THEVETS

VETERANS MEMORIAL AUDITORIUM

PHASE III

PROJECT MANUAL

Northeast Collaborative Architects LLC
333 Westminster Street
Providence, RI 02903

August 12, 2013

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RHODE ISLAND CONVENTIONS CENTER AUTHORITY

Invitation for Bids
Veterans Memorial Auditorium
Phase III

The Rhode Island Convention Center Authority (the "Authority") invites bids for construction of a new stair addition, interior renovations, and site and related work at the Veterans Memorial Auditorium located at One Avenue of the Arts, Providence, Rhode Island, in accordance with plans and specifications dated August 12, 2013 ("Veterans Memorial Auditorium - Phase III").

Sealed bids must be received at the office of the Rhode Island Convention Center Authority, Dunkin' Donuts Center – Third Floor, One LaSalle Square, Providence, RI 02903, Attention: James P McCarvill, Executive Director, **not later than 11:30 AM, prevailing time, on September 24, 2013**. At that time bids will be opened and read in accordance with public bidding procedures. The award will be made to the responsive and responsible bidder who has the lowest bid price.

A bid package with the plans and specifications for submitting bids may be obtained in digital PDF format on compact disc by contacting Eileen.Smith@riccauth.com or 401.351.4295.

Every bid shall be accompanied by a bid deposit in the form of a bid bond, certified check drawn on, or a treasurer or cashiers check, issued by a responsible bank or trust company, in the amount of 5% of the bid.

Performance and payment bonds equal to 100% of the contract price with a surety company registered and licensed in the state of Rhode Island shall be required of the successful bidder. This project is subject to Chapter 37-14.1 of the Rhode Island General Laws and regulations promulgated there under, which require that 10% of the dollar value of the work performed on the project be performed by minority business enterprises. Additionally, prevailing wages on file in the Rhode Island Department of Labor, office of the Director shall be paid.

A **mandatory pre-bid conference** will be held at the Veterans Memorial Auditorium at **10:30 AM on September 11, 2013**.

This advertisement does not constitute an offer on the part of the Authority, rather, it is placed only in order to solicit bids. The Authority reserves the right to reject any and all bids for any reason.

INSTRUCTIONS TO BIDDERS

1) SECURING DOCUMENTS

Copies of the proposed Contract Documents may be obtained for bidding purposes as set forth in the Invitation to Bid.

2) BID FORM

a) Submit bids on the form prescribed herein, properly executed and with all items filled out. Do not change the wording of the Bid Form, and do not add words to the wording of the Bid Form. Unauthorized conditions, limitations, or provisions attached to the bid shall be cause for rejection of the bid. Alterations by erasure or interlineations must be explained or noted in the bid over the signature of the bidder. Bids submitted in pencil, or which do not bear an original signature in ink by an owner or authorized agent thereof, will not be accepted.

b) No telegraphic bid or telegraphic modification of bid will be considered. No bids received after the time fixed for receiving them will be considered. Late bids will be returned unopened.

c) Each bid shall be addressed to:

Rhode Island Convention Center Authority
Dunkin' Donuts Center – Third Floor
One LaSalle Square
Providence, RI 02903
Attn: James P. McCarvill, Executive Director

and shall be delivered on or before the day and hour set for opening of bids. Each bid shall be enclosed in a sealed envelope bearing the title of the Project and the name of the bidder. The title of the Project is "Veterans Memorial Auditorium – Phase III". It is the sole responsibility of each bidder to see that his bid is received on time.

d) Be sure to include in the sealed envelope the following:

i) Completed Bid Form

ii) Bid Deposit

iii) Contractor's Qualification Statement, AIA Form A3105-1986

iv) Certificate of Non-Collusion

v) MBE Certification

vi) Additionally, in accordance with the accompanying "Notice to Contractors and Vendors Bidding on Public Work Projects", the bidder shall submit for public disclosure on a CD a copy of all of its documents submitted in response to the bid invitation.

All documents submitted in response to this bid invitation are public upon opening in accordance with Section 37-2-18 of the Rhode Island General Laws, the burden being on the bidder to identify confidential and proprietary information.

3) EXAMINATION OF DRAWINGS, SPECIFICATIONS AND SITE

Before submitting a bid, each bidder shall carefully examine the Contract Documents and visit the site of the work. Each bidder shall fully inform himself prior to bidding as to existing conditions and limitations under which the Work is to be performed, and he shall include in his bid a sum to cover all costs of all items necessary to perform the Work as set forth in the proposed Contract Documents. No allowance will be made to any bidder because of lack of such examination.

Special attention is drawn to the accelerated Contract Time outlined in Summary of Work section. Prospective bidders will need to demonstrate the ability to perform on an accelerated construction schedule as outlined, and the ability to work around the Auditorium's event schedule. The Owner reserves the right to reject any bid received from a bidder who can not adequately demonstrate the ability to complete the work in the allotted time, and work around the Auditorium's event schedule.

4) WITHDRAWAL OF BIDS

Any bidder may withdraw his bid, either personally or by written request, at any time prior to the scheduled time for the opening of bids. No bidder may withdraw his bid for a period of 90 days after the date set for the opening thereof, without the written consent of the Rhode Island Convention Center Authority (the "Authority", also referred to as the "Owner" herein), and all bids shall be subject to acceptance by the Authority during this period.

5) AWARD OR REJECTION OF BIDS

a) The Contract, if awarded, will be awarded to the responsive and responsible bidder who has the lowest bid price, subject to the Owner's right to reject any or all bids for any reason and to waive informality and irregularity in the bids and the bidding .

b) The Owner reserves the right to determine the responsibility of any bidder.

c) The Authority reserves the right to cancel this bid invitation at any time prior to a contract being fully executed by the bidder and the Authority.

d) Any direct contacts made or attempted to be made by any bidder with any Authority Board member prior to the selection of the successful bidder will automatically disqualify a bidder from any further consideration.

e) In addition to any other cause for rejection of a bid, a bid may be rejected if the Bidder submitting the bid is in default or arrears under any prior or existing contract with the Authority or any other State of Rhode Island department or agency, or there is an unresolved claim between the bidder and the Authority or any other State of Rhode Island department or agency.

6) EXECUTION

a) The form of Agreement which the successful bidder, as Contractor, will be required to execute is included in this Project Manual.

b) The bidder to whom the Contract is awarded by the Owner shall, within 5 days after notice of award and receipt of Agreement forms from the Owner, sign and deliver to the Owner all required copies, along with furnishing the required Payment and Performance Bonds, the Drug Free Certificate of Compliance, and the Apprenticeship/Worker Eligibility Certification.

c) At or prior to delivery of the signed Agreement, the Contractor shall deliver to the Owner the policies of insurance or insurance certificates as required by the Contract Documents. All policies of insurance shall be approved by the Owner before the successful bidder may proceed with the Work.

7) INTERPRETATION OF CONTRACT DOCUMENTS AND ADDENDA

a) No oral interpretations will be made to any bidder as to the meaning of the specifications, including drawings. Request for interpretations shall be made in writing to the Architect.

b) If any person contemplating submitting a bid for the Work is in doubt as to the true meaning of any part of the proposed Contract Documents, or finds discrepancies in or omissions from any part of the proposed Contract Documents, he may submit to the Architect, Northeast Collaborative Architects, Inc., Attention: Mike Abbot, at the address and numbers listed in Section 011110, a written request for interpretation thereof. Any inquiry received five or more business days prior to the date fixed for opening of bids will be given consideration. Interpretations made to bidders will be in the form of an Addendum to the specifications, which will be mailed or emailed to all bidders of record.

c) The person submitting the request shall be responsible for its prompt delivery.

d) The Owner will be not responsible for any other explanations or interpretations of the proposed Contract Documents.

e) It is the responsibility of all bidders to make inquiry as to addenda issued. All addenda shall become part of the Contract and all bidders shall be bound by all addenda, whether or not received by bidder.

8) BID DEPOSIT

a) Every bid submitted for a contract shall be accompanied by a bid deposit in the form of a bid bond, or a certified check on, or a treasurer's or cashier's check issued by a responsible bank or trust company. All bid bonds must be dated within 30 days of the bid opening, and shall be valid for no less than 90 days from the bid opening date.

b) The amount of the bid deposit shall be five percent (5%) of the value of the bid.

c) A Bid Deposit shall be made payable to the "Rhode Island Convention Center Authority".

d) Return of Bid Deposits:

i) Bid Deposits of the three-lowest responsive and responsible bidders shall be returned within ten (10) days (Sundays and holidays excluded) after execution of a contract with the Contractor, and as to the successful bidder, upon issuance of appropriate payment and performance bonds. Bid Deposits of all others shall be returned within ten (10) days (Sundays and holidays excluded) after opening of bids.

ii) If the selected bidder fails to execute a contract with the Owner within five (5) days after notice of the award (Sundays and holidays excluded) along with the other items required by paragraph 6.b, the amount received as the Bid Deposit from bidder shall become property of the Owner to the extent necessary to compensate it for the additional cost incurred by the Authority by contracting with the next responsible bidder. The Bid Deposit shall, however, be returned in case of death, disability, or unforeseen circumstances affecting bidder.

9) TIME OF RECEIVING BIDS

Bids of General Bidders will be received by the Authority until **11:30 pm prevailing time, on Tuesday, September 24, 2013** at which time they will be publicly opened and read.

10) TAXES

The Authority is exempt from any federal, state, and / or municipal sales and / or excise taxes. Bidders shall propose accordingly and it shall be the responsibility of the successful bidder to obtain the appropriate tax exemption certificate(s) from the Authority for use during the course of the Project.

11) VALIDITY OF THE BIDS

Bids shall remain valid and in force unchanged for a period of ninety (90) days after the prescribed date for submission.

12) MANDATORY PRE-BID MEETING

A mandatory pre-bid meeting will be held on Wednesday, September 11, 2013 at 11:30 a.m., prevailing time, at the Veterans Memorial Auditorium, One Avenue of the Arts, Providence, Rhode Island. **Representatives of all bidders are mandated to attend**. Failure to attend will serve to disqualify the bidding General Contractor.

Summary of Significant Dates

ACTIVITY	**DATE**
Authority distributes Invitation to Bid	September 4, 2013
Mandatory Pre-Bid Conference @ 10:30 AM	September 11, 2013
Questions from Bidders due	September 17, 2013 by 2:00 pm, prevailing time
Responses to Questions Distributed to Bidders	September 19, 2013
Bids Due	September 24, 2012 by 11:30 pm, prevailing time

13) FOREIGN CORPORATIONS

Bidders are advised, that in accordance with Chapter 1.1 of Title 7 of the Rhode Island General Laws, no foreign corporation shall have the right to transact business in the state of Rhode Island until it shall have procured a certificate of authority from the Secretary of State, and the successful bidder, if a foreign corporation, must be so qualified at the time of execution of the contract.

14) PROHIBITION AGAINST CONTINGENT FEES AND GRATUITIES

By submitting a bid, bidder warrants that it has not paid, and agrees not to pay, any bonus, commission, fee, or gratuity to any employee or official of the Owner or the State of Rhode Island for the purpose of obtaining an award of the proposed contract. Bidder further warrants that no commission or other payment has been or will be received from or paid to any third party contingent on the award of this contract by the Owner, except as shall have been expressly communicated in writing to the Owner prior to acceptance of such award.

END OF SECTION

Rhode Island Convention Center Authority
Veterans Memorial Auditorium

BID FORM

Undersigned proposes to furnish all labor and materials required for the "Veterans Memorial Auditorium – Phase III", Providence, Rhode Island, in accordance with the plans and specifications prepared for the project by Northeast Collaborative Architects, Inc., 333 Westminster St, 4th Floor, Providence, Rhode Island and dated August 12, 2013, for the contract price specified below, subject to additions and deductions according to terms of specifications.

BIDDER INFORMATION

Contracting Firm: _____

Address: _____

_____

Type of Ownership: _____

President / Owner: _____

ADDENDUM RECEIVED: IF ISSUED

ADDENDUM #1 _____ DATED _____

ADDENDUM #2 _____ DATED _____

(List any additional Addenda received at the end of this form)

BID AMOUNTS:

GENERAL CONDITIONS	$_____
BONDS AND INSURANCE	$_____
DIVISION 1 – SITE WORK (Fencing)	$_____
DIVISION 2 – DEMOLITION	$_____
DIVISION 3 – CONCRETE	$_____
DIVISION 4 – MASONRY (PRECAST)	$_____
DIVISION 5 – METALS	$_____
DIVISION 6 – WOOD AND PLASTICS	$_____
DIVISION 7 – THERMAL AND MOISTURE	$_____
DIVISION 8 – OPENINGS	$_____

DIVISION 09 – FINISHES	$_____
DIVISION 10 – SPECIALTIES	$_____
DIVISION 11 – EQUIPMENT	$_____
DIVISION 12 – FURNISHINGS	$_____
DIVISION 21 – FIRE SUPPRESSION	$_____
DIVISION 22 – PLUMBING	$_____
DIVISION 23 – MECHANICAL	$_____
DIVISION 26 – ELECTRICAL	$_____
DIVISION 28 – FIRE DETECTION	$_____
OTHER _____	$_____
BID	**$**_____

(_____dollars_____cents)

BIDDER REAFFIRMS SUBMITTED BID DEPOSIT, CONTRACTOR'S QUALIFICATION STATEMENT, CERTIFICATE OF NON-COLLUSION, AND MBE CERTIFICATION.

_____
(Date)

_____
(Name of General Bidder)

By:_____
(Name of Person Signing Bid and Title)

_____

_____
(Business Address)

_____
(City and State)

_____
(Telephone Number)

END OF SECTION

Bid Bond

for the Veterans Memorial Auditorium – Phase III Project

KNOW ALL MEN BY THESE PRESENTS, that we, _____of _____as Principal, hereinafter called the Principal, and _____, a corporation duly organized under the laws of the state of _____as Surety, hereinafter called the Surety, are held and firmly bound unto the Rhode Island Convention Center Authority as Obligee, hereinafter called the Obligee, in the sum of _____Dollars (being 5% of Principal's Bid), for the payment of which sum well and truly to be made, the said Principal and the said Surety, bind ourselves, our heirs, executors, administrators, successors and assigns, jointly and severally, firmly by these presents.

WHEREAS, the Principal has submitted a bid for _____

NOW, THEREFORE, if the Obligee shall accept the bid of the Principal and the Principal shall enter into a Contract with the Obligee in accordance with the terms of such bid, and give such bond or bonds as may be specified in the bidding or Contract Documents with good and sufficient surety for the faithful performance of such Contract and for the prompt payment of labor and material furnished in the prosecution thereof, or in the event of the failure of the Principal to enter such Contract and give such bond or bonds, if the Principal shall pay to the Obligee the difference not to exceed the penalty hereof between the amount specified in said bid and such larger amount for which the Obligee may in good faith contract with another party to perform the Work covered by said bid, then this obligation shall be null and void, otherwise to remain in full force and effect.

Signed and sealed this ____ day of _____, _____.

_____
(Witness)

{ _____
(Principal) (Seal)

By:_____
(Title)

_____
(Witness)

{ _____
(Surety) (Seal)

By:_____
(Title) Attorney-in-Fact

DRAFT

AIA® Document A305™ – 1986

Contractor's Qualification Statement

The Undersigned certifies under oath that the information provided herein is true and sufficiently complete so as not to be misleading.

SUBMITTED TO: « »

ADDRESS: « »

SUBMITTED BY: « »

NAME: « »

ADDRESS: « »

PRINCIPAL OFFICE: « »

[« »] Corporation

[« »] Partnership

[« »] Individual

[« »] Joint Venture

[« »] Other « »

NAME OF PROJECT *(if applicable)*: VETERANS MEMORIAL AUDITORIUM – PHASE III

TYPE OF WORK (file separate form for each Classification of Work):

[« »] General Construction

[« »] HVAC

[« »] Electrical

[« »] Plumbing

[« »] Other (please specify) « »

§ 1. ORGANIZATION

§ 1.1 How many years has your organization been in business as a Contractor? « »

§ 1.2 How many years has your organization been in business under its present business name? « »

§ 1.2.1 Under what other or former names has your organization operated?

« »

§ 1.3 If your organization is a corporation, answer the following:

§ 1.3.1 Date of incorporation: « »

§ 1.3.2 State of incorporation: « »

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

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

This form is approved and recommended by the American Institute of Architects (AIA) and The Associated General Contractors of America (AGC) for use in evaluating the qualifications of contractors. No endorsement of the submitting party or verification of the information is made by AIA or AGC.

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User Notes: (1718104698)

§ 1.3.3 President's name: « »
§ 1.3.4 Vice-president's name(s)

« »

§ 1.3.5 Secretary's name: « »
§ 1.3.6 Treasurer's name: « »

§ 1.4 If your organization is a partnership, answer the following:
§ 1.4.1 Date of organization: « »
§ 1.4.2 Type of partnership (if applicable): « »
§ 1.4.3 Name(s) of general partner(s)

« »

§ 1.5 If your organization is individually owned, answer the following:
§ 1.5.1 Date of organization: « »
§ 1.5.2 Name of owner:

« »

§ 1.6 If the form of your organization is other than those listed above, describe it and name the principals:

« »

§ 2. LICENSING
§ 2.1 List jurisdictions and trade categories in which your organization is legally qualified to do business, and indicate registration or license numbers, if applicable.

« »

§ 2.2 List jurisdictions in which your organization's partnership or trade name is filed.

« »

§ 3. EXPERIENCE
§ 3.1 List the categories of work that your organization normally performs with its own forces.

§ 3.1.1 Does your organization have an approved Rhode Island Department of Labor apprenticeship program as to each category of such work**.**

§ 3.2 Claims and Suits. (If the answer to any of the questions below is yes, please attach details.)
§ 3.2.1 Has your organization ever failed to complete any work awarded to it?

« »

§ 3.2.2 Are there any judgments, claims, arbitration proceedings or suits pending or outstanding against your organization or its officers?

« »

§ 3.2.3 Has your organization filed any law suits or requested arbitration with regard to construction contracts within the last five years?

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«**§ 3.2.4** » State whether your organization, or any owner, stockholder, officer, director, member, partner, or principal thereof, or any subsidiary or affiliated company:

(i) has been subject to suspension or debarment by any federal, state or municipal government agency, or the subject of criminal prosecution, or convicted of a criminal offense within the previous five years. If yes, please attach details.

(ii) has had any contracts with a federal, state or municipal government agency terminated for any reason within the previous five years. If yes, please attach details.

(iii) has been fined more than $5,000 for violation(s) of Rhode Island environmental laws by the Rhode Island Department of Environmental Management within the previous five years. If yes, please attach details.

§ 3.3 Within the last five years, has any officer or principal of your organization ever been an officer or principal of another organization when it failed to complete a construction contract? (If the answer is yes, please attach details.)

« »

§ 3.4 On a separate sheet, list major construction projects your organization has in progress, giving the name of project, owner, architect, contract amount, percent complete and scheduled completion date.

« »

§ 3.4.1 State total worth of work in progress and under contract:

«**§ 3.4.2** » Based upon your answer to Sections 3.4 & 3.4.1, explain how your organization i) can timely complete the project phases within the allotted times and (ii) has ability to perform on an accelerated basis and to work around the auditorium schedule.

§ 3.5 On a separate sheet, list the major projects your organization has completed in the past five years, giving the name of project, owner, architect, contract amount, date of completion and percentage of the cost of the work performed with your own forces.

« »

§ 3.5.1 State average annual amount of construction work performed during the past five years:

« »

§ 3.6 On a separate sheet, list the construction experience and present commitments of the key individuals of your organization.

« Include resumes of Superintendants and Project Managers intended to run this project. »

§ 4. REFERENCES

§ 4.1 Trade References:

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« »

§ 4.2 Bank References:

« »

§ 4.3 Surety:

§ 4.3.1 Name of bonding company:

« »

§ 4.3.2 Name and address of agent:

« »

§ 5. FINANCING

§ 5.1 Financial Statement.

§ 5.1.1 Attach a financial statement, preferably audited, including your organization's latest balance sheet and income statement showing the following items:

Current Assets (e.g., cash, joint venture accounts, accounts receivable, notes receivable, accrued income, deposits, materials inventory and prepaid expenses);

Net Fixed Assets;

Other Assets;

Current Liabilities (e.g., accounts payable, notes payable, accrued expenses, provision for income taxes, advances, accrued salaries and accrued payroll taxes);

Other Liabilities (e.g., capital, capital stock, authorized and outstanding shares par values, earned surplus and retained earnings).

§ 5.1.2 Name and address of firm preparing attached financial statement, and date thereof:

« »

§ 5.1.3 Is the attached financial statement for the identical organization named on page one?

« »

§ 5.1.4 If not, explain the relationship and financial responsibility of the organization whose financial statement is provided (e.g., parent-subsidiary).

« »

§ 5.2 Will the organization whose financial statement is attached act as guarantor of the contract for construction?

« »

§ 6. SIGNATURE

§ 6.1 Dated at this « » day of « » « »

Name of Organization: « »

By: « »

Title: « »

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§ 6.2

« »

M « » being duly sworn deposes and says that the information provided herein is true and sufficiently complete so as not to be misleading.

Subscribed and sworn before me this « » day of « » « »

Notary Public: « »

My Commission Expires: « »

DRAFT

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RHODE ISLAND CONVENTION CENTER AUTHORITY
VETERANS MEMORIAL AUDITORIUM

CERTIFICATE OF NON-COLLUSION

State of _____)

County of _____)

_____, being first duly sworn, deposes and says that:

(1) He is _____ of _____, the Bidder that has submitted the accompanying Bid;

(2) He is fully informed respecting the preparation and contents of the accompanying Bid and of all pertinent circumstances respecting such a Bid;

(3) Such a Bid is genuine and is not a collusive or sham Bid.

(4) Neither the Bidder nor any of its officers, partners, owners, agents, representatives, employees, or parties in interest, including this affiant, has in any way colluded, conspired, connived, or agreed, directly or indirectly with any other Bidder, firm, or person to submit a collusive or sham Bid in connection with the Contract for which the accompanying Bid has been submitted or to refrain from bidding in connection with such Contract, or has in any manner, directly or indirectly, sought by agreement or collusion or communication or conference with any other Bidder, firm, or person to fix the price or prices in the accompanying Bid or of any other Bidder, or to fix any overhead, profit, or cost element of the Bid price or the Bid price of any other Bidder, or to secure through any collusion, conspiracy, connivance or unlawful agreement any advantage against the the Rhode Island Convention Center Authority or any person interested in the proposed Contract; and

(5) The price or prices quoted in the accompanying Bid are fair and proper and are not tainted by any collusion, conspiracy, connivance or unlawful agreement on the part of the Bidder or any of its agents, representatives, owners, employees, or parties in interest.

Signed _____

Subscribed and sworn before me this _____ day of _____, 19

_____
Notary Public My Commission expires:_____

RHODE ISLAND CONVENTION CENTER AUTHORITY
VETERANS MEMORIAL AUDITORIUM – PHASE III

APPRENTICESHIP/WORKER ELIGIBILITY CERTIFICATION

_____ ("Contractor"), the prospective general contractor on the above project (the "Project"), hereby acknowledges and confirms to the Rhode Island Convention Center Authority (the "Authority"), that:

a) Contractor has been advised by the Authority that under the contract documents for the Project, the general contractor (for work performed by it) and each of its subcontractors are required to comply with Rhode Island General Laws Section 37-13-3.1 concerning apprenticeships on the Project.

b) Contractor does not intend to perform any trade work on the Project other than _____, for which it has and will maintain throughout such work an approved Department of Labor apprenticeship program. All other trade work will be performed through subcontractors. There is no apprenticeship program applicable to Contractor's supervisory personnel and services.

c) The applicable requirements of Rhode Island General Laws Section 37-13-3.1 for apprenticeship shall be incorporated by reference into Contractor's subcontracts with each subcontractor on the Project.

d) The number of apprentices for the applicable work shall comply with the apprentice to journeyman ratio for each trade as approved by the Apprenticeship Council of the Department of Labor. Where subcontractors are required to provide apprentices, the subcontractors shall be properly registered and/or certified by the Rhode Island Department of Labor and Training throughout their respective work on the Project.

e) Before each trade covered by Rhode Island General Laws Section 37-13-3.1 performs work at the project, Contractor will provide the Authority with satisfactory evidence of the entity performing the trade will be in compliance with the requirements of the section, including the entities certifying to such compliance.

f) As part of Contractor's and the subcontract requirements, Subcontractors will be asked to provide the apprentice/journeyman status for each trade worker on the certified payroll forms.

h) Each of Contractor's employees on the Project must be authorized to work in the United States and Contractor will require in its subcontracts with all subcontactors that each of their employees on the Project must be authorized to work in the United States.

g) Contractor acknowledges that failure to comply with the above is grounds for termination.

_____
(Name of Contractor)

By_____

Its_____

Dated:

RHODE ISLAND CONVENTION CENTER AUTHORITY
VETERANS MEMORIAL AUDITORIUM – PHASE III

MBE CERTIFICATION

The undersigned, a bidder on the above renovation project, hereby acknowledges to the Rhode Island Convention Center Authority, the undersigned's obligations to meet the 10% minority business enterprise requirement of Chapter 37-14.1 of the Rhode Island General Laws, and the regulations promulgated thereunder, if the undersigned is the successful bidder on the project.

Additionally, if the undersigned is the successful bidder, it shall, within ten working days, prepare a MBE Compliance Plan and submit it to the Director of Administration or his designee for approval. The Plan shall identify by MBE name, subcontract dollar amount, and type each subcontract that the undersigned anticipates will be awarded to MBE's over the period of the project.

Additionally, the undersigned certifies that it is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the project.

_____
(Date)

_____
(Name of General Bidder)

By:_____
(Name of Person Signing Bid and Title)

_____
(Business Address)

_____
(City and State)

CS-387 d
3/89

Drug-Free Workplace Policy

Contractor Certificate of Compliance

The undersigned contractor doing business with the Rhode Island Convention Center Authority at the Veterans Memorial Auditorium (a State of Rhode Island owned building) hereby acknowledges that it has received a copy of the State's policy regarding the maintenance of a **drug free workplace**. The undersigned has been informed that the unlawful manufacture, distribution, dispensation, possession or use of a controlled substance (to include but not limited to such drugs as marijuana, heroin, cocaine, PCP, and crack, and may also include legal drugs which may be prescribed by a licensed physician if they are abused), is prohibited on the State's premises or while conducting state business. The undersigned acknowledges that its employees must report for work in a fit condition to perform their duties.

As a condition for contracting with the Authority, as a result of the Executive Order No. 91-14, the undersigned will require its employees to abide by the State's policy. Further, the undersigned recognizes that any violation of this policy may result in termination of the contract.

_____

_____ _____
Contractor Date

END OF SECTION

State of Rhode Island Department of Administration
Division of Purchases

REVISED
December 7, 2012

NOTICE TO CONTRACTORS AND VENDORS BIDDING ON PUBLIC WORKS PROJECTS

Effective **January 1, 2013** all Public Works related project proposals exceeding Five Hundred Thousand ($500,000) dollars are required to include a "public copy." All agency contract solicitations, requests for proposals, invitations for bids, etc. shall state that any bid or proposal that exceeds Five Hundred Thousand ($500,000) dollars must include a copy to be available for public inspection upon the opening of the bids. Any bid or proposal in excess of Five Hundred Thousand ($500,000) dollars which does not include a copy for public inspection shall be deemed to be non-responsive. Additionally, proposals submitted for a Master Price Agreement, when the total amount potentially may exceed Five Hundred Thousand ($500,000) and the solicitation expressly requires any or all vendors to submit a public copy, must include a copy to be available for public inspection.

For further information, please see R.I. Gen. Laws Section 37-2-18(j) and State Procurement Regulations at www.purchasing.ri.gov. This requirement applies to all public works projects (vertical and horizontal) exceeding Five Hundred Thousand ($500,000) dollars and any combination of base bid plus all alternates.

In accordance to the State Procurement Regulations that became effective January 2, 2012 the following conditions are required:

1. All bid proposals shall be opened publicly and read aloud.
2. Each bid, together with the name of the bidder, shall be recorded and an abstract made available "immediately" for public inspection.

3. Copy of the redacted bid proposal shall be available for public inspection by the close of the business the day the subject bid(s) and/or contract(s) is opened by the Division of Purchases.

4. The burden to identify and withhold from the public copy that is released at the bid opening any trade secrets, commercial or financial information, or other information the bidder deems not subject to public disclosure pursuant to Chapter 38-2, the Access to Public Records Act, shall rest solely and exclusively with the bidder submitting the bid proposal.

5. At the time that a proposal is submitted, a bidder must submit a redacted copy of the bid proposal in a PDF (Portable Document File) file format on a read only CD-R Media Disk (hereinafter referred to as a "CD"). Vendors are required to provide all documents submitted in response to the bid solicitation on the CD.
    a. The acceptable media is a CD-R. Media that is read/writable (CD RW) will not be accepted.
    b. Only readable, not writeable media is acceptable.
    c. Vendor is responsible for supplying their own CD-R media.
    d. Vendor is responsible for the integrity of the CD.

6. Failure of the bidder to submit a public copy on a readable CD, as required by RIGL 37-2-18 as amended, shall result in the disqualification of said bid.

7. CD must be enclosed in a protective cover and the protective cover clearly labeled with the following:
    a. Marked "Public Copy"
    b. Title of Solicitation as it appears on the RIVIP cover letter.
    c. Name of Company and Vendor ID as it appears on the RIVIP cover letter.
    d. Bid Response Number as it appears on the RIVIP cover letter.
    e. Date of Bid as it appears on the RIVIP cover letter.
8. Bid response on CD-R to be in a PDF (Portable Document Format).
    a. One PDF file will be on the CD-R. File to meet the following requirements:
        i. Only one file will contain all documents in response to the bid. If you have more than one document for the response, the documents must be concatenated or merged into one PDF document. Failure to submit only one PDF file may result in disqualification of bid.
        ii. File should be named in the following manner:
            1. BidNumber_DateofBid_VendorName_VendorID.pdf. Where:
                1. Bid Number is the bid number for which the response is for as it appears on the RIVIP cover sheet.
                2. Dateofbid is date of bid using the format (mm-dd-yyyy).
                3. VendorName is the name of the vendor as one word – no spaces or punctuation.
                4. Vendor ID as it appears on the RIVIP vendor cover sheet.

Note: you must use underscores in separating the fields. Do not use underscores anywhere else in the filename other than to separate the fields.

Example: 1234567_06-01-2011_Vendor1_9876.pdf

9. Purchasing staff will officially conclude the bid opening and all loaded proposals will be posted to the Purchasing web site. All proposals will be available immediately after bid opening www.purchasing.ri.gov .

For technical assistance, contact the Division of Purchases office at 574-8100.

DRAFT

AIA® Document A101™ – 2007

Standard Form of Agreement Between Owner and Contractor
where the basis of payment is a Stipulated Sum

AGREEMENT made as of the day of in the year 2013
(In words, indicate day, month and year.)

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

Rhode Island Convention Center Authority
Dunkin' Donuts Center – Third Floor
One LaSalle Square
Providence, RI 02903

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

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

Veterans Memorial Auditorium - Phase III

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

Northeast Collaborative Architects, LLC
333 Westminster Street
Providence, RI 02903

The Owner and Contractor agree as follows.

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

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

AIA Document A201™–2007, General Conditions of the Contract for Construction, is adopted in this document by reference. Do not use with other general conditions unless this document is modified.

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TABLE OF ARTICLES

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2 THE WORK OF THIS CONTRACT

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10 INSURANCE AND BONDS

ARTICLE 1 THE CONTRACT DOCUMENTS

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

ARTICLE 2 THE WORK OF THIS CONTRACT

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

ARTICLE 3 DATE OF COMMENCEMENT AND SUBSTANTIAL COMPLETION

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

« »

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

N/A

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

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

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Portion of Work	Substantial Completion Date
All work except auditorium repair & painting	February 28, 2014
Auditorium repair & painting	August 31, 2011

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

Liquidated damages shall be as stipulated in Exhibit "A".

ARTICLE 4 CONTRACT SUM

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

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

N/A

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

Item	Units and Limitations	Price Per Unit ($0.00)
N/A		

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

Item	Price

ARTICLE 5 PAYMENTS

§ 5.1 PROGRESS PAYMENTS

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

§ 5.1.2 The period covered by each Application for Payment shall be one calendar month ending on the last day of the month.

§ 5.1.3 Provided that an Application for Payment is received by the Architect not later than the 5th day of a month, the Owner shall make payment of the certified amount to the Contractor not later than the 15th day of the next month. If an Application for Payment is received by the Architect after the application date fixed above, payment shall be made by the Owner not later than (30) days after the Architect receives the Application for Payment.
(Federal, state or local laws may require payment within a certain period of time.)

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

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

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

.1 Take that portion of the Contract Sum properly allocable to completed Work as determined by multiplying the percentage completion of each portion of the Work by the share of the Contract Sum allocated to that portion of the Work in the schedule of values, less retainage of ten percent (10 %). Pending final determination of cost to the Owner of changes in the Work, amounts not in dispute shall be included as provided in Section 7.3.9 of AIA Document A201™–2007, General Conditions of the Contract for Construction;

.2 Add that portion of the Contract Sum properly allocable to materials and equipment delivered and suitably stored at the site for subsequent incorporation in the completed construction (or, if approved in advance by the Owner, suitably stored off the site at a location agreed upon in writing), less retainage of five percent (5 %);

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

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

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

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

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

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

N/A

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

§ 5.2 FINAL PAYMENT

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

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

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

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

ARTICLE 6 DISPUTE RESOLUTION

§ 6.1 INITIAL DECISION MAKER

The Architect will serve as Initial Decision Maker pursuant to Section 15.2 of AIA Document A201–2007, unless the parties appoint below another individual, not a party to this Agreement, to serve as Initial Decision Maker.

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(If the parties mutually agree, insert the name, address and other contact information of the Initial Decision Maker, if other than the Architect.)

§ 6.2 BINDING DISPUTE RESOLUTION

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

[X] Arbitration pursuant to Section 15.4 of AIA Document A201–2007

[ ] Litigation in a court of competent jurisdiction

[ ] Other *(Specify)*

ARTICLE 7 TERMINATION OR SUSPENSION

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

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

ARTICLE 8 MISCELLANEOUS PROVISIONS

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

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

Betty Sullivan, Director of Financial Operations
Rhode Island Convention Center Authority
Dunkin' Donuts Center – Third Floor
One LaSalle Square
Providence, RI 02903
V: 401.351.4295

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

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

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§ 8.5 Other provisions:

See Exhibit "A", attached.

ARTICLE 9 ENUMERATION OF CONTRACT DOCUMENTS

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

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

§ 9.1.2 The General Conditions are AIA Document A201–2007, General Conditions of the Contract for Construction.

§ 9.1.3 The Supplementary and other Conditions of the Contract:

Document	Title	Date	Pages
Section 007300	Supplemental Conditions	8.12.2013	1 - 15

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

The entire Project Manual, dated 8.12.2013.

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

Number	Title	Date
Section 000115	Drawing Index	8.12.3013

§ 9.1.6 The Addenda, if any:

Number	Date	Pages

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

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

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

Exhibit "A".

ARTICLE 10 INSURANCE AND BONDS

The Contractor shall purchase and maintain insurance and provide bonds as set forth in Article 11 of AIA Document A201–2007.
(State bonding requirements, if any, and limits of liability for insurance required in Article 11 of AIA Document A201–2007.)

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Type of insurance or bond	Limit of liability or bond amount ($0.00)
Performance Bond Labor & Material Bond	

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

OWNER *(Signature)*	**CONTRACTOR** *(Signature)*
James P. McCarvill, Executive Director	
(Printed name and title)	*(Printed name and title)*

DRAFT

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EXHIBIT A

to AIA Document A101 – 2007

Standard Form of Agreement between Owner and Contractor where the basis of payment is a Stipulated Sum for the Veterans Memorial Auditorium - Phase III Project

The following provisions shall be added to the Agreement and the terms used herein shall have the same meaning as in the Agreement and the General Conditions.

ARTICLE 11. NO LIENS

The Veterans Memorial Auditorium is owned by the state of Rhode Island, and as such, pursuant to Section 34-28-31 of the Rhode Island General Laws, mechanic liens may not be placed against the building. Contractor shall so inform all its subcontractors and vendors.

ARTICLE 12. MISCELLANEOUS

§ 12. 1 *Domestic Steel*. All steel products used or supplied in the Project by the Contractor, its subcontractors or vendors, shall be in compliance with the "Steel Products Procurement Act", Chapter 2.1 of Title 37 of the Rhode Island General Laws.

§ 12.2 *OSHA*. Contractor shall comply with Chapter 20 of Title 28 of the Rhode Island General Laws as well as Chapter 23 of Title 37 as to Safety Awareness, and shall have a competent person, as required under the Occupational Safety and Health Act ("OSHA"), onsite at all pertinent times to inspect and supervise the performance of the Work with regards to OSHA regulations.

§ 12.3 *Prevailing Wages.* Contractor shall comply with Chapter 13 of Title 37 of the Rhode Island General Laws, in particular, but not in limitation thereof, the prevailing wage sections of the chapter and Sections 37-13-5, 37-13-6 and 37-13-7, and applicable regulatory requirements. Prevailing wage rates are posted online in the information section of the Rhode Island Vendor Information Program of the Rhode Island Division of Purchasing.

§ 12.4 *Apprenticeship.* Contractor shall comply with the apprenticeship requirements of Rhode Island General Laws Section 37-13-3.1. At the time of the execution of this Agreement, Contractor shall execute an Apprenticeship/Worker Eligibility Certification. The number of apprentices shall comply with the apprentice to journeyman ratio for each trade approved by the apprenticeship council of the Department of Labor and Training. Contractor shall be responsible for requiring that all subcontractors certify their compliance with Section 37-13-3.1 prior to allowing the subcontractor to commence work on the Project. Contractor shall submit the subcontractor's compliance certification to the Architect.

§ 12.5 *Sprinkler Inspection and Hot Work.* Contractor shall comply with the practices of the State of Rhode Island's insurance carrier for sprinkler impairment and hot work. Prior to performing any work, Contractor shall obtain the necessary information for compliance from the Risk Management Office at the Department of Administration.

ARTICLE 13 MBE COMPLIANCE/DISABILITY

§ 13.1 *MBE.* Contractor agrees to ensure that minority business enterprises as defined in Rhode Island General Laws Section 37-14.1-3, shall have the maximum opportunity to participate in the performance of subcontracts performed under this Agreement. Contractor will take all reasonable steps in accordance with regulations promulgated under Chapter14.1 of Title 37 of the Rhode Island General Laws to ensure that minority business enterprises have the maximum opportunity to compete for and perform subcontracts under this Agreement, and shall comply with Contractor's MBE Certification for the Project.

§ 13.2 *Disability.* Contractor shall comply with the Disability Business Enterprises Act, Chapter 2.2 of Title 37 of the Rhode Island General Laws.

ARTICLE 14. EQUAL OPPORTUNITY COMPLIANCE, HANDICAPPED ACCESS AND AFFIRMATIVE ACTION.

Contractor shall comply with and demonstrate the same commitment to equal opportunity as prevails under federal contracts controlled by Federal Executive Orders 11346, 11625, 11375 and 11830, and Chapter 5.2 of Title 28 of the General Laws of Rhode Island. Affirmative action plans shall be submitted by the Contractor for review by the State Equal Opportunity Office.

ARTICLE 15 THIRD-PARTY BENEFICIARY

The State of Rhode Island is a disclosed third-party beneficiary of this Agreement and shall have all rights hereunder entitled such a party.

ARTICLE 15 LIQUIDATED DAMAGES

Contractor shall be liable for liquidated damages in the amount of $1,000 per day for each day of delay in achieving Substantial Completion past the date set forth in Section 3.3 of this Agreement, plus any extensions authorized under the General Conditions.

AIA® Document A312™ – 2010

Performance Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Blank Doc's 2010

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 16

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Performance Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner for the performance of the Construction Contract, which is incorporated herein by reference.

§ 2 If the Contractor performs the Construction Contract, the Surety and the Contractor shall have no obligation under this Bond, except when applicable to participate in a conference as provided in Section 3.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation under this Bond shall arise after

- **.1** the Owner first provides notice to the Contractor and the Surety that the Owner is considering declaring a Contractor Default. Such notice shall indicate whether the Owner is requesting a conference among the Owner, Contractor and Surety to discuss the Contractor's performance. If the Owner does not request a conference, the Surety may, within five (5) business days after receipt of the Owner's notice, request such a conference. If the Surety timely requests a conference, the Owner shall attend. Unless the Owner agrees otherwise, any conference requested under this Section 3.1 shall be held within ten (10) business days of the Surety's receipt of the Owner's notice. If the Owner, the Contractor and the Surety agree, the Contractor shall be allowed a reasonable time to perform the Construction Contract, but such an agreement shall not waive the Owner's right, if any, subsequently to declare a Contractor Default;
- **.2** the Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and
- **.3** the Owner has agreed to pay the Balance of the Contract Price in accordance with the terms of the Construction Contract to the Surety or to a contractor selected to perform the Construction Contract.

§ 4 Failure on the part of the Owner to comply with the notice requirement in Section 3.1 shall not constitute a failure to comply with a condition precedent to the Surety's obligations, or release the Surety from its obligations, except to the extent the Surety demonstrates actual prejudice.

§ 5 When the Owner has satisfied the conditions of Section 3, the Surety shall promptly and at the Surety's expense take one of the following actions:

§ 5.1 Arrange for the Contractor, with the consent of the Owner, to perform and complete the Construction Contract;

§ 5.2 Undertake to perform and complete the Construction Contract itself, through its agents or independent contractors;

§ 5.3 Obtain bids or negotiated proposals from qualified contractors acceptable to the Owner for a contract for performance and completion of the Construction Contract, arrange for a contract to be prepared for execution by the Owner and a contractor selected with the Owner's concurrence, to be secured with performance and payment bonds executed by a qualified surety equivalent to the bonds issued on the Construction Contract, and pay to the Owner the amount of damages as described in Section 7 in excess of the Balance of the Contract Price incurred by the Owner as a result of the Contractor Default; or

§ 5.4 Waive its right to perform and complete, arrange for completion, or obtain a new contractor and with reasonable promptness under the circumstances:

- **.1** After investigation, determine the amount for which it may be liable to the Owner and, as soon as practicable after the amount is determined, make payment to the Owner; or
- **.2** Deny liability in whole or in part and notify the Owner, citing the reasons for denial.

§ 6 If the Surety does not proceed as provided in Section 5 with reasonable promptness, the Surety shall be deemed to be in default on this Bond seven days after receipt of an additional written notice from the Owner to the Surety demanding that the Surety perform its obligations under this Bond, and the Owner shall be entitled to enforce any remedy available to the Owner. If the Surety proceeds as provided in Section 5.4, and the Owner refuses the payment or the Surety has denied liability, in whole or in part, without further notice the Owner shall be entitled to enforce any remedy available to the Owner.

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§ 7 If the Surety elects to act under Section 5.1, 5.2 or 5.3, then the responsibilities of the Surety to the Owner shall not be greater than those of the Contractor under the Construction Contract, and the responsibilities of the Owner to the Surety shall not be greater than those of the Owner under the Construction Contract. Subject to the commitment by the Owner to pay the Balance of the Contract Price, the Surety is obligated, without duplication, for

- **.1** the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;
- **.2** additional legal, design professional and delay costs resulting from the Contractor's Default, and resulting from the actions or failure to act of the Surety under Section 5; and
- **.3** liquidated damages, or if no liquidated damages are specified in the Construction Contract, actual damages caused by delayed performance or non-performance of the Contractor.

§ 8 If the Surety elects to act under Section 5.1, 5.3 or 5.4, the Surety's liability is limited to the amount of this Bond.

§ 9 The Surety shall not be liable to the Owner or others for obligations of the Contractor that are unrelated to the Construction Contract, and the Balance of the Contract Price shall not be reduced or set off on account of any such unrelated obligations. No right of action shall accrue on this Bond to any person or entity other than the Owner or its heirs, executors, administrators, successors and assigns.

§ 10 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 11 Any proceeding, legal or equitable, under this Bond may be instituted in any court of competent jurisdiction in the location in which the work or part of the work is located and shall be instituted within two years after a declaration of Contractor Default or within two years after the Contractor ceased working or within two years after the Surety refuses or fails to perform its obligations under this Bond, whichever occurs first. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 12 Notice to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears.

§ 13 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 14 Definitions

§ 14.1 Balance of the Contract Price. The total amount payable by the Owner to the Contractor under the Construction Contract after all proper adjustments have been made, including allowance to the Contractor of any amounts received or to be received by the Owner in settlement of insurance or other claims for damages to which the Contractor is entitled, reduced by all valid and proper payments made to or on behalf of the Contractor under the Construction Contract.

§ 14.2 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and changes made to the agreement and the Contract Documents.

§ 14.3 Contractor Default. Failure of the Contractor, which has not been remedied or waived, to perform or otherwise to comply with a material term of the Construction Contract.

§ 14.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 14.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

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§ 15 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 16 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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Additions and Deletions Report for

AIA® Document A312™ – 2010

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

Note: This Additions and Deletions Report is provided for information purposes only and is not incorporated into or constitute any part of the associated AIA document. This Additions and Deletions Report and its associated document were generated simultaneously by AIA software at 10:53:00 on 08/18/2010.

PAGE 1

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Raymond A. Giolitto, AIA, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:53:00 on 08/18/2010 under Order No. 2393910186_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A312™ – 2010, Performance Bond, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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AIA® Document A312™ – 2010

Payment Bond

CONTRACTOR:
(Name, legal status and address)

SURETY:
(Name, legal status and principal place of business)

OWNER:
(Name, legal status and address)

CONSTRUCTION CONTRACT
Date:
Amount: $
Description:
(Name and location)
Blank Doc's 2010

BOND
Date:
(Not earlier than Construction Contract Date)

Amount: $
Modifications to this Bond: ☐ None ☐ See Section 18

CONTRACTOR AS PRINCIPAL
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

SURETY
Company: *(Corporate Seal)*

Signature: _____
Name and Title:

(Any additional signatures appear on the last page of this Payment Bond.)

(FOR INFORMATION ONLY — Name, address and telephone)
AGENT or **BROKER:**

OWNER'S REPRESENTATIVE:
(Architect, Engineer or other party:)

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

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

Any singular reference to Contractor, Surety, Owner or other party shall be considered plural where applicable.

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User Notes:

(1147824439)

§ 1 The Contractor and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors and assigns to the Owner to pay for labor, materials and equipment furnished for use in the performance of the Construction Contract, which is incorporated herein by reference, subject to the following terms.

§ 2 If the Contractor promptly makes payment of all sums due to Claimants, and defends, indemnifies and holds harmless the Owner from claims, demands, liens or suits by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract, then the Surety and the Contractor shall have no obligation under this Bond.

§ 3 If there is no Owner Default under the Construction Contract, the Surety's obligation to the Owner under this Bond shall arise after the Owner has promptly notified the Contractor and the Surety (at the address described in Section 13) of claims, demands, liens or suits against the Owner or the Owner's property by any person or entity seeking payment for labor, materials or equipment furnished for use in the performance of the Construction Contract and tendered defense of such claims, demands, liens or suits to the Contractor and the Surety.

§ 4 When the Owner has satisfied the conditions in Section 3, the Surety shall promptly and at the Surety's expense defend, indemnify and hold harmless the Owner against a duly tendered claim, demand, lien or suit.

§ 5 The Surety's obligations to a Claimant under this Bond shall arise after the following:

§ 5.1 Claimants, who do not have a direct contract with the Contractor,

.1 have furnished a written notice of non-payment to the Contractor, stating with substantial accuracy the amount claimed and the name of the party to whom the materials were, or equipment was, furnished or supplied or for whom the labor was done or performed, within ninety (90) days after having last performed labor or last furnished materials or equipment included in the Claim; and

.2 have sent a Claim to the Surety (at the address described in Section 13).

§ 5.2 Claimants, who are employed by or have a direct contract with the Contractor, have sent a Claim to the Surety (at the address described in Section 13).

§ 6 If a notice of non-payment required by Section 5.1.1 is given by the Owner to the Contractor, that is sufficient to satisfy a Claimant's obligation to furnish a written notice of non-payment under Section 5.1.1.

§ 7 When a Claimant has satisfied the conditions of Sections 5.1 or 5.2, whichever is applicable, the Surety shall promptly and at the Surety's expense take the following actions:

§ 7.1 Send an answer to the Claimant, with a copy to the Owner, within sixty (60) days after receipt of the Claim, stating the amounts that are undisputed and the basis for challenging any amounts that are disputed; and

§ 7.2 Pay or arrange for payment of any undisputed amounts.

§ 7.3 The Surety's failure to discharge its obligations under Section 7.1 or Section 7.2 shall not be deemed to constitute a waiver of defenses the Surety or Contractor may have or acquire as to a Claim, except as to undisputed amounts for which the Surety and Claimant have reached agreement. If, however, the Surety fails to discharge its obligations under Section 7.1 or Section 7.2, the Surety shall indemnify the Claimant for the reasonable attorney's fees the Claimant incurs thereafter to recover any sums found to be due and owing to the Claimant.

§ 8 The Surety's total obligation shall not exceed the amount of this Bond, plus the amount of reasonable attorney's fees provided under Section 7.3, and the amount of this Bond shall be credited for any payments made in good faith by the Surety.

§ 9 Amounts owed by the Owner to the Contractor under the Construction Contract shall be used for the performance of the Construction Contract and to satisfy claims, if any, under any construction performance bond. By the Contractor furnishing and the Owner accepting this Bond, they agree that all funds earned by the Contractor in the performance of the Construction Contract are dedicated to satisfy obligations of the Contractor and Surety under this Bond, subject to the Owner's priority to use the funds for the completion of the work.

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User Notes:

(1147824439)

§ 10 The Surety shall not be liable to the Owner, Claimants or others for obligations of the Contractor that are unrelated to the Construction Contract. The Owner shall not be liable for the payment of any costs or expenses of any Claimant under this Bond, and shall have under this Bond no obligation to make payments to, or give notice on behalf of, Claimants or otherwise have any obligations to Claimants under this Bond.

§ 11 The Surety hereby waives notice of any change, including changes of time, to the Construction Contract or to related subcontracts, purchase orders and other obligations.

§ 12 No suit or action shall be commenced by a Claimant under this Bond other than in a court of competent jurisdiction in the state in which the project that is the subject of the Construction Contract is located or after the expiration of one year from the date (1) on which the Claimant sent a Claim to the Surety pursuant to Section 5.1.2 or 5.2, or (2) on which the last labor or service was performed by anyone or the last materials or equipment were furnished by anyone under the Construction Contract, whichever of (1) or (2) first occurs. If the provisions of this Paragraph are void or prohibited by law, the minimum period of limitation available to sureties as a defense in the jurisdiction of the suit shall be applicable.

§ 13 Notice and Claims to the Surety, the Owner or the Contractor shall be mailed or delivered to the address shown on the page on which their signature appears. Actual receipt of notice or Claims, however accomplished, shall be sufficient compliance as of the date received.

§ 14 When this Bond has been furnished to comply with a statutory or other legal requirement in the location where the construction was to be performed, any provision in this Bond conflicting with said statutory or legal requirement shall be deemed deleted herefrom and provisions conforming to such statutory or other legal requirement shall be deemed incorporated herein. When so furnished, the intent is that this Bond shall be construed as a statutory bond and not as a common law bond.

§ 15 Upon request by any person or entity appearing to be a potential beneficiary of this Bond, the Contractor and Owner shall promptly furnish a copy of this Bond or shall permit a copy to be made.

§ 16 Definitions

§ 16.1 Claim. A written statement by the Claimant including at a minimum:

- **.1** the name of the Claimant;
- **.2** the name of the person for whom the labor was done, or materials or equipment furnished;
- **.3** a copy of the agreement or purchase order pursuant to which labor, materials or equipment was furnished for use in the performance of the Construction Contract;
- **.4** a brief description of the labor, materials or equipment furnished;
- **.5** the date on which the Claimant last performed labor or last furnished materials or equipment for use in the performance of the Construction Contract;
- **.6** the total amount earned by the Claimant for labor, materials or equipment furnished as of the date of the Claim;
- **.7** the total amount of previous payments received by the Claimant; and
- **.8** the total amount due and unpaid to the Claimant for labor, materials or equipment furnished as of the date of the Claim.

§ 16.2 Claimant. An individual or entity having a direct contract with the Contractor or with a subcontractor of the Contractor to furnish labor, materials or equipment for use in the performance of the Construction Contract. The term Claimant also includes any individual or entity that has rightfully asserted a claim under an applicable mechanic's lien or similar statute against the real property upon which the Project is located. The intent of this Bond shall be to include without limitation in the terms "labor, materials or equipment" that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental equipment used in the Construction Contract, architectural and engineering services required for performance of the work of the Contractor and the Contractor's subcontractors, and all other items for which a mechanic's lien may be asserted in the jurisdiction where the labor, materials or equipment were furnished.

§ 16.3 Construction Contract. The agreement between the Owner and Contractor identified on the cover page, including all Contract Documents and all changes made to the agreement and the Contract Documents.

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§ 16.4 Owner Default. Failure of the Owner, which has not been remedied or waived, to pay the Contractor as required under the Construction Contract or to perform and complete or comply with the other material terms of the Construction Contract.

§ 16.5 Contract Documents. All the documents that comprise the agreement between the Owner and Contractor.

§ 17 If this Bond is issued for an agreement between a Contractor and subcontractor, the term Contractor in this Bond shall be deemed to be Subcontractor and the term Owner shall be deemed to be Contractor.

§ 18 Modifications to this bond are as follows:

(Space is provided below for additional signatures of added parties, other than those appearing on the cover page.)

CONTRACTOR AS PRINCIPAL		**SURETY**	
Company:	*(Corporate Seal)*	Company:	*(Corporate Seal)*
Signature:		Signature:	
Name and Title:		Name and Title:	
Address:		Address:	

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_____

(Signed)

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(Title)

_____

(Dated)

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AIA® Document A201™ – 2007

General Conditions of the Contract for Construction

for the following PROJECT:
(Name and location or address)

.

THE OWNER:
(Name and address)

THE ARCHITECT:
(Name and address)

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

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ARTICLE 1 GENERAL PROVISIONS

§ 1.1 BASIC DEFINITIONS

§ 1.1.1 THE CONTRACT DOCUMENTS

The Contract Documents are enumerated in the Agreement between the Owner and Contractor (hereinafter the Agreement) and consist of the Agreement, Conditions of the Contract (General, Supplementary and other Conditions), Drawings, Specifications, Addenda issued prior to execution of the Contract, other documents listed in the Agreement and Modifications issued after execution of the Contract. A Modification is (1) a written amendment to the Contract signed by both parties, (2) a Change Order, (3) a Construction Change Directive or (4) a written order for a minor change in the Work issued by the Architect. Unless specifically enumerated in the Agreement, the Contract Documents do not include the advertisement or invitation to bid, Instructions to Bidders, sample forms, other information furnished by the Owner in anticipation of receiving bids or proposals, the Contractor's bid or proposal, or portions of Addenda relating to bidding requirements.

§ 1.1.2 THE CONTRACT

The Contract Documents form the Contract for Construction. The Contract represents the entire and integrated agreement between the parties hereto and supersedes prior negotiations, representations or agreements, either written or oral. The Contract may be amended or modified only by a Modification. The Contract Documents shall not be construed to create a contractual relationship of any kind (1) between the Contractor and the Architect or the Architect's consultants, (2) between the Owner and a Subcontractor or a Sub-subcontractor, (3) between the Owner and the Architect or the Architect's consultants or (4) between any persons or entities other than the Owner and the Contractor. The Architect shall, however, be entitled to performance and enforcement of obligations under the Contract intended to facilitate performance of the Architect's duties.

§ 1.1.3 THE WORK

The term "Work" means the construction and services required by the Contract Documents, whether completed or partially completed, and includes all other labor, materials, equipment and services provided or to be provided by the Contractor to fulfill the Contractor's obligations. The Work may constitute the whole or a part of the Project.

§ 1.1.4 THE PROJECT

The Project is the total construction of which the Work performed under the Contract Documents may be the whole or a part and which may include construction by the Owner and by separate contractors.

§ 1.1.5 THE DRAWINGS

The Drawings are the graphic and pictorial portions of the Contract Documents showing the design, location and dimensions of the Work, generally including plans, elevations, sections, details, schedules and diagrams.

§ 1.1.6 THE SPECIFICATIONS

The Specifications are that portion of the Contract Documents consisting of the written requirements for materials, equipment, systems, standards and workmanship for the Work, and performance of related services.

§ 1.1.7 INSTRUMENTS OF SERVICE

Instruments of Service are representations, in any medium of expression now known or later developed, of the tangible and intangible creative work performed by the Architect and the Architect's consultants under their respective professional services agreements. Instruments of Service may include, without limitation, studies, surveys, models, sketches, drawings, specifications, and other similar materials.

§ 1.1.8 INITIAL DECISION MAKER

The Initial Decision Maker is the person identified in the Agreement to render initial decisions on Claims in accordance with Section 15.2 and certify termination of the Agreement under Section 14.2.2.

§ 1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

§ 1.2.1 The intent of the Contract Documents is to include all items necessary for the proper execution and completion of the Work by the Contractor. The Contract Documents are complementary, and what is required by one shall be as binding as if required by all; performance by the Contractor shall be required only to the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated results.

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§ 1.2.2 Organization of the Specifications into divisions, sections and articles, and arrangement of Drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

§ 1.2.3 Unless otherwise stated in the Contract Documents, words that have well-known technical or construction industry meanings are used in the Contract Documents in accordance with such recognized meanings.

§ 1.3 CAPITALIZATION

Terms capitalized in these General Conditions include those that are (1) specifically defined, (2) the titles of numbered articles or (3) the titles of other documents published by the American Institute of Architects.

§ 1.4 INTERPRETATION

In the interest of brevity the Contract Documents frequently omit modifying words such as "all" and "any" and articles such as "the" and "an," but the fact that a modifier or an article is absent from one statement and appears in another is not intended to affect the interpretation of either statement.

§ 1.5 OWNERSHIP AND USE OF DRAWINGS, SPECIFICATIONS AND OTHER INSTRUMENTS OF SERVICE

§ 1.5.1 The Architect and the Architect's consultants shall be deemed the authors and owners of their respective Instruments of Service, including the Drawings and Specifications, and will retain all common law, statutory and other reserved rights, including copyrights. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers shall not own or claim a copyright in the Instruments of Service. Submittal or distribution to meet official regulatory requirements or for other purposes in connection with this Project is not to be construed as publication in derogation of the Architect's or Architect's consultants' reserved rights.

§ 1.5.2 The Contractor, Subcontractors, Sub-subcontractors and material or equipment suppliers are authorized to use and reproduce the Instruments of Service provided to them solely and exclusively for execution of the Work. All copies made under this authorization shall bear the copyright notice, if any, shown on the Instruments of Service. The Contractor, Subcontractors, Sub-subcontractors, and material or equipment suppliers may not use the Instruments of Service on other projects or for additions to this Project outside the scope of the Work without the specific written consent of the Owner, Architect and the Architect's consultants.

§ 1.6 TRANSMISSION OF DATA IN DIGITAL FORM

If the parties intend to transmit Instruments of Service or any other information or documentation in digital form, they shall endeavor to establish necessary protocols governing such transmissions, unless otherwise already provided in the Agreement or the Contract Documents.

ARTICLE 2 OWNER

§ 2.1 GENERAL

§ 2.1.1 The Owner is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Owner shall designate in writing a representative who shall have express authority to bind the Owner with respect to all matters requiring the Owner's approval or authorization. Except as otherwise provided in Section 4.2.1, the Architect does not have such authority. The term "Owner" means the Owner or the Owner's authorized representative.

§ 2.1.2 The Owner shall furnish to the Contractor within fifteen days after receipt of a written request, information necessary and relevant for the Contractor to evaluate, give notice of or enforce mechanic's lien rights. Such information shall include a correct statement of the record legal title to the property on which the Project is located, usually referred to as the site, and the Owner's interest therein.

§ 2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

§ 2.2.1 Prior to commencement of the Work, the Contractor may request in writing that the Owner provide reasonable evidence that the Owner has made financial arrangements to fulfill the Owner's obligations under the Contract. Thereafter, the Contractor may only request such evidence if (1) the Owner fails to make payments to the Contractor as the Contract Documents require; (2) a change in the Work materially changes the Contract Sum; or (3) the Contractor identifies in writing a reasonable concern regarding the Owner's ability to make payment when due. The Owner shall furnish such evidence as a condition precedent to commencement or continuation of the Work or the

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portion of the Work affected by a material change. After the Owner furnishes the evidence, the Owner shall not materially vary such financial arrangements without prior notice to the Contractor.

§ 2.2.2 Except for permits and fees that are the responsibility of the Contractor under the Contract Documents, including those required under Section 3.7.1, the Owner shall secure and pay for necessary approvals, easements, assessments and charges required for construction, use or occupancy of permanent structures or for permanent changes in existing facilities.

§ 2.2.3 The Owner shall furnish surveys describing physical characteristics, legal limitations and utility locations for the site of the Project, and a legal description of the site. The Contractor shall be entitled to rely on the accuracy of information furnished by the Owner but shall exercise proper precautions relating to the safe performance of the Work.

§ 2.2.4 The Owner shall furnish information or services required of the Owner by the Contract Documents with reasonable promptness. The Owner shall also furnish any other information or services under the Owner's control and relevant to the Contractor's performance of the Work with reasonable promptness after receiving the Contractor's written request for such information or services.

§ 2.2.5 Unless otherwise provided in the Contract Documents, the Owner shall furnish to the Contractor one copy of the Contract Documents for purposes of making reproductions pursuant to Section 1.5.2.

§ 2.3 OWNER'S RIGHT TO STOP THE WORK

If the Contractor fails to correct Work that is not in accordance with the requirements of the Contract Documents as required by Section 12.2 or repeatedly fails to carry out Work in accordance with the Contract Documents, the Owner may issue a written order to the Contractor to stop the Work, or any portion thereof, until the cause for such order has been eliminated; however, the right of the Owner to stop the Work shall not give rise to a duty on the part of the Owner to exercise this right for the benefit of the Contractor or any other person or entity, except to the extent required by Section 6.1.3.

§ 2.4 OWNER'S RIGHT TO CARRY OUT THE WORK

If the Contractor defaults or neglects to carry out the Work in accordance with the Contract Documents and fails within a ten-day period after receipt of written notice from the Owner to commence and continue correction of such default or neglect with diligence and promptness, the Owner may, without prejudice to other remedies the Owner may have, correct such deficiencies. In such case an appropriate Change Order shall be issued deducting from payments then or thereafter due the Contractor the reasonable cost of correcting such deficiencies, including Owner's expenses and compensation for the Architect's additional services made necessary by such default, neglect or failure. Such action by the Owner and amounts charged to the Contractor are both subject to prior approval of the Architect. If payments then or thereafter due the Contractor are not sufficient to cover such amounts, the Contractor shall pay the difference to the Owner.

ARTICLE 3 CONTRACTOR

§ 3.1 GENERAL

§ 3.1.1 The Contractor is the person or entity identified as such in the Agreement and is referred to throughout the Contract Documents as if singular in number. The Contractor shall be lawfully licensed, if required in the jurisdiction where the Project is located. The Contractor shall designate in writing a representative who shall have express authority to bind the Contractor with respect to all matters under this Contract. The term "Contractor" means the Contractor or the Contractor's authorized representative.

§ 3.1.2 The Contractor shall perform the Work in accordance with the Contract Documents.

§ 3.1.3 The Contractor shall not be relieved of obligations to perform the Work in accordance with the Contract Documents either by activities or duties of the Architect in the Architect's administration of the Contract, or by tests, inspections or approvals required or performed by persons or entities other than the Contractor.

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§ 3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

§ 3.2.1 Execution of the Contract by the Contractor is a representation that the Contractor has visited the site, become generally familiar with local conditions under which the Work is to be performed and correlated personal observations with requirements of the Contract Documents.

§ 3.2.2 Because the Contract Documents are complementary, the Contractor shall, before starting each portion of the Work, carefully study and compare the various Contract Documents relative to that portion of the Work, as well as the information furnished by the Owner pursuant to Section 2.2.3, shall take field measurements of any existing conditions related to that portion of the Work, and shall observe any conditions at the site affecting it. These obligations are for the purpose of facilitating coordination and construction by the Contractor and are not for the purpose of discovering errors, omissions, or inconsistencies in the Contract Documents; however, the Contractor shall promptly report to the Architect any errors, inconsistencies or omissions discovered by or made known to the Contractor as a request for information in such form as the Architect may require. It is recognized that the Contractor's review is made in the Contractor's capacity as a contractor and not as a licensed design professional, unless otherwise specifically provided in the Contract Documents.

§ 3.2.3 The Contractor is not required to ascertain that the Contract Documents are in accordance with applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, but the Contractor shall promptly report to the Architect any nonconformity discovered by or made known to the Contractor as a request for information in such form as the Architect may require.

§ 3.2.4 If the Contractor believes that additional cost or time is involved because of clarifications or instructions the Architect issues in response to the Contractor's notices or requests for information pursuant to Sections 3.2.2 or 3.2.3, the Contractor shall make Claims as provided in Article 15. If the Contractor fails to perform the obligations of Sections 3.2.2 or 3.2.3, the Contractor shall pay such costs and damages to the Owner as would have been avoided if the Contractor had performed such obligations. If the Contractor performs those obligations, the Contractor shall not be liable to the Owner or Architect for damages resulting from errors, inconsistencies or omissions in the Contract Documents, for differences between field measurements or conditions and the Contract Documents, or for nonconformities of the Contract Documents to applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities.

§ 3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

§ 3.3.1 The Contractor shall supervise and direct the Work, using the Contractor's best skill and attention. The Contractor shall be solely responsible for, and have control over, construction means, methods, techniques, sequences and procedures and for coordinating all portions of the Work under the Contract, unless the Contract Documents give other specific instructions concerning these matters. If the Contract Documents give specific instructions concerning construction means, methods, techniques, sequences or procedures, the Contractor shall evaluate the jobsite safety thereof and, except as stated below, shall be fully and solely responsible for the jobsite safety of such means, methods, techniques, sequences or procedures. If the Contractor determines that such means, methods, techniques, sequences or procedures may not be safe, the Contractor shall give timely written notice to the Owner and Architect and shall not proceed with that portion of the Work without further written instructions from the Architect. If the Contractor is then instructed to proceed with the required means, methods, techniques, sequences or procedures without acceptance of changes proposed by the Contractor, the Owner shall be solely responsible for any loss or damage arising solely from those Owner-required means, methods, techniques, sequences or procedures.

§ 3.3.2 The Contractor shall be responsible to the Owner for acts and omissions of the Contractor's employees, Subcontractors and their agents and employees, and other persons or entities performing portions of the Work for, or on behalf of, the Contractor or any of its Subcontractors.

§ 3.3.3 The Contractor shall be responsible for inspection of portions of Work already performed to determine that such portions are in proper condition to receive subsequent Work.

§ 3.4 LABOR AND MATERIALS

§ 3.4.1 Unless otherwise provided in the Contract Documents, the Contractor shall provide and pay for labor, materials, equipment, tools, construction equipment and machinery, water, heat, utilities, transportation, and other facilities and services necessary for proper execution and completion of the Work, whether temporary or permanent and whether or not incorporated or to be incorporated in the Work.

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§ **3.4.2** Except in the case of minor changes in the Work authorized by the Architect in accordance with Sections 3.12.8 or 7.4, the Contractor may make substitutions only with the consent of the Owner, after evaluation by the Architect and in accordance with a Change Order or Construction Change Directive.

§ **3.4.3** The Contractor shall enforce strict discipline and good order among the Contractor's employees and other persons carrying out the Work. The Contractor shall not permit employment of unfit persons or persons not properly skilled in tasks assigned to them.

§ 3.5 WARRANTY

The Contractor warrants to the Owner and Architect that materials and equipment furnished under the Contract will be of good quality and new unless the Contract Documents require or permit otherwise. The Contractor further warrants that the Work will conform to the requirements of the Contract Documents and will be free from defects, except for those inherent in the quality of the Work the Contract Documents require or permit. Work, materials, or equipment not conforming to these requirements may be considered defective. The Contractor's warranty excludes remedy for damage or defect caused by abuse, alterations to the Work not executed by the Contractor, improper or insufficient maintenance, improper operation, or normal wear and tear and normal usage. If required by the Architect, the Contractor shall furnish satisfactory evidence as to the kind and quality of materials and equipment.

§ 3.6 TAXES

The Contractor shall pay sales, consumer, use and similar taxes for the Work provided by the Contractor that are legally enacted when bids are received or negotiations concluded, whether or not yet effective or merely scheduled to go into effect.

§ 3.7 PERMITS, FEES, NOTICES, AND COMPLIANCE WITH LAWS

§ **3.7.1** Unless otherwise provided in the Contract Documents, the Contractor shall secure and pay for the building permit as well as for other permits, fees, licenses, and inspections by government agencies necessary for proper execution and completion of the Work that are customarily secured after execution of the Contract and legally required at the time bids are received or negotiations concluded.

§ **3.7.2** The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities applicable to performance of the Work.

§ **3.7.3** If the Contractor performs Work knowing it to be contrary to applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of public authorities, the Contractor shall assume appropriate responsibility for such Work and shall bear the costs attributable to correction.

§ **3.7.4 Concealed or Unknown Conditions.** If the Contractor encounters conditions at the site that are (1) subsurface or otherwise concealed physical conditions that differ materially from those indicated in the Contract Documents or (2) unknown physical conditions of an unusual nature, that differ materially from those ordinarily found to exist and generally recognized as inherent in construction activities of the character provided for in the Contract Documents, the Contractor shall promptly provide notice to the Owner and the Architect before conditions are disturbed and in no event later than 21 days after first observance of the conditions. The Architect will promptly investigate such conditions and, if the Architect determines that they differ materially and cause an increase or decrease in the Contractor's cost of, or time required for, performance of any part of the Work, will recommend an equitable adjustment in the Contract Sum or Contract Time, or both. If the Architect determines that the conditions at the site are not materially different from those indicated in the Contract Documents and that no change in the terms of the Contract is justified, the Architect shall promptly notify the Owner and Contractor in writing, stating the reasons. If either party disputes the Architect's determination or recommendation, that party may proceed as provided in Article 15.

§ **3.7.5** If, in the course of the Work, the Contractor encounters human remains or recognizes the existence of burial markers, archaeological sites or wetlands not indicated in the Contract Documents, the Contractor shall immediately suspend any operations that would affect them and shall notify the Owner and Architect. Upon receipt of such notice, the Owner shall promptly take any action necessary to obtain governmental authorization required to resume the operations. The Contractor shall continue to suspend such operations until otherwise instructed by the Owner but shall continue with all other operations that do not affect those remains or features. Requests for adjustments in the Contract Sum and Contract Time arising from the existence of such remains or features may be made as provided in Article 15.

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§ 3.8 ALLOWANCES

§ 3.8.1 The Contractor shall include in the Contract Sum all allowances stated in the Contract Documents. Items covered by allowances shall be supplied for such amounts and by such persons or entities as the Owner may direct, but the Contractor shall not be required to employ persons or entities to whom the Contractor has reasonable objection.

§ 3.8.2 Unless otherwise provided in the Contract Documents,

- **.1** allowances shall cover the cost to the Contractor of materials and equipment delivered at the site and all required taxes, less applicable trade discounts;
- **.2** Contractor's costs for unloading and handling at the site, labor, installation costs, overhead, profit and other expenses contemplated for stated allowance amounts shall be included in the Contract Sum but not in the allowances; and
- **.3** whenever costs are more than or less than allowances, the Contract Sum shall be adjusted accordingly by Change Order. The amount of the Change Order shall reflect (1) the difference between actual costs and the allowances under Section 3.8.2.1 and (2) changes in Contractor's costs under Section 3.8.2.2.

§ 3.8.3 Materials and equipment under an allowance shall be selected by the Owner with reasonable promptness.

§ 3.9 SUPERINTENDENT

§ 3.9.1 The Contractor shall employ a competent superintendent and necessary assistants who shall be in attendance at the Project site during performance of the Work. The superintendent shall represent the Contractor, and communications given to the superintendent shall be as binding as if given to the Contractor.

§ 3.9.2 The Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the name and qualifications of a proposed superintendent. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to the proposed superintendent or (2) that the Architect requires additional time to review. Failure of the Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 3.9.3 The Contractor shall not employ a proposed superintendent to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not change the superintendent without the Owner's consent, which shall not unreasonably be withheld or delayed.

§ 3.10 CONTRACTOR'S CONSTRUCTION SCHEDULES

§ 3.10.1 The Contractor, promptly after being awarded the Contract, shall prepare and submit for the Owner's and Architect's information a Contractor's construction schedule for the Work. The schedule shall not exceed time limits current under the Contract Documents, shall be revised at appropriate intervals as required by the conditions of the Work and Project, shall be related to the entire Project to the extent required by the Contract Documents, and shall provide for expeditious and practicable execution of the Work.

§ 3.10.2 The Contractor shall prepare a submittal schedule, promptly after being awarded the Contract and thereafter as necessary to maintain a current submittal schedule, and shall submit the schedule(s) for the Architect's approval. The Architect's approval shall not unreasonably be delayed or withheld. The submittal schedule shall (1) be coordinated with the Contractor's construction schedule, and (2) allow the Architect reasonable time to review submittals. If the Contractor fails to submit a submittal schedule, the Contractor shall not be entitled to any increase in Contract Sum or extension of Contract Time based on the time required for review of submittals.

§ 3.10.3 The Contractor shall perform the Work in general accordance with the most recent schedules submitted to the Owner and Architect.

§ 3.11 DOCUMENTS AND SAMPLES AT THE SITE

The Contractor shall maintain at the site for the Owner one copy of the Drawings, Specifications, Addenda, Change Orders and other Modifications, in good order and marked currently to indicate field changes and selections made during construction, and one copy of approved Shop Drawings, Product Data, Samples and similar required submittals. These shall be available to the Architect and shall be delivered to the Architect for submittal to the Owner upon completion of the Work as a record of the Work as constructed.

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§ 3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

§ 3.12.1 Shop Drawings are drawings, diagrams, schedules and other data specially prepared for the Work by the Contractor or a Subcontractor, Sub-subcontractor, manufacturer, supplier or distributor to illustrate some portion of the Work.

§ 3.12.2 Product Data are illustrations, standard schedules, performance charts, instructions, brochures, diagrams and other information furnished by the Contractor to illustrate materials or equipment for some portion of the Work.

§ 3.12.3 Samples are physical examples that illustrate materials, equipment or workmanship and establish standards by which the Work will be judged.

§ 3.12.4 Shop Drawings, Product Data, Samples and similar submittals are not Contract Documents. Their purpose is to demonstrate the way by which the Contractor proposes to conform to the information given and the design concept expressed in the Contract Documents for those portions of the Work for which the Contract Documents require submittals. Review by the Architect is subject to the limitations of Section 4.2.7. Informational submittals upon which the Architect is not expected to take responsive action may be so identified in the Contract Documents. Submittals that are not required by the Contract Documents may be returned by the Architect without action.

§ 3.12.5 The Contractor shall review for compliance with the Contract Documents, approve and submit to the Architect Shop Drawings, Product Data, Samples and similar submittals required by the Contract Documents in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness and in such sequence as to cause no delay in the Work or in the activities of the Owner or of separate contractors.

§ 3.12.6 By submitting Shop Drawings, Product Data, Samples and similar submittals, the Contractor represents to the Owner and Architect that the Contractor has (1) reviewed and approved them, (2) determined and verified materials, field measurements and field construction criteria related thereto, or will do so and (3) checked and coordinated the information contained within such submittals with the requirements of the Work and of the Contract Documents.

§ 3.12.7 The Contractor shall perform no portion of the Work for which the Contract Documents require submittal and review of Shop Drawings, Product Data, Samples or similar submittals until the respective submittal has been approved by the Architect.

§ 3.12.8 The Work shall be in accordance with approved submittals except that the Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Architect's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Architect in writing of such deviation at the time of submittal and (1) the Architect has given written approval to the specific deviation as a minor change in the Work, or (2) a Change Order or Construction Change Directive has been issued authorizing the deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Architect's approval thereof.

§ 3.12.9 The Contractor shall direct specific attention, in writing or on resubmitted Shop Drawings, Product Data, Samples or similar submittals, to revisions other than those requested by the Architect on previous submittals. In the absence of such written notice, the Architect's approval of a resubmission shall not apply to such revisions.

§ 3.12.10 The Contractor shall not be required to provide professional services that constitute the practice of architecture or engineering unless such services are specifically required by the Contract Documents for a portion of the Work or unless the Contractor needs to provide such services in order to carry out the Contractor's responsibilities for construction means, methods, techniques, sequences and procedures. The Contractor shall not be required to provide professional services in violation of applicable law. If professional design services or certifications by a design professional related to systems, materials or equipment are specifically required of the Contractor by the Contract Documents, the Owner and the Architect will specify all performance and design criteria that such services must satisfy. The Contractor shall cause such services or certifications to be provided by a properly licensed design professional, whose signature and seal shall appear on all drawings, calculations, specifications, certifications, Shop Drawings and other submittals prepared by such professional. Shop Drawings and other submittals related to the Work designed or certified by such professional, if prepared by others, shall bear such professional's written approval when submitted to the Architect. The Owner and the Architect shall be entitled to rely upon the adequacy, accuracy and

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completeness of the services, certifications and approvals performed or provided by such design professionals, provided the Owner and Architect have specified to the Contractor all performance and design criteria that such services must satisfy. Pursuant to this Section 3.12.10, the Architect will review, approve or take other appropriate action on submittals only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Contractor shall not be responsible for the adequacy of the performance and design criteria specified in the Contract Documents.

§ 3.13 USE OF SITE

The Contractor shall confine operations at the site to areas permitted by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities and the Contract Documents and shall not unreasonably encumber the site with materials or equipment.

§ 3.14 CUTTING AND PATCHING

§ 3.14.1 The Contractor shall be responsible for cutting, fitting or patching required to complete the Work or to make its parts fit together properly. All areas requiring cutting, fitting and patching shall be restored to the condition existing prior to the cutting, fitting and patching, unless otherwise required by the Contract Documents.

§ 3.14.2 The Contractor shall not damage or endanger a portion of the Work or fully or partially completed construction of the Owner or separate contractors by cutting, patching or otherwise altering such construction, or by excavation. The Contractor shall not cut or otherwise alter such construction by the Owner or a separate contractor except with written consent of the Owner and of such separate contractor; such consent shall not be unreasonably withheld. The Contractor shall not unreasonably withhold from the Owner or a separate contractor the Contractor's consent to cutting or otherwise altering the Work.

§ 3.15 CLEANING UP

§ 3.15.1 The Contractor shall keep the premises and surrounding area free from accumulation of waste materials or rubbish caused by operations under the Contract. At completion of the Work, the Contractor shall remove waste materials, rubbish, the Contractor's tools, construction equipment, machinery and surplus materials from and about the Project.

§ 3.15.2 If the Contractor fails to clean up as provided in the Contract Documents, the Owner may do so and Owner shall be entitled to reimbursement from the Contractor.

§ 3.16 ACCESS TO WORK

The Contractor shall provide the Owner and Architect access to the Work in preparation and progress wherever located.

§ 3.17 ROYALTIES, PATENTS AND COPYRIGHTS

The Contractor shall pay all royalties and license fees. The Contractor shall defend suits or claims for infringement of copyrights and patent rights and shall hold the Owner and Architect harmless from loss on account thereof, but shall not be responsible for such defense or loss when a particular design, process or product of a particular manufacturer or manufacturers is required by the Contract Documents, or where the copyright violations are contained in Drawings, Specifications or other documents prepared by the Owner or Architect. However, if the Contractor has reason to believe that the required design, process or product is an infringement of a copyright or a patent, the Contractor shall be responsible for such loss unless such information is promptly furnished to the Architect.

§ 3.18 INDEMNIFICATION

§ 3.18.1 To the fullest extent permitted by law the Contractor shall indemnify and hold harmless the Owner, Architect, Architect's consultants, and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), but only to the extent caused by the negligent acts or omissions of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, regardless of whether or not such claim, damage, loss or expense is caused in part by a party indemnified hereunder. Such obligation shall not be construed to negate, abridge, or reduce other rights or obligations of indemnity which would otherwise exist as to a party or person described in this Section 3.18.

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§ 3.18.2 In claims against any person or entity indemnified under this Section 3.18 by an employee of the Contractor, a Subcontractor, anyone directly or indirectly employed by them or anyone for whose acts they may be liable, the indemnification obligation under Section 3.18.1 shall not be limited by a limitation on amount or type of damages, compensation or benefits payable by or for the Contractor or a Subcontractor under workers' compensation acts, disability benefit acts or other employee benefit acts.

ARTICLE 4 ARCHITECT

§ 4.1 GENERAL

§ 4.1.1 The Owner shall retain an architect lawfully licensed to practice architecture or an entity lawfully practicing architecture in the jurisdiction where the Project is located. That person or entity is identified as the Architect in the Agreement and is referred to throughout the Contract Documents as if singular in number.

§ 4.1.2 Duties, responsibilities and limitations of authority of the Architect as set forth in the Contract Documents shall not be restricted, modified or extended without written consent of the Owner, Contractor and Architect. Consent shall not be unreasonably withheld.

§ 4.1.3 If the employment of the Architect is terminated, the Owner shall employ a successor architect as to whom the Contractor has no reasonable objection and whose status under the Contract Documents shall be that of the Architect.

§ 4.2 ADMINISTRATION OF THE CONTRACT

§ 4.2.1 The Architect will provide administration of the Contract as described in the Contract Documents and will be an Owner's representative during construction until the date the Architect issues the final Certificate For Payment. The Architect will have authority to act on behalf of the Owner only to the extent provided in the Contract Documents.

§ 4.2.2 The Architect will visit the site at intervals appropriate to the stage of construction, or as otherwise agreed with the Owner, to become generally familiar with the progress and quality of the portion of the Work completed, and to determine in general if the Work observed is being performed in a manner indicating that the Work, when fully completed, will be in accordance with the Contract Documents. However, the Architect will not be required to make exhaustive or continuous on-site inspections to check the quality or quantity of the Work. The Architect will not have control over, charge of, or responsibility for, the construction means, methods, techniques, sequences or procedures, or for the safety precautions and programs in connection with the Work, since these are solely the Contractor's rights and responsibilities under the Contract Documents, except as provided in Section 3.3.1.

§ 4.2.3 On the basis of the site visits, the Architect will keep the Owner reasonably informed about the progress and quality of the portion of the Work completed, and report to the Owner (1) known deviations from the Contract Documents and from the most recent construction schedule submitted by the Contractor, and (2) defects and deficiencies observed in the Work. The Architect will not be responsible for the Contractor's failure to perform the Work in accordance with the requirements of the Contract Documents. The Architect will not have control over or charge of and will not be responsible for acts or omissions of the Contractor, Subcontractors, or their agents or employees, or any other persons or entities performing portions of the Work.

§ 4.2.4 COMMUNICATIONS FACILITATING CONTRACT ADMINISTRATION

Except as otherwise provided in the Contract Documents or when direct communications have been specially authorized, the Owner and Contractor shall endeavor to communicate with each other through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect's consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors shall be through the Owner.

§ 4.2.5 Based on the Architect's evaluations of the Contractor's Applications for Payment, the Architect will review and certify the amounts due the Contractor and will issue Certificates for Payment in such amounts.

§ 4.2.6 The Architect has authority to reject Work that does not conform to the Contract Documents. Whenever the Architect considers it necessary or advisable, the Architect will have authority to require inspection or testing of the Work in accordance with Sections 13.5.2 and 13.5.3, whether or not such Work is fabricated, installed or completed. However, neither this authority of the Architect nor a decision made in good faith either to exercise or not to exercise such authority shall give rise to a duty or responsibility of the Architect to the Contractor, Subcontractors, material and equipment suppliers, their agents or employees, or other persons or entities performing portions of the Work.

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§ 4.2.7 The Architect will review and approve, or take other appropriate action upon, the Contractor's submittals such as Shop Drawings, Product Data and Samples, but only for the limited purpose of checking for conformance with information given and the design concept expressed in the Contract Documents. The Architect's action will be taken in accordance with the submittal schedule approved by the Architect or, in the absence of an approved submittal schedule, with reasonable promptness while allowing sufficient time in the Architect's professional judgment to permit adequate review. Review of such submittals is not conducted for the purpose of determining the accuracy and completeness of other details such as dimensions and quantities, or for substantiating instructions for installation or performance of equipment or systems, all of which remain the responsibility of the Contractor as required by the Contract Documents. The Architect's review of the Contractor's submittals shall not relieve the Contractor of the obligations under Sections 3.3, 3.5 and 3.12. The Architect's review shall not constitute approval of safety precautions or, unless otherwise specifically stated by the Architect, of any construction means, methods, techniques, sequences or procedures. The Architect's approval of a specific item shall not indicate approval of an assembly of which the item is a component.

§ 4.2.8 The Architect will prepare Change Orders and Construction Change Directives, and may authorize minor changes in the Work as provided in Section 7.4. The Architect will investigate and make determinations and recommendations regarding concealed and unknown conditions as provided in Section 3.7.4.

§ 4.2.9 The Architect will conduct inspections to determine the date or dates of Substantial Completion and the date of final completion; issue Certificates of Substantial Completion pursuant to Section 9.8; receive and forward to the Owner, for the Owner's review and records, written warranties and related documents required by the Contract and assembled by the Contractor pursuant to Section 9.10; and issue a final Certificate for Payment pursuant to Section 9.10.

§ 4.2.10 If the Owner and Architect agree, the Architect will provide one or more project representatives to assist in carrying out the Architect's responsibilities at the site. The duties, responsibilities and limitations of authority of such project representatives shall be as set forth in an exhibit to be incorporated in the Contract Documents.

§ 4.2.11 The Architect will interpret and decide matters concerning performance under, and requirements of, the Contract Documents on written request of either the Owner or Contractor. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness.

§ 4.2.12 Interpretations and decisions of the Architect will be consistent with the intent of, and reasonably inferable from, the Contract Documents and will be in writing or in the form of drawings. When making such interpretations and decisions, the Architect will endeavor to secure faithful performance by both Owner and Contractor, will not show partiality to either and will not be liable for results of interpretations or decisions rendered in good faith.

§ 4.2.13 The Architect's decisions on matters relating to aesthetic effect will be final if consistent with the intent expressed in the Contract Documents.

§ 4.2.14 The Architect will review and respond to requests for information about the Contract Documents. The Architect's response to such requests will be made in writing within any time limits agreed upon or otherwise with reasonable promptness. If appropriate, the Architect will prepare and issue supplemental Drawings and Specifications in response to the requests for information.

ARTICLE 5 SUBCONTRACTORS

§ 5.1 DEFINITIONS

§ 5.1.1 A Subcontractor is a person or entity who has a direct contract with the Contractor to perform a portion of the Work at the site. The term "Subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Subcontractor or an authorized representative of the Subcontractor. The term "Subcontractor" does not include a separate contractor or subcontractors of a separate contractor.

§ 5.1.2 A Sub-subcontractor is a person or entity who has a direct or indirect contract with a Subcontractor to perform a portion of the Work at the site. The term "Sub-subcontractor" is referred to throughout the Contract Documents as if singular in number and means a Sub-subcontractor or an authorized representative of the Sub-subcontractor.

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§ 5.2 AWARD OF SUBCONTRACTS AND OTHER CONTRACTS FOR PORTIONS OF THE WORK

§ 5.2.1 Unless otherwise stated in the Contract Documents or the bidding requirements, the Contractor, as soon as practicable after award of the Contract, shall furnish in writing to the Owner through the Architect the names of persons or entities (including those who are to furnish materials or equipment fabricated to a special design) proposed for each principal portion of the Work. The Architect may reply within 14 days to the Contractor in writing stating (1) whether the Owner or the Architect has reasonable objection to any such proposed person or entity or (2) that the Architect requires additional time for review. Failure of the Owner or Architect to reply within the 14 day period shall constitute notice of no reasonable objection.

§ 5.2.2 The Contractor shall not contract with a proposed person or entity to whom the Owner or Architect has made reasonable and timely objection. The Contractor shall not be required to contract with anyone to whom the Contractor has made reasonable objection.

§ 5.2.3 If the Owner or Architect has reasonable objection to a person or entity proposed by the Contractor, the Contractor shall propose another to whom the Owner or Architect has no reasonable objection. If the proposed but rejected Subcontractor was reasonably capable of performing the Work, the Contract Sum and Contract Time shall be increased or decreased by the difference, if any, occasioned by such change, and an appropriate Change Order shall be issued before commencement of the substitute Subcontractor's Work. However, no increase in the Contract Sum or Contract Time shall be allowed for such change unless the Contractor has acted promptly and responsively in submitting names as required.

§ 5.2.4 The Contractor shall not substitute a Subcontractor, person or entity previously selected if the Owner or Architect makes reasonable objection to such substitution.

§ 5.3 SUBCONTRACTUAL RELATIONS

By appropriate agreement, written where legally required for validity, the Contractor shall require each Subcontractor, to the extent of the Work to be performed by the Subcontractor, to be bound to the Contractor by terms of the Contract Documents, and to assume toward the Contractor all the obligations and responsibilities, including the responsibility for safety of the Subcontractor's Work, which the Contractor, by these Documents, assumes toward the Owner and Architect. Each subcontract agreement shall preserve and protect the rights of the Owner and Architect under the Contract Documents with respect to the Work to be performed by the Subcontractor so that subcontracting thereof will not prejudice such rights, and shall allow to the Subcontractor, unless specifically provided otherwise in the subcontract agreement, the benefit of all rights, remedies and redress against the Contractor that the Contractor, by the Contract Documents, has against the Owner. Where appropriate, the Contractor shall require each Subcontractor to enter into similar agreements with Sub-subcontractors. The Contractor shall make available to each proposed Subcontractor, prior to the execution of the subcontract agreement, copies of the Contract Documents to which the Subcontractor will be bound, and, upon written request of the Subcontractor, identify to the Subcontractor terms and conditions of the proposed subcontract agreement that may be at variance with the Contract Documents. Subcontractors will similarly make copies of applicable portions of such documents available to their respective proposed Sub-subcontractors.

