Indicate proposed locations and construction of barriers.
- C. Schedule of Selective Demolition Activities: Indicate the following:
1. 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.
 2. Interruption of utility services. Indicate how long utility services will be interrupted.
 3. Coordination for shutoff, capping, and continuation of utility services.
 4. Coordination of Owner's continued occupancy of portions of existing building and of Owner's partial occupancy of completed Work areas.
- D. Pre-removal Photographs or Video: Show existing conditions of adjoining construction, including finish surfaces, that might be misconstrued as damage caused by salvage and

demolition operations. Comply with Division 01 Section for Photographic Documentation." Submit before Work begins.

1.6 FIELD CONDITIONS

- A. Owner will occupy 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 removals.
- D. Hazardous Materials: Present in buildings and structures to be selectively demolished. A report on the presence of hazardous materials is on file for review and use. Examine report to become aware of locations where hazardous materials are present.
 - 1. Hazardous material remediation is specified elsewhere in the Contract Documents.
 - 2. Do not disturb hazardous materials or items suspected of containing hazardous materials except under procedures specified elsewhere in the Contract Documents.
- E. 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.
 - 2. Review replacement of standpipe with Owner and local authorities.

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 ANSI/ASSP A10.6 and NFPA 241.EXECUTION

2.2 EXAMINATION

- A. If required, 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. Perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.
 - 1. Perform surveys as the Work progresses to detect hazards resulting from selective removal activities.
- D. Verify that hazardous materials have been remediated before proceeding with building removal operations.
- E. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs.
 - 1. Inventory and record the condition of items to be removed and salvaged.
 - 2. Before selective demolition or removal of existing building elements that will be reproduced or duplicated in final Work, make permanent record of measurements, materials, and construction details required to make exact reproduction.

2.3 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. Owner will arrange to shut off indicated services/systems when requested by Contractor.
 - 2. Arrange to shut off utilities with utility companies.
 - 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 fire-suppression systems, 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: Drain 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.

2.4 SELECTIVE REMOVALS, GENERAL

- A. General: 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 removals systematically, from higher to lower level. Complete selective removal 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 24 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 removed items and materials promptly. Comply with requirements in Section 01 for Construction Waste Management and Disposal.
- B. Site Access and Temporary Controls: Conduct selective removals 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 stone veneer for reuse at Tunnel entrance.
 2. Pack or crate sandstone steps and landings. Identify contents of containers.
 3. Store items in a secure area until delivery to Owner.
 4. Transport items to Owner's storage area within 5 miles of site as designated by Owner, except as noted for stone veneer.
 5. Protect items from damage during transport and storage.
- 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 removal operations are complete.

2.5 SELECTIVE REMOVAL 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 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. Foundation Waterproofing: Remove no more existing membrane waterproofing to be replaced than what can be covered in one day by new waterproofing and so that building interior remains watertight and weathertight.
 1. Remove existing waterproofing membrane, flashings, and accessories.
 2. Remove existing waterproofing system down to substrate.
 3. See Drawings for extent of removals at building and tunnel foundations.

2.6 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 removed 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 Construction Waste Management and Disposal.
- B. Burning: Do not burn removed materials.

2.7 CLEANING

- A. Clean adjacent structures and improvements of dust, dirt, and debris caused by selective removal operations. Return adjacent areas to condition existing before selective removal operations began.

END OF SECTION 024119

SECTION 033000 – CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY:

- A. The Contractor shall furnish all materials, labor, and equipment necessary for the proper completion of all cast-in-place concrete work as indicated on the Drawings and specified herein.
 - 1. New subsurface reinforced concrete foundation at West Elevation Main Entrance.
 - 2. New subsurface reinforced concrete foundation at South Elevation Secondary Entrance.

1.2 REFERENCE SPECIFICATIONS:

- A. Concrete work shall conform to all requirements of the American Concrete Institute, "ACI Standard Specifications for Structural Concrete for Buildings", ACI 301, including Amendments, except as modified by the supplemental requirements contained in these project specifications. The referenced specifications are declared to be a part of these project specifications the same as if fully set forth herein.

1.3 QUALITY ASSURANCE:

- A. Codes and Standards:
 - 1. Comply with the provisions of the following codes, specification and standards, except where more stringent requirements are shown or specified:
 - ACI 301 "Specifications for Structural Concrete for Buildings"
 - ACI 318 "Building Code Requirements for Reinforced Concrete"
 - ACI 304 "Recommended Practice for Measuring, Mixing, Transporting and Placing Concrete"
 - ACI 305 "Hot Weather Concreting"
 - ACI 306 "Recommended Practice for Winter Concreting"
- B. Workmanship:
 - 1. The Contractor is responsible for correction of concrete work which does not conform to the specified requirements, including strength, tolerances and finishes. Correct deficient concrete as required by the Architect.

PART 2 - PRODUCTS

2.1 CONCRETE:

- A. Concrete shall be plant mixed with properties as listed below:
Provide minimum 28-day compressive strength as indicated below.
- B. Footings: 5000 PSI
- C. The Contractor shall furnish at his expense the concrete mix design including necessary testing.

2.2 CONCRETE MATERIALS:

- A. Portland Cement: ASTM C 150, Type 1 or II, unless otherwise acceptable to the Architect.
 - 1. Use only one brand of cement throughout the project, unless otherwise acceptable to the Architect.
- B. Slag Cement: The use of slag cement shall not be allowed on this Project.
- C. Normal Weight Aggregates:
 - 1. ASTM C 33, and as herein specified. Provide aggregates from a single source for all concrete.
- D. Fine Aggregate:
 - 1. Clean, sharp, natural sand free from loam clay, lumps or other deleterious substances.
- E. Coarse Aggregate:
 - 1. Clean, uncoated, processed aggregate containing no clay, mud, loam or foreign matter.
- F. Crushed Stone: Processed from natural rock or stone.
- G. Maximum Aggregate Size:
 - 1. Not larger than one-fifth of the narrowest dimension between sides of forms, one-third of the depth of slabs, nor three-fourths of the minimum clear spacing between individual reinforcing bars or bundles of bars.
- H. Water: Clean, fresh, drinkable.
- I. Admixtures:

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1. Fly ash or set control additives shall not be used. Water reducing admixtures that do not provide set control may be used.
2. Admixtures containing calcium chloride shall not be used on this project.

2.3 PROPORTIONING AND DESIGN OF MIXES:

- A. Prepare design mixes for each type and strength of concrete in accordance with applicable provisions of ASTM C 94. Use an independent testing facility acceptable to the Architect for preparing mix designs. Do not use the testing facility used for field quality control testing unless otherwise acceptable to the Architect.
- B. Submit written reports to the Architect of proposed mix of concrete at least 15 days prior to start of work. Do not begin concrete production until mixes have been reviewed by the Architect.
- C. Design mixes to provide normal weight concrete as indicated in this Section.

PART 3 - EXECUTION

3.1 MEASUREMENT OF MATERIALS:

- A. Mobile volumetric batching and continuous mixing equipment shall meet the requirements of ASTM C685
- B. Bag cement shall be protected from moisture, and fractional bags shall not be used unless they are weighed.
- C. The Contractor shall verify the accuracy and dependability of the water measuring device.

3.2 MIXING:

- A. Concrete work shall conform to the requirements of ACI standard "Recommended Practice for Measuring, Mixing, Transporting, and Placing Concrete", ACI 304.

3.3 CONVEYING AND PLACING:

- A. Except as these Specifications are at variance therewith, methods of placing shall conform to ACI 304.
- B. Before depositing concrete, remove debris and water from spaces to receive concrete.

3.4 EMBEDDED ITEMS:

- A. All dowels, anchor bolts, sleeves, inserts, and other embedded items shall be securely positioned in place prior to the placement of concrete.

3.5 GROUTING:

- A. Non-shrink grout shall be mixed in strict accordance with the manufacturer's printed instructions. Bedding grout shall be placed solidly between bearing surfaces.

3.6 CONCRETE PLACEMENT:

A. Pre-placement Inspection:

- 1. Before placing concrete, inspect and complete the formwork installation, reinforcing steel, and items to be embedded or cast-in. Notify other crafts to permit the installation of their work; cooperate with other trades in setting such work, as required. Thoroughly wet wood forms immediately before placing concrete, as required where form coatings are not used.

B. General:

- 1. Comply with ACI 304, and as herein specified. Employ adequate equipment and competent personnel for the placing and handling of concrete. Do not allow excessive free drops, improper placing techniques which will cause segregation in the mix.
 - 2. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness within the section. If a section cannot be placed continuously, provide construction joints as herein specified.
 - 3. Deposit concrete as nearly as practicable to its final location to avoid segregation due to rehandling or flowing.
- C. Consolidate placed concrete by mechanical vibrating equipment supplemented by hand-spading, rodding or tamping. Use equipment and procedures for consolidation of concrete in accordance with the recommended practices of ACI 309, to suit the type of concrete and project conditions.
 - D. Bring concrete surfaces to the correct level with a straightedge and strike off. Use bull floats or darbies to smooth the surface, leaving it free of humps or hollows. Do not sprinkle water on the plastic surface.
 - E. Maintain reinforcing in the proper position during concrete placement operations.

3.7 COLD WEATHER CONDITIONS:

- A. Protect concrete work from physical damage or reduced strength which could be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306R and as herein specified.
- B. When air temperature has fallen to, or is expected to fall below 40 degrees F, uniformly heat all water before mixing as required to obtain a concrete mixture temperature of not less than 50 degrees F, and not more than 80 degrees F. at point of placement.

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- C. Do not use frozen materials or materials containing ice or snow. Do not place concrete on frozen subgrade containing frozen materials.

3.8 COLD WEATHER PLACING:

- A. Protect concrete work from physical damage or reduced strength which would be caused by frost, freezing actions, or low temperatures, in compliance with ACI 306 and as herein specified.
- B. Do not use calcium chloride or other accelerators or "antifreezes".
- C. In addition to laboratory cured test specimens, cure additional concrete test specimens under field conditions as required and directed by the Architect to check the adequacy of curing and protection of the concrete.

3.9 HOT WEATHER PLACING:

- A. When hot weather conditions exist that would seriously impair the quality and strength of concrete, place concrete in compliance with ACI 305 and as herein specified.
- B. Cool ingredients before mixing to maintain concrete temperature at time of placement below 90 degrees F. Mixing water may be chilled or chopped ice may be used to control the concrete temperature provided the water equivalent of the ice is calculated to the total amount of mixing.

3.10 FINISHES:

- A. Unless otherwise noted, the finishing of concrete work shall be in accordance with ACI Specifications.
- B. At the completion of the consolidation of the concrete, the tops of all footings shall be floated to a level plane, dense surface with wood or metal floats.
- C. Troweled Finish: Additional troweling shall be done by hand after the surface has hardened sufficiently. The finish surface shall be free of trowel marks, uniform in texture and appearance.

3.11 CURING AND PROTECTION:

- A. All concrete shall be cured in a minimum of 7 days by one or more methods specified in the ACI Specifications, except polyethylene or similar plastic sheets shall not be used for the curing of concrete.

3.12 FIELD QUALITY CONTROL:

- A. Inspection by the Contractor:

1. Prior to notification of the Architect for a field review 48 hours preceding concrete placement, the Contractor shall carefully inspect all formwork, reinforcing steel placement, embedded items, and shall coordinate the installation of embedded items by other contractors.

B. Quality Control Testing During Construction:

1. All concrete testing shall be performed by an approved independent testing agency meeting the requirements of ASTM E-329, Standard Recommended Practice for Testing Agencies for Concrete as Used in Construction. The testing agency shall provide a letter from the Cement and Concrete Reference Laboratory (CCRL) stating that they meet the requirements of ASTM C 1077 and ASTM E-329. Testing agency shall be selected and paid for by Cornell University. Procedure shall be in accordance with the testing chapter of ACI-301.
2. Routine testing of materials and of resulting concrete for compliance with the Specifications shall be the duty of the approved testing agency elected and paid for by Cornell University. This agency shall be responsible for all testing including the taking, handling, transporting and curing of concrete samples, and the preparation and breaking of test specimens.
3. The University shall provide and maintain for the sole use of the testing agency, adequate facilities for safe storage, and proper curing of concrete test specimens on the job for initial curing, as required by ASTM C31.
4. The University's testing is to indicate compliance and is not intended to benefit the Contractor. The Contractor may test, at his own expense, to maintain his quality control.

3.13 COMPRESSIVE TESTS:

- A. All concrete tests shall be conducted by ACI Field Grade 1 Technicians. Sampling and testing for quality control during the placement of concrete may include the following, as directed by the University. Cast one set ((4) cylinders) of standard test cylinders for each 100 cubic yards of concrete placed or for each days work per class of concrete. Two specimens shall be tested at 7 days for information and two specimens tested at 28 days for acceptance. All test cylinders shall be removed from the field on a timely basis.
- B. Sampling Fresh Concrete: ASTM C 172, except modified for slump to comply with ASTM C 94.
- C. Slump:
 1. ASTM C 143; one test for each concrete load at point of discharge; and one test for each set of compressive strength test specimens.
 2. The testing agency shall make and record a slump test in connection with each sampling of concrete. The testing agency shall immediately notify the Contractor when the slump tests indicate the concrete is not within the specified limits.

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3. Additional slump tests shall be made when directed by the Architect or as necessary to control the consistency of the concrete.

D. Air Content:

1. ASTM C 173, volumetric method for lightweight concrete; one for each set of compressive strength test specimens. The testing agency shall note the maximum and minimum temperature during the initial curing period on the report and the time the test cylinders were made and picked up.

E. Concrete Temperature:

1. Test hourly when air temperature is 40 degrees F. and below, and when 80 degrees F. and above; and each time a set of compression test specimens made.

3.14 NOTIFICATION:

- A. The Contractor shall be responsible to notify the University to procure their testing agency in ample time for the assignment of testing personnel and shall afford the testing agency a safe area for the storage of test specimens.
- B. The Contractor shall not commence placement of concrete until such time as the representative of the testing agency is on the job site with the necessary equipment to perform the specified tests.
- C. The testing agency shall promptly send a copy of all test reports to the ready-mix producer.

3.15 RETESTING:

- A. Any testing required for the convenience of the Contractor or any retesting of materials failing to meet the requirements of the Specifications shall be entirely at the Contractor's expense.

3.16 FIELD REVIEW BY THE ARCHITECT:

- A. The Contractor shall give at least a 24-hour notice to the University and Architect prior to placing concrete to permit field review of the general construction work as well as mechanical, electrical and other work to be incorporated into the concrete.

END OF SECTION 033000

SECTION 042000 - MASONRY RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section is applicable to masonry assemblies consisting of the following:
 - 1. Granite steps and landings
 - 2. Reuse of existing stone veneer at Tunnel Entrance
 - 3. New supplemental stone veneer at Tunnel Entrance
 - 4. Mortar
 - 5. Subsurface cement wall parging at building foundation
 - 6. Stone patching repair mortar to existing plinth blocks at West Entrance
 - 7. Masonry accessories and anchors
- B. Related Sections include the following:
 - 1. Division 01 Section "Selective Removals" for removal, salvage and reuse of existing areaway brick, stonework, and stair tread stone.
 - 2. Division 03 Section "Cast-In-Place Concrete" for concrete footings and foundation walls.
 - 3. Division 07 Section "Sheet Membrane Waterproofing" for waterproofing at foundation.
 - 4. Division 31 Section "Excavation, Compaction and Backfill" for site work.
 - 5. Division 32 Section "Subdrainage" for foundation drainage system.
 - 6. Division 32 Section "Lawn Restoration" for grading and seeding.

1.2 SUBMITTALS

- A. Product Data: For each different masonry unit, accessory, and other manufactured product specified.
- B. Samples for Verification: For the following:
 - 1. Granite samples representing full range of natural markings and background color of stone characteristics.
 - 2. Metal ties and anchors.
 - 3. Flashing materials.
- C. Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with cold and hot-weather requirements.

1.3 QUALITY ASSURANCE

- A. Restoration Specialist: Engage an experienced masonry restoration and architectural stone setting firm that has specialized in the types of work required for this Project.

1. Only skilled journeymen masons who are familiar and experienced in removing and laying architectural stonework in historic buildings shall be used for the work.
 2. One skilled journeyman mason shall be present at all times during execution of the work and shall personally direct the work.
 3. In acceptance or rejection of stone masonry work, no allowance will be made for lack of skill on the part of the workmen.
- B. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, through one source from a single manufacturer for each product required.
- C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component and from one source or producer for each aggregate.
- D. Sample Panels: Before re-construction of Tunnel foundation wall, build sample panels including anchoring details and materials indicated for the completed Work, to verify selections made under sample submittals and to demonstrate aesthetic effects. Build sample panels for each type of exposed unit masonry assembly in sizes approximately 24 inches by 48 inches by full thickness.
1. Sand aids in the color matching of mortar using natural hydraulic lime. Several sample panels using different sand colorations may be required to produce a color match to the existing, original historic mortar.
 2. Allow sample panels to cure for a minimum of two (2) weeks prior to Architect's scheduled review of sample panels.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Carefully pack, handle, and ship stone units and accessories strapped together in suitable containers, pallets or heavy-duty cartons. Take particular care when unloading and handling of material to prevent chipping and breaking stone. Contractor shall replace any stone which are chipped or otherwise broken. Damaged stone shall not be allowed to be used in the Work.
- B. 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.
- C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.
- D. Store aggregates where grading and other required characteristics can be maintained, and contamination avoided.
- E. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

- F. Existing stone landing and step components indicated to be removed at the South Entrance shall be carefully dismantled, placed on wood pallets, and protected from the weather. The University shall be responsible for the removal and transportation of all pallets of stone off-site to campus materials storage facility.

1.5 PROJECT CONDITIONS

- A. Protection of Masonry: During construction, cover masonry completely with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress. Provide mortar curing materials and methods that are recommended by the manufacture for the climate and conditions of the work.
- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1.
 - 1. Use liquid cleaning methods only when air temperature is 40 deg F and above and will remain so until masonry has dried, but not less than 7 days after completing cleaning.
- C. Hot-Weather Requirements: Protect unit masonry work when temperature and humidity conditions produce excessive evaporation of water from mortar and grout. Provide artificial shade and wind breaks and use cooled materials as required.
 - 1. When ambient temperature exceeds 100 deg F or 90 deg F with a wind velocity greater than 8 mph do not spread mortar beds more than 48 inches ahead of masonry. Set masonry units within one minute of spreading mortar.

PART 2 - PRODUCTS

2.1 STONE TYPE 1 - GRANITE ENTRANCE STEPS AND LANDINGS

- A. Custom sized units, factory milled, and finished.
 - 1. Selection: Radiant Red Granite with Diamond 100 finish.
 - 2. Manufacturer: Coldspring, 17482 Granite West Road, Coldspring, MN 56320 Tele: 320-685-3621, www.coldspringusa.com or Architect approved equal.

2.2 STONE TYPE 2 - SUPPLEMENTAL STONE VENEER AT TUNNEL RECONSTRUCTION

- A. Stone Quarry: Finger Lakes Stone, Ithaca, New York: Natural quarried stone of shape and configuration indicated on Drawings, free of spalls, cracks, open seams, pits, and other defects that impair structural integrity. No distinct shifts in texture and pronounced difference in thickness shall be allowed.

1. Stone Fabrication/Placement: Natural bedded.
2. Stone Finish: Split-Faced to match tooling of existing stonework.
3. Color Range: Blues, Grays, Browns.
4. Assume ten (10%) percent replacement stone required for Tunnel reconstruction work.

2.3 STONE TYPE 3 – SCUPPER STONE AT TUNNEL RECONSTRUCTION

- A. Stone Quarry: New York Quarries, Alcove, New York: Natural quarried stone of shape and configuration indicated on Drawings, free of spalls, cracks, open seams, pits, and other defects that impair structural integrity. No distinct shifts in texture and pronounced difference in thickness shall be allowed. New stone fabrication shall match thickness, drain profile, and dimensions of existing stonework to be replaced. Two (2) units required.
1. Stone Fabrication/Placement: Natural bedded.
 2. Stone Finish: Thermal
 5. Color: Deep Blue.

2.4 MORTAR AND PARGING

- A. General: Do not use admixtures, including air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated. Do not use calcium chloride in mortar.
- B. Parging:
1. Repair work to existing foundation wall surface parging.
 2. New surface parging over existing stone foundation wall.
 3. Parging Mix: Type S Mortar. 2 parts Portland cement, 1 part hydrated lime, 9 parts sand.
- C. Mortar:
1. Mortar for setting and pointing existing and new stonework at Entrance Tunnel.
 2. Mortar for setting and pointing new entrance steps and landing stonework.
 3. Mortar Mix: Type N Mortar. 1 part Portland cement, 1 part hydrated lime, 6 parts sand.
- D. Portland cement: ASTM C150/C150M, Type 1, natural color or white cement may be used as required to produce approved mortar color.
- E. Hydrated Lime: ASTM C207, Type S.

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- F. Sand: Clean, fine natural bank silica sand free from excessive organic or deleterious matter and graded in compliance with ASTM C 144.
- G. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C979. Use only pigments with a record of satisfactory performance in stone masonry mortar.
- H. Water: Clean, potable water free from acids, alkalis, oils, salts, organic matter, and other deleterious substances.
- I. Preparation:
 - 1. Fully dry-mix cement, lime and sand together before adding water.
 - 2. Add necessary amount of potable water to achieve a mason's consistency, mix mortar for approximately ten (10) minutes.

2.5 STONE PATCHING MATERIAL

- A. Stone Patching Compound: Factory-mixed natural hydraulic lime product that is custom manufactured for patching stone, is vapor and water permeable, exhibits low shrinkage, and develops high bond strength to all types of stone. Formulate in colors and textures to match stone being patched. Provide number of colors needed to enable matching each piece of stone.
 - a. St. Astier LITHOMEX distributed by deGruchy's Lime Works, Tel: (215) 536-6706.
 - b. "MIMIC" as manufactured by Conproco, Tel: (800) 258-3500.
 - c. "Jahn M120" as manufactured by Cathedral Stone Products, Inc. Tel: (800) 782-9150
- B. Parging:
 - 1. Repair work to existing foundation wall surface parging.
 - 2. New surface parging over existing stone foundation wall.
 - 3. Parging Mix: Type S Mortar. 2 parts Portland cement, 1 part hydrated lime, 9 parts sand.

2.6 MISCELLANEOUS MATERIALS

- A. Stone Veneer Anchors: 304 stainless steel.
- B. Drainage Stone Fill: Washed, evenly graded mixture of crushed stone, ASTM D 448, coarse aggregate, Size No.57, with 100 percent passing 1 ½ inch sieve.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

- A. Thickness: Build masonry construction to the full wall thickness shown on drawings to match original construction.
- B. Cut new stone masonry units where required to provide clean, sharp, unchipped edges. Cut units as required to provide a continuous pattern. Where possible, use full-size units without cutting unless otherwise indicated on Drawings. Install cut units with cut surfaces and, where possible, cut edges concealed.

3.2 LAYING STONE MASONRY

- A. Lay out original and new stone in advance for accurate spacing of surface bond patterns with uniform joint thickness and for accurate location of openings, returns, and offsets. Place stone in an interlocking manner to form a homogenous mass. Provide additional angular hearting or packing stone as required to fill all voids between stone.
- B. Bond Pattern for Exposed Masonry: Lay exposed masonry in the running bond pattern; set stone in full bed of mortar; finish exposed joints; rake to shed water.
- C. Lay concealed stone with all units in a wythe in running bond or bonded by lapping not less than 2 inches. Bond and interlock each course of each wythe at corners.

3.3 REPAIRING, POINTING, AND CLEANING

- A. Remove and replace stone 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: When mortar is thumbprint hard, tool joints to match original appearance of surrounding joints and provide a neat, uniform appearance. Remove excess mortar from edge of joint by brushing.
- C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints. Use only fiber bristle brushes only.
- 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. Clean stone by bucket and fiber bristle brush, hand-cleaning method described in "BIA Technical Notes 20" from the Brick Industry Association.
 - 3. Use of acid or alkali cleaning agents shall not be permitted.

END OF SECTION 042000

SECTION 071410 – SHEET MEMBRANE WATERPROOFING

PART 1 - GENERAL

1.1 SUMMARY

- A. This Section includes the following:
 - 1. Self-adhesive waterproofing membrane.
 - 2. Prefabricated drainage composite.
 - 3. Protection board.
- B. Related Sections include the following:
 - 1. Division 02 Section "Subdrainage" for drainage panels and geotextile filter fabrics.
 - 2. Division 03 Section "Cast-in Place Concrete" for concrete curing requirements.
 - 3. Division 04 Section "Masonry Restoration" for wall parging requirements.
 - 4. Division 07 Section "Modified Bituminous Sheet Air Barriers" for requirements for connections to adjacent air barrier system.

