WINANS HALL

ROOF REPLACEMENT

PROJECT MANUAL

tbs PROJECT NO. 2502006

Architect: tbs Services, Inc.
17 W. Knight Avenue
Collingswood, NJ 08108
P 856.547.6250

Construction Issue
01 October 2025

ROWAN UNIVERSITY

TABLE OF CONTENTS

END OF SECTION

PLANNING AND CONSTRUCTION

ALLOWANCE AUTHORIZATION

Project: _____

_____

Vendor: _____

_____

Allowance Authorization Number: _____

Date: _____

RU Project Number: _____

PO Number: _____

You are authorized to perform the following item(s) of work and to adjust the Allowance Sum accordingly:

This authorization is due to:
☐ Owners Request ☐ Field Condition Requirement ☐ Unforeseen Condition ☐ Design Error/Omission ☐ DCA Request

Explain:

THIS IS NOT A CHANGE ORDER AND DOES NOT INCREASE OR DECREASE THE CONTRACT AMOUNT

Original Allowance ..... $
Allowance Expenditures prior to this Authorization..... $
Allowance Balance prior to this Authorization..... $
Allowance will be [increased] [decreased] by this Authorization..... $
New Allowance Balance..... $

APPROVAL RECOMMENDED

_____
Rowan Project Manager Date

_____
VP Administration and Finance Date
(amounts >$30,099.99)

_____
AVP Facilities Date
(amounts > $6,019.99)

☐ Attachments

Copies: ☐ Owner ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ File

Revision 1 – October 2010

PLANNING AND CONSTRUCTION

ALLOWANCE CHARGE REQUEST (PROPOSAL)

Project: _____

_____

To: _____

_____

Re: _____

Allowance Charge Request Number: _____

From (Contractor): _____

Date: _____

RU Project Number: _____

PO Number: _____

This Allowance Charge Request contains charges to be made against the contract allowance

Description of Proposed Charge:

Attached supporting information from: ☐ Subcontractor ☐ Supplier ☐ ☐

Reason for Charge:

Attached pages: ☐ Proposal Worksheet Summary:
☐ Proposal Worksheet Details:

Signed by: Date:

Copies: ☐ Owner ☐ Contractor ☐ Consultants ☐ _____ ☐ _____ ☐ _____ ☐ File

Rowan University

Facilities Planning & Construction

REQUEST FOR INFORMATION

RFI No:

Rowan Project No./Description:	Date Submitted:
	Requested Response Date:
	Actual Response Date:
Rowan Project Manager:	
Submitted to:	
Company:	

Contract Document Reference:

RFI DISCUSSION

Individually number each separate topic or question

Submitted by (Name & Company): Title: Date:

RFI RESPONSE

Answered by (Name & Company): Title: Date:

CHANGE ORDER REQUEST

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
FIELD ☐
OTHER ☐

PROJECT: (name, address)

CHANGE ORDER REQUEST NUMBER:

DATE OF ISSUANCE:

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

OWNER: (name, address)

CONTRACT DATE:

ARCHITECT: (name, address)

FROM CONTRACTOR: (name, address)

The contractor must submit this proposal with all appropriate documentation and/or notify the Architect or Owner, in writing, of the date on which proposal submission is anticipated.

THIS IS NOT A CHANGE ORDER, A CONSTRUCTION DIRECTIVE OR A DIRECTION TO PROCEED WITH THE WORK DESCRIBED IN THE PROPOSED MODIFICTIONS.

DESCRIPTION: (Insert a written description of the Work)

ATTACHMENTS: (List attached documents that support description)

REQUESTED BY THE CONTRACTOR:

(Signature)

(Printed Name and title)

CHANGE ORDER

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
FIELD ☐
OTHER ☐

PROJECT:
(name, address)

CHANGE ORDER NUMBER:

DATE:

TO CONTRACTOR:
(name, address)

ARCHITECT'S PROJECT NO:

CONTRACT DATE:

CONTRACT FOR:

PURCHASE ORDER NO:

The Contract is changed as follows:

Not valid until signed by the Owner, Architect and Contractor.

The original (Contract Sum) (Guaranteed Maximum Price) was
New change by previously authorized Change Orders
The (Contract Sum) (Guaranteed Maximum Price) prior to this Change Order was
The (Contract Sum) (Guaranteed Maximum Price) will be (increased) (decreased) (unchanged) by this Change Order in the amount of
The new (Contract Sum) (Guaranteed Maximum Price) including this Change Order will be

The Contract Time will be (increased) (decreased) (unchanged) by ( ) days.
The date of Substantial Completion as of the date of this Change Order therefore is

NOTE: This summary does not reflect changes in the Contract Sum, Contract Time or Guaranteed Maximum Price which have been authorized by Construction Change Directive.

_____	_____	Rowan University
ARCHITECT	CONTRACTOR	OWNER
_____	_____	201 Mullica Hill Road
Address	Address	Address
_____	_____	Glassboro, NJ 08028-1701
BY_____	BY_____	BY_____
DATE_____	DATE_____	DATE_____

Rowan University

PROJECT NAME		**PROJECT NO.**	
CONTRACTOR		**CONTRACT NO.**	
SUBCONTRACTOR		**DATE**	

HOURLY LABOR RATE BREAKDOWN FORM

All Contractors (Including sub-subcontractors) need to include a detailed breakdown of all wage rates, payroll burden costs and material costs for lump sum and time and material extras. Payroll burden items, FICA, FUI, SUI, and Workmen's Compensation will be reimbursed on an average annualized basis. **This information must be provided for all trade to be utilized on the project by any and all contractors at the time of contractors bid submission.** The required format is as follows:
(Reference 'Change Orders' in AIA 201 General Conditions. Certified payrolls required for all workers on Project.)

TRADE: _____ **CLASSIFICATION:** _____

Item	Benefit Paid	Benefit Provided	Rate Per $100	Prevailing Wage Rate: Regular Time	Overtime	Double Time	Notes
Base Labor Rate							*Use certified payroll to verify.*
	Benefit Paid	Benefit Provided					
Fringe Benefits:	(put X in appropriate box)						
Pension [1]							
Annuity Fund [1]							
Health/Welfare [1]							
Training/Certification [1]							
Vacation [1]							
Paid Holiday [1]							
Associate Dues [1]							
Other [1]							
Fringe Benefits Subtotal							
Total PW Hourly Rate							*= Base Labor Rate + Benefits*
Benefits Paid							
Total Paid Hourly Rate							*= Base Labor Rate + Benefits*
Burden: Taxes & Insurance [2]							
FICA							
Medicare							
Federal Unemployment							
State Unemployment							*Maximum - 0.062.*
Workers Compensation [1]							*Usually less than 11%; can*
Other [1]							
Other [1]							
Burden Subtotal							
Contractor Liability Insurance				N/A	N/A	N/A	*Included in OH&P*
Small Tools				N/A	N/A	N/A	*Included in OH&P*
Other (warranty, record drawings, payment bonds, performance bonds, etc.)				N/A	N/A	N/A	*Included in OH&P*
TOTAL HOURLY RATE (Total Hourly Rate + Burden)							*= Amount Contractor paid to employee*

Note: For change order work, mark-ups for overhead and profit shall be applied to the above rates (these rates are subject to audit) in accordance with the provisions of AIA 201 General Conditions, under 'Change Orders'.

[1] Costs for Overtime and Double Time are same as for Regular Time.

[2] Taxes & Insurance apply to Total Paid Hourly Rate which includes Base Labor Rate plus benefits paid in cash.

By signing below, the submitter certifies and declares under penalty of perjury under the laws of the State of New Jersey that the foregoing is true and correct.

Rates certified by: _____ (print name) Company Name: _____

Signature: _____ Date: _____

RowanUniversity

PROJECT NAME	**Superiority Hall Renovation Project**	**PROJECT NO.**	**RU00000**
CONTRACTOR	**Cut No Corners Contractors**	**CONTRACT NO.**	**PO000000**
SUBCONTRACTOR	**Don Write Electrical**	**DATE**	**1/1/2019**

HOURLY LABOR RATE BREAKDOWN FORM

All Contractors (Including sub-subcontractors) need to include a detailed breakdown of all wage rates, payroll burden costs and material costs for lump sum and time and material extras. Payroll burden items, FICA, FUI, SUI, and Workmen's Compensation will be reimbursed on an average annualized basis. **This information must be provided for all trade to be utilized on the project by any and all contractors at the time of contractors bid submission.** The required format is as follows:
(Reference 'Change Orders' in AIA 201 General Conditions. Certified payrolls required for all workers on Project.)

TRADE: Electrical **CLASSIFICATION:** Electrical Forman

Item	Benefit Paid	Benefit Provided	Rate Per $100	Prevailing Wage Rate: Regular Time	Overtime	Double Time	Notes
Base Labor Rate				$ 37.40	$ 56.10	$ 74.80	*Use certified payroll to verify.*
	Benefit Paid	Benefit Provided					
Fringe Benefits:	(put X in appropriate box)						
Pension [1]		X		5.65	5.65	5.65	
Annuity Fund [1]		X		-	-	-	
Health/Welfare [1]	X			10.40	10.40	10.40	
Training/Certification [1]	X			0.70	0.70	0.70	
Vacation [1]		X		-	-	-	
Paid Holiday [1]		X		-	-	-	
Associate Dues [1]		X		-	-	-	
Other [1]		X		0.41	0.41	0.41	
Fringe Benefits Subtotal				$ 17.16	$ 17.16	$ 17.16	
Total PW Hourly Rate				$ 54.56	$ 73.26	$ 91.96	*= Base Labor Rate + Benefits*
Benefits Paid				$ 11.10	$ 11.10	$ 11.10	
Total Paid Hourly Rate				$ 48.50	$ 67.20	$ 85.90	*= Base Labor Rate + Benefits*
Burden: Taxes & Insurance [2]							
FICA			0.0620	3.01	4.17	5.33	
Medicare			0.0145	0.70	0.97	1.25	
Federal Unemployment			0.0080	0.39	0.54	0.69	
State Unemployment				-	-	-	*Maximum - 0.062.*
Workers Compensation [1]				-	-	-	*Usually less than 11%; can*
Other [1]				-	-	-	
Other [1]				-	-	-	
Burden Subtotal				$ 4.10	$ 5.68	$ 7.26	
Contractor Liability Insurance				N/A	N/A	N/A	*Included in OH&P*
Small Tools				N/A	N/A	N/A	*Included in OH&P*
Other (warranty, record drawings, payment bonds, performance bonds, etc.)				N/A	N/A	N/A	*Included in OH&P*
TOTAL HOURLY RATE (Total Hourly Rate + Burden)				**$ 58.66**	**$ 78.94**	**$ 99.22**	*= Amount Contractor paid to employee*

Note: For change order work, mark-ups for overhead and profit shall be applied to the above rates (these rates are subject to audit) in accordance with the provisions of AIA 201 General Conditions, under 'Change Orders'.

[1] Costs for Overtime and Double Time are same as for Regular Time.

[2] Taxes & Insurance apply to Total Paid Hourly Rate which includes Base Labor Rate plus benefits paid in cash.

By signing below, the submitter certifies and declares under penalty of perjury under the laws of the State of New Jersey that the foregoing is true and correct.

Rates certified by: **Don Write** (print name) Company Name: **Don Write Electrical**

Signature: *Don Write* Date: *1/1/2019*

DAILY JOB REPORT

Project #

DATE:	
WEATHER CONDITIONS:	
VISITORS:	

CONTRACTORS ON SITE:	***SUPER ON SITE (Y/N):***	**WORKFORCE ON SITE: (Foreman, Tradesmen, Laborers, etc.)**	***NO. OF WORKERS***	***WORK BEING DONE:***

MATERIALS DELIVERED:	***EQUIPMENT ONSITE:***

PROBLEMS/STATUS/CAUSES FOR DELAY:

NOTEWORTHY PHONE CALLS:

APPLICATION AND CERTIFICATE FOR PAYMENT

AIA DOCUMENT G702

TO OWNER:

PROJECT:

APPLICATION NO:

PERIOD TO:

PROJECT/CONTRACT NO:

FROM CONTRACTOR:

VIA ENGINEER:

CONTRACT DATE:

APPLICATION DATE:

CONTRACTOR'S APPLICATION FOR PAYMENT

CHANGE ORDER SUMMARY			
Change Orders approved in previous months by owner		ADDITIONS	DEDUCTIONS
TOTAL			
Approved This Month			
Number	Date Approved		
TOTALS			
Net Change By Change Orders			

The undersigned Contractor certifies that to the best of the Contractor's knowledge, information and belief the work covered by this Application for Payment has been completed in accordance with the Contract Documents, that all amounts have been paid by the Contractor for Work for which previous Certificates for Payment were issued and payments received from the Owner, and that current payment shown herein is now due.

CONTRACTOR:

By: _____ Date: _____

Application is made for Payment, as shown below, in connection with the Contract.
Continuation Sheet, AIA Document G703, is attached.

1. ORIGINAL CONTRACT SUM..... _____
2. Net change by Change Orders..... _____
3. CONTRACT SUM TO DATE (LINE 1 + 2)..... _____
4. TOTAL COMPLETED & STORED TO DATE..... _____
   {Column G on G703}
5. Retainage:
   a. _____ % of Completed Work.. _____
      {Column D + E on G703}
   b. 0 % of Stored Materials... _____
      {Column f on G703}
   Total Retainage (line 5a + 5b or
   Total in Column I of G703)..... _____
6. TOTAL EARNED LESS RETAINAGE..... _____
   {Line 4 less Line 5 Total}
7. LESS PREVIOUS CERTIFICATES FOR
   PAYMENT (Line 6 from prior Certificate)..... _____
8. **CURRENT PAYMENT DUE**..... _____
9. BALANCE TO FINISH, PLUS RETAINAGE..... _____
   {Line 3 less Line 6}

State County of:
Subscribed and sworn to before me this day of 2010
Notary Public:
My Commission expires:

ARCHITECT'S CERTIFICATE FOR PAYMENT

In accordance with the Contract Documents, Based on on-site observations and the data comprising the above application, the Architect certifies to the Owner that to the best of the Architect's knowledge, information and belief the Work has progressed as indicated, the quality of the Work is in accordance with the Contract Documents, and the Contractor is entitled to payment of the AMOUNT CERTIFIED.

AMOUNT CERTIFIED..... $ _____

{Attach explanation if amount certified differs from the amount applied for.}

ARCHITECT:

By: _____ Date: _____

This Certificate is not negotiable. THE AMOUNT CERTIFIED is payable only to the Contractor named herein. Issuance, payment and acceptance of payment are without prejudice to any rights of the Owner or Contractor under this Contract.

CONTINUATION SHEET

AIA Document G702, APPLICATION AND CERTIFICATE FOR PAYMENT, containing
Contractor's signed Certification is attached.
In tabulations below, amounts are stated to the nearest dollar
Use Column I on Contracts where variable retainage for line items may apply.

APPLICATION NO:
APPLICATION DATE:
PERIOD TO:
PROJECT NO:

A	B			C	C	D			E			F	G	H	I
ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT OF MEASURE	PRICE	SCHEDULED VALUE	FROM PREVIOUS APPLICATION	UNIT OF MEASURE	TOTAL	WORK COMPLETED COMPLETED THIS PERIOD	UNIT OF MEASURE	TOTAL	MATERIALS PRESENTLY STORED NOT IN D OR E	TOTAL COMPLETED AND STORED TO DATE D+E+F	% G/C	BALANCE TO FINISH C - G

Attachment to G702 (or equivalent)
Certification for Payment

Project Name:_____
Project Number:_____Payment Number:____

I, _____, a prime contractor working for Rowan University on the above-mentioned project, hereby certify as required by P.L. 191, c.507 of the State of New Jersey that: **(you must check one under "A" and one under "B")**

A. With respect to previous progress payments:

( ) all my sub-contractors and suppliers have been paid all amounts due from all previous progress payments I have received from Rowan University for my work on this project

( ) all my sub-contractors and suppliers have been paid all amounts due from all previous progress payments with the exception of those listed below for which payment is being withheld as there exists a valid basis for those sub-contractors and suppliers listed below under the terms of their contract(s) to withhold payment from each such sub-contractor and supplier:

1._____

2._____

3._____

For each such sub-contractor and supplier for which payment is being withheld, I further certify that written notice detailing the specific reason(s) for withholding payment has been provided to each such sub-contractor and supplier with copies

thereof provided to my performance bond company and Rowan University.

B. With respect to this payment number_____:

( ) all my sub-contractors and suppliers shall be paid all amounts due from this progress payment

( ) all my sub-contractors and suppliers shall be paid all amounts due from this progress payment with the exception of those listed below for which payment will be withheld as there exists a valid basis for those sub-contractors and suppliers listed below under the terms of their contract(s) to withhold payment from each such sub-contractor and supplier:

1._____

2._____

3._____

For each sub-contractor and supplier for which payment is being withheld, I further certify that written notice detailing the specific reason(s) for withholding payment has been provided to each sub-contractor and supplier with copies thereof provided to my performance bond company and Rowan University.

I certify that the above statements are true. I am aware that if any of the above statements are willfully false, I am subject to punishment.

Dated:_____ _____

Signature

_____

Please Print Name

CONTRACTOR'S PARTIAL OR FINAL RELEASE AND WAIVER OF LIENS

OWNER: **CONTRACT FOR:**

OWNER'S AGENT:

PROJECT: **CONTRACT DATE:**

Upon receipt by the undersigned Contractor of a check from Owner in the sum of $_____, which check will consume payment of all sums due the Contractor for labor, equipment and/or materials supplied in connection with the Project, and when said check has been paid by the bank upon which it is drawn, this document shall become effective to fully and finally waive and release any and all liens, claims, liabilities, actions, and demands that this Contractor and all its subcontractors have or might have against Owner, Lender, the Project, the real property upon which the Project is located and any and all other property owned by Owner on account of or in connection with labor, equipment and/or materials supplied by the undersigned to the Project.

The undersigned Contractor does hereby further acknowledge and represent that through the date hereof the undersigned has received payments totaling $_____ for labor, equipment and/or materials supplied to the Project.

This instrument has been executed as of the _____ day of _____, 20__.

CONTRACTOR:

_____

By: _____

Name: _____

Title: _____

STATE OF _____ δ
δ
COUNTY OF _____ δ

Sworn to and subscribed before me the undersigned authority on this _____ day of _____, 20__.

[S E A L]

_____
Notary Public, State of _____

My Commission Expires:

_____

_____
Printed Name of Notary Public

Rowan University

To Whom It May Concern:

Your recent request to Rowan University requesting information or a tax exempt form is hereby acknowledged.

It has been determined that Rowan University is a government body and is Exempt from New Jersey Sales and Use Taxes imposed by the Sales and Use Tax Act (P.L. 1966, c.30 and c.52). An opinion from the State of New Jersey, Office of the Attorney General has been reproduced below.

If you have any questions, please contact the Accounts Payable Office at (856) 256-4115.

Sincerely,

Joseph F. Scully, Jr.
Vice President for Finance & CFO

State of New Jersey

CHRIS CHRISTIE
Governor

KIM GUADAGNO
Lt. Governor

OFFICE OF THE ATTORNEY GENERAL
DEPARTMENT OF LAW AND PUBLIC SAFETY
DIVISION OF LAW
25 MARKET STREET
PO Box 112
TRENTON, NJ 08625-0112

PAULA T. DOW
Attorney General

ROBERT M. HANNA
Director

May 4, 2011

Joseph F. Scully, Jr.
Vice President for Finance & CFO
Rowan University
Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028-1701

Re: Tax Exempt Status of Rowan University
Federal Tax ID #222-764-819

Dear Mr. Scully:

You have asked this office for an opinion whether Rowan University is obligated to pay New Jersey sales and use taxes in the conduct of the University's business.

You are hereby advised that, pursuant to N.J.S.A. 54:32B-9, any sales, service or amusement charge by or to the University or any use or occupancy by the University is not subject to taxes imposed by the New Jersey Sales and Use Tax Act, N.J.S.A. 54:32B-1 et seq., where the University or its authorized representative conducting University business, is the purchaser, user or consumer. Further, should the United States or any other state grant an exemption from certain taxes to the State of New Jersey, Rowan University, as an arm of the State, is entitled to such consideration.

Sincerely yours,

PAULA T. DOW
ATTORNEY GENERAL OF NEW JERSEY

By: Cheryl R. Clarke
Cheryl R. Clarke
Deputy Attorney General

CRC/rd

HUGHES JUSTICE COMPLEX • TELEPHONE: (609) 292-8572 • FAX: (609) 943-5853
New Jersey Is An Equal Opportunity Employer • Printed on Recycled Paper and Recyclable

Chief Financial Officer
Bole Hall
201 Mullica Hill Road
Glassboro, NJ 08028-1701

856-256-4127
856-256-4443 fax

CONSENT OF SURETY COMPANY TO FINAL PAYMENT

AIA DOCUMENT G707

OWNER ☐
ARCHITECT ☐
CONTRACTOR ☐
SURETY ☐
OTHER

PROJECT:
(name, address)

TO (Owner)

ARCHITECT'S PROJECT NO:

CONTRACT FOR:

CONTRACT DATE:

CONTRACTOR:

In accordance with the provisions of the Contract between the Owner and the Contractor as indicated above, the (there insert name and address of Surety Company)

, SURETY COMPANY,

on bond of (there insert name and address of Contractor)

, CONTRACTOR,

hereby approves of the final payment to the Contractor, and agrees that final payment to the Contractor shall not relieve the Surety Company of any of its obligations to (there insert name and address of Owner)

, OWNER,

as set forth in the said Surety Company's bond.

IN WITNESS WHEREOF,
the Surety Company has hereunto set its hand this day of 2017

Surety Company

Signature of Authorized Representative

Attest:
(Seal):

Title

NOTE: This form is to be used as a companion document to AIA DOCUMENT G706, CONTRACTOR'S AFFIDAVIT OF PAYMENT OF DEBTS AND CLAIMS, Current Edition

SECTION 011000 - SUMMARY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

1. This Section includes the following:
    1. Work covered by the Contract Documents
    2. Contract
    3. Specification formats and conventions
    4. Use of premises.

2. Related Sections include the following:

    1. Division 01 Section “Construction Facilities and Temporary Controls” for limitations and procedures governing temporary use of Owner’s premises.

1.3 WORK COVERED BY CONTRACT DOCUMENTS

1. Project Identification:

    1. Project Location: Rowan University, Glassboro, New Jersey

        a. Winans Hall Roof Replacement

    2. Owner: Rowan University

2. Architect Identification: The Contract Documents were prepared for Project by:

    1. TBS Services, Inc., (“TBS”)
    17 W. Knight Ave., Collingswood, NJ 08108
    Architects Representative: Lauren Whitney, Project Manager
    P: 856.547.6250
    lwhitney@tbsservices.com

3. The Work consists of the following:
    1. The scope of work shall not be limited to what is specifically called out on the drawings and/or specifications, but shall include any and all demolition, temporary work, protection of stockpiled materials for re-use, dewatering, cutting and patching, temporary protection and shoring, and all work as required to accomplish the intended construction.
    2. The contractor will be permitted to conduct their building surveys once the letter of award is issued. Contractor shall also begin the submittal process.
    3. Contractor must outline in their bid any long lead items that may impact their ability to meet the deadlines of the schedule. Failure to advise of long lead items shall

preclude Contractor from right to additional time and/or costs associated with such delay.

4. Rowan University has submitted the Plans and Specification to The Department of Community Affairs (DCA) for the Plan Review Process.
5. Contractor is responsible for submitting and securing all necessary permits to complete the work.
6. Bid shall include all work shown on the Contract Drawings, Technical Specifications, and other documents issued under this IFB.
7. Contractor must follow all OSHA and Rowan safety guidelines and procedures.
8. Contractor shall Schedule and Coordinate all work activities with Rowan University.
9. Contractor must bid the project to meet the schedule outlined in the bid documents which may include weekend and/or shift work. Contractor must staff the project accordingly to meet the schedule since the end date is firm. Rowan will not entertain change orders for contractor's inability to meet this schedule or time extensions.
10. Contractor is responsible to schedule and manage all required inspections, including but not limited to Final Certificate of Occupancy inspection.
11. Contractor is required to maintain a clean job site and to turn over the building back to the owner in the condition is was received.
12. Contractor is responsible to perform final cleaning prior to Final Turn Over and Owner's Final Acceptance.

1.5 SPECIFICATION FORMATS AND CONVENTIONS

A. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "MasterFormat" numbering system.

1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

1.4 USE OF PREMISES

1. General Construction Operations: Contractor shall have limited use of premises for construction operations, including a limited use of the project site (outside the facilities exterior walls) during the period of construction activity. Contractor's use of the premises is limited by Rowans right to perform work or to retain other contractor's on portions of the Project or to limit access for events or other functions as the University might require. The Contractor will be given notice of any such events well in advance so that arrangements can be made to insure the prosecution of the work continues as scheduled.

2. Arrange use of site and premises to allow:

    1. Owner occupancy.
    2. Work by others.
    3. Work by Owner.

3. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of Project site beyond the building perimeter unless prior approval of the University is received prior to conduction such work or operations.

    1. Limit site disturbance, as approved by Rowan University.
    2. **REFER TO SECTION 011400 FOR WORK HOURS.**

3. Storage of construction materials and equipment is not permitted inside the existing building.
4. Driveways and Entrances: Keep driveways and entrances serving premises clear and available to Rowan University, Rowans employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

    a. Schedule deliveries to minimize use of the driveways and entrances.
    b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

4. Use of Existing Building: Maintain existing building in a weather tight condition throughout construction period. Repair damage caused by construction operations. Protect building and its occupants during construction period.

5. **The Contractor will be responsible for photographing the entire area of work, adjacent spaces where incidental work may occur, corridors and elevators accessing the area of work, the loading area, and contractor parking area. The Contractor will provide Owner with digital copies of all the photographs prior to mobilization as a record of the existing conditions PRIOR to the start of the works. Digital format shall be in PDF format.**

1.5 SPECIFICATION FORMATS AND CONVENTIONS

1. Specification Format: The Specifications are organized into Divisions and Sections using the 48-division format and CSI/CSC's "Master Format" numbering system.

    1. Section Identification: The Specifications use section numbers and titles to help cross-referencing in the Contract Documents. Sections in the Project Manual are in numeric sequence; however, the sequence is incomplete. Consult the table of contents at the beginning of the Project Manual to determine numbers and names of sections in the Contract Documents.

1.6 MISCELLANEOUS PROVISIONS

A. WORK REQUIRED TO BE PERFORMED UNDER THIS CONTRACT SHALL BE COMPLETED IN ACCORDANCE WITH THE FOLLOWING MILESTONES AND COMPLETION DATES. CONTRACTORS MUST INCLUDE IN THEIR BIDS ALL COSTS INCLUDING OVERTIME ASSOCIATED WITH INSURING THAT THE PROJECT IS COMPLETED BY THE MILESTONE DEADLINES LISTED HEREIN.

B. Summary of Milestones:

1. The Notice to Award is anticipated on or about **March 20, 2026**.
2. The Notice to Proceed, Construction Contract, and/or University purchase order as evidence of contract award is anticipated on or about **April 10, 2026**.
3. All Submittals and Shop Drawings must be submitted to the Architect within **10 days** of issuance of the Notice to Proceed.
4. Any materials identified as having long lead times are to be submitted to the Architect and Owner for approval and ordering of materials within **2 weeks** after the date established in the Notice to Proceed, University Contract and/or purchase order. The contractor will be responsible for all additional costs associated with material escalations and no extension of time will be afforded should the contractor not appropriately identify and order materials within the time frame herein
5. All construction activities may not proceed until **May 18, 2026**.
6. Substantial Completion and a weather tight building by **August 1, 2026**

7. Final Completion will be achieved within **10 calendar days** from the issuance of Substantial Completion which will include All construction punch list work, closeout documentation, final payment application, etc.

C. Weather Conditions:

1. Unfavorable weather conditions shall not be justification for delays in completion or final completion dates as specified. No change orders will be issued or approved for extensions of time due to weather conditions. Seasonal weather conditions shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures for the completion of all contract work within the allotted contract time. In addition, appropriate allowances shall be made for anticipated time losses due to normal rain and snow conditions by statistically expanding the estimated time durations for weather sensitive activities with the constraint that the substantial completion deadline cannot change.
2. The University may at its sole discretion entertain extensions of time from the contractor for weather related delays. However no extensions of time shall be considered by the University until at least twenty-five (25) lost project schedule days have accrued. Lost time will accrue on a proportionate basis – 1/4 lost day will be charged as 1/4 lost day, 1/2 lost day will be charged as 1/2 lost day, and so forth. A lost project schedule day is considered a day or any portion of a day when all members of the construction workforce on the project cannot work due to inclement weather conditions. Whether or not the contractors' workforce fails to begin work or leaves the project site on any given day due to a claim of inclement weather a lost project schedule day will not be recognized by the University until it is approved in writing by the Owner's Project Manager.
3. Should the University approve an extension of time the contractor may only submit reimbursement for the cost of the extension of rental equipment agreements; bond premium and insurance adjustments at actual cost with no mark up; and general conditions directly impacted by the approved extension. Appropriate back up documentation as requested by the Owner's Project Manager must accompany any submission for reimbursement. Appropriate back up can be anything from copies of contractor's rental agreements showing rental durations, unit costs, rental rates, etc. to copies of superintendents pay stubs.

D. Intent of Contract: The drawings and specifications of the contract are intended to require the contractor to provide for everything reasonably necessary to accomplish the proper and complete finishing of the work. All work and materials included in the specifications and not shown on the drawings, or shown on the drawings and not in the specifications, shall be performed and/or furnished by the contractor as if described in both. Any incidental materials and/or work not specified in the drawings and/or the specifications which are, nevertheless, necessary for the true development thereof and reasonably inferable therefrom, the contractor shall understand the same to be implied and required, and shall perform all such work and furnish all such materials as if particularly delineated or described therein. Should there be an obvious error between the drawings and specifications, the most stringent constraints of the conflicting information shall be assumed by the contractor and it shall be the contractor's responsibility to complete the work as reasonably required, consistent with the intent of such drawings and specifications as may be interpreted by the University.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011000

SECTION 011400 – WORK RESTRICTIONS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 USE OF PREMISES

A. Use of Site: Limit use of premises to work in areas indicated. Do not disturb portions of site beyond areas in which the Work is indicated.

1. Limits: Confine construction operations to weekdays (Monday through Friday) from 6:00 AM to 5:00 PM. Weekend and Holiday work may be permitted if approved by the Owner.
2. Owner Occupancy: Allow for Owner occupancy of building, site and use by the public.
3. Driveways and Entrances: Keep streets, driveways and entrances serving premises clear and available to owner, Owner's employees, and emergency vehicles at all times. Do not use these areas for parking or storage of materials.

a. Schedule deliveries to minimize use of driveways and entrances.
b. Schedule deliveries to minimize space and time requirements for storage of materials and equipment on-site.

B. Use of Existing Building: Repair damage caused by construction operations. Protect building and its occupants during construction period.

1.3 OCCUPANCY REQUIREMENTS

A. Full Owner Occupancy: Owner will occupy site and existing building during entire construction period. Cooperate with owner during construction operations to minimize conflicts and facilitate Owner usage. Perform the Work so as not to interfere with Owner's operations.

1. Any crane activities must be coordinated with the occupants of the building prior to the start of work.

1.4 WORK SEQUENCE

A. Work shall be completed within the schedule as outlined in Section 011000 – Summary. University intends to issue Notice to Proceed, Construction Contract, and/or University Purchase Order as evidence of contract award on or before Project start date listed.

1.5 CONTRACTOR WORK AREAS, WORKING CONDITIONS AND EQUIPMENT STORAGE REGULATIONS

A. The Contractor shall not unreasonably encumber the facilities with its equipment or work to be performed. Work conducted by the Contractor, Subcontractor, or any other person

and/or firm affiliated with the Contractor shall be contained within pre-designated working areas established by the documents.

B. The Contractor shall, at all times during the progress of the work, keep the site free from the accumulation of all rubbish and debris caused by its performance. The Contractor shall remove all debris and rubbish related to its work at the end of each workday to the satisfaction of the Owner's Project Manager. Tool storage boxes shall not be permitted inside the building on the first floor or outside the building.

C. The Contractor shall adequately secure and protect its equipment, materials and vehicles. The University assumes no liability for any damage to, or theft of, the Contractor's property. The Contractor shall have the use of a designated area for storage and staging of construction materials and equipment. The Contractor shall be responsible for adhering to security procedures outlined by the Owner's Project Manager.

D. The Contractor is responsible for all safety precautions for all of its employees and property while performing its services.

E. The Contractor shall strictly limit its employees' use of the facilities for lunch, smoking or rest time usage to only those areas designated by the Owner's Project Manager. Use of facility telephones will not be allowed. Use of building toilet facilities shall not be permitted. Smoking is not allowed inside the building.

1.6 WORK STOPPAGES, EXISTING UTILITY INTERRUPTIONS, NOISE AND ODOR RESTRICTIONS, AND MATERIAL APPROVALS

A. Work Stoppages – DOES NOT APPLY.

B. Existing Utility Interruptions: Do not interrupt utilities serving facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary utility services according to requirements indicated:

1. Notify Owner not less than five (5) working days in advance of proposed utility interruptions.
2. Do not proceed with utility interruptions without Owner's Project Manager's written permission.

C. Consideration shall be given by the Contractor regarding odors emanating from adhesives and sealants, etc and excessive noise. If the odors or noise are such that they may disturb the employees and guests, then such work shall be performed while the building is not occupied. This determination shall be at the sole discretion of the Owner's Project Manager. The playing of radios and other unnecessary noise will not be permitted at any time.

D. All safety data sheets shall be submitted and approved by the Owner's Project Manager prior to use of the material.

E. The playing of radios and other unnecessary noise will not be permitted at any time.

1.7 PROTECTION OF INTERIOR FINISHES

A. The Contractor shall take extra care to avoid damage or soiling to any part of the facility. The Contractor is responsible for all damages or destruction caused directly or indirectly by its performance to any part of the building or adjoining property. Any damage or destruction

caused by the Contractor or its employees will be repaired or replaced as the Owner's Project Manager directs and to their satisfaction with all costs charged to the Contractor. The costs may be deducted from any and all amounts due to the Contractor.

B. Any of the Contractor's employees found defacing, damaging or marring the building or its finishes or contents shall be immediately removed by the Contractor. The Contractor shall be charged for all remedial work to restore the damaged area or contents to their original condition to the satisfaction of the State.

C. The Contractor shall take all necessary steps to ensure adequate protection of all building furniture, equipment and building finishes, including but not limited to: floors, walls, ceilings, windows, draperies, blinds, carpeting, doors, doorways and contents. In this endeavor, all workers are to take precautions to protect rugs and floors. The Contractor shall be charged for all remedial work to clean, repair and/or replace items damaged by the Contractor to the satisfaction of the State.

D. The Contractor is responsible for the cost of cleanup of dust, dirt and stains caused by the work to the satisfaction of the Owner's Project Manager. The Contractor shall take all necessary precautions to keep dust, dirt and debris to a minimum both within the construction area and throughout the buildings.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 011400

SECTION 01210 - ALLOWANCES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements governing allowances.

1. Certain items are specified in the Contract Documents by allowances. Allowances have been established in lieu of additional requirements and to defer selection of actual materials and equipment to a later date when additional information is available for evaluation. If necessary, additional requirements will be issued by Change Order Directive **THE ALLOWANCE SHALL BE INCLUDED IN THE BASE BID**.

B. Types of allowances include the following:

1. Lump-sum allowances.

C. Related Sections include the following:

1. Division 01 Section "Quality Control Services" for procedures governing the use of allowances for testing and inspecting.
2. Divisions 02 through 48 Division Sections for items of Work covered by allowances.

1.3 SELECTION AND PURCHASE

A. If applicable, at the earliest practical date after award of the Contract, advise Architect of the date when final selection and purchase of each product or system described by an allowance must be completed to avoid delaying the Work.

B. At Architects request and Owners approval, obtain proposals for each allowance for use in making final selections. Include recommendations that are relevant to performing the Work.

C. Purchase products and systems selected by Architect from the designated supplier.

1.4 SUBMITTALS

A. Submit proposals for purchase of products or systems included in allowances, in the form specified for Change Orders.

B. Submit invoices or delivery slips to show actual quantities of materials delivered to the site for use in fulfillment of each allowance.

C. Coordinate and process submittals for allowance items in same manner as for other portions of the Work.

D. All Allowances will be recorded as separate line items on the initial Schedule of Values to be approved by the Owner and/or Architect. Once the initial Schedule of Values is approved all subsequent Schedule's will continue to include these Allowances as separate line items. Allowances will be tracked as separate line items.

1.5 COORDINATION

A. Coordinate allowance items with other portions of the Work. Furnish templates as required to coordinate installation.

1.6 LUMP-SUM ALLOWANCES

A. Allowance shall include cost to Contractor of specific products and materials and shall include taxes, freight, and delivery to Project site.

B. Contractor's costs for receiving and handling at Project site, labor, installation, overhead and profit, and similar costs related to products and materials accepted by Owner under this Section shall be included as part of the allowance.

1.7 UNUSED MATERIALS

A. Return unused materials purchased under an allowance to manufacturer or supplier for credit to Owner, after installation has been completed and accepted.

1. If requested by Architect, prepare unused material for storage by Owner when it is not economically practical to return the material for credit. If directed by Architect, deliver unused material to Owner's storage space. Otherwise, disposal of unused material is Contractor's responsibility.

1.8 UNUSED ALLOWANCES

A. All unused Allowances are and will remain the Owner's property. The Contractor shall return any remaining Allowance balances to the Owner upon completion of all punch list items and Final Acceptance of the Building.

1. Allowance balances will be returned to the Owner by Change Order.

2. Change Orders for returning Allowance balances to the Owner will be initiated and approved prior to the Contractor submitting for Final Payment. Allowance balances will not be included in the Final Application for Payment.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine products covered by an allowance promptly on delivery for damage or defects. Return damaged or defective products to manufacturer for replacement.

3.2 PREPARATION

A. Coordinate materials and their installation for each allowance with related materials and installations to ensure that each allowance item is completely integrated and interfaced with related work.

3.3 SCHEDULE OF ALLOWANCES

A. Allowance No. 01: Please provide (included in the Base Bid) a $20,000.00 allowance for permits.

END OF SECTION 012100

SECTION 012400 – PROCEDURES AND CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 DESCRIPTION OF WORK

A. The types of minimum requirements for procedures and performance or control work of a general nature, to be fulfilled collectively by contractors, include but are not necessarily limited to the following categories:

1. Coordination and meetings.
2. Administration/supervisory personnel.
3. Examination and checking of contract drawings.
4. Surveys and records or reports.
5. Limitations for use of site.
6. Protection of Persons and Property.
7. Special reports.
8. Subcontractor, material approval.
9. Tradesmen and workmanship standards.
10. Inspections, tests and reports.
11. Progress photographs.
12. General installation provisions.
13. Control Wiring.
14. Chases, recesses and openings.
15. Sleeves, built-in items.
16. Cutting and patching.
17. Uncovering and correction of work.
18. Cleaning and protection.
19. Conservation and salvage.

1.3 COORDINATION AND MEETINGS

A. General: Contractor shall prepare a written memorandum of general instructions on required coordination activities including notices/reports/meetings, and distribute memorandum to each engaged entity performing work at project site, with copies to Architect and Owner.

B. Coordination Drawings: Where work by separate entities requires off-site fabrication of products and materials which must be accurately interfaced and closely intermeshed to produce required results, prepare coordination drawings to indicate how work shown by separate shop drawings will be interfaced, intermeshed, and sequenced for installation.

1. Comply with submittal requirements of "Submittals" section, and other requirements outlined in the other Divisions.

C. Biweekly Job Meeting: The Contractor’s Project Manager and Superintendent, the Owner's

Project Manager and the Architect shall attend biweekly job meetings convened by the Owner for the purpose of affording the opportunity to review Contractor's coordination efforts, to expedite the performance of administrative tasks, and to generally assess the work progress. Contractor shall require representation (at each meeting) by every entity currently involved in coordination or planning for the work (of the entire project). Contractor shall participate in meetings in a manner, which will resolve coordination problems.

1. Time and location of job meetings shall be designated by the mutual agreement of the Contractor, Architect and Owner.
2. Job meetings shall be chaired by the Architect, who shall record the proceedings in the form of minutes and shall be responsible for proper distribution thereof to all parties. Initial minutes will be distributed within three (3) business days after the meeting.
3. Any and all corrections or clarifications to these minutes shall be received by the Architect in writing within three (3) days of their issuance. After the interval allowed for corrections and clarifications, Job Meeting Minutes will stand as part of the project record.
4. All decisions, instructions and interpretations given by Owner, with concurrence of the Architect, at these meetings shall be binding and conclusive on Contractor.
5. Architect and Owner shall have the right to schedule Special Job Meetings or increase the frequency of job meetings if, in his opinion, the progress and condition of the work warrant it. Attendance at such meetings is mandatory.
6. Subcontractors and suppliers shall attend at the request of the Architect or Owner as appropriate to the agenda topics at each meeting.
7. Agenda:

    a. Review of Work progress.
    b. Field observations, problems, and decisions.
    c. Identification of problems, which impede planned progress.
    d. Maintenance of Progress Schedule- updated by Contractor and discussed at every meeting.
    e. Corrective measures to regain projected schedule milestones and deadlines.
    f. Planned progress during succeeding work period and two (2) week look ahead.
    g. Effect of proposed changes on progress schedule and coordination.
    h. Review and update Submittal Log for every meeting.
    i. Other business relating to the Work.

D. Pre-Construction Meeting: Owner will schedule a meeting after Notice of Award.

1. Attendance Required:

    a. Owner.
    b. Architect.
    c. Contractor.
    d. Manufacturer representatives.

2. Agenda:

    a. Execution of Owner/Contractor Agreement.
    b. Submission of executed bonds and insurance certificates.
    c. Distribution of Contract Documents.
    d. Submission of list of Subcontractors, list of Products, schedule of values, etc.
    e. Procedures and processing of field decisions, submittals, substitutions, applications for payment, proposal requests, Change Orders, and Contract closeout procedures.

f. Scheduling (Preliminary Progress Schedule by Contractor).

3. The above Agenda is a comprehensive list of items that could be discussed at the Pre- Construction Meeting. Some items will be included while the Owner may choose to handle other items by other means.
4. Architect will record minutes and distribute copies within two (2) days after meeting to participants, with two copies to Contractor, Owner, and those affected by any decisions made.

E. Pre-Installation Conferences:

1. When required by individual specification sections, contractor shall convene a pre-installation conference prior to the start of installation for the portion of work in question.
2. Require attendance of all Subcontractors, suppliers, manufacturers (if necessary), Owner Architect (at the Owners request), Engineers (at the Owners request) directly affecting of affected by the Work in question.

F. Application for Payment “PENCIL COPY” review meeting:

1. Contractor to schedule a Pencil Copy Review Meeting five (5) working days prior to payment period deadline stipulated in the Agreement.
2. Contractor will be responsible to incorporate all agreed upon changes to the Pencil Copy version of the Application and submit the revised Application in accordance with all Contract requirements.

1.4 ADMINISTRATIVE/SUPERVISORY PERSONNEL

A. General: In addition to a Home Office Project Manager and a Field Construction Superintendent and other administrative and supervisory personnel required for performance of the work, the Contractor shall provide specific coordinating personnel as may be required for proper interface between the trades and other work of the total project.

B. Project Superintendent: The Contractor shall provide a full-time Project Superintendent, who is experienced in administration and supervision of building construction of a type similar in nature and scope to this Project, including mechanical and electrical work, and who is hereby authorized to act as the general coordinator of interfaces between the work of all the trades. For purpose of this provision, "interface" is defined to include the scheduling and sequencing of work, sharing of access to work spaces, installations, each trade's protection of work by other trades, cutting and patching, tolerances, preparation of coordination drawings, inspections, tests, and temporary facilities and services.

C. Submittal of Staff Names, Duties: Within 15 days of contract date, the Contractor shall submit to the Owner and Architect a listing of Contractor's principal staff assignments and consultants, naming persons and listing their addresses, telephone numbers and past construction experience.