§ 5.4 CONTINGENT ASSIGNMENT OF SUBCONTRACTS

§ 5.4.1 Each subcontract agreement for a portion of the Work is assigned by the Contractor to the Owner, provided that

- **.1** assignment is effective only after termination of the Contract by the Owner for cause pursuant to Section 14.2 and only for those subcontract agreements that the Owner accepts by notifying the Subcontractor and Contractor in writing; and
- **.2** assignment is subject to the prior rights of the surety, if any, obligated under bond relating to the Contract.

When the Owner accepts the assignment of a subcontract agreement, the Owner assumes the Contractor's rights and obligations under the subcontract.

§ 5.4.2 Upon such assignment, if the Work has been suspended for more than 30 days, the Subcontractor's compensation shall be equitably adjusted for increases in cost resulting from the suspension.

§ 5.4.3 Upon such assignment to the Owner under this Section 5.4, the Owner may further assign the subcontract to a successor contractor or other entity. If the Owner assigns the subcontract to a successor contractor or other entity, the

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Owner shall nevertheless remain legally responsible for all of the successor contractor's obligations under the subcontract.

ARTICLE 6 CONSTRUCTION BY OWNER OR BY SEPARATE CONTRACTORS

§ 6.1 OWNER'S RIGHT TO PERFORM CONSTRUCTION AND TO AWARD SEPARATE CONTRACTS

§ 6.1.1 The Owner reserves the right to perform construction or operations related to the Project with the Owner's own forces, and to award separate contracts in connection with other portions of the Project or other construction or operations on the site under Conditions of the Contract identical or substantially similar to these including those portions related to insurance and waiver of subrogation. If the Contractor claims that delay or additional cost is involved because of such action by the Owner, the Contractor shall make such Claim as provided in Article 15.

§ 6.1.2 When separate contracts are awarded for different portions of the Project or other construction or operations on the site, the term "Contractor" in the Contract Documents in each case shall mean the Contractor who executes each separate Owner-Contractor Agreement.

§ 6.1.3 The Owner shall provide for coordination of the activities of the Owner's own forces and of each separate contractor with the Work of the Contractor, who shall cooperate with them. The Contractor shall participate with other separate contractors and the Owner in reviewing their construction schedules. The Contractor shall make any revisions to the construction schedule deemed necessary after a joint review and mutual agreement. The construction schedules shall then constitute the schedules to be used by the Contractor, separate contractors and the Owner until subsequently revised.

§ 6.1.4 Unless otherwise provided in the Contract Documents, when the Owner performs construction or operations related to the Project with the Owner's own forces, the Owner shall be deemed to be subject to the same obligations and to have the same rights that apply to the Contractor under the Conditions of the Contract, including, without excluding others, those stated in Article 3, this Article 6 and Articles 10, 11 and 12.

§ 6.2 MUTUAL RESPONSIBILITY

§ 6.2.1 The Contractor shall afford the Owner and separate contractors reasonable opportunity for introduction and storage of their materials and equipment and performance of their activities, and shall connect and coordinate the Contractor's construction and operations with theirs as required by the Contract Documents.

§ 6.2.2 If part of the Contractor's Work depends for proper execution or results upon construction or operations by the Owner or a separate contractor, the Contractor shall, prior to proceeding with that portion of the Work, promptly report to the Architect apparent discrepancies or defects in such other construction that would render it unsuitable for such proper execution and results. Failure of the Contractor so to report shall constitute an acknowledgment that the Owner's or separate contractor's completed or partially completed construction is fit and proper to receive the Contractor's Work, except as to defects not then reasonably discoverable.

§ 6.2.3 The Contractor shall reimburse the Owner for costs the Owner incurs that are payable to a separate contractor because of the Contractor's delays, improperly timed activities or defective construction. The Owner shall be responsible to the Contractor for costs the Contractor incurs because of a separate contractor's delays, improperly timed activities, damage to the Work or defective construction.

§ 6.2.4 The Contractor shall promptly remedy damage the Contractor wrongfully causes to completed or partially completed construction or to property of the Owner, separate contractors as provided in Section 10.2.5.

§ 6.2.5 The Owner and each separate contractor shall have the same responsibilities for cutting and patching as are described for the Contractor in Section 3.14.

§ 6.3 OWNER'S RIGHT TO CLEAN UP

If a dispute arises among the Contractor, separate contractors and the Owner as to the responsibility under their respective contracts for maintaining the premises and surrounding area free from waste materials and rubbish, the Owner may clean up and the Architect will allocate the cost among those responsible.

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ARTICLE 7 CHANGES IN THE WORK

§ 7.1 GENERAL

§ 7.1.1 Changes in the Work may be accomplished after execution of the Contract, and without invalidating the Contract, by Change Order, Construction Change Directive or order for a minor change in the Work, subject to the limitations stated in this Article 7 and elsewhere in the Contract Documents.

§ 7.1.2 A Change Order shall be based upon agreement among the Owner, Contractor and Architect; a Construction Change Directive requires agreement by the Owner and Architect and may or may not be agreed to by the Contractor; an order for a minor change in the Work may be issued by the Architect alone.

§ 7.1.3 Changes in the Work shall be performed under applicable provisions of the Contract Documents, and the Contractor shall proceed promptly, unless otherwise provided in the Change Order, Construction Change Directive or order for a minor change in the Work.

§ 7.2 CHANGE ORDERS

§ 7.2.1 A Change Order is a written instrument prepared by the Architect and signed by the Owner, Contractor and Architect stating their agreement upon all of the following:

- .1 The change in the Work;
- .2 The amount of the adjustment, if any, in the Contract Sum; and
- .3 The extent of the adjustment, if any, in the Contract Time.

§ 7.3 CONSTRUCTION CHANGE DIRECTIVES

§ 7.3.1 A Construction Change Directive is a written order prepared by the Architect and signed by the Owner and Architect, directing a change in the Work prior to agreement on adjustment, if any, in the Contract Sum or Contract Time, or both. The Owner may by Construction Change Directive, without invalidating the Contract, order changes in the Work within the general scope of the Contract consisting of additions, deletions or other revisions, the Contract Sum and Contract Time being adjusted accordingly.

§ 7.3.2 A Construction Change Directive shall be used in the absence of total agreement on the terms of a Change Order.

§ 7.3.3 If the Construction Change Directive provides for an adjustment to the Contract Sum, the adjustment shall be based on one of the following methods:

- .1 Mutual acceptance of a lump sum properly itemized and supported by sufficient substantiating data to permit evaluation;
- .2 Unit prices stated in the Contract Documents or subsequently agreed upon;
- .3 Cost to be determined in a manner agreed upon by the parties and a mutually acceptable fixed or percentage fee; or
- .4 As provided in Section 7.3.7.

§ 7.3.4 If unit prices are stated in the Contract Documents or subsequently agreed upon, and if quantities originally contemplated are materially changed in a proposed Change Order or Construction Change Directive so that application of such unit prices to quantities of Work proposed will cause substantial inequity to the Owner or Contractor, the applicable unit prices shall be equitably adjusted.

§ 7.3.5 Upon receipt of a Construction Change Directive, the Contractor shall promptly proceed with the change in the Work involved and advise the Architect of the Contractor's agreement or disagreement with the method, if any, provided in the Construction Change Directive for determining the proposed adjustment in the Contract Sum or Contract Time.

§ 7.3.6 A Construction Change Directive signed by the Contractor indicates the Contractor's agreement therewith, including adjustment in Contract Sum and Contract Time or the method for determining them. Such agreement shall be effective immediately and shall be recorded as a Change Order.

§ 7.3.7 If the Contractor does not respond promptly or disagrees with the method for adjustment in the Contract Sum, the Architect shall determine the method and the adjustment on the basis of reasonable expenditures and savings of those performing the Work attributable to the change, including, in case of an increase in the Contract Sum, an amount

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for overhead and profit as set forth in the Agreement, or if no such amount is set forth in the Agreement, a reasonable amount. In such case, and also under Section 7.3.3.3, the Contractor shall keep and present, in such form as the Architect may prescribe, an itemized accounting together with appropriate supporting data. Unless otherwise provided in the Contract Documents, costs for the purposes of this Section 7.3.7 shall be limited to the following:

- .1 Costs of labor, including social security, old age and unemployment insurance, fringe benefits required by agreement or custom, and workers' compensation insurance;
- .2 Costs of materials, supplies and equipment, including cost of transportation, whether incorporated or consumed;
- .3 Rental costs of machinery and equipment, exclusive of hand tools, whether rented from the Contractor or others;
- .4 Costs of premiums for all bonds and insurance, permit fees, and sales, use or similar taxes related to the Work; and
- .5 Additional costs of supervision and field office personnel directly attributable to the change.

§ 7.3.8 The amount of credit to be allowed by the Contractor to the Owner for a deletion or change that results in a net decrease in the Contract Sum shall be actual net cost as confirmed by the Architect. When both additions and credits covering related Work or substitutions are involved in a change, the allowance for overhead and profit shall be figured on the basis of net increase, if any, with respect to that change.

§ 7.3.9 Pending final determination of the total cost of a Construction Change Directive to the Owner, the Contractor may request payment for Work completed under the Construction Change Directive in Applications for Payment. The Architect will make an interim determination for purposes of monthly certification for payment for those costs and certify for payment the amount that the Architect determines, in the Architect's professional judgment, to be reasonably justified. The Architect's interim determination of cost shall adjust the Contract Sum on the same basis as a Change Order, subject to the right of either party to disagree and assert a Claim in accordance with Article 15.

§ 7.3.10 When the Owner and Contractor agree with a determination made by the Architect concerning the adjustments in the Contract Sum and Contract Time, or otherwise reach agreement upon the adjustments, such agreement shall be effective immediately and the Architect will prepare a Change Order. Change Orders may be issued for all or any part of a Construction Change Directive.

§ 7.4 MINOR CHANGES IN THE WORK

The Architect has authority to order minor changes in the Work not involving adjustment in the Contract Sum or extension of the Contract Time and not inconsistent with the intent of the Contract Documents. Such changes will be effected by written order signed by the Architect and shall be binding on the Owner and Contractor.

ARTICLE 8 TIME

§ 8.1 DEFINITIONS

§ 8.1.1 Unless otherwise provided, Contract Time is the period of time, including authorized adjustments, allotted in the Contract Documents for Substantial Completion of the Work.

§ 8.1.2 The date of commencement of the Work is the date established in the Agreement.

§ 8.1.3 The date of Substantial Completion is the date certified by the Architect in accordance with Section 9.8.

§ 8.1.4 The term "day" as used in the Contract Documents shall mean calendar day unless otherwise specifically defined.

§ 8.2 PROGRESS AND COMPLETION

§ 8.2.1 Time limits stated in the Contract Documents are of the essence of the Contract. By executing the Agreement the Contractor confirms that the Contract Time is a reasonable period for performing the Work.

§ 8.2.2 The Contractor shall not knowingly, except by agreement or instruction of the Owner in writing, prematurely commence operations on the site or elsewhere prior to the effective date of insurance required by Article 11 to be furnished by the Contractor and Owner. The date of commencement of the Work shall not be changed by the effective date of such insurance.

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§ 8.2.3 The Contractor shall proceed expeditiously with adequate forces and shall achieve Substantial Completion within the Contract Time.

§ 8.3 DELAYS AND EXTENSIONS OF TIME

§ 8.3.1 If the Contractor is delayed at any time in the commencement or progress of the Work by an act or neglect of the Owner or Architect, or of an employee of either, or of a separate contractor employed by the Owner; or by changes ordered in the Work; or by labor disputes, fire, unusual delay in deliveries, unavoidable casualties or other causes beyond the Contractor's control; or by delay authorized by the Owner pending mediation and arbitration; or by other causes that the Architect determines may justify delay, then the Contract Time shall be extended by Change Order for such reasonable time as the Architect may determine.

§ 8.3.2 Claims relating to time shall be made in accordance with applicable provisions of Article 15.

§ 8.3.3 This Section 8.3 does not preclude recovery of damages for delay by either party under other provisions of the Contract Documents.

ARTICLE 9 PAYMENTS AND COMPLETION

§ 9.1 CONTRACT SUM

The Contract Sum is stated in the Agreement and, including authorized adjustments, is the total amount payable by the Owner to the Contractor for performance of the Work under the Contract Documents.

§ 9.2 SCHEDULE OF VALUES

Where the Contract is based on a stipulated sum or Guaranteed Maximum Price, the Contractor shall submit to the Architect, before the first Application for Payment, a schedule of values allocating the entire Contract Sum to the various portions of the Work and prepared in such form and supported by such data to substantiate its accuracy as the Architect may require. This schedule, unless objected to by the Architect, shall be used as a basis for reviewing the Contractor's Applications for Payment.

§ 9.3 APPLICATIONS FOR PAYMENT

§ 9.3.1 At least ten days before the date established for each progress payment, the Contractor shall submit to the Architect an itemized Application for Payment prepared in accordance with the schedule of values, if required under Section 9.2., for completed portions of the Work. Such application shall be notarized, if required, and supported by such data substantiating the Contractor's right to payment as the Owner or Architect may require, such as copies of requisitions from Subcontractors and material suppliers, and shall reflect retainage if provided for in the Contract Documents.

§ 9.3.1.1 As provided in Section 7.3.9, such applications may include requests for payment on account of changes in the Work that have been properly authorized by Construction Change Directives, or by interim determinations of the Architect, but not yet included in Change Orders.

§ 9.3.1.2 Applications for Payment shall not include requests for payment for portions of the Work for which the Contractor does not intend to pay a Subcontractor or material supplier, unless such Work has been performed by others whom the Contractor intends to pay.

§ 9.3.2 Unless otherwise provided in the Contract Documents, payments shall be made on account of materials and equipment delivered and suitably stored at the site for subsequent incorporation in the Work. If approved in advance by the Owner, payment may similarly be made for materials and equipment suitably stored off the site at a location agreed upon in writing. Payment for materials and equipment stored on or off the site shall be conditioned upon compliance by the Contractor with procedures satisfactory to the Owner to establish the Owner's title to such materials and equipment or otherwise protect the Owner's interest, and shall include the costs of applicable insurance, storage and transportation to the site for such materials and equipment stored off the site.

§ 9.3.3 The Contractor warrants that title to all Work covered by an Application for Payment will pass to the Owner no later than the time of payment. The Contractor further warrants that upon submittal of an Application for Payment all Work for which Certificates for Payment have been previously issued and payments received from the Owner shall, to the best of the Contractor's knowledge, information and belief, be free and clear of liens, claims, security interests or

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encumbrances in favor of the Contractor, Subcontractors, material suppliers, or other persons or entities making a claim by reason of having provided labor, materials and equipment relating to the Work.

§ 9.4 CERTIFICATES FOR PAYMENT

§ 9.4.1 The Architect will, within seven days after receipt of the Contractor's Application for Payment, either issue to the Owner a Certificate for Payment, with a copy to the Contractor, for such amount as the Architect determines is properly due, or notify the Contractor and Owner in writing of the Architect's reasons for withholding certification in whole or in part as provided in Section 9.5.1.

§ 9.4.2 The issuance of a Certificate for Payment will constitute a representation by the Architect to the Owner, based on the Architect's evaluation of the Work and the data comprising the Application for Payment, that, to the best of the Architect's knowledge, information and belief, the Work has progressed to the point indicated and that the quality of the Work is in accordance with the Contract Documents. The foregoing representations are subject to an evaluation of the Work for conformance with the Contract Documents upon Substantial Completion, to results of subsequent tests and inspections, to correction of minor deviations from the Contract Documents prior to completion and to specific qualifications expressed by the Architect. The issuance of a Certificate for Payment will further constitute a representation that the Contractor is entitled to payment in the amount certified. However, the issuance of a Certificate for Payment will not be a representation that the Architect has (1) made exhaustive or continuous on-site inspections to check the quality or quantity of the Work, (2) reviewed construction means, methods, techniques, sequences or procedures, (3) reviewed copies of requisitions received from Subcontractors and material suppliers and other data requested by the Owner to substantiate the Contractor's right to payment, or (4) made examination to ascertain how or for what purpose the Contractor has used money previously paid on account of the Contract Sum.

§ 9.5 DECISIONS TO WITHHOLD CERTIFICATION

§ 9.5.1 The Architect may withhold a Certificate for Payment in whole or in part, to the extent reasonably necessary to protect the Owner, if in the Architect's opinion the representations to the Owner required by Section 9.4.2 cannot be made. If the Architect is unable to certify payment in the amount of the Application, the Architect will notify the Contractor and Owner as provided in Section 9.4.1. If the Contractor and Architect cannot agree on a revised amount, the Architect will promptly issue a Certificate for Payment for the amount for which the Architect is able to make such representations to the Owner. The Architect may also withhold a Certificate for Payment or, because of subsequently discovered evidence, may nullify the whole or a part of a Certificate for Payment previously issued, to such extent as may be necessary in the Architect's opinion to protect the Owner from loss for which the Contractor is responsible, including loss resulting from acts and omissions described in Section 3.3.2, because of

- **.1** defective Work not remedied;
- **.2** third party claims filed or reasonable evidence indicating probable filing of such claims unless security acceptable to the Owner is provided by the Contractor;
- **.3** failure of the Contractor to make payments properly to Subcontractors or for labor, materials or equipment;
- **.4** reasonable evidence that the Work cannot be completed for the unpaid balance of the Contract Sum;
- **.5** damage to the Owner or a separate contractor;
- **.6** reasonable evidence that the Work will not be completed within the Contract Time, and that the unpaid balance would not be adequate to cover actual or liquidated damages for the anticipated delay; or
- **.7** repeated failure to carry out the Work in accordance with the Contract Documents.

§ 9.5.2 When the above reasons for withholding certification are removed, certification will be made for amounts previously withheld.

§ 9.5.3 If the Architect withholds certification for payment under Section 9.5.1.3, the Owner may, at its sole option, issue joint checks to the Contractor and to any Subcontractor or material or equipment suppliers to whom the Contractor failed to make payment for Work properly performed or material or equipment suitably delivered. If the Owner makes payments by joint check, the Owner shall notify the Architect and the Architect will reflect such payment on the next Certificate for Payment.

§ 9.6 PROGRESS PAYMENTS

§ 9.6.1 After the Architect has issued a Certificate for Payment, the Owner shall make payment in the manner and within the time provided in the Contract Documents, and shall so notify the Architect.

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§ 9.6.2 The Contractor shall pay each Subcontractor no later than seven days after receipt of payment from the Owner the amount to which the Subcontractor is entitled, reflecting percentages actually retained from payments to the Contractor on account of the Subcontractor's portion of the Work. The Contractor shall, by appropriate agreement with each Subcontractor, require each Subcontractor to make payments to Sub-subcontractors in a similar manner.

§ 9.6.3 The Architect will, on request, furnish to a Subcontractor, if practicable, information regarding percentages of completion or amounts applied for by the Contractor and action taken thereon by the Architect and Owner on account of portions of the Work done by such Subcontractor.

§ 9.6.4 The Owner has the right to request written evidence from the Contractor that the Contractor has properly paid Subcontractors and material and equipment suppliers amounts paid by the Owner to the Contractor for subcontracted Work. If the Contractor fails to furnish such evidence within seven days, the Owner shall have the right to contact Subcontractors to ascertain whether they have been properly paid. Neither the Owner nor Architect shall have an obligation to pay or to see to the payment of money to a Subcontractor, except as may otherwise be required by law.

§ 9.6.5 Contractor payments to material and equipment suppliers shall be treated in a manner similar to that provided in Sections 9.6.2, 9.6.3 and 9.6.4.

§ 9.6.6 A Certificate for Payment, a progress payment, or partial or entire use or occupancy of the Project by the Owner shall not constitute acceptance of Work not in accordance with the Contract Documents.

§ 9.6.7 Unless the Contractor provides the Owner with a payment bond in the full penal sum of the Contract Sum, payments received by the Contractor for Work properly performed by Subcontractors and suppliers shall be held by the Contractor for those Subcontractors or suppliers who performed Work or furnished materials, or both, under contract with the Contractor for which payment was made by the Owner. Nothing contained herein shall require money to be placed in a separate account and not commingled with money of the Contractor, shall create any fiduciary liability or tort liability on the part of the Contractor for breach of trust or shall entitle any person or entity to an award of punitive damages against the Contractor for breach of the requirements of this provision.

§ 9.7 FAILURE OF PAYMENT

If the Architect does not issue a Certificate for Payment, through no fault of the Contractor, within seven days after receipt of the Contractor's Application for Payment, or if the Owner does not pay the Contractor within seven days after the date established in the Contract Documents the amount certified by the Architect or awarded by binding dispute resolution, then the Contractor may, upon seven additional days' written notice to the Owner and Architect, stop the Work until payment of the amount owing has been received. The Contract Time shall be extended appropriately and the Contract Sum shall be increased by the amount of the Contractor's reasonable costs of shut-down, delay and start-up, plus interest as provided for in the Contract Documents.

§ 9.8 SUBSTANTIAL COMPLETION

§ 9.8.1 Substantial Completion is the stage in the progress of the Work when the Work or designated portion thereof is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use.

§ 9.8.2 When the Contractor considers that the Work, or a portion thereof which the Owner agrees to accept separately, is substantially complete, the Contractor shall prepare and submit to the Architect a comprehensive list of items to be completed or corrected prior to final payment. Failure to include an item on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents.

§ 9.8.3 Upon receipt of the Contractor's list, the Architect will make an inspection to determine whether the Work or designated portion thereof is substantially complete. If the Architect's inspection discloses any item, whether or not included on the Contractor's list, which is not sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work or designated portion thereof for its intended use, the Contractor shall, before issuance of the Certificate of Substantial Completion, complete or correct such item upon notification by the Architect. In such case, the Contractor shall then submit a request for another inspection by the Architect to determine Substantial Completion.

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§ 9.8.4 When the Work or designated portion thereof is substantially complete, the Architect will prepare a Certificate of Substantial Completion that shall establish the date of Substantial Completion, shall establish responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance, and shall fix the time within which the Contractor shall finish all items on the list accompanying the Certificate. Warranties required by the Contract Documents shall commence on the date of Substantial Completion of the Work or designated portion thereof unless otherwise provided in the Certificate of Substantial Completion.

§ 9.8.5 The Certificate of Substantial Completion shall be submitted to the Owner and Contractor for their written acceptance of responsibilities assigned to them in such Certificate. Upon such acceptance and consent of surety, if any, the Owner shall make payment of retainage applying to such Work or designated portion thereof. Such payment shall be adjusted for Work that is incomplete or not in accordance with the requirements of the Contract Documents.

§ 9.9 PARTIAL OCCUPANCY OR USE

§ 9.9.1 The Owner may occupy or use any completed or partially completed portion of the Work at any stage when such portion is designated by separate agreement with the Contractor, provided such occupancy or use is consented to by the insurer as required under Section 11.3.1.5 and authorized by public authorities having jurisdiction over the Project. Such partial occupancy or use may commence whether or not the portion is substantially complete, provided the Owner and Contractor have accepted in writing the responsibilities assigned to each of them for payments, retainage, if any, security, maintenance, heat, utilities, damage to the Work and insurance, and have agreed in writing concerning the period for correction of the Work and commencement of warranties required by the Contract Documents. When the Contractor considers a portion substantially complete, the Contractor shall prepare and submit a list to the Architect as provided under Section 9.8.2. Consent of the Contractor to partial occupancy or use shall not be unreasonably withheld. The stage of the progress of the Work shall be determined by written agreement between the Owner and Contractor or, if no agreement is reached, by decision of the Architect.

§ 9.9.2 Immediately prior to such partial occupancy or use, the Owner, Contractor and Architect shall jointly inspect the area to be occupied or portion of the Work to be used in order to determine and record the condition of the Work.

§ 9.9.3 Unless otherwise agreed upon, partial occupancy or use of a portion or portions of the Work shall not constitute acceptance of Work not complying with the requirements of the Contract Documents.

§ 9.10 FINAL COMPLETION AND FINAL PAYMENT

§ 9.10.1 Upon receipt of the Contractor's written notice that the Work is ready for final inspection and acceptance and upon receipt of a final Application for Payment, the Architect will promptly make such inspection and, when the Architect finds the Work acceptable under the Contract Documents and the Contract fully performed, the Architect will promptly issue a final Certificate for Payment stating that to the best of the Architect's knowledge, information and belief, and on the basis of the Architect's on-site visits and inspections, the Work has been completed in accordance with terms and conditions of the Contract Documents and that the entire balance found to be due the Contractor and noted in the final Certificate is due and payable. The Architect's final Certificate for Payment will constitute a further representation that conditions listed in Section 9.10.2 as precedent to the Contractor's being entitled to final payment have been fulfilled.

§ 9.10.2 Neither final payment nor any remaining retained percentage shall become due until the Contractor submits to the Architect (1) an affidavit that payrolls, bills for materials and equipment, and other indebtedness connected with the Work for which the Owner or the Owner's property might be responsible or encumbered (less amounts withheld by Owner) have been paid or otherwise satisfied, (2) a certificate evidencing that insurance required by the Contract Documents to remain in force after final payment is currently in effect and will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner, (3) a written statement that the Contractor knows of no substantial reason that the insurance will not be renewable to cover the period required by the Contract Documents, (4) consent of surety, if any, to final payment and (5), if required by the Owner, other data establishing payment or satisfaction of obligations, such as receipts, releases and waivers of liens, claims, security interests or encumbrances arising out of the Contract, to the extent and in such form as may be designated by the Owner. If a Subcontractor refuses to furnish a release or waiver required by the Owner, the Contractor may furnish a bond satisfactory to the Owner to indemnify the Owner against such lien. If such lien remains unsatisfied after payments are made, the Contractor shall refund to the Owner all money that the Owner may be compelled to pay in discharging such lien, including all costs and reasonable attorneys' fees.

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§ 9.10.3 If, after Substantial Completion of the Work, final completion thereof is materially delayed through no fault of the Contractor or by issuance of Change Orders affecting final completion, and the Architect so confirms, the Owner shall, upon application by the Contractor and certification by the Architect, and without terminating the Contract, make payment of the balance due for that portion of the Work fully completed and accepted. If the remaining balance for Work not fully completed or corrected is less than retainage stipulated in the Contract Documents, and if bonds have been furnished, the written consent of surety to payment of the balance due for that portion of the Work fully completed and accepted shall be submitted by the Contractor to the Architect prior to certification of such payment. Such payment shall be made under terms and conditions governing final payment, except that it shall not constitute a waiver of claims.

§ 9.10.4 The making of final payment shall constitute a waiver of Claims by the Owner except those arising from

- **.1** liens, Claims, security interests or encumbrances arising out of the Contract and unsettled;
- **.2** failure of the Work to comply with the requirements of the Contract Documents; or
- **.3** terms of special warranties required by the Contract Documents.

§ 9.10.5 Acceptance of final payment by the Contractor, a Subcontractor or material supplier shall constitute a waiver of claims by that payee except those previously made in writing and identified by that payee as unsettled at the time of final Application for Payment.

ARTICLE 10 PROTECTION OF PERSONS AND PROPERTY

§ 10.1 SAFETY PRECAUTIONS AND PROGRAMS

The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs in connection with the performance of the Contract.

§ 10.2 SAFETY OF PERSONS AND PROPERTY

§ 10.2.1 The Contractor shall take reasonable precautions for safety of, and shall provide reasonable protection to prevent damage, injury or loss to

- **.1** employees on the Work and other persons who may be affected thereby;
- **.2** the Work and materials and equipment to be incorporated therein, whether in storage on or off the site, under care, custody or control of the Contractor or the Contractor's Subcontractors or Sub-subcontractors; and
- **.3** other property at the site or adjacent thereto, such as trees, shrubs, lawns, walks, pavements, roadways, structures and utilities not designated for removal, relocation or replacement in the course of construction.

§ 10.2.2 The Contractor shall comply with and give notices required by applicable laws, statutes, ordinances, codes, rules and regulations, and lawful orders of public authorities bearing on safety of persons or property or their protection from damage, injury or loss.

§ 10.2.3 The Contractor shall erect and maintain, as required by existing conditions and performance of the Contract, reasonable safeguards for safety and protection, including posting danger signs and other warnings against hazards, promulgating safety regulations and notifying owners and users of adjacent sites and utilities.

§ 10.2.4 When use or storage of explosives or other hazardous materials or equipment or unusual methods are necessary for execution of the Work, the Contractor shall exercise utmost care and carry on such activities under supervision of properly qualified personnel.

§ 10.2.5 The Contractor shall promptly remedy damage and loss (other than damage or loss insured under property insurance required by the Contract Documents) to property referred to in Sections 10.2.1.2 and 10.2.1.3 caused in whole or in part by the Contractor, a Subcontractor, a Sub-subcontractor, or anyone directly or indirectly employed by any of them, or by anyone for whose acts they may be liable and for which the Contractor is responsible under Sections 10.2.1.2 and 10.2.1.3, except damage or loss attributable to acts or omissions of the Owner or Architect or anyone directly or indirectly employed by either of them, or by anyone for whose acts either of them may be liable, and not attributable to the fault or negligence of the Contractor. The foregoing obligations of the Contractor are in addition to the Contractor's obligations under Section 3.18.

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§ 10.2.6 The Contractor shall designate a responsible member of the Contractor's organization at the site whose duty shall be the prevention of accidents. This person shall be the Contractor's superintendent unless otherwise designated by the Contractor in writing to the Owner and Architect.

§ 10.2.7 The Contractor shall not permit any part of the construction or site to be loaded so as to cause damage or create an unsafe condition.

§ 10.2.8 INJURY OR DAMAGE TO PERSON OR PROPERTY
If either party suffers injury or damage to person or property because of an act or omission of the other party, or of others for whose acts such party is legally responsible, written notice of such injury or damage, whether or not insured, shall be given to the other party within a reasonable time not exceeding 21 days after discovery. The notice shall provide sufficient detail to enable the other party to investigate the matter.

§ 10.3 HAZARDOUS MATERIALS
§ 10.3.1 The Contractor is responsible for compliance with any requirements included in the Contract Documents regarding hazardous materials. If the Contractor encounters a hazardous material or substance not addressed in the Contract Documents and if reasonable precautions will be inadequate to prevent foreseeable bodily injury or death to persons resulting from a material or substance, including but not limited to asbestos or polychlorinated biphenyl (PCB), encountered on the site by the Contractor, the Contractor shall, upon recognizing the condition, immediately stop Work in the affected area and report the condition to the Owner and Architect in writing.

§ 10.3.2 Upon receipt of the Contractor's written notice, the Owner shall obtain the services of a licensed laboratory to verify the presence or absence of the material or substance reported by the Contractor and, in the event such material or substance is found to be present, to cause it to be rendered harmless. Unless otherwise required by the Contract Documents, the Owner shall furnish in writing to the Contractor and Architect the names and qualifications of persons or entities who are to perform tests verifying the presence or absence of such material or substance or who are to perform the task of removal or safe containment of such material or substance. The Contractor and the Architect will promptly reply to the Owner in writing stating whether or not either has reasonable objection to the persons or entities proposed by the Owner. If either the Contractor or Architect has an objection to a person or entity proposed by the Owner, the Owner shall propose another to whom the Contractor and the Architect have no reasonable objection. When the material or substance has been rendered harmless, Work in the affected area shall resume upon written agreement of the Owner and Contractor. By Change Order, the Contract Time shall be extended appropriately and the Contract Sum shall be increased in the amount of the Contractor's reasonable additional costs of shut-down, delay and start-up.

§ 10.3.3 To the fullest extent permitted by law, the Owner shall indemnify and hold harmless the Contractor, Subcontractors, Architect, Architect's consultants and agents and employees of any of them from and against claims, damages, losses and expenses, including but not limited to attorneys' fees, arising out of or resulting from performance of the Work in the affected area if in fact the material or substance presents the risk of bodily injury or death as described in Section 10.3.1 and has not been rendered harmless, provided that such claim, damage, loss or expense is attributable to bodily injury, sickness, disease or death, or to injury to or destruction of tangible property (other than the Work itself), except to the extent that such damage, loss or expense is due to the fault or negligence of the party seeking indemnity.

§ 10.3.4 The Owner shall not be responsible under this Section 10.3 for materials or substances the Contractor brings to the site unless such materials or substances are required by the Contract Documents. The Owner shall be responsible for materials or substances required by the Contract Documents, except to the extent of the Contractor's fault or negligence in the use and handling of such materials or substances.

§ 10.3.5 The Contractor shall indemnify the Owner for the cost and expense the Owner incurs (1) for remediation of a material or substance the Contractor brings to the site and negligently handles, or (2) where the Contractor fails to perform its obligations under Section 10.3.1, except to the extent that the cost and expense are due to the Owner's fault or negligence.

§ 10.3.6 If, without negligence on the part of the Contractor, the Contractor is held liable by a government agency for the cost of remediation of a hazardous material or substance solely by reason of performing Work as required by the Contract Documents, the Owner shall indemnify the Contractor for all cost and expense thereby incurred.

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§ 10.4 EMERGENCIES

In an emergency affecting safety of persons or property, the Contractor shall act, at the Contractor's discretion, to prevent threatened damage, injury or loss. Additional compensation or extension of time claimed by the Contractor on account of an emergency shall be determined as provided in Article 15 and Article 7.

ARTICLE 11 INSURANCE AND BONDS

§ 11.1 CONTRACTOR'S LIABILITY INSURANCE

§ 11.1.1 The Contractor shall purchase from and maintain in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located such insurance as will protect the Contractor from claims set forth below which may arise out of or result from the Contractor's operations and completed operations under the Contract and for which the Contractor may be legally liable, whether such operations be by the Contractor or by a Subcontractor or by anyone directly or indirectly employed by any of them, or by anyone for whose acts any of them may be liable:

- **.1** Claims under workers' compensation, disability benefit and other similar employee benefit acts that are applicable to the Work to be performed;
- **.2** Claims for damages because of bodily injury, occupational sickness or disease, or death of the Contractor's employees;
- **.3** Claims for damages because of bodily injury, sickness or disease, or death of any person other than the Contractor's employees;
- **.4** Claims for damages insured by usual personal injury liability coverage;
- **.5** Claims for damages, other than to the Work itself, because of injury to or destruction of tangible property, including loss of use resulting therefrom;
- **.6** Claims for damages because of bodily injury, death of a person or property damage arising out of ownership, maintenance or use of a motor vehicle;
- **.7** Claims for bodily injury or property damage arising out of completed operations; and
- **.8** Claims involving contractual liability insurance applicable to the Contractor's obligations under Section 3.18.

§ 11.1.2 The insurance required by Section 11.1.1 shall be written for not less than limits of liability specified in the Contract Documents or required by law, whichever coverage is greater. Coverages, whether written on an occurrence or claims-made basis, shall be maintained without interruption from the date of commencement of the Work until the date of final payment and termination of any coverage required to be maintained after final payment, and, with respect to the Contractor's completed operations coverage, until the expiration of the period for correction of Work or for such other period for maintenance of completed operations coverage as specified in the Contract Documents.

§ 11.1.3 Certificates of insurance acceptable to the Owner shall be filed with the Owner prior to commencement of the Work and thereafter upon renewal or replacement of each required policy of insurance. These certificates and the insurance policies required by this Section 11.1 shall contain a provision that coverages afforded under the policies will not be canceled or allowed to expire until at least 30 days' prior written notice has been given to the Owner. An additional certificate evidencing continuation of liability coverage, including coverage for completed operations, shall be submitted with the final Application for Payment as required by Section 9.10.2 and thereafter upon renewal or replacement of such coverage until the expiration of the time required by Section 11.1.2. Information concerning reduction of coverage on account of revised limits or claims paid under the General Aggregate, or both, shall be furnished by the Contractor with reasonable promptness.

§ 11.1.4 The Contractor shall cause the commercial liability coverage required by the Contract Documents to include (1) the Owner, the Architect and the Architect's Consultants as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's operations; and (2) the Owner as an additional insured for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's completed operations.

§ 11.2 OWNER'S LIABILITY INSURANCE

The Owner shall be responsible for purchasing and maintaining the Owner's usual liability insurance.

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§ 11.3 PROPERTY INSURANCE

§ 11.3.1 Unless otherwise provided, the Owner shall purchase and maintain, in a company or companies lawfully authorized to do business in the jurisdiction in which the Project is located, property insurance written on a builder's risk "all-risk" or equivalent policy form in the amount of the initial Contract Sum, plus value of subsequent Contract Modifications and cost of materials supplied or installed by others, comprising total value for the entire Project at the site on a replacement cost basis without optional deductibles. Such property insurance shall be maintained, unless otherwise provided in the Contract Documents or otherwise agreed in writing by all persons and entities who are beneficiaries of such insurance, until final payment has been made as provided in Section 9.10 or until no person or entity other than the Owner has an insurable interest in the property required by this Section 11.3 to be covered, whichever is later. This insurance shall include interests of the Owner, the Contractor, Subcontractors and Sub-subcontractors in the Project.

§ 11.3.1.1 Property insurance shall be on an "all-risk" or equivalent policy form and shall include, without limitation, insurance against the perils of fire (with extended coverage) and physical loss or damage including, without duplication of coverage, theft, vandalism, malicious mischief, collapse, earthquake, flood, windstorm, falsework, testing and startup, temporary buildings and debris removal including demolition occasioned by enforcement of any applicable legal requirements, and shall cover reasonable compensation for Architect's and Contractor's services and expenses required as a result of such insured loss.

§ 11.3.1.2 If the Owner does not intend to purchase such property insurance required by the Contract and with all of the coverages in the amount described above, the Owner shall so inform the Contractor in writing prior to commencement of the Work. The Contractor may then effect insurance that will protect the interests of the Contractor, Subcontractors and Sub-subcontractors in the Work, and by appropriate Change Order the cost thereof shall be charged to the Owner. If the Contractor is damaged by the failure or neglect of the Owner to purchase or maintain insurance as described above, without so notifying the Contractor in writing, then the Owner shall bear all reasonable costs properly attributable thereto.

§ 11.3.1.3 If the property insurance requires deductibles, the Owner shall pay costs not covered because of such deductibles.

§ 11.3.1.4 This property insurance shall cover portions of the Work stored off the site, and also portions of the Work in transit.

§ 11.3.1.5 Partial occupancy or use in accordance with Section 9.9 shall not commence until the insurance company or companies providing property insurance have consented to such partial occupancy or use by endorsement or otherwise. The Owner and the Contractor shall take reasonable steps to obtain consent of the insurance company or companies and shall, without mutual written consent, take no action with respect to partial occupancy or use that would cause cancellation, lapse or reduction of insurance.

§ 11.3.2 BOILER AND MACHINERY INSURANCE

The Owner shall purchase and maintain boiler and machinery insurance required by the Contract Documents or by law, which shall specifically cover such insured objects during installation and until final acceptance by the Owner; this insurance shall include interests of the Owner, Contractor, Subcontractors and Sub-subcontractors in the Work, and the Owner and Contractor shall be named insureds.

§ 11.3.3 LOSS OF USE INSURANCE

The Owner, at the Owner's option, may purchase and maintain such insurance as will insure the Owner against loss of use of the Owner's property due to fire or other hazards, however caused. The Owner waives all rights of action against the Contractor for loss of use of the Owner's property, including consequential losses due to fire or other hazards however caused.

§ 11.3.4 If the Contractor requests in writing that insurance for risks other than those described herein or other special causes of loss be included in the property insurance policy, the Owner shall, if possible, include such insurance, and the cost thereof shall be charged to the Contractor by appropriate Change Order.

§ 11.3.5 If during the Project construction period the Owner insures properties, real or personal or both, at or adjacent to the site by property insurance under policies separate from those insuring the Project, or if after final payment

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property insurance is to be provided on the completed Project through a policy or policies other than those insuring the Project during the construction period, the Owner shall waive all rights in accordance with the terms of Section 11.3.7 for damages caused by fire or other causes of loss covered by this separate property insurance. All separate policies shall provide this waiver of subrogation by endorsement or otherwise.

§ 11.3.6 Before an exposure to loss may occur, the Owner shall file with the Contractor a copy of each policy that includes insurance coverages required by this Section 11.3. Each policy shall contain all generally applicable conditions, definitions, exclusions and endorsements related to this Project. Each policy shall contain a provision that the policy will not be canceled or allowed to expire, and that its limits will not be reduced, until at least 30 days' prior written notice has been given to the Contractor.

§ 11.3.7 WAIVERS OF SUBROGATION

The Owner and Contractor waive all rights against (1) each other and any of their subcontractors, sub-subcontractors, agents and employees, each of the other, and (2) the Architect, Architect's consultants, separate contractors described in Article 6, if any, and any of their subcontractors, sub-subcontractors, agents and employees, for damages caused by fire or other causes of loss to the extent covered by property insurance obtained pursuant to this Section 11.3 or other property insurance applicable to the Work, except such rights as they have to proceeds of such insurance held by the Owner as fiduciary. The Owner or Contractor, as appropriate, shall require of the Architect, Architect's consultants, separate contractors described in Article 6, if any, and the subcontractors, sub-subcontractors, agents and employees of any of them, by appropriate agreements, written where legally required for validity, similar waivers each in favor of other parties enumerated herein. The policies shall provide such waivers of subrogation by endorsement or otherwise. A waiver of subrogation shall be effective as to a person or entity even though that person or entity would otherwise have a duty of indemnification, contractual or otherwise, did not pay the insurance premium directly or indirectly, and whether or not the person or entity had an insurable interest in the property damaged.

§ 11.3.8 A loss insured under the Owner's property insurance shall be adjusted by the Owner as fiduciary and made payable to the Owner as fiduciary for the insureds, as their interests may appear, subject to requirements of any applicable mortgagee clause and of Section 11.3.10. The Contractor shall pay Subcontractors their just shares of insurance proceeds received by the Contractor, and by appropriate agreements, written where legally required for validity, shall require Subcontractors to make payments to their Sub-subcontractors in similar manner.

§ 11.3.9 If required in writing by a party in interest, the Owner as fiduciary shall, upon occurrence of an insured loss, give bond for proper performance of the Owner's duties. The cost of required bonds shall be charged against proceeds received as fiduciary. The Owner shall deposit in a separate account proceeds so received, which the Owner shall distribute in accordance with such agreement as the parties in interest may reach, or as determined in accordance with the method of binding dispute resolution selected in the Agreement between the Owner and Contractor. If after such loss no other special agreement is made and unless the Owner terminates the Contract for convenience, replacement of damaged property shall be performed by the Contractor after notification of a Change in the Work in accordance with Article 7.

§ 11.3.10 The Owner as fiduciary shall have power to adjust and settle a loss with insurers unless one of the parties in interest shall object in writing within five days after occurrence of loss to the Owner's exercise of this power; if such objection is made, the dispute shall be resolved in the manner selected by the Owner and Contractor as the method of binding dispute resolution in the Agreement. If the Owner and Contractor have selected arbitration as the method of binding dispute resolution, the Owner as fiduciary shall make settlement with insurers or, in the case of a dispute over distribution of insurance proceeds, in accordance with the directions of the arbitrators.

§ 11.4 PERFORMANCE BOND AND PAYMENT BOND

§ 11.4.1 The Owner shall have the right to require the Contractor to furnish bonds covering faithful performance of the Contract and payment of obligations arising thereunder as stipulated in bidding requirements or specifically required in the Contract Documents on the date of execution of the Contract.

§ 11.4.2 Upon the request of any person or entity appearing to be a potential beneficiary of bonds covering payment of obligations arising under the Contract, the Contractor shall promptly furnish a copy of the bonds or shall authorize a copy to be furnished.

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ARTICLE 12 UNCOVERING AND CORRECTION OF WORK

§ 12.1 UNCOVERING OF WORK

§ 12.1.1 If a portion of the Work is covered contrary to the Architect's request or to requirements specifically expressed in the Contract Documents, it must, if requested in writing by the Architect, be uncovered for the Architect's examination and be replaced at the Contractor's expense without change in the Contract Time.

§ 12.1.2 If a portion of the Work has been covered that the Architect has not specifically requested to examine prior to its being covered, the Architect may request to see such Work and it shall be uncovered by the Contractor. If such Work is in accordance with the Contract Documents, costs of uncovering and replacement shall, by appropriate Change Order, be at the Owner's expense. If such Work is not in accordance with the Contract Documents, such costs and the cost of correction shall be at the Contractor's expense unless the condition was caused by the Owner or a separate contractor in which event the Owner shall be responsible for payment of such costs.

§ 12.2 CORRECTION OF WORK

§ 12.2.1 BEFORE OR AFTER SUBSTANTIAL COMPLETION

The Contractor shall promptly correct Work rejected by the Architect or failing to conform to the requirements of the Contract Documents, whether discovered before or after Substantial Completion and whether or not fabricated, installed or completed. Costs of correcting such rejected Work, including additional testing and inspections, the cost of uncovering and replacement, and compensation for the Architect's services and expenses made necessary thereby, shall be at the Contractor's expense.

§ 12.2.2 AFTER SUBSTANTIAL COMPLETION

§ 12.2.2.1 In addition to the Contractor's obligations under Section 3.5, if, within one year after the date of Substantial Completion of the Work or designated portion thereof or after the date for commencement of warranties established under Section 9.9.1, or by terms of an applicable special warranty required by the Contract Documents, any of the Work is found to be not in accordance with the requirements of the Contract Documents, the Contractor shall correct it promptly after receipt of written notice from the Owner to do so unless the Owner has previously given the Contractor a written acceptance of such condition. The Owner shall give such notice promptly after discovery of the condition. During the one-year period for correction of Work, if the Owner fails to notify the Contractor and give the Contractor an opportunity to make the correction, the Owner waives the rights to require correction by the Contractor and to make a claim for breach of warranty. If the Contractor fails to correct nonconforming Work within a reasonable time during that period after receipt of notice from the Owner or Architect, the Owner may correct it in accordance with Section 2.4.

§ 12.2.2.2 The one-year period for correction of Work shall be extended with respect to portions of Work first performed after Substantial Completion by the period of time between Substantial Completion and the actual completion of that portion of the Work.

§ 12.2.2.3 The one-year period for correction of Work shall not be extended by corrective Work performed by the Contractor pursuant to this Section 12.2.

§ 12.2.3 The Contractor shall remove from the site portions of the Work that are not in accordance with the requirements of the Contract Documents and are neither corrected by the Contractor nor accepted by the Owner.

§ 12.2.4 The Contractor shall bear the cost of correcting destroyed or damaged construction, whether completed or partially completed, of the Owner or separate contractors caused by the Contractor's correction or removal of Work that is not in accordance with the requirements of the Contract Documents.

§ 12.2.5 Nothing contained in this Section 12.2 shall be construed to establish a period of limitation with respect to other obligations the Contractor has under the Contract Documents. Establishment of the one-year period for correction of Work as described in Section 12.2.2 relates only to the specific obligation of the Contractor to correct the Work, and has no relationship to the time within which the obligation to comply with the Contract Documents may be sought to be enforced, nor to the time within which proceedings may be commenced to establish the Contractor's liability with respect to the Contractor's obligations other than specifically to correct the Work.

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§ 12.3 ACCEPTANCE OF NONCONFORMING WORK

If the Owner prefers to accept Work that is not in accordance with the requirements of the Contract Documents, the Owner may do so instead of requiring its removal and correction, in which case the Contract Sum will be reduced as appropriate and equitable. Such adjustment shall be effected whether or not final payment has been made.

ARTICLE 13 MISCELLANEOUS PROVISIONS

§ 13.1 GOVERNING LAW

The Contract shall be governed by the law of the place where the Project is located except that, if the parties have selected arbitration as the method of binding dispute resolution, the Federal Arbitration Act shall govern Section 15.4.

§ 13.2 SUCCESSORS AND ASSIGNS

§ 13.2.1 The Owner and Contractor respectively bind themselves, their partners, successors, assigns and legal representatives to covenants, agreements and obligations contained in the Contract Documents. Except as provided in Section 13.2.2, neither party to the Contract shall assign the Contract as a whole without written consent of the other. If either party attempts to make such an assignment without such consent, that party shall nevertheless remain legally responsible for all obligations under the Contract.

§ 13.2.2 The Owner may, without consent of the Contractor, assign the Contract to a lender providing construction financing for the Project, if the lender assumes the Owner's rights and obligations under the Contract Documents. The Contractor shall execute all consents reasonably required to facilitate such assignment.

§ 13.3 WRITTEN NOTICE

Written notice shall be deemed to have been duly served if delivered in person to the individual, to a member of the firm or entity, or to an officer of the corporation for which it was intended; or if delivered at, or sent by registered or certified mail or by courier service providing proof of delivery to, the last business address known to the party giving notice.

§ 13.4 RIGHTS AND REMEDIES

§ 13.4.1 Duties and obligations imposed by the Contract Documents and rights and remedies available thereunder shall be in addition to and not a limitation of duties, obligations, rights and remedies otherwise imposed or available by law.

§ 13.4.2 No action or failure to act by the Owner, Architect or Contractor shall constitute a waiver of a right or duty afforded them under the Contract, nor shall such action or failure to act constitute approval of or acquiescence in a breach there under, except as may be specifically agreed in writing.

§ 13.5 TESTS AND INSPECTIONS

§ 13.5.1 Tests, inspections and approvals of portions of the Work shall be made as required by the Contract Documents and by applicable laws, statutes, ordinances, codes, rules and regulations or lawful orders of public authorities. Unless otherwise provided, the Contractor shall make arrangements for such tests, inspections and approvals with an independent testing laboratory or entity acceptable to the Owner, or with the appropriate public authority, and shall bear all related costs of tests, inspections and approvals. The Contractor shall give the Architect timely notice of when and where tests and inspections are to be made so that the Architect may be present for such procedures. The Owner shall bear costs of (1) tests, inspections or approvals that do not become requirements until after bids are received or negotiations concluded, and (2) tests, inspections or approvals where building codes or applicable laws or regulations prohibit the Owner from delegating their cost to the Contractor.

§ 13.5.2 If the Architect, Owner or public authorities having jurisdiction determine that portions of the Work require additional testing, inspection or approval not included under Section 13.5.1, the Architect will, upon written authorization from the Owner, instruct the Contractor to make arrangements for such additional testing, inspection or approval by an entity acceptable to the Owner, and the Contractor shall give timely notice to the Architect of when and where tests and inspections are to be made so that the Architect may be present for such procedures. Such costs, except as provided in Section 13.5.3, shall be at the Owner's expense.

§ 13.5.3 If such procedures for testing, inspection or approval under Sections 13.5.1 and 13.5.2 reveal failure of the portions of the Work to comply with requirements established by the Contract Documents, all costs made necessary by

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such failure including those of repeated procedures and compensation for the Architect's services and expenses shall be at the Contractor's expense.

§ 13.5.4 Required certificates of testing, inspection or approval shall, unless otherwise required by the Contract Documents, be secured by the Contractor and promptly delivered to the Architect.

§ 13.5.5 If the Architect is to observe tests, inspections or approvals required by the Contract Documents, the Architect will do so promptly and, where practicable, at the normal place of testing.

§ 13.5.6 Tests or inspections conducted pursuant to the Contract Documents shall be made promptly to avoid unreasonable delay in the Work.

§ 13.6 INTEREST

Payments due and unpaid under the Contract Documents shall bear interest from the date payment is due at such rate as the parties may agree upon in writing or, in the absence thereof, at the legal rate prevailing from time to time at the place where the Project is located.

§ 13.7 TIME LIMITS ON CLAIMS

The Owner and Contractor shall commence all claims and causes of action, whether in contract, tort, breach of warranty or otherwise, against the other arising out of or related to the Contract in accordance with the requirements of the final dispute resolution method selected in the Agreement within the time period specified by applicable law, but in any case not more than 10 years after the date of Substantial Completion of the Work. The Owner and Contractor waive all claims and causes of action not commenced in accordance with this Section 13.7.

ARTICLE 14 TERMINATION OR SUSPENSION OF THE CONTRACT

§ 14.1 TERMINATION BY THE CONTRACTOR

§ 14.1.1 The Contractor may terminate the Contract if the Work is stopped for a period of 30 consecutive days through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, for any of the following reasons:

- .1 Issuance of an order of a court or other public authority having jurisdiction that requires all Work to be stopped;
- .2 An act of government, such as a declaration of national emergency that requires all Work to be stopped;
- .3 Because the Architect has not issued a Certificate for Payment and has not notified the Contractor of the reason for withholding certification as provided in Section 9.4.1, or because the Owner has not made payment on a Certificate for Payment within the time stated in the Contract Documents; or
- .4 The Owner has failed to furnish to the Contractor promptly, upon the Contractor's request, reasonable evidence as required by Section 2.2.1.

§ 14.1.2 The Contractor may terminate the Contract if, through no act or fault of the Contractor or a Subcontractor, Sub-subcontractor or their agents or employees or any other persons or entities performing portions of the Work under direct or indirect contract with the Contractor, repeated suspensions, delays or interruptions of the entire Work by the Owner as described in Section 14.3 constitute in the aggregate more than 100 percent of the total number of days scheduled for completion, or 120 days in any 365-day period, whichever is less.

§ 14.1.3 If one of the reasons described in Section 14.1.1 or 14.1.2 exists, the Contractor may, upon seven days' written notice to the Owner and Architect, terminate the Contract and recover from the Owner payment for Work executed, including reasonable overhead and profit, costs incurred by reason of such termination, and damages.

§ 14.1.4 If the Work is stopped for a period of 60 consecutive days through no act or fault of the Contractor or a Subcontractor or their agents or employees or any other persons performing portions of the Work under contract with the Contractor because the Owner has repeatedly failed to fulfill the Owner's obligations under the Contract Documents with respect to matters important to the progress of the Work, the Contractor may, upon seven additional days' written notice to the Owner and the Architect, terminate the Contract and recover from the Owner as provided in Section 14.1.3.

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§ 14.2 TERMINATION BY THE OWNER FOR CAUSE

§ 14.2.1 The Owner may terminate the Contract if the Contractor

- .1 repeatedly refuses or fails to supply enough properly skilled workers or proper materials;
- .2 fails to make payment to Subcontractors for materials or labor in accordance with the respective agreements between the Contractor and the Subcontractors;
- .3 repeatedly disregards applicable laws, statutes, ordinances, codes, rules and regulations, or lawful orders of a public authority; or
- .4 otherwise is guilty of substantial breach of a provision of the Contract Documents.

§ 14.2.2 When any of the above reasons exist, the Owner, upon certification by the Initial Decision Maker that sufficient cause exists to justify such action, may without prejudice to any other rights or remedies of the Owner and after giving the Contractor and the Contractor's surety, if any, seven days' written notice, terminate employment of the Contractor and may, subject to any prior rights of the surety:

- .1 Exclude the Contractor from the site and take possession of all materials, equipment, tools, and construction equipment and machinery thereon owned by the Contractor;
- .2 Accept assignment of subcontracts pursuant to Section 5.4; and
- .3 Finish the Work by whatever reasonable method the Owner may deem expedient. Upon written request of the Contractor, the Owner shall furnish to the Contractor a detailed accounting of the costs incurred by the Owner in finishing the Work.

§ 14.2.3 When the Owner terminates the Contract for one of the reasons stated in Section 14.2.1, the Contractor shall not be entitled to receive further payment until the Work is finished.

§ 14.2.4 If the unpaid balance of the Contract Sum exceeds costs of finishing the Work, including compensation for the Architect's services and expenses made necessary thereby, and other damages incurred by the Owner and not expressly waived, such excess shall be paid to the Contractor. If such costs and damages exceed the unpaid balance, the Contractor shall pay the difference to the Owner. The amount to be paid to the Contractor or Owner, as the case may be, shall be certified by the Initial Decision Maker, upon application, and this obligation for payment shall survive termination of the Contract.

§ 14.3 SUSPENSION BY THE OWNER FOR CONVENIENCE

§ 14.3.1 The Owner may, without cause, order the Contractor in writing to suspend, delay or interrupt the Work in whole or in part for such period of time as the Owner may determine.

§ 14.3.2 The Contract Sum and Contract Time shall be adjusted for increases in the cost and time caused by suspension, delay or interruption as described in Section 14.3.1. Adjustment of the Contract Sum shall include profit. No adjustment shall be made to the extent

- .1 that performance is, was or would have been so suspended, delayed or interrupted by another cause for which the Contractor is responsible; or
- .2 that an equitable adjustment is made or denied under another provision of the Contract.

§ 14.4 TERMINATION BY THE OWNER FOR CONVENIENCE

§ 14.4.1 The Owner may, at any time, terminate the Contract for the Owner's convenience and without cause.

§ 14.4.2 Upon receipt of written notice from the Owner of such termination for the Owner's convenience, the Contractor shall

- .1 cease operations as directed by the Owner in the notice;
- .2 take actions necessary, or that the Owner may direct, for the protection and preservation of the Work; and
- .3 except for Work directed to be performed prior to the effective date of termination stated in the notice, terminate all existing subcontracts and purchase orders and enter into no further subcontracts and purchase orders.

§ 14.4.3 In case of such termination for the Owner's convenience, the Contractor shall be entitled to receive payment for Work executed, and costs incurred by reason of such termination, along with reasonable overhead and profit on the Work not executed.

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ARTICLE 15 CLAIMS AND DISPUTES

§ 15.1 CLAIMS

§ 15.1.1 DEFINITION

A Claim is a demand or assertion by one of the parties seeking, as a matter of right, payment of money, or other relief with respect to the terms of the Contract. The term "Claim" also includes other disputes and matters in question between the Owner and Contractor arising out of or relating to the Contract. The responsibility to substantiate Claims shall rest with the party making the Claim.

§ 15.1.2 NOTICE OF CLAIMS

Claims by either the Owner or Contractor must be initiated by written notice to the other party and to the Initial Decision Maker with a copy sent to the Architect, if the Architect is not serving as the Initial Decision Maker. Claims by either party must be initiated within 21 days after occurrence of the event giving rise to such Claim or within 21 days after the claimant first recognizes the condition giving rise to the Claim, whichever is later.

§ 15.1.3 CONTINUING CONTRACT PERFORMANCE

Pending final resolution of a Claim, except as otherwise agreed in writing or as provided in Section 9.7 and Article 14, the Contractor shall proceed diligently with performance of the Contract and the Owner shall continue to make payments in accordance with the Contract Documents. The Architect will prepare Change Orders and issue Certificates for Payment in accordance with the decisions of the Initial Decision Maker.

§ 15.1.4 CLAIMS FOR ADDITIONAL COST

If the Contractor wishes to make a Claim for an increase in the Contract Sum, written notice as provided herein shall be given before proceeding to execute the Work. Prior notice is not required for Claims relating to an emergency endangering life or property arising under Section 10.4.

§ 15.1.5 CLAIMS FOR ADDITIONAL TIME

§ 15.1.5.1 If the Contractor wishes to make a Claim for an increase in the Contract Time, written notice as provided herein shall be given. The Contractor's Claim shall include an estimate of cost and of probable effect of delay on progress of the Work. In the case of a continuing delay, only one Claim is necessary.

§ 15.1.5.2 If adverse weather conditions are the basis for a Claim for additional time, such Claim shall be documented by data substantiating that weather conditions were abnormal for the period of time, could not have been reasonably anticipated and had an adverse effect on the scheduled construction.

§ 15.1.6 CLAIMS FOR CONSEQUENTIAL DAMAGES

The Contractor and Owner waive Claims against each other for consequential damages arising out of or relating to this Contract. This mutual waiver includes

- .1 damages incurred by the Owner for rental expenses, for losses of use, income, profit, financing, business and reputation, and for loss of management or employee productivity or of the services of such persons; and
- .2 damages incurred by the Contractor for principal office expenses including the compensation of personnel stationed there, for losses of financing, business and reputation, and for loss of profit except anticipated profit arising directly from the Work.

This mutual waiver is applicable, without limitation, to all consequential damages due to either party's termination in accordance with Article 14. Nothing contained in this Section 15.1.6 shall be deemed to preclude an award of liquidated damages, when applicable, in accordance with the requirements of the Contract Documents.

§ 15.2 INITIAL DECISION

§ 15.2.1 Claims, excluding those arising under Sections 10.3, 10.4, 11.3.9, and 11.3.10, shall be referred to the Initial Decision Maker for initial decision. The Architect will serve as the Initial Decision Maker, unless otherwise indicated in the Agreement. Except for those Claims excluded by this Section 15.2.1, an initial decision shall be required as a condition precedent to mediation of any Claim arising prior to the date final payment is due, unless 30 days have passed after the Claim has been referred to the Initial Decision Maker with no decision having been rendered. Unless the Initial Decision Maker and all affected parties agree, the Initial Decision Maker will not decide disputes between the Contractor and persons or entities other than the Owner.

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§ 15.2.2 The Initial Decision Maker will review Claims and within ten days of the receipt of a Claim take one or more of the following actions: (1) request additional supporting data from the claimant or a response with supporting data from the other party, (2) reject the Claim in whole or in part, (3) approve the Claim, (4) suggest a compromise, or (5) advise the parties that the Initial Decision Maker is unable to resolve the Claim if the Initial Decision Maker lacks sufficient information to evaluate the merits of the Claim or if the Initial Decision Maker concludes that, in the Initial Decision Maker's sole discretion, it would be inappropriate for the Initial Decision Maker to resolve the Claim.

§ 15.2.3 In evaluating Claims, the Initial Decision Maker may, but shall not be obligated to, consult with or seek information from either party or from persons with special knowledge or expertise who may assist the Initial Decision Maker in rendering a decision. The Initial Decision Maker may request the Owner to authorize retention of such persons at the Owner's expense.

§ 15.2.4 If the Initial Decision Maker requests a party to provide a response to a Claim or to furnish additional supporting data, such party shall respond, within ten days after receipt of such request, and shall either (1) provide a response on the requested supporting data, (2) advise the Initial Decision Maker when the response or supporting data will be furnished or (3) advise the Initial Decision Maker that no supporting data will be furnished. Upon receipt of the response or supporting data, if any, the Initial Decision Maker will either reject or approve the Claim in whole or in part.

§ 15.2.5 The Initial Decision Maker will render an initial decision approving or rejecting the Claim, or indicating that the Initial Decision Maker is unable to resolve the Claim. This initial decision shall (1) be in writing; (2) state the reasons therefor; and (3) notify the parties and the Architect, if the Architect is not serving as the Initial Decision Maker, of any change in the Contract Sum or Contract Time or both. The initial decision shall be final and binding on the parties but subject to mediation and, if the parties fail to resolve their dispute through mediation, to binding dispute resolution.

§ 15.2.6 Either party may file for mediation of an initial decision at any time, subject to the terms of Section 15.2.6.1.

§ 15.2.6.1 Either party may, within 30 days from the date of an initial decision, demand in writing that the other party file for mediation within 60 days of the initial decision. If such a demand is made and the party receiving the demand fails to file for mediation within the time required, then both parties waive their rights to mediate or pursue binding dispute resolution proceedings with respect to the initial decision.

§ 15.2.7 In the event of a Claim against the Contractor, the Owner may, but is not obligated to, notify the surety, if any, of the nature and amount of the Claim. If the Claim relates to a possibility of a Contractor's default, the Owner may, but is not obligated to, notify the surety and request the surety's assistance in resolving the controversy.

§ 15.2.8 If a Claim relates to or is the subject of a mechanic's lien, the party asserting such Claim may proceed in accordance with applicable law to comply with the lien notice or filing deadlines.

§ 15.3 MEDIATION

§ 15.3.1 Claims, disputes, or other matters in controversy arising out of or related to the Contract except those waived as provided for in Sections 9.10.4, 9.10.5, and 15.1.6 shall be subject to mediation as a condition precedent to binding dispute resolution.

§ 15.3.2 The parties shall endeavor to resolve their Claims by mediation which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Mediation Procedures in effect on the date of the Agreement. A request for mediation shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the mediation. The request may be made concurrently with the filing of binding dispute resolution proceedings but, in such event, mediation shall proceed in advance of binding dispute resolution proceedings, which shall be stayed pending mediation for a period of 60 days from the date of filing, unless stayed for a longer period by agreement of the parties or court order. If an arbitration is stayed pursuant to this Section 15.3.2, the parties may nonetheless proceed to the selection of the arbitrator(s) and agree upon a schedule for later proceedings.

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§ 15.3.3 The parties shall share the mediator's fee and any filing fees equally. The mediation shall be held in the place where the Project is located, unless another location is mutually agreed upon. Agreements reached in mediation shall be enforceable as settlement agreements in any court having jurisdiction thereof.

§ 15.4 ARBITRATION

§ 15.4.1 If the parties have selected arbitration as the method for binding dispute resolution in the Agreement, any Claim subject to, but not resolved by, mediation shall be subject to arbitration which, unless the parties mutually agree otherwise, shall be administered by the American Arbitration Association in accordance with its Construction Industry Arbitration Rules in effect on the date of the Agreement. A demand for arbitration shall be made in writing, delivered to the other party to the Contract, and filed with the person or entity administering the arbitration. The party filing a notice of demand for arbitration must assert in the demand all Claims then known to that party on which arbitration is permitted to be demanded.

§ 15.4.1.1 A demand for arbitration shall be made no earlier than concurrently with the filing of a request for mediation, but in no event shall it be made after the date when the institution of legal or equitable proceedings based on the Claim would be barred by the applicable statute of limitations. For statute of limitations purposes, receipt of a written demand for arbitration by the person or entity administering the arbitration shall constitute the institution of legal or equitable proceedings based on the Claim.

§ 15.4.2 The award rendered by the arbitrator or arbitrators shall be final, and judgment may be entered upon it in accordance with applicable law in any court having jurisdiction thereof.

§ 15.4.3 The foregoing agreement to arbitrate and other agreements to arbitrate with an additional person or entity duly consented to by parties to the Agreement shall be specifically enforceable under applicable law in any court having jurisdiction thereof.

§ 15.4.4 CONSOLIDATION OR JOINDER

§ 15.4.4.1 Either party, at its sole discretion, may consolidate an arbitration conducted under this Agreement with any other arbitration to which it is a party provided that (1) the arbitration agreement governing the other arbitration permits consolidation, (2) the arbitrations to be consolidated substantially involve common questions of law or fact, and (3) the arbitrations employ materially similar procedural rules and methods for selecting arbitrator(s).

§ 15.4.4.2 Either party, at its sole discretion, may include by joinder persons or entities substantially involved in a common question of law or fact whose presence is required if complete relief is to be accorded in arbitration, provided that the party sought to be joined consents in writing to such joinder. Consent to arbitration involving an additional person or entity shall not constitute consent to arbitration of any claim, dispute or other matter in question not described in the written consent.

§ 15.4.4.3 The Owner and Contractor grant to any person or entity made a party to an arbitration conducted under this Section 15.4, whether by joinder or consolidation, the same rights of joinder and consolidation as the Owner and Contractor under this Agreement.

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Additions and Deletions Report for

AIA® Document A201™ – 2007

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

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Certification of Document's Authenticity

AIA® Document D401™ – 2003

I, Raymond A. Giolitto, AIA, hereby certify, to the best of my knowledge, information and belief, that I created the attached final document simultaneously with its associated Additions and Deletions Report and this certification at 10:25:41 on 04/13/2009 under Order No. 1000355669_1 from AIA Contract Documents software and that in preparing the attached final document I made no changes to the original text of AIA® Document A201™ – 2007 - General Conditions of the Contract for Construction, as published by the AIA in its software, other than those additions and deletions shown in the associated Additions and Deletions Report.

_____

(Signed)

_____

(Title)

_____

(Dated)

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1. GENERAL CONDITIONS

A. Except as supplemented herein, the "General Conditions of the Contract for Construction", AIA Document A201, 2007 Edition, Articles 1 through 15 inclusive, is a part of this contract and is incorporated herein as fully as if here set forth at length.

1.1 OTHER CONDITIONS

A. Other conditions, in addition to those which supplement the General Conditions, are included in that portion of this section entitled "Other Conditions" and with their inclusion become a part of this contract.

1.1 SUPPLEMENTS

A. The following supplements, modify, delete and/or add to the General Conditions. Where any article, paragraph or subparagraph in the General Conditions is supplemented by one of the following paragraphs, the remaining provisions of such article, paragraph, or sub-paragraph shall stand and the supplemental provisions shall be considered as added thereto. Where any article, paragraph, or sub-paragraph in the General Conditions is amended, voided or superseded by any of the following paragraphs, the provisions of such article, paragraph, sub-paragraph not so amended, voided, or superseded shall remain in effect.

ARTICLES 1-15

"Architect" shall mean Northeast Collaborative Architects.

"Awarding Authority" shall mean the Rhode Island Convention Center Authority.

The term "Owner" and "Awarding Authority" shall be considered synonymous.

ARTICLE 1 - GENERAL PROVISIONS

1.2 CORRELATION AND INTENT OF THE CONTRACT DOCUMENTS

1.2.3 Add the following:

These specifications and drawing notes are of the abbreviated type: in places "Streamlining" occurs through the omission of phases such as "The Contractor Shall", "In Conformity Therewith", or "Shall Be Furnished", and the words "A", "The", "An", and "All". They shall be implied where omitted. Architect/Engineer is abbreviated "A/E".

In addition, the following words shall be interpreted as follows:

"Indicated", where used in specifications, means indicated on the drawings.

"Provide", where used in the specifications, means to both furnish and install the item referenced.

"Furnish", where used in the specifications, means to deliver to job site in state specified and under terms and conditions specified.

"Similar" and "Typical", where used on the drawings, refer to the general sense, rather than the strictly identical. "Similar", where used in the specifications, means a close proximity, as close as possible within the performance requirements.

1.2.4 Add the following:
The Contractor and all Subcontractors shall refer to all of the drawings, including those showing primarily the work of the mechanical, electrical and other specialized trades, and to all of the sections of the specifications, and shall perform all work reasonably inferable there from as being necessary to produce the indicated results.

1.2.5 Add the following:
Where codes, standards, requirements and publications of public and private bodies are referred to in the specifications, references shall be understood to be to the latest revision prior to the date receiving bids, except where specifically indicated otherwise.

1.2.6 Add the following:
In case of discrepancies between contract documents, specifications shall take precedence over drawings, larger scale shall govern smaller scale, and contractual agreement shall take precedence over drawings and specifications.

1.2.7 Add the following:
In the event of conflict between referenced specifications and this project specification, the more restrictive or more costly specification shall govern.

1.2.8 Add the following:
Where drawings indicate partial hachures or detail, and remainder is in outline form, parts or materials so indicated shall apply also to other similar portions of work. Where ornament or other detail is indicated by starting only, such detail shall be continued, and shall apply to other similar parts unless otherwise stated.

1.2.9 Add the following:
The mechanical and electrical drawings are diagrammatic only, and not intended to show the exact physical locations or configurations of work. Such work shall be installed to clear all obstruction, permit proper clearances for the work of other trades, and present an orderly appearance where exposed. Exact location of fixtures and outlets shall be obtained from the A/E as provided in subparagraph 4.2.2 before the work is roughed in; work installed without such information from the A/E may be relocated at the A/E's direction and the Contractor's expense.

1.5 OWNERSHIP AND USE OF INSTRUMENTS OF SERVICE

1.5.2 In first line of this subparagraph delete "and owners" and in second line of the paragraph insert before "will" the words "and either the Architect or the Owner"

At the end of this subparagraph, add the following:

The A/E shall be held harmless and free of any liability and legal costs arising from use of the drawings and specifications for any purpose other than for this project. Furthermore, any release of Ownership of the drawings and specifications by the A/E to the Owner and re-use of these documents for any other project, and/or modifications of these documents for this or any other project, shall void all contractual requirements of the A/E to the Owner and shall further remove and void any expressed or implied liabilities, Warranties, guarantees, etc., of the A/E.

After subparagraph 1.5.2, add the following:

1.5.3 The A/E will furnish, and the Owner will pay for, the following number of copies of drawings and specifications:

5 complete sets for the Contractor. (The A/E will furnish more if they are available).

1 set of black-line prints for creation of record drawings by the Contractor.

Sufficient copies as necessary to obtain building or other permits.

3 copies of revisions and explanatory details issued by the A/E after contract award, for Contractor only.

1.5.4 Alteration to plans, or copies of parts thereof, by the Contractor or their agents, is not permitted, except as required for the record drawing sets.

ARTICLE 2 – OWNER

2.1.2 Delete this subparagraph in its entirety and substitute the following:

The Veterans Memorial Auditorium being owned by the State of Rhode Island, the Project is a so-called "Public Works Project" and pursuant to Rhode Island General Laws Section 34-28-31 no mechanic's lien may be placed upon the building by any party.

2.2 INFORMATION AND SERVICES REQUIRED OF THE OWNER

2.2.4 Delete this subparagraph in its entirety and substitute the following:

2.2.4 Information or services under the Owner's control will be furnished by the Owner with reasonable promptness only after receipt from the Contractor of a written request for such information or services.

2.2.5 Delete this subparagraph in its entirety and substitute the following:

2.2.5 The Contractor will be furnished copies of drawings and specifications as outlined in paragraph 1.5.3.

ARTICLE 3 - CONTRACTOR

3.2 REVIEW OF CONTRACT DOCUMENTS AND FIELD CONDITIONS BY CONTRACTOR

3.2.5. Add the following:

The Contractor shall give the A/E one week notice of any additional design drawings, specifications, or instructions required to define the work in greater detail, or to permit the proper progress of the work. If detailed information is lacking and the Contractor fails to request from the A/E the required information, no excuse will be thereafter entertained for failure to carry out work in a manner satisfactory to the A/E. Should conflict be evident between contract documents, the Contractor is deemed to have estimated the more expensive way of doing the work unless he shall have asked for,

and obtained, a written decision prior to submittal of bid as to which method or materials will be required.

3.3 SUPERVISION AND CONSTRUCTION PROCEDURES

3.3.1 Add the following:

The Contractor shall not commit, nor permit, any act that would interfere with performance of work by other Contractors or suppliers (including those hired by the Owner outside this contract). He / she shall be responsible for job site safety and providing a safe place to work.

Contractor shall coordinate and organize with Owner and A/E biweekly scheduled meetings for prompt resolution of any outstanding issues and for Owner to maintain a fully informed position on renovation activities.

3.5 WARRANTY

Add the following:

3.5.1 The contractor shall be responsible for determining that all materials furnished for the work meet the requirements of the contract documents. The A/E may require the Contractor to produce reasonable evidence that a material meets such requirements, such certified reports of past tests by qualified laboratories, reports of studies by qualified experts, or other evidence which, in the opinion of the A/E, would lead to a reasonable certainty that any material used, or proposed to be used in the work, meets the requirements of the contract documents. All such data shall be furnished at the Contractor's expense. This provision shall not require the Contractor to pay for periodic testing of different lots of the same material, unless such testing is specifically required by the contract documents to be performed at the Contractor's expense.

3.5.2 The warranty provided in these paragraphs 3.5 shall be in addition to and not in limitation of any other warranty required by the contract documents or otherwise prescribed by law.

3.5.3 The Contractor shall procure and deliver to the A/E, no later than the date claimed by the Contractor as the date of substantial completion, all special warranties required by the contract documents. Delivery by the Contractor shall constitute the Contractor's guarantee to the Owner that the warranty will be performed in accordance with its terms and conditions. All warrantee periods shall begin at the date of "Substantial Completion" (not shipping date, installation date, etc...) and end one (1) year later, unless specified otherwise elsewhere, and shall be written in the name of the Owner.

3.6 TAXES

Delete this subparagraph in its entirety and substitute the following:

3.6.1 Owner is exempt from sales tax on products permanently incorporated in work. Contractor shall obtain sales tax exemption certificate number from Owner.

3.6.2 Contractor shall furnish copies of all invoices for material incorporated in work to Owner. Upon completion of work, Contractor shall file with Owner a notarized statement that all purchases made were entitled to be exempt. Contractor shall pay legally assessed penalties for improper use of Owner's tax exemption status.

3.7.1 At the end of this subparagraph add the following sentence:

A photocopy of the various building permits shall be delivered to Architect and Owner as soon as they are obtained. As a condition to Final Payment hereunder, Contractor shall deliver all original permits, licenses and certificates to Owner and photocopies to Architect.

3.7. 2. At the end of the subparagraph add the following sentence:

If any of the Work is required to be inspected or approved by any public authority, the Contractor shall cause such inspection or approval to be performed.

3.9.1 Add the following:

Contractor shall designate a superintendent at commencement of work. This superintendent shall be assigned to this Project only, unless agreement otherwise in writing is given by the A/E and Owner. This superintendent shall remain assigned to this project only for the duration of this project unless otherwise agreed to in writing by A/E and Owner.

3.10.1 Delete this subparagraph in its entirety and substitute the following:

3.10.1 Within 5 days after work is commenced, prepare and submit to the A/E, for his review, a practicable and feasible schedule, indicating order in which the work shall be carried out and dates on which salient features, including procurement of the various materials, plant and equipment, shall be commenced. Include contemplated dates for completing work. Schedule shall be in form of a progress chart of suitable scale to appropriately indicate percentage of work scheduled and completed. Copy of sample chart will be available from A/E. Contractor shall enter on chart actual progress at end of each week, or at such intervals as directed by A/E, and shall thereafter deliver two copies to the A/E, with each periodic application for payment.

3.11 DOCUMENTS AND SAMPLES AT THE SITE

Delete this subparagraph in its entirety and substitute the following:

The Contractor shall maintain at the site for the Owner one record copy of all drawings, specifications, addenda, change orders and other modifications, in good order and marked currently to record all changes made during construction and reviewed shop drawings, product data and samples.

3.12 SHOP DRAWINGS, PRODUCT DATA AND SAMPLES

3.12.6 Delete this subparagraph in its entirety and substitute the following:

3.12.6 All submittals shall bear the approval stamp and signature of the Contractor before submission to the A/E. By approving and submitting shop drawings, product data, and samples, the Contractor thereby represents that he has determined and verified all dimensions, quantities, field dimensions, relations to existing work, coordination with work to be installed later, coordination with information on previously accepted shop drawings, product data, or samples and verification of compliance with all the requirements of the contract documents. The accuracy of all such information is the responsibility of the Contractor. In reviewing shop drawings, product data, and samples, the A/E shall be entitled to rely upon the Contractor's representation that such information is correct and accurate.

3.13 USE OF THE SITE

Delete this subparagraph in its entirety and substitute the following:

3.13 The right of possession of the premises and the improvements made thereon by the Contractor shall remain at all times with the Owner. The Contractor's right to entry and use thereof arises solely from the permission granted by the Owner under the contract documents The Contractor shall confine his apparatus, the storage of materials and the operations of his workmen to limits indicated by law, ordinances, the contract documents and permits and directions of the A/E and Owner. The Contractor shall not unreasonably encumber the premises with his materials.

3.18 Change the title of paragraph 3.18 to "INDEMNIFICATION AND COVENANT NOT TO SUE"

At the end of the first line of this paragraph after “Owner,” insert “the State of Rhode Island,”

After this paragraph, add the following:

3.19 CERTIFICATES

3.19.1 Contractor, if required by specifications or A/E's request, shall furnish an affidavit from manufacturer certifying that materials or products delivered to project meet the requirements specified. Such certifications shall not relieve Contractor from responsibility of complying with requirements in the contract documents.

ARTICLE 4 - ARCHITECT

4.2.4 Delete the subparagraph in its entirety and substitute the following:

4.2.4 The Owner and Contractor may communicate with each other directly or through the Architect about matters arising out of or relating to the Contract. Communications by and with the Architect’s consultants shall be through the Architect. Communications by and with Subcontractors and material suppliers shall be through the Contractor. Communications by and with separate contractors, is any, shall be through the Owner.

4.2.7 Change first line to read "The A/E will review, or take other …"

4.2.9 In the first line of this subparagraph, delete the word "Inspections" and replace with "Observations of the Work".

Add the following:

4.2.15 If the Contractor claims that any instructions or orders, whether oral, written, or by drawings, or otherwise, involve extra cost or time, and such instructions or orders are not accompanied by a written acknowledgment by the Owner or A/E that extra payment will be made or time extended, he shall promptly so notify the A/E in writing and shall not proceed with the work until he has received a further written order to proceed, except, as provided in paragraph 10.4, in the case of an emergency affecting life or property. No claim for extra cost or time on account of such instructions or orders shall be valid unless the Contractor has so notified the A/E, before proceeding, that he claims extra cost and time and has received the further written order to proceed.

Upon receipt from the Contractor of a written notice of claim the A/E shall review such claim and if he determines that any work in dispute should proceed, he shall issue to the Contractor a written order to proceed, in which he shall review the Contractor's claim, in whole or in part, or shall instruct the Contractor to proceed with the work subject to a later determination by A/E of the Contractor's right to extra payment.

To the extent that the A/E, when issuing the written order to proceed, reviews the Contractor's claim, the contract sum shall be adjusted, subsequently. If the A/E, when issuing his written order to proceed, instructs the Contractor to proceed with the work subject to a later determination by the A/E of the Contractor's right to extra time or payment, the Contractor shall have the right to request a decision from the A/E, but the Contractor shall proceed with the work without delay, in any case.

ARTICLE 5 - SUBCONTRACTORS

5.1 DEFINITIONS

5.1.2 After this paragraph, add the following:

5.1.3 Each Subcontractor or Sub-Subcontractor shall be a person or organization of established reputation, regularly engaged in specialized manufacture or installation of items required, who selects and combines materials involved, who maintains and makes available for this purpose a regular force of workmen skilled in such work, and who is licensed as an installer by manufacturer of products involved or is working under direct supervision of manufacturer. The term "Subcontractor", as used in the specifications, may mean either a Subcontractor or Sub-Subcontractor.

ARTICLE 7 - CHANGES IN THE WORK

7.3.3 Delete this subparagraph in its entirety and substitute the following:

The amount by which the contract sum shall be adjusted shall be determined by one of the following methods, as selected by the Owner.

(A) By unit prices, when stated in the contract documents.

(B) By cost and percentages estimated by the Contractor and accepted by the Owner. The Contractor's estimate shall become a fixed price which shall not be changed by any variation in the actual cost of executing the work.

(C) By actual cost determined after the work is completed, plus percentage.

(D) By submission to a court having competent jurisdiction (or arbitration if mutually agreed upon by Owner and Contractor or if mandated by laws or regulations of governing authority), which shall determine the fair value of the work covered by the change.

As used in this paragraph, "cost" shall be limited to the following: cost of materials, including sales tax (if applicable) and cost of delivery, cost of labor, including social security, old age and unemployment insurance (labor cost may include a pro rate share of the foreman's time only in case an extension of contract time is granted on account of the change); workmen's compensation insurance; rental value of power tools and equipment.

As used in this paragraph, "Overhead" shall include all other expenses not included in "cost". "All other expenses" shall be described as including, but not limited to, bond premiums, insurance

premiums, supervision, foremen, superintendents, time-keepers, watchmen, clerks, small tools, incidentals, general office expenses, supervisory personnel, accounting and home office expenses.

As used in this paragraph, "percentage" shall mean an allowance to be added to the cost in lieu of overhead and profit. The allowance for overhead and profit combined, included in the total cost to the Owner, shall be based on the following schedule:

For the Contractor, Subcontractor, or Sub-Subcontractor, for any work performed by his own forces, 15% of the cost.

For the Contractor, Subcontractor, or Sub-Subcontractor, for the work performed by his respective Subcontractor, 8% of the amount due his Subcontractor.

When in the judgment of the A/E, a series of additive or credit change orders accumulate to a single change, percentage shall be calculated on the cumulative net increase in cost, if any. In the case of changes which result in a net decrease in cost, the credit to the Owner shall be the exact amount of the decrease in cost. No credit shall be given for overhead or profit on such decrease.

If the Owner elects to determine the cost of the work by unit prices as provided in subparagraph 7.3.3 and the nature of the work is such that its extent cannot readily be measured after the completion of such work or any subsequent work, the Contractor shall keep daily records, available at all times to the Architect for review, of the actual quantities of such work put in place, and delivery receipts or other adequate evidence, acceptable to the A/E, indicating the quantities of materials delivered to the site for use in such unit price work, and distinguishing such from other similar material delivered for use in work included in the base contract sum. If so require by the A/E, materials for use in unit price work shall be stored apart from all other materials on the project.

If the Owner elects to determine the cost of the work as provided in subparagraph 7.3.3 using unit prices as stated in the contract documents or subsequently agreed upon, and if the quantities originally contemplated are so changed in a proposed change order that application of the agreed unit prices to the quantities of work proposed will create a hardship on the Owner or the Contractor, the applicable unit prices shall be equitably adjusted to prevent such hardship. Notwithstanding the inclusion of unit prices in the contract documents, it shall be the Owner's option to require the cost of any given change to be determined by one of the other methods stated in 7.3.3.

If the Owner elects to determine the cost of the work as provided in method (C) and (D) of subparagraph 7.3.3 or if the method of determining the cost has not been established before the work is begun, the Contractor shall keep detailed daily records of labor and materials costs applicable to the work.

Upon request of the Owner or the A/E, the Contractor shall submit to the A/E, in such form as the A/E may require, an accurate written estimate of the cost of any proposed extra work or change prior to any execution. The estimate shall indicate the quantity and unit cost of each item of materials, and the number of hours of work and hourly rate for each class of labor, as well as the description and amounts of all other costs chargeable under the terms of this article. Unit labor costs for the installation of each item of materials shall be shown if required by the A/E. The Contractor shall promptly revise and resubmit such estimate if the A/E determined that is in not in compliance with the requirements of this article, or that it contains errors of fact or mathematical errors. If required by the A/E, in order to establish the exact cost of new work added or of previously required work omitted, the Contractor shall obtain and furnish to the A/E bona fide proposals from recognized suppliers for furnishing any material or labor included is such work. Such estimates shall be furnished promptly so as to occasion no delay in the work, and shall be furnished at the Contractor's expense. The Contractor

shall state in the estimate any extension of the time required for the completion of the work if the change or extra work is ordered.

ARTICLE 8 - TIME

8.1.3 In the first line of this subparagraph, delete the work "certified" and replace with the word "determined".

ARTICLE 9 - PAYMENTS AND COMPLETION

9.2 SCHEDULE OF VALUES

Add at the end of the first sentence:

"And shall be revised if later found by the A/E to be inaccurate".

Add the following:

“Schedule of values shall not be altered without written permission of A/E.”

9.3 APPLICATION FOR PAYMENT

9.3.1 Add the following:

"The format and number of copies of such application for payment shall be as directed by the Architect.

9.4.2 Delete the word "certified" and replace with the word "determined".

9.5 DECISIONS TO WITHHOLD CERTIFICATION

9.5.1 Delete the word "certify" wherever it appears in this subparagraph and replace with the word "recommend". Also, add sub-paragraph 9.5.1.8 as follows:

"Failure of any Subcontractor to comply with mandatory requirements for maintaining properly executed record drawings".

9.6 PROGRESS PAYMENTS

9.6.1 Delete this subparagraph in its entirety and substitute the following:

9.6.1 The Owner shall make payment to the Contractor within a total of 25 calendar days from when the Contractor's Application for Payment is received. A retainage not exceeding ten (10) percent of the approved amount will be withheld from each payment for work performed during the preceding month and for materials not incorporated in the work but delivered and suitably stored at the site or at some location agreed upon in writing to which the Contractor has title or a Subcontractor has title and has authorized the Contractor to transfer title to the Owner. Any additional retainage, which may be required, shall be over and above the initial ten (10) percent retained.

9.6.1.1 First progress payment - A/E will process this requisition, only after he has received (1) the information required of post-bid information/submissions of the instructions to bidder, (2) certification

that the Contractor is currently maintaining as-built drawings, and (3) the information required of Article 3 of the General Conditions and Supplementary Conditions.

9.6.1.2 Second and subsequent progress payments - the A/E will process the second and subsequent requisitions only after receipt of (1) the certification that Contractor is currently maintaining as-built drawings and (2) release of liens.

9.6.1.3 Releases of lien shall be required from all Subcontractors and material suppliers who, at the time of submission by the contractor of his previous requisition for payment, have submitted a requisition for payment. Requisitions will not be processed unless these releases are included herewith.

9.6.1.4 Contractor shall immediately satisfy any lien or encumbrance which, because of any act or default of the Contractor is filed against the premises, and indemnify and save the Owner harmless against all resulting loss and expenses, including attorney's fees. In addition, moneys due under this contract, as may be considered necessary by the Owner, may be retained by the Owner until all such suits, claims for damages or expenses as aforesaid shall have been settled and paid.

9.7 FAILURE OF PAYMENT
Delete the word "certified" in this subparagraph and replace with the word "recommended".

9.8 SUBSTANTIAL COMPLETION

9.8.1 At the end of this sub-paragraph, add the following:

"And only minor items which can be corrected or completed without substantial interference with the Owner's use of the work remain to be corrected or completed".

9.10 FINAL COMPLETION AND FINAL PAYMENT

9.10.1 Delete the word "inspection" wherever it appears in this subparagraph and replace with the word "review". Also, delete the word "promptly" wherever it occurs in this subparagraph.

9.10.3 Delete the word "certification" wherever it appears and replace with "recommendation".

ARTICLE 11 – INSURANCE AND BONDS

11.1 CONTRACTOR'S LIABILITY INSURANCE

11.1.1 In the second line following the word "companies" insert the words, "to which the Owner has no reasonable objection".