1.2 PERFORMANCE REQUIREMENTS

- A. Provide waterproofing membrane that prevents the passage of water.

1.3 SUBMITTALS

- A. Product Data: Include manufacturer's written instructions for evaluating, preparing, and treating substrate, material technical data, and tested physical and performance properties of waterproofing.
- B. Shop Drawings: Show locations and extent of waterproofing. Include footing, under slab, wall, and deck membrane details for substrate, joints and cracks, sheet flashings, penetrations, inside and outside corners, tie-ins with adjoining waterproofing, and other termination conditions. Reproductions of Contract Document drawing details will not be accepted as a submittal.
 - 1. Include Setting Drawings showing layout, sizes, sections, profiles, and joint details.
- C. Samples: For the following products:
 - 1. 4-by-4-inch square of drainage panel.
 - 2. 4-by-4-inch square of protection board.
 - 3. Waterproofing membrane sheet.

- D. Installer Certificates: Signed by manufacturers certifying that installers comply with requirements.
- E. 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.
- F. Waterproofing Membrane Adhesion Testing: Agency selected and hired by Cornell University to test new waterproofing system membrane adhesion to the following substates:
 - 1. New membrane bond to existing foundation parging surface.
 - 2. New membrane bond to new foundation parging surface.
 - 3. New membrane bond to existing concrete substrate at Entrance Tunnel.
- G. Sample Warranty: Copy of special waterproofing manufacturer's and Installer's warranty stating obligations, remedies, limitations, and exclusions before starting waterproofing.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified installer that has at a minimum (3) years experience in work of this type, who is acceptable to waterproofing manufacturer to install manufacturer's products.
- B. Source Limitations: Obtain waterproofing materials and drainage panel through one source from a single manufacturer.
- C. Mockups: Apply waterproofing to 50 sq. ft. of area to demonstrate surface preparation, crack and joint treatment, corner treatment, thickness, texture, and execution quality.
 - 1. If Architect determines mockups do not comply with requirements, reapply waterproofing until mockups are approved.
 - 2. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- D. Preinstallation Conference: Conduct conference at project site with Architect and Manufacturers Technical Representative. Review requirements for waterproofing, including surface preparation specified under other Sections, 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.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver liquid materials to Project site in original containers with seals unbroken, labeled with manufacturer's name, product brand name and type, date of manufacture, shelf life, 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 waterproofing manufacturer.
- C. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- D. Protect stored materials from direct sunlight.

1.6 PROJECT 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, when relative humidity exceeds 85 percent, or when temperatures are less than 5 deg F above dew point.
 - 1. Do not apply waterproofing in snow, rain, fog or mist, or when such weather conditions are imminent during application and curing period.
- B. Maintain adequate ventilation during application and curing of waterproofing materials.

1.7 WARRANTY

- A. Special Manufacturer's Warranty: Written warranty, signed by waterproofing manufacturer agreeing to repair or replace waterproofing that does not comply with requirements or that does not remain watertight within specified warranty period.
 - 1. Warranty Period: Five years after date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
- B. Products: Subject to compliance with requirements, provide one of the following products:
 - 1. Self-adhesive waterproofing membrane:
 - a. Below Slabs: W. R. Grace & Co.; Bituthene System 300R.
 - b. Walls and Roof: W. R. Grace & Co.; Bituthene System 4000.
 - 2. Prefabricated Wall Drainage Composite:
 - a. W. R. Grace & Co.; HydroDuct Coil 600.
 - 3. Prefabricated Horizontal Geocomposite Protection layer:

- a. W.R. Grace & Co., Hydroduct 660

2.2 WATERPROOFING MATERIALS

- A. General: Provide waterproofing materials recommended by manufacturer to be compatible with one another and able to develop bond to substrate under conditions of service and application, as demonstrated by waterproofing manufacturer based on testing and field experience.
 - 1. Produce waterproofing materials suitable for application to vertical, horizontal, and sloped substrates, as applicable.
 - 2. Provide waterproofing materials with not less than 90 percent solids.

2.3 AUXILIARY MATERIALS

- A. Primer: Manufacturer's standard, factory-formulated primer.
- B. Sheet Flashing: 50-mil minimum, non-staining uncured sheet neoprene.
 - 1. Adhesive: Manufacturer's recommended contact adhesive.
- C. Reinforcing Strip: Manufacturer's recommended fiberglass mesh or polyester fabric.
- D. Termination Bars: Manufacturer's stainless-steel components for horizontal and vertical membrane termination and liquid sealing application.
- E. Joint Sealant: Multicomponent polyurethane sealant, compatible with waterproofing, complying with ASTM C 920 Type M, Class 25; Grade NS for sloping and vertical applications or Grade P for deck applications; Use NT exposure; and as recommended by manufacturer for substrate and joint conditions.
 - 1. Backer Rod: Closed-cell polyethylene foam.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.
 - 1. Verify that concrete has cured and aged for minimum time recommended by waterproofing manufacturer.
 - 2. Verify that substrate is visibly dry and free of moisture. Test for capillary moisture by plastic sheet method according to ASTM D 4263.
 - 3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Clean and prepare substrate according to manufacturer's written recommendations. Provide clean, dust-free, and dry substrate for waterproofing application.
- B. Mask off adjoining surfaces not receiving waterproofing to prevent spillage or overspray affecting other construction.
- C. Close off deck drains and other deck penetrations to prevent spillage and migration of waterproofing fluids.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.
 - 1. Abrasive blast clean concrete surfaces uniformly to expose top surface of fine aggregate according to ASTM D 4259 with a self-contained, recirculating, blast-cleaning apparatus. Remove material to provide a sound surface free of laitance, glaze, efflorescence, curing compounds, concrete hardeners, or form-release agents. Remove remaining loose material and clean surfaces according to ASTM D 4258.
- E. Remove fins, ridges, and other projections and fill honeycomb, aggregate pockets, and other voids.

3.3 PREPARATION AT TERMINATIONS AND PENETRATIONS

- A. Prepare vertical and horizontal surfaces at terminations and penetrations through waterproofing and at expansion joints, drains, and sleeves according to ASTM C 898 and manufacturer's written instructions.
- B. Prime substrate, unless otherwise instructed by waterproofing manufacturer.
- C. Apply a double thickness of waterproofing and embed a joint reinforcing strip in preparation coat when recommended by waterproofing manufacturer.
 - 1. Provide sealant cants around penetrations and at inside corners of deck-to-wall butt joints when recommended by waterproofing manufacturer.

3.4 JOINT AND CRACK TREATMENT

- A. Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 898 and waterproofing manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.
 - 1. Comply with ASTM C 1193 for joint-sealant installation.
 - 2. Apply bond breaker between sealant and preparation strip.
 - 3. Prime substrate and apply a single thickness of preparation strip extending a minimum of 3 inches along each side of joint. Apply a double thickness of waterproofing and embed a joint reinforcing strip in preparation coat.

- B. Install sheet flashing and bond to deck and wall substrates where indicated or required according to waterproofing manufacturer's written instructions.
 - 1. Extend sheet flashings onto perpendicular surfaces and other work penetrating substrate according to ASTM C 898.

3.5 WATERPROOFING APPLICATION

- A. Apply waterproofing according to manufacturer's written instructions.
- B. Start installing waterproofing in presence of manufacturer's technical representative.
- C. Apply primer over prepared substrate.
- D. Apply waterproofing to prepared wall terminations and vertical surfaces.
- E. Install protection course with butted joints over nominally cured membrane before starting subsequent construction operations.
 - 1. Molded-sheet drainage panels may be used in place of a separate protection course to vertical applications when approved by waterproofing manufacturer.

3.6 MOLDED-SHEET DRAINAGE PANEL INSTALLATION

- A. Place and secure molded-sheet drainage panels to substrate according to manufacturer's written instructions. Use adhesives that do not penetrate waterproofing. Lap edges and ends of geotextile fabric to maintain continuity. Protect installed molded-sheet drainage panels during subsequent construction.
 - 1. For vertical applications, install board insulation used as a protection course before installing drainage panels.

3.7 CURING, PROTECTING, AND CLEANING

- A. Cure waterproofing according to manufacturer's written recommendations, taking care to prevent contamination and damage during application stages and curing.
 - 1. Do not permit foot or vehicular traffic on unprotected membrane.
- B. Protect waterproofing from damage and wear during remainder of construction period.
- C. Protect installed insulation drainage panels from damage due to ultraviolet 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.

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END OF SECTION 071410

SECTION 072100 - THERMAL INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Polyisocyanurate foam-plastic board insulation.
- B. Related Requirements:
 - 1. Section 042000 "Masonry Restoration" for cavity wall construction.
 - 2. Section 071410 "Sheet Membrane Waterproofing" for foundation waterproofing.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Extruded polystyrene foam-plastic board insulation.
 - 2. Polyisocyanurate foam-plastic board insulation.

1.3 INFORMATIONAL SUBMITTALS

- A. Installer's Certification: Listing type, manufacturer, and R-value of insulation installed in each element of the building thermal envelope.
 - 1. Sign, date, and post the certification in a conspicuous location on Project site.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.
- B. Protect foam-plastic board insulation as follows:
 - 1. Do not expose to sunlight except to necessary extent for period of installation and concealment.
 - 2. Protect against ignition at all times. Do not deliver foam-plastic board materials to Project site until just before installation time.
 - 3. Quickly complete installation and concealment of foam-plastic board insulation in each area of construction.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Surface-Burning Characteristics: Maximum flame-spread and smoke-developed indexes less than 25 and 450 when tested in accordance with ASTM E84.
- B. Fire-Resistance Ratings: Comply with ASTM E119 or UL 263; 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 listings of another qualified testing agency.
- C. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly.
- D. Labeling: Provide identification of mark indicating R-value of each piece of insulation 12 inches and wider in width.
- E. Thermal-Resistance Value (R-Value): R-value per inch as indicated below in accordance with ASTM C518.
 - 1. Install insulation in thicknesses as indicated on the Drawings.

2.2 EXTRUDED POLYSTYRENE FOAM-PLASTIC BOARD INSULATION

- A. Extruded Polystyrene Board Insulation, ASTM C578, Type IV, 25-psi minimum compressive strength; unfaced. Minimum R5 per inch thickness.
 - 1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
 - a. DuPont de Nemours, Inc.
 - b. Owens Corning.
 - c. The Dow Chemical Company.
 - d. Kingspan GreenGuard

2.3 POLYISOCYANURATE FOAM-PLASTIC BOARD INSULATION

- A. Polyisocyanurate Board Insulation, Glass-Fiber-Mat Faced: ASTM C1289, glass-fiber-mat faced, Type II, Class 2.
 - 1. Products: Subject to compliance with requirements, provide one of the following:
 - a. Atlas Polyiso Roof Insulation;
 - b. Carlisle Coatings & Waterproofing Inc;
 - c. Firestone Building Products;
 - d. Johns Manville; a Berkshire Hathaway company;
 - e. Rmax, Inc.;

2.4 ACCESSORIES

- A. Insulation for Miscellaneous Voids:
 - 1. Safing Insulation or Mineral Fiber
 - 2. Glass-Fiber Insulation: ASTM C764, Type II, loose fill; with maximum flame-spread and smoke-developed indexes of 5, per ASTM E84.
 - 3. Spray Polyurethane Foam Insulation: ASTM C1029, Type II, closed cell, with maximum flame-spread and smoke-developed indexes of 75 and 450, respectively, per ASTM E84.
- B. Adhesive for Bonding Insulation: Product compatible with insulation and air and water barrier materials, and with demonstrated capability to bond insulation securely to substrates without damaging insulation and substrates. See section 072726 Fluid-Applied Membrane Air Barriers.
- C. Wire Mesh: Poultry Netting Galvanized, 20ga. with 1" hexagons.
- D. Mechanical fasteners compatible with wire mesh.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Clean substrates of substances that are harmful to insulation, including removing projections capable of puncturing insulation or vapor retarders, or that interfere with insulation attachment.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications.
- B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.
- C. Install insulation with manufacturer's R-value label exposed after insulation is installed.
- D. Extend insulation to envelop entire area to be insulated. Cut and rabbet to fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.
- E. Provide sizes to fit applications and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units unless multiple layers are otherwise shown or required to make up total thickness or to achieve R-value.
- F. Stagger joints in multi-layer applications.

- G. See roofing manufacturer's instructions for additional board insulation that is part of a roof assembly.

3.3 INSTALLATION OF RIGID BOARD INSULATION

- A. Foam-Plastic Board Insulation: Install pads of adhesive spaced approximately 24 inches o.c. both ways on inside face and as recommended by manufacturer.
 - 1. Fit insulation panels with edges butted tightly in both directions, and with faces flush.
 - 2. Verify penetrations in exterior assembly are sealed to air barrier. Do not proceed with installation of insulation until all penetrations are sealed from air and water penetration.
 - 3. Bevel cut sloping to exterior at flashings.
 - 4. Press units firmly against inside substrates.
 - 5. Where substrates have obstructions reduce depth of insulation to fit tight to wall, but not less than 1" thick.
 - 6. Fill cracks and gaps in insulation with sealer or spray foam insulation compatible with board insulation.
- B. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation using the following materials:
- C.
 - 1. Spray Polyurethane Insulation: Apply according to manufacturer's written instructions.

3.4 PROTECTION

- A. Protect installed insulation from damage due to harmful weather exposures, physical abuse, and other causes.
- B. Provide temporary coverings or enclosures where insulation is subject to abuse and cannot be concealed and protected by permanent construction immediately after installation.

END OF SECTION 072100

SECTION 072713 – MODIFIED BITUMINOUS SHEET AIR BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes: Self-adhering, vapor-retarding, air barrier.
 - 1. Modified bituminous sheet.
- B. Related Requirements:
 - 1. Section 071410 "Sheet Applied Waterproofing" for self-adhering sheet waterproofing.

1.2 DEFINITIONS

- A. Air-Barrier Assembly: The collection of air-barrier materials and accessories applied to an opaque wall, including joints and junctions to abutting construction, to control air movement through the wall.

1.3 PREINSTALLATION MEETINGS

- A. Preinstallation Conference: Conduct conference at Project site.
 - 1. Review air-barrier requirements and installation, special details, mockups, air-leakage and bond testing, air-barrier protection, and work scheduling that covers air barriers.

1.4 ACTION SUBMITTALS

- A. Product Data: Self-adhering, vapor-retarding, sheet air barrier. Include manufacturer's written instructions for evaluating, preparing, and treating each substrate; technical data; and tested physical and performance properties of products. Include manufacturers information stating air barrier and waterproofing, specified under separate section, are compatible.
 - 1. Modified bituminous sheet.
- B. Shop Drawings: For air-barrier assemblies.
 - 1. Show locations and extent of air barrier materials, accessories, and assemblies specific to Project conditions.
 - 2. Include details for substrate joints and cracks, counterflashing strips, penetrations, inside and outside corners, terminations, and tie-ins with adjoining construction.
 - 3. Include details of interfaces with other materials that form part of air barrier.

1.5 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For Installer.
- B. Product Certificates: From air-barrier manufacturer, certifying compatibility of air barriers and accessory materials with Project materials that connect to or that come in contact with air barrier.
- C. Product Test Reports: For each air-barrier assembly, for tests performed by a qualified testing agency.
- D. Field quality-control reports.

1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.
- B. Mockups: Build mockups to set quality standards for materials and execution and for preconstruction testing.
 - 1. Build mockups, 100 sq. ft., incorporating, ties and other penetrations, and flashing to demonstrate surface preparation, crack and joint treatment, application of air barriers, and sealing of gaps, terminations, and penetrations of air-barrier assembly.
 - a. Coordinate construction of mockups to permit inspection and adhesion testing of air barrier before external insulation and cladding are installed.
 - b. Include junction with roofing membrane, building corner condition, and foundation wall intersection.
 - c. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
 - 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 - 3. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

- A. Preconstruction Testing Service: Owner will engage a qualified testing agency to perform preconstruction testing on field mockups.
- B. Mockup Testing: Air-barrier assemblies to comply with performance requirements indicated, as evidenced by reports based on mockup testing by a qualified testing agency.

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1. Adhesion Testing: Mockups will be tested for required air-barrier adhesion to substrate in accordance with ASTM D4541.
2. Notify Architect seven days in advance of the dates and times when mockups will be tested.

1.8 DELIVERY, STORAGE, AND HANDLING

- A. Remove and replace liquid materials that cannot be applied within their stated shelf life.
- B. Protect stored materials from direct sunlight.

1.9 FIELD CONDITIONS

- A. Environmental Limitations: Apply air barrier within the range of ambient and substrate temperatures recommended in writing by air-barrier manufacturer.
 1. Protect substrates from environmental conditions that affect air-barrier performance.
 2. Do not apply air barrier to a damp or wet substrate or during snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain primary air-barrier materials and air-barrier accessories from single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Air-Barrier Performance: Air-barrier assembly and seals with adjacent construction to be capable of performing as a continuous air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air-barrier assemblies to be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, penetrations, tie-ins to installed waterproofing, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

2.3 SELF-ADHERING SHEET AIR BARRIER

- A. Modified Bituminous Sheet:

1. Basis of Design Product: Perm-A-Barrier NPS Wall Membrane manufactured by GCP Applied Technologies www.gcpat.com; a self-adhered membrane that does not require a primer. Membrane should be interleaved with disposable release liner until installed. Product shall have the following minimum physical properties:
 - a. Air Permeance: ASTM E2178: Not to exceed 0.004 cfm/sq. ft. under a pressure differential of 1.57 psf (equal to 0.02L/s/sq. m @ 75 Pa)
 - b. Assembly Air Permeance: ASTM E2357: Not to exceed 0.04 cfm/sq.ft. under a pressure differential of 1.57 psf (equal to 0.2 L/s/sq. m @ 75 Pa)
 - c. Water Vapor Permeance: ASTM E96, Method B: Less than 0.1 perm
 - d. Water Absorption: ASTM D570: Max 0.1% by weight
 - e. Puncture Resistance: ASTM E154: Min. 40 lbs. (178 N)
 - f. Pliability, Low Temperature Flexibility: ASTM D1970: Pass at -20F (-29C)
 - g. Tensile Strength: ASTM D412: Min. 400 psi (2.8 MPa)
 - h. Elongation: ASTM D412: Min. 200%
 - i. Peel Adhesion: ASTM D903: Min. 5 pli
 - j. Fire Propagation Characteristics: Passes NFPA 285 testing as part of an approved assembly
 - k. UV Resistance: Can be exposed to sunlight for 30 days in accordance with manufacturer's written instructions.

2.4 ACCESSORY MATERIALS

- A. Requirement: Provide primers, transition strips, termination strips, joint sealants, counterflashing strips, flashing sheets and metal termination bars, termination mastic, substrate patching materials, adhesives, tapes, foam sealants, lap sealants, and other accessory materials that are recommended in writing by air-barrier manufacturer to produce a complete air-barrier assembly and that are compatible with primary air-barrier material and adjacent construction to which they may seal.
- B. Transition Membrane: Perm-A-Barrier NPS Detail Membrane; a self-adhered membrane that does not require a primer fabricated in various widths for detail areas conforming with the following:
 1. Puncture Resistance: ASTM E154: Min. 40 lbs. (178 N)
 2. Pliability, Low Temperature Flexibility ASTM D1970: Pass at -20F (-29C)
 3. Tensile Strength: ASTM D412: Min. 400 psi (2.8 MPa)
 4. Elongation: ASTM D412: Min. 200%
- C. Flexible Membrane Wall Flashing: Perm-A-Barrier Wall Flashing; a 32 mil (0.8 mm) of self-adhesive rubberized asphalt integrally bonded to 8 mil (0.2 mm) of cross-laminated, high-density polyethylene film to provide a min. 40 mil (1.0 mm) thick membrane. Membrane shall be interleaved with disposable silicone-coated release paper until installed, conforming with the following:
 1. Puncture Resistance: ASTM E154: Min. 80 lbs.(356 N)
 2. Pliability, Low Temperature Flexibility: ASTM D1970: Pass at -45F (-43C)
 3. Tensile Strength: ASTM D412, Die C Modified: Min. 1,200 psi (8.3 MPa)
 4. Elongation: ASTM D412, Die C: Min. 200%
- D. Sealant and Liquid Flashing for Terminations and Flashing of Rough Openings: Perm-A-Barrier Universal Flashing & Sealant; a single component sealant.

- E. Liquid Membrane for Details, Terminations and Substrate Preparation: Bituthene Liquid Membrane; a two-part, elastomeric, trowel grade material.
- F. Primer: Liquid primer recommended for substrate by air-barrier material manufacturer.
- G. Stainless Steel Sheet: ASTM A240/A240M, Type 304, 0.0250 inch thick, and Series 300 stainless steel fasteners.
- H. Preformed Silicone Extrusion: Manufacturer's standard system consisting of cured low-modulus silicone extrusion, sized to fit opening widths, with a single-component, neutral-curing, Class 100/50 (low-modulus) silicone sealant for bonding extrusions to substrates.

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 substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
 - 2. Verify that substrates have cured and aged for minimum time recommended in writing by air-barrier manufacturer.
 - 3. Verify that substrates are visibly dry and free of moisture.
 - 4. Verify that masonry joints are flush and completely filled with mortar.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

- A. Refer to manufacturer's literature for requirements for preparation of substrates. Provide clean, dust-free, and dry substrate for air-barrier application. Surfaces shall be sound and free of voids, spalled areas, loose aggregate and sharp protrusions. Remove contaminants such as grease, oil and wax from exposed surfaces. Remove dust, dirt, loose stone, debris and any material that may interfere with proper adhesion of the air barrier to the substrate. Use repair materials and methods that are acceptable to manufacturer of the air barrier assembly.
- B. Masonry Substrates: Fill all voids and holes, particularly in the mortar joints, with a lean mortar mix, non-shrinking grout or parge coat. Mortar joints shall be struck full and flush with the surface of the masonry substrate to receive air barrier.
- C. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.
- D. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

- E. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate-patching membrane.
- F. Remove excess mortar from masonry ties, shelf angles, and other obstructions.
- G. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.
- H. Cover gaps in substrate plane and form a smooth transition from one substrate plane to another with stainless steel sheet mechanically fastened to structural framing to provide continuous support for air barrier.
- I. Bridge isolation joints expansion joints and discontinuous wall-to-wall, deck-to-wall, and deck-to-deck joints with air-barrier accessory material that accommodates joint movement in accordance with manufacturer's written instructions and details.

3.3 INSTALLATION OF SELF-ADHERING SHEET AIR BARRIER

- A. Install materials in accordance with air-barrier manufacturer's written instructions and details and in accordance with recommendations in ASTM D6135 to form a seal with adjacent construction and ensure continuity of air and water barrier.
- B. Prepare, treat, and seal inside and outside corners and vertical and horizontal surfaces at terminations and penetrations with termination mastic and in accordance with ASTM D6135.
- C. Apply primer to substrates at required rate and allow it to dry. Limit priming to areas that will be covered by air-barrier sheet on same day. Reprime areas exposed for more than 24 hours.
- D. Precut pieces of air barrier into easily handled lengths.
- E. Remove release linear before or during membrane installation.
- F. Begin installation at the base of the wall placing top edge of membrane immediately below any masonry reinforcement or ties protruding from substrate.
- G. When properly positioned, place against surface by pressing firmly into place. Roll membrane with roller immediately after placement.
- H. Apply and firmly adhere air-barrier sheets over area to receive air barrier. Accurately align sheets and maintain uniform 2-inch- minimum lap widths and end laps. Overlap and seal seams, and stagger end laps to ensure airtight installation.
 - 1. Apply sheets in a shingled manner to shed water.
 - 2. Roll sheets firmly to enhance adhesion to substrate.
- I. Subsequent sheets of membrane applied above shall be positioned immediately below masonry reinforcement or ties. Bottom edge shall be slit to fit around reinforcing wires or ties, and membrane shall overlap the membrane sheet below by 50 mm (2 in.). Roll firmly into place.