1.5 EXAMINATION AND CHECKING OF CONTRACT DOCUMENTS

A. Contractor shall be responsible for reviewing the contract documents in accordance with the requirements specified herein.

1. Contractor shall examine and check all quantities and dimensions given on contract drawings, and shall be responsible for noting any errors which can be discovered by

such examination and check, and shall be responsible for satisfactory joining and fitting of all parts of the work; any check or observation by Architect/Engineer shall not relieve the Contractor of any responsibility as to correctness of the work.

2. Field verification of dimensions on drawings is specifically directed and required of the Contractor as a matter of course, because locations, distances and elevations will be governed by actual field conditions. Contractor shall review plans, site plans and details of construction on the drawings, and adjust his work to conform to all conditions indicated thereon or reasonably inferable therefrom.
3. Discrepancies shown on different plans and details, or between drawings, and actual field conditions, or between drawings and specifications, shall promptly be brought to the attention of the Architect for interpretation and resolution.
4. If, in Contractor's opinion, any work is indicated on drawings or specified in such a manner as will make it impossible to produce such in conformance with the contact, he shall refer same to Architect for interpretation. If additional and supplementary instructions are necessary, Architect/Engineer will prepare and issue same in an appropriate form to the Contractor, with a copy being forwarded to the Owner.
5. Contractor is directed never to scale dimensions or locations from contract drawings. Consult Architect/Engineer for dimensions and locations of all items.

1.6 SURVEYS AND RECORDS/REPORTS

A. General: Working from lines and levels established by property survey, and as shown in relation to the work, the Contractor shall establish and maintain bench marks and other dependable markers to set lines and levels for the work at each story of construction and elsewhere on site as needed to properly locate each element of entire project. Contractor shall calculate and measure required dimensions as shown (within recognized tolerances if not otherwise indicated); and shall not scale drawings to determine dimensions. Advise tradesmen performing the work, of marked lines and levels provided for their use in layout of work.

1.7 LIMITATIONS FOR USE OF SITE

A. General: It is the intent of the Owner to preserve the present character of the campus to the greatest extent possible, both during and after the period of construction. To this end the Contractor will be subject to certain operational controls in the movement of personnel and equipment on and off the construction site. The Contractor's cooperation with the general goal of protecting and preserving the Institute campus, and with the specific controls specified hereinafter, shall be mandatory. The following general controls shall be observed:

1. Construction activities, including location of temporary support facilities, stockpiling of materials, loading and unloading, parking for construction personnel and other related activities shall be restricted to areas as specified by the Owner.
2. The accumulation or stockpiling of debris, rubbish or other material resulting from demolition or construction operations will not be permitted. Removal and off-site disposal must proceed concurrent with demolition and construction activities, to the end that the site shall at all times present a neat, orderly and workmanship appearance. No liquid or solid material of any kind is to be disposed of on campus property. No burning of trash or debris will be permitted on the site.
3. The Contractor shall be responsible for the prevention, abatement and control of any environmental pollution arising from demolition or construction activities in the performance of the work, in full compliance with all applicable Federal and State laws and regulations.

    a. Existing trees and other vegetation on and adjacent to the project site shall be protected. Refer to Section 015000 - "Temporary Facilities" - for specific

requirements concerning fencing. Under no circumstances shall materials be stored or heavy equipment operated beneath the drip lines of existing trees.

4. Contractor shall be responsible for the control of dust arising from demolition or construction operations within the project site or along the Access Routes.

B. Allocation of Space: In addition to site utilization limitations and requirements shown on drawings, and indicated by other contract documents, Contractor shall administer allocation of available space equitably among separate subcontractors and other entities needing access and space, so as to produce overall efficiency in performance of total work of project.

C. Deliveries: Contractor shall schedule deliveries so as to minimize space and time requirements for storage of materials and equipment on site.

D. Construction Access:

1. Contractor shall plan, coordinate and execute all construction activities in such manner as to avoid traffic disruption over local streets.

   a. Prior to the start of work, Contractor shall contact the Police Department and determine approved travel routes for delivery vehicles on local streets.
   b. Contractor shall obtain and pay for all necessary permits in connection with the operation of overweight and over length vehicles on City streets.

2. Contractor shall be responsible for controlling all traffic entering and leaving the Owner's property including provision of flagmen as necessary. Contractor shall be responsible to require mud removal from rubber-tired vehicles departing the immediate project site. Operation of tracked vehicles shall be restricted to the project site as defined by the contract limit lines, and is not permitted on paved areas.
3. Whenever and wherever the project work must be performed outside the contract limit lines, and after the necessary permits have been secured from local authorities, Contractor shall erect and maintain barricades, danger signals and warning signs at working sites, closed roads, intersections and other places of danger to traffic, the work, or the public. Barricades and obstructions of any kind shall be marked with lights or flares at not more than five (5) foot intervals visible for a distance of not less than 500 feet. Contractor shall provide sufficient watchmen and traffic directors and shall take all necessary precautions for the proper protection of the work and the safety of the public.
4. Contractor shall be responsible for identification, control and maintenance of construction traffic within the contract limit lines. Identification and control shall include the provision of temporary traffic signs and the installation of barricades and warning lights to protect the work and to identify excavations or other hazards, all as may be required. Maintenance shall include the provision and placing of ballast materials as may be required, grading and compaction, removal of debris, removal of snow, and general care to insure a serviceable roadbed at all times.

   a. The Owner shall be responsible for snow removal from paved roadways and parking lots in the vicinity of the project area, but not within the work areas or areas immediate to the Contractor's temporary facilities.

5. Prior to final completion, perform all cleaning and repairs as necessary to restore all existing areas within the limits of any and all work required as a part of the scope of these contract documents, to their original condition.

E. Temporary Parking for Construction Personnel: The Owner shall designate available areas

for parking.

1. Offsite parking will be available for employee parking, in an area to be designated by the Owner on RUI property. Construction personnel will not be permitted to park in campus parking lots, except as specifically designated and authorized by the Owner. The designated parking area may change due to seasonal demands of the Owner.

F. Staging and Storage Area: The Contractor shall have the authority and responsibility to plan and locate storage areas, equipment marshaling areas, and temporary field facilities. Staging and storage areas shall be so located and utilized as to afford unrestricted access to all of the work at all times. Such areas shall not encroach upon access routes to the work, nor shall they be so located or utilized as to impede free access of emergency vehicles. Such areas must be approved by the Owner prior to use by the contractor.

1. Staging and storage areas shall be located wholly within the contract limit lines and site enclosure fence.
2. All loading and unloading operations shall occur inside the contract limit lines and behind the site enclosure fence.
3. Storage of materials and equipment outside the site enclosure fence or on City streets is absolutely prohibited.
4. Prior to final completion, perform all cleanup, disposal, grading, topsoiling, seeding and other work as necessary to restore the entire staging/storage area to its original condition.

G. Verification of Underground Utilities: Contractor shall have the responsibility to verify the actual locations of existing underground utility lines. Should verified underground utility locations conflict with excavation required in connection with the work, Contractor shall notify the Owner's Project Manager immediately. Hand excavation shall be required at locations in close proximity to verified existing utilities.

1. The Owner does not guarantee the accuracy and completeness of information shown on any contract drawings for underground utilities; Contractor must be responsible for ascertaining all facts concerning utility locations.
2. Damage to existing underground utilities, caused as a result of Contractor's negligence or failure to comply with the requirements listed herein, shall be repaired and/or replaced at Contractor's expense, to the complete satisfaction of the Owner and utility company by close of business of the day of damage.

H. Cleaning and Trash Disposal: Comply with requirements specified in Section 01500, "Temporary Facilities".

1.8 PROTECTION OF PERSONS AND PROPERTY

A. Safety Precautions and Programs: Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the work. He shall designate a responsible member of his organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent, unless otherwise designated by the Contractor, in writing, to the Owner.

B. Protection of Persons: Contractor shall take all necessary precautions for the safety of employees on the work, and shall comply with all applicable provisions of Federal and State safety laws, union safety regulations, and building codes to prevent accidents or injury to persons on, about or adjacent to the premises where the work is being performed. Particular attention is called to the requirements of the Federal Occupational Safety and Health Act (OSH Act). In connection with the work of its own forces, Contractor shall direct and properly

maintain, at all times, as required by the conditions and progress of the work, all necessary safeguards for the protection of workers and the public and shall post danger signs warning against the hazards created by such features of construction as protruding nails, hoists, well holes, elevator hatchways, scaffolding, window openings, stairways and falling materials.

1. Security/protection provisions are specified in "Temporary Facilities" section.

C. Protection of Work and Property: Contractor shall take all precautions for the safety of, and shall provide all reasonable protection to prevent damage, injury or loss to:

1. All the work and all materials and equipment to be incorporated therein, whether in storage on or off the site, under the care, custody or control of the Contractor or any of his Subcontractors, or Sub-subcontractors; and
2. Other property at the site or adjacent thereto, including trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

a. Refer to "Temporary Facilities" section for specific requirements concerning fencing around existing trees.

D. Emergencies: In any emergency affecting the safety of persons or property, Contractor shall act with diligence, at his discretion, to prevent threatening injury, damage or loss. In such case, he shall immediately notify the Owner, of the action taken and shall forthwith prepare and submit a detailed and documented report to the Owner and the Architect.

E. Insurance and Indemnification: Comply with requirements of the Contract Agreement.

1.9 SPECIAL REPORTS

A. General: Except as otherwise indicated, submit special reports directly to Owner within one day of occurrence requiring special report, with copy to Architect/Engineer and others affected by occurrence.

B. Reporting Unusual Events: When an event of unusual and significant nature occurs at site, the Contractor shall prepare and submit a special report listing chain of events, persons participating, response by Contractor's personnel, evaluations of results or effects, and similar pertinent information. When such events are known or predictable in advance, it is the responsibility of the Contractor to advise the Owner in advance at earliest possible date.

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

1.10 SUBCONTRACTOR, MATERIAL APPROVAL

A. Material Approval: Contractor shall submit to the Owner and Architect, for approval, a list of all vendors and manufacturers for the supply of materials and equipment, whether specified or not, starting within fifteen (15) calendar days after award of contract; said list shall be complete within forty-five (45) days thereafter. In instances where specified materials and equipment are subject to the Owner’s and Architect's approval by way of the submittal process, no contract shall be entered into with any vendor, supplier or manufacturer before the Owner and Architect have approved his name in writing.

B. Subcontractor Approval: Contractor shall, beginning within fifteen (15) calendar days after award of contract and ending within forty-five (45) days thereafter, notify the Architect and Owner in writing of the names of all subcontractors proposed for the work, and shall not employ any without prior written approval of the Owner, or any that Owner may within a reasonable time reject.

1.11 TRADESMEN AND WORKMANSHIP STANDARDS

A. General: Contractor shall instigate and maintain procedures to ensure that tradesmen performing work at site are skilled and knowledgeable in methods and craftsmanship needed to produce required quality-levels for workmanship in completed work. Remove and replace work, which does not comply with workmanship standards as specified and as recognized in the construction industry for applications indicated. Remove and replace other work damaged or deteriorated by faulty workmanship or its replacement.

B. Availability of Tradesmen: At each progress or job meeting, Contractor shall review availability of tradesmen and projected needs to accomplish work as scheduled. Require each entity employing tradesmen to report on current and pending trade actions and jurisdictional matters, which might affect progress of work. Where possible dispute or delay is identified, consider alternatives and take actions to avoid disputes and delays.

C. Labor Peace Clause:

1. The Contractor agrees that in the performance of the work called for under these Contract Documents, it will employ only such labor as will not delay or interfere with the speedy and diligent progress of the project and as will be acceptable to and work in harmony with all other workmen employed by the Owner.
2. In the event of labor difficulties (including, but not limited to, strikes, walkouts, picketing, boycotts, shutdowns, or inability to obtain a sufficient number of competent laborers or mechanics), which interfere with the work, or any part thereof, it shall be the responsibility of the contractor to take all measures necessary and possible to insure the projects progress and completion as prescribed by the time schedule including, but not limited to, seeking injunctive relief in an appropriate Court of Common Pleas, filing an unfair labor practices charge(s) with the National Labor Relations Board, discharging employees who engage in an unprotected strike or work stoppage, or any other applicable legal or equitable action related to the aforesaid labor difficulty which occurs in connection with the performance of this contract.
3. In the event of a strike or stoppage of work resulting from a dispute involving or affecting the labor employed by the contractor (including subcontractors and suppliers), the Owner may, at its option, terminate this contract. However, where practicable the contractor will give subcontractors 24 hours to resolve the strike or stoppage of work before terminating its contract. In the event there is a conflict between this clause and any other agreement between contractor and the Owner, including but not limited to other provisions of this contract, other written agreements and verbal agreements, this clause will take precedent. In the event of such termination, the Owner shall have the right to take possession, for the purpose of completing such work, of all materials, tools, and appliances on its premises and employ any person or persons to finish the work and provide the materials and labor for such work. The Contractor shall not be entitled to receive any further payments under this agreement until the work shall be finished completely, at which time the contractor shall be paid whatever balance is found to be due to contractor for amounts expended by it either for labor, materials, or otherwise, plus contractors percentage of profit as provided in this agreement, less, however such expenses or damages as the Owner may suffer by so completing the work. The Contractor shall not be entitled to prospective profits on portions of the project not performed by it or with respect to

the materials not furnished by it. Further, it is understood and agreed that should the expenses to the Owner in completing the contract be increased by reason of such discontinuance of the services of this contractor, then this contractor shall be responsible to the Owner for such entire increase in addition to the other expenses or damages referred to above.

1.12 INSPECTIONS, TESTS AND REPORTS

A. General: Required inspection and testing services are intended to assist in determination of probable compliances of the work with requirements, but do not relieve Contractor of responsibility for those compliances, or for general fulfillment of requirements of contract documents. Specified inspections and tests are not intended to limit Contractor's quality control program. Afford reasonable access to agencies performing tests and inspections.

B. Inspection and Testing by Independent Agencies: General requirements are specified in "Quality Control Services" section of these specifications (Section 01400). Particular requirements are specified in the technical sections (Divisions 02 through 48).

C. Inspection and Testing by Authorities with Jurisdiction: If the Contract Documents, laws, ordinances, rules, regulations or order of any public authority having jurisdiction require any portion of the Work to be inspected, tested or approved, the Contractor shall give the Owner not less than five (5) working days notice in writing of its readiness for inspections or testing. The Contractor shall bear all costs of such inspections, tests or approvals conducted by public authorities.

D. Inspection and Testing by Contractors: When inspections and tests are required by the technical sections of these specifications to be performed by Contractors on installed materials and equipment, all such inspections and tests shall be conducted in the presence of, and upon timely notice to, the Owner, and the results thereof approved prior to acceptance of the installation. Fuel, power and any other items or services required for the proper inspecting and testing of equipment and for the period of instructing the Owner's operating personnel shall be at the cost and expense of the Contractor furnishing such equipment.

E. Special Inspection and Testing: If the Owner or Architect/Engineer determines that any Work requires special inspection, testing or approval, not otherwise required herein, he will instruct the Contractor to order such special inspection, testing or approval, and the Contractor shall give notice as provided in subparagraph C. If such special testing or inspection reveals a failure of the Work to comply with the requirements of the Contract Documents, the Contractor shall bear all costs thereof, including compensation for the Architect/Engineer's additional services made necessary by such failure; otherwise the Owner shall bear all costs and an appropriate Change Order will be issued.

1.13 PROGRESS PHOTOGRAPHS

A. Refer to Specification Section 01300, “Submittals” for requirements pertaining to Progress Photographs.

B. Provide photographs of the site and construction throughout progress of Work produced by an experienced photographer or job superintendent experienced in taking construction photographs, acceptable to the Owner.

C. Take photos in a timely fashion to allow for their submission with each application for a payment and/ as follows (as applicable):

1. Installation of site utilities.
2. Installation of footings.
3. Installation of foundations.
4. Building pad proof roll.
5. Building pad sub grade (vapor barrier and stone).
6. Installation of concrete floors, decks, walls, etc.
7. Installation of masonry for stair towers, elevator, exterior walls, etc.
8. Installation of structural steel, steel deck and joist, etc.
9. Rough grading.
10. Installation of parking lot paving, parking lot lighting, line stripping, etc.
11. Installation of interior and exterior framing.
12. Plumbing and electrical rough-ins.
13. HVAC ductwork and units.
14. Installation of telecommunications cabling and devices.
15. Installation of roofing.
16. Installation of windows, doors, hardware, etc.
17. Enclosure of walls and ceilings.
18. Interior and exterior finishes.
19. Installations of millwork, casework, trim work, etc.
20. Landscaping
21. Final Completion.

D. Digital PDFs: Color photos. 4” X 8” or larger of each view. Provide enough photos at each stage of construction to give someone not familiar with the Project a clear understanding of the progress of the work. Review photos with the Owner’s representative at each stage of construction requiring photographs. The Owner will determine if additional photos will be needed.

1. PDF format.
2. Identify each print. Identify name of Project, orientation of view, date and time of view.

E. Deliver prints with each Application for Payment or at times specified by Owner with transmittal letter.

1.14 MANAGEMENT SOFTWARE

A. The Contractor is to purchase and implement a web-based project management software solution for use by the Architect, Consultants, Construction Manager, and Owner. The Contractor shall utilize this software solution throughout the project duration for all related project documentation including, but not limited to Requests for Information, submittals, daily reports, correspondence, meeting minutes, change orders, etc.

1.15 REQESUSTS FOR INFORMATION

A. The Contractor is to prepare and submit a Request for Information (RFI) through web-based project management tool for action when a clarification and/or additional information is required to perform an activity of work.

B. The request must include a drawing and/or specification reference when applicable and must also include a proposed solution for review by the Architect. Requests not provided with a recommended solution, if applicable, will be returned to the Contractor with no action until such recommendation is provided.

C. The Construction Manager and Architect will endeavor to respond to requests in a timely

manner so not to impact onsite activity. It is the Contractor's responsibility to review the Contract Documents thoroughly for planned work and submit a request with sufficient time for the Construction Manager and Architect to review and respond. If the Contractor fails to carry out this responsibility, The Contractor will not be entitled to an extension of time and/or additional incurred costs should the request impact construction progress.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION PROVISIONS

A. Pre-Installation Conference: Well in advance of installation of every major unit of work which requires coordination and interfacing with other work, Contractor shall meet at project site with subcontractors, installers and representatives of manufacturers and fabricators who are involved in or affected by unit of work, and in its coordination or integration with other work which has preceded or will follow. Contractor shall advise Owner and Architect of scheduled meeting dates. At each meeting review progress of other work and preparations for particular work under consideration, including requirements of contract documents, options, related change orders, purchases, deliveries, shop drawings, product data, quality control samples, possible conflicts, compatibility problems, time schedules, weather limitations, temporary facilities, space and access limitations, structural limitations, governing regulations, safety, inspection and testing requirements, required performance results, recording requirements, and protection. Contractor shall record significant discussions of each conference, and agreements and disagreements, along with final plan of action. Distribute record of meeting promptly to everyone concerned, including Architect/Engineer and Owner.

1. Do not proceed with the work if associated pre-installation conference cannot be concluded successfully. Instigate actions to resolve impediments to performance of the work and reconvene conference at earliest date feasible.

B. Installer's Inspection of Conditions: Require Installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

C. Manufacturer's Instructions: Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation, to whatever extent these are more explicit or more stringent than applicable requirements indicated in contract documents.

D. Inspect each item of materials or equipment immediately prior to installation and reject damaged and defective items.

E. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerances if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

F. Recheck measurements and dimensions of the work, as an integral step of starting each

installation.

G. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion, which will ensure best possible results for each unit of work, in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.

H. Coordinate enclosure (closing-in) of work with inspections and tests, so as to minimize necessity of uncovering work for that purpose.

I. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. Refer questionable mounting height choices to Architect/Engineer for final decision.

3.2. The contractor shall include in his/her proposal the cost of all control wiring and its installation for all mechanical equipment including, but not limited to, heating, ventilating and air conditioning systems, ATC systems, boilers, remote monitoring systems, etc. which systems require electrical control wiring. The contractor shall employ a sub-contractor approved by the University for all such control wiring. The sub-contractor shall provide a final certificate of electrical inspection of the control wiring. Installed or control wiring must connect to a point of electrical power supply as shown on the contract documents.

3.3 CHASES, RECESSES AND OPENINGS

A. Contractor shall build chases, recesses, openings, channels and flues, and shall leave or create holes where shown on drawings, or where directed for piping, electrical conduits, switchboxes, panelboards, flues and ducts, or any other feature of the mechanical and electrical work. All trades requiring chases, recesses, openings, etc. shall furnish to the Contractor, complete detailed drawings for all chases, recesses and openings required in connection with such work in ample time to allow the construction to proceed without interruption or delay. Comply with requirements of "Submittals" section of these specifications.

1. Contractor shall close, build in and finish around or over all chases, recesses, openings, etc. after installation of mechanical and electrical work has been completed. Should any fail to furnish the above required information in time, he shall, at his own expense, arrange for all cutting, rebuilding, patching and finishing, but shall employ the Contractor whose work must be cut to do so.
2. Contractor shall obtain prior written approval from the Architect/Engineer and the Owner before cutting or boring through beams, floor construction or supporting members.

3.4 SLEEVES, BUILT-IN ITEMS

A. Each trade shall be responsible for furnishing and setting of sleeves, built-in items, anchors, inserts, etc. for his work. Contractor shall build these items into the construction.

1. Comply with requirements of "Submittals" section in the preparation of sleeve drawings.

3.5 CUTTING AND PATCHING

A. General: Do not cut-and-patch structural work in a manner resulting in reduction of load-carrying capacity or load/deflection ratio; submit proposed cutting and patching to

Architect/Engineer for structural approval before proceeding. Do not cut-and-patch operational elements and safety-related components in a manner resulting in reduction of capacities to perform in manner intended or resulting in decreased operational-life, increased maintenance, or decreased safety. Do not cut-and-patch work which is exposed on exterior or exposed in occupied spaces of building, in a manner resulting in reduction of visual qualities or resulting in substantial evidence of cut-and-patch work, both as judged solely by Architect. Remove and replace work judged by Architect to be cut-and-patched in a visually unsatisfactory manner.

1. Contractor shall do all cutting, fitting, adjusting and patching as may be required to permit the several parts to properly come together as intended and indicated.
2. Engage original Fabricator/Installer to perform cutting-and-patching of structural work, operational/ safety-related components, and visually exposed work; or, if not available, engage only recognized experts; employ only proven methods.
3. Do not cut or alter work performed under separate contracts without the Architect's written permission.
4. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specific requirements and methods needed for proper performance of the work of this Section.
5. Verify that existing site conditions and substrate surfaces are acceptable for subsequent work. Beginning new work means acceptance of existing conditions.
6. Verify that existing substrate is capable of structural support or attachment of new work being applied or attached.
7. Examine and verify specific conditions described in individual specification sections.
8. Verify that utility services are available, of the correct characteristics, and in the correct locations.
9. Prior to Cutting: Examine existing conditions prior to commencing work, including elements subject to damage or movement during cutting and patching. After uncovering existing work, assess conditions affecting performance of work. Beginning of cutting or patching means acceptance of existing conditions.

B. Materials: Except as otherwise indicated or approved by Architect/Engineer, provide materials for cutting-and-patching which will result in equal-or-better work than work being cut-and- patched, in terms of performance characteristics and including visual effect where applicable. Use materials identical with original materials where feasible and where recognized that satisfactory results can be produced thereby.

C. Temporary Support and Protection: Provide adequate temporary support for work to be cut, to prevent failure. Do not endanger other work. Provide adequate protection of other work during cutting-and-patching, to prevent damage; and provide protection of the work from adverse weather exposure.

D. Cut work using methods least likely to damage work to be retained and work adjoining.

1. Where physical cutting action is required, cut work with sawing and grinding tools, not with hammering and chopping tools. Core drill openings through concrete work. Comply with the requirements of applicable sections of Division 02 where cutting-and-patching requires excavating and backfilling.
2. Fit work air tight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
3. At penetrations of fire rated walls, partitions, ceilings, or floor construction, completely seal voids with fire rated materials in accordance with Section 07841 to full thickness of the penetrated elements.
4. Refinish surfaces to match adjacent finish. For continuous surfaces, refinish to nearest intersection or natural break. For an assembly, refinish entire unit.

E. Patch with seams, which are durable and as invisible as possible. Comply with specified tolerances for the work.

1. Where feasible, inspect and test patched areas to demonstrate integrity of work.

F. Restore exposed finishes of patched areas; and, where necessary extend finish restoration onto retained work adjoining, in a manner, which will eliminate evidence of patching.

1. Where patch occurs in a smooth painted surface, extend final paint coat over entire unbroken surface containing patch, after patched area has received prime and base coats.

G. Execute cutting and patching including excavation and fill to complete the work, to uncover work to install improperly sequenced work, to remove and replace defective or non-conforming work, to remove samples of installed work for testing when requested, to provide opening in the work for penetrations of mechanical and electrical work, to execute patching to complement adjacent work, and to fit Products together to integrate with other work.

H. Execute work by methods to avoid damage to other work, and which will provide appropriate surfaces to receive patching and finishing. In existing work, minimize damage and restore to original conditions.

I. **ALL CUTTING AND PATCHING SHALL BE CONSIDERED PART OF THE BASE BID PRICE WHEN THE WORK IS REQUIRED AS PART OF THE OVERALL PROJECT. NO ADDITIONAL PAYMENT WILL BE CONSIDERED FOR WORK OF THIS SECTION UNLESS ALL APPLICABLE PARTIES OBTAIN PRIOR AUTHORIZATION OR WRITTEN APPROVAL.**

3.6 UNCOVERING AND CORRECTION OF WORK

A. Comply with requirements of the General Conditions of the Contract, and with additional requirements specified herein.

1. Subsequent Disclosure of Faulty Work: Failure of Owner or Architect/Engineer to exercise powers of rejection or condemnation against the work of the Contractor during construction shall not be construed as an acceptance on Owner's part or Architect/ Engineer's part that Contractor's work has been faithfully performed, if the fact be otherwise.

3.7 PROJECT CONDITIONS

A. Protect site from puddling or running water. Provide water barriers as required to protect site from soil erosion.

B. Ventilate enclosed areas to assist cure of materials, to dissipate humidity, and to prevent accumulation of dust, fumes, vapors, or gases.

C. Pollution Control: Provide methods, means, and facilities to prevent contamination of soil, water, and air from discharge of noxious, toxic substances, and pollutants produced by construction activities. Comply with all governmental and code requirements.

3.8 PREPERATION FOR CUTTING AND PATCHING AND/OR NEW WORK.

A. Prepare surfaces and remove surface finishes to provide for proper installation of work and

finishes.

B. Clean substrate surfaces prior to applying next material or substance.

C. Seal cracks or openings of substrate prior to applying next material or substance.

D. Apply manufacturers required or recommended substrate primer, sealer, or conditioner prior to applying any new material or substance in contact or bond.

3.9 LAYING OUT THE WORK

A. Verify locations of survey control points prior to starting work.

B. Promptly notify Owner's Representative and Architect of any discrepancies discovered.

C. Protect survey control points prior to starting site work; preserve permanent reference points during construction.

D. Promptly report to Architect/Engineer and Owner's Representative the loss or destruction of any reference point or relocation required because of changes in grades or other reasons.

E. Utilize recognized engineering survey practices.

F. Establish elevations, lines and levels. Locate and lay out by instrumentation and similar appropriate means:

1. Site improvements including but not limited to pavements; stakes for grading, fill and topsoil placement; utility locations, slopes, and invert elevations, etc.
2. Building foundation, column locations, all floor elevations, stairwells, elevator shafts, machine and mechanical rooms, etc.
3. All other work as necessary to complete all the requirements of the contract documents.

G. Periodically verify layouts by same means.

H. Maintain a complete and accurate log of control and survey work as it progresses.

3.10 GENERAL INSTALLATION REQUIREMENTS

A. Install Products as specified in individual sections and in accordance with manufacturer's recommendations.

B. Make neat transitions. Patch work to match adjacent work in texture and appearance. Where new Work abuts or aligns with existing, perform a smooth and even transition.

C. When existing finished surfaces are cut so that a smooth transition with new Work is not possible, terminate existing surface along a straight line at a natural line of division and make recommendations to the Architect and Owner.

3.11 CLEANING AND PROTECTION

A. General: During handling and installation of work at project site, Contractor shall clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure

freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

B. Removal of all debris and rubbish resulting from or relating to the construction work; rubbish shall not be thrown from building openings above the ground floor unless confined within chutes.

1. Progress Cleaning:

a. Maintain areas free of waste material, debris, and rubbish (on a daily basis). Maintain site in a clean and orderly condition, as determined by the Owner.
b. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces, and other closed or remote spaces, prior to enclosing the space.
c. Broom and vacuum clean interior areas prior to start of surface finishing, and continue cleaning to eliminate dust.
d. Collect and remove waste materials, debris, and rubbish from site periodically and dispose of off-site.
e. Protect installed work and provide special protection where specified in individual specification sections.
f. Provide temporary and removable protection for installed Products. Control activity during and after installation in the immediate work area to prevent damage.
g. Protect finished floors and other surfaces from traffic, dirt, wear, damage, or movement of heavy objects, by protecting with durable sheet materials appropriate for the task involved.

C. Limiting Exposures of Work: To extent possible through reasonable control and protection methods, Contractor shall supervise performance of work in a manner and by means which will ensure that none of the work, whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

D. Construction Debris: The Contractor shall intermittently remove waste and rubble so that at no time shall there be undue accumulations. Upon completion, the Contractor shall dress up all areas affected by this work whether inside or outside the boundary of the Project. Loading, crating, hauling and dumping will be at the contractor's expense.

E. Rubbish: The Contractor shall provide covered metal trash cans in sufficient quantity to accept the accumulation of rubbish and garbage from lunch and the like of employees of all Contractors working on site.

1. The Contractor shall instruct his and his subcontractors' employees to deposit their trash and garbage in these containers and not elsewhere about the site; and also not to use the containers for construction scraps, rubbish, trash and surplus materials.
2. The Contractor shall empty these containers daily and haul the rubbish to a legal disposal site off the property.

F. Roads and Pathways:

1. The Contractor is responsible for the removal of construction dirt and debris in public areas on the site and in the surrounding areas serving the site.
2. Dirt and mud tracked onto streets by the Contractor or its subcontractors is to be immediately cleaned up by the Contractor to the satisfaction of the Owner and the local municipal authorities.

G. Trucks: All trucks leaving the construction area are to be covered in accordance with NJDOT over the road requirements. Trucks leaving the site are to be clean and free of mud or other materials.

H. Quality Assurance: University streets and pathways are to be maintained in a clean safe condition at all times. Under no circumstances shall the Contractor leave the site each day without inspecting and verifying that streets and paths to the construction site, access areas, lay down areas, and gates in the area of the site are clean of all construction related materials and are clean and sage for use by the Rowan University population. The Contractor will immediately correct any violation of this provision upon notification by the Owner.

3.12 CONSERVATION AND SALVAGE

A. General: It is a general procedural requirement for Contractor's supervision and administration of the work that construction operations be carried out with maximum practical consideration for conservation of energy, water and materials; and with maximum practical consideration for salvaging materials and equipment involved in performance of the work but not incorporated therein.

END OF SECTION 012400

SECTION 012500 - CONTRACT MODIFICATION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements for handling and processing Contract modifications.

B. Related Sections include the following:
1. Division 01 Section "Product Requirements" for administrative procedures for handling requests for substitutions made after Contract award.

1.3 MINOR CHANGES IN THE WORK

A. Architect may issue through Owner's Project Manager supplemental instructions authorizing Changes in the Work, not involving adjustment to the Contract Time, as "Architects Supplemental Instructions" (ASI). Architects Supplemental Instructions may or may not involve adjustments to the contract sum. THERE WILL BE NO ADJUSTMENTS TO THE CONTRACT TIME ALLOWED FOR THIS PROJECT.

1. For ASI's involving no adjustment to the contract sum or time, the contractor is authorized to execute the change or clarification immediately.
2. For ASI's resulting in an adjustment to the contract sum, do not consider them instructions either to stop work in progress or to execute the proposed change without obtaining written authorization from the Owner. Written authorization can include the provisions of the general conditions, Article 14, paragraphs 14.5.3 and 14.7.1, an approved change order or a Construction Change Directive.

B. The technical specifications may refer to certain brand name products by name/or catalog number. This is done to establish standards of quality. Is it not being done to intentionally eliminate competition. If the contractor deems a product equivalent or better quality from another supplier or manufacture where fully suitable in design and manufacturing, see Section 016350 Substitution Procedures.

1.4 PROPOSAL REQUESTS

A. In the event the Contractor believes that any change directed by the Owner or Architect would entitle it to additional compensation to complete its work under this contract, **the Contractor shall immediately notify the Owner's Project Manager of this fact WITHIN 48 HOURS OF RECEIPT OF THE CHANGE REQUESTED**. The contractor shall then prepare and submit an original of the Change Order Request (COR) with all supporting documentation to the Owner's Project Manager and submit two (2) copies of the Change Order Request (COR) with all supporting documentation to the Architect and University within five (5) calendar days of its receipt of the directive by the Owner and/or Architect.

B. Owner-Initiated Proposal Requests (OIPR): Owner may issue proposal requests or may have the Architect issue such requests. In any event a detailed description of proposed changes in the Work will be submitted to the contractor that may require adjustment to the Contract Sum. THERE WILL BE NO ADJUSTMENTS TO TIME FOR ANY GIVEN CHANGE ORDER REQUESTED. If necessary, the description will include supplemental or revised Drawings and Specifications.

1. OIPR issued by Architect are for information only. For ASI's resulting in adjustments to the contract sum, do not consider them instructions either to stop work in progress or to execute the proposed change without first obtaining written authorization from the Owner.
2. If the contractor feels the ASI or OIPR requires a change to the contract sum then the contractor shall notify the Owner's Project Manager of this fact within 48 hours of receipt of the ASI or OIPR directive.
3. Within five (5) business days after receipt of directive, ASI or OIPR from the Owner, submit a Change Order Request (COR) estimating cost adjustments to the Contract Sum necessary to execute the change. The contractor shall then prepare and submit an original of the COR with all supporting documentation to the Owner's Project Manager and submit two (2) copies of the COR with all supporting documentation to the architect.

    a. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to substantiate quantities.
    b. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
    c. Include costs of labor directly attributable to the change.

        1) Labor shall be broken down by man-hours, hourly wages, fringe benefits per hour and any other benefits payable.

    d. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float however the date of Substantial and Final Completion cannot be extended.

C. In the event that the Contractor encounters a condition that it considers a change, the Contractor shall immediately notify the Owner's Project Manager prior to disturbing the condition and shall then prepare and submit an original of the COR with all supporting documentation to the Owner's Project Manager and two (2) copies of a Change Order Request with all required supporting documentation to the architect within five (5) calendar days of encountering the condition. The condition shall not be disturbed until the Owner's Project Manager has inspected the condition.

D. Contractor-Initiated Proposals: If latent or unforeseen conditions require modifications to the Contract, Contractor may propose changes by submitting a Change Order Request (COR) to Owner's Project Manager. The contractor shall prepare and submit one (1) original of the COR with all supporting documentation to the Owner's Project Manager and submit two (2) copies of the COR with all supporting documentation to the architect.

1. Include a statement outlining reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum.
2. Include a list of quantities of products required or eliminated and unit costs, with total amount of purchases and credits to be made. If requested, furnish survey data to

substantiate quantities.

3. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.
4. Include costs of labor and supervision directly attributable to the change.
5. Include an updated Contractor's Construction Schedule that indicates the effect of the change, including, but not limited to, changes in activity duration, start and finish times, and activity relationship. Use available total float however the date of Substantial and Final Completion cannot be extended.

E. Proposal Request Form: Use AIA Document G709 for Proposal Requests.

1.5 ALLOWANCES (**IF APPLICABLE ON A GIVEN PROJECT**)

A. Allowance Adjustment: To adjust allowance amounts, base each Allowance Request Proposal on the difference between purchase amount and the allowance, multiplied by final measurement of work-in-place. If applicable, include reasonable allowances for cutting losses, tolerances, mixing wastes, normal product imperfections, and similar margins. **Only allowances included as part of the Bid Price will be considered for an Allowance Authorization. All other Proposals must be hard costed.**

1. Include installation costs in purchase amount only where indicated as part of the allowance.
2. If requested, prepare explanation and documentation to substantiate distribution of overhead costs and other margins claimed.
3. Submit substantiation of a change in scope of work, if any, claimed in Change Orders related to allowances.
4. Owner reserves the right to establish the quantity of work-in-place by independent quantity survey, measure, or count.

B. Submit claims for increased costs because of a change in scope or nature of the allowance described in the Contract Documents, whether for the Purchase Order amount or Contractor's handling, labor, installation, overhead, and profit. Submit claims within ten (10) business days of receipt of the Change Order or Construction Change Directive authorizing work to proceed. Owner will reject claims submitted later than ten (10) business days after such authorization.

1. Do not include Contractor's or subcontractor's indirect expense in the Change Order cost amount unless it is clearly shown that the nature or extent of work has changed from what could have been foreseen from information in the Contract Documents.
2. No change to Contractor's indirect expense is permitted for selection of higher- or lower- priced materials or systems of the same scope and nature as originally indicated.

C. ***Use the same procedure(s) followed for handling Change Order Requests (COR's) and Change Orders with Allowances (except use Allowance Forms rather than Change Order Forms).***

1.6 CHANGE ORDER PROCEDURES

A. Upon the Owner's approval of a Change Order Request (COR), the Owner will direct the Architect to issue a Change Order for signatures of the Contractor and Owner on AIA Document G701.

1. The Change Order breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit. Any

amount proposed for sub-contracts shall be supported by a similar price breakdown.

B. Each Change Order must contain a detailed description of the change and the amount by which the Contract Price will be increased or decreased.

C. COMPUTATION OF ADDITIONAL COMPENSATION

1. In connection with any request for additional compensation the Contractor shall furnish a price breakdown, as follows:

   a. Labor shall be broken down by the man-hour, hourly wages, fringe benefits per hour and any other benefits payable by the Contractor;
   b. Materials shall be broken down by quantity and unit prices.

2. Unless otherwise directed, the breakdown shall cover all work involved in the change whether such work was deleted, added or changed.
3. The breakdown shall be in sufficient detail to permit an analysis of all material, labor, equipment, sub-contract and overhead costs as well as profit. Any amount proposed for sub-contracts shall be supported by a similar price breakdown.
4. The following rates shall apply in computing indirect costs and profit for the negotiation of additional compensation under all provisions of this contract, which provide for such adjustments that do not exceed twenty-five thousand dollars ($25,000.00). The resulting change in the contract amount will include the indirect impact cost of extended performance computed in accordance with the terms of this article and no further consideration of such costs arising from the specific modification will be given. The percentages for overhead and profit shall be negotiated and may vary according to the nature, extent and complexity of the work involved. If not negotiated prior to the start of construction then the rates herein designated shall apply. The percentages shall be applicable for deleted work as well as additional work. When a change consists of both added and deleted work, the applicable percentages shall be applied to the net cost or credit. In any event, the percentages shall not exceed the sum of the following:

   a. Overhead will be the sum of ten percent (10%) of direct labor costs.

      1) For the purpose of the article, the term direct labor shall include all labor by contractor's employees necessary to perform the actual work on site. Foremen, equipment operators and skilled, semi-skilled and common laborers directly assigned to the specific operation are direct labor; project managers, superintendents, office personnel, and subcontractors are not direct labor.
      2) The term direct labor costs shall consist of the contract or actual payroll rate of wage per hour and fringe benefits paid for each and every hour that such employees are actually engaged in the performance of the work. Overhead will be the sum of ten percent (10) % of direct material costs.

   b. Overhead will be the sum of ten percent (10%) of direct material costs.

      1) For the purpose of the article, the term direct material costs shall consist of the actual costs of the materials, including applicable tax and transportation charges
   c. For rented equipment, an hourly rental rate will be used which will be determined by using the monthly rental rates taken from the current edition of the rental rate blue book for construction equipment and dividing it by one

hundred seventy-six (176). An allowance will be made for operating costs for each and every hour the equipment is actually operating in accordance with the rate listed in the aforesaid rental book. The contractor will be allowed only sixty-five percent (65%) of the rental rate on contractor owned equipment.

d. Bond premiums, insurance, payroll taxes and travel subsistence, if applicable, will be allowed at actual cost (only) for the equitable adjustment allowed. No mark-up will be allowed for overhead on these indirect cost items.

e. The contractor's profit on the sub-contractor's work will be five percent (5%) of the sub-contractor's costs. Sub-contractor indirect costs will be computed in the same manner as for the contractor. The contractor agrees to incorporate this article in each of it sub-contracts.

f. A profit of six percent (6%) where profit is allowable by the terms of the applicable contract provision shall be added to the contractor's total cost for the equitable adjustment allowed for the work conducted by the contractors own workforce. Indirect costs will not be duplicated in direct costs.

g. When more than one (1) tier of sub-contractors exists, they shall be treated as one (1) sub-contractor for the purpose of mark-ups.

D. ANY CONTRACTOR PERFORMING CHANGE ORDER WORK WITHOUT **WRITTEN** APPROVAL FROM THE OWNER DOES SO AT ITS OWN RISK.

1. Only the signature of an Assistant Vice President or above is authorized to give approval of a Change Order Request (COR) or Change Order (CO). The Owner's Project Manager is not authorized to approve change orders. The Owner's Project Manager is only authorized to verify the work in question is in addition to or outside the scope of work delineated on the original contract documents.

1.7 CONSTRUCTION CHANGE DIRECTIVE

A. Construction Change Directive: Architect at the direction of the Owner's Project Manager may issue a Construction Change Directive on AIA Document G714. Construction Change Directive instructs Contractor to proceed with a change in the Work, for subsequent inclusion in a Change Order.

1. Construction Change Directive contains a complete description of change in the Work. It also designates method to be followed to determine change in the Contract Sum.

B. Documentation: Maintain detailed records on a time and material basis of work required by the Construction Change Directive.

1. After completion of change, submit an itemized account and supporting data necessary to substantiate cost adjustments to the Contract.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 PERFORMANCE OF CHANGE ORDER WORK

A. A contractor who performs any scope of work associated with a change order or allowance (if allowances are applicable on a given project) without receiving proper approval in accordance with all contract document requirements hereof does so at its own risk. The

Contractor shall have waived any and all claims for additional compensation related to said changes or conditions encountered.

END OF SECTION 012500

SECTION 012900 - PAYMENT PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section specifies administrative and procedural requirements necessary to prepare and process Applications for Payment.

B. Related Sections include the following:
1. Division 01 Section "Contract Modification Procedures" for administrative procedures for handling changes to the Contract.
2. Division 01 Section "Construction Progress Documentation" for administrative requirements governing preparation and submittal of Contractor's Construction Schedule and Submittals Schedule.

1.3 DEFINITIONS

A. Schedule of Values: A statement furnished by Contractor allocating portions of the Contract Sum to various portions of the Work and used as the basis for reviewing Contractor's Applications for Payment.

1.4 SCHEDULE OF VALUES

A. Coordination: Coordinate preparation of the Schedule of Values with preparation of Contractor's Construction Schedule.

1. Correlate line items in the Schedule of Values with other required administrative forms and schedules, including the following:

a. Application for Payment forms with Continuation Sheets.
b. Submittals Schedule.

2. Submit the Schedule of Values submission to Architect and Owners Construction Manager in accordance with the general conditions and general conduct of work.

3. Sub schedules: Where the Work is separated into phases requiring separately phased payments, provide sub schedules showing values correlated with each phase of payment.

B. Format and Content: Use the Project Manual table of contents as a guide to establish line items for the Schedule of Values. Provide at least one line item for each Specification Section.

1. Identification: Include the following Project identification on the Schedule of Values:

a. Project name and location.
b. Name of Architect.
c. Architect's project number.
d. Contractor's name and address.
e. Date of submittal.