11.1.2 Delete subparagraph 11.1.2 in its entirety and substitute the following.

11.1.2 The insurance required by Section 11.1.1 shall be written for not less than the limits of liability specified below or required by law, as applicable. Coverages shall be written on an occurrence basis and shall be maintained without interruption from date of commencement of the Work until date of final payment and termination of any coverage required to be maintained after final payment.

a. Commercial General Liability:	$1,000,000	General Aggregate Limit (other than Products-Completed Operations)

	$1,000,000	Products-Completed Operations Aggregate Limit
	$1,000,000	Personal and Advertising Liability
	$1,000,000	Each Occurrence Limit
	$1,000,000	Fire Legal Liability
	$ 10,000	Medical Expense Limit (each person)
	$1,000,000	Employee Benefit Liability
b. Business Automobile Liability	$1,000,000	Bodily Injury and Property Damage Combined Single Limit
c. Excess Umbrella Liability		Minimum of $5,000,000
d. Worker's Compensation		In accordance with Rhode Island law

e. Contractor's Property Insurance as identified in Paragraph 11.1.2.2 below.

11.1.2.1 As to the Commercial General Liability policy, it shall include, without limitation, the following coverage: (i) Premises/Operations, including deletion of explosion, collapse and underground (XCU) exclusions, (ii) Independent Contractor's Protective Liability, (iii) Products/Completed Operations to be maintained in full force and effect for a period of two (2) years following Final Payment and continuing to name required parties as additional insureds for the entire two (2) year period, (iv) Broad Form Contractual Liability, (vi) Personal Injury Liability, (vii) endorsements equivalent to ISO CG 20 10 for ongoing operations and CG 20 37 for completed operations, (viii) endorsement equivalent to CG 24 04, a Waiver of Subrogation in favor of Owner and additional insureds, and (ix) shall include endorsement CG 24 10, coverage for injury to leased workers. Additionally, the General Aggregate limit shall be specifically endorsed to provide that the General Aggregate Limit applies separately to the Project.

11.1.2.2 Business Automobile Liability shall include contractual liability coverage for all owned, non-owned and hired vehicles. The Umbrella Policy shall specifically identify each of the policies described in Section 11.1.2a on the Schedule of Underlying Coverage, and shall provide coverage at least as broad as each and every one of the underlying policies. The Contractor's Property Insurance shall cover all property owned by, or in control of, Contractor or which is not to be incorporated into the Work, including, without limitation, tools, equipment and materials, Owner shall not be responsible for, nor shall it insure, such property of the Contractor or any subcontractor. Contractor shall also maintain Contractor's Equipment Floater Insurance for owned or leased equipment under its care, custody and control as required for the performance of Contractor's duties. The policy shall include a waiver of subrogation in favor of the Owner.

11.1.4 Delete this subparagraph in its entirety and substitute the following

11.1.4 The Contractor shall cause the commercial liability coverage and umbrella policy required above to include: (i) the Owner, State of Rhode Island, the Architect and the Architect's consultants as additional insureds for claims caused in whole or in part by Contractor's negligent acts or omissions during the Contractor's operations; (ii) the Owner and State of Rhode Island as additional insureds for claims caused in whole or in part by the Contractor's negligent acts or omissions during the Contractor's negligent acts or completed operations, and (iii) and if requested by Owner as additional insureds on the Business Automobile Liability policy. The coverage afforded under any insurance policy obtained under or pursuant to Section 11.1 shall be primary to any valid and collectible insurance carried separately by any of the required additional insureds.

Add the following:

11.1.5 In no event shall any failure of Owner to receive certificates of insurance required under Section 11.1.3 hereof or to demand receipt of such certificates of insurance prior to Contractor commencing Work be construed as a waiver of the Contractor's obligations to obtain insurance.

11.1.6 Contractor shall cause each subcontractor, vendor or supplier to procure and maintain insurance coverage in accordance with the requirements of above, but with limits of liability as deemed appropriate by Contractor.

11.3.1.4 At the end of this sub-paragraph, add the following:

The Contractor shall report the value, time and location of any such transit or temporary location. Contractor shall be responsible for any loss that is uninsured or underinsured arising out of such failure to notify the Owner.

11.3.1.5 delete.

11.3.3 BOILER AND MACHINERY INSURANCE

In the first line of this paragraph, delete the word “The Owner” and replace with “The Contractor”.

11.3.7 WAIVERS OF SUBROGATION

At the end of this subparagraph, add the following:

The legal owner of the building upon which the Work is being performed is the State of Rhode Island. Nothing herein shall require a waiver of subrogation as to any insurance policies owned by it.

11.4 PERFORMANCE BOND AND PAYMENT BOND

11.4.2 After this subparagraph, add the following:

11.4.3 Having satisfied all conditions of award as set forth elsewhere in these documents, successful bidder shall, within five days of award, furnish a performance bond and labor-and-materials bond in penal sum of not less than 100% of amount of contract as awarded, as security for faithful performance of the contract, and for payment of persons, firms or corporations to whom Contractor may become legally indebted for labor, materials, tools, equipment, or services, of any nature, employed or used by him in performing the work. Such bonds shall be in the forms stipulated in the bidding requirements, in such number of counterparts as Owner may require and shall bear same date as, or a date subsequent to, date of "agreement". Separate bond forms shall be furnished upon request.

11.4.4 The Bonds must be appropriately executed by the Contractor and:

i) The Surety Company executing the Bonds must be licensed to do business in the State of Rhode Island or the Bonds must be countersigned by a company so licensed.

ii) The Bonds must be signed by an official of the Surety Company and the corporate seal must be affixed over his signature.

iii) Signatures of witnesses must appear on the Bonds.

iv) A power of Attorney for the official signing of the Bond for the Surety Company must be submitted with the Bond.

11.4.5 Failure of successful bidder to execute such bond contract, and to supply required bonds within such period as Owner may grant, based on reasons determined adequate by the Owner, shall constitute default, and Owner may either award contract to next responsible bidder, or re-advertise for bids, of bid and amount for which a contract for the work is subsequently executed, irrespective of whether amount thus due exceeds amount of bid guaranty.

ARTICLE 12 - UNCOVERING AND CORRECTION OF WORK

12.2 Correction of work

12.2.1 Add the following:

"And any cost, loss, or damages to the Owner resulting from such failure or defect".

ARTICLE 13 - MISCELLANEOUS PROVISIONS

13.2 SUCCESSORS AND ASSIGNS

13.2.2 After this subparagraph, add the following:

13.2.3 If, after making final payment, the Owner conveys to a third party any building or other improvement constructed under the contract, any rights with respect to the property so conveyed which the Owner may have against the Contractor under Article 13 or by virtue of claims which, under the terms of subparagraph 9.10.4 are reserved to the Owner after the making and acceptance of final payment, shall automatically transfer to such third party.

13.5 TESTS AND INSPECTIONS

13.5.4 Delete this subparagraph in its entirety and substitute the following:

13.5.4 The Contractor shall obtain and deliver promptly to the A/E any required certificates of testing, review, final inspection of any part of his work or operating permits for any mechanical apparatus, such as elevators, escalators, boilers, air compressors, etc., which may be required by law to permit full use and occupancy of the premises by the Owner. Receipt of such permits or certificates by the A/E shall be a condition precedent to substantial completion of the work.

13.6 INTEREST

13.6.1 Delete this subparagraph in its entirety and substitute the following:

13.6.1 Approved payments due and unpaid under the contract documents shall bear interest from a date thirty days after such approval at such rate as the parties may agree upon in whiting or, in the absence thereof, at the legal rate prevailing at the place of the project.

ARTICLE 14 - TERMINATION OR SUSPENSION OF THE CONTRACT

14.2 TERMINATION BY THE OWNER FOR CAUSE

14.2.1 thru 14.2.4 Delete these subparagraphs in their entirety and substitute the following:

14.2.1 If the Contractor is adjudged a bankrupt, a trustee-in-bankruptcy, appointed by the bankruptcy court, may proceed to continue performance of the construction contract after giving the Owner adequate assurance of its ability to cure defaults, compensate for damages and perform satisfactorily in the future. The trustee-in-bankruptcy shall also assume all terms and conditions of the contract including all liquidated damage clauses that may be stated therein.

14.2.1.1 If no trustee-in-bankruptcy is appointed by the bankruptcy court and the Contractor makes a general assignment for the benefit of his creditors, or if a receiver is appointed on account of his insolvency, except as stipulated in paragraph 14.2.1, the Owner may, only after a review of the circumstances by legal counsel, terminate the employment of the Contractor, take over the site and finish the work.

14.2.2 If the Contractor should persistently or repeatedly refuse or should fail, except in cases for which extension of time is provided, to supply enough properly skilled workmen or proper materials, or if he should fail to make prompt payment to Subcontractors or for materials or labor, or if it is found by the Rhode Island Director of Labor and Training that any employee employed by Contractor or any subcontractor directly on the Project site has been or is being paid a rate of wages less than the wages required by the Contract, or Contractor persistently disregards laws, ordinances, rules, regulations or orders of any public authority having jurisdiction or Contractor disregards an instruction, order or decision of the A/E, or otherwise is guilty of substantial violation of any provision of the contract, then the Contractor shall be in default, and the Owner, with the concurrence of the A/E, may, without prejudice to any other right or remedy and upon written notice to the Contractor, take possession of all materials, tools, appliances, equipment, construction equipment and machinery and vehicles, offices and other facilities on the project site, and all materials intended for the project, wherever stored, and, seven (7) days after such notice, may terminate the employment of the Contractor, and finish the work by whatever methods he may deem expedient. In such case the Contractor shall not be entitled to receive any further payment until the work is finished.

14.2.3 If the balance of the contract sum exceeds the costs of finishing the work, including compensation for the A/E's additional services made necessary thereby, such excess shall be paid to the Contractor. If such costs exceed the unpaid balance, the Contractor or his surety shall pay the difference to the Owner. The amount to be paid to the Contractor or to the Owner, as the case may be, shall be recommended by the A/E, upon application, in the manner provided in paragraph 9.4, and this obligation for payment shall survive the termination of the contract.

OTHER CONDITIONS

A. "DIG SAFE" DAMAGE PREVENTION SYSTEM

All Contractors or Subcontractors performing drilling, boring, augering, jetting, sheeting or pile installation, soil preloading for consolidation, demolition, excavation or like work shall, prior to commencement of these activities, contact utility companies having responsibility for underground transmission systems for information relative to locations of existing underground utilities and/or an appropriate dig safe damage prevention and notification agency.

END OF DOCUMENT

WAGE RATE REQUIREMENTS

Prevailing wages shall be those in effect as of the date of bid issuance. Prevailing wages can be obtained online at the Division of Labor and Training website: http://www.dlt.ri.gov/pw/

END OF DOCUMENT

011100 SUMMARY OF WORK

A. Project Number 1046-3 is entitled Veterans Memorial Auditorium, Phase III. The existing steel framed masonry and terra cotta six story building located near the Capitol Building of Rhode Island is to have the upper 3 floors renovated, new auditorium HVAC system, and other miscellaneous construction. The work is to be completed and ready for use by the Owner within the Contract Time specified in the Contract.

B. The Project Description:

1. Park Street sidewalk on western side of street, new metal decorative fence & and bollards around existing dumpster pad.
2. Construction of a 6+ story steel framed and masonry cavity wall egress stair on existing foundation at rear of building. Installation of new walk-in refrigerator with mechanical system.
3. Removing and discarding interior terra cotta, masonry and removable partitions, raised flooring, doors, millwork, ceilings, carpet, plumbing, light fixtures, unused electrical wiring and HVAC ductwork and systems.
4. Provide new interior drywall and movable partitions, interior finishes include painted and exposed masonry, painted gypsum board. Floor coverings include vinyl composition & ceramic tile, carpet tile.
5. Ceilings shall be exposed painted structure, and suspended acoustical panel systems. Provide new HVAC and Fire Protection systems for interior spaces.

C. This project has two phases, Phase IIIa and Phase IIIb. Each phase includes but is not limited to the following:

1 Phase IIIa – *Office Tower and site work*;

a Architectural Precast Concrete;

b Masonry;

c Structural Steel, Miscellaneous Metals;

d Rough Carpentry, Architectural Woodwork, Laminate Clad Casework;

e Waterproofing, Insulation, Firestopping, Roof repair, Sheet metal, and Joint Sealants;

f Doors and Frames, Roll-up shutters, Hardware;

g Drywall, Floor Coverings, Acoustical Ceilings, and Painting;

h Toilet Compartments, Louvers and Vents, Signage, Fire Extinguishers, and Toilet Accessories;

i Walk-in Refrigerator and Equipment;

2 Phase IIIb - *Auditorium and auditorium lobbies & vestibules*

a Painting and plaster repair of all surfaces;

b New auditorium stair handrails.

D. Work Sequence - phases:

1 Phase IIIa work shall begin as soon as contract signing and shall be completed by January 28, 2014.

2 Phase IIIb work shall begin on June 15, 2014, and be completed by August 30, 2014.

3 Any additional work, overtime, and efforts to meet the scheduled deadline will be the responsibility of the General Contractor.

E. The Contractor will include in his bid, all items required in order to carry out the intent of the work as described, shown and implied in the Contract Documents.

F. It shall be the Contractor's responsibility upon discovery to immediately notify the Construction Administrator, in writing, of errors, omissions, discrepancies, and instances of non-compliance with applicable codes and regulations within the documents, and of any work which will not fit or properly function if installed as indicated on the Contract Documents. Any additional costs arising from the Contractor's failure to provide such notification shall be borne by the Contractor.

G. The Work will be constructed under a single lump sum.

011105 OWNER

A. Owner: The Owner is:

The Rhode Island Convention Center Authority
Dunkin' Donuts Center – Third Floor
One LaSalle Square
Providence, RI 02903
v: 401.351.4295.

B. The Owner Representative and Construction Administrator is **Betty Sullivan**, Director of Financial Operations for the Authority. Communication with the Owner Representative shall be through the Contractor.

011110 ARCHITECT:

A. The Architectural Firm is **Northeast Collaborative Architects LLC** (NCA), and is located at 333 Westminster Street, 4th Flr, Providence, RI 02903. The Architect representing the firm for this project is J. Michael Abbott, AIA, Partner; jmabbott@ncarchitects.com. NCA's contact shall be: Oran Mills, AIA; omills@ncarchitects.com. Phone: 860.344.9332

A. The Architect and Engineer or their accredited representative is referred to in the Contract Documents as "Architect" or "Architects" or "Engineer" or "Engineers" or by pronouns which imply them. As information for the Contractor, the Architect's or Engineer's status is defined as follows:

a. The Architect and Engineer will not make interpretations or decisions directly to the Contractor. All interpretations or decisions will be conveyed through the Construction Administrator or Ower.

b. As the authorized representative of the Owner, the Architect and Engineer is responsible for review of shop drawings, materials, and equipment intended for the work, in accordance with the "General Conditions", and the "Supplementary Conditions".

A. Wherever the Architect or Engineer is mentioned in the documents in connection with an administrative function, it shall include the Construction Administrator in that function except for shop drawings.

011115 EXAMINATION OF SITE

A. It is not the intent of the Documents to show all existing conditions. All contractors are advised to visit and examine the site with the Construction Administrator prior to submitting bids.

B. Contractors should investigate and satisfy themselves as to the conditions affecting the work, including but no restricted to those bearing upon transportation, disposal, handling and storage of materials, availability of labor, water, electric power, uncertainties of weather, roads or similar physical conditions of the ground, the character of equipment, and facilities needed preliminary to and during the prosecution of the Work. The Contractor should further satisfy himself as to the character, quality, and quantity of surface and subsurface materials or obstacles to be encountered insofar as this information is reasonably ascertainable from an inspection of the site, as well as from information presented by the Contract Documents. Any failure by the Contractor to acquaint himself with the available information shall not relieve him from the responsibility for estimating properly the difficulty and cost of successfully performing the Work.

C. Pre-Bid Conference:

a. A Pre-Bid Conference and tour of the site will be conducted as scheduled in the Notice to Bidders. This scheduled conference is the only official opportunity for the bidders to tour the site with the Owner, Architect, Engineer, and Construction Administrator.

011130 PROJECT DOCUMENTS

A. The Specifications and Drawings are intended to describe the materials and final appearance of the Work of this Project. They are diagrammatic and do not reflect the labor required or all of the myriad details of constructing this Project. The Owner has contracted with the Contractor because it is understood by both parties that the Contractor has the experience to understand the intent of the Contract Documents and to properly construct the Work.

B. Throughout the Technical Specifications, various State, local and Federal Standards are referenced. Where so referenced the requirements of the latest editions set forth therein are applicable and made a part hereof.

011140 DOCUMENTS FURNISHED

A. The General Contractor will be given three (3) print sets and one PDF set of the Contract Documents on or about the time of execution of Contract, free of charge. The contractor will be responsible for any additional copies.

B. The Contractor shall receive ***one (1)*** set of AutoCAD compatible (latest version) Floor Plans on disks at no cost on or about the time of execution of the Contract from the Architect. Additional sets of AutoCAD compatible (latest version) Floor Plans on disks from the Architect are available at the cost of their reproduction, to the contractor.

011160 OCCUPANCY REQUIREMENTS

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

1. Provide adequate building and fire code egress from the buildings during the renovation process. The Contractor will be responsible to maintain and protect egress ways during the construction sequence per the design as supplied by the Architect. Contractor shall be responsible for preparing egress plans for Owner approval and for Office of State Building Official and Office of State Fire Marshal for approval if required.

B. **Partial Owner Occupancy:** The Owner reserves the right to occupy and to place and install equipment in completed areas of the building prior to Substantial Completion, provided such

occupancy does not interfere with completion of the Work. Such placing of equipment and partial occupancy shall not constitute acceptance of the total Work.

1. Should it become necessary or advisable, as the work nears final completion, for the Owner to occupy a portion of the building prior to final acceptance, the Contractor shall cooperate in completing such areas and making same accessible.
2. The Construction Administrator will determine whether such occupancy or use is possible and, if so, will make arrangements for holding a job inspection with the Project Manager, Owner's Representative, Architect and General Contractor.
3. A comprehensive list of items to be completed or corrected as issued by the General Contractor, together with the status of completion and terms of occupancy, will be forwarded to the Architect by the Construction Administrator. A letter will be issued by the Construction Administrator and Architect to the Owner granting such occupancy and will state the terms and conditions of occupancy.
4. Prior to partial Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.
5. The Architect will prepare a "Certificate of Substantial Completion" for each specific portion of the Work to be occupied prior to Owner occupancy. Use the "Certificate of Substantial Completion" form as required by the Owner.
6. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building.
7. Work after Partial Owner Occupancy:
    a. For all work to complete the area occupied, warranty work, the balancing and commissioning of systems, repair of latent defects and adjustments after partial occupancy, the contractor is responsible for all costs associated with working in occupied buildings.

C. **Owner Occupancy:**

1. The Construction Administrator will determine whether such occupancy is possible and, if so, will make arrangements for holding a job inspection with the Owner Representative, Architect and General Contractor.
2. A comprehensive list of items to be completed or corrected as issued by the General Contractor, together with the status of completion and terms of occupancy, will be forwarded to the Contractor by the Architect and the Construction Administrator.
3. Prior to Owner occupancy, mechanical and electrical systems shall be fully operational. Required inspections and tests shall have been successfully completed. Upon occupancy, the Owner will operate and maintain mechanical and electrical systems serving occupied portions of the building.
4. The Architect will prepare a "Certificate of Substantial Completion" for the Work to be occupied prior to Owner occupancy. Use the "Certificate of Substantial Completion" form as required by the Owner.
5. Upon occupancy, the Owner will assume responsibility for maintenance and custodial service for occupied portions of the building.

6. Work after Owner Occupancy:
    a. For all work to complete the occupied building, warranty work, the balancing and commissioning of systems, repair of latent defects and adjustments after occupancy, the contractor is responsible for all costs associated with working in occupied buildings.

011413 CONTRACTOR'S USE OF PREMISES

A. The Contractor shall confine his operations, including storage of apparatus, equipment and materials to the contract limit lines as directed by the Construction Administrator.

B. The areas and/or spaces, including their access, shall be maintained free and clear throughout the contract term.

C. Parking for Contractor's employees will be limited to an area (or areas) designated by the Construction Administrator. The Contractor may be required to provide identification stickers for employees' cars.

012000 PRICE AND PAYMENT PROCEDURES

A. Allowances:

1. The Contractor's costs for unloading and handling, labor, installation costs, storage, insurance, overhead and profit and other expense related to the Allowance item shall be included in the Lump Sum Bid Amount and not in the Allowance unless stated otherwise is the Allowance Schedule of this section.
2. Architect/Engineer:
    a. Consult with Contractor for consideration of Products, suppliers and installers.
    b. Select Products in consultation with the Owner Representatives and transmit decision to Construction Administrator.
3. Construction Administrator Responsibilities:
    a. Consult with Architect/Engineer, Contractor, Construction Manager and Owner Representatives for consideration of Products, suppliers and installers.
    b. Select Products in consultation with Architect/Engineer, Construction Manager and Owner Representatives and transmit decision to Contractor
4. Contractor Responsibilities:
    a. Assist Architect/Engineer and Construction Administrator in selection of Products and Suppliers.
    b. Obtain proposals from Suppliers and offer recommendations.
    c. On notification of selection by Construction Administrator execute purchase agreement with designated supplier.
    d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.
    e. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.
5. Sub-Contractor Responsibilities:
    a. Assist Architect/Engineer and Contractor in selection of Products and Suppliers.
    b. Obtain proposals from Suppliers and offer recommendations.
    c. On notification of selection by Contractor, execute purchase agreement with designated supplier.

d. Arrange for and process shop drawings, product data, and samples. Arrange for delivery.

e. If the actual cost of an Allowance item is more or less than the given amount, the Contract Sum will be adjusted by Change Order.

6. Allowance Schedule:

a. Include the Stipulated sum of $ **3,000.00** for material and labor for the provision of conduit and power for door & camera security system at new rear stair.

b. Include the Stipulated sum of $ **15,000.00** for material and labor for the provision of suspended Theatrical Light Support Truss, power and lighting circuits for the sixth floor as indicated. Truss shall be hung from structure above with beam clamps and aircraft style cables.

B. Unit Prices - General:

1. Definition - Unit Price: Amount the General Contractor acknowledges in the Bid Proposal Form as a price per unit of measurement for materials or services as described in the Bidding Documents or in the Contract Documents.

2. Procedures:

a. Unit Prices are for items complete, in place, and shall be inclusive of furnishing and installing of all material, labor, trucking, overhead, profit, equipment, hoisting, engineering, scaffolding, power hookups, protection, shop drawings, taxes, permits, appliances, delivery, insurance, supervision, cost of bond, etc. and shall remain in effect until completion of the Contract.

b. Contractor's bid shall include his material quantity take-off times the indicated unit price for purchase and installation of said material.

1. The Owner reserves the right to reject the Contractor's measurement of work-in-place that involves use of established unit prices, and to have this work measured, at the Owner's expense, by an independent surveyor acceptable to the Contractor.

1. Unit Price Schedule:

a. Include the sum of $ **35.00** per yard for material and labor for the provision of Sheet Carpet for all existing carpet in all areas other than office tower. This includes, but is not limited to, auditorium aisles, auditorium balconies, ramps, lobbies, foyers, stairs, concessions stands, corridors, and service areas. This cost to include hemming, seaming, borders, edging and all accessories. The cost of removing existing carpet shall not be included in this unit price.

012300 ALTERNATES

A. Definition: An Alternate is an amount proposed by bidders and stated on the Bid Proposal Form for certain work defined in the Bidding Documents that may be added to the Base Bid amount if the Owner decides to accept a corresponding change in either the amount of construction to be completed, or in the products, materials, equipment, systems, or installation methods described in the Contract Documents.

1. The cost for each Alternate is the net addition to the Contract Sum to incorporate the Alternate into the Work. No other adjustments are made to the Contract Sum.

B. Procedures:

1. Coordination: Modify or adjust affected adjacent Work as necessary to completely and fully integrate that Work into the Project.

a. Include as part of each Alternate, miscellaneous devices, accessory objects, and similar items and labor incidental to or required for a complete installation whether or not mentioned as part of the Alternate.

2. Execute accepted Alternate under the same conditions as other Work of this Contract.
3. Schedule: A "Schedule of Alternates" is included at the end of this Section. Specification Sections referenced in the Schedule contain requirements for materials necessary to achieve the Work described under each Alternate.

C. Schedule of Alternates:

1. None at this time.

012500 EQUALS AND SUBSTITUTIONS

A. Definitions: Definitions in this Article do not change or modify the meaning of other terms used in the Contract Documents.

1 Equals or Substitutions General: Changes in products, materials, equipment, and methods of construction required by the Contract Documents proposed by the Contractor after award of the Contract.

2 Equal: Any deviation from the specification which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is recognized and accepted as substantially equal to the first listed manufacturer or first listed procedure specified, after review, by the Architect and may be rejected or approved at the sole discretion of the owner. All equals must be substantially equivalent to the first manufacturer or first procedure listed in the Specifications with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size, rating and cost. The equal does not constitute a modification in the scope of Work, the Schedule or Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

3 Substitution: Any deviation from the specified requirements, which is defined as follows: A replacement for the specified material, device, procedure, equipment, etc., which is not recognized or accepted as equal to the first manufacturer or procedure listed in the Specification after review by the Architect and may be rejected or approved by the Owner. The Substitution is not equal to the specified requirement in comparison to the first manufacture or first procedure listed in the Specifications in one or more of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended; size; cost and rating. The Substitution constitutes a modification in the scope of Work, the Schedule or the Architect/Engineer's design intent of the specified material, device, procedure, equipment, etc.

4 The following are not considered to be requests for Equals or Substitutions:

a. Revisions to the Contract Documents requested by the Owner or Architect.

b. Specified options of products and construction methods included in the Contract Documents.

c. The Contractor's determination of and compliance with governing regulations and orders issued by governing authorities having jurisdiction.

B. Submittals:

1. Equals and Substitution Request Submittals: The Owner will consider requests for equals or substitutions if received within time period designated in the General Conditions Article 15

"Materials; Standards". Requests received more than the days specified in Article 15 after the start date of the contract will be rejected.

a. The Contractor is required to prepare and submit 3 copies of the required data for the first manufacturer listed or procedure listed in the specifications section with reference to all of the following areas: the substance and function considering quality, workmanship, economy of operation, durability and suitability for purposes intended including the size, rating and cost. All submissions must include all the required data for the first listed manufacturer or procedure as specified, as well as the required data for the proposed Equal or Substitution. This will enable the Owner and Architect to determine that the proposed Equal or Substitution is or is not substantially equal to the first listed manufacturer or procedure.

2. Identify the product or the fabrication or installation method to be replaced in each request. Include related Specification Section and Drawing numbers.
3. Provide complete documentation showing compliance with the requirements for equals or substitutions, and the following information, as appropriate on a "Substitution Request" form as required by the Owner:
   a. Coordination information, including a list of changes or modifications needed to other parts of the Work and to construction performed by the Owner and separate contractors, that will be necessary to accommodate the proposed Equal or Substitution.
   b. A detailed comparison chart of significant qualities of the proposed substitution with those of the Work specified. Significant qualities may include elements, such as performance, weight, size, durability, and visual effect.
   c. Product Data, including Shop Drawings and descriptions of products and fabrication and installation procedures.
   d. Samples, where applicable or requested.
   e. A statement indicating the effect on the Contractor's Construction Schedule or CPM Schedule compared to the schedule without approval of the Equal or Substitution. Indicate the effect on overall Contract Time.
   f. Cost information, broken down, including a proposal of the net change, if any in the Contract Sum.
   g. The Contractor's certification that the proposed Equal or Substitution conforms to requirements in the Contract Documents in every respect and is appropriate for the applications indicated.
   h. The Contractor's waiver of rights to additional payment or time that may subsequently become necessary because of the failure of the Equal or Substitution to perform adequately.
4. Architect's Action: If necessary, the Architect will request additional information or documentation for evaluation within one week of receipt of the original request for equal or substitution request. The Architect will notify the Construction Administrator of recommended acceptance or rejection of the proposed equal or substitution, within two (2) weeks of receipt of the request, or one (1) week of receipt of additional information or documentation, whichever is later. The Construction Administrator will give final acceptance or rejection by the Owner not less than one (1) week after notification.

a. Any request deemed an "Equal" and accepted by the Construction Administrator, Architect, Owner, and Owner will result in written notification to the Contractor and will not be in the form of a change order for an "Equal".

b. Any request deemed a "Substitution" and rejected or approved by Construction Administrator, Architect, and Owner may result in written notification to the Contractor and may be in the form of a change order if the "Substitution" is approved.

C. Equal or Substitutions:

1. Conditions: The Architect will consider the Contractor's request for Equal or Substitution of a product or method of construction when one or more of the following conditions are satisfied, as determined by the Architect. If the following conditions are not satisfied, the Architect will return the requests to the Construction Administrator without action except to record noncompliance with these requirements.

   a. The proposed request does not require extensive revisions to the Contract Documents.

   b. The proposed request is in accordance with the general intent of the Contract Documents.

   c. The proposed request is timely, fully documented, and/or properly submitted.

   d. The proposed request can be provided within the Contract Time. However, the Architect will not consider the proposed request if it is a result of the Contractor's failure to pursue the Work promptly or coordinate activities properly.

   e. The proposed request will offer the Owner a substantial advantage, in cost, time, energy conservation, or other considerations, after deducting additional responsibilities the Owner must assume. However, if the proposed request requires the Owner to incur additional responsibilities, including but not limited to, additional compensation to the Architect for redesign and evaluation services, increased cost of other construction by the Owner or similar considerations, then the Owner will have just cause to reject the request for Equal or Substitution.

   f. The proposed request can receive the necessary approvals, in a timely manner, required by governing authorities having jurisdiction.

   g. The proposed request can be provided in a manner that is compatible with the Work as certified by the Contractor.

   h. The proposed request can be coordinated with the Work as certified by the Contractor.

   i. The proposed request can uphold the warranties required by the Contract Documents as certified by the Contractor.

2. The Contractor's submission and the Architect's review of Submittals, including but not limited to, Samples, Manufacturer's Data, Shop Drawings, or other such items, which are not clearly identified as a request for an Equal or Substitution, will not be considered or accepted as a valid request for an Equal or Substitution, nor does it constitute an approval.

012600 MODIFICATION PROCEDURES

A. Summary: This Section specifies administrative and procedural requirements for handling and processing contract modifications.

B. Requests for Information:

1. In the event that the contractor or subcontractor, at any tier, determines that some portion of the drawings, specifications, or other contract documents requires clarification or interpretation by the Architect, the contractor shall submit a "Request for Information" in writing to the Architect.

"Requests for Information" may only be submitted by the contractor and shall only be submitted on "Request for Information" forms as required by the owner. In the "Request for Information", the contractor shall clearly and concisely set forth the issue for which clarification or interpretation is sought and why a response is needed from the Architect.

a. In the "Request for Information", the contractor shall set forth an interpretation or understanding of the requirement along with reasons why such an understanding was reached.

b. The owner acknowledges that this is a complex project. Based upon the owner's past experience with projects of similar complexity, the owner anticipates that there will be some "Requests for Information" on this project.

c. The Architect will review all "Requests for Information" to determine whether they are "Requests for Information" within the meaning of this term. If it is determined that the document is not a "Request for Information", it will be returned to the contractor, unreviewed as to content, for resubmittal on the proper form and in the proper manner.

d. "Requests for Information Response" shall be issued within seven (7) Working Calendar Days of receipt of the request from the contractor unless the owner determines that a longer time is necessary to provide an adequate response. If a longer time is determined necessary by the owner, the owner will, within seven (7) Working Calendar Days of receipt of the request, notify the contractor of the anticipated response time. If the contractor submits a "Request for Information" on an activity with seven (7) Working Calendar Days or less of float on the current project schedule, the contractor shall not be entitled to any time extension due to the time it takes the Architect to respond to the request provided that the Architect responds within the seven (7) Working Calendar Days set forth above.

e. "Requests for Information Response" from Architect will not change any requirement of the contract documents. In the event the contractor believes that the "Requests for Information Response" will cause a change to the requirements of the contract document, the contractor shall immediately give written notice to the Architect stating that the contractor believes the "Requests for Information Response" will result in "Change Order" and the Contractor intends to submit a "Change Order Proposal" request. Failure to give such written notice immediately shall waive the contractor's right to seek additional time or cost under the requirement these Requirements.

C. Minor Changes in the Work

1. The Architect will issue supplemental instruction authorizing minor changes in the Work, not involving adjustment to the Contract Sum or Contract time, on the "Supplemental Instructions" form as required by the Owner.

D. Proposal Request:

1. Architect/Owner-Initiated Requests For Proposals: The Architect or Owner will issue a detailed description of proposed changes in the Work that will require adjustment to the Contract Sum or Contract Time. If necessary, the description will include supplemental or revised Drawings and Specifications. Such requests shall be on a "Proposal Request" form as required by the owner.
2. "Proposal Request" is issued for information only. Do not consider them as an instruction either to stop work in progress or to execute the proposed change.
3. Within Seven (7) Working Calendar Days of receipt of a "Proposal Request", submit an "Change Order Proposal" with the required information necessary to execute the change to the Architect for the Architect's/Owner's review.
4. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities.

a. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

b. Include a statement indicating the effect the proposed change in the Work will have on the Contract Time.

c. The Owner is tax exempt. All Contractor and Subcontractor services provided under your contract with the Owner may not be exempt from taxes. The Division of Taxation, Department of Revenue, can guide you as to which services are exempt and which are not. Please contact the Rhode Island Division of Taxation at (401) 574-8922.

d. Dollar values shown on the Schedule of Values shall not be the governing (or deciding) final amounts for change orders involving either additional charges or deletions.

E. Change Order Proposal:

1. When either a "Request for Information" from the Contractor or a "Proposal Request" from the Architect or Owner results in conditions that may require modifications to the Contract, the Contractor may propose changes by submitting a request for a "Change Order Proposal" to the Architect on forms as required by the Owner. These forms shall also include "Change Order Proposal Worksheets" as required by the Owner.

   a. Include statements outlining the reasons for the change and the effect of the change on the Work. Provide a complete description of the proposed change. Indicate the effect of the proposed change on the Contract Sum and Contract Time.

   b. Include a list of quantities of products required and unit costs, with the total amount of purchases to be made. Where requested, furnish survey data to substantiate quantities as directed by Article 7 "Compensation for Changes in the Work" of the General Conditions of the Contract for Construction.

   c. Indicate applicable delivery charges, equipment rental, and amounts of trade discounts.

   d. Comply with requirements in Section "Equals and Substitutions" if the proposed change requires an equal or substitution of one product or system for a product or system specified.

1. "Change Order Request" Forms: Use "Change Order Proposal" and "Change Order Proposal Worksheets" forms as required by Owner.

"Change Order Proposal" cannot be submitted without the Contractor either prior submission of a "Request for Information" from the Contractor or as a response to a "Proposal Request" submitted by the Architect or Owner.

2. Any "Change Order Request " submitted without a prior submittal of a "Request for Information" or as a response to a "Proposal Request" will be immediately rejected and returned to the Contractor.

F. Construction Change Directive:

1. "Construction Change Directive": When the Owner and the Contractor disagree on the terms of a "Change Order Proposal" resulting from either a "Request for Information" or "Proposal Request", then the Architect may issue a "Construction Change Directive" on a "Construction Change Directive" as authorized by the Owner on the form required by the Owner. The "Construction Change Directive" instructs the Contractor to proceed with a change in the Work, for subsequent inclusion in a "Change Order".

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

2. Documentation: The Contractor shall maintain detailed records on a time and material basis of work required by the "Construction Change Directive".
   a. After completion of the change, submit an itemized account and supporting data necessary to substantiate cost and time adjustments to the Contract.
   b. The final value shall be negotiated based on the supporting data to determine the value of the work.

G. Change Order Procedures:

1. Upon the Owner's approval of a Contractor's "Change Order Proposal", the Contractor will issue a "Change Order" for signatures of the Architect, Owner and the Contractor on "Change Order" form as required by the Owner.

012976 APPLICATIONS FOR PAYMENT

A. **Schedule of Values**: Submit the "Schedule of Values" to the Architect at the earliest possible date but no later than (21) twenty Calendar Days after the Contract Start Date. A separate "Schedule of Values" shall be provided for each Phase of the Project identified in Section 011110 Summary of Work, Work Sequence - Phase(s).

1. Format and Content: Use the Project Manual Table of contents as a guide to establish the format for the "Schedule of Values". Provide at least one line item for each of the Specification Section on electronic media printout.
2. Identification: Project identification on the Schedule of Values shall include, but not be limited to, the following:
   a. Owner
   b. Project Number
   c. Project Name
   d. Project Location
   e. Contractor's name and address.
1. Arrange the "Schedule of Values" in tabular format as required by the Owner, containing separate columns including, but not limited to, the following Items:
   a. Item Number.
   b. Description of Work with Related Specification Section or Division Number.
   c. Scheduled Values broken down by description number, type material, units of each material.
   d. Name of subcontractor.
   e. Name of manufacturer or fabricator.
   f. Name of supplier.
   g. Retainage.
   h. Contract sum in sufficient detail.
2. Percentage of Contract Sum to nearest one-hundredth percent, adjusted to total 100 percent.
3. Provide a breakdown of the Contract Sum in sufficient detail to facilitate continued evaluation of Applications for Payment and progress reports. Coordinate with the Project Manual table of contents. Break principal subcontract amounts down into several line items.

4. Round amounts to nearest whole dollar; the total shall equal the Contract Sum.
5. Unit-Cost Allowances: Show the line-item value of unit-cost allowances, as a product of the unit cost, multiplied by the measured quantity. Estimate quantities from the best indication in the Contract Documents.
6. General Conditions: Show line items for indirect costs and margins on actual costs only when such items are listed individually in Applications for Payment. Each item in the Schedule of Values and Applications for Payment shall be complete. Include the total cost and proportionate share of general overhead and profit margin for each item.
   a. Temporary facilities and other major cost items that are not direct cost of actual work-in-place may be shown either as separate line items in the Schedule of Values or distributed as general overhead expense, at the Contractor's option.

B. **Applications for Payment - General:** Each Application for Payment shall be consistent with previous applications and payments as certified by the Architect and Construction Administrator and paid for by the Owner.

1. The initial "Application for Payment", the "Application for Payment", at time of "Substantial Completion", and the final "Application for Payment", involve additional requirements.
2. Payment-Application Terms: The Owner will process monthly progress payments. The Contractor may submit applications for payment on a monthly basis.
3. Payment-Application Forms: Use the "Application for Payment" form as required by the Owner. Present the required information on electronic media printout or approved Owner Form, multiple pages should be used if required.
4. For each item, provide a column including but not limited to the following items:
   a. Item Number.
   b. Description of Work and Related Specification Section or Division.
   c. Scheduled Value, break down by units of material and units of labor.
   d. Work completed from previous application.
   e. Work completed this period.
   f. Materials presently stored.
   g. Total completed and stored to date of application.
   h. Percentage of Completion.
   i. Balance to Finish.
   j. Retainage
5. Application Preparation: Complete every entry on the Application form. At the time of Final Payment only, include an executed Application form by a person authorized to sign legal documents on behalf of the Contractor. The Construction Administrator will return incomplete Applications without action.
   a. Entries shall match data on the "Schedule of Values".
   b. Include amounts of Change Orders issued prior to the last day of the construction period covered by the application.
6. Transmittal: Except for final payment, submit to the Architect by a method ensuring receipt within forty-eight (**48**) hours. One (**1**) complete, signed and notarized original of each Application for Payment, including lien waivers and similar attachments when required, along

with three (**3**) copies. For Final Payment, four (**4**) complete, signed and notarized copies shall be submitted.

a. Transmit each copy with a transmittal form listing attachments and recording appropriate information related to the application, in a manner acceptable to the Architect.

7. Applications for Payment: Administrative actions and submittals that must precede or coincide with submittal of the first Application for Payment and all subsequent Application for Payments including, but not limited to, the following items:

   a. List of subcontractors and suppliers' name, FEIN/Social Security numbers, and Rhode Island Tax Registration Numbers.
   b. List of principal suppliers and fabricators.
   c. Schedule of Values.
   d. Contractor's Construction Schedule (preliminary if not final).
   e. Schedule of principal products.
   f. Submittal Schedule (preliminary if not final).
   g. List of Contractor's staff assignments.
   h. List of Contractor's principal consultants.
   i. Copies of all applicable permits.
   j. Copies of authorizations and licenses from governing authorities for performance of the Work.
   k. Proof that as-built documents are updated as required by Section 01700 "Contract Closeout".

C. **Application for Payment at Substantial Completion**: Following issuance of the Certificate of Substantial Completion submit an Application for Payment form, use the form as required by the Owner. Present the required information on electronic media printout.

1. This application shall reflect Certificates of Partial Substantial Completion issued previously for Owner occupancy of designated portions of the Work.
2. Administrative actions and submittals that shall precede or coincide with this application include, but are not limited to, the following:

   a. Occupancy permits and similar approvals.
   b. Warranties (guarantees) and maintenance agreements.
   c. Test/adjust/balance records.
   d. Maintenance instructions.
   e. Startup performance reports.
   f. Changeover information related to Owner's occupancy, use, operation, and maintenance.
   g. Final cleaning.
   h. Application for reduction of retainage and consent of surety.
   i. Advice on shifting insurance coverage.
   j. Final progress photographs.
   k. List of incomplete Work, recognized as exceptions to Architect's Certificate of Substantial Completion.

D. **Final Payment Application:** Administrative actions and submittals that must precede or coincide with submittal of the final Application for Payment include, but are not limited, to the following:

1. Completion of Project Closeout requirements.
2. Completion of list of items remaining to be completed as indicated on the attachment to the Certificate of Substantial Completion.
3. Ensure that unsettled claims will be settled.
4. Ensure that incomplete Work is not accepted and will be completed without undue delay.
5. Transmittal of required Project construction records to the Owner (including as-built documents Reference Section 01700 "Contract Closeout".)
6. Certified property survey.
7. Proof that taxes, fees, and similar obligations were paid.
8. Removal of temporary facilities and services.
9. Removal of surplus materials, rubbish, and similar elements.
10. Change of door locks to Owner's access.
11. The requirements of the General Conditions and Supplementary Conditions for Final Acceptance, Final Completion, Final Inspection, and Final Payment.

013100 COORDINATION

A. Construction Administrator:

1. The Construction Administrator is identified in Division 1 "Construction Administrator".
2. Construction Mobilization:
   a. Cooperate with the Construction Administrator in the allocation of mobilization areas of the site, for field offices and sheds, for Owner facility access, traffic, and parking facilities.
   b. During Construction, coordinate use of site and facilities through the Construction Administrator.
   c. Comply with Construction Administrators procedures for intra-project communications; submittals, reports and records, schedules, coordination drawings, and recommendations; and resolution of ambiguities and conflicts.
   d. Comply with instructions of the Construction Administrator for use of temporary utilities and construction facilities.

B. 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.

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 Construction Administrator, 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. Preparation of schedules.
2. Installation and removal of temporary facilities.
3. Delivery and processing of submittals.
4. Progress meetings.
5. Project closeout activities.

E. General Coordination Provisions:

1. Inspection of Conditions: Require the Installer of each major component to inspect both the substrate and conditions under which Work is to be performed and coordinate such inspections with the Construction Administrator and authorities having jurisdictions. If unsatisfactory conditions exist notify the Construction Administrator immediately. Do not proceed until unsatisfactory conditions have been corrected in an acceptable manner.
2. The Contractor shall coordinate temporary enclosures with required inspections and tests to minimize the necessity of uncovering completed construction for that purpose.
2. Coordination Drawings:
   a. The HVAC Subcontractor will initiate 1/4" scale drawings done on AutoCAD showing ducts and piping in plan and sections. Sheet metal shop drawings must be approved prior to starting coordination drawings.
   b. The Sprinkler Subcontractor will then superimpose his piping layout on the CAD file.
   c. The Electrical subcontractor will superimpose all the electrical information on the drawing. Said information to include but not necessary limited to cable trays, equipment, lighting, conduits, bus duct, etc.
   d. The sprinkler subcontractor will complete the coordination drawing by drawing his piping (include pitch) on the drawing.
   e. The Construction Administrator will review the completed coordination drawing for general compliance and then submit it to the Architect for his review. All subcontractors shall rework the drawings until all systems are properly coordinated.
1. The Construction Administrator will meet with the Contractor on all major items of coordination.
2. See also General Conditions Article 7 “Cooperation of Trades”.

013119 PROJECT MEETINGS

A. Pre-construction Conference:

1. The Contractor will attend a Pre-construction Conference before starting construction, as scheduled by the Construction Administrator convenient to the Construction Administrator, Architect, and Contractor. This meeting will take place within fourteen (14) Calendar Days after

the written Notice to Proceed and before the Contract Start Date. Hold the conference at the Project Site or another convenient location as directed by the Construction Administrator. The Construction Administrator shall conduct the Pre-construction Conference to review the Contractor and Subcontractor responsibilities and personnel assignments.

2. Attendees: Authorized representatives of the Construction Administrator, Owner, Architect, and their consultants; the Contractor and its superintendent; major subcontractors; Owner; and other concerned parties shall attend the conference. All participants at the conference shall be familiar with the Project and authorized to conclude matters relating to the Work.
3. Agenda: Discuss items of significance that could affect progress, including the following:
   - ***a. Tentative construction schedule.***
   - ***b. Critical work sequencing.***
   - ***c. Progress meeting schedule.***
   - ***d. Designation of responsible personnel.***
   - ***e. Procedures for processing field decisions and Change Orders.***
   - ***f. Procedures for processing Applications for Payment.***
   - ***g. Distribution of Contract Documents.***
   - ***h. Submittal of Shop Drawings, Product Data, and Samples.***
   - ***i. Preparation of record documents.***
   - ***j. Use of the premises.***
   - ***k. Parking availability.***
   - ***l. Office, work, and storage areas.***
   - ***m. Equipment deliveries and priorities.***
   - ***n. Safety procedures.***
   - ***o. First aid.***
   - ***p. Security.***
   - ***q. Housekeeping.***
   - ***r. Working hours.***
   - ***s. Coordination with Audio-Visual and Telecommunications.***

B. Progress Meetings:

1. The Construction Administrator will conduct weekly progress meetings at the Project Site or at regular intervals as agreed upon at the Pre-construction Conference. The Construction Administrator will notify the Owner, the Architect, and the Contractor of the scheduled Progress Meeting dates. Coordinate dates of Progress Meetings with preparation of Application for Payment requests.
2. Attendees: In addition to representatives of the Contractor, Construction Administrator, Owner and the Architect, subcontractor, supplier, or other entity concerned with current progress or involved in planning, coordination, or performance of future activities may be requested to attend these meetings on an as needed basis. All participants at the meeting shall be familiar with the Project and authorized to conclude matters relating to the Work. The Contractor shall include the site superintendent as a minimum.

3. Agenda: Progress Meetings shall review and correct or approve minutes of the previous Progress Meeting. Review other items of significance that could affect progress. Include topics for discussion as appropriate to the status of the Project.
    a. Construction Schedule: Review progress since the last Progress Meeting. Determine where each activity is in relation to the required Contractor's "Construction Schedule" and whether each activity is on time or ahead or behind Schedule. Determine how Work that is behind Schedule will be expedited; secure commitments from parties involved to do so. Discuss whether Schedule revisions are required to insure that current and subsequent activities will be completed within the Contract Time.
    b. Review the present and future needs of each entity present
4. Reporting: The Construction Administrator will distribute minutes of the meeting to each party present, promptly and before the next scheduled meeting, and to parties who should have been present.
5. A schedule of regular Project Meetings will be established at the Pre-construction Conference.

013216 CONSTRUCTION SCHEDULE

A. **Definitions**:
1. Construction Schedule: A method of planning and scheduling a construction project utilizing a horizontal bar chart with a separate bar for each major portion of the Work or operation to make the schedule an effective tool for planning and monitoring the progress of the work.

B. **Quality Assurance:** The Contractor's Consultant: Retain a consultant to provide planning, evaluating, and reporting by CPM scheduling.
1. In-house Option: The Owner may waive the requirement to retain a consultant if the Contractor can demonstrate that:
    a. The Contractor has the computer equipment required to produce construction schedules.
    b. The Contractor employs skilled personnel with experience in construction scheduling and reporting techniques.
2. **Program**: Use **"Microsoft Project"**, latest version.
3. Standards: Comply with procedures contained in AGC's "Construction Planning & Scheduling."

C. Construction Schedule Format:
1. Format: Utilize a horizontal bar chart (gantt) with a separate bar for each major portion of the Work or operation, identifying first work day of each week.
2. Sequence of Listings: Utilize the Table of Contents of this Project Manual and the chronological order of the start of each item of work.
3. Scale and Spacing: Provide space for notations and revisions.
4. Sheet Size: To be coordinated with Construction Administrator.

D. Content:
1. Show complete sequence of construction by activity, with dates beginning and completion of each element of construction.
2. Identify each item by specification section number.
3. Identify work of separate phases other and other logically grouped activities.

4. Show accumulated percentages of completion of each item, and total percentage of Work completed, as of the first day of each month.
5. Provide separate schedule of submittal dates for shop drawings, product data, and samples, Owner/Owner furnished products and any products identified as under Allowances, and dates reviewed submittals will be required from Architect/Engineer. Indicate decision dates for selection of finishes.
6. Indicate delivery dates for Owner/Owner furnished products and any products identified as under Allowances.
7. Coordinate content with Schedule of Values specified in Section 01027 "Application for Payment".
8. Indicate critical path with original baseline indicated.

E. Submittals And Revisions To Schedules:

1. Indicate progress of each activity to date of submittal, and projected completion date of each activity.
2. Identify activities modified since previous submittal, major changes in scope, and other identifiable changes.
3. Provide narrative report to define problem areas, anticipated delays, and impact on Schedule. Report corrective action taken, or proposed, and its effect.
4. An initial bar graph (gantt) schedule is to be prepared by the General Contractor and submitted to the Construction Administrator within seven (7) Working calendar days of award of contract. This schedule is to cover all items of work from the start of the project up to the completion of the project. After review, resubmit required revised data within five (5) Working calendar days. This schedule must be revised monthly and when the actual schedule of significant items varies more than seven (7) Calendar days from the proposed schedule. The critical path with baseline must be indicated.
5. Electronically submit an updated PDF of the Construction Schedule to the Construction Administrator with each Application for Payment.

F. Distribution:

1. Distribute copies of the Construction Schedules to Construction Administrator, Architect, Owner, Subcontractors, suppliers, and other concerned parties.
2. Instruct recipients to promptly report, in writing, problem anticipated by projections indicated in schedules.

013230 CONSTRUCTION PHOTOGRAPHS

A. On the date the work is begun and every thirty (30) days thereafter (typically at the end of the month- until the work is at least 95 percent complete), the Contractor shall have photographs of the exterior construction taken by a professional photographer or an individual approved by the Owner.

B. Photographs: Provide a digital camera to take (12) or more photos each time. Deliver 1 sets of photo files on CD-ROM and one set of prints to the Construction Administrator for the department. Label each CD-ROM with project name and the date the photographs were taken. With each submittal provide an index sheet of digital photos and where the photos were taken.

C. As photographs are a record of the work progress, they shall be taken each month, whether or not they show work done during the preceding month. Deliver digital photos to the Construction Administrator within 10 days of their taking.

013300 SUBMITTALS

A. SUMMARY

1. This Section includes administrative and procedural requirements for submittals required for performance of the Work, including but not limited to the following:
    a. Submittal Procedures.
    b. Submittal schedule.
    c. Daily Construction reports.
    d. Shop Drawings.
    e. Shop Drawings for Fire Protection Systems.
    f. Product Data.
    g. Samples.
    h. Quality assurance submittals.
    i. Architects Action.
    j. Submittals shall comply with all requirements in Division 1 Section 01631 “Equals and Substitutions”.
    k. Submittals shall comply with all requirements in Division 1 Section 01740 “Warrantees and Bonds”.
    l. Submittals shall comply with all requirements in Division 1 Section 01040 “Coordination”.
    m. Submittals shall comply with all requirements in Division 1 Section 01730 “Operation & Maintenance Manuals”.

B. **Administrative Submittals**: Refer to other Division 1 Sections and other Contract Documents for requirements for administrative submittals. Such submittals include, but are not limited to, the following:
    1. Permits.
    2. Applications for Payment.
    3. Performance and payment bonds.
    4. Contractor’s construction schedule.
    5. Daily construction reports.
    6. Construction Photographs.
    7. Insurance certificates.
    8. List of subcontractors.
    9. Subcontractors***/Suppliers FEIN #’s and Rhode Island tax registration #.***

C. **Related Sections**: The following Sections contain requirements that relate to this Section:
    1. Division 1 Section 012976 "Application for Payment" specifies requirements for submittal of the Schedule of Values.
    2. Division 1 Section 013100 "Coordination" specifies requirements governing preparation and submittal of required Coordination Drawings.
    3. Division 1 Section 013119 “Project Meetings" specifies requirements for submittal and distribution of meeting and conference minutes.

4. Division 1 Section 013216 "CPM Schedule" specifies requirements for contractor's schedule submittal.
5. Division 1 Section 013230 "Construction Photographs" specifies requirements for submittal of periodic construction photographs.
6. Division 1 Section 014500 "Quality Control" specifies requirements for submittal of inspection and test reports.
7. Division 1 Section 012500 "Equals and Substitutions" specifies requirements for submittal of requests to use products other than those specified.
8. Division 1 Section 017700 "Contract Closeout" specifies requirements for submittal of Project Record Documents and warranties at project closeout.
9. Division 1 Section 017830 “Warranties and Guarantees”.

D. DEFINITIONS

1. Coordination Drawings show the relationship and integration of different construction elements that require careful coordination during fabrication or installation to fit in the space provided or to function as intended and as identified in the Specification Division 2 through 16.
2. Preparation of Coordination Drawings is specified in Division 1 Section "Coordination" and may include components previously shown in detail on Shop Drawings or Product Data.
3. Field samples are full-size physical examples erected on-site to illustrate finishes, coatings, or finish materials. Field samples are used to establish the standard by which the Work will be judged.
4. Mockups are full-size assemblies for review of construction, coordination, testing, or operation; they are not Samples.

B. SUBMITTAL PROCEDURES

1. Coordination: Coordinate preparation and processing of submittals with performance of construction activities. Transmit each submittal sufficiently in advance of performance of related construction activities to avoid delay.
2. Coordinate each submittal with fabrication, purchasing, testing, delivery, other submittals, and related activities that require sequential activity.
3. Coordinate transmittal of different types of submittals for related elements of the Work so processing will not be delayed by the need to review submittals concurrently for coordination.
   a. The Architect reserves the right to withhold action on a submittal requiring coordination with other submittals until all related submittals are received.
   b. The Architect reserves the right to reject incomplete submitted packages.
4. Processing: To avoid the need to delay installation as a result of the time required to process submittals, allow sufficient time for submittal review, including time for resubmittals.
   a. Allow (2) two weeks for initial review. Allow additional time if the Architect must delay processing to permit coordination with subsequent submittals.
   b. If an intermediate submittal is necessary, process the same as the initial submittal.
   c. Allow (2) two weeks for reprocessing each submittal.
   d. No extension of Contract Time will be authorized because of failure to transmit submittals to the Architect sufficiently in advance of the Work to permit processing.

C. **Submittal Preparation**: Place a permanent 8-1/2 inches x 11 inches cover page approved by the Architect, on each submittal for identification. Indicate the name of the entity that prepared each submittal on the label or title block.

1. The minimum number of copies required for each submittal shall be at a minimum 4 copies or as determine otherwise at the pre-construction conference or by the Construction Administrator.
2. It is preferred that submittals are sent electronically, as PDFs, not scanned JPG, JEP, etc.
3. Provide a space approximately 4 inches by 5 inches on the label, beside the title block or on the cover page on Shop Drawings to record the Contractor's review and approval markings and the action taken.
4. Include the following information on the label for processing and recording action taken.
   - ***a. Project Name and Architect's Project Number.***
   - ***b. Date.***
   - ***c. Name and address of the Architect, Construction Administrator, and Owner Representative.***
   - ***d. Name and address of the Contractor.***
   - ***e. Name and address of the subcontractor.***
   - ***f. Name and address of the supplier.***
   - ***g. Name of the manufacturer.***
   - ***h. Number and title of appropriate Specification Section.***
   - ***i. Drawing number and detail references, as appropriate.***
   - ***j. Indicate either initial or resubmittal.***
   - ***k. Indicate deviations from Contract Documents.***
   - ***l. Indicate if "equal" or "substitution".***

D. **Submittal Transmittal**: Package each submittal appropriately for transmittal and handling. Transmit each submittal from the Contractor to the Architect using a transmittal form. Copy the Construction Administrator on the transmittal. The Architect will return all submittals to the Contractor after action is taken with a complete copy of the submittal package and one complete copy of the submittal package. The Architect will not accept submittals received from sources other than the Contractor.

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

E. SUBMITTAL SCHEDULE

1. After development and review by the Owner and Architect acceptance of the Contractor's Construction or CPM schedule prepare a complete schedule of submittals. Submit the schedule to the Construction Administrator within 15 days of Contract Award.
2. Coordinate Submittal Schedule with the list of subcontracts, Schedule of Values, and the list of products as well as the contractor's Construction or CPM Schedule.
3. Prepare the schedule in chronological order. Provide the following information:
   - a. Schedule date for the initial submittal.
   - b. Related section number.

c. Submittal category (Shop Drawings, Product Data, or Samples).

d. Name of Subcontractor.

e. Description of the part of Work covered.

f. Scheduled date for resubmittal.

g. Scheduled date for the Architect's final release of approval.

F. **Distribution**: Following response to the initial submittal, print and distribute copies to the Construction Administrator, Architect, Owner, subcontractors, and other parties required to comply with submittal dates indicated. Post copies in the Project meeting room and field office.

1. When revisions are made, distribute to the same parties and post in the same locations. Delete parties from distribution when they have completed their assigned portion of the Work and are no longer involved in construction activities.

G. **Schedule Updating**: Revise the schedule after each meeting or activity where revisions have been recognized or made. Issue the updated schedule concurrently with the report of each meeting.

H. DAILY CONSTRUCTION REPORTS

2. Prepare a daily construction report recording the following information concerning events at the site, and submit duplicate copies to the Construction Administrator at weekly intervals:

a. List of subcontractors at the site.

b. Approximate count of personnel at the site.

c. High and low temperatures, general weather conditions.

d. Accidents and unusual events.

e. Meetings and significant decisions.

f. Stoppages, delays, shortages, and losses.

g. List of equipment on site and identify if idle or in use.

h. Orders and requests of governing authorities.

i. Change Orders received, start and end dates.

j. Services connected, disconnected.

k. Equipment or system tests and startups.

l. Partial Completion's, occupancies.

m. Substantial Completion's authorized.

n. Equals or Substitutions approved or rejected.

I. SHOP DRAWINGS

1. Submit newly prepared information drawn accurately to scale. Highlight, encircle, or otherwise indicate deviations from the Contract Documents. Do not reproduce Contract Documents or copy standard information as the basis of Shop Drawings. Standard information prepared without specific reference to the Project is not a Shop Drawing.

2. Shop Drawings include fabrication and installation Drawings, setting diagrams, schedules, patterns, templates and similar Drawings. Include the following information:

a. Dimensions.

b. Identification of products and materials included by sheet and detail number.

c. Compliance with specified standards.

d. Notation of coordination requirements.

e. Notation of dimensions established by field measurement.

f. 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 24 by 36 inches.

g. Submit one print se as directed by the Construction Administrator. The Contractor's submittal shall identify the specification section and/or drawing number applicable to the submittal.

h. Details shall be large scale and/or full size.

3. The Contractor shall review the Shop Drawings, stamp with this approval, and submit them with reasonable promptness and in orderly sequence so as to cause no delay in his Workor in the Workof any subcontractor. Shop Drawings shall be properly identified as specified for item, material, workmanship, and project number. At the submission, the Contractor shall inform the Architect, in writing of any deviation in the shop drawings from the requirements of the Contract Documents.

4. The Architect will review and comment on shop drawings with reasonable promptness so as to cause no delay, but only for conformance with the design concept of the project and with the information given in the Contract Documents. Refer to Article 5 of General Conditions. Shop Drawings received by the Architect that indicate insufficient study of drawings and specifications, illegible portions or gross errors, will be rejected outright. Such rejections shall not constitute an acceptable reason for granting the Contractor additional time to perform the work.

5. The Contractor shall make any corrections required by the Architect and shall resubmit the required number of corrected copies of shop drawings until fully reviewed.

6. Upon final review submit one (1) additional prints, same as submitted, to the Construction Administrator for his use.

7. The Architect's review and comments on shop drawings shall not relieve the Contractor of responsibility for any deviation from the requirements of the Contract Documents.

8. Only final reviewed shop drawings are to be used on the project site.

9. The Work installed shall be reviewed in accordance with the shop drawings and the drawings and specifications. Final Review of the shop drawings by the Architect shall constitute acceptance by the State and the Architect of a variation or departure that is clearly identified. Final reviewed shop drawings shall not replace or be used as a vehicle to issue or incorporate change orders.

J. SHOP DRAWING FOR FIRE PROTECTION SYSTEMS

1. Shop drawings for fire protection systems shall comply with all of the requirements in the section above “Shop Drawings.” In addition Sprinkler system shop drawings and hydraulic calculations must be stamped by a professional engineer licensed in the state of Rhode Island.

2. Before the shop drawings are submitted to the FM, the A/E fire protection consultant must review the sprinkler design for compliance with the code and State requirements. The contractor is responsible for fire protection changes that result from FM review comments during construction.

3. Coordinate and advise State Insurance Carrier (SIC) of the sprinkler test two- (2) weeks prior to the sprinkler system acceptance test.

K. PRODUCT DATA

1. Collect Product Data into a single submittal for each element of construction or system. Product Data includes printed information, schedules, such as manufacturer's installation instructions, catalog cuts, standard color charts, roughing-in diagrams and templates, standard wiring diagrams, and performance curves.
2. Mark each copy to show applicable choices and options. Where printed Product Data includes information on several products that are not required, mark copies to indicate the applicable information. Include the following information:
   a. Manufacturer's printed recommendations.
   b. Compliance with trade association standards.
   c. Compliance with recognized testing Owner standards.
   d. Application of testing Owner labels and seals.
   e. Notation of dimensions verified by field measurement.
   f. Notation of coordination requirements.
3. Do not submit Product Data until compliance with requirements of the Contract Documents has been confirmed.
4. Preliminary Submittal: Submit a preliminary single copy of Product Data where selection of options is required.
5. Submittals: Submit 7 copies of each required submittal; submit 5 copies where required for maintenance manuals. The Architect will retain one and will return the other marked with action taken and corrections or modifications required.
   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
6. Distribution: Furnish copies of final submittal to installers, subcontractors, suppliers, manufacturers, fabricators, and others required for performance of construction activities. Show distribution on transmittal forms.
   a. Do not proceed with installation until a copy of Product Data is in the Installer's possession.
   b. Do not permit use of unmarked copies of Product Data in connection with construction.

L. SAMPLES

1. Submit full-size, fully fabricated Samples cured and finished as specified and physically identical with the material or product proposed. Samples include partial sections of manufactured or fabricated components, cuts or containers of materials, color range sets, and swatches showing color, texture, and pattern.
2. Store, mount or display Samples on site in the manner to facilitate review of qualities indicated. Prepare Samples to match the Architect's sample. Include the following:
   a. Specification Section number and reference.
   b. Generic description of the Sample.
   c. Sample source.
   d. Product name or name of the manufacturer.
   e. Compliance with recognized standards.
   f. Availability and delivery time.

3. Submit Samples for review of size, kind, color, pattern, and texture. Submit Samples for a final check of these characteristics with other elements and a comparison of these characteristics between the final submittal and the actual component as delivered and installed.
   a. Where variation in color, pattern, texture, or other characteristic is inherent in the material or product represented, submit at least (3) three multiple units that show approximate limits of the variations.
   b. Refer to other Specification Sections for requirements for Samples that illustrate workmanship, fabrication techniques, details of assembly, connections, operation, and similar construction characteristics.
   c. Refer to other Sections for Samples to be returned to the Contractor for incorporation in the Work. Such Samples must be undamaged at time of use. On the transmittal, indicate special requests regarding disposition of Sample submittals.
   d. Samples not incorporated into the Work, or otherwise designated as the Owner's property, are the property of the Contractor and shall be removed from the site prior to Substantial Completion.
4. Preliminary Submittals: Submit a full set of choices where Samples are submitted for selection of color, pattern, texture, or similar characteristics from a range of standard choices, unless otherwise noted in specification section..
   a. The Architect will review and return preliminary submittals with the Architects notation, indicating selection and other action.
5. Submittals: Except for Samples illustrating assembly details, workmanship, fabrication techniques, connections, operation, and similar characteristics, submit (3) sets. The Architect will return one set marked with the action taken.
6. Maintain sets of Samples, as returned, at the Project Site, for quality comparisons throughout the course of construction.
   a. Unless noncompliance with Contract Document provisions is observed, the submittal may serve as the final submittal.
   b. Sample sets may be used to obtain final acceptance of the construction associated with each set.
7. Distribution of Samples: Prepare and distribute additional sets to subcontractors, manufacturers, fabricators, suppliers, installers, and others as required for performance of the Work. Show distribution on transmittal forms.
   a. Field samples are full-size examples erected on-site to illustrate finishes, coatings, or finish materials and to establish the Project standard.
      1) Comply with submittal requirements to the fullest extent possible. Process transmittal forms to provide a record of activity.

M. QUALITY ASSURANCE SUBMITTALS

1. Submit quality-control submittals, including design data, certifications, manufacturer's instructions, manufacturer's field reports, and other quality-control submittals as required under other Sections of the Specifications.
2. Certifications: Where other Sections of the Specifications require certification that a product, material, or installation complies with specified requirements, submit a notarized certification from the manufacturer certifying compliance with specified requirements.

a. Signature: Certification shall be signed by an officer of the manufacturer or other individual authorized to sign documents on behalf of the company.

3. Inspection and Test Reports: Requirements for submittal of inspection and test reports from independent testing agencies are specified in Division 1 Section "Quality Control."

N. ARCHITECT'S ACTION

1. Except for submittals for the record or information, where action and return is required, the Architect will review each submittal, mark to indicate action taken, and return promptly.
   a. Compliance with specified characteristics is the Contractor's responsibility.
2. Action Stamp: The Architect will stamp each submittal with a uniform, action stamp. The Architect will mark the stamp appropriately to indicate the action taken, as follows:
   a. Final Unrestricted Release: When the Architect marks a submittal "Approved for fabrication," the Work covered by the submittal may proceed provided it complies with requirements of the Contract Documents. Final payment depends on that compliance.
   b. Final-But-Restricted Release: When the Architect marks a submittal "Incorporate Notations," the Work covered by the submittal may proceed provided it complies with notations or corrections on the submittal and requirements of the Contract Documents. Submit corrected copies for record. Final payment depends on that compliance.
   c. Returned for Resubmittal: When the Architect marks a submittal "Rejected, or Revise and Resubmit," do not proceed with Work covered by the submittal, including purchasing, fabrication, delivery, or other activity. Revise or prepare a new submittal according to the notations; resubmit without delay. Repeat if necessary to obtain different action mark.
      1) Do not use, or allow others to use, submittals marked "Rejected, or Revise and Resubmit" at the Project Site or elsewhere where Work is in progress.
      2) Other Action: Where a submittal is for information or record purposes or special processing or other activity, the Architect will return the submittal marked "Action Not Required."
   d. Unsolicited Submittals: The Architect will discard unsolicited submittals without action.

014220 REFERENCE STANDARDS & DEFINITIONS

A. For products specified by association or trade standards, comply with requirements of the standard, except when more rigid requirements are specified or are required by applicable codes.

B. References to standard specifications and codes refer to the editions current at the bid due date. An exception is, buildings exceeding the threshold limit must be in substantial compliance with the requirements of the effective code at the time of receipt of completed application to the Office of State Building Inspector (OSBI). References include their addenda and errata, if any, and shall be considered a part of these specifications as if they were printed herein in full.

C. The manufacturers' standard warranties or guarantees shall apply when their products are used on this project.

D. Flame Spread Ratings - all materials that are required of obligated to meet specified standards shall be submitted to the owner for their records as part of the shop drawing submittal process for their construction records.

014500 QUALITY CONTROL

A. Contractor Responsibilities: Unless otherwise indicated as the responsibility of another identified entity, the Owner, through the Construction Administrator, shall provide Fire Alarm Acceptance testing, inspections, tests, and other quality-control services specified elsewhere in the Contract Documents and required by authorities having jurisdiction. All tests required by the individual specification sections are required to be scheduled and notification given to the Construction Administrator forty-eight (48) hours in advance to the test/inspection as applicable. Costs for these services are not included in the Contract Sum.

1. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Contractor's responsibility, the Contractor shall employ and pay a qualified independent testing Owner to perform quality-control services. Costs for these services are included in the Contract Sum.
2. Where individual Sections specifically indicate that certain inspections, tests, and other quality-control services are the Owner's responsibility, the Owner will employ and pay a qualified independent testing Owner to perform those services.
    a. Such services include Special Inspections as required by the latest adoption of the "Rhode Island State building Code".
    b. Where the Owner has engaged a testing Owner for testing and inspecting part of the Work, and the Contractor is also required to engage an entity for the same or related element, the Contractor shall not employ the entity engaged by the Owner. The Owner will engage the services of a qualified Special Inspector for this project. The Special Inspector, as a representative of the Owner, shall document and confirm compliance with the provisions of the Rhode Island State Building Code for Special Inspections.
    c. Materials and assemblers for this project will be tested and construction operations inspected as the work progresses. Failure to detect any defective work or material shall not in any way prevent later rejection when such defect is discovered nor shall it obligate the State for final acceptance.
    d. The Owner use of testing and inspection services shall in no way relieve the contractor of the responsibility to furnish materials and finished construction in full compliance with the Contract Documents and the Rhode Island State Building Codes.

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.
2. The Owner will issue a credit change order to cover all costs incurred related to all re-tests/re-inspection due to non-compliance to the contract documents, including but not limited to the Owners costs and the Consultants costs.

C. **Associated Services:** Cooperate with agencies performing required inspections, tests, and similar services, and provide reasonable auxiliary services as requested. Notify the Owner 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 Owner in taking samples.
4. Provide facilities for storage and curing of test samples.
5. Deliver samples to testing laboratories.
6. Provide an approved design mix proposed for use for material mixes that require control by the testing Owner.
7. Provide security and protection of samples and test equipment at the Project Site.

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

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

E. Owner will pay for the services of an independent testing Agency laboratory to perform inspections, tests and other services required by the Specifications except as noted below, listed for which the Owner will issue a deduct change order to cover the cost associated with these tests:

1. When the Contractor notifies the Construction Administrator and/or Testing Agency less than twenty-four (24) hours before the expected time of testing.
2. When the Contractor requires testing for his own convenience.
3. When the Contractor schedules a test and is not ready for the required test.

F. Reports of test that are part of the submittal requirements which indicate compliance or non-compliance with the specified standard.

G. See also General Conditions Article 16 “Inspections and Tests”.

H. Fire Alarm/Acceptance Testing Procedures:

1. The State Fire Marshals Office shall dictate the fire alarm testing requirements.
2. This test will not be limited as set below:

   a. Protective Signaling Systems:

      All protective signaling systems shall meet with acceptance testing requirements of the applicable standards listed in Section 7-6.1.4, NFPA 101/1997 and NFPA 13/19996.

   b. Prior Test Notification:

      At least 5 working days prior to testing, the Fire Alarm Contractor shall notify (in writing) the following people of the proposed date the acceptance tests are to be performed (Also, see Part 2 of Certificate of Compliance).

      - The State Fire Marshals Office Representative
      - General Contractor
      - Engineer of Record
      - Equipment Supplier Representative

- Sprinkler Contractor

c. Certificates of Compliance
   1) A Fire Alarm System Inspection and Testing Certification and Description form shall be prepared for each system (See NFPA 72/1999 Chapter 7 and Figure 7-5.2.2).
   2) Parts 1 and 3 through 9, shall be completed after the system is installed and the installation of the wiring has been checked. Every alarm device must also be pre-tested to ensure proper operation and correct annunciation at each remote annunciator and control panel. Part 1 of the form (Certification of System Installation) shall be signed by the fire alarm contractor. The signed and completed preliminary copies of the Certification form shall be forwarded to all parties along with the Prior Test Notification.
   3) Part 2, of each applicable form, shall be completed after the operational tests have been completed.
   4) After the completion of the operational acceptance tests and sign-off of test witness (with stipulations noted), final copies of the Certificates shall be forwarded to the State Fire Marshals Office.

d. Tests:
   1) All tests shall be conducted in accordance with the Manufacturers Testing Recommendations.
   2) All testing equipment, apparatus (i.e. sound level decibel meter, 2-way radio communication, test devices, ladders, tools, lighting, etc.) and personnel shall be supplied by the Fire Alarm Contractor and Sprinkler Contractor.

e. System Documentation:

   Every system shall include the following documentation, which shall be delivered to the State Fire Marshals Office upon final acceptance of the system. An owner's manual or manufacturer's installation instructions covering all system equipment, including the following:

   1. A detailed narrative description of the system inputs, evacuation signaling, ancillary functions, annunciation, intended sequence of operations, expansion capability, application considerations, and limitations.
   2. Operators instructions for basic systems operations including alarm acknowledgment, system reset, interpreting system output (LED's CRT display, and printout), operation of manual evacuation signaling and ancillary function controls, changing printer paper, etc.
   3. A detailed description of routine maintenance and testing as required and recommended and as would be provided under a maintenance contract, including testing and maintenance instructions for each type of device installed. This information should include:

      a. A listing of individual system components that require periodic testing and maintenance.

      b. Step by step instructions detailing the requisite testing and maintenance procedures and the intervals at which those procedures should be performed.

      c. A schedule that correlates the testing and maintenance procedures required by paragraph (2) above and with the listing required by paragraph (1) above.
   4. Detailed troubleshooting instructions for each type of trouble condition recognized by the system, including opens, grounds, parity errors, "loop failures," etc. These

instructions should include a list of all trouble signals, and step by step instructions describing how to isolate those problems and correct them (or call for service as appropriate).

5. A service directory, including a list of names and telephone numbers for those who should be called to service on the system.

f. As-Built Drawings:

The Contractor will produce two sets of as-built drawings and specifications for the fire alarm system, indicating the location (and programmed address, if applicable) of all devices and appliances, the wiring sequences, wiring methods, connection of the components, and sequence of operation of the protective signaling system as installed, shall be given to the State Fire Marshals Office. This shall be in Accordance with NFPA 72. Refer also to Section 017700 "Contract Closeout".

I. Submittals:

1. Unless the Contractor is responsible for this service, the independent testing Agency shall submit a certified written report, in duplicate, of each inspection, test, or similar service to the Construction Administrator. If the Contractor is responsible for the service, submit a certified written report, in duplicate, of each inspection, test, or similar service through the Contractor.
2. Submit additional copies of each written report directly to the governing authority, when the authority so directs.
3. Report Data: Written reports of each inspection, test, or similar service include, but are not limited to, the following:
   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 re-testing.

J. Conflicting Information

1. The Contract Documents are complimentary. They describe the intent of the final product. The contractor's performance is expected to meet the extent consistent with the Contract Documents and reasonably inferable from them as being necessary to produce the indicated final product.
2. If compliance with two or more standards or instructions is specified and these standards establish different or conflicting requirements for minimum quantities or quality levels, contractor shall

comply with the most stringent, more costly, and/or more time consuming requirement. Refer conflicting requirements to Architect for a decision before proceeding.

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

4. The order of information describing the Work is as follows:
    a. Schedules shall override Specifications.
    b. Specifications shall override drawing details.
    c. Drawn details shall override building or wall sections.
    d. Drawn building or wall sections shall override drawing plans or elevation views.
5. Interpretation:
    a. The Construction Manager shall provide the final decisions and coordination for any means and methods conflicts that arise with the Work.
    e. The Architect shall provide the final interpretation of any conflicting information on the Construction Documents.

K. Copies of Standards:

1. Each entity engaged in construction on the Project is required to be familiar with industry standards applicable to its construction activity. Copies of applicable standards are not bound with the Contract Documents.

2. Where copies of standards are needed to perform a required construction activity, the Contractor shall obtain copies directly from the publication source.

L. Quality Assurance:

1. Qualifications for Service Agencies: Engage inspection and testing service agencies, including independent testing laboratories, that are pre-qualified as complying with the National Voluntary Laboratory Accreditation Program and that specialize in the types of inspections and tests to be performed.
    a. Each independent inspection and testing Owner engaged on the Project shall be authorized by authorities having jurisdiction to operate in the state where the Project is located.

M. Repair and Protection:

1. General: Upon completion of inspection, testing, sample taking and similar services, repair damaged construction and restore substrates and finishes. Comply with Contract Document requirements for Division 1 Section "Cutting and Patching."
2. Protect constructions exposed by or for quality-control service activities, and protect repaired construction.
3. Repair and protection is Contractor's responsibility, regardless of the assignment of responsibility for inspection, testing, or similar services.

015035 CONSTRUCTION EQUIPMENT

A. The Contractor shall furnish tools, apparatus and appliances, hoists and/or cranes and power for same, scaffolding, runways, ladders, temporary supports and bracing and similar work or material necessary to insure convenience and safety in the execution of the Contract except where this is otherwise specified in any Specification Section. All such items shall meet the approval of the State of Rhode Island but responsibility for design, strength and safety shall remain with the Contractor. All such items shall comply with Federal OSHA regulations and applicable codes, statutes, rules and regulations, including compliance with the requirements of the current edition of the "Manual of Accident Prevention in Construction" published by the A.G.C. and the standards of the State Labor Department.

B. Staging, exterior and interior, required for the execution of this Contract, shall be furnished, erected, relocated if necessary and removed by the General Contractor. Staging shall be maintained in a safe condition without charge to and for the use of all trades as needed.

015045 PROTECTION

A. Protect buildings, equipment, furnishings, grounds and plantings from damage. Any damage shall be repaired or otherwise made good at no expense to the State.

B. Provide protective coverings and barricades to prevent damage. The Contractor shall be held responsible for, and must make good at his own expense, any water or other type of damage due to improper coverings. Protect the public and building personnel from injury.

C. Provide temporary protection for installed products. Control traffic in immediate area to minimize damage.

D. Provide protective coverings for walls, projections, jambs, sills and soffits of openings. Protect finished floors and stairs from traffic, movement of heavy objects and storage. Prohibit traffic and storage on waterproofed and roofed surfaces and on lawn and landscaped areas.

E. Provide temporary partitions and ceilings to separate work areas from Owner-occupied areas to prevent penetration of dust and moisture into Owner-occupied areas and equipment. Erect framing and sheet materials with closed joints and sealed edges at intersections with existing surfaces.

F. See also General Conditions Article 19 “Protection of the Work, Persons and Property”.

015050 SECURITY

A. Provide security program and facilities to protect work, existing facilities and Owner's operations from unauthorized entry, vandalism and theft. Coordinate with Owner's security program.

B. The Contractor shall be solely responsible for damage, loss or liability due to theft or vandalism.

015055 TRAFFIC WAYS

A. The Contractor may use on-site paved roads and parking areas but shall not encumber same or their access. Public highways shall not be blocked by standing trucks, parked cars, material storage, construction operations or in any other manner.

B. Public roads and existing paved roads, drives and parking areas on Owner's property shall be kept free from scrap or debris due to construction operations and any damage to their surface caused by the Contractor shall be repaired by him at his own expense.

C. If the work of the Contract affects public use of any street, road, highway or thoroughfare, the G. C. shall confer with the police authority having jurisdiction to determine if and how many police are

needed for public safety in addition to any barriers and signals that may be needed. The G.C. will be responsible for payment of any needed police services.

015113 TEMPORARY POWER AND LIGHTING

A. Provide service required for construction with branch wiring and distribution boxes located to provide power and lighting by construction-type extension cords.

B. Connect to existing service, provide branch wiring and distribution boxes located to provide power and lighting by construction-grade extension cords. Owner will pay cost of energy used. Take measures to conserve energy. Provide lighting for construction operations. At the termination of construction, return the facilities to their original condition.

015116 FIRE PROTECTION

A. The Contractor, during construction, shall be responsible for loss or damage by fire to the work of the Contract until completion. Any fire used within the structure for working purposes shall be extinguished when not in use. No flammable material shall be stored in the structure in excess of amounts allowed by the authorities. No gasoline shall be stored in or close to the building at any time. The Contractor shall assign a responsible employee to be in charge of fire protection measures.

B. If an EPDM or other single-ply roof is included in the work that requires cleaning of mating surfaces of laps with gasoline, limit amount of gasoline on roof to 2 gallons which shall be in U.L. listed containers. Also provide one 30 B:C fire extinguisher within 75 feet of any point on the roof.

015123 TEMPORARY HEATING, COOLING AND VENTILATING

A. Provide temporary heat during construction for interior areas included in the Contract to counteract low temperatures or excessive dampness and, in any event, between October 15th and April 15th. Maintain during said period or periods until final completion of the Contract, unless otherwise approved by the State of Rhode Island in writing. Windows, doors, ventilators and similar openings shall be temporarily closed. Provide heat and ventilation to maintain specified conditions for construction operations and to protect materials and finishes from damage by temperature or humidity. The permanent heating system is not to be used for temporary heating unless approved, in writing, by the State of Rhode Island. The Contractor shall pay costs. See individual Sections for temperature/humidity limits. Temporary H methods shall comply with OSHA regulations and other applicable codes, statutes, rules and regulations and shall be approved by the State of Rhode Island.

B. Permanent air handling equipment, when used for temporary heating, shall be equipped with disposable "construction" filters. The construction filters shall have an average efficiency at least equal to the filters specified under Division 15, but not less than 30% when tested in accordance with ASHRAE 52-76. The filters shall have an average arrestance of not less than 90% efficiency on one (1) micron size particles. Before turning over the system for final acceptance, the contractor shall remove and dispose of the construction filters; spray clean the heating and cooling coils, and drain pans to "like new" condition; and install the filters specified in Division 15.

015136 TEMPORARY WATER

A. Connect to existing facilities, through an approved backflow prevention device; extend branch piping with outlets so that water is available by use of hoses. Owner will pay for water used. The Contractor shall not waste water or use faulty equipment. The Contractor shall provide, at his own expense, all connections, extensions and other apparatus required for use of such services. Upon completion of the

Contract, the Contractor shall disconnect temporary extensions and return utility to its original condition.

015213 FIELD OFFICES AND SHEDS

A. Field Offices:

1. The Owner will furnish, without charge, ***(1) one*** room***(s)*** for the Contractor's use as an office in an existing building. The Contractor shall provide and install a 5 lb. ABC fire extinguisher and an approved first aid kit. The Contractor shall be responsible for furniture and shall keep this area clean and return it to its original condition after use. The Contractor shall provide the following furniture, which will remain his property. The furniture may be used but shall be in good condition as judged by the Construction Administrator.

B. **Storage and Fabrication Sheds:** Install storage and fabrication sheds sized, furnished, and equipped to accommodate materials and equipment involved, including temporary utility service. Sheds may be open shelters or fully enclosed spaces within the building or elsewhere on-site.

1. Storage sheds for tools, materials and equipment shall be weathertight with heat, lighting and ventilation for products requiring controlled conditions.
2. Remove temporary materials, equipment services and construction before Substantial Completion.
3. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to specified or to original condition.

015219 TEMPORARY SANITARY FACILITIES

A. Designated existing toilets may be used during construction. It is the responsibility of the Contractor to maintain the facilities in a clean and sanitary condition and return them to their original condition after use. No loitering or smoking will be permitted in these areas.

015400 TEMPORARY CONTROLS

A. Temporary Environmental Controls: Contractor is to provide the following controls.

1. Dust Control (construction and demolition).
2. Noise Control.
3. Erosion and Sediment Control.
4. Pollution Control.
5. Traffic Control.

015600 BARRIERS AND ENCLOSURES

A. Provide barriers to prevent public entry into construction areas and to protect existing facilities from damage by construction operations.

B. Provide a fence around construction site; equip with vehicular and pedestrian gates with locks.

C. Provide covered walkways as required by governing authorities for public rights-of-way and for public access to existing buildings.

D. Provide barriers around trees and plants designated to remain. Protect against vehicular traffic, materials' dumping, chemically injurious materials, puddling or running water.

E. Provide temporary, insulated, weathertight closures at openings to the exterior to provide acceptable working conditions and protection for materials, to allow for temporary heating and to prevent entry of unauthorized persons. Provide doors with self-closing hardware and locks.

F. Barriers and enclosures shall be in conformance with code requirements. Do not block egress from occupied buildings unless necessary to further the work of the Contract. In this case, obtain the State's approval of an alternate egress plan.

G. See also General Conditions Article 19 "Protection of the Work, Persons and Property".

015639 TREE PROTECTION

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

B. General protection and pruning of existing trees and plants that are affected by execution of the work, whether temporary or permanent construction.

C. DEFINITIONS

a. Caliper: Diameter of a trunk measured by a diameter tape at 6 inches (150 mm) above the ground for trees up to, and including, 4-inch (100-mm) size; and 12 inches (300 mm) above the ground for trees larger than 4-inch (100-mm) size.

D. SUBMITTALS

a. Sample of Tree Trunk Protection types for verification.

b. Pine Bark Mulch: One quart volume of pine bark mulch; in sealed plastic bags labeled with composition of materials by percentage of weight and source of mulch.

c. Maintenance Recommendations: From arborist, for care and protection of trees affected by construction during and after completing work.

E. JOB CONDITIONS

a. Temporary Protections: Provide temporary fencing, barricades or guards to protect trees and other plants, which are to remain, from damage.

b. Protect Root Systems: Do not store construction materials, debris or excavated material within drip line (outer perimeter of branches). Do not permit vehicles within drip line. Restrict foot traffic to prevent excessive compaction of soil over root systems. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted

F. MATERIALS

a. Tree Trunk Protection types for verification: Constructed of 2”x2” to 2”x6” preservative treated wood with wire material that is 9 gauge wire or ½” strapping.

b. Mulch: Pine Bark Mulch shall be derived from evergreen tree bark aged to a minimum of six months and no more than eighteen months. The bark shall be shredded so that the resulting pieces are no more than quarter inch (¼”) thick and no longer than three inches (3”). The mulch shall be free of stringy material and shall not contain an excess of fine particles. The mulch shall be brown in color, free of leaves, twigs, sod, weeds, shavings and other foreign materials which are injurious to health plant growth. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

G. EXECUTION

a. Protect tree root systems from damage due to noxious materials and solution caused by run-off or spillage during mixing and placement of construction materials, or drainage from stored materials. Protect root systems from flooding, erosion or excessive wetting resulting from dewatering operations.

b. Do not allow fires under or adjacent to trees or other plants which are to remain.

c. Remove branches from trees that are to remain, if required and authorized by the Landscape Architect to clear for new construction.

d. Where directed by Landscape Architect, extend pruning operation to restore natural shape of entire tree.

e. Cut branches and roots, where required, with sharp pruning instruments; do not break or chop.

H. EXCAVATION AROUND TREES

a. Excavate within drip line of trees only where indicated.

b. Where trenching for utilities is required within drip line, tunnel under or around roots by hand digging. Do not cut main lateral roots or tap roots; cut only smaller roots which interfere with installation of new work. Cut roots with sharp pruning instruments; do not break or chop.

c. Where excavating for new construction is required within drip line of trees, handexcavate to minimize damage to root systems. Provide sheeting at excavations if required. Use narrow tine spading forks and comb soil to expose roots.

d. Relocate roots in backfill areas wherever possible. If large, main lateral roots are encountered, expose beyond excavation limits, as required, to bend and relocate without breaking. If encountered immediately adjacent to location of new construction and relocation is not practical, cut roots approximately 3" back from new construction

e. Do not allow exposed roots to dry out before permanent backfill is placed; provide temporary earth cover, or pack with peat moss and wrap with burlap. Water and maintain in moist condition and temporarily support and protect from damage until permanently relocated and covered with earth.

f. Prune branches to balance loss to root system caused by damage or cutting of root system.

I. GRADING AND FILLING AROUND TREES

a. Maintain existing grade within drip line of trees, unless otherwise indicated.

b. Lowering Grades: Where existing grade is above new finish grade shown around trees, carefully hand excavate within drip line to new finish grade. Cut roots exposed by excavation or provide permanent protections as recommended by Arborist.

c. Prune branches to stimulate root growth and to compensate for loss of roots. Provide subsequent maintenance during the contract period as recommended by Arborist. Provide Owner with typed instructions for recommended long-range maintenance procedures to be followed after completion of construction operations.

d. Raising Grades:

i. Minor Fills: Where existing grade is 6" or less below elevation of finish grade shown, use topsoil fill material specified. Place in single layer and do not compact; hand grade to the required finish elevations.

ii. Moderate Fills: Where existing grade is more than 6", but less than 12" below finish grade elevation, place a layer of drainage fill on existing grade prior to placing topsoil. Carefully place against trunk of tree approximately 2" above finish grade elevation and extend not less than 18" from tree trunk on all sides. For balance of area within drip line perimeter, place drainage fill to an elevation 6" below grade and complete fill with a layer of topsoil to finish grade elevation. Do not compact drainage fill or topsoil layers; hand grade to required elevations.

J. REPAIR AND REPLACEMENT OF TREES

a. Repair trees damaged by construction operations. Make repairs promptly after damage occurs to prevent progressive deterioration of damaged trees.

b. Remove and replace dead and damaged trees that are determined by Arborist to be incapable of restoration to normal growth pattern.

c. Provide new trees of same size and species as those being replaced. Plant and maintain as specified under Section "Trees and Shrubs".

d. If trees over 6" in caliper measurement taken 12" above grade are required to be replaced, provide new trees of 6" caliper size, and of species selected by the Landscape Architect.