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- J. Apply continuous air-barrier sheets over accessory strips bridging substrate cracks, construction, and contraction joints.
- K. Seal around masonry reinforcing or ties and penetrations with termination mastic.
- L. Seal top of through-wall flashings to air-barrier sheet with an additional 6-inch- wide, transition strip.
- M. Seal exposed edges of sheet at seams, cuts, penetrations, and terminations not concealed by metal counterflashings or ending in reglets with termination mastic.
- N. Install air-barrier sheet and accessory materials to form a seal with adjacent construction and to maintain a continuous air barrier.
 - 1. Coordinate air-barrier installation with installation of roofing membrane and base flashing to ensure continuity of air barrier with roofing membrane.
 - 2. Install transition strip on roofing membrane or base flashing so that a minimum of 3 inches of coverage is achieved over each substrate.
- O. Connect and seal exterior wall air-barrier sheet continuously to roofing-membrane air barrier, concrete below-grade structures, floor-to-floor construction, exterior glazing and window systems, glazed curtain-wall systems, storefront systems, exterior louvers, exterior door framing, and other construction used in exterior wall openings, using accessory materials.
- P. At end of each working day, seal top edge of air-barrier material to substrate with termination mastic.
- Q. Apply joint sealants forming part of air-barrier assembly within manufacturer's recommended application temperature ranges. Consult manufacturer when sealant cannot be applied within these temperature ranges.
- R. Wall Openings: Prime concealed, perimeter frame surfaces of windows, curtain walls, storefronts, and doors. Apply transition strip so that a minimum of 3 inches of coverage is achieved over each substrate. Maintain 3 inches of contact over firm bearing to perimeter frames, with not less than 1 inch of full contact.
 - 1. Transition Strip: Roll firmly to enhance adhesion.
- S. Fill gaps in perimeter frame surfaces of windows, curtain walls, storefronts, doors, and miscellaneous penetrations of air-barrier material with foam sealant.
- T. Repair punctures, voids, and deficient lapped seams in air barrier. Slit and flatten fishmouths and blisters. Patch with air-barrier sheet extending 6 inches beyond repaired areas in all directions.
- U. Do not cover air barrier until it has been tested and inspected by testing agency.
- V. Correct deficiencies in or remove air barrier that does not comply with requirements; repair substrates and reapply air-barrier components.

3.4 FIELD QUALITY CONTROL

- A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections.
- B. Inspections: Air-barrier materials, accessories, and installation are subject to inspection for compliance with requirements. Inspections may include the following:
 - 1. Continuity of air-barrier system has been achieved throughout the building envelope with no gaps or holes.
 - 2. Continuous structural support of air-barrier system has been provided.
 - 3. Masonry and concrete surfaces are smooth, clean, and free of cavities, protrusions, and mortar droppings.
 - 4. Site conditions for application temperature and dryness of substrates have been maintained.
 - 5. Maximum exposure time of materials to UV deterioration has not been exceeded.
 - 6. Surfaces have been primed.
 - 7. Laps in sheet materials have complied with the minimum requirements and have been shingled in the correct direction (or mastic applied on exposed edges), with no fishmouths.
 - 8. Termination mastic has been applied on cut edges.
 - 9. Air barrier has been firmly adhered to substrate.
 - 10. Compatible materials have been used.
 - 11. Transitions at changes in direction and structural support at gaps have been provided.
 - 12. Connections between assemblies (air barrier and sealants) have complied with requirements for cleanliness, surface preparation and priming, structural support, integrity, and continuity of seal.
 - 13. All penetrations have been sealed.
- C. Tests: As determined by testing agency from among the following tests:
 - 1. Adhesion Testing: Air-barrier assemblies will be tested for required adhesion to substrate in accordance with ASTM D4541 for each 600 sq. ft. of installed air barrier or part thereof.
- D. Air barriers will be considered defective if they do not pass tests and inspections.
 - 1. Apply additional air-barrier material, in accordance with manufacturer's written instructions, where inspection results indicate insufficient thickness.
 - 2. Remove and replace deficient air-barrier components for retesting as specified above.
- E. Repair damage to air barriers caused by testing; follow manufacturer's written instructions.
- F. Prepare test and inspection reports.

3.5 CLEANING AND PROTECTION

- A. Protect air-barrier system from damage during application and remainder of construction period, in accordance with manufacturer's written instructions.

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1. Protect air barrier from exposure to UV light and harmful weather exposure as recommended in writing by manufacturer. If exposed to these conditions for longer than recommended, remove and replace air barrier or install additional, full-thickness, air-barrier application after repairing and preparing the overexposed materials in accordance with air-barrier manufacturer's written instructions.
 2. Protect air barrier from contact with incompatible materials and sealants not approved by air-barrier manufacturer.
- B. Clean spills, stains, and soiling from construction that would be exposed in the completed Work, using cleaning agents and procedures recommended in writing by manufacturer of affected construction.

END OF SECTION 072713

SECTION 076200 - SHEET METAL FLASHING

PART 1 - GENERAL

1.1 SUMMARY

- A. The extent of sheet metal fabrications and flashing work is indicated on the Drawings and by provisions of this Section.
- B. The Section includes, but is not limited to:
 - 1. Placement of sheet metal flashings, trim and related accessories that form termination and waterproof connections.
 - 2. Installation of sheet metal window sill flashing.
 - 3. Installation of sheet metal flashing above doors at Entrance Tunnel.
 - 4. Installation of sheet metal flashing at Entrance Tunnel through-wall scuppers.
 - 5. Install of above grade sheet metal cap flashing at foundation waterproofing.
- C. Related Sections:
 - 1. Division 04 Section "Masonry Restoration"
 - 2. Division 07 Section "Sheet Membrane Waterproofing"
 - 3. Division 08 Section "Hollow Metal Door Frames"

1.2 PERFORMANCE REQUIREMENTS

- A. General: Sheet metal flashing and trim assemblies as indicated shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.
- B. Thermal Movements: Provide sheet metal flashing and trim that allows for thermal movements from ambient and surface temperature changes.
 - 1. Temperature Change (Range): 120 deg F, ambient; 180 deg F, material surfaces.

1.3 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.
- B. Shop Drawings: Show fabrication and installation layouts of sheet metal flashing and trim, including plans, elevations, expansion-joint locations, and keyed details. Distinguish between shop and field-assembled work. Include the following:

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1. Identification of material, thickness, weight, and finish for each item and location in Project.
 2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
 3. Details for joining, supporting, and securing sheet metal flashing and trim, including layout of fasteners, cleats, clips, and other attachments. Include pattern of seams.
- C. Samples for Initial Selection: For each type of sheet metal flashing, trim, and accessory.
- D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Sheet Metal Flashing: 12 inches long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.
- E. Qualification Data: For qualified fabricator.
- F. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

- A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.
- B. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual" unless more stringent requirements are specified or shown on Drawings.
- C. Copper Sheet Metal Standard: Comply with CDA's "Copper in Architecture Handbook." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.
1. Build mockup of typical above grade cap flashing at termination of foundation waterproofing approximately 10 feet long, including supporting relet construction, seams, attachments, waterproofing membrane, and accessories.
 2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
 3. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.
- E. Pre-installation Conference: Conduct conference at Project site
1. Meet with University Representative, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of foundation waterproofing system.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.
- B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to the extent necessary for the period of sheet metal flashing and trim installation.

1.6 WARRANTY

- A. Special Warranty on Finishes: Manufacturer's standard form in which manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.
 - 1. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SHEET METALS

- A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying a strippable, temporary protective film before shipping.

2.2 METAL FLASHING AND SHEET METAL:

- A. Tin-Zinc (T-Z) Coated Copper Sheet: ASTM B 370, H00 temper, consisting of cold-rolled copper sheet coated both sides by the hot-dip process with tin-zinc alloy.
 - 1. Weight of Coated Sheet: 20 oz. for all copper flashings unless noted otherwise. Weights of T-Z-coated copper specified or indicated shall be weights of copper sheet EXCLUSIVE of alloy coating.
 - 2. Distributor:
 - a. Freedom Gray Z-T Alloy Coated Copper, Revere Copper Products, Inc., One Revere Park, Rome, NY, 13440-5561, www.reverecopper.com; 800-448-1776 or approved equal.

2.3 MISCELLANEOUS MATERIALS

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

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- B. Fasteners: 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.
- C. Solder: For tin-Zinc Alloy-Coated Copper ASTM B 32, 100 percent tin.
- D. Elastomeric Sealant: ASTM C 920, elastomeric silicone polymer sealant; low modulus; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight. Refer to Division 07 Section "Joint Sealants" for specific sealant type.
- E. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.4 FABRICATION, GENERAL

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, geometry, metal thickness, and other characteristics of item indicated. Fabricate items at the shop to greatest extent possible.
 - 1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
 - 2. Obtain field measurements for accurate fit before shop fabrication.
 - 3. Form sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.
 - 4. Conceal fasteners and expansion provisions where possible. Exposed fasteners are not allowed on faces exposed to view.
- B. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of the Work.
 - 1. Verify compliance with requirements for installation tolerances of substrates.
 - 2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
- B. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
 - 1. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder 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. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.
 - 4. Install sealant tape where indicated.
 - 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 will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by SMACNA.
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection.

3.3 CLEANING AND PROTECTION

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder.
- C. Clean off excess sealants.
- D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of installation, remove unused materials and clean finished surfaces. Maintain in a clean condition during construction.
- E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 076200

SECTION 079200 - JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes, but is not limited to:
 - 1. Non-staining silicone joint sealants.
 - 2. Urethane joint sealants.
 - 3. Butyl joint sealants.
 - 4. Latex joint sealants.
- B. Related Requirements:
 - 1. Section 072726 "Fluid Applied Membrane Air Barriers" for compatible sealants not specified in this section.

1.2 SUBMITTALS

- A. Product Data:
 - 1. Each joint sealant type specified.
- B. 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.
- C. Samples for Verification: For each type and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- wide joints formed between two 6-inch- long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.
- D. Joint-Sealant Schedule: Include the following information:
 - 1. Joint-sealant application, joint location, and designation.
 - 2. Joint-sealant manufacturer and product name.
 - 3. Joint-sealant formulation.
 - 4. Joint-sealant color.

1.3 INFORMATIONAL SUBMITTALS

- 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.
- D. Field Quality-Control Reports: For field-adhesion-test reports, for each sealant application tested.
- E. Sample warranties.

1.4 CLOSEOUT SUBMITTALS

- A. Manufacturers' special warranties.
- B. General Contractor and Installer's special warranties.

1.5 QUALITY ASSURANCE

- A. Installer Qualifications: Authorized representative who is trained and approved by manufacturer.
- B. Testing Agency Qualifications: Qualified in accordance with ASTM C1021 to conduct the testing indicated.

1.6 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.

1.7 PRECONSTRUCTION TESTING

- A. 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.
5. Test Method: Test joint sealants in accordance with Method A, Tail Procedure, in ASTM C1521.
 - a. 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.
6. 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.
7. 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.

1.8 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.
 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.

1.9 WARRANTY

- A. Special Installer and General Contractor Warrantees: General Contractor and sealant installer jointly guarantee to replace, at no cost to the University, any or all joints which fail to establish and maintain airtight and watertight continuous sealed joints without staining or deteriorating joint substrates.
 1. Warranty Period: Twenty (20) 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.
- 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.

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. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.3 NONSTAINING SILICONE JOINT SEALANTS

- 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.

Non-textured and *textured are both required for matching adjacent mortar joints.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Sika Corporation - Building Components; Sikasil WS-290.
 - b. Pecora Corporation 890 FTS and 890 TXTR*
 - c. Tremco Spectrem 3

2.4 LATEX JOINT SEALANTS

- A. Acrylic Latex: Acrylic latex or siliconized acrylic latex, ASTM C834, Type OP, Grade NF.
 1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to the following:
 - a. Pecora Corporation; AC-20+ Silicone.
 - b. Tremco Incorporated; Tremflex 834.
 - c. BASF Building Systems; Sonolac

2.5 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.
 - 1. Manufacturers: Subject to compliance with requirements, available manufacturers with products that may be incorporated into the Work include, but are not limited to the following:
 - a. Adfast.
 - b. W.R Meadows
 - c. Tremco
- B. Cylindrical Sealant Backings: ASTM C1330, Type C (closed-cell material with a surface skin) Type O (open-cell material) Type B (bicellular material with a surface skin) or any of the preceding types, as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
- C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

- A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.
- B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.
- C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting 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.
 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. 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 in accordance with 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: 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 10 tests for the first 1000 ft. of joint length for each kind of sealant and joint substrate.
 - 2) Perform one test for each 1000 ft. of joint length thereafter and one test per each floor per elevation and one test per week per installation crew.
 - 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 JOINT-SEALANT SCHEDULE

- A. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces. Joint Sealant Type 1:
 1. Joint Locations:
 - a. Construction joints in cast-in-place concrete.
 - b. Control and expansion joints in unit stone masonry.
 - c. Joints between different materials listed above.
 - d. Perimeter joints between materials listed above and frames of doors and windows.
 - e. Other joints as indicated on Drawings.
 2. Joint Sealant: Silicone, non-staining, S, NS, 100/50, NT .
 3. Joint-Sealant Color and Finish: As selected by Architect from manufacturer's full range of colors. Provide different colors for each material application. Joints in stone masonry require texture to match adjacent mortar finish.
- B. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces not subject to significant movement. Joint Sealant Type 2:

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1. Joint Locations:
 - a. Control joints on exposed interior surfaces of exterior walls.
 - b. Perimeter joints between interior wall surfaces and frames of interior doors and windows.
 - c. Joints in painted woodwork.
 - d. Other joints as indicated on Drawings.
2. Joint Sealant: Acrylic latex.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors. Provide different colors for each material application.

3.7 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.

END OF SECTION 079200

SECTION 081000 – HOLLOW METAL DOOR FRAMES

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes, but is not limited to:
 - 1. Exterior hollow-metal door and transom frames.
- B. Related Requirements:
 - 1. Section 081433 Exterior Wood Doors.
 - 2. Section 087100 Door Hardware.

1.2 DEFINITIONS

- A. Minimum Thickness: Minimum thickness of base metal without coatings in accordance with NAAMM-HMMA 803.

1.3 COORDINATION

- A. Coordinate anchorage installation for hollow-metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.
- B. Coordinate requirements for installation of door hardware, electrified door hardware, and access control and security systems.

1.4 ACTION SUBMITTALS

- A. Product Data:
 - 1. For each door type
- B. Product Data Submittals: For each product.
 - 1. Include construction details, material descriptions, core descriptions, and finishes.
- C. Shop Drawings: Indicate location, size, elevation of each type of door frame; construction details not covered in Product Data, including those for jamb, head, astragal, and transom frame, including the following:
 - 1. Door schedule indicating door frame location, type, size, fire protection rating, and swing. Use same reference numbers as on drawings.
 - 2. Door elevations, dimensions and location of hardware, lite locations, and glazing thickness.
 - 3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
 - 4. Locations of reinforcement and preparations for hardware.

5. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Dimensions and locations of mortises and holes for hardware.
10. Clearances and undercuts.
11. Doors to be factory primed painted.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Deliver hollow-metal door frames palletized, packaged, or crated to provide protection during transit and Project-site storage. Do not use non-vented plastic.
 1. Provide additional protection to prevent damage to factory-finished units.
- B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.
- C. Store hollow-metal door frames vertically under cover at Project site with head up. Place on minimum 4-inch-high wood blocking. Provide minimum 1/4-inch space between each stacked door to permit air circulation.
- D. Package door frames individually in opaque plastic bags or cardboard cartons.

1.6 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace door frames that fail in materials or workmanship within specified warranty period.
 1. Failures include, but are not limited to, the following:
 - a. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 2. Warranty must also include installation and finishing that may be required due to repair or replacement of defective door frames.
 3. Warranty must be in effect during specified period of time from date of Substantial Completion.
 4. Warranty Period for Exterior Doors: Five years.

PART 2 - PRODUCTS

2.1 EXTERIOR HOLLOW-METAL DOOR FRAMES

- A. Commercial Door Frames: NAAMM-HMMA 861; Physical Performance Level A.
 1. Frames:

- a. Materials: Metallic-coated steel sheet, minimum thickness of (14 gage.) 0.064 inch, except 0.067 inch for openings exceeding 4 feet wide; with minimum G60 or A60 coating.
 - b. Construction: Thermally broken Full profile welded.
2. Exposed Finish: Prime.

2.2 FRAME ANCHORS

A. Jamb Anchors:

1. Type: Anchors of minimum size and type required by applicable door frame standard, and suitable for performance level indicated.
2. Quantity: Minimum of three anchors per jamb, with one additional anchor for frames with no floor anchor. Provide one additional anchor for each 24 inches of frame height above 7 feet.
3. Post installed Expansion Anchor: Minimum 3/8-inch-diameter bolts with expansion shields or inserts, with manufacturer's standard pipe spacer.

B. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor.

C. Material: ASTM A879/A879M, Commercial Steel (CS), 04Z coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A1008/A1008M or ASTM A1011/A1011M; hot-dip galvanized in accordance with ASTM A153/A153M, Class B.

2.3 MATERIALS

- A. Cold-Rolled Steel Sheet: ASTM A1008/A1008M, Commercial Steel (CS), Type B; suitable for exposed applications.
- B. Hot-Rolled Steel Sheet: ASTM A1011/A1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.
- C. Metallic-Coated Steel Sheet: ASTM A653/A653M, Commercial Steel (CS), Type B.
- D. Inserts, Bolts, and Fasteners: Hot-dip galvanized in accordance with ASTM A153/A153M.
- E. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow-metal frames of type indicated.
- F. Glazing: Comply with requirements in Section 088000 "Glazing."

2.4 FABRICATION

- A. Door Astragals: Provide overlapping astragal on one leaf of pairs of doors. Extend minimum 3/4 inch beyond edge of door on which astragal is mounted.
- B. Hollow-Metal Frames: Fabricate in one piece except where handling and shipping limitations require multiple sections. Where frames are fabricated in sections, provide alignment plates or angles at each joint, fabricated of metal of same or greater thickness as frames.
 - 1. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
 - 2. Door Silencers: Except on weather-stripped frames, drill stops to receive door silencers as follows. Keep holes clear during construction.
 - a. Double-Door Frames: Drill stop in head jamb to receive two door silencers.
- C. Hardware Preparation: Factory prepare hollow-metal doors and frames to receive templated mortised hardware, and electrical wiring; include cutouts, reinforcement, mortising, drilling, and tapping in accordance with ANSI/SDI A250.6, the Door Hardware Schedule on Drawings, and templates.
 - 1. Reinforce door frames to receive nontemplated, mortised, and surface-mounted door hardware.
 - 2. Comply with BHMA A156.115 for preparing hollow-metal doors and frames for hardware.

2.5 STEEL FINISHES

- A. Prime Finish: Clean, pretreat, and apply manufacturer's standard primer.
 - 1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.
- B. Factory Finish: Clean, pretreat, and apply manufacturer's standard two-coat, baked-on finish consisting of prime coat and thermosetting topcoat, complying with ANSI/SDI A250.3.
 - 1. Color and Gloss: As selected by Architect from manufacturer's full range.

PART 3 - EXECUTION

3.1 PREPARATION

- A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces. Touch up factory-applied finishes where spreaders are removed.
- B. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.2 INSTALLATION

- A. Install hollow-metal door frames plumb, rigid, properly aligned, and securely fastened in place. Comply with approved Shop Drawings and with manufacturer's written instructions.
- B. Hollow-Metal Frames: Comply with NAAMM-HMMA 840.
 - 1. Set frames accurately in position; plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces without damage to completed Work.
 - a. Where frames are fabricated in sections, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces. Touch-up finishes.
 - b. Install frames with removable stops located on secure side of opening.
 - 2. Floor Anchors: Secure with postinstalled expansion anchors.
 - a. Floor anchors may be set with power-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.
 - 3. Solidly pack mineral-fiber insulation inside frames.
 - 4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout or mortar.
 - 5. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
 - 6. Installation Tolerances: Adjust hollow-metal frames to the following tolerances:
 - a. Squareness: Plus or minus 1/16 inch, measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
 - b. Alignment: Plus or minus 1/16 inch, measured at jambs on a horizontal line parallel to plane of wall.
 - c. Twist: Plus or minus 1/16 inch, measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
 - d. Plumbness: Plus or minus 1/16 inch, measured at jambs at floor.

3.3 FIELD QUALITY CONTROL

- A. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- B. Reinspect repaired or replaced installations to determine if replaced or repaired door assembly installations comply with specified requirements.

3.4 REPAIR

- A. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

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- B. Metallic-Coated Surface Touchup: Clean abraded areas and repair with galvanizing repair paint in accordance with manufacturer's written instructions.
- C. Factory-Finish Touchup: Clean abraded areas and repair with same material used for factory finish in accordance with manufacturer's written instructions.
- D. Touchup Painting: Cleaning and touchup painting of abraded areas of paint are specified in painting Sections.

END OF SECTION 081000

SECTION 081433 - EXTERIOR WOOD DOORS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes, but is not limited to:
 - 1. Exterior stile and rail wood doors.
- B. Related Requirements:
 - 1. Section 081000 "Hollow Metal Door Frames" for entrance frame construction.

1.2 ACTION SUBMITTALS

- A. Product Data:
 - 1. Exterior stile and rail wood entrance door with vision panels.
- B. Shop Drawings: Indicate location, size, and hand of each door; elevation of each type of door; construction details not covered in Product Data, including those for stiles, rails, panels, moldings, and other pertinent data, including the following:
 - 1. Door schedule indicating door and frame location, type, size, fire protection rating, and swing.
 - 2. Door elevations, dimensions and location of hardware, lite locations, and glazing thickness.
 - 3. Details of frame for each frame type, including dimensions and profile.
 - 4. Dimensions and locations of mortises and holes for hardware.
 - 5. Clearances and undercuts.
 - 6. Doors to be factory finished and application requirements.
 - 7. Show connection to and continuity with adjacent thermal, weather, air, and vapor barriers.
 - 8. Details of electrical raceway and preparation for electrified hardware, access control systems, and security systems. Include point-to-point wiring diagrams showing the following:
 - a. Power requirements for each electrically operated door hardware.
 - b. Location and types of switches, signal device, conduit sizes, and number and size of wires.
- C. Samples for Initial Selection: For factory-finished doors and factory-finished door frames.
 - 1. Sample of stile and rail wood construction.
 - 2. Sample for door finish. Up to six (6) samples in range of tones as directed by Architect.

D. Samples for Verification:

1. Factory finishes applied to actual door face materials, approximately 8 by 10 inches, for each material and finish. For each wood species and transparent finish, provide two Samples showing typical range of color and grain to be expected in finished Work.
2. Corner sections of doors, approximately 8 by 10 inches, with door faces and edges representing actual materials to be used.

1.3 INFORMATIONAL SUBMITTALS

- A. Qualification Data: For door inspector.
1. Egress Door Inspector: Submit documentation of compliance with NFPA 101, Section 7.2.1.15.4.
 2. Submit copy of DHI Fire and Egress Door Assembly Inspector (FDAI) certificate.
- B. Field quality control reports.
- C. Sample Warranty: For special warranty.

1.4 CLOSEOUT SUBMITTALS.

- A. Special warranties.

1.5 QUALITY ASSURANCE

- A. Egress Door Inspector Qualifications: Inspector for field quality control inspections of egress door assemblies must meet the qualifications set forth in NFPA 101, Section 7.2.1.15.4 and the following:
1. Door and Hardware Institute Fire and Egress Door Assembly Inspector (FDAI) certification.

1.6 DELIVERY, STORAGE, AND HANDLING

- A. Comply with requirements of referenced standard and manufacturer's written instructions.
- B. Package doors individually in opaque plastic bags or cardboard cartons.
- C. Mark each door on top and bottom rail with opening number used on Shop Drawings.

1.7 WARRANTY

- A. Special Warranty: Manufacturer agrees to repair or replace doors and frames that fail in materials or workmanship within specified warranty period.
1. Failures include, but are not limited to, the following:

- a. Delamination of veneer.
 - b. Warping (bow, cup, or twist) more than 1/4 inch in a 42-by-84-inch section.
 - c. Telegraphing of core construction in face veneers exceeding 0.01 inch in a 3-inch span.
2. Warranty must also include installation and finishing that may be required due to repair or replacement of defective doors and frames.
 3. Warranty must be in effect during specified period of time from date of Substantial Completion.
 4. Warranty Period for Exterior Doors: Five years.
 5. Insulating Glass Vision Panels: Five years.

PART 2 - PRODUCTS

2.1 SOURCE LIMITATIONS

- A. Obtain stile and rail wood doors from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

- A. Exterior Door Thermal Transmittance: Maximum whole fenestration product U-factor of 0.40 Btu/sq. ft. x h x deg F, in accordance with AAMA 1503, ASTM E1423, or NFRC 100.

2.3 EXTERIOR STILE AND RAIL WOOD DOORS

- A. Exterior Stile and Rail Wood Doors: Exterior custom doors complying with the AWI, AWMAC, and WI's Architectural Woodwork Standards, and with other requirements specified.
 1. Subject to compliance with requirements, available manufacturers whose products may be incorporated in the Work include, but are not limited to, the following:
 - a. Simpson Door Company
 - b. VT Industries
 2. Architectural Woodwork Standards Quality Grade: Premium.
 3. Wood Species and Cut for Painted Finish: White oak, quarter sawed/sliced stiles and rails, and quarter sawed/sliced panels.
 4. Door Construction for Painted Finish:
 - a. Stile and Rail Construction:
 - 1) Clear lumber; v-grooved, glued to both sides of a wood-based panel product. Select lumber for similarity of grain and color and arrange for optimum match between adjacent pieces.
 5. Door Thickness: 2-1/4"
 6. Stile and Rail Widths: As indicated on Drawings.