2. Arrange the Schedule of Values in tabular form with separate columns to indicate the following for each item listed:

   a. Related Specification Section or Division.
   b. Description of the Work.
   c. Name of subcontractor.
   d. Name of manufacturer or fabricator.
   e. Name of supplier.
   f. Change Orders (numbers) that affect value.
   g. Dollar values
   h. Cost totals.

      1) Percentage of the Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.

3. Provide a breakdown of the Contract Sum in enough detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Provide several line items for principal subcontract amounts, where appropriate.

   a. Use data from approved Schedule of Values. Provide dollar value in each column for each line item for portion of work performed.

4. Round amounts to nearest whole dollar; total shall equal the Contract Sum.

5. Provide a separate line item in the Schedule of Values for each part of the Work where Applications for Payment may include materials or equipment purchased or fabricated and stored, but not yet installed.

   a. Differentiate between items stored on-site and items stored off-site.
   b. The University may, in its sole discretion, pay the Contractor for material delivered on the site and preparatory work done to be taken into consideration. Material delivered to the contractor at locations other than the site may also be taken into consideration if (1) such consideration is specifically authorized by the contract and (2) the contractor furnishes a form entitled "Contractor's Summary of Stored Materials" and agreement and bill of sale certification, respectively, for stored materials and (3) the contractor furnishes evidence of insurance for said materials or a bonded warehousing agreement.

6. Provide separate line items in the Schedule of Values for initial cost of materials, for each subsequent stage of completion, and for total installed value of that part of the Work.

7. Allowances: Provide a separate line item in the Schedule of Values for each allowance. Show line-item value of unit-cost allowances, as a product of the unit cost, multiplied by measured quantity. Use information indicated in the Contract Documents to determine quantities. Allowances will only be accepted for items listed in the Bid Documents.

8. Each item in the Schedule of Values and Applications for Payment shall be complete. Include total cost and proportionate share of general overhead and profit for each item.

    a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place must be shown as separate line items in the Schedule of Values.

9. Schedule Updating: Update and resubmit the Schedule of Values before the next Applications for Payment when Change Orders or Construction Change Directives result in a change in the Contract Sum.

    a. List each authorized Change Order as a separate line item, listing Change Order number and dollar amount as for an original item of work.

1.5 APPLICATIONS FOR PAYMENT

A. Each Application for Payment shall be consistent with previous applications and payments as certified by Architect and paid for by Owner.

1. Initial Application for Payment, Application for Payment at time of Substantial Completion, and final Application for Payment involve additional requirements.
2. Submit three (3) copies of each Application for Payment, at least five (5) business days prior to the actual submission date as specified. This Application will be reviewed and adjusted by all parties (Architect, Owner and Contractor) at a "**PENCIL COPY REVIEW"** meeting prior to final approval.

B. Payment Application Times: The date for each progress payment is indicated in the Agreement between Owner and Contractor. The period of construction Work covered by each Application for Payment is the period indicated in the Agreement.

C. Payment Application Times: The date for each progress payment is per the General Conditions. The period covered by each Application for Payment starts on the day following the end of the preceding period and ends 15 days before the date for each progress payment.

D. Payment Application Forms: Use AIA Document G702 and AIA Document G703 Continuation Sheets

E. Application Preparation: Complete every entry on form. Notarize and execute by a person authorized to sign legal documents on behalf of Contractor. Owner's Project Manager will return incomplete applications without action.

1. Entries shall match data on the Schedule of Values and Contractor's Construction Schedule. Use updated schedules if revisions were made.
2. Include amounts of Change Orders and Construction Change Directives issued before last day of construction period covered by application.

F. Transmittal: Submit 3 (three) signed and notarized original copies of each Application for Payment to Owner's Project Manager by a method ensuring receipt within 24 hours. All copy's shall include 'Attachment to G702- Certification for Payment", Release of Liens Forms (included in the Contract Documents) entirely completed for the contractor, all subcontractors and anyone else whose payment is listed in the Schedule of Values for the application being requested, AIA G706 A-Contractors Affidavit…, Certified Payrolls and Monthly Work Force Reports, updated and current Construction Schedule, updated and

current Submittal Log, and current Project Photograph's.

1. Transmit each copy with a transmittal form listing attachments and recording appropriate information about application.

G. Release of Mechanic's Lien: With each Application for Payment, submit partial or final releases of mechanic's lien (as may apply) from every entity that is lawfully entitled to file a mechanic's lien arising out of the Contract and related to the Work covered by the payment.

1. Submit partial waivers on each item for amount requested, before deduction for retainage, on each item.
2. When an application shows completion of an item, submit final or full waivers.
3. Owner reserves the right to designate which entities involved in the Work must submit waivers.
4. Submit final Application for Payment with or proceeded by final waivers from every entity involved with performance of the Work covered by the application that is lawfully entitled to a lien.
5. Release Forms: Submit release of lien on forms, executed in a manner acceptable to Owner. (Use Form listed in Division 0 of the Specifications).

H. Initial Application for Payment: Administrative actions and submittals that must precede or coincide with submittal of first Application for Payment include the following:

1. List of subcontractors.
2. Schedule of Values.
3. Contractor's Construction Schedule (preliminary if not final).

    a) A final schedule must be submitted prior to Owners payment of the second (2^{nd}) progress payment.

4. Products list.
5. Schedule of unit prices.
6. Submittals Schedule (preliminary if not final).
7. List of Contractor's staff assignments.
8. List of Contractor's principal consultants.
9. Copies of building permits.
10. Copies of authorizations and licenses from authorities having jurisdiction for performance of the Work.
11. Initial progress report.
12. Report of preconstruction conference.
13. Certificates of insurance and insurance policies.
14. Performance and payment bonds.
15. Data needed to acquire Owner's insurance.
16. Initial settlement survey and damage report if required.
17. Current construction photographs as specified herein.

I. Application for Payment at Substantial Completion: After issuing the Certificate of Substantial Completion, submit an Application for Payment showing 100 percent completion for portion of the Work claimed as substantially complete.

1. Include documentation supporting claim that the Work is substantially complete and a statement showing an accounting of changes to the Contract Sum.
2. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.

J. Final Payment Application: Submit final Application for Payment with releases and supporting documentation not previously submitted and accepted, including, but not limited, to the following:

1. Evidence of completion of Project closeout requirements.
2. Insurance certificates for products and completed operations where required and proof that taxes, fees, and similar obligations were paid.
3. Updated final statement, accounting for final changes to the Contract Sum.
4. AIA Document G706, "Contractor's Affidavit of Payment of Debts and Claims."
5. AIA Document G706A, "Contractor's Affidavit of Release of Liens."
6. AIA Document G707, "Consent of Surety to Final Payment."
7. Evidence that claims have been settled.
8. Final meter readings for utilities, a measured record of stored fuel, and similar data as of date of Substantial Completion or when Owner took possession of and assumed responsibility for corresponding elements of the Work.
9. Final, liquidated damages settlement statement.

K. When Owner or Architect/Engineer requires substantiating information, submit data justifying dollar amounts in question. Provide one (1) copy of data with cover letter for each copy of submittal. Show application number and date, and line item by number and description.

1. Any other information or documentation required by other provisions of the contract documents shall be supplied.

L. In order to be proper an Application for Payment must include the following as applicable:

1. Total amount, payee name and address, department/agency, payee declaration, payee reference number and identification number.
2. contract number, contractor’s name, period of the Application, completion date, number of sheets, amount due this period, amount to date, retainage, certification by payee, certification signed by the Project Manager and Architect and approval of payment signed by the contracting officer or his/her designee, previous payment requests, total deductions and additions.
3. In making progress payments for work, the University will retain ten percent (10%) of the approved invoice of payment until final acceptance and completion of all work covered by the contract.
4. After fifty percent (50%) of the work has been completed, upon written request by the contractor and provided the contracting officer determines that the contractor's performance and progress have been satisfactory, the University will make partial payments thereafter in full of the approved payment amount. If, however, progress is not maintained in accordance with the approved schedule, the contracting officer may elect to reinstitute retainage of ten percent (10%) of amounts due to the contractor. The contracting officer shall have the sole authority to determine whether contractor’s performance and progress warrant waiver of ten percent (10%) retainage.

M. Upon acceptance and completion of each building or other clearly definable severable portion of the contract work for which the price is stated separately within the contract, payment may be made in full at the discretion of the contracting officer including retained percentages thereon less authorized deductions.

N. All authorized Applications are to be sent to the Owners authorized representative at the address provided at the pre-construction conference. Receipt shall start the prompt payment clock unless returned to the contractor for correction within thirty (30) calendar days after receipt. Reference section 10.2.4 (d) of the General Conditions.

1.6 FINAL PAYMENT

A. Upon final acceptance, the amount due the contractor under this contract shall be paid upon satisfactory completion by the contractor of all contract close-out requirements as required by the University, completion of a University audit on all contract values and payments and after the contractor shall have furnished the University with a final release of liens from the contractor and all subcontractors, sub-subcontractors, vendors, suppliers and any other entity affiliated with the contractor for completion of this project of any and all claims against the University arising by virtue of this contract other than claims in stated amounts as may be specifically excepted by the contractor from the release.

B. Upon satisfying the above conditions, the contractor shall submit a properly executed Application for Final Payment to the University through the Owner's Project Manager. The University Controller shall date stamp the Application. This action by the University Controller shall constitute receipt of a properly executed State invoice application.

C. If, for any reason, the contractor refuses final payment, the project shall be closed-out by the University unilaterally processing a final acceptance certificate. The University will hold all residual funds in escrow until all claims of the University and all contractors are satisfied.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 012900

SECTION 013100 – COORDINATION

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and supervisory requirements necessary for coordinating construction operations including, but not necessarily limited to, the following:

1. General project coordination procedures.
2. Conservation.
3. Coordination Drawings.
4. Administrative and supervisory personnel.
5. Cleaning and protection.

B. Related Sections: The following Sections contain requirements that relate to this Section:
1. Division 01 Section "Submittals" for preparing and submitting the Contractor's Construction Schedule.
2. Division 01 Section "Contract Closeout" for coordinating contract closeout.

1.3 COORDINATION

A. Coordinate construction operations included in various Sections of these Specifications to assure efficient and orderly installation of each part of the Work. Coordinate construction operations included under different Sections that depend on each other for proper installation, connection, and operation.

1. Schedule construction operations in the sequence required to obtain the best results where installation of one part of the Work depends on installation of other components, before or after its own installation.
2. Coordinate installation of different components to assure maximum accessibility for required maintenance, service, and repair.
3. Make provisions to accommodate items scheduled for later installation.

B. The mechanical. electrical and fire protection drawings are diagrammatic only and are not intended to show the alignment, physical locations or configurations of such work. Such work shall be coordinated by the Contractor and shall be installed to clear all obstructions, permit proper clearances for the work of other trades, satisfy all code requirements and present an orderly appearance where exposed a t no additional cost to the Owner.

C. Where necessary, prepare memoranda for distribution to each party involved, outlining special procedures required for coordination. Include such items as required notices, reports, and attendance at meetings.

1. Prepare similar memoranda for the Owner and separate contractors where coordination of their work is required.

D. Administrative Procedures: Coordinate scheduling and timing of required administrative procedures with other construction activities to avoid conflicts and assure orderly progress of the Work. Such administrative activities include, but are not limited to, the following:

1. Prepare and coordinate scheduling, delivery and processing of submittals, and work of the various sections of the Project Manual to ensure efficient and orderly sequence of installation of interdependent construction elements, with provisions for accommodating items installed later.
2. Verify that utility requirements and characteristics of operating equipment are compatible with building utilities. Coordinate work of various sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
3. Coordinate space requirements, supports, and installation of mechanical and electrical work, which are indicated diagrammatically on the Drawings. Follow routing shown for pipes, ducts and conduit, as closely as practicable; place runs parallel with lines of building. Utilize spaces efficiently to maximize accessibility for other installations, for maintenance and for repairs.
4. Installation and removal of temporary facilities.
5. Progress meetings.
6. In finished areas except as otherwise indicated, conceal pipes, ducts, and wiring within the construction. Coordinate locations of fixtures and outlets with finish elements.
7. Coordinate completion and clean-up of work of separate sections.
8. After Owner occupancy of premises, coordinate access to site for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
9. Project closeout activities.

E. Conservation: Coordinate construction operations to assure that operations are carried out with consideration given to conservation of energy, water, and materials.

1. Salvage materials and equipment involved in performance of, but not actually incorporated in, the Work.

1.4 SUBMITTALS

A. Coordination Drawings: Prepare coordination drawings where careful coordination is needed for installation of products and materials fabricated by separate entities. Prepare coordination drawings where limited space availability necessitates maximum utilization of space for efficient installation of different components.

1. Show the relationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Comply with requirements contained in Section "Submittals."

a. Note the coordination drawing submittal requirements under Section 013300 "Submittals", paragraph 2.3.9

B. Staff Names: Within fifteen (15) days of commencement of construction operations, submit a list of the Contractor's principal staff assignments, including the superintendent and other personnel in attendance at the Project Site. Identify individuals and their duties and

responsibilities. List their addresses and telephone numbers.

1. Post copies of the list in the Project meeting room, and the temporary field office.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 GENERAL COORDINATION PROVISIONS

A. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.

B. Coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.

3.2 CLEANING AND PROTECTION

A. Clean and protect construction in progress and adjoining materials in place, during handling and installation. Apply protective covering where required to assure protection from damage or deterioration at Substantial Completion.

B. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to assure operability without damaging effects.

C. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

END OF SECTION 013100

SECTION 013200 – CONSTRUCTION PROGRESS SCHEDULE

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions (Contract Administration Division Section D), General Conduct of the Work and Special Requirements, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUBMITTALS

A. Within three (3) days after the date established in the Notice to Proceed, University Contract and/or purchase order submit preliminary schedule indicating the scope of work for the duration of the project. A Gantt chart format will be acceptable however the final approved schedule must be in both a Gantt chart and CPM schedule format. If another method other than CPM is used the critical path and float time must be established and programmed into the schedule.

B. Initial Working CPM Schedule Submittal: To the extent necessary for the Contractor to reflect in the arrow diagram the plan for completion of this contract, the contractor shall meet with and furnish all necessary information for the preparation of the scheduling system within ten (10) calendar days after award of this contract. This information shall include, but not necessarily be limited to, logical sequencing of work operations; activity time estimated, intended crew flow, activity costs and estimated manpower requirements of each activity.

1. The contractor shall be responsible to reflect all sub-contractor work as well as his/her own work in proper coordinated sequence on the network diagram. The contractor shall be prepared to meet as many times as necessary with the Owner's Project Manager for the timely development of the project schedule.

1.3 SCHEDULE FORMAT

A. Listings: In chronological order according to the start date for each activity. Identify each activity with the applicable specification section number. At a minimum provide the following.

1. Include a separate bar for each portion of work or operation.
2. Identify the first workday of each week.
3. Identify each critical path task or portion of work.
4. Identify task durations, predecessors and dependent tasks.
5. Identify milestone dates for completion/start of each critical path element.

B. The contractor shall utilize the earliest scheduled start and finish dates in planning, coordinating and performing the work under this contract including all activities of sub-contractors, equipment vendors and suppliers.

PART 2 - PRODUCTS – NOT USED

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 CONTENT

A. Construction logic and activity time durations shall be established by the contractor subject to approval by the Owner's Project Manager consistent with contract requirements and reflective of proper coordination between trades.

B. The Owner's Project Manager shall establish the specific level of detail to be reflected in the scheduling system.

C. Seasonal weather conditions shall be considered in the planning and scheduling of all work influenced by high or low ambient temperatures for the completion of all contract work within the allotted contract time. In addition, appropriate allowances shall be made for anticipated time losses due to normal rain and snow conditions by statistically expanding the estimated time durations for weather sensitive activities with the constraint that the substantial completion deadline cannot change.

D. The coordinated combined Progress Schedule the Contractor will develop shall incorporate the schedules of all Prime Contractors engaged on the project. The Schedule shall be in a form as specified herein and elsewhere in the contract documents and in sufficient detail to satisfy the Architect/Engineer and the University.

E. The Progress Schedule based upon the Contractor's logic and time estimates shall indicate, in suitable detail for display, all significant features of the Work of each Contractor, including the placing of orders and anticipated delivery dates for critical items and all other critical path activities, submissions and approvals of Shop Drawings, all work activities to be performed by each Contractor and the beginning and time durations thereof, float time and the dates of substantial and final completion of the various branches of the Work.

1. Show complete sequence of construction activity, with dates for beginning and completion of each element of construction.
2. Identify each item by specification section number or per bid form breakdown.
3. Show accumulated percentage of completion of each item, and total percentage of Work completed, as of the first day of each month.
4. Indicate delivery dates as milestones for Owner-furnished items and any critical path items.
5. Provide legend for symbols and abbreviations used.
6. Show critical path tasks; differentiate them from other construction tasks.
7. Schedule will be based upon a five-day workweek.

3.2 REVIEW AND EVALUATION OF SCHEDULE

A. Review and Approval of Initial Working Schedule: Within ten (10) calendar days after receipt of the initial arrow diagram and computer produced schedule, the University's representative shall meet with the contractor and for joint review, correction or adjustment of the proposed plan and schedule to evaluate the cost values assigned to each activity. Within ten (10) calendar days after the joint review, the Contractor will revise the arrow diagram and the computer- produced schedule in accordance with agreement reached during the joint review and shall submit two (2) copies each of the revised arrow diagram, computer produced schedule and cost requisition to the University. The resubmission will be reviewed by the University and, if found to be as previously agreed upon, will be approved. An approved

copy of each will be returned to the Contractor. The contractor shall review the schedule to insure that it reflects all changes agreed to and, if all changes have been made, the contractor shall approve and sign the network diagrams, computer produced schedule and cost requisition listing at that time. Approval will be without reservation and the contractor will be deemed to have accepted the schedule as adequate, proper and binding in all respects and shall not raise objections to the schedule. After the network diagrams, computer-produced schedule and cost requisition listing have been signed, the Contractor shall forward one (1) set of signed copies of all scheduling documents to the Owner's Project Manager. The arrow diagram and the computer-produced schedule with approved signatures shall constitute the project work schedule until subsequently revised in accordance with the requirements of this section.

B. Evaluate project status to determine work behind schedule and work ahead of schedule. Submit revised recovery schedule with action plan to bring "behind schedule" tasks and milestones back into original timeline.

3.3 UPDATING SCHEDULES

A. Maintain schedules to record actual start and finish dates of completed activities.

1. Updated schedules must be submitted at each progress meeting and with each application for payment or as required by Architect or Owner. These schedules must include the following:

   a. approved changes in activity sequencing;
   b. changes in activity durations for unstarted or partially completed activities where agreed upon;
   c. the effect to the network of any delays in any activities in progress and/or the impact of known delays, which are expected to affect future work;
   d. the effect of contractor modifications; i.e., activity durations, logic and cost estimates; to the network;
   e. changes to activity logic where agreed upon to reflect revision in the contractor's work plan; i.e., changes in activity duration, cost estimates and activity sequences for the purpose of regaining lost time or improving progress;
   f. changes to milestones, and due dates (except substantial completion) which have been agreed upon by the University since the last revision of the schedule.

B. At the same time the network is updated, the contractor and the University's representative shall jointly make entries on the preceding network diagram schedule to show actual progress, to identify those activities started by date and those completed by date during the previous period to show the estimated time required to complete each activity started but not yet completed, to show activity percent completed and to reflect any changes in the arrow diagram approved in accordance with the preceding paragraph. After completion of the joint review and the University's approval of all entries, the Contractor will submit updated network diagrams and an updated computer produced calendar dated schedule to the University and the contractor.

1. The resultant computer print-out and network diagrams shall be recognized by the contractor as solely his/her updated construction schedule to complete all remaining contractor work except that portion affected by interim University decisions.

3.4 DISTRIBUTION OF SCHEDULES

A. Upon approval at each level of schedule development (preliminary, final for Contractors work

and Single Coordinated including all Prime Contractors work) the Contractor shall prepare and distribute (10) copies of the schedule at each level to the University. The Contractor shall also prepare and distribute two (2) copies of the final schedule showing Prime Contractors work to each Prime Contractor. In the event a new Prime Contractor is added to the job the General Construction Contractor shall furnish a revised schedule immediately with copies as indicated. The final coordinated schedule shall be signed and dated by all Prime Contractors involved and shall become part of the contract documents.

B. Distribute copies of updated (current) schedules to Contractors project site file, subcontractors, suppliers, Architect and Owner at each bi-weekly progress meeting. Also submit an updated (current) schedule with each Application for Payment or more often as required by the Architect and/or Owner.

3.5 SCHEDULE ADJUSTMENTS

A. Upon Owner and/or Architects request, if Contractor falls behind the approved schedule, the Contractor must submit a revised schedule to show how the Contractor intends to accomplish the completion of the work within the original contract time.

1. Within seven (7) days after receipt of notice from the Owner, the contractor shall submit to the University in writing an explanation of corrective action taken or proposed. The contracting officer shall make a decision binding on all parties after reviewing the written submissions.

B. Responsibility for Completion: The contractor agrees that whenever it becomes apparent from the current monthly computer produced calendar dated schedule that any contract completion date will not be met, he/she will take some or all of the following actions at no additional cost to the University.

1. increase construction manpower in such trades and numbers as will substantially eliminate the backlog of work in the opinion of the Construction Manager and contracting officer
2. increase the number of working hours per shift, shifts per working days, working days per week or the amount of construction equipment of any combination of the foregoing sufficiently to substantially eliminate the backlog of work in the judgment of the Construction Manager and contracting officer
3. reschedule activities to achieve maximum practical concurrence of accomplishment of activities

C. Lost time due to weather conditions will not accrue nor be credited to Contractor for weather delays with time added to the Substantial Completion milestone deadline. No weather delays will be granted once the building is under roof.

3.6 BI-WEEKLY REPORTING

A. Upon request from the Owner, the Contractor shall furnish for approval, his proposed operating schedule for the next immediate two-week period of time. This schedule will be submitted at each bi-weekly progress meeting along with the overall updated schedule.

1. Every two (2) weeks, the Architect will conduct a coordination and scheduling meeting on the job site. At this meeting, the contractor shall provide detailed information in the form of a bar chart schedule regarding the work schedule to be performed during the upcoming two (2) weeks. Bi-weekly scheduling by the contractor shall be in accordance with the priorities and degree of concurrent work required by the official schedule for the project. The contractor shall be prepared to explain a difference

between the contractor's bi-weekly schedules and the priorities required by the latest updating of the official schedule.

2. At the bi-weekly scheduling meeting, the Owner and Architect shall review the bar charts for the preceding two (2) weeks and the contractor shall report the progress actually achieved for each activity, which was scheduled to be performed during the two (2) weeks, including the actual dates on which the work was performed. The contractor agrees that this information shall constitute the official historical record of project progress. At each bi-weekly scheduling meeting, the contractor shall document any current delays to work operations. In addition, the contractor shall provide any available information regarding any potential delays, which they anticipate; i.e., procurement delays, expected strikes, etc.
3. Following the bi-weekly scheduling meeting, the Contractor shall issue to the Owner and Architect a new set of bi-weekly bar charts as developed at the meeting, which shall constitute the construction schedule for the upcoming two (2) weeks. The Contractor shall also issue a narrative bi-weekly progress analysis documenting progress achieved during the preceding two (2) weeks and analyze delays reported to constitute current or anticipated impacts to timely construction. The revised bar chart schedule and progress narrative shall agree with the meeting minutes and items discussed and agreed to at the bi-weekly meeting.
4. The contractor shall be represented at the bi-weekly scheduling meeting by their Construction Manager who shall have complete authority to provide the information required for the development of the next two (2) weeks bar chart schedule, documentation of past progress and documentation of delays. The contractor representatives shall also be authorized to discuss correction action planned to overcome delaying conditions at these meetings.

3.7 DAILY REPORTS

A. Daily Construction Reports: Prepare a daily construction report recording the following information concerning events at the Project site:

1. List of subcontractors at Project site.
2. List of separate contractors at Project site.
3. Approximate count of personnel at Project site.
4. Equipment at Project site.
5. Material deliveries.
6. High and low temperatures and general weather conditions.
7. Accidents.
8. Meetings and significant decisions.
9. Unusual events (refer to special reports).
10. Stoppages, delays, shortages, and losses.
11. Meter readings and similar recordings.
12. Emergency procedures.
13. Orders and requests of authorities having jurisdiction.
14. Change Orders received and implemented.
15. Construction Change Directives received and implemented.
16. Services connected and disconnected.
17. Equipment or system tests and startups.
18. Partial Completions and occupancies.
19. Substantial Completions authorized.

B. Field Condition Reports: Immediately on discovery of a difference between field conditions and the Contract Documents prepare and submit a detailed report. Submit with requests for interpretation. Include a detailed description of the differing conditions, together with recommendations for changing the Contract Documents.

END OF SECTION 013200

SECTION 013300 SUBMITTAL PROCEDURES

PART 1 - PRODUCTS

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section augments requirements set forth in the General Conditions and specifies administrative and procedural requirements for submittals required for performance of the Work, including:

1. Contractor’s Use of Architect’s CAD Files.
2. Shop Drawings.
3. Product Data.
4. Samples.
5. Informational Submittals.
6. Delegated Design.

B. Administrative Submittals: Refer to General Conditions, other Division 01 Sections and other Contract Documents for requirements for administrative submittals. Such submittals included, but are not limited to:

1. Permits.
2. Contractor’s Construction Schedule.
3. Submittal Schedule.
4. Schedule of Values.
5. Applications for payment.
6. List of Subcontractors.

C. Related Sections include the following:

1. Division 01 Section "Project Management and Coordination" for submitting and distributing meeting and conference minutes and for submitting Coordination Drawings.
2. Division 01 Section "Quality Requirements" for submitting test and inspection reports and for mockup requirements.
3. Division 01 Section "Closeout Procedures" for submitting warranties.
4. Division 01 Section "Operation and Maintenance Data" for submitting operation and maintenance manuals.
5. Division 01 Section "Demonstration and Training" for submitting videotapes of demonstration of equipment and training of Owner's personnel.
6. Divisions 2 through 48 Sections for specific requirements for submittals in those Sections.

1.3 DEFINITIONS

A. Action Submittals: Written and graphic information that requires Architect and Construction Manager's responsive action.

B. Informational Submittals: Written information that does not require Architect and Construction Manager's responsive action. Submittals may be rejected for not complying with requirements.

C. Concurrent Review: Simultaneous review by Architect and other discipline(s).

D. Shop Drawings: Original fabrication drawings.

E. Product Data: Manufacturer’s standard product literature and samples.

1.4 SUBMITTAL PROCEDURES

A. Coordination: Coordinate preparation and processing of submittals with performance of construction activities.

1. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
2. Coordinate transmittal of different types of submittals for related parts of the Work so processing will not be delayed because of need to review submittals concurrently for coordination.

a. Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until related submittals are received.

B. Submittals Schedule: Comply with General Conditions and other requirements of the Contract Administration Division. A submittal schedule will be developed by the Contractor within 10 working days of Notice to Proceed and approved by the Architect within 10 working days after receipt for review.

1. Follow the submittal requirements listed in this Section and elsewhere throughout the Contract Documents**.**

C. Contractor shall record all submittal information on the required “Submittal Log”. Distribute Log at each progress meeting.

D. Processing Time: Allow enough time for submittal review, including time for resubmittals, as follows. Time for review shall commence on Architect's receipt of submittal. No extension of the Contract Time will be authorized because of failure to transmit submittals enough in advance of the Work to permit processing, including resubmittals.

1. Initial Review: Allow 10 working days for initial review of each submittal. Allow additional time if coordination with subsequent submittals is required. Architect will advise Contractor when a submittal being processed must be delayed for coordination.

2. Intermediate Review: If intermediate submittal is necessary, process it in same manner as initial submittal.
3. Resubmittal Review: Allow 5 working days for review of each resubmittal.
4. Concurrent Consultant Review: Where the Contract Documents indicate that submittals may be transmitted simultaneously to Architect and to Architect's consultants, allow 10 working days for initial review of each submittal. Submittal will be returned to Contractor, through Architect. Submittals in the following sections require concurrent consultant review:
    a. Division 05: Sections 05120 “Structural Steel”, 05310 “Steel Deck”, 05300 “Steel Joists.

5. Concurrent Transmittal to Consultant: Where indicated above and acceptable to Architect, Contractor may transmit submittals directly to Architect’s consultants in the required number of copies, while at the same time transmitting two additional copies of the entire submittal including the transmittal to the Architect.
6. Concurrent Transmittal to Owner:

    a. Transmit two (2) additional copies of all shop drawings, product data and coordination drawings and coordination drawings and one (1) set of each sample submittal to Owner’s Project Manager.

E. Identification: Place a permanent label or title block on each submittal for identification.

1. Indicate name of firm or entity that prepared each submittal on label or title block.
2. Provide a space approximately 4 by 5 inches on label or beside title block to record Contractor's review and approval markings and action taken by Architect.
3. Include the following information on label for processing and recording action taken:

    a. Project name.
    b. Date.
    c. Name and address of Architect.
    d. Name and address of Contractor.
    e. Name and address of subcontractor.
    f. Name and address of supplier.
    g. Name of manufacturer.
    h. Submittal number or other unique identifier, including revision identifier.

        1) Architect will assign own numbers to each submittal, which may be different than those assigned by the Contractor.

    i. Number and title of appropriate Specification Section, and Keynote reference where applicable.
    j. Drawing number and detail references, as appropriate.
    k. Other necessary identification.

F. Deviations: Encircle or otherwise specifically identify deviations from the Contract Documents on submittals.

1. No deviation or substitutions will be considered without a credit value, and subsequent approval from the Owner’s Project Manager.

G. Additional Copies: Unless additional copies are required for final submittal, and unless Architect observes noncompliance with provisions in the Contract Documents, initial submittal may serve as final submittal.

1. Submit specified number of copies of submittal to concurrent reviewer in addition to one complete copy and transmittal to Architect.
2. Additional copies submitted for maintenance manuals will not be marked with action taken and will be returned.

H. Transmittal: Package each submittal individually and appropriately for transmittal and handling. Transmit each submittal using a transmittal form. Architect will return submittals, without review, received from sources other than Contractor.

1. Transmittal Form: Provide locations on form for the following information:

a. Project name.
b. Date.
c. Destination (To:).
d. Source (From:).
e. Names of subcontractor, manufacturer, and supplier.
f. Category and type of submittal.
g. Submittal purpose and description.
h. Specification Section number and title.
i. Drawing number and detail references, as appropriate.
j. Submittal and transmittal distribution record.
k. Remarks.
l. Signature of transmitter.

2. On the transmittal record relevant information and requests for data. On the form, or separate sheet, record deviations from Contract Document requirements, including minor variations and limitations. Include Contractor's Certification that information complies with Contract Document requirements.

I. Contractor's Certification: All scale and full-size shop, erection or setting drawings, roughing drawings, sleeve and opening drawings, product data, and samples shall be examined and checked by qualified technical employees of Contractor as to accuracy, completeness and compliance with all contract documents prior to submission to the Architect for his review. These drawings, data and samples shall be stamped and signed by Contractor certifying to such examination and compliance. Any drawings, data and samples not checked, stamped, and signed by Contractor will be returned unchecked, to Contractor. Contractor will be held responsible for any delay in the progress of the work due to his failure to observe these requirements, and the time for the completion of his contract will not be extended on account of his failure to submit drawings, data and samples promptly in accordance herewith.

J. Resubmittals: Make resubmittals in same form and number of copies as initial submittal.

1. Note date and content of previous submittal.
2. Note date and content of revision in label or title block and clearly indicate extent of revision.
3. Resubmit submittals until they are marked "No Exceptions Taken", or "Make Corrections Noted".

K. Distribution: Furnish copies of final submittals to manufacturers, subcontractors, suppliers, fabricators, installers, and authorities having jurisdiction, and others as necessary for performance of construction activities. Furnish one (1) copy of final submittals to Owner. Show distribution on transmittal forms.

L. Use for Construction: Use only final submittals with mark indicating "No Exceptions Taken" or "Make Corrections Noted" by Architect.

M. In instances where sepias, shop drawings and/or erection of drawings of a scale larger than the contract drawings are prepared by a contract, such drawings and sepias will be accepted in lieu of marked-up contract drawings provided they are updated according to the contract documents. A master sheet of the same dimensions as the contract drawings shall be prepared by the contractor on a tracing which shall indicate, sheet by sheet, a cross-reference to all shop drawings pertaining to that drawing. All drawings and sepias as required by Section 2.8 F below, shall be labeled "as-built" and dated above the tile block.

1.5 CONTRACTOR'S USE OF ARCHITECT'S CAD FILES

A. General: Architect may provide electronic copies of CAD files of the Contract Drawings for Contractor's use in preparing submittals subject to execution by the Contractor of a waiver and payment to the Architect for this service in the amount of $250. In accordance with the language of the waiver, the agreement is non-transferable by the Contractor to any Subcontractor, from any Subcontractor to the Contractor or from any Subcontractor to another Subcontractor. A separate waiver and payment is required for each individual contractor or subcontractor requesting electronic copies of CAD Drawings.

1. This service is not available prior to the award of the contract.
2. Architect's consultants may or may not provide CAD files under the above agreement. Such consultants reserve the right to refuse to provide CAD files, regardless of whether or not the aforementioned waiver and fee agreement is executed. Consultants may, if they agree to provide CAD files, attach additional conditions to those listed above and below. Architect's consultants include the following disciplines: civil, landscape, structural, mechanical, electrical, plumbing, and fire protection. Architect will advise Contractor if any consultants will not provide CAD files prior to executing above agreement.
3. CAD files will be provided in AutoCad 2020 format or newer version only.
4. CAD files will be provided in Architect's office standard conventions for file structure, file names, layering standards, drafting standards, etc. Architect will not make revisions to these standards for the convenience of the Contractor.
5. CAD files may or may not contain differences from the Contract Documents, including work and information related, but not limited to, alternate designs, obsolete designs, addenda, bulletins, construction sketches, and informational sketches. Such differences may or may not be clearly indicated. Where such differences are found, they do not supersede the Contract Documents.

PART 2 - PRODUCTS

2.1 ACTION SUBMITTALS

A. General: Prepare and submit Action Submittals required by individual Specification Sections.

B. When the following are specified in individual sections, submit them for review:

1. Shop drawings.
2. Samples for selection.
3. Samples for verification.
4. HVAC Test and Balance Reports.

C. Submit to Architect for review for the limited purpose of checking for conformance with information given and the design concept expressed in the contract documents.

D. Architect will consult with the Owner prior to rendering a decision or approval.

2.2 PRODUCT DATA

A. Collect information into a single submittal for each element of construction and type of product or equipment.

1. If information must be specially prepared for submittal because standard printed data are not suitable for use, submit as Shop Drawings, not as Product Data.
2. Mark each copy of each submittal to show which products and options are applicable.
3. Include the following information, as applicable:

a. Manufacturer's written recommendations.
b. Manufacturer's product specifications.
c. Manufacturer's installation instructions.
d. Standard color charts.
e. Manufacturer's catalog cuts.
f. Wiring diagrams showing factory-installed wiring.
g. Printed performance curves.
h. Operational range diagrams.
i. Mill reports.
j. Standard product operation and maintenance manuals.
k. Compliance with specified referenced standards.
l. Testing by recognized testing agency.
m. Application of testing agency labels and seals.
n. Notation of coordination requirements.

4. Submit Product Data before or concurrent with Samples. Each item of materials listed shall be marked “as specified” or “unspecified” as the case may be.
5. Number of Copies: Submit one original and three copies. For color charts submit four original color charts. One original and one copy will be returned. Reproduction for distribution to subcontractors, manufacturers, fabricators and suppliers is the responsibility of the Contractor.

a. Concurrent Submittals to Consultants: Submit one original and three copies to concurrent reviewer and two copies to Architect. In the case of color charts and other non-reproducible information, submit four originals to concurrent reviewer and two original to Architect.
b. Concurrent Submittals to Owner: Submit one (1) copy.
c. Copy Owner with any transmittals for Product data sent to Architect or Consultants.

2.3 SHOP DRAWINGS:

A. Shop Drawings:

1. Shop Drawings are required all new work. Do not use Shop Drawings without an appropriate final stamp indicating action taken.
2. Prepare Project-specific information, drawn accurately to scale. Do not base Shop Drawings on reproductions of the Contract Documents or standard printed data.
3. Preparation: Fully illustrate requirements in the Contract Documents. Include the following information, as applicable:

    a. Dimensions.
    b. Identification of products.
    c. Fabrication and installation drawings.
    d. Roughing-in and setting diagrams.
    e. Wiring diagrams showing field-installed wiring, including power, signal, and control wiring.
    f. Shopwork manufacturing instructions.
    g. Templates and patterns.
    h. Schedules.
    i. Design calculations.
    j. Compliance with specified standards.
    k. Notation of coordination requirements.
    l. Notation of dimensions established by field measurement.
    m. Relationship to adjoining construction clearly indicated.
    n. Seal and signature of professional engineer if specified.
    o. Wiring Diagrams: Differentiate between manufacturer-installed and field-installed wiring.

4. Sheet Size: Except for templates, patterns, and similar full-size drawings, submit Shop Drawings on sheets at least 8-1/2 by 11 inches but no larger than 36 by 48 inches.
5. Number of Copies: Submit one original (Contractor's option of bond print or correctable translucent reproducible print) and three additional copies. One original and one copy will be returned. Reproduction for distribution to subcontractors, manufacturers, fabricators and suppliers is the responsibility of the Contractor.

    a. Concurrent Submittals: Submit one original and three copies to concurrent reviewer and two copies to Architect.
    b. Concurrent Submittals to Owner: Submit one (1) copy to Owner
    c. Copy Owner with any transmittals for Product data sent to Architect or Consultants.

6. Special Types of Shop Drawings:

    a. Sleeve and Opening Drawings: Comply with requirements set forth in the General Conditions.

        1) Comply with shop drawing requirements for submittal and review as specified in this Section.

    b. Roughing Drawings: Furnish manufacturers certified roughing drawings, indicating accurate locations and sizes of all service utility connections, for machinery and equipment requiring such connections. Submit roughing drawings together with shop drawings for respective machinery and equipment.

7. Mechanical/Electrical Shop Drawing Minimum Requirements: Shop Drawings prepared by mechanical specialty trades shall comply with the following minimum requirements:

    a. The accurate dimensions locate all horizontal ducts from column centerline. Locate all offsets, transitions, elbows, fire dampers, registers, grilles and diffusers.
    b. All components shall be located to avoid recessed lighting, piping, conduits, cable trays and other in-plenum assemblies and where required shall be located so as to provide access to the component through removable ceiling material panels or access doors.
    c. Vertical riser ducts shall be located and dimensioned from column centerlines in two (2) directions. Each vertical duct riser shall be shown in its total length when concealed inside of a shaft.
    d. Each horizontal duct run shall be drawn to scale and size (width and depth noted) and an ELEVATION (bottom of duct) be clearly noted. This elevation shall clear all beams in the floor above and the ceiling construction below.
    e. Sheet metal shop drawings shall be made using not less than ¼" scale per foot; increase scale as required in congested areas or as directed by the Contractor.

8. All piping, including fire protection, storm, sanitary, domestic, heating and cooling systems.

    a. Give location of lines from column centerlines, indicate size, indicate centerline ELEVATION of piping and indicate drainage pitch as required.
    b. Where a piping line is indicated locate centerline ELEVATION and pitch at intervals not to exceed twenty (20) feet.
    c. Priority status shall be accorded preparation of dimensioned piping drawings for all piping below slabs-on-grade. Show all line pitches, critical inverts, in-slab fixtures as drains, floor sinks, troughs, cleanouts, etc. and outfall tie-in to site plumbing. Coordinate under slab piping with arrangement(s) of equipment furnished by others where applicable.

9. Electrical Trade:

    a. Plan layouts, not less than ¼" scale, of transformer vaults, main electrical rooms, satellite electrical and/or communications closets, emergency generator spaces showing equipment to scale and locations thereof.
    b. Main feeder distribution routing, horizontal and vertical sweep transitions to scale, of conduit over 1" showing ceiling plenum to scale.

10. Coordination:

    a. Coordination of the work of the several trades and the fitting and routing of the systems within concealed areas to avoid conflicts is the responsibility of the contractor(s). The Architect reserves the right to request coordinated drawings of congested areas showing all systems in plan and section to appropriate scale to insure the proper fitting of the work. The Contractor shall comply if so requested by the Architect.
    b. Provide coordinated drawings of all main mechanical, electrical, communications, and other rooms listed below showing equipment required by all trades including structure, piping, hanger assemblies, HVAC ductwork, conduit, electrical devices, fire alarm devices, control centers, pipe grids, acoustic enclosures, other devices. Drawings dimensioned in both plan and section(s); not less than 3/8"=1’-0” scale.

2.4 COORDINATION DRAWINGS

A. Prepare and submit Coordination Drawings where close and careful coordination is required for installation of products and materials fabricated off-site by separate entities, and where limited space availability necessitates maximum utilization of space for efficient installation of different components. See paragraph 2.3.9 above.

1. Show the interrelationship of components shown on separate Shop Drawings.
2. Indicate required installation sequences.
3. Refer to "General Provisions" Sections for specific Composite Drawing requirements for mechanical and electrical installations.

B. Role of Expediter: Contractor shall be responsible for expediting the preparation of the Coordination Drawings. Actual preparation of the drawings is described below. Contractor shall meet with subcontractors to develop a format for the Coordination Drawings (e.g. CAD, pin-register drafting, conventional drafting on Mylar using multiple pencil colors, etc.) such that reproductions obtained from the final Coordination Drawings can distinguish between the work of the various trades. Contractor shall resolve all conflicts arising in the coordination process.

C. Preparation Responsibility: Preparation of Coordination Drawings is the responsibility of the Contractor and all subcontractors principally involved. Production of the drawings shall proceed as follows:

1. HVAC subcontractor shall initiate the drawings by indicating his work, drawn at a scale of 3/8" per foot, showing dimensions, layouts, elevations and sections, all in relation to building construction (all steel structure, floor / roof slabs, ceilings, beams and columns).
2. Where applicable, the GWB subcontractor shall indicate the layout of all acoustic ceiling construction extent including all hanger devices and locations. AC ceiling construction indicated as well.
3. Fire Protection subcontractor shall then indicate the layout, sizes, dimensions and elevations of his work, using the HVAC subcontractor's drawings as a base, with dimensions in reference to fixed building construction.
4. Electrical subcontractor shall add his work to the base drawings begun by HVAC and Fire Protection subcontractors. Indicate locations and dimensions of light fixtures and electrical equipment conduit/cable-tray infrastructure, fire alarm equipment with reference to fixed building construction.
5. Plumbing subcontractor shall then add layouts, sizes and elevations of his work to the drawings of the above-mentioned trades, also dimensioned with reference to building structure.

D. Conflicts arising between the work of several trades shall be resolved between the respective trades, with the assistance of the General Contractor as expediter; and the drawings revised. Final Coordination Drawings shall be submitted by the Contractor to the Architect as required for submittals.

2.5 SAMPLES:

A. Submit Samples for review of kind, color, pattern, and texture for a check of these characteristics with other elements and for a comparison of these characteristics between submittal and actual component as delivered and installed.

1. Transmit Samples that contain multiple, related components such as accessories together in one submittal package.
2. Identification: Attach label on unexposed side of Samples that includes the following:

    a. Generic description of Sample.
    b. Product name and name of manufacturer.
    c. Sample source.
    d. Number and title of appropriate Specification Section.

3. Disposition: Maintain sets of approved Samples at Project site, available for quality-control comparisons throughout the course of construction activity. Sample sets may be used to determine final acceptance of construction associated with each set.

    a. Samples not incorporated into the Work, or otherwise designated as Owner's property, are the property of Contractor.

4. Samples for Initial Selection: Submit manufacturer's color charts consisting of units or sections of units showing the full range of colors, textures, and patterns available.

    a. Number of Samples: Submit three full set(s) of available choices where color, pattern, texture, or similar characteristics are required to be selected from manufacturer's product line. Architect will return submittal with options selected.