K. ROOT PRUNING

a. Prune roots that are affected by temporary and permanent construction.

b. Cut roots manually by digging a trench and cutting exposed roots with sharp pruning instruments; do not break, tear, chop or slant the cuts. Do not use a backhoe or other equipment that rips, tears, or pulls the roots.

c. Cut Ends: Do not paint cut root ends.

d. Temporarily support and protect roots from damage until they are permanently redirected and covered with soil.

e. Cover exposed roots with burlap and water regularly.

f. Backfill as soon as possible according to requirements in Division 31 Section “General Requirements for Earthwork”.

g. Root Pruning at Edge of Dripline Tree Protection: Prune roots twelve (12) inches outside of the dripline tree protection, by cleanly cutting all roots to the depth of the required excavation.

h. Root Pruning within the Dripline Tree Protection: Clear and excavate by hand to the depth of the required excavation to minimize damage to root systems. Use narrow-tine spading forks, comb soil to expose roots, and cleanly cut roots as close to excavation as possible.

L. CROWN PRUNING

a. Prune Branches that are affected by temporary and permanent construction. Prune Branches as follows:

b. Prune trees to remain to compensate for root loss caused by damaging or cutting root system. Provide subsequent maintenance during contract period as recommended by arborist.

i. Pruning Standards: Prune trees according to ANSI 300.

ii. Cut branches with sharp pruning instruments; do not break or chop.

iii. Do not apply paint to wounds.

M. DISPOSAL

a. Burning on Owner's Property: Burning of removed trees and branches is not permitted on site.

b. Removal from Owner's Property: Remove excess excavation, displaced trees, and trimmings and legally dispose of off Owner's property.

END OF SECTION

015800 PROJECT SIGNS

A. Project Signs: Engage an experienced sign painter to apply graphics. Comply with details to be furnished by the Construction Administrator.

1. Project Sign: The Contractor shall contact the Architect for the proper wording for the project sign. Fabricate sign of 48” x 96” x 3/4", exterior grade, A-B Fir plywood. Mount sign on preservative treated Fir posts. The Owner shall provide design, color selection and illustration of the Project Sign. Paint both sides and all edges of sign and the posts with two coats of exterior, white, alkyd primer. Paint the border and letters with "bulletin" (sign) paint. Letter sizes, colors and related information is given on the illustration as below. A self-adhesive decal of the State seal will be furnished at the Contract signing. Erect the sign within two weeks after execution of the Contract and remove the sign within one week after completion of the project.
2. Sign detail: to be provided by Architect.

015850 IDENTIFICATION BADGES

A. Identification Badges for Contractor's Personnel:

1. The Contractor will provide each person working at the site with an identification badge, bearing the name of the Contractor and a number. As badges are assigns, a record shall be kept by the Contractor and given to the Construction Administrator. Update and correct the records of all badges issued on a semi-monthly basis.
2. Badges are to be worn on outer garment where visible at all times while at the construction site, return them to the Contractor’s field office at the end of each day and pick them up there each morning.

016400 OWNER-FURNISHED PRODUCTS

A. The Owner may furnish various products such as indicated below and/or as indicated in the construction documents. The Work includes providing support systems to receive Owner's equipment, and mechanical and electrical connections.

1. If Owner-furnished items are damaged, defective, or missing, the Owner will arrange for replacement.
2. The Contractor shall designate delivery dates of Owner-furnished items in the Contractor's Construction Schedule.
3. The Contractor is responsible for receiving, unloading, and handling Owner-furnished items at the site.
4. The Contractor is responsible for protecting Owner-furnished items from damage, including damage from exposure to the elements. The Contractor shall repair or replace items damaged as a result of his operations.
3. Schedule:
    1. Egress stair windows.
    2. Percentage of exterior masonry brick for rear egress stair. Additional brick may have to be ordered.

016600 PRODUCT STORAGE AND HANDLING REQUIREMENTS

A. Materials and Equipment: Shall be delivered, stored and handled to prevent intrusion of foreign matter and damage by weather or breakage. Packaged materials shall be delivered and stored in original, unbroken packages.

1. Promptly inspect shipments to assure that products comply with requirements, that quantities are correct and products are undamaged.
2. Packages, materials and equipment showing evidence of damage will be rejected and replaced at no additional cost to the Owner.

B. Storage and Protection:

1. Store products in accordance with manufacturers' instructions with seals and labels intact and legible. Store sensitive products in weathertight enclosures; maintain within temperature and humidity range required by manufacturer.
2. For exterior storage of fabricated products, place on sloped supports above ground. Cover products subject to deterioration with impervious sheet covering; provide ventilation to avoid condensation.
3. Store loose granular material on solid surfaces in a well-drained area; prevent mixing with foreign matter.
4. Arrange storage to provide access for inspection. Periodically inspect to insure products are undamaged and are maintained under required conditions. Keep log showing date, time and problems, if any.
5. Stone, masonry units and similar materials shall be stored on platforms or dry skids and shall be adequately covered and protected against damage.
6. The Contractor shall prepare, as directed by the Owner, one area or space in the building for storage of State-owned equipment.

017123 FIELD ENGINEERING

A. Provide field engineering services to establish and record grades, lines and elevations.

B. The Contractor shall retain a Professional Engineer or Land Surveyor registered by the State of Rhode Island to lay out the building, underground utility lines and other site work from the horizontal and vertical control information furnished by the Owner and to establish and record the necessary elevations, at no additional cost to the Owner.

C. The Contractor shall forward a letter from his Land Surveyor or Professional Engineer stating that the control information furnished by the Owner, is accurate or shall identify inaccuracies, if they exist. The Contractor shall not take advantage of errors, which may be included in the control information. Stakes and markings shall be preserved.

017329 CUTTING AND PATCHING

A. Openings and chases may not be shown on the Drawings. It is the responsibility of the Contractor to examine the Architectural, Electrical, Heating, Cooling, Ventilating and Plumbing Drawings and to provide chases, channels or openings where needed.

B. The Contractor shall install sleeves, inserts and hangers furnished by the trades needing same.

C. After installing work into openings, channels and/or chases, the Contractor shall close same. If finishes are to be restored, the new work shall match the original and shall be done by the trade customarily responsible for the particular kind of work.

D. Permission shall be obtained from the Construction Administrator before cutting beams, arches, lintels or other structural members.

E. Requirements for Structural Work: Do not cut and patch structural elements in a manner that would change their load-carrying capacity or load-deflection ratio.

1. Obtain approval from the Architect/Engineer's of the cutting and patching proposal before cutting and patching the following structural elements:

   a. Foundation construction.

   b. Bearing and retaining walls.

   c. Structural concrete.

   d. Structural steel.

   e. Lintels.

   f. Structural decking.

   g. Miscellaneous structural metals.

   h. Exterior curtain-wall construction.

   i. Equipment supports.

   j. Piping, ductwork, vessels, and equipment.

   k. Structural systems of special construction in Division 13 Sections.

F. Do cutting and patching to integrate all elements of the work. Provide penetrations of existing surfaces. Provide samples for testing. Seal penetrations through floors, walls, ceilings and roofs, as applicable; restore or preserve fire-rated and smoke-barrier construction. Construction and finishes shall match original work.

G. The Contractor shall verify dimensions for built-in work and/or work adjoining that of other trades before ordering any material or doing any work. Discrepancies shall be submitted to the Construction Administrator before proceeding with the work.

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

I. See also General Conditions Article 23 "Cutting, Fitting, Patching and Digging".

017400 CLEANING

A. Maintain areas under Contractor's control free of waste materials, debris and rubbish. Maintain in a clean and orderly condition.

B. Remove debris and rubbish from pipe chases, plenums, attics, crawl spaces and other closed or remote spaces before closing the space.

C. Periodically clean interior areas before start of surface finishing and continue cleaning on an as-needed basis.

D. Control cleaning operations so that dust and other particulates will not adhere to wet or newly-coated surfaces.

E. Remove waste materials, debris and rubbish from site daily and dispose of legally off-site. No scrap/debris shall remain inside the building or anywhere on site upon final acceptance of the project.

F. See also General Conditions Article 24 "Cleaning Up".

017410 RENOVATION/DEMOLITION PROJECT PROCEDURES

A. Products For Patching And Extending Work:

1. New materials: As specified in product sections; match existing Products and Work .for patching and extending Work.
2. Type and Quality of Existing Products: Determine by inspecting and testing Products where necessary, referring to existing Work as a standard.

B. Inspection- General:

1. Verify that demolition is complete and areas are ready for installation of new Work.
2. Beginning of restoration Work means acceptance of existing conditions.

C. Project Procedures for Work Involving <u>Asbestos Containing Material (ACM):</u>

1. The Owner is responsible for abating all ACM that is visible and accessible. This is to be accomplished through a separate project prior to the start of the renovation project. In demolition projects, every attempt should by the owner to remove all ACM.
2. If the Contractor should encounter any material suspect or known to contain ACM, he should immediately notify the Construction Administrator of same. It is the State's responsibility to have the material tested and abated (if necessary). The Owner will respond within twenty-four (24) hours after receiving the Contractor's written request to the Construction Administrator for testing the suspect material. The Owner will abate ACM (if necessary) within a reasonable time period, i.e. with seven (7) Working Calendar Days.
3. Testing for asbestos has been conducted at the facility scheduled for renovation, demolition, reconstruction, alteration, remodeling, or repair. Results of the asbestos testing are for information purposes only. The testing results are in a separate Volume of this Project Manual. Under no circumstance shall this information be the sole means used by the Contractor for determining the extent of asbestos. The Contractor shall be responsible for verification of all field conditions affecting performance of the Work.
4. See also General Conditions Article 23 "Cutting, Fitting, Patching and Digging".

E. Project Procedures for Work Involving Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBT's) such as Polychlorinated Biphenols (PCB's), Di-2-ethylhexyl Phthalate (DEHP), and Mercury:

1. The Contractor is responsible for abating all PCB's, DEHP, and mercury prior to the start any work involving construction, renovation or demolition (if necessary).
2. Exposure Levels for Products Containing Persistent Bioaccumulative Toxic Chemicals (PBT's) such as PCB's. DEHP, and mercury in the construction industry is regulated by 29CFR1910.1200 and 29CFR1926.28 et. al. Construction, renovation or demolition activities disturbing Products Containing Persistent Bioaccumulative Toxic Chemicals" (PBT's) such as PCB's and DEHP which are likely to be employed. These materials include but are not limited to fluorescent light fixture & exit sign, ballast's, high density discharge (HID) lamps , and certain types of construction products containing vinyl, and mercury containing electrical switches and thermostats. These activities may expose workers in excess of the respective Permissible Exposure Limit (PEL). Conduct demolition and removal Work specified in the technical sections of these specifications in conformance with these regulations. In addition construction debris/waste may be classified as hazardous waste. Disposal of all hazardous materials shall be in

accordance with but not limited to 40CRF Parts 761 Subpart K, 761, and 761.65 and the Rhode Island General Hazardous Waste Statute Sec. 22a-454.

3. A Survey for Products Containing Persistent Bioaccumulative Toxic Chemicals (PBT's) such as PCB's, DEHP and Mercury has NOT been conducted at the facility. Examples include but are not limited to fluorescent light fixture & exit sign, ballast's, high density discharge(HID) lamps , and certain types of construction products containing vinyl, and mercury containing electrical switches and thermostats. It is the Contractors responsibility for verification of all material and field conditions prior to construction, renovation, and demolition that may affect the performance of their Work.

F. Preparation:

1. Cut, move, or remove items as are necessary for access to alterations and renovation Work. Replace and restore at completion.
2. Remove unsuitable material not marked for salvage, such as rotted wood, corroded metals, and deteriorated masonry and concrete. Replace materials as specified for finished Work.
3. Remove debris and abandoned items from area and from concealed spaces.
4. Prepare surface and remove surface finishes to provide for proper installation of new Work and finishes.
5. Close openings in exterior surfaces to protect existing Work and salvage items from weather and extremes of temperature and humidity. Insulate ductwork and piping to prevent condensation in exposed areas.

G. Installation:

1. Coordinate Work of alterations and renovations to expedite completion and if required sequence Work to accommodate Owner occupancy.
2. Remove, cut and patch Work in a manner to minimize damage and to provide restoring Products and finishes to original and or specified condition in accordance with Section 01045 "Cutting and Patching".
3. Refinish visible existing surfaces to remain in renovated rooms and spaces, to specified condition for each material, with neat transition to adjacent finishes in accordance with Section 01045 "Cutting and Patching".
4. In addition to specified replacement of ***equipment*** and ***fixtures***, restore existing ***plumbing, heating, ventilation, air conditioning, electrical***, systems to full operational condition.
5. Recover and refinish Work that exposes mechanical and electrical Work exposed accidentally during the Work.
6. Install Products as specified in individual sections.

H. Transitions:

1. Where new Work abuts or aligns with existing, perform a smooth and even transition. Patch work to match existing adjacent Work in texture and appearance.
2. When 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 recommendation to Architect/Engineer.

B. Adjustments:

1. Where removal of partitions or walls result in adjacent spaces becoming one, rework floors, walls, and ceilings to a smooth plane without breaks, steps, or bulkheads.

2. Where a change of plane of ¼ inch in **12 inches** or more occurs, request recommendation from Architect/Engineer for providing a smooth transition.
3. Trim existing doors as necessary to clear new floor finish. Refinish trim as required.
4. Fit Work at penetrations of surfaces as specified in Section 01045 "Cutting and Patching".

C. Repair of Damaged Surfaces:

1. Patch or replace portions of existing surfaces that are damaged, lifted, discolored, or showing imperfections.
2. Repair substrate prior to patching finish.

D. Finishes:

1. Finish surfaces as specified in individual Product sections.
2. Finish patches to produce uniform finish and texture over entire area. When finish cannot be matched, refinish entire surface to nearest intersections.

E. Cleaning:

1. In addition cleaning specified in Section 01700 "Project Closeout", clean Owner occupied areas of Work

017419 SALVAGEABLE MATERIALS

A. The Contractor shall be responsible for removing the following salvageable items from premises and handing the items to the Owner.

1. Equipment:

2. Windows:

3. Doors:

4. Door Hardware:

5. Fixtures:

B. The Contractor shall notify the Construction Administrator in writing (7) seven working Calendar Days prior to removing all salvageable items from the existing project location and unloading all salvageable items and store items in the appropriate location as directed by the Owner.

017500 STARTING OF SYSTEMS

A. General:

1. Coordinate schedule for start-up of various equipment and systems.
2. Provide written notification the Construction Administrator 15 Calendar Days prior to start-up of each item.
3. Verify that each piece of equipment or system has been checked for proper lubrication, drive rotation, belt tension, and control sequence for other conditions that may cause damage.
4. Verify that tests, meter readings, and specified electrical characteristics agree with those required by the equipment or system manufacturer.
5. Verify in wiring and support components are complete and tested.
6. Execute the start-up under supervision of manufacturer's representative, in accordance with manufacturer's instructions.

7. When referenced in individual specification sections, require manufacturer to provide an authorized representative to be present at the site to inspect, check, and approve equipment or system installation prior to start-up, and to supervise placing equipment or system in operation.
8. Submit a written report in accordance Section 014500 "Quality Control" that the equipment or system has been properly installed and is functioning properly.

B. Demonstration and Instructions:

1. Demonstrate operation and maintenance of Products to Owner and Owner Personnel two (2) weeks prior to substantial completion.
2. For equipment or systems requiring seasonal operation perform demonstration for season within six (6) months.
3. Utilize operation and maintenance manuals as basis for instruction. Review contents of manual with Owner and Owner Personnel in detail to explain all aspects of operation and maintenance.
4. Demonstrate start-up, operation, control, adjustment, troubleshooting, servicing, and maintenance, and shutdown of each item at agreed upon scheduled time and at equipment or designated location.
5. Prepare and insert additional data in operations and maintenance manuals when need for additional data becomes apparent during demonstration.

C. Testing Adjusting, and Balancing:

1. The Contractor will employ and pay for the testing services of an independent consultant to verify the testing, adjusting, and balancing.
2. Reports will be submitted by the independent testing consultant to the Construction Administrator indicating observations and results of tests and indicating compliance or non-compliance with the requirements of the Contract Documents.
3. The Owner may employ and pay for the services of an independent consultant to verify testing, adjusting, and balancing which was performed by the Contractor.

017700 CONTRACT CLOSEOUT

A. Substantial Completion:

1. Preliminary Procedures: Before requesting inspection for Certification of Substantial Completion, complete the following. List exceptions in the request.
   a. 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.
      1) Include supporting documentation for completion as indicated in these Contract Documents and a statement showing an accounting of changes to the Contract Sum.
      2) If 100 percent completion cannot be shown, include a list of incomplete items, the value of incomplete construction, and reasons the Work is not complete.
   b. Advise the Owner of pending insurance changeover requirements.
   c. Submit specific warranties, workmanship bonds, maintenance agreements, final certifications, and similar documents.
   d. 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.

e. Submit record drawings, maintenance manuals, damage or settlement surveys, property surveys, and similar final record information.

f. Deliver tools, spare parts, extra stock, and similar items.

g. Make final changeover of permanent locks and transmit keys to the Owner. Advise the Owner's personnel of changeover in security provisions.

h. Demonstration, thru operation and testing, the functions of all systems and/or equipment to the satisfaction of the Owner for compliance to the contract. Complete testing of systems, and instruction of the Owner's operation and maintenance personnel. Discontinue and remove temporary facilities from the site, along with mockups, construction tools, and similar elements.

i. Complete final cleanup requirements, including touchup painting.

j. Touch up and otherwise repair and restore marred, exposed finishes.

2. Inspection Procedures: The Contract shall be ready and prepared when they request a Substantial Completion inspection. If the inspection reveals that the work is not complete, there are extensive punchlist items and as the items listed above are not complete, the Construction Administrator, Architect, and Owner will determine the inspection has failed.

3. The Contractor is responsible for all costs to re-inspect due to a failed inspection. The Owner will issue a deduct change order to cover all costs for re-inspection.

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.

B. Final Acceptance:

1. Preliminary Procedures: Before requesting final inspection for certification of final acceptance and final payment, complete the following. List exceptions in the request.

a. 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.

b. Submit an updated final statement, accounting for final additional changes to the Contract Sum.

c. 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.

d. 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.

e. Submit consent of surety to Final Payment.

f. Submit evidence of final, continuing insurance coverage complying with insurance requirements.

2. Reinspection Procedure: The Inspection Group will re-inspect the Work upon receipt of notice from the Construction Administrator 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.

a. Upon completion of reinspection, the Construction Administrator will prepare a certificate of final acceptance. If the Work is incomplete, the Construction Administrator will advise the Contractor of Work that is incomplete or of obligations that have not been fulfilled but are required for final acceptance.

C. As Built Document Submittals:

1. **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. Keep documents current; do not permanently conceal any work until required information has been recorded. **Failure to keep documents current is sufficient cause to withhold progress payments.**

   a. The Contractor shall also hire the services of a Surveyor registered in the State of Rhode Island to conduct a final survey to determine the location of exterior underground utility lines and to record the results, and update existing electronic media

   b. The record of exterior underground utilities shall be made at the time of installation on Mylar film drawing and AutoCAD (latest version) compatible disks. The drawing shall bear the seal of the Land Surveyor and a statement of accuracy.

2. **As-built Drawings:** The Contractor shall maintain one clean, complete 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 substantially from the Work as originally shown. Mark which drawing is most capable of showing conditions fully and accurately. Where Shop Drawings are used, record a cross-reference at the corresponding location on the Contract Drawings. Give particular attention to concealed elements that would be difficult to measure and record at a later date.

   a. Mark record sets with erasable pencil to distinguish between variations in separate categories of the Work.

   b. Mark all new information that is not shown on Contract Drawings.

   c. Note related change-order numbers where applicable.

   d. 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.

   e. Upon completion of the work, the Contractor shall submit Record Drawings to the Construction Administrator for the Owner's Records who will pass them on to the Architect or Engineer for transferring the changes to the Record Drawing Mylar Tracings.

   f. Submit electronic format data of all Coordination Drawings as required by the owner, at no additional cost.

   g. Refer to Section 014500 “Quality Control” Section 1.3 for required as built drawings and specifications for fire alarm systems.

3. **Record Specifications:** The Contractor shall 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.

   a. Mark these documents to show substantial variations in actual Work performed in comparison with the text of the Specifications and modifications.

   b. Give particular attention to equals and substitutions and selection of options and information on concealed construction that cannot otherwise be readily discerned later by direct observation.

c. Note related record drawing information and Product Data.

d. Upon completion of the Work, submit record Specifications to the Construction Administrator for the Owner's records.

4. **Record Product Data:** The Contractor shall maintain one copy of each Product Data submittal. Note related Change Orders and markup of record drawings and Specifications.

   a. 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.

   b. Give particular attention to concealed products and portions of the Work that cannot otherwise be readily discerned later by direct observation.

   c. Upon completion of markup, submit complete set of Record Product Data to the Construction Administrator for the Owner's records.

5. **Record Sample Submitted:** Immediately prior to Substantial Completion, the Contractor shall meet with the Construction Administrator, 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.

6. **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 Construction Administrator for the Owner's records.

7. **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 according to section 01730 "Operations & Maintenance Data". Included but not limited to the following types of information:

   a. Emergency instructions.

   b. Spare parts list.

   c. Copies of warranties.

   d. Wiring diagrams.

   e. Recommended "turn-around" cycles.

   f. Inspection procedures.

   g. Shop Drawings and Product Data.

   h. Fixture lamping schedule.

D. Closeout Procedures:

1. 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:

   3. Maintenance manuals.

   4. Record documents.

   5. Spare parts and materials.

6. ***Tools.***
7. ***Lubricants.***
8. ***Identification systems.***
9. ***Control sequences.***
10. ***Hazards.***
11. ***Cleaning.***
12. ***Warranties and bonds.***
13. ***Maintenance agreements and similar continuing commitments.***

2. As part of instruction for operating equipment, demonstrate the following procedures:
   a. Startup.
   b. Shutdown.
   c. Emergency operations.
   d. Noise and vibration adjustments.
   e. Safety procedures.
   f. Economy and efficiency adjustments.
   g. Effective energy utilization.

E. **Final Cleaning**:

1. **General**: The General Conditions requires general cleaning during construction. Regular site cleaning is included in Division 1 Section 017400 "Cleaning"".
2. 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. Complete the following cleaning operations before requesting inspection for Certification of Substantial Completion and Certification of Occupancy.
3. **Interior:**
   a. Remove labels that are not permanent labels.
   b. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass
   c. Clean exposed 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. Vacuum carpeted surfaces.
   d. Wash washable surfaces of mechanical, electrical equipment and fixtures and replace filters, clean strainers on mechanical equipment. Remove excess lubrication and other substances. Clean plumbing fixtures to a sanitary condition. Clean light fixtures and lamps.
   e. Clean and polish finish hardware.
   f. Clean and polish tile and other glazed surfaces.
   g. Clean floors; wax and buff resilient tile. Clean vinyl or rubber base.
   h. Vacuum and/or dust walls, ceilings, lighting fixtures, ceiling diffusers and other wall and ceiling items.

i. Remove defacements, streaks, fingerprints and erection marks.

4. **Exterior**:
   a. Clean the site, including landscape development areas, of rubbish, litter, and other foreign substances. Sweep paved areas broom clean; remove stains, spills, and other foreign deposits. Rake grounds that are neither paved nor planted, to a smooth, even-textured surface.
   b. Clean exposed exterior hard-surfaced finishes to a dust-free condition, free of stains, films, and similar foreign substances.
   c. Clean roofs, gutters and downspouts.
   d. Remove waste and surplus materials, rubbish and construction equipment and facilities from the site, and deposit it legally elsewhere.
   e. Clean transparent materials, including mirrors and glass in doors and windows. Remove glazing compounds and other substances that are noticeable vision-obscuring materials. Replace chipped or broken glass and other damaged transparent materials. Remove paint spots; wash and polish glass.
5. **Pest Control:** Engage an experienced, licensed exterminator to make a final inspection and rid the work of rodents, insects, and other pests.
6. **Removal of Protection:** Remove temporary protection and facilities installed for protection of the Work during construction.
7. **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.
   a. 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 Construction Administrator.
   b. Leave building clean and ready for occupancy. If the Contractor fails to clean up, the Owner may do so, with the cost charged to the Contractor. The Owner will issue a credit change order to cover the costs.

017823 OPERATION AND MAINTENANCE DATA

A. The Contractor shall instruct the State's designated personnel in the operation of new equipment and shall provide manuals and if required, provide video tapes of this basic maintenance of the equipment for training purposes. Provide qualified personnel for as long as necessary to instruct the State's personnel.

B. Submit two copies of the manuals in 3-ring, loose-leaf notebooks to the Architect/Engineer for approval. Manuals may consist of plain paper copies of approved shop drawings and catalog cuts.

C. Manuals shall include:
   1. Operating Procedures:
      a. Typewritten procedures for each mode of operation of each piece of equipment. Procedures shall indicate the status of each component of a system in each operating mode.
      b. Procedures shall include names, symbols, valve tags, circuit numbers, schematic wiring diagrams, locations of thermostats, manual starters, control cabinets and other controls of each system.

D. Emergency shut-down procedures for each piece of equipment or system, both automatic and manual, as appropriate.

1. Maintenance Schedule:
   a. Typewritten schedule describing manufacturers schedule of maintenance and maintenance procedures.
2. Catalog Cuts:
   a. To illustrate each piece of installed equipment, including options.
   b. Include equipment descriptions including physical, electrical and mechanical; performance characteristics; installation or erection diagrams.
   c. Include spare parts numbers and names, address and phone number of manufacturer; name, address and phone number of local representative or service department.
   d. Typewritten list of all subcontractors on the project, including name, address and phone number of local representative or service department.
3. Manuals shall be indexed with dividers indicating each system or piece of equipment.

017830 WARRANTIES AND GUARANTEES

A. **Disclaimers and Limitations**: Manufacturer's disclaimers and limitations on product warranties do not relieve the Contractor of the warranty on the Work that incorporates the products. Manufacturer's disclaimers and limitations on product warranties do not relieve suppliers, manufacturers, and subcontractors required to countersign special warranties with the Contractor.

B. **Related Damages and Losses:** When correcting failed or damaged warranted construction, remove and replace construction that has been damaged as a result of such failure or must be removed and replaced to provide access for correction of warranted construction.

C. **Reinstatement of Warranty:** When Work covered by a warranty has failed and been corrected by replacement or rebuilding, reinstate the warranty by written endorsement. The reinstated warranty shall be equal to the original warranty with an equitable adjustment for depreciation.

D. **Replacement Cost:** Upon determination that Work covered by a warranty has failed, replace or rebuild the Work to an acceptable condition complying with requirements of the Contract Documents. The Contractor is responsible for the cost of replacing or rebuilding defective Work regardless of whether the Owner has benefited from use of the Work through a portion of its anticipated useful service life.

E. **Owner's Recourse:** Expressed warranties made to the Owner are in addition to implied warranties and shall not limit the duties, obligations, rights, and remedies otherwise available under the law. Expressed warranty periods shall not be interpreted as limitations on the time in which the Owner can enforce such other duties, obligations, rights, or remedies.

   1. Rejection of Warranties: The Owner reserves the right to reject warranties and to limit selection to products with warranties not in conflict with requirements of the Contract Documents.

F. Where the Contract Documents require a special warranty, or similar commitment on the Work or part of the Work, the Owner reserves the right to refuse to accept the Work, until the Contractor presents evidence that entities required to countersign such commitments are willing to do so.

G. The Contractor shall guarantee all materials and workmanship for a period of eighteen months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed

below. Submit four copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

H. The Contractor shall guarantee all materials and workmanship for a period of **eighteen** months from the date of acceptance of the Work. In addition, the Contractor shall furnish the warranties listed below. Submit four copies of each to the Construction Administrator in the supplier's standard form or in the form given below if there is no standard form available.

I. Submit certification that finish materials are fire rated as specified.

J. Bonds shall be by approved Surety Companies, made out to the Commissioner, State of Rhode Island on companies' standard form.

K. Guarantees, warranties or bonds supplied by Subcontractors, Suppliers or Manufacturers shall reference the project name, number, and location and be certified by the General Contractor to be for the product and installation on the project and must be countersigned by the General Contractor.

L. **Submittals**:

1. Submit written warranties prior to the date certified for Substantial Completion. If the Architect's Certificate of Substantial Completion designates a commencement date for warranties other than the date of Substantial Completion for the Work, or a designated portion of the Work, submit written warranties upon request of the Architect.
2. Forms for special warranties are included in this Section. Prepare a written document utilizing the appropriate form, ready for execution by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Submit a draft to the Owner, through the Construction Administrator, for approval prior to final execution.
    a. Refer to Divisions 2 through 17 Sections for specific content requirements and particular requirements for submitting special warranties.
3. Form of Submittal: At Final Completion compile two copies of each required warranty properly executed by the Contractor, or by the Contractor, subcontractor, supplier, or manufacturer. Organize the warranty documents into an orderly sequence based on the table of contents of the Project Manual.
4. Bind warranties and bonds in heavy-duty, commercial-quality, durable 3-ring, vinyl-covered loose-leaf binders, thickness as necessary to accommodate contents, and sized to receive 8-1/2-by-11-inch paper.
    a. Provide heavy paper dividers with celluloid covered tabs for each separate warranty. Mark the tab to identify the product or installation. Provide a typed description of the product or installation, including the name of the product, and the name, address, and telephone number of the Installer.
    b. Identify each binder on the front and spine with the typed or printed title "WARRANTIES," Project title or name, and name of the Contractor.
    c. When warranted construction requires operation and maintenance manuals, provide additional copies of each required warranty, as necessary, for inclusion in each required manual.

END OF DIVISION 1
GENERAL REQUIREMENTS

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. Demolition and removal of selected portions of building or structure.

1.3 DEFINITIONS

A. Remove: Detach items from existing construction and legally dispose of them off-site unless indicated to be removed and salvaged or removed and reinstalled.

B. Remove and Reinstall: Detach items from existing construction, prepare for reuse, and reinstall where indicated.

C. Existing to Remain: Existing items of construction that are not to be permanently removed and that are not otherwise indicated to be removed, removed and salvaged, or removed and reinstalled.

1.4 MATERIALS OWNERSHIP

A. Unless otherwise indicated, demolition waste becomes property of Contractor.

B. Historic items, relics, antiques, and similar objects including, but not limited to, cornerstones and their contents, commemorative plaques and tablets, and other items of interest or value to Owner that may be uncovered during demolition remain the property of Owner.

1. Carefully salvage in a manner to prevent damage and promptly return to Owner.

1.5 PRE-INSTALLATION MEETINGS

A. Pre-demolition Conference: Conduct conference at Project site.

1. Inspect and discuss condition of construction to be selectively demolished.
2. Review structural load limitations of existing structure.
3. Review and finalize selective demolition schedule and verify availability of materials, demolition personnel, equipment, and facilities needed to make progress and avoid delays.
4. Review requirements of work performed by other trades that rely on substrates exposed by selective demolition operations.

5. Review areas where existing construction is to remain and requires protection.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For refrigerant recovery technician.

B. Proposed Protection Measures: Submit report, including drawings, that indicates the measures proposed for protecting individuals and property , for dust control and for noise control. Indicate proposed locations and construction of barriers.

C. Schedule of Selective Demolition Activities: Indicate the following:

1. Detailed sequence of selective demolition and removal work, with starting and ending dates for each activity. Ensure Owner's building manager's and other tenants' on-site operations are uninterrupted.
2. Interruption of utility services. Indicate how long utility services will be interrupted.
3. Coordination for shutoff, capping, and continuation of utility services.
4. Use of elevator and stairs.
5. Coordination of Owner's continuing occupancy of portions of existing building and of Owner's partial occupancy of completed Work.

D. Predemolition Photographs or Video: Submit before Work begins.

E. Warranties: Documentation indicated that existing warranties are still in effect after completion of selective demolition.

1.7 CLOSEOUT SUBMITTALS

A. Inventory: Submit a list of items that have been removed and salvaged.

1.8 FIELD CONDITIONS

A. Owner will occupy portions of building immediately adjacent to selective demolition area. Conduct selective demolition so Owner's operations will not be disrupted.

B. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

1. Before selective demolition, Owner will remove the following items:

a. Loose furniture.

C. Notify Architect of discrepancies between existing conditions and Drawings before proceeding with selective demolition.

D. Hazardous Materials: It is not expected that hazardous materials will be encountered in the Work.

1. Hazardous materials will be removed by Owner before start of the Work.
2. If suspected hazardous materials are encountered, do not disturb; immediately notify Architect and Owner. Hazardous materials will be removed by Owner under a separate contract.

E. Storage or sale of removed items or materials on-site is not permitted.

F. Utility Service: Maintain existing utilities indicated to remain in service and protect them against damage during selective demolition operations.

1. Maintain fire-protection facilities in service during selective demolition operations.

1.9 WARRANTY

A. Existing Warranties: Remove, replace, patch, and repair materials and surfaces cut or damaged during selective demolition, by methods and with materials so as not to void existing warranties. Notify warrantor before proceeding. Existing warranties include the following:

1. Roof membrane system.

B. Notify warrantor on completion of selective demolition, and obtain documentation verifying that existing system has been inspected and warranty remains in effect. Submit documentation at Project closeout.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Regulatory Requirements: Comply with governing EPA notification regulations before beginning selective demolition. Comply with hauling and disposal regulations of authorities having jurisdiction.

B. Standards: Comply with ANSI/ASSE A10.6 and NFPA 241.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verify that utilities have been disconnected and capped before starting selective demolition operations.

B. Review record documents of existing construction provided by Owner. Owner does not guarantee that existing conditions are same as those indicated in record documents.

C. Survey existing conditions and correlate with requirements indicated to determine extent of selective demolition required.

D. When unanticipated mechanical, electrical, or structural elements that conflict with intended function or design are encountered, investigate and measure the nature and extent of conflict. Promptly submit a written report to Architect.

E. Engage a professional engineer to perform an engineering survey of condition of building to determine whether removing any element might result in structural deficiency or unplanned collapse of any portion of structure or adjacent structures during selective building demolition operations.

1. Perform surveys as the Work progresses to detect hazards resulting from selective demolition activities.

F. Survey of Existing Conditions: Record existing conditions by use of preconstruction photographs or preconstruction videotapes.

1. Comply with requirements specified in Section 013233 "Photographic Documentation."
2. Inventory and record the condition of items to be removed and salvaged. Provide photographs of conditions that might be misconstrued as damage caused by salvage operations.

3.2 UTILITY SERVICES AND MECHANICAL/ELECTRICAL SYSTEMS

A. Existing Services/Systems to Remain: Maintain services/systems indicated to remain and protect them against damage.

1. Comply with requirements for existing services/systems interruptions specified in Section 011000 "Summary."

B. Existing Services/Systems to Be Removed, Relocated, or Abandoned: Locate, identify, disconnect, and seal or cap off indicated utility services and mechanical/electrical systems serving areas to be selectively demolished.

1. Building manager will arrange to shut off indicated services/systems when requested by Contractor.
2. Arrange to shut off indicated utilities with utility companies.
3. If services/systems are required to be removed, relocated, or abandoned, provide temporary services/systems that bypass area of selective demolition and that maintain continuity of services/systems to other parts of building.
4. Disconnect, demolish, and remove fire-suppression systems, plumbing, and HVAC systems, equipment, and components indicated to be removed.

a. Piping to Be Removed: Remove portion of piping indicated to be removed and cap or plug remaining piping with same or compatible piping material.
b. Piping to Be Abandoned in Place: Drain piping and cap or plug piping with same or compatible piping material.
c. Equipment to Be Removed: Disconnect and cap services and remove equipment.
d. Equipment to Be Removed and Reinstalled: Disconnect and cap services and remove, clean, and store equipment; when appropriate, reinstall, reconnect, and make equipment operational.

e. Equipment to Be Removed and Salvaged: Disconnect and cap services and remove equipment and deliver to Owner.
f. Ducts to Be Removed: Remove portion of ducts indicated to be removed and plug remaining ducts with same or compatible ductwork material.
g. Ducts to Be Abandoned in Place: Cap or plug ducts with same or compatible ductwork material.

3.3 PREPARATION

A. Site Access and Temporary Controls: Conduct selective demolition and debris-removal operations to ensure minimum interference with roads, streets, walks, walkways, and other adjacent occupied and used facilities.

1. Comply with requirements for access and protection specified in Section 015000 "Temporary Facilities and Controls."

B. Temporary Facilities: Provide temporary barricades and other protection required to prevent injury to people and damage to adjacent buildings and facilities to remain.

1. Provide protection to ensure safe passage of people around selective demolition area and to and from occupied portions of building.
2. Provide temporary weather protection, during interval between selective demolition of existing construction on exterior surfaces and new construction, to prevent water leakage and damage to structure and interior areas.
3. Protect walls, ceilings, floors, and other existing finish work that are to remain or that are exposed during selective demolition operations.
4. Cover and protect furniture, furnishings, and equipment that have not been removed.
5. Comply with requirements for temporary enclosures, dust control, heating, and cooling specified in Section 015000 "Temporary Facilities and Controls."

C. Temporary Shoring: Provide and maintain shoring, bracing, and structural supports as required to preserve stability and prevent movement, settlement, or collapse of construction and finishes to remain, and to prevent unexpected or uncontrolled movement or collapse of construction being demolished.

1. Strengthen or add new supports when required during progress of selective demolition.

3.4 SELECTIVE DEMOLITION, GENERAL

A. General: Demolish and remove existing construction only to the extent required by new construction and as indicated. Use methods required to complete the Work within limitations of governing regulations and as follows:

1. Proceed with selective demolition systematically, from higher to lower level. Complete selective demolition operations above each floor or tier before disturbing supporting members on the next lower level.
2. Neatly cut openings and holes plumb, square, and true to dimensions required. Use cutting methods least likely to damage construction to remain or adjoining construction.

Use hand tools or small power tools designed for sawing or grinding, not hammering and chopping, to minimize disturbance of adjacent surfaces. Temporarily cover openings to remain.

3. Cut or drill from the exposed or finished side into concealed surfaces to avoid marring existing finished surfaces.
4. Do not use cutting torches until work area is cleared of flammable materials. At concealed spaces, such as duct and pipe interiors, verify condition and contents of hidden space before starting flame-cutting operations. Maintain fire watch and portable fire-suppression devices during flame-cutting operations.
5. Maintain adequate ventilation when using cutting torches.
6. Remove decayed, vermin-infested, or otherwise dangerous or unsuitable materials and promptly dispose of off-site.
7. Remove structural framing members and lower to ground by method suitable to avoid free fall and to prevent ground impact or dust generation.
8. Locate selective demolition equipment and remove debris and materials so as not to impose excessive loads on supporting walls, floors, or framing.
9. Dispose of demolished items and materials promptly.

B. Existing Items to Remain: Protect construction indicated to remain against damage and soiling during selective demolition. When permitted by Architect, items may be removed to a suitable, protected storage location during selective demolition and cleaned and reinstalled in their original locations after selective demolition operations are complete.

3.5 SELECTIVE DEMOLITION PROCEDURES FOR SPECIFIC MATERIALS

A. Concrete: Demolish in sections. Cut concrete full depth at junctures with construction to remain and at regular intervals using power-driven saw, then remove concrete between saw cuts.

B. Masonry: Demolish in small sections. Cut masonry at junctures with construction to remain, using power-driven saw, then remove masonry between saw cuts.

C. Concrete Slabs-on-Grade: Saw-cut perimeter of area to be demolished, then break up and remove.

D. General: Except for items or materials indicated to be recycled, reused, salvaged, reinstalled, or otherwise indicated to remain Owner's property, remove demolished materials from Project site and legally dispose of them in an EPA-approved landfill.

1. Do not allow demolished materials to accumulate on-site.
2. Remove and transport debris in a manner that will prevent spillage on adjacent surfaces and areas.
3. Remove debris from elevated portions of building by chute, hoist, or other device that will convey debris to grade level in a controlled descent.

E. Burning: Do not burn demolished materials.

F. Disposal: Transport demolished materials off Owner's property and legally dispose of them.

3.6 CLEANING

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

END OF SECTION 024119

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 maintenance of unit masonry consisting of masonry joint restoration and cleaning for the existing west and south exterior building elevations, as follows:

1. Replacing sealant joints.
2. Preliminary cleaning, including removing plant growth.
3. Cleaning exposed unit masonry and cast stone surfaces.

B. Reused Material: brick salvaged from demolished areas.

C. Architectural joint systems for building exteriors: Section 079500 – Expansion Joints

1.3 DEFINITIONS

A. Very Low-Pressure Spray: Under 100 psi (690 kPa).

B. Low-Pressure Spray: 100 to 400 psi (690 to 2750 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

C. Medium-Pressure Spray: 400 to 800 psi (2750 to 5510 kPa); 4 to 6 gpm (0.25 to 0.4 L/s).

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Shop Drawings: For the following:

1. Provisions for expansion joints or other sealant joints.

C. Samples for Initial Selection: For the following:

1. Sealant Materials: See Section 079200 "Joint Sealants."
2. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For the following:
1. Sealant Materials: See Section 079200 "Joint Sealants."
2. Accessories: Each type of anchor, accessory, and miscellaneous support.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For cleaning specialists including field supervisors and restoration workers, chemical-cleaner manufacturer.

B. Cleaning Program.

1.6 QUALITY ASSURANCE

A. Joint Specialist Qualifications: Engage an experienced restoration firm to perform work of this Section. Firm shall have completed work similar in material, design, and extent to that indicated for this Project with a record of successful in-service performance.

1. At Contractor's option, work may be divided between two specialist firms: one for cleaning work and one for repair work.
2. Field Supervision: Restoration specialist firms shall maintain experienced full-time supervisors on Project site during times that clay masonry restoration and cleaning work is 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 and specialize in restoration work of types they will be performing.

B. Chemical-Cleaner Manufacturer Qualifications: A firm regularly engaged in producing masonry cleaners that have been used for similar applications with successful results, and with factory-trained representatives who are available for consultation and Project-site inspection and assistance at no additional cost.

C. Source Limitations: Obtain each type of material for masonry restoration (cement, sand, etc.) from one source with resources to provide materials of consistent quality in appearance and physical properties.

D. Quality-Control Program: Prepare a written quality-control program for this Project to systematically demonstrate the ability of personnel to properly follow methods and use materials and tools without damaging masonry. Include provisions for supervising performance and preventing damage due to worker fatigue.

E. Cleaning Program: Prepare a written cleaning program that describes cleaning process in detail, including materials, methods, and equipment to be used, protection of surrounding materials, and control of runoff during operations.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

F. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed by Architect from 20 feet (6 m) from the sidewalk, 50 feet (15 m) for all other areas. Perform additional paint and stain removal, general cleaning, and

spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

G. Mockups: Prepare mockups of restoration and cleaning to demonstrate aesthetic effects and set quality standards for materials and execution and for fabrication and installation.

1. Masonry Repair: Prepare sample areas for each type of masonry material indicated to have repair work performed. If not otherwise indicated, size each mockup not smaller than 2 adjacent whole units or approximately 48 inches (1200 mm) in least dimension. Erect sample areas in existing walls unless otherwise indicated, to demonstrate quality of materials, workmanship, and blending with existing work. Include the following as a minimum:

   a. Patching: Three small holes at least 1 inch (25 mm) in diameter for each type of masonry material indicated to be patched, so as to leave no evidence of repair.

2. Cleaning: Clean an area approximately 25 sq. ft. (2.3 sq. m) for each type of masonry and surface condition.

   a. Test cleaners and methods on samples of adjacent materials for possible adverse reactions. Do not use cleaners and methods known to have deleterious effect.
   b. Allow a waiting period of not less than seven days after completion of sample cleaning to permit a study of sample panels for negative reactions.

3. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

H. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to masonry restoration and cleaning including, but not limited to, the following:

   a. Construction schedule. Verify availability of materials, Restoration Specialist's personnel, equipment, and facilities needed to make progress and avoid delays.
   b. Materials, material application, sequencing, tolerances, and required clearances.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver materials to Project site in manufacturer's original and unopened containers, labeled with manufacturer's name and type of products.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store hydrated lime in manufacturer's original and unopened containers. Discard lime if containers have been damaged or have been opened for more than two days.

D. Store lime putty covered with water in sealed containers.

E. Store sand where grading and other required characteristics can be maintained and contamination avoided.

1.8 PROJECT CONDITIONS

A. Weather Limitations: Proceed with installation only when existing and forecasted weather conditions permit masonry restoration and cleaning work to be performed according to manufacturers' written instructions and specified requirements.

B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing unless otherwise indicated:

1. 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).
2. 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 masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required to minimize evaporation. Do not apply mortar to substrates with temperatures of 90 deg F (32 deg C) and above unless otherwise indicated.

D. For manufactured repair materials, perform work within the environmental limits set by each manufacturer.

E. Clean masonry surfaces only when air temperature is 40 deg F (4 deg C) and above and is predicted to remain so for at least 7 days after completion of cleaning.

1.9 COORDINATION

A. Coordinate masonry re-jointing and cleaning with public circulation patterns at Project site. Some work is near public circulation patterns and streets. Public circulation patterns cannot be closed off entirely, and in places can be only temporarily redirected around small areas of work. Plan and execute the Work accordingly.

1.10 SEQUENCING AND SCHEDULING

A. Order replacement materials at earliest possible date to avoid delaying completion of the Work.

B. Perform masonry restoration work in the following sequence:

1. Remove plant growth.

2. Inspect for open sealant joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
3. Remove paint.
4. Tape or mask off window and louver frames and glazing that may get wet from cleaning fluids and overspray.
5. 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 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. Water: Potable.

2.2 MANUFACTURED REPAIR MATERIALS

A. Masonry Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching masonry.

1. Use formulation that is vapor- and water permeable (equal to or more than the masonry unit), exhibits low shrinkage, has lower modulus of elasticity than the masonry units being repaired, and develops high bond strength to all types of masonry.
2. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
3. Formulate patching compound used for patching brick and cast stone in colors and textures to match each masonry unit being patched. Provide sufficient number of not less than three colors to enable matching the color, texture, and variation of each unit.

2.3 CLEANING MATERIALS

A. Water: Potable.

B. Job-Mixed Detergent Solution: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 1/2 cup (125 mL) of laundry detergent, and 20 quarts (20 L) of hot water for every 5 gal. (20 L) of solution required.

C. Job-Mixed Mold, Mildew, and Algae Remover: Solution prepared by mixing 2 cups (0.5 L) of tetrasodium polyphosphate, 5 quarts (5 L) of 5 percent sodium hypochlorite (bleach), and 15 quarts (15 L) of hot water for every 5 gal. (20 L) of solution required.

D. Nonacidic Liquid Cleaner: Manufacturer's standard mildly alkaline liquid cleaner formulated for removing mold, mildew, and other organic soiling from ordinary building materials, including polished stone, brick, aluminum, plastics, and wood.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Diedrich Technologies Inc.; Diedrich 910PM Polished Marble Cleaner.
b. Dominion Restoration Products, Inc.; Bio-Cleanse.
c. Dumond Chemicals, Inc.; Safe n' Easy Architectural Cleaner/Restorer.
d. Price Research, Ltd.; Price Non-Acid Masonry Cleaner.
e. PROSOCO; Enviro Klean 2010 All Surface Cleaner.

E. Mild Acidic Cleaner: Manufacturer's standard mildly acidic cleaner containing no muriatic (hydrochloric), hydrofluoric, or sulfuric acid; or ammonium bifluoride or chlorine bleaches.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABR Products, Inc.; X-190 Limestone & Concrete Cleaner.
b. Diedrich Technologies Inc.; Envirorestore 100.
c. Dominion Restoration Products, Inc.; DR-60 Stone and Masonry Cleaner.
d. PROSOCO; Enviro Klean BioWash.

2.4 ACCESSORY MATERIALS

A. Liquid Strippable Masking Agent: Manufacturer's standard liquid, film-forming, strippable masking material for protecting glass, metal, and polished stone surfaces from damaging effects of acidic and alkaline masonry cleaners.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. ABR Products, Inc.; Rubber Mask.
b. Price Research, Ltd.; Price Mask.
c. PROSOCO; Sure Klean Strippable Masking.

B. Sealant Materials:

1. Provide manufacturer's standard chemically curing, elastomeric sealant(s) of base polymer and characteristics indicated below that comply with applicable requirements in Section 079200 "Joint Sealants."

   a. Single-component, nonsag urethane sealant.

2. Colors: Provide colors of exposed sealants to match colors of masonry adjoining installed sealant unless otherwise indicated.

C. Joint-Sealant Backing:

1. Cylindrical Sealant Backings: ASTM C 1330, Type C (closed-cell material with a surface skin), and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.
2. 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 acceptable.

D. Masking Tape: Nonstaining, nonabsorbent material, compatible with pointing mortar, joint primers, sealants, and surfaces adjacent to joints; that will easily come off entirely, including adhesive.

E. Miscellaneous Products: Select materials and methods of use based on the following, subject to approval of a mockup:

1. Previous effectiveness in performing the work involved.
2. Little possibility of damaging exposed surfaces.
3. Consistency of each application.
4. Uniformity of the resulting overall appearance.
5. Do not use products or tools that could do the following:

   a. Remove, alter, or in any way harm the present condition or future preservation of existing surfaces, including surrounding surfaces not in contract.
   b. Leave a residue on surfaces.

2.5 CHEMICAL CLEANING SOLUTIONS

A. Dilute chemical cleaners with water to produce solutions not exceeding concentration recommended by chemical-cleaner manufacturer.

B. Acidic Cleaner Solution for Brick and Cast stone: Dilute with water to produce hydrofluoric acid content of 3 percent or less, but not greater than that recommended by chemical-cleaner manufacturer.

C. Acidic Cleaner Solution for Glazed Cast stone: Dilute with water to concentration demonstrated by testing that does not etch or otherwise damage cast stone surface, but not greater than that recommended by chemical-cleaner manufacturer.

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. Comply with chemical-cleaner manufacturer's written instructions for protecting building and other surfaces against damage from exposure to its products. Prevent chemical-cleaning solutions from coming into contact with people, motor vehicles, landscaping, buildings, and other surfaces that could be harmed by such contact.

1. Cover adjacent surfaces with materials that are proven to resist chemical cleaners used unless chemical cleaners being used will not damage adjacent surfaces. Use materials that contain only waterproof, UV-resistant adhesives. Apply masking agents to comply with manufacturer's written instructions. Do not apply liquid masking agent to painted or porous surfaces. When no longer needed, promptly remove masking to prevent adhesive staining.
2. Keep wall wet below area being cleaned to prevent streaking from runoff.
3. Do not clean masonry during winds of sufficient force to spread cleaning solutions to unprotected surfaces.
4. Neutralize and collect alkaline and acid wastes for disposal off Owner's property.
5. Dispose of runoff from cleaning operations by legal means and in a manner that prevents soil erosion, undermining of paving and foundations, damage to landscaping, and water penetration into building interiors.

C. 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.

D. Remove gutters and downspouts adjacent to masonry and store during masonry restoration and cleaning. Reinstall when masonry restoration and cleaning are complete.

1. Provide temporary rain drainage during work to direct water away from building.

3.2 CLEANING MASONRY, GENERAL

A. 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. Ensure that dirty residues and rinse water will not wash over cleaned, dry surfaces.

B. Use only those cleaning methods indicated for each masonry material and location.

1. Do not use wire brushes or brushes that are not resistant to chemical cleaner being used. Do not use plastic-bristle brushes if natural-fiber brushes will resist chemical cleaner being used.
2. 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.

3. For chemical-cleaner spray application, use low-pressure tank or chemical pump suitable for chemical cleaner indicated, equipped with cone-shaped spray tip.
4. For water-spray application, use fan-shaped spray tip that disperses water at an angle of 25 to 50 degrees.
5. For high-pressure water-spray application, use fan-shaped spray tip that disperses water at an angle of at least 40 degrees.

C. 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.

D. Water Application Methods:
1. Water-Spray Applications: Unless otherwise indicated, hold spray nozzle at least 6 inches (150 mm) from surface of masonry and apply water in horizontal back and forth sweeping motion, overlapping previous strokes to produce uniform coverage.

E. Chemical-Cleaner Application Methods: Apply chemical cleaners to masonry surfaces to comply with chemical-cleaner manufacturer's written instructions; use brush or spray application. Do not spray apply at pressures exceeding 50 psi (345 kPa). Do not allow chemicals to remain on surface for periods longer than those indicated or recommended by manufacturer.

F. Rinse off chemical residue and soil by working upward from bottom to top of each treated area at each stage or scaffold setting. Periodically during each rinse, test pH of rinse water running off of cleaned area to determine that chemical cleaner is completely removed.

1. Apply neutralizing agent and repeat rinse if necessary to produce tested pH of between 6.7 and 7.5.

G. After cleaning is complete, remove protection no longer required. Remove tape and adhesive marks.

3.3 PRELIMINARY CLEANING

A. Removing Plant Growth: Completely remove visible plant, moss, and shrub growth from masonry surfaces. Carefully remove plants, creepers, and vegetation by cutting at roots and allowing to dry as long as possible before removal. Remove loose soil and debris from open masonry joints to whatever depth they occur.

B. Preliminary Cleaning: Before beginning general cleaning, remove extraneous substances that are resistant to cleaning methods being used. Extraneous substances include paint, calking, asphalt, and tar.

1. Carefully remove heavy accumulations of material from surface of masonry with a sharp chisel. Do not scratch or chip masonry surface.
2. Remove paint and calking with alkaline paint remover.

   a. Comply with requirements in "Paint Removal" Article.
   b. Repeat application up to two times if needed.

3. Remove asphalt and tar with solvent-type paint remover.

   a. Comply with requirements in "Paint Removal" Article.
   b. Apply paint remover only to asphalt and tar by brush without prewetting.
   c. Allow paint remover to remain on surface for 10 to 30 minutes.
   d. Repeat application if needed.

3.4 CLEANING BRICKWORK

A. Cold-Water Soak:

1. Apply cold water by intermittent spraying to keep surface moist.
2. Use perforated hoses or other means that will apply a fine water mist to entire surface being cleaned.
3. Apply water in cycles with at least 30 minutes between cycles.
4. Continue spraying until surface encrustation has softened sufficiently to permit its removal by water wash, as indicated by cleaning tests.
5. Continue spraying for 72 hours.
6. Remove soil and softened surface encrustation from masonry with cold water applied by low-pressure spray.

B. Cold-Water Wash: Use cold water applied by medium-pressure spray.

C. Detergent Cleaning:

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 applied by low-pressure spray to remove detergent solution and soil.

D. Mold, Mildew, and Algae Removal:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply mold, mildew, and algae remover by brush.
3. Scrub masonry with medium-soft brushes until mold, mildew, and algae are thoroughly dislodged and can be removed by rinsing. Use small brushes for mortar joints and crevices. Dip brush in mold, mildew, and algae remover often to ensure that adequate fresh cleaner is used and that masonry surface remains wet.
4. Rinse with cold water applied by medium-pressure spray to remove mold, mildew, and algae remover and soil.

E. Nonacidic Liquid Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry by brush. Let cleaner remain on surface for period indicated below:

   a. As recommended by chemical-cleaner manufacturer.
   b. As established by mockup.

3. Rinse with cold water applied by medium-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam cleaning.

F. Mild Acidic Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry by brush. Let cleaner remain on surface for period indicated below:

   a. As recommended by chemical-cleaner manufacturer.
   b. As established by mockup.

3. Rinse with cold water applied by medium-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use a steam cleaning.

3.5 CLEANING CAST STONE

A. Cold-Water Soak:

1. Apply cold water by intermittent spraying to keep surface moist.
2. Use perforated hoses or other means that will apply a fine water mist to entire surface being cleaned.

3. Apply water in cycles with at least 30 minutes between cycles.
4. Continue spraying until surface encrustation has softened sufficiently to permit its removal by water wash, as indicated by cleaning tests.
5. Remove soil and softened surface encrustation from masonry with cold water applied by low-pressure spray.

B. Cold-Water Wash: Use cold water applied by low-pressure spray.

C. Detergent Cleaning:

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 applied by low-pressure spray to remove detergent solution and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup.

D. Nonacidic Liquid Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry by brush or low-pressure spray. Let cleaner remain on surface for period indicated below:

   a. As recommended by chemical-cleaner manufacturer.
   b. As established by mockup.

3. Rinse with cold water applied by low-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use steam cleaning.

E. Mild Acidic Chemical Cleaning:

1. Wet masonry with cold water applied by low-pressure spray.
2. Apply cleaner to masonry by brush. Let cleaner remain on surface for period indicated below:

   a. As recommended by chemical-cleaner manufacturer.
   b. As established by mockup.

3. Rinse with cold water applied by low-pressure spray to remove chemicals and soil.
4. Repeat cleaning procedure above where required to produce cleaning effect established by mockup. Do not repeat more than once. If additional cleaning is required, use a steam cleaning.

3.6 REPOINTING MASONRY

A. Rake out and repoint joints to the following extent:

1. Cracked sealant joints where cracks can be penetrated at least 1/4 inch (6 mm) by a knife blade 0.027 inch (0.7 mm) thick.
2. Cracked joints where cracks are 1/8 inch (3 mm) or more in width and of any depth.
3. Joints where they have been filled with substances other than mortar.
4. Joints indicated as sealant-filled joints.

B. Do not rake out and repoint joints where not required.

C. Rake out joints as follows, according to procedures demonstrated in approved mockup:

1. Do not spall edges of masonry units or widen joints. Replace or patch damaged masonry units as directed by Architect.

   a. Cut out mortar by hand with chisel and resilient mallet. Do not use power-operated grinders without Architect's written approval based on approved quality-control program.

D. Notify Architect of unforeseen detrimental conditions including voids in mortar joints, cracks, loose masonry units, rusted metal, and other deteriorated items.

E. Pointing with Sealant:

1. After raking out, keep joints dry and free of mortar and debris.
2. Clean and prepare joint surfaces according to Section 079200 "Joint Sealants". Do not allow primer to spill or migrate onto adjoining surfaces.
3. Fill sealant joints with specified joint sealant according to Section 079200 "Joint Sealants" and the following:

   a. Install cylindrical sealant backing beneath the sealant, except where space is insufficient. There, install bond-breaker tape.
   b. Install sealant using only proven installation techniques that will ensure that sealant will be deposited in a uniform, continuous ribbon, without gaps or air pockets, and with complete wetting of the joint bond surfaces equally on both sides. Fill joint flush with surrounding masonry and matching the contour of adjoining mortar joints.
   c. Install sealant as recommended by sealant manufacturer but within the following general limitations, measured at the center (thin) section of the bead:

      1) Fill joints to a depth equal to joint width, but not more than 1/2 inch (13 mm) deep or less than 1/4 inch (6 mm) deep.

   d. Immediately after first tooling, apply ground-mortar aggregate to sealant, gently pushing aggregate into the surface of sealant. Retool sealant to form smooth, uniform beads, slightly concave. Remove excess sealant and aggregate from surfaces adjacent to joint.

e. Do not allow sealant to overflow or spill onto adjoining surfaces, or to migrate into the voids of adjoining surfaces, particularly rough textures. Remove excess and spillage of sealant promptly as the work progresses. Clean adjoining surfaces by the means necessary to eliminate evidence of spillage, without damage to adjoining surfaces or finishes, as demonstrated in an approved mockup.

4. Cure sealant according to Section 079200 "Joint Sealants."

F. Where repointing work precedes cleaning of existing masonry, allow mortar to harden at least 30 days before beginning cleaning work.

3.7 FIELD QUALITY CONTROL

A. Architect's Project Representatives: Architect will assign Project representatives to help carry out Architect's responsibilities at the site, including observing progress and quality of portion of the Work completed. Allow Architect's Project representatives use of lift devices and scaffolding, as needed, to observe progress and quality of portion of the Work completed.

B. Notify Architect's Project representatives in advance of times when lift devices and scaffolding will be relocated. Do not relocate lift devices and scaffolding until Architect's Project representative have had reasonable opportunity to make observations of work areas at lift device or scaffold location.

END OF SECTION 040120

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. Concrete masonry units.
2. Face brick.
3. Mortar and grout.
4. Steel reinforcing bars.
5. Masonry joint reinforcement.
6. Ties and anchors.
7. Embedded flashing.
8. Miscellaneous masonry accessories.
9. Cavity-wall insulation.

B. Mason shall use all of Owner supplied brick. Mason shall be responsible for confirming existing brick quantity and determining new quantities required, and to provide additional material as required.

1.3 DEFINITIONS

A. CMU(s): Concrete masonry unit(s).

B. Reinforced Masonry: Masonry containing reinforcing steel in grouted cells.

1.4 PERFORMANCE REQUIREMENTS

A. Provide unit masonry that develops indicated net-area compressive strengths at 28 days.

1. Determine net-area compressive strength of masonry from average net-area compressive strengths of masonry units and mortar types (unit-strength method) according to Tables 1 and 2 in ACI 530.1/ASCE 6/TMS 602.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For the following:

1. Masonry Units: Show sizes, profiles, coursing, and locations of special shapes.
2. Reinforcing Steel: Detail bending and placement of unit masonry reinforcing bars. Comply with ACI 315, "Details and Detailing of Concrete Reinforcement."
3. Fabricated Flashing: Detail corner units, end-dam units, and other special applications.

C. Samples for Verification: For each type and color of the following:

1. Face Hollow brick, in the form of straps of five or more bricks
2. Special brick shapes.
3. Pigmented and colored-aggregate mortar. Make Samples using same sand and mortar ingredients to be used on Project.
4. Weep holes and vents.
5. Accessories embedded in masonry.

1.6 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each type and size of the following:

1. Masonry units.

   a. Include data on material properties.
   b. For brick, include size-variation data verifying that actual range of sizes falls within specified tolerances.
   c. For exposed brick, include test report for efflorescence according to ASTM C 67.

2. Cementitious materials. Include brand, type, and name of manufacturer.
3. Preblended, dry mortar mixes. Include description of type and proportions of ingredients.
4. Grout mixes. Include description of type and proportions of ingredients.
5. Reinforcing bars.
6. Joint reinforcement.
7. Anchors, ties, and metal accessories.

B. Mix Designs: For each type of mortar. Include description of type and proportions of ingredients.

1. Include test reports for mortar mixes required to comply with property specification. Test according to ASTM C 109/C 109M for compressive strength, ASTM C 1506 for water retention, and ASTM C 91 for air content.
2. Include test reports, according to ASTM C 1019, for grout mixes required to comply with compressive strength requirement.

C. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.

1.7 QUALITY ASSURANCE

A. Source Limitations for Masonry Units: Obtain exposed masonry units of a uniform texture and color, or a uniform blend within the ranges accepted for these characteristics, from single source from single manufacturer for each product required.

B. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color for exposed masonry, from single manufacturer for each cementitious component and from single source or producer for each aggregate.

C. Masonry Standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.

D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Section 013100 "Project Management and Coordination."

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store masonry units on elevated platforms in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied. If units become wet, do not install until they are dry.

B. Deliver preblended, dry mortar mix in moisture-resistant containers designed for use with dispensing silos. Store preblended, dry mortar mix in delivery containers on elevated platforms, under cover, and in a dry location or in covered weatherproof dispensing silos.

C. Store masonry accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.9 PROJECT CONDITIONS

A. Protection of Masonry: During construction, cover tops of walls, projections, and sills with waterproof sheeting at end of each day's work. Cover partially completed masonry when construction is not in progress.

1. Extend cover a minimum of 24 inches (600 mm) down both sides of walls and hold cover securely in place.
2. Where one wythe of multiwythe masonry walls is completed in advance of other wythes, secure cover a minimum of 24 inches (600 mm) down face next to unconstructed wythe and hold cover in place.

B. Stain Prevention: Prevent grout, mortar, and soil from staining the face of masonry to be left exposed or painted. Immediately remove grout, mortar, and soil that come in contact with such masonry.

1. Protect base of walls from rain-splashed mud and from mortar splatter by spreading coverings on ground and over wall surface.

2. Protect sills, ledges, and projections from mortar droppings.
3. Protect surfaces of window and door frames, as well as similar products with painted and integral finishes, from mortar droppings.
4. Turn scaffold boards near the wall on edge at the end of each day to prevent rain from splashing mortar and dirt onto completed masonry.

C. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and higher and will remain so until masonry has dried, but not less than seven days after completing cleaning.

D. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 MASONRY UNITS, GENERAL

A. Defective Units: Referenced masonry unit standards may allow a certain percentage of units to contain chips, cracks, or other defects exceeding limits stated in the standard. Do not use units where such defects will be exposed in the completed Work.

B. Fire-Resistance Ratings: Where indicated, provide units that comply with requirements for fire-resistance ratings indicated as determined by testing according to ASTM E 119, by equivalent masonry thickness, or by other means, as acceptable to authorities having jurisdiction.

2.2 CONCRETE MASONRY UNITS

A. Regional Materials: CMUs shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Shapes: Provide shapes indicated and as follows, with exposed surfaces matching exposed faces of adjacent units unless otherwise indicated.

1. Provide special shapes for lintels, corners, jambs, sashes, movement joints, headers, bonding, and other special conditions.
2. Provide interior bullnose units for outside corners unless otherwise indicated.

C. CMUs: ASTM C 90.

1. Unit Compressive Strength: Provide units with minimum average net-area compressive strength of 2150 psi (14.8 MPa).
2. Density Classification: Lightweight unless otherwise indicated.
3. Size (Width): Manufactured to dimensions 3/8 inch less than nominal dimensions.

2.3 BRICK

A. Basis of Design Product: provide Rome Gray, S-93 and S42STD, Tuscan Series by Spaulding Brick. New brick is to match existing stored brick.

B. Owner has stored brick on site for use in egress stair and corner joint repair. Bidders shall include in their bids any additional brick needed to complete this project.

C. Any additional brick delivered for this phase shall be used in corner joint repair and mixed with brick used on top floors of egress stair, east side.

D. General: Provide shapes indicated and as follows, with exposed surfaces matching finish and color of exposed faces of adjacent units:

1. For ends of sills and caps and for similar applications that would otherwise expose unfinished brick surfaces, provide units without cores or frogs and with exposed surfaces finished.
2. Provide special shapes for applications where stretcher units cannot accommodate special conditions, including those at corners, movement joints, bond beams, sashes, and lintels.
3. Provide special shapes for applications requiring brick of size, form, color, and texture on exposed surfaces that cannot be produced by sawing.
4. Provide special shapes for applications where shapes produced by sawing would result in sawed surfaces being exposed to view.

E. Face Brick: Facing brick complying with ASTM C 216 or hollow brick complying with ASTM C 652, Class H40V (void areas between 25 and 40 percent of gross cross-sectional area).

1. Grade: SW.
2. Type: FBS.
3. Initial Rate of Absorption: Less than 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67.
4. Efflorescence: Provide brick that has been tested according to ASTM C 67 and is rated "not effloresced."
5. Size (Actual Dimensions): to match existing.
6. Application: Use where brick is exposed unless otherwise indicated.
7. Provide face brick matching color range, texture, and size of existing adjacent exterior brickwork.

2.4 MORTAR AND GROUT MATERIALS

A. Regional Materials: Aggregate for mortar and grout shall be extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

E. Colored Cement Product: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements, and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
3) Lafarge North America Inc.; Eaglebond Portland & Lime.
4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

2. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. White-Mortar Aggregates: Natural white sand or crushed white stone.

G. Aggregate for Grout: ASTM C 404.

H. Epoxy Pointing Mortar: ASTM C 395, epoxy-resin-based material formulated for use as pointing mortar for structural-clay tile facing units (and approved for such use by manufacturer of units); in color indicated or, if not otherwise indicated, as selected by Architect from manufacturer's colors.

I. Cold-Weather Admixture: Nonchloride, noncorrosive, accelerating admixture complying with ASTM C 494/C 494M, Type C, and recommended by manufacturer for use in masonry mortar of composition indicated.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Euclid Chemical Company (The); Accelguard 80.
   b. Grace Construction Products, W. R. Grace & Co. - Conn.; Morset.
   c. Sonneborn Products, BASF Aktiengesellschaft; Trimix-NCA.

J. Water: Potable.

2.5 REINFORCEMENT

A. Masonry Joint Reinforcement, General: ASTM A 951/A 951M.

1. Interior Walls: Mill galvanized, carbon steel.
2. Exterior Walls: Hot-dip galvanized, carbon steel.
3. Wire Size for Side Rods: 0.148-inch (3.77-mm) diameter.
4. Wire Size for Cross Rods: 0.148-inch (3.77-mm) diameter.
5. Wire Size for Veneer Ties: 0.148-inch (3.77-mm) diameter.
6. Spacing of Cross Rods, Tabs, and Cross Ties: Not more than 16 inches (407 mm) o.c.
7. Provide in lengths of not less than 10 feet (3 m), with prefabricated corner and tee units].

B. Masonry Joint Reinforcement for Single-Wythe Masonry: Either ladder or truss type with single pair of side rods.

C. Masonry Joint Reinforcement for Veneers Anchored with Seismic Masonry-Veneer Anchors: Single 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized, carbon-steel continuous wire.

2.6 TIES AND ANCHORS

A. Materials: Provide ties and anchors specified in this article that are made from materials that comply with the following unless otherwise indicated.

1. Mill-Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 641/A 641M, Class 1 coating.
2. Hot-Dip Galvanized, Carbon-Steel Wire: ASTM A 82/A 82M; with ASTM A 153/A 153M, Class B-2 coating.
3. Galvanized Steel Sheet: ASTM A 653/A 653M, Commercial Steel, G60 (Z180) zinc coating.
4. Steel Sheet, Galvanized after Fabrication: ASTM A 1008/A 1008M, Commercial Steel, with ASTM A 153/A 153M, Class B coating.
5. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

B. Corrugated Metal Ties: Metal strips not less than 7/8 inch (22 mm) wide with corrugations having a wavelength of 7.6 to 12.7 mm and an amplitude of 0.06 to 0.10 inch (1.5 to 2.5 mm) made from 0.060-inch- (1.52-mm-) thick, steel sheet, galvanized after fabrication.

C. Wire Ties, General: Unless otherwise indicated, size wire ties to extend at least halfway through veneer but with at least 5/8-inch (16-mm) cover on outside face. Outer ends of wires are bent 90 degrees and extend 2 inches (50 mm) parallel to face of veneer.

D. Individual Wire Ties: Rectangular units with closed ends and not less than 4 inches (100 mm) wide.

1. Z-shaped ties with ends bent 90 degrees to provide hooks not less than 2 inches (50 mm) long may be used for masonry constructed from solid units.
2. Wire: Fabricate from 3/16-inch- (4.76-mm-) diameter, hot-dip galvanized steel wire. Mill-galvanized wire ties may be used in interior walls unless otherwise indicated.

E. Adjustable Anchors for Connecting to Structural Steel Framing: Provide anchors that allow vertical or horizontal adjustment but resist tension and compression forces perpendicular to plane of wall.

1. Anchor Section for Welding to Steel Frame: Crimped 1/4-inch- (6.35-mm-) diameter, hot-dip galvanized steel wire.

F. Partition Top anchors: 0.105-inch- (2.66-mm-) thick metal plate with 3/8-inch- (9.5-mm-) diameter metal rod 6 inches (152 mm) long welded to plate and with closed-end plastic tube fitted over rod that allows rod to move in and out of tube. Fabricate from steel, hot-dip galvanized after fabrication.

G. Adjustable Masonry-Veneer Anchors:

1. General: Provide anchors that allow vertical adjustment but resist tension and compression forces perpendicular to plane of wall, for attachment over sheathing to wood or metal studs, and as follows:

a. Structural Performance Characteristics: Capable of withstanding a 100-lbf (445-N) load in both tension and compression without deforming or developing play in excess of 0.05 inch (1.3 mm).

2. Fabricate sheet metal anchor sections and other sheet metal parts from 0.075-inch- (1.90-mm-) thick steel sheet, galvanized after fabrication.
3. Wire Ties: Triangular-, rectangular-, or T-shaped wire ties fabricated from 0.187-inch- (4.76-mm-) diameter, hot-dip galvanized-steel wire unless otherwise indicated.
4. Contractor's Option: Unless otherwise indicated, provide any of the following types of anchors:
5. Screw-Attached, Masonry-Veneer Anchors: Units consisting of a wire tie and a metal anchor section.

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following]:

1) Dayton Superior Corporation, Dur-O-Wal Division; D/A 213.
2) Wire-Bond; RJ-711.
3) Hohmann & Barnard, Inc.; DW-10.

b. Anchor Section: Rib-stiffened, sheet metal plate with screw holes top and bottom, 2-3/4 inches (70 mm) wide by 3 inches (76 mm) high; with projecting tabs having slotted holes for inserting vertical legs of wire tie specially formed to fit anchor section.

6. Polymer-Coated, Steel Drill Screws for Steel Studs: ASTM C 954 except manufactured with hex washer head and neoprene or EPDM washer, No. 10 (4.83-mm) diameter by length required to penetrate steel stud flange with not less than three exposed threads, and with organic polymer coating with salt-spray resistance to red rust of more than 800 hours per ASTM B 117.

a. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

1) ITW Buildex; Teks Maxiseal with Climaseal finish.
2) Textron Inc., Textron Fastening Systems; Elco Dril-Flex with Stalgard finish.

2.7 MISCELLANEOUS ANCHORS

2.8 EMBEDDED FLASHING MATERIALS

A. Metal Flashing: Provide metal flashing complying with SMACNA's "Architectural Sheet Metal Manual and Section 076200 "Sheet Metal Flashing and Trim" and as follows:

1. Fabricate through-wall flashing with drip edge unless otherwise indicated. Fabricate by extending flashing 1/2 inch (13 mm) out from wall, with outer edge bent down 30 degrees and hemmed.

2.9 MISCELLANEOUS MASONRY ACCESSORIES

A. Compressible Filler: Premolded filler strips complying with ASTM D 1056, Grade 2A1; compressible up to 35 percent; of width and thickness indicated; formulated from [neoprene] [urethane] [or] [PVC].

B. Preformed Control-Joint Gaskets: Made from [styrene-butadiene-rubber compound, complying with ASTM D 2000, Designation M2AA-805] [or] [PVC, complying with ASTM D 2287, Type PVC-65406] and designed to fit standard sash block and to maintain lateral stability in masonry wall; size and configuration as indicated.

C. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).

D. Weep/Vent Products: Use[one of] the following unless otherwise indicated:

1. Mesh Weep/Vent: Free-draining mesh; made from polyethylene strands, full height and width of head joint and depth 1/8 inch (3 mm) less than depth of outer wythe; in color selected from manufacturer's standard.

    a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

        1) Mortar Net USA, Ltd.; Mortar Net Weep Vents.

E. Cavity Drainage Material: Free-draining mesh, made from polymer strands that will not degrade within the wall cavity.

1. Products: Subject to compliance with requirements, provide the following:

    a. Archovations, Inc.; CavClear Masonry Mat.
    b. Mortar Net USA, Ltd.; Mortar Net.

2. Provide one of the following configurations:

    a. Strips, full-depth of cavity and 10 inches (250 mm) high, with dovetail shaped notches 7 inches (175 mm) deep that prevent clogging with mortar droppings.

F. Reinforcing Bar Positioners: Wire units designed to fit into mortar bed joints spanning masonry unit cells and hold reinforcing bars in center of cells. Units are formed from 0.148-inch (3.77-mm) steel wire, hot-dip galvanized after fabrication. Provide units designed for number of bars indicated.

1. Products: Subject to compliance with requirements, [provide the following] [provide one of the following] [available products that may be incorporated into the Work include, but are not limited to, the following]:

    a. Dayton Superior Corporation, Dur-O-Wal Division; D/A 810, D/A 812 or D/A 817.
    b. Heckmann Building Products Inc.; No. 376 Rebar Positioner.
    c. Hohmann & Barnard, Inc.; #RB or #RB-Twin Rebar Positioner.
    d. Wire-Bond; O-Ring or Double O-Ring Rebar Positioner.

2.10 CAVITY-WALL INSULATION

A. Extruded-Polystyrene Board Insulation: ASTM C 578, Type X, closed-cell product extruded with an integral skin.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type I aluminum-foil-faced, Class 2 (glass-fiber-reinforced).

C. Adhesive: Type recommended by insulation board manufacturer for application indicated.

2.11 MASONRY CLEANERS

A. Proprietary Acidic Cleaner: Manufacturer's standard-strength cleaner designed for removing mortar/grout stains, efflorescence, and other new construction stains from new masonry without discoloring or damaging masonry surfaces. Use product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units being cleaned.

1. Manufacturers: Subject to compliance with requirements, [provide products by one of the following] [available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following]:

a. Diedrich Technologies, Inc.
b. EaCo Chem, Inc.
c. ProSoCo, Inc.

2.12 MORTAR AND GROUT MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures, unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use masonry cement mortar unless otherwise indicated.
3. For exterior masonry, use portland cement-lime mortar.
4. Add cold-weather admixture (if used) at same rate for all mortar that will be exposed to view, regardless of weather conditions, to ensure that mortar color is consistent.

B. Preblended, Dry Mortar Mix: Furnish dry mortar ingredients in form of a preblended mix. Measure quantities by weight to ensure accurate proportions, and thoroughly blend ingredients before delivering to Project site.

C. Mortar for Unit Masonry: Comply with ASTM C 270, Property Specification. Provide the following types of mortar for applications stated unless another type is indicated.
1. For reinforced masonry, use Type S.
2. For mortar parge coats, use Type N.
3. For exterior, above-grade, load-bearing and non-load-bearing walls and parapet walls; for interior load-bearing walls; for interior non-load-bearing partitions; and for other applications where another type is not indicated, use Type N.
4. For interior non-load-bearing partitions, Type O may be used instead of Type N.

D. Pigmented Mortar: Use colored cement product[or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products].

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Pigments shall not exceed 5 percent of [masonry cement] [or] [mortar cement] by weight.
3. Mix to match Architect's sample.
4. Application: Use pigmented mortar for exposed mortar joints with the following units:

a. Decorative CMUs.
b. Pre-faced CMUs.
c. Face brick.
d. Hollow brick.
e. Cast stone trim units.

E. Grout for Unit Masonry: Comply with ASTM C 476.

1. Use grout of type indicated or, if not otherwise indicated, of type (fine or coarse) that will comply with Table 1.15.1 in ACI 530.1/ASCE 6/TMS 602 for dimensions of grout spaces and pour height.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

1. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of work.
2. Verify that foundations are within tolerances specified.
3. Verify that reinforcing dowels are properly placed.

B. Before installation, examine rough-in and built-in construction for piping systems to verify actual locations of piping connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. Thickness: Build cavity and composite walls and other masonry construction to full thickness shown. Build single-wythe walls to actual widths of masonry units, using units of widths indicated.

B. Build chases and recesses to accommodate items specified in this and other Sections.

C. Leave openings for equipment to be installed before completing masonry. After installing equipment, complete masonry to match the construction immediately adjacent to opening.

D. Use full-size units without cutting if possible. If cutting is required to provide a continuous pattern or to fit adjoining construction, cut units with motor-driven saws; provide clean, sharp, unchipped edges. Allow units to dry before laying unless wetting of units is specified. Install cut units with cut surfaces and, where possible, cut edges concealed.

E. Select and arrange units for exposed unit masonry to produce a uniform blend of colors and textures.

1. Mix units from several pallets or cubes as they are placed.

F. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.

G. Blending of existing brick: existing brick shall be mixed with new in an even manor throughout the project.

H. Wetting of Brick: Wet brick before laying if initial rate of absorption exceeds 30 g/30 sq. in. (30 g/194 sq. cm) per minute when tested per ASTM C 67. Allow units to absorb water so they are damp but not wet at time of laying.

3.3 TOLERANCES

A. Dimensions and Locations of Elements:

1. For dimensions in cross section or elevation do not vary by more than plus 1/2 inch (12 mm) or minus 1/4 inch (6 mm).
2. For location of elements in plan do not vary from that indicated by more than plus or minus 1/2 inch (12 mm).
3. For location of elements in elevation do not vary from that indicated by more than plus or minus 1/4 inch (6 mm) in a story height or 1/2 inch (12 mm) total.

B. Lines and Levels:

1. For bed joints and top surfaces of bearing walls do not vary from level by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
2. For conspicuous horizontal lines, such as lintels, sills, parapets, and reveals, do not vary from level by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
3. For vertical lines and surfaces do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
4. For conspicuous vertical lines, such as external corners, door jambs, reveals, and expansion and control joints, do not vary from plumb by more than 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.
5. For lines and surfaces do not vary from straight by more than 1/4 inch in 10 feet (6 mm in 3 m), 3/8 inch in 20 feet (9 mm in 6 m), or 1/2 inch (12 mm) maximum.
6. For vertical alignment of exposed head joints, do not vary from plumb by more than 1/4 inch in 10 feet (6 mm in 3 m), or 1/2 inch (12 mm) maximum.
7. For faces of adjacent existing exposed masonry units, do not vary from flush alignment by more than 1/16 inch (1.5 mm) except due to warpage of masonry units within tolerances specified for warpage of units.

C. Joints:

1. For bed joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm), with a maximum thickness limited to 1/2 inch (12 mm).
2. For exposed bed joints, do not vary from bed-joint thickness of adjacent courses by more than 1/8 inch (3 mm).
3. For head and collar joints, do not vary from thickness indicated by more than plus 3/8 inch (9 mm) or minus 1/4 inch (6 mm).
4. For exposed head joints, do not vary from thickness indicated by more than plus or minus 1/8 inch (3 mm).[Do not vary from adjacent bed-joint and head-joint thicknesses by more than 1/8 inch (3 mm).]
5. For exposed bed joints and head joints of stacked bond, do not vary from a straight line by more than 1/16 inch (1.5 mm) from one masonry unit to the next.

3.4 LAYING MASONRY WALLS

A. Lay out walls in advance for accurate spacing of surface bond patterns with uniform joint thicknesses and for accurate location of openings, movement-type joints, returns, and offsets. Avoid using less-than-half-size units, particularly at corners, jambs, and, where possible, at other locations.

B. Bond Pattern for Exposed Masonry: Unless otherwise indicated, lay exposed masonry in bond pattern to match existing building addition; do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

C. Lay concealed masonry with all units in a wythe in running bond or bonded by lapping not less than [2 inches (50 mm)] [4-inches (100-mm)]. Bond and interlock each course of each wythe at corners. Do not use units with less than nominal 4-inch (100-mm) horizontal face dimensions at corners or jambs.

D. Stopping and Resuming Work: Stop work by racking back units in each course from those in course below; do not tooth. When resuming work, clean masonry surfaces that are to receive mortar, remove loose masonry units and mortar, and wet brick if required before laying fresh masonry.

E. Built-in Work: As construction progresses, build in items specified in this and other Sections. Fill in solidly with masonry around built-in items.

F. Fill space between steel frames and masonry solidly with mortar unless otherwise indicated.

G. Where built-in items are to be embedded in cores of hollow masonry units, place a layer of metal lath, wire mesh, or plastic mesh in the joint below and rod mortar or grout into core.

H. Fill cores in hollow CMUs with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.

I. Build non-load-bearing interior partitions full height of story to underside of solid floor or roof structure above unless otherwise indicated.

1. Install compressible filler in joint between top of partition and underside of structure above.
2. Fasten partition top anchors to structure above and build into top of partition. Grout cells of CMUs solidly around plastic tubes of anchors and push tubes down into grout to provide 1/2-inch (13-mm) clearance between end of anchor rod and end of tube. Space anchors 48 inches (1200 mm) o.c. unless otherwise indicated.
3. At fire-rated partitions, treat joint between top of partition and underside of structure above to comply with Section 078446 "Fire-Resistive Joint Systems."

3.5 MORTAR BEDDING AND JOINTING

A. Lay hollow [brick] [and] [CMUs] as follows:

1. With face shells fully bedded in mortar and with head joints of depth equal to bed joints.
2. With webs fully bedded in mortar in all courses of piers, columns, and pilasters.
3. With webs fully bedded in mortar in grouted masonry, including starting course on footings.
4. With entire units, including areas under cells, fully bedded in mortar at starting course on footings where cells are not grouted.

B. Lay solid masonry units with completely filled bed and head joints; butter ends with sufficient mortar to fill head joints and shove into place. Do not deeply furrow bed joints or slush head joints.

C. Lay structural-clay tile as follows:

1. Lay vertical-cell units with full head joints unless otherwise indicated. Provide bed joints with full mortar coverage on face shells and webs.
2. Lay horizontal-cell units with full bed joints unless otherwise indicated. Keep drainage channels, if any, free of mortar. Form head joints with sufficient mortar so excess will be squeezed out as units are placed in position. Butter both sides of units to be placed, or butter one side of unit already in place and one side of unit to be placed.
3. Maintain joint thicknesses indicated except for minor variations required to maintain bond alignment. If not indicated, lay walls with 1/4- to 3/8-inch- (6- to 10-mm-) thick joints.
4. Where epoxy-mortar pointed joints are indicated, rake out setting mortar to a uniform depth of 1/4 inch (6 mm) and point with epoxy mortar to comply with epoxy-mortar manufacturer's written instructions.

D. Set firebox brick in full bed of refractory mortar with full head joints. Form joints by buttering both surfaces of adjoining brick and sliding it into place. Make joints just wide enough to accommodate variations in size of brick, approximately 1/8 inch (3 mm). Tool joints smooth on surfaces exposed to fire or smoke.

E. Install clay flue liners to comply with ASTM C 1283. Install flue liners ahead of surrounding masonry. Set clay flue liners in full bed of refractory mortar 1/16 to 1/8 inch (1.6 to 3 mm) thick. Strike joints flush on inside of flue to provide smooth surface. Maintain expansion space

between flue liner and surrounding masonry except where surrounding masonry is required to provide lateral support for flue liners.

F. Set cast-stone trim units in full bed of mortar with full vertical joints. Fill dowel, anchor, and similar holes.

1. Clean soiled surfaces with fiber brush and soap powder and rinse thoroughly with clear water.
2. Wet joint surfaces thoroughly before applying mortar.

G. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

3.6 CAVITY WALLS

A. Bond wythes of cavity walls together using one of the following methods:

1. Individual Metal Ties: Provide ties as shown installed in horizontal joints, but not less than one metal tie for 2.67 sq. ft. (0.25 sq. m) of wall area spaced not to exceed 16 inches (406 mm) o.c. horizontally and 16 inches (406 mm) o.c. vertically. Stagger ties in alternate courses. Provide additional ties within 12 inches (305 mm) of openings and space not more than 36 inches (915 mm) apart around perimeter of openings. At intersecting and abutting walls, provide ties at no more than 24 inches (610 mm) o.c. vertically.

a. Where bed joints of wythes do not align, use adjustable (two-piece) type ties.
b. Where one wythe is of clay masonry and the other of concrete masonry, use adjustable (two-piece) type ties to allow for differential movement regardless of whether bed joints align.

2. Masonry Joint Reinforcement: Installed in horizontal mortar joints.

a. Where bed joints of both wythes align, use ladder-type reinforcement extending across both wythes.
b. Where bed joints of wythes do not align, use adjustable (two-piece) type reinforcement[with continuous horizontal wire in facing wythe attached to ties].

3. Header Bonding: Provide masonry unit headers extending not less than 3 inches (76 mm) into each wythe. Space headers not over [8 inches (203 mm)] [12 inches (305 mm)] clear horizontally and 16 inches (406 mm) clear vertically.

B. Keep cavities clean of mortar droppings and other materials during construction. Bevel beds away from cavity, to minimize mortar protrusions into cavity. Do not attempt to trowel or remove mortar fins protruding into cavity.

C. Apply air barrier to face of backup wythe to comply with Section 072726 "Fluid-Applied Membrane Air Barriers."

D. Installing Cavity-Wall Insulation: Place small dabs of adhesive, spaced approximately 12 inches (300 mm) o.c. both ways, on inside face of insulation boards, or attach with plastic fasteners designed for this purpose. Fit courses of insulation between wall ties and other confining obstructions in cavity, with edges butted tightly both ways. Press units firmly against inside wythe of masonry or other construction as shown.

1. Fill cracks and open gaps in insulation with crack sealer compatible with insulation and masonry.

3.7 MASONRY JOINT REINFORCEMENT

A. General: Install entire length of longitudinal side rods in mortar with a minimum cover of 5/8 inch (16 mm) on exterior side of walls, 1/2 inch (13 mm) elsewhere. Lap reinforcement a minimum of 6 inches (150 mm).

1. Space reinforcement not more than 16 inches (406 mm) o.c.
2. Space reinforcement not more than 8 inches (203 mm) o.c. in foundation walls and parapet walls.
3. Provide reinforcement not more than 8 inches (203 mm) above and below wall openings and extending 12 inches (305 mm) beyond openings in addition to continuous reinforcement.

B. Interrupt joint reinforcement at control and expansion joints unless otherwise indicated.

C. Provide continuity at wall intersections by using prefabricated T-shaped units.

D. Provide continuity at corners by using prefabricated L-shaped units.

3.8 ANCHORING MASONRY TO STRUCTURAL STEEL AND CONCRETE

A. Anchor masonry to structural steel and concrete where masonry abuts or faces structural steel or concrete to comply with the following:

1. Provide an open space not less than 1/2 inch (13 mm) wide between masonry and structural steel or concrete unless otherwise indicated. Keep open space free of mortar and other rigid materials.
2. Anchor masonry with anchors embedded in masonry joints and attached to structure.
3. Space anchors if indicated, but not more than 24 inches (610 mm) o.c. vertically and 36 inches (915 mm) o.c. horizontally.