7. Glass: Uncoated, clear, insulating-glass units made from two lites of 3.0-mm-thick, fully tempered glass with 1/4-inch interspace.

2.4 STILE AND RAIL WOOD DOOR FABRICATION

- A. Factory fit doors to suit frame-opening sizes indicated, with the following uniform clearances and bevels unless otherwise indicated:
 1. Clearances:
 - a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
 - b. At threshold, provide not more than 3/8 inch from bottom of door to top of threshold.
 2. Bevel doors 1/8 inch in 2 inches at lock and hinge edges.
- B. Fabricate stile and rail wood doors in sizes indicated for field fitting.
- C. Factory machine doors for hardware that is not surface applied.
 1. Locate hardware to comply with DHI-WDHS-3.
 2. Comply with final hardware schedules, door frame Shop Drawings, BHMA-156.115-W, and hardware templates.
 3. For doors scheduled to receive electrified locksets, provide factory-installed raceway and wiring to accommodate specified hardware.
 4. Coordinate measurements of hardware mortises in metal frames to verify dimensions and alignment before factory machining.
- D. Glazed Openings:
 1. Trim openings indicated for glazing with solid-wood moldings, with one side removable. Miter wood moldings at corner joints.
 2. Factory install glazing in doors. Install glass using manufacturer's standard elastomeric glazing sealant complying with ASTM C920. Secure glass in place with removable wood moldings. Miter wood moldings at corner joints.
- E. Transom Panels:
 1. Fabricate matching panels with same construction, exposed surfaces, and finish as specified for associated doors.
 2. Finish bottom edges of transoms and top edges of rabbeted doors same as door stiles.
 3. Fabricate door and transom panels with full-width, solid-lumber, rabbeted, meeting rails.
 4. Provide factory-installed spring bolts for concealed attachment into jambs of metal door frames.
- F. Exterior Doors: Factory treat exterior doors with water-repellent preservative after fabrication has been completed but before shop priming and factory finishing.
 1. Flash top of out swinging doors with manufacturer's standard metal flashing.

2.5 FACTORY FINISHING

- A. Comply with referenced quality standard for factory finishing.
 - 1. Complete fabrication, including fitting doors for openings and machining for hardware that is not surface applied, before finishing.
 - 2. Finish faces, all four edges, edges of cutouts, and mortises.
 - 3. Stains and fillers may be omitted on top and bottom edges, edges of cutouts, and mortises.
- B. Factory finish doors.
- C. Painted Finish:
 - 1. Architectural Woodwork Standards Grade: Premium.
 - 2. Sheen: Semigloss.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine doors and installed door frames, with Installer present, before hanging doors.
 - 1. Verify that installed frames comply with indicated requirements for type, size, location, and swing characteristics and have been installed with level heads and plumb jambs.
 - 2. Reject doors with defects.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

- A. Hardware: For installation, see Section 087100 "Door Hardware."
- B. Verify existing conditions and substrates are prepared to receive doors and frames. Ensure air barrier and door flashings are installed. Do not proceed until conditions are corrected.
- C. Install doors and frames to comply with manufacturer's written instructions and referenced quality standard, and as indicated.
- D. Job-Fitted Doors:
 - 1. Align and fit doors in frames with uniform clearances and bevels as indicated below.
 - a. Do not trim stiles and rails in excess of limits set by manufacturer or permitted for fire-rated doors.
 - 2. Machine doors for hardware.

3. Seal edges of doors, edges of cutouts, and mortises after fitting and machining.
 4. Clearances:
 - a. Provide 1/8 inch at heads, jambs, and between pairs of doors.
 - b. Provide 3/8 inch from bottom of door to top of decorative floor finish or covering unless threshold is specified or otherwise indicated on Drawings.
 - c. Where threshold is shown on Drawings or scheduled, provide 1/4 inch from bottom of door to top of threshold unless otherwise indicated.
 - d. Comply with NFPA 80 for fire-rated doors.
 5. Bevel non-fire-rated doors 1/8 inch in 2 inches at lock and hinge edges.
 6. Bevel fire-rated doors 1/8 inch in 2 inches on lock edge; trim stiles and rails only to extent permitted by labeling agency.
- E. Factory-Fitted Doors: Align in frames for uniform clearance at each edge.
- F. Factory- Finished Doors: Restore finish before installation if fitting or machining is required at Project site.

3.3 FIELD QUALITY CONTROL

- A. Inspection Agency: Engage a qualified inspector to perform inspections and to furnish reports to Architect.
- B. Inspections:
1. Egress Door Inspections: Inspect each door equipped with panic hardware, each door equipped with fire exit hardware, each door located in an exit enclosure, each electrically controlled egress door, and each door equipped with special locking arrangements in accordance with NFPA 101, Section 7.2.1.15.
- C. Repair or remove and replace installations where inspections indicate that they do not comply with specified requirements.
- D. Reinspect repaired or replaced installations to determine if replaced or repaired door installations comply with specified requirements.

3.4 ADJUSTING

- A. Operation: Rehang or replace doors that do not swing or operate freely.
- B. Finished Doors: Replace doors that are damaged or do not comply with requirements. Doors may be repaired or refinished if Work complies with requirements and shows no evidence of repair or refinishing.

END OF SECTION 081433

SECTION 087100 - DOOR HARDWARE

1.1 SUMMARY

- A. This Section includes commercial door hardware for the following:
 - 1. Swinging doors.
- B. Door hardware includes, but is not necessarily limited to, the following:
 - 1. Mechanical door hardware.
 - 2. Electromechanical door hardware.
- C. Related Sections:
 - 1. Division 08 Section "Hollow Metal Door Frames".
 - 2. Division 08 Section "Exterior Wood Doors".
 - 3. Division 08 Section "Automatic Door Operators".
- D. Codes and References: Comply with the version year adopted by the Authority Having Jurisdiction.
 - 1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
 - 2. ICC/IBC - International Building Code.
 - 3. NFPA 70 - National Electrical Code.
 - 4. NFPA 80 - Fire Doors and Windows.
 - 5. NFPA 101 - Life Safety Code.
 - 6. NFPA 105 - Installation of Smoke Door Assemblies.
 - 7. UL/ULC and CSA C22.2 - Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
 - 8. State Building Codes, Local Amendments.
- E. Standards: All hardware specified herein shall comply with the following industry standards as applicable. Any undated reference to a standard shall be interpreted as referring to the latest edition of that standard:
 - 1. ANSI/BHMA Certified Product Standards - A156 Series.

1.2 SUBMITTALS

- A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.
- B. Door Hardware Schedule: Prepared by or under the supervision of supplier, detailing fabrication and assembly of door hardware, as well as procedures and diagrams. Coordinate the final Door

Hardware Schedule with doors, frames, and related work to ensure proper size, thickness, hand, function, and finish of door hardware.

1. Format: Comply with scheduling sequence and vertical format in DHI's "Sequence and Format for the Hardware Schedule."
 2. Organization: Organize the Door Hardware Schedule into door hardware sets indicating complete designations of every item required for each door or opening. Organize door hardware sets in same order as in the Door Hardware Sets at the end of Part 3. Submittals that do not follow the same format and order as the Door Hardware Sets will be rejected and subject to resubmission.
 3. Content: Include the following information:
 - a. Type, style, function, size, label, hand, and finish of each door hardware item.
 - b. Manufacturer of each item.
 - c. Fastenings and other pertinent information.
 - d. Location of door hardware set, cross-referenced to Drawings, both on floor plans and in door and frame schedule.
 - e. Explanation of abbreviations, symbols, and codes contained in schedule.
 - f. Mounting locations for door hardware.
 - g. Door and frame sizes and materials.
 - h. Warranty information for each product.
 4. Submittal Sequence: Submit the final Door Hardware Schedule at earliest possible date, particularly where approval of the Door Hardware Schedule must precede fabrication of other work that is critical in the Project construction schedule. Include Product Data, Samples, Shop Drawings of other work affected by door hardware, and other information essential to the coordinated review of the Door Hardware Schedule.
- C. Shop Drawings: Details of electrified access control hardware indicating the following:
1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication, and control of the access control system electrified hardware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:
 - a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
 - b. Complete (risers, point-to-point) access control system block wiring diagrams.
 - c. Wiring instructions for each electronic component scheduled herein.
 2. Electrical Coordination: Coordinate with related sections the voltages and wiring details required at electrically controlled and operated hardware openings.
- D. Keying Schedule: After a keying meeting with the owner has taken place prepare a separate keying schedule detailing final instructions. Submit the keying schedule in electronic format. Include keying system explanation, door numbers, key set symbols, hardware set numbers and

special instructions. Owner must approve submitted keying schedule prior to the ordering of permanent cylinders/cores.

E. Informational Submittals:

1. Product Test Reports: Indicating compliance with cycle testing requirements, based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified independent testing agency.

F. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete door hardware installation in quantity as required in Division 01, Closeout Procedures.

1.3 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum 5 years of documented experience in producing hardware and equipment similar to that indicated for this Project and that have a proven record of successful in-service performance.

B. Certified Products: Where specified, products must maintain a current listing in the Builders Hardware Manufacturers Association (BHMA) Certified Products Directory (CPD).

C. Installer Qualifications: A minimum 3 years documented experience installing both standard and electrified door hardware similar in material, design, and extent to that indicated for this Project and whose work has resulted in construction with a record of successful in-service performance.

D. Door Hardware Supplier Qualifications: Experienced commercial door hardware distributors with a minimum five (5) years documented experience supplying both mechanical and electromechanical hardware installations comparable in material, design, and extent to that indicated for this Project. Supplier recognized as a factory direct distributor by the manufacturers of the primary materials with a warehousing facility in Project's vicinity. Supplier to have on staff a certified Architectural Hardware Consultant (AHC) available during the course of the Work to consult with Contractor, Architect, and Owner concerning both standard and electromechanical door hardware and keying.

E. Source Limitations: Obtain each type and variety of door hardware specified in this section from a single source unless otherwise indicated.

1. Provide electromechanical door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Each unit to bear third party permanent label demonstrating compliance with the referenced standards.

G. Keying Conference: Conduct conference to comply with requirements in Division 01 Section "Project Meetings." Keying conference to incorporate the following criteria into the final keying schedule document:

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1. Function of building, purpose of each area and degree of security required.
 2. Plans for existing and future key system expansion.
 3. Requirements for key control storage and software.
 4. Installation of permanent keys, cylinder cores and software.
 5. Address and requirements for delivery of keys.
- H. Pre-Submittal Conference: Conduct coordination conference with attendance by representatives of Supplier(s), Installer(s), and Contractor to review proper methods and the procedures for receiving, handling, and installing door hardware.
1. Prior to installation of door hardware, conduct a project specific training meeting to instruct the installing contractors' personnel on the proper installation and adjustment of their respective products. Product training to be attended by installers of door hardware (including electromechanical hardware) for wood doors. Training will include the use of installation manuals, hardware schedules, templates and physical product samples as required.
 2. Inspect and discuss electrical roughing-in, power supply connections, and other preparatory work performed by other trades.
 3. Review sequence of operation narratives for each unique access controlled opening.
 4. Review and finalize construction schedule and verify availability of materials.
 5. Review the required inspecting, testing, commissioning, and demonstration procedures
- I. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedule.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Inventory door hardware on receipt and provide secure lock-up and shelving for door hardware delivered to Project site. Do not store electronic access control hardware, software or accessories at Project site without prior authorization.
- B. Tag each item or package separately with identification related to the final Door Hardware Schedule, and include basic installation instructions with each item or package.
- C. Deliver, as applicable, permanent keys, cylinders, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner shall be established at the "Keying Conference".

1.5 COORDINATION

- A. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing standard and electrified hardware. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing hardware to comply with indicated requirements.
- B. Door Hardware and Electrical Connections: Coordinate the layout and installation of scheduled electrified door hardware and related access control equipment with required connections to

source power junction boxes, low voltage power supplies, detection and monitoring hardware, and fire and detection alarm systems.

- C. Door and Frame Preparation: Doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of standard and electrified door hardware that fails in materials or workmanship within specified warranty period after final acceptance by the Owner. Failures include, but are not limited to, the following:
 - 1. Structural failures including excessive deflection, cracking, or breakage.
 - 2. Faulty operation of the hardware.
 - 3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
 - 4. Electrical component defects and failures within the systems operation.
- C. Warranty Period: One year from date of Substantial Completion unless otherwise indicated below:
 - a. Mortise Locksets: Ten (10) years from date of Substantial Completion.
 - b. Exit Devices: Five (5) years from date of Substantial Completion.
 - c. Manual Closers: Ten (10) years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Continuing Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous six (6) months full maintenance including repair and replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

PART 2 - PRODUCTS

2.1 SCHEDULED DOOR HARDWARE

- A. General: Provide door hardware for each door to comply with requirements in Door Hardware Sets and each referenced section that products are to be supplied under.
- B. Designations: Requirements for quantity, item, size, finish or color, grade, function, and other distinctive qualities of each type of door hardware are indicated in the Door Hardware Sets at the end of Part 3. Products are identified by using door hardware designations, as follows:
 - 1. Named Manufacturer's Products: Product designation and manufacturer are listed for each door hardware type required for the purpose of establishing requirements. Manufacturers' names are abbreviated in the Door Hardware Schedule.
- C. Substitutions: Requests for substitution and product approval for inclusive mechanical and electromechanical door hardware in compliance with the specifications must be submitted in writing and in accordance with the procedures and time frames outlined in Division 01, Substitution Procedures. Approval of requests is at the discretion of the architect, owner, and their designated consultants.

2.2 HANGING DEVICES

- A. Continuous Geared Hinges: ANSI/BHMA A156.26 Grade 1-600 continuous geared hinge. with minimum 0.120-inch thick extruded 6063-T6 aluminum alloy hinge leaves and a minimum overall width of 4 inches. Hinges are non-handed, reversible and fabricated to template screw locations. Factory trim hinges to suit door height and prepare for electrical cut-outs.
 - 1. Manufacturers:
 - a. Bommer Industries (BO).
 - b. Hager Companies (HA).
 - c. Pemko (PE).

2.3 POWER TRANSFER DEVICES

- A. Concealed Quick Connect Electric Power Transfers: Provide concealed wiring pathway housing mortised into the door and frame for low voltage electrified door hardware. Furnish with Molex™ standardized plug connectors and sufficient number of concealed wires (up to 12) to accommodate the electrified functions specified in the Door Hardware Sets. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Wire nut connections are not acceptable.
 - 1. Manufacturers:
 - a. Securitron (SU) - EL-CEPT Series.

- B. Electric Door Wire Harnesses: Provide electric/data transfer wiring harnesses with standardized plug connectors to accommodate up to twelve (12) wires. Connectors plug directly to through-door wiring harnesses for connection to electric locking devices and power supplies. Provide sufficient number and type of concealed wires to accommodate electric function of specified hardware. Provide a connector for through-door electronic locking devices and from hinge to junction box above the opening. Wire nut connections are not acceptable. Determine the length required for each electrified hardware component for the door type, size and construction, minimum of two per electrified opening.
1. Provide one each of the following tools as part of the base bid contract:
 - a. McKinney (MK) - Electrical Connecting Kit: QC-R001.
 - b. McKinney (MK) - Connector Hand Tool: QC-R003.
 2. Manufacturers:
 - a. McKinney (MK) - QC-C Series.

2.4 CYLINDERS AND KEYING

- A. General: Cylinder manufacturer to have minimum (10) years' experience designing secured master key systems and have on record a published security keying system policy.
- B. Cylinder Types: Original manufacturer cylinders able to supply the following cylinder formats and types:
1. Threaded mortise cylinders with rings and cams to suit hardware application.
 2. Rim cylinders with back plate, flat-type vertical or horizontal tailpiece, and raised trim ring.
 3. Bored or cylindrical lock cylinders with tailpieces as required to suit locks.
 4. Tubular deadlocks and other auxiliary locks.
 5. Mortise and rim cylinder collars to be solid and recessed to allow the cylinder face to be flush and be free spinning with matching finishes.
 6. Keyway: Match Building.
- C. Keying System: Each type of lock and cylinders to be factory keyed.
1. Supplier shall conduct a "Keying Conference" to define and document keying system instructions and requirements.
 2. Furnish factory cut, nickel-silver large bow permanently inscribed with a visual key control number as directed by Owner.
 3. Existing System: Field verify and key cylinders to match Owner's existing system.
- D. Key Quantity: Provide the following minimum number of keys:
1. Change Keys per Cylinder: Three (3).
 2. Construction Keys (where required): Ten (10).
 3. Construction Control Keys (where required): Two (2).

- E. Construction Keying: Provide temporary keyed construction cores / keyed construction cylinders to suit ETR building system..
- F. Key Registration List (Bitting List):
 - 1. Provide keying transcript list to Owner's representative in the proper format for importing into key control software.
 - 2. Provide transcript list in writing or electronic file as directed by the Owner.

2.5 LOCK AND LATCH STRIKES

- A. Strikes: Provide manufacturer's standard strike with strike box for each latch or lock bolt, with curved lip extended to protect frame, finished to match door hardware set, unless otherwise indicated, and as follows:
 - 1. Flat-Lip Strikes: For locks with three-piece antifriction latchbolts, as recommended by manufacturer.
 - 2. Extra-Long-Lip Strikes: For locks used on frames with applied wood casing trim.
 - 3. Aluminum-Frame Strike Box: Provide manufacturer's special strike box fabricated for aluminum framing.
 - 4. Double-lipped strikes: For locks at double acting doors. Furnish with retractable stop for rescue hardware applications.
- B. Standards: Comply with the following:
 - 1. Strikes for Mortise Locks and Latches: BHMA A156.13.
 - 2. Strikes for Bored Locks and Latches: BHMA A156.2.
 - 3. Strikes for Auxiliary Deadlocks: BHMA A156.36.
 - 4. Dustproof Strikes: BHMA A156.16.

2.6 CONVENTIONAL EXIT DEVICES

- A. General Requirements: All exit devices specified herein shall meet or exceed the following criteria:
 - 1. At doors not requiring a fire rating, provide devices complying with NFPA 101 and listed and labeled for "Panic Hardware" according to UL305. Provide proper fasteners as required by manufacturer including sex nuts and bolts at openings specified in the Hardware Sets.
 - 2. Except on fire rated doors, provide exit devices with hex key dogging device to hold the pushbar and latch in a retracted position. Provide optional keyed cylinder dogging on devices where specified in Hardware Sets.
 - 3. Devices must fit flat against the door face with no gap that permits unauthorized dogging of the push bar. The addition of filler strips is required in any case where the door light extends behind the device as in a full glass configuration.

4. Flush End Caps: Provide flush end caps made of architectural metal in the same finish as the devices as in the Hardware Sets. Plastic end caps will not be acceptable.
 5. Rail Sizing: Provide exit device rails factory sized for proper door width application.
 6. Dummy Push Bar: Nonfunctioning push bar matching functional push bar.
 7. Through Bolt Installation: For exit devices and trim as indicated in Door Hardware Sets.
- B. Extruded Aluminum Removable Mullions: ANSI/BHMA A156.3 anodized, removable mullions with malleable-iron top and bottom retainers. Mullions to be provided standard with stabilizers and imbedded weatherstrip.
1. Manufacturers:
 - a. Same as exit device manufacturer.

2.7 ELECTROMECHANICAL EXIT DEVICES

- A. Electromechanical Push Rail Exit Devices (Heavy Duty): ANSI/BHMA A156.3, Grade 1 Certified Products Directory (CPD) listed panic and fire exit hardware devices subject to same compliance standards and requirements as mechanical exit devices. Electrified exit devices to be of type and design as specified below and in the hardware sets.
1. Where conventional power supplies are not sufficient, include any specific controllers required to provide the proper inrush current.
 2. Motorized Electric Latch Retraction: Devices with an electric latch retraction feature must use motors which have a maximum current draw of 600mA. Solenoid driven latch retraction is not acceptable.
 3. Manufacturers:
 - a. dormakaba Precision (PR) - Apex 2000 Series.
 - b. Sargent Manufacturing (SA) - 80 Series.
 - c. Von Duprin (VD) - 35A/98 XP Series.

2.8 INTEGRATED WIRED OUTPUT EXIT DEVICES - MULTI-CLASS READER

- A. Integrated Wired Output Multi-Class Exit Hardware: Wiegand output ANSI 156.3 Grade 1 rim, mortise, and vertical rod exit device hardware with integrated card reader with or without keypad option, latchbolt and touchbar monitoring, and request-to-exit signaling, in one complete unit. Hard wired, solenoid driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

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1. Open architecture, hard wired platform supports centralized control of locking units with new or existing Wiegand or OSDP compatible access control systems. Inside push bar (request-to-exit) signaling and door position (open/closed status) monitoring (via separately connected DPS).
2. Integrated reader supports the following credentials:
 - a. 125kHz proximity credentials: HID, AWID, Indala, and EM4102.
 - b. 13.56 MHz proximity credentials: HID Secure Identity Object™ (SIO) on iCLASS Seos, HID iCLASS, HID iCLASS SE/SR, MIFARE Classic, DESFire EV1 and EV2.
 - c. 2.4 GHz credentials: Secure Identity Object™ (SIO) on Mobile IDs (Bluetooth Smart)
 - d. ISO14443A/B (PIV-compatible Transparent FASC-N read) available with pivCLASS variant
 - e. NFC-enabled mobile phones
 - f. PIN code only or PIN + credential with keypad option
3. 12VDC external power supply required for reader. 24VDC required for solenoid operated exit trim. Fail safe or fail secure options.
4. Installation requires only one cable run from the exit hardware to the access control panel without requirements for additional proprietary lock panel interface boards or modules.
5. Competitor Alternates Allowed Option: Installation to include manufacturer's access control panel interface board or module where required for Wiegand or OSDP output protocol.
6. Manufacturers:
 - a. Sargent Manufacturing (SA) – 80 Series.

2.9 DOOR CLOSERS

A. All door closers specified herein shall meet or exceed the following criteria:

1. General: Door closers to be from one manufacturer, matching in design and style, with the same type door preparations and templates regardless of application or spring size. Closers to be non-handed with full sized covers.
2. Standards: Closers to comply with UL-10C for Positive Pressure Fire Test and be U.L. listed for use of fire rated doors.
3. Size of Units: Comply with manufacturer's written recommendations for sizing of door closers depending on size of door, exposure to weather, and anticipated frequency of use. Where closers are indicated for doors required to be accessible to the Americans with Disabilities Act, provide units complying with ANSI ICC/A117.1.
4. Closer Arms: Provide heavy duty, forged steel closer arms unless otherwise indicated in Hardware Sets.

5. Closers shall not be installed on exterior or corridor side of doors; where possible install closers on door for optimum aesthetics.
 6. Closer Accessories: Provide door closer accessories including custom templates, special mounting brackets, spacers and drop plates as required for proper installation. Provide through-bolt and security type fasteners as specified in the hardware sets.
- B. Door Closers, Surface Mounted (Heavy Duty): ANSI/BHMA A156.4, Grade 1 Certified Products Directory (CPD) listed surface mounted, heavy duty door closers with complete spring power adjustment, sizes 1 thru 6; and fully operational adjustable according to door size, frequency of use, and opening force. Closers to be rack and pinion type, one piece cast iron or aluminum alloy body construction, with adjustable backcheck and separate non-critical valves for closing sweep and latch speed control. Provide non-handed units standard.
1. Heavy duty surface mounted door closers shall have a 25-year warranty.
 2. Manufacturers:
 - a. LCN Closers (LC) - 4040 Series.
 - b. Sargent Manufacturing (SA) - 351 Series.

2.10 DOOR PROTECTIVE TRIM

- A. General: Door protective trim units to be of type and design as specified below or in the Hardware Sets.
- B. Fabricate protection plates (kick, armor, or mop) not more than 2" less than door width (LDW) on stop side of single doors and 1" LDW on stop side of pairs of doors, and not more than 1" less than door width on pull side.
- C. Coordinate and provide proper width and height as required where conflicting hardware dictates.
- D. Metal Protection Plates: ANSI/BHMA A156.6 certified metal protection plates (kick, armor, push or mop), beveled on four edges (B4E), fabricated from the following:
1. Stainless Steel: 300 series, 050-inch thick Fasteners: Provide manufacturer's designated fastener type as specified in the Hardware Sets.
- E. Acceptable Manufacturers:
1. Burns Manufacturing (BU).
 2. Rockwood Manufacturing (RO).
 3. Trimco (TC).