5. Samples for Verification: Submit full-size units or Samples of size indicated, prepared from same material to be used for the Work, cured and finished in manner specified, and physically identical with material or product proposed for use, and that show full range of color and texture variations expected. Samples include, but are not limited to, the following: partial sections of manufactured or fabricated components; small cuts or containers of materials; complete units of repetitively used materials; swatches showing color, texture, and pattern; color range sets; and components used for independent testing and inspection.

    a. Number of Samples: Submit four sets of Samples. Architect will retain one Sample sets; remainder will be returned. Mark up and retain one returned Sample set as a Project Record Sample.

        1) Submit a single Sample where assembly details, workmanship, fabrication techniques, connections, operation, and other similar characteristics are to be demonstrated.
        2) If variation in color, pattern, texture, or other characteristic is inherent in material or product represented by a Sample, submit at least three sets of paired units that show approximate limits of variations.

2.6 INFORMATIONAL SUBMITTALS

A. General: Prepare and submit Informational Submittals required by other Specification Sections.

1. Number of Copies: Submit two copies of each submittal, unless otherwise indicated. Architect will not return copies.
2. Certificates and Certifications: Provide a notarized statement that includes signature of entity responsible for preparing certification. An officer shall sign certificates and certifications or other individual authorized to sign documents on behalf of that entity.
3. Test and Inspection Reports: Comply with requirements specified in Division 01 Section "Quality Requirements."

B. Coordination Drawings: Comply with requirements specified in Division 01 Section "Coordination."

C. Qualification Data: Prepare written information that demonstrates capabilities and experience of firm or person. Include lists of completed projects with project names and addresses, names.

D. Welding Certificates: Prepare written certification that welding procedures and personnel comply with requirements in the Contract Documents. Submit record of Welding Procedure Specification (WPS) and Procedure Qualification Record (PQR) on AWS forms. Include names of firms and personnel certified.

E. Installer Certificates: Prepare written statements on manufacturer's letterhead certifying that Installer complies with requirements in the Contract Documents and, where required, is authorized by manufacturer for this specific Project.

F. Manufacturer Certificates: Prepare written statements on manufacturer's letterhead certifying that manufacturer complies with requirements in the Contract Documents. Include evidence of manufacturing experience where required.

G. Product Certificates: Prepare written statements on manufacturer's letterhead certifying that product complies with requirements in the Contract Documents.

H. Material Certificates: Prepare written statements on manufacturer's letterhead certifying that material complies with requirements in the Contract Documents.

I. Material Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting test results of material for compliance with requirements in the Contract Documents.

J. Product Test Reports: Prepare written reports indicating current product produced by manufacturer complies with requirements in the Contract Documents. Base reports on evaluation of tests performed by manufacturer and witnessed by a qualified testing agency, or on comprehensive tests performed by a qualified testing agency.

K. Research/Evaluation Reports: Prepare written evidence, from a model code organization acceptable to authorities having jurisdiction, that product complies with building code in effect for Project. Include the following information:

1. Name of evaluation organization.
2. Date of evaluation.
3. Time period when report is in effect.
4. Product and manufacturers' names.
5. Description of product.
6. Test procedures and results.
7. Limitations of use.

L. Schedule of Tests and Inspections: Comply with requirements specified in Division 01 Section "Quality Requirements."

M. Preconstruction Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of tests performed before installation of product, for compliance with performance requirements in the Contract Documents.

N. Compatibility Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of compatibility tests performed before installation of product. Include written recommendations for primers and substrate preparation needed for adhesion.

O. Field Test Reports: Prepare reports written by a qualified testing agency, on testing agency's standard form, indicating and interpreting results of field tests performed either during installation of product or after product is installed in its final location, for compliance with requirements in the Contract Documents.

P. Maintenance Data: Prepare written and graphic instructions and procedures for operation and normal maintenance of products and equipment. Comply with requirements specified in Division 01 Section "Operation and Maintenance Data."

Q. Design Data: Prepare written and graphic information, including, but not limited to, performance and design criteria, list of applicable codes and regulations, and calculations. Include list of assumptions and other performance and design criteria and a summary of loads. Include load diagrams if applicable. Provide name and version of software, if any, used for calculations. Include page numbers.

R. Manufacturer's Instructions: Prepare written or published information that documents manufacturer's recommendations, guidelines, and procedures for installing or operating a product or equipment. Include name of product and name, address, and telephone number of manufacturer. Include the following, as applicable:

1. Preparation of substrates.
2. Required substrate tolerances.
3. Sequence of installation or erection.
4. Required installation tolerances.
5. Required adjustments.
6. Recommendations for cleaning and protection.

S. Manufacturer's Field Reports: Prepare written information documenting factory-authorized service representative's tests and inspections. Include the following, as applicable:

1. Name, address, and telephone number of factory-authorized service representative making report.
2. Statement on condition of substrates and their acceptability for installation of product.
3. Statement that products at Project site comply with requirements.
4. Summary of installation procedures being followed, whether they comply with requirements and, if not, what corrective action was taken.
5. Results of operational and other tests and a statement of whether observed performance complies with requirements.
6. Statement whether conditions, products, and installation will affect warranty.
7. Other required items indicated in individual Specification Sections.

T. Insurance Certificates and Bonds: Prepare written information indicating current status of insurance or bonding coverage. Include name of entity covered by insurance or bond, limits of coverage, amounts of deductibles, if any, and term of the coverage.

2.7 DELEGATED DESIGN

A. Performance and Design Criteria: Where professional design services or certifications by a design professional are specifically required of Contractor by the Contract Documents, provide products and systems complying with specific performance and design criteria indicated.

1. If criteria indicated are not sufficient to perform services or certification required, submit a written request for additional information to Architect.

B. Delegated-Design Submittal: In addition to Shop Drawings, Product Data, and other required submittals, submit three copies of a statement, signed and sealed by the responsible design professional, for each product and system specifically assigned to Contractor to be designed or certified by a design professional.

1. Indicate that products and systems comply with performance and design criteria in the Contract Documents. Include list of codes, loads, and other factors used in performing these services.

2.8 ADMINISTRATIVE SUBMITTALS

A. Contractor's Construction Schedule: Comply with the General Conditions and other requirements of the Contract Administration Division.

1. If preliminary schedule requires revision after review, submit revised schedule within 5 business days.

2. Submit updated schedule with each Application for Payment.

B. Submittals Schedule: Comply with the General Conditions and other requirements of the Contract Administration Division.

1. Submit updated Submittal Log with each Application for Payment.

C. Application for Payment: Comply with the General Conditions and other requirements of the Contract Administration Division.

D. Schedule of Values: Comply with the General Conditions and other requirements of the Contract Administration Division.

E. Subcontract List: Comply with the General Conditions and other requirements of the Contract Administration Division. Prepare a written summary identifying individuals or firms proposed for each portion of the Work, including those who are to furnish products or equipment fabricated to a special design. Include the following information in tabular form:

1. Name, address, and telephone number of entity performing subcontract or supplying products.
2. Number and title of related Specification Section(s) covered by subcontract.
3. Drawing number and detail references, as appropriate, covered by subcontract.
4. Number of Copies: Submit three copies of subcontractor list, unless otherwise indicated. Architect will return two copies.

a. Mark up and retain one returned copy as a Project Record Document.

5. Submit one (1) copy of initial subcontractor list to Owner within (10) business days after Owner's Notice to Proceed. No portion of the work shall be started until the Contractor has furnished the Owner with a list showing the sub-contractor and/or material supplier responsible for the portion of the actual work needing to be started. The list will be updated until the list reflects the complete group of all subcontractors, suppliers, vendors, etc. employed to carry out the work.

F. The contractor shall keep one (1) set of drawings on the project at all times which are to be marked "as-built". During the course of the project, they shall mark these drawings with colored pencils to reflect any changes as well as dimension, the location of all pipe runs, conduits, traps, footing depths or any other information not already shown on the drawings or differing there from. All buried utilities outside the building shall be located by a metes and bounds survey performed by a licensed surveyor who shall certify as to its accuracy. These marked-up drawings and surveys shall be made available to the contracting officer, the Construction Manager and the Architect/Engineer at any time during the progress of the work upon their request. These shall include the drawings of principal sub-contractors as well. The Owner's Project Manager as well as the Architect on a monthly basis as a prerequisite to the review of the contractor's payment applications will review as-built drawings.

2.9 SUBMITTALS FOR PROJECT CLOSE OUT

A. When the following are specified in individual sections, submit them at project closeout:

1. Project record documents.
2. Operation and maintenance data
3. Warranties.
4. Bonds (if and when required by the Owner).
5. Other types as indicated.

B. Manufacturers' Instructions, Product Literature, Certificates, and Reports.

1. All instructions, literature, certificates, test reports, other technical data and correspondence shall be submitted in four (4) copies. The Owner shall retain Two (2) copies, and the other two (2) returned to the Contractor.

C. Written Certifications

1. Provide written certifications where required, in the following formats:

a. Manufacturer's Written Certifications: Shall be submitted in letter form on the manufacturer's letterhead, signed by an authorized representative, indicating that all required components and elements of their manufacture are in conformity with the requirements so stated under the individual sections of these Specifications. Technical data, additional support material, or other information may be submitted with the certification letter.
b. Installer's Written Certifications: Shall be submitted in letter form on the installer's company letterhead, signed by a legal authorized company officer, indicating that their respective installation and/or Work are in conformity with the requirements so stated under the individual sections of these Specifications.

D. Submit all of the above items in this Section for the Owner's benefit during and after project completion.

PART 3 - EXECUTION

3.1 CONTRACTOR'S REVIEW

A. Review each submittal and check for coordination with other Work of the Contract and for compliance with the Contract Documents. Note corrections and field dimensions. Mark with approval stamp before submitting to Architect. The Architect / Consultants will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Approval Stamp: Stamp each submittal with a uniform, approval stamp. Include Project name and location, submittal number, Specification Section title and number, name of reviewer, date of Contractor's approval, and statement certifying that submittal has been reviewed, checked, and approved for compliance with the Contract Documents.

3.2 ARCHITECT'S ACTION

A. General: Architect will not review submittals that do not bear Contractor's approval stamp and will return them without action.

B. Action Submittals: Architect will review each submittal, make marks to indicate corrections or modifications required, and return it. Architect will stamp each submittal with an action stamp and will mark stamp appropriately to indicate action taken, as follows:

1. Final Unrestricted Release: When submittals are marked “No Exceptions Taken” (NET), that part of the Work covered by the submittal may precede provided it complies with requirements of the Contract Documents; final acceptance will depend upon compliance.
2. Final-But-Restricted Release: When submittals are marked “Make Corrections Noted” (MCN), that part of the Work covered by the submittal may precede provided it complies with notations or corrections on the submittal and requirements of the Contract Documents; final acceptance will depend on that compliance.
3. Returned for Resubmittal: When submittal is marked “Amend and Resubmit” (AR), do not proceed with that part of the Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal in accordance with the notations; resubmit without delay. Repeat if necessary to obtain a different action mark.

    a. Do not permit submittals marked “Amend and Resubmit” to be used at the Project site, or elsewhere where Work is in progress.

4. Disapproved for Non-Compliance: When submittal is marked “Rejected - See Remarks” (R), Architect’s explanation for rejection will be included. Do not proceed with the work. Prepare a completely new submission.
5. Other Action: Where a submittal is primarily for information or record purposes, special processing or other activity, the submittal will be returned, marked “Action Not Required”.

C. Informational Submittals: Architect will review each submittal and will not return it, or will return it if it does not comply with requirements. Architect will forward each submittal to appropriate party.

D. Partial submittals are not acceptable, will be considered nonresponsive, and will be returned without review.

E. Submittals not required by the Contract Documents may not be reviewed and may be discarded.

F. Architect's Review: Review of shop and setting drawings, roughing drawings, sleeve and opening drawings, product data and samples by Architect will be a general review for conformance with design concept and compliance with information given in contact documents only, and shall not relieve Contractor of responsibility for accuracy of such submissions, nor for proper fitting, construction of work, or for furnishings of materials or work required by the contract and not indicated on submissions. Field dimensions, fabrication details, and job fitting are entirely Contractor's responsibility. Review shall not be construed as approving departures from contract requirements. Any proposed deviations from contract requirements, together with Contractor's explanations thereof, shall be stated in the letter of transmittal. Approval of a specific item shall not indicate approval of an entire assembly of which the item is a component. Should contractor check and certify submissions which indicate changes or deviations from the contract documents, and such changes are found acceptable to Architect, any and all additional costs resulting therefrom, including any cost for changes required to adjacent work or the work of other trades shall be the sole responsibility of Contractor.

END OF SECTION 013300

SECTION 014000 - QUALITY CONTROL REQUIREMENTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, general conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1. In Divisions 01 through 48 Sections:

a. The term "Architect" shall be synonymous with the term “Professional”.
b. The terms “Subcontractor”, “Sub-subcontractor”, “Installer”, “Applicator”, “Erector” and similar terms are synonymous with the term “Trade Contractor”.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for quality-control services.

B. Quality-control services include inspections, tests, and related actions, including reports performed by Contractor, by independent agencies, and by governing authorities. They do not include contract enforcement activities performed by Architect.

C. Inspection and testing services are required to verify compliance with requirements specified or indicated. These services do not relieve Contractor of responsibility for compliance with Contract Document requirements.

D. Requirements of this Section relate to fabrication and installation procedures.

1. Specific quality-control requirements for individual construction activities are specified in the Sections that specify those activities. Requirements in those Sections may also cover production of standard products.
2. Specified inspections, tests, and related actions do not limit Contractor's quality-control procedures that facilitate compliance with Contract Document requirements.
3. Requirements for Contractor to provide quality-control services required by Architect, Owner, or authorities having jurisdiction are not limited by provisions of this Section.

E. Related Sections: The following Sections contain requirements that relate to this Section:

1. Division 01 Section "Coordination".
2. Division 01 Section "Testing and Inspections".
3. Division 01 Section "Testing Laboratory Services".
4. Testing by the Contractor of installed materials and equipment is specified in the Technical Sections (Divisions 02 through 48) of these Specifications.

F. Testing requirements for real property installed equipment (RPIE) to be furnished by the contractor when such testing is required by code, contract or the manufacturer shall be performed in a pre-approved testing laboratory or in the absence of such by the manufacturer or its authorized representative at its place of business. The contractor shall

provide a five (5) days' notice to the University and Architect/Engineer through the Owner's Project Manager. The University and the Architect/Engineer shall have the right to witness all tests.

G. The contractor will hire and pay for a qualified testing agency.

1.3 DEFINITIONS

A. Quality-Assurance Services: Activities, actions, and procedures performed before and during execution of the Work to guard against defects and deficiencies and ensure that proposed construction complies with requirements.

B. Quality-Control Services: Tests, inspections, procedures, and related actions during and after execution of the Work to evaluate that completed construction complies with requirements. Services do not include contract enforcement activities performed by Architect.

C. Mockups: Full-size, physical example assemblies to illustrate finishes and materials. Mockups are used to verify selections made under Sample submittals, to demonstrate aesthetic effects and, where indicated, qualities of materials and execution, and to review construction, coordination, testing, or operation; they are not Samples. Mockups establish the standard by which the Work will be judged.

D. Testing Agency: An entity engaged to perform specific tests, inspections, or both. Testing laboratory shall mean the same as testing agency.

1.4 RESPONSIBILITIES

A. **Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, Contractor shall provide inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and/or required by authorities having jurisdiction. Costs for these services are included in the Contract Sum.**

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are to be done these services will be the Contractor's responsibility. The Contractor shall employ and pay a qualified independent testing agency to perform quality-control services. Costs for these services are included in the Contract Sum.

B. Retesting: The Contractor is responsible for retesting where results of inspections, tests, or other quality-control services prove unsatisfactory and indicate noncompliance with Contract Document requirements, regardless of whether the original test was Contractor's responsibility.

1. The cost of retesting construction, revised or replaced by the Contractor, is the Contractor's responsibility where required tests performed on original construction indicated noncompliance with Contract Document requirements. The contractor shall pay for all costs including administrative cost incurred by the University.
2. When the University and/or Architect/Engineer require special or additional inspections, testing or approvals due to Contractor's failure to comply with contract specifications, industry standards, good building practices, any applicable code procedures including but not limited to ASIC, ASTM, etc., whether or not testing is required by the contract documents for any individual component, entire system or process, the Contractor will secure the service of such special or additional

inspections, testing or approvals. In the event such special or additional inspections and testing reveal a failure of the work to comply with the terms and conditions of the contract, the contractor shall also bear all costs necessary to repair or replace the work as required by the Architect/Engineer.

C. Associated Services: Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the agency sufficiently in advance of operations to permit assignment of personnel. Auxiliary services required include, but are not limited to, the following:

1. Provide access to the Work.
2. Furnish incidental labor and facilities necessary to facilitate inspections and tests.
3. Take adequate quantities of representative samples of materials that require testing or assist the agency in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide the agency with a preliminary design mix proposed for use for materials mixes that require control by the testing agency.
7. Provide security and protection of samples and test equipment at the Project Site.

D. Duties of the Testing Agency: The independent agency engaged to perform inspections, sampling, and testing of materials and construction specified in individual Sections shall cooperate with the Architect, the Contractor and the Owner in performance of the agency's duties. The testing agency shall provide qualified personnel to perform required inspections and tests.

1. The agency shall notify the Architect, the Contractor, and the Owner promptly of irregularities or deficiencies observed in the Work during performance of its services.
2. The agency is not authorized to release, revoke, alter, or enlarge requirements of the Contract Documents or approve or accept any portion of the Work.
3. The agency shall not perform any duties of the Contractor.

E. Coordination: Coordinate the sequence of activities to accommodate required services with a minimum of delay. Coordinate activities to avoid the necessity of removing and replacing construction to accommodate inspections and tests.

1. The Contractor is responsible for scheduling times for inspections, tests, taking samples, and similar activities.

1.5 SUBMITTALS

A. Submit a certified written report of each inspection, test, or similar service.

1. Distribute copies of each report to Owner, Architect and Engineer. Distribution of reports shall be made promptly, upon the completion of each test or inspection. **A field report will be distributed to the Owner's Project Manager prior to the Inspector leaving the jobsite on any day during which a test or inspection has been done. A final inspection report will be required from the inspection agency to all parties within five (5) business days following the inspection. Test reports will be required within (5) business days following the actual test date.**
2. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
3. Report Data: Refer to specification sections of Divisions 02 through 48 for submittal requirements applicable to inspection and test reports. In general, each report shall include:

a. Date of issue.
b. Project title and number.
c. Name, address, and telephone number of testing agency.
d. Dates and locations of samples and tests or inspections.
e. Names of individuals making the inspection or test.
f. Designation of the Work and test method.
g. Identification of product and Specification Section.
h. Complete inspection or test data.
i. Test results and an interpretation of test results.
j. Ambient conditions at the time of sample taking and testing.
k. Comments or professional opinion on whether inspected or tested Work complies with Contract Document requirements.
l. Name and signature of laboratory inspector.
m. Recommendations on retesting.

4. All submittals of inspections and test reports or requests for approval shall be accompanied by a certification signed by the contractor attesting to his/her knowledge of the submittal, acceptance of its findings and acknowledgement that material tested meets the required standards and certify the report's representation of the facts. Failure to provide the written certification shall be grounds for rejection of the submittal.

1.6 QUALITY ASSURANCE

A. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are prequalified as complying with the American Council of Independent Laboratories' "Recommended Requirements for Independent Laboratory Qualification" and that specialize in the types of inspections and tests to be performed.

1. Each independent inspection and testing agency engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.
2. Each independent inspection and testing agency engaged on the Project shall be pre-qualified by the Division of Building and Construction of the State of New Jersey to perform the types of tests and inspections required.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION

3.1 REPAIRS AND PROTECTION

A. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes.

1. Comply with Contract Document requirements for Division 01 Section "Cutting and Patching."
2. Provide materials and comply with installation requirements specified in other Sections of these Specifications.
3. Restore patched areas and extended restoration into adjoining areas in a manner that eliminates evidence of patching.

B. Protect construction exposed by or for quality control service activities, and protect repaired construction.

C. Repair and protection are Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

END OF SECTION 014000

SECTION 014100 - TESTING LABORATORY SERVICES

PART 1 - GENERAL

1.1 RELEATED DOCUMENTS

A. Drawings and general provisions of the contract, including general conditions, general conduct of the work and special requirements, supplementary conditions, and other Division 01 specification sections, apply to this section. In the event of any conflicts between the requirements of these sections, the more stringent requirement shall apply.

1.2 SECTION INCLUDES

A. Selection and payment.

B. Contractor submittals.

C. Laboratory responsibilities.

D. Laboratory reports.

E. Limits on testing laboratory authority.

F. Contractor responsibilities.

1.3 RELATED SECTIONS

A. General Conditions: Inspections, testing, and approvals required by public authorities.

B. Individual Specification Sections: Inspections and tests required, and standards for testing.

C. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these sections, the more stringent requirement shall apply.

1.4 REFERENCE STANDARDS

A. American Society for Testing and Materials (ASTM): ASTM C802 - Practice for Conducting an Interlaboratory Test Program to Determine the Precision of Test Methods for Construction.

B. ASTM C1077 - Practice for Laboratories Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluation.

C. ASTM D290 - Recommended Practice for Bituminous Mixing Plant Inspection.

D. ASTM D3740 - Practice for Evaluation of Agencies Engaged in Testing and/or Inspection of Soil and Rock as Used in Engineering Design and Construction.

E. ASTM D4561 - Practice for Quality Control Systems or an Inspection and Testing Agency for Bituminous Paving Materials.

F. ASTM E329 - Practice for Use in the Evaluation of Inspection and Testing Agencies as Used in Construction.

G. ASTM E548 - Practice for Preparation of Criteria for Use in the Evaluation of Testing Laboratories and Inspection Bodies.

H. Testing, Quality Assurance, and Evaluating Building Components in Accordance with Test Methods Promulgated by ASTM Committee E6.

1.5 SELECTION AND PAYMENT

A. Contractor shall employ and pay for services of an independent Testing Laboratory, and Balancing Laboratory/Organization, approved by Owner and Architect/Engineer, to perform all specified inspecting and testing.

B. Employment of testing laboratory in NO WAY relieves Contractor of obligation to perform Work in accordance with requirements of Contract Documents.

1.6 QUALITY ASSURANCE

A. Comply with requirements of ASTM C802, ASTM C1077, ASTM D290, ASTM D3740, ASTM D4561, ASTM E329, ASTM E548, and ASTM E699.

B. Testing Laboratory Qualifications: Shall have been inspected by a nationally recognized inspection agency, acceptable to Owner and Architect/Engineer. Evidence of such inspection and current status shall be provided to Owner and Architect/Engineer. In addition, the approved lab shall document participation in a nationally recognized soils and concrete reference testing program during the twelve (12) months preceding the start of work on this project. Results of reference testing shall indicate an acceptable rating for the laboratory to be considered by the Owner and Architect/Engineer.

C. Laboratory: Authorized to operate in the State in which Project is located.

D. Laboratory Staff: Maintain a full time registered Professional Engineer on staff to review services.

E. Testing Equipment: Shall be calibrated at reasonable intervals with devices of accuracy traceable to either National Bureau of Standards or accepted values of natural physical constants.

1.7 CONTRACTOR SUBMITTALS

A. PRIOR TO START OF WORK, submit testing laboratory name, address, and telephone number, and names of full time registered Engineer and responsible officer.

B. Submit copy of report of laboratory facilities inspection made by Materials Reference Laboratory of National Bureau of Standards during most recent inspection, with memorandum of remedies of any deficiencies reported by the inspection.

1.8 LABORATORY RESPONSIBILITIES

A. Test samples of required items submitted by Contractor.

B. Provide qualified personnel at site. Cooperate with Architect/Engineer and Contractor in performance of services.

C. Perform specified inspecting, sampling, and testing of Products in accordance with specified standards.

D. Ascertain compliance of materials and mixes with requirements of Contract Documents.

E. Promptly notify Architect/Engineer and Contractor of observed irregularities or non-conformance of Work or Products.

F. Perform additional inspection and tests required by Architect/Engineer.

1.9 LABORATORY REPORTS

A. After each inspection and test within five (5) business days, promptly submit three (3) copies of laboratory report to Owner, Architect/ Engineer, and to Contractor. Include:

1. Date issued
2. Project title and number
3. Name of inspector
4. Date and time of sampling or inspection
5. Identification of product and specifications section
6. Location in the Project
7. Type of inspection or test
8. Date of test
9. Results of tests
10. Conformance with Contract Documents.

B. When requested by Architect/Engineer, provide interpretation of test results.

1.10 LIMITS ON TESTING LABORATORY AUTHORITY

A. Laboratory MAY NOT release, revoke, alter, or enlarge on requirements of Contract Documents.

B. Laboratory MAY NOT approve or accept any portion of the Work.

C. Laboratory MAY NOT assume any duties of Contractor.

D. Laboratory HAS NO authority to stop the Work.

1.11 CONTRACTOR RESPONSIBILITIES

A. Deliver to laboratory at designated location, adequate samples of materials proposed to be used, which require testing.

B. Cooperate with laboratory personnel, and provide access to the Work and to manufacturers' facilities.

C. Provide incidental labor and facilities:

1. to provide access to Work to be tested,
2. to obtain and handle samples at the site or at source of Products to be tested,
3. to facilitate tests and inspections,
4. to provide storage and curing of test samples.

D. Notify Architect/Engineer, Owner and laboratory 24 hours prior to expected time for operations requiring inspecting and testing services.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 014100

SECTION 014523 – TESTING AND INSPECTIONS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the testing and inspection requirements as specified herein.

1.3 RELATED SECTIONS

A. Requirements for testing and inspection shall be described in various Sections of these Specifications. Where no testing and inspection requirements are described but the Owner determines that it is necessary, the Owner may request additional testing and inspection to be performed at his own expense.

B. Work Not Included

1. Unless otherwise noted in this Section or other Section of work, the Owner will select a pre-qualified independent testing laboratory and inspection professional.
2. Unless otherwise noted in this Section or other Sections of work, the Owner will pay for all initial services of the testing laboratory and inspection professionals as further described in Article 2.1 of this Section of these Specifications.

1.4 QUALITY ASSURANCE

A. The testing laboratory will be qualified to the Owner's approval in accordance with ASTM E 329-14a "Standard Specification for Agencies Engaged in Construction Inspection, Testing, or Special Inspection."

B. Testing, when required, will be in accordance with all pertinent codes and regulations and with selected standards of the American Society for Testing and Materials.

1.5 PRODUCT HANDLING

A. Promptly process and distribute all required copies of test reports and related instructions to ensure all necessary retesting and/or replacement of materials with the least possible delay in progress of the work.

PART 2 - PRODUCTS

2.1 PAYMENTS FOR TESTING AND INSPECTION SERVICES

A. Initial Services: The Owner will pay for all initial testing and inspection services.

B. Retesting: When initial tests and inspections indicate non-compliance with local Codes and the Contract Documents, all subsequent retesting occasioned by the non- compliance shall be performed by the same testing laboratory and inspectors and the costs thereof will be deducted by the Owner from the Contract Sum.

2.2 CODE COMPLIANCE TESTING AND INSPECTION

A. Inspections and tests required by Codes or Ordinances, or by a plan approval authority, shall be paid by for by the Owner unless otherwise noted in this Section or other Sections of work. Retesting or inspection as required shall conform to the requirements of Article 2.1 B of this Section.

2.3 CONTRACTOR'S TESTING

A. Inspection or testing performed exclusively for the Contractor's convenience shall be the sole responsibility of the Contractor.

B. Where operating tests are specified, the Contractor shall test his work as it progresses, on his own account, and shall make satisfactory preliminary tests in all cases before applying for official tests.

C. Tests shall be made in the manner specified, for the different branches of the work. Each test shall be made on the entire system for which such test is required, wherever practical. In case it is necessary to test portions of the work independently, the Contractor shall do so without extra compensation. The Contractor shall furnish all labor, material and apparatus, make corrections and conduct the official test. The test will be conducted in the presence of a representative of the Architect.

D. All parts of the mechanical and electrical work and associated equipment shall be tested and adjusted to work properly and be left in perfect operating condition. All defects disclosed by these tests shall be corrected to the satisfaction of the Architect and Engineer without any additional cost to the Owner. Tests shall be repeated on this repaired or replaced work if deemed necessary by the Architect. The Architect shall be notified at least forty-eight (48) hours in advance of all tests, and shall be represented at tests that he deems necessary. The Contractor shall furnish all necessary instruments, other equipment, and personnel required for such tests.

E. Required certificates of inspection, testing or approval shall be secured by the Contractor and promptly delivered by him to the Architect.

F. If the Architect or Engineer is to observe the inspections, tests or approvals required by the Contract Documents, he will endeavor to do so promptly and, where practicable, at the source of supply.

PART 3 - EXECUTION

3.1 COOPERATION WITH TESTING LABORATORY AND INSPECTORS

A. Representatives of the testing laboratory and inspectors shall have access to the work at all times. Provide facilities for such access in order that they may properly perform their functions.

3.2 SCHEDULES

A. Establishing Schedule: By advance discussions with the inspection service and testing laboratory selected by the Owner, determine the time required to perform inspections and tests and to issue each of its findings. Provide all required time within the construction schedule.

B. Revising Schedule: When changes of construction schedule are necessary during construction, coordinate all such changes of schedule with the inspectors and testing laboratory as required.

C. Adherence to Schedule: When the testing laboratory is ready to test according to the determined schedule but is prevented from testing or taking specimens due to incompleteness of the work, all extra costs for testing attributable to the delay will be back-charged to the Contractor.

3.3 TAKING SPECIMENS

A. All specimens and samples for testing, unless otherwise provided in these Contract Documents, will be taken by the testing laboratory; all sampling equipment and personnel will be provided by the testing laboratory; and all deliveries of specimens and samples to the testing laboratory will be performed by the testing laboratory.

END OF SECTION 014523

SECTION 014200- REFERENCE STANDARDS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, General Conduct of the Work and Special Requirements, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 DEFINITIONS

A. General: Basic contract definitions are included in the Conditions of the Contract.

B. "Indicated": The term "indicated" refers to graphic representations, notes, or schedules on the Drawings; or to other paragraphs or schedules in the Specifications and similar requirements in the Contract Documents. Terms such as "shown," "noted," "scheduled," and "specified" are used to help the user locate the reference. Location is not limited.

C. “Directed": Terms such as "directed," "requested," "authorized," "selected," "approved," "required," and "permitted" mean directed by the Architect, requested by the Architect, and similar phrases, unless any item associated with these terms will result in a monetary change order to the project. If the items associated with these terms require a change order the Owner must be notified prior to any action being taken.

D. "Approved": The term "approved," when used in conjunction with the Architect's action on the Contractor's submittals, applications, and requests, and the Architect's and Owners duties and responsibilities are limited as specified by the Conditions of the Contract.

E. "Regulations": The term "regulations" includes laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, as well as rules, conversations and agreements within the construction industry that control performance of the Work.

F. "Furnish": The term "furnish" means to supply and deliver to the Project site, ready for unloading, unpacking, assembly, installation, and similar operations.

G. "Install": The term "install" describes operations at the Project site including the actual unloading, temporary storage, unpacking, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.

H. "Provide": The term "provide" means to furnish and install, complete and ready for the intended use.

I. "Installer": An installer is the Contractor or another entity engaged by the Contractor, either as an employee, subcontractor, or contractor of lower tier, to perform a particular construction activity, including installation, erection, application, or similar operations. Installers are required to be experienced in the operations they are engaged to perform.

1. The term "experienced," when used with the term "installer," means having successfully completed a minimum of five previous projects similar in size and scope to this Project; being familiar with the special requirements indicated; and having complied with requirements of authorities having jurisdiction.
2. Trades: Using a term such as "carpentry" does not imply that certain construction activities must be performed by accredited or unionized individuals of a corresponding generic name, such as "carpenter." It also does not imply that requirements specified apply exclusively to tradespersons of the corresponding generic name. However, work resulting from any construction activity performed by a "Trade" must meet all quality standards acceptable to the Architect and Owner

J. "Project site" is the space available to the Contractor for performing construction activities, either exclusively or in conjunction with others performing other work as past of the Project. The extent of the Project site is shown on the Drawings and may or may not be identical with the description of the land on which the Project is to be built.

K. "Testing Agencies": A testing agency is an independent entity engaged to perform specific inspections or tests, either at the Project site or elsewhere, and to report on and, if required, to interpret results of those inspections or tests.

L. If Requested: If requested by the Owner.

M. Where: Where or when practicable in the judgment of the Owner.

N. Satisfactory: Acceptable in the judgment of the Owner.

O. As Required: As required by the Architect, or as field conditions dictate.

P. Replace: To remove an existing product or service, and furnish and install an indicated product in its place.

Q. Specifications: The total and complete specifications of this Project as identified by the Architect, and the Architects consultants through the Architect, including referenced standard specifications, the General Specifications and the Technical Specifications as indexed.

R. System/ Assembly: In the context of this Project, where a 'system' or an 'assembly' as indicated in the Specifications and/or Drawings, it shall consist of the sum of all the relevant pasts and/or materials specific to the use of the system or assembly indicated; installed complete, in place, and in working order. All said pasts and/or materials required for a complete system indicated, shall be supplied and installed as past of the Base Bid Price for a complete, proper, and fully functional installation, whether specifically detailed or not. All materials for the system or assembly shall be installed completely, all necessary connections to other construction shall be provided. Upon completion of this system or assembly, the sum of all the parts that constitute the make-up of this unit, shall function and/or operate properly according to its intended design.

S. Mandatory: Means as required by code, any Building Authority, and any and all governing laws. All mandatory requirements for construction shall be included in the Base Bid Price for the Project.

T. Functional: Items(s) installed that are to operate properly or as intended.

U. Typical: A condition, detail, or other item that is common to an identified system, assembly, or any other construction condition where the essential characteristics are the same.

1.3 SPECIFICATION FORMAT AND CONTENT EXPLANATION

A. Specification Format: These Specifications are organized into Divisions and Sections based on the 48-division format and CSI/ICSC's "MasterFormat" numbering system.

B. Specification Content: These Specifications use certain conventions for the style of language and the intended meaning of certain terms, words, and phrases when used in particular situations. These conventions are as follows.

1. Abbreviated Language: Language used in the Specifications and other Contract Documents is abbreviated. Words and meanings shall be interpreted as appropriate. Words implied, but not stated, shall be interpolated, as the sense requires. Singular words shall be interpreted as plural and plural words interpreted as singular where applicable as the context of the Contract Documents indicates.

a. The Technical Specifications are of the abbreviated type and include incomplete sentences. Omissions of words or phrases such as "the Contractor shall"; "in conformance with"; "shall be"; "as noted on the Drawings"; "according to the Plans"; "a" "an"; "the"; and "all" are intentional. Omitted words and phrases shall be supplied by inference in the same manner, as they are when a "note" occurs on the Drawings. Works "shall be" "shall have", and "shall" will be supplied by inference where a colon (:) is used within sentences or phrases.

2. Imperative mood and streamlined language are generally used in the Specifications. Requirements expressed in the imperative mood are to be performed by the Contractor. At certain locations in the Section Text, subjective language is used for clarity to describe responsibilities that must be fulfilled indirectly by the Contractor or by others when so noted.

a. The words "shall," "shall be," or "shall comply with," depending on the context, are implied where a colon (:) is used within a sentence or phrase.
b. Abbreviated references to trade associations, technical societies, recognized authorities and other institutions are included in the contract documents. Any abbreviation or organization not recognized by the Contractors shall be requested from the Architect for interpretation. Failure to request and receive an interpretation shall not relieve the Contractor from performing and/or supplying materials or workmanship in compliance with specified references to the satisfaction of the Architect or Owner

C. References: References to known standard specifications shall mean and intend the latest edition of such specifications adopted and published as of the date of the invitation to bid.

D. Divisions: Divisions of the specifications into sections is done for the convenience of reference and is not intended to control the Contractor in dividing the Work among subcontractors or to limit the scope of work performed by any trade under any section

1.4 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 past of the Contract Documents by reference.

B. Publication Dates: Comply with standards in effect as of the date of the Contract Documents.

C. Conflicting Requirements: Where compliance with two or more standards is specified and the standards establish different or conflicting requirements for minimum quantities or quality levels, comply with the most stringent requirement. Refer uncertainties and requirements that are different, but apparently equal, to the Architect for a decision before proceeding.

1. Minimum Quantity or Quality Levels: The quantity or quality level shown or specified shall be the minimum provided or performed. The actual installation may comply exactly with the minimum quantity or quality specified, or it may exceed the minimum within reasonable limits. To comply with these requirements, indicated numeric values are minimum or maximum, as appropriate, for the context of the requirements. Refer uncertainties to the Architect for a decision before proceeding

D. Copies of Standards: Each entity engaged in construction on the Project must 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, the Contractor shall obtain copies directly from the publication source and make them available on request.

E. Abbreviations and Names: Trade association names and titles of general standards are frequently abbreviated. Where abbreviations and acronyms are used in the Specifications or other Contract Documents, they mean the recognized name of the trade association, standards-producing organization, authorities having jurisdiction, or other entity applicable to the context of the text provision. Refer to Gale Research's "Encyclopedia of Associations" or Columbia Books' "National Trade & Professional Associations of the U.S.," which are available in most libraries.

1.5 GOVERNING REGULATIONS AND AUTHORITIES

A. Copies of Regulations: Obtain copies of the following regulations and retain at the Project site to be available for reference by parties who have a reasonable need:

1. Any and all Federal, State or Local regulations required by the Agency having jurisdiction to be retained or posted at the project site

1.6 SUBMITTALS

A. Permits, Licenses, and Certificates: For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdictional settlements, notices, receipts for fee payments, judgments, correspondence, records, and similar documents, established for compliance with standards and regulations bearing on performance of the Work.

1.7 DRAWINGS

A. The Contractor shall provide all quantities, items, articles, materials, operations, or methods listed, mentioned, implied, scheduled, or specified, on the Drawings, including all labor, materials, equipment, and incidentals required for their completion.

B. Intent of the Drawings:

1. As with any plan, the Contractor shall be responsible for verifying all field conditions, whether or not noted in the plans prior to construction. Any discrepancies shall be resolved with the Owner prior to construction. The start of construction will not be delayed due to the Contractors need to verify all field conditions. Verification of items must be scheduled by the Contractor so as not to impede the progress of the work. The Contractor shall be responsible for correcting damage resulting from Contractor's failure to verify field conditions. Architect/Engineer and Owner liability for accuracy of survey information.
2. The implied intent of the Drawings, includes the overall layout of the Project, inclusive of site structures, site improvements, location of all items required during construction, the extent of construction and the extent of the materials.
3. All such Drawings and Specifications constitute the Project as a whole, and are as a result, directly related to one another. The Drawings and Specifications are not divided into, or are intended to be divided into separate entities according to building trades or local practice. It is the responsibility of the Contractor to disseminate all information represented on the Drawings and Specifications so that all trades and sub-trades will have complete and thorough knowledge of the Project intent. No requests for Change Orders, time extensions, or other considerations will be accepted if the Contractor fails to properly coordinate information to the various trades/sub-trades.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 014200

SECTION 015000 – CONSTRUCTION FACILITIES AND TEMPORARY CONTROLS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General Conditions, Supplementary Conditions, and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes requirements for construction facilities and temporary controls, including temporary utilities, support facilities, and security and protection. Temporary utilities include, but are not limited to, the following:

1. Temporary water service and distribution.
2. Temporary electric power and light.
3. Temporary heat.
4. Telephone service.
5. Sanitary facilities, including drinking water.
6. Storm and sanitary sewer.

B. Support facilities include, but are not limited to, the following:

1. Field offices and storage sheds.
2. Temporary roads, paving and truck wash-down station.
3. Dewatering facilities and drains.
4. Temporary enclosures.
5. Hoists.
6. Temporary project identification signs and bulletin boards.
7. Waste disposal services.
8. Rodent and pest control.
9. Construction aids and miscellaneous services and facilities.

C. Security and protection facilities include, but are not limited to, the following:

1. Temporary fire protection.
2. Barricades, warning signs, and lights.
3. Sidewalk bridge or enclosure fence for the site.
4. Environmental protection.

D. The Contractor is responsible for all costs associated with the supply, maintenance or usage of temporary utilities and construction related facilities unless indicated otherwise in this Section.

1.3 QUALITY ASSURANCE

A. Regulations: Comply with industry standards and applicable laws and regulations of authorities having jurisdiction including, but not limited to, the following:

1. Building code requirements.
2. Health and safety regulations.
3. Utility company regulations.
4. Police, fire department, and rescue squad rules.
5. Environmental protection regulations.

B. Standards: Comply with NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations," ANSI A10 Series standards for "Safety Requirements for Construction and Demolition," and NECA Electrical Design Library "Temporary Electrical Facilities."

1. Electrical Service: Comply with NEMA, NECA, and UL standards and regulations for temporary electric service. Install service in compliance with NFPA 70 "National Electric Code."

C. Inspections: Arrange for authorities having jurisdiction to inspect and test each temporary utility before use. Obtain required certifications and permits.

1.4 PROJECT CONDITIONS

A. Temporary Utilities: Prepare a schedule indicating dates for implementation and termination of each temporary utility.

B. Conditions of Use: Keep temporary services and facilities clean and neat in appearance. Operate in a safe and efficient manner. Relocate temporary services and facilities as the Work progresses. Do not overload facilities or permit them to interfere with progress. Take necessary fire-prevention measures. Do not allow hazardous, dangerous, or unsanitary conditions, or public nuisances to develop or persist on-site.

C. Provide waste removal services as required to maintain the site in a clean and orderly condition.

PART 2 - PRODUCTS

2.1 MATERIALS

A. General: Provide new materials. If acceptable to the Owner, the Contractor may use undam- aged, previously used materials in serviceable condition. Provide materials suitable for use in- tended.

B. Paint: Comply with requirements.

1. For job-built temporary offices, shops, sheds, fences, and other exposed lumber and ply- wood, provide exterior-grade acrylic-latex emulsion over exterior primer.
2. For sign panels and applying graphics, provide exterior-grade alkyd gloss enamel over exterior primer.

C. Tarpaulins: Provide waterproof, fire-resistant, UL-labeled tarpaulins with flame-spread rating of 15 or less. For temporary enclosures, provide translucent, nylon-reinforced, laminated polyethylene or polyvinyl chloride, fire-retardant tarpaulins.

D. Water: Provide potable water approved by local health authorities.

2.2 EQUIPMENT

A. General: Provide new equipment. If acceptable to the Owner, the Contractor may use undam- aged, previously used equipment in serviceable condition. Provide equipment suitable for use intended.

B. Water Hoses: Provide 3/4-inch, heavy-duty, abrasion-resistant, flexible rubber hoses 100 feet long, with pressure rating greater than the maximum pressure of the water distribution system. Provide adjustable shutoff nozzles at hose discharge.

C. Electrical Outlets: Provide properly configured, NEMA-polarized outlets to prevent insertion of 110- to 120-Volt plugs into higher voltage outlets. Provide receptacle outlets equipped with ground-fault circuit interrupters, reset button, and pilot light for connection of power tools and equipment.

D. Electrical Power Cords: Provide grounded extension cords. Use hard-service cords where ex- posed to abrasion and traffic. Provide waterproof connectors to connect separate lengths of electric cords if single lengths will not reach areas where construction activities are in progress. Do not exceed safe length-voltage ratio.

E. Lamps and Light Fixtures: Provide general service incandescent lamps of wattage required for adequate illumination. Provide guard cages or tempered-glass enclosures where exposed to breakage.

F. Fire Extinguishers: Provide hand-carried, portable, UL-rated; Class A fire extinguishers for temporary offices and similar spaces. In other locations, provide hand-carried, portable, UL-rated, Class ABC, dry-chemical extinguishers or a combination of extinguishers of NFPA-recommended classes for the exposures.

1. Comply with NFPA 10 and NFPA 241 for classification, extinguishing agent, and size required by location and class of fire exposure.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Use qualified personnel for installation of temporary facilities. Locate facilities where they will serve the Project adequately and result in minimum interference with performance of the Work and the areas adjacent to the Work area. Relocate and modify facilities as required.