3.9 ANCHORING MASONRY VENEERS

A. Anchor masonry veneers to [wall framing] [and] [concrete and masonry backup] with[seismic] masonry-veneer anchors to comply with the following requirements:

1. Fasten screw-attached anchors through sheathing to wall framing with metal fasteners of type indicated. Use two fasteners unless anchor design only uses one fastener.
2. Insert slip-in anchors in metal studs as sheathing is installed. Provide one anchor at each stud in each horizontal joint between sheathing boards.
3. Embed tie sections in masonry joints.
4. Locate anchor sections to allow maximum vertical differential movement of ties up and down.
5. Space anchors as indicated, but not more than 18 inches (458 mm) o.c. vertically and 24 inches (610 mm) o.c. horizontally, with not less than 1 anchor for each 2 sq. ft. (0.2 sq. m) of wall area. Install additional anchors within 12 inches (305 mm) of openings and at intervals, not exceeding 8 inches (203 mm), around perimeter.

3.10 ONTROL AND EXPANSION JOINTS

A. General: Install control and expansion joint materials in unit masonry as masonry progresses. Do not allow materials to span control and expansion joints without provision to allow for in-plane wall or partition movement.

B. Form control joints in concrete masonry as follows:

1. Fit bond-breaker strips into hollow contour in ends of CMUs on one side of control joint. Fill resultant core with grout and rake out joints in exposed faces for application of sealant.
2. Install temporary foam-plastic filler in head joints and remove filler when unit masonry is complete for application of sealant.

C. Form expansion joints in brick as follows:

1. Build in compressible joint fillers where indicated.
2. Form open joint full depth of brick wythe and of width indicated, but not less than 1/2 inch (13 mm) for installation of sealant and backer rod specified in Section 079200 "Joint Sealants."

D. Provide horizontal, pressure-relieving joints by either leaving an air space or inserting a compressible filler of width required for installing sealant and backer rod specified in Section 079200 "Joint Sealants," but not less than [3/8 inch (10 mm)] <Insert minimum width>.

1. Locate horizontal, pressure-relieving joints beneath shelf angles supporting masonry.

3.11 LINTELS

A. Install steel lintels where indicated.

B. Provide concrete or masonry lintels where shown and where openings of more than 12 inches (305 mm) for brick-size units and 24 inches (610 mm) for block-size units are shown without structural steel or other supporting lintels.

C. Provide minimum bearing of 8 inches (200 mm) at each jamb unless otherwise indicated.

3.12 FLASHING, WEEP HOLES, CAVITY DRAINAGE, AND VENTS

A. General: Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to downward flow of water in wall, and where indicated. Install vents at shelf angles, ledges, and other obstructions to upward flow of air in cavities, and where indicated.

B. Install flashing as follows unless otherwise indicated:

1. Prepare masonry surfaces so they are smooth and free from projections that could puncture flashing. Where flashing is within mortar joint, place through-wall flashing on sloping bed of mortar and cover with mortar. Before covering with mortar, seal penetrations in flashing with adhesive, sealant, or tape as recommended by flashing manufacturer.
2. At masonry-veneer walls, extend flashing through veneer, across air space behind veneer, and up face of sheathing at least 8 inches (200 mm); with upper edge tucked under building paper or building wrap, lapping at least 4 inches (100 mm).
3. At lintels and shelf angles, extend flashing a minimum of 6 inches (150 mm) into masonry at each end. At heads and sills, extend flashing 6 inches (150 mm) at ends and turn up not less than 2 inches (50 mm) to form end dams.
4. Interlock end joints of ribbed sheet metal flashing by overlapping ribs not less than 1-1/2 inches (38 mm) or as recommended by flashing manufacturer, and seal lap with elastomeric sealant complying with requirements in Section 079200 "Joint Sealants" for application indicated.
5. Install metal drip edges beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal drip edge.
6. Install metal flashing termination beneath flexible flashing at exterior face of wall. Stop flexible flashing 1/2 inch (13 mm) back from outside face of wall and adhere flexible flashing to top of metal flashing termination.
7. Cut flexible flashing off flush with face of wall after masonry wall construction is completed.

C. Install reglets and nailers for flashing and other related construction where they are shown to be built into masonry.

D. Install weep holes in head joints in exterior wythes of first course of masonry immediately above embedded flashing and as follows:

1. Use specified weep/vent products to form weep holes.
2. Use wicking material to form weep holes above flashing under brick sills. Turn wicking down at lip of sill to be as inconspicuous as possible.
3. Space weep holes 24 inches (600 mm) o.c. unless otherwise indicated.
4. Trim wicking material flush with outside face of wall after mortar has set.

E. Place cavity drainage material in cavities to comply with configuration requirements for cavity drainage material in "Miscellaneous Masonry Accessories" Article.

F. Install vents in head joints in exterior wythes at spacing indicated. Use specified weep/vent products to form vents.

1. Close cavities off vertically and horizontally with blocking in manner indicated. Install through-wall flashing and weep holes above horizontal blocking.

3.13 FIELD QUALITY CONTROL

A. Testing and Inspecting: Owner will engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as needed to perform tests and inspections. Retesting of materials that fail to comply with specified requirements shall be done at Contractor's expense.

B. Inspections: Level 2 special inspections according to the "International Building Code."

1. Begin masonry construction only after inspectors have verified proportions of site-prepared mortar.
2. Place grout only after inspectors have verified compliance of grout spaces and of grades, sizes, and locations of reinforcement.
3. Place grout only after inspectors have verified proportions of site-prepared grout.

C. Mortar Aggregate Ratio Test (Proportion Specification): For each mix provided, according to ASTM C 780.

D. Mortar Test (Property Specification): For each mix provided, according to ASTM C 780. Test mortar for mortar air content and compressive strength.

3.14 REPAIRING, POINTING, AND CLEANING

A. Remove and replace masonry units that are loose, chipped, broken, stained, or otherwise damaged or that do not match adjoining units. Install new units to match adjoining units; install in fresh mortar, pointed to eliminate evidence of replacement.

B. Pointing: During the tooling of joints, enlarge voids and holes, except weep holes, and completely fill with mortar. Point up joints, including corners, openings, and adjacent construction, to provide a neat, uniform appearance. Prepare joints for sealant application, where indicated.

C. In-Progress Cleaning: Clean unit masonry as work progresses by dry brushing to remove mortar fins and smears before tooling joints.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed masonry as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample wall panel; leave one-half of panel uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of masonry.
3. Protect adjacent stone and nonmasonry surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet wall surfaces with water before applying cleaners; remove cleaners promptly by rinsing surfaces thoroughly with clear water.
5. Clean masonry with a proprietary acidic cleaner applied according to manufacturer's written instructions.
6. Clean concrete masonry by cleaning method indicated in NCMA TEK 8-2A applicable to type of stain on exposed surfaces.
7. Clean stone trim to comply with stone supplier's written instructions.
8. Clean limestone units to comply with recommendations in ILI's "Indiana Limestone Handbook."

3.15 MASONRY WASTE DISPOSAL

A. Salvageable Materials: Unless otherwise indicated, excess masonry materials are Contractor's property. At completion of unit masonry work, remove from Project site.

B. Excess Masonry Waste: Remove excess clean masonry waste that cannot be used as fill, as described above, and other masonry waste, and legally dispose of off Owner's property.

END OF SECTION 042000

SECTION 042300 - GLASS UNIT MASONRY

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. Glass block set in mortar.

1.3 SEQUENCING AND SCHEDULING

A. Sequence and coordinate completion of glass unit masonry assemblies so sealants can be installed immediately after mortar has attained final set.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details for glass unit masonry, including vertical and horizontal coursing, anchors, reinforcement, and expansion strips.

C. Samples for Initial Selection: Manufacturer's actual glass-block units and joint materials involving color selection.

D. Samples for Verification: Glass-block units and joint materials involving color selection.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store glass block in unopened cartons on elevated platforms, under cover, and in a dry location. If units are not stored in an enclosed location, cover tops and sides of stacks with waterproof sheeting, securely tied.

B. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

C. Store accessories, including metal items, to prevent corrosion and accumulation of dirt and oil.

1.6 FIELD CONDITIONS

A. Environmental Limitations: Proceed with installation of glass unit masonry assemblies only when ambient and material temperatures are 40 deg F (5 deg C) or higher.

1. Maintain temperature in installation areas at 40 deg F (5 deg C) or above for 48 hours after installing.
2. Do not install sealants when ambient and substrate temperatures are outside limits permitted by sealant manufacturer or when joint substrates are wet.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations for Accessory Materials: Obtain each cementitious material, admixture and accessory component through single source from single manufacturer.

2.2 PERFORMANCE REQUIREMENTS

A. Structural Performance: Glass-block grid systems, including attachment to building construction, shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Loads: As indicated.

2.3 GLASS BLOCK

A. Hollow Glass Block: Hollow units made from transparent glass, with manufacturer's standard edge coating.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Mulia Inc.; distributed by Glass Blocks Unlimited.
b. Mulia Inc.; distributed by Mulia, Inc.
c. Pittsburgh Corning Corporation.
d. Seves; distributed by Glass Blocks Unlimited.
e. Seves; distributed by Glass Block Warehouse, LC.
f. Vetroarredo Sediver S.p.A.; distributed by International Product Supply.
g. J. Weck GmbH & Co. KG; distributed by Glashaus, Inc.
h. J. Weck GmbH & Co. KG; distributed by Glass Blocks Unlimited.
i. WGS Westerwald Glasstein GmbH. Solaris Glasstein; distributed by Glass Blocks Unlimited.

2. Glass Color: As selected by Architect from manufacturer's full range.

3. Pattern: As selected by Architect from manufacturer's full range.

4. Sizes: Manufacturer's standard sizes corresponding to nominal sizes indicated on Drawings.
5. Square-Block Size: 7-3/4 inches (197 mm) square by 3-7/8 inches (98 mm) thick.

2.4 MORTAR MATERIALS

A. Portland Cement: ASTM C 150/C 150M, Type I or Type II. Provide mortar color to match existing.

B. Hydrated Lime: ASTM C 207, Type S.

C. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979/C 979M. Use only pigments with a record of satisfactory performance in masonry mortar.

E. Water-Repellent Admixture: Liquid polymeric water-repellent mortar admixture that does not reduce flexural bond strength of mortar.

1. Products: Subject to compliance with requirements, provide the following:
   a. BASF Corporation, Construction Chemicals; Rheopel Mortar Admixture.
   b. Grace Construction Products, W. R. Grace & Co. - Conn.; Dry-Block Mortar Admixture.

F. Water: Potable.

2.5 GLASS UNIT MASONRY ACCESSORIES

A. Panel Reinforcement: Ladder-type units, butt welded, not lapped and welded; complying with ASTM A 951/A 951M in straight lengths of not less than 10 feet (3 m), and as follows:
1. Exterior Walls: Stainless-steel wire.
2. Wire Size: W1.7 or 0.148-inch (3.8-mm) diameter.
3. Width: 2 inches (50 mm).
4. Spacing of Cross Rods: Not more than 16 inches (407 mm) apart.

B. Post-Installed Anchors: Fastener systems with working capacity greater than or equal to the design load, according to an evaluation report acceptable to authorities having jurisdiction, based on ICC-ES AC193[or AC308].

C. Plastic-Foam Expansion Strips: Polyethylene foam complying with requirements of glass-block manufacturer; 3/8 inch (9 mm) thick by 3-1/2 inches (89 mm) wide.

1. Use plastic-foam expansion strips for non-fire-rated assemblies.

D. Sealants: Manufacturer's standard elastomeric sealants of base polymer and characteristics indicated below that comply with applicable requirements in Section 079200 "Joint Sealants."

1. Urethane, S, NS, 25, NT.
2. Sealants shall have a VOC content of 250g/L or less.

E. Sealant Accessories: Provide sealant accessories, including primers, bond-breaker tape, and cylindrical sealant backing, that comply with applicable requirements in Section 079200 "Joint Sealants."

2.6 MORTAR MIXES

A. General: Do not use admixtures, including pigments, air-entraining agents, accelerators, retarders, or antifreeze compounds unless otherwise indicated.

1. Do not use calcium chloride in mortar.
2. For mortar in exterior panels, use water-repellent admixture according to admixture manufacturer's written instructions.
3. Limit cementitious materials in mortar to portland cement and lime.

B. Mortar for Glass Unit Masonry Assemblies: Comply with ASTM C 270, Proportion Specification for Type S mortar.

1. Combine and thoroughly mix cementitious materials, water, and aggregates in a mechanical batch mixer unless otherwise indicated. Mix mortar to produce a stiff but workable consistency that is drier than mortar for brick or concrete masonry. Discard mortar when it has reached initial set.

C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 5 percent of masonry cement by weight.
2. Mix to match existing mortar.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine sills, jambs, and heads surrounding glass unit masonry assemblies, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLING GLASS BLOCK WITH MORTAR

A. Apply a heavy coat of asphalt emulsion to sill and adhere expansion strips to jambs and heads with asphalt emulsion. Allow asphalt emulsion to dry before placing mortar. Trim expansion strips to width required to fit glass block and to full lengths of heads and jambs.

B. Set glass block with completely filled bed and head joints, with no furrowing, accurately spaced and coordinated with other construction. Maintain 3/8-inch (10-mm) exposed joint widths unless otherwise indicated.

C. Install panel reinforcement in horizontal joints at spacing indicated and continuously from end to end of panels; comply with the following requirements:

1. Vertical Spacing of Panel Reinforcement for Exterior Panels: Every other course but not more than 16 inches (407 mm) o.c., starting with first course above sill.
2. Vertical Spacing of Panel Reinforcement for Interior Panels: Not more than 16 inches (407 mm) o.c..
3. Lap panel reinforcement not less than 6 inches (150 mm) if more than one length is necessary.
4. Embed panel reinforcement in mortar bed by placing lower half of mortar bed first, pressing panel reinforcement into place, and covering with upper half of mortar bed.

D. Install panel anchors in same horizontal joints where panel reinforcement occurs. Extend panel anchors at least 12 inches (300 mm) into joints, and bend within expansion joints at edges of panels and across the head. Attach panel anchors as follows:

1. For in-place unit masonry assemblies and concrete, attach panel anchors with 1/4-inch-(6-mm-) diameter, bolt-size post-installed anchors, two per panel anchor.

E. Use rubber mallet to tap units into position. Do not use steel tools, and do not allow units to come into contact with metal accessories and frames.

F. Use plastic spacers in mortar joints to produce uniform joint widths and to prevent mortar from being squeezed out of joints.

G. Keep expansion joints free of mortar.

H. Rake out joints indicated to be pointed to a uniform depth sufficient to accommodate pointing material, but not less than joint width.

1. If temporary wedges are used, remove them before raking out and pointing joints.
2. Point joints at exterior face of exterior panels with mortar.

I. Point joints with mortar by filling raked joints and voids. Place and compact pointing mortar in layers not more than 3/8 inch (10 mm) thick. Compact each layer thoroughly and allow to become thumbprint hard before applying next layer.

1. Tool exposed joints slightly concave when pointing mortar is thumbprint hard. Use a smooth plastic jointer larger than joint width.

J. Clean glass unit masonry assemblies as work progresses. Remove mortar fins and smears immediately, using a clean, wet sponge or a scrub brush with stiff fiber bristles. Do not use harsh cleaners, acids, abrasives, steel wool, or wire brushes when removing mortar or cleaning glass unit masonry assemblies.

K. Install sealant at jambs, heads, mullions, and other locations indicated. Prepare joints, including installation of primer and bond-breaker tape or cylindrical sealant backing, and apply elastomeric sealants to comply with requirements in Section 079200 "Joint Sealants."

L. Construction Tolerances: Set glass block to comply with the following tolerances:

1. Variation from Level: For bed joints and other conspicuous lines, do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet ((6 mm in 6 m),) or 1/2 inch in 40 feet (12 mm in 12 m) or more.
2. Variation in Mortar-Joint Thickness: Do not vary from joint thickness indicated by more than plus or minus 1/16 inch (1.5 mm).
3. For faces of adjacent exposed units, do not vary from flush alignment by more than 1/16 inch (1.5 mm).

3.3 CLEANING

A. On surfaces adjacent to glass unit masonry assemblies, remove mortar, sealants, and other residue resulting from glass-block installation, in a manner approved by manufacturers of materials involved.

B. Remove excess sealants with commercial solvents according to sealant manufacturer's written instructions. Exercise care not to damage sealant in joints.

C. Perform final cleaning of glass unit masonry assemblies when surface is not exposed to direct sunlight. Start at top of panel using generous amounts of clean water. Remove water with clean, dry, soft cloths; change cloths frequently.

END OF SECTION 042300

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. Cast stone trim including the following:

a. Pediments.
b. Coping.
c. Belt courses.

2. All cast stone shall match existing on building addition and on adjacent banding, in color, texture & shape, or as indicated on drawings.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication and installation details for cast stone units. Include dimensions, details of reinforcement and anchorages, and indication of finished faces.

1. Include building elevations showing layout of units and locations of joints and anchors.

C. Samples for Initial Selection: For colored mortar.

D. Samples for Verification:

1. For each color and texture of cast stone required, 10 inches (250 mm) square in size.

E. Full-Size Samples: For each texture and shape of cast stone unit required.

1. Make available for Architect's review at Project site or at manufacturing plant, if acceptable to Architect.
2. Make Samples from materials to be used for units used on Project immediately before beginning production of units for Project.
3. Approved Samples may be installed in the Work.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturer.

B. Material Test Reports: For each mix required to produce cast stone, based on testing according to ASTM C 1364, including test for resistance to freezing and thawing.

1. Provide test reports based on testing within previous two years.

1.5 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer of cast stone units similar to those indicated for this Project, that has sufficient production capacity to manufacture required units, and is a plant certified by the Cast Stone Institute, the Architectural Precast Association or the Precast/Prestressed Concrete Institute for Group A, Category AT.

B. Source Limitations for Cast Stone: Obtain cast stone units through single source from single manufacturer.

C. Source Limitations for Mortar Materials: Obtain mortar ingredients of a uniform quality, including color, from one manufacturer for each cementitious component and from one source or producer for each aggregate.

D. Mockups: Build mockups to verify selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Coordinate delivery of cast stone with unit masonry work to avoid delaying the Work and to minimize the need for on-site storage.

B. Pack, handle, and ship cast stone units in suitable packs or pallets.

1. Lift with wide-belt slings; do not use wire rope or ropes that might cause staining. Move cast stone units, if required, using dollies with wood supports.
2. Store cast stone units on wood skids or pallets with nonstaining, waterproof covers, securely tied. Arrange to distribute weight evenly and to prevent damage to units. Ventilate under covers to prevent condensation.

C. Store cementitious materials on elevated platforms, under cover, and in a dry location. Do not use cementitious materials that have become damp.

D. Store mortar aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

1.7 PROJECT CONDITIONS

A. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Comply with cold-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

1. Cold-Weather Cleaning: Use liquid cleaning methods only when air temperature is 40 deg F (4 deg C) and above and will remain so until cast stone has dried, but no fewer than seven days after completing cleaning.

B. Hot-Weather Requirements: Comply with hot-weather construction requirements in ACI 530.1/ASCE 6/TMS 602.

PART 2 - PRODUCTS

2.1 CAST STONE MATERIALS

A. General: Comply with ASTM C 1364 and the following:

B. Coarse Aggregates: Granite, quartz, or limestone complying with ASTM C 33; gradation and colors as needed to produce required cast stone textures and colors.

C. Fine Aggregates: Natural sand or crushed stone complying with ASTM C 33, gradation and colors as needed to produce required cast stone textures and colors.

D. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

E. Admixtures: Use only admixtures specified or approved in writing by Architect.

1. Do not use admixtures that contain more than 0.1 percent water-soluble chloride ions by mass of cementitious materials. Do not use admixtures containing calcium chloride.
2. Use only admixtures that are certified by manufacturer to be compatible with cement and other admixtures used.
3. Air-Entraining Admixture: ASTM C 260. Add to mixes for units exposed to the exterior at manufacturer's prescribed rate to result in an air content of 4 to 6 percent, except do not add to zero-slump concrete mixes.

F. Reinforcement: Deformed steel bars complying with ASTM A 615/A 615M, Grade 60 (Grade 420). Use galvanized or epoxy-coated reinforcement when covered with less than 1-1/2 inches (38 mm) of cast stone material.

1. Epoxy Coating: ASTM A 775/A 775M.
2. Galvanized Coating: ASTM A 767/A 767M.

G. Embedded Anchors and Other Inserts: Fabricated from stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666, Type 304.

2.2 CAST STONE UNITS

A. Regional Materials: Cast stone units shall be manufactured within 500 miles (800 km) of Project site from aggregates and cement that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Provide cast stone units complying with ASTM C 1364 using either the vibrant dry tamp or wet-cast method.

1. Provide units that are resistant to freezing and thawing as determined by laboratory testing according to ASTM C 666/C 666M, Procedure A, as modified by ASTM C 1364.

C. Fabricate units with sharp arris and accurately reproduced details, with indicated texture on all exposed surfaces unless otherwise indicated.

1. Slope exposed horizontal surfaces 1:12 to drain unless otherwise indicated.
2. Provide raised fillets at backs of sills and at ends indicated to be built into jambs.
3. Provide drips on projecting elements unless otherwise indicated.

D. Fabrication Tolerances:

1. Variation in Cross Section: Do not vary from indicated dimensions by more than 1/8 inch (3 mm).
2. Variation in Length: Do not vary from indicated dimensions by more than 1/360 of the length of unit or 1/8 inch (3 mm), whichever is greater, but in no case by more than 1/4 inch (6 mm).
3. Warp, Bow, and Twist: Not to exceed 1/360 of the length of unit or 1/8 inch (3 mm), whichever is greater.
4. Location of Grooves, False Joints, Holes, Anchorages, and Similar Features: Do not vary from indicated position by more than 1/8 inch (3 mm) on formed surfaces of units and 3/8 inch (10 mm) on unformed surfaces.

E. Cure units as follows:

1. Cure units in enclosed moist curing room at 95 to 100 percent relative humidity and temperature of 100 deg F (38 deg C) for 12 hours or 70 deg F (21 deg C) for 16 hours.
2. Keep units damp and continue curing to comply with one of the following:

   a. No fewer than five days at mean daily temperature of 70 deg F (21 deg C) or above.
   b. No fewer than six days at mean daily temperature of 60 deg F (16 deg C) or above.
   c. No fewer than seven days at mean daily temperature of 50 deg F (10 deg C) or above.
   d. No fewer than eight days at mean daily temperature of 45 deg F (7 deg C) or above.

F. Acid etch units after curing to remove cement film from surfaces to be exposed to view.

G. Color and Texture: Provide units with fine-grained texture and color to match existing cast stone surfaces.

2.3 MORTAR MATERIALS

A. Regional Materials: Aggregate for mortar, cement, and lime shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

B. Portland Cement: ASTM C 150, Type I or II, except Type III may be used for cold-weather construction. Provide natural color or white cement as required to produce mortar color indicated.

C. Hydrated Lime: ASTM C 207, Type S.

D. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes and complying with ASTM C 979. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Davis Colors; True Tone Mortar Colors.
b. Lanxess Corporation; Bayferrox Iron Oxide Pigments.
c. Solomon Colors, Inc.; SGS Mortar Colors.

E. Colored Cement Product: Packaged blend made from portland cement and hydrated lime and mortar pigments, all complying with specified requirements and containing no other ingredients.

1. Colored Portland Cement-Lime Mix:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Capital Materials Corporation; Riverton Portland Cement Lime Custom Color.
2) Holcim (US) Inc.; Rainbow Mortamix Custom Color Cement/Lime.
3) Lafarge North America Inc.; Eaglebond Portland & Lime.
4) Lehigh Cement Company; Lehigh Custom Color Portland/Lime Cement.

2. Colored Masonry Cement:

a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

1) Capital Materials Corporation; Flamingo Color Masonry Cement.
2) Cemex S.A.B. de C.V.; Richcolor Masonry Cement.
3) Essroc, Italcementi Group; Brixment-in-Color.
4) Holcim (US) Inc.; Rainbow Mortamix Custom Color Masonry Cement.
5) Lafarge North America Inc.; U.S. Cement Custom Color Masonry Cement.
6) Lehigh Cement Company; Lehigh Custom Color Masonry Cement.
7) National Cement Company, Inc.; Coosa Masonry Cement.

3. Formulate blend as required to produce color indicated or, if not indicated, as selected from manufacturer's standard colors.
4. Pigments shall not exceed 10 percent of portland cement by weight.

F. Aggregate for Mortar: ASTM C 144.

1. For mortar that is exposed to view, use washed aggregate consisting of natural sand or crushed stone.
2. For joints less than 1/4 inch (6 mm) thick, use aggregate graded with 100 percent passing the No. 16 (1.18-mm) sieve.
3. Colored-Mortar Aggregates: Natural sand or crushed stone of color necessary to produce mortar to match existing building mortar.

G. Water: Potable.

2.4 ACCESSORIES

A. Anchors: Type and size indicated, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

B. Dowels: 1/2-inch- (12-mm-) diameter, round bars, fabricated from Type 304 stainless steel complying with ASTM A 240/A 240M, ASTM A 276, or ASTM A 666.

2.5 MORTAR MIXES

A. Do not use admixtures including pigments, air-entraining agents, accelerators, retarders, water-repellent agents, antifreeze compounds, or other admixtures unless otherwise indicated.

1. Do not use calcium chloride in mortar or grout.
2. Use[portland cement-lim] mortar unless otherwise indicated.

B. Comply with ASTM C 270, Proportion Specification.

1. For setting mortar, use Type.
2. For pointing mortar, use Type.

C. Pigmented Mortar: Use colored cement product or select and proportion pigments with other ingredients to produce color required. Do not add pigments to colored cement products.

1. Pigments shall not exceed 10 percent of portland cement by weight.
2. Application: Use pigmented mortar for exposed mortar joints.

D. Colored-Aggregate Mortar: Produce required mortar color by using colored aggregates and natural color or white cement as necessary to produce required mortar color.

1. Mix to match existing mortar.
2. Application: Use colored aggregate mortar for exposed mortar joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SETTING CAST STONE IN MORTAR

A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
2. Coordinate installation of cast stone with installation of flashing specified in other Sections.

B. Wet joint surfaces thoroughly before applying mortar or setting in mortar.

C. Set units in full bed of mortar with full head joints unless otherwise indicated.

1. Set units with joints 3/8 to 1/2 inch (10 to 13 mm) wide unless otherwise indicated.
2. Build anchors and ties into mortar joints as units are set.
3. Fill dowel holes and anchor slots with mortar.
4. Fill collar joints solid as units are set.
5. Build concealed flashing into mortar joints as units are set.
6. Keep head joints in coping and other units with exposed horizontal surfaces open to receive sealant.
7. Keep joints at shelf angles open to receive sealant.

D. Rake out joints for pointing with mortar to depths of not less than 3/4 inch (19 mm). Rake joints to uniform depths with square bottoms and clean sides. Scrub faces of units to remove excess mortar as joints are raked.

E. Point mortar joints by placing and compacting mortar in layers not greater than 3/8 inch (10 mm). Compact each layer thoroughly and allow it to become thumbprint hard before applying next layer.

F. Tool exposed joints recessed and slightly concave when thumbprint hard, using a jointer larger than joint thickness unless otherwise indicated.

G. Provide sealant joints at copings and other horizontal surfaces, at expansion, control, and pressure-relieving joints, and at locations indicated.

1. Keep joints free of mortar and other rigid materials.
2. Build in compressible foam-plastic joint fillers where indicated.

3. Form joint of width indicated, but not less than 3/8 inch (10 mm).
4. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.
5. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.3 SETTING ANCHORED CAST STONE WITH SEALANT-FILLED JOINTS

A. Set cast stone as indicated on Drawings. Set units accurately in locations indicated with edges and faces aligned according to established relationships and indicated tolerances.

1. Install anchors, supports, fasteners, and other attachments indicated or necessary to secure units in place.
2. Shim and adjust anchors, supports, and accessories to set cast stone in locations indicated with uniform joints.

B. Keep cavities open where unfilled space is indicated between back of cast stone units and backup wall; do not fill cavities with mortar or grout.

C. Fill anchor holes with sealant.

1. Where dowel holes occur at pressure-relieving joints, provide compressible material at ends of dowels.

D. Set cast stone supported on clip or continuous angles on resilient setting shims. Use material of thickness required to maintain uniform joint widths. Hold shims back from face of cast stone a distance at least equal to width of joint.

E. Keep joints free of mortar and other rigid materials. Remove temporary shims and spacers from joints after anchors and supports are secured in place and cast stone units are anchored. Do not begin sealant installation until temporary shims and spacers are removed.

1. Form open joint of width indicated, but not less than 3/8 inch (10 mm).

F. Prime cast stone surfaces to receive sealant and install compressible backer rod in joints before applying sealant unless otherwise indicated.

G. Prepare and apply sealant of type and at locations indicated to comply with applicable requirements in Section 079200 "Joint Sealants."

3.4 INSTALLATION TOLERANCES

A. Variation from Plumb: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

B. Variation from Level: Do not exceed 1/8 inch in 10 feet (3 mm in 3 m), 1/4 inch in 20 feet (6 mm in 6 m), or 1/2 inch (12 mm) maximum.

C. Variation in Joint Width: Do not vary joint thickness more than 1/8 inch in 36 inches (3 mm in 900 mm) or one-fourth of nominal joint width, whichever is less.

D. Variation in Plane between Adjacent Surfaces (Lipping): Do not vary from flush alignment with adjacent units or adjacent surfaces indicated to be flush with units by more than 1/16 inch (1.5 mm), except where variation is due to warpage of units within tolerances specified.

3.5 ADJUSTING AND CLEANING

A. Remove and replace stained and otherwise damaged units and units not matching approved Samples. Cast stone may be repaired if methods and results are approved by Architect.

B. Replace units in a manner that results in cast stone matching approved Samples, complying with other requirements, and showing no evidence of replacement.

C. In-Progress Cleaning: Clean cast stone as work progresses.

1. Remove mortar fins and smears before tooling joints.
2. Remove excess sealant immediately, including spills, smears, and spatter.

D. Final Cleaning: After mortar is thoroughly set and cured, clean exposed cast stone as follows:

1. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
2. Test cleaning methods on sample; leave one sample uncleaned for comparison purposes. Obtain Architect's approval of sample cleaning before proceeding with cleaning of cast stone.
3. Protect adjacent surfaces from contact with cleaner by covering them with liquid strippable masking agent or polyethylene film and waterproof masking tape.
4. Wet surfaces with water before applying cleaners; remove cleaners promptly by rinsing thoroughly with clear water.
5. Clean cast stone with proprietary acidic cleaner applied according to manufacturer's written instructions.

END OF SECTION 047200

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

General Notes, Sections, Plans, Typical Details, and other notes indicated on the structural drawings. In cases of conflict, information indicated on the structural drawings shall govern.

1.2 SUMMARY

A. Section Includes:
   1. Structural steel.
   2. Grout.

B. Related Sections include the following:
   1. Division 1 Section "Quality Requirements" for independent testing agency procedures and administrative requirements.
   2. Division 5 Section "Steel Deck" for field installation of shear connectors.
   3. Division 5 Section "Metal Fabrications" for steel lintels or shelf angles not attached to structural-steel frame miscellaneous steel fabrications and other metal items not defined as structural steel.
   4. Division 7 "Cementitious Fireproofing".
   5. Division 9 painting Sections and Division 9 Section "High-Performance Coatings" for surface preparation and priming requirements.
   6. Division 13 Section "Metal Building Systems" for structural steel.

C. LEED: Comply with Section 01 8100 Sustainable Design Requirements. The following credit goals apply:
   1. Materials and Resources Credits 2.1 and 2.2 Construction Waste Management
   2. Materials and Resources Credits 4.1 and 4.2 Recycled Content
   3. Materials and Resources Credits 5.1 and 5.2 Regional Materials

1.3 DEFINITIONS

A. Structural Steel: Elements of structural-steel frame, as classified by AISC's "Code of Standard Practice for Steel Buildings and Bridges," that support design loads.

1.4 PERFORMANCE REQUIREMENTS

A. Connections: Provide details of simple shear connections required by the Contract Documents to be selected or completed by structural-steel fabricator to withstand ASD-service loads indicated and comply with other information and restrictions indicated.
   1. Select and complete connections using schematic details indicated and AISC's "Manual of Steel Construction, Allowable Stress Design," Part 4.
   2. Engineering Responsibility: Fabricator's responsibilities include using a qualified professional engineer to prepare structural analysis data for structural-steel connections.

B. Construction: Type 2, simple framing.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: Show fabrication of structural-steel components.
1. Include details of cuts, connections, splices, camber, holes, and other pertinent data.
2. Include embedment drawings.
3. Indicate welds by standard AWS symbols, distinguishing between shop and field welds, and show size, length, and type of each weld.
4. Indicate type, size, and length of bolts, distinguishing between shop and field bolts. Identify pretensioned and slip-critical high-strength bolted connections.
5. For structural-steel connections indicated to comply with design loads, include structural analysis data prepared by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For Installer and fabricator.

E. Mill Test Reports: Signed by manufacturers certifying that the following products comply with requirements:
1. Structural steel including chemical and physical properties.
2. Bolts, nuts, and washers including mechanical properties and chemical analysis.
3. Shop primers.

F. Source quality-control test reports.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who participates in the AISC Quality Certification Program and is designated an AISC-Certified Erector, Category CSE.

B. Fabricator Qualifications: A qualified fabricator who participates in the AISC Quality Certification Program and is designated an AISC-Certified Plant, Category Sbd.

C. Welding: Qualify procedures and personnel according to AWS D1.1, "Structural Welding Code--Steel."

D. Comply with applicable provisions of the following specifications and documents:
1. AISC's "Code of Standard Practice for Steel Buildings and Bridges."
2. AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
3. AISC's "Specification for the Design of Steel Hollow Structural Sections."
4. AISC's "Specification for Allowable Stress Design of Single-Angle Members."
5. RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

E. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 1 Section "Project Management and Coordination."

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials to permit easy access for inspection and identification. Keep steel members off ground and spaced by using pallets, dunnage, or other supports and spacers. Protect steel members and packaged materials from erosion and deterioration.
   1. Store fasteners in a protected place. Clean and relubricate bolts and nuts that become dry or rusty before use.
   2. Do not store materials on structure in a manner that might cause distortion, damage, or overload to members or supporting structures. Repair or replace damaged materials or structures as directed.

1.8 COORDINATION

A. Furnish anchorage items to be embedded in or attached to other construction without delaying the Work. Provide setting diagrams, sheet metal templates, instructions, and directions for installation.

PART 2 - PRODUCTS

2.1 STRUCTURAL-STEEL MATERIALS

A. W-Shapes: ASTM A 992/A 992M.

B. Channels, Angles, M , S-Shapes: ASTM A 572/A 572M, Grade 50

C. Plate and Bar: ASTM A 36/A 36M.

D. Cold-Formed Hollow Structural Sections: ASTM A 500, Grade B C, structural tubing.

E. Welding Electrodes: Comply with AWS requirements.

2.2 BOLTS, CONNECTORS, AND ANCHORS

A. High-Strength Bolts, Nuts, and Washers: ASTM A 325 Type 1, heavy hex steel structural bolts; ASTM A 563 heavy hex carbon-steel nuts; and ASTM F 436 hardened carbon-steel washers.

B. Headed Anchor Rods: ASTM F 1554, Grade 55, weldable, straight.
   1. Nuts: ASTM A 563 heavy hex carbon steel.
   2. Plate Washers: ASTM A 36/A 36M carbon steel.
   3. Washers: ASTM F 436 hardened carbon steel.

2.3 PRIMER

A. Primer: Fabricator's standard lead- and chromate-free, nonasphaltic, rust-inhibiting primer.

B. Galvanizing Repair Paint: MPI#18, MPI#19, or SSPC-Paint 20 ASTM A 780.

2.4 GROUT

A. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404, Size No. 2. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

2.5 FABRICATION

A. Structural Steel: Fabricate and assemble in shop to greatest extent possible. Fabricate according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and AISC's "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."
   1. Camber structural-steel members where indicated.
   2. Identify high-strength structural steel according to ASTM A 6/ A 6M and maintain markings until structural steel has been erected.
   3. Mark and match-mark materials for field assembly.
   4. Complete structural-steel assemblies, including welding of units, before starting shop-priming operations.

B. Thermal Cutting: Perform thermal cutting by machine to greatest extent possible.
   1. Plane thermally cut edges to be welded to comply with requirements in AWS D1.1.

C. Bolt Holes: Cut, drill, mechanically thermal cut, or punch standard bolt holes perpendicular to metal surfaces.

D. Finishing: Accurately finish ends of columns and other members transmitting bearing loads.

E. Holes: Provide holes required for securing other work to structural steel and for passage of other work through steel framing members.
   1. Cut, drill, or punch holes perpendicular to steel surfaces. Do not thermally cut bolt holes or enlarge holes by burning.
   2. Base-Plate Holes: Cut, drill, mechanically thermal cut, or punch holes perpendicular to steel surfaces.
   3. Weld threaded nuts to framing and other specialty items indicated to receive other work.

2.6 SHOP CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.

2.7 SHOP PRIMING

A. Shop prime steel surfaces except the following:
   1. Surfaces embedded in concrete or mortar. Extend priming of partially embedded members to a depth of 2 inches (50 mm).
   2. Surfaces to be field welded.

3. Surfaces to receive sprayed fire-resistive materials.
4. Galvanized surfaces.

B. Painting: Apply a 1-coat, nonasphaltic primer complying with SSPC-PS Guide 7.00, "Painting System Guide 7.00: Guide for Selecting One-Coat Shop Painting Systems," to provide a dry film thickness of not less than 1.5 mils.

2.8 GALVANIZING

A. Hot-Dip Galvanized Finish: Apply zinc coating by the hot-dip process to structural steel according to ASTM A 123/ A 123M.
1. Fill vent holes and grind smooth after galvanizing.
2. Galvanize lintels attached to structural-steel frame and located in exterior walls.

2.9 SOURCE QUALITY CONTROL

A. Owner will engage an independent testing and inspecting agency to perform shop tests and inspections and prepare test reports.
1. Provide testing agency with access to places where structural-steel work is being fabricated or produced to perform tests and inspections.

B. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

C. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

D. Welded Connections: In addition to visual inspection, shop-welded connections will be tested and inspected according to AWS D1.1 and the following inspection procedures, at testing agency's option:
1. Liquid Penetrant Inspection: ASTM E 165.
2. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
3. Ultrasonic Inspection: ASTM E 164.
4. Radiographic Inspection: ASTM E 94.

PART 3 - EXECUTION

1.1 EXAMINATION

A. Verify elevations of concrete- and masonry-bearing surfaces and locations of anchor rods, bearing plates, and other embedments, with steel erector present, for compliance with requirements.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

1.2 PREPARATION

A. Provide temporary shores, guys, braces, and other supports during erection to keep structural steel secure, plumb, and in alignment against temporary construction loads and loads equal in

intensity to design loads. Remove temporary supports when permanent structural steel, connections, and bracing are in place, unless otherwise indicated.

1.3 ERECTION

A. Set structural steel accurately in locations and to elevations indicated and according to AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design."

B. Base and Bearing Plates: Clean concrete- and masonry-bearing surfaces of bond-reducing materials, and roughen surfaces prior to setting base and bearing plates. Clean bottom surface of base and bearing plates.
   1. Set base and bearing plates for structural members on wedges, shims, or setting nuts as required.
   2. Weld plate washers to top of base plate.
   3. Snug-tighten anchor rods after supported members have been positioned and plumbed. Do not remove wedges or shims but, if protruding, cut off flush with edge of base or bearing plate before packing with grout.
   4. Promptly pack grout solidly between bearing surfaces and base or bearing plates so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure.

C. Maintain erection tolerances of structural steel within AISC's "Code of Standard Practice for Steel Buildings and Bridges."

D. Align and adjust various members forming part of complete frame or structure before permanently fastening. Before assembly, clean bearing surfaces and other surfaces that will be in permanent contact with members. Perform necessary adjustments to compensate for discrepancies in elevations and alignment.
   1. Level and plumb individual members of structure.

E. Do not use thermal cutting during erection.

F. Do not enlarge unfair holes in members by burning or using drift pins. Ream holes that must be enlarged to admit bolts.

1.4 FIELD CONNECTIONS

A. High-Strength Bolts: Shop install high-strength bolts according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts" for type of bolt and type of joint specified.
   1. Joint Type: Snug tightened.

B. Weld Connections: Comply with AWS D1.1 for welding procedure specifications, tolerances, appearance, and quality of welds and for methods used in correcting welding work.
   1. Comply with AISC's "Code of Standard Practice for Steel Buildings and Bridges" and "Specification for Structural Steel Buildings--Allowable Stress Design and Plastic Design" for bearing, adequacy of temporary connections, alignment, and removal of paint on surfaces adjacent to field welds.

1.5 FIELD QUALITY CONTROL

A. Testing Agency: Engage a qualified independent testing and inspecting agency to inspect field welds and high-strength bolted connections.

B. Bolted Connections: Shop-bolted connections will be inspected according to RCSC's "Specification for Structural Joints Using ASTM A 325 or A 490 Bolts."

C. Welded Connections: Field welds will be visually inspected according to AWS D1.1.
   1. In addition to visual inspection, field welds will be tested according to AWS D1.1 and the following inspection procedures, at testing agency's option:
      a. Liquid Penetrant Inspection: ASTM E 165.
      b. Magnetic Particle Inspection: ASTM E 709; performed on root pass and on finished weld. Cracks or zones of incomplete fusion or penetration will not be accepted.
      c. Ultrasonic Inspection: ASTM E 164.
      d. Radiographic Inspection: ASTM E 94.

D. Correct deficiencies in Work that test reports and inspections indicate does not comply with the Contract Documents.

1.6 REPAIRS AND PROTECTION

A. Repair damaged galvanized coatings on galvanized items with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Touchup Painting: After installation, promptly clean, prepare, and prime or reprime field connections, rust spots, and abraded surfaces of prime-painted joists and accessories, bearing plates, and abutting structural steel.
   1. Clean and prepare surfaces by SSPC-SP 2 hand-tool cleaning or SSPC-SP 3 power-tool cleaning.
   2. Apply a compatible primer of same type as shop primer used on adjacent surfaces.

C. Touchup Painting: Cleaning and touchup painting are specified in Division 9 painting Sections.

END OF SECTION 051200

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. Exterior non-load-bearing wall framing.

1.3 PERFORMANCE REQUIREMENTS

A. Structural Performance: Provide cold-formed metal framing capable of withstanding design loads within limits and under conditions indicated.

1. Design Loads: As follows:

a. Dead Loads: Weights of materials and construction.
b. Wind Loads: 100 MPH three second gust.
c. Seismic Loads: as indicated on structural drawings.

2. Deflection Limits: Design framing systems to withstand design loads without deflections greater than the following:

a. Exterior Non-Load-Bearing Framing: Horizontal deflection of 1/360 of the wall height for EIFS walls.

3. Design framing systems to provide for movement of framing members without damage or overstressing, sheathing failure, connection failure, undue strain on fasteners and anchors, or other detrimental effects when subject to a maximum ambient temperature change of 120 deg F (67 deg C).

4. Design framing system to maintain clearances at openings, to allow for construction tolerances, and to accommodate live load deflection of primary building structure as follows:

a. Upward and downward movement of 1/2 inch (13 mm).

B. Cold-Formed Steel Framing, General: Design according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions."

1. Headers: Design according to AISI's "Standard for Cold-Formed Steel Framing - Header Design."

2. Design exterior non-load-bearing wall framing to accommodate horizontal deflection without regard for contribution of sheathing materials.

3. Notwithstanding the requirements below, use base metal thicknesses noted in Part 2 of this section.

1.4 SUBMITTALS

A. Product Data: For each type of cold-formed metal framing product and accessory indicated.

B. Shop Drawings: Show layout, spacings, sizes, thicknesses, and types of cold-formed metal framing; fabrication; and fastening and anchorage details, including mechanical fasteners. Show reinforcing channels, opening framing, supplemental framing, strapping, bracing, bridging, splices, accessories, connection details, and attachment to adjoining work.

1. For cold-formed metal framing indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Welding certificates.

D. Qualification Data: For professional engineer.

E. Product Test Reports: From a qualified testing agency, unless otherwise stated, indicating that each of the following complies with requirements, based on evaluation of comprehensive tests for current products:

1. Steel sheet.
2. Expansion anchors.
3. Power-actuated anchors.
4. Mechanical fasteners.
5. Vertical deflection clips.
6. Horizontal drift deflection clips
7. Miscellaneous structural clips and accessories.

F. Research/Evaluation Reports: For cold-formed metal framing.

1.5 QUALITY ASSURANCE

A. Engineering Responsibility: Preparation of Shop Drawings, design calculations, and other structural data by a qualified professional engineer.

B. Professional Engineer Qualifications: A professional engineer who is legally qualified to practice in the State of Connecticut and who is experienced in providing engineering services of the kind indicated. Engineering services are defined as those performed for installations of cold-formed metal framing that are similar to those indicated for this Project in material, design, and extent.

C. Product Tests: Mill certificates or data from a qualified independent testing agency indicating steel sheet complies with requirements, including base-metal thickness, yield strength, tensile strength, total elongation, chemical requirements and metallic-coating thickness.

D. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code--Steel," and AWS D1.3, "Structural Welding Code--Sheet Steel."

E. AISI Specifications and Standards: Comply with AISI's "North American Specification for the Design of Cold-Formed Steel Structural Members" and its "Standard for Cold-Formed Steel Framing - General Provisions."

1. Comply with AISI's "Standard for Cold-Formed Steel Framing - Header Design."

F. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01 Section "Project Management and Coordination."

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect cold-formed metal framing from corrosion, deformation, and other damage during delivery, storage, and handling.

B. Store cold-formed metal framing, protect with a waterproof covering, and ventilate to avoid condensation.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering cold-formed metal framing that may be incorporated into the Work include, but are not limited to, the following:

1. Allied Studco.
2. AllSteel Products, Inc.
3. Clark Steel Framing.
4. Consolidated Fabricators Corp.; Building Products Division.
5. Craco Metals Manufacturing, LLC.
6. Custom Stud, Inc.
7. Dietrich Metal Framing; a Worthington Industries Company.
8. Formetal Co. Inc. (The).
9. MarinoWare; a division of Ware Industries.
10. SCAFCO Corporation.
11. Steel Construction Systems.
12. Steeler, Inc.
13. Super Stud Building Products, Inc.
14. United Metal Products, Inc.

2.2 MATERIALS

A. Recycled Content of Steel Products: Provide products with an average recycled content of steel products so postconsumer recycled content plus one-half of preconsumer recycled content is not less than 25 percent.

B. Steel Sheet: ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of grade and coating weight as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275) or equivalent.

C. Steel Sheet for Clips: ASTM A 653/A 653M, structural steel, zinc coated, of grade and coating as follows:

1. Grade: As required by structural performance.
2. Coating: G90 (Z275).

2.3 EXTERIOR NON-LOAD-BEARING WALL FRAMING

A. Steel Studs: Manufacturer's standard C-shaped steel studs, of web depths indicated, punched, with stiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Minimum Flange Width: 1-5/8 inches (41 mm)

B. Steel Track: Manufacturer's standard U-shaped steel track, of web depths indicated, unpunched, with unstiffened flanges, and as follows:

1. Minimum Base-Metal Thickness: 0.0428 inch (1.09 mm).
2. Flange Width: 1-1/4 inches (32 mm).

C. Vertical Deflection Clips: Manufacturer's standard clips, capable of accommodating upward and downward vertical displacement of primary structure through positive mechanical attachment to stud web.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Dietrich Metal Framing; a Worthington Industries Company.
b. MarinoWare, a division of Ware Industries.
c. SCAFCO Corporation
d. The Steel Network, Inc.

D. Double Deflection Tracks: Manufacturer's double, deep-leg, U-shaped steel tracks, consisting of nested inner and outer tracks; unpunched, with unstiffened flanges.

1. Outer Track: Of web depth to allow free vertical movement of inner track, with flanges designed to support horizontal and lateral loads and transfer them to the primary structure, and as follows:

   a. Minimum Base-Metal Thickness: 0.0677 inch (1.72 mm).
   b. Flange Width: 1 inch (25 mm) plus twice the design gap.

2. Inner Track: Of web depth indicated, and as follows:

   a. Minimum Base-Metal Thickness: 0.0677 inch (1.72 mm).
   b. Flange Width: equal to sum of outer deflection track flange width plus 1 inch (25 mm).

E. Drift Clips: Manufacturer's standard bypass or head clips, capable of isolating wall stud from upward and downward vertical displacement and lateral drift of primary structure.

2.4 FRAMING ACCESSORIES

A. Fabricate steel-framing accessories from steel sheet, ASTM A 1003/A 1003M, Structural Grade, Type H, metallic coated, of same grade and coating weight used for framing members.

B. Provide accessories of manufacturer's standard thickness and configuration, unless otherwise indicated, as follows:

1. Supplementary framing.
2. Bracing, bridging, and solid blocking.
3. Web stiffeners.
4. Anchor clips.
5. End clips.
6. Foundation clips.
7. Gusset plates.
8. Stud kickers, knee braces, and girts.
9. Joist hangers and end closures.
10. Hole reinforcing plates.
11. Backer plates.

2.5 ANCHORS, CLIPS, AND FASTENERS

A. Steel Shapes and Clips: ASTM A 36/A 36M, zinc coated by hot-dip process according to ASTM A 123/A 123M.

B. Anchor Bolts: ASTM F 1554, Grade 36, threaded carbon-steel hex-headed bolts and carbon-steel nuts; and flat, hardened-steel washers; zinc coated by hot-dip process according to ASTM A 153/A 153M, Class C.

C. Expansion Anchors: Fabricated from corrosion-resistant materials, with capability to sustain, without failure, a load equal to 5 times design load, as determined by testing per ASTM E 488 conducted by a qualified independent testing agency.

D. Welding Electrodes: Comply with AWS standards.

2.6 MISCELLANEOUS MATERIALS

A. Galvanizing Repair Paint: SSPC-Paint 20 or DOD-P-21035.

B. Cement Grout: Portland cement, ASTM C 150, Type I; and clean, natural sand, ASTM C 404. Mix at ratio of 1 part cement to 2-1/2 parts sand, by volume, with minimum water required for placement and hydration.

C. Nonmetallic, Nonshrink Grout: Premixed, nonmetallic, noncorrosive, nonstaining grout containing selected silica sands, portland cement, shrinkage-compensating agents, and plasticizing and water-reducing agents, complying with ASTM C 1107, with fluid consistency and 30-minute working time.

D. Shims: Load bearing, high-density multimonomer plastic, nonleaching.

E. Sealer Gaskets: Closed-cell neoprene foam, 1/4 inch (6.4 mm) thick, selected from manufacturer's standard widths to match width of bottom track or rim track members.

2.7 FABRICATION

A. Fabricate cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened, according to referenced AISI's specifications and standards, manufacturer's written instructions, and requirements in this Section.

1. Fabricate framing assemblies using jigs or templates.
2. Cut framing members by sawing or shearing; do not torch cut.
3. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting as standard with fabricator. Wire tying of framing members is not permitted.

   a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
   b. Locate mechanical fasteners and install according to Shop Drawings, with screw penetrating joined members by not less than three exposed screw threads.

4. Fasten other materials to cold-formed metal framing by welding, bolting, or screw fastening, according to Shop Drawings.

B. Reinforce, stiffen, and brace framing assemblies to withstand handling, delivery, and erection stresses. Lift fabricated assemblies to prevent damage or permanent distortion.

C. Fabrication Tolerances: Fabricate assemblies level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

1. Spacing: Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.
2. Squareness: Fabricate each cold-formed metal framing assembly to a maximum out-of-square tolerance of 1/8 inch (3 mm).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine supporting substrates and abutting structural framing for compliance with requirements for installation tolerances and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Install load bearing shims or grout between the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations to ensure a uniform bearing surface on supporting concrete or masonry construction.

B. Install sealer gaskets to isolate the underside of wall bottom track or rim track and the top of foundation wall or slab at stud or joist locations.

3.3 INSTALLATION, GENERAL

A. Cold-formed metal framing may be shop or field fabricated for installation, or it may be field assembled.

B. Install cold-formed metal framing according to AISI's "Standard for Cold-Formed Steel Framing - General Provisions" and to manufacturer's written instructions unless more stringent requirements are indicated.

C. Install shop- or field-fabricated, cold-formed framing and securely anchor to supporting structure.

1. Screw, bolt, or weld wall panels at horizontal and vertical junctures to produce flush, even, true-to-line joints with maximum variation in plane and true position between fabricated panels not exceeding 1/16 inch (1.6 mm).

D. Install cold-formed metal framing and accessories plumb, square, and true to line, and with connections securely fastened.

1. Cut framing members by sawing or shearing; do not torch cut.
2. Fasten cold-formed metal framing members by welding, screw fastening, clinch fastening, or riveting. Wire tying of framing members is not permitted.

    a. Comply with AWS D1.3 requirements and procedures for welding, appearance and quality of welds, and methods used in correcting welding work.
    b. Locate mechanical fasteners and install according to Shop Drawings, and complying with requirements for spacing, edge distances, and screw penetration.

E. Install framing members in one-piece lengths unless splice connections are indicated for track or tension members.

F. Install temporary bracing and supports to secure framing and support loads comparable in intensity to those for which structure was designed. Maintain braces and supports in place, undisturbed, until entire integrated supporting structure has been completed and permanent connections to framing are secured.

G. Do not bridge building expansion and control joints with cold-formed metal framing. Independently frame both sides of joints.

H. Install insulation, specified in Division 07 Section "Thermal Insulation," in built-up exterior framing members, such as headers, sills, boxed joists, and multiple studs at openings, that are inaccessible on completion of framing work.

I. Fasten hole reinforcing plate over web penetrations that exceed size of manufacturer's standard punched openings.

J. Erection Tolerances: Install cold-formed metal framing level, plumb, and true to line to a maximum allowable tolerance variation of 1/8 inch in 10 feet (1:960) and as follows:

    1. Space individual framing members no more than plus or minus 1/8 inch (3 mm) from plan location. Cumulative error shall not exceed minimum fastening requirements of sheathing or other finishing materials.

3.4 EXTERIOR NON-LOAD-BEARING WALL INSTALLATION

A. Install continuous tracks sized to match studs. Align tracks accurately and securely anchor to supporting structure as indicated.

B. Fasten both flanges of studs to top and bottom track, unless otherwise indicated. Do not fasten studs to deflection track.

C. Space studs as follows: 16 inches (406 mm).

D. Set studs plumb, except as needed for diagonal bracing or required for nonplumb walls or warped surfaces and similar requirements.

E. Isolate non-load-bearing steel framing from building structure to prevent transfer of vertical loads while providing lateral support.

1. Install double deep-leg deflection tracks and anchor outer track to building structure.
2. Connect vertical deflection clips to bypassing studs and anchor to building structure.
3. Connect drift clips to cold formed metal framing and anchor to building structure.

F. Install horizontal bridging in wall studs, spaced in rows indicated on Shop Drawings but not more than 48 inches (1220 mm) apart. Fasten at each stud intersection.

1. Bridging: Combination of flat, taut, steel sheet straps of width and thickness indicated and stud-track solid blocking of width and thickness to match studs. Fasten flat straps to stud flanges and secure solid blocking to stud webs or flanges.
   a. Size: as per design, or minimum 1-1/2 by 0.0329 inch (38 by 0.84 mm)

G. Install miscellaneous framing and connections, including stud kickers, web stiffeners, clip angles, continuous angles, anchors, fasteners, and stud girts, to provide a complete and stable wall-framing system.

3.5 FIELD QUALITY CONTROL

A. Testing: Owner will engage a qualified independent testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Field and shop welds will be subject to testing and inspecting.

C. Testing agency will report test results promptly and in writing to Contractor and Architect.

D. Remove and replace work where test results indicate that it does not comply with specified requirements.

E. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.6 REPAIRS AND PROTECTION

A. Galvanizing Repairs: Prepare and repair damaged galvanized coatings on fabricated and installed cold-formed metal framing with galvanized repair paint according to ASTM A 780 and manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that cold-formed metal framing is without damage or deterioration at time of Substantial Completion.

END OF SECTION 054000

SECTION 055000 - METAL FABRICATIONS

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. Steel framing and supports for applications where framing and supports are not specified in other Sections.
2. Miscellaneous steel trim including steel angle corner guards.
3. Metal bollards.
4. Loose bearing and leveling plates for applications where they are not specified in other Sections.

B. Products furnished, but not installed, under this Section:

1. Loose steel lintels.
2. Anchor bolts, steel pipe sleeves, slotted-channel inserts, and wedge-type inserts indicated to be built into unit masonry.

1.3 PERFORMANCE REQUIREMENTS

A. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Nonslip aggregates and nonslip-aggregate surface finishes.
2. Metal nosings and treads.
3. Paint products.
4. Grout.

B. Shop Drawings: Show fabrication and installation details for metal fabrications.

1. Include plans, elevations, sections, and details of metal fabrications and their connections. Show anchorage and accessory items.

C. Samples for Verification: For each type and finish of extruded nosing and tread.

1.5 INFORMATIONAL SUBMITTALS

A. Mill Certificates: Signed by manufacturers of stainless-steel certifying that products furnished comply with requirements.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Welding Qualifications: Qualify procedures and personnel according to the following:

1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
2. AWS D1.6, "Structural Welding Code - Stainless Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages and steel weld plates and angles for casting into concrete. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For metal fabrications exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Stainless-Steel Sheet, Strip, and Plate: ASTM A 240/A 240M or ASTM A 666, Type 304 .

D. Stainless-Steel Bars and Shapes: ASTM A 276, Type 304.

E. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

F. Steel Tubing: ASTM A 500, cold-formed steel tubing.

G. Steel Pipe: ASTM A 53/A 53M, standard weight (Schedule 40) unless otherwise indicated.

H. Slotted Channel Framing: Cold-formed metal box channels (struts) complying with MFMA-4.

1. Size of Channels: 1-5/8 by 1-5/8 inches (41 by 41 mm).
2. Material: Galvanized steel, ASTM A 653/A 653M, commercial steel, Type B, with G90 (Z275) coating; 0.079-inch (2-mm) nominal thickness.
3. Material: Cold-rolled steel, ASTM A 1008/A 1008M, commercial steel, Type B; 0.0677-inch (1.7-mm) minimum thickness; hot-dip galvanized after fabrication.

I. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

2.3 NONFERROUS METALS

A. Aluminum Plate and Sheet: ASTM B 209 (ASTM B 209M), Alloy 6061-T6.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T6.

C. Aluminum-Alloy Rolled Tread Plate: ASTM B 632/B 632M, Alloy 6061-T6.

D. Aluminum Castings: ASTM B 26/B 26M, Alloy 443.0-F.

2.4 FASTENERS

A. General: Unless otherwise indicated, provide Type 304 stainless-steel fasteners for exterior use and zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, at exterior walls. Select fasteners for type, grade, and class required.

1. Provide stainless-steel fasteners for fastening aluminum.
2. Provide stainless-steel fasteners for fastening stainless steel.

B. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Steel Bolts and Nuts: Regular hexagon-head bolts, ASTM A 325, Type 3 (ASTM A 325M, Type 3); with hex nuts, ASTM A 563, Grade C3 (ASTM A 563M, Class 8S3); and, where indicated, flat washers.

D. Stainless-Steel Bolts and Nuts: Regular hexagon-head annealed stainless-steel bolts, ASTM F 593 (ASTM F 738M); with hex nuts, ASTM F 594 (ASTM F 836M); and, where indicated, flat washers; Alloy Group 1 (A1).

E. Eyebolts: ASTM A 489.

F. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

G. Lag Screws: ASME B18.2.1 (ASME B18.2.3.8M).

H. Wood Screws: Flat head, ASME B18.6.1.

I. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

J. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

K. Anchors, General: Anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

L. Cast-in-Place Anchors in Concrete: Either threaded type or wedge type unless otherwise indicated; galvanized ferrous castings, either ASTM A 47/A 47M malleable iron or ASTM A 27/A 27M cast steel. Provide bolts, washers, and shims as needed, all hot-dip galvanized per ASTM F 2329.

M. Post-Installed Anchors: Torque-controlled expansion anchors.

1. Material for Interior Locations: Carbon-steel components zinc plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.

2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.5 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Universal Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79 and compatible with topcoat.

1. Use primer containing pigments that make it easily distinguishable from zinc-rich primer.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Concrete: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa).

2.6 FABRICATION, GENERAL

A. Shop Assembly: Preassemble items in the shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Use connections that maintain structural value of joined pieces. Clearly mark units for reassembly and coordinated installation.

B. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

C. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

D. Form exposed work with accurate angles and surfaces and straight edges.

E. Weld corners and seams continuously to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

F. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners or welds where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) fasteners unless otherwise indicated. Locate joints where least conspicuous.

G. Fabricate seams and other connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

H. Cut, reinforce, drill, and tap metal fabrications as indicated to receive finish hardware, screws, and similar items.

I. Provide for anchorage of type indicated; coordinate with supporting structure. Space anchoring devices to secure metal fabrications rigidly in place and to support indicated loads.

1. Where units are indicated to be cast into concrete or built into masonry, equip with integrally welded steel strap anchors, 1/8 by 1-1/2 inches (3.2 by 38 mm), with a minimum 6-inch (150-mm) embedment and 2-inch (50-mm) hook, not less than 8 inches (200 mm) from ends and corners of units and 24 inches (600 mm) o.c., unless otherwise indicated.

2.7 MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Provide steel framing and supports not specified in other Sections as needed to complete the Work.

B. Fabricate units from steel shapes, plates, and bars of welded construction unless otherwise indicated. Fabricate to sizes, shapes, and profiles indicated and as necessary to receive adjacent construction.

1. Fabricate units from slotted channel framing where indicated.
2. Furnish inserts for units installed after concrete is placed.

C. Galvanize miscellaneous framing and supports where outside of weather barrier.

D. Prime miscellaneous framing and supports if not galvanized with zinc-rich primer.

2.8 SHELF ANGLES

A. Fabricate shelf angles from steel angles of sizes indicated and for attachment to concrete framing. Provide horizontally slotted holes to receive 3/4-inch (19-mm) bolts, spaced not more than 6 inches (150 mm) from ends and 24 inches (600 mm) o.c., unless otherwise indicated.

1. Provide mitered and welded units at corners.
2. Provide open joints in shelf angles at expansion and control joints. Make open joint approximately 2 inches (50 mm) larger than expansion or control joint.

B. For cavity walls, provide vertical channel brackets to support angles from backup masonry and concrete.

C. Galvanize shelf angles located in exterior walls.

D. Furnish wedge-type concrete inserts, complete with fasteners, to attach shelf angles to cast-in-place concrete.

2.9 MISCELLANEOUS STEEL TRIM

A. Unless otherwise indicated, fabricate units from steel shapes, plates, and bars of profiles shown with continuously welded joints and smooth exposed edges. Miter corners and use concealed field splices where possible.

B. Provide cutouts, fittings, and anchorages as needed to coordinate assembly and installation with other work.

1. Provide with integrally welded steel strap anchors for embedding in concrete or masonry construction.

C. Galvanize exterior miscellaneous steel trim.

D. Prime miscellaneous steel trim with zinc-rich primer.

2.10 METAL BOLLARDS

A. Fabricate metal bollards from Schedule 80 steel pipe.

1. Where bollards are indicated to receive controls for door operators, provide necessary cutouts for controls and holes for wire.

B. Fabricate sleeves for bollard anchorage from steel pipe with 1/4-inch- (6.4-mm-) thick steel plate welded to bottom of sleeve. Make sleeves not less than 8 inches (200 mm) deep and 3/4 inch (19 mm) larger than OD of bollard.

C. Prime bollards with zinc-rich primer.

2.11 LOOSE BEARING AND LEVELING PLATES

A. Provide loose bearing and leveling plates for steel items bearing on masonry or concrete construction. Drill plates to receive anchor bolts and for grouting.

B. Galvanize plates.

2.12 LOOSE STEEL LINTELS

A. Fabricate loose steel lintels from steel angles and shapes of size indicated for openings and recesses in masonry walls and partitions at locations indicated. Fabricate in single lengths for each opening unless otherwise indicated. Weld adjoining members together to form a single unit where indicated.

B. Size loose lintels to provide bearing length at each side of openings equal to 1/12 of clear span but not less than 8 inches (200 mm) unless otherwise indicated.

C. Galvanize loose steel lintels located in exterior walls.

D. Prime loose steel lintels located in interior walls with zinc-rich primer.

2.13 STEEL WELD PLATES AND ANGLES

A. Provide steel weld plates and angles not specified in other Sections, for items supported from concrete construction as needed to complete the Work. Provide each unit with no fewer than two integrally welded steel strap anchors for embedding in concrete.

2.14 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal fabrications after assembly.

C. Finish exposed surfaces to remove tool and die marks and stretch lines, and to blend into surrounding surface.

2.15 STEEL AND IRON FINISHES

A. Galvanizing: Hot-dip galvanize items as indicated to comply with ASTM A 153/A 153M for steel and iron hardware and with ASTM A 123/A 123M for other steel and iron products.

1. Do not quench or apply post galvanizing treatments that might interfere with paint adhesion.

B. Shop prime iron and steel items not indicated to be galvanized unless they are to be embedded in concrete or masonry, or unless otherwise indicated.

1. Shop prime with universal shop primer unless zinc-rich primer is indicated.

C. Preparation for Shop Priming: Prepare surfaces to comply with requirements indicated below:

1. Exterior Items: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Items Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Items Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Items: SSPC-SP 3, "Power Tool Cleaning."

D. Shop Priming: Apply shop primer to comply with SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting.

1. Stripe paint corners, crevices, bolts, welds, and sharp edges.

2.16 ALUMINUM FINISHES

A. Finish designations prefixed by AA comply with the system established by the Aluminum Association for designating aluminum finishes.

B. As-Fabricated Finish: AA-M10 (Mechanical Finish: as fabricated, unspecified).

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal fabrications. Set metal fabrications accurately in location, alignment, and elevation; with edges and surfaces level, plumb, true, and free of rack; and measured from established lines and levels.

B. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

C. Field Welding: Comply with the following requirements:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.

4. At exposed connections, finish exposed welds and surfaces smooth and blended so no roughness shows after finishing and contour of welded surface matches that of adjacent surface.

D. Fastening to In-Place Construction: Provide anchorage devices and fasteners where metal fabrications are required to be fastened to in-place construction. Provide threaded fasteners for use with concrete and masonry inserts, toggle bolts, through bolts, lag screws, wood screws, and other connectors.

E. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

F. Corrosion Protection: Coat concealed surfaces of aluminum that will come into contact with grout, concrete, masonry, wood, or dissimilar metals with the following:

1. Cast Aluminum: Heavy coat of bituminous paint.
2. Extruded Aluminum: Two coats of clear lacquer.

3.2 INSTALLING MISCELLANEOUS FRAMING AND SUPPORTS

A. General: Install framing and supports to comply with requirements of items being supported, including manufacturers' written instructions and requirements indicated on Shop Drawings.

3.3 INSTALLING METAL BOLLARDS

A. Anchor bollards in concrete with pipe sleeves preset and anchored into concrete. Fill annular space around bollard solidly with nonshrink, nonmetallic grout; mixed and placed to comply with grout manufacturer's written instructions. Slope grout up approximately 1/8 inch (3 mm) toward bollard.

B. Fill bollards solidly with concrete, mounding top surface to shed water.

3.4 INSTALLING BANNER RINGS

A. Anchor banner rings in concrete with epoxy filled concrete holes. Fill annular space around bolt shaft solidly with non-shrink, nonmetallic epoxy; mixed and placed to comply with epoxy manufacturer's written instructions. Holes shall be approximately 1" from street face of concrete beams & columns.

3.5 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas. Paint uncoated and abraded areas with the same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

B. Touchup Painting: Clean and touchup paint of field welds, bolted connections, and abraded areas of shop paint.

C. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

END OF SECTION 055000

SECTION 055100 - METAL STAIRS

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. Preassembled steel stairs with concrete-filled treads.

1.3 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design metal stairs, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Structural Performance of Stairs: Metal stairs shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated.

1. Uniform Load: 100 lbf/sq. ft. (4.79 kN/sq. m).
2. Concentrated Load: 300 lbf (1.33 kN) applied on an area of 4 sq. in. (2580 sq. mm).
3. Uniform and concentrated loads need not be assumed to act concurrently.
4. Stair Framing: Capable of withstanding stresses resulting from railing loads in addition to loads specified above.
5. Limit deflection of treads, platforms, and framing members to L/240 or 1/4 inch (6.4 mm), whichever is less.

C. Seismic Performance: Metal stairs shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. Component Importance Factor is 1.5.

1.4 ACTION SUBMITTALS

A. Product Data: For metal stairs and the following:

1. Prefilled metal-pan stair treads.
2. Abrasive nosings.
3. Paint products.
4. Grout.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: For the following products, in manufacturer's standard sizes:

1. Abrasive nosings.

D. Delegated-Design Submittal: For installed products indicated to comply with performance requirements and design criteria, including analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified professional engineer.

B. Welding certificates.

C. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. NAAMM Stair Standard: Comply with "Recommended Voluntary Minimum Standards for Fixed Metal Stairs" in NAAMM AMP 510, "Metal Stairs Manual," for class of stair designated, unless more stringent requirements are indicated.

1. Preassembled Stairs: Commercial class.

C. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 COORDINATION

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for metal stairs. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Coordinate locations of hanger rods and struts with other work so that they will not encroach on required stair width and will be within the fire-resistance-rated stair enclosure.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth, flat surfaces unless otherwise indicated. For components exposed to view in the completed Work, provide materials without seam marks, roller marks, rolled trade names, or blemishes.

2.2 FERROUS METALS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

C. Steel Tubing: ASTM A 500 (cold formed) or ASTM A 513.

D. Rolled-Steel Floor Plate: ASTM A 786/A 786M, rolled from plate complying with ASTM A 36/A 36M or ASTM A 283/A 283M, Grade C or D.

E. Steel Bars for Grating Treads: ASTM A 36/A 36M or steel strip, ASTM A 1011/A 1011M or ASTM A 1018/A 1018M.

F. Wire Rod for Grating Crossbars: ASTM A 510 (ASTM A 510M).

G. Cast Iron: Either gray iron, ASTM A 48/A 48M, or malleable iron, ASTM A 47/A 47M, unless otherwise indicated.

H. Uncoated, Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, either commercial steel, Type B, or structural steel, Grade 30 (Grade 205), unless another grade is required by design loads.

I. Provide anchors for embedding units in concrete, either integral or applied to units, as standard with manufacturer.

J. Apply bituminous paint to concealed surfaces of cast-metal units set into concrete.

K. Apply clear lacquer to concealed surfaces of extruded units set into concrete.

2.3 FASTENERS

A. General: Provide zinc-plated fasteners with coating complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 12 for exterior use, and Class Fe/Zn 5 where built into exterior walls. Select fasteners for type, grade, and class required.

B. Bolts and Nuts: Regular hexagon-head bolts, ASTM A 307, Grade A (ASTM F 568M, Property Class 4.6); with hex nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

C. Anchor Bolts: ASTM F 1554, Grade 36, of dimensions indicated; with nuts, ASTM A 563 (ASTM A 563M); and, where indicated, flat washers.

D. Machine Screws: ASME B18.6.3 (ASME B18.6.7M).

E. Plain Washers: Round, ASME B18.22.1 (ASME B18.22M).

F. Lock Washers: Helical, spring type, ASME B18.21.1 (ASME B18.21.2M).

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Shop Primers: Provide primers that comply with Section 099123 "Interior Painting".

D. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

E. Concrete Materials and Properties: Comply with requirements in Section 033000 "Cast-in-Place Concrete" for normal-weight, air-entrained, ready-mix concrete with a minimum 28-day compressive strength of 3000 psi (20 MPa) unless otherwise indicated.

2.5 FABRICATION, GENERAL

A. Provide complete stair assemblies, including metal framing, hangers, struts,[railings,] clips, brackets, bearing plates, and other components necessary to support and anchor stairs and platforms on supporting structure.

1. Join components by welding unless otherwise indicated.
2. Use connections that maintain structural value of joined pieces.

B. Preassembled Stairs: Assemble stairs in shop to greatest extent possible. Disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form bent-metal corners to smallest radius possible without causing grain separation or otherwise impairing work.

E. Form exposed work with accurate angles and surfaces and straight edges.

F. Weld connections to comply with the following:

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove welding flux immediately.
4. Weld exposed corners and seams continuously unless otherwise indicated.
5. At exposed connections, finish exposed welds to comply with NOMMA's "Voluntary Joint Finish Standards" for Type 2 welds: completely sanded joint, some undercutting and pinholes okay.

G. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners where possible. Where exposed fasteners are required, use Phillips flat-head (countersunk) screws or bolts unless otherwise indicated. Locate joints where least conspicuous.

H. Fabricate joints that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

I. Fillers: Provide fillers made from steel plate, or other suitably crush-resistant material, where needed to transfer wall bracket loads through wall finishes to structural supports. Size fillers to suit wall finish thicknesses and to produce adequate bearing area to prevent bracket rotation and overstressing of substrate.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Finish metal stairs after assembly.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Fastening to In-Place Construction: Provide anchorage devices and fasteners where necessary for securing metal stairs to in-place construction. Include threaded fasteners for concrete and masonry inserts, through-bolts, lag bolts, and other connectors.

B. Cutting, Fitting, and Placement: Perform cutting, drilling, and fitting required for installing metal stairs. Set units accurately in location, alignment, and elevation, measured from established lines and levels and free of rack.

C. Install metal stairs by welding stair framing to steel structure unless otherwise indicated.

D. Provide temporary bracing or anchors in formwork for items that are to be built into concrete, masonry, or similar construction.

E. Fit exposed connections accurately together to form hairline joints. Weld connections that are not to be left as exposed joints but cannot be shop welded because of shipping size limitations. Do not weld, cut, or abrade surfaces of exterior units that have been hot-dip galvanized after fabrication and are for bolted or screwed field connections.

F. Field Welding: Comply with requirements for welding in "Fabrication, General" Article.

G. Place and finish concrete fill for treads and platforms to comply with Section 033000 "Cast-in-Place Concrete."

3.2 ADJUSTING AND CLEANING

A. Touchup Painting: Immediately after erection, clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with same material as used for shop painting to comply with SSPC-PA 1 for touching up shop-painted surfaces.

1. Apply by brush or spray to provide a minimum 2.0-mil (0.05-mm) dry film thickness.

END OF SECTION 055100

SECTION 055213 - PIPE AND TUBE RAILINGS

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. Steel pipe and tube railings.

1.3 PERFORMANCE REQUIREMENTS

A. General: In engineering railings to withstand structural loads indicated, determine allowable design working stresses of railing materials based on the following:

1. Steel: 72 percent of minimum yield strength.

B. Structural Performance: Railings shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated:

1. Handrails and Top Rails of Guards:

a. Uniform load of 50 lbf/ ft. (0.73 kN/m) applied in any direction.
b. Concentrated load of 200 lbf (0.89 kN) applied in any direction.
c. Uniform and concentrated loads need not be assumed to act concurrently.

2. Infill of Guards:

a. Concentrated load of 50 lbf (0.22 kN) applied horizontally on an area of 1 sq. ft. (0.093 sq. m).
b. Infill load and other loads need not be assumed to act concurrently.

C. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes acting on exterior metal fabrications by preventing buckling, opening of joints, overstressing of components, failure of connections, and other detrimental effects.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

D. Control of Corrosion: Prevent galvanic action and other forms of corrosion by insulating metals and other materials from direct contact with incompatible materials.

1.4 ACTION SUBMITTALS

A. Product Data: For the following:

1. Manufacturer's product lines of mechanically connected railings.
2. Railing brackets.
3. Grout, anchoring cement, and paint products.

B. Shop Drawings: Include plans, elevations, sections, details, and attachments to other work.

C. Samples for Verification: For each type of exposed finish required.

1. Fittings and brackets.

1.5 INFORMATIONAL SUBMITTALS

A. Welding certificates.

B. Paint Compatibility Certificates: From manufacturers of topcoats applied over shop primers certifying that shop primers are compatible with topcoats.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each type of railing from single source from single manufacturer.

B. Welding Qualifications: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.

1.8 COORDINATION AND SCHEDULING

A. Coordinate selection of shop primers with topcoats to be applied over them. Comply with paint and coating manufacturers' written recommendations to ensure that shop primers and topcoats are compatible with one another.

B. Coordinate installation of anchorages for railings. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors, that are to be embedded in concrete or masonry. Deliver such items to Project site in time for installation.

C. Schedule installation so wall attachments are made only to completed walls. Do not support railings temporarily by any means that do not satisfy structural performance requirements.

PART 2 - PRODUCTS

2.1 METALS, GENERAL

A. Metal Surfaces, General: Provide materials with smooth surfaces, without seam marks, roller marks, rolled trade names, stains, discolorations, or blemishes.

B. Brackets, Flanges, and Anchors: Cast or formed metal of same type of material and finish as supported rails unless otherwise indicated.

2.2 STEEL AND IRON

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Tubing: ASTM A 500 (cold formed).

1. Provide galvanized finish for exterior installations and where indicated.

C. Plates, Shapes, and Bars: ASTM A 36/A 36M.

2.3 FASTENERS

A. General: Provide the following:

1. Ungalvanized-Steel Railings: Plated steel fasteners complying with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5 for zinc coating.
2. Hot-Dip Galvanized Railings: Type 304 stainless-steel or hot-dip zinc-coated steel fasteners complying with ASTM A 153/A 153M or ASTM F 2329 for zinc coating.

B. Fasteners for Anchoring Railings to Other Construction: Select fasteners of type, grade, and class required to produce connections suitable for anchoring railings to other types of construction indicated and capable of withstanding design loads.

C. Fasteners for Interconnecting Railing Components:

1. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless otherwise indicated.
2. Provide concealed fasteners for interconnecting railing components and for attaching them to other work, unless exposed fasteners are unavoidable or are the standard fastening method for railings indicated.
3. Provide tamper-resistant flat-head machine screws for exposed fasteners unless otherwise indicated.

D. Post-Installed Anchors: Torque-controlled expansion anchors capable of sustaining, without failure, a load equal to six times the load imposed when installed in unit masonry and four times

the load imposed when installed in concrete, as determined by testing according to ASTM E 488, conducted by a qualified independent testing agency.

1. Material for Interior Locations: Carbon-steel components zinc-plated to comply with ASTM B 633 or ASTM F 1941 (ASTM F 1941M), Class Fe/Zn 5, unless otherwise indicated.
2. Material for Exterior Locations and Where Stainless Steel is Indicated: Alloy Group 1 (A1) stainless-steel bolts, ASTM F 593 (ASTM F 738M), and nuts, ASTM F 594 (ASTM F 836M).

2.4 MISCELLANEOUS MATERIALS

A. Welding Rods and Bare Electrodes: Select according to AWS specifications for metal alloy welded.

B. Low-Emitting Materials: Paints and coatings shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Etching Cleaner for Galvanized Metal: Complying with MPI#25.

D. Galvanizing Repair Paint: High-zinc-dust-content paint complying with SSPC-Paint 20 and compatible with paints specified to be used over it.

E. Shop Primers: Provide primers that comply with Section 099113 "Exterior Painting" and Section 099123 "Interior Painting."

F. Nonshrink, Nonmetallic Grout: Factory-packaged, nonstaining, noncorrosive, nongaseous grout complying with ASTM C 1107. Provide grout specifically recommended by manufacturer for interior and exterior applications.

G. Anchoring Cement: Factory-packaged, nonshrink, nonstaining, hydraulic-controlled expansion cement formulation for mixing with water at Project site to create pourable anchoring, patching, and grouting compound.

1. Water-Resistant Product: At exterior locations provide formulation that is resistant to erosion from water exposure without needing protection by a sealer or waterproof coating and that is recommended by manufacturer for exterior use.

2.5 FABRICATION

A. General: Fabricate railings to comply with requirements indicated for design, dimensions, member sizes and spacing, details, finish, and anchorage, but not less than that required to support structural loads.

B. Assemble railings in the shop to greatest extent possible to minimize field splicing and assembly. Disassemble units only as necessary for shipping and handling limitations. Clearly

mark units for reassembly and coordinated installation. Use connections that maintain structural value of joined pieces.

C. Cut, drill, and punch metals cleanly and accurately. Remove burrs and ease edges to a radius of approximately 1/32 inch (1 mm) unless otherwise indicated. Remove sharp or rough areas on exposed surfaces.

D. Form work true to line and level with accurate angles and surfaces.

E. Fabricate connections that will be exposed to weather in a manner to exclude water. Provide weep holes where water may accumulate.

F. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.

G. Connections: Fabricate railings with welded connections unless otherwise indicated.

H. Welded Connections: Cope components at connections to provide close fit, or use fittings designed for this purpose. Weld all around at connections, including at fittings.

1. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals.
2. Obtain fusion without undercut or overlap.
3. Remove flux immediately.
4. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.

I. Form changes in direction as follows:

1. By bending or by inserting prefabricated elbow fittings.

J. Bend members in jigs to produce uniform curvature for each configuration required; maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.

K. Close exposed ends of railing members with prefabricated end fittings.

L. Provide wall returns at ends of wall-mounted handrails unless otherwise indicated. Close ends of returns unless clearance between end of rail and wall is 1/4 inch (6 mm) or less.

M. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.

N. Provide inserts and other anchorage devices for connecting railings to concrete or masonry work. Fabricate anchorage devices capable of withstanding loads imposed by railings. Coordinate anchorage devices with supporting structure.

O. For railing posts set in concrete, provide stainless-steel sleeves not less than 6 inches (150 mm) long with inside dimensions not less than 1/2 inch (13 mm) greater than outside dimensions of post, with metal plate forming bottom closure.

2.6 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Provide exposed fasteners with finish matching appearance, including color and texture, of railings.

2.7 STEEL AND IRON FINISHES

A. Galvanized Railings:

1. Hot-dip galvanize exterior steel and iron railings, including hardware, after fabrication.
2. Comply with ASTM A 123/A 123M for hot-dip galvanized railings.
3. Fill vent and drain holes that will be exposed in the finished Work, unless indicated to remain as weep holes, by plugging with zinc solder and filing off smooth.

B. For galvanized railings, provide hot-dip galvanized fittings, brackets, fasteners, sleeves, and other ferrous components.

C. For nongalvanized steel railings, provide nongalvanized ferrous-metal fittings, brackets, fasteners, and sleeves, except galvanize anchors to be embedded in exterior concrete or masonry.

D. Preparation for Shop Priming: Prepare uncoated ferrous-metal surfaces to comply with requirements indicated below:

1. Exterior Railings: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
2. Railings Indicated to Receive Zinc-Rich Primer: SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
3. Railings Indicated to Receive Primers Specified in Section 099600 "High-Performance Coatings": SSPC-SP 6/NACE No. 3, "Commercial Blast Cleaning."
4. Other Railings: SSPC-SP 3, "Power Tool Cleaning."

E. Primer Application: Apply shop primer to prepared surfaces of railings unless otherwise indicated. Comply with requirements in SSPC-PA 1, "Paint Application Specification No. 1: Shop, Field, and Maintenance Painting of Steel," for shop painting. Primer need not be applied to surfaces to be embedded in concrete or masonry.

1. Shop prime uncoated railings with primers specified in Section 099113 "Exterior Painting" and Section 099123 "Interior Painting" unless indicated.
2. Do not apply primer to galvanized surfaces.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine attachment surfaces, where reinforced to receive anchors, to verify that locations of concealed reinforcements have been clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

A. Fit exposed connections together to form tight, hairline joints.

B. Perform cutting, drilling, and fitting required for installing railings. Set railings accurately in location, alignment, and elevation; measured from established lines and levels and free of rack.

1. Do not weld, cut, or abrade surfaces of railing components that have been coated or finished after fabrication and that are intended for field connection by mechanical or other means without further cutting or fitting.
2. Set posts plumb within a tolerance of 1/16 inch in 3 feet (2 mm in 1 m).
3. Align rails so variations from level for horizontal members and variations from parallel with rake of steps and ramps for sloping members do not exceed 1/4 inch in 12 feet (5 mm in 3 m).

C. Corrosion Protection: Coat concealed surfaces of aluminum that will be in contact with grout, concrete, masonry, wood, or dissimilar metals, with a heavy coat of bituminous paint.

D. Adjust railings before anchoring to ensure matching alignment at abutting joints.

E. Fastening to In-Place Construction: Use anchorage devices and fasteners where necessary for securing railings and for properly transferring loads to in-place construction.

3.3 RAILING CONNECTIONS

A. Welded Connections: Use fully welded joints for permanently connecting railing components. Comply with requirements for welded connections in "Fabrication" Article whether welding is performed in the shop or in the field.

B. Expansion Joints: Install expansion joints at locations indicated but not farther apart than required to accommodate thermal movement. Provide slip-joint internal sleeve extending 2 inches (50 mm) beyond joint on either side, fasten internal sleeve securely to one side, and locate joint within 6 inches (150 mm) of post.

3.4 ANCHORING POSTS

A. Form or core-drill holes not less than 5 inches (125 mm) deep and 3/4 inch (20 mm) larger than OD of post for installing posts in concrete. Clean holes of loose material, insert posts, and fill annular space between post and concrete with nonshrink, nonmetallic grout, mixed and placed to comply with anchoring material manufacturer's written instructions.

B. Leave anchorage joint exposed with 1/8-inch (3-mm) buildup, sloped away from post.

C. Anchor posts to metal surfaces with oval flanges, angle type, or floor type as required by conditions, connected to posts and to metal supporting members as follows:

1. For steel pipe railings, weld flanges to post and bolt to metal supporting surfaces.

3.5 ATTACHING RAILINGS

A. Attach railings to wall with wall brackets. Provide brackets with 1-1/2-inch (38-mm) clearance from inside face of handrail and finished wall surface. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

1. Use type of bracket with flange tapped for concealed anchorage to threaded hanger bolt.
2. Locate brackets as indicated or, if not indicated, at spacing required to support structural loads.

B. Secure wall brackets to building construction as follows:

1. For concrete and solid masonry anchorage, use drilled-in expansion shields and hanger or lag bolts.
2. For hollow masonry anchorage, use toggle bolts.
3. For wood stud partitions, use hanger or lag bolts set into studs or wood backing between studs. Coordinate with carpentry work to locate backing members.
4. For steel-framed partitions, use self-tapping screws fastened to steel framing or to concealed steel reinforcements.

3.6 ADJUSTING AND CLEANING

A. Galvanized Surfaces: Clean field welds, bolted connections, and abraded areas and repair galvanizing to comply with ASTM A 780.

3.7 PROTECTION

A. Protect finishes of railings from damage during construction period with temporary protective coverings approved by railing manufacturer. Remove protective coverings at time of Substantial Completion.

END OF SECTION 055213

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. Wood blocking and nailers.
2. Wood furring.
3. Utility shelving.
4. Laminated Veneer Lumber for blocking.
5. Plywood backing panels.

1.3 DEFINITIONS

A. Dimension Lumber: Lumber of 2 inches nominal (38 mm actual) or greater but less than 5 inches nominal (114 mm actual) 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 ACTION 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.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For the following, from ICC-ES:

1. Preservative-treated wood.

1.6 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber flat with spacers beneath and between each bundle to provide air circulation. Protect lumber from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WOOD PRODUCTS, GENERAL

A. Certified Wood: Lumber and plywood shall be 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."

B. 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.

C. Maximum Moisture Content of Lumber: 15 percent for 2-inch nominal (38-mm actual) thickness or less, 19 percent for more than 2-inch nominal (38-mm actual) thickness unless otherwise indicated.

2.2 WOOD-PRESERVATIVE-TREATED MATERIALS

A. Preservative Treatment by Pressure Process: AWPA U1; Use Category UC2 for interior construction not in contact with the ground, Use Category UC3b for exterior construction not in contact with the ground, and Use Category UC4a for items in contact with the ground.

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, furring, stripping, and similar concealed members in contact with masonry or concrete.
3. 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.
5. Furring.
6. Grounds.
7. Utility shelving.

B. For items of dimension lumber size, provide Construction or No. 2 grade lumber of any species.

C. For utility shelving, provide lumber with 15 percent maximum moisture content and any of the following species and grades:

1. Eastern white pine, Idaho white, lodgepole, ponderosa, or sugar pine; Premium or No. 2 Common (Sterling) grade; NeLMA, NLGA, WCLIB, or WWPA.
2. Mixed southern pine, No. 2 grade; SPIB.
3. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
4. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.

D. For concealed boards, provide lumber with 19 percent maximum moisture content and any of the following species and grades:

1. Mixed southern pine, No. 2grade; SPIB.
2. Hem-fir or hem-fir (north), Construction or No. 2 Common grade; NLGA, WCLIB, or WWPA.
3. Spruce-pine-fir (south) or spruce-pine-fir, Construction or No. 2 Common grade; NeLMA, NLGA, WCLIB, or WWPA.
4. Eastern softwoods, No. 2 Common grade; NELMA.
5. Northern species, No. 2 Common grade; NLGA.
6. Western woods, Construction or No. 2 Common grade; WCLIB or WWPA.

E. For blocking not used for attachment of other construction, Utility, Stud, or No. 3 grade lumber of any species may be used provided that it is cut and selected to eliminate defects that will interfere with its attachment and purpose.

F. 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.

G. For furring strips for installing plywood or hardboard paneling, select boards with no knots capable of producing bent-over nails and damage to paneling.

2.4 PLYWOOD BACKING PANELS

A. Equipment Backing Panels: DOC PS 1, Exterior, C-C Plugged in thickness not less than 3/4-inch (19-mm) nominal thickness.

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, or in area of high relative humidity, provide fasteners[with hot-dip zinc coating complying with ASTM A 153/A 153M] [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 Metal Framing: ASTM C 1002 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: 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).