2.11 DOOR STOPS AND HOLDERS

- A. General: Door stops and holders to be of type and design as specified below or in the Hardware Sets.

- B. Overhead Door Stops and Holders: ANSI/BHMA A156.8, Grade 1 Certified Products Directory (CPD) listed overhead stops and holders to be surface or concealed types as indicated in Hardware Sets. Track, slide, arm and jamb bracket to be constructed of extruded bronze and shock absorber spring of heavy tempered steel. Provide non-handed design with mounting brackets as required for proper operation and function.
 - 1. Manufacturers:
 - a. Norton Rixson (RF).
 - b. Sargent Manufacturing (SA).
 - c. Glynn-Johnson (GJ)

2.12 ARCHITECTURAL SEALS

- A. General: Thresholds, weatherstripping, and gasket seals to be of type and design as specified below or in the Hardware Sets. Provide continuous weatherstrip gasketing on exterior doors and provide smoke, light, or sound gasketing on interior doors where indicated. At exterior applications provide non-corrosive fasteners and elsewhere where indicated.
- B. Smoke Labeled Gasketing: Assemblies complying with NFPA 105 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for smoke control ratings indicated, based on testing according to UL 1784.
 - 1. Provide smoke labeled perimeter gasketing at all smoke labeled openings.
- C. Fire Labeled Gasketing: Assemblies complying with NFPA 80 that are listed and labeled by a testing and inspecting agency acceptable to authorities having jurisdiction, for fire ratings indicated, based on testing according to UL-10C.
 - 1. Provide intumescent seals as indicated to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies, and NPFA 252, Standard Methods of Fire Tests of Door Assemblies.
- D. Sound-Rated Gasketing: Assemblies that are listed and labeled by a testing and inspecting agency, for sound ratings indicated.
- E. Replaceable Seal Strips: Provide only those units where resilient or flexible seal strips are easily replaceable and readily available from stocks maintained by manufacturer.
- F. Manufacturers:
 - 1. National Guard Products (NG).
 - 2. Pemko (PE).
 - 3. Reese Enterprises, Inc. (RE).

2.13 ELECTRONIC ACCESSORIES

- A. Door Position Switches: Door position magnetic reed contact switches specifically designed for use in commercial door applications. On recessed models the contact and magnetic housing snap-lock into a 1" diameter hole. Surface mounted models include wide gap distance design complete with armored flex cabling. Provide SPDT, N/O switches with optional Rare Earth Magnet installation on steel doors with flush top channels.
 - 1. Manufacturers:
 - a. Securitron (SU) - DPS Series.
 - b. Sentrol (SO) – 1078 x Color
- B. Wiegand Test Unit: Test unit verifies proper Wiegand output integrated card reader lock installation in the field by testing for proper wiring, card reader data integrity, and lock functionality including lock/unlock, door position, and request-to-exit status. 12 or 24VDC voltage adjustable operating as Fail Safe or Fail Secure.
 - 1. Manufacturers:
 - a. Sargent Manufacturing (SA) - WT2 Wiegand Test Unit.

2.14 LOCK BOXES

- A. The University Fire Marshal's Office administers the university's Knox Box program (exterior lock boxes for emergency rapid entry) and will facilitate obtaining the appropriate Knox Box Application.
 - 1. This projects intends to reuse the existing box unless a change type is required by the Marshall.
- B. To comply with local ordinance requirements, Cornell University requires the provision of exterior lock boxes for emergency rapid entry. All new and existing buildings that have fire alarm and/or fire detection systems, which interconnect with the fire department, are to be covered by this standard. Alarm system interconnects include, but are not limited to, municipal fire alarm, radio, telephone leased line, telephone dialer, or central station systems.
- C. Lock box for the storage of building keys shall be as follows:
 - 1. Manufacturer: The Knox Company, 846 Production Place, Newport Beach, CA.92663 (City of Ithaca Requirement)
- D. Model and location of lock box shall be prescribed and established by University Fire Marshal's Office in collaboration with the fire department having jurisdiction. Lock boxes shall be installed and affixed to the structure in accordance with the manufacturer's detailed instructions.
 - 1. This project intends to reinstall the existing box in the same location unless a change to location is required by the Fire Marshall.

2.15 FABRICATION

- A. Fasteners: Provide door hardware manufactured to comply with published templates generally prepared for machine, wood, and sheet metal screws. Provide screws according to manufacturers recognized installation standards for application intended.

2.16 FINISHES

- A. Standard: Designations used in the Hardware Sets and elsewhere indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

- A. Hollow Metal Doors and Frames: Comply with ANSI/DHI A115 series.
- B. Wood Doors: Comply with ANSI/DHI A115-W series.

3.3 INSTALLATION

- A. Install each item of mechanical and electromechanical hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.
 - 1. Installers are to be trained and certified by the manufacturer on the proper installation and adjustment of fire, life safety, and security products including: hanging devices; locking devices; closing devices; and seals.

- B. Mounting Heights: Mount door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:
 - 1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
 - 2. DHI TDH-007-20: Installation Guide for Doors and Hardware.
 - 3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."
 - 4. Provide blocking in drywall partitions where wall stops or other wall mounted hardware is located.
- C. Retrofitting: Install door hardware to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.
- D. Thresholds: Set thresholds for exterior and acoustical doors in full bed of sealant complying with requirements specified in Division 7 Section "Joint Sealants."
- E. Storage: Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.4 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.

3.5 ADJUSTING

- A. Initial Adjustment: Adjust and check each operating item of door hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate as intended. Adjust door control devices to compensate for final operation of heating and ventilating equipment and to comply with referenced accessibility requirements.
 - 1. Door Closers: Adjust sweep period to comply with accessibility requirements and requirements of authorities having jurisdiction.

3.6 CLEANING AND PROTECTION

- A. Protect all hardware stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.
- B. Clean adjacent surfaces soiled by door hardware installation.
- C. Clean operating items as necessary to restore proper finish. Provide final protection and maintain conditions that ensure door hardware is without damage or deterioration at time of owner occupancy.

3.7 DEMONSTRATION

- A. Instruct Owner's maintenance personnel to adjust, operate, and maintain mechanical and electromechanical door hardware.

3.8 MAINTENANCE SERVICE

- A. Maintenance Tools and Instructions: All special tools and instructions packed with hardware items shall be saved and turned over to the Owner upon completion of work for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.
- B. Maintenance Service: Beginning at Substantial Completion, maintenance service shall include six months' full maintenance by skilled employees of door hardware Installer. Include quarterly preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door and door hardware operation. Parts and supplies shall be manufacturer's authorized replacement parts and supplies.
- C. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate and maintain automatic door operators.

3.9 DOOR HARDWARE SETS

- A. The hardware sets represent the design intent and direction of the owner and architect. They are a guideline only and should not be considered a detailed hardware schedule. Discrepancies, conflicting hardware and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.
 - 1. Quantities listed are for each pair of doors, or for each single door.
 - 2. The supplier is responsible for handing and sizing all products.
 - 3. Where multiple options for a piece of hardware are given in a single line item, the supplier shall provide the appropriate application for the opening.

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4. At existing openings with new hardware the supplier shall field inspect existing conditions prior to the submittal stage to verify the specified hardware will work as required. Provide alternate solutions and proposals as needed.

B. Manufacturer's Abbreviations:

1. MK - McKinney
2. PE - Pemko
3. RO - Rockwood
4. SA - SARGENT
5. OT - Other
6. NO - Norton
7. SU - Securitron

Hardware Sets

Set: 1.0

Doors: Double Wood Doors at Tunnel

2 Continuous Hinge	KDFMxx-HD1 PT Cut to "	PE	087100	
1 Key Removeable Mullion	L980S	SA	087100	
1 MELR Rim Exit	16 53 55 56 8804 less pull	US10BE	SA	281500 ⚡
1 Exit Device	16 55 8810 less pull	US10BE	SA	087100 ⚡
4 Core	Final Core to suit building ETR system	SA	087100	
2 Pulls	Reinstall Existing		087100	
1 Cylinder	Mortise Cylinder for Keyed Mullion to suit ETR Building system	SA	087100	
1 Automatic Opener	Provided by 087113		087113	⚡
2 Concealed Overhead Stop	31- 698S	US10BE		
1 Surface Closer	31- 351 P / 351 O	US10BE	SA	087100
1 Threshold	252x3DFG	PE	087100	
1 Gasketing	2891DS	PE	087100	
2 Door Bottom / Shoe	211DPK	PE	087100	
2 Astragal	305DN	PE		
2 Armor Plates (push side)	K1125 B4E per elevation	US10BE	RO	
2 Kick Plates (pull side)	K1125 B4E per elevation	US10BE	RO	
2 Push Plates (push side)	70- per elevation	US10BE	RO	

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2 ElectroLynx Frame 2 Harness	QC-C006P length as required, jamb to J-box		
2 ElectroLynx Door Harness	QC-Cxxx Length as req'd	MK 087100	⚡
1 Card Reader	Reinstall Existing	OT	
1 Actuator (Exterior)	Provided by 087113	NO 087113	⚡
2 Position Switch	DPS-x-BK	SU 087100	⚡
1 Actuator (Interior)	Interior Existing to Remain	087100	⚡
1 Power Supply	AQD4 w/ Battery Back Up	SU 087100	⚡
2 Electric Power Transfer	EL-CEPT	613E	SU 087100 ⚡
1 Wiring Diagram	Wiring Diagram	OT	

Operation:

Doors are normally closed and secured.

Valid card at reader retracts latch for momentary access, then enables outside actuator.

Inside actuator retracts latch, then auto opens door. Monitoring by door position switches.

During a loss of power, the door will default to secure.

Free egress at all times.

Lock status will not change when the fire detection/suppression systems are activated.

Depressing push rail will activate request to exit switch for appropriate monitor by EAC systems.

Outside key override.

END OF SECTION 087100

SECTION 087113 - AUTOMATIC DOOR OPERATORS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Low energy automatic door operators for swinging doors.

B. Related Sections:

1. Division 08 Section "Hollow Metal Door Frames".
2. Division 08 Section "Exterior Wood Doors".
3. Division 08 Section "Door Hardware".

A. Codes and Standards: Comply with the version year adopted by the Authority Having Jurisdiction.

1. ANSI A117.1 - Accessible and Usable Buildings and Facilities.
2. ANSI/BHMA A156.4 - Door Controls, Door Closers.
3. ANSI/BHMA A156.19 - Power Assist and Low-Energy Power Operated Doors.
4. ICC/IBC - International Building Code.
5. NFPA 70 - National Electrical Code.
6. NFPA 80 - Fire Doors and Windows.
7. NFPA 101 - Life Safety Code.
8. NFPA 105 - Installation of Smoke Door Assemblies.
9. UL/ULC and CSA C22.2 – Standards for Automatic Door Operators Used on Fire and Smoke Barrier Doors and Systems of Doors.
10. UL 325 - Door, Drapery, Gate, Louver, and Window Operators and Systems.
11. State Building Codes, Local Amendments.

1.2 PERFORMANCE REQUIREMENTS

A. Automatic door operators to be used on interior or exterior doors; up to 200 pounds (91 kg) weight and maximum door width of 48" (1219 mm).

1. Auto door operator capable of operating within temperature ranges of -22°F (-30°C) and 122°F (50°C).

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, and finishes for automatic door

operators, including activation devices. Include operating characteristics, electrical characteristics, and furnished accessories.

- B. Shop Drawings: Include details and attachments to other work.
 - 1. Include locations and elevations of each unique entrance showing activation devices.
 - 2. Indicate required clearances, components, and location and size of field connections.
 - 3. Wiring Diagrams: For power, signal, and activation wiring.
- C. Qualification Data: Provide copy of manufacturer's official certification or accreditation document indicating proof of status as a qualified and authorized installer of automatic door operators and accessories.
- D. Operating and Maintenance Manuals: Provide manufacturer's operating and maintenance manual for each item comprising the automatic door operator installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and contact information of the manufacturer and Installer providing the operators and installation. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.
- E. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation and maintenance of units required for this Project.
- B. Source Limitations: Obtain automatic door operators, including activation devices, from single source, qualified supplier unless otherwise indicated.
- C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a testing agency, and marked for intended location and application.
- D. Exit Door Requirements: Comply with requirements of authorities having jurisdiction for doors with automatic door operators serving as a component of a required means of egress.
- E. Pre-Submittal Conference: Conduct coordination conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier, Installer, and Contractor to review proper methods and the procedures for receiving, handling, and installing automatic door operators.
 - 1. Prior to installation of automatic door operators, arrange for certified Installer's representative to conduct a project specific meeting to review the installation and maintenance of their respective products. Project meeting to be attended by representatives of related trades furnishing and installing the aluminum, hollow metal and wood doors sections.
 - 2. Review and finalize construction schedule and verify availability of materials.

1.5 COORDINATION

- A. Electrical Systems Coordination: Coordinate the layout and installation of scheduled automatic door operators and related activation devices, with required connections to source power junction boxes, remote power supplies, access control equipment, detection and monitoring hardware, and fire alarm system.
- B. Templates: Obtain and distribute to the parties involved, templates for doors, frames, operators, and other work specified to be factory prepared and reinforced for installing automatic door operators. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing automatic door operators to comply with indicated requirements.
- C. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified automatic door operators without additional in-field modifications.

1.6 WARRANTY

- A. General Warranty: Special warranties specified in this Article shall not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.
- B. Special Warranty: Written warranty, executed by manufacturer, agreeing to repair or replace components of automatic door operators that fail in materials or workmanship within specified warranty period after final acceptance by Owner. Failures include, but are not limited to, the following:
 - 1. Faulty or sporadic operation of automatic door operator, including activation and safety devices.
 - 2. Deterioration of metals, metal finishes, and other materials beyond normal weathering or use.
- C. Special Warranty Period: Two (2) years from date of Substantial Completion.

1.7 MAINTENANCE SERVICE

- A. Maintenance Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance by skilled employees of automatic door operator Installer. Include planned and preventive maintenance, repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door operation. Provide parts and supplies the same as those used in the manufacture and installation of original equipment.
- B. Extended Maintenance Support and Service Agreement: Submit for Owner's consideration an optional extended Service Agreement for the installed automatic door operator system. The

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extended Service Agreement is considered elective and is without manufacturer's requirement stipulating mandatory coverage for owner and/or vendor system support.

1. A published copy of this agreement to be included with the submittal package
2. Support for the installed automatic door operator system is provided through the vendor under a specified, limited 24 hour support program.
3. Automatic door operators and components are to be available on a one-day turn around time frame from the vendor.

PART 2 - PRODUCTS

2.1 DOOR OPERATORS

- A. General: Provide low energy operators of size recommended by manufacturer for door size, weight, and movement; for condition of exposure; and for compliance with UL 325. Coordinate operator mechanisms with door operation, hinges, and activation devices.
- B. Standard: Certified ANSI/BHMA A156.19.
- C. Performance Requirements:
 1. Opening Force if Power Fails: Not more than 15 lbf required to release a latch if provided, not more than 30 lbf required to manually set door in motion, and not more than 15 lbf required to fully open door.
 2. Entrapment Protection: Not more than 15 lbf required to prevent stopped door from closing or opening.
- D. Configuration: Surface mounted or in-ground as required. Door operators to control single swinging door.
- E. Operation: Power opening and spring closing operation capable of meeting ANSI A117.1 accessibility guideline. Provide time delay for door to remain open before initiating closing cycle as required by ANSI/BHMA A156.19. When not in automatic mode, door operator to function as manual door closer with fully adjustable opening and closing forces, with or without electrical power.
- F. Features: Operator units to have full feature adjustments for door opening and closing force and speed, backcheck, motor assist acceleration from 0 to 30 seconds, time delay, vestibule interface delay, obstruction recycle, and hold open time from 0 up to 30 seconds.
- G. Provide outputs and relays on board the operator to allow for coordination of exit device latch retraction, electric strikes, magnetic locks, card readers, safety and motion sensors and specified auxiliary contacts.
- H. Brackets and Reinforcements: Manufacturer's standard, fabricated from aluminum with nonferrous shims for aligning system components.

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- I. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. LCN Closers (LC) - 4640 Series.
2. Norton Door Controls (NO) - 6300 Series.

2.2 ACTIVATION DEVICES

- A. General: Provide activation devices in accordance with ANSI/BHMA A156.19 standard, for condition of exposure indicated and for long term, maintenance free operation under normal traffic load operation. Coordinate activation control with electrified hardware and access control interfaces. Activation switches are standard SPST, with optional DPDT availability.
1. Interior Actuator: Existing to remain.
 2. Exterior Actuator: Post Mounted Camden Door Controls CM45 WT OB US10B
 3. Exterior Post: CM-42-BSU-BRZ 6x6
 4. All components required for complete system
 5. Automatic Opener: LC 4640-XXX Statuary Bronze

2.3 ACCESSORIES

- A. Signage: As required by cited ANSI/BHMA A156.19 standard for the type of operator.

2.4 FINISHES

- A. Standard: Designations used to indicate hardware finishes complying with ANSI/BHMA A156.18, including coordination with traditional U.S. finishes indicated by certain manufacturers for their products.
- B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware. Units will be sprayed with a combination of waterborne acrylic and polyester powder coat.
- C. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

2.5 OPENING LABELS

- A. Provide 1"W x 2"H gloss polyester label imprinted with door mark and QR-type code readable via IR and visible light scan. QR code links to a security credential protected site displaying the installed door opening information. Label constructed with a high-performance, permanent acrylic adhesive resistant to chemicals, smear and scratch, and repeated freeze and thaw cycles. Face stock of label to be white or clear coated, 2.0 mil thickness with tensile strength meeting or exceeding 18,000 psi.
1. Approved Manufacturer: Openings Studio™ Smart Tags (AA).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances, door and frame preparation and reinforcements, power connections, electrical systems interfaces, and other conditions affecting performance of automatic door operators.
- B. Notify architect of any discrepancies or conflicts between the door schedule, door types, drawings and scheduled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 INSTALLATION

- A. General: Install complete automatic door operators according to manufacturer's written instructions and ANSI/BHMA A156.19 standard, including activation devices, control wiring, remote power units if any, connection to the building's fire alarm system, and required signage.
- B. Power Connection: Reference Division 26 "Electrical" Sections for connection to electrical power distribution system.
- C. Access Control System: Coordinate connections and operation with access control system
- D. Signage: Apply signage as required by ANSI/BHMA A156.19 standard for type of door operator and direction of pedestrian travel.

3.3 FIELD QUALITY CONTROL

- A. Field Inspection (Punch Report): Reference Division 01 Sections "Closeout Procedures". Produce project punch report for each installed door opening indicating compliance with approved submittals and verification hardware is properly installed, operating and adjusted. Include list of items to be completed and corrected, indicating the reasons or deficiencies causing the Work to be incomplete or rejected.
 - 1. Organization of List: Include separate Door Opening and Deficiencies and Corrective Action Lists organized by Mark, Opening Remarks and Comments, and related Opening Images and Video Recordings.
 - 2. Submit documentation of incomplete items in the following formats:
 - a. PDF electronic file.
 - b. Electronic formatted file integrated with the Openings Studio™ door opening management software platform.

3.4 ADJUSTING

- A. Comply with requirements of ANSI/BHMA A156.19 standard. Adjust automatic door operators to function smoothly and lubricate as recommended by manufacturer.

3.5 DEMONSTRATION

- A. Certified Installer's representative to provide eight (8) hours of training to Owner's maintenance personnel in the proper adjustment, operation, and maintenance of automatic door operators.

END OF SECTION 087113

SECTION 099000 - PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes, but is not limited to:
 - 1. Exterior paint primers and finish coats.
- B. Related Requirements:
 - 1. Division 05 Section "Decorative Metal Railings".
 - 2. Division 08 Section "Hollow Metal Door Frames".
 - 3. Division 08 Section "Exterior Wood Doors".

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product. Include preparation requirements and application instructions.
 - 1. Include preparation requirements and application instructions.
 - 2. Indicate VOC content.
- B. Samples for Initial Selection: For each type of topcoat product. Provide manufacturers full range of colors available.
- C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.
 - 1. Submit Samples on rigid backing, 8 inches square.
 - 2. Apply coats on Samples in steps to show each coat required for system.
 - 3. Label each coat of each Sample.
 - 4. Label each Sample for location and application area.
- D. Product Schedule: Use same designations indicated on Drawings and in the Interior Painting Schedule to cross-reference paint systems specified in this Section. Include color designations.

1.3 DELIVERY, STORAGE, AND HANDLING

- A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F.
 - 1. Maintain containers in clean condition, free of foreign materials and residue.
 - 2. Remove rags and waste from storage areas daily.

1.4 FIELD CONDITIONS

- A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F.
- B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures of less than 5 deg F above the dew point; or to damp or wet surfaces.
- C. Do not apply paints in snow, rain, fog, or mist.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Basis-of-Design Products: Subject to compliance with requirements, provide products named in Painting Schedule or comparable products, including but not limited to, the following manufacturers:
 - 1. Benjamin Moore & Co.
 - 2. PPG Paints; PPG Industries, Inc.
 - 3. Pratt & Lambert; a subsidiary of The Sherwin-Williams Company.
 - 4. Sherwin-Williams Company (The).
- B. Source Limitations: Obtain each paint product from single source from single manufacturer.

2.2 PAINT PRODUCTS, GENERAL

- A. Material Compatibility:
 - 1. Materials for use within each paint system shall be compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
 - 2. For each coat in a paint system, products shall be recommended in writing by topcoat manufacturers for use in paint system and on substrate indicated.
- B. Colors: As selected by Architect from manufacturer's full range. Interior finish colors and sheen to be selected to match adjacent existing finishes.
- C. Manufacturers and Products: Subject to compliance with the requirements, products that may be submitted include but are not limited to those specified under the painting schedule at the end of this Section.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Wood: 15 percent.
- C. Verify suitability of substrates, including surface conditions and compatibility, with existing finishes and primers.
- D. Proceed with coating application only after unsatisfactory conditions have been corrected.
 - 1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

- A. Comply with manufacturer's written instructions and recommendations applicable to substrates and paint systems indicated.
- B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.
 - 1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
- C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.
 - 1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.
- D. Steel Substrates: For components that are not shop primed, remove rust, loose mill scale, and residual primer, if any. Clean using methods recommended in writing by paint manufacturer but not less than the following:
 - 1. SSPC-SP 11.
- E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and areas where shop paint is abraded. Paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.
- F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Wood Substrates:

1. Scrape and clean knots and apply coat of knot sealer before applying primer.
2. Sand surfaces that will be exposed to view, and dust off.
3. Use preparation products and methods as recommended by manufacturer.
4. Prime edges, ends, faces, undersides, and backsides of wood.
5. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.

3.3 INSTALLATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.
4. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
5. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.
6. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

3.4 FIELD QUALITY CONTROL

A. Dry-Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry-film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry-film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply additional coats as needed to provide dry-film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

- A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.
 - 1. Do not clean equipment with free-draining water and prevent solvents, thinners, cleaners, and other contaminants from entering into waterways, sanitary and storm drain systems, and ground.
 - 2. Dispose of contaminants in accordance with requirements of authorities having jurisdiction.
 - 3. Allow empty paint cans to dry before disposal.
 - 4. Collect waste paint by type and deliver to recycling or collection facility.
- B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.
- C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.
- D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 PAINTING SCHEDULE

- A. Exterior Wood Substrates:

P1 - Exterior: Latex over Alkyd Primer System:

- a. Prime Coat: Exterior alkyd primer sealer for wood.
 - 1) Benjamin Moore Fresh Start Alkyd Primer (094)
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Benjamin Moore Regal Select Moorgard Latex Low Luster (W103)

- B. Exterior Metal Elements:

P2 - Exterior: Water-Based, Light Industrial Coating System:

- a. Prime Coat: Zinc rich primer or shop primed if specified in other section.
- b. Intermediate Coat: Matching topcoat.
- c. Topcoat: Benjamin Moore Ultra Spec EXT Gloss (N449)

- C. Interior Gypsum Board Substrates:

P3 - Interior: Water-Based, Interior Finish Coating System:

- a. Prime Coat: Benjamin Moore Acrylic Primer (609).

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- b. Intermediate Coat: Benjamin Moore Waterborne Paint (508) in sheen to match existing surrounding wall and ceiling surfaces within Entrance Tunnel corridor.
- c. Topcoat: Match Intermediate Coat.

END OF SECTION 099000

SECTION 310000 – EXCAVATION, COMPACTION AND BACKFILL

PART 1 - GENERAL

1.1 RELATED WORK SPECIFIED ELSEWHERE

- A. Division 32 Section “Lawn Restoration” for grading and seeding.