B. Provide each facility ready for use when needed to avoid delay. Maintain and modify as required. Do not remove until facilities are no longer needed.

3.2 TEMPORARY UTILITY INSTALLATION

A. General: Engage the appropriate local utility company to install temporary service or connect to existing service. Where company provides only part of the service, provide the remainder with matching, compatible materials and equipment. Comply with company recommendations.

1. Arrange with company and existing users for a time when service can be interrupted, if necessary, to make connections for temporary services.
2. Provide adequate capacity at each stage of construction. Prior to temporary utility

avail- ability, provide trucked-in services.

3. Obtain easements to bring temporary utilities to the site where the Owner's easements cannot be used for that purpose.
4. Use Charges: Cost or use charges for temporary facilities are not chargeable to the Owner. Neither the Owner will accept cost or use charges as a basis of claims for Change Orders.
5. Install services to cause minimum disruption to area's adjacent to the work area.
6. Add provisions for work not in Contract but served by temporary facilities, if required.

B. Water Service: Contractor may use existing water service in the area of work.

C. Temporary Electric Power Service: Provide weatherproof, grounded electric power service and distribution system of sufficient size, capacity, and power characteristics during construction period. Include meters, transformers, overload-protected disconnects, automatic ground-fault interrupters, and main distribution switchgear. **Cost of temporary electric power usage is the Contractors responsibility. Cost shall be included in the bid.**

D. Initial temporary service shall be three (3) phase, or single phase. Temporary light and power installations, wiring and miscellaneous electrical hardware must meet the electric code. Electrical characteristics shall be provided to meet all temporary light and power reasonably required as herein and hereinafter specified or as included under the general conditions. The contractor shall pay the cost of running temporary services. **All costs shall be included in the bid.**

1. Power Distribution System: Install wiring overhead and rise vertically where least exposed to damage. Where permitted, wiring circuits not exceeding 125 Volts, ac 20 Ampere rating, and lighting circuits may be nonmetallic-sheathed cable where overhead and exposed for surveillance.

E. Power outlets shall be fed independently of the temporary lighting system. The extension of service shall include the necessary wiring of sufficient capacity to the location of the well for the operation of the well pump in the event a water well is the source of water supply for the project. Where service of a type other than herein mentioned is required, the contractor requiring it shall pay all costs of such special service.

F. Temporary Lighting: Provide temporary lighting with local switching. **Cost of temporary lighting usage is the contractors' responsibility. Cost shall be included in the bid.**

1. The contractor shall provide double sockets at a maximum of thirty feet (30') on centers in large areas. One (1) socket shall contain a 150-watt lamp and the other socket shall be a grounding type to accept a receptacle plug for small, single-phase loads to be used for short periods of time.
2. Install and operate temporary lighting that will fulfill security and protection requirements without operating the entire system. Provide temporary lighting that will provide adequate illumination for construction operations and traffic conditions.

G. The contractor shall observe the requirements of the Federal Occupational Safety and Health Act (OSHA) of 1970 with regard to temporary light and power.

H. Temporary Heat: Provide temporary heat required by construction activities. Select safe equipment that will not have a harmful effect. **Any cost associated with the supply, maintenance and usage of temporary heat will be the responsibility of the contractor. Cost of temporary heat shall be included in the bid.**

I. Use of gasoline-burning space heaters, open flame, or salamander heating units is prohibited.

J. Should electricians be required to supervise and maintain equipment required for the provision of heat, the payment for the services of the supervisors and/or maintenance personnel shall be the responsibility of the Contractor. The contractor shall pay the cost of all fuel consumed in the operation of the generating unit for supplying temporary heat.

K. All heating equipment shall be NFPA approved. Heaters shall be approved by a recognized testing laboratory and must be equipped with a positive shut-off safety valve. Notwithstanding the above, all temporary heating equipment will comply with all Federal and State laws and regulations.

L. Temporary Telephones: Contractor shall utilize their own cell phones for service.

M. The contractor may utilize the Owner's sanitary/wash facilities, drinking water, etc. if these amenities are available. The contractor shall only use these facilities with Owner's permission. The contractor will be responsible to reimburse the Owner for all Owner provided utilities use by the Contractor. Further, should the contractor elect to utilize Owner provided utilities the contractor will be responsible to repair all damage and replace all damaged items before the project will be considered substantially completed. The Owner will not be required to make final payment to the contractor until such damage is repair or replaced to its original or better than original condition.

3.3 SUPPORT FACILITIES INSTALLATION

A. Temporary storage sheds are not permitted on the Owner's property.

B. Temporary Enclosures: Provide temporary enclosures for protection of construction, in progress and completed, from exposure, foul weather, other construction operations, and similar activities.

1. Where temporary wood or plywood enclosure exceeds 100 sq. ft. in area, use UL-labeled, fire-retardant-treated material for framing and main sheathing.

C. Temporary Lifts and Hoists: Contractor may utilize the existing elevator for bringing materials to the area of work and disposing materials to the area of work provided that:

1. The Contractor provides temporary protection materials, padding, etc. for the elevator cab.
2. The Contractor observes the weight capacity of the existing elevator cab.
3. The Contractor is only permitted to use the existing elevator from the hours of 9:00 p.m. to 6:00 a.m. Monday through Friday.
4. The Contractor notify the Owner of the elevator use three (3) business days prior to use.

D. Project Identification and Temporary Signs: Prepare project identification and other signs of size indicated. Install signs where indicated to inform the public and persons seeking entrance to the Project. Support on posts or framing of preservative-treated wood or steel. Do not permit installation of unauthorized signs.

1. Temporary Signs: Prepare signs to provide directional information to construction personnel and visitors.

E. Collection and Disposal of Waste: Collect waste from construction areas and elsewhere daily. Comply with requirements of NFPA 241 for removal of combustible waste material and debris. Enforce requirements strictly. Do not hold materials more than 7 days during normal weather or 3 days when the temperature is expected to rise above 80 deg F. Handle hazardous, dangerous, or unsanitary waste materials separately from other waste by containerizing properly. Dispose of material lawfully.

1. Provide containers with lids. Dispose of waste off-site periodically.

F. Individual Project circumstances may require use of other construction aids and miscellaneous facilities, such as walkways, scaffoldings, platforms, swing stages, ramps and bridges, incidental sheeting and shoring, demolition waste chutes, and similar construction aids. Add requirements as necessary to suit Project.

3.4 SECURITY AND PROTECTION FACILITIES INSTALLATION

A. Temporary Fire Protection: Install and maintain temporary fire-protection facilities of the types needed to protect against reasonably predictable and controllable fire losses. Comply with NFPA 10 "Standard for Portable Fire Extinguishers" and NFPA 241 "Standard for Safeguarding Construction, Alterations, and Demolition Operations."

1. Locate fire extinguishers where convenient and effective for their intended purpose, but not less than one extinguisher on each floor at or near each usable stair- well.
2. Store combustible materials in containers in fire-safe locations.
3. Maintain unobstructed access to fire extinguishers, fire hydrants, temporary fire-protection facilities, stairways, and other access routes for fighting fires. Prohibit smoking in hazardous fire-exposure areas.
4. Provide supervision of welding operations, combustion-type temporary heating units, and similar sources of fire ignition.

B. Barricades, Warning Signs, and Lights: Comply with standards and code requirements for erection of structurally adequate barricades. Paint with appropriate colors, graphics, and warning signs to inform personnel and the public of the hazard being protected against. Where appropriate and needed, provide lighting, including flashing red or amber lights.

C. Security Enclosure and Lockup: Install substantial temporary enclosure of partially completed areas of construction. Provide locking entrances to prevent unauthorized entrance, vandalism, theft, and similar violations of security.

1. Storage: Where materials and equipment must be stored, and are of value or attractive for theft, provide a secure lockup. Enforce discipline in connection with the installation and release of material to minimize the opportunity for theft and vandalism.

D. Environmental Protection: Provide protection, operate temporary facilities, and conduct construction in ways and by methods that comply with environmental regulations, and minimize the possibility that air, waterways, and subsoil might be contaminated or polluted or that other undesirable effects might result. Avoid use of tools and equipment that produce harmful noise. Re- strict use of noise-making tools and equipment to hours that will minimize complaints from per- sons or firms near the site.

1. No burning will be permitted on the site.
2. It will be the Contractor’s responsibility to control dust by a means acceptable to the Owner. The Contractor shall make due allowance in his bid to cover these non-productive costs.

E. Protection of Utilities:

1. The Contractor shall exercise special care when working near existing utility installations such as lights, ducts, structures, underground trench laid cables, cable markers, pads, water lines, underground oil lines, railroads and other installations, to ensure that no damage is done to them and that the underground wiring to such utilities is not damaged or rooted out, or pipelines broken or punctured.
2. If the Contractor damages any installation, the Contractor shall repair at no cost to the Owner the damaged item to the Owner's satisfaction. At the Owners discretion, repairs will be done continuously on a 24-hour per day basis until completed. The Contractor shall submit for approval the name of an electrical contractor and a plumbing contractor who shall be available on a 24 hour a day basis to affect any repairs as may be necessary due to Contractor error.
3. The Contractor shall obtain (if available) as-built site underground information prior to beginning excavation to minimize the possibility of interruption or damage to existing facilities. The lack of this information shall not excuse damage to the utilities by the con- tractor or the requirement to make necessary repairs immediately, the Contractor shall pay for Cost of the repair work.

F. Protection and Restoration of Property and Landscape: The Contractor shall be responsible for the preservation of all public and private property. All land monuments and property markers shall be preserved until the Owner has witnessed and recorded their location.

G. Protection of Existing Trees, Shrubs, and Vegetation to Remain: Contractor shall take all means necessary to protect existing trees, shrubs, and vegetation. Contractor and its forces shall abide by the boundaries set by the Drawings for the protection of root systems of all designated trees, shrubs and vegetation. Protection shall be completely in place prior to the start of construction work in any area. Contractor shall clearly mark all restricted areas as indicated on the Drawings and prevent the use of the area by all personnel and equipment until final cleanup.

H. Project Security:

1. The Contractor shall be responsible for monitoring all personnel requiring access to the work site including his personnel, subcontractor's personnel, other contractors working in the same construction area, material delivery trucks, authorized visitors to the site, etc.
2. The Contractor shall be held responsible for the security and protection of its own, sub- contractors and sub-subcontractors equipment, vehicles, trailers, tools, materials, and all other items necessary for the work under this Contract.
3. The Contractor shall be held responsible for the admission of any unauthorized personnel into his work area.
4. In general, provide security and facilities to protect Work, existing facilities, and the Owner's operations from unauthorized entry, vandalism or theft.

3.5 OPERATION, TERMINATION, AND REMOVAL

A. Supervision: Enforce strict discipline in use of temporary facilities. Limit availability of temporary facilities to essential and intended uses to minimize waste and abuse.

B. Maintenance: Maintain facilities in good operating condition until removal. Protect from dam- age by freezing temperatures and similar elements.

1. Protection: Prevent water-filled piping from freezing. Maintain markers for underground lines. Protect from damage during excavation operations.

C. Termination and Removal: Unless the Owner requests that it be maintained longer, remove each temporary facility when the need has ended or no later than Substantial Completion. Complete or, if necessary, restore existing permanent construction that may have been damaged as a result of the use, maintenance or operation of temporary facility for this project. Repair damaged new work, repair or replace, as directed by the Owner, existing work and or conditions, clean ex- posed surfaces, and replace construction that cannot be satisfactorily repaired as a result of the use, maintenance or operation of temporary facilities for the project.

1. Where the area is intended for future landscape development, remove any material, equipment, debris, trash, soil and aggregate fill used as part or in conjunction with the project that do not comply with requirements for fill or subsoil in the area. Remove materials contaminated with road oil, asphalt and other petrochemical compounds, and other substances that might impair growth of plant materials or lawns. Repair or replace street paving, curbs, and sidewalks damaged during and as a result of work conducted as part of this project. Replace and/or repair as required and direct by the governing authority and the Owner.

END OF SECTION 015000

SECTION 016000 – PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete product requirements as specified herein, including, but not limited to, the following:

1. Product delivery, storage and handling.

2. Storage and protection.

3. Identifying markings.

4. Temporary use of equipment.

5. General standards.

1.3 RELATED SECTIONS

A. Substitution Procedures - Section 012500.

B. Execution Requirements - Section 017300.

1.4 TRANSPORTATION AND HANDLING

A. Materials, products, and equipment shall be properly containerized, packaged, boxed, and protected to prevent damage during transportation and handling.

B. More detailed requirements for transportation and handling are specified under the technical Sections.

1.5 PRODUCT DELIVERY, STORAGE, AND HANDLING

A. Deliver, store, and handle products using means and methods that will prevent damage, deterioration, and loss, including theft and vandalism. Comply with manufacturer's written instructions.

B. Delivery and Handling

1. Schedule delivery to minimize long-term storage at Project site and to prevent overcrowding of construction spaces.
2. Coordinate delivery with installation time to ensure minimum holding time for items that are flammable, hazardous, easily damaged, or sensitive to deterioration, theft, and other losses.

3. Deliver products to Project site in an undamaged condition in manufacturer's original sealed container or other packaging system, complete with labels and instructions for handling, storing, unpacking, protecting, and installing.
4. Inspect products on delivery to determine compliance with the Contract Documents and to determine that products are undamaged and properly protected.

C. Storage

1. Store products to allow for inspection and measurement of quantity or counting of units.
2. Store materials in a manner that will not endanger Project structure.
3. Store products that are subject to damage by the elements, under cover in a weathertight enclosure above ground, with ventilation adequate to prevent condensation.
4. Store foam plastic from exposure to sunlight, except to extent necessary for period of installation and concealment.
5. Comply with product manufacturer's written instructions for temperature, humidity, ventilation, and weather-protection requirements for storage.
6. Protect stored products from damage and liquids from freezing.
7. Provide a secure location and enclosure at Project site for storage of materials and equipment by Owner's construction forces. Coordinate location with Owner.

1.6 IDENTIFYING MARKINGS

A. Name plates and other identifying markings shall not be affixed on exposed surfaces of manufactured items installed in finished spaces.

1.7 PRODUCT APPROVAL STANDARDS

A. Where the words "or approved equal" or other synonymous terms are used, it is expressly understood that they shall mean that the approval of any such submission is vested in the Architect, whose decision shall be final and binding upon all concerned. All submissions are subject to such approval and shall conform to the requirements of Article 1.8 herein.

1.8 TEMPORARY USE OF EQUIPMENT

A. No equipment intended for permanent installation shall be operated for temporary purposes without the written permission of the Architect.

B. The temporary or trial usage by the Owner of any mechanical device, machinery, apparatus, equipment or any work or materials supplied under this Contract before final completion and written acceptance by the Architect, shall not be construed as evidence of the acceptance of same by the Owner. The Owner shall have the privilege of such temporary and trial usage, for such reasonable length of time as and when the Architect shall deem to be proper for making a complete and thorough test of same and no claim for damage shall be made by the Contractor for the injury to or breaking of parts of such work which may be caused by weakness or inaccuracy of structural parts or by defective material or workmanship. If the Contractor so elects, he may at his own expense, place a competent person or persons to make such trial usage; such trial usage shall be under the supervision of the Contractor.

1.9 GENERAL REQUIREMENTS

A. In the event that it is necessary for the Contractor to store any materials offsite, he shall first obtain the approval of the Architect. The Contractor shall be responsible for insurance and warehousing charges of any materials stored offsite. The Contractor shall also be responsible for the cost of delivery to the job site of any materials that have been stored offsite.

B. Materials delivered to the job site shall be carefully stored and protected from damage. Damaged material shall not be used in the work. The Contractor shall provide, where directed temporary storage facilities as may be required for the storage of all materials which might be damaged by weather.

C. Manufactured articles, materials and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned as directed by the representative manufacturers, unless otherwise specified.

D. Equipment, plant, and appliances, such as hoists, centering, concrete lifts, construction elevators, cranes, rigging, towers, derricks, walks, ramps, chutes, scaffolding, implements, transportation, cartage and other things necessary and required for the adequate execution of the work and as required by law and applicable Union rules shall be provided and shall be maintained in good and safe mechanical working order, be responsible for their safe use, and remove them when no longer required. Applicable requirements of OSHA shall become and form a part of this document.

E. During handling and installation of work at project site clean and protect work in progress and adjoining work on a basis of perpetual maintenance. Apply suitable protective covering on newly installed work where reasonably required to ensure freedom from damage or deterioration at time of substantial completion; otherwise, clean and perform maintenance on newly installed work as frequently as necessary through remainder of construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

F. To extent possible through reasonable control and protection methods, supervise performance of work in a manner and by means which will ensure that none of the work whether completed or in progress, will be subjected to harmful, dangerous, damaging, or otherwise deleterious exposures during construction period. Such exposures include (where applicable, but not by way of limitation) static loading, dynamic loading, internal pressures, external pressures, high or low temperatures, thermal shock, high or low humidity, air contamination or pollution, water, ice, solvents, chemicals, light, radiation, puncture, abrasion, heavy traffic, soiling, bacteria, insect infestation, combustion, electrical current, high speed operation, improper lubrication, unusual wear, misuse, incompatible interface, destructive testing, misalignment, excessive weathering, unprotected storage, improper shipping/handling, theft and vandalism.

G. Require installer of each major unit of work to inspect substrate to receive the work, and conditions under which the work will be performed, and to report (in writing to Contractor) unsatisfactory conditions. Do not proceed with the work until unsatisfactory conditions have been corrected in a manner acceptable to Installer.

H. Where installations include manufactured products, comply with manufacturer's applicable instructions and recommendations for installation to whatever extent these are more explicit or more stringent than applicable requirements indicated in the Contract Documents.

I. Inspect each item of materials or equipment immediately prior to installation and reject damaged and defective items.

J. Provide attachment and connection devices and methods for securing work properly as it is installed; true to line and level, and within recognized industry tolerance if not otherwise indicated. Allow for expansions and building movements. Provide uniform joint widths in exposed work, organized for best possible visual effect. Refer questionable visual-effect choices to Architect for final decision.

K. Recheck measurements and dimensions of the work as an integral step of starting each installation.

L. Install work during conditions of temperature, humidity, exposure, forecasted weather, and status of project completion which will ensure best possible results for each unit of work in coordination with entire work. Isolate each unit of work from non-compatible work, as required to prevent deterioration.

M. Coordinate enclosure (closing-in) of work with required inspections and tests, so as to avoid necessity of uncovering work for that purpose.

N. Mounting Heights: Except as otherwise indicated, mount individual units of work at industry-recognized standard mounting heights, for applications indicated. In CMU walls mount units at height closest to manufacturer's recommendation so as to minimize cutting of block coursings. Refer questionable mounting height choices to Architect for final decision.

PART 2 - PRODUCTS (NOT USED)

PART 3 - EXECUTION (NOT USED)

END OF SECTION 016000

SECTION 016350 - SUBSTITUTION PROCEDURES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

a. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

a. Section includes administrative and procedural requirements for substitutions and/or equivalent requests.

b. Related Requirements:

1. Section 016000 "Product Requirements" for requirements for submitting comparable product submittals for products by listed manufacturers.

1.3 DEFINITIONS

a. Substitutions: Changes in products, materials, equipment, and methods of construction from those required by the Contract Documents and proposed by Contractor.

1. Substitutions for Cause: Changes proposed by Contractor that are required due to changed Project conditions, such as unavailability of product, regulatory changes, or unavailability of required warranty terms.
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. Equivalents: When the products, materials, equipment, and methods are the same to the specified, but supplied and/or manufactured by a firm or vendor not listed in the specifications. In accordance with N.J.S.A. 18A:64-64, equal products, materials and equipment will be considered by the Architect for all products, unless sole source is approved, specified in the bid documents regardless if the language “or equivalent” and/or “or equal” is stated in each specification.

1.4 ACTION SUBMITTALS

a. Substitution Requests: Submit one copy of each request for consideration. Identify product or fabrication or installation method to be replaced. Include Specification Section number and title and Drawing numbers and titles.

1. Documentation: Show compliance with requirements for substitutions and the following, as

applicable:

A. Statement indicating why specified product or fabrication or installation cannot be provided, if applicable.
B. Coordination information, including a list of changes or revisions needed to other parts of the Work and to construction performed by Owner and separate contractors, that will be necessary to accommodate proposed substitution.
C. Detailed comparison of significant qualities of proposed substitution with those of the Work specified. Include annotated copy of applicable Specification Section. Significant qualities may include attributes such as performance, weight, size, durability, visual effect, sustainable design characteristics, warranties, and specific features and requirements indicated. Indicate deviations, if any, from the Work specified.
D. Product Data, including drawings and descriptions of products and fabrication and installation procedures.
E. Samples, where applicable or requested.
F. Certificates and qualification data, where applicable or requested.
G. List of similar installations for completed projects with project names and addresses and names and addresses of architects and owners.
H. Material test reports from a qualified testing agency indicating and interpreting test results for compliance with requirements indicated.
I. Research reports evidencing compliance with building code in effect for Project.
J. Detailed comparison of Contractor's construction schedule using proposed substitution with products specified for the Work, including effect on the overall Contract Time. If specified product or method of construction cannot be provided within the Contract Time, include letter from manufacturer, on manufacturer's letterhead, stating date of receipt of purchase order, lack of availability, or delays in delivery.
K. Cost information, including a proposal of change, if any, in the Contract Sum.
L. Contractor's certification that proposed substitution complies with requirements in the Contract Documents except as indicated in substitution request, is compatible with related materials, and is appropriate for applications indicated.
M. Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of failure of proposed substitution to produce indicated results.

2. Architect's Action: If necessary, Architect will request additional information or documentation for evaluation within seven (7) calendar days of receipt of a request for substitution. Architect will notify Contractor of acceptance or rejection of proposed substitution within fifteen (15) calendar days of receipt of request, or seven (7) calendar days of receipt of additional information or documentation, whichever is later.

A. Forms of Acceptance: Change Order, Construction Change Directive, or Architect's Supplemental Instructions for minor changes in the Work.
B. Use product specified if Architect does not issue a decision on use of a proposed substitution within time allocated.

1.5 QUALITY ASSURANCE

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

1.6 PROCEDURES

a. Coordination: Revise or adjust affected work as necessary to integrate work of the approved substitutions.

PART 2 - PRODUCTS

2.1 SUBSTITUTIONS

A. Substitutions for Cause: Submit requests for substitution immediately on discovery of need for change, but not later than seven (7) calendar days prior to time required for preparation and review of related submittals.

1. Conditions: Architect will consider Contractor's request for substitution when the following conditions are satisfied. If the following conditions are not satisfied, Architect will return requests without action, except to record noncompliance with these requirements:

a. Requested substitution is consistent with the Contract Documents and will produce indicated results.
b. Requested substitution provides sustainable design characteristics that specified product provided.
c. Substitution request is fully documented and properly submitted.
d. Requested substitution will not adversely affect Contractor's construction schedule.
e. Requested substitution has received necessary approvals of authorities having jurisdiction.
f. Requested substitution is compatible with other portions of the Work.
g. Requested substitution has been coordinated with other portions of the Work.
h. Requested substitution provides specified warranty.
i. If requested substitution involves more than one contractor, requested substitution has been coordinated with other portions of the Work, is uniform and consistent, is compatible with other products, and is acceptable to all contractors involved.

B. Substitutions for Convenience: Not allowed.

PART 3 - EXECUTION (Not Used)

END OF SECTION 016350

SECTION 017300 – EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 GENERAL REQUIREMENTS

A. Work of this Section, as shown or specified, shall be in accordance with the requirements of the Contract Documents.

1.2 SECTION INCLUDES

A. This Section includes general procedural requirements governing execution of the Work including, but not limited to, the following:

1. General installation of products.
2. Progress cleaning.
3. Starting and adjusting.
4. Protection of installed construction.
5. Correction of the Work.

1.3 RELATED SECTIONS

A. Cutting and Patching - Section 017329.

B. Closeout Procedures - Section 017700.

1.4 SUBMITTALS

A. Landfill Receipts: Submit copy of receipts issued by a landfill facility, licensed to accept hazardous materials, for hazardous waste disposal.

1. All left over chemicals will be taken or disposed of by the contractor. Provide shipping manifests from a licensed hazardous waste transporter.

PART 2 - PRODUCTS (NOT APPLICABLE)

PART 3 - EXECUTION

3.1 EXAMINATION

A. Acceptance of Conditions: Examine substrates, areas, and conditions, with Installer or Applicator present where indicated, for compliance with requirements for installation tolerances and other conditions affecting performance. Record observations.

1. Written Report: Where a written report listing conditions detrimental to performance of the Work is required by other Sections, include the following:

a. Description of the Work.
b. List of detrimental conditions, including substrates.
c. List of unacceptable installation tolerances.

d. Recommended corrections.

2. Verify compatibility with and suitability of substrates, including compatibility with existing finishes or primers.
3. Examine roughing-in for mechanical and electrical systems to verify actual locations of connections before equipment and fixture installation.
4. Examine walls, floors, and roofs for suitable conditions where products and systems are to be installed.
5. Proceed with installation only after unsatisfactory conditions have been corrected. Proceeding with the Work indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Existing Utility Information: Furnish information to local utility that is necessary to adjust, move, or relocate existing utility structures, utility poles, lines, services, or other utility appurtenances located in or affected by construction. Coordinate with authorities having jurisdiction.

B. Field Measurements: Take field measurements as required to fit the Work properly. Recheck measurements before installing each product. Where portions of the Work are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

C. Space Requirements: Verify space requirements and dimensions of items shown diagrammatically on Drawings.

D. Review of Contract Documents and Field Conditions: Immediately on discovery of the need for clarification of the Contract Documents, submit a request for information to Architect. Include a detailed description of problem encountered, together with recommendations for changing the Contract Documents.

3.3 INSTALLATION

A. General: Locate the Work and components of the Work accurately, in correct alignment and elevation, as indicated.

1. Make vertical work plumb and make horizontal work level.
2. Where space is limited, install components to maximize space available for maintenance and ease of removal for replacement.
3. Conceal pipes, ducts, and wiring in finished areas, unless otherwise indicated.
4. Maintain minimum headroom clearance of 8 feet in spaces without a suspended ceiling.

B. Comply with manufacturer's written instructions and recommendations for installing products in applications indicated.

C. Install products at the time and under conditions that will ensure the best possible results. Maintain conditions required for product performance until Substantial Completion.

D. Conduct construction operations so no part of the Work is subjected to damaging operations or loading in excess of that expected during normal conditions ofoccupancy.

E. Tools and Equipment: Do not use tools or equipment that produce harmful noise levels.

F. Anchors and Fasteners: Provide anchors and fasteners as required to anchor each component securely in place, accurately located and aligned with other portions of the Work.

1. Mounting Heights: Where mounting heights are not indicated, mount components at heights directed by Architect.
2. Allow for building movement, including thermal expansion and contraction.

G. Joints: Make joints of uniform width. Where joint locations in exposed work are not indicated, arrange joints for the best visual effect. Fit exposed connections together to form hairline joints.

H. Hazardous Materials: Use products, cleaners, and installation materials that are not considered hazardous.

3.4 PROGRESS CLEANING

A. General: Clean Project site and work areas daily, including common areas. Coordinate progress cleaning for joint-use areas where more than one installer has worked. Enforce requirements strictly. Dispose of materials lawfully.

1. Comply with requirements in NFPA 241 for removal of combustible waste materials and debris.
2. Do not hold materials more than 7 days during normal weather or 3 days if the temperature is expected to rise above 80 deg. F.
3. Containerize hazardous and unsanitary waste materials separately from other waste. Mark containers appropriately and dispose of legally, according to regulations.

B. Site: Maintain Project site free of waste materials and debris.

C. Work Areas: Clean areas where work is in progress to the level of cleanliness necessary for proper execution of the Work.

1. Remove liquid spills promptly.
2. Where dust would impair proper execution of the Work, broom-clean or vacuum the entire work area, as appropriate.

D. Installed Work: Keep installed work clean. Clean installed surfaces according to written instructions of manufacturer or fabricator of product installed, using only cleaning materials specifically recommended. If specific cleaning materials are not recommended, use cleaning materials that are not hazardous to health or property and that will not damage exposed surfaces.

E. Concealed Spaces: Remove debris from concealed spaces before enclosing the space.

F. Exposed Surfaces: Clean exposed surfaces and protect as necessary to ensure freedom from damage and deterioration at time of Substantial Completion.

G. Cutting and Patching: Clean areas and spaces where cutting and patching are performed. Completely remove paint, mortar, oils, putty, and similar materials.

1. Thoroughly clean piping, conduit, and similar features before applying paint or other finishing materials. Restore damaged pipe covering to its original condition.

H. Waste Disposal: Burying or burning waste materials on-site will not be permitted. Washing waste materials down sewers or into waterways will not be permitted.

I. During handling and installation, clean and protect construction in progress and adjoining materials already in place. Apply protective covering where required to ensure protection from damage or deterioration at Substantial Completion.

J. Clean and provide maintenance on completed construction as frequently as necessary through the remainder of the construction period. Adjust and lubricate operable components to ensure operability without damaging effects.

K. Limiting Exposures: Supervise construction operations to assure that no part of the construction, completed or in progress, is subject to harmful, dangerous, damaging, or otherwise deleterious exposure during the construction period.

3.5 STARTING AND ADJUSTING

A. Start equipment and operating components to confirm proper operation. Remove malfunctioning units, replace with new units, and retest.

B. Adjust operating components for proper operation without binding. Adjust equipment for proper operation.

C. Test each piece of equipment to verify proper operation. Test and adjust controls and safeties. Replace damaged and malfunctioning controls and equipment.

D. Manufacturer's Field Service: If a factory-authorized service representative is required to inspect field-assembled components and equipment installation, comply with qualification requirements in Section 014000, "Quality Requirements."

3.6 PROTECTION OF INSTALLED CONSTRUCTION

A. Provide continuous protection during construction of all finishes, including taped Masontie joints, and maintain conditions that ensure installed Work is without damage or deterioration at time of Substantial Completion.

B. Comply with manufacturer's written instructions for temperature and relative humidity.

3.1 CORRECTION OF THE WORK

A. Repair or remove and replace defective construction. Restore damaged substrates and finishes. Comply with requirements in Section 017329, "Cutting and Patching."

1. Repairing includes replacing defective parts, refinishing damaged surfaces, touching up with matching materials, and properly adjusting operating equipment.

B. Restore permanent facilities used during construction to their specified condition.

C. Remove and replace damaged surfaces that are exposed to view if surfaces cannot be repaired without visible evidence of repair.

D. Repair components that do not operate properly.

E. Remove and replace operating components that cannot be repaired.

F. Remove and replace chipped, scratched, and broken glass or reflective surfaces.

END OF SECTION 017300

SECTION 017700– CONTRACT CLOSEOUT

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for contract closeout, including, but not limited to, the following:

1. Inspection procedures.
2. Project record document submittal.
3. Operation and maintenance manual submittal.
4. Submittal of warranties.
5. Final cleaning.

B. Closeout requirements for specific construction activities are included in the appropriate Drawings.

1.3 SUBSTANTIAL COMPLETION

A. Substantial Completion: The date of Substantial Completion for the Work, or designated portion thereof, is the date certified by the Architect when the construction is sufficiently complete, in accordance with the Contract Documents, so that the Owner may occupy the project, or the designated portions thereof, for the use for which it was intended PRIOR to the Mandatory Completion Date. Substantial Completion shall be accomplished and the full project and all designated portions thereof, read for use and occupancy by the Owner by the completion milestone deadline listed below. It shall be the responsibility of the Contractor to notify the Architect and Owner in not less than seven (7) calendar days prior to the Substantial Completion Milestone deadline for a “substantial completion” inspection. The University shall issue a Certificate of Substantial Completion (AIA Document G704) at the point in time when the inspection has been fully completed and the appropriate approvals and certificates have been granted by governing authorities and obtained by the Contractor.

1. IT IS THE INTENT OF THESE SPECIFICAITONS THAT SUBSTANTIAL COMPLETION IS ACHIEVED NO LATER THAN THE DATES AS OUTLINED IN SECTION 011000 “SUMMARY”**. THE CONTRACTOR MUST INCLUDE ANY AND ALL COSTS INCLUDING ANY OVERTIME NECESSARY TO ATTAIN SUBSTANTIAL COMPLETION BY THE DEADLINE LISTED IN SECTION 011000 BASED UPON BEING AWARDED THE PROJECT BY THE DATE LISTED IN SECTION 011000.**

B. **LIQUIDATED DAMAGES ARE PART OF THIS PROJECT. These will be assessed at the following rates:**

1. $1,000.00 per day beyond substantial completion.

C. Preliminary Procedures: Before requesting inspection for certification of Substantial Completion, complete the following. List items below that are incomplete in request.

1. In the Application for Payment that coincides with, or first follows, the date Substantial Completion is claimed, show 100 percent completion for the portion of the Work claimed as substantially complete.

    a. Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
    b. If 100 percent completion cannot be shown, include a list of incomplete items (a project punch list), the value of incomplete construction, reasons the Work is not complete, and a timeline during which the work must be completed.

2. Advise Owner of pending insurance changeover requirements.
3. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
4. Obtain and submit releases enabling the Owner unrestricted use of the Work and access to services and utilities. Include occupancy permits, operating certificates, and similar releases.
5. Prepare and submit Project Record Documents, operation and maintenance manuals, Final Completion construction photographs, damage or settlement surveys, property surveys, and similar final record information.
6. Deliver tools, spare parts, extra materials, and similar items to location designated by Owner. Label with manufacturer's name and model number where applicable.
7. Make final changeover of permanent locks and deliver keys to Owner. Advise Owner's personnel of changeover in security provisions.
8. Complete startup testing of systems and instruction of the Owner’s operation and maintenance personnel.
9. Disconnect and remove temporary facilities from Project site, along with mockups, construction tools, and similar elements.
10. When mechanical, electrical or other equipment is installed, it shall be the responsibility of the contractor to maintain, warrant and operate it for such period of time as required by the contract documents or as necessary for the proper inspecting and testing of the equipment for adequately instructing the University's operating personnel. All costs associated with the maintenance, warranty, operations, inspection and testing of equipment in addition to instructing University personnel shall be borne by the contractor. All tests shall be conducted in the presence of and upon timely notice to the contracting officer, Owner’s Project Manager and Architect/Engineer prior to acceptance of the equipment.
11. Owner’s warranties will start at Final Acceptance of the Project.

D. Pre-final Inspection:

1. When the Contractor has completed all work and is satisfied the Project is in compliance with the Contract Documents, it will notify the Owner and Architect, in writing, that the Project is complete and ready for inspection. The Owner and Architect will arrange for and conduct an inspection of the Project by the Owner, Architect, Engineers and the Contractor. The Owner will be provided with a reasonable time to arrange for and conduct an inspection.

2. The Owner and Architect will document any deficiencies on a written punch list and will arrange a meeting with the Contractor to review the punch list, explain deficient items and designate a time frame in which the punch list must be completed. The Contractor will correct all the deficiencies within the designated time frame and notify the Owner in writing, when the Project is ready for re-inspection. The Owner will arrange and conduct the re-inspection of the Project to review the corrected items.
3. The formal list of deficiencies found shall not be considered a final list of all deficient items. Any deficiencies found during instructions to the Owner, inspection for Substantial Completion, beneficial occupancy, or inspection for final acceptance, the Contractor will correct all deficient items per the contract documents prior to final acceptance.

E. Substantial Completion:

1. Upon completion of deficient items and instruction to the Owner, the Contractor will arrange for an inspection of the Project with the Owner and the Architect. This inspection may result in a list of additional items to complete after occupancy, but before final payment and/or may require additional correction prior to occupancy by the Owner.
2. Upon formal notice from the Owner, the Contractor shall then arrange for the submission of all outstanding record documents, including: maintenance manuals, guarantees, warranties, maintenance contracts, and any additional instructions necessary for the operation of the project. The Contractor shall acquaint the Owner with acceptance tests, guarantees, warranties, and maintenance manuals. The Contractor shall also obtain a 'Certificate of Occupancy' or similar releases required to permit the Owner's occupancy of the Project.
3. Should the instruction period find deficiencies, the Owner will notify the Contractor in writing of deficient items.
4. If the inspection confirms that the Project is 'substantially complete' and is 'ready for occupancy', the Owner through the Architect/Engineer will issue a "Certificate of Substantial Completion'. The Certificate will confirm that the Project can be occupied for its intended use. Attached to the Certificate will be any final punch list to be completed. Prior to issuance of the Certificate, the Contractor shall submit a schedule for completion of remaining deficiencies, approved or amended by the Owner.
5. Inspection Procedures: On receipt of a request for inspection, the Architect will either proceed with inspection or advise the Contractor of unfilled requirements. The Architect will prepare the Certificate of Substantial Completion following inspection or advise the Contractor of construction that must be completed or corrected before the certificate will be issued.

    a. The Architect will repeat inspection when requested and assured that the Work is substantially complete.
    b. Results of the completed inspection will form the basis of requirements for final acceptance.

1.4 BENEFICIAL OCCUPANCY

A. Upon issuance of the 'Certificate of Substantial Completion', the Owner may then occupy the Project (or the designated area of the Project).

1.5 FINAL ACCEPTANCE

A. Final Inspection: Upon completion of any remaining deficiencies the Contractor shall notify the Owner in writing, that the Project is complete and ready for final inspection. The Contractor shall arrange for and conduct the final inspection of the Project with the Owner.

B. Final Acceptance: If the final inspection indicates satisfactory completion of the Work, the Owner through the Architect/Engineer will issue a Change Order adjusting to the final quantities. Following acceptance of the final Change Order, receipt of required affidavits, final release of liens, consent of surety for final payment along with all other documentation required by the contractor documents, the Owner through the Architect will authorize a final Certificate for Payment.

1. Mandatory or Final Completion: Final Completion shall be accomplished and the full project, and all designated portions thereof, completed and ready for use without any further work required within the time frame identified for each phase of work from the date of issuance and as listed on the Certificate of Substantial Completion by the Architect.
2. The guarantee period for all materials, equipment and workmanship shall start on the date of 'Final Acceptance' unless otherwise noted on the Certificate.

C. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

1. Submit the final payment request with releases and supporting documentation not previously submitted and accepted. Include insurance certificates for products and completed operations where required.
2. Submit an updated final statement, accounting for final additional changes to the Contract Sum.
3. Submit a certified copy of the Architect's final inspection list of items to be completed or corrected, endorsed and dated by the Architect. The certified copy of the list shall state that each item has been completed or otherwise resolved for acceptance and shall be endorsed and dated by the Architect.
4. Submit final meter readings for utilities, a measured record of stored fuel, and similar data as of the date of Substantial Completion or when the Owner took possession of and assumed responsibility for corresponding elements of the Work.
5. Submit consent of surety to final payment.
6. Submit a final liquidated damages settlement statement.
7. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

D. Re-inspection Procedure: The Architect will re-inspect the Work upon receipt of notice that the Work, including inspection list items from earlier inspections, has been completed, except for items whose completion is delayed under circumstances acceptable to the Owner.

1. Upon completion of re-inspection, the Architect will prepare a certificate of final acceptance. If the Work is incomplete, the Architect will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.
2. If necessary, re-inspection will be repeated.
3. Should the Project require inspections beyond the inspections noted above, i.e. a pre-final and a final inspection only the Owner will reduce from the Contractor's final payment those monies necessary to provide for the cost of the additional inspections. The reduction shall not be considered as a part of any "Liquidated Damages' for failure to complete within the specified Contract Time. The reduction shall not be considered as a penalty to the Contractor; but shall be for the actual cost of monies required for the reimbursement of fees for the Architect, Engineers, Owner and any other specialists necessary for obtaining final approval of the Work.

1.6 EXCESSIVE DEFICIENCIES

A. During any inspection for Project completion, if it is determined by the Owner, that the Contractor has not sufficiently completed the Work in compliance with the Contract Documents, the Owner may declare that the Project is not sufficiently complete to continue the inspection of the Work. Within three (3) working days of this declaration, the Owner will issue in writing, a list of excessive deficiencies found. Upon receipt of the Owners notice of excessive deficiencies the Contractor will have ten (10) working days to remove such deficiencies. If such deficiencies have not been corrected in the time frame herein specified the Owner can at its' option complete the Work. Any costs incurred by the Owner as a result of its' assuming the responsibilities of the Contractor in this regard will be deducted from any monies remaining to be paid to the Contractor. Should the costs associated with the Owner having to assume responsibility for the work to correct excessive deficiencies exceed the amount of funds remaining to be paid the Contractor shall be liable to the Owner for the difference.

1.7 RECORD DOCUMENT SUBMITTALS

A. General: Do not use record documents for construction purposes. Protect record documents from deterioration and loss in a secure, fire-resistant location. Provide access to record documents for the Architect's reference during normal working hours.

1. **All of the record documentation listed herein shall be provided by the Contractor in hard copy and digitally. Digital copies shall be provided by the Contractor in PDF format, and issued to the Owner via CD. Hard copy shall be provided by the Contractor in an 8-1/2" x 11" binder.**

B. Record Drawings: Maintain a clean, undamaged set of blue or black line white-prints of Contract Drawings and Shop Drawings. Mark the set to show the actual installation where the installation varies from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

1. Mark record sets with red erasable pencil. Use other colors to distinguish between variations in separate categories of the Work.
2. Mark new information that is important to the Owner but was not shown on Contract Drawings or Shop Drawings.
3. Note related change-order numbers where applicable.
4. Organize record drawing sheets into manageable sets. Bind sets with durable-paper cover sheets; print suitable titles, dates, and other identification on the cover of each set.

C. Record Specifications: Maintain one complete copy of the Project Manual, including addenda. Include with the Project Manual one copy of other written construction documents, such as Change Orders and modifications issued in printed form during construction.

1. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.
2. Give particular attention to substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.
3. Note related record drawing information and Product Data.
4. Upon completion of the Work, submit record Specifications to the Architect for the Owner's records.

D. Record Product Data: Maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

1. Mark these documents to show significant variations in actual Work performed in comparison with information submitted. Include variations in products delivered to the site and from the manufacturer's installation instructions and recommendations.
2. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.
3. Upon completion of markup, submit complete set of record Product Data to the Architect for the Owner's records.

E. Record Sample Submitted: Immediately prior to Substantial Completion, the Contractor shall meet with the Architect and the Owner's personnel at the Project Site to determine which Samples are to be transmitted to the Owner for record purposes. Comply with the Owner's instructions regarding delivery to the Owner's Sample storage area.

F. Miscellaneous Record Submittals: Refer to other Specification Sections for requirements of miscellaneous record keeping and submittals in connection with actual performance of the Work. Immediately prior to the date or dates of Substantial Completion, complete miscellaneous records and place in good order. Identify miscellaneous records properly and bind or file, ready for continued use and reference. Submit to the Architect for the Owner's records.

G. Maintenance Manuals: Organize operation and maintenance data into suitable sets of manageable size. Bind properly indexed data in individual, heavy-duty, 2-inch (51-mm), 3-ring, vinyl-covered binders, with pocket folders for folded sheet information. Mark appropriate identification on front and spine of each binder. Include the following types of information:

1. Emergency instructions.
2. Spare parts list.
3. Copies of warranties.
4. Wiring diagrams.
5. Recommended "turn-around" cycles.
6. Inspection procedures.
7. Shop Drawings and Product Data.
8. Fixture lamping schedule.

H. Roughing Drawings and Operating Manuals: Plumbing, HVAC, electrical and other machinery and mechanical equipment items requiring utility service connections shall have their respective shop drawings accompanied by manufacturer's certified roughing drawings indicating accurate locations and sizes of all service utility connections.

I. Sleeve and Opening Drawings: Prior to installing service utilities or other piping, etc. through structural elements of the building, the contractor shall prepare and submit accurate dimensioned drawings to the Construction Manager for approval of the Architect and/or Structural Engineer for approval indicating the positions and sizes of all sleeves and openings required to accommodate his/her work and installation of his/her piping, equipment, etc. and all with reference to the established dimensional grid of the building. Such drawings must be submitted in sufficient time to allow proper coordination with reinforcing steel shop drawings and proper placing in the field.