2.6 MISCELLANEOUS MATERIALS

A. Flexible Flashing: Composite, self-adhesive, flashing product consisting of a pliable, butyl rubber or rubberized-asphalt compound, bonded to a high-density polyethylene film, aluminum foil, or spunbonded polyolefin to produce an overall thickness of not less than 0.025 inch (0.6 mm).

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 furring, 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. Install plywood backing panels by fastening to studs; coordinate locations with utilities requiring backing panels.

D. Metal Framing Anchors: Install metal framing anchors to comply with manufacturer's written instructions. Install fasteners through each fastener hole.

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 (406 mm) 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. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.

I. 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.

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 WOOD FURRING INSTALLATION

A. Install level and plumb with closure strips at edges and openings. Shim with wood as required for tolerance of finish work.

3.4 PROTECTION

A. Protect wood that has been treated with inorganic boron (SBX) from weather. If, despite protection, inorganic boron-treated wood becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

B. Protect miscellaneous rough carpentry from weather. If, despite protection, miscellaneous rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION 061053

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. Wall sheathing.
2. Sheathing joint and penetration treatment.

1.3 ACTION 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 plywood complies with requirements. Indicate type of preservative used and net amount of preservative retained.
2. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated plywood complies with requirements. Include physical properties of treated materials.
3. For fire-retardant treatments, include physical properties of treated plywood both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5516.
4. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced to levels specified before shipment to Project site.
5. Include copies of warranties from chemical treatment manufacturers for each type of treatment.

1.4 INFORMATIONAL SUBMITTALS

1.5 QUALITY ASSURANCE

A. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 WALL SHEATHING

A. Glass-Mat Gypsum Wall Sheathing: ASTM C 1177/1177M.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Corporation; GlasRoc.
b. G-P Gypsum Corporation; Dens-Glass Gold.
c. National Gypsum Company; Gold Bond e(2)XP.
d. Temple-Inland Inc.; GreenGlass
e. United States Gypsum Co.; Securock.

2. Type and Thickness: Regular, 1/2 inch (13 mm) thick.
3. Size: minimum size 48 by 96 inches (1219 by 2438 mm) for vertical installation.

2.2 FASTENERS

A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.

1. For wall sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A 153M.

B. Power-Driven Fasteners: NES NER-272.

C. Wood Screws: ASME B18.6.1.

D. Screws for Fastening Gypsum Sheathing to Cold-Formed Metal Framing: Steel drill screws, in length recommended by sheathing manufacturer for thickness of sheathing to be attached, with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.

1. For steel framing from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick, use screws that comply with ASTM C 954.

2.3 SHEATHING JOINT-AND-PENETRATION TREATMENT MATERIALS

A. Sealant for Glass-Mat Gypsum Sheathing: Silicone emulsion sealant complying with ASTM C 834, compatible with sheathing tape and sheathing and recommended by tape and sheathing manufacturers for use with glass-fiber sheathing tape and for covering exposed fasteners.

1. Sheathing Tape: Self-adhering glass-fiber tape, minimum 2 inches (50 mm) wide, 10 by 10 or 10 by 20 threads/inch (390 by 390 or 390 by 780 threads/m), of type recommended by sheathing and tape manufacturers for use with silicone emulsion sealant in sealing joints in glass-mat gypsum sheathing and with a history of successful in-service use.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Do not use materials with defects that impair quality of sheathing or pieces that are too small to use with minimum number of joints or optimum joint arrangement. Arrange joints so that pieces do not span between fewer than three support members.

B. Cut panels at penetrations, edges, and other obstructions of work; fit tightly against abutting construction unless otherwise indicated.

C. Securely attach to substrate by fastening as indicated, complying with the following:

1. NES NER-272 for power-driven fasteners.
2. Table 2304.9.1, "Fastening Schedule," in ICC's "International Building Code."

D. Coordinate wall sheathing installation with flashing and joint-sealant installation so these materials are installed in sequence and manner that prevent exterior moisture from passing through completed assembly.

E. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.

F. Coordinate sheathing installation with installation of materials installed over sheathing so sheathing is not exposed to precipitation or left exposed at end of the workday when rain is forecast.

3.2 GYPSUM SHEATHING INSTALLATION

A. Comply with GA-253 and with manufacturer's written instructions.

1. Fasten gypsum sheathing to cold-formed metal framing with screws.
2. Install boards with a 3/8-inch (9.5-mm) gap where non-load-bearing construction abuts structural elements.

3. Install boards with a 1/4-inch (6.4-mm) gap where they abut masonry or similar materials that might retain moisture, to prevent wicking.

B. Apply fasteners so heads bear tightly against face of sheathing, but do not cut into facing.

C. Horizontal Installation: Install sheathing with V-grooved edge down and tongue edge up. Interlock tongue with groove to bring long edges in contact with edges of adjacent boards without forcing. Abut ends of boards over centers of studs, and stagger end joints of adjacent boards not less than one stud spacing. Attach boards at perimeter and within field of board to each steel stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.

D. Vertical Installation: Install board vertical edges centered over studs. Abut ends and edges of each board with those of adjacent boards. Attach boards at perimeter and within field of board to each stud.

1. Space fasteners approximately 8 inches (200 mm) o.c. and set back a minimum of 3/8 inch (9.5 mm) from edges and ends of boards.

END OF SECTION 061600

SECTION 062023 - INTERIOR FINISH 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. Section Includes:

1. Shelving and clothes rods.
2. Window surrounds and sills
3. Wall mounted coat hooks on maple board

1.3 DEFINITIONS

A. MDF: Medium-density fiberboard.

B. MDO: Plywood with a medium-density overlay on the face.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of process and factory-fabricated product. Indicate component materials, dimensions, profiles, textures, and colors 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. Include chemical-treatment manufacturer's written instructions for finishing treated material.
2. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.
3. For products receiving a waterborne treatment, include statement that moisture content of treated materials was reduced before shipment to Project site to levels specified.
4. Include copies of warranties from chemical-treatment manufacturers for each type of treatment.

B. Samples for Verification:

1. For each species and cut of lumber and panel products with non-factory-applied finish, with 1/2 of exposed surface finished, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.

2. For each finish system and color of lumber and panel products with factory-applied finish, 50 sq. in. (300 sq. cm) for lumber and 8 by 10 inches (200 by 250 mm) for panels.

1.5 INFORMATIONAL SUBMITTALS

A. Evaluation Reports: For fire-retardant-treated wood, from ICC-ES.

B. Sample Warranty: For manufacturer's warranty.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Stack lumber, plywood, and other panels flat with spacers between each bundle to provide air circulation. Protect materials from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

B. Deliver interior finish carpentry materials only when environmental conditions meet requirements specified for installation areas. If interior finish carpentry materials must be stored in other than installation areas, store only where environmental conditions meet requirements specified for installation areas.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install interior finish carpentry materials until building is enclosed and weatherproof, wet work in space is completed and nominally dry, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Do not install finish carpentry materials that are wet, moisture damaged, or mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 MATERIALS, GENERAL

A. Regional Materials: The following wood products shall be manufactured within 500 miles (800 km) of Project site from materials that have been extracted, harvested, or recovered, as well as manufactured, within 500 miles (800 km) of Project site.

1. Shelving .

B. Certified Wood: The following wood products shall be 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. Shelving

C. Low-Emitting Materials: Composite wood products shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

D. Lumber: DOC PS 20 and the following grading rules:

1. NeLMA: Northeastern Lumber Manufacturers' Association, "Standard Grading Rules for Northeastern Lumber."
2. NHLA: National Hardwood Lumber Association, "Rules for the Measurement and Inspection of Hardwood & Cypress."
3. NLGA: National Lumber Grades Authority, "Standard Grading Rules for Canadian Lumber."
4. SPIB: The Southern Pine Inspection Bureau, "Standard Grading Rules for Southern Pine Lumber."
5. WCLIB: West Coast Lumber Inspection Bureau, Standard No. 17, "Grading Rules for West Coast Lumber."
6. WWPA: Western Wood Products Association, "Western Lumber Grading Rules."

E. Factory mark each piece of lumber with grade stamp of inspection agency indicating grade, species, moisture content at time of surfacing, and mill.

1. For exposed lumber, mark grade stamp on end or back of each piece, or omit grade stamp and provide certificates of grade compliance issued by inspection agency.

F. Softwood Plywood: DOC PS 1.

G. Hardboard: AHA A135.4.

H. MDF: ANSI A208.2, made with binder containing no urea-formaldehyde resin.

2.2 INTERIOR TRIM

A. Hardwood Lumber Trim for Transparent Finish (Stain or Clear Finish):

1. Species and Grade: White maple; Clear; NHLA.
2. Maximum Moisture Content: 10 percent.
3. Finger Jointing: Not allowed.
4. Gluing for Width: Not allowed.
5. Veneered Material: Not allowed
6. Face Surface: Surfaced (smooth).
7. Matching: Selected for compatible grain and color.

2.3 SHELVING AND CLOTHES RODS

A. Exposed Closet Shelving: Made from the following material 3/4 inch (19 mm) thick.

1. MDF with solid-wood front edge.

B. Shelf Cleats: 3/4-by-3-1/2-inch (19-by-89-mm) boards with hole and notch to receive clothes rods, as specified above for hardwood lumber trim for transparent finish.

C. Clothes Rods: 1-5/16-inch- (33-mm-) diameter, chrome-plated-steel tubes.

D. Rod Flanges: Chrome-plated steel.

2.4 SOLID-SURFACE-MATERIAL WINDOW SILLS

A. Window sills: solid surface material and thckness to match existing third floor window sills.

B. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

2.5 COAT HOOKS

A. Exposed coat hooks mounted on wall mounted hard wood. Materials and finished to match existing on third floor.

2.6 MISCELLANEOUS MATERIALS

A. Fasteners for Interior Finish Carpentry: Nails, screws, and other anchoring devices of type, size, material, and finish required for application indicated to provide secure attachment, concealed where possible.

B. Low-Emitting Materials: Adhesives shall comply with the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

C. Paneling Adhesive: Comply with paneling manufacturer's written recommendations for adhesives.

1. Adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.7 FABRICATION

A. Back out or kerf backs of the following members except those with ends exposed in finished work:

1. Interior standing and running trim .

B. Ease edges of lumber less than 1 inch (25 mm) in nominal thickness to 1/16-inch (1.5-mm) radius and edges of lumber 1 inch (25 mm) or more in nominal thickness to 1/8-inch (3-mm) radius.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Examine finish carpentry materials before installation. Reject materials that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrates of projections and substances detrimental to application.

B. Before installing interior finish carpentry, condition materials to average prevailing humidity in installation areas for a minimum of 24 hours.

3.3 INSTALLATION, GENERAL

A. Do not use materials that are unsound, warped, improperly treated or finished, inadequately seasoned, too small to fabricate with proper jointing arrangements, or with defective surfaces, sizes, or patterns.

B. Install interior finish carpentry level, plumb, true, and aligned with adjacent materials. Use concealed shims where necessary for alignment.

1. Scribe and cut interior finish carpentry to fit adjoining work. Refinish and seal cuts as recommended by manufacturer.
2. Where face fastening is unavoidable, countersink fasteners, fill surface flush, and sand unless otherwise indicated.
3. Install to tolerance of 1/8 inch in 96 inches (3 mm in 2438 mm) for level and plumb. Install adjoining interior finish carpentry with 1/32-inch (0.8-mm) maximum offset for flush installation and 1/16-inch (1.5-mm) maximum offset for reveal installation.
4. Coordinate interior finish carpentry with materials and systems in or adjacent to it. Provide cutouts for mechanical and electrical items that penetrate interior finish carpentry.

3.4 SHELVING AND CLOTHES ROD INSTALLATION

A. Cut shelf cleats at ends of shelves about 1/2 inch (13 mm) less than width of shelves and sand exposed ends smooth.

B. Install shelf cleats by fastening to framing or backing with trim screws, set below face and filled Space fasteners not more than 16 inches (400 mm) o.c.

C. Cut shelves to neatly fit openings with only enough gap to allow shelves to be removed and reinstalled. Install shelves, fully seated on cleats, brackets, and supports.

1. Fasten shelves to cleats with finish nails or trim screws, set flush.
2. Fasten shelves to brackets to comply with bracket manufacturer's written instructions.

D. Install rod flanges for rods as indicated. Fasten to shelf cleats, framing members, blocking, or metal backing, or use toggle bolts or hollow wall anchors. Install rods in rod flanges.

3.5 ADJUSTING

A. Replace interior finish carpentry that is damaged or does not comply with requirements. Interior finish carpentry may be repaired or refinished if work complies with requirements and shows no evidence of repair or refinishing. Adjust joinery for uniform appearance.

3.6 CLEANING

A. Clean interior finish carpentry on exposed and semiexposed surfaces. Restore damaged or soiled areas and touch up factory-applied finishes, if any.

3.7 PROTECTION

A. Protect installed products from damage from weather and other causes during construction.

B. Remove and replace finish carpentry materials that are wet, moisture damaged, and mold damaged.

1. Indications that materials are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that materials are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 062023

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. Plastic-laminate-faced architectural cabinets, to match existing on 1st floor of Office Wing.
2. Wood furring, blocking, shims, and hanging strips for installing plastic-laminate-faced architectural cabinets unless concealed within other construction before cabinet installation.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product, including high-pressure decorative laminate, adhesive for bonding plastic laminate and cabinet hardware and accessories.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of furring, blocking, and hanging strips, including concealed blocking and reinforcement specified in other Sections.
2. Show locations and sizes of cutouts and holes for electrical switches and outlets and other items installed in architectural plastic-laminate cabinets.

C. Samples for Initial Selection:

1. Plastic laminates.
2. PVC edge material.

D. Samples for Verification:

1. Plastic laminates, 8 by 10 inches (200 by 250 mm) , for each type, color, pattern, and surface finish and specified edge material applied to one edge.

2. Corner pieces as follows:

   a. Cabinet-front frame joints between stiles and rails, as well as exposed end pieces, 18 inches (450 mm) high by 18 inches (450 mm) wide by 6 inches (150 mm) deep.
   b. Miter joints for standing trim.

3. Exposed cabinet hardware and accessories, one unit for each type.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. High-pressure decorative laminate.
3. Adhesives.

C. Woodwork Quality Standard Compliance Certificates: Compatible with the AWI Quality Certification Program.

D. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.6 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance. Shop follows AWI's Quality Certification Program requirements.

B. Installer Qualifications: Fabricator of products.

C. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver cabinets until painting and similar operations that could damage woodwork have been completed in installation areas. If cabinets must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Environmental Limitations: Do not deliver or install cabinets until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 43 and 70 percent during the remainder of the construction period.

C. Field Measurements: Where cabinets are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

1. Locate concealed framing, blocking, and reinforcements that support cabinets by field measurements before being enclosed, and indicate measurements on Shop Drawings.

D. Established Dimensions: Where cabinets are indicated to fit to other construction, establish dimensions for areas where cabinets are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

1.9 COORDINATION

A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that cabinets can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE-FACED ARCHITECTURAL CABINETS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural plastic-laminate cabinets indicated for construction, finishes, installation, and other requirements.

1. The Contract Documents contain selections chosen from options in the quality standard and additional requirements beyond those of the quality standard. Comply with those selections and requirements in addition to the quality standard.

B. Grade: Custom.

C. Certified Wood: Plastic-laminate cabinets shall be made from wood products certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

D. Type of Construction: Face frame.

E. Cabinet, Door, and Drawer Front Interface Style: Flush overlay.

F. Reveal Dimension: 1/2 inch (13 mm) or as indicated.

G. High-Pressure Decorative Laminate: NEMA LD 3, grades as indicated or if not indicated, as required by woodwork quality standard.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Formica Corporation.
b. Lamin-Art, Inc.
c. Wilsonart International; Div. of Premark International, Inc.

H. Laminate Cladding for Exposed Surfaces:

1. Horizontal Surfaces: Grade HGS.
2. Postformed Surfaces: Grade HGP.
3. Vertical Surfaces: Grade HGS.
4. Edges: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
5. Pattern Direction: Vertically for drawer fronts, doors, and fixed panels.

I. Materials for Semiexposed Surfaces:

1. Surfaces Other Than Drawer Bodies: Thermoset decorative panels.

a. Edges of Plastic-Laminate Shelves: PVC edge banding, 0.12 inch (3 mm) thick, matching laminate in color, pattern, and finish.
b. Edges of Thermoset Decorative Panel Shelves: PVC or polyester edge banding.
c. For semiexposed backs of panels with exposed plastic-laminate surfaces, provide surface of high-pressure decorative laminate, NEMA LD 3, Grade CLS.

2. Drawer Sides and Backs: Solid-hardwood lumber.
3. Drawer Bottoms: Hardwood plywood.

J. Concealed Backs of Panels with Exposed Plastic-Laminate Surfaces: High-pressure decorative laminate, NEMA LD 3, Grade BKL.

K. Drawer Construction: Fabricate with exposed fronts fastened to subfront with mounting screws from interior of body.

1. Join subfronts, backs, and sides with glued rabbeted joints supplemented by mechanical fasteners.

L. Colors, Patterns, and Finishes: Provide materials and products that result in colors and textures of exposed laminate surfaces complying with the following requirements:

1. As indicated or, if not indicated, as selected by Architect from laminate manufacturer's full range in the following categories:

   a. Finish: matte .

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Wood Moisture Content: 8 to 13 percent.
2. Medium-Density Fiberboard: ANSI A208.2, Grade 130 made with binder containing no urea formaldehyde.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.

2.4 PLASTIC MATERIALS

A. Translucent Composite panel: Provide "Fusion", item #:DTA/046(US)-7, Broken Bottles.

1. Thickness: 3/8"
2. Finish: Sandstone, both sides

3. Back surface: milk white translucent plastic sheet.

2.5 CABINET HARDWARE AND ACCESSORIES

A. General: Provide cabinet hardware and accessory materials associated with architectural cabinets except for items specified in Section 087111 "Door Hardware (Descriptive Specification)."

B. Frameless Concealed Hinges (European Type): BHMA A156.9, B01602, 135 degrees of opening, self-closing.

C. Back-Mounted Pulls: BHMA A156.9, B02011.

D. Wire Pulls: Back mounted, solid metal, 4 inches (100 mm) long, 5/16 inch (8 mm) in diameter .

E. Adjustable Shelf Standards and Supports: BHMA A156.9, B04071; with shelf rests, B04081

F. Drawer Slides: BHMA A156.9.
   1. Grade 1HD-100 and Grade 1HD-200: Side mounted; full-extension type; zinc-plated-steel ball-bearing slides.
   2. For drawers more than 3 inches (75 mm) high but not more than 6 inches (150 mm) high and not more than 24 inches (600 mm) wide, provide Grade 1HD-100.
   3. For drawers more than 6 inches (150 mm) high or more than 24 inches (600 mm) wide, provide Grade 1HD-200.

G. Aluminum Slides for Sliding Glass Doors: BHMA A156.9, B07063.

H. Door Locks: BHMA A156.11, E07121.

I. Drawer Locks: BHMA A156.11, E07041.

J. Door and Drawer Silencers: BHMA A156.16, L03011.

K. Tempered Float Glass for Cabinet Doors: ASTM C 1048, Kind FT, Condition A, Type I, Class 1 (clear) Quality-Q3, 6 mm thick unless otherwise indicated.

L. Exposed Hardware Finishes: For exposed hardware, provide finish that complies with BHMA A156.18 for BHMA finish number indicated.

   1. Satin Chromium Plated: BHMA 626 for brass or bronze base; BHMA 652 for steel base.

M. For concealed hardware, provide manufacturer's standard finish that complies with product class requirements in BHMA A156.9.

2.6 MISCELLANEOUS MATERIALS

A. Furring, Blocking, Shims, and Hanging Strips: Fire-retardant-treated softwood lumber, kiln dried to less than 15 percent moisture content.

B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide metal expansion sleeves or expansion bolts for post-installed anchors. Use nonferrous-metal or hot-dip galvanized anchors and inserts at inside face of exterior walls and at floors.

C. Adhesives: Do not use adhesives that contain urea formaldehyde.

D. Adhesives: Use adhesives that meet the testing and product requirements of the California Department of Health Services' "Standard Practice for the Testing of Volatile Organic Emissions from Various Sources Using Small-Scale Environmental Chambers."

E. Adhesive for Bonding Plastic Laminate: Contact cement .

1. Adhesive for Bonding Edges: Hot-melt adhesive.

2.7 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate cabinets to dimensions, profiles, and details indicated.

C. Complete fabrication, including assembly and hardware application, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

D. Shop-cut openings to maximum extent possible to receive hardware, appliances, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition cabinets to average prevailing humidity conditions in installation areas.

B. Before installing cabinets, examine shop-fabricated work for completion and complete work as required.

3.2 INSTALLATION

A. Grade: Install cabinets to comply with same grade as item to be installed.

B. Assemble cabinets and complete fabrication at Project site to the extent that it was not completed in the shop.

C. Install cabinets level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

D. Scribe and cut cabinets to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

E. Anchor cabinets to anchors or blocking built in or directly attached to substrates. Secure with countersunk, concealed fasteners and blind nailing. Use fine finishing nails for exposed fastening, countersunk and filled flush with woodwork.

1. Use filler matching finish of items being installed.

F. Cabinets: Install without distortion so doors and drawers fit openings properly and are accurately aligned. Adjust hardware to center doors and drawers in openings and to provide unencumbered operation. Complete installation of hardware and accessory items as indicated.

1. Install cabinets with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Fasten wall cabinets through back, near top and bottom, and at ends not more than 16 inches (400 mm) o.c. with No. 10 wafer-head screws sized for not less than 1-1/2-inch (38-mm) penetration into wood framing, blocking, or hanging strips.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective cabinets, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean, lubricate, and adjust hardware.

C. Clean cabinets on exposed and semiexposed surfaces.

END OF SECTION 064116

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. Plastic sheet paneling (FRP).

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: For plastic paneling and trim accessories, in manufacturer's standard sizes.

1.4 QUALITY ASSURANCE

A. Testing Agency: FM Approvals

1.5 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install plastic paneling until spaces are enclosed and weathertight and temporary HVAC system is operating and maintaining ambient temperature and humidity conditions at occupancy levels during the remainder of the construction period.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain plastic paneling and trim accessories from single manufacturer.

2.2 PLASTIC SHEET PANELING

A. Glass-Fiber-Reinforced Plastic Paneling: Gelcoat-finished, glass-fiber-reinforced plastic panels complying with ASTM D 5319.

1. Surface-Burning Characteristics: As follows when tested by a qualified testing agency according to ASTM E 84. Identify products with appropriate markings of applicable testing agency.

   a. Flame-Spread Index: 25 or less.
   b. Smoke-Developed Index: 450 or less.

2. Nominal Thickness: Not less than 0.09 inch (2.3 mm)
3. Surface Finish: As selected by Architect from manufacturer's full range.
4. Color: As selected by Architect from manufacturer's full range.

2.3 ACCESSORIES

A. Trim Accessories: Manufacturer's standard one-piece vinyl extrusions designed to retain and cover edges of panels. Provide division bars, inside corners, outside corners, and caps as needed to conceal edges.

   1. Color: As selected by Architect from manufacturer's full range.

B. Exposed Fasteners: Nylon drive rivets recommended by panel manufacturer.

C. Concealed Mounting Splines: Continuous, H-shaped aluminum extrusions designed to fit into grooves routed in edges of factory-laminated panels and to be fastened to substrate.

D. Adhesive: As recommended by plastic paneling manufacturer and with a VOC content of 50 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrate by sanding high spots and filling low spots as needed to provide flat, even surface for panel installation.

B. Clean substrates of substances that could impair adhesive bond, including oil, grease, dirt, and dust.

C. Condition panels by unpacking and placing in installation space before installation according to manufacturer's written recommendations.

D. Lay out paneling before installing. Locate panel joints to provide equal panels at ends of walls not less than half the width of full panels.

1. Mark plumb lines on substrate at panel joint locations for accurate installation.
2. Locate trim accessories to allow clearance at panel edges according to manufacturer's written instructions.

3.3 INSTALLATION

A. Install plastic paneling according to manufacturer's written instructions.

B. Install panels in a full spread of adhesive.

C. Install trim accessories with adhesive.

D. Fill grooves in trim accessories with sealant before installing panels, and bed inside corner trim in a bead of sealant.

E. Maintain uniform space between panels and wall fixtures. Fill space with sealant.

F. Remove excess sealant and smears as paneling is installed. Clean with solvent recommended by sealant manufacturer and then wipe with clean dry cloths until no residue remains.

END OF SECTION 066400

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Coating and waterproofing exterior exposed cast concrete, vertical and overhead surfaces.

2. Coating interior exposed cast concrete or masonry, vertical or overhead surfaces.

1.2 SYSTEM DESCRIPTION

A. Portland-cement based coating for concrete and masonry that resists both positive and negative hydrostatic pressure.

B. Performance Requirements: Provide patching material complying with the following requirements:

1. Service temperatures: Immersion, up to 140 degrees F (60 degrees C); cleaning water, up to 200 degrees F (93 degrees C); dry air, up to 220 degrees F (104 degrees C).

2. VOC: 0 lbs/gal (0 g/L) less water and exempt solvents.

3. Initial Set, minutes at 70 degree F (21 degree C), 50 percent relative humidity: 10 minutes per Lab Method.

4. Final Set, minutes at 70 degree F (21 degree C), 50 percent relative humidity: 90 minutes per Lab Method.

5. Density (cured): 129 pounds per foot (2,080 kg/m) per Lab Method.

6. Positive resistance to hydrostatic pressure, hrs, at 200 psi (1.4 MPa), 461 head feet, air cured at 70 degree F (21 degree C) 50 percent relative humidity: 752 (No leakage, no softening) per CRD C 48, modified.

7. Negative resistance to hydrostatic pressure, hours, at 200 psi (1.4 MPa), 461 head feet, air cured at 70 degree F (21 degree C) 50 percent relative humidity: 664 (Limited dampness) per CRD C 48, modified.

8. Potable water (direct contact): Suitable approved per BS6920 (British standard), NSF Standard 61.

9. Water absorption, boiling water submersion at 24 hour: 3.6 percent per ASTM C 67 (Section 7.3).

10. Compressive strength, ASTM C 109:

a. 7 days: 4,200 psi (29 MPa)

b. 28 days: 6,030 psi (42 MPa)

11. Flexural strength, ASTM C 348:

    a. 7 days: 360 psi (2.5 MPa)

    b. 28 days: 1,027 psi (7 MPa)

12. Tensile strength, ASTM C 190:

    a. 7 days: 250 psi (2 MPa).

    b. 28 days: 440 psi (3 MPa).

13. Modulus of elasticity, ASTM C 469, 28 days: 2.72 x 10 to the 6th psi (1.87 x 10 to the 4th MPa).

14. Artificial weathering, hrs:

    a. Xenon Arc: 5,000 = No failure per ASTM G 26.

    b. Carbon Arc: 500 = No failure per ASTM G 23.

15. Adhesion strength, Test by tensile bond: 418 psi (2.9 MPa).

16. Artificial weathering, Atlas Type DMC weatherometer: No cracking, loss of adhesion, checking or other defect.

17. Freeze/thaw resistance, 200 cycles: No change per ASTM C 666 (Procedure B).

18. Salt spray resistance, 300 hours: No defect per ASTM B 117.

19. Carbon Dioxide (CO2), 1/16 inch (1.6 mm) per Lab Method Diffusion. Equivalent to 3/4 inch (19 mm) new concrete.

20. Permeance:

    a. Perms: 12 (0.10698) per ASTM E 96

    b. Metric permeability 18 x 10 to the 3rd resistance (water-vapor transmission) per Swedish standard SS-02-15-82.

21. Wind-driven rain, hrs: 8 = excellent per Fed. Spec. TT-P-0035 (Para 4.4.7).

22. Coefficient of thermal expansion in/in/degree F (mm/mm/degree C), at 28 days: 6.99 x 10 to the minus 6th (5 x 10 to the minus 7th) per ASTM C 531.

23. Impact strength (Gardener impact tester): No chipping per Fed. Spec. TT-P-0035 (Cement paints para. 3.4.8)

24. Hardness, (Barber Colemen Impressor) Requirement min = 30, max = 60 (para 4.4.9) Fed. Spec. TT-P-0035:

a. 7 days: 35.

b. 14 days: 47.

c. 21 days: 52.

25. Abrasion resistance 3,000 L sand: Passed per Fed. Spec. TT-P-141B.

26. Reflectance ASTM D 2244 using Hunterlab D-25 meter:

    a. Gray Thoroseal: 64.2.

    b. White Thoroseal: 88.1.

27. Fungus resistance at 21 days: No growth; meets all requirements of Fed. Spec. TT-P-29B.

28. Surface burning characteristics per ASTM E 84:

    a. Flame Spread: 0.

    b. Smoke developed: 5.

29. Fire Propagation Flame spread: Index = 1.5, Class 1 per BS476: Part 6:1981, BS476: Part 7:1971.

1.3 SUBMITTALS

A. Product Data: Submit manufacturer's technical bulletins and MSDS on each product.

B. Submit list of project references as documented in this Specification under Quality Assurance Article. Include contact name and phone number of person charged with oversight of each project.

C. Quality Control Submittals:

1. Provide protection plan of surrounding areas and non-work surfaces.

D. Samples for Verification: Concrete coating amples, cast vertically, approximately 8 by 8 , of finishes, colors, and textures to match design reference sample. Include Sample sets showing the full range of variations expected in these characteristics.

1.4 QUALITY ASSURANCE

A. Qualifications:

1. Manufacturer Qualifications: Company with minimum 15 years of experience in manufacturing of specified products and systems.

2. Manufacturer Qualifications: Company shall be ISO 9001:2000 Certified.

3. Applicator Qualifications: Company with minimum of 5 years experience in application of specified products and systems on projects of similar size and scope, and is acceptable to product manufacturer.

   a. Successful completion of a minimum of 5 projects of similar size and complexity to specified Work.

B. Field Sample:

1. Install at Project site or pre-selected area of building an area for field sample, as directed by Architect.

2. Apply material in strict accordance with manufacturer's written application instructions.

3. Manufacturer's representative or designated representative will review technical aspects; surface preparation, application, and workmanship.

4. Field sample will be standard for judging workmanship on remainder of Project.

5. Maintain field sample during construction for workmanship comparison.

6. Do not alter, move, or destroy field sample until Work is completed and approved by Architect.

7. Obtain Architect's written approval of field sample before start of material application, including approval of aesthetics, color, texture, and appearance.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Comply with manufacturer's ordering instructions and lead-time requirements to avoid construction delays.

B. Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.

C. Transport and store in unopened containers and keep in clean, dry condition protected from rain, dew, and humidity. If dry onsite storage of bags is unavailable or if Project is located in a very wet, humid climate zone, purchase product in manufacturer's packaged metal pails.

D. Do not stack bags more than 2 pallets high.

1.6 PROJECT CONDITIONS

A. Environmental Requirements:

1. Do not apply in rain or when rain is expected within 24 hours. Do not apply above 90 degrees F (32 degrees C) or below 40 degrees F (4 degrees C) or when temperatures are expected to fall below 40 degrees F (4 degrees C) within 24 hours. For hot and cold temperature applications, store materials and water at 50 degrees F (10 degrees C) to 70 degrees F (21 degrees C) before use.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Basis of Design Product: Subject to compliance with requirements, provide commercial grade products from the following manufacturer:

BASF Corporation
889 Valley Park Drive
Shakopee, MN 55379
Customer Service: 800- 433-9517
Technical Service: 800-243-6739
Internet: www.buildingsystems.basf.com

B. Substitutions: Comply with Section 016000.

C. Specifications and Drawings are based on manufacturer's proprietary literature from BASF Corporation. Other manufacturers shall comply with minimum levels of material, color selection, and detailing indicated in Specifications or on Drawings. Architect will be sole judge of appropriateness of substitutions.

2.2 MATERIALS

A. Portland-cement based coating for concrete and masonry that resists both positive and negative hydrostatic pressure.

1. Acceptable Product:

a. First Coating: Thoroseal by BASF Corporation.

b. Second Coating: Thoro high-build architectural coating by BASF Corporation.

B. Color Pigment: ASTM C 979, synthetic mineral-oxide pigments or colored water-reducing admixtures; color stable, free of carbon black, nonfading, and resistant to lime and other alkalis.

1. Color: As selected by Architect from manufacturer's full range.

2.3 MIXING

A. Mix material per manufacturer instructions allowing material to rest 10 minutes before remixing and application.

B. Color Pigment: Add color pigment to concrete coating mixture according to manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance of the Work.

1. Verify that concrete has cured and aged for minimum time period recommended in writing by waterproofing manufacturer.
2. Verify that substrate is visibly dry and within the moisture limits recommended in writing by manufacturer. Test for capillary moisture by plastic sheet method according to ASTM D 4263.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Ensure that substrates are sound and free of dust, dirt, laitance, paints, oils, grease, curing compounds, and other contaminants.

B. Patch holes and cracks before installation.

C. Roughen or brush blast extremely smooth surfaces to ensure good mechanical adhesion.

3.3 APPLICATION - GENERAL

A. Apply coating with manufacturer recommend brush or broom or equivalent stiff fiber brush or by textured spray equipment. Spray, back-brush, or broom applications of first coat to fill voids and achieve uniformity.

B. Completely dampen substrate with water before starting application. Do not saturate substrate. Keep substrate cool and damp throughout application.

C. Work first coat thoroughly into substrate to completely fill and cover voids, holes, and nonmoving cracks.

D. Allow first coat to cure 24 hours, then apply second coat and finish with vertical stroke.

E. On masonry walls, allow 5 to 7 days before applying second coat to eliminate joint read through.

3.4 CLEANING

A. Clean waterproofing material from tools and equipment with water. Remove cured materials mechanically.

B. Clean up and properly dispose of debris remaining on Project site related to application.

C. Remove temporary coverings and protection from adjacent Work areas.

3.5 PROTECTION

A. Protect system from damage during construction.

END OF SECTION

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. Glass-fiber blanket insulation.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each product.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Protect insulation materials from physical damage and from deterioration due to moisture, soiling, and other sources. Store inside and in a dry location. Comply with manufacturer's written instructions for handling, storing, and protecting during installation.

PART 2 - PRODUCTS

2.1 GLASS-FIBER BLANKET INSULATION

A. Unfaced, Glass-Fiber Blanket Insulation: ASTM C 665, Type I; with maximum flame-spread and smoke-developed indexes of 25 and 50, respectively, per ASTM E 84; passing ASTM E 136 for combustion characteristics.

B. Sustainability Requirements: Provide glass-fiber blanket insulation as follows:

1. Free of Formaldehyde: Insulation manufactured with 100 percent acrylic binders and no formaldehyde.
2. Low Emitting: Insulation tested according to ASTM D 5116 and shown to emit less than 0.05-ppm formaldehyde.

PART 3 - EXECUTION

3.1 PREPARATION

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

3.2 INSTALLATION, GENERAL

A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.

B. Install insulation that is undamaged, dry, and unsoiled and that has not been left exposed to ice, rain, or snow at any time.

C. Extend insulation to envelop entire area to be insulated. Cut and fit tightly around obstructions and fill voids with insulation. Remove projections that interfere with placement.

D. Provide sizes to fit applications indicated and selected from manufacturer's standard thicknesses, widths, and lengths. Apply single layer of insulation units to produce thickness indicated unless multiple layers are otherwise shown or required to make up total thickness.

3.3 INSTALLATION OF INSULATION FOR FRAMED CONSTRUCTION

A. Apply insulation units to substrates by method indicated, complying with manufacturer's written instructions. If no specific method is indicated, bond units to substrate with adhesive or use mechanical anchorage to provide permanent placement and support of units.

B. Glass-Fiber Blanket Insulation: Install in cavities formed by framing members according to the following requirements:

1. Use insulation widths and lengths that fill the cavities formed by framing members. If more than one length is required to fill the cavities, provide lengths that will produce a snug fit between ends.
2. Place insulation in cavities formed by framing members to produce a friction fit between edges of insulation and adjoining framing members.
3. Maintain 3-inch (76-mm) clearance of insulation around recessed lighting fixtures not rated for or protected from contact with insulation.

4. For metal-framed wall cavities where cavity heights exceed 96 inches (2438 mm), support unfaced blankets mechanically and support faced blankets by taping flanges of insulation to flanges of metal studs.

C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.

3.4 PROTECTION

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

END OF SECTION 072100

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. Materials and installation methods for fluid-applied air and vapor barrier membrane system located in the new stair exterior walls and roof.

1.3 DEFINITIONS

A. ABAA: Air Barrier Association of America.

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

1.4 PERFORMANCE REQUIREMENTS

A. General: Air barrier shall be capable of performing as a continuous vapor-retarding air barrier and as a liquid-water drainage plane flashed to discharge to the exterior incidental condensation or water penetration. Air barrier assemblies shall be capable of accommodating substrate movement and of sealing substrate expansion and control joints, construction material changes, and transitions at perimeter conditions without deterioration and air leakage exceeding specified limits.

B. Material Performance: Provide materials which have an air permeance not to exceed 0.004 cubic feet per minute per square foot under a pressure differential of 0.3 in. water (1.57 psf) (0.02 L/m^2 @ 75 Pa.) when tested according to ASTM E 2178.

C. Assembly Performance: Provide a continuous air and vapor barrier assembly that has an air leakage not to exceed 0.040 cubic feet per square foot per minute under a pressure differential of 0.3 in. water (1.57 psf) (0.20 L/ m2 @ 75 Pa.) when tested in accordance with ASTM E 2357, and a vapor permeance of 1 perm (57 mg) or less when tested in accordance with ASTM E 96 using the desiccant method. Assembly shall perform as a liquid drainage plane flashed to discharge condensation or water penetration to the exterior. Assembly shall accommodate movements of building materials by providing expansion and control joints as required, with accessory air and vapor seal materials at such locations, changes in substrate and perimeter conditions.

1. Assembly shall be capable of withstanding combined positive and negative design wind, fan and stack pressures on the envelope without damage or displacement, and shall transfer the load to the structure.

2. Assembly shall not displace adjacent materials under full load.
3. Assembly shall be joined in an airtight and flexible manner to the air barrier material of adjacent assemblies, allowing for the relative movement of assemblies due to thermal and moisture variations and creep, and anticipated seismic movement.

1.5 SUBMITTALS

A. Product Data: Submit manufacturer's product data, installation instructions, and manufacturer's printed instructions for evaluating, preparing, and treating substrate, temperature, and other limitations of installation conditions, technical data, and tested physical and performance properties.

1. Submit letter from primary materials manufacturer indicating approval of products not manufactured by primary manufacturer.
2. Include statement that materials are compatible with adjacent materials proposed for use.
3. Submit reports indicating that field peel-adhesion test on all materials to which sealants are adhered have been performed and the changes made, if required, to other approved materials, in order to achieve successful adhesion.

B. Shop Drawings: Submit shop drawings showing locations and extent of air and vapor barrier assemblies and details of all typical conditions, intersections with other envelope assemblies and materials, membrane counter-flashings, and details showing how gaps in the construction will be bridged, how inside and outside corners are negotiated, how materials that cover the air and vapor barrier are secured with air-tight condition maintained, and how miscellaneous penetrations such as conduits, pipes, electric boxes and similar items are sealed.

1. Include VOC content of each material, and applicable legal limit in the jurisdiction of the project.
2. Include statement that materials are compatible with adjacent materials proposed for use.
3. Include recommended values for field adhesion test on each substrate.
4. Connections to Adjacent Materials: Provide connections to prevent air leakage and vapor migration at the following locations:
   a. Walls, windows, curtain walls, storefronts, louvers or doors.
   b. Different wall and roof assemblies and fixed openings within those assemblies.
   c. Wall and roof connections and penetrations.
   d. Floors over unconditioned space.
   e. Walls, floor and roof across construction, control and expansion joints.
   f. Walls, floors and roof to utility, pipe and duct penetrations.
   g. Seismic and expansion joints.
   h. All other leakage pathways in the building envelope.

C. Samples: Submit representative samples of the following for approval: Cured sample of the fluid-applied, transition, and through-wall flashing membranes, as well as certification by air and vapor barrier manufacturer that products supplied comply with local regulations controlling use of volatile organic compounds (VOC's).

D. Compatibility: Submit letter from manufacturer stating that materials proposed for use are permanently chemically compatible and adhesively compatible with adjacent materials proposed for use. Submit letter from manufacturer stating that cleaning materials used during installation are chemically compatible with each of the adjacent materials proposed for use.

E. Product Certificates: For air barriers, certifying compatibility of air barrier and accessory materials with Project materials that connect to or that come in contact with the barrier; signed by product manufacturer.

F. Qualification Data: The installer shall demonstrate qualifications to perform the work of this Section by submitting the following: Written confirmation or certification from the air barrier manufacturer that the installer has been trained and is recognized by the manufacturer as suitable for the execution of the work.

1. Installer must show evidence of adequate equipment and trained field personnel to successfully complete the project in a timely manner. Both the architect and the air barrier materials manufacturer must approve the installer's credentials.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for air barriers.

1.6 QUALITY ASSURANCE

A. Air Barrier Installer Qualifications: Currently accredited by the Air Barrier Association of America (ABAA) whose applicators are certified in accordance with the ABAA Quality Assurance Program.

B. Manufacturer: Obtain primary materials from a single manufacturer regularly engaged in manufacturing air and vapor barrier membranes. Obtain secondary materials from a source acceptable to the primary materials manufacturer.

C. Mockups: Before beginning installation of air barrier, build mockups of exterior wall assemblies as indicated on drawings, minimum 150 sq. ft. (14 sq. m), incorporating backup wall construction, external cladding, window, door frame and sill, insulation, and flashing to demonstrate surface preparation, crack and joint treatment, and sealing of gaps, terminations, and penetrations of air barrier membrane.

1. Coordinate construction of mockup to permit inspection by Owner's testing agency of air barrier before external insulation and cladding is installed.
2. Include junction with roofing membrane, building corner condition and foundation wall intersection.
3. If Architect determines mockups do not comply with requirements, reconstruct mockups and apply air barrier until mockups are approved.
4. Approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

D. VOC Regulations: Provide products which comply with applicable regulations controlling the use of volatile organic compounds for the specific authority having jurisdiction.

E. Preinstallation Conference: Conduct conference at Project site.

1. Include installers of other construction connecting to air barrier, including roofing, waterproofing, architectural cast stone, masonry, sealants, windows, glazed curtain walls, and door frames.
2. Review air barrier requirements including surface preparation, substrate condition and pretreatment, minimum substrate curing period, forecasted weather conditions, special details and sheet flashings, mockups, installation procedures, sequence of installation, testing and inspecting procedures, and protection and repairs.
3. Sequence of construction, responsibilities and schedule for subsequent operations.
4. Manufacturer's Representative: Make arrangements necessary to have a trained representative of the manufacturer to review installation procedures. Notify manufacturer's representative not less than 72 hours before meeting is to be held.

F. Inspection and Testing: Cooperate and coordinate with the Owner's inspection and testing agency. Do not cover any installed air and vapor barrier membrane until any required inspections, testing, and approvals have been completed.

G. Mock-Up Tests for Air and Water Infiltration: Test mock-up for air and water infiltration in accordance with ASTM E 1186 (air leakage location) or ASTM E 783 (air leakage quantification), and ASTM E 1105 (water penetration). Use smoke tracer to locate sources of air leakage. If deficiencies are found, repair or modify mock-up and retest until satisfactory results are obtained. Deficiencies include air leakage beyond values specified, uncontrolled water leakage, unsatisfactory workmanship.

1. Perform the air leakage tests and water penetration test of mock-up prior to installation of cladding and trim but after installation of all fasteners for cladding and trim and after installation of other penetrating elements. For fasteners which would normally only be installed with cladding, install representative fasteners without cladding; intent is to perform testing with all types of penetrations in place.

H. Mock-Up Tests for Adhesion: Test mock-up of fluid-applied and sheet applied materials for adhesion in accordance with ASTM D 4541 using a Type 1 pull tester except that the disk used shall be 100mm in diameter and the membrane shall be cut through to separate the material attached to the disk from the surrounding material. Perform test after curing period recommended by the manufacturer. Record mode of failure and area which failed in accordance with ASTM D 4541. When the air barrier material manufacturer has established a minimum adhesion level for the product on the particular substrate, the inspection report shall indicate whether this requirement has been met. Where the manufacturer has not declared a minimum adhesion value for their product/substrate combination, then the inspector shall simply record the value.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store liquid materials in their original undamaged packages in a clean, dry, protected location and within temperature range required by air barrier manufacturer.

B. Remove and replace liquid materials that cannot be applied within their stated shelf life.

C. Store rolls according to manufacturer's written instructions.

D. Protect stored materials from direct sunlight.

1.8 PROJECT CONDITIONS

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

1.9 WARRANTY

A. Material Warranty: Provide manufacturer's standard product warranty, for a minimum 3 years from date of Substantial Completion.

B. Installation Warranty: Provide air barrier subcontractor's 2 year warranty from date of Substantial Completion, including all components of the air and vapor barrier assembly, against failures including loss of air tight seal, loss of watertight seal, loss of adhesion, loss of cohesion, failure to cure properly.

PART 2 - PRODUCTS

2.1 FLUID-APPLIED MEMBRANE AIR BARRIER

A. Fluid-applied proprietary materials as specified. Use regular or low-temperature formulation depending on site conditions, within temperature ranges specified by manufacturer. Provide related accessories including primer, seam tape, mastic, fluid and sealant recommended by manufacturer. Subject to compliance with requirements, provide one of the following:

1. Carlisle Coatings and Waterproofing:
   a. Fluid-Applied Air and Vapor Barrier Membrane: Barriseal, 40 mils thick (dry).
   b. Water-Based Primer: CCW-AWP Water-Based Primer.
   c. Mastic: CCW-704 Solvent-Based Rubberized Asphalt Mastic.
   d. Sealants: CCW-703 Vertical Grade Liquiseal membrane or CCW-201 two component polyurethane sealant.
   e. Counterflashing for Masonry Through-Wall Flashings: CCW-705.
   f. Website: www.carlisle-ccw.com..

2. Grace Construction Products:
   a. Fluid-Applied Air and Vapor Barrier: Perm-A-Barrier Liquid, 60 mils thick (wet).
   b. Water-Based Primer for Flashing, Transition Strip and Detail Membrane: Perm-A-Barrier WB Primer.
   c. Through-Wall Flashings or Shelf Angle Flashings: Perm-A-Barrier Wall Flashing.
   d. Mastics, Adhesives and Tapes: As recommended by Grace Construction Products.

e. Transition Strip: Perm-A-Barrier Detail Membrane and Perm-A-Barrier Wall Flashing.
f. Termination Mastic: Bituthene Liquid Membrane and as recommended by Grace Construction Products.
g. Window Flashing and Detail Membrane: Perm-A-Barrier Detail Membrane and Perm-A-Barrier Wall Flashing.
h. Website: www.na.graceconstruction.com.

3. Henry:
   a. Fluid-Applied Air and Vapor Barrier for Cold Temperature Applications: Air Bloc 06, 93 mils (wet).
   b. Fluid-Applied Air and Vapor Barrier (Also Used as Insulation Adhesive): Air Bloc 21 and AirBloc 21FR fire-resistive type, 120 mils (wet).
   c. Fluid-Applied Air and Vapor Barrier, Low VOC: Air Bloc 32, 75 to 115 mils thick (wet).
   d. Transition Membrane: Blueskin SA and Blueskin SA LT for low-temperature applications.
   e. Water-Based Primer for Transition Membrane: Aquatec Primer.
   f. Counterflashing for Masonry Through-Wall Flashing: Blueskin TWF.
   g. Mastics, Adhesives and Tapes: Henry 570-05 Polybitume.
   h. Website: www.henry.com.

4. Hohmann & Barnard, Inc:
   a. Fluid-Applied Air and Vapor Barrier Membrane: Textroflash Liquid Air and Vapor Barrier, 60 mils (wet), 40 mils (dry), approximately 25 square feet per gallon.
   b. Flashing and Transition Membrane: Hohmann and Barnard Textroflash Green, Spun-bonded polypropylene membrane with adhesive and release paper, 40 mils.
   c. Base Flashing: Hohmann and Barnard Flex-Flash Flashing, 40 mil with pressure sensitive adhesive.
   d. Primers: As recommended by manufacturer.
   e. Mastics: As recommended by manufacturer.
   f. Website: www.h-b.com.

5. Protective Coatings Technology, Inc.:
   a. Fluid-Applied Air and Vapor Barrier Membrane: Poly-Wall AirLok or AirLok Flex as recommended by manufacturer, 8-12 mils (dry) (50-80 square feet per gallon inversely related to texture and porosity of wall surface).
   b. Water-Based Primer: As recommended by manufacturer.
   c. Counterflashing for Masonry Through-Wall Flashings: Poly-Wall Crack-Guard.
   d. Mastics, Adhesives and Tapes: As recommended by manufacturer.
   e. Website: www.poly-wall.com.

6. Rubber Polymer Corporation:
   a. Fluid-Applied Air and Vapor Barrier: Rub-R-Wall Airtight, 40 mils thick (dry) (20 to 25 square feet per gallon).
   b. Water-Based Primer: As recommended by manufacturer.
   c. Transition Strip, Counterflashing for Masonry Through-Wall Flashings: Rub-R-Wall SA.

d. Mastics: Rub-R-Wall Mastic.
e. Website: www.rpcinfo.com.

7. Seaboard Asphalt Products:
   a. Fluid-Applied Air and Vapor Barrier Membrane: EF-400 Modified Emulsion Coating, 40 mils (dry).
   b. Flashing and Transition Membrane: Self-adhesive polymeric air and vapor barrier membrane, 40 mils.
   c. Water-Based Primer for Temperatures Above 40 degrees F: Manufacturer's water-based primer.
   d. Mastics, Adhesives and Tapes: As recommended by manufacturer.
   e. Website: www.seaboardasphalt.com.

8. Tremco, Inc.:
   a. Fluid-Applied Air and Vapor Barrier Membrane: ExoAir 120SP/R (spray-applied and ExoAir 120R (roller-grade), 60 mils (wet) (25 square feet per gallon for sheathing panels and 20 square feet per gallon for unparged masonry walls). ExoAir 220R (roller-grade), 70 mils (wet).
   b. Water-Based Primer: ExoAir 10 WB Primer.
   c. Transition Strips: ExoAir 110/110 LT.
   d. Counterflashing for Masonry Through-Wall Flashings: ExoAir TWF, Proglaze ETA.
   e. Mastics, Adhesives and Tapes: ExoAir Termination Mastic.
   f. Detail Sealants: Tremflex 834 acrylic latex sealant, Dymonic FC polyurethane sealant, or Spectrem 1 silicone sealant.
   g. Adhesives and Tapes: As recommended by manufacturer.
   h. Website: www.tremcosealants.com.

2.2 AUXILIARY MATERIALS

A. General: Auxiliary materials recommended by air barrier manufacturer for intended use and compatible with air barrier membrane. Liquid-type auxiliary materials shall comply with VOC limits of authorities having jurisdiction.

B. Membrane at Transitions in Substrate and Connections to Adjacent Elements: Neoprene, ASTM D 2000 Designation 2BC415 to 3BC620, 50 to 65 mils (1.3 mm to 1.6 mm) thick with non-corrosive termination bars and fasteners. Adhesive and lap sealant as recommended by manufacturer.

C. Sealant at Transitions in Substrate and Connections to Adjacent Elements: Low-modulus pre-cured siliconized extrusion and sealant for bonding extrusions to substrates; Tremco Silicone Extruded Sheet by Tremco, Proglaze ETA by Tremco, or Bondaflex Silbridge 300 by May National Associates.

D. Flashing Membrane: Self-adhered through-wall flashing membrane, 32 mils (.80mm) of self-adhering SBS rubberized asphalt laminated to a 8 mil (.20mm) cross-laminated, high-density polyethylene film with a siliconized release liner.

E. Transition and Flashing Membrane Primer: Water-based liquid primer for extruded polystyrene, concrete, masonry, gypsum sheathing, wood, metal, and painted substrates.

F. Butyl-based Self-Adhered Membrane: Transition between air and vapor barrier membrane and TPO or EPDM membranes.

G. Mastic: Liquid mastic for sealing around brick ties, penetrations and lap and T-joints.

H. Stainless-Steel Sheet Flashing: ASTM A167, Type 304, soft annealed, with No. 2D finish; minimum, 0.0156 inch (0.4 mm) thick.

I. Sprayed Polyurethane Foam Sealant: 1- or 2-component, foamed-in-place, polyurethane foam sealant, 1.5 to 2.0 lb/cu. ft (24 to 32 kg/cu. m) density; flame spread index of 25 or less according to ASTM E 162; with primer and noncorrosive substrate cleaner recommended by foam sealant manufacturer.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements and other conditions affecting performance.

1. Verify that substrates are sound and free of oil, grease, dirt, excess mortar, or other contaminants.
2. Ensure that the following conditions are met:
   a. Surfaces are sound, dry, even, and free of oil, grease, dirt, excess mortar or other contaminants
   b. Concrete surfaces are cured and dry, smooth without large voids, spalled areas or sharp protrusions.
   c. Masonry joints are flush and completely filled with mortar, and all excess mortar sitting on masonry ties has been removed.
3. Verify substrate is surface dry. Test for capillary moisture by plastic sheet method according to ASTM D 4263 and take suitable measures until substrate passes moisture test. Surface dry is an acceptable substrate condition if acceptable to the manufacturer.
4. Verify that masonry joints are flush and completely filled with mortar.
5. Verify sealants used in sheathing are compatible with membrane proposed for use. Perform field peel-adhesion test on materials to which sealants are adhered.
6. Notify Architect in writing of anticipated problems using air and vapor barrier over substrate prior to proceeding.
7. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 SURFACE PREPARATION

A. Clean, prepare, treat, and seal substrate according to manufacturer's written instructions. Provide clean, dust-free, and dry substrate for air barrier application.

B. Mask off adjoining surfaces not covered by air barrier to prevent spillage and overspray affecting other construction.

C. Remove grease, oil, bitumen, form-release agents, paints, curing compounds, and other penetrating contaminants or film-forming coatings from concrete.

D. Remove fins, ridges, mortar, and other projections and fill honeycomb, aggregate pockets, holes, and other voids in concrete with substrate patching membrane.

E. Remove excess mortar from masonry ties, shelf angles, and other obstructions.

F. Prime substrate for application of sheet membrane transition strips as recommended by manufacturer and as follows:

1. Prime masonry, concrete substrates with conditioning primer.
2. Prime glass-fiber surfaced gypsum sheathing an adequate number of coats to achieve required bond, with adequate drying time between coats.
3. Prime wood, metal, and painted substrates with primer.
4. Prepare, treat, and seal vertical and horizontal surfaces at terminations and penetrations through air and vapor barrier and at protrusions.

G. Prime substrate for application of fluid-applied air and vapor barrier if recommended by manufacturer based on project conditions and as follows.

H. At changes in substrate plane, apply sealant or termination mastic beads at sharp corners and edges to form a smooth transition from one plane to another.

I. Masonry Substrates: Repair any cracks, voids, and unfilled mortar joints with non-shrinking grout.

3.3 INSTALLATION

A. Air and Vapor Barrier Installation: Install transition strip materials and fluid-applied air and vapor barrier to provide continuity throughout the building envelope. Install materials in accordance with manufacturer's recommendations and as follows, unless manufacturer recommends other procedures in writing based on project conditions or particular requirements of their recommended materials:

1. Apply primer for transition strips at rate recommended by manufacturer. Allow primer to dry completely before transition strip application. Apply as many coats as necessary for proper adhesion.
2. Apply primer for fluid-applied air and vapor barrier as recommended by fluid-applied air and vapor barrier manufacturer. Based on manufacturer's recommendation, no primer may be required for the fluid-applied materials.
3. Apply fluid-applied air and vapor barrier using equipment and methods recommended by manufacturer, to achieve a dry film thickness as recommended by the manufacturer.
4. Apply fluid-applied air and vapor barrier and transition strips to shed water naturally without interception by a sheet edge, unless that edge is sealed with permanently flexible termination mastic.
5. Position subsequent sheets of transition strips applied above so that membrane overlaps the membrane sheet below by a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll into place with roller.

6. Overlap horizontally adjacent pieces of transition strips a minimum of 2 inches (50 mm), unless greater overlap is recommended by manufacturer. Roll seams with roller.
7. Seal around all penetrations with termination mastic, extruded silicone sealant, membrane counterflashing or other procedure in accordance with manufacturer's recommendations.
8. Connect air and vapor barrier in exterior wall assembly continuously to the air barrier of the roof, to concrete below-grade structures, to window frames, curtain wall, storefront, louvers, exterior doors and other intersection conditions and perform sealing of penetrations, using accessory materials and in accordance with the manufacturer's recommendations.
9. At changes in substrate plane, provide transition material (bead of sealant, mastic, extruded silicone sealant, membrane counterflashing or other material recommended by manufacturer) under membrane to eliminate all sharp 90 degree inside corners and to make a smooth transition from one plane to another.
10. Provide mechanically fastened non-corrosive metal sheet to span gaps in substrate plane and to make a smooth transition from one plane to the other. Membrane shall be continuously supported by substrate or as recommended by the manufacturer.
11. At through-wall flashings, provide an additional 6 inch wide strip of manufacturer's recommended membrane counterflashing to seal top of through-wall flashing to membrane or as recommended by manufacturer . Seal exposed top edge of strip with bead of mastic or as recommended by manufacturer.
12. At deflection and control joints, provide backup for the membrane to accommodate anticipated movement.
13. Apply a bead or trowel coat of mastic along membrane seams at reverse lapped seams, rough cuts, and as recommended by the manufacturer.
14. At end of each working day, seal top edge of the self-adhered membrane to substrate with termination mastic.
15. Do not allow materials to come in contact with chemically incompatible materials.
16. Do not expose membrane to sunlight longer than as recommended by the manufacturer.
17. Inspect installation prior to enclosing assembly and repair punctures, damaged areas and inadequately lapped seams with a patch of membrane lapped as recommended by manufacturer.

3.4 JOINT TREATMENT

A. Concrete and Masonry: Prepare, treat, rout, and fill joints and cracks in substrate according to ASTM C 1193 and air barrier manufacturer's written instructions. Remove dust and dirt from joints and cracks complying with ASTM D 4258 before coating surfaces.

1. Prime substrate and apply a single thickness of preparation coat strip extending a minimum of 3 inches (75 mm) along each side of joints and cracks. Apply a double thickness of air barrier membrane and embed a joint reinforcing strip in preparation coat.

3.5 FIELD QUALITY CONTROL

A. Testing Agency: Owner will engage a qualified testing agency to perform tests and inspections and prepare test reports.

B. Inspections: Air barrier materials and installation are subject to inspection for compliance with requirements. Inspections may include the following:

1. Continuity of air barrier system has been achieved throughout the building envelope with no gaps or holes.
2. Continuous structural support of air barrier system has been provided.
3. Masonry and concrete surfaces are smooth, clean and free of cavities, protrusions, and mortar droppings.
4. Site conditions for application temperature and dryness of substrates have been maintained.
5. Maximum exposure time of materials to UV deterioration has not been exceeded.
6. Surfaces have been primed, if applicable.
7. Laps in strips and transition strips have complied with minimum requirements and have been shingled in the correct direction (or mastic has been applied on exposed edges), with no fishmouths.
8. Termination mastic has been applied on cut edges.
9. Strips and transition strips have been firmly adhered to substrate.
10. Compatible materials have been used.
11. Transitions at changes in direction and structural support at gaps have been provided.
12. Connections between assemblies (membrane and sealants) have complied with requirements for cleanliness, preparation and priming of surfaces, structural support, integrity, and continuity of seal.
13. All penetrations have been sealed.

C. Tests: Testing to be performed will be determined by Owner's testing agency from among the following tests:

1. Qualitative Testing: Air barrier assemblies will be tested for evidence of air leakage according to ASTM E 1186, smoke pencil with pressurization or depressurization.

D. Remove and replace deficient air barrier components and retest as specified above.

3.6 CLEANING AND PROTECTION

A. Protect air barrier system from damage during application and remainder of construction period, according to manufacturer's written instructions.

1. Protect air barrier from exposure to UV light and harmful weather exposure as required by manufacturer. Remove and replace air barrier exposed for more than the published limit.

2. Protect air barrier from contact with creosote, uncured coal-tar products, TPO, EPDM, flexible PVC membranes, and sealants not approved by air barrier manufacturer.

B. Clean spills, stains, and soiling from construction that would be exposed in the completed work using cleaning agents and procedures recommended by manufacturer of affected construction.

C. Remove masking materials after installation.

END OF SECTION 072726

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 EPDM membrane roofing system.
2. Vapor retarder.
3. Adhered Roof insulation.

1.3 DEFINITIONS

A. Roofing Terminology: See ASTM D 1079 and glossary of NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 PERFORMANCE REQUIREMENTS

A. General Performance: Installed membrane 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. Membrane roofing and base flashings shall remain watertight.

B. Material Compatibility: Provide roofing materials that are compatible with one another under conditions of service and application required, as demonstrated by membrane roofing manufacturer based on testing and field experience.

C. Roofing System Design: Provide adhered membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspecting agency to resist uplift pressure calculated according to ASCE/SEI 7. There shall be no fasteners penetrating metal roof deck.

D. FM Approvals Listing: Provide membrane roofing, base flashings, and component materials that comply with requirements in FM Approvals 4450 and FM Approvals 4470 as part of a membrane roofing system, and that are listed in FM Approvals' "RoofNav" for Class 1 or noncombustible construction, as applicable. Identify materials with FM Approvals' markings.

1. Fire/Windstorm Classification: Class 1A-105
2. Hail Resistance: MH.

E. Solar Reflectance Index: Not less than 78 when calculated according to ASTM E 1980 based on testing identical products by a qualified testing agency.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For roofing system. Include plans, elevations, sections, details, and attachments to other work.

1. Base flashings and membrane terminations.
2. Tapered insulation, including slopes.
3. Roof plan showing orientation of steel roof deck and orientation of membrane roofing and fastening spacings and patterns for mechanically fastened membrane roofing.
4. Insulation fastening patterns for corner, perimeter, and field-of-roof locations.

C. Samples for Verification: For the following products, in manufacturer's standard sizes:

1. Sheet roofing, of color specified, including T-shaped side and end lap seam.
2. Roof insulation.
3. Termination bars.
4. Six insulation fasteners of each type, length, and finish.
5. Six roof cover fasteners of each type, length, and finish.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer and manufacturer.

B. Manufacturer Certificate: Signed by roofing manufacturer certifying that membrane roofing system complies with requirements specified in "Performance Requirements" Article.

1. Submit evidence of complying with performance requirements.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by manufacturer and witnessed by a qualified testing agency, for components of membrane roofing system.

D. Research/Evaluation Reports: For components of membrane roofing system, from the ICC-ES.

E. Warranties: Sample of special warranties.

1.7 CLOSEOUT SUBMITTALS

A. Maintenance Data: For membrane roofing system to include in maintenance manuals.

1.8 QUALITY ASSURANCE

A. Manufacturer Qualifications: A qualified manufacturer that is FM Approvals approved for membrane roofing system identical to that used for this Project.

B. Installer Qualifications: A qualified firm 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 including roof insulation and fasteners for membrane roofing system from same manufacturer as membrane roofing.

D. Exterior Fire-Test Exposure: ASTM E 108, Class A; for application and roof slopes indicated, as determined by testing identical membrane roofing materials by a qualified testing agency. Materials shall be identified with appropriate markings of applicable testing agency.

E. Preinstallation Roofing Conference: Conduct conference at Project site.

1. Meet with Owner, Architect, Owner's insurer if applicable, testing and inspecting agency representative, roofing Installer, roofing system manufacturer's representative, deck Installer, and installers whose work interfaces with or affects roofing, including installers of roof accessories and roof-mounted equipment.
2. Review methods and procedures related to roofing installation, including manufacturer's written instructions.
3. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
4. Examine deck substrate conditions and finishes for compliance with requirements, including flatness and fastening.
5. Review structural loading limitations of roof deck during and after roofing.
6. Review base flashings, special roofing details, roof drainage, roof penetrations, equipment curbs, and condition of other construction that will affect roofing system.
7. Review governing regulations and requirements for insurance and certificates if applicable.
8. Review temporary protection requirements for roofing system during and after installation.
9. Review roof observation and repair procedures after roofing installation.

1.9 DELIVERY, STORAGE, AND HANDLING

A. Deliver roofing materials to Project site in original containers with seals unbroken and labeled with manufacturer's name, product brand name and type, date of manufacture, approval or listing agency markings, and directions for storing and mixing with other components.

B. Store liquid materials in their original undamaged containers in a clean, dry, protected location and within the temperature range required by roofing system manufacturer. Protect stored liquid material from direct sunlight.

1. Discard and legally dispose of liquid material that cannot be applied within its stated shelf life.

C. Protect roof insulation materials from physical damage and from deterioration by sunlight, moisture, soiling, and other sources. Store in a dry location. Comply with insulation manufacturer's written instructions for handling, storing, and protecting during installation.

D. Handle and store roofing materials and place equipment in a manner to avoid permanent deflection of deck.

1.10 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.

1.11 WARRANTY

A. 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, substrate board, roofing accessories and other components of membrane roofing system.
2. Warranty Period: 20 years from date of Substantial Completion.

B. Special Project Warranty: Submit roofing Installer's warranty, on warranty form at end of this Section, signed by Installer, covering 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: Two years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 EPDM MEMBRANE ROOFING

A. EPDM: ASTM D 4637, Type II, scrim or fabric internally reinforced, uniform, flexible EPDM sheet.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. Carlisle SynTec Incorporated: "Sure White."
b. Firestone Building Products: "Ecowhite."

2. Thickness: 60 mils (1.5 mm) nominal.
3. Exposed Face Color: White.

2.2 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.
2. Adhesives and sealants that are not on the exterior side of weather barrier shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

a. Plastic Foam Adhesives: 50 g/L.
b. Gypsum Board and Panel Adhesives: 50 g/L.
c. Multipurpose Construction Adhesives: 70 g/L.
d. Fiberglass Adhesives: 80 g/L.
e. Single-Ply Roof Membrane Adhesives: 250 g/L.
f. Single-Ply Roof Membrane Sealants: 450 g/L.
g. Nonmembrane Roof Sealants: 300 g/L.
h. Sealant Primers for Nonporous Substrates: 250 g/L.
i. Sealant Primers for Porous Substrates: 775 g/L.
j. Other Adhesives and Sealants: 250 g/L.

B. Sheet Flashing: 60-mil- (1.5-mm-) thick EPDM, partially cured or cured, according to application.

C. Bonding Adhesive: Manufacturer's standard.

D. Seaming Material: Manufacturer's standard, synthetic-rubber polymer primer and 3-inch- (75-mm-) wide minimum, butyl splice tape with release film.

E. Lap Sealant: Manufacturer's standard, single-component sealant, colored to match membrane roofing.

F. Water Cutoff Mastic: Manufacturer's standard butyl mastic sealant.

G. Metal Termination Bars: Manufacturer's standard, predrilled stainless-steel or aluminum bars, approximately 1 by 1/8 inch (25 by 3 mm) thick; with anchors.

H. Metal Battens: Manufacturer's standard, aluminum-zinc-alloy-coated or zinc-coated steel sheet, approximately 1 inch wide by 0.05 inch thick (25 mm wide by 1.3 mm thick), prepunched.

I. Fasteners: Factory-coated steel fasteners and metal or plastic plates complying with corrosion-resistance provisions in FM Approvals 4470, designed for fastening membrane to vertical blocking, and acceptable to roofing system manufacturer.

J. Miscellaneous Accessories: Provide pourable sealers, preformed cone and vent sheet flashings, preformed inside and outside corner sheet flashings, reinforced EPDM securement strips, T-joint covers, in-seam sealants, termination reglets, cover strips, and other accessories.

2.3 VAPOR RETARDER

A. Self-Adhering-Sheet Vapor Retarder: Polyethylene film laminated to layer of butyl rubber adhesive, minimum 30-mil- (0.76-mm-) total thickness; maximum permeance rating of 0.1 perm (6 ng/Pa x s x sq. m); cold applied, with slip-resisting surface and release paper backing. Provide primer when recommended by vapor-retarder manufacturer.

2.4 ROOF INSULATION

A. General: Preformed roof insulation boards manufactured by EPDM membrane roofing manufacturer, selected from manufacturer's standard sizes suitable for application, of thicknesses indicated.

B. Polyisocyanurate Board Insulation: ASTM C 1289, Type II, Class 1, Grade 3, felt or glass-fiber mat facer on both major surfaces.

C. Tapered Insulation: Provide factory-tapered insulation boards fabricated to slope of 1/4 inch per 12 inches (1:48) unless otherwise indicated.

D. Provide preformed saddles, crickets, tapered edge strips, and other insulation shapes where indicated for sloping to drain. Fabricate to slope of ½ inch per 12 inches.

2.5 INSULATION ACCESSORIES

A. General: Furnish roof insulation accessories recommended by insulation manufacturer for intended use and compatibility with membrane roofing.

B. Full-Spread Applied Insulation Adhesive: Insulation manufacturer's recommended spray-applied, low-rise, two-component urethane adhesive formulated to attach substrate to metal deck, roof insulation to substrate or to another insulation layer.

C. Cover Board: ASTM C 1177/C 1177M, glass-mat, water-resistant gypsum substrate, **1/2 inch (13 mm)** thick.

1. Products: Subject to compliance with requirements, **provide one of the following**:

a. CertainTeed Corporation; **GlasRoc Sheathing Type X**.
b. Georgia-Pacific Corporation; **Dens Deck Prime**.
c. National Gypsum Company; Gold Bond eXP Extended Exposure Sheathing.
d. USG Corporation; Securock Glass Mat Roof Board.

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. Verify that surface plane flatness and fastening of steel roof deck complies with requirements in Section 053100 "Steel Decking."

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean substrate of dust, debris, moisture, and other substances detrimental to roofing installation according to roofing system manufacturer's written instructions. Remove sharp projections.

B. Prevent materials from entering and clogging roof drains and conductors and from spilling or migrating onto surfaces of other construction. Remove roof-drain plugs when no work is taking place or when rain is forecast.

C. 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. Remove and discard temporary seals before beginning work on adjoining roofing.

3.3 AIR BARRIER INSTALLATION

A. Self-Adhering-Sheet Vapor Retarder: Prime substrate if required by manufacturer. Install self-adhering-sheet vapor retarder over area to receive vapor retarder, side and end lapping each sheet a minimum of 3-1/2 inches (90 mm) and 6 inches (150 mm), respectively. Seal laps by rolling.

B. Completely seal vapor retarder at terminations, obstructions, and penetrations to prevent air movement into membrane roofing system.

3.4 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. Mechanically Fastened Insulation: Install each layer of insulation and secure to deck using mechanical fasteners specifically designed and sized for fastening specified board-type roof insulation to deck type.

1. Fasten insulation according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten insulation to resist uplift pressure at corners, perimeter, and field of roof.

D. Install tapered insulation under area of roofing to conform to slopes indicated.

E. Install insulation under area of roofing to achieve required thickness. Where overall insulation thickness is 2.7 inches (68 mm) or greater, install two or more layers with joints of each succeeding layer staggered from joints of previous layer a minimum of 6 inches (150 mm) in each direction.

F. Trim surface of insulation where necessary at roof drains so completed surface is flush and does not restrict flow of water.

G. Install insulation 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 (6 mm) with insulation.

1. Cut and fit insulation within 1/4 inch (6 mm) of nailers, projections, and penetrations.

H. Install cover boards over insulation with long joints in continuous straight lines with end joints staggered between rows. Offset joints of insulation below a minimum of 6 inches (150 mm) in each direction. Loosely butt cover boards together **and fasten to roof deck**.

1. Fasten cover boards according to requirements in FM Global's "RoofNav" for specified Windstorm Resistance Classification.
2. Fasten cover boards to resist uplift pressure at corners, perimeter, and field of roof.

3.5 MEMBRANE ROOFING INSTALLATION

A. Adhere membrane roofing over area to receive roofing according to membrane roofing system manufacturer's written instructions. Unroll membrane roofing and allow to relax before installing.

B. Start installation of membrane roofing in presence of membrane roofing system manufacturer's technical personnel.

C. Accurately align membrane roofing and maintain uniform side and end laps of minimum dimensions required by manufacturer. Stagger end laps.

D. Bonding Adhesive: Apply to substrate and underside of membrane roofing at rate required by manufacturer and allow to partially dry before installing membrane roofing. Do not apply to splice area of membrane roofing.

E. In addition to adhering, mechanically fasten membrane roofing securely at terminations, penetrations, and perimeters where fasteners will not be visible from below roof deck.

F. Apply membrane roofing with side laps shingled with slope of roof deck where possible.

G. Adhesive Seam Installation: Clean both faces of splice areas, apply splicing cement, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.

1. Apply a continuous bead of in-seam sealant before closing splice if required by membrane roofing system manufacturer.

H. Tape Seam Installation: Clean and prime both faces of splice areas, apply splice tape, and firmly roll side and end laps of overlapping membrane roofing according to manufacturer's written instructions to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of membrane roofing terminations.

I. Repair tears, voids, and lapped seams in roofing that does not comply with requirements.

J. Spread sealant or mastic bed over deck drain flange at roof drains and securely seal membrane roofing in place with clamping ring.

3.6 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. Apply bonding adhesive to substrate and underside of sheet flashing at required rate and allow to partially dry. Do not apply to seam area of flashing.

C. Flash penetrations and field-formed inside and outside corners with cured or uncured sheet flashing.

D. Clean splice areas, apply splicing cement, and firmly roll side and end laps of overlapping sheets to ensure a watertight seam installation. Apply lap sealant and seal exposed edges of sheet flashing terminations.

E. Terminate and seal top of sheet flashings and mechanically anchor to substrate through termination bars.

3.7 WALKWAY INSTALLATION

A. Flexible Walkways: Install walkway products in locations indicated. Adhere walkway products to substrate with compatible adhesive according to roofing system manufacturer's written instructions.

3.8 FIELD QUALITY CONTROL

A. Testing Agency: Owner may engage a qualified independent testing agency to perform inspections.

B. Final Roof Inspection: Arrange for roofing system manufacturer's technical personnel to inspect roofing installation on completion.

C. Repair or remove and replace components of membrane roofing system where inspections indicate that they do not comply with specified requirements.

D. Additional inspections, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

3.9 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. 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.

C. Clean overspray and spillage from adjacent construction using cleaning agents and procedures recommended by manufacturer of affected construction.

3.10 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 exceeding 90 mph (40 m/sec);
    c. Fire;
    d. Failure of roofing system substrate, including cracking, settlement, excessive deflection, deterioration, and decomposition;
    e. Faulty construction of parapet walls, copings, chimneys, skylights, vents, equipment supports, and other edge conditions and penetrations of the work;
    f. Vapor condensation on bottom of roofing; and
    g. Activity on roofing by others, including construction contractors, maintenance personnel, other persons, and animals, whether authorized or unauthorized by Owner.

2. When work has been damaged by any of foregoing causes, Warranty shall be null and void until such damage has been repaired by Roofing Installer and until cost and expense thereof have been paid by Owner or by another responsible party so designated.
3. Roofing Installer is responsible for damage to work covered by this Warranty but is not liable for consequential damages to building or building contents resulting from leaks or faults or defects of work.
4. During Warranty Period, if Owner allows alteration of work by anyone other than Roofing Installer, including cutting, patching, and maintenance in connection with penetrations, attachment of other work, and positioning of anything on roof, this Warranty shall become null and void on date of said alterations, but only to the extent said alterations affect work covered by this Warranty. If Owner engages Roofing Installer to perform said alterations, Warranty shall not become null and void unless Roofing Installer, before starting said work, shall have notified Owner in writing, showing reasonable cause for claim, that said alterations would likely damage or deteriorate work, thereby reasonably justifying a limitation or termination of this Warranty.
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 075323

SECTION 076200 - SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. Section Includes:

1. Manufactured reglets with counterflashing.
2. Formed equipment support flashing.

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. Review construction schedule. Verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review special roof details, roof drainage, roof-penetration flashing, equipment curbs, and condition of other construction that affect sheet metal flashing and trim.
3. Review requirements for insurance and certificates if applicable.
4. Review sheet metal flashing observation and repair procedures after flashing installation.

1.5 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes for each manufactured product and accessory.

B. Shop Drawings: For sheet metal flashing and trim.

1. Include plans, elevations, sections, and attachment details.

2. Detail fabrication and installation layouts, expansion-joint locations, and keyed details. Distinguish between shop- and field-assembled work.
3. Include identification of material, thickness, weight, and finish for each item and location in Project.
4. Include details for forming, including profiles, shapes, seams, and dimensions.
5. Include details for joining, supporting, and securing, including layout and spacing of fasteners, cleats, clips, and other attachments. Include pattern of seams.
6. Include details of termination points and assemblies.
7. Include details of expansion joints and expansion-joint covers, including showing direction of expansion and contraction from fixed points.
8. Include details of roof-penetration flashing.
9. Include details of edge conditions, including eaves and counterflashings as applicable.
10. Include details of special conditions.
11. Include details of connections to adjoining work.

C. 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.
2. Trim, Metal Closures, Expansion Joints, Joint Intersections, and Miscellaneous Fabrications: 12 inches (300 mm) long and in required profile. Include fasteners and other exposed accessories.
3. Unit-Type Accessories and Miscellaneous Materials: Full-size Sample.

1.6 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For each type of coping and roof edge flashing that is FM Approvals approved.

C. Product Test Reports: For each product, for tests performed by a qualified testing agency.

D. Sample Warranty: For special warranty.

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. Fabricator Qualifications: Employs skilled workers who custom fabricate sheet metal flashing and trim similar to that required for this Project and whose products have a record of successful in-service performance.

1. For copings and roof edge flashings that are FM Approvals approved, shop shall be listed as able to fabricate required details as tested and approved.

B. 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 typical roof edge, including built-in gutter, fascia trim, apron flashing, approximately 10 feet (3.0 m) long, including supporting construction cleats, seams, attachments, underlayment, and accessories.
2. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
3. 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.

1.10 WARRANTY

A. Special Warranty on Finishes: Manufacturer agrees to repair finish or replace sheet metal flashing and trim that shows evidence of deterioration of factory-applied finishes within specified warranty period.

1. Exposed Panel Finish: Deterioration includes, but is not limited to, the following:

a. Color fading more than 5 Hunter units when tested according to ASTM D 2244.
b. Chalking in excess of a No. 8 rating when tested according to ASTM D 4214.
c. Cracking, checking, peeling, or failure of paint to adhere to bare metal.

2. Finish Warranty Period: 20 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General: Sheet metal flashing and trim assemblies shall withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failure due to

defective manufacture, fabrication, installation, or other defects in construction. Completed sheet metal flashing and trim shall not rattle, leak, or loosen, and shall remain watertight.

B. Sheet Metal Standard for Flashing and Trim: Comply with NRCA's "The NRCA Roofing Manual" requirements for dimensions and profiles shown unless more stringent requirements are indicated.

C. FM Approvals Listing: Manufacture and install copings and roof edge flashings that are listed in FM Approvals' "RoofNav" and approved for windstorm classification, Class 1-105 Identify materials with name of fabricator and design approved by FM Approvals.

D. Recycled Content of Steel-Sheet Flashing and Trim: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

E. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes to prevent buckling, opening of joints, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Base calculations on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change: 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

2.2 SHEET METALS

A. General: Protect mechanical and other finishes on exposed surfaces from damage by applying strippable, temporary protective film before shipping.

1. Exposed Coil-Coated Finish:

a. Three-Coat Fluoropolymer: AAMA 620. 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.

2. Color: Custom to match Architect supplied RAL color system.

2.3 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226/D 226M, Type II (No. 30), asphalt-saturated organic felt; nonperforated.

B. Slip Sheet: Rosin-sized building paper, 3 lb/100 sq. ft. (0.16 kg/sq. m)minimum.

2.4 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, protective coatings, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation and as

recommended by manufacturer of primary sheet metal or manufactured item unless otherwise indicated.

B. Fasteners: 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. Sealant Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealant tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape 1/2 inch (13 mm) wide and 1/8 inch (3 mm) thick.

D. Elastomeric Sealant: ASTM C 920, elastomeric [polyurethane] [polysulfide] [silicone] polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

2.5 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with details shown and recommendations in cited sheet metal standard that apply to design, dimensions, geometry, metal thickness, and other characteristics of item required. Fabricate sheet metal flashing and trim in shop to greatest extent possible.

1. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
2. Obtain field measurements for accurate fit before shop fabrication.
3. Form sheet metal flashing and trim to fit substrates without excessive oil canning, buckling, and tool marks; true to line, levels, and slopes; and with exposed edges folded back to form hems.
4. Conceal fasteners and expansion provisions where possible. Do not use exposed fasteners on faces exposed to view.

B. Fabrication Tolerances: Fabricate sheet metal flashing and trim that is capable of installation to a tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

C. Expansion Provisions: Form metal for thermal expansion of exposed flashing and trim.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.

D. Sealant Joints: Where movable, nonexpansion-type joints are required, form metal to provide for proper installation of elastomeric sealant according to cited sheet metal standard.

E. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

F. Fabricate cleats and attachment devices of sizes as recommended by cited sheet metal standard and by FM Global Property Loss Prevention Data Sheet 1-49 for application, but not less than thickness of metal being secured.

G. Seams: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with elastomeric sealant unless otherwise recommended by sealant manufacturer for intended use.

H. Do not use graphite pencils to mark metal surfaces.

2.6 LOW-SLOPE ROOF SHEET METAL FABRICATIONS

A. Roof-to-Wall Transition and Fascia-Cap Transition, Expansion-Joint Cover: Fabricate from the following materials.

1. Zinc-Tin Alloy-Coated Stainless Steel: 0.024 inch (0.61 mm) thick.

B. Base Flashing: Fabricate from the following materials:

1. Stainless Steel: 0.019 inch (0.48 mm) thick.

C. Counterflashing: Shop fabricate interior and exterior corners. Fabricate from the following materials:

1. Stainless Steel: [0.019 inch (0.48 mm)] <Insert dimension> thick.

2.7 MISCELLANEOUS SHEET METAL FABRICATIONS

A. Equipment Support Flashing: Fabricate from the following materials:

1. Zinc-Tin Alloy-Coated Stainless Steel: 0.018 inch (0.46 mm) thick.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, substrate, and other conditions affecting performance of the Work.

1. Verify compliance with requirements for installation tolerances of substrates.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
3. Verify that air- or water-resistant barriers have been installed over sheathing or backing substrate to prevent air infiltration or water penetration.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free. Prime substrate if recommended by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Overlap side edges not less than 3-1/2 inches (90 mm). Roll laps and edges with roller. Cover underlayment within 14 days.

B. Apply slip sheet, if required by manufacturer, wrinkle free, over underlayment before installing sheet metal flashing and trim.

3.3 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Install sheet metal flashing and trim true to line, levels, and slopes. Provide uniform, neat seams with minimum exposure of 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 (300 mm) apart. Attach each cleat with at least two fasteners. Bend tabs over fasteners.
4. Install exposed sheet metal flashing and trim with limited oil canning, and free of buckling and tool marks.
5. Torch cutting of sheet metal flashing and trim is not permitted.
6. Do not use graphite pencils to mark metal surfaces.

B. Metal Protection: Where dissimilar metals contact each other, or where metal contacts pressure-treated wood or other corrosive substrates, protect against galvanic action or corrosion by painting contact surfaces with bituminous coating or by other permanent separation as recommended by sheet metal manufacturer or cited sheet metal standard.

1. Coat concealed side of uncoated-aluminum and stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim contact ferrous metal or cementitious construction.

2. Underlayment: Where installing sheet metal flashing and trim directly on cementitious substrates, install underlayment and cover with slip sheet.

C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet (3 m) with no joints within 24 inches (600 mm) of corner or intersection.

1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with sealant concealed within joints.

D. Fasteners: Use fastener sizes that penetrate substrate not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.

E. Conceal fasteners and expansion provisions where possible in exposed work and locate to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

F. Seal joints as required for watertight construction.

1. Use sealant-filled joints unless otherwise indicated. Embed hooked flanges of joint members not less than 1 inch (25 mm) into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is between 40 and 70 deg F (4 and 21 deg C), set joint members for 50 percent movement each way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F (4 deg C).
2. Prepare joints and apply sealants to comply with requirements in Section 079200 "Joint Sealants."

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions, and cited sheet metal standard. Provide concealed fasteners where possible, and set units true to line, levels, and slopes. Install work with laps, joints, and seams that are permanently watertight and weather resistant.

B. Roof Edge Flashing: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for FM Approvals' listing for required windstorm classification.

C. Copings: Anchor to resist uplift and outward forces according to recommendations in FM Global Property Loss Prevention Data Sheet 1-49 for specified FM Approvals' listing for required windstorm classification.

D. Pipe or Post Counterflashing: Install counterflashing umbrella with close-fitting collar with top edge flared for elastomeric sealant, extending minimum of 4 inches (100 mm) over base flashing. Install stainless-steel draw band and tighten.

E. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend

counterflashing 4 inches (100 mm) over base flashing. Lap counterflashing joints minimum of 4 inches (100 mm). Secure in waterproof manner by means of anchor and washer at 36-inch (910-mm) centers unless otherwise indicated.

F. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Seal with elastomeric sealant and clamp flashing to pipes that penetrate roof.

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 installation of wall-opening components such as windows, doors, and louvers.

B. Through-Wall Flashing: Installation of through-wall flashing is specified in Section 042000 "Unit Masonry."

C. Reglets: Installation of reglets is specified in Section 033000 "Cast-in-Place Concrete."

3.6 MISCELLANEOUS FLASHING INSTALLATION

A. Equipment Support Flashing: Coordinate installation of equipment support flashing with installation of roofing and equipment. Weld or seal flashing with elastomeric sealant to equipment support member.

B. Overhead-Piping Safety Pans: Suspend pans from structure above, independent of other overhead items such as equipment, piping, and conduit, unless otherwise indicated on Drawings. Pipe and install drain line to plumbing waste or drainage system.

3.7 ERECTION TOLERANCES

A. Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerance of 1/4 inch in 20 feet (6 mm in 6 m) on slope and location lines indicated on Drawings and within 1/8-inch (3-mm) offset of adjoining faces and of alignment of matching profiles.

3.8 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 076200

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. Penetrations in fire-resistance-rated walls.
2. Penetrations in horizontal assemblies.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For qualified Installer.

B. Installer Certificates: From Installer indicating penetration firestopping has been installed in compliance with requirements and manufacturer's written recommendations.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for penetration firestopping.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: A firm experienced in installing penetration firestopping similar in material, design, and extent to that indicated for this Project, whose work has resulted in construction with a record of successful performance. Qualifications include having the necessary experience, staff, and training to install manufacturer's products per specified requirements. Manufacturer's willingness to sell its penetration firestopping products to Contractor or to Installer engaged by Contractor does not in itself confer qualification on buyer.

B. Fire-Test-Response Characteristics: Penetration firestopping shall comply with the following requirements:

1. Penetration firestopping tests are performed by a qualified testing agency acceptable to authorities having jurisdiction.
2. Penetration firestopping is identical to those tested per testing standard referenced in "Penetration Firestopping" Article. Provide rated systems complying with the following requirements:

a. Penetration firestopping products bear classification marking of qualified testing and inspecting agency.
b. Classification markings on penetration firestopping correspond to designations listed by the following:

1) UL in its "Fire Resistance Directory."

C. Preinstallation Conference: Conduct conference at **Project site**.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install penetration firestopping when ambient or substrate temperatures are outside limits permitted by penetration firestopping manufacturers or when substrates are wet because of rain, frost, condensation, or other causes.

B. Install and cure penetration firestopping per manufacturer's written instructions using natural means of ventilations or, where this is inadequate, forced-air circulation.

1.7 COORDINATION

A. Coordinate construction of openings and penetrating items to ensure that penetration firestopping is installed according to specified requirements.

B. Coordinate sizing of sleeves, openings, core-drilled holes, or cut openings to accommodate penetration firestopping.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, **available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following**:

1. A/D Fire Protection Systems Inc.
2. Grace Construction Products.
3. Hilti, Inc.
4. Johns Manville.
5. 3M Fire Protection Products.
6. Tremco, Inc.; Tremco Fire Protection Systems Group.
7. USG Corporation.

2.2 PENETRATION FIRESTOPPING

A. Provide penetration firestopping that is produced and installed to resist spread of fire according to requirements indicated, resist passage of smoke and other gases, and maintain original fire-resistance rating of construction penetrated. Penetration firestopping systems shall be compatible with one another, with the substrates forming openings, and with penetrating items if any.

B. Penetrations in Fire-Resistance-Rated Walls: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Fire-resistance-rated walls include **fire-barrier walls and fire partitions**].
2. F-Rating: Not less than the fire-resistance rating of constructions penetrated.

C. Penetrations in Horizontal Assemblies: Provide penetration firestopping with ratings determined per ASTM E 814 or UL 1479, based on testing at a positive pressure differential of 0.01-inch wg (2.49 Pa).

1. Horizontal assemblies include **floors** and **floor/ceiling assemblies**.
2. F-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated.
3. T-Rating: At least 1 hour, but not less than the fire-resistance rating of constructions penetrated except for floor penetrations within the cavity of a wall.

D. Exposed Penetration Firestopping: Provide products with flame-spread and smoke-developed indexes of less than 25 and 450, respectively, as determined per ASTM E 84.

E. VOC Content: Penetration firestopping sealants and sealant primers shall comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

F. Accessories: Provide components for each penetration firestopping system that are needed to install fill materials and to maintain ratings required. Use only those components specified by penetration firestopping manufacturer and approved by qualified testing and inspecting agency for firestopping indicated.