1.2 DEFINITIONS

- A. The following terms shall have the meanings ascribed to them in this Article, wherever they appear in this Section.
 - 1. Earth Excavation: The removal of all surface and subsurface material not classified as rock (as defined below).
 - 2. Rock: Limestone, sandstone, shale, granite, and similar material in solid beds or masses in its original or stratified position which can be removed only by blasting operations, drilling, wedging, or use of pneumatic tools, and boulders with a volume greater than 1.0 cu yd. Concrete building foundations and concrete slabs, not indicated, with a volume greater than 1.0 cu yd shall be classified as rock.
 - a. Limestone, sandstone, shale, granite, and similar material in a broken or weathered condition, which can be removed with an excavator or backhoe, equipped with a bucket with ripping teeth or any other style bucket shall be classified as earth excavation.
 - b. Masonry building foundations, whether indicated or not, shall be classified as earth excavation.
 - 3. Subgrade Surface: Surface upon which subbase or topsoil is placed.
 - 4. Subbase: Select granular material or subbase course Type 2 which is placed immediately beneath pavement or concrete slabs.
 - 5. Foundation Bearing Grade: Grade/elevation at which the bottom-of-footings are constructed.
 - 6. Maximum Density:
 - a. The dry unit weight in pounds per cubic foot of the soil at “Optimum Moisture Content” when determined by ASTM D 698 (Standard Proctor) for backfilling of utility lines or pavement construction.
 - b. If the earthwork includes placement of large amounts of fill to establish subgrade or a new building, addition, or retaining wall, use ASTM D 1557 (Modified Proctor).
 - 7. Structures: Buildings, footings, foundations, retaining walls, slabs, tanks, mechanical and electrical appurtenances, or other man-made stationary features constructed above or below the ground surface.
 - 8. Landscaped Areas: Areas not covered by structures, walks, roads, paving, or parking.
 - 9. Unauthorized Excavation: The removal of material below required elevation indicated on the Drawings or beyond lateral dimensions indicated or specified without specific written direction by the University’s Representative.

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10. Grading Limit Line (Limit of Disturbance): Limits of grading, excavations and filling required for the work of this contract. Unless specifically noted otherwise, the Grading Limit Line and Contract Limit Line shall be considered the same.

1.3 SUBMITTALS

- A. Product Data:
 1. Filter Fabric: Manufacturer's catalog sheets, specifications, and installation instructions.
- B. Samples: Submit samples as follows. Take the samples in the presence of the University's Representative, and submit to the Directors Representative the laboratory test results for gradation, proctors and soundness tests, when required. These tests shall be performed in accordance with ASTM standards, shall be performed and signed by a certified soils laboratory, and shall be submitted as part of the original submittal. At a minimum, the samples taken shall be of the following quantities:
 1. Select Granular Material: 50 - 60 lb. (Two Samples).
 2. Subbase Course Type 2: 50 - 60 lb. (Two Samples).
 3. Selected Fill: 40 - 50 lb.
 4. Cushion Material: 30 lb.
 5. Crushed Stone: 30 lb
- C. Quality Control Submittals:
 1. Excavation Procedure: Submit a lay out drawing or detailed outline of intended excavation procedure for the Director's information. This submittal will not relieve the Contractor of responsibility for the successful performance of intended excavation methods.
 2. Subbase Materials: Name and location of source and the DOT Source Number. If the material is not being taken from an approved DOT Source, the results of the gradation and soundness tests performed by an ASTM certified soils laboratory will be required.
 3. Other Aggregates: Name and location of source and soil laboratory test results.

1.4 PROJECT CONDITIONS

- A. Care shall be taken when exposing subgrade for construction of pavements to protect any loose or un-compacted subgrade from being saturated by rain events and runoff. Subgrade shall be proof rolled to assure no movement is observed under loaded truck traffic before placing subbase course. Open subgrade, and subbase materials should be properly pitched and sealed (compacted) to avoid saturation from rain or runoff. In some instances, it may be necessary to scarify and leave open for air-drying existing site soils that become unstable due to excessive moisture. In the event subgrade is exposed and saturation or high water table is observed upon its initial exposure, than a Campus representative shall be notified and the condition properly documented.

- B. Protect existing trees and plants during performance of the Work unless otherwise indicated. Box trees and plants indicated to remain within the grading limit line with temporary steel fencing or solidly constructed wood barricades as required. Protect root systems from smothering. Do not store excavated material, or allow vehicular traffic or parking within the branch drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems.
- C. Cold Weather Requirements: When freezing temperatures are predicted, do not excavate to final required elevations for pipe, conduit or equipment requiring concrete work unless concrete can be placed immediately. Retain enough earth over the bottom elevation of excavations to prevent frost penetration.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Select Granular Material: Stockpiled, sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation and material requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
2 inch	50.8	100
1/4 inch	6.35	30-65
No. 40	0.425	5-40
No. 200	0.075	0-10

1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
 2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
 3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.
- B. Subbase Course Type 2: Stockpiled, crushed ledge rock or approved blast furnace slag. Comply with the gradation and material requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
2 inch	50.8	100
1/4 inch	6.35	25-60
No. 40	0.425	5-40
No. 200	0.075	0-10

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1. Magnesium Sulfate Soundness Test: 20 percent maximum loss by weight after four test cycles.
2. Plasticity Index: The plasticity index of the material passing the No. 40 mesh sieve shall not exceed 5.0.
3. Elongated Particles: Not more than 30 percent, by weight, of the particles retained on a 1/2 inch sieve shall consist of flat or elongated particles. A flat or elongated particle is defined as one which has its greatest dimension more than three times its least dimension.

- C. Selected Fill: Sound, durable, sand, gravel, stone, or blends of these materials, free from organic and other deleterious materials. Comply with the gradation requirements specified below:

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
4 inch	101.6	100
No. 40	0.425	0-70
No. 200	0.075	0-15

- D. Suitable Material (Fill and Backfill for Landscaped Areas): Material consisting of mineral soil (inorganic), blasted or broken rock and similar materials of natural or man-made origin, including mixtures thereof. Maximum particle size shall not exceed 2/3 of the specified layer thickness prior to compaction. NOTE: Material containing cinders, industrial waste, sludge, building rubble, landfill, muck, and peat shall be considered unsuitable for fill and backfill, except topsoil and organic silt may be used as suitable material in landscaped areas provided it is placed in the top layer of the subgrade surface.

- E. Cushion Material (Pipe Bedding): Shall consist of clean, hard, durable, uncoated particles, free from lumps of clay and all deleterious substances and shall meet the following gradation requirements:

Sieve Size		Percent Passing
Sieve Size	Size opening (mm)	
1/4 inch	6.35	100
No. 60	0.25	0-35
No. 100	0.15	0-10

- F. Rip Rap: Fine, Light, Medium or Heavy Stone Filling that complies with DOT Article 620-2.02 for stone filling.

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1-1/2 inch	38.1	100
1 inch	25.4	95-100
1/2 inch	12.7	45-60
1/4 inch	6.35	0-15

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- H. No. 1 Coarse Aggregate: Crushed Stone that complies with material requirements of DOT Article 703-02 and meets the following gradation.

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1 inch	25.4	100
1/2 inch	12.7	90-100
1/4 inch	6.35	0-15

- I. No. 2 Coarse Aggregate: Crushed Stone that complies with material requirements of DOT Article 703-02 and meets the following gradation.

Sieve		Percent Passing
Sieve Size	Size opening (mm)	
1-1/2 inch	38.1	100
1 inch	25.4	90-100
1/2 inch	12.7	0-15

- J. Marker Tape: FL Industries Blackburn/Holub's Type YT6, or Seton Nameplate Corporations Type 6 ELE, imprinted with message suited to item buried below.

2.2 GEOTECHNICAL FABRICS

- A. Filter Fabric (GeoTextile)

1. Separation/Stabilization beneath pavements: Amoco 4551, Bonded Fibers Products PN080, Maccaferri Gabions MacTex MX275 & 340, Mirafi 160N & 180N or equivalent.

2.3 BRICK AND MORTAR

- A. Manhole Brick: Standard size, ASTM C 32, Grade MS.
- B. Mortar Materials: Dry packaged, proportioned for Type M unit masonry mortar, complying with ASTM C 387.

PART 3 EXECUTION

3.1 CLEARING AND GRUBBING

- A. Clear and grub the site within the Grading Limit Line (GLL) of trees, shrubs, brush, other prominent vegetation, debris, and obstructions except for those items indicated to remain. Completely remove stumps and roots protruding through the ground surface.

- B. Fill depressions caused by the clearing and grubbing operations in accordance with the requirements for filling and backfilling, unless further excavation is indicated.

3.2 UNDERGROUND UTILITIES

- A. Locate existing underground utilities prior to commencing excavation work. Determine exact utility locations by hand excavated test pits. Support and protect utilities to remain in place.
- B. Do not interrupt existing utilities that are in service until temporary or new utilities are installed and operational.
- C. Utilities to remain in service: Shall be re-routed as shown on the Contract Drawings.
- D. Utilities abandoned beneath and five feet laterally beyond the structure's proposed footprint shall be removed in their entirety. Excavations required for their removal shall be backfilled and compacted as specified herein.
- E. Utilities located outside the limits specified above may be abandoned in place provided their ends are adequately plugged as described below.
 - 1. Permanently close open ends of abandoned underground utilities exposed by excavations, which extend outside the limits of the area to be excavated.
 - 2. Close open ends of metallic conduit and pipe with threaded galvanized metal caps, plastic plugs, or other approved method for the type of material and size of pipe. Do not use wood plugs.
 - 3. Close open ends of concrete and masonry utilities with concrete or flow-able fill.

3.3 EXCAVATION

- A. Excavate earth as required for the Work.
- B. Install and maintain all erosion and sedimentation controls during all earthwork operations as specified on the Contract Drawings or as directed by local officials. If the erosion and sedimentation controls specified by the local officials are more stringent than those specified on the Contract Drawings contact the University's Representative.
- C. Maintain sides and slopes of excavations in a safe condition until completion of backfilling. Comply with Code of Federal Regulations Title 29 - Labor, Part 1926 (OSHA).
 - 1. Trenches: Deposit excavated material on one side of trench only. Trim banks of excavated material to prevent cave-ins and prevent material from falling or sliding into trench. Keep a clear footway between

excavated material and trench edge. Maintain areas to allow free drainage of surface water.

- D. Stockpile excavated materials classified as suitable material where directed, until required for fill. Place, grade, and shape stockpiles for proper drainage as approved by the University's Representative.
- E. Pipe Trenches and/or Bell and Spigot Pipe Trenches: Open only enough trench length to facilitate laying pipe sections. Unless otherwise indicated on the Drawings, excavate trenches approximately 24 inches wide plus the outside pipe diameter, equally divided on each side of pipe centerline. Cut trenches to cross section, elevation, profile, line, and grade indicated. Accurately grade and shape trench bottom for uniform bearing of pipe.
 - 1. Trench in Rock: Excavate an additional 6 inches below bottom of pipe for bed of cushion material under the piping.
- F. Conduit, Cable, Tubing and Piping (other than Bell and Spigot): Provide sufficient trench width for installation and to accommodate special backfill when specified.
- G. Open Ditches: Cut ditches to cross sections and grades indicated.
- H. Pavement: Excavate to subgrade surface elevation.
- I. Unauthorized Excavations: Unless otherwise directed, backfill unauthorized excavation under footings, foundation bases, and retaining walls with compacted select granular material without altering the required footing elevation. Elsewhere, backfill and compact unauthorized excavation as specified for authorized excavation of the same classification, unless otherwise directed by the Director.
 - 1. Unauthorized excavations under structural Work such as footings, foundation bases, and retaining walls shall be reported immediately to the Director before any concrete or backfilling Work commences.
- J. Notify the University's Representative upon completion of excavation operations. Do not proceed with the Work until the excavation is inspected and approved. Inspection of the excavation by the University's Representative will be made on 3 working days notice.

3.4 DEWATERING

- A. Prevent surface and subsurface water from flowing into excavations and trenches and from flooding the site and surrounding area.
- B. Do not allow water to accumulate in excavations or trenches. Remove water from all excavations immediately to prevent softening of foundation bottoms, undercutting footings, and soil changes detrimental to the stability of subgrades and foundations. Furnish and maintain pumps, sumps, suction and discharge

pipng systems, and other system components necessary to convey the water away from the Site.

- C. Convey water removed from excavations, and rain water, to collecting or run-off area. Cut and maintain temporary drainage ditches and provide other necessary diversions outside excavation limits for each structure. Do not use trench excavations as temporary drainage ditches.
- D. Provide temporary controls to restrict the velocity of discharged water as necessary to prevent erosion and siltation of receiving areas.

3.5 PLACING FILTER FABRIC

- A. Place and overlap filter fabric in accordance with the manufacturer's installation instructions, unless otherwise shown.
- B. Cover tears and other damaged areas with additional filter fabric layer extending 3 feet beyond the damage.
- C. Do not permit traffic or construction equipment directly on filter fabric.
- D. Backfill over filter fabric within two weeks after placement. Backfill in accordance with the fabric manufacturer's instructions and in a manner to prevent damage to the fabric.

3.6 PLACING FILL AND BACKFILL

- A. Surface Preparation of Fill Areas: Strip topsoil, remaining vegetation, and other deleterious materials prior to placement of fill. Remove all asphalt pavement in its entirety from areas requiring the placement of fill or break up old pavements to a maximum size of four inches. Prior to placement of fill, smooth out and compact areas where wheel rutting has occurred due to stripping or earthwork operations.
- B. Excavations: Backfill as promptly as practicable, but only after approval by the University's Representative. Do not backfill with excavated material unless it meets the requirements of this Section.
- C. Place backfill and fill materials in layers not more than 8 inches thick in loose depth unless otherwise specified. Before compaction, moisten or aerate each layer as necessary to facilitate compaction to the required density. Do not place backfill or fill material on surfaces that are muddy, frozen, or covered with ice.
 - 1. Place fill and backfill against foundation walls, and in confined areas (such as trenches) not easily accessible by larger compaction equipment, in maximum six inch thick (loose depth) layers.
- D. Prevent wedging action of backfill against structures by placing backfill uniformly around structure to approximately same elevation in each layer. Place

backfill against walls of structures containing basements or crawl spaces only after the first floor structural members are in place.

- E. Under Pavements and Walks:
 - 1. Up to Subgrade Surface Elevation: Place selected fill when fill or backfill is required.
 - 2. Subbase Material: Place as indicated.
- F. Landscaped Areas: Place suitable material when required to complete fill or backfill areas up to subgrade surface elevation. Do not use material containing rocks over four inches in diameter within the top 12 inches of suitable material.
- G. Plastic Pipe in Trenches: Place backfill material a minimum of six inches deep under pipe, 12 inches on both sides, and 12 inches above top of pipe. Complete balance of backfill as specified.
- H. Rigid Non-Metallic Conduit: Except where concrete encasement is required, place cushion material a minimum of four inches deep under conduit, four inches on both sides, and 12 inches over top of conduit. Complete balance of backfill as specified.

3.7 COMPACTION

- A. All materials with exception of open graded stone (No. 2 Coarse aggregate, No. 1 Coarse aggregate, Item B-12, etc.):
 - 1. Compact each layer of fill and backfill for the following area classifications to the percentage of maximum density specified below and at a moisture content suitable to obtain the required densities, but at not less than three percent drier or more than two percent wetter than the optimum content as determined by ASTM D 698 (Standard Proctor) or 1557 (Modified Proctor).
 - a. Concrete Slabs and Steps: 95 percent.
 - b. Landscaped Areas: 90 percent.
 - c. Pavements and Walks: 95 percent.
 - d. Pipe Bedding: 95 percent.
 - 2. If a compacted layer fails to meet the specified percentage of maximum density, the layer will be re-compacted and retested. If compaction cannot be achieved the material/layer will be removed and replaced. No additional material may be placed over a compacted layer until the specified density is achieved
- B. Open graded Stone: Place material in maximum twelve inch lifts. Each lift shall be raked smooth and compacted through several passes of a walk behind vibratory roller. Compaction Testing is **not** required.

3.8 GRADING

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- A. Rough Grading: Trim and grade area within the Grading Limit Line and excavations outside the limit line, required by this Contract, to a level of four inches below the finish grades indicated unless otherwise specified herein or where greater depths are indicated. Provide smooth uniform transition to adjacent areas.
- B. Finish Grading: Finish surfaces free from irregular surface changes, and as follows:
 - 1. Grassed Areas: Finish areas to receive topsoil to within 1 inch above or below the required subgrade surface elevations.
 - 2. Walks and Pavements: Place and compact subbase material as specified. Shape surface of areas to required line, grade and cross section, with the finish surface not more than 1/2 inch above or below the required subbase elevation.
 - 3. Building Slabs: Grade subbase material smooth and even, free of voids, compacted as specified to within 1/4 inch above or below required subbase elevation.
- C. Spread approved topsoil directly upon prepared subgrade surface to a depth indicated drawings (min. of 4") after natural settlement of the topsoil has occurred in areas to be seeded or to receive sod. Place to greater depth when necessary to adjust grades to required elevations.
 - 1. Approved existing topsoil within the Grading Limit Line may be used. Provide additional topsoil from outside sources as required.
- D. Finish topsoil surface free of depressions which will trap water, free of stones over 1 inch in any dimension, and free of debris.

3.9 RESTORATION

- A. Restore pavements, walks, curbs, lawns, and other exterior surfaces damaged during performance of the Work to match the appearance and performance of existing corresponding surfaces as closely as practicable.
- B. Topsoil and seed or sod damaged lawn areas outside the GLL and new lawn areas inside the GLL. Water as required until physical completion of the Work.

3.10 DISPOSAL OF EXCESS AND UNSUITABLE MATERIALS

- A. Remove from University property (unless otherwise directed) and lawfully dispose of excess and unsuitable materials, including materials resulting from clearing and grubbing and removal of existing improvements.

3.11 FIELD QUALITY CONTROL

- A. Compaction Testing: Notify the University's Representative at least 3 working days in advance of all phases of filling and backfilling operations. Compaction testing will be performed by the University's Representative to ascertain the compacted density of the fill and backfill materials. Compaction testing will be

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performed on certain layers of the fill and backfill as determined by the University's Representative. If a compacted layer fails to meet the specified percentage of maximum density, the layer shall be re-compacted and will be retested. No additional material may be placed over a compacted layer until the specified density is achieved.

3.12 PROTECTION

- A. Protect graded areas from traffic and erosion, and keep them free of trash and debris. Grade and compact areas such that ponding or saturation of material does not occur. Areas left unprotected, and vulnerable to weather events and runoff, may be required to be replaced at contractor's expense.

END OF SECTION 310000

SECTION 321216 – HOT MIX ASPHALT (HMA) PAVEMENTS

PART 1 - GENERAL

- 1.1 A. Section Includes:
 - 1. Repairs and patching existing asphalt pavements.
- B. All work references and shall conform to the New York State Department of Transportation (NYSDOT) Standard Specifications, Current Edition at time of bid.
- 1.2 RELATED WORK SPECIFIED ELSEWHERE
 - A. Earthwork: Section 310000.
 - B. Concrete walks: Section 321300.
- 1.3 SUBMITTALS
 - A. Product Data: Copy of original Job Mix Formula (JMF) from an active producing NYSDOT Approved Plant, signed by Regional Materials Engineer for each mix design to be incorporated in the project.
 - B. Quality Control Submittals:
 - 1. Plant name and location of asphalt concrete supplier.
 - 2. Copy of Printed Delivery Ticket with breakdown of materials and quantities in accordance with NYSDOT requirements and project name.
 - C. Plant Certification: Shall be provided for each day's placement, certifying that all materials delivered meets NYSDOT requirements and include a tally of each day's mix type delivered to the jobsite specific to the project on that date.
- 1.4 ASPHALT PRICE ADJUSTMENT
 - A. The University can require or the Contractor may request evaluation and possible adjustment of the price of asphalt providing the actual price differs by more than \$15 per ton of Performance Graded Binder (PGB).
 - B. The Asphalt Price Index will be determined based upon the NYSDOT posted index price at time of bid.
 - C. Price adjustments will be solely based upon the price changes for PGB as determined by the formulas below. No adjustment will be made if the monthly average posted price is within \$15.00 of the asphalt index price. No consideration will be given to the situation where an individual supplier's price exceeds the monthly average posted price.

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D. Prices

1. Asphalt Index Price. The asphalt index price is a price per ton of PGB used solely as a basis from which to compute asphalt price adjustments. The asphalt index price for the original contract bid price items and additional work at the original contract bid process will be the monthly average posted price for the month of the bid opening. The asphalt index price for additional work at agreed price will be the monthly average posted price for the month the agreed price was submitted to the University.
2. Monthly Average Price. The average terminal price for unmodified PG 64S-22 binder, without anti-stripping agent, determined by the NYSDOT, based on prices of approved primary sources of PGB in effect at the time the work is completed.

- E. Quantity. The quantity of asphalt in tons considered for adjustment will be determined by multiplying the quantity of eligible work completed by the conversion factors listed in the following NYSDOT publication.

F. Adjustment Formulas.

1. When the price increases. Price Adjustment =
$$(\text{Quantity of PGB Asphalt}) \times (\text{Monthly Average Posted Price} - \text{PGB Index Price} - \$15.00)$$
2. When the price decreases. Price Adjustment =
$$(\text{Quantity of PGB Asphalt}) \times (\text{Monthly Average Posted Price} - \text{PGB Index Price} + \$15.00)$$

PART 2 PRODUCTS

2.1 MATERIALS

- A. Asphalt Concrete Paving: Conform to NYSDOT Section 402 Hot Mix Asphalt.

1. Top Course: NYSDOT, Item 402.097303, 9.5 mm Top HMA.
2. Top Course: NYSDOT, Item 402.127303, 12.5 mm Top HMA.
3. Binder Course: NYSDOT, Item 402.197903, 19 mm Binder HMA.
4. Base Course: NYSDOT, Item 402.257903, 25 mm Binder HMA.

- B. Asphalt PG Binder Specific Requirements:

1. Use a PG 64S-22 meeting the requirements of AASHTO M320, Standard Specification for Performance Graded Asphalt Binder for the production of Superpave Hot Mix Asphalt mixtures for this project.
2. Use of polyphosphoric acid (PPA) to modify the PG binder properties is prohibited. This prohibition also applies to the use of PPA as a cross-linking agent for polymer modification.

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3. The mixture designs must be developed in accordance with the criteria specified in the SUPERPAVE Hot Mix Asphalt items that are appropriate for an estimated traffic level of <30 Million 80 kN ESALs.

C. Asphalt Cement Tack Coat.

1. Shall be used in accordance with Section 402 and meet the requirements of Section 407.

D. Asphalt Joint Adhesive

1. Shall be used in placement of Top Course in accordance with Section 402 and meet the requirements of Section 418.

PART 3 EXECUTION

3.1 ASPHALT CONCRETE PAVING

- A. Construct asphalt pavement in accordance with DOT, Section 402.
- B. Pavement Density will be verified and accepted by the 70 Series Compaction Method with all acceptance testing provided by Cornell University's Third-Party Testing Agency.
- C. Intent of paving operation shall be to have an adequate number of delivery trucks available in order to keep the paver moving at all times during paving operation with the exceptions being during loading, and when repositioning.
- C. Special attention shall be paid to joint construction and to avoid concentration of segregated stones from paver. Excess stones shall be removed from paving mat. At times, it may be necessary to sweep coated fine particles into the paving joint prior to compaction.

END OF SECTION 321216

SECTION 321300 – CONCRETE WALKS

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. New cast-in-place concrete sidewalks.

1.2 RELATED WORK SPECIFIED ELSEWHERE

- A. Cast-In-Place Concrete: Section 033000.
- B. Excavation, Compaction and Backfill: Section 301000.
- C. Hot Mix Asphalt Pavement: Section 321216.
- D. Concrete Paving Joints Sealants: Section 321373.
- E. Lawn Restoration: Section 324300.

1.3 REFERENCES

- A. Comply with American Concrete Institute, ACI 301-05, for the Work of this Section unless otherwise indicated on the drawings or specified.