J. Control Valve and Circuit Location Charts and Diagrams: The contractor shall prepare a complete set of inked or typewritten control valve and circuit location diagrams, charts, diagrams and lists under frame glass in appropriate designed equipment rooms as directed. The contractor shall also furnish one-line diagrams as well as such color-coding of piping and wiring and identifying charges as specified or required. This information is to be framed under glass and installed where directed. The Contractor shall also provide the University a second complete set of the control valve and circuit location diagrams, charts, diagrams and lists not under glass.

K. Warranties:
1. For equipment or component parts of equipment put into service during construction with Owner's permission, submit documents within the (10) days after completion of the applicable item of work. Leave the date of beginning of time of warranty until the Date of Final Acceptance of the building and prior to receipt of final payment.
2. Make other submittals within ten (10) days after Date of Substantial Completion, prior to final Application for Payment.
3. For items of Work for which acceptance is delayed beyond the Date of Substantial Completion, submit within (10) days after written acceptance, listing the date of acceptance as the beginning of the warranty period. Final payment will not be approved until the Owner has received all warranties.
4. Warranty periods for all items installed as part of the Work under this Contract will start at 'Final Acceptance' of the entire scope of Work on the Project.
5. Co-execute submittals when required.
6. Warranty Manual: Bind all warranties and bonds in a commercial type 81/2" X 11" three D side ring binder with durable plastic covers.

    a. Cover: Identify each binder with typed or printed title WARRANTIES AND BONDS, with title of Project; name, address and telephone number of General Contractor and equipment suppliers; and name of responsible company principal.
    b. Table of Contents: Neatly typed, in the sequence of the Table of Contents of the Project Manual, with each item identified with the number and title of the specification section in which specified, and the name of the product or work item.
    c. Transmit two (2) copies of the "Warranties Manual" to the University prior to submission of Final Application for Payment.

7. A certificate of Asbestos shall certify that no asbestos or asbestos-containing products are or have been installed as part of this project.

1.8 CLOSEOUT PROCEDURES

A. Operation and Maintenance Instructions: Arrange for each Installer of equipment that requires regular maintenance to meet with the Owner's personnel to provide instruction in proper operation and maintenance. Provide instruction by manufacturer's representatives if installers are not experienced in operation and maintenance procedures. Include a detailed review of the following items:

1. Maintenance manuals.
2. Record documents.
3. Spare parts and materials.
4. Tools.
5. Lubricants.
6. Fuels.
7. Identification systems.

8. Control sequences.
9. Hazards.
10. Cleaning.
11. Warranties and bonds.
12. Maintenance agreements and similar continuing commitments.

B. As part of instruction for operating equipment, demonstrate the following procedures:

1. Startup.
2. Shutdown.
3. Emergency operations.
4. Noise and vibration adjustments.
5. Safety procedures.
6. Economy and efficiency adjustments.
7. Effective energy utilization.

C. Allow a minimum of three (3) hours training for all of the Owners personnel who will be involved with the maintenance or operation for each piece of equipment or system that requires any type of maintenance or operation.

D. For equipment, or component parts of equipment put into service during construction and operated by the Owner, submit completed documents within ten (10) days after written acceptance and prior to receipt of final payment.

E. The contractor shall submit the as-built documents to the Owner’s Project Manager for review by the Architect/Engineer whether altered or not with a certification as to the accuracy of the information thereon at the time of contract completion and before final payment will be made to the contractor. After acceptance by the Architect/Engineer, the contractor will furnish two (2) sets of all shop and/or erection drawings used for as-built documentation.

1. All as-built drawings as submitted by the contractor shall be labeled "as-built" and dated above the title block. This information shall be checked, edited and certified by the Architect/Engineer who shall then transpose such information from the contractor's as-built drawings to the original tracings and certify that such tracing reflect "as-built" status and deliver said tracings to the University. Where shop drawings have been used by the contractor for as-built documentation the tracing provided shall include cross-reference information, which shall be included in the set of as-built drawings furnished to the University. The Contractor shall be responsible for and shall pay for the cost of erasable transparencies for its as-built drawings.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Cleaning Agents: Use cleaning materials and agents recommended by manufacturer or fabricator of the surface to be cleaned. Do not use cleaning agents that are potentially hazardous to health or property or that might damage finished surfaces.

PART 3 - EXECUTION

3.1 FINAL CLEANING

A. General: The General Conditions require general cleaning during construction. Regular site cleaning is included in Division 01 Section "Construction Facilities and Temporary Controls."

B. Cleaning: Employ experienced workers or professional cleaners for final cleaning. Clean each surface or unit to the condition expected in a normal, commercial building cleaning and maintenance program. Comply with manufacturer's instructions.

1. Complete the following cleaning operations before requesting inspection for certification of Substantial Completion.

a. Remove labels that are not permanent labels.
b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are vision-detracting materials. Replace chipped or broken glass and other damaged transparent materials.

1) removal of putty stains from glass and mirrors; wash and polish inside and outside;

c. Clean exposed exterior and interior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances. Restore reflective surfaces to their original condition. Leave concrete floors broom clean and dust free. Vacuum carpeted surfaces.

1) removal of spots, paint and soil from resilient, glaze and unglazed masonry and ceramic flooring and wall work;

d. Vacuum as required and advisable and wipe surfaces of mechanical and electrical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps to a mark free condition.
e. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, mud, stones and other foreign deposits. Rake grounds that are neither paved nor planted to a smooth, even-textured surface.

1) restoration of all landscaping, roadway and walkways to pre-existing condition; damage to trees and plantings shall be repaired in the next planting season and such shall be guaranteed for one (1) year from date of repair and/or replanting;

f. removal of marks, undesirable stains, fingerprints, other soil, dust or dirt from painted, decorated or stained woodwork, plaster or plasterboard, metal acoustic tile and equipment surfaces;
g. removal of temporary floor protections; clean, wash or otherwise treat and/or polish all finished floors as directed;
h. clean exterior and interior metal surfaces, including doors and window frames and hardware, of oil stains, dust, dirt, paint and the like; polish where applicable and leave without fingerprints or blemishes;

i. removal of all pollutants of any kind or nature deposited or remaining upon the site or upon the University's property as a result of the construction work on this project;

C. Pest Control: Engage an experienced, licensed exterminator to make a final inspection and rid the Project of rodents, insects, and other pests.

D. Removal of Protection: Remove temporary protection and facilities installed for protection of the Work during construction.

E. Compliance: Comply with regulations of authorities having jurisdiction and safety standards for cleaning. Do not burn waste materials. Do not bury debris or excess materials on the Owner's property. Do not discharge volatile, harmful, or dangerous materials into drainage systems. Remove waste materials from the site and dispose of lawfully.

1. Comply with the Environmental Protection Agency (EPA) 2016 Generator Improvement Rule of the Resource Conservation Recover Act (RCRA) for all hazardous waste as adopted by reference by NJDEP.

2. Where extra materials of value remain after completion of associated Work, they become the Owner's property. Dispose of these materials as directed by the Owner.

END OF SECTION 017700

SECTION 017820 - OPERATION AND MAINTENANCE DATA

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. Work of this Section includes all labor, materials, equipment, and services necessary to complete the operation and maintenance data as specified herein.

B. This Section includes administrative and procedural requirements for preparing operation and maintenance manuals, including the following:

1. Operation and maintenance documentation directory.
2. Emergency manuals.
3. Operation manuals for systems, subsystems, and equipment.
4. Maintenance manuals for the care and maintenance of products, materials, and finishes systems and equipment.

C. Related Sections include the following:

1. Division 01 Section "Summary" for coordinating operation and maintenance manuals covering the Work of multiple contracts.
2. Division 01 Section "Submittal Procedures" for submitting copies of submittals for operation and maintenance manuals.
3. Division 01 Section "Closeout Procedures" for submitting operation and maintenance manuals.
4. Division 01 Section "Project Record Documents" for preparing Record Drawings for operation and maintenance manuals.
5. Divisions 02 through 48 Sections for specific operation and maintenance manual requirements for the Work in those Sections.

1.3 DEFINITIONS

A. System: An organized collection of parts, equipment, or subsystems united by regular interaction.

B. Subsystem: A portion of a system with characteristics similar to a system.

1.4 SUBMITTALS

A. Initial Submittal: Submit two (2) draft copies of each manual at least fifteen (15) calendar days before requesting inspection for Substantial Completion. Include a complete operation and maintenance directory. Owner will return one copy of draft and mark whether general scope and content of manual are acceptable.

1. In lieu of hard copies, Contractor may submit digital copies in PDF format.

B. Final Submittal: Submit two copies of each manual in final form at least fifteen (15) calendar days before final inspection. Architect will return copy with comments within 15days after final inspection.

1. Submit four (4) sets prior to final inspection, bound in 8-1/2" X 11" binders with durable plastic covers, acceptable to the Owner.
2. In addition, Contractor shall submit digital copy in PDF format.
3. Submit final volumes revised, to the authorized representative of the Owner as required in these Contract Documents.

1.5 COORDINATION

A. Where operation and maintenance documentation includes information on installations by more than one factory-authorized service representative, assemble and coordinate information furnished by representatives and prepare manuals.

PART 2 - PRODUCTS

2.1 OPERATION AND MAINTENANCE DOCUMENTATION DIRECTORY

A. Organization: Include a section in the directory for each of the following:

1. List of documents.
2. List of systems.
3. List of equipment.
4. Table of contents.

B. List of Systems and Subsystems: List systems alphabetically. Include references to operation and maintenance manuals that contain information about each system.

C. List of Equipment: List equipment for each system, organized alphabetically by system. For pieces of equipment not part of system, list alphabetically in separate list.

D. Tables of Contents: Include a table of contents for each emergency, operation, and maintenance manual.

E. Identification: In the documentation directory and in each operation and maintenance manual, identify each system, subsystem, and piece of equipment with same designation used in the Contract Documents. If no designation exists, assign a designation according to ASHRAE Guideline 4, "Preparation of Operating and Maintenance Documentation for Building Systems."

2.2 MANUALS, GENERAL

A. Organization: Unless otherwise indicated, organize each manual into a separate section for each system and subsystem, and a separate section for each piece of equipment not part of a system. Each manual shall contain the following materials, in the order listed:

1. Title page.
2. Table of contents.
3. Manual contents.

B. Title Page: Enclose title page in transparent plastic sleeve. Include the following information:

1. Subject matter included in manual.
2. Name and address of Project.
3. Name and address of Owner.
4. Date of submittal.
5. Name, address, and telephone number of Contractor.
6. Name and address of Architect.
7. Cross-reference to related systems in other operation and maintenance manuals.

C. Table of Contents: List each product included in manual, identified by product name, indexed to the content of the volume, and cross-referenced to Specification Section number in Project Manual.

1. If operation or maintenance documentation requires more than one volume to accommodate data, include comprehensive table of contents for all volumes in each volume of the set.

D. Manual Contents: Organize into sets of manageable size. Arrange contents alphabetically by system, subsystem, and equipment. If possible, assemble instructions for subsystems, equipment, and components of one system into a single binder.

1. Binders: Heavy-duty, 3-ring, vinyl-covered, loose-leaf binders, in thickness necessary to accommodate contents, sized to hold 8-1/2-by-11-inch paper; with clear plastic sleeve on spine to hold label describing contents and with pockets inside covers to hold folded oversize sheets.

    a. If two or more binders are necessary to accommodate data of a system, organize data in each binder into groupings by subsystem and related components. Cross- reference other binders if necessary to provide essential information for proper operation or maintenance of equipment or system.

2. Identify each binder on front and spine, with printed title "OPERATION AND MAINTENANCE MANUAL," Project title or name, and subject matter of contents. Indicate volume number for multiple-volume sets. These manuals shall include a complete description of all systems and equipment, diagrams indicating connectors, oiling requirements, types of lubricants to be used and method of operating equipment. Included within the manuals shall be a list of names, addresses and telephone numbers of sub- contractors involved in the installation and firms capable of performing services for each mechanical item.
3. Dividers: Heavy-paper dividers with plastic-covered tabs for each section. Mark each tab to indicate contents. Include typed list of products and major components of equipment included in the section on each divider, cross-referenced to Specification Section number and title of Project Manual. Internally subdivide the binders contents with permanent page dividers, logically organized as described below and with tab titling clearly printed under reinforced laminated plastic tabs.

a. PART 1: Directory, listing names, addresses, contact persons and telephone numbers of Architects, Engineers, Contractors, Subcontractors and suppliers.

b. PART 2: Maintenance instructions subdivided by MasterSpec Format Sections as listed within these Contract Documents. For each Section identify names, addresses, contact persons and telephone numbers of Subcontractors and suppliers. Identify the following (in addition to the items listed in "G" above):

1) Significant design criteria
2) List of equipment.
3) Parts list for each component.
4) Maintenance instructions for equipment and systems.
5) Maintenance instructions for special finishes, including recommended cleaning methods and materials and special precautions identifying detrimental agents.

4. Protective Plastic Sleeves: Transparent plastic sleeves designed to enclose diagnostic software diskettes for computerized electronic equipment.
5. Supplementary Text: Prepared on 8-1/2-by-11-inch white bond paper.
6. Drawings: Attach reinforced, punched binder tabs on drawings and bind with text.

a. If oversize drawings are necessary, fold drawings to same size as text pages and use as foldouts.
b. If drawings are too large to be used as foldouts, fold and place drawings in labeled envelopes and bind envelopes in rear of manual. At appropriate locations in manual, insert typewritten pages indicating drawing titles, descriptions of contents, and drawing locations.

2.3 EMERGENCY MANUALS

A. Content: Organize manual into a separate section for each of the following:

1. Type of emergency.
2. Emergency instructions.
3. Emergency procedures.

B. Type of Emergency: Where applicable for each type of emergency indicated below, include instructions and procedures for each system, subsystem, piece of equipment, and component:

1. Fire.
2. Flood.
3. Gas leak.
4. Water leak.
5. Power failure.
6. Water outage.
7. System, subsystem, or equipment failure.
8. Chemical release or spill.

C. Emergency Instructions: Describe and explain warnings, trouble indications, error messages, and similar codes and signals. Include responsibilities of Owner's operating personnel for notification of Installer, supplier, and manufacturer to maintain warranties.

D. Emergency Procedures: Include the following, as applicable:

1. Instructions on stopping.
2. Shutdown instructions for each type of emergency.
3. Operating instructions for conditions outside normal operating limits.
4. Required sequences for electric or electronic systems.
5. Special operating instructions and procedures.

2.4 OPERATION MANUALS

A. Content: In addition to requirements in this Section, include operation data required in individual Specification Sections and the following information:

1. System, subsystem, and equipment descriptions.
2. Performance and design criteria if Contractor is delegated design responsibility.
3. Operating standards.
4. Operating procedures.
5. Operating logs.
6. Wiring diagrams.
7. Control diagrams.
8. Piped system diagrams.
9. Precautions against improper use.
10. License requirements including inspection and renewal dates.

B. Descriptions: Include the following:

1. Product name and model number.
2. Manufacturer's name.
3. Equipment identification with serial number of each component.
4. Equipment function.
5. Operating characteristics.
6. Limiting conditions.
7. Performance curves.
8. Engineering data and tests.
9. Complete nomenclature and number of replacement parts.

C. Operating Procedures: Include the following, as applicable:

1. Startup procedures.
2. Equipment or system break-in procedures.
3. Routine and normal operating instructions.
4. Regulation and control procedures.
5. Instructions on stopping.
6. Normal shutdown instructions.
7. Seasonal and weekend operating instructions.
8. Required sequences for electric or electronic systems.
9. Special operating instructions and procedures.

D. Systems and Equipment Controls: Describe the sequence of operation, and diagram controls as installed.

E. Piped Systems: Diagram piping as installed, and identify color-coding where required for identification.

2.5 PRODUCT MAINTENANCE MANUAL

A. Content: Organize manual into a separate section for each product, material, and finish. Include source information, product information, maintenance procedures, repair materials and sources, and warranties and bonds, as described below.

B. Source Information: List each product included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Product Information: Include the following, as applicable:

1. Product name and model number.
2. Manufacturer's name.
3. Color, pattern, and texture.
4. Material and chemical composition.
5. Reordering information for specially manufactured products.

D. Maintenance Procedures: Include manufacturer's written recommendations and the following:

1. Inspection procedures.
2. Types of cleaning agents to be used and methods of cleaning.
3. List of cleaning agents and methods of cleaning detrimental to product.
4. Schedule for routine cleaning and maintenance.
5. Repair instructions.

E. Repair Materials and Sources: Include lists of materials and local sources of materials and related services.

F. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

2.6 SYSTEMS AND EQUIPMENT MAINTENANCE MANUAL

A. Content: For each system, subsystem, and piece of equipment not part of a system, include source information, manufacturers' maintenance documentation, maintenance procedures, maintenance and service schedules, spare parts list and source information, maintenance service contracts, and warranty and bond information, as described below.

B. Source Information: List each system, subsystem, and piece of equipment included in manual identified by product name and arranged to match manual's table of contents. For each product, list name, address, and telephone number of Installer or supplier and maintenance service agent, and cross-reference Specification Section number and title in Project Manual.

C. Manufacturers' Maintenance Documentation: Manufacturers' maintenance documentation including the following information for each component part or piece of equipment:

1. Standard printed maintenance instructions and bulletins.
2. Drawings, diagrams, and instructions required for maintenance, including disassembly and component removal, replacement, and assembly.
3. Identification and nomenclature of parts and components.
4. List of items recommended to be stocked as spare parts.

D. Maintenance Procedures: Include the following information and items that detail essential maintenance procedures:

1. Test and inspection instructions.
2. Troubleshooting guide.
3. Precautions against improper maintenance.
4. Disassembly; component removal, repair, and replacement; and reassembly instructions.
5. Aligning, adjusting, and checking instructions.
6. Demonstration and training videotape, if available.

E. Maintenance and Service Schedules: Include service and lubrication requirements, list of required lubricants for equipment, and separate schedules for preventive and routine maintenance and service with standard time allotment.

1. Scheduled Maintenance and Service: Tabulate actions for daily, weekly, monthly, quarterly, semiannual, and annual frequencies.
2. Maintenance and Service Record: Include manufacturers' forms for recording maintenance.

F. Spare Parts, Extra Materials and Maintenance Materials

1. Provide products, spare parts, maintenance and extra materials in quantities specified in individual specification sections. If there are no quantities specified then provide a minimum of five percent (5%) of:

    a. all interior finish materials (attic stock).
    b. the number of lamps and ballast needed for every light fixture.
    c. the total number of automatic light sensors
    d. the total number of each filter type required for each Mechanical Unit requiring filters.

2. Provide 100% of all spare parts necessary to operate and maintain all equipment and building systems within the design parameters and/or as recommended by the manufacturer or supplier.
3. Deliver to Owner’s Project Manager and obtain receipt prior to final payment.
4. Spare Parts List and Source Information: Include lists of replacement and repair parts, with parts identified and cross-referenced to manufacturers' maintenance documentation and local sources of maintenance materials and related services.

G. Special Tools

1. Provide any “special tools” (one of each type) if required as part of the operation and maintenance of any of the systems herein specified. “Special tools” are devices that are considered unique to a specified system and necessary for maintenance and operation of that system, and not normally part of the maintenance department inventory.

H. Maintenance Service Contracts: Include copies of maintenance agreements with name and telephone number of service agent.

I. Warranties and Bonds: Include copies of warranties and bonds and lists of circumstances and conditions that would affect validity of warranties or bonds.

1. Include procedures to follow and required notifications for warranty claims.

PART 3 - EXECUTION

3.1 MANUAL PREPARATION

A. Operation and Maintenance Documentation Directory: Prepare a separate manual that provides an organized reference to emergency, operation, and maintenance manuals.

B. Emergency Manual: Assemble a complete set of emergency information indicating procedures for use by emergency personnel and by Owner's operating personnel for types of emergencies indicated.

C. Product Maintenance Manual: Assemble a complete set of maintenance data indicating care and maintenance of each product, material, and finish incorporated into the Work.

D. Operation and Maintenance Manuals: Assemble a complete set of operation and maintenance data indicating operation and maintenance of each system, subsystem, and piece of equipment not part of a system.

1. Engage a factory-authorized service representative to assemble and prepare information for each system, subsystem, and piece of equipment not part of a system.
2. Prepare a separate manual for each system and subsystem, in the form of an instructional manual for use by Owner's operating personnel.

E. Manufacturers' Data: Where manuals contain manufacturers' standard printed data, include only sheets pertinent to product or component installed. Mark each sheet to identify each product or component incorporated into the Work. If data include more than one item in a tabular format, identify each item using appropriate references from the Contract Documents. Identify data applicable to the Work and delete references to information not applicable.

1. Prepare supplementary text if manufacturers' standard printed data are not available and where the information is necessary for proper operation and maintenance of equipment or systems.

F. Drawings: Prepare drawings supplementing manufacturers' printed data to illustrate the relationship of component parts of equipment and systems and to illustrate control sequence and flow diagrams. Coordinate these drawings with information contained in Record Drawings to ensure correct illustration of completed installation.

1. Do not use original Project Record Documents as part of operation and maintenance manuals.
2. Comply with requirements of newly prepared Record Drawings in Division 01 Section "Project Record Documents."

G. Comply with Division 01 Section "Closeout Procedures" for schedule for submitting operation and maintenance documentation.

END OF SECTION 017820

SECTION 018200 - DEMONSTRATION AND TRAINING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and other Division 01 Specification Sections, apply to this Section. In the event of any conflicts between the requirements of these Sections, the more stringent requirement shall apply.

1.2 SUMMARY

A. This Section includes administrative and procedural requirements for instructing Owner's personnel, including the following:

1. Demonstration of operation of systems, subsystems, and equipment.
2. Training in operation and maintenance of systems, subsystems, and equipment.
3. Demonstration and training videotapes.

B. Related Sections include the following, as applicable to this project:
1. Division 01 Section "Project Management and Coordination" for requirements for pre-instruction conferences.
2. Divisions 02 through 48 Sections for specific requirements for demonstration and training for products in those Sections.

C. Allowances: Furnish demonstration and training instruction time under the Demonstration and Training Allowance as specified in Division 01 Section "Allowances."

D. Unit Price for Instruction Time: Length of instruction time will be measured by actual time spent performing demonstration and training in required location. No payment will be made for time spent assembling educational materials, setting up, or cleaning up.

1.3 SUBMITTALS

A. Instruction Program: Submit one (1) copy of outline of instructional program for demonstration and training, including a schedule of proposed dates, times, length of instruction time, and instructors' names for each training module. Include learning objective and outline for each training module.

1. At completion of training, submit one (1) complete training manual(s) for Owner's use.

B. Qualification Data: For instructors.

C. Attendance Record: For each training module, submit list of participants and length of instruction time.

D. Evaluations: For each participant and for each training module, submit results and documentation of performance-based test.

E. Demonstration and Training Video: Submit one (1) copy within seven (7) days of end of each training module.

1. Identification: On each copy, provide an applied label with the following information:

    a. Name of Project.
    b. Name and address of photographer.
    c. Name of Architect.
    d. Name of Contractor.
    e. Date videotape was recorded.
    f. Description of vantage point, indicating location, direction (by compass point), and elevation or story of construction.

1.4 QUALITY ASSURANCE

A. Facilitator Qualifications: A firm or individual experienced in training or educating maintenance personnel in a training program similar in content and extent to that indicated for this Project, and whose work has resulted in training or education with a record of successful learning performance.

B. Instructor Qualifications: A factory-authorized service representative, complying with requirements in Division 01 Section "Quality Control Requirements," experienced in operation and maintenance procedures and training.

C. Photographer Qualifications: A professional photographer who is experienced photographing construction projects.

D. Pre-instruction Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination." Review methods and procedures related to demonstration and training including, but not limited to, the following:

    1. Inspect and discuss locations and other facilities required for instruction.
    2. Review and finalize instruction schedule and verify availability of educational materials, instructors' personnel, audiovisual equipment, and facilities needed to avoid delays.
    3. Review required content of instruction.
    4. For instruction that must occur outside, review weather and forecasted weather conditions and procedures to follow if conditions are unfavorable.

1.5 COORDINATION

A. Coordinate instruction schedule with Owner's operations. Adjust schedule as required to minimize disrupting Owner's operations.

B. Coordinate instructors, including providing notification of dates, times, length of instruction time, and course content.

C. Coordinate content of training modules with content of approved emergency, operation, and maintenance manuals. Do not submit instruction program until operation and maintenance data has been reviewed and approved by Architect.

PART 2 - PRODUCTS

2.1 INSTRUCTION PROGRAM

A. Program Structure: Develop an instruction program that includes individual training modules for each system and equipment not part of a system, as required by individual Specification Sections, and as follows:

1. Motorized doors, including overhead coiling doors, overhead coiling grilles, and automatic entrance doors.
2. Equipment, including stage equipment, projection screens, loading dock equipment, waste compactors, food-service equipment, residential appliances and laboratory fume hoods, etc.
3. Fire-protection systems, including fire alarm, fire pumps and fire-extinguishing systems.
4. Intrusion detection systems.
5. Conveying systems, including elevators, wheelchair lifts, escalators and cranes.
6. Medical equipment, including medical gas equipment and piping.
7. Laboratory equipment, including laboratory air and vacuum equipment and piping.
8. Heat generation, including boilers, feed water equipment, pumps, steam distribution piping, and water distribution piping.
9. Refrigeration systems, including chillers, cooling towers, condensers, pumps and distribution piping.
10. HVAC systems, including air-handling equipment, air distribution systems and terminal equipment and devices.
11. HVAC instrumentation and controls.
12. Electrical service and distribution, including transformers, switchboards, panel boards, uninterruptible power supplies and motor controls.
13. Packaged engine generators, including transfer switches.
14. Lighting equipment and controls.
15. Communication systems, including intercommunication, surveillance, clocks and programming, voice and data and television equipment.

B. Training Modules: Develop a learning objective and teaching outline for each module. Include a description of specific skills and knowledge that participant is expected to master. For each module, include instruction for the following:

1. Basis of System Design, Operational Requirements, and Criteria: Include the following:

    a. System, subsystem, and equipment descriptions.
    b. Performance and design criteria if Contractor is delegated design responsibility.
    c. Operating standards.
    d. Regulatory requirements.
    e. Equipment function.
    f. Operating characteristics.
    g. Limiting conditions.
    h. Performance curves.

2. Documentation: Review the following items in detail:

    a. Emergency manuals.
    b. Operations manuals.
    c. Maintenance manuals.
    d. Project Record Documents.
    e. Identification systems.
    f. Warranties and bonds.
    g. Maintenance service agreements and similar continuing commitments.

3. Emergencies: Include the following, as applicable:

    a. Instructions on meaning of warnings, trouble indications, and error messages.
    b. Instructions on stopping.
    c. Shutdown instructions for each type of emergency.
    d. Operating instructions for conditions outside of normal operating limits.
    e. Sequences for electric or electronic systems.
    f. Special operating instructions and procedures.

4. Operations: Include the following, as applicable:

    a. Startup procedures.
    b. Equipment or system break-in procedures.
    c. Routine and normal operating instructions.
    d. Regulation and control procedures.
    e. Control sequences.
    f. Safety procedures.
    g. Instructions on stopping.
    h. Normal shutdown instructions.
    i. Operating procedures for emergencies.
    j. Operating procedures for system, subsystem, or equipment failure.
    k. Seasonal and weekend operating instructions.
    l. Required sequences for electric or electronic systems.
    m. Special operating instructions and procedures.

5. Adjustments: Include the following:

    a. Alignments.
    b. Checking adjustments.
    c. Noise and vibration adjustments.
    d. Economy and efficiency adjustments.

6. Troubleshooting: Include the following:

    a. Diagnostic instructions.
    b. Test and inspection procedures.

7. Maintenance: Include the following:

    a. Inspection procedures.
    b. Types of cleaning agents to be used and methods of cleaning.
    c. List of cleaning agents and methods of cleaning detrimental to product.
    d. Procedures for routine cleaning
    e. Procedures for preventive maintenance.
    f. Procedures for routine maintenance.
    g. Instruction on use of special tools.

8. Repairs: Include the following:

    a. Diagnosis instructions.
    b. Repair instructions.
    c. Disassembly; component removal, repair, and replacement; and reassembly instructions.
    d. Instructions for identifying parts and components.
    e. Review of spare parts needed for operation and maintenance.

PART 3 - EXECUTION

3.1 PREPARATION

A. Assemble educational materials necessary for instruction, including documentation and training module. Assemble training modules into a combined training manual.

B. Set up instructional equipment at instruction location.

3.2 INSTRUCTION

A. Facilitator: Engage a qualified facilitator to prepare instruction program and training modules, to coordinate instructors, and to coordinate between Contractor and Owner for number of participants, instruction times, and location.

B. Engage qualified instructors to instruct Owner's personnel to adjust, operate, and maintain systems, subsystems, and equipment not part of a system.

1. Architect will furnish an instructor to describe basis of system design, operational requirements, criteria, and regulatory requirements.
2. Owner will furnish an instructor to describe Owner's operational philosophy.
3. Owner will furnish Contractor with names and positions of participants.

C. Scheduling: Provide instruction at mutually agreed on times. For equipment that requires seasonal operation, provide similar instruction at start of each season.

1. Schedule training with Owner with at least seven (7) calendar days' advance notice.

D. Evaluation: At conclusion of each training module, assess and document each participant's mastery of module by use of an oral and a demonstration performance-based test.

E. Cleanup: Collect used and leftover educational materials and give to Owner. Remove instructional equipment. Restore systems and equipment to condition existing before initial training use.

3.3 DEMONSTRATION AND TRAINING VIDEOTAPES

A. General: Engage a qualified commercial photographer to record demonstration and training video. Record each training module separately. Include classroom instructions and demonstrations, board diagrams, and other visual aids, but not student practice.

1. At beginning of each training module, record each chart containing learning objective and lesson outline.

B. Recorded Format: MPG file to be provided to the Owner's Project Manager.

C. Recording: Mount camera on tripod before starting recording, unless otherwise necessary to show area of demonstration and training. Display continuous running time.

D. Narration: Describe scenes on recording by dubbing audio narration off-site after videotape is recorded. Include description of items being viewed. Describe vantage point, indicating location, direction (by compass point), and elevation or story of construction.

E. Transcript: Provide a typewritten transcript of the narration. Display images and running time captured from videotape opposite the corresponding narration segment.

END OF SECTION 018200

SECTION 04 90 10 - MASONRY REHABILITATION AND POINTING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. This Section includes the following:
   1. Cleaning of all exposed clay masonry surfaces indicated to be repointed and/or rebuilt/repaired
   2. Brick replacement and repointing of mortar joints at areas to receive new exterior wall coating.
   3. Removal and replacement of the existing exterior face brick to allow for through-wall scuppers as indicated within the project drawings.

B. Related Sections include the following:

   1. Division 7 Section 075419 - "PVC Membrane Roofing" for related roof replacement
   2. Division 7 Section 07 62 00 - "Sheet Metal Flashing and Trim" for metal flashing installed in or on restored brick masonry including through-wall scuppers
   3. Division 7 Section 07 92 00 -"Joint Sealants" for sealing joints in repaired/restored brick

1.3 ACTION SUBMITTALS

A. Product Data: For each product indicated. Include recommendations for application and use. Include test reports and certifications substantiating that products comply with requirements.

B. Samples for Initial Selection: For the following:
   1. Pointing Mortar: Submit sets of mortar for pointing in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
      a. Have each set contain a close color range of at least (6) six samples of different mixes of colored sands and cements that produce a mortar matching the cleaned masonry when cured and dry.
      b. Submit with precise measurements on ingredients, proportions, gradations, and sources of colored sands from which each Sample was made.
      c. Produce samples utilizing sample cleaner/cleaning procedures to be employed in finished work.
   2. Sealant Materials: See Section 079200 "Joint Sealants."
   3. Include similar Samples of accessories involving color selection.

C. Samples for verification, before erecting the mockup, of the following:

   1. Each new exposed masonry material to be used for replacing existing materials. Include in each set of samples the full range of colors and textures to be expected in the completed Work.

a. Provide straps or panels containing at least 4 brick units.

2. Each type of mortar for pointing and masonry rebuilding and repair in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
   a. Include with each Sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.
   b. Produce samples utilizing sample cleaner/cleaning procedures to be employed in finished work.
3. Sealant Materials: See Section 079200 "Joint Sealants."

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For firms and persons specified in "Quality Assurance" Article to demonstrate their capabilities and experience. Include lists of completed projects with project names and addresses, names and addresses of architects and owners, and other information specified.

B. Operation outline for each phase of the work process, including protection of surrounding materials on the building and Project site during operations. Describe in detail the materials, methods, equipment, and sequence of operations to be used for each phase of the restoration work.

   1. If alternative materials and methods to those indicated are proposed for any phase of the restoration work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

C. Cleaning program indicating cleaning process, including protection of surrounding materials on building and Project site, and control of runoff during operations. Describe in detail the materials, methods, and equipment to be used.

   1. If materials and methods other than those indicated are proposed for cleaning work, provide a written description, including evidence of successful use on other comparable projects, and a testing program to demonstrate their effectiveness for this Project.

1.5 QUALITY ASSURANCE

A. Rehabilitation Specialist: Engage an experienced masonry restoration and cleaning firm that has completed work similar in material, design, and extent to that indicated for this Project and with a record of successful in-service performance. Experience installing standard unit masonry is not sufficient experience for masonry restoration work.

   1. At Contractor's option, the work may be divided between 2 specialist firms: 1 for cleaning work and 1 for repair work.
   2. Field Supervision: Require restoration specialist firms to maintain an experienced full-time supervisor on the Project site during times that clay masonry restoration and cleaning are in progress. Supervisors shall not be changed during Project except for causes beyond the control of restoration specialist firm.
   3. Restoration Worker Qualifications: Persons who are experienced in restoration work of types they will be performing.

B. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 20 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas, etc. that are noticeably different, so that surface blends smoothly into surrounding areas.

C. Mockups: Prepare field samples for restoration methods and cleaning procedures to demonstrate aesthetic effects and qualities of materials and execution. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.

1. Locate mockups on the building where directed by Architect.
   a. Provide a repointing mock-ups, demonstrating joint grinding, chiseling, and repointing of new mortar.
2. Masonry Repair: Prepare sample panels of size directed by Architect for each type of masonry material indicated to be patched, rebuilt, or replaced. Erect sample panels into an existing wall to demonstrate the quality of materials and workmanship. Panel to be a minimum of 4 sq ft in area
3. Cleaning: Prepare sample approximately 25 sq. ft. in area for each type of clay masonry and surface condition.

   a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions, unless cleaners and methods are known to have a deleterious effect.
   b. Allow a waiting period of not less than 7 days after completion of sample cleaning to permit a study of sample panels for negative reactions.

4. Repointing: Prepare 2 separate sample areas approximately 12 inches high by 12 inches wide minimum for each type of repointing required; 1 for demonstrating methods and quality of workmanship expected in removing mortar from joints and the other for demonstrating quality of materials and workmanship expected in pointing mortar joints.
5. Notify Architect 7 days in advance of the dates and times when samples will be prepared.
6. Obtain Architect's approval of mockups before starting the remainder of clay masonry restoration and cleaning.
7. Maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.

D. Preinstallation Conference: Conduct a preinstallation conference at Project site no later than 14 days prior to the start of the work
1. Attendees: Installer, installers job superintendent and/or foreman and representatives of manufacturers as well as sub-contractors involved in or affected by the installation and its coordination or integration with other materials and installations that have preceded or will follow, shall attend the meeting. Advise Architect of scheduled meeting dates.
2. Agenda: Review progress of other construction activities and preparations for the particular activity under consideration, including but not limited to requirements for the following:
   a. Contract Documents.
   b. Options.
   c. Submittals.
   d. Review of mockups.
   e. Possible conflicts.
   f. Compatibility problems.
   g. Time schedules.
   h. Weather limitations.
   i. Manufacturer's written recommendations.
   j. Warranty requirements.
   k. Compatibility of materials.
   l. Acceptability of substrates.

m. Space and access limitations.
n. Testing and inspecting requirements.
o. Required performance results.
p. Protection of construction and personnel.

3. Record significant conference discussions, agreements, and disagreements.
4. Do not proceed with installation if the conference cannot be successfully concluded. Initiate whatever actions are necessary to resolve impediments to performance of the Work and reconvene the conference at earliest feasible date.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Carefully pack, handle, and ship masonry units and accessories strapped together in suitable packs or pallets or in heavy-duty cartons.

B. Deliver other materials to Project site in manufacturer's original and unopened containers, labeled with type and name of products and manufacturers.

C. Store cementitious materials off the ground, under cover, and in a dry location.

D. Store aggregates off the ground, covered and in a dry location, where grading and other required characteristics can be maintained and contamination avoided.

E. Comply with manufacturer's written instructions for minimum and maximum temperature requirements for storage.

F. Do not use pinch or wrecking bars on stonework.

G. Lift stonework with wide-belt type slings where possible; do not use wire rope or ropes containing tar or other substances which might cause staining.

H. Store stone on non-staining wood skids or pallets, covered with non-staining, waterproof membrane. Place and stack skids and stone to distribute weight evenly and to prevent breakage or cracking of stones.

1.7 PROJECT CONDITIONS

A. Do not repoint mortar joints or repair masonry unless air temperature is between 40 deg F and 80 deg F and will remain so for at least 48 hours after completion of Work.

B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:

1. Comply with the Brick Industry Association (BIA) Technical Documents for Cold and Hot Weather Construction, current edition/publication.
2. When air temperature is below 40 deg F (4 deg C), heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F (4 and 49 deg C).
3. When mean daily air temperature is below 40 deg F (4 deg C), provide enclosure and heat to maintain temperatures above 32 deg F (0 deg C) within the enclosure for 7 days after repair and pointing.

C. Hot-Weather Requirements: Protect restoration work when temperature and humidity conditions produce excessive evaporation of water from mortar and patching materials. Provide

artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F and above.

1. Comply with the Brick Industry Association (BIA) Technical Documents for Cold and Hot Weather Construction, current edition/publication.

D. Prevent grout or mortar used in repointing and repair work from staining face of surrounding masonry and other surfaces. Immediately remove grout and mortar in contact with exposed masonry and other surfaces.

E. Protect sills, ledges, projections, etc. from mortar droppings.

F. Immediately clean all surfaces affected by the pointing work.

1.8 SEQUENCING AND SCHEDULING

A. Order replacement materials at the earliest possible date, to avoid delaying completion of the Work.

B. Perform masonry restoration work in the following sequence:

1. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
2. Clean masonry surfaces.
3. Rake out mortar from joints surrounding masonry to be replaced and from joints adjacent to masonry repairs along joints.
4. Repair masonry, including replacing existing masonry with new masonry materials.
5. Rake out mortar from joints to be repointed.
6. Point mortar and sealant joints.
7. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
8. Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
9. Clean masonry surfaces.

C. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to comply with "Masonry Unit Patching" Article. Patch holes in mortar joints to comply with "Repointing Masonry" Article.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

A. Basis-of-Design Product: The design for the masonry repair/restoration systems is based on the products and manufacturer(s) specified. Subject to compliance with requirements, provide the named product or a comparable product.

1. All substitute products shall meet or exceed the performance criteria of the designed product. Submit, for review, a detailed side-by-side comparison showing compatibility of the substitute product with the performance and warranty criteria of the designed product.
2. Contractor to bear all costs associated with the Architects review of substituted products. The contract amount to be revised via a credit Change Order to the Owner for the associated professional fees and costs, or paid directly to the Architect by the Contractor.

B. Replacement Face Brick and Accessories: Provide face brick and accessories, including specially molded, ground, cut, or sawed shapes where required to complete masonry restoration work.

1. Provide units with color, surface texture, size, and shape to match existing brick work and with physical properties not less than those determined from preconstruction testing of selected existing units.

a. For existing brickwork that exhibits a range of colors, provide brick that matches that range rather than brick that matches an individual color within that range.

C. Water: Potable.

2.2 MORTAR MATERIALS

A. Portland Cement: ASTM C 150, Type I or Type II, white or gray or both where required for color matching of exposed mortar.
1. Provide cement containing not more than 0.60 percent total alkali when tested according to ASTM C 114.

B. Hydrated Lime: ASTM C 207, Type S.

C. Mortar Sand: ASTM C 144 unless otherwise indicated.
1. Color: Provide natural sand or ground marble, granite, or other sound stone of color necessary to produce required mortar color.
2. For pointing mortar, provide sand with rounded edges.
3. Match size, texture, and gradation of existing mortar sand as closely as possible. Blend several sands if necessary to achieve suitable match.

D. Mortar Pigments: Natural and synthetic iron oxides, compounded for mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortars.

E. Water: Potable.

2.3 MORTAR MIXES

A. Measurement and Mixing: Measure cementitious materials and sand in a dry condition by volume or equivalent weight. Do not measure by shovel; use known measure. Mix materials in a clean, mechanical batch mixer.
1. Mixing Pointing Mortar: Thoroughly mix cementitious materials and sand together before adding any water. Then mix again adding only enough water to produce a damp, unworkable mix that will retain its form when pressed into a ball. Maintain mortar in this dampened condition for 15 to 30 minutes. Add remaining water in small portions until mortar reaches desired consistency. Use mortar within one hour of final mixing; do not retemper or use partially hardened material.

B. Colored Mortar: Produce mortar of color required to match existing. Do not alter specified proportions without Architect's approval.
1. Mortar Pigments: Where mortar pigments are required to match existing, do not exceed a pigment-to-cement ratio of 1:10 by weight.

C. Colored-Aggregate mortar: Produce color required by combining colored aggregates with portland cement of selected color.

D. Do not use admixtures in mortar unless otherwise indicated.

E. Mortar Proportions: Mix mortar materials in the following proportions:
   1. Portland Cement-Lime Mortar for Brick: Comply with ASTM C 270. Proportion Specification, for Types of N mortar for pointing of brick.
      a. 1 part portland cement, 1 parts lime, and 6 parts sand
      b. Add mortar pigments to produce mortar colors required.
   2. Mortar to match the existing, cleaned mortar finish, color and texture.

F. Joint Sealant Installation: Prepare joints and apply sealants of type and at locations indicated to comply with applicable requirements in Division 7 Section 07920 -"Joint Sealants."

G. Clean brick no fewer than six days after completion of pointing and sealing, using clean water and stiff-bristle fiber brushes. Do not use wire brushes, acid-type cleaning agents, cleaning agents containing caustic compounds or abrasives, or other materials or methods that could damage masonry.

2.4 CLEANING MATERIALS

A. Water for Cleaning: Potable.

B. Hot Water: Water heated to a temperature of 140 to 160 deg F.

C. Manufactured Cleaning Solutions:
   1. Brick: For use at all brick surfaces indicated to be cleaned/restored.
      a. Basis of Design Products:
         1) PROSOCO; Enviro Klean EK Restoration Cleaner

D. Pressure washers: Pressure washing equipment including compressors, hoses, fan-tip nozzles, and pressure gauges that can be attached to the nozzle apparatus. Note: Pressure gauges are acceptable only at the nozzle tip, not on the compression unit.
         1) Pressure washing not to exceed 1000psi, exact pressure to be determined based on mock-ups.

PART 3 - EXECUTION

3.1 PROTECTION

A. Protect persons, motor vehicles, surrounding surfaces of building being restored, building site, plants, and surrounding buildings from harm resulting from masonry restoration work.
   1. Erect temporary protective covers over walkways and at points of pedestrian and vehicular entrance and exit that must remain in service during course of restoration and cleaning work.

B. Prevent mortar from staining face of surrounding masonry and other surfaces.
   1. Cover sills, ledges, and projections to protect from mortar droppings.
   2. Keep wall area wet below rebuilding and pointing work to discourage mortar from adhering.
   3. Immediately remove mortar in contact with exposed masonry and other surfaces.
   4. Clean mortar splatters from scaffolding at end of each day.