1. Permanent forming/damming/backing materials, including the following:

a. Slag-wool-fiber or rock-wool-fiber insulation.
b. Sealants used in combination with other forming/damming/backing materials to prevent leakage of fill materials in liquid state.
c. Fire-rated form board.
d. Fillers for sealants.

2. Temporary forming materials.

3. Substrate primers.
4. Collars.
5. Steel sleeves.

2.3 FILL MATERIALS

A. Latex Sealants: Single-component latex formulations that do not re-emulsify after cure during exposure to moisture.

B. Firestop Devices: Factory-assembled collars formed from galvanized steel and lined with intumescent material sized to fit specific diameter of penetrant.

C. Mortars: Prepackaged dry mixes consisting of a blend of inorganic binders, hydraulic cement, fillers, and lightweight aggregate formulated for mixing with water at Project site to form a nonshrinking, homogeneous mortar.

D. Pillows/Bags: Reusable heat-expanding pillows/bags consisting of glass-fiber cloth cases filled with a combination of mineral-fiber, water-insoluble expansion agents, and fire-retardant additives. Where exposed, cover openings with steel-reinforcing wire mesh to protect pillows/bags from being easily removed.

E. Silicone Foams: Multicomponent, silicone-based liquid elastomers that, when mixed, expand and cure in place to produce a flexible, nonshrinking foam.

F. Silicone Sealants: Single-component, silicone-based, neutral-curing elastomeric sealants of grade indicated below:

1. Grade: Pourable (self-leveling) formulation for openings in floors and other horizontal surfaces, and nonsag formulation for openings in vertical and sloped surfaces, unless indicated firestopping limits use of nonsag grade for both opening conditions.

2.4 MIXING

A. For those products requiring mixing before application, comply with penetration firestopping manufacturer's written instructions for accurate proportioning of materials, water (if required), type of mixing equipment, selection of mixer speeds, mixing containers, mixing time, and other items or procedures needed to produce products of uniform quality with optimum performance characteristics for application indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Installer present, for compliance with requirements for opening configurations, penetrating items, substrates, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Surface Cleaning: Clean out openings immediately before installing penetration firestopping to comply with manufacturer's written instructions and with the following requirements:

1. Remove from surfaces of opening substrates and from penetrating items foreign materials that could interfere with adhesion of penetration firestopping.
2. Clean opening substrates and penetrating items to produce clean, sound surfaces capable of developing optimum bond with penetration firestopping. Remove loose particles remaining from cleaning operation.
3. Remove laitance and form-release agents from concrete.

B. Priming: Prime substrates where recommended in writing by manufacturer using that manufacturer's recommended products and methods. Confine primers to areas of bond; do not allow spillage and migration onto exposed surfaces.

C. Masking Tape: Use masking tape to prevent penetration firestopping from contacting adjoining surfaces that will remain exposed on completion of the Work and that would otherwise be permanently stained or damaged by such contact or by cleaning methods used to remove stains. Remove tape as soon as possible without disturbing firestopping's seal with substrates.

3.3 INSTALLATION

A. General: Install penetration firestopping to comply with manufacturer's written installation instructions and published drawings for products and applications indicated.

B. Install forming materials and other accessories of types required to support fill materials during their application and in the position needed to produce cross-sectional shapes and depths required to achieve fire ratings indicated.

1. After installing fill materials and allowing them to fully cure, remove combustible forming materials and other accessories not indicated as permanent components of firestopping.

C. Install fill materials for firestopping by proven techniques to produce the following results:

1. Fill voids and cavities formed by openings, forming materials, accessories, and penetrating items as required to achieve fire-resistance ratings indicated.
2. Apply materials so they contact and adhere to substrates formed by openings and penetrating items.
3. For fill materials that will remain exposed after completing the Work, finish to produce smooth, uniform surfaces that are flush with adjoining finishes.

3.4 IDENTIFICATION

A. Identify penetration firestopping with preprinted metal or plastic labels. Attach labels permanently to surfaces adjacent to and within 6 inches (150 mm) of firestopping edge so labels will be visible to anyone seeking to remove penetrating items or firestopping. Use mechanical fasteners or self-adhering-type labels with adhesives capable of permanently bonding labels to surfaces on which labels are placed. Include the following information on labels:

1. The words "Warning - Penetration Firestopping - Do Not Disturb. Notify Building Management of Any Damage."
2. Contractor's name, address, and phone number.
3. Designation of applicable testing and inspecting agency.
4. Date of installation.
5. Manufacturer's name.
6. Installer's name.

3.5 FIELD QUALITY CONTROL

A. Owner will engage a qualified testing agency to perform tests and inspections.

B. Where deficiencies are found or penetration firestopping is damaged or removed because of testing, repair or replace penetration firestopping to comply with requirements.

C. Proceed with enclosing penetration firestopping with other construction only after inspection reports are issued and installations comply with requirements.

3.6 CLEANING AND PROTECTION

A. Clean off excess fill materials adjacent to openings as the Work progresses by methods and with cleaning materials that are approved in writing by penetration firestopping manufacturers and that do not damage materials in which openings occur.

B. Provide final protection and maintain conditions during and after installation that ensure that penetration firestopping is without damage or deterioration at time of Substantial Completion. If, despite such protection, damage or deterioration occurs, immediately cut out and remove damaged or deteriorated penetration firestopping and install new materials to produce systems complying with specified requirements.

END OF SECTION 078413

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. Silicone joint sealants.
2. Urethane joint sealants.
3. Latex joint sealants.
4. Acoustical joint sealant.

1.3 PRECONSTRUCTION TESTING

A. Preconstruction Field-Adhesion Testing: Before installing sealants, field test their adhesion to Project joint substrates as follows:

1. Locate test joints where indicated on Project or, if not indicated, as directed by Architect.
2. Conduct field tests for each application indicated below:

   a. Each kind of 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 or Method A, Tail Procedure, in ASTM C 1521.

      1) For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

5. Report whether sealant failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. For sealants that fail adhesively, retest until satisfactory adhesion is obtained.
6. Evaluation of Preconstruction Field-Adhesion-Test Results: Sealants not evidencing adhesive failure from testing, in absence of other indications of noncompliance with requirements, will be considered satisfactory. Do not use sealants that fail to adhere to joint substrates during testing.

1.4 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 colors available for each product exposed to view.

C. Samples for Verification: For each kind and color of joint sealant required, provide Samples with joint sealants in 1/2-inch- (13-mm-) wide joints formed between two 6-inch- (150-mm-) long strips of material matching the appearance of exposed surfaces adjacent to joint sealants.

D. Joint-Sealant Schedule: Include the following information:

1. Joint-sealant application, joint location, and designation.
2. Joint-sealant manufacturer and product name.
3. Joint-sealant formulation.
4. Joint-sealant color.

E. Qualification Data: For qualified Installer and testing agency.

F. Product Certificates: For each kind of joint sealant and accessory, from manufacturer.

G. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, indicating that sealants comply with requirements.

H. Preconstruction Field-Adhesion Test Reports: Indicate which sealants and joint preparation methods resulted in optimum adhesion to joint substrates based on testing specified in "Preconstruction Testing" Article.

I. Warranties: Sample of special warranties.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Manufacturer's authorized representative who is trained and approved for installation of units required for this Project.

B. Source Limitations: Obtain each kind of joint sealant from single source from single manufacturer.

C. Product Testing: Test joint sealants using a qualified testing agency.

1. Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

D. Mockups: Install sealant in mockups of assemblies specified in other Sections that are indicated to receive joint sealants specified in this Section. Use materials and installation methods specified in this Section.

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 or are below 40 deg F (5 deg C).
2. When joint substrates are wet.
3. Where joint widths are less or greater than those allowed by joint-sealant manufacturer for applications indicated.
4. Where contaminants capable of interfering with adhesion have not yet been removed from joint substrates.

1.7 WARRANTY

A. Special Installer's Warranty: Manufacturer's standard form in which Installer agrees to repair or replace joint sealants that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Two years from date of Substantial Completion.

B. Special Manufacturer's Warranty: Manufacturer's standard form in which joint-sealant manufacturer agrees to furnish joint sealants to repair or replace those that do not comply with performance and other requirements specified in this Section within specified warranty period.

1. Warranty Period: Ten years from date of Substantial Completion.

C. Special warranties specified in this article exclude deterioration or failure of joint sealants from the following:

1. Movement of the structure caused by structural settlement or errors attributable to design or construction resulting in stresses on the sealant exceeding sealant manufacturer's written specifications for sealant elongation and compression.
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 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 joint-sealant manufacturer, based on testing and field experience.

B. VOC Content of Interior Sealants: Provide sealants and sealant primers for use inside the weatherproofing system that comply with the following limits for VOC content when calculated according to 40 CFR 59, Part 59, Subpart D (EPA Method 24):

1. Architectural Sealants: 250 g/L.
2. Sealant Primers for Nonporous Substrates: 250 g/L.
3. Sealant Primers for Porous Substrates: 775 g/L.

C. Liquid-Applied Joint Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied joint sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.

D. Stain-Test-Response Characteristics: Where 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.

E. Colors of Exposed Joint Sealants: As selected by Architect from manufacturer's full range.

2.2 SILICONE JOINT SEALANTS

A. Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Pecora Corporation; 890FTS.
d. Sika Corporation, Construction Products Division; SikaSil-C990.
e. Tremco Incorporated; Spectrem 800.

B. Single-Component, Nonsag, Traffic-Grade, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 100/50, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. May National Associates, Inc.; Bondaflex Sil 728 NS.
c. Pecora Corporation; 311 NS
d. Tremco Incorporated; Spectrem 800.

C. Mildew-Resistant, Single-Component, Nonsag, Neutral-Curing Silicone Joint Sealant: ASTM C 920, Type S, Grade NS, Class 25, for Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; 898.

2.3 URETHANE JOINT SEALANTS

A. Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 50, for Use T.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Polymeric Systems, Inc.; PSI-270.
b. Tremco Incorporated; Dymeric 240 FC.

B. Immersible Multicomponent, Nonsag, Traffic-Grade, Urethane Joint Sealant: ASTM C 920, Type M, Grade NS, Class 25, for Uses T and I.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems; Sonolastic NP 2.
b. Pecora Corporation; Dynatred.
c. Tremco Incorporated; Vulkem 227.

2.4 LATEX JOINT SEALANTS

A. Latex Joint Sealant: Siliconized acrylic latex, ASTM C 834, Type OP, Grade NF.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. BASF Building Systems; Sonolac.
b. Bostik, Inc.; Chem-Calk 600.
c. Pecora Corporation; AC-20+.
d. Schnee-Morehead, Inc.; SM 8200.
e. Tremco Incorporated; Tremflex 834.

2.5 POLYURETHANE JOINT SEALANTS

A. Polyurethane Joint Sealant: Sily-Terminated Polyurethane, ASTM C-920-98, Type S, Grade NS, Class 12.5

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; Dynaflex™ SC

2.6 ACOUSTICAL JOINT SEALANTS

A. Acoustical Joint Sealant: Manufacturer's standard one part, nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product to reduces airborne sound transmission through perimeter joints and openings as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Pecora Corporation; AIS-919
b. USG Corporation; SHEETROCK Acoustical Sealant.

2.7 JOINT SEALANT BACKING

A. General: Provide sealant backings of material 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 Type B (bicellular material with a surface skin, or as approved in writing by joint-sealant manufacturer for joint application indicated, and of size and density to control sealant depth and otherwise contribute to producing optimum sealant performance.

C. Bond-Breaker Tape: Polyethylene tape or other plastic tape recommended by sealant manufacturer for preventing sealant from adhering to rigid, inflexible joint-filler materials or joint surfaces at back of joint. Provide self-adhesive tape where applicable.

2.8 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, mechanical abrading, or a combination of these methods to produce a clean, sound substrate capable of developing optimum bond with joint sealants. Remove loose particles remaining after cleaning operations above by vacuuming or blowing out joints with oil-free compressed air. Porous joint substrates include the following:

   a. Concrete.
   b. Masonry.

3. Remove laitance and form-release agents from concrete.
4. Clean nonporous joint substrate surfaces with chemical cleaners or other means that do not stain, harm substrates, or leave residues capable of interfering with adhesion of joint sealants. Nonporous joint substrates include the following:

   a. Metal.
   b. Glass.

B. Joint Priming: Prime joint substrates where recommended by joint-sealant manufacturer or as indicated by preconstruction joint-sealant-substrate tests or prior experience. Apply primer to comply with joint-sealant manufacturer's written instructions. Confine primers to areas of joint-sealant bond; do not allow spillage or migration onto adjoining surfaces.

C. Masking Tape: Use masking tape where required to prevent contact of sealant or primer with adjoining surfaces that otherwise would be permanently stained or damaged by such contact or by cleaning methods required to remove sealant smears. Remove tape immediately after tooling without disturbing joint seal.

3.3 INSTALLATION OF JOINT SEALANTS

A. General: Comply with joint-sealant manufacturer's written installation instructions for products and applications indicated, unless more stringent requirements apply.

B. Sealant Installation Standard: Comply with recommendations in ASTM C 1193 for use of joint sealants as applicable to materials, applications, and conditions indicated.

C. Install sealant backings of kind indicated to support sealants during application and at position required to produce cross-sectional shapes and depths of installed sealants relative to joint widths that allow optimum sealant movement capability.

1. Do not leave gaps between ends of sealant backings.
2. Do not stretch, twist, puncture, or tear sealant backings.
3. Remove absorbent sealant backings that have become wet before sealant application and replace them with dry materials.

D. Install bond-breaker tape behind sealants where sealant backings are not used between sealants and backs of joints.

E. Install sealants using proven techniques that comply with the following and at the same time backings are installed:

1. Place sealants so they directly contact and fully wet joint substrates.
2. Completely fill recesses in each joint configuration.
3. Produce uniform, cross-sectional shapes and depths relative to joint widths that allow optimum sealant movement capability.

F. Tooling of Nonsag Sealants: Immediately after sealant application and before skinning or curing begins, tool sealants according to requirements specified in subparagraphs below to form smooth, uniform beads of configuration indicated; to eliminate air pockets; and to ensure contact and adhesion of sealant with sides of joint.

1. Remove excess sealant from surfaces adjacent to joints.
2. Use tooling agents that are approved in writing by sealant manufacturer and that do not discolor sealants or adjacent surfaces.
3. Provide concave joint profile per Figure 8A in ASTM C 1193, unless otherwise indicated.

G. Acoustical Sealant Installation: At sound-rated assemblies and elsewhere as indicated, seal construction at perimeters, behind control joints, and at openings and penetrations with a continuous bead of acoustical sealant. Install acoustical sealant at both faces of partitions at perimeters and through penetrations. Comply with ASTM C 919 and with manufacturer's written recommendations.

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 and cured sealant joints as follows:

   a. Perform 5 tests for the first 500 feet (150 m) of joint length for each kind of sealant and joint substrate.
   b. Perform 1 test for each 1000 feet (300 m) of joint length thereafter or 1 test per each floor per elevation.

2. Test Method: Test joint sealants according to Method A, Field-Applied Sealant Joint Hand Pull Tab, in Appendix X1 in ASTM C 1193 or Method A, Tail Procedure, in ASTM C 1521.

   a. For joints with dissimilar substrates, verify adhesion to each substrate separately; extend cut along one side, verifying adhesion to opposite side. Repeat procedure for opposite side.

3. Inspect tested joints and report on the following:

   a. Whether sealants filled joint cavities and are free of voids.
   b. Whether sealant dimensions and configurations comply with specified requirements.
   c. Whether sealants in joints connected to pulled-out portion failed to adhere to joint substrates or tore cohesively. Include data on pull distance used to test each kind of product and joint substrate. Compare these results to determine if adhesion passes sealant manufacturer's field-adhesion hand-pull test criteria.

4. Record test results in a field-adhesion-test log. Include dates when sealants were installed, names of persons who installed sealants, test dates, test locations, whether joints were primed, adhesion results and percent elongations, sealant fill, sealant configuration, and sealant dimensions.
5. 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-Adhesion Test Results: Sealants not evidencing adhesive failure from testing or noncompliance with other indicated requirements will be considered satisfactory. Remove sealants that fail to adhere to joint substrates during testing or to comply with other requirements. Retest failed applications until test results prove sealants comply with indicated requirements.

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.

3.7 JOINT-SEALANT SCHEDULE

A. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces.

1. Joint Locations:

a. Isolation and contraction joints in cast-in-place concrete slabs.
b. Joints between different materials listed above.
c. Other joints as indicated.

2. Urethane Joint Sealant: Multicomponent, nonsag, traffic grade, Class 50.
3. Preformed Joint Sealant: Preformed foam sealant.
4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors

B. Joint-Sealant Application: Exterior joints in horizontal traffic surfaces subject to water immersion.

1. Joint Locations:

a. Joints in pedestrian plazas.
b. Joints in stone paving units, including steps.
c. Joints in precast concrete paving units, including steps
d. Other joints as indicated.

2. Urethane Joint Sealant: Immersible, multicomponent, pourable, traffic grade.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

C. Joint-Sealant Application: Exterior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

a. Construction joints in cast-in-place concrete.
b. Joints between plant-precast architectural concrete units.
c. Control and expansion joints in unit masonry.
d. Joints in glass unit masonry assemblies.
e. Joints between different materials listed above.
f. Perimeter joints between materials listed above and frames of doors, windows, and louvers.
g. Other joints as indicated.

2. Silicone Joint Sealant: Single component, nonsag, neutral curing, Class 100/50**.**

3. Preformed Joint Sealant: Preformed foam.
4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

D. Joint-Sealant Application: Interior joints in horizontal traffic surfaces.

1. Joint Locations:

   a. Isolation joints in cast-in-place concrete slabs.
   b. Other joints as indicated.

2. Silicone Joint Sealant: Single component, nonsag, traffic grade, neutral curing**.**
3. Preformed Joint Sealant: Preformed foam.
4. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors

E. Joint-Sealant Application: Interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Locations:

   a. Control and expansion joints on exposed interior surfaces of exterior walls.
   b. Perimeter joints of exterior openings where indicated.
   c. Vertical joints on exposed surfaces of interior unit masonry, concrete walls, and partitions.
   d. Joints on underside of plant-precast structural concrete beams and tees.
   e. Perimeter joints between interior wall surfaces and frames of interior doors, windows and elevator entrances.
   f. Other joints as indicated.

2. Joint Sealant: Siliconized Acrylic latex.

F. Joint-Sealant Application: Mildew-resistant interior joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Sealant Location:

   a. Joints between plumbing fixtures and adjoining walls, floors, and counters.
   b. Other joints as indicated.

2. Joint Sealant: Mildew resistant, single component, nonsag, neutral curing, silicone.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

G. Joint-Sealant Application: Interior acoustical joints in vertical surfaces and horizontal nontraffic surfaces.

1. Joint Location:

   a. Acoustical joints where indicated.
   b. Other joints as indicated.

2. Joint Sealant: Acoustical.
3. Joint-Sealant Color: As selected by Architect from manufacturer's full range of colors.

END OF SECTION 079200

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. Architectural joint systems for building exteriors.

1.3 DEFINITIONS

A. Maximum Joint Width: Widest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

B. Minimum Joint Width: Narrowest linear gap a joint system tolerates and in which it performs its designed function without damaging its functional capabilities.

C. Movement Capability: Value obtained from the difference between widest and narrowest widths of a joint opening typically expressed in numerical values (mm or inches) or a percentage (plus or minus) of nominal value of joint width.

D. Nominal Joint Width: The width of the linear opening specified in practice and in which the joint system is installed.

1.4 SUBMITTALS

A. Shop Drawings: Provide the following for each joint system specified:

1. Placement Drawings: Include line diagrams showing plans, elevations, sections, details, splices, blockout requirement, entire route of each joint system, and attachments to other work. Where joint systems change planes, provide isometric or clearly detailed drawing depicting how components interconnect.

2. Architectural Joint System Schedule: Prepared by or under the supervision of the supplier. Include the following information in tabular form:

a. Manufacturer and model number for each joint system.
b. Joint system location cross-referenced to Drawings.
c. Nominal joint width.
d. Movement capability.
e. Classification as thermal or seismic.
f. Materials, colors, and finishes.

g. Product options.

B. Samples for Initial Selection: For each type of joint system indicated.

1. Include manufacturer's color charts showing the full range of colors and finishes available for each exposed metal and elastomeric seal material.

C. Samples for Verification: For each type of architectural joint system indicated.

1. Full width by 6 inches (150 mm) long, for each system required.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for current products.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain architectural joint systems through one source from a single manufacturer.

C. Product Options: Drawings indicate size, profiles, and dimensional requirements of architectural joint systems and are based on the specific systems indicated. Refer to Division 01 Section "Product Requirements."

1. Do not modify intended aesthetic effects, as judged solely by Architect, except with Architect's approval. If modifications are proposed, submit comprehensive explanatory data to Architect for review.

D. Accessibility Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA), Accessibility Guidelines (ADAAG)" and ICC A117.1.

1.6 COORDINATION

A. Coordinate installation of exterior wall joint systems with masonry assemblies to ensure that wall transitions are watertight.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Strip Seals: ASTM E 1783; preformed elastomeric membrane or tubular extrusions having an internal baffle system and secured in or over a joint by a metal locking rail.

B. Cellular Foam Seals: Extruded, compressible foam designed to function under compression.

C. Accessories: Manufacturer's standard anchors, clips, fasteners, set screws, spacers, and other accessories compatible with material in contact, as indicated or required for complete installations.

2.2 ARCHITECTURAL JOINT SYSTEMS, GENERAL

A. General: Provide architectural joint systems of design, basic profile, materials, and operation indicated. Provide units with capability to accommodate variations in adjacent surfaces.

1. Furnish units in longest practicable lengths to minimize field splicing. Install with hairline mitered corners where joint changes direction or abuts other materials.
2. Include factory-fabricated closure materials and transition pieces, tee-joints, corners, curbs, cross-connections, and other accessories as required to provide continuous joint systems.

B. Design architectural joint systems for the following size and movement characteristics:

1. Nominal Joint Width: As indicated on Drawings.
2. Movement Capability: Plus or minus 100 percent.
3. Type of Movement: Seismic, or as noted.

2.3 ARCHITECTURAL JOINT SYSTEMS FOR BUILDING EXTERIORS

A. Architectural Joint Systems for Exterior Walls:

1. Basis-of-Design Product: MM Systems Corporation
2. Type: Exterior.
3. Exposed Silicone with polyurethane backup support system.
   a. Color to be selected from manufacturer's full range.
4. Masonry to masonry: Series ESS

2.4 FINISHES

A. Appearance of Finished Work: Noticeable variations in same piece are not acceptable.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine surfaces and blockouts where architectural joint systems will be installed for installation tolerances and other conditions affecting performance of work.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to architectural joint system manufacturer's written instructions.

B. Coordinate and furnish anchorages, setting drawings, and instructions for installing joint systems. Provide fasteners of metal, type, and size to suit type of construction indicated and to provide for secure attachment of joint systems.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for storing, handling, and installing architectural joint assemblies and materials unless more stringent requirements are indicated.

B. Terminate exposed ends of joint assemblies with field- or factory-fabricated termination devices.

C. Water Barrier: Provide water barrier at exterior joints and where called for on Drawings.

3.4 PROTECTION

A. Do not remove protective covering until finish work in adjacent areas is complete. When protective covering is removed, clean exposed metal surfaces to comply with manufacturer's written instructions.

B. Protect the installation from damage by work of other Sections. Where necessary due to heavy construction traffic, remove and properly store cover plates or seals and install temporary protection over joints. Reinstall cover plates or seals prior to Substantial Completion of the Work.

END OF SECTION 079500

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. Standard hollow metal doors and welded frames for doors.

1.3 DEFINITIONS

A. Minimum Thickness: Minimum thickness of base metal without coatings.

B. Standard Hollow Metal Work: Hollow metal work fabricated according to ANSI/SDI A250.8.

C. Custom Hollow Metal Work: Hollow metal work fabricated according to ANSI/NAAMM-HMMA 861.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, core descriptions, fire-resistance rating, and finishes.

B. Shop Drawings: Include the following:

1. Elevations of each door design.
2. Details of doors, including vertical and horizontal edge details and metal thicknesses.
3. Frame details for each frame type, including dimensioned profiles and metal thicknesses.
4. Locations of reinforcement and preparations for hardware.
5. Details of each different wall opening condition.
6. Details of anchorages, joints, field splices, and connections.
7. Details of accessories.
8. Details of moldings, removable stops, and glazing.
9. Details of conduit and preparations for power, signal, and control systems.

C. Other Action Submittals:

1. Schedule: Provide a schedule of hollow metal work prepared by or under the supervision of supplier, using same reference numbers for details and openings as those on Drawings. Coordinate with door hardware schedule.

2. Submit two standard frame samples, illustrating factory finished frame colors and surface texture

D. Oversize Construction Certification: For assemblies required to be fire rated and exceeding limitations of labeled assemblies.

E. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each type of hollow metal door and frame assembly.

1.5 QUALITY ASSURANCE

A. Source Limitations: Obtain hollow metal work from single source from single manufacturer.

B. Installers:

1. Individuals that are "Certified Prefinished Frame Installers" for the installation of prefinished assembled door frames.

2. Refer to manufacturer's Internet web site for listing of Certified installers.

C. Fire-Rated Door Assemblies: Assemblies complying with NFPA 80 that are listed and labeled by a qualified testing agency, for fire-protection ratings indicated, based on testing at positive pressure according to NFPA 252 or UL 10C.

1. Oversize Fire-Rated Door Assemblies: For units exceeding sizes of tested assemblies, provide certification by a qualified testing agency that doors comply with standard construction requirements for tested and labeled fire-rated door assemblies except for size.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver hollow metal work palletized, wrapped, or crated to provide protection during transit and Project-site storage. Do not use nonvented plastic.

1. Provide additional protection to prevent damage to finish of factory-finished units.

B. Deliver welded frames with two removable spreader bars across bottom of frames, tack welded to jambs and mullions.

C. Store hollow metal work under cover at Project site. Place in stacks of five units maximum in a vertical position with heads up, spaced by blocking, on minimum 4-inch- (102-mm-) high wood blocking. Do not store in a manner that traps excess humidity.

1. Provide minimum 1/4-inch (6-mm) space between each stacked door to permit air circulation.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1.8 COORDINATION

A. Coordinate installation of anchorages for hollow metal frames. Furnish setting drawings, templates, and directions for installing anchorages, including sleeves, concrete inserts, anchor bolts, and items with integral anchors. Deliver such items to Project site in time for installation.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Amweld Building Products, LLC.
2. Ceco Door Products; an Assa Abloy Group company.
3. Curries Company; an Assa Abloy Group company.
4. Habersham Metal Products Company.
5. Phillip Manufacturing.
6. Steelcraft; an Ingersoll-Rand company.

2.2 MATERIALS

A. Cold-Rolled Steel Sheet: ASTM A 1008/A 1008M, Commercial Steel (CS), Type B; suitable for exposed applications.

B. Hot-Rolled Steel Sheet: ASTM A 1011/A 1011M, Commercial Steel (CS), Type B; free of scale, pitting, or surface defects; pickled and oiled.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS), Type B; with minimum G60 (Z180) metallic coating.

D. Frame Anchors: ASTM A 591/A 591M, Commercial Steel (CS), 40Z (12G) coating designation; mill phosphatized.

1. For anchors built into exterior walls, steel sheet complying with ASTM A 1008/A 1008M or ASTM A 1011/A 1011M, hot-dip galvanized according to ASTM A 153/A 153M, Class B.

E. Inserts, Bolts, and Fasteners: Hot-dip galvanized according to ASTM A 153/A 153M.

F. Powder-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hollow metal frames of type indicated.

G. Grout: ASTM C 476, except with a maximum slump of 4 inches (102 mm), as measured according to ASTM C 143/C 143M.

H. Mineral-Fiber Insulation: ASTM C 665, Type I (blankets without membrane facing); consisting of fibers manufactured from slag or rock wool with 6- to 12-lb/cu. ft. (96- to 192-kg/cu. m) density; with maximum flame-spread and smoke-development indexes of 25 and 50, respectively; passing ASTM E 136 for combustion characteristics.

I. Glazing: Comply with requirements in Division 08 Section "Glazing."

J. Bituminous Coating: Cold-applied asphalt mastic, SSPC-Paint 12, compounded for 15-mil (0.4-mm) dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

2.3 STANDARD HOLLOW METAL DOORS

A. General: Provide doors of design indicated, not less than thickness indicated; fabricated with smooth surfaces, without visible joints or seams on exposed faces unless otherwise indicated. Comply with ANSI/SDI A250.8.

1. Design: Flush panel.
2. Core Construction: Manufacturer's standard kraft-paper honeycomb, polyurethane, polyisocyanurate, mineral-board, or vertical steel-stiffener core.

   a. Fire Door Core: As required to provide fire-protection ratings indicated.
   b. Thermal-Rated (Insulated) Exterior Doors: Where indicated, provide doors fabricated with thermal-resistance value (R-value) of not less than 6.0 deg F x h x sq. ft./Btu (1.057 K x sq. m/W) when tested according to ASTM C 1363.

3. Vertical Edges for Single-Acting Doors: Beveled strike edge.

   a. Beveled Edge: 1/8 inch in 2 inches (3 mm in 50 mm).

4. Top and Bottom Edges: Closed with flush or inverted 0.042-inch- (1.0-mm-) thick, end closures or channels of same material as face sheets.
5. Tolerances: Comply with SDI 117, "Manufacturing Tolerances for Standard Steel Doors and Frames."

B. Exterior Doors: Face sheets fabricated from metallic-coated steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Level 4 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).

C. Interior Doors: Face sheets fabricated from cold-rolled steel sheet. Provide doors complying with requirements indicated below by referencing ANSI/SDI A250.8 for level and model and ANSI/SDI A250.4 for physical performance level:

1. Typical Interior Doors: Level 3 and Physical Performance Level A (Extra Heavy Duty), Model 1 (Full Flush).

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcing plates from same material as door face sheets.

E. Fabricate concealed stiffeners and hardware reinforcement from either cold- or hot-rolled steel sheet.

2.4 STANDARD HOLLOW METAL FRAMES

A. General: Comply with ANSI/SDI A250.8 and with details indicated for type and profile.

B. Exterior Frames: Fabricated from metallic-coated steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.

C. Interior Frames: Fabricated from cold-rolled steel sheet.

1. Fabricate frames with mitered or coped corners.
2. Fabricate frames as full profile welded unless otherwise indicated.
3. Frames for Level 3 Steel Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
4. Frames for Wood Doors: 0.053-inch- (1.3-mm-) thick steel sheet.
5. Frames for Borrowed Lights: Same as adjacent door frame.

D. Hardware Reinforcement: Fabricate according to ANSI/SDI A250.6 with reinforcement plates from same material as frames.

2.5 FRAME ANCHORS

A. Jamb Anchors:

1. Masonry Type: Adjustable strap-and-stirrup or T-shaped anchors to suit frame size, not less than 0.042 inch (1.0 mm) thick, with corrugated or perforated straps not less than 2 inches (50 mm) wide by 10 inches (250 mm) long; or wire anchors not less than 0.177 inch (4.5 mm) thick.
2. Stud-Wall Type: Designed to engage stud, welded to back of frames; not less than 0.042 inch (1.0 mm) thick.
3. Postinstalled Expansion Type for In-Place Concrete or Masonry: Minimum 3/8-inch- (9.5-mm-) diameter bolts with expansion shields or inserts. Provide pipe spacer from frame to wall, with throat reinforcement plate, welded to frame at each anchor location.

B. Floor Anchors: Formed from same material as frames, not less than 0.042 inch (1.0 mm) thick, and as follows:

1. Monolithic Concrete Slabs: Clip-type anchors, with two holes to receive fasteners.
2. Separate Topping Concrete Slabs: Adjustable-type anchors with extension clips, allowing not less than 2-inch (50-mm) height adjustment. Terminate bottom of frames at finish floor surface.

2.6 HOLLOW METAL PANELS

A. Provide hollow metal panels of same materials, construction, and finish as specified for adjoining hollow metal work.

2.7 STOPS AND MOLDINGS

A. Moldings for Glazed Lites in Doors: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as door face sheet in which they are installed.

B. Fixed Frame Moldings: Formed integral with hollow metal frames, a minimum of 5/8 inch (16 mm) high unless otherwise indicated.

C. Loose Stops for Glazed Lites in Frames: Minimum 0.032 inch (0.8 mm) thick, fabricated from same material as frames in which they are installed.

2.8 ACCESSORIES

A. Mullions and Transom Bars: Join to adjacent members by welding or rigid mechanical anchors.

B. Ceiling Struts: Minimum 1/4-inch-thick by 1-inch- (6.4-mm-thick by 25.4-mm-) wide steel.

C. Grout Guards: Formed from same material as frames, not less than 0.016 inch (0.4 mm) thick.

2.9 FABRICATION

A. Fabricate hollow metal work to be rigid and free of defects, warp, or buckle. Accurately form metal to required sizes and profiles, with minimum radius for thickness of metal. Where practical, fit and assemble units in manufacturer's plant. To ensure proper assembly at Project site, clearly identify work that cannot be permanently factory assembled before shipment.

B. Tolerances: Fabricate hollow metal work to tolerances indicated in SDI 117.

C. Hollow Metal Doors:

1. Exterior Doors: Provide weep-hole openings in bottom of exterior doors to permit moisture to escape. Seal joints in top edges of doors against water penetration.
2. Glazed Lites: Factory cut openings in doors.
3. Astragals: Provide overlapping astragal on one leaf of pairs of doors where required by NFPA 80 for fire-performance rating or where indicated. Extend minimum 3/4 inch (19 mm) beyond edge of door on which astragal is mounted.

D. Hollow Metal Frames: Where frames are fabricated in sections due to shipping or handling limitations, provide alignment plates or angles at each joint, fabricated of same thickness metal as frames.

1. Welded Frames: Weld flush face joints continuously; grind, fill, dress, and make smooth, flush, and invisible. Knock-down frames will not be accepted.

2. Sidelight and Transom Bar Frames: Provide closed tubular members with no visible face seams or joints, fabricated from same material as door frame. Fasten members at crossings and to jambs by butt welding.
3. Provide countersunk, flat- or oval-head exposed screws and bolts for exposed fasteners unless otherwise indicated.
4. Grout Guards: Weld guards to frame at back of hardware mortises in frames to be grouted.
5. Floor Anchors: Weld anchors to bottom of jambs and mullions with at least four spot welds per anchor.
6. Jamb Anchors: Provide number and spacing of anchors as follows:

    a. Masonry Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Two anchors per jamb up to 60 inches (1524 mm) high.
        2) Three anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Four anchors per jamb from 90 to 120 inches (2286 to 3048 mm) high.
        4) Four anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 120 inches (3048 mm) high.

    b. Stud-Wall Type: Locate anchors not more than 18 inches (457 mm) from top and bottom of frame. Space anchors not more than 32 inches (813 mm) o.c. and as follows:

        1) Three anchors per jamb up to 60 inches (1524 mm) high.
        2) Four anchors per jamb from 60 to 90 inches (1524 to 2286 mm) high.
        3) Five anchors per jamb from 90 to 96 inches (2286 to 2438 mm) high.
        4) Five anchors per jamb plus 1 additional anchor per jamb for each 24 inches (610 mm) or fraction thereof above 96 inches (2438 mm) high.
        5) Two anchors per head for frames above 42 inches (1066 mm) wide and mounted in metal-stud partitions.

    c. Postinstalled Expansion Type: Locate anchors not more than 6 inches (152 mm) from top and bottom of frame. Space anchors not more than 26 inches (660 mm) o.c.

7. Door Silencers: Except on weather-stripped doors, drill stops to receive door silencers as follows. Keep holes clear during construction.

    a. Single-Door Frames: Drill stop in strike jamb to receive three door silencers.
    b. Double-Door Frames: Drill stop in head jamb to receive two door silencers.

E. Fabricate concealed stiffeners, edge channels, and hardware reinforcement from either cold- or hot-rolled steel sheet.

F. Hardware Preparation: Factory prepare hollow metal work to receive templated mortised hardware; include cutouts, reinforcement, mortising, drilling, and tapping according to the Door Hardware Schedule and templates furnished as specified in Division 08 Section "Door Hardware."

1. Locate hardware as indicated, or if not indicated, according to ANSI/SDI A250.8.

2. Reinforce doors and frames to receive nontemplated, mortised and surface-mounted door hardware.
3. Comply with applicable requirements in ANSI/SDI A250.6 and ANSI/DHI A115 Series specifications for preparation of hollow metal work for hardware.
4. Coordinate locations of conduit and wiring boxes for electrical connections with Division 26 Sections.

G. Stops and Moldings: Provide stops and moldings around glazed lites where indicated. Form corners of stops and moldings with butted or mitered hairline joints.

1. Single Glazed Lites: Provide fixed stops and moldings welded on secure side of hollow metal work.
2. Multiple Glazed Lites: Provide fixed and removable stops and moldings so that each glazed lite is capable of being removed independently.
3. Provide fixed frame moldings on outside of exterior and on secure side of interior doors and frames.
4. Provide loose stops and moldings on inside of hollow metal work.
5. Coordinate rabbet width between fixed and removable stops with type of glazing and type of installation indicated.

2.10 STEEL FINISHES

A. Prime Finish: Apply manufacturer's standard primer immediately after cleaning and pretreating.

1. Shop Primer: Manufacturer's standard, fast-curing, lead- and chromate-free primer complying with ANSI/SDI A250.10 acceptance criteria; recommended by primer manufacturer for substrate; compatible with substrate and field-applied coatings despite prolonged exposure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Examine roughing-in for embedded and built-in anchors to verify actual locations before frame installation.

C. For the record, prepare written report, endorsed by Installer, listing conditions detrimental to performance of the Work.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Remove welded-in shipping spreaders installed at factory. Restore exposed finish by grinding, filling, and dressing, as required to make repaired area smooth, flush, and invisible on exposed faces.

B. Prior to installation, adjust and securely brace welded hollow metal frames for squareness, alignment, twist, and plumbness to the following tolerances:

1. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
2. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
3. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
4. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a perpendicular line from head to floor.

C. Drill and tap doors and frames to receive nontemplated, mortised, and surface-mounted door hardware.

3.3 INSTALLATION

A. General: Install hollow metal work plumb, rigid, properly aligned, and securely fastened in place; comply with Drawings and manufacturer's written instructions.

B. Hollow Metal Frames: Install hollow metal frames of size and profile indicated. Comply with ANSI/SDI A250.11.

1. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set. After wall construction is complete, remove temporary braces, leaving surfaces smooth and undamaged.

a. At fire-protection-rated openings, install frames according to NFPA 80.
b. Where frames are fabricated in sections because of shipping or handling limitations, field splice at approved locations by welding face joint continuously; grind, fill, dress, and make splice smooth, flush, and invisible on exposed faces.
c. Install frames with removable glazing stops located on secure side of opening.
d. Install door silencers in frames before grouting.
e. Remove temporary braces necessary for installation only after frames have been properly set and secured.
f. Check plumbness, squareness, and twist of frames as walls are constructed. Shim as necessary to comply with installation tolerances.
g. Field apply bituminous coating to backs of frames that are filled with grout containing antifreezing agents.

2. Floor Anchors: Provide floor anchors for each jamb and mullion that extends to floor, and secure with postinstalled expansion anchors.

a. Floor anchors may be set with powder-actuated fasteners instead of postinstalled expansion anchors if so indicated and approved on Shop Drawings.

3. Metal-Stud Partitions: Solidly pack mineral-fiber insulation behind frames.
4. Masonry Walls: Coordinate installation of frames to allow for solidly filling space between frames and masonry with grout.
5. Concrete Walls: Solidly fill space between frames and concrete with grout. Take precautions, including bracing frames, to ensure that frames are not deformed or damaged by grout forces.
6. In-Place Concrete or Masonry Construction: Secure frames in place with postinstalled expansion anchors. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
7. In-Place Gypsum Board Partitions: Secure frames in place with postinstalled expansion anchors through floor anchors at each jamb. Countersink anchors, and fill and make smooth, flush, and invisible on exposed faces.
8. Ceiling Struts: Extend struts vertically from top of frame at each jamb to overhead structural supports or substrates above frame unless frame is anchored to masonry or to other structural support at each jamb. Bend top of struts to provide flush contact for securing to supporting construction. Provide adjustable wedged or bolted anchorage to frame jamb members.
9. Installation Tolerances: Adjust hollow metal door frames for squareness, alignment, twist, and plumb to the following tolerances:

    a. Squareness: Plus or minus 1/16 inch (1.6 mm), measured at door rabbet on a line 90 degrees from jamb perpendicular to frame head.
    b. Alignment: Plus or minus 1/16 inch (1.6 mm), measured at jambs on a horizontal line parallel to plane of wall.
    c. Twist: Plus or minus 1/16 inch (1.6 mm), measured at opposite face corners of jambs on parallel lines, and perpendicular to plane of wall.
    d. Plumbness: Plus or minus 1/16 inch (1.6 mm), measured at jambs at floor.

C. Hollow Metal Doors: Fit hollow metal doors accurately in frames, within clearances specified below. Shim as necessary.

1. Non-Fire-Rated Standard Steel Doors:

    a. Jambs and Head: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
    b. Between Edges of Pairs of Doors: 1/8 inch (3 mm) plus or minus 1/16 inch (1.6 mm).
    c. Between Bottom of Door and Top of Threshold: Maximum 3/8 inch (9.5 mm).
    d. Between Bottom of Door and Top of Finish Floor (No Threshold): Maximum 3/4 inch (19 mm).

2. Fire-Rated Doors: Install doors with clearances according to NFPA 80.
3. Smoke-Control Doors: Install doors according to NFPA 105.

D. Glazing: Comply with installation requirements in Division 08 Section "Glazing" and with hollow metal manufacturer's written instructions.

1. Secure stops with countersunk flat-head machine screws spaced uniformly not more than 9 inches (230 mm) o.c. and not more than 2 inches (50 mm) from each corner.

3.4 ADJUSTING AND CLEANING

A. Final Adjustments: Check and readjust operating hardware items immediately before final inspection. Leave work in complete and proper operating condition. Remove and replace defective work, including hollow metal work that is warped, bowed, or otherwise unacceptable.

B. Remove grout and other bonding material from hollow metal work immediately after installation.

C. Prime-Coat Touchup: Immediately after erection, sand smooth rusted or damaged areas of prime coat and apply touchup of compatible air-drying, rust-inhibitive primer.

D. Metallic-Coated Surfaces: Clean abraded areas and repair with galvanizing repair paint according to manufacturer's written instructions.

END OF SECTION 081113

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. Access doors and frames for walls and ceilings.

1.3 SUBMITTALS

A. Product Data: For each type of access door and frame indicated. Include construction details, fire ratings, materials, individual components and profiles, and finishes.

B. Shop Drawings: Show fabrication and installation details of access doors and frames for each type of substrate. Include plans, elevations, sections, details, and attachments to other work.

C. Access Door and Frame Schedule: Provide complete access door and frame schedule, including types, locations, sizes, latching or locking provisions, and other data pertinent to installation.

D. Ceiling Coordination Drawings: Reflected ceiling plans, drawn to scale, on which ceiling-mounted items including access doors and frames, lighting fixtures, diffusers, grilles, speakers, sprinklers, and special trim are shown and coordinated with each other.

1.4 QUALITY ASSURANCE

A. Source Limitations: Obtain access door(s) and frame(s) through one source from a single manufacturer.

B. Fire-Rated Access Doors and Frames: Units complying with NFPA 80 that are identical to access door and frame assemblies tested for fire-test-response characteristics per the following test method and that are listed and labeled by UL or another testing and inspecting agency acceptable to authorities having jurisdiction:

1. NFPA 252 or UL 10B for vertical access doors and frames.
2. ASTM E 119 for horizontal access doors and frames.

C. Size Variations: Obtain Architect's acceptance of manufacturer's standard-size units, which may vary slightly from sizes indicated.

1.5 COORDINATION

A. Verification: Determine specific locations and sizes for access doors needed to gain access to concealed plumbing, mechanical, or other concealed work, and indicate in the schedule specified in "Submittals" Article.

PART 2 - PRODUCTS

2.1 STEEL MATERIALS

A. Steel Plates, Shapes, and Bars: ASTM A 36/A 36M.

1. ASTM A 123/A 123M, for galvanizing steel and iron products.
2. ASTM A 153/A 153M, for galvanizing steel and iron hardware.

B. Steel Sheet: Electrolytic zinc-coated, ASTM A 591/A 591M with cold-rolled steel sheet substrate complying with ASTM A 1008/A 1008M, Commercial Steel (CS), exposed.

C. Metallic-Coated Steel Sheet: ASTM A 653/A 653M, Commercial Steel (CS) with A60 (ZF180) zinc-iron-alloy (galvannealed) coating or G60 (Z180) mill-phosphatized zinc coating; stretcher-leveled standard of flatness; with minimum thickness indicated representing specified thickness according to ASTM A 924/A 924M.

D. Steel Finishes: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

1. Surface Preparation for Steel Sheet: Clean surfaces to comply with SSPC-SP 1, "Solvent Cleaning," to remove dirt, oil, grease, or other contaminants that could impair paint bond. Remove mill scale and rust, if present, from uncoated steel, complying with SSPC-SP 5/NACE No. 1, "White Metal Blast Cleaning," or SSPC-SP 8, "Pickling."
2. Surface Preparation for Metallic-Coated Steel Sheet: Clean surfaces with nonpetroleum solvent so surfaces are free of oil and other contaminants. After cleaning, apply a conversion coating suited to the organic coating to be applied over it. Clean welds, mechanical connections, and abraded areas, and apply galvanizing repair paint specified below to comply with ASTM A 780.

   a. Galvanizing Repair Paint: High-zinc-dust-content paint for regalvanizing welds in steel, complying with SSPC-Paint 20.

3. Factory-Primed Finish: Apply shop primer immediately after cleaning and pretreating.

E. Drywall Beads: Edge trim formed from 0.0299-inch (0.76-mm) zinc-coated steel sheet formed to receive joint compound and in size to suit thickness of gypsum board.

2.2 ACCESS DOORS AND FRAMES FOR WALLS AND CEILINGS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Acudor Products, Inc.
2. Babcock-Davis; A Cierra Products Co.
3. Bar-Co, Inc. Div.; Alfab, Inc.
4. Cendrex Inc.
5. Karp Associates, Inc.
6. Larsen's Manufacturing Company.
7. MIFAB, Inc.

B. Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Door: Minimum 0.060-inch- (1.5-mm-) thick sheet metal, set flush with exposed face flange of frame.
3. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
4. Hinges: Spring-loaded, concealed-pin type.
5. Lock: Cylinder.

C. Fire-Rated, Insulated, Flush Access Doors and Frames with Exposed Trim: Fabricated from steel sheet.

1. Locations: Wall and ceiling surfaces.
2. Fire-Resistance Rating: Not less than that of adjacent construction.
3. Temperature Rise Rating: 250 deg F (139 deg C) at the end of 30 minutes.
4. Door: Flush panel with a core of mineral-fiber insulation enclosed in sheet metal with a minimum thickness of 0.036 inch (0.9 mm).
5. Frame: Minimum 0.060-inch- (1.5-mm-) thick sheet metal with 1-inch- (25-mm-) wide, surface-mounted trim.
6. Hinges: Concealed-pin type.
7. Automatic Closer: Spring type.
8. Lock: Self-latching device with mortise cylinder lock.

2.3 FABRICATION

A. General: Provide access door and frame assemblies manufactured as integral units ready for installation.

B. Metal Surfaces: For metal surfaces exposed to view in the completed Work, provide materials with smooth, flat surfaces without blemishes. Do not use materials with exposed pitting, seam marks, roller marks, rolled trade names, or roughness.

C. Doors and Frames: Grind exposed welds smooth and flush with adjacent surfaces. Furnish attachment devices and fasteners of type required to secure access panels to types of supports indicated.

1. Exposed Flanges: As indicated.
2. Provide mounting holes in frames for attachment of units to metal or wood framing.
3. Provide mounting holes in frame for attachment of masonry anchors.

D. Latching Mechanisms: Furnish number required to hold doors in flush, smooth plane when closed.

1. For cylinder type lock, furnish two keys per lock and key all locks alike.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 LOCATIONS FOR ACCESS DOORS

A. Provide and locate access doors as required for access to all utilities. Size doors as appropriate for each application. Review each location with Owner's representative and receive approval for location, size and mounting of each access door.

3.3 INSTALLATION

A. Comply with manufacturer's written instructions for installing access doors and frames.

B. Set frames accurately in position and attach securely to supports with plane of face panels aligned with adjacent finish surfaces.

C. Install doors flush with adjacent finish surfaces or recessed to receive finish material.

3.4 ADJUSTING AND CLEANING

A. Adjust doors and hardware after installation for proper operation.

B. Remove and replace doors and frames that are warped, bowed, or otherwise damaged.

END OF SECTION 083113

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. Counter doors.

1.3 ACTION SUBMITTALS

A. Product Data: For each type and size of coiling counter door and accessory.

1. Include construction details, material descriptions, dimensions of individual components, profiles for slats, and finishes.

B. Shop Drawings: For each installation and for special components not dimensioned or detailed in manufacturer's product data.

1. Include plans, elevations, sections, and mounting details.
2. Include details of equipment assemblies, and indicate dimensions, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include points of attachment and their corresponding static and dynamic loads imposed on structure.

C. Samples for Initial Selection: Manufacturer's finish charts showing full range of colors and textures available for units with factory-applied finishes.

1. Include similar Samples of accessories involving color selection.

D. Samples for Verification: For each type of exposed finish on the following components, in manufacturer's standard sizes:

1. Curtain slats.
2. Bottom bar.
3. Guides.
4. Brackets.
5. Hood.
6. Locking device(s).
7. Include similar Samples of accessories involving color selection.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For coiling counter doors to include in maintenance manuals.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer for both installation and maintenance of units required for this Project.

PART 2 - PRODUCTS

2.1 MANUFACTURERS, GENERAL

A. Source Limitations: Obtain coiling counter doors from single source from single manufacturer.

1. Obtain operators and controls from coiling counter door manufacturer.

2.2 COUNTER DOOR ASSEMBLY

A. Counter Door: Coiling counter door formed with curtain of interlocking metal slats.

1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

a. ACME Rolling Doors.
b. Alpine Overhead Doors, Inc.
c. Alumatec Pacific Products.
d. Amarr Garage Doors.
e. C.H.I. Overhead Doors.
f. City-Gates.
g. Clopay Building Products.
h. Cookson Company.
i. Cornell Iron Works, Inc.
j. Lawrence Roll-Up Doors, Inc.
k. McKeon Rolling Steel Door Company, Inc.
l. Metro Door.
m. Overhead Door Corporation.
n. QMI Security Solutions.
o. Raynor.
p. Wayne-Dalton Corp.

B. Operation Cycles: Door components and operators capable of operating for not less than 20,000. One operation cycle is complete when a door is opened from the closed position to the fully open position and returned to the closed position.

C. Door Curtain Material: Aluminum.

D. Door Curtain Slats: Flat profile slats of 1-1/4-inch (32-mm) center-to-center height.

1. Gasket Seal. Manufacturer's standard continuous gaskets between slats.

E. Bottom Bar: Manufacturer's standard continuous channel or tubular shape, fabricated aluminum extrusion and finished to match door.

F. Curtain Jamb Guides: Aluminum with exposed finish matching curtain slats. Provide continuous integral wear strips to prevent metal-to-metal contact and to minimize operational noise.

G. Hood: Aluminum.

1. Shape: Round.
2. Mounting: Face of wall or recessed, as indicated.

H. Sill Configuration: No sill.

I. Locking Devices: Equip door with jamb bolt operable from inside or outside if inside is non-accessible.

J. Manual Door Operator: Push-up operation.

K. Door Finish:

1. Baked-Enamel or Powder-Coated Finish: Color as selected by Architect from manufacturer's full range.
2. Factory Prime Finish: Manufacturer's standard color.

2.3 MATERIALS, GENERAL

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.4 DOOR CURTAIN MATERIALS AND CONSTRUCTION

A. Door Curtains: Fabricate coiling counter-door curtain of interlocking metal slats in a continuous length for width of door without splices. Unless otherwise indicated, provide slats of thickness and mechanical properties recommended by door manufacturer for performance, size, and type of door indicated, and as follows:

1. Aluminum Door Curtain Slats: ASTM B 209 (ASTM B 209M) sheet or ASTM B 221 (ASTM B 221M) extrusions, alloy and temper standard with manufacturer for type of use and finish indicated; thickness of 0.050 inch (1.27 mm); and as required.

B. Curtain Jamb Guides: Manufacturer's standard angles or channels and angles of same material and finish as curtain slats unless otherwise indicated, with sufficient depth and strength to retain curtain, to allow curtain to operate smoothly, and to withstand loading. Slot bolt holes for guide adjustment. Provide removable stops on guides to prevent overtravel of curtain.

2.5 HOODS

A. General: Form sheet metal hood to entirely enclose coiled curtain and operating mechanism at opening head. Contour to fit end brackets to which hood is attached. Roll and reinforce top and bottom edges for stiffness. Form closed ends for surface-mounted hoods and fascia for any portion of between-jamb mounting that projects beyond wall face. Equip hood with intermediate support brackets as required to prevent sagging.

1. Aluminum: 0.040-inch- (1.02-mm-) thick aluminum sheet complying with ASTM B 209 (ASTM B 209M), of alloy and temper recommended by manufacturer and finisher for type of use and finish indicated.

2.6 LOCKING DEVICES

A. Slide Bolt: Fabricate with side-locking bolts to engage through slots in tracks for locking by padlock, located on both left and right jamb sides, operable from coil side.

2.7 CURTAIN ACCESSORIES

A. Push/Pull Handles: Equip each push-up-operated or emergency-operated door with lifting handles on each side of door, finished to match door.

2.8 COUNTERBALANCING MECHANISM

A. General: Counterbalance doors by means of manufacturer's standard mechanism with an adjustable-tension, steel helical torsion spring mounted around a steel shaft and contained in a spring barrel connected to top of curtain with barrel rings. Use grease-sealed bearings or self-lubricating graphite bearings for rotating members.

B. Counterbalance Barrel: Fabricate spring barrel of manufacturer's standard hot-formed, structural-quality, welded carbon-steel pipe, of sufficient diameter and wall thickness to support rolled-up curtain without distortion of slats and to limit barrel deflection to not more than 0.03 in./ft. (2.5 mm/m) of span under full load.

C. Counterbalance Spring: One or more oil-tempered, heat-treated steel helical torsion springs. Size springs to counterbalance weight of curtain, with uniform adjustment accessible from outside barrel. Secure ends of springs to barrel and shaft with cast-steel barrel plugs.

1. Fire-Rated Doors: Equip with auxiliary counterbalance spring and prevent tension release from main counterbalance spring when automatic closing device operates.

D. Torsion Rod for Counterbalance Shaft: Fabricate of manufacturer's standard cold-rolled steel, sized to hold fixed spring ends and carry torsional load.

E. Brackets: Manufacturer's standard mounting brackets of either cast iron or cold-rolled steel plate.

2.9 MANUAL DOOR OPERATORS

A. General: Equip door with manual door operator by door manufacturer.

B. Push-up Door Operation: Design counterbalance mechanism so that required lift or pull for door operation does not exceed 25 lbf (111 N).

2.10 GENERAL FINISH REQUIREMENTS

A. Comply with NAAMM/NOMMA's "Metal Finishes Manual for Architectural and Metal Products (AMP 500-06)" for recommendations for applying and designating finishes.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

2.11 ALUMINUM FINISHES

A. Baked-Enamel or Powder-Coat Finish: AAMA 2603. Comply with coating manufacturer's written instructions for cleaning, conversion coating, application, and baking.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates areas and conditions, with Installer present, for compliance with requirements for substrate construction and other conditions affecting performance of the Work.

B. Examine locations of electrical connections.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install coiling counter doors and operating equipment complete with necessary hardware, anchors, inserts, hangers, and equipment supports; according to manufacturer's written instructions and as specified.

B. Install coiling counter doors, hoods, controls, and operators at the mounting locations indicated for each door.

3.3 STARTUP SERVICE

A. Engage a factory-authorized service representative to perform startup service.

1. Perform installation and startup checks according to manufacturer's written instructions.
2. Test and adjust controls and safety devices. Replace damaged and malfunctioning controls and equipment.

3.4 ADJUSTING

A. Adjust hardware and moving parts to function smoothly so that doors operate easily, free of warp, twist, or distortion.

B. Lubricate bearings and sliding parts as recommended by manufacturer.

3.5 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain coiling counter doors.

END OF SECTION 083313

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 installation of owner supplied exterior aluminum .

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review and finalize construction schedule and verify availability of materials, Installer's personnel, equipment, and facilities needed to make progress and avoid delays.
2. Review, discuss, and coordinate the interrelationship of aluminum windows with other exterior wall components. Include provisions for anchorage, flashing, sealing perimeters, and protecting finishes.
3. Review and discuss the sequence of work required to construct a watertight and weathertight exterior building envelope.
4. Inspect and discuss the condition of substrate and other preparatory work performed by other trades.

1.4 ACTION SUBMITTALS

A. Shop Drawings: Include plans, elevations, sections, operational clearances, and details of installation, including anchor, flashing, and sealant installation.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: An installer acceptable to aluminum window manufacturer for installation of units required for this Project.

B. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Build mockup of typical wall area as shown on Drawings.

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.

PART 2 - PRODUCTS

A. Fasteners: Noncorrosive and compatible with window members, trim, hardware, anchors, and other components.

1. Exposed Fasteners: Do not use exposed fasteners to the greatest extent possible. For application of hardware, use fasteners that match finish hardware being fastened.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine openings, substrates, structural support, anchorage, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work.

B. Verify rough opening dimensions, levelness of sill plate, and operational clearances.

C. Examine wall flashings, vapor retarders, water and weather barriers, and other built-in components to ensure weathertight window installation.

D. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Comply with manufacturer's written instructions for installing windows, hardware, accessories, and other components. For installation procedures and requirements not addressed in manufacturer's written instructions, comply with installation requirements in ASTM E 2112.

B. Install windows level, plumb, square, true to line, without distortion or impeding thermal movement, anchored securely in place to structural support, and in proper relation to wall flashing and other adjacent construction to produce weathertight construction.

C. Install windows and components to drain condensation, water penetrating joints, and moisture migrating within windows to the exterior.

D. Separate aluminum and other corrodible surfaces from sources of corrosion or electrolytic action at points of contact with other materials.

3.3 FIELD QUALITY CONTROL

A. Remove and replace noncomplying windows and retest as specified above.

B. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

C. Prepare test and inspection reports.

3.4 ADJUSTING, CLEANING, AND PROTECTION

A. Adjust operating sashes and hardware for a tight fit at contact points and weather stripping for smooth operation and weathertight closure.

B. Clean exposed surfaces immediately after installing windows. Avoid damaging protective coatings and finishes. Remove excess sealants, glazing materials, dirt, and other substances.

1. Keep protective films and coverings in place until final cleaning.

C. Remove and replace glass that has been broken, chipped, cracked, abraded, or damaged during construction period.

D. Protect window surfaces from contact with contaminating substances resulting from construction operations. If contaminating substances do contact window surfaces, remove contaminants immediately according to manufacturer's written instructions.

END OF SECTION 085113

PART I – GENERAL

1.01 SUMMARY

A. SECTION INCLUDES

1. The work in this section includes furnishing all items of finish hardware as hereinafter specified or obviously necessary for all swinging and other doors. Except items which are specifically excluded from this section or of unique hardware, specified in the same sections as the doors and frames on which they are installed.

B. RELATED DOCUMENTS

1. Related documents, drawings and general provisions of contract, including General and Supplementary Conditions and Division 1 specification sections apply to this section.

1.02 REFERENCES

A. STANDARDS

1. ANSI-A250.4 – Steel Doors and Frames Physical Endurance
2. ANSI A156.1 – Butts and Hinges
3. ANSI A156.2 – Bored Locks and Latches
4. ANSI A156.3 – Exit Devices
5. ANSI A156.4 – Door Controls – Door Closers
6. ANSI A156.5 – Auxiliary Locks and Associated Products
7. ANSI A156.6 – Architectural Door Trim
8. ANSI A156.7 – Template Hinge Dimensions
9. ANSI A156.8 – Door Controls – Overhead Holders
10. ANSI A156.13 – Mortise Locks and Latches
11. ANSI A156.15 – Closer Holder Release Devices
12. ANSI A156.16 – Auxiliary Hardware
13. ANSI A156.18 – Material and Finishes
14. ANSI A156.26 – Continuous Hinges
15. UL10C – Positive Pressure Fire Tests of Door Assemblies

B. CODES

1. NFPA 101 – Life Safety Code
2. IBC 2009 – International Building Code with RI State Modifications
3. ANSI A117.1 – Accessible and Usable Buildings and Facilities
4. ADA – Americans with Disabilities Act

1.03 SUBMITTALS

A. GENERAL REQUIREMENTS

1. Submit copies of finish hardware schedule in accordance with Division 1, General Requirements.

B. SCHEDULES AND PRODUCT DATA

1. Schedules to be in vertical format, listing each door opening, and organized into "hardware sets" indicating complete designations of every item required for each door opening to function as intended. Hardware schedule shall be submitted within two (2) weeks from date the purchase order is received by the finish hardware supplier. Furnish four (4) copies of revised schedules after approval for field and file use. Note any special mounting instructions or requirements with the hardware schedule. Schedules to include the following information:

   a. Location of each hardware set cross-referenced to indications on drawings, both on floor plans and in door and frame schedule.
   b. Handing and degree of swing of each door.
   c. Door and frame sizes and materials.
   d. Keying information.
   e. Type, style, function, size, and finish of each hardware item.
   f. Elevation drawings and operational descriptions for all electronic openings.
   g. Name and manufacturer of each hardware item.
   h. Fastenings and other pertinent information.
   i. Explanation of all abbreviations, symbols and codes contained in schedule
   j. Mounting locations for hardware when varies from standard.

2. Submit catalog cuts and/or product data sheets for all scheduled finish hardware.

3. Submit separate detailed keying schedule for approval indicating clearly how the owner's final instructions on keying of locks has been fulfilled.

C. SAMPLES

1. Upon request, samples of each type of hardware in finish indicated shall be submitted. Samples are to remain undamaged and in working condition through submittal and review process. Items will be returned to the supplier or incorporated into the work within limitations of keying coordination requirements.

D. TEMPLATES

1. Furnish a complete list and suitable templates, together with finish hardware schedule to contractor, for distribution to necessary trades supplying materials to be prepped for finish hardware.

E. OPERATIONS AND MAINTENANCE MANUALS

1. Upon completion of construction and building turnover, furnish two (2) complete maintenance manuals to the owner. Manuals to include the following items:

   a. Approved hardware schedule, catalog cuts and keying schedule.
   b. Hardware installation and adjustment instructions.
   c. Manufacturer's written warranty information.

1.04 QUALITY ASSURANCE

A. SUBSTITUTIONS

1. All substitution requests must be submitted before bidding and within the procedures and time frame as outlined in Division 1, General Requirements. Approval of products is at the discretion of the architect and his hardware consultant.

B. SUPPLIER QUALIFICATIONS

1. A recognized architectural door hardware supplier who has maintained an office and has been furnishing hardware in the project's vicinity for a period of at least two (2) years.

2. Hardware supplier shall have office and warehouse facilities to accommodate this project.

3. Hardware supplier shall have in his employment at least one (1) Architectural Hardware Consultant (AHC) who is available at reasonable times during business hours for consultation about the project's hardware and requirements to the owner, architect and contractor.

4. Hardware supplier must be an authorized factory distributor of all products specified herein.

1.05 FIRE-RATED OPENINGS

1. Provide door hardware for fire-rated openings that comply with NFPA 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed by Underwriters Laboratories (UL) or Warnock Hersey (WH) for use on types and sizes of doors indicated.

2. Project requires door assemblies and components that are compliant with positive pressure and S-label requirements. Specifications must be cross-referenced and coordinated with door manufacturers to ensure that total opening engineering is compatible with UL10C Standard for Positive Pressure Fire Tests of Door Assemblies.

   a. Hardware required for fire doors shall be listed with Underwriters Laboratories for ratings specified.
   b. Certification(s) of compliance shall be made available upon request by the Authority Having Jurisdiction.

1.06 DELIVERY, STORAGE AND HANDLING

A. MARKING AND PACKAGING

1. Properly package and mark items according to the approved hardware schedule, complete with necessary screws and accessories, instructions and installation templates for spotting mortising tools. Contractor shall check deliveries against accepted list and provide receipt for them, after which he is responsible for storage and care. Any shortage or damaged good shall be made without cost to the owner.

2. Packaging of door hardware is the responsibility of the supplier. As hardware supplier receives material from various manufacturers, sort and repackage in containers clearly marked with appropriate hardware set and door numbers to match the approved hardware schedule. Two or more identical sets may be packed in same container.

B. DELIVERY

1. The supplier shall deliver all hardware to the project site; direct factory shipments are not allowed unless agreed upon beforehand. Hardware supplier shall coordinate delivery times and schedules with the contractor. Inventory door hardware jointly with representatives of hardware supplier and hardware installer/contractor until each is satisfied that count is correct.

2. No keys, other than construction master keys and/or temporary keys are to be packed in boxes with the locks.

3. At time of hardware delivery, door openings supplier in conjunction with the contractor shall check in all hardware and set up a hardware storage room.

C. STORAGE

1. Provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items that are not immediately replaceable so that completion of work will not be delayed by hardware losses both before and after installation.

1.07 WARRANTY

A. All items, except as noted below, shall be warranted in writing by the manufacturer against failure due to defective materials and workmanship for a minimum period of one (1) year commencing on the date of final completion and acceptance. In the event of product failure, promptly repair or replace item with no additional cost to the owner.

1. Mortise locksets: Seven (7) years
2. Exit Devices: Five (5) years
3. Door closers: Ten (10) years

PART II – PRODUCTS

2.01 MANUFACTURERS

A. Only manufacturers as listed below shall be accepted. Obtain each type of finish hardware (hinges, latch and locksets, exit devices, door closers, etc.) from a single manufacturer.

B. It is the intent of this section to match existing hardware in Office Wing wherever possible. New hardware types shall be as specified.

2.02 MATERIALS

A. SCREWS AND FASTENERS

1. All required screws shall be supplied as necessary for securing finish hardware in the appropriate manner. Thru-bolts shall be supplied for exit devices and door closers where required by code and the appropriate blocking or reinforcing is not present in the door to preclude their use.

B. HANGING DEVICES

1. HINGES

a. Hinges shall conform to ANSI A156.1 and have the number of knuckles as specified, oil-impregnated bearings as specified with NRP (non-removable pin) feature, at all exterior reverse bevel doors. Unless otherwise scheduled, supply one (1) hinge for every 30" of door height. Hinges shall be a minimum of 4 1/2" high and 4" wide; heavy weight hinges (.180) shall be supplied at all doors where specified.

1) Specified Manufacturer: McKinney
2) Approved Substitutes: Hager, Stanley

2. CONTINUOUS GEARED HINGES

a. All hinges to be non-handed and completely reversible. Hinge line to be available in concealed flush mount with or without inset, full surface and half surface types as specified in the hardware sets. All hinges to be made of extruded 6060 T6 aluminum alloy with polyacetal thrust bearings, anodized after cutouts are made for bearings. All concealed hinges to be fire-rated for 20, 45 and 90 minutes when incorporated into proper door and frame labeled installations, without necessitating the use of fusible-link pins. All concealed hinges to be available in standard, heavy, and extra heavy duty weights; all full surface and half surface hinges in standard and heavy duty weights as specified in the hardware sets. All hinges to be factory cut for door size.

1) Specified Manufacturers: McKinney
2) Approved Manufacturers: Pemko, Select

C. FLUSH BOLTS AND ACCESSORIES

1. All manual and automatic flush bolts to be furnished as specified.

   a. Specified Manufacturer: Rockwood
   b. Approved Substitutes: McKinney, Quality, Trimco

D. CYLINDERS AND KEYING

1. CYLINDERS

   a. Where specified, high security cylinders shall be supplied. Provide Patented High security keys able to operate both the appropriate conventional and high security cylinder within the same master key system while the keys for the conventional cylinders will not operate the high security cylinders. The high security cylinder can be easily re-configured by the Owner to void existing keys without disturbing the pinning of the master key system. If the master key system is compromised by the loss of a top-level master key, the system can be changed through a simple realignment of the barrel/plug components. The existing keys are then voided from operating the cylinder. Stamp all change keys with keyset symbol (VKC), but do not stamp with key section or bitting number.

      1) Specified Manufacturer: to match existing (Owner standard)
      2) Approved Substitutes: None

2. KEYING

   a. All locks and cylinders shall be removable core and shall be furnished with brass construction cores for use during the construction phase of the project. These brass construction cores remain the property of the lock/cylinder manufacturer and must be returned upon installation of the permanent cores. All locks and cylinders to be master-keyed or grandmaster-keyed as directed by the owner. The factory shall key all locks and cylinders. Furnish the following key amounts:

      1) Four (4) change keys per lock
      2) Four (4) grand master keys
      3) Four (4) master keys per master level
      4) Ten (10) construction/temporary keys
      5) Two (2) construction control keys
      6) Two (2) permanent control keys

   b. Master keys shall be sealed in tamper-proof packaged boxes when shipped from the factory.

E. LOCKING DEVICES

1. MORTISE LOCKSETS

a. All locksets shall be ANSI 156.13 Series 1000, Grade 1 Certified. All functions shall be manufactured in a single sized case formed from 12 gauge steel minimum. The lockset shall have a field-adjustable, beveled armored front, with a .125" minimum thickness and shall be reversible without opening the lock body. The lockset shall be 2 3/4" backset with a one-piece 3/4" anti-friction stainless steel latchbolt. The deadbolt shall be a full 1" throw made of stainless steel and have 2 hardened steel roller inserts. All strikes shall be non-handed with a curved lip. To insure proper alignment, all trim, shall be thru-bolted and fully interchangeable between rose and escutcheon designs and shall be the product of one manufacturer.

1) Specified Manufacturer: to match existing (Owner standard)
2) Approved Substitutes: None

2. LOCKSET STRIKES

a. Strikes shall be non-handed and available with curved lip, full lip or ASA type strikes as required. Provide strikes with lip-length required to accommodate jamb and/or trim detail and projection.

F. EXIT DEVICES

1. CONVENTIONAL DEVICES – PUSH RAIL

a. All exit devices shall be ANSI A156.3, Grade 1 Certified and shall be listed by Underwriters Laboratories and bear the UL label for life safety in full compliance with NFPA 80 and NFPA 101. Mounting rails shall be formed from a solid single piece of stainless steel, brass or bronze no less than 0.072" thick. Push rails shall be constructed of 0.062" thick material. Painted or anodized aluminum shall not be considered heavy duty and is not acceptable. Lever trim shall be available in finishes and designs to match that of the specified locksets.

1) Specified Manufacturer: to match existing (Owner standard)
2) Approved Substitutes: None

G. DOOR CLOSERS

1. SURFACE MOUNTED CLOSERS – HEAVY DUTY

a. All door closers shall be ANSI 156.4, Grade 1 Certified. All surface closers shall be of full rack and pinion construction. Closing speed, latching speed and backcheck shall be controlled by key operated valves. Closers shall be non-handed to meet a variety of door conditions and design requirements. Closers shall project no more than 2 3/4" from the surface of the door. All arms shall be finely finished with heavy duty forged steel main arm and closer covers shall be of high impact plastic material of flame retardant grade.

1) Specified Manufacturer: Corbin Russwin DC8000 Series (Owner standard)
2) Approved Substitutes: None

2. HOLD OPEN CLOSERS

a. SINGLE-POINT HOLD OPEN

1) Closers to have adjustable hold-open range of 85 to 110 degrees. Mountings for regular and double egress arm applications to be supplied where necessary. When a detector is required, use integral photo-electric type with LED indicator. Voltage to be 24VDC unless otherwise specified.

a) Specified Manufacturers: Corbin Russwin DC62900
b) Approved Manufacturers: Norton Powertrack

3. AUTOMATIC DOOR OPERATORS – HEAVY DUTY

a. All door closers shall be ANSI 156.19, Grade 1 Certified. Units shall have adjustments for door closing force and backcheck, motor assist from 0 to 30 seconds, motor start up delay, vestibule interface delay, electric lock delay, and door hold open delay up to 30 seconds. Operator units shall provide conventional door closer opening and closing forces unless the power operator motor is activated by an initiating device with door closer assembly having adjustable spring size, backcheck valve, sweep valve, latch valve, speed control valve, and pressure adjustment valve to control door closing. Operators shall have push and go function to activate power operator or power assist functions. Units shall have a presence detector input to prevent a closed door from opening or a door that is fully opened from closing and shall have a hold open toggle input to allow remote activation for indefinite hold open; door shall close the second time the input is activated. Operators shall have a SPDT relay for interfacing with latching or locking devices. All controlling operator switches shall be of radio-frequency design and not hard-wired.

1) Specified Manufacturer: Norton 6900 Series
2) Approved Substitutes: Besam Power Swing

H. DOOR TRIM AND PROTECTIVE PLATES

1. Kick plates shall be .050 gauges and two (2) inches less full width of door, or as specified. Push plates, pull plates, door pulls and miscellaneous door trim shall be as shown in the hardware schedule.

2. Beveled plates with oval head screws.

a. Specified Manufacturer: Rockwood
b. Approved Substitutes: McKinney, Quality, Trimco

I. DOOR STOPS AND HOLDERS

1. WALL MOUNTED DOOR STOPS

a. Where a door is indicated on the plans to strike flush against a wall, wall bumpers shall be provided. Provide convex or concave design as indicated.

1) Specified Manufacturers: Rockwood
2) Approved Substitutes: McKinney, Quality, Trimco

2. OVERHEAD STOPS/HOLDERS

a. Where specified, overhead stops/holders as shown in the hardware sets are to be provided. Track, slide, arm and jamb bracket shall be constructed of extruded bronze and shock absorber spring shall be of heavy tempered steel. Overhead stops shall be of non-handed design.

1) Specified Manufacturers: Rixson
2) Approved Substitutes: ABH, Sargent

J. GASKETING AND THRESHOLDS

1. Provide continuous weatherseal on exterior doors and smoke, light, or sound seals on interior doors where indicated or scheduled. Provide intumescent seals as required to meet UL10C Standard for Positive Pressure Fire Tests of Door Assemblies. Provide only those units where resilient or flexible seal strip is easily replaceable and readily available from stocks maintained by manufacturer.

2. Provide threshold units not less than 4" wide, formed to accommodate change in floor elevation where indicated, fabricated to accommodate door hardware and to fit door frames. All threshold units shall comply with the Americans with Disabilities Act (ADA).

a. Specified Manufacturers: Pemko
b. Approved Substitutes: McKinney, National Guard, Reese, Zero

K. SILENCERS

1. Furnish rubber door silencers all hollow metal frames; two (2) per pair and three (3) per single door frame.

2.03 FINISHES

A. The designations used in schedules and elsewhere to indicate hardware finishes are those listed in ANSI/BHMA A156.18 or traditional U.S. finishes shown by certain manufacturers for their products.

B. Provide quality of finish, including thickness of plating or coating (if any), composition, hardness, and other qualities complying with manufacturer's standards, but in no case less than specified by referenced standards for the applicable units of hardware.

C. Where specified hardware shall have an antimicrobial coating which permanently suppresses the growth of bacteria, algae, fungus, mold and mildew applied. The finish shall control the spread and growth of bacteria, mold and mildew and shall be FDA listed for use in medical and food preparation equipment.

PART III – EXECUTION

3.01 EXAMINATION

A. Contractor shall ensure that the building is secured and free from weather elements prior to installing interior door hardware. Examine hardware before installation to ensure it is free of defects.

3.02 INSTALLATION

A. Mount hardware units at heights indicated in the following applicable publications, except as specifically indicated or required to comply with the governing regulations.

1. "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute (DHI.)
2. NWWDA Industry Standard I.S.1.7, "Hardware Locations for Wood Flush Doors."

B. All hardware shall be applied and installed in accordance with best trade practice by an experienced hardware installer. Care shall be exercised not to mar or damage adjacent work.

C. Install each hardware item in compliance with the manufacturer's instructions and recommendations. Where cutting and fitting is required to install hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation or application of surface protection with finishing work specified in the Division 9 Sections. Do not install surface-mounted items until finishes have been completed on the substrates involved.

D. Provide a secure lock up for hardware delivered to the project but not yet installed. Control the handling and installation of hardware items so that the completion of the work will not be delayed by hardware losses before and after installation.

3.03 FIELD QUALITY CONTROL

A. Prior to the installation of hardware, manufacturer's representatives for locksets, closers, and exit devices shall arrange and hold a jobsite meeting to instruct the installing contractor's personnel on the proper installation of their respective products. A letter of compliance, indicating when this meeting is held and who is in attendance, shall be sent to the Architect and Owner.

B. The hardware supplier shall do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.

C. The manufacturer's representative shall do a final inspection prior to building completion to ensure that all hardware was correctly installed and is in proper working order.

3.04 ADJUSTING, CLEANING, AND DEMONSTRATING

A. Adjust and check each operating item of hardware and each door to ensure proper operation or function of every unit. Replace units that cannot be adjusted to operate freely and smoothly or as intended for the application made.

B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore to proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.

C. Instruct owner's personnel in the proper adjustment and maintenance of door hardware and hardware finishes and usage of any electronic devices.

3.05 PROTECTION

A. Contractor shall protect all hardware, as it is stored on construction site in a covered and dry place. Protect exposed hardware installed on doors during the construction phase. Install any and all hardware at the latest possible time frame.

3.06 HARDWARE SCHEDULE

A. The following schedule is furnished for whatever assistance it may afford the Contractor; do not consider it as entirely inclusive. Should any particular door or item be omitted in any scheduled hardware heading, provide door or item with hardware same as required for similar purposes. Hardware supplier is responsible for handing and sizing all products as listed in the hardware heading. Quantities listed are for each pair of doors, or for each single door.

B. Manufacturer's Abbreviations:

1. CR Corbin Russwin
2. HI HID
3. MC McKinney
4. NO Norton
5. PE Pemko
6. RO Rockwood
7. RX Rixson
8. SN Securitron

3.07 HARDWARE SETS

SET #1

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Panic Hardware	ED5200 x N959 CT6R M21 M51	630	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop)	DC8210 A11	689	CR
1	Protection Plate	K1050 8" x 2" LDW	32D	RO
3	Door Silencers	608	GREY	RO

SET #2

6	Hinges	T4A3786 4 1/2 X 4 1/2	26D	MC
2	Panic Hardware	ED5400 x N955 M52 M55	630	CR
4	Pyramid Core	8027 KY3	626	CR
2	Surface Closer (Stop)	DC8210 A11	689	CR
2	Protection Plate	K1050 8" x 1" LDW	32D	RO
2	Door Silencers	608	GREY	RO

SET #3

6	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
2	Flush Bolt	555	26D	RO
1	Storeroom Lockset	ML2057 NSA CT6R M21	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop/HO)	DC8210 A12	689	CR
1	Surface Overhead Stop	10-	652	RX
2	Protection Plate	K1050 8" x 1" LDW	32D	RO
1	Dust Proof Strike	570	26D	RO
2	Door Silencers	608	GREY	RO

SET #4

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Storeroom Lockset	ML2057 NSA CT6R M21	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop)	DC8210 A11	689	CR
1	Protection Plate	K1050 8" x 2" LDW	32D	RO
3	Door Silencers	608	GREY	RO

SET #5

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Storeroom Lockset	ML2057 NSA CT6R M21	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop)	DC8210 A11	689	CR

1	Protection Plate	K1050 8" x 2" LDW	32D	RO
3	Door Silencers	608	GREY	RO
1	Weatherseal			
1	Threshold	2005 AP		PE

SET #6

6	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
2	Flush Bolt	555	26D	RO
1	Classroom Lockset	ML2055 NSA CT6R M21	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop/HO)	DC8210 A12	689	CR
1	Surface Overhead Stop	10-	652	RX
2	Protection Plate	K1050 34" x 1" LDW	32D	RO
1	Dust Proof Strike	570	26D	RO
2	Door Silencers	608	GREY	RO

Verify all existing frame preps prior to scheduling hardware.

SET #7

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Classroom Lockset	ML2055 NSA CT6R M21	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer (Stop/HO)	DC8210 A12	689	CR
1	Surface Overhead Stop	10-	652	RX
3	Door Silencers	608	GREY	RO

SET #8

3	Hinges	T4A3786 4 1/2 X 4 1/2	26D	MC
1	Classroom Lockset	ML2055 NSA CT6R	626	CR
1	Pyramid Core	8027 KY3	626	CR
1	Surface Closer	DC8200 A10	689	CR
1	Protection Plate	K1050 8" x 2" LDW	32D	RO
1	Wall Stop	406	32D	RO
3	Door Silencers	608	GREY	RO

SET #9

3	Hinges	T4A3786 4 1/2 X 4 1/2	26D	MC
1	Push/Pull Plate Set	111 X 73C/73CL	32D	ROCK
1	Surface Closer	DC8200 A10	689	CR
1	Protection Plate	K1050 8" x 2" LDW	32D	RO
1	Wall Stop	406	32D	RO
3	Door Silencers	608	GREY	RO

SET #10

3	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
1	Privacy Set	ML2030 NSA	626	CR
1	Surface Closer	DC8200 A10	689	CR
1	Protection Plate	K1050 8" x 2" LDW	32D	RO
1	Wall Stop	406	32D	RO
3	Door Silencers	608	GREY	RO

SET #11

6	Hinges	TA2714 4 1/2 X 4 1/2	26D	MC
2	Push/Pull Plate Set	111 X 73C/73CL	32D	RO
2	Surface Closer	DC8200 A10	689	CR
2	Protection Plate	K1050 8" x 1" LDW	32D	RO
2	Wall Stop	406	32D	RO
2	Door Silencers	608	GREY	RO

SET #13

1	Continuous Hinge	MCK-12HD	CLEAR	MC
1	Panic Hardware	ED5200 CT6R M52	630	CR
1	Surface Closer	DC8210 A3	689	CR
1	Concealed Overhead Stop	6-	652	RX
1	Weatherseal	FURNISHED BY ALUMINUM DOOR SUPPLIER		
1	Threshold	2005 AP		PE

SET #14

2	Continuous Hinge	MCK-12HD	CLEAR	MC
2	Panic Hardware	ED5200 CT6R M52	630	CR
2	Surface Closer	DC8210 A3	689	CR
2	Concealed Overhead Stop	6-	652	RX
2	Fire seal	FURNISHED BY FIRE RATED DOOR MANUFACTURER		
1	Threshold	2005 AP		PE
2	Door Silencers	608	GREY	RO

END OF SECTION 087100

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 glazing for the following products and applications, including those specified in other Sections where glazing requirements are specified by reference to this Section:

1. Fire rated glazing
2. Tempered glass mirrors qualifying as safety glazing.

1.3 DEFINITIONS

A. Glass Manufacturers: Firms that produce primary glass, fabricated glass, or both, as defined in referenced glazing publications.

B. Glass Thicknesses: Indicated by thickness designations in millimeters according to ASTM C 1036.

1.4 ACTION SUBMITTALS

A. Product Data: For each glass product and glazing material indicated.

B. Glass Samples: For each type of the following products; 12 inches (300 mm) square.

1. Fire-resistive glazing products.
2. Mirrors. Include description of materials and process used to produce each type of silvered flat glass mirror specified that indicates sources of glass, glass coating components, edge sealer, and quality-control provisions.
   a. Mirrors: 12 inches (300 mm) square, including edge treatment on two adjoining edges.
   b. Mirror Clips: Full size.
   c. Mirror Trim: 12 inches (300 mm) long.

C. Shop Drawings: Include mirror elevations, edge details, mirror hardware, and attachments to other work.

D. Samples: For each Glazing Accessory Samples: For gaskets, in 12-inch (300-mm) lengths.

E. Glazing Schedule: List glass types and thicknesses for each size opening and location. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For manufacturers of insulating-glass units with sputter-coated, low-e coatings.

B. Product Certificates: For glass and glazing products, from manufacturer.

C. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for insulating glass.

1. For glazing sealants, provide test reports based on testing current sealant formulations within previous 36-month period.

D. Preconstruction adhesion and compatibility test report.

E. Warranties: Sample of special warranties.

1.6 QUALITY ASSURANCE

A. Manufacturer Qualifications for Insulating-Glass Units with Sputter-Coated, Low-E Coatings: A qualified insulating-glass manufacturer who is approved by coated-glass manufacturer.

B. Installer Qualifications: A qualified installer who employs glass installers for this Project who are certified under the National Glass Association's Certified Glass Installer Program.

C. Glass Testing Agency Qualifications: A qualified independent testing agency accredited according to the NFRC CAP 1 Certification Agency Program.

D. Sealant Testing Agency Qualifications: An independent testing agency qualified according to ASTM C 1021 to conduct the testing indicated.

E. Source Limitations for Glass: Obtain insulating glass from single source from single manufacturer for each glass type.

F. Source Limitations for Glazing Accessories: Obtain from single source from single manufacturer for each product and installation method.

G. Preconstruction Mirror Mastic Compatibility Test: Submit mirror mastic products to mirror manufacturer for testing to determine compatibility of mastic with mirror backing and substrates on which mirrors are installed.

H. Glazing Publications: Comply with published recommendations of glass product manufacturers and organizations below, unless more stringent requirements are indicated. Refer to these publications for glazing terms not otherwise defined in this Section or in referenced standards.

1. GANA Publications: GANA's "Glazing Manual."
2. GANA Mirror Division's "Mirrors, Handle with Extreme Care: Tips for the Professional on the Care and Handling of Mirrors."

I. Safety Glazing Labeling: Where safety glazing labeling is indicated, permanently mark glazing with certification label of the SGCC or another certification agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, type of glass, thickness, and safety glazing standard with which glass complies.

J. Fire-Protection-Rated Glazing Labeling: Permanently mark fire-protection-rated glazing with certification label of a testing agency acceptable to authorities having jurisdiction. Label shall indicate manufacturer's name, test standard, whether glazing is for use in fire doors or other openings, whether or not glazing passes hose-stream test, whether or not glazing has a temperature rise rating of 450 deg F (250 deg C), and the fire-resistance rating in minutes.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Protect glazing materials according to manufacturer's written instructions. Prevent damage to glass and glazing materials from condensation, temperature changes, direct exposure to sun, or other causes.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not proceed with glazing when ambient and substrate temperature conditions are outside limits permitted by glazing material manufacturers and when glazing channel substrates are wet from rain, frost, condensation, or other causes.

1.9 WARRANTY

A. Manufacturer's Special Warranty on Insulating Glass: Manufacturer's standard form in which insulating-glass manufacturer agrees to replace insulating-glass units that deteriorate within specified warranty period. Deterioration of insulating glass is defined as failure of hermetic seal under normal use that is not attributed to glass breakage or to maintaining and cleaning insulating glass contrary to manufacturer's written instructions. Evidence of failure is the obstruction of vision by dust, moisture, or film on interior surfaces of glass.

1. Warranty Period: 10 years from date of Substantial Completion.
2. Warranty Period, Mirrors: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GLASS PRODUCTS, GENERAL

A. Thickness: Where glass thickness is indicated, it is a minimum. Provide glass lites in thicknesses as needed to comply with requirements indicated.

1. Minimum Glass Thickness for Exterior Lites: Not less than 6.0 mm.

B. Strength: Where float glass is indicated, provide annealed float glass, Kind HS heat-treated float glass, or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where heat-strengthened glass is indicated, provide Kind HS heat-treated float glass or Kind FT heat-treated float glass as needed to comply with "Performance Requirements" Article. Where fully tempered glass is indicated, provide Kind FT heat-treated float glass.

C. Thermal and Optical Performance Properties: Provide glass with performance properties specified, as indicated in manufacturer's published test data, based on procedures indicated below:

1. For monolithic-glass lites, properties are based on units with lites of thickness indicated.
2. For laminated-glass lites, properties are based on products of construction indicated.
3. For insulating-glass units, properties are based on units of thickness indicated for overall unit and for each lite.
4. U-Factors: Center-of-glazing values, according to NFRC 100 and based on LBL's WINDOW 5.2 computer program, expressed as Btu/sq. ft. x h x deg F (W/sq. m x K).
5. Solar Heat-Gain Coefficient and Visible Transmittance: Center-of-glazing values, according to NFRC 200 and based on LBL's WINDOW 5.2 computer program.
6. Visible Reflectance: Center-of-glazing values, according to NFRC 300.

2.2 GLASS PRODUCTS

A. Float Glass: ASTM C 1036, Type I, Quality-Q3, Class I (clear) unless otherwise indicated.

B. Heat-Treated Float Glass: ASTM C 1048; Type I; Quality-Q3; Class I (clear) unless otherwise indicated; of kind and condition indicated.

1. Fabrication Process: By horizontal (roller-hearth) process with roll-wave distortion parallel to bottom edge of glass as installed unless otherwise indicated.
2. For uncoated glass, comply with requirements for Condition A.
3. For coated vision glass, comply with requirements for Condition C (other coated glass).

C. Pyrolytic-Coated, Self-Cleaning, Low-Maintenance Glass: Clear float glass with a coating on first surface having both photocatalytic and hydrophilic properties that act to loosen dirt and to cause water to sheet evenly over the glass instead of beading.

D. Ceramic-Coated Spandrel Glass: ASTM C 1048, Condition B, Type I, Quality-Q3, and complying with other requirements specified.

1. Glass: Clear float.
2. Ceramic Coating Color: As selected by Architect from manufacturer's full range.

2.3 FIRE-PROTECTION-RATED GLAZING

A. Fire-Protection-Rated Glazing, General: Listed and labeled by a testing agency acceptable to authorities having jurisdiction, for fire-protection ratings indicated, based on testing according to NFPA 252 for door assemblies.