1.4 SUBMITTALS

- A. Product Data:
 - 1. Concrete Design Mix: Submit proposed concrete design mix together with name and location of batching plant at least 28 days prior to the start of concrete work.
 - 2. Portland Cement: Brand and Manufacturer's name.
 - 3. Air-entraining Admixture: Brand and manufacturer's name.
 - 4. Water-reducing or High Range Water-reducing Admixture: Brand and manufacturer's name.
 - 5. Penetrating Sealer: Manufacturer's specifications and application instructions.
 - 6. Fibrous Concrete Reinforcement: Manufacturer's specifications, and batching and mixing instructions for fibrous concrete reinforcement.
 - 7. ADA Detectable Warning Surface: Manufacturer's specifications, product data, test reports, method of installation, and maintenance instructions.
- B. Samples:
 - 1. Fibrous Concrete Reinforcement
- C. Work Plan:

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1. Submit work plan to include quality control, labor and equipment to be used, detours, and protections, and monitoring plan for weather conditions and changes.
2. Provide a curing plan including materials use (water source, misters, sprinklers, hoses, rain protection, evaporation control)

1.5 QUALITY ASSURANCE

- A. At minimum one ACI Certified Flatwork Finisher shall present for all concrete flatwork placements. ACI Certified Flatwork Technicians shall fulfill this requirement in cases where the afore-mentioned finisher cannot be present and when the concrete contractor has provided a portfolio greater than five years of consecutive flatwork placement experience and at least 10,000 sf of constructed flatwork. Equivalent Union/Trade certification and or credentials may be submitted in lieu of ACI credentials upon approval of the Owner.
- B. Concrete batching plants shall be currently approved as concrete suppliers by the New York State Department of Transportation.
- C. Fibrous Concrete Reinforcement:
 1. Certificates: Affidavit by the concrete supplier certifying that approved fibrous concrete reinforcement in the required amount per cubic yard was added to and properly mixed into each batch of concrete discharged at the site.
- D. See Specification Section 033000 Cast-In-Place Concrete for material testing requirements.

1.6 DELIVERY

- A. Batch Ticket Information: Indicate on the delivery ticket the type, brand, and amount of fibrous concrete reinforcement material added to each batch of concrete in addition to all other admixtures.

1.7 PRE-CONCRETE PLACEMENT MEETING

- A. A mandatory meeting will be held in advance of commencing concrete placement on all University Capital Projects, or as determined by Facilities Engineering. The meeting shall include representatives from the architect or engineer, contractors, material suppliers, owner's testing agency, Civil Section of Facilities Engineering, and University project management team. The purpose of the meeting will be to discuss concrete procedures and mitigating risks to the project. Furthermore, the design team shall identify critical concrete components of the structure and critical service conditions. Collectively the attendees will establish and coordinate procedures to best address these items. Key points would include mitigating weather conditions including high evaporability, proper curing procedures, minimizing shrinkage cracking, mix design, cement paste content, aggregate gradation, placement and finishing techniques, protecting base course prior to slab on grade placement, flatness/levelness criteria, construction

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joints, vapor barriers, list of critical items for inspection, water control, communication, and key concrete tolerances.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Cast-In-Place Concrete: Normal weight, air-entrained concrete with a minimum compressive strength of 5,000 psi in 28 days with a water/cement ratio of 0.40.
1. Design Air Content: ASTM C 260, and on the New York State Department of Transportation's current "Approved List"; 6 percent by volume plus or minus 1.5 percent.
 2. Cement: ASTM C 150 Type I or II Portland cement.
 3. Water: Potable. Water in addition to the approved quantity on the submitted mix design shall not be permitted without permission of the engineer. The contractor is required to clearly note on the delivery ticket the quantity of water withheld at the batching plant that can be added onsite.
 4. Aggregates: Coarse and fine aggregates shall be on the New York State DOT list of approved aggregate sources and shall not be designated as having ASR potential. • The minimum bulk SSD specific gravity of the coarse aggregate on the New York State DOT posted test results shall be 2.67. • The maximum absorption of the coarse aggregate on the New York State DOT posted test results shall be 1.2%. Local aggregates have the potential for AAR (alkali aggregate reaction) which is a concern for concrete exposed to moisture. Cornell University prefers that concrete with the potential for moisture exposure be designed using strategies to reduce AAR, such as substituting 15% to 20% of cementitious material with class F fly ash conforming to ASTM C-618.
 5. Chloride Limits: Concrete producers shall provide verification that submitted concrete mixes do not exceed maximum water-soluble chloride ion (Cl) limits per exposure class as stated in ACI 318-14 Table 19.3.2.1.
 6. Slump: Maximum 4 inches; minimum 2 inches before the addition of any water-reducing admixtures or high-range water-reducing admixtures (superplasticizers) at the site. Except when a water-reducing admixture is used, maximum slump shall be 6 inches and when a high range water reducing admixture is used maximum slump shall be 8 inches.
 7. Water-reducing Admixture: ASTM C 494 / C 494M-04 Type A and on the New York State Department of Transportation's current "Approved List".

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8. High Range Water-reducing Admixture: ASTM C 494 / C 494M-04 Type F and on the New York State Department of Transportation's current "Approved List".
 9. Retarding Admixture: ASTM C 494, Type D, Water-reducing and retarding, for use in hot weather concreting, and on the New York State Department of Transportation's current "Approved List".
- B. Penetrating Sealer: Chemically reactive penetrating sealer with salt and moisture resistance that is breathable and has minimal impact on traction. If applied on freshly placed concrete or partially cured concrete shall meet ASTM C309, Type 1, Class B requirements.
1. **V-Seal 102 Winter Guard by V-Seal, 9042 Cotter Street, Lewis Center, OH 43035, (877) 738-7325, www.vseal.com
 2. PS 102, Concrete Sealers USA, PO Box 1223 Brookfield, WI 53008 (888) 583-2992, www.concretesealersusa.com
 3. Silencure, by ChemMasters, 300 Edwards Street, Madison OH 44057, (800) 486-7866, www.chemmasters.net
- ** University Basis of Design. Also meets requirements of ASTM C309 for use as a membrane curing compound (For use in limited applications on Campus when approved by University)*
- C. Fibrous Concrete Reinforcement: Macro-synthetic fibers shall be manufactured specifically for the reinforcement of concrete and be in accordance with ASTM 1116, Class III. Fibers shall provide temperature and shrinkage reinforcement, provide moderate benefits to reduce cracking, and increase toughness of concrete. Fibers shall be grey color, virgin polypropylene/co-polymer blend, 2" minimum length, and designed for broom finished concrete and be designed to take the place of traditional 6 x 6, W 2.9 W2.9 mesh. Use at minimum 4 pounds / cubic yard. Micro-synthetic and cellulose fibers shall not be permitted. Concrete supplier shall provide appropriate representation upon request for first placement (pre-pour, on-site, or at ready-mix plant) as required.
1. Forta-Ferro by Forta, Grove City, PA, (800) 245-0306, www.forta-ferro.com
 2. ICF M Macro Plus, by ICF Concrete Additives, Warren, NJ (908) 293-8280, www.icfconcreteadditives.com
 3. Strux by Grace Construction Products, Cambridge, MA, (877)423-6491, www.gcpat.com
 4. Tuf-Strand by Euclid Chemical Company, Cleveland, OH, (800) 321-7628, www.euclidchemical.com
 5. Or Equal

Supplier shall adjust mix at plant to account for changes in slump after addition of fibers, possibly requiring need for water reducers or other admixture to assure workability on the jobsite. Required Water Cement Ratio shall not be changed.

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- D. Expansion Joint Filler: Preformed, resilient, non-extruding fiber expansion joint complying with ASTM D 1751 composed of a bond of cellulose fibers and uniformly saturated with asphalt units. Product shall be designed to be set ½” below surface, and to later finish with a joint sealant.
- E. ADA Detectable Warning Surface: Cast Iron Detectable Warning plate with a non-slip texture on the travel surface. Material used to provide visual warning shall be an integral part of the detectable warning surface. Visual contrast to meet the existing ADAAG A4.2.9.2. University requires panels with deeper web to allow embedment into concrete and to not simply sit on surface. The use of plate type panels with cleats or anchors are PROHIBITED.
 - 1. Detectable Warning Plate Model R-4984 by Neenah Foundry, 2121 Brooks Avenue, Neenah, WI 54956, (800) 558-5075, www.nfco.com
 - 2. Duralast by East Jordan, Phoenix, NY (315) 669-2601, www.ejco.com
 - 3. Or Equal
- F. Speed/Slip Dowel Load Transfer System: Shall be designed as to be inserted in drilled in grouted concrete slab with one part free and one part fixed. Provide minimum #5 bar at 18” or #4 bar at 12”.
 - 1. Speed Dowel by Greenstreak (Sika)
 - 2. Or Equal

PART 3 EXECUTION

3.1 PREPARATION

- A. Do not use items of aluminum for mixing, chuting, conveying, forming, or finishing concrete. However, magnesium alloy tools may be used for finishing.
- B. Set forms true to line and grade and anchor rigidly in position.
- C. Space expansion joints equally at not more than 30’-0” on center unless otherwise indicated. Place expansion joints to isolate sidewalk from other structures and fixed objects.
- D. Place joint filler at expansion joints and where new concrete abuts existing concrete paving and fixed structures or appurtenances. Protect the top edge of the joint filler during concrete placement with a temporary cap and remove after concrete has been placed.
- E. Place bond breaker at interface with granite curbing that abuts asphalt roadways.

3.2 TEST PLACEMENT SECTION

- A. Contractor shall prepare a test placement at minimum equal to 10 linear foot of sidewalk at the design width. The purpose of this test placement is to become familiar with the materials, the consistency, admixtures, fibers and other

reinforcing, etc. in addition to the finishing requirements which may include consolidating, floating, broom finish, etc.

- B. The Test Placement shall be a completed wet cure approved by the University and Architect before the Contractor is allowed to proceed with new concrete walk installation. Only approved Test Placement may be included as part of the finished work at the authorization of the University's Representative.
- C. Subsequent placements shall be staggered such that the test section can be placed and finished to meet the Owner's requirements. Any placement prior to acceptance of the test section may be required to be removed and replaced at the Contractor's expense.
- D. Removal of test sections not approved for incorporation into the final work shall be the responsibility of the Contractor.

3.3 PLACEMENT OF FIBER REINFORCEMENT

- A. Add minimum of 4.0 lbs. per CY of macro fibrous concrete reinforcement to the concrete and mix in accordance with fiber manufacturer's batching and mixing instructions.
- B. Fibers shall be uniformly dispersed in the concrete, and concrete shall be free of fiber balls or lumps when discharged at the Site.
- C. Utilize water reducers and plasticizers as per supplier mix design for provide required slump and workability. Do not increase water-cement ratio.
- D. Add fiber after all or a portion of mixer has been charged. Add water-reducing admixture after fibers have been added. Follow ACI mixing procedures (nominally 5 minutes) once all ingredients are in drum.

3.4 LOAD TRANSFER DOWELS

- A. At connection to existing concrete, drill and grout as necessary to result in one side fixed and one end unrestrained at locations shown on drawing and where new concrete is placed adjacent to building entrances, at expansion joints, and or along travelled pathways where any vertical settlement would result in a trip hazard.
- B. At expansion joints provide dowel system with bond breaking sleeve.

3.5 PLACING CONCRETE

- A. Consolidate concrete by spading, rodding, forking, or using an approved vibrator eliminating all air pockets, stone pockets, and honeycombing. Work and float concrete surface to produce a uniform texture.
- B. Locate construction joints, if any, at expansion joints.

3.6 PLACING ADA DETECTABLE WARNING SURFACE

- A. The ADA detectable warning surface shall be installed behind the edge of the curb.
- B. Domes shall be aligned on a square grid in the predominant direction of travel to permit wheels to roll between the domes.
- C. Install in accordance with the manufacturer's printed instructions.
- D. Cutting or supply of radius sections may be required based upon location.
- E. The curb, ADA detectable warning surface, and sidewalk shall be flush with the elevation of the road surface.

3.7 FINISHING AND CURING

- A. Wait until bleeding is stopped before final finishing operations.
- B. Keep surface damp but not wet between initial strike off and final finish.
 - 1. Utilize a fog spray, evaporative inhibitor, or midrange water reducer that is compatible with supplementary cementing materials to help control the amount of surface drying of the fresh concrete.
- C. Utilize a magnesium or wood float.
- D. Finish edges of walk and expansion and control joints with a 1/4 inch radius edging tool.
- E. Verify timing for final finish by impression depth into surface, and other judgments, to ensure proper finishing timing. Use steel/magnesium tools. For broom finish, broom in one direction only, without overlapping broom strokes. Time brooming as necessary to minimize any fiber in mix being pulled from concrete. Keep broom clean (and damp only).
- F. Once concrete has begun to set (cannot be easily marred) place wet curing materials and begin wet cure or other curing methods as specified or approved by the University.
- G. Contractor shall be prepared for weather conditions during placement including having materials on hand to protect concrete from rain, evaporation, and from freezing temperatures during placement and curing.

3.8 CURING

- A. All cast-in-place concrete shall be wet cured for not less than seven days. The University understands there is a value associated with this process and the contractor shall provide a price for wet curing in the schedule of values for each

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scope area. The University will provide a water source where possible including access to hydrants and building spigots, however contractor may be required to establish tanks, or other storage to assure wet curing. In instances as permitted by the University due to Code, Means of Egress, or other isolated circumstances the requirements for wet curing may be waived or reduced in lieu of applied compounds. The University will then be credited via the Change Order process for wet curing not performed.

- B. All curing supplies shall be on project site prior to commencement of concrete placement. This shall include identification of water supply, and all curing materials.
- C. Commence curing activity as soon as concrete has set to a state where it cannot be easily marred. Conditions may require application of an evaporation retarder to keep surface from drying out during set time. Curing objective shall be to provide constant water supply for concrete hydration through means and methods of the contractor. This shall include a source of clean water available at all times. Avoid concentrated watering that may erode the fresh concrete. If using hydrant water, flush any discolored water prior to hooking up to soaker hoses or sprinkler/mister. Water can be turned off at times during cure as long as it remains wet. Wet cure for 7 days and have personnel available at all times during that period to attend to curing issues that may arise. If curing has to be cut short, due to circumstances and as directed by the University, apply specified cure and seal product on moist concrete to continue curing process for remaining time. Contractor shall submit detailed curing plan prior to planned placement.
- D. Hot Weather Concreting: Comply with ACI 305R whenever the atmospheric temperature or the form surface temperature is at or above 90 degrees F., or climatic conditions of wind and/or low humidity will cause premature drying of the concrete.
- E. Curing Temperature: Maintain the temperature of the concrete at 50 degrees F. or above during the curing period. Keep the concrete temperature as uniform as possible and protect from rapid atmospheric temperature changes. Avoid temperature changes in concrete, which exceeds 5 degrees F. in any one hour and 50 degrees F. in any 24-hour period. Contractor may be required to place high-low thermometers with placement to monitor conditions during curing.

3.9 JOINTS

- A. Provide expansion joints as shown on drawings at a distance no greater than 30 feet, and where abutting existing placed concrete, foundations, and other fixed structures. Install pre-formed joint material for the depth of the slab and with a removable cap or bond breaker along the top. Set below grade to allow for later application of a joint sealant. Provide joint sealant in accordance with Section 321373.
- B. Sawed control joints (CJ) are the University Standard and shall be cut one inch deep after the concrete has set. Complete saw cuts within 8-12 hours after slab is

placed or sooner with an early entry saw. Warmer ambient temperatures and low humidity may require saw cutting sooner. In all cases contractor shall use their best judgement as to when to begin saw cutting operations to minimize shrinkage cracks. Concrete cracking due to not cutting soon enough may require replacement at Contractor's expense. Space control joints equally between expansion joints as shown on the drawings.

- C. In some cases tooled control joints are allowed to match adjoining tooled sections, or in other cases approved by the University. In those cases, provide tooled control joints one inch deep. Space control joints equally between expansion joints as shown on the drawings.
- D. Provide doweled connection where tying into existing concrete surfaces and buildings. Drill and grout into existing concrete or place in subsequent pours. Place bond breaker or basket in new concrete as shown on plans.
- E. Maintain Curing operations throughout saw cutting and avoid exposing and drying/shrinkage of curing concrete during operations. A worker may be required to continually wet surface while exposed to sun and wind.
- F. Restore any areas of damage resulting from curing operations including erosion, puddling, and repair of affected landscapes.

3.10 SEALING

- A. Apply penetrating sealer in accordance with manufacturer's recommendations, including the timing of the applications, the number of coats, protection of other surfaces, etc.
- B. Some sealers are designed to be applied on fresh or moist concrete and others require concrete to be fully cured and in dry state. Apply as per Manufacturer's Recommended.

END OF SECTION 321300

SECTION 321373 - CONCRETE PAVING JOINT SEALANTS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Joint sealants at cast-in-place concrete walks.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Concrete Walks: Section 321300.

1.3 SUBMITTALS

- A. Product Data:** Catalog sheets, specifications, and installation instructions for each product specified except miscellaneous materials.

1.4 QUALITY ASSURANCE

- A. Container Labels:** Include manufacturer's name, trade name of product, kind of material, federal specification number (if applicable), expiration date (if applicable) and packaging date or batch number.

1.5 PROJECT CONDITIONS

A. Environmental Conditions:

1. **Temperature:** Unless otherwise approved or recommended in writing by the sealant manufacturer, do not install sealants at temperatures below 40 degrees F or above 85 degrees F.
2. **Humidity and Moisture:** Do not install the Work under this Section under conditions that are detrimental to the application, curing and performance of the specified materials.

B. Protection:

1. Protect all surfaces adjacent to sealants with non-staining removable tape or other approved covering to prevent soiling or staining.

PART 2 PRODUCTS

2.1 SEALANTS

A. Type 1B Sealant:

1. **For Horizontal Joints:** One-part, self-leveling silicone or polyurethane sealant for traffic bearing construction; Bostik Chem-Calk 955-SL,

MCWB ARCHITECTS
SAGE HALL FOUNDATION WATERPROOFING
CORNELL UNIVERSITY

Tremco Vulkem 45, Pecora Urexpam NR-201, Pecora 300-SL, Pecora 310-SL, Sika Sikaflex-1CSL, Dow Corning CCS.

2. For Vertical Joints: One-part, non-sag silicone or polyurethane sealant; Tremco Vulkem 116, Pecora Dynatrol I, Sika Sikaflex Textured Sealant, Dow Corning CCS or CWS, Pecora 301-NS, Pecora 311-NS.

2.2 JOINT FILLERS

- A. The pre-molded resilient joint filler shall conform to the requirements of ASTM D1751. This product shall consist of preformed sheets or strips made from cane or other suitable fibers of a cellulosic nature securely bound together and then uniformly saturated with asphalt; or strips formed from clean granulated cork securely bound together by a suitable asphalt binder and encased between two layers of saturated felt or two layers of glass-fiber felt.

2.3 MISCELLANEOUS MATERIALS

- A. Joint Primer/Sealer/Conditioner: As recommended by the sealant manufacturer for the particular joint surface materials and conditions.
- B. Backer Rod: Compressible rod stock or expanded, extruded polyethylene.
- C. Bond Breaker Tape: Polyethylene or other plastic tape as recommended by the sealant manufacturer; non-bonding to sealant.
- D. Cleaning Solvents: Oil free solvents as recommended by the sealant manufacturer. Do not use re-claimed solvents.
- E. Masking Tape: Removable paper or fiber tape, self-adhesive, non-staining.

2.4 COLOR OF MATERIALS

- A. For exposed materials, furnish color as indicated, or if not indicated, as selected by the University's Representative from the manufacturer's standard colors. For concealed materials, provide the natural color, which has the best overall performance characteristics.

PART 3 EXECUTION

3.1 PREPARATION

- A. Clean joint surfaces immediately before installation of sealant and other materials specified in this Section.
 1. Remove all loose materials, dirt, dust, rust, oils and other foreign matter that will impair the performance of materials installed under this Section. When necessary or when directed, wire brush, grind, or acid etch to thoroughly clean joint surfaces.

3.2 JOINT FILLER INSTALLATION

- A. Set joint fillers at proper depth and position as required for installation of bond breakers, backer rods and sealants. Do not leave voids or gaps between the ends of joint filler units.
 - 1. Smooth Edged Joints: For joints between two concrete slabs or where new concrete abuts smooth edged materials use either filler as specified.
 - 2. Irregular Edged Joints: For joints where new concrete abuts granite curbs or other irregular edges use closed cell polyurethane joint filler.

3.3 SEALANT INSTALLATION

- A. Except as shown or specified otherwise, install sealants in accordance with the manufacturer's printed instructions.
- B. Apply sealant with ratchet handgun or other approved mechanical gun. Where gun application is impractical, apply sealant by knife or by pouring as applicable.
- C. Finishing: Tool all vertical, non-sag sealants so as to compress the sealant and eliminate air voids. Provide a neat smoothly finished joint with a slightly concave surface unless otherwise indicated or recommended by the manufacturer.
 - 1. Use tool wetting agents as recommended by the sealant manufacturer.

3.4 CLEANING

- A. Immediately remove misapplied sealant and drippings from metal surfaces with solvents and wiping cloths. On other materials, remove misapplied sealant and droppings by methods and materials recommended in writing by the manufacturer of the sealant material.
- B. After sealants are applied and before skin begins to form on sealant, remove all masking and other protection and clean up any remaining defacement caused by the Work.

END OF SECTION 32 13 73

SECTION 324200 - SUBDRAINAGE

PART 1 - GENERAL

1.1 SUMMARY

- A. Extent of foundation drainage system work is shown on Contract Drawings.
- B. Drainage collection systems work includes, but is not limited to the following:

Work Included:

- 1. New subsurface drainage system – foundation and footing drains.

1.2 RELATED WORK SPECIFIED IN OTHER SECTIONS

- A. Division 07 Section “Sheet Membrane Waterproofing” for foundation waterproofing.
- B. Division 31 Section “Excavation, Compaction and Backfill” for related site work.
- C. Division 32 Section “Lawn Restoration” for grading and seeding.

1.3 QUALITY ASSURANCE

- A. Code Compliance: Comply with applicable portions of National Plumbing Code and any governing state, local, municipal, or health authority regulations and standards.
- B. Piping materials shall conform to representative standards: ANSI/AWWA, ASTM, AASHTO.

1.4 DEFINITIONS

- A. HDPE: High-density polyethylene
- B. PE: Polyethylene.
- C. PVC: Polyvinyl chloride.

1.5 SUBMITTALS

- A. Shop Drawings: Submit shop drawings for subsurface drainpipe layout, cleanout location, supports, anchors, and connections.

- B. Product Data: Submit manufacturer's product data and specifications for materials being used (pipe, fittings, etc.) and include compliance with requirements outlined in "Quality Assurance". Submit materials acceptable to local municipal authorities, sewer districts, public works, etc.

1.6 COORDINATION

- A. Drainage materials and installation shall be compatible with waterproofing of original stone foundation walls below grade.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. In other Part 2 articles where subparagraph titles below introduce lists, the following requirements apply for product selection:
 - 1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the manufacturers specified.
 - 2. Furnish ells, tees, reducing tees, wyes, couplings, increasers, crossers, transitions, and end caps of same type and class of material as conduit, or of material having equal or superior physical and chemical properties as deemed acceptable to the Architect.

2.2 CORRUGATED HIGH DENSITY POLYETHYLENE – STORM SEWER PIPING - SDR 35:

- A. Corrugated high density polyethylene storm sewer shall be Advanced Drainage Systems (ADS) N-12. Interior shall be smooth with a Mannings Roughness Coefficient of 0.012. ASTM F667, AASHTO M-294.
- B. Joints: Coupling Bands
- C. Fittings: ASTM- F667

2.3 CORRUGATED PERFORATED HIGH-DENSITY POLYETHYLENE UNDERDRAINAGE PIPING - SDR 35:

- A. Pipe shall be Advanced Drainage Systems (ADS). Interior shall have a Manning Roughness Coefficient of not greater than 0.020. Pipe shall be in accordance with the Standard Specification: AASHTO M294-86- ASTM F667-85. Pipe shall be surrounded with drain fill material, wrapped in filter fabric.
- B. Joints: Corrugated Coupling Bands
- C. Fittings: ASTM- F-667.
- D. Pipe Stiffness: Consistent with ASTM- D-2412.

1. Couplings: Manufacturer's standard, band type.

2.4 SPECIAL PIPE COUPLINGS

- A. Description: ASTM C 1173. Rubber or elastomeric sleeve and band assembly fabricated to match outside diameters of pipes to be joined.

2.5 CLEANOUTS

- A. Cast-Iron Pipe: ASME A112.36.2M; with round-flanged, cast-iron housing, medium-duty loading class, cast-iron cover. Include cast-iron ferrule and countersunk, brass cleanout plug.

2.6 SOIL MATERIALS

- A. Impervious Fill: Clay, gravel, and sand mixture.
- B. Drain Fill: Washed, evenly graded mixture of crushed stone, or crushed or uncrushed gravel, ASTM D 448, coarse aggregate, Size No. 57, with 100 percent passing 1-1/2-inch sieve and not more than 5 percent passing No. 8 sieve.