3.2 BRICK REMOVAL AND REPLACEMENT

A. Carefully remove by hand, at locations indicated, bricks that are damaged, spalled, or deteriorated or are to be reused/salvaged. Cut out full units from joint to joint and in a manner to permit replacement with full-size units without damaging surrounding masonry.
   1. When removing single bricks, remove material from center of brick and work toward outside edges.

B. Salvage existing exterior face brick at new scupper openings for reuse at infill at exterior face brick of existing scupper openings.

C. Support and protect remaining masonry that surrounds removal area. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition, unless indicated to be replaced.

D. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing masonry backup, rotted wood, rusted metal, and other deteriorated items.

E. At areas of new through-wall flashings, remove existing exterior face brick and mortar without damage to back-up brick wythe and to allow for installation of new metal through wall flashing between brick wythes and reinstallation of exterior face brick flush with the existing wall.

F. Clean remaining brick at edges of removal areas by removing mortar, dust, and loose particles in preparation for replacement.

G. Replace removed damaged brick with other removed brick and salvaged brick in good quality, where possible, or with new brick matching existing brick, including size. Do not use broken units unless they can be cut to usable size.

H. Install new brick to replace removed brick. Fit replacement units into bonding and coursing pattern of existing brick. If cutting is required, use a motor-driven saw designed to cut masonry with clean, sharp, unchipped edges.
   1. Maintain joint width for replacement units to match existing joints.
   2. Use setting buttons or shims to set units accurately spaced with uniform joints.

I. Lay replacement brick with completely filled bed, head, and collar joints. Butter ends with sufficient mortar to fill head joints and shove into place. Wet both replacement and surrounding bricks that have ASTM C 67 initial rates of absorption (suction) of more than 30 g/30 sq. in. per min. Use wetting methods that ensure that units are nearly saturated but surface is dry when laid. Maintain joint width for replacement units to match existing units.
   1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing brickwork.
   2. Rake out mortar used for laying brick before mortar sets and point new mortar joints in repaired area to comply with requirements for repointing existing masonry, and at same time as repointing of surrounding area.
   3. When mortar is sufficiently hard to support units, remove shims and other devices interfering with pointing of joints.

3.3 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:
   1. All areas of cracked/deteriorated joints in areas indicated to receive new clear water repellant

B. Rake out joints as follows, according to procedures demonstrated in approved mockup:
   1. Remove mortar from joints to depth of 2 times joint width, but not less than 3/4 inch or not less than that required to expose sound, unweathered mortar.
   2. Remove mortar from masonry surfaces within raked-out joints to provide reveals with square backs and to expose masonry for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.
   3. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.
      a. Use of power-operated grinders contingent on Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry. Quality-control program shall include provisions for supervising performance.

C. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rotted wood, rusted metal, and other deteriorated items.

D. Pointing with Mortar:
   1. Rinse joint surfaces with water to remove dust and mortar particles. Time rinsing application so, at time of pointing, joint surfaces are damp but free of standing water. If rinse water dries, dampen joint surfaces before pointing.
   2. Apply pointing mortar first to areas where existing mortar was removed to depths greater than surrounding areas. Apply in layers not greater than 1/4 inch until a uniform depth is formed. Fully compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.
   3. After low areas have been filled to same depth as remaining joints, point all joints by placing mortar in layers not greater than 1/4 inch. Fully compact each layer and allow to become thumbprint hard before applying next layer. Where existing masonry units have worn or rounded edges, slightly recess finished mortar surface below face of masonry to avoid widened joint faces. Take care not to spread mortar beyond joint edges onto exposed masonry surfaces or to featheredge the mortar.
   4. When mortar is thumbprint hard, tool joints to match original appearance of joints as demonstrated in approved mockup. Remove excess mortar from edge of joint by brushing.
   5. Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours including weekends and holidays.
      a. Acceptable curing methods include covering with wet burlap and plastic sheeting, periodic hand misting, and periodic mist spraying using system of pipes, mist heads, and timers.
      b. Adjust curing methods to ensure that pointing mortar is damp throughout its depth without eroding surface mortar.
   6. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint to the complete satisfaction of the Architect.

E. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.1 CLEANING MASONRY, GENERAL

F. Proceed with cleaning in an orderly manner; work from top to bottom of each scaffold width and from one end of each elevation to the other. Work from bottom to top of the building for each scaffold drop.

G. Use only those cleaning methods indicated for each masonry material and location.

1. Use spray equipment that provides controlled application at volume and pressure indicated, measured at spray tip. Adjust pressure and volume to ensure that cleaning methods do not damage masonry.

    a. Equip units with pressure gages.

H. Perform each cleaning method indicated in a manner that results in uniform coverage of all surfaces, including corners, moldings, and interstices, and that produces an even effect without streaking or damaging masonry surfaces.

I. Water Application Methods: Where water application methods are indicated, comply with the following:

1. Spray Applications: Spray apply water to masonry surfaces to comply with requirements indicated for location, purpose, water temperature, pressure, volume, and equipment. Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water from side to side in overlapping bands to produce uniform coverage and an even effect.

J. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting.

K. Protect all non-masonry components within the wall system and at adjacent systems from damage and exposure to cleaning materials

3.2 CLEANING BRICKWORK

A. Detergent Cleaning: Clean brick masonry with a detergent solution applied as follows:

1. Wet masonry with cold water applied by low-pressure spray.
2. Scrub masonry with detergent solution using medium-soft brushes until soil is thoroughly dislodged and can be removed by rinsing. Use small brushes to remove soil from mortar joints and crevices. Dip brush in solution often to ensure that adequate fresh detergent is used and that masonry surface remains wet.
3. Rinse with cold water to remove detergent solution and soil.

    a. Apply rinse by low-pressure spray.

4. Repeat cleaning procedure above where required to produce the cleaning effect established by mockup.

3.3 CLEAN MASONRY AFTER POINTING WORK IS COMPLETED AND CLEANING

B. After mortar has fully hardened, thoroughly clean exposed masonry surfaces of excess mortar and foreign matter; use stiff-nylon or -fiber brushes and clean water, spray applied at a low pressure.

C. Do not use metal scrapers or brushes.

D. Do not use acidic or alkaline cleaners.

END OF SECTION 04 90 10

SECTION 06 10 53 - MISCELLANEOUS CARPENTRY

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes the following:
   1. Wood blocking**,** cants, and nailers.

B. Related Requirements:

   a. Section 07 01 50 “Preparation for Re-Roofing”

   b. Section 07 54 00 "PVC Membrane Roofing"

   c. Section 07 71 00 “Roof Specialties” for Metal roof edging/fascia systems, metal coping systems, expansion joint systems, etc.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal or greater but less than 5 inches nominal in least dimension.

B. Lumber grading agencies, and the abbreviations used to reference them, include the following:

   1. NeLMA: Northeastern Lumber Manufacturers' Association.
   2. NHLA: National Hardwood Lumber Association.
   3. NLGA: National Lumber Grades Authority.
   4. SPIB: The Southern Pine Inspection Bureau.
   5. WCLIB: West Coast Lumber Inspection Bureau.
   6. WWPA: Western Wood Products Association.

1.4 SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials and dimensions and include construction and application details.

   1. Include data for wood-preservative treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Indicate type of preservative used and net amount of preservative retained.
   2. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
   3. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

B. Research/Evaluation Reports: For the following, showing compliance with building code in effect for Project:

1. Preservative-treated wood.
2. Power-driven fasteners.
3. Powder-actuated fasteners.
4. Expansion anchors.

1.5 QUALITY ASSURANCE

A. Forest Certification: For the following wood products, provide materials produced from wood obtained from forests certified by an FSC-accredited certification body to comply with FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship":
1. Miscellaneous lumber.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers between each bundle to provide air circulation. Provide for air circulation around stacks and under coverings.

B. Deliver interior wood materials that are to be exposed to view only after building is enclosed and weatherproof, wet work other than painting is dry, and HVAC system is operating and maintaining temperature and humidity at occupancy levels.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.

1. Factory mark each piece of lumber with grade stamp of grading agency.
2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
3. Provide dressed lumber, S4S, unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA UC3B

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent. Do not use material that is warped or does not comply with requirements for untreated material.

C. Mark lumber with treatment quality mark of an inspection agency approved by the ALSC Board of Review.

D. Application: Treat items indicated on Drawings, and the following:

1. Wood cants, nailers, curbs, equipment support bases, blocking, stripping, and similar members in connection with roofing, flashing, vapor barriers, and waterproofing.
2. Wood sills, sleepers, blocking, and similar concealed members in contact with masonry or concrete.
3. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
4. Wood framing members that are less than 18 inches above the ground in crawl spaces or unexcavated areas.
5. Wood floor plates that are installed over concrete slabs-on-grade.

2.3 MISCELLANEOUS LUMBER

A. General: Provide miscellaneous lumber indicated and lumber for support or attachment of other construction, including the following:

1. Blocking.
2. Nailers.
3. Rooftop equipment bases and support curbs.
4. Cants.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber with 19 percent maximum moisture content of any species.

C. For exposed boards, provide lumber with 19 percent maximum moisture content and of any species

D. For concealed boards, provide lumber with 19 percent maximum moisture content and of any species

E. For blocking and nailers used for attachment of other construction, select and cut lumber to eliminate knots and other defects that will interfere with attachment of other work.

2.4 PRESERVATIVE-TREATED PLYWOOD

A. Preservative Treatment by Pressure Process: AWPA UC3B.

1. Preservative Chemicals: Acceptable to authorities having jurisdiction and containing no arsenic or chromium.

B. Mark plywood with appropriate classification marking of an inspection agency acceptable to authorities having jurisdiction.

C. Application: Treat all plywood, unless otherwise indicated

2.5 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this Article for material and manufacture.

1. Where carpentry is exposed to weather, in ground contact, pressure-preservative treated, for roof and wall sheathing, or in area of high relative humidity, provide fasteners with either hot-dip zinc coating complying with ASTM A 153/A 153M or of Type 304 stainless steel.

B. Nails, Brads, and Staples: ASTM F 1667.

C. Power-Driven Fasteners: NES NER-272.

D. Wood Screws: ASME B18.6.1.

E. Screws for Fastening to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.

F. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).

G. Bolts: Steel bolts complying with ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with ASTM A 563 (ASTM A 563M) hex nuts and, where indicated, flat washers.

H. Expansion Anchors: Anchor bolt and sleeve assembly of material indicated below with capability to sustain, without failure, a load equal to 6 times the load imposed when installed in unit masonry assemblies and equal to 4 times the load imposed when installed in concrete as determined by testing per ASTM E 488 conducted by a qualified independent testing and inspecting agency.

1. Material: Carbon-steel components, zinc plated to comply with ASTM B 633, Class Fe/Zn 5.
2. Material: Stainless steel with bolts and nuts complying with ASTM F 593 and ASTM F 594, Alloy Group 1 or 2 (ASTM F 738M and ASTM F 836M, Grade A1 or A4).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Set carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit carpentry to other construction; scribe and cope as needed for accurate fit. Locate nailers, blocking, and similar supports to comply with requirements for attaching other construction.

B. Where wood-preservative-treated lumber is installed adjacent to metal decking, install continuous flexible flashing separator between wood and metal decking.

C. Framing Standard: Comply with AF&PA's "Details for Conventional Wood Frame Construction," unless otherwise indicated.

D. Do not splice structural members between supports, unless otherwise indicated.

E. Provide blocking and framing as indicated and as required to support facing materials, fixtures, specialty items, and trim.

1. Provide metal clips for fastening gypsum board or lath at corners and intersections where framing or blocking does not provide a surface for fastening edges of panels. Space clips not more than 16 inches o.c.

F. Sort and select lumber so that natural characteristics will not interfere with installation or with fastening other materials to lumber. Do not use materials with defects that interfere with function of member or pieces that are too small to use with minimum number of joints or optimum joint arrangement.

G. Comply with AWPA M4 for applying field treatment to cut surfaces of preservative-treated lumber.

1. Use inorganic boron for items that are continuously protected from liquid water.
2. Use copper naphthenate for items not continuously protected from liquid water.

H. Securely attach carpentry work to substrate by anchoring and fastening as indicated, complying with the following:
1. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

I. Use common wire nails, unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood; do not countersink nail heads, unless otherwise indicated.

3.2 WOOD BLOCKING, AND NAILER INSTALLATION

A. Install where indicated and where required for attaching other work. Form to shapes indicated and cut as required for true line and level of attached work. Coordinate locations with other work involved.

B. Attach items to substrates to support applied loading. Recess bolts and nuts flush with surfaces, unless otherwise indicated.

3.3 PROTECTION

A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 06 10 53

SECTION 070150 - PREPARATION FOR REROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Full tear-off of entire roof.
2. Removal of base flashings.
3. Temporary roofing.

1.3 DEFINITIONS

A. Roofing Terminology: Definitions in ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" apply to work of this Section.

B. Full Roof Tear-Off: Removal of existing roofing system from deck.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Include plans, sections, and details.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1. Include certificate that Installer is approved by warrantor of existing roofing system.

B. Photographs or Videotape: Show existing conditions of adjoining construction and site improvements, including exterior and interior finish surfaces, that might be misconstrued as having been damaged by reroofing operations. Submit before Work begins.

1.6 QUALITY ASSURANCE

A. Reroofing Conference: Conduct conference at Project site.

1. Meet with Owner; Architect; Owner's insurer if applicable; testing and inspecting agency representative; roofing system manufacturer's representative; roofing Installer, including project manager, superintendent, and foreman; and installers whose work interfaces with

or affects reroofing, including installers of roof deck, roof accessories, and roof-mounted equipment.

2. Review methods and procedures related to roofing system tear-off and replacement, including, but not limited to, the following:

    a. Reroofing preparation, including roofing system manufacturer's written instructions.
    b. Existing roof drains and roof drainage during each stage of reroofing, and roof-drain plugging and plug removal.
    c. Construction schedule and availability of materials, Installer's personnel, equipment, and facilities needed to avoid delays.
    d. Existing roof deck conditions requiring notification of Architect.
    e. Condition and acceptance of existing roof deck and base flashing substrate for reuse.
    f. Structural loading limitations of roof deck during reroofing.
    g. Base flashings, special roofing details, drainage, penetrations, equipment curbs, and condition of other construction that affect reroofing.
    h. HVAC shutdown and sealing of air intakes.
    i. Shutdown of fire-suppression, -protection, and -alarm and -detection systems.
    j. Existing conditions that may require notification of Architect before proceeding.

1.7 FIELD CONDITIONS

A. Existing Roofing System: Modified bitumen roofing over 2.5” flay poly-iso insulation over tectum roof deck as indicated within the drawings.

B. Protect building to be reroofed, adjacent buildings, walkways, site improvements, exterior plantings, and landscaping from damage or soiling from reroofing operations.

C. Maintain access to existing walkways, corridors, and other adjacent occupied or used facilities.

D. Conditions existing at time of inspection for bidding are maintained by Owner as far as practical.

E. Weather Limitations: Proceed with reroofing preparation only when existing and forecasted weather conditions permit Work to proceed without water entering existing roofing system or building.

    1. Remove only as much roofing in one day as can be made watertight in the same day.

F. Hazardous Materials: It is not expected that hazardous materials, such as asbestos-containing materials, will be encountered in the Work.

    1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify the University. Hazardous materials will be removed by the University under a separate contract.

PART 2 - PRODUCTS

2.1 TEMPORARY ROOFING MATERIALS

A. Design and selection of materials for temporary roofing are Contractor's responsibilities and must be acceptable to the roofing manufacturer.

2.2 AUXILIARY REROOFING MATERIALS

A. General: Use auxiliary reroofing preparation materials recommended by roofing system manufacturer for intended use and compatible with components of new roofing system.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Roofing Contractor to verify existing site conditions, including roof dimensions. The Owner and Architect assume no responsibility for the existing actual conditions that the Contractor may encounter during the course of work that can be reasonably foreseen during the Pre-Bid inspection. The building layout was taken from existing drawings. The Contractor shall verify all dimensions and conditions in the field prior to demolition and notify the Architect should any conditions encountered vary from the Contract Documents.

3.2 PREPARATION

A. Prior to start of work at low-slope roof areas, coordinate with the Owner a specific schedule of all low-slope roofing related events and time-frames to allow the occupants below the low-slope roof areas to be temporarily relocated.

B. Shut off rooftop utilities and service piping before beginning the Work.

C. Test existing roof drains to verify that they are not blocked or restricted. Immediately notify Architect and the University of any blockages or restrictions.

D. Coordinate with Owner to shut down air-intake equipment in the vicinity of the Work. Cover air-intake louvers before proceeding with reroofing work that could affect indoor air quality or activate smoke detectors in the ductwork.

E. During removal operations, have sufficient and suitable materials on-site to facilitate rapid installation of temporary protection in the event of unexpected rain.

F. Maintain roof drains in functioning condition to ensure roof drainage at end of each workday. Prevent debris from entering or blocking roof drains and conductors. Use roof-drain plugs specifically designed for this purpose. Remove roof-drain plugs at end of each workday, when no work is taking place, or when rain is forecast.

1. If roof drains are temporarily blocked or unserviceable due to roofing system removal or partial installation of new roofing system, provide alternative drainage method to remove water and eliminate ponding. Do not permit water to enter into or under existing roofing system components that are to remain.

G. All curbs are to be raised to a minimum height of 8” above the finished roof surface. Be sure to calculate tapered insulation + recovery board + new roof system when calculating blocking heights

H. All soil stacks/pipe penetrations must be raised a minimum of 8” above the finished roof surface. No soil stack may be sleeved with the joint facing to weather.

I. All abandoned drain lines must be capped with a threaded cap.

J. All abandoned curbs must be removed and the deck replaced with like kind materials and color.

K. All heat pumps are to be disconnected by a licensed mechanical contractor and set aside until the roof is replaced. The units are to be reinstalled after work is complete and fed through a goose neck penetration. The roofing contract must hire a certified mechanical contractor for all mechanical reclamation work and disconnect

3.3 SAFETY

A. The roofing contractor shall be responsible for all means and methods as they relate to safety and shall comply with all applicable local, state and federal requirements that are safety related. **Safety shall be the responsibility of the roofing contractor.** All related personnel shall be instructed daily to be mindful of the full time requirement to maintain a safe environment for the facility's occupants including staff, visitors, customers and the occurrence of the general public on or near the site.

B. All work shall be performed in accordance with the requirements of the Occupational Safety and Health Administration (OSHA), the University Department of Environmental Health and Safety (EHS) requirements, and other agencies regulating the safety and proper workmanship of this job. Anyone working at heights of six feet or more above another surface in construction or more than four feet in general industry needs to be protected by guardrails, safety nets, or personal fall protection systems. These regulations also apply to skylights and other roof openings. Refer to ANSI/ASSE Z359 and OSHA 1926.501 for applicable fall protection for window cleaning.

C. GUARDING OF HIGH-PITCHED ROOF PERIMETERS

1. A catch platform or scaffold shall be installed below the work area of roofs greater than 16 feet (4.9 meters) from the ground to eaves with a slope greater than 4 inches in 12 inches and with an unprotected side or edge. In width, the platform shall extend 2 feet beyond the protection of the eaves and shall be provided with a guardrail, mid-rail, and toe-board. This provision shall not apply where employees engaged in work upon such roofs are protected by a full body harness attached to a fall arrest system.

D. GUARDING OF LOW-PITCHED ROOF PERIMETERS

1. General Provisions - During the performance of roofing work on low-pitched roofs with a ground to eave height greater than 16 feet (4.9 meters), employees engaged in such work shall be protected from falling from unprotected sides and edges of the roof as follows:

a. By the use of a warning line system erected and maintained as provided in Section 2 and supplemented for employees working between the warning line and the roof edge by the use of either an MSS (motion-stopping-safety) system, or where mechanical equipment is not being used or stored, by the use of a safety monitoring system; or

b. By the use of a safety monitoring system on roofs fifty feet (15.25 meters) or less in width where mechanical equipment is not being used or stored.

c. "Safety-monitoring system" - a safety system in which a competent person monitors the safety of all employees in a roofing crew, and warns them when it appears to the monitor that they are unaware of the hazard or are acting in an unsafe manner. The competent person must be on the same roof as and within

visual sighting distance of the employees, and must be close enough to verbally communicate with the employees and complies with all requirements as stated in 29CFR1926.502(b)

d. Personal fall arrest system (i.e. proper anchor point, lanyard and body harness).

2. Warning lines

a. Warning lines shall be erected around all sides of the work area when mechanical equipment is not being used, the warning lines shall be erected not less than six feet (1.8 meters) from the roof edge.

b. The warning lines shall consist of a rope, wire, or chain, and supporting stanchions erected as follows:

1) The rope, wire, or chain shall be flagged at no more than six foot (1.8 meters) intervals with high-visibility material.

2) The rope, wire, or chain shall be rigged and supported in such a way that its lowest point (including sag) is no less than 34 inches (.86 meters) from the roof surface and its highest point is no more than 39 inches (1 meter) from the roof surface.

3) After being erected, with the rope, wire, or chain attached, stanchions shall be capable of resisting, without tipping over, a force of at least 16 pounds (71 Newtons) applied horizontally against the stanchion; 30 inches (0.76 meters) above the roof surface, perpendicular to the warning line, and in the direction of the roof edge.

4) The rope, wire, or chain shall have a minimum tensile strength of 500 pounds (227 Kilograms), and after being attached to the stanchions, shall be capable of supporting, without breaking, the loads applied to the stanchions as prescribed in paragraph 3.B.2.c of this section; and

5) The line shall be attached at each stanchion in such a way that pulling on one section of the line between stanchions will not result in slack being taken up in adjacent sections before the stanchion tips over.

3. ACCESS PATHS SHALL BE ERECTED AS FOLLOWS:

a. Points of access, materials handling areas and storage areas shall be connected to the work area by a clear access path formed by two warning lines.

b. When the path to a point of access is not in use, a rope, wire, or chain, equal in strength and height to the warning line, shall be placed across the path at the point where the path intersects the warning line erected around the work area

3.4 ROOF TEAR-OFF

A. General: Notify Owner each day of extent of roof tear-off proposed for that day.

B. Full Roof Tear-Off: Remove existing roofing and other roofing system components down to the deck.

1. Remove roof insulation.
2. Remove wood blocking, curbs, and nailers, cant strips, etc
3. Remove fasteners from deck or cut fasteners off slightly above deck surface.

C. Remove all membrane, cant strips, insulation, expansion joints, base flashings, and any other items required for installation of the new roof. In addition, completely remove all nails and other debris to leave a smooth, even surface for re-roofing.

D. Contractor to incorporate one or more of the following methods for removal of dirt, silt, gravel, debris, roof membrane, and insulation from the roof surface in order to preserve the ecology, eliminate unsightly conditions, and protect the building surfaces:
1. Enclosed chutes with protective shrouds on the building and ground surfaces.
2. All debris dumped from the roof shall be transported from the roof via chutes into dumpsters or trucks, and this debris shall be removed from the premises when vehicles are full at the Contractors cost. No debris shall be transported from the area being worked on over a previously finished roof without a minmimum underlayment of 3/4" plywood.

E. Perform all demolition and re-roofing work in such a manner as to not damage or affect the load carrying capacity of the existing structural system.

F. Contractor shall provide water-tight cut off (night tie in) at the end of each day's work.

3.5 DECK PREPARATION

A. Inspect deck after tear-off of roofing system with the new roof system manufacturer’s field technical representative to confirm suitability of roof deck.

B. If deck surface is unsuitable for receiving new roofing or if structural integrity of deck is suspect, immediately notify Architect. Do not proceed with installation until directed by Architect.

3.6 BASE FLASHING REMOVAL

A. Remove existing base flashings. Clean substrates of contaminants, such as asphalt, sheet materials, dirt, and debris.

B. Remove, and replace where indicated, all existing metal counterflashings

3.7 DISPOSAL

A. Collect demolished materials and place in containers. Promptly dispose of demolished materials. Do not allow demolished materials to accumulate on-site.

1. Storage or sale of demolished items or materials on-site is not permitted.

B. Transport and legally dispose of demolished materials off Owner's property.

3.8 PROTECTION

A. It is the contractor’s responsibility to provide the suitable and appropriate protection of the work and building, including temporary tie-ins. At a minimum all roof temporary tie-ins/laps shall be fully adhered at the end of each work day.

B. It shall be the Contractor's responsibility to respond immediately to correction of roof leakage during construction. A four (4) hour time limit shall be given from the time of notification of emergency conditions. In the event of water penetration during rain or a storm, the Contractor shall provide for repair of the building contents and interior including, but not limited to, all interior contents, furnishings, equipment, building systems and finishes. If the Contractor does not respond or cannot be contacted, the Owner will affect repairs or emergency action and the Contractor shall be back charged for all expenses and damages, if any.

END OF SECTION 070150

SECTION 075419 - POLYVINYL-CHLORIDE (PVC) MEMBRANE ROOFING

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Adhered PVC membrane roofing system.
2. Substrate Preparation
3. Vapor Barrier
4. Roof Insulation
5. Roof Membrane
6. Fasteners
7. Adhesive for Flashings
8. Roof Membrane Flashings
9. Liquid Flashing system
10. Walkways
11. Metal Flashings

B. Related Sections:

1. Section 070150 “Preparation for Re-Roofing”
2. Section 076200 "Sheet Metal Flashing and Trim" for metal roof flashings and counterflashings, scuppers, downspouts, etc.
3. Section 077100 “Roof Specialties” for Metal roof edging/fascia systems, metal coping systems, expansion joint systems, etc.

C. General Notes

1. Preceding job start up, contractor shall decide to his satisfaction that all specifications contained herein are workable.
2. Contractor will perform all work by competent, trained, manufacturer authorized, and properly equipped personnel in strict accordance with good roofing practices and applicable industry standards.
3. Contractor will observe all published safety prevention policies and practices relating to application of roofing system and related work. All federal, state, and local codes shall be followed.
4. Contractor will follow application, safety, etc. information as published in the most current edition of the Manufacturer’s Roofing System Technical Specifications.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definition of terms related to roofing work in this Section.

B. Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," before multiplication by a safety factor.

C. Factored Design Uplift Pressure: The uplift pressure, calculated according to procedures in SPRI's "Wind Load Design Guide for Fully Adhered and Mechanically Fastened Roofing Systems," after multiplication by a safety factor and in accordance with the design wind load pressures outlined in IBC Chapter 16.

1.4 PREINSTALLATION CONFERENCE

A. Preinstallation Conference: Conduct conference at Project site, a minimum of seven (7) days prior to the start of work. Comply with requirements in Division 1 Section "Project Management and Coordination." Review methods and procedures related to roofing system including, but not limited to, the following:

1. Meet with Owner; Architect; roofing Installer; roofing system manufacturer's representative; deck Installer; and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

A. System Assembly Letter:
1. List information specific to this project, including owner, contractor, building, and location.
2. List each material required for roofing system including but not limited too, roof membranes, insulation fastener/adhesive type and spacing/quantity, underlayment, substrate, etc.
3. Certification of single source responsibility.
4. Indicate FM RoofNav number to comply with requirements specified.
5. Confirmation of receipt and review of the current issue project documents (i.e. drawings and specifications) from the contractor.
6. Signed by roofing manufacturer certifying that roofing system outlined meets performance requirements (including wind up-lift) and warranty specified.

B. Shop Drawings: For roofing system, to be **Project specific**, which includes at a minimum editing of manufacturer's standard details to indicate components and requirements to be utilized within the actual work, and keyed to the project documents, i.e. roof plan and details. Include plans, elevations, sections, details, and attachments to other work, including:

1. Base flashings and membrane terminations.
2. Tapered insulation layout, including slopes, R-Value, thickness, etc.
3. Crickets, saddles, and tapered edge strips, including slopes.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products:

1. Roof Membrane.
2. Walkway pads
3. Roof accessories including fascia

D. Wind Uplift Resistance Submittal: For roofing system, indicating compliance with wind uplift performance requirements.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer and manufacturer.

B. Product Test Reports: For components of membrane roofing system, for tests performed by manufacturer and witnessed by a qualified testing agency.

C. Research/Evaluation Reports: For components of membrane roofing system, from ICC-ES.

D. Field quality-control reports.

E. Sample Warranties: For manufacturer's special warranties.

F. FM Global: Subsequent to the completion of the work and prior to project close-out the contractor shall complete and submit FM Global Form 2688, "Application for Acceptance of Roofing Systems".

G. Inspection Reports: Copy of roofing system manufacturer's inspection reports from the initial, interim, and final inspections of completed roofing installation.

1. Submit report to Architect within 72 hours of visit. Inspection Reports will reference the project drawings and specific project areas and conditions observed, as well as the following:

    a. Date and time
    b. Jobsite weather conditions, temperature, precipitation, etc.
    c. Description of work inspected, noting exact areas keyed to the construction drawings.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is UL listed and/or FM Approvals approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm with personnel that is approved, authorized, or licensed by membrane roofing system manufacturer to install manufacturer's product and that is eligible to receive manufacturer's special warranty.

C. Source Limitations: Obtain components for membrane roofing system from same manufacturer as membrane roofing or as approved by membrane roofing manufacturer/FM Approvals.

D. Fire-Test-Response Characteristics: Provide membrane roofing materials with the fire-test-response characteristics indicated as determined by testing identical products per test method below by UL, FMG, or another testing and inspecting agency acceptable to authorities having jurisdiction. Materials shall be identified with appropriate markings of applicable testing and inspecting agency.

1. Exterior Fire-Test Exposure: Class A; ASTM E 108, for application and roof slopes indicated.
2. Fire-Resistance Ratings: ASTM E 119, for fire-resistance-rated roof assemblies of which roofing system is a part.

E. FM Global Inspections and Reports: Contractor to coordinate with the University to allow for the FM Global technical personnel to inspect the roofing system and components at the following:

1. FM Global Form 2688 *Checklist for Roofing System* should be completed by the contractor and forwarded to Rowan and FM Global office for review and acceptance prior to the start of work in the field.
   a. Each assembly component shall be specified by manufacturer and trade name with characteristics such as thickness, length, size, etc. included as applicable. The rates of application for any adhesives and the density of any fasteners should also be clearly indicated. The form should include the FM Approvals RoofNav assembly number of the roof system to be referenced.
   b. Include Roof specialties (i.e. Copings) identifying manufacturer, trade name, material thickness, material type, face height, back height, securement rate, etc.
2. Condition of existing roof deck, subsequent to removal of existing roof systems and prior to installation of new system components
3. Installation and securement of new Insulation Boards, prior to installation of cover materials (i.e. roof membrane)
4. Notify Architect and the University 72 hours minimum, in advance of date and time of inspection of work.
5. Dates, times, and frequency of FM Global field visits to be reviewed with the University and incorporated into the project schedule by the Contractor.

1.9 ADHESIVE & FASTENER PULL-OUT TESTING

A. In preparation of the project submittals outlined herein and prior to the start of work engage the roof manufacturer or authorized representative acceptable to roof manufacturer to perform fastener and adhesive pull-out tests according to SPRI FX-1 on the existing roof deck substrates and submit test report to Architect and roofing membrane manufacturer before installing new membrane roofing system.

1. Perform pull-out testing of the following:
    a. Roof Insulation Adhesive: Roofing system manufacturer's low-rise, VOC-free, two-component, insulating polyurethane adhesive approved for securing roof insulation boards to roof deck and as required to meet or exceed the performance requirement outlined herein.
    b. Screw-type fasteners: manufacturer's factory coated screw type fasteners approved for use within the roofing membrane system for securing insulation to roof deck and as required to meet or exceed the performance requirement outlined herein.

2. Obtain Architect's and roofing membrane manufacturer's approval to proceed with specified fastening/adhesive pattern. Roofing membrane manufacturer may furnish revised fastening/adhesive pattern commensurate with pull-out test results and required performance requirements outlined herein.

3. Subsequent to pull-out testing the contractor shall properly patch/repair the existing roof membrane and associated components to maintain a water-tight building.

1.10 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.

C. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

    1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

D. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

    1. All insulation deemed wet/damaged by The University and/or Architect is to be discarded and replaced with an acceptable material, at the contractor's expense.

E. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.11 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit roofing system to be installed according to manufacturer's written instructions and warranty requirements.

1.12 WARRANTY

A. General: The warranties specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.

B. Special Warranty: Manufacturer's standard or customized form, without monetary limitation, in which manufacturer agrees to repair or replace components of membrane roofing system that fail in materials or workmanship within specified warranty period.

1. Special warranty includes membrane roofing, base flashings, roof insulation, fasteners, cover boards, substrate board, roofing accessories, and other components of membrane roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.
3. Warrantable Wind Speed: 72 mph

C. Installer’s Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering the Work of this Section, including all components of membrane roofing system such as membrane roofing, base flashing, roof insulation, fasteners, cover boards, substrate boards, vapor retarders, roof pavers, and walkway products, for the following warranty period:

1. Warranty Period: 2 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Installed roofing and base flashings shall withstand specified uplift pressures, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Roof system and flashings shall remain watertight.

1. Accelerated Weathering: Roof membrane shall withstand 2000 hours of exposure when tested according to ASTM G 152, ASTM G 154, or ASTM G 155.
2. Impact Resistance: Roof membrane shall resist impact damage when tested according to ASTM D 3746, ASTM D 4272/D 4272M, or the "Resistance to Foot Traffic Test" in FM Approvals 4470.

B. Dead Load: Loading of the roof structure, due to tear off of existing, and/or installation of new roofing materials shall not exceed the present loading. There will be no additional weight added to the structure

C. Material Compatibility: Roofing materials shall be compatible with one another and adjacent materials under conditions of service and application required, as demonstrated by roof membrane manufacturer based on testing and field experience.

D. FM Global Listing: Roofing, base flashings, and component materials shall comply with requirements in FM Global 4450 or FM Global 4470 as part of a roofing system, and shall be listed in FM Global's "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Global markings.

Fire/Windstorm Classification: Class 1A-**105**

2. Hail-Resistance Rating: FM Global Property Loss Prevention Data Sheet 1-34 MH

3. Wind Uplift Ratings:
   a. Zone 1 - Field of roof : 45 psf
      1) FM Rating: 1-90
   b. Zone 2 – Perimeter: 60 psf
      1) FM Rating: 1-120
      2) Width: 13 ft. (Roofs A, B, C, D, & E)
      3) Width 16 ft. (Roof F)
   c. Zone 3 – Corners: 75 psf
      1) FM Rating: 1-150
      2) Width: 13 ft. x 13 ft. x 5 ft. (Roofs A, B, C, D, & E)
      3) Width: 16 ft. x 16 ft. x 6 ft. (Roof F)

4. All roofing assemblies and base assemblies should be FM Approved, Class 1, Class A fire rated and designed for a wind speed of 115 mph and Ground Roughness Exposure B.

5. Ensure all installations use components and systems (insulation, roof cover, etc.) that are FM Approved for use together on the particular deck.

E. Perimeter Edge Metals: All perimeter edge metals, including fascia, gravel stops, copings, gutters, etc. are to be secured in accordance with ANSI/SPRI-ES-1. Design wind speed shall be determined in accordance with IBC Section 1609.

F. Odors: Wherever a system component (i.e. adhesive, flashing cement, liquid flashing, sealant, etc.) is available in a no/low odor formulation the contractor is to provide, at no additional cost to the owner, the component(s) in the lowest form odor configuration that may incorporated within the system while still meeting the performance requirements, including VOC and environmental requirements herein.

G. Energy Performance: Roofing system shall have an initial solar reflectance of not less than 0.46 and an emissivity of not less than 0.89 when tested according to CRRC-1.

H. Exterior Fire-Test Exposure: ASTM E 108 or UL 790, Class A for application and roof slopes indicated; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

I. Fire-Resistance Ratings: Comply with fire-resistance-rated assembly designs indicated. Identify products with appropriate markings of applicable testing agency.

J. Pourable sealants (i.e. pitch pockets) are not acceptable anywhere on this project.

2.2 MANUFACTURERS

A. Basis-of-Design Product: The design for roofing system is based on the products and manufacturer(s) specified. Subject to compliance with requirements, provide the named product or a comparable/equivalent product.

1. All substitute products shall meet or exceed the performance criteria of the designed product(s). Submit, for review, a detailed side-by-side comparison showing compatibility of the substitute product with all performance and warranty criteria of the designed product.

2. Contractor to bear all costs associated with the Architects review of substituted products. The contract amount to be revised via a credit Change Order to the Owner for the associated professional fees and costs, or paid directly to the Architect by the Contractor.

2.3 PVC MEMBRANE ROOFING

A. PVC Sheet: ASTM D 4434/D 4434M, Type II, glass fiber reinforced.

1. Products: Subject to compliance with requirements, provide the following:

a. Basis of Design: Sure-Flex PVC membrane as manufactured by Carlisle-Syntec

b. Sentinel G150 membrane as manufactured by Soprema

c. Sarnafil G410 membrane as manufactured by Sika-Sarnafil.

2. Thickness: 60 mils, minimum.
3. Exposed Face Color: To be selected by Owner from all available colors.

2.4 AUXILIARY MEMBRANE ROOFING MATERIALS

A. General: Auxiliary membrane roofing materials recommended by roofing system manufacturer for intended use, and compatible with membrane roofing.

1. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Wherever available, contractor is to provide roof system and associated components free of solvents, VOC's and odor or with the lowest available solvents, VOC's and odor to meet the performance requirements herein, whether or not specifically identified for each component.

C. Sheet Flashing: Manufacturer's standard sheet flashing of same material, type, reinforcement, thickness, and color as PVC sheet membrane.

D. Base Sheet: Manufacturer's SBS-modified bitumen coated base sheet for use as an anchor sheet for cold-adhesive

E. Bonding Adhesive: Manufacturer's standard water-based bonding adhesive for membrane, insulation and water-based bonding adhesive for base flashings.

F. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1" by 1/8" thick; with anchors 8" on center max.

G. Fasteners: Manufacturer's standard factory-coated (post-galvanized) steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, and acceptable to membrane roofing system manufacturer.

H. Miscellaneous Membrane Accessories: Provide manufacturer's certified fabricated accessories including but not limited to; inside and outside corners, curb wrap corners, molded pipe seals, prefabricated split pipe boots, prefabricated square tubing wraps, T-joint covers, and other accessories of same material, type, reinforcement, thickness, and color as PVC sheet membrane.
1. Field wrapping/detailing in lieu of certified prefabricated accessories, where available, is not permitted.

I. Miscellaneous Sealant Accessories: Provide manufacturer's standard, lap sealants, adhesives, and other accessories.

J. Liquid Flashing Primer: Two-component polymethyl methacrylate-based (PMMA) primer used to promote the adhesion of Liquid Flashing over wood and concrete surfaces.

K. Liquid Flashing Fleece: Non-woven, needle-punched polyester fleece used as the reinforcement for liquid flashing details.

L. Liquid Flashing Catalyst: Reactive agent based on dibenzoyl peroxide to induce curing of Liquid Flashing and Liquid Flashing Primer when mixed.

M. Low-pressure foam system for sealing roof deck: As indicated within the project drawings provide manufacturer's foam sealant system for sealing all metal deck roof seams, terminations at building walls, penetrations, etc. to provide an air-tight seal.
   1. Basis of Design: Dow Froth-Pak 200 Foam Sealant as manufactured by Dow Chemical Company.

N. Pre-Manufactured Expansion Joint Support: Extruded EPDM Expansion Joint System: As indicated in the project drawings, provide manufacturer's extruded EPDM expansion joints supports and associated components for sealing expansion joints in PVC roof membrane systems.
   1. Basis of Design: Expansion Joint Systems as manufactured by Carlisle Syntec Systems

2.1 VAPOR RETARDER

A. A reinforced composite aluminum foil with self-adhesive SBS backing and removable poly release film. Used for direct application over metal decks.

   1. Basis of Design: VapAir Seal MD Air and Vapor Barrier by Carlisle SynTec, Inc

2.2 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured or approved by PVC membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated and that produce FM Approvals-approved roof insulation

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, felt or glass-fiber mat facer on both major surfaces.

   1. Provide roof insulation and component materials as part of a membrane roofing system that comply with requirements in FMG 4450 or UL 1256 when tested as part of an assembly.
   2. Type: 1/8" per 12" Tapered boards (Roofs A, B, D & F) and Flat boards (Roofs C & E)
   3. Thickness: 1/8" Tapered boards at Roofs A, B, D & F to achieve R-30 average continuous insulation value over existing roof deck and 5.2-inch total thickness at Roofs C & E to achieve R-30 total thickness. <u>All areas consisting of minimum 2-layers with staggered joints.</u>
      a. Sump Insulation at drains down to the existing deck/drain bowl.

C. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slopes indicated.

   1. Contractor to provide preformed crickets/tapered insulation sloped 1/2" per foot or twice the finished roof slope of the roof area at all rooftop equipment units, roof hatches, and any other curbs/obstructions up-slope for the new tapered insulation to ensure positive

drainage, whether illustrated within the project drawings or not. Contractor is responsible for verifying all locations and quantities with requirements herein.

2.3 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Fasteners: Factory-coated (post-galvanized) steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening roof insulation to substrate, and acceptable to roofing system manufacturer.

C. Bead-Applied Insulation Adhesive: Insulation manufacturer's recommended low odor, VOC compliant, two component, low-rise polyurethane adhesive used to attach roof insulation to substrate or to another insulation layer.

D. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, 1/2 inch thick**,** factory primed.

1. Products: Subject to compliance with requirements, provide the following basis-of design product:
   a. Georgia Pacific
   b. National Gypsum Company
   c. USG

2.4 RETROFIT DRAIN INSERTS

A. Retrofit Roof Drain Inserts: Install at all existing drain locations.

1. Basis of Design:
   a. RD2150 as manufactured by Zurn, or approved equivalent.
   b. Provide with aluminum dome strainer, cast iron clamping ring, and back-flow gasket.
2. Fasten drain flange through tie-down slots to existing roof deck to secure firmly in place.

2.5 WALKWAYS

A. Flexible Walkway Pads: Factory-formed, nonporous, heavy-duty, slip-resisting, polyester reinforced, 0.096 inch, weldable membrane with surface embossment. Walkway pads shall be manufactured by or acceptable to membrane roofing system manufacturer.

1. Colors and Textures: As indicated by manufacturer's designations.

B. Provide walkways continuously from roof access (i.e. hatch) to all roof top equipment units, and continuously around entire unit/equipment. Contractor to review exact location and extent of walkway with Architect and Owner prior to the start of work.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with the following requirements and other conditions affecting performance of roofing system:

1. Verify that roof openings and penetrations are in place and curbs are set and braced and that roof drain bodies are securely clamped in place.
2. Verify that wood blocking, curbs, and nailers are securely anchored to roof deck at penetrations and terminations and that nailers match thicknesses of insulation.
3. Coordinate curb heights with the tapered insulation layout. All curbs less than 8” above the finished roof level shall be raised by adding wood blocking. All blocking and costs associated with raising units, exhaust fans, B Vents, etc. are the responsibility of the contractor and shall be included in the bid price.
4. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. All existing roofing, base flashing, wood blocking and metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weathertight with new materials during a one-day period or before the onset of inclement weather.

B. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

C. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

D. Inspect the deck to verify integrity. Bring any areas of questionable integrity to the Owner’s attention. Do not cover any areas of questionable deck or deck out of plane.

E. All obsolete/abandoned equipment, curbs, and utilities are to be removed, deck infilled, and insulation installed to bring it up to the height of the surrounding roof area. All existing areas of infill are to be removed, insulation replaced to bring it up to the level of the existing insulation. Any areas of deflected deck are to be brought to the attention of the Architect and owner prior to proceeding with the roofing installation.

F. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at the end of the workday or when rain is forecast. Uninterrupted waterstops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Waterstops shall not emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner. Remove and discard temporary seals before beginning work on adjoining roofing.

G. Perform fastener-pullout tests according to roof system manufacturer's written instructions.

1. Submit test result within 24 hours of performing tests.
    a. Include manufacturer's requirements for any revision to previously submitted fastener patterns required to achieve specified wind uplift requirements.

3.3 WOOD NAILER INSTALLATION

A. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons/lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two fasteners shall be installed at ends of nailer lengths. Nailer attachment shall also meet the requirement of the current Factory Mutual Loss Prevention Data Sheet 1-49.