B. Laminated Ceramic Glazing: Laminated glass made from 2 plies of clear, ceramic flat glass; 5/16-inch (8-mm) total nominal thickness; complying with testing requirements in 16 CFR 1201 for Category II materials.

1. Products: Subject to compliance with requirements, provide the following:

a. Nippon Electric Glass Co., Ltd. (distributed by Technical Glass Products); FireLite Plus.

2.4 SILVERED FLAT GLASS MIRRORS

A. Glass Mirrors, General: ASTM C 1503; manufactured using copper-free, low-lead mirror coating process.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Arch Aluminum & Glass Co., Inc.
b. Avalon Glass and Mirror Company.
c. Binswanger Mirror; a division of Vitro America, Inc.
d. D & W Incorporated
e. Donisi Mirror Company.
f. Gardner Glass, Inc.
g. Gilded Mirrors, Inc.
h. Guardian Industries.
i. Head West.
j. Independent Mirror Industries, Inc.
k. Lenoir Mirror Company.
l. Maran-Wurzell Glass & Mirror.
m. National Glass Industries.
n. Stroupe Mirror Co., Inc.
o. Sunshine Mirror; Westshore Glass Corp.
p. Virginia Mirror Company, Inc.
q. Walker Glass Co., Ltd.

B. Tempered Clear Glass: Mirror Glazing Quality, for blemish requirements; and comply with ASTM C 1048 for Kind FT, Condition A, tempered float glass before silver coating is applied.

1. Nominal Thickness: 4.0 mm.

2.5 GLAZING GASKETS

A. Dense Compression Gaskets: Molded or extruded gaskets of profile and hardness required to maintain watertight seal, made from one of the following:

1. EPDM complying with ASTM C 864.
2. Silicone complying with ASTM C 1115.

3. Thermoplastic polyolefin rubber complying with ASTM C 1115.

B. Soft Compression Gaskets: Extruded or molded, closed-cell, integral-skinned thermoplastic polyolefin rubber gaskets complying with ASTM C 509, Type II, black; of profile and hardness required to maintain watertight seal.

1. Application: Use where soft compression gaskets will be compressed by inserting dense compression gaskets on opposite side of glazing or pressure applied by means of pressure-glazing stops on opposite side of glazing.

C. Lock-Strip Gaskets: Neoprene extrusions in size and shape indicated, fabricated into frames with molded corner units and zipper lock-strips, complying with ASTM C 542, black.

2.6 GLAZING SEALANTS

A. General:

1. Compatibility: Provide glazing sealants that are compatible with one another and with other materials they will contact, including glass products, seals of insulating-glass units, and glazing channel substrates, under conditions of service and application, as demonstrated by sealant manufacturer based on testing and field experience.
2. Suitability: Comply with sealant and glass manufacturers' written instructions for selecting glazing sealants suitable for applications indicated and for conditions existing at time of installation.
3. Sealants used inside the weatherproofing system, shall have a VOC content of not more than 250 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
4. Colors of Exposed Glazing Sealants: As selected by Architect from manufacturer's full range.

B. Glazing Sealant: Neutral-curing silicone glazing sealant complying with ASTM C 920, Type S, Grade NS, Class 100/50, Use NT.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Dow Corning Corporation; 790.
b. GE Advanced Materials - Silicones; SilPruf LM SCS2700.
c. Pecora Corporation; 890.
d. Tremco Incorporated; Spectrem 1.

C. Glazing Sealants for Fire-Rated Glazing Products: Products that are approved by testing agencies that listed and labeled fire-resistant glazing products with which they are used for applications and fire-protection ratings indicated.

2.7 MIRROR HARDWARE

A. Top Channel/Cleat and Bottom Aluminum J-Channels: Aluminum extrusions with a return deep enough to produce a glazing channel to accommodate mirrors of thickness indicated and in lengths required to cover bottom and top edges of each mirror in a single piece.

1. Finish: Clear bright anodized.

B. Fasteners: Fabricated of same basic metal and alloy as fastened metal and matching it in finished color and texture where fasteners are exposed.

C. Anchors and Inserts: Provide devices as required for mirror hardware installation. Provide toothed or lead-shield expansion-bolt devices for drilled-in-place anchors. Provide galvanized anchors and inserts for applications on inside face of exterior walls and where indicated.

2.8 GLAZING TAPES

A. Back-Bedding Mastic Glazing Tapes: Preformed, butyl-based, 100 percent solids elastomeric tape; nonstaining and nonmigrating in contact with nonporous surfaces; with or without spacer rod as recommended in writing by tape and glass manufacturers for application indicated; and complying with ASTM C 1281 and AAMA 800 for products indicated below:

1. AAMA 806.3 tape, for glazing applications in which tape is subject to continuous pressure.

B. Expanded Cellular Glazing Tapes: Closed-cell, PVC foam tapes; factory coated with adhesive on both surfaces; and complying with AAMA 800 for the following types:

1. AAMA 810.1, Type 1, for glazing applications in which tape acts as the primary sealant.
2. AAMA 810.1, Type 2, for glazing applications in which tape is used in combination with a full bead of liquid sealant.

2.9 MISCELLANEOUS GLAZING MATERIALS

A. General: Provide products of material, size, and shape complying with referenced glazing standard, requirements of manufacturers of glass and other glazing materials for application indicated, and with a proven record of compatibility with surfaces contacted in installation.

B. Cleaners, Primers, and Sealers: Types recommended by sealant or gasket manufacturer.

C. Setting Blocks: Elastomeric material with a Shore, Type A durometer hardness of 85, plus or minus 5.

D. Spacers: Elastomeric blocks or continuous extrusions of hardness required by glass manufacturer to maintain glass lites in place for installation indicated.

E. Edge Blocks: Elastomeric material of hardness needed to limit glass lateral movement (side walking).

F. Cylindrical Glazing Sealant Backing: ASTM C 1330, Type O (open-cell material), of size and density to control glazing sealant depth and otherwise produce optimum glazing sealant performance.

G. Perimeter Insulation for Fire-Resistive Glazing: Product that is approved by testing agency that listed and labeled fire-resistant glazing product with which it is used for application and fire-protection rating indicated.

H. Mirror Mastic: An adhesive setting compound, asbestos-free, produced specifically for setting mirrors and certified by both mirror manufacturer and mastic manufacturer as compatible with glass coating and substrates on which mirrors will be installed.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Franklin International; Titebond Division.
b. Laurence, C. R. Co., Inc.
c. Macco Adhesives; Liquid Nails Division.
d. OSI Sealants, Inc.
e. Palmer Products Corporation.
f. Pecora Corporation.
g. Royal Adhesives & Sealants; Gunther Mirror Mastics Division.
h. Sommer & Maca Industries, Inc.

2. Adhesive shall have a VOC content of not more than 70 g/L when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

I. Film Backing for Safety Mirrors: Film backing and pressure-sensitive adhesive; both compatible with mirror backing paint as certified by mirror manufacturer.

2.10 FABRICATION

A. Fabricate glazing units in sizes required to fit openings indicated for Project, with edge and face clearances, edge and surface conditions, and bite complying with written instructions of product manufacturer and referenced glazing publications, to comply with system performance requirements.

B. Grind smooth and polish exposed glass edges and corners.

C. Mirror Sizes: To suit Project conditions, and before tempering, cut mirrors to final sizes and shapes.

2.11 MONOLITHIC-GLASS TYPES

A. Glass Type Clear fully tempered float glass.

1. Thickness: 6.0 mm.

2. Provide safety glazing labeling.

2.12 FIRE-PROTECTION-RATED GLAZING TYPES

A. Glass Type 60-minute fire-rated glazing; film-faced ceramic glazing.

1. Provide safety glazing labeling.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine framing, glazing channels, and stops, with Installer present, for compliance with the following:

1. Manufacturing and installation tolerances, including those for size, squareness, and offsets at corners.
2. Presence and functioning of weep systems.
3. Minimum required face and edge clearances.
4. Effective sealing between joints of glass-framing members.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Clean glazing channels and other framing members receiving glass immediately before glazing. Remove coatings not firmly bonded to substrates.

B. Examine glazing units to locate exterior and interior surfaces. Label or mark units as needed so that exterior and interior surfaces are readily identifiable. Do not use materials that will leave visible marks in the completed work.

3.3 GLAZING, GENERAL

A. Comply with combined written instructions of manufacturers of glass, sealants, gaskets, and other glazing materials, unless more stringent requirements are indicated, including those in referenced glazing publications.

B. Adjust glazing channel dimensions as required by Project conditions during installation to provide necessary bite on glass, minimum edge and face clearances, and adequate sealant thicknesses, with reasonable tolerances.

C. Protect glass edges from damage during handling and installation. Remove damaged glass from Project site and legally dispose of off Project site. Damaged glass is glass with edge damage or

other imperfections that, when installed, could weaken glass and impair performance and appearance.

D. Apply primers to joint surfaces where required for adhesion of sealants, as determined by preconstruction testing.

E. Install setting blocks in sill rabbets, sized and located to comply with referenced glazing publications, unless otherwise required by glass manufacturer. Set blocks in thin course of compatible sealant suitable for heel bead.

F. Do not exceed edge pressures stipulated by glass manufacturers for installing glass lites.

G. Provide spacers for glass lites where length plus width is larger than 50 inches (1270 mm).

1. Locate spacers directly opposite each other on both inside and outside faces of glass. Install correct size and spacing to preserve required face clearances, unless gaskets and glazing tapes are used that have demonstrated ability to maintain required face clearances and to comply with system performance requirements.
2. Provide 1/8-inch (3-mm) minimum bite of spacers on glass and use thickness equal to sealant width. With glazing tape, use thickness slightly less than final compressed thickness of tape.

H. Provide edge blocking where indicated or needed to prevent glass lites from moving sideways in glazing channel, as recommended in writing by glass manufacturer and according to requirements in referenced glazing publications.

I. Set glass lites in each series with uniform pattern, draw, bow, and similar characteristics.

J. Set glass lites with proper orientation so that coatings face exterior or interior as specified.

K. Where wedge-shaped gaskets are driven into one side of channel to pressurize sealant or gasket on opposite side, provide adequate anchorage so gasket cannot walk out when installation is subjected to movement.

L. Square cut wedge-shaped gaskets at corners and install gaskets in a manner recommended by gasket manufacturer to prevent corners from pulling away; seal corner joints and butt joints with sealant recommended by gasket manufacturer.

3.4 TAPE GLAZING

A. Position tapes on fixed stops so that, when compressed by glass, their exposed edges are flush with or protrude slightly above sightline of stops.

B. Install tapes continuously, but not necessarily in one continuous length. Do not stretch tapes to make them fit opening.

C. Cover vertical framing joints by applying tapes to heads and sills first and then to jambs. Cover horizontal framing joints by applying tapes to jambs and then to heads and sills.

D. Place joints in tapes at corners of opening with adjoining lengths butted together, not lapped. Seal joints in tapes with compatible sealant approved by tape manufacturer.

E. Do not remove release paper from tape until right before each glazing unit is installed.

F. Center glass lites in openings on setting blocks and press firmly against tape by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners and work toward centers of openings.

3.5 MIRROR INSTALLATION

A. General: Install mirrors to comply with mirror manufacturer's written instructions and with referenced GANA publications. Mount mirrors accurately in place in a manner that avoids distorting reflected images.

B. Provide a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface for air circulation between back of mirrors and face of mounting surface.

C. Wall-Mounted Mirrors: Install mirrors with mastic and mirror hardware. Attach mirror hardware securely to mounting surfaces with mechanical fasteners installed with anchors or inserts as applicable. Install fasteners so heads do not impose point loads on backs of mirrors.

1. Top Channel/Cleat and Bottom Aluminum J-Channels: Fasten J-channel directly to wall and attach top trim to continuous cleat fastened directly to wall.
2. Mirror Clips: Place a felt or plastic pad between mirror and each clip to prevent spalling of mirror edges. Locate clips so they are symmetrically placed and evenly spaced.
3. Install mastic as follows:

a. Apply barrier coat to mirror backing where approved in writing by manufacturers of mirrors and backing material.
b. Apply mastic to comply with mastic manufacturer's written instructions for coverage and to allow air circulation between back of mirrors and face of mounting surface.
c. After mastic is applied, align mirrors and press into place while maintaining a minimum air space of 1/8 inch (3 mm) between back of mirrors and mounting surface.

3.6 GASKET GLAZING (DRY)

A. Cut compression gaskets to lengths recommended by gasket manufacturer to fit openings exactly, with allowance for stretch during installation.

B. Insert soft compression gasket between glass and frame or fixed stop so it is securely in place with joints miter cut and bonded together at corners.

C. Installation with Drive-in Wedge Gaskets: Center glass lites in openings on setting blocks and press firmly against soft compression gasket by inserting dense compression gaskets formed and installed to lock in place against faces of removable stops. Start gasket applications at corners

and work toward centers of openings. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

D. Installation with Pressure-Glazing Stops: Center glass lites in openings on setting blocks and press firmly against soft compression gasket. Install dense compression gaskets and pressure-glazing stops, applying pressure uniformly to compression gaskets. Compress gaskets to produce a weathertight seal without developing bending stresses in glass. Seal gasket joints with sealant recommended by gasket manufacturer.

E. Install gaskets so they protrude past face of glazing stops.

3.7 CLEANING AND PROTECTION

A. Protect exterior glass from damage immediately after installation by attaching crossed streamers to framing held away from glass. Do not apply markers to glass surface. Remove nonpermanent labels and clean surfaces.

B. Protect glass from contact with contaminating substances resulting from construction operations. If, despite such protection, contaminating substances do come into contact with glass, remove substances immediately as recommended in writing by glass manufacturer.

C. Examine glass surfaces adjacent to or below exterior concrete and other masonry surfaces at frequent intervals during construction, but not less than once a month, for buildup of dirt, scum, alkaline deposits, or stains; remove as recommended in writing by glass manufacturer.

D. Remove and replace glass that is broken, chipped, cracked, or abraded or that is damaged from natural causes, accidents, and vandalism, during construction period.

E. Wash glass on both exposed surfaces in each area of Project not more than four days before date scheduled for inspections that establish date of Substantial Completion. Wash glass as recommended in writing by glass manufacturer.

END OF SECTION 088000

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

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

1.2 SUMMARY

A. Section Includes:

1. Fixed, extruded-aluminum and formed-metal louvers.

1.3 DEFINITIONS

A. Louver Terminology: Definitions of terms for metal louvers contained in AMCA 501 apply to this Section unless otherwise defined in this Section or in referenced standards.

B. Horizontal Louver: Louver with horizontal blades; i.e., the axes of the blades are horizontal.

C. Drainable-Blade Louver: Louver with blades having gutters that collect water and drain it to channels in jambs and mullions, which carry it to bottom of unit and away from opening.

1.4 PERFORMANCE REQUIREMENTS

A. Structural Performance: Louvers shall withstand the effects of gravity loads and the following loads and stresses within limits and under conditions indicated without permanent deformation of louver components, noise or metal fatigue caused by louver blade rattle or flutter, or permanent damage to fasteners and anchors. Wind pressures shall be considered to act normal to the face of the building.

1. Wind Loads: Determine loads based on pressures for 120 miles per hour three second gust.

B. Thermal Movements: Allow for thermal movements from ambient and surface temperature changes, without buckling, opening of joints, overstressing of components, failure of connections, or other detrimental effects.

1. Temperature Change (Range): 120 deg F (67 deg C), ambient; 180 deg F (100 deg C), material surfaces.

C. Louver Performance Ratings: Provide louvers complying with requirements specified, as demonstrated by testing manufacturer's stock units identical to those provided, except for length and width according to AMCA 500-L.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

1. For louvers specified to bear AMCA seal, include printed catalog pages showing specified models with appropriate AMCA Certified Ratings Seals.

B. Shop Drawings: For louvers and accessories. Include plans, elevations, sections, details, and attachments to other work. Show frame profiles and blade profiles, angles, and spacing.

1. Show weep paths, gaskets, flashing, sealant, and other means of preventing water intrusion.
2. Show mullion profiles and locations.
3. Wiring Diagrams: For power, signal, and control wiring for motorized adjustable louvers.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each type of metal finish required.

E. Product Test Reports: Based on evaluation of comprehensive tests performed according to AMCA 500-L by a qualified testing agency or by manufacturer and witnessed by a qualified testing agency, for each type of louver and showing compliance with performance requirements specified.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain louvers and vents from single source from a single manufacturer where indicated to be of same type, design, or factory-applied color finish.

B. SMACNA Standard: Comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" for fabrication, construction details, and installation procedures.

C. UL and NEMA Compliance: Provide motors and related components for motor-operated dampers that are listed and labeled by UL and comply with applicable NEMA standards.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication.

1. Established Dimensions: Where field measurements cannot be made without delaying the Work, establish dimensions and proceed with fabrication without field measurements. Coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Extrusions: ASTM B 221 (ASTM B 221M), Alloy 6063-T5, T-52, or T6.

B. Aluminum Sheet: ASTM B 209 (ASTM B 209M), Alloy 3003 or 5005 with temper as required for forming, or as otherwise recommended by metal producer for required finish.

C. Aluminum Castings: ASTM B 26/B 26M, Alloy 319.

D. Fasteners: Use types and sizes to suit unit installation conditions.

1. Use hex-head or Phillips pan-head screws for exposed fasteners unless otherwise indicated.
2. For fastening aluminum, use aluminum or 300 series stainless-steel fasteners.
3. For color-finished louvers, use fasteners with heads that match color of louvers.

E. Bituminous Paint: Cold-applied asphalt emulsion complying with ASTM D 1187.

2.2 FABRICATION, GENERAL

A. Assemble louvers in factory to minimize field splicing and assembly. Disassemble units as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation.

B. Maintain equal louver blade spacing, including separation between blades and frames at head and sill, to produce uniform appearance.

C. Fabricate frames, including integral sills, to fit in openings of sizes indicated, with allowances made for fabrication and installation tolerances, adjoining material tolerances, and perimeter sealant joints.

1. Frame Type: Channel unless otherwise indicated.

D. Include supports, anchorages, and accessories required for complete assembly.

E. Provide vertical mullions of type and at spacings not more than recommended by manufacturer, or 72 inches (1830 mm) o.c., whichever is less.

1. Exposed Mullions: Provide units with exposed mullions of same width and depth as louver frame. Where length of louver exceeds fabrication and handling limitations, provide interlocking split mullions designed to permit expansion and contraction.

F. Provide subsills made of same material as louvers for recessed louvers.

G. Join frame members to each other and to fixed louver blades with fillet welds, threaded fasteners, or both, as standard with louver manufacturer unless otherwise indicated or size of louver assembly makes bolted connections between frame members necessary.

2.3 FIXED, EXTRUDED-ALUMINUM LOUVERS

A. Horizontal, Drainable-Blade Louver:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. Air Balance Inc.; a Mestek company.
   b. Air Flow Company, Inc.
   c. Airolite Company, LLC (The).
   d. All-Lite Architectural Products.
   e. Arrow United Industries; a division of Mestek, Inc.
   f. Cesco Products; a division of Mestek, Inc.
   g. Construction Specialties, Inc.
   h. Dowco Products Group; Safe-Air of Illinois, Inc.
   i. Greenheck Fan Corporation.
   j. Industrial Louvers, Inc.
   k. Louvers & Dampers, Inc.; a division of Mestek, Inc.
   l. Metal Form Manufacturing Inc.
   m. NCA Manufacturing, Inc.
   n. Nystrom Building Products.
   o. Ruskin Company; Tomkins PLC.
   p. United Enertech Corp.
   q. Vent Products Company, Inc.

2. Louver Depth: 6 inches.
3. Frame and Blade Nominal Thickness: 0.060 inch (1.52 mm) for blades and 0.080 inch (2.03 mm) for frames.
4. Mullion Type: Exposed.
5. Louver Performance Ratings:

   a. Free Area: Not less than that shown.
   b. Point of Beginning Water Penetration: Not less than 1100 fpm.
   c. Air Performance: Not more than 0.15-inch wg (37-Pa) 1000-fpm (5.1-m/s) free-area intake velocity.

6. AMCA Seal: Mark units with AMCA Certified Ratings Seal.

2.4 LOUVER SCREENS

A. General: Provide screen at each exterior louver.

1. Screen Location for Fixed Louvers: Interior face.

2. Screening Type: Bird screening.

B. Secure screen frames to louver frames with stainless-steel machine screws, spaced a maximum of 6 inches (150 mm) from each corner and at 12 inches (300 mm) o.c.

C. Louver Screen Frames: Fabricate with mitered corners to louver sizes indicated.

1. Metal: Same kind and form of metal as indicated for louver to which screens are attached. Reinforce extruded-aluminum screen frames at corners with clips.
2. Finish: Mill finish unless otherwise indicated.
3. Type: Rewirable frames with a driven spline or insert.

2.5 FINISHES, GENERAL

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

2.6 ALUMINUM FINISHES

A. Finish louvers after assembly.

B. High-Performance Organic Finish: 4-coat fluoropolymer finish complying with AAMA 2605 and 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.

1. Color: to match RAL 9002
2. Gloss: gloss to high gloss.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and openings, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Coordinate setting drawings, diagrams, templates, instructions, and directions for installation of anchorages that are to be embedded in concrete or masonry construction. Coordinate delivery of such items to Project site.

3.3 INSTALLATION

A. Locate and place louvers and vents level, plumb, and at indicated alignment with adjacent work.

B. Use concealed anchorages where possible. Provide brass or lead washers fitted to screws where required to protect metal surfaces and to make a weathertight connection.

C. Form closely fitted joints with exposed connections accurately located and secured.

D. Provide perimeter reveals and openings of uniform width for sealants and joint fillers, as indicated.

E. Repair finishes damaged by cutting, welding, soldering, and grinding. Restore finishes so no evidence remains of corrective work. Return items that cannot be refinished in the field to the factory, make required alterations, and refinish entire unit or provide new units.

F. Protect unpainted galvanized and nonferrous-metal surfaces that will be in contact with concrete, masonry, or dissimilar metals from corrosion and galvanic action by applying a heavy coating of bituminous paint or by separating surfaces with waterproof gaskets or nonmetallic flashing.

G. Install concealed gaskets, flashings, joint fillers, and insulation as louver installation progresses, where weathertight louver joints are required. Comply with Division 7 Section "Joint Sealants" for sealants applied during louver installation.

3.4 ADJUSTING AND CLEANING

A. Test operation of adjustable louvers and adjust as needed to produce fully functioning units that comply with requirements.

B. Clean exposed surfaces of louvers and vents that are not protected by temporary covering, to remove fingerprints and soil during construction period. Do not let soil accumulate during construction period.

C. Before final inspection, clean exposed surfaces with water and a mild soap or detergent not harmful to finishes. Thoroughly rinse surfaces and dry.

D. Restore louvers and vents damaged during installation and construction so no evidence remains of corrective work. If results of restoration are unsuccessful, as determined by Architect, remove damaged units and replace with new units.

1. Touch up minor abrasions in finishes with air-dried coating that matches color and gloss of, and is compatible with, factory-applied finish coating.

END OF SECTION 089000

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. Non-load-bearing steel framing systems for interior gypsum board assemblies.
2. Suspension systems for interior gypsum ceilings, soffits, and grid systems.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For fire-resistance-rated assemblies that incorporate non-load-bearing steel framing, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 119 by an independent testing agency.

B. STC-Rated Assemblies: For STC-rated assemblies, provide materials and construction identical to those tested in assembly indicated, according to ASTM E 90 and classified according to ASTM E 413 by an independent testing agency.

2.2 FRAMING SYSTEMS

A. Recycled Content of Steel Products: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.

B. Framing Members, General: Comply with ASTM C 754 for conditions indicated.

1. Steel Sheet Components: Comply with ASTM C 645 requirements for metal unless otherwise indicated.
2. Protective Coating: ASTM A 653/A 653M, G40 (Z120), hot-dip galvanized unless otherwise indicated.

C. Studs and Runners: ASTM C 645.

1. Steel Studs and Runners:

   a. Minimum Base-Metal Thickness: 0.033 inch (0.84 mm).
   b. Depth: As indicated on Drawings.

D. Slip-Type Head Joints: Where indicated, provide one of the following:

1. Single Long-Leg Runner System: ASTM C 645 top runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs, installed with studs friction fit into top runner and with continuous bridging located within 12 inches (305 mm) of the top of studs to provide lateral bracing.
2. Double-Runner System: ASTM C 645 top runners, inside runner with 2-inch- (51-mm-) deep flanges in thickness not less than indicated for studs and fastened to studs, and outer runner sized to friction fit inside runner.
3. Deflection Track: Steel sheet top runner manufactured to prevent cracking of finishes applied to interior partition framing resulting from deflection of structure above; in thickness not less than indicated for studs and in width to accommodate depth of studs.

   a. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

      1) Dietrich Metal Framing; SLP-TRK Slotted Deflection Track.
      2) MBA Building Supplies; FlatSteel Deflection Track.
      3) Steel Network Inc. (The); VertiClip SLD, VertiTrack VTD Series.
      4) Superior Metal Trim; Superior Flex Track System (SFT).
      5) Telling Industries; Vertical Slip Track, Vertical Slip Track II.

E. Firestop Tracks: Top runner manufactured to allow partition heads to expand and contract with movement of the structure while maintaining continuity of fire-resistance-rated assembly indicated; in thickness not less than indicated for studs and in width to accommodate depth of studs.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

   a. Fire Trak Corp.; Fire Trak System attached to studs with Fire Trak Posi Klip.
   b. Grace Construction Products; FlameSafe FlowTrak System.
   c. Metal-Lite, Inc.; The System.

F. Flat Strap and Backing Plate: Steel sheet for blocking and bracing in length and width indicated.

1. Minimum Base-Metal Thickness: 0.027 inch (0.68 mm).

G. Cold-Rolled Channel Bridging: Steel, 0.053-inch (1.34-mm) minimum base-metal thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 1-1/2 inches (38 mm).
2. Clip Angle: Not less than 1-1/2 by 1-1/2 inches (38 by 38 mm), 0.068-inch- (1.72-mm-) thick, galvanized steel.

H. Hat-Shaped, Rigid Furring Channels: ASTM C 645.

1. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).
2. Depth: As indicated on Drawings.

I. Resilient Furring Channels: 1/2-inch- (13-mm-) deep, steel sheet members designed to reduce sound transmission.

1. Configuration: Asymmetrical].

J. Cold-Rolled Furring Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: As indicated on Drawings.
2. Furring Brackets: Adjustable, corrugated-edge type of steel sheet with minimum uncoated-steel thickness of 0.033 inch (0.8 mm).
3. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

K. Z-Shaped Furring: With slotted or nonslotted web, face flange of 1-1/4 inches (32 mm), wall attachment flange of 7/8 inch (22 mm), minimum uncoated-metal thickness of 0.018 inch (0.45 mm), and depth as indicated.

2.3 SUSPENSION SYSTEMS

A. Tie Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.062-inch- (1.59-mm-) diameter wire, or double strand of 0.048-inch- (1.21-mm-) diameter wire.

B. Hanger Attachments to Concrete:

1. Anchors: Fabricated from corrosion-resistant materials with holes or loops for attaching wire hangers and capable of sustaining, without failure, a load equal to 5 times that imposed by construction as determined by testing according to ASTM E 488 by an independent testing agency.

   a. Type: Postinstalled, chemical anchor or postinstalled, expansion anchor.

2. Powder-Actuated Fasteners: Suitable for application indicated, fabricated from corrosion-resistant materials with clips or other devices for attaching hangers of type indicated, and capable of sustaining, without failure, a load equal to 10 times that imposed by construction as determined by testing according to ASTM E 1190 by an independent testing agency.

C. Wire Hangers: ASTM A 641/A 641M, Class 1 zinc coating, soft temper, 0.16 inch (4.12 mm) in diameter.

D. Flat Hangers: Steel sheet, 1 by 3/16 inch (25 by 5 mm) by length required.

E. Carrying Channels: Cold-rolled, commercial-steel sheet with a base-metal thickness of 0.053 inch (1.34 mm) and minimum 1/2-inch- (13-mm-) wide flanges.

1. Depth: 2 inches (51 mm).

F. Furring Channels (Furring Members):

1. Cold-Rolled Channels: 0.053-inch (1.34-mm) uncoated-steel thickness, with minimum 1/2-inch- (13-mm-) wide flanges, 3/4 inch (19 mm) deep.
2. Steel Studs and Runners: ASTM C 645.

a. Minimum Base-Metal Thickness: 0.027 inch (0.68 mm).
b. Depth: As indicated on Drawings.

3. Hat-Shaped, Rigid Furring Channels: ASTM C 645, 7/8 inch (22 mm) deep.

a. Minimum Base-Metal Thickness: 0.018 inch (0.45 mm).

4. Resilient Furring Channels: 1/2-inch- (13-mm-) deep members designed to reduce sound transmission.

a. Configuration: Asymmetrical.

G. Grid Suspension System for Gypsum Board Ceilings: ASTM C 645, direct-hung system composed of main beams and cross-furring members that interlock.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Armstrong World Industries, Inc.; Drywall Grid Systems.
b. Chicago Metallic Corporation; Drywall Grid System.
c. USG Corporation; Drywall Suspension System.

2.4 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards.

1. Fasteners for Metal Framing: Of type, material, size, corrosion resistance, holding power, and other properties required to fasten steel members to substrates.

B. Isolation Strip at Exterior Walls: Provide one of the following:

1. Asphalt-Saturated Organic Felt: ASTM D 226, Type I (No. 15 asphalt felt), nonperforated.
2. Foam Gasket: Adhesive-backed, closed-cell vinyl foam strips that allow fastener penetration without foam displacement, 1/8 inch (3.2 mm) thick, in width to suit steel stud size.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates, with Installer present, and including welded hollow-metal frames, cast-in anchors, and structural framing, for compliance with requirements and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Suspended Assemblies: Coordinate installation of suspension systems with installation of overhead structure to ensure that inserts and other provisions for anchorages to building structure have been installed to receive hangers at spacing required to support the Work and that hangers will develop their full strength.

1. Furnish concrete inserts and other devices indicated to other trades for installation in advance of time needed for coordination and construction.

3.3 INSTALLATION, GENERAL

A. Installation Standard: ASTM C 754.

1. Gypsum Board Assemblies: Also comply with requirements in ASTM C 840 that apply to framing installation.

B. Install supplementary framing, and blocking to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction.

C. Install bracing at terminations in assemblies.

D. Do not bridge building control and expansion joints with non-load-bearing steel framing members. Frame both sides of joints independently.

3.4 INSTALLING FRAMED ASSEMBLIES

A. Install framing system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Single-Layer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
2. Multilayer Application: 16 inches (406 mm) o.c. unless otherwise indicated.
3. Tile Backing Panels: 16 inches (406 mm) o.c. unless otherwise indicated.

B. Where studs are installed directly against exterior masonry walls or dissimilar metals at exterior walls, install isolation strip between studs and exterior wall.

C. Install studs so flanges within framing system point in same direction.

D. Install tracks (runners) at floors and overhead supports. Extend framing full height to structural supports or substrates above suspended ceilings except where partitions are indicated to terminate at suspended ceilings. Continue framing around ducts penetrating partitions above ceiling.

1. Slip-Type Head Joints: Where framing extends to overhead structural supports, install to produce joints at tops of framing systems that prevent axial loading of finished assemblies.
2. Door Openings: Screw vertical studs at jambs to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.

    a. Install two studs at each jamb unless otherwise indicated.
    b. Extend jamb studs through suspended ceilings and attach to underside of overhead structure.
    c. Provide 45° diagonal stud brace from top of strike jamb to structure above.

3. Other Framed Openings: Frame openings other than door openings the same as required for door openings unless otherwise indicated. Install framing below sills of openings to match framing required above door heads.
4. Fire-Resistance-Rated Partitions: Install framing to comply with fire-resistance-rated assembly indicated and support closures and to make partitions continuous from floor to underside of solid structure.

    a. Firestop Track: At fire-rated walls, install to maintain continuity of fire-resistance-rated assembly indicated.

E. Direct Furring:

1. Attach to concrete or masonry with stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.

F. Z-Furring Members:

1. Erect insulation, specified in Section 072100 "Thermal Insulation," vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (610 mm) o.c.
3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw-attach short flange of furring channel to web of attached channel. At interior corners, space second member no more than 12 inches (305 mm) from corner and cut insulation to fit.

G. Installation Tolerance: Install each framing member so fastening surfaces vary not more than 1/8 inch (3 mm) from the plane formed by faces of adjacent framing.

3.5 INSTALLING SUSPENSION SYSTEMS

A. Install suspension system components according to spacings indicated, but not greater than spacings required by referenced installation standards for assembly types.

1. Hangers: 48 inches (1219 mm) o.c.
2. Carrying Channels (Main Runners): 48 inches (1219 mm) o.c.
3. Furring Channels (Furring Members): 24 inches (610 mm) o.c.

B. Isolate suspension systems from building structure where they abut or are penetrated by building structure to prevent transfer of loading imposed by structural movement.

C. Suspend hangers from building structure as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structural or suspension system.

   a. Splay hangers only where required to miss obstructions and offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.

2. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with locations of hangers required to support standard suspension system members, install supplemental suspension members and hangers in the form of trapezes or equivalent devices.

   a. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced installation standards.

3. Wire Hangers: Secure by looping and wire tying, either directly to structures or to inserts, eye screws, or other devices and fasteners that are secure and appropriate for substrate, and in a manner that will not cause hangers to deteriorate or otherwise fail.
4. Flat Hangers: Secure to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices and fasteners that are secure and appropriate for structure and hanger, and in a manner that will not cause hangers to deteriorate or otherwise fail.
5. Do not attach hangers to steel roof deck.
6. Do not connect or suspend steel framing from ducts, pipes, or conduit.

D. Fire-Resistance-Rated Assemblies: Wire tie furring channels to supports.

E. Seismic Bracing: Sway-brace suspension systems with hangers used for support.

F. Grid Suspension Systems: Attach perimeter wall track or angle where grid suspension systems meet vertical surfaces. Mechanically join main beam and cross-furring members to each other and butt-cut to fit into wall track.

G. Installation Tolerances: Install suspension systems that are level to within 1/8 inch in 12 feet (3 mm in 3.6 m) measured lengthwise on each member that will receive finishes and transversely between parallel members that will receive finishes.

END OF SECTION 092216

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. Interior gypsum board.
2. Tile backing panels.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.4 DELIVERY, STORAGE AND HANDLING

A. Store materials inside under cover and keep them dry and protected against weather, condensation, direct sunlight, construction traffic, and other potential causes of damage. Stack panels flat and supported on risers on a flat platform to prevent sagging.

1.5 FIELD CONDITIONS

A. Environmental Limitations: Comply with ASTM C 840 requirements or gypsum board manufacturer's written recommendations, whichever are more stringent.

B. Do not install paper-faced gypsum panels until installation areas are enclosed and conditioned.

C. Do not install panels that are wet, those that are moisture damaged, and those that are mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Resistance-Rated Assemblies: For fire-resistance-rated assemblies, provide materials and construction identical to those tested in assembly indicated according to ASTM E 119 by an independent testing agency.

2.2 GYPSUM BOARD, GENERAL

A. Size: Provide maximum lengths and widths available that will minimize joints in each area and that correspond with support system indicated.

2.3 INTERIOR GYPSUM BOARD

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. American Gypsum.
2. CertainTeed Corp.
3. Georgia-Pacific Gypsum LLC.
4. Lafarge North America Inc.
5. National Gypsum Company.
6. PABCO Gypsum.
7. Temple-Inland.
8. USG Corporation.

B. Gypsum Board, Type X: ASTM C 1396/C 1396M.

1. Thickness: 5/8 inch (15.9 mm).
2. Long Edges: Tapered.

C. Gypsum Ceiling Board: ASTM C 1396/C 1396M.

1. Thickness: 1/2 inch (12.7 mm).
2. Long Edges: Tapered.

D. Abuse-Resistant Gypsum Board: ASTM C 1629/C 1629M, Level 2.

1. Core: 5/8 inch (15.9 mm), Type X.
2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

E. Moisture- and Mold-Resistant Gypsum Board: ASTM C 1396/C 1396M. With moisture- and mold-resistant core and paper surfaces.

1. Core: 5/8 inch (15.9 mm), Type X.

2. Long Edges: Tapered.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.4 TILE BACKING PANELS: one of the following:

A. Glass-Mat, Water-Resistant Backing Board: ASTM C 1178/C 1178M, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. CertainTeed Corp.; GlasRoc Tile Backer.
b. Georgia-Pacific Gypsum LLC; DensShield Tile Backer.

2. Core: 1/2 inch (12.7 mm), Type X.
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

B. Cementitious Backer Units: ANSI A118.9 and ASTM C 1288 or 1325, with manufacturer's standard edges.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. C-Cure; C-Cure Board 990.
b. CertainTeed Corp.; FiberCement BackerBoard.
c. Custom Building Products; Wonderboard.
d. FinPan, Inc.; Util-A-Crete Concrete Backer Board.
e. National Gypsum Company, Permabase Cement Board.
f. USG Corporation; DUROCK Cement Board.

2. Thickness: 1/2 inch (12.7 mm).
3. Mold Resistance: ASTM D 3273, score of 10 as rated according to ASTM D 3274.

2.5 TRIM ACCESSORIES

A. Interior Trim: ASTM C 1047.

1. Material: Galvanized or aluminum-coated steel sheet or rolled zinc.
2. Shapes:

a. Cornerbead.
b. LC-Bead: J-shaped; exposed long flange receives joint compound.
c. Expansion (control) joint.

B. Gypsum Board Trim:

1. "Z" Reveal Molding # VPRZ-625-50, as manufactured by Fry Reglet Corporation, shall be installed. Aluminum shall be extruded alloy 6063 T5, with clear anodized finish, unless otherwise specified.

2. To be installed where-ever gypsum board meets exposed masonry.

2.6 JOINT TREATMENT MATERIALS

A. General: Comply with ASTM C 475/C 475M.

B. Joint Tape:

1. Interior Gypsum Board: Paper.
2. Tile Backing Panels: As recommended by panel manufacturer.

C. Joint Compound for Interior Gypsum Board: For each coat use formulation that is compatible with other compounds applied on previous or for successive coats.

1. Prefilling: At open joints, rounded or beveled panel edges, and damaged surface areas, use setting-type taping compound.
2. Embedding and First Coat: For embedding tape and first coat on joints, fasteners, and trim flanges, use drying-type, all-purpose compound.

3. Fill Coat: For second coat, use drying-type, all-purpose compound.
4. Finish Coat: For third coat, use drying-type, all-purpose compound.

D. Joint Compound for Tile Backing Panels:

1. Glass-Mat, Water-Resistant Backing Panel: As recommended by backing panel manufacturer.
2. Cementitious Backer Units: As recommended by backer unit manufacturer.

2.7 AUXILIARY MATERIALS

A. General: Provide auxiliary materials that comply with referenced installation standards and manufacturer's written recommendations.

B. Laminating Adhesive: Adhesive or joint compound recommended for directly adhering gypsum panels to continuous substrate.

1. Laminating adhesive shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Steel Drill Screws: ASTM C 1002, unless otherwise indicated.

1. Use screws complying with ASTM C 954 for fastening panels to steel members from 0.033 to 0.112 inch (0.84 to 2.84 mm) thick.
2. For fastening cementitious backer units, use screws of type and size recommended by panel manufacturer.

D. Sound Attenuation Blankets: ASTM C 665, Type I (blankets without membrane facing) produced by combining thermosetting resins with mineral fibers manufactured from glass, slag wool, or rock wool.

1. Fire-Resistance-Rated Assemblies: Comply with mineral-fiber requirements of assembly.

E. Acoustical Joint Sealant: Manufacturer's standard nonsag, paintable, nonstaining latex sealant complying with ASTM C 834. Product effectively reduces airborne sound transmission through perimeter joints and openings in building construction as demonstrated by testing representative assemblies according to ASTM E 90.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Accumetric LLC; BOSS 824 Acoustical Sound Sealant.
b. Grabber Construction Products; Acoustical Sealant GSC.
c. Pecora Corporation; AC-20 FTR, AIS-919.
d. Specified Technologies, Inc.; Smoke N Sound Acoustical Sealant.
e. USG Corporation; SHEETROCK Acoustical Sealant.

2. Acoustical joint sealant shall have a VOC content of [250] <Insert value> g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

F. Thermal Insulation: As specified in Section 072100 "Thermal Insulation."

G. Vapor Retarder: As specified in Section 072100 "Thermal Insulation."

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine areas and substrates including welded hollow-metal frames and framing, with Installer present, for compliance with requirements and other conditions affecting performance.

B. Examine panels before installation. Reject panels that are wet, moisture damaged, and mold damaged.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 APPLYING AND FINISHING PANELS, GENERAL

A. Comply with ASTM C 840.

B. Install ceiling panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

C. Install panels with face side out. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.

D. Locate edge and end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Do not make joints other than control joints at corners of framed openings.

E. Form control and expansion joints with space between edges of adjoining gypsum panels.

F. Cover both faces of support framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases braced internally.

1. Unless concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
2. Fit gypsum panels around ducts, pipes, and conduits.
3. Where partitions intersect structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.

G. Isolate perimeter of gypsum board applied to non-load-bearing partitions at structural abutments, except floors. Provide 1/4- to 1/2-inch- (6.4- to 12.7-mm-) wide spaces at these locations and trim edges with edge trim where edges of panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

H. Attachment to Steel Framing: Attach panels so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.

I. Install sound attenuation blankets before installing gypsum panels unless blankets are readily installed after panels have been installed on one side.

3.3 APPLYING INTERIOR GYPSUM BOARD

A. Install interior gypsum board in the following locations:

1. Wallboard Type: Vertical surfaces unless otherwise indicated .
2. Type X: Vertical surfaces unless otherwise indicated.
3. Ceiling Type: Ceiling surfaces.
4. Abuse-Resistant Type: Corridor wall surfaces up to 6" above ceiling, and as indicated on Drawings.

B. Single-Layer Application:

1. On ceilings, apply gypsum panels before wall/partition board application to greatest extent possible and at right angles to framing unless otherwise indicated.
2. On partitions/walls, apply gypsum panels horizontally (perpendicular to framing) unless otherwise indicated or required by fire-resistance-rated assembly, and minimize end joints.

    a. Stagger abutting end joints not less than one framing member in alternate courses of panels.
    b. At stairwells and other high walls, install panels horizontally unless otherwise indicated or required by fire-resistance-rated assembly.

3. On Z-furring members, apply gypsum panels vertically (parallel to framing) with no end joints. Locate edge joints over furring members.
4. Fastening Methods: Apply gypsum panels to supports with steel drill screws.

C. Multilayer Application:

1. On ceilings, apply gypsum board indicated for base layers before applying base layers on walls/partitions; apply face layers in same sequence. Apply base layers at right angles to framing members and offset face-layer joints one framing member, 16 inches (400 mm) minimum, from parallel base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly.
2. On partitions/walls, apply gypsum board indicated for base layers and face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints, unless otherwise indicated or required by fire-resistance-rated assembly. Stagger joints on opposite sides of partitions.
3. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
4. Fastening Methods: Fasten base layers with screws; fasten face layers with adhesive and supplementary fasteners.

3.4 APPLYING TILE BACKING PANELS

A. Glass-Mat, Water-Resistant Backing Panels: Comply with manufacturer's written installation instructions and install at showers, and where indicated and at locations indicated to receive tile. Install with 1/4-inch (6.4-mm) gap where panels abut other construction or penetrations.

B. Cementitious Backer Units: ANSI A108.11, at showers, and where indicated and locations indicated to receive tile.

C. Where tile backing panels abut other types of panels in same plane, shim surfaces to produce a uniform plane across panel surfaces.

3.5 INSTALLING TRIM ACCESSORIES

A. General: For trim with back flanges intended for fasteners, attach to framing with same fasteners used for panels. Otherwise, attach trim according to manufacturer's written instructions.

B. Control Joints: Install control joints [at locations indicated on Drawings] [according to ASTM C 840 and in specific locations approved by Architect for visual effect].

C. Interior Trim: Install in the following locations:

1. Cornerbead: Use at outside corners.
2. LC-Bead: Use at exposed panel edges.

3.6 FINISHING GYPSUM BOARD

A. General: Treat gypsum board joints, interior angles, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration. Promptly remove residual joint compound from adjacent surfaces.

B. Prefill open joints, rounded or beveled edges, and damaged surface areas.

C. Apply joint tape over gypsum board joints, except for trim products specifically indicated as not intended to receive tape.

D. Gypsum Board Finish Levels: Finish panels to levels indicated below and according to ASTM C 840:

1. Level 1: Ceiling plenum areas, concealed areas, and where indicated.
2. Level 2: Panels that are substrate for tile.
3. Level 4: At panel surfaces that will be exposed to view unless otherwise indicated.

E. Cementitious Backer Units: Finish according to manufacturer's written instructions.

3.7 APPLYING TEXTURE FINISHES

A. See Division 9 Section "Soffit Coating System."

3.8 PROTECTION

A. Protect adjacent surfaces from drywall compound and promptly remove from floors and other non-drywall surfaces. Repair surfaces stained, marred, or otherwise damaged during drywall application.

B. Protect installed products from damage from weather, condensation, direct sunlight, construction, and other causes during remainder of the construction period.

C. Remove and replace panels that are wet, moisture damaged, and mold damaged.

1. Indications that panels are wet or moisture damaged include, but are not limited to, discoloration, sagging, or irregular shape.
2. Indications that panels are mold damaged include, but are not limited to, fuzzy or splotchy surface contamination and discoloration.

END OF SECTION 092900

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. Ceramic tile.
2. Stone thresholds.
3. Waterproof membrane.
4. Crack isolation membrane.
5. Metal edge strips.

1.3 DEFINITIONS

A. General: Definitions in the ANSI A108 series of tile installation standards and in ANSI A137.1 apply to Work of this Section unless otherwise specified.

B. ANSI A108 Series: ANSI A108.01, ANSI A108.02, ANSI A108.1A, ANSI A108.1B, ANSI A108.1C, ANSI A108.4, ANSI A108.5, ANSI A108.6, ANSI A108.8, ANSI A108.9, ANSI A108.10, ANSI A108.11, ANSI A108.12, ANSI A108.13, ANSI A108.14, ANSI A108.15, ANSI A108.16, and ANSI A108.17, which are contained in "American National Standard Specifications for Installation of Ceramic Tile."

C. Module Size: Actual tile size plus joint width indicated.

D. Face Size: Actual tile size, excluding spacer lugs.

1.4 PERFORMANCE REQUIREMENTS

A. Slip resistance: For tile installed on walkway surfaces, provide products that are considered "slip resistant" by the manufacturer.

1.5 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of tile and grout indicated. Include Samples of accessories involving color selection.

C. Samples for Verification:
1. Full-size units of each type of trim and accessory for each color and finish required.

2. Stone thresholds in 6-inch (150-mm) lengths.
3. Metal edge strips in 6-inch (150-mm) lengths.

D. Submit shop drawings for approval prior to proceeding with fabrication. The drawings shall show layout, method of anchoring, and all information necessary or helpful to obtain job site dimensions to insure proper fabrication and installation. Each piece shall be numbered as to location to facilitate placement and checking. Except, as noted, dimensions and layout shall be in accordance with architectural drawings. Considerations that necessitate deviation shall be noted and architect's approval obtained prior to fabrication.

E. Qualification Data: For qualified Installer.

F. Product Certificates: For each type of product, signed by product manufacturer.

G. Material Test Reports: For each tile-setting and -grouting product.

1.6 QUALITY ASSURANCE

A. Source Limitations for Tile: Obtain tile of each type and color or finish from one source or producer.

1. Obtain tile of each type and color or finish from same production run and of consistent quality in appearance and physical properties for each contiguous area.

B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from one manufacturer and each aggregate from one source or producer.

C. Source Limitations for Other Products: Obtain each of the following products specified in this Section from a single manufacturer for each product:

1. Stone thresholds.
2. Waterproof membrane.
3. Crack isolation membrane.
4. Joint sealants.
5. Metal edge strips.

D. Preinstallation Conference: Conduct conference at Project site.

1. Review requirements in ANSI A108.01 for substrates and for preparation by other trades.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirements in ANSI A137.1 for labeling tile packages.

B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.

C. Store aggregates where grading and other required characteristics can be maintained and contamination can be avoided.

D. Store liquid materials in unopened containers and protected from freezing.

E. Handle tile that has temporary protective coating on exposed surfaces to prevent coated surfaces from contacting backs or edges of other units. If coating does contact bonding surfaces of tile, remove coating from bonding surfaces before setting tile.

1.8 PROJECT CONDITIONS

A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

1.9 EXTRA MATERIALS

A. Furnish extra materials that match and are from same production runs as products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Tile and Trim Units: Furnish quantity of full-size units equal to 3 percent of amount installed for each type, composition, color, pattern, and size indicated.

2. Grout: Furnish quantity of grout equal to 3 percent of amount installed for each type, composition, and color indicated.

PART 2 - PRODUCTS

2.1 PRODUCTS, GENERAL

A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1 for types, compositions, and other characteristics indicated.

B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI A108.02, ANSI standards referenced in other Part 2 articles, ANSI standards referenced by TCA installation methods specified in tile installation schedules, and other requirements specified.

C. Factory Blending: For tile exhibiting color variations within ranges, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.

D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer unless otherwise indicated.

E. Factory-Applied Temporary Protective Coating: Where indicated under tile type, protect exposed surfaces of tile against adherence of mortar and grout by precoating with continuous film of petroleum paraffin wax, applied hot. Do not coat unexposed tile surfaces.

2.2 TILE PRODUCTS

A. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include those indicated or, but are not limited to, the following:

   a. American Olean; Division of Dal-Tile International Inc
   b. Crossville, Inc.
   c. Daltile; Division of Dal-Tile International Inc.

B. Tiles: square edged, as scheduled.
   1. Glazed tile Finish: Glazed: Bright, opaque glaze.
   2. Tile Color and Pattern: As selected by Architect from manufacturer's full range.
   3. Grout Color: As selected by Architect from manufacturer's full range.
   4. Trim Units: Coordinated with sizes and coursing of adjoining flat tile where applicable and matching characteristics of adjoining flat tile. Provide shapes as follows, selected from manufacturer's standard shapes:

      a. Base Cove.
      b. Base Cap for Thin-Set Mortar Installations: Surface bullnose.
      c. Wainscot Cap for Thin-Set Mortar Installations: Surface bullnose.
      d. External Corners for Thin-Set Mortar Installations: Surface bullnose.
      e. Internal Corners: Field-butted square corners. For coved base and cap, use angle pieces designed to fit with stretcher shapes.

   5. Composition: Vitreous or impervious natural clay or porcelain.
   6. Module Size: 2 by 2 inches (50.8 by 50.8 mm) or as indicated.
   7. Thickness: 1/4 inch (6.35 mm).
   8. Face: Plain with cushion edges.
   9. Surface:
      a. Glazed tile: Smooth, without abrasive admixture.
      b. Unglazed tile: Slip-resistant, with abrasive admixture.

2.3 THRESHOLDS

A. General: Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.

   1. Bevel edges at 1:2 slope, with lower edge of bevel aligned with or up to 1/16 inch (1.5 mm) above adjacent floor surface. Finish bevel to match top surface of

threshold. Limit height of threshold to 1/2 inch (12.7 mm) or less above adjacent floor surface.

B. Marble Thresholds: ASTM C 503, with a minimum abrasion resistance of 12 per ASTM C 1353 or ASTM C 241 and with honed finish.

1. Description: Uniform, fine- to medium-grained white stone with gray veining.

2.4 WATERPROOF MEMBRANE

A. General: Manufacturer's standard product, selected from the following**,** that complies with ANSI A118.10 and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

1. LATICRETE 9235 Waterproofing Membrane

2.5 CRACK ISOLATION MEMBRANE

A. General: Manufacturer's standard product, selected from the following, that complies with ANSI A118.12 for standard performance and is recommended by the manufacturer for the application indicated. Include reinforcement and accessories recommended by manufacturer.

B. Fabric-Reinforced, Fluid-Applied Membrane: System consisting of liquid-latex rubber or elastomeric polymer and fabric reinforcement.

2.6 SETTING MATERIALS

A. Dry-Set Portland Cement Mortar (Thin Set): ANSI A118.1.

1. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.1.

B. Latex-Portland Cement Mortar (Thin Set): ANSI A118.4.

1. Provide prepackaged, dry-mortar mix containing dry, redispersible, vinyl acetate or acrylic additive to which only water must be added at Project site.
2. Provide prepackaged, dry-mortar mix combined with styrene-butadiene-rubber liquid-latex additive at Project site.
3. For wall applications, provide mortar that complies with requirements for nonsagging mortar in addition to the other requirements in ANSI A118.4.

C. Water-Cleanable, Tile-Setting Epoxy: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

1. Provide product capable of withstanding continuous and intermittent exposure to temperatures of up to 140 deg F (60 deg C) and 212 deg F (100 deg C), respectively, and certified by manufacturer for intended use.

2.7 GROUT MATERIALS

A. Standard Cement Grout: ANSI A118.6.

B. Polymer-Modified Tile Grout: ANSI A118.7.

1. Polymer Type: Ethylene vinyl acetate or acrylic additive, in dry, redispersible form, prepackaged with other dry ingredients.
2. Polymer Type: styrene-butadiene rubber in liquid-latex form for addition to prepackaged dry-grout mix.

2.8 MISCELLANEOUS MATERIALS

A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

B. Metal Edge Strips: Angle or L-shape, height to match tile and setting-bed thickness, metallic or combination of metal and PVC or neoprene base, designed specifically for flooring applications; stainless-steel, ASTM A 666, 300 Series exposed-edge material.

C. Temporary Protective Coating: Product indicated below that is formulated to protect exposed surfaces of tile against adherence of mortar and grout; compatible with tile, mortar, and grout products; and easily removable after grouting is completed without damaging grout or tile.

1. Grout release in form of manufacturer's standard proprietary liquid coating that is specially formulated and recommended for use as temporary protective coating for tile.

D. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

E. Grout Sealer: Manufacturer's standard product for sealing grout joints and that does not change color or appearance of grout.

2.9 MIXING MORTARS AND GROUT

A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.

B. Add materials, water, and additives in accurate proportions.

C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.

1. Verify that substrates for setting tile are firm, dry, clean, free of coatings that are incompatible with tile-setting materials including curing compounds and other substances that contain soap, wax, oil, or silicone; and comply with flatness tolerances required by ANSI A108.01 for installations indicated.
2. Verify that concrete substrates for tile floors installed with thin-set mortar comply with surface finish requirements in ANSI A108.01 for installations indicated.

    a. Verify that surfaces that received a steel trowel finish have been mechanically scarified.
    b. Verify that protrusions, bumps, and ridges have been removed by sanding or grinding.

3. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed.
4. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Architect.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Fill cracks, holes, and depressions in concrete substrates for tile floors installed with thin-set mortar with trowelable leveling and patching compound specifically recommended by tile-setting material manufacturer.

B. Where indicated, prepare substrates to receive waterproofing by applying a reinforced mortar bed that complies with ANSI A108.1A and is sloped 1/4 inch per foot (1:50) toward drains.

C. Blending: For tile exhibiting color variations, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

D. Field-Applied Temporary Protective Coating: If indicated under tile type or needed to prevent grout from staining or adhering to exposed tile surfaces, precoat them with continuous film of temporary protective coating, taking care not to coat unexposed tile surfaces.

3.3 TILE INSTALLATION

A. Comply with latest version of TCA's "Handbook for Ceramic Tile Installation" for TCA installation methods specified in tile installation schedules. Comply with parts of the ANSI A108 Series "Specifications for Installation of Ceramic Tile" that are referenced in TCA installation methods, specified in tile installation schedules, and apply to types of setting and grouting materials used.

1. For the following installations, follow procedures in the ANSI A108 Series of tile installation standards for providing 95 percent mortar coverage:

a. Tile floors in wet areas.
b. Tile floors composed of rib-backed tiles.

B. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

C. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.

D. Jointing Pattern: Lay tile in grid pattern unless otherwise indicated. Lay out tile work and center tile fields in both directions in each space or on each wall area. Lay out tile work to minimize the use of pieces that are less than half of a tile. Provide uniform joint widths unless otherwise indicated.

1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
2. Where adjoining tiles on floor, base, walls, or trim are specified or indicated to be same size, align joints.
3. Where tiles are specified or indicated to be whole integer multiples of adjoining tiles on floor, base, walls, or trim, align joints unless otherwise indicated.

E. Joint Widths: Unless otherwise indicated, install tile with 1/16 inch (1.6 mm).joint widths.

F. Stone Thresholds: Install stone thresholds in same type of setting bed as adjacent floor unless otherwise indicated.

1. At locations where mortar bed (thickset) would otherwise be exposed above adjacent floor finishes, set thresholds in latex-portland cement mortar (thin set).
2. Do not extend waterproofing or crack isolation membrane under thresholds set in dry-set portland cement or latex-portland cement mortar. Fill joints between such thresholds and adjoining tile set on membranes with elastomeric sealant.

G. Metal Edge Strips: Install where exposed edge of tile flooring meets other flooring that finishes flush with or below top of tile and no threshold is indicated.

H. Grout Sealer: Apply grout sealer to cementitious grout joints according to grout-sealer manufacturer's written instructions. As soon as grout sealer has penetrated grout joints, remove excess sealer and sealer from tile faces by wiping with soft cloth.

3.4 TILE BACKING PANEL INSTALLATION

A. Install cementitious backer units and treat joints according to ANSI A108.11 and manufacturer's written instructions for type of application indicated. Use latex-portland cement mortar for bonding material unless otherwise directed in manufacturer's written instructions.

3.5 WATERPROOFING INSTALLATION

A. Install waterproofing to comply with ANSI A108.13 and manufacturer's written instructions to produce waterproof membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.6 CRACK ISOLATION MEMBRANE INSTALLATION

A. Install crack isolation membrane to comply with ANSI A108.17 and manufacturer's written instructions to produce membrane of uniform thickness and bonded securely to substrate.

B. Do not install tile or setting materials over crack isolation membrane until membrane has cured.

3.7 CLEANING AND PROTECTING

A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.

1. Remove grout residue from tile as soon as possible.
2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.
3. Remove temporary protective coating by method recommended by coating manufacturer and that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent drain clogging.

B. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear. If recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors.

C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed.

D. Before final inspection, remove protective coverings and rinse neutral protective cleaner from tile surfaces.

3.8 INTERIOR TILE INSTALLATION SCHEDULE (Finish Schedule Designation below):

A. TILE

1. As indicated.

B. Accessories:

1. Quarter Round (at wall outside corner), 3/4" x 6"
2. Bullnose Cap, 2" x 6"
3. Provide matching bullnose corner
4. Color: Architect shall select from entire group 2 product line.

END OF SECTION 093000

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:

1. Acoustical panels and exposed suspension systems for ceilings.

B. Products furnished, but not installed under this Section, include anchors, clips, and other ceiling attachment devices to be cast in concrete at ceilings.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Coordination Drawings: Reflected ceiling plans, drawn to scale, on which the following items are shown and coordinated with each other, based on input from installers of the items involved:

1. Ceiling suspension system members.
2. Method of attaching hangers to building structure.

a. Furnish layouts for cast-in-place anchors, clips, and other ceiling attachment devices whose installation is specified in other Sections.

3. Ceiling-mounted items including lighting fixtures, diffusers, grilles, speakers, sprinklers, access panels, and special moldings.
4. Minimum Drawing Scale: 3/8 inch = 1 foot (1:32).

C. Samples for Verification: For each component indicated and for each exposed finish required, prepared on Samples of size indicated below.

1. Acoustical Panel: Set of 6-inch- (150-mm-) square samples of each type, color, pattern, and texture.
2. Exposed Suspension System Members, Moldings, and Trim: Set of 12-inch- (300-mm-) long Samples of each type, finish, and color.

D. Product Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each acoustical panel ceiling.

E. Maintenance Data: For finishes to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations:

1. Acoustical Ceiling Panel: Obtain each type through one source from a single manufacturer.
2. Suspension System: Obtain each type through one source from a single manufacturer.

B. Fire-Test-Response Characteristics: Provide acoustical panel ceilings that comply with the following requirements:

1. Surface-Burning Characteristics: Provide acoustical panels with the following surface-burning characteristics complying with ASTM E 1264 for Class A materials as determined by testing identical products per ASTM E 84:

a. Smoke-Developed Index: 450 or less.

C. Seismic Performance: Provide acoustical ceiling system that has been evaluated by an independent party and found to be compliant with the 2009 International Building Code, Seismic Category D.

1. Tested per International Code Council - Evaluation Services - AC 156 Acceptance Criteria for Seismic Qualification Testing of Non-structural Components as evidenced by International Code Council Evaluation Report, ESR-1308.

2. CISCA Seismic Zones 3 & 4 - Ceilings and Interior Systems Construction Association Guidelines for Seismic Restraint for Direct Hung Suspended Ceiling Assemblies.

D. Preinstallation Conference: Conduct conference at Project site.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Deliver acoustical panels, suspension system components, and accessories to Project site in original, unopened packages and store them in a fully enclosed, conditioned space where they will be protected against damage from moisture, humidity, temperature extremes, direct sunlight, surface contamination, and other causes.

B. Before installing acoustical panels, permit them to reach room temperature and a stabilized moisture content.

C. Handle acoustical panels carefully to avoid chipping edges or damaging units in any way.

1.6 PROJECT CONDITIONS

A. Environmental Limitations: Do not install acoustical panel ceilings until spaces are enclosed and weatherproof, wet work in spaces is complete and dry, work above ceilings is complete, and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

1.7 COORDINATION

A. Coordinate layout and installation of acoustical panels and suspension system with other construction that penetrates ceilings or is supported by them, including light fixtures, HVAC equipment, fire-suppression system, and partition assemblies.

1.8 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Acoustical Ceiling Panels: Full-size panels equal to 2.0 percent of quantity installed.
2. Suspension System Components: Quantity of each exposed component equal to 2.0 percent of quantity installed.

PART 2 - PRODUCTS

2.1 ACOUSTICAL PANELS, GENERAL

A. Recycled Content: Provide acoustical panels with recycled content such that postconsumer recycled content plus one-half of preconsumer recycled content constitutes a minimum of 20 percent by weight.

B. Acoustical Panel Standard: Provide manufacturer's standard panels of configuration indicated that comply with ASTM E 1264 classifications as designated by types, patterns, acoustical ratings, and light reflectances, unless otherwise indicated.

1. Mounting Method for Measuring NRC: Type E-400; plenum mounting in which face of test specimen is 15-3/4 inches (400 mm) away from test surface per ASTM E 795.

C. Broad Spectrum Antimicrobial Fungicide and Bactericide Treatment: Provide acoustical panels treated with manufacturer's standard antimicrobial formulation that inhibits fungus, mold, mildew, and gram-positive and gram-negative bacteria and showing no mold, mildew, or bacterial growth when tested according to ASTM D 3273 and evaluated according to ASTM D 3274 or ASTM G 21.

2.2 ACOUSTICAL PANELS FOR ACOUSTICAL PANEL CEILING

A. Acoustical Panels (ACT-1):

1. All areas unless otherwise noted.
2. Basis of Design Product: Fine Fissured Second Look, 1761 as manufactured by Armstrong World Industries.
3. Color: White
4. Size: 24in x 48in x 3/4in
5. Edge Profile: Angled Tegular for interface with Prelude XL 15/16" Exposed Tee.
6. Dimensional Stability: HumiGuard Plus.

7. Mold/Mildew & Bacteria Inhibitor: The front and back of the product have been treated with BioBlock Plus, ASTM D 3273.

B. Acoustical Panels (ACT-2):

1. Areas indicated: kitchen and pantry rooms, etc.
2. Basis of Design Product: Fine Fissured Second Look, 1761 as manufactured by Armstrong World Industries.
3. Color: White
4. Size: 48in x 24in x 3/4in
5. Edge Profile: Square for interface with Prelude XL 15/16" Exposed Tee.
6. Dimensional Stability: HumiGuard Plus

C. Acoustical Panels (ACT-3):

1. Areas indicated: kitchen and pantry rooms, etc.
2. Basis of Design Product: Fine Fissured Second Look, 1861 as manufactured by Armstrong World Industries.
3. Color: White
4. Size: 48in x 24in x 3/4 in
5. Edge Profile: Square for interface with Prelude XL 15/16" Exposed Tee.
6. Dimensional Stability: HumiGuard Plus

D. Alternative products may be submitted for Architect's review and acceptance, subject to meeting or exceeding the requirements of the Basis of Design Product.

2.3 METAL SUSPENSION SYSTEMS, GENERAL

A. Metal Suspension System Standard: Provide manufacturer's standard direct-hung metal suspension systems of types, structural classifications, and finishes indicated that comply with applicable requirements in ASTM C 635.

1. Aluminum Suspension Grid System: Provide aluminum suspension grid systems in locker rooms, toilet rooms and shower areas. Comply with ASTM C 635 requirements for "Coating Classification for Severe Environment Performance" for ceiling suspension systems in locker room areas.

B. Finishes and Colors, General: Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes. Provide manufacturer's standard factory-applied finish for type of system indicated.

C. Attachment Devices: Size for five times the design load indicated in ASTM C 635, Table 1, "Direct Hung," unless otherwise indicated. Comply with seismic design requirements.

1. Anchors in Concrete: Anchors of type and material indicated below, with holes or loops for attaching hangers of type indicated and with capability to sustain, without failure, a load equal to five times that imposed by ceiling construction, as determined by testing per ASTM E 488 or ASTM E 1512 as applicable, conducted by a qualified testing and inspecting agency.

a. Type: Post-installed expansion or post-installed bonded anchors.
b. Corrosion Protection: Carbon-steel components zinc plated to comply with ASTM B 633, Class Fe/Zn 5 (0.005 mm) for Class SC 1 service condition.

2. Power-Actuated Fasteners in Concrete: Fastener system of type suitable for application indicated, fabricated from corrosion-resistant materials, with clips or other accessory devices for attaching hangers of type indicated, and with capability to sustain, without failure, a load equal to 10 times that imposed by ceiling construction, as determined by testing per ASTM E 1190, conducted by a qualified testing and inspecting agency.

D. Wire Hangers, Braces, and Ties: Provide wires complying with the following requirements:

1. Zinc-Coated, Carbon-Steel Wire: ASTM A 641/A 641M, Class 1 zinc coating, soft temper.
2. Size: Select wire diameter so its stress at 3 times hanger design load (ASTM C 635, Table 1, "Direct Hung") will be less than yield stress of wire, but provide not less than 0.135-inch- (3.5-mm-) diameter wire.

E. Hanger Rods and Flat Hangers: Mild steel, zinc coated or protected with rust-inhibitive paint.

F. Angle Hangers: Angles with legs not less than 7/8 inch (22 mm) wide; formed with 0.04-inch- (1-mm-) thick, galvanized steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation; with bolted connections and 5/16-inch- (8-mm-) diameter bolts.

G. Seismic Stabilizer Bars: Manufacturer's standard perimeter stabilizers designed to accommodate seismic forces.

H. Seismic Struts: Manufacturer's standard compression struts designed to accommodate seismic forces.

I. Seismic Clips: Manufacturer's standard seismic clips designed and spaced to secure acoustical panels in-place.

J. Hold-Down Clips: manufacturer's standard hold-down clips spaced 24 inches (610 mm) o.c. on all cross tees.

1. Provide for: Locker rooms, toilet and shower rooms.

K. Impact Clips: manufacturer's standard impact-clip system designed to absorb impact forces against acoustical panels.

1. Provide for: All corridors, lobbies and vestibules.

2.4 METAL SUSPENSION SYSTEM FOR ACOUSTICAL PANEL CEILING

A. Typical for all areas unless otherwise noted:

1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
a. Structural Classification: ASTM C 635 Heavy Duty.

b. Color: White and match the actual color of the selected ceiling tile, unless noted otherwise.
c. Acceptable Product: Prelude XL 15/16" Exposed Tee as manufactured by Armstrong World Industries, Inc.
d. Alternative products may be submitted for Architect's review and acceptance, subject to meeting the requirements of the Basis of Design Product.
e. Attachment Devices: In accordance with the International Building Code, for Category D.

B. Typical for all ACP-2 areas:
1. Basis-of-Design Product: Subject to compliance with requirements, provide the following:
a. High Humidity Finish: Comply with ASTM C 635 requirements for Coating Classification for Severe Environment Performance where high humidity finishes are indicated.
b. Structural Classification: ASTM C 635 heavy duty.
c. Color: White aluminum
d. Acceptable Product: Prelude Plus XL Fire Guard 15/16" for damp Applications as manufactured by Armstrong World Industries, Inc.
e. Alternative products may be submitted for Architect's review and acceptance, subject to meeting the requirements of the Basis of Design Product.

2.5 SEISMIC EXPANSION CLIPS

A. Provide Armstrong's Seismic Joint Clip (SJM) for main beams and (SJCG and SJCSI) for cross tees in areas were the number of diagonal seismic hangers must be reduced.

2.6 METAL EDGE MOLDINGS AND TRIM

A. Roll-Formed, Sheet-Metal Edge Moldings and Trim: Type and profile indicated or, if not indicated, manufacturer's standard moldings for edges and penetrations that comply with seismic design requirements; formed from sheet metal of same material, finish, and color as that used for exposed flanges of suspension system runners.

1. Provide manufacturer's standard edge moldings that fit acoustical panel edge details and suspension systems indicated and that match width and configuration of exposed runners, unless otherwise indicated.
2. For lay-in panels with reveal edge details, provide stepped edge molding that forms reveal of same depth and width as that formed between edge of panel and flange at exposed suspension member.
3. For circular penetrations of ceiling, provide edge moldings fabricated to diameter required to fit penetration exactly.

B. Seismic Joint Edge Molding: Manufacturer's standard edge molding for 2 inch seismic control at building seismic joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, including structural framing to which acoustical panel ceilings attach or abut, with Installer present, for compliance with requirements specified in this and other Sections that affect ceiling installation and anchorage and with requirements for installation tolerances and other conditions affecting performance of acoustical panel ceilings.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Measure each ceiling area and establish layout of acoustical panels to balance border widths at opposite edges of each ceiling. Avoid using less-than-half-width panels at borders, and comply with layout shown on reflected ceiling plans.

3.3 INSTALLATION

A. General: Install acoustical panel ceilings to comply with ASTM C 636 and seismic design requirements indicated, per manufacturer's written instructions and CISCA's "Ceiling Systems Handbook."

B. Suspend ceiling hangers from building's structural members and as follows:

1. Install hangers plumb and free from contact with insulation or other objects within ceiling plenum that are not part of supporting structure or of ceiling suspension system.
2. Splay hangers only where required to miss obstructions; offset resulting horizontal forces by bracing, countersplaying, or other equally effective means.
3. Where width of ducts and other construction within ceiling plenum produces hanger spacings that interfere with location of hangers at spacings required to support standard suspension system members, install supplemental suspension members and hangers in form of trapezes or equivalent devices.
4. Secure wire hangers to ceiling suspension members and to supports above with a minimum of three tight turns. Connect hangers directly either to structures or to inserts, eye screws, or other devices that are secure and appropriate for substrate and that will not deteriorate or otherwise fail due to age, corrosion, or elevated temperatures.
5. Secure flat, angle, channel, and rod hangers to structure, including intermediate framing members, by attaching to inserts, eye screws, or other devices that are secure and appropriate for both structure to which hangers are attached and type of hanger involved. Install hangers in a manner that will not cause them to deteriorate or fail due to age, corrosion, or elevated temperatures.
6. Do not support ceilings directly from permanent metal forms or floor deck. Fasten hangers to cast-in-place hanger inserts, postinstalled mechanical or adhesive anchors, or power-actuated fasteners that extend through forms into concrete.
7. When steel framing does not permit installation of hanger wires at spacing required, install carrying channels or other supplemental support for attachment of hanger wires.
8. Do not attach hangers to steel deck tabs.

9. Do not attach hangers to steel roof deck. Attach hangers to structural members.
10. Space hangers not more than 48 inches (1200 mm) o.c. along each member supported directly from hangers, unless otherwise indicated; provide hangers not more than 8 inches (200 mm) from ends of each member.
11. Size supplemental suspension members and hangers to support ceiling loads within performance limits established by referenced standards and publications.

C. Secure bracing wires to ceiling suspension members and to supports with a minimum of four tight turns. Suspend bracing from building's structural members as required for hangers, without attaching to permanent metal forms, steel deck, or steel deck tabs. Fasten bracing wires into concrete with cast-in-place or postinstalled anchors.

D. Install edge moldings and trim of type indicated at perimeter of acoustical ceiling area and where necessary to conceal edges of acoustical panels.

1. Apply acoustical sealant in a continuous ribbon concealed on back of vertical legs of moldings before they are installed.
2. Screw attach moldings to substrate at intervals not more than 16 inches (400 mm) o.c. and not more than 3 inches (75 mm) from ends, leveling with ceiling suspension system to a tolerance of 1/8 inch in 12 feet (3.2 mm in 3.6 m). Miter corners accurately and connect securely.
3. Do not use exposed fasteners, including pop rivets, on moldings and trim.

E. Install suspension system runners so they are square and securely interlocked with one another. Remove and replace dented, bent, or kinked members.

F. Install acoustical panels with undamaged edges and fit accurately into suspension system runners and edge moldings. Scribe and cut panels at borders and penetrations to provide a neat, precise fit.

1. Arrange directionally patterned acoustical panels as follows:
   a. Install panels with pattern running in one direction parallel to long axis of space.
2. For reveal-edged panels on suspension system runners, install panels with bottom of reveal in firm contact with top surface of runner flanges.
3. Paint cut edges of panel remaining exposed after installation; match color of exposed panel surfaces using coating recommended in writing for this purpose by acoustical panel manufacturer.

3.4 CLEANING

A. Clean exposed surfaces of acoustical panel ceilings, including trim, edge moldings, and suspension system members. Comply with manufacturer's written instructions for cleaning and touchup of minor finish damage. Remove and replace ceiling components that cannot be successfully cleaned and repaired to permanently eliminate evidence of damage.

END OF SECTION 095113

PART 1 GENERAL

1.01 THIS SECTION INCLUDES

A. Commercial Laminate Flooring
B. Floating foam underlayment
C. Maintenance products
D. Coordinated transitions and molding pieces
E. Adhesives

1.03 REFERENCES

A. ASTM E 648 - Standard Test Method for Critical Radiant Flux of Floor Covering Systems Using a Radiant Heat Energy Source.

B. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density

C. ASTM E 90 (Classified by E 413) Standard Test Method for Laboratory Measurement of Airborne Sound Transmission Loss of Building Partitions and Elements (STC)

D. ASTM E 492 (Classified by E 989) Standard Test Method for Laboratory Measurement of Impact Sound Transmission Through Floor-Ceiling Assemblies Using the Tapping Machine (IIC).

E. ASTM F 970 (Standard & Modified) Test Method for Static Load Limit.

F. ASTM F 710 - Standard Practice for Preparing Concrete Floors.

G. ASTM F 1869 - Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride.

H. ASTM F 2170 - Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *In-Situ* Probes.

1.04 QUALITY ASSURANCE AND REGULATORY REQUIREMENTS

A. Select an installer who is competent in the installation of Armstrong Commercial Laminate flooring or has a minimum of 5 years experience handling similar products.

B. If required, provide types of laminate flooring and accessories supplied by one manufacturer, including leveling and patching compounds, and adhesives.

C. If required, provide flooring material to meet the following fire test performance criteria as tested by a recognized independent testing laboratory:

a. ASTM E 648 Critical Radiant Flux of 0.45 watts per sq. cm. or greater, Class I.

b. ASTM E 662 (Smoke Generation) Maximum Specific Optical Density of 450 or less.

1.05 SUBMITTALS

A. Submit product data in accordance with Section (01 30 00) (01 33 00), including manufacturer's installation and maintenance instructions.

B. Submit shop drawings/floor layout, transition/moulding details, and manufacturer's technical data, installation and maintenance instructions (latest edition of "Armstrong Guaranteed Installation System," F-5061) for flooring and accessories.

C. Submit the manufacturer's standard samples showing the selected design visual for flooring and all applicable accessories.

D. If required, submit the manufacturer's certification that the flooring has been tested by an independent laboratory and complies with the required fire tests.

E. If Armstrong Installer Certification is preferred: Request a list of at least three similar installations successfully completed within the past year affirming the degree of installation expertise along with verifying Armstrong Certified Installer Program (ACIP) ID#.

1.06 ENVIRONMENTAL CONDITIONS

A. Deliver materials in good condition to the jobsite in the manufacturer's original unopened containers that bear the name and brand of the manufacturer, project identification, and shipping and handling instructions. Cartons of laminate should be delivered the day of installation and do not require acclimation. However, in extreme cases where laminate has been stored incorrectly or in unfavorable conditions it is highly recommended to acclimate to proper installation conditions.

B. Store materials indoor in a clean, dry, enclosed/conditioned space off the ground, and protected from the weather and from extremes of heat and cold. Protect adhesives from freezing. Protect flooring from exposure to moisture along with moisture producing sources resulting from wet trades such as and not limited to drywall, concrete, masonry, painting, and grouting work. If a temporary heating source is utilized at the jobsite be cognizant that this practice can result in adding environmental moisture which may affect laminate products. All trade work shall be complete and cured prior to shipment delivery.

C. Maintain a minimum temperature in the spaces to receive the flooring and accessories of 65ºF (18ºC) and a maximum temperature of 100ºF (38ºC) for at least 48 hours before, during, and for 48 hours after installation. Protect all materials from the direct flow of heat from hot-air registers, radiators, or other heating fixtures and appliances. Preferred jobsite Relative Humidity shall be between 35% - 55%, not to exceed limits for optimum product performance. Ensure that permanent HVAC is in operation (minimum 14 days) along with permanent lighting prior to installation. Keep in mind that adverse fluctuations in Relative Humidity for extended periods of time may result in expansion and contraction of laminate

flooring leading to complaints and possible floor failure.

D. Install flooring and accessories after all other finishing operations and construction have been completed. Close spaces to traffic during the installation of the flooring and protect flooring surface as necessary with a breathable material after the completion of installation. Do not install flooring over concrete slabs or wood substrates until they are sufficiently dry to achieve a bond with the adhesive (especially when employing direct glue down method to substrate), in accordance with the manufacturer's recommended bond and moisture tests.

1.07 WARRANTY

A. Provide a 15 year Limited Warranty.

PART 2 PRODUCTS

2.01 COMMERCIAL LAMINATE FLOORING MATERIALS

A. Basis of Design Product: Provide Commercial Laminate (Direct Pressure Laminate) consisting of four layered construction, installed by Lock & Fold system, manufactured for Armstrong World Industries, Inc.

1. Colors shall be selected from currently available Premium Collection in 4.92 in. width x 47.24 in. length (125mm x 1200mm) with Micro Edge / Micro Ends having a nominal total gauge of 0.47 in. (12 mm).

2. A four layered thermal fused process includes a smooth, AC5 abrasion resistant wear surface composed of cellulose paper saturated with melamine resin embedded with Aluminum Oxide to provide stain and scratch resistance, a High Definition/ Masterworks Technology with VTX print saturated with melamine resin to provide fade resistance, a High Density Fiberboard core with HydraCore Plus technology for added moisture resistance, and a melamine saturated balanced backing paper for added dimensional stability.

2.02 TRANSITION AND MOLDING PIECES

A. Provide all available coordinating transitions and molding pieces designated for planks to meet installation application for finishing and transitioning to other flooring products. Install in accordance with manufacturer's guidelines and intended use.

2.04 ACCESSORIES

A. For patching, smoothing, repairing, and leveling monolithic subfloors, provide Armstrong [S-183 Fast-Setting Cement-Based Underlayment] [S-184 Fast-Setting Cement-Based Patch and Skim Coat] [S-194 Fast-Setting Cement-Based Patch and Underlayment][S-195 Latex Additive].

B. For completing minor repairs during installation provide coordinated [Armstrong Acrylic filler][Bruce Acrylic filler] that corresponds and blends with product color.

C. For added noise reduction, sound absorption, thermal insulation, and moisture barrier provide Armstrong's S-1837 Quiet Comfort Underlayment for Floating applications.

PART 3 EXECUTION

3.01 INSPECTION

A. Examine subfloors prior to installation to determine that surfaces are smooth and free from cracks, holes, ridges, and other defects that might prevent adhesive bond or impair durability or appearance of the flooring material.

B. Inspect subfloors prior to installation to determine that surfaces are free from curing, sealing, parting and hardening compounds; residual adhesives; adhesive removers; oil, grease, wax; and other foreign materials that might prevent adhesive bond. Visually inspect for evidence of moisture, alkaline salts, carbonation, laitance, mold, or mildew.

C. Report conditions contrary to contract requirements that would prevent a proper installation. Do not proceed with the installation until unsatisfactory conditions have been corrected.

D. Failure to call attention to defects or imperfections will be construed as acceptance and approval of the subfloor. Installation indicates acceptance of substrates with regard to conditions existing at the time of installation.

3.02 PREPARATION

A. CONCRETE

1. Smooth concrete surfaces, removing rough areas, projections, ridges, and bumps, and filling low spots, control or construction joints, and other defects with Armstrong [S-183 Fast-Setting Cement Based Underlayment][S-184 Fast-Setting Cement-Based Patch and Skim Coat][S-194 Fast-Setting Cement-Based Patch and Underlayment] as recommended by the flooring manufacturer.

2. Remove paint, varnish, oils, release agents, sealers, and waxes. Remove residual adhesives as recommended by the flooring manufacturer. Remove curing and hardening compounds not compatible with the adhesives used, as indicated by a bond test or by the compound manufacturer's recommendations for flooring. Avoid organic solvents.

3. Perform subfloor moisture testing in accordance with [ASTM F 2170, "Standard Test Method for Determining Relative Humidity in Concrete Slabs Using *in-situ* Probes"][ASTM F 1869,"Standard Test Method for Measuring Moisture Vapor Emission Rate of Concrete Subfloor Using Anhydrous Calcium Chloride"] and Bond Tests as described in the latest publication F-5061, "Armstrong Guaranteed Installation System," to determine if surfaces are dry; free of curing and hardening compounds, old adhesive, and other coatings; and ready to receive flooring. [Relative humidity shall not exceed 80%.][MVER shall not exceed 5 lbs. /1000 sq. ft. /24 hrs.] On installations where both the Percent Relative Humidity and the Moisture

Vapor Emission Rate tests are conducted, results for both tests shall comply with the allowable limits listed above. Do not proceed with flooring installation until results of moisture tests are acceptable. All test results shall be documented and retained.

4. Perform pH tests on concrete floors regardless of their age or grade level. All test results shall be documented and retained.

5. Vacuum or broom-clean surfaces to be covered immediately before the application of flooring Make subfloor free from dust, dirt, grease, and all foreign materials.

B. OTHER SUITABLE SUBSTRATES

1. Include existing in place terrazzo, vinyl sheet/tile, not to exceed 85ºF (29ºC). See latest edition of F-5061 for proper floor preparation prior to installation

3.03 INSTALLATION OF COMMERCIAL LAMINATE FLOORING

A. Install flooring in strict accordance with the latest edition of "Armstrong Guaranteed Installation System", F-5061.

B. Install flooring wall to wall before the installation of floor-set cabinets, casework, furniture, equipment, movable partitions, etc. Extend flooring into toe spaces, door recesses, closets, and similar openings as shown on the drawings.

C. If required, install flooring on pan-type floor access covers. Maintain continuity of color and pattern within pieces of flooring installed on these covers. Adhere flooring to the subfloor around covers and to covers.

D. Scribe, cut, and fit to permanent fixtures, columns, walls, partitions, pipes, outlets, and built-in furniture and cabinets leaving the required expansion of 1/4 inch to 1/2 inch.

E. Install flooring with adhesives, tools, and procedures in strict accordance with the manufacturer's written instructions. Observe the recommended adhesive trowel notching, open times, and working times.

3.04 INSTALLATION OF ACCESSORIES

A. Install all coordinated transitions and moulding pieces in accordance with the latest edition of "Armstrong Guaranteed Installation System", F-5061.

B. Fill small voids and complete minor repairs with acrylic filler.

3.05 CLEANING AND PROTECTION

A. Perform initial maintenance according to the latest edition of "Armstrong Guaranteed Installation System," F-5061 under the care instructions with the proper cleaners.

B. If a Floating application is utilized then traffic is permitted immediately with care to

prevent topical damage.

End of Section 096219

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. Resilient base.
2. Resilient stair accessories.
3. Resilient molding accessories.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of product indicated.

C. Samples for Verification: For each type of product indicated, in manufacturer's standard-size Samples but not less than 12 inches (300 mm) long, of each resilient product color, texture, and pattern required.

1.4 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Furnish not less than 10 linear feet (3 linear m) for every 500 linear feet (150 linear m) or fraction thereof, of each type, color, pattern, and size of resilient product installed.

1.5 QUALITY ASSURANCE

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store resilient products and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C).

1.7 PROJECT CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F or more than 95 deg F, in spaces to receive resilient products during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. Until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F or more than 95 deg F.

C. Install resilient products after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 RESILIENT BASE

A. Resilient Base:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Allstate Rubber Corp.; Stoler Industries.
b. Armstrong World Industries, Inc.
c. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
d. Endura Rubber Flooring; Division of Burke Industries, Inc.
e. Estrie Products International; American Biltrite (Canada) Ltd.
f. Flexco, Inc.
g. Johnsonite.
h. Mondo Rubber International, Inc.
i. Musson, R. C. Rubber Co.
j. Nora Rubber Flooring; Freudenberg Building Systems, Inc.
k. PRF USA, Inc.
l. Roppe Corporation, USA.
m. VPI, LLC; Floor Products Division.

B. Resilient Base Standard: ASTM F 1861.

1. Material Requirement: Type TS (rubber, vulcanized thermoset) or Type TP (rubber, thermoplastic)].
2. Manufacturing Method: Group I (solid, homogeneous)
3. Style: Cove (base with toe).

C. Minimum Thickness: 0.080 inch.

D. Height: 4 inches (102 mm).

E. Lengths: Coils in manufacturer's standard length.

F. Outside Corners: Job formed or preformed.

G. Inside Corners: Job formed or preformed.

H. Finish: As selected by Architect from manufacturer's full range.

I. Colors and Patterns: As selected by Architect from full range of industry colors.

2.2 RUBBER STAIR ACCESSORIES

A. Fire-Test-Response Characteristics: As determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Armstrong World Industries, Inc.
2. Johnsonite; A Tarkett Company.
3. Mondo Rubber International, Inc.
4. Musson Rubber Company.
5. Nora Systems, Inc.
6. Roppe Corporation, USA.

C. Stair Treads: ASTM F 2169.

1. Type: TS (rubber, vulcanized thermoset) or TP (rubber, thermoplastic).
2. Class: 1 (smooth, flat).
3. Group: embedded abrasive strips with contrasting color for the visually impaired.
4. Nosing Style: Square
5. Nosing Height: to tightly wrap stair nosing.
6. Thickness: 1/4 inch (6 mm) and tapered to back edge.
7. Size: Lengths and depths to fit each stair tread in one piece.
8. Integral Risers: Smooth, flat; in height that fully covers substrate.

D. Stringers: Height and length after cutting to fit risers and treads and to cover stair stringers; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

1. Thickness: 0.125 inch (3.2 mm).

E. Landing Tile: Matching treads; produced by same manufacturer as treads and recommended by manufacturer for installation with treads.

F. Locations: Provide rubber stair accessories in stairs where indicated.

G. Colors and Patterns: As selected by Architect from full range of industry colors and patterns.

2.3 RESILIENT MOLDING ACCESSORY

A. Resilient Molding Accessory:

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Burke Mercer Flooring Products; Division of Burke Industries, Inc.
b. Flexco, Inc.
c. Johnsonite.
d. R.C.A. Rubber Company (The).
e. Roppe Corporation, USA.
f. VPI, LLC; Floor Products Division.

B. Description: Reducer strip for resilient floor covering, reducer strip for carpet, joiner for tile and carpet.

C. Material: Rubber.

D. Profile and Dimensions: As indicated.

E. Colors and Patterns: As selected by Architect from full range of industry colors, to match wall base color.

2.4 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by manufacturer to suit resilient products and substrate conditions indicated.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of resilient products.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates for Resilient Stair Treads and Accessories: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by manufacturer.
4. Moisture Testing: Perform tests recommended by manufacturer. Proceed with installation only after substrates pass testing.

a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound and remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install resilient products until they are same temperature as the space where they are to be installed.

1. Move resilient products and installation materials into spaces where they will be installed at least 48 hours in advance of installation.

E. Sweep and vacuum clean substrates to be covered by resilient products immediately before installation.

3.3 RESILIENT BASE INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient base.

B. Apply resilient base to walls, columns, pilasters, casework and cabinets in toe spaces, and other permanent fixtures in rooms and areas where base is required.

C. Install resilient base in lengths as long as practicable without gaps at seams and with tops of adjacent pieces aligned.

D. Tightly adhere resilient base to substrate throughout length of each piece, with base in continuous contact with horizontal and vertical substrates.

E. Do not stretch resilient base during installation.

F. On masonry surfaces or other similar irregular substrates, fill voids along top edge of resilient base with manufacturer's recommended adhesive filler material.

G. Preformed Corners: Install preformed corners before installing straight pieces.

H. Job-Formed Corners:

1. Outside Corners: Use straight pieces of maximum lengths possible. Form without producing discoloration (whitening) at bends.
2. Inside Corners: Use straight pieces of maximum lengths possible.

3.4 RESILIENT ACCESSORY INSTALLATION

A. Comply with manufacturer's written instructions for installing resilient accessories.

B. Resilient