2.7 GEOTEXTILE FILTER FABRICS

- A. Woven geotextile filter fabric of polyester fibers. Flow rates range from 110 to 330 gallons /per minute/per sq. ft. when tested according to ASTM D 4491.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine surfaces and areas for suitable conditions where subdrainage systems are to be installed.
- B. Locate and mark existing utilities, underground structures, and aboveground obstructions before beginning installation and avoid disruption and damage of services.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 CORRUGATED HIGH DENSITY POLYETHYLENE (N-12) – STORM SEWER

- A. Lay pipe on a bedding shaped to receive the bottom 1/2" of pipe diameter.
- B. Join pipe in accordance with "ADS Installation Guidelines for Culvert and Other Heavy Duty Drainage Applications".

- C. Compact backfill to a minimum density of 90% per AASHTO- T-99

3.3 CORRUGATED PERFORATED HIGH DENSITY POLYETHYLENE - UNDERDRAIN

- A. Trench shall be constructed in such a way to provide a minimum of 6 inches for filter medium to be placed completely around pipe.
- B. After trench excavation Geofabric: AMOCO No. 2006 or approved equal is placed, insure material is of sufficient width to completely surround and provide a trench width of over lap.
- C. Filter medium shall be crushed stone with a uniform gradation, not exceeding one inch, having a minimum compaction level of 90% AASHTO (T-99) standard density.

3.4 IDENTIFICATION

- A. Materials and their installation are specified in Division 32 Section "Earthwork." Arrange for installation of green warning tapes directly over piping.
 - 1. Install detectable warning tape over nonferrous piping and over edges of underground structures.

3.5 FOUNDATION DRAINAGE INSTALLATION

- A. Drain Fill: Extend membrane waterproofing down over existing concrete footings. After installing drainage piping, add drainage fill to width of at least 6 inches on side away from wall and to top of pipe to perform tests. After satisfactory testing, cover piping to width of at least 6 inches on side away from footing and above top of pipe to within 12 inches of finish grade. Place drain fill in layers not exceeding 3 inches in loose depth; compact each layer placed.
 - 1. Before installing drain fill, lay flat-style geotextile filter fabric in trench and overlap trench sides. After installing drainage fill, wrap top of drainage fill with flat-style geotextile filter fabric.
- B. Fill to Grade: Place stone mulch material over compacted drain fill. Place stone mulch material in loose-depth layers not exceeding 6 inches. Thoroughly compact each layer. Fill to finish elevations and slope away from building. Protect adjacent metal cap flashing from damage during stone mulch installation.

3.6 PIPING INSTALLATION

- A. Install piping beginning at low points of system, true to grades and alignment indicated, with unbroken continuity of invert. Bed piping with full bearing in filtering material. Install gaskets, seals, sleeves, and couplings according to manufacturer's written instructions and other requirements indicated.

1. Foundation Subdrainage: Install piping pitched down in direction of flow, at a minimum slope of 1/8" per foot and with a minimum cover of 48 inches, unless otherwise indicated.
 2. Lay perforated pipe with perforations down.
- B. Use increasers, reducers, and couplings made for different sizes or materials of pipes and fittings being connected. Reduction of pipe size in direction of flow is prohibited.
- C. Install PE piping according to ASTM D 2321.
- D. Install PVC piping according to ASTM D 2321.

3.7 PIPE JOINT CONSTRUCTION

- A. Cast-Iron Soil Pipe and Fittings: Hub and spigot, with rubber compression gaskets according to CISPI's "Cast Iron Soil Pipe and Fittings Handbook." Use gaskets that match class of pipe and fittings.
- B. Join PE pipe, tubing, and fittings with couplings for soil-tight joints according to AASHTO's "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties."
- C. Join perforated, PE pipe and fittings with couplings for soil-tight joints according to AASHTO's "Standard Specifications for Highway Bridges," Division II, Section 26.4.2.4, "Joint Properties"; or according to ASTM D 2321.
- D. Join PVC pipe and fittings according to ASTM D 3034 with elastomeric seal gaskets according to ASTM D 2321.
- E. Special Pipe Couplings: Join piping made of different materials and dimensions with special couplings made for this application. Use couplings that are compatible with and that fit both pipe materials and dimensions.

3.8 FOUNDATION SUBDRAINAGE CLEANOUT INSTALLATION

- A. Install cleanouts from subdrainage piping to grade. Locate cleanouts at beginning of piping run and at changes in direction. Install fittings so cleanouts open in direction of flow in piping.
- B. In nonvehicular-traffic areas, use NPS 4 cast iron soil pipe and fittings for subdrainage piping branch fittings and riser extensions to cleanout plug. Set cleanout frames and covers in a cast-in-place concrete anchor, 12 by 12 by 4 inches in depth. Set top of cleanout plug 1 inch above grade.

3.9 FIELD QUALITY CONTROL

- A. Testing: After installing drainage fill to top of pipe, test drain piping with water to ensure free flow before backfilling. Remove obstructions, replace damaged components, and repeat test until results are satisfactory.

3.10 CLEANING

- A. Clear interior of installed piping and structures of dirt and other superfluous material as work progresses. Maintain swab or drag in piping and pull past each joint as it is completed. Place plugs in ends of uncompleted pipe at end of each day or when work stops.

END OF SECTION 324200

SECTION 324300 – LAWN RESTORATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Section Includes:
 - 1. Topsoil and Grading
 - 2. Seeding
 - 3. Turf Restoration and Maintenance

1.2 DEFINITIONS

- A. Finish Grade: Elevation of finished surface of planting soil.
- B. Pesticide: A substance or mixture intended for preventing, destroying, repelling, or mitigating a pest. Pesticides include insecticides, miticides, herbicides, fungicides, rodenticides, and molluscicides. They also include substances or mixtures intended for use as a plant regulator, defoliant, or desiccant.
- C. Pests: Living organisms that occur where they are not desired or that cause damage to plants, animals, or people. Pests include insects, mites, grubs, mollusks (snails and slugs), rodents (gophers, moles, and mice), unwanted plants (weeds), fungi, bacteria, and viruses.
- D. Planting Soil: Existing, on-site soil; imported soil; or manufactured soil that has been modified with soil amendments and perhaps fertilizers to produce a soil mixture best for plant growth.
- E. Subgrade: The surface or elevation of subsoil remaining after excavation is complete, or the top surface of a fill or backfill before planting soil is placed.

1.3 SUBMITTALS

- A. Product data and certificates: For each type of manufactured product, submit data and certificates that the product meets the specification requirements, signed by the product manufacturer, and complying with the following:
 - 1. Products: Topsoil
 - 2. Fertilizer, Biological, and Other Amendments; Existing Soil; and Modified Existing Soil.
- B. Samples: Submit samples of each product and material to the Architect for approval. Label samples to indicate product, characteristics, and locations where product will be used on the site. Samples will be reviewed for appearance only.
 - 1. Submit samples a minimum of 8 weeks prior to the anticipated date of the start of soil installation.

2. Samples of all Topsoil shall be submitted at the same time as the particle size and physical analysis of that material.

1.4 QUALITY ASSURANCE

- A. Installer Qualifications: A qualified landscape installer whose work has resulted in successful turf establishment.
 1. The installer shall be a firm having at least 5 years of experience of a scope similar to that required for the work, including the preparation, mixing and installation of soil mixes to support planting.
- B. Source Quality Control:
 1. Topsoil: Acquire all topsoil and topsoil amendments. Before delivery of topsoil, furnish the Owner's Representative with written statement giving location of properties from which topsoil is to be obtained, names and addresses of owners, depth to be stripped, and crops grown during past two years.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. Seed and Other Packaged Materials: Deliver packaged materials in original, unopened containers showing weight, certified analysis, name and address of manufacturer, and indication of compliance with state and Federal laws, as applicable.
- B. Bulk Materials:
 1. Do not dump or store bulk materials near structures, utilities, walkways, and pavements, or on existing turf areas or plants.
 2. Provide erosion-control measures to prevent erosion or displacement of bulk materials; discharge of soil-bearing water runoff; and airborne dust reaching adjacent properties, water conveyance systems, or walkways.
 3. Accompany each delivery of bulk materials with appropriate certificates.

1.6 FIELD CONDITIONS

- A. Planting Restrictions: Plant during one of the following periods. Coordinate planting periods with initial maintenance periods to provide required maintenance from date of planting completion.
 1. Seed immediately after preparation of seed bed. Seeding shall be done between April 1 and June 1, or between August 15 and September 30.
- B. Weather Limitations: Proceed with planting only when existing and forecasted weather conditions permit planting to be performed when beneficial and optimum results may be obtained. Apply products during favorable weather conditions according to manufacturer's written instructions.

PART 2 - PRODUCTS

2.1 TOP SOIL

A. General

1. General definition: Surface soil in the area surrounding the building will be altered and graded during the construction process but is still considered acceptable for planting and long term health of the plants specified with the proposed modifications. Modifications respond to the soil problems expected or encountered.
2. Soil in the work area shall be suitable for the specified modification at the beginning of planting bed preparation work in that area. In the event that the work of this project construction has damaged the existing soil to the point where the soil is no longer suitable to support the plants specified with the specified modification, the Owner's Representative may require further modification of the damaged soil up to and including removal and replacement with soil of equal quality to the soil that would have resulted from the modification. Damage may include further compaction, contamination, grading, creation of hardpan or drainage problem, and loss of the O, and or A horizon.
3. General requirements for all soil modifications:
 - a. Take soil samples, test for chemical properties, and make appropriate adjustments.
 - b. Unless otherwise instructed, remove all existing plants, root thatch, and nonsoil debris from the surface of the soil using equipment that does not add to the compaction in the soil.
 - c. Complete all soil grading, tilling, and loosening at times when the soil moisture is below field capacity. Allow soil to drain for at least two days after any rain event more than 1 inch in 24 hours or long enough so that the soil does not make the hand muddy when squeezed.
 - d. Provide pre-emergent weed control after the soil work is complete and plants planted but prior to adding mulch to the surface, if indicated by weed type and degree of threat.

B. Modified Existing Soil (soil suitable for planting with indicated modification)

1. Modified Existing Soil – soil removed, stockpiled, and spread. Existing soil that is suitable for reuse as Planting Soil but is in the wrong place or elevation or cannot be adequately protected during construction. Soil is to be harvested, stockpiled and re-spread with or without further modifications as indicated.
2. Modifications:
 - a. Excavate existing soil from the areas and to depths designated on the drawings. Stockpile in zones noted on the drawings or in areas approved by the Cornell Project Manager.
 - b. Excavate soil using equipment and methods to preserve the clumps and peds in the soil. Generally, this means using the largest piece of equipment that is practical for the project size and scope.
 - c. Protect stockpiles from erosion by lightly compacting or tracking the soil surface, covering with breathable fabric or planting with annual grasses as appropriate for the season, location, and length of expected time of storage.
 - d. Re-spread soil as required in Part 3 of this standard.

- C. Modified Existing Soil for Lawn Areas – Low Organic Matter
 - 1. Where areas have low and/or missing soil organic matter
 - 2. The soil organic matter, pH and/or chemistry are not suitable for the proposed plants and should be modified as required.
 - 3. Modifications:
 - a. Amend re-spread topsoil with 3 - 4 inches of Compost over the surface of the soil and make chemical adjustment as recommended by the soil test.
 - b. Till compost into the top 6 inches of the soil.
- D. Soil within the root zone of existing established trees
 - 1. Do not modify or impact grade under canopy of tree.

2.2 SEED

- A. Grass Seed: Fresh, clean, dry, new-crop seed complying with AOSA's "Rules for Testing Seeds" for purity and germination tolerances.
- B. Seed Species:
 - 1. Quality, Non-State Certified: Seed of grass species as listed below for solar exposure, with not less than 85 percent germination, not less than 95 percent pure seed, and not more than 0.5 percent weed seed:
- C. Grass-Seed Mix: Proprietary seed mix as follows:
 - 1. Products: Subject to compliance with requirements, provide the following:
 - a. Type 5: P-5 Premium Ryegrass turf blend:
This grass seed may be used for repair and overseeding as specified by the Cornell Grounds Department.
 - b. This seed mix will consist of the following, or at least 3 approved endophyte enhanced ryegrasses. Blends are available through Banfield-Baker, Lakeside Sod, Winfield or Crosman Seed Company or may be blended at vendor of your choice
 - 20% Palmer IV
 - 20% Prelude IV
 - 20% Dazzle
 - 20% Quest II
 - 20% Drifter

or that have performed in the top statistical grouping from the most recent NTEP trials conducted for the species.

 - c. Seed may NOT be mixed on site. If seed mixed by a dealer, the contractor shall furnish the owner the dealer's guaranteed statement of the composition of the mixture. A sufficient number of seed labels for seed used on campus will be furnished to the Owner's Representative for review, and then incorporated into the University's project files.

2.3 FERTILIZERS

- A. Commercial Fertilizer: Commercial-grade complete fertilizer of neutral character, consisting of fast- and slow-release nitrogen, 50 percent derived from natural organic sources of urea formaldehyde, phosphorous, and potassium in the following composition:
 - 1. Composition:
 - a. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.
- B. Slow-Release Fertilizer: Granular or pelleted fertilizer consisting of 50 percent water-insoluble nitrogen, phosphorus, and potassium in the following composition:
 - 1. Composition:
 - a. 20 percent nitrogen, 10 percent phosphorous, and 10 percent potassium, by weight.
 - b. Nitrogen, phosphorous, and potassium in amounts recommended in soil reports from a qualified soil-testing laboratory.

2.4 MULCHES

- A. Straw Mulch: Provide air-dry, clean, mildew- and seed-free, salt hay or threshed straw of wheat, rye, oats, or barley.
- B. Compost Mulch: Well-composted, stable, and weed-free organic matter, pH range of 5.5 to 8; moisture content 35 to 55 percent by weight; 100 percent passing through 1-inch sieve; soluble salt content of 2 to 5 decisiemens/m; not exceeding 0.5 percent inert contaminants and free of substances toxic to plantings; and as follows:
 - 1. Organic Matter Content: 50 to 60 percent of dry weight.

2.5 PESTICIDES

- A. General: Pesticide, registered and approved by the EPA, acceptable to authorities having jurisdiction, and of type recommended by manufacturer for each specific problem and as required for Project conditions and application. Do not use restricted pesticides unless authorized in writing by authorities having jurisdiction.

2.6 MISCELLANEOUS MATERIALS

- A. Erosion-Control Mulch: Provide clean, seed-free salt hay or threshed straw of wheat, rye, oats or barley
- B. Filtration/Separation Fabric: Water permeable filtration fabric of fiberglass or polypropylene fabric.

- C. Temporary Lawn Protection: Shall include 1" x 1" hardwood stakes, 4' (four feet) high a maximum of 10' (ten feet) apart with a single line of double stranded white polypropylene twine, flagged with 1" wide red weather resistant flag tape. The maximum length of the flagging tapes will be 4" (four inches).

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine areas to be planted for compliance with requirements and other conditions affecting installation and performance of the Work.
 - 1. Verify that no foreign or deleterious material or liquid such as paint, paint washout, concrete slurry, concrete layers or chunks, cement, plaster, oils, gasoline, diesel fuel, paint thinner, turpentine, tar, roofing compound, or acid has been deposited in soil within a planting area.
 - 2. Suspend planting operations during periods of excessive soil moisture until the moisture content reaches acceptable levels to attain the required results.
 - 3. Uniformly moisten excessively dry soil that is not workable or which is dusty.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.
- C. If contamination by foreign or deleterious material or liquid is present in soil within a planting area, remove the soil and contamination as directed by Architect and replace with new planting soil.

3.2 SITE PREPARATION

- A. Excavate to the proposed subgrade. Maintain all required angles of repose of the adjacent materials as shown on the drawings or as required by this standard. Do not over excavate compacted subgrades of adjacent pavement or structures. Maintain a supporting 1:1 side slope of compacted subgrade material along the edges of all paving and structures where the bottom of the paving or structure is above the bottom elevation of the excavated planting area.
- B. Protect adjacent walls, walks and utilities from damage or staining by the soil. Use 1/2 inch plywood and or plastic sheeting as directed to cover existing concrete, metal and masonry work and other items as directed during the progress of the work.
- C. At the end of each working day, clean up any soil spilled on any paved surface.
- D. Any damage to the paving or site features or work shall be repaired at the Contractor's expense.
- E. Protect structures; utilities; sidewalks; pavements; and other facilities, trees, shrubs, and plantings from damage caused by planting operations.
 - 1. Protect grade stakes set by others until directed to remove them.

- F. Install erosion-control measures to prevent erosion or displacement of soils and discharge of soil-bearing water runoff or airborne dust to adjacent properties and walkways.

3.3 TURF AREA PREPARATION

- A. General:
 - 1. Fine grade lawn areas to smooth, even surface with loose, uniformly fine texture. Rake and drag lawn areas, remove ridges and fill depressions, as required to meet finish grades. Limit fine grading to areas which can be planted immediately after grading.
 - 2. Allow for soil settlement. Placing Planting Soil: Blend planting soil in place in place with soil removed from work area.
 - 3. Moisten prepared area before planting if soil is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.
 - 4. Before planting, obtain Architect's acceptance of finish grading; restore planting areas if eroded or otherwise disturbed after finish grading.
- B. Preparation where lawn areas have been disturbed by construction alterations:
 - 1. Renovate existing turf that is disturbed around perimeter of building. Renovation may require repair and amendment of soil in place or removal and re-spreading of amended soil.
 - 2. Install the Planting Soil in a minimum of 6 inches deep and in a maximum of 12 inch lifts to the required depths. Apply compacting forces to each lift as required to attain the required compaction.
 - 3. Ensure subsurface drains, drainage fill and filter fabric are installed prior to re-establishing turf.
 - 4. Prior to installing any Planting Soil from stockpiles or Planting Soil Mixes blended off site, the Owner's Representative will approve the condition of the subgrade.
 - 5. Renovate turf damaged by Contractor's operations, such as storage of materials or equipment and movement of vehicles.
 - 6. Reestablish turf where settlement or washouts occur or where minor regrading is required.
 - 7. Install new planting soil as required.
 - 8. Remove sod and vegetation from diseased or unsatisfactory turf areas; do not bury in soil.
 - 9. Apply seed and protect with straw mulch as required for new turf.
 - 10. Water newly planted areas and keep moist until new turf is established.

3.4 SEEDING

- A. Sow seed with spreader or seeding machine. Do not broadcast or drop seed when wind velocity exceeds 5 mph.
 - 1. Evenly distribute seed by sowing equal quantities in two directions at right angles to each other.
 - 2. Do not use wet seed or seed that is moldy or otherwise damaged.
 - 3. Do not seed against existing trees. Limit extent of seed to outside edge of planting saucer.
- B. Sow grass seed at rate specified for seed mixture type. Increase by 20% for new seeding on slopes in excess of a 3:1 ratio. And when expecting significant seed loss.

- C. Rake seed lightly into top 1/8 inch of soil, roll lightly, and water with fine spray.
- D. Protect seeded areas with slopes exceeding 1:3 with erosion-control blankets installed and stapled according to manufacturer's written instructions.
- E. Protect seeded areas with slopes not exceeding 1:6 by spreading straw mulch. Spread uniformly at a minimum rate of 2 tons/acre to form a continuous blanket 1-1/2 inches in loose thickness over seeded areas. Spread by hand, blower, or other suitable equipment.
 - 1. Anchor straw mulch by crimping into soil with suitable mechanical equipment.

3.5 PREPARATION FOR EROSION-CONTROL MATERIALS

- A. Prepare area as specified in "Site and Turf Area Preparation" Article.
- B. For erosion-control mats, install planting soil in two lifts, with second lift equal to thickness of erosion-control mats. Install erosion-control mat and fasten as recommended by material manufacturer.
- C. Fill cells of erosion-control mat with planting soil and compact before planting.
- D. For erosion-control blanket or mesh, install from top of slope, working downward, and as recommended by material manufacturer for site conditions. Fasten as recommended by material manufacturer.
- E. Moisten prepared area before planting if surface is dry. Water thoroughly and allow surface to dry before planting. Do not create muddy soil.

3.6 TURF MAINTENANCE

- A. General: Maintain and establish turf by watering, fertilizing, weeding, mowing, trimming, replanting, and performing other operations as required to establish healthy, viable turf. Roll, regrade, and replant bare or eroded areas and re-mulch to produce a uniformly smooth turf. Provide materials and installation the same as those used in the original installation.
 - 1. Fill in as necessary soil subsidence that may occur because of settling or other processes. Replace materials and turf damaged or lost in areas of subsidence.
 - 2. In areas where mulch has been disturbed by wind or maintenance operations, add new mulch and anchor as required to prevent displacement.
 - 3. Apply treatments as required to keep turf and soil free of pests and pathogens or disease. Use integrated pest management practices whenever possible to minimize the use of pesticides and reduce hazards.
- B. Watering: Install and maintain temporary piping, hoses, and turf-watering equipment to convey water from sources and to keep turf uniformly moist to a depth of 4 inches.

1. Schedule watering to prevent wilting, puddling, erosion, and displacement of seed or mulch. Lay out temporary watering system to avoid walking over muddy or newly planted areas.
2. Water turf with fine spray at a minimum rate of 1 inch per week unless rainfall precipitation is adequate.

3.7 SATISFACTORY TURF

- A. Turf installations shall meet the following criteria as determined by Architect:
 1. Satisfactory Seeded Turf: At end of maintenance period, a healthy, uniform, close stand of grass has been established, free of weeds and surface irregularities, with coverage exceeding 90 percent over any 10 sq. ft. and bare spots not exceeding 5 by 5 inches.
- B. Use specified materials to reestablish turf that does not comply with requirements and continue maintenance until turf is satisfactory.

3.8 PESTICIDE APPLICATION

- A. Apply pesticides and other chemical products and biological control agents according to requirements of authorities having jurisdiction and manufacturer's written recommendations. Coordinate applications with Owner's operations and others in proximity to the Work. Notify Owner before each application is performed.
- B. Post-Emergent Herbicides (Selective and Nonselective): Apply only as necessary to treat already-germinated weeds and according to manufacturer's written recommendations.

3.9 FINISH GRADING

- A. Grade the finish surface of all planted areas to match the existing grades, allowing for settling. Except as noted:
 1. Where existing slope is towards building on west side, raise grade to create positive slope away from structure.
- B. Utilize hand equipment, small garden tractors with rakes, or small garden tractors with buckets with teeth for fine grading to keep surface rough without further compaction. Do not use the flat bottom of a loader bucket to fine grade, as it will cause the finished grade to become overly smooth and or slightly compressed.
- C. Provide for positive drainage from all areas toward the existing inlets, drainage structures and or the edges of planting beds. Adjust grades as directed to reflect actual constructed field conditions of paving, wall and inlet elevations. Notify the Owner's Representative in the event that conditions make it impossible to achieve positive drainage.
- D. Provide smooth, rounded transitions between slopes of different gradients and direction. Modify the grade so that the finish grade -- before adding mulch and after the soil has settled -- is one or two inches below all paving surfaces or as directed by the drawings.

3.10 CLEANUP AND PROTECTION

- A. Protect installed and/or modified Planting Soil from damage including contamination and over compaction due to other soil installation, planting operations, and operations by other Contractors or trespassers. Maintain protection during installation until acceptance. Utilize fencing and matting as required or directed to protect the finished soil work. Treat, repair or replace damaged Planting Soil immediately.
- B. Provide Plant and Root Protection around all trees. Maintain protection during installation until the substantial completion. Treat, repair or replace damaged work immediately.
- C. Provide temporary erosion control as needed to stop soil erosion until the site is stabilized with mulch, plantings or turf.
- D. Damage done by the Contractor or any of their sub-contractors to existing or installed plants, or any other parts of the work or existing features to remain including those on adjacent property, shall be cleaned, repaired or replaced by the Contractor at no expense to the Owner. The Owner's Representative will determine when such cleaning, replacement or repair is satisfactory.
- E. A certified arborist shall assess damage to existing trees. Promptly remove soil and debris created by turf work from paved areas. Clean wheels of vehicles before leaving site to avoid tracking soil onto roads, walks, or other paved areas.
- F. During installation, keep the site free of trash, pavements reasonably clean and work area in an orderly condition at the end of each day. Remove surplus soil and waste material, including excess subsoil, unsuitable soil, trash, and debris, no less than once per week and legally dispose of them off Owner's property. No debris is to be buried on-site
- G. Erect temporary fencing or barricades and warning signs as required to protect newly planted areas from traffic. Maintain fencing and barricades throughout initial maintenance period and remove after plantings are established.
- H. Remove nondegradable erosion-control measures after grass establishment period.
- I. Immediately clean up any spilled or tracked soil, fuel, oil, trash or debris deposited by the Contractor from all surfaces within the project or on public right of ways and neighboring property.
- J. Equipment and vehicles shall not be washed on-site.
- K. Once installation is complete, wash all soil from pavements and other structures. Ensure that mulch is confined to planting beds and that all tags and flagging tape are removed from the site.
- L. Make all repairs to grades, ruts, and damage to the work or other work at the site. Other work to include compaction relief.

END OF SECTION 324300