3.4 ROOFING INSTALLATION, GENERAL

A. Install roofing system according to roofing system manufacturer's written instructions, FM Approvals' RoofNav assembly requirements, and FM Global Property Loss Prevention Data Sheet 1-29.

B. Complete terminations and base flashings and provide temporary seals to prevent water from entering completed sections of roofing system at end of workday or when rain is forecast. Remove and discard temporary seals before beginning work on adjoining roofing.

C. All existing roof top equipment, stacks, penetrations, etc. not indicated to be removed/raised and less than 8-inches clear above the roof are to be flashed with Liquid Flashing.

D. All irregular penetrations such as steel I-Beams, etc. are to be flashed/sealed with Liquid Flashing. No sealant pockets are permissible.

3.5 AIR AND VAPOR RETARDER INSTALLATION

A. Install air and vapor retarder to achieve an air tight installation including flashing and sealing all penetrations, roof edges, drains, etc. Follow manufactures installation requirements to achieve air and vapor retarder and temporary roofing and in the absence of specific instructions from the manufacturer, follow similar instructions to the Carlisle SynTec Air and Vapor Barrier Field Guide

B. Prime steel roof deck

C. Follow material product data sheets and published general requirements for installation instructions.

D. Ensure environmental conditions are satisfactory, and will remain satisfactory, during the application of the self-adhesive membrane.

E. Unroll membrane onto the roof surface and allow time to relax prior to installing the membrane.

F. Starting at the low point of the roof, lay out the membrane to ensure the plies are installed perpendicular to the roof slope, shingled to prevent back-water laps.

G. Ensure all substrates are prepared and acceptable to receive the self-adhesive membrane.

H. Ensure primer is tacky to-the-touch, but not wet. Primer should not transfer to the fingertips when touched. Do not proceed if primer is wet or becomes fully dry and dirty. If primer becomes fully dry, dirty and looses all tack, re-prime the substrate as necessary to achieve membrane adhesion.

I. Cut rolls to working lengths and widths to conform to rooftop conditions and lay out to always work to a selvage edge.

J. Ensure membrane side-laps end-laps are maintained.

K. Peel the release film from the underside of the membrane. Press and adhere the leading edge of the membrane to the substrate but leaving the 6 in end-lap un-adhered in order to heat weld the end-lap.

L. As the release film is peeled away, use a weighted roller to firmly set the sheet in place. Ensure full contact is made between the ply and the substrate for full adhesion. Use a hand-roller to roll-in vertical applications and confined areas to firmly apply pressure.

M. At 6 in end-laps, cut a 45 degree dog-ear away from the 3 in selvage edge.

N. Offset self-adhered end-laps 3 ft.

O. All membrane terminating edges, penetrations, seams, etc. to be continuously sealed with manufacturer compatible sealant.

P. Each day, physically inspect all side and end-laps, and ensure the membrane is sealed watertight. Where necessary, use a torch or hot-air welder and a clean trowel to ensure all laps are fully sealed.

Q. Inspect the installation each day to ensure the plies are fully adhered. Repair all un-adhered voids, wrinkles, open laps and all other deficiencies

3.6 INSULATION INSTALLATION

A. Coordinate installing membrane roofing system components so insulation is not exposed to precipitation or left exposed at the end of the workday.

B. Comply with membrane roofing system and insulation manufacturer's written instructions for installing roof insulation.

C. Install tapered insulation under area of roofing to conform to slopes indicated on approved shop drawings.

D. Install insulation under area of roofing to achieve required thickness. Install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches in each direction.

1. Where installing insulation in two or more layers, install insulation joints staggered horizontally and vertically for each layer, when applicable, and install tapered insulation for top layer.

E. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

F. Install individual insulation layers with long joints of insulation in a continuous straight line with end joints staggered between rows, abutting edges and ends between boards. Fill gaps exceeding 1/4 inch with insulation.

1. Cut and fit insulation within 1/4 inch of nailers, projections, and penetrations.

G. At internal roof drains, slope insulation to create a square drain sump with each side equal to the diameter of the drain bowl plus 24 inches.

H. Mechanically Fastened and Adhered Insulation (Metal Deck locations as indicated on drawings): Install each layer of insulation and secure first layer of insulation to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

Fasten first layer of insulation according to requirements in FMG's "Approval Guide" for specified Windstorm Resistance Classification.

2. Install subsequent layers of insulation in a cold fluid-applied adhesive.
   a. Space adhesive beads per manufacturer’s requirements in accordance with FMG’s “Approval Guide” for specified Windstorm Resistance Classification.

3.7 INSTALLATION OF COVER BOARDS

A. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches in each direction.

1. Trim cover board neatly to fit around penetrations and projections, and to fit tight to intersecting sloping roof decks.
2. At internal roof drains, conform to slope of drain sump.

   a. Trim cover board so that water flow is unrestricted.

3. Cut and fit cover board tight to nailers, projections, and penetrations.
4. Adhere cover board to substrate using adhesive according to FM Approvals' RoofNav assembly requirements and FM Global Property Loss Prevention Data Sheet 1-29 for specified Windstorm Resistance Classification, as follows:
   a. Set cover board in ribbons of bead-applied insulation adhesive, firmly pressing and maintaining insulation in place.

3.8 ADHERED ROOFING INSTALLATION

A. Adhere roof membrane over area to receive roofing according to roofing system manufacturer's written instructions.

B. Unroll roof membrane and allow to relax before installing.

C. Start installation of roofing in presence of roofing system manufacturer's technical personnel

D. Accurately align roof membrane and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

E. Bonding Adhesive: Apply to substrate and underside of roof membrane at rate required by manufacturer and allow to partially dry before installing roof membrane. Do not apply to splice area of roof membrane.

F. In addition to adhering, mechanically fasten roof membrane securely at terminations, penetrations, and perimeter of roofing.

G. Apply roof membrane with side laps shingled with slope of roof deck where possible.

H. Seams: Clean seam areas, overlap roofing, and hot-air weld side and end laps of roof membrane and sheet flashings to ensure a watertight seam installation.

1. Test lap edges with probe to verify seam weld continuity. Apply lap sealant to seal cut edges of roof membrane and sheet flashings.
2. Verify field strength of seams a minimum of twice daily, and repair seam sample areas.
3. Repair tears, voids, and lapped seams in roof membrane that do not comply with requirements.

I. Spread sealant bed over deck-drain flange at roof drains, and securely seal roof membrane in place with clamping ring.

3.9 BASE FLASHING INSTALLATION

A. Install sheet flashings and preformed flashing accessories and adhere to substrates according to membrane roofing system manufacturer's written instructions.

B. Bonding Adhesive for Membrane Flashings: Over the properly installed and prepared flashing substrate, adhesive shall be applied according to manufacturer’s written instructions. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.

C. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

D. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate at 6-8 inches on center through termination bars.

3.10 LIQUID FLASHING INSTALLATION

A. At all areas indication on drawings including existing roof top equipment, stacks, penetrations, etc. are to be flashed with Liquid Flashing.

B. Application Guidelines
1. Liquid Flashing has a strong odor. Precautions should be taken to prevent odors and/or vapors from entering the building/structure, including but not limited to turning off and sealing air intake vents and other means of ingress for odors and/or vapors into the building/structure during product application and cure. Refer to Drawings General Notes and General Conditions.

C. Installation Notes
1. Prepare the surface to be flashed by cleaning the area to like-new condition

a. Pre-cut vertical and horizontal liquid flashing fleece to fit around the penetration with 2” (51 mm) overlaps.
b. Thoroughly mix the Liquid Flashing and the Liquid Flashing Catalyst with a slow speed mixer.
c. Apply the catalyzed liquid flashing with a 55 mil base layer. Place the pre-cut fleece into the wet Liquid Flashing making sure to saturate the fleece. Apply a 25 mil finishing layer over the fleece.

3.11 WALKWAY INSTALLATION

A. Roofing membrane to receive Walkway treads shall be clean and dry. Place chalk lines on deck sheet to indicate location of Walkway. Apply a continuous coat of manufacturer’s membrane adhesive to the deck sheet and the back of Walkway in accordance with manufacturer’s technical requirements and press Walkway into place with a water-filled, foam-covered lawn roller. Clean the deck membrane in areas to be welded. Hot-air weld the entire perimeter of the Walkway to the deck sheet. Check all welds with a rounded screwdriver. Re-weld any inconsistencies. Check all existing deck membrane seams that are to be covered by Walkway with rounded screwdriver and re-weld any inconsistencies before Walkway installation.
1. Install walkway products in locations indicated on project drawings, but at a minimum from all access points (i.e. roof hatches and ladders) to all mechanical units and entire perimeters of mechanical units.

3.12 FIELD QUALITY CONTROL

A. Initial Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect at the start of the installation of roof membrane system submit a project specific report to Architect.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

B. Interim Roof Inspections: Arrange for roofing system manufacturer's technical personnel to inspect the installation of roof membrane system bi-weekly while work is in progress and submit a project specific report to Architect.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

C. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing membrane system installation on completion and submit a project specific report to Architect.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

D. Repair or remove and replace components of membrane roofing system where test results or inspections indicate that they do not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

F. Failure to coordinate and schedule roofing inspections and provide the associated inspections reports as outlined herein shall be credited back to OWNER, via a credit change order to the contractor’s contract at a cost of $1,000.00 per an inspection/report

3.13 PROTECTING AND CLEANING

A. Protect membrane roofing system from damage and wear during remainder of construction period. When remaining construction will not affect or endanger roofing, inspect roofing for deterioration and damage, describing its nature and extent in a written report, with copies to Architect and Owner.

B. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Applicator shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer approved by manufacturer shall be provided for all new and existing roof areas that receive rooftop traffic during construction.

C. Correct deficiencies in or remove membrane roofing system that does not comply with requirements; repair substrates; and repair or reinstall membrane roofing system to a condition free of damage and deterioration at time of Substantial Completion and according to warranty requirements.

D. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.14 ROOFING INSTALLER'S WARRANTY

A. WHEREAS <**Insert name**> of <**Insert address**>, herein called the "Roofing Installer," has performed roofing and associated work ("work") on the following project:

1. Owner: <**Insert name of Owner**>.
2. Address: <**Insert address**>.
3. Building Name/Type: <**Insert information**>.
4. Address: <**Insert address**>.
5. Area of Work: <**Insert information**>.
6. Acceptance Date: <**Insert date**>.
7. Warranty Period: <**Insert time**>.
8. Expiration Date: <**Insert date**>.

B. AND WHEREAS Roofing Installer has contracted (either directly with Owner or indirectly as a subcontractor) to warrant said work against leaks and faulty or defective materials and workmanship for designated Warranty Period,

C. NOW THEREFORE Roofing Installer hereby warrants, subject to terms and conditions herein set forth, that during Warranty Period he will, at his own cost and expense, make or cause to be made such repairs to or replacements of said work as are necessary to correct faulty and defective work and as are necessary to maintain said work in a watertight condition.

D. This Warranty is made subject to the following terms and conditions:

1. Specifically excluded from this Warranty are damages to work and other parts of the building, and to building contents, caused by:

    a. Lightning;
    b. Peak gust wind speed
    c. Fire;
    d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;

e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
f. Vapor condensation on bottom of roofing; and
g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
5. During Warranty Period, if original use of roof is changed and it becomes used for, but was not originally specified for, a promenade, work deck, spray-cooled surface, flooded basin, or other use or service more severe than originally specified, this Warranty shall become null and void on date of said change, but only to the extent said change affects work covered by this Warranty.
6. Owner shall promptly notify Roofing Installer of observed, known, or suspected leaks, defects, or deterioration and shall afford reasonable opportunity for Roofing Installer to inspect work and to examine evidence of such leaks, defects, or deterioration.
7. This Warranty is recognized to be the only warranty of Roofing Installer on said work and shall not operate to restrict or cut off Owner from other remedies and resources lawfully available to Owner in cases of roofing failure. Specifically, this Warranty shall not operate to relieve Roofing Installer of responsibility for performance of original work according to requirements of the Contract Documents, regardless of whether Contract was a contract directly with Owner or a subcontract with Owner's General Contractor.

E. IN WITNESS THEREOF, this instrument has been duly executed this <**Insert day**> day of <**Insert month**>, <**Insert year**>.

1. Authorized Signature: <**Insert signature**>.
2. Name: <**Insert name**>.
3. Title: <**Insert title**>.

END OF SECTION 075419

SECTION 07 62 00 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:
   1. Formed through-wall flashing with snaplock receiver with counterflashing and weeps
   2. Miscellaneous metals

B. Related Requirements:
   1. Section 07 54 19 “PVC Membrane Roofing”
   2. Division 7 Section 07 92 00 – "Joint Sealants"

1.3 COORDINATION

A. Coordinate sheet metal flashing and trim layout and seams with sizes and locations of penetrations to be flashed, and joints and seams in adjacent materials.

B. Coordinate sheet metal flashing and trim installation with adjoining roofing and wall materials, joints, and seams to provide leakproof, secure, and noncorrosive installation.

1.4 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

   1. Meet with Owner, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of air barrier membrane systems and joint sealants..

   2. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
   3. Review special details and conditions of other construction that affect sheet metal flashing and trim.
   4. Review requirements for insurance and certificates if applicable.
   5. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings (**Project Specific**): Show layouts of sheet metal flashing and trim, including plans and elevations. Shop drawings for sheet metal flashing and trim shall be keyed to the contract documents and include the following:

1. Include plans, elevations, sections, and attachment details.

2. Field verified dimensions of existing conditions and configurations
3. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
4. Include identification of material, thickness, weight, and finish for each item and location in Project.
5. Include details for forming, including profiles, shapes, seams, and dimensions.
6. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
7. Include details of termination points and assemblies.
8. Include details of special conditions.
9. Include details of connections to adjoining work.
10. Detail formed flashing and trim at scale of not less than 6 inches per 12 inches (1:5).

C. Samples for Initial Selection: For each type of sheet metal and accessory indicated with factory-applied finishes.

D. Samples for Verification: For each type of exposed finish.

1. Sheet Metal Flashing: 12 inches (300 mm) long by actual width of unit, including finished seam and in required profile. Include fasteners, cleats, clips, closures, and other attachments.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Test Reports: For each product, for tests performed by a qualified testing agency.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For sheet metal flashing and trim, and its accessories, to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for fabrication and installation.

1. Build mockup of the following:
   a. Typical through-wall flashing, approximately 10 feet (3.0 m) long, including supporting construction cleats, seams, end dams attachments, air barrier system and sheet membrane flashings and accessories.
   b. Typical aluminum edging at existing aluminum canopy
   c. Typical aluminum edging at existing aluminum louver sill edge
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.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage. Store sheet metal flashing and trim materials away from uncured concrete and masonry.

B. Protect strippable protective covering on sheet metal flashing and trim from exposure to sunlight and high humidity, except to extent necessary for period of sheet metal flashing and trim installation.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" and SMACNA's "Architectural Sheet Metal Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. Aluminum Sheet: ASTM B 209, Alloy 3003, 3004, 3105, or 5005, Temper suitable for forming and structural performance required, but not less than H14, finished as follows:

1. High-Performance Organic Finish: AA-C12C42R1x (Chemical Finish: cleaned with inhibited chemicals; Chemical Finish: acid-chromate-fluoride-phosphate conversion coating; Organic Coating: as specified below). Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

    a. Fluoropolymer 2-Coat System: Manufacturer's standard 2-coat, thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

        1) Color/Finish: As selected by Rowan and Architect from manufacturer's full range, including all non-standard/custom colors and finishes.

B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, dead soft, fully annealed; with smooth, flat surface.

1. Finish: 2D (dull, cold rolled).

2.3 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. All aluminum flashings/trim to be fabricated to required profiles and dimensions for installation prior to application of finish. .
1. All field cutting of aluminum flashing/counterflashing is to be minimized. All cut edges to be properly prepared and finish repaired at cut edge prior to installation.

D. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation unless otherwise indicated.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads and recommended by manufacturer of primary sheet metal or manufactured item

1. General: Blind fasteners or self-drilling screws, gasketed, with hex-washer head.

a. Exposed Fasteners: Heads matching color of sheet metal using plastic caps or factory-applied coating. Provide metal-backed EPDM or PVC sealing washers under heads of exposed fasteners bearing on weather side of metal.
b. Blind Fasteners: High-strength aluminum or stainless-steel rivets suitable for metal being fastened.
c. Spikes and Ferrules: Same material as gutter; with spike with ferrule matching internal gutter width.

2. Fasteners for Aluminum Sheet: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

C. Solder:
1. For Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.

D. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

E. Elastomeric Sealant: ASTM C 920, elastomeric **silicone** polymer sealant (**JS-2**); of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.

G. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

H. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.

I. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

C. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with silicone sealant. Rivet joints for additional strength.

D. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

E. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

F. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

H. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.6 WALL SHEET METAL FABRICATIONS

A. Through-Wall Flashing: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12-foot- long, sections, at rising walls, shelf angles, etc.. Fabricate discontinuous lintel, and similar flashings to extend 8 inches minimum beyond each side of wall openings; and form with 2-inch- high, end dams or of configuration illustrated within the project drawings. Fabricate from the following materials:

1. Stainless Steel: 26 gauge.

2. Profile: As indicated within drawings
   a. 2-piece as indicated within drawings
      1) All seams at wall flashing inside & outside corners, transitions, etc. to be soldered continuously watertight.

3. Lap seams: overlap 4-inches min. and bed overlap in two continuous beads of silicone sealant

4. Miter corners and transitions, and weld/solder watertight all corners, transitions, and end dams.

B. Counterflashing: Fabricate continuous flashings in minimum 96-inch- (2400-mm-) long, but not exceeding 12-foot- long, sections at non-through-wall flashing locations indicated within the drawings. Fabricate from the following materials:

1. Stainless Steel: 26 gauge.

2. Profile: As indicated within drawings
   a. 2-piece as indicated within drawings
      1) All seams at wall flashing inside & outside corners, transitions, etc. to be soldered continuously watertight.

2) Lap seams: overlap 4-inches min. and bed overlap in two continuous beads of silicone sealant.

C. End cap/ Saddle: Fabricate end cap/saddle flashings in the locations and configurations as indicated within the drawings. Fabricate from the following materials:

1. Stainless Steel: 22 gauge.

2. All inside & outside corners, transitions, etc. to be soldered continuously watertight.

2.7 THROUGH-WALL FLASHINGS ACCESSORIES

A. Cavity Weeps Vents:

1. Provide 3/8" thick non-woven mesh weep vent with M-notched bottom.

a. Basis of Design:

1) CavClear Weep Vents as manufactured by Archovations, Inc. or an acceptable comparable product. Color to be selected by architect from manufacturers full range.

b. Install weep vents set directly on top of flashing.

B. Sefl-adhered Membrane Flashing

1. Description: A 30-mil thick cold applied self-adhered membrane with cross laminated high density polyethylene film laminated to an aluminum foil and coated on high temperature 100% butyl adhesive and all associated system components (i.e. primers, mastics etc.), for use in conjunction with through-wall flashing systems.

a. Basis of Design:

1) Perm-A-Barrier Ultra 100% butyl rubber, aluminum faced self-adhered air and vapor barrier membrane as manufactured by GCP Technologies or approved equal

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 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, levels, and slopes. Provide uniform, neat seams with minimum exposure of solder, welds, and sealant.
2. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.
3. Space cleats not more than 12 inches apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact wood, ferrous metal, or cementitious construction.

C. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

D. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

E. Seal lap joints as required for watertight construction.
1. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

F. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pre-tin edges of sheets with solder to width of 1-1/2 inches (38 mm); however, reduce pre-tinning where pre-tinned surface would show in completed Work.

1. Do not use torches for soldering.
2. Heat surfaces to receive solder, and flow solder into joint. Fill joint completely. Completely remove flux and spatter from exposed surfaces.
3. Stainless-Steel Soldering: Tin edges of uncoated sheets, using solder for stainless steel and acid flux. Promptly remove acid flux residue from metal after tinning and soldering. Comply with solder manufacturer's recommended methods for cleaning and neutralization.

3.3 ROOF DRAINAGE SYSTEM INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing and edging with installation of roof drainage system.

B. Parapet Scuppers:
   1. Continuously support scupper, set to correct elevation, and seal flanges to interior wall face, over cants or tapered edge strips, and under roofing membrane.
   2. Seal exterior wall scupper flanges into back of conductor head

C. Conductor Heads: Anchor securely to wall.

D. Downspouts: Join sections with 1-1/2-inch telescoping joints.
   1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
   2. Connect downspouts to underground drainage system indicated.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. 2-Piece Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner by means of snap-in installation or anchor and washer at 36-inch (910-mm) centers unless otherwise indicated.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to cited sheet metal standard unless otherwise indicated. Coordinate installation of wall flashing with roofing and exterior wall coatings as indicated in the project drawings.

B. Reglets: Saw-cut existing masonry surfaces 1-1/2” deep by 3/8 min. high, or full height of existing masonry joint. Anchor new sheet metal flashing within reglet with lead wedges to secure.
   1. Install backer rod and sealant compatible with exterior wall coating at all reglets within walls scheduled to receive exterior wall coatings.
   2. Install/point joints with new mortar per Specification 04 90 10 at all reglets outside exterior wall coating areas.

C. Lap Seams: Provide a continuous splice plate at all lap seams within the metal counter flashing systems. Lap seam and bed into two (2) continuous beads of silicone sealant (**JS-2**) at each side of joint.

D. All other seams in wall flashings to be soldered watertight.

E. DO NOT install new joint sealants at stone cladding across top of new through-wall flashings. Seal between bottom of new through-wall flashing and stone cladding below as illustrated within the project drawings.

3.6 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet on slope and location lines indicated on Drawings and within 1/8-inch offset of adjoining faces and of alignment of matching profiles.

3.7 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder.

C. Clean off excess sealants.

D. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed unless otherwise indicated in manufacturer's written installation instructions. On completion of sheet metal flashing and trim installation, remove unused materials and clean finished surfaces as recommended by sheet metal flashing and trim manufacturer. Maintain sheet metal flashing and trim in clean condition during construction.

E. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION 07 62 00

SECTION 07 71 00 - ROOF SPECIALTIES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Copings.
2. Roof-edge specialties (i.e. fascia and edge metals)

B. Related Requirements:
1. Section 06 10 53 "Miscellaneous Rough Carpentry" for wood nailers, curbs, and blocking.
2. Section 07 54 19 “PVC Membrane Roofing”
3. Section 07 62 00 "Sheet Metal Flashing and Trim" for custom- and site-fabricated sheet metal flashing and trim.
4. Section 07 92 00 "Joint Sealants" for field-applied sealants between roof specialties and adjacent materials.

C. Preinstallation Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, roofing-system testing and inspecting agency representative, roofing Installer, roofing-system manufacturer's representative, Installer, structural-support Installer, and installers whose work interfaces with or affects roof specialties, including installers of roofing materials and accessories.
2. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
3. Review special roof details, roof drainage, and condition of other construction that will affect roof specialties.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

2. Include manufacturer’s most current installation instructions

A. Shop Drawings (**Project Specific**): Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Shop drawings for sheet metal flashing and trim shall be keyed to the contract documents (i.e. roof plan and details) as well as indicated within and/or keyed to shop drawings of adjacent works (i.e. roofing, etc.) and include the following:

1. Indicate Project specific conditions and dimensions
2. Identify material, thickness, weight, and finish for each item and location in Project.
3. Details for forming, including profiles, shapes, seams, and dimensions.
4. Details for fastening, joining, supporting, and anchoring, including fasteners, clips, cleats, and attachments to adjoining work.
5. Details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction.
6. Details of termination points and assemblies, including fixed points.
7. Details of edge conditions
8. Details of special conditions.
9. Details of connections to adjoining work.

B. Samples: For each type of roof specialty and for each color and texture specified.

C. Samples for Initial Selection: For each type of roof specialty indicated with factory-applied color finishes.

D. Samples for Verification:

1. Include Samples of each type of roof specialty to verify finish and color selection, in manufacturer's standard sizes.
2. Include copings and roof-edge/fascia made from 12-inch lengths of full-size components in specified material, and including fasteners, cover joints, accessories, and attachments.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Product Certificates: For each type of roof specialty.

C. Product Test Reports: For copings and roof-edge flashings, for tests performed by a qualified testing agency.

D. Sample Warranty: For manufacturer's special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roofing specialties to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer offering products meeting requirements that are SPRI ES-1 tested to specified design pressures.

B. Source Limitations: Obtain roof specialties approved by manufacturer providing roofing-system warranty specified in Section 07 54 19 “PVC Membrane Roofing”

C. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and set quality standards for fabrication and installation.

1. Build mockup of typical roof edge as shown on Drawings.

2. Build mockup of typical roof edge as part of Integrated Exterior Mockup specified in Section 014000 "Quality Requirements"
3. Build mockup of typical roof edge, including coping, fascia, scupper, and downspout, approximately 10 feet long, including supporting construction, seams, attachments, underlayment, and accessories.
4. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
5. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not store roof specialties in contact with other materials that might cause staining, denting, or other surface damage. Store roof specialties away from uncured concrete and masonry.

B. Protect strippable protective covering on roof specialties from exposure to sunlight and high humidity, except to extent necessary for the period of roof-specialty installation.

1.8 FIELD CONDITIONS

A. Field Measurements: Verify profiles and tolerances of roof-specialty substrates by field measurements before fabrication, and indicate measurements on Shop Drawings.

B. Coordination: Coordinate roof specialties with flashing, trim, and construction of parapets, roof deck, roof and wall panels, and other adjoining work to provide a leakproof, secure, and noncorrosive installation.

1.9 WARRANTY

A. Roofing-System Warranty: Roof specialties, i.e. metal coping, roof fascia, and systems are included in warranty provisions in Section 07 54 19 “PVC Membrane Roofing” and include the following:
1. Metal Copings: Manufacturer shall guarantee that a standard size roof edge system, when installed per manufacturer’s instructions, will not blow off, leak, or cause membrane failure, even in wind conditions up to 115 mph, or the manufacturer shall at their option repair or replace their materials.

B. Special Warranty on Painted Finishes: Manufacturer agrees to repair finish or replace roof specialties that show evidence of deterioration of factory-applied finishes within specified warranty period.

1. Fluoropolymer Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Roof specialties shall withstand exposure to weather and resist thermally induced movement without failure, rattling, leaking, or fastener disengagement due to defective manufacture, fabrication, installation, or other defects in construction.

A. FM Approvals' Listing: Manufacture and install copings and roof-edge specialties that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-105. Identify materials with FM Approvals' markings.

B. SPRI Wind Design Standard: Manufacture and install copings and roof-edge specialties tested according to SPRI ES-1 and capable of resisting the following design pressures:

1. Design Pressure:

a. Wind Zone 2: Coping 1-60

b. Wind Zone 3: Coping 1-72

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of thermal movements. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F , material surfaces.

2.2 COPINGS

A. Metal Copings: Manufactured coping system consisting of metal coping cap in section lengths not exceeding 12 feet, concealed anchorage; with corner units, end cap units, and concealed splice plates with finish matching coping caps.

1. Basis-of-Design Product: Subject to compliance with requirements, the design for metal coping system is based on the following:

a. Carlisle Syntec Systems
1) SecurEdge 200 Gold Coping

2. Other Manufacturers: Subject to compliance with requirements, other available manufacturers offering products that may be incorporated into the Work include, but are not limited to the following:

a. W.P. Hickman
b. Metal Era

3. Formed Aluminum Sheet Coping Caps: Aluminum sheet, 0.050 inch thick.

a. Surface: Smooth, flat finish.

b. Finish: Fluoropolymer 2 or 3-Coat System: Manufacturer's thermocured system consisting of specially formulated inhibitive primer and fluoropolymer color topcoat

containing not less than 70 percent polyvinylidene fluoride resin by weight; complying with AAMA 2605.

c. Finish: Painted, Color to match existing and be selected by Architect and Rowan from manufacturer's full available range including standard, premium/specialty colors/finishes.
d. Exterior Vertical Face Dimension: as indicated within Drawings
e. Interior Vertical Face Dimension: 4-inches minimum.
f. Internal splice plates: Shall be concealed with matching finish to maintain outside face continuity.
g. Coping Cleat: 24 gauge galvanized steel cleat, 10'0" lengths.
h. Anchor Clips: Galvanized steel clip 12" wide @ 36-inches on center to be mechanically fastened as indicated and detailed

4. Special Fabrications:
   a. Transition caps as indicated within the project drawings
   b. End caps, end wall flashing splice plates, etc. at all abutments of new copings to all rising walls
   c. Vertical side-wall caps

5. Coping Accessories:
   a. Provide all system accessories including: corners, end caps, T-intersections, etc. to be fabricated by the coping manufacturer with welded seams and post-finished to match coping finish. **NOTE: Field painting of welds is not acceptable.**
      1) Provide end dams/caps at all abutments/terminations to rising walls. Review all conditions and configurations and provide shop drawings of configurations and dimensions for review by Architect prior to fabrication.
         a) Endwall flashings to turn-up vertically as well at out/beyond interior and exterior faces.

2.3 ROOF-EDGE SPECIALTIES

A. Roof-Edge Fascia: Manufactured, two-piece, roof-edge fascia consisting of snap-on metal fascia cover in section lengths not exceeding 10 feet and a continuous metal receiver with integral drip-edge cleat to engage fascia cover and secure single-ply roof membrane. Provide matching corner units.

1. Basis-of-Design Product: Subject to compliance with requirements, provide or comparable product by one of the following:

   a. Carlisle Synetec Systems
      1) SecurEdge 2000 Standard Fascia Single Ply

2. Formed Aluminum Sheet Fascia Covers: Aluminum sheet, 0.050 inch thick.

   a. Surface: Smooth, flat finish.
   b. Finish: Painted, Color to be selected by Architect and Rowan from manufacturer's full available range including standard, premium/specialty colors/finishes.

3. Exterior Vertical Face Dimension: as indicated within Drawings
4. Corners: Factory mitered and continuously welded.
5. Splice Plates: Concealed, of same material, finish, and shape as fascia cover.
6. Receiver/Rail: Galvanized-steel sheet, 20-Ga. Minimum thickness.
7. Special Fabrications:
   a. Transition caps as indicated within the project drawings

b. End caps, end wall flashing splice plates, etc. at all abutments of new fascia to all rising walls.
c. Radius: Provide factory radiused coping in areas to meet existing wall radius

8. Fascia Accessories:
a. Provide all system accessories including: corners, end caps, endwall flashing splice plates, T-intersections, etc. to be fabricated by the manufacturer with welded seams and post-finished to match fascia finish. **NOTE: Field painting of welds is not acceptable.**

B. Provide all system accessories including: corners, end caps, endwall flashing splice plates, T-intersections, etc. to be fabricated by the manufacturer with welded seams and post-finished to match fascia finish. **NOTE: Field painting of welds is not acceptable.**

2.4 MATERIALS

A. Aluminum Sheet: ASTM B 209 (ASTM B 209M), alloy as standard with manufacturer for finish required, with temper to suit forming operations and performance required.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), alloy and temper recommended by manufacturer for type of use and finish indicated, finished as follows:

C. Stainless-Steel Sheet: ASTM A 240/A 240M or ASTM A 666, Type 304.

2.5 MISCELLANEOUS MATERIALS

A. Fasteners: Manufacturer's recommended fasteners, suitable for application and designed to meet performance requirements. Furnish the following unless otherwise indicated:

1. Exposed Penetrating Fasteners: Gasketed screws with hex washer heads matching color of sheet metal.
2. Fasteners for Aluminum: Aluminum or Series 300 stainless steel.
3. Fasteners for Stainless-Steel Sheet: Series 300 stainless steel.

B. Bituminous Coating: Cold-applied asphalt emulsion complying with ASTM D 1187/D 1187M.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

D. Coil-Coated Aluminum Sheet Finishes:

1. High-Performance Organic Finish: Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.

a. Two-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
b. Three-Coat Fluoropolymer: AAMA 2605. Fluoropolymer finish containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
c. Two-Coat Mica Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended mica flakes containing not less than 70 percent PVDF resin by weight in color coat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
d. Three-Coat Metallic Fluoropolymer: AAMA 2605. Fluoropolymer finish with suspended metallic flakes containing not less than 70 percent PVDF resin by weight in both color coat and clear topcoat. Prepare, pretreat, and apply coating to exposed metal surfaces to comply with coating and resin manufacturers' written instructions.
e. Concealed Surface Finish: Apply pretreatment and manufacturer's standard acrylic or polyester backer finish consisting of prime coat and wash coat with a minimum total dry film thickness of 0.5 mil

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions, and other conditions affecting performance of the Work.

B. Examine walls, roof edges, and parapets for suitable conditions for roof specialties.

C. Verify that substrate is sound, dry, smooth, clean, sloped for drainage where applicable, and securely anchored.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Install roof specialties according to manufacturer's written instructions and SMACNA Architectural Sheet Metal Manual. Anchor roof specialties securely in place, with provisions for thermal and structural movement. Use fasteners, solder, protective coatings, separators, underlayments, sealants, and other miscellaneous items as required to complete roof-specialty systems.

1. Install roof specialties level, plumb, true to line and elevation; with limited oil-canning and without warping, jogs in alignment, buckling, or tool marks.
2. Provide uniform, neat seams with minimum exposure of solder and sealant.
3. Install roof specialties to fit substrates and to result in weathertight performance. Verify shapes and dimensions of surfaces to be covered before manufacture.
4. Torch cutting of roof specialties is not permitted.
5. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Protect metals against galvanic action by separating dissimilar metals from contact with each other or with corrosive substrates by painting contact surfaces with bituminous coating or by other permanent separation as recommended by manufacturer.

1. Coat concealed side of uncoated aluminum roof specialties with bituminous coating where in contact with wood, ferrous metal, or cementitious construction.
2. Bed flanges in thick coat of asphalt roofing cement where required by manufacturers of roof specialties for waterproof performance.

C. Fastener Sizes: Use fasteners of sizes that penetrate wood blocking or sheathing not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

D. Seal concealed joints with butyl sealant as required by roofing-specialty manufacturer.

E. Seal joints as required for weathertight construction. Place sealant to be completely concealed in joint. Do not install sealants at temperatures below 40 deg F.

3.3 COPING INSTALLATION

A. Install cleats, anchor plates, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor copings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

1. Interlock face and back leg drip edges of snap-on coping cap into cleated anchor plates anchored to substrate at manufacturer's required spacing that meets performance requirements.
2. For all vertical copings interlock face-leg drip edge into continuous cleat anchored to substrate at manufacturer's required spacing that meets performance requirements. Anchor back leg of coping with screw fasteners and elastomeric washers at manufacturer's required spacing that meets performance requirements.

3.4 INSTALLATION OF ROOF-EDGE SPECIALITIES

A. Install cleats, cants, and other anchoring and attachment accessories and devices with concealed fasteners.

B. Anchor roof edgings with manufacturer's required devices, fasteners, and fastener spacing to meet performance requirements.

3.5 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 and sealants.

C. Remove temporary protective coverings and strippable films as roof specialties are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain roof specialties in a clean condition during construction.

D. Replace roof specialties that have been damaged or that cannot be successfully repaired by finish touchup or similar minor repair procedures.

END OF SECTION 07 71 00

SECTION 07 92 00 - JOINT SEALANTS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 00 and 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes joint sealants for the following applications, including those specified by reference to this Section:

1. Exterior joints in the following vertical surfaces and horizontal nontraffic surfaces:

a. Metal to metal joints including sheet metal flashing and trim and roof coping systems.
b. Other exterior joints and conditions indicated.

1.3 PERFORMANCE REQUIREMENTS

A. Provide elastomeric joint sealants that establish and maintain watertight and airtight continuous joint seals without staining or deteriorating joint substrates.

1.4 SUBMITTALS

A. Product Data: For each joint-sealant product indicated.

B. Samples for Initial Selection: Manufacturer's color charts consisting of strips of cured sealants showing the full range of standard and standard/custom 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. Product Certificates: For each type of joint sealant and accessory, signed by product manufacturer.

E. SWRI Validation Certificate: For each elastomeric sealant specified to be validated by SWRI's Sealant Validation Program.

F. Qualification Data: For Installer.

G. Preconstruction Field Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on preconstruction testing specified in "Quality Assurance" Article.

H. Compatibility and Adhesion Test Reports: From sealant manufacturer, indicating the following:

1. Materials forming joint substrates and joint-sealant backings have been tested for compatibility and adhesion with joint sealants.
2. Interpretation of test results and written recommendations for primers and substrate preparation needed for adhesion.

I. Product Test Reports: Based on comprehensive testing of product formulations performed by a qualified testing agency, indicating that sealants comply with requirements.

J. Warranties: Special warranties specified in this Section.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized Installer who is approved or licensed for installation of elastomeric sealants required for this Project.

B. Source Limitations: Obtain each type of joint sealant through one source from a single manufacturer.

C. Preconstruction Field-Adhesion Testing: Before installing elastomeric 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 application indicated below:

    a. Each type of elastomeric sealant and joint substrate indicated.
    b. Each type of nonelastomeric sealant and joint substrate indicated.

3. Notify Architect seven days in advance of dates and times when test joints will be erected.
4. Arrange for tests to take place with joint-sealant manufacturer's technical representative present.

    a. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193.

        1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant in joint connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each type of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

D. Mockups: Build mockups incorporating sealant joints, as follows, to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution:

1. Joints in mockups of assemblies specified in other Sections that are indicated to receive elastomeric joint sealants, which are specified by reference to this Section.

E. Preinstallation Conference: Conduct conference at Project site.

1.6 PROJECT CONDITIONS

A. Do not proceed with installation of joint sealants under the following conditions:

1. When ambient and substrate temperature conditions are outside limits permitted by joint-sealant manufacturer.
2. When joint substrates are wet.
3. Where joint widths are less than those allowed by joint-sealant manufacturer for applications indicated.
4. Contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Installer's standard form in which Installer agrees to repair or replace elastomeric joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which elastomeric sealant manufacturer agrees to furnish elastomeric joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Urethane Warranty Period: Five years from date of Substantial Completion.

2. Silicone Warranty Period: Twenty years from date of Substantial Completion.

C. Special warranties specified in this Article exclude deterioration or failure of elastomeric joint sealants from the following:

1. Movement of the structure resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression caused by structural settlement or errors attributable to design or construction.
2. Disintegration of joint substrates from natural causes exceeding design specifications.
3. Mechanical damage caused by individuals, tools, or other outside agents.
4. Changes in sealant appearance caused by accumulation of dirt or other atmospheric contaminants.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, products listed in other Part 2 articles.

B. Basis-of-Design Product: The design for joint sealant system is based on the products and manufacturer(s) specified. Subject to compliance with requirements, provide the named product or a comparable product.

1. All substitute products shall meet or exceed the performance criteria of the designed product. Submit, for review, a detailed side-by-side comparison showing compatibility of the substitute product with the performance and warranty criteria of the designed product.

2. Contractor to bear all costs associated with the Architects review of substituted products. The contract amount to be revised via a credit Change Order to the Owner for the associated professional fees and costs, or paid directly to the Architect by the Contractor.

2.2 MATERIALS, GENERAL

A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.

B. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range of standard and standard/custom colors.

2.3 ELASTOMERIC JOINT SEALANTS

A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

B. Stain-Test-Response Characteristics: Where elastomeric sealants are specified to be nonstaining to porous substrates, provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.

2.4 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 50, for Use NT.

1. Products: Subject to compliance with requirements, provide one of the following:

   a. Dow Corning Corporation; 795.
   b. Pecora Corporation; 895 .
   c. Tremco Incorporated; Spectrem 2.

2. Joint Locations:
   a. All metal to metal flashing lap joints per Specification Section 07 62 00-“Sheet Metal Flashing and Trim”
   b. Other metal-to metal joints as indicated.

3. Joint-Sealant Color: Non-specific at areas of embedded sealants.

2.5 JOINT-SEALANT BACKING

A. General: Provide sealant backings of material and type that are nonstaining; are compatible with joint substrates, sealants, primers, and other joint fillers; and are approved for applications indicated by sealant manufacturer based on field experience and laboratory testing.

B. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin) 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. Elastomeric Tubing Sealant Backings: Neoprene, butyl, EPDM, or silicone tubing complying with ASTM D 1056, nonabsorbent to water and gas, and capable of remaining resilient at temperatures down to minus 26 deg F. Provide products with low compression set and of size and shape to provide a secondary seal, to control sealant depth, and to otherwise contribute to optimum sealant performance.

D. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint where such adhesion would result in sealant failure. Provide self-adhesive tape where applicable.

2.6 MISCELLANEOUS MATERIALS

A. Primer: Material recommended by joint-sealant manufacturer where required for adhesion of sealant to joint substrates indicated, as determined from preconstruction joint-sealant-substrate tests and field tests.

B. Cleaners for Nonporous Surfaces: Chemical cleaners acceptable to manufacturers of sealants and sealant backing materials, free of oily residues or other substances capable of staining or harming joint substrates and adjacent nonporous surfaces in any way, and formulated to promote optimum adhesion of sealants to joint substrates.

C. Masking Tape: Nonstaining, nonabsorbent material compatible with joint sealants and surfaces adjacent to joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine joints indicated to receive joint sealants, with Installer present, for compliance with requirements for joint configuration, installation tolerances, and other conditions affecting joint-sealant performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning of Joints: Clean out joints immediately before installing joint sealants to comply with joint-sealant manufacturer's written instructions and the following requirements:

1. Remove all foreign material from joint substrates that could interfere with adhesion of joint sealant, including dust, paints (except for permanent, protective coatings tested and approved for sealant adhesion and compatibility by sealant manufacturer), old joint sealants, oil, grease, waterproofing, water repellents, water, surface dirt, and frost.

2. Clean porous joint substrate surfaces by brushing, grinding, blast cleaning, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air.

3. Clean nonporous surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants.

B. Joint Priming: Prime joint substrates, where recommended in writing by joint-sealant manufacturer,] based on preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of type indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified 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 configuration per Figure 5A in ASTM C 1193, unless otherwise indicated.
4. Provide flush joint configuration where indicated per Figure 5B in ASTM C 1193.
5. Provide recessed joint configuration of recess depth and at locations indicated per Figure 5C in ASTM C 1193.

    a. Use masking tape to protect surfaces adjacent to recessed tooled joints.

G. Installation of Preformed Joints: Install according to manufacturer's written instructions.

3.4 FIELD QUALITY CONTROL

A. Field-Adhesion Testing: Field test joint-sealant adhesion to joint substrates as follows:

1. Extent of Testing: Test completed elastomeric sealant joints as follows:
    a. Perform 1 test for each 100 feet of joint length thereafter or minimum 1 test per elevation, per substrate condition

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab in Appendix X1 in ASTM C 1193, as appropriate for type of joint-sealant application indicated.

    a. For joints with dissimilar substrates, verify adhesion to each substrate separately; do this by extending cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect joints for complete fill, for absence of voids, and for joint configuration complying with specified requirements. Record results in a field-adhesion-test log.
4. Inspect tested joints and report on the following:

    a. 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 type of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.
    b. Whether sealants filled joint cavities and are free of voids.
    c. Whether sealant dimensions and configurations comply with specified requirements.

5. 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 referencing the construction documents, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
6. 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.

B. Evaluation of Field 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. Final Inspection (**for secondary seal at roof expansion joint curb**): Arrange for preformed foam joint seal system manufacturer's technical personnel to inspect joint seal system installation on completion, prior to installation of overburden, i.e. metal expansion flashing, and submit a project specific report to Architect and Owner within 72 hours of visit.

1. Notify Architect and Owner 48 hours in advance of date and time of inspection.

3.5 CLEANING

A. Clean off excess sealant or sealant smears adjacent to joints as the Work progresses by methods and with cleaning materials approved in writing by manufacturers of joint sealants and of products in which joints occur.

3.6 PROTECTION

A. Protect joint sealants during and after curing period from contact with contaminating substances and from damage resulting from construction operations or other causes so sealants are without deterioration or damage at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, cut out and remove damaged or deteriorated joint sealants immediately so installations with repaired areas are indistinguishable from original work.

END OF SECTION 07 92 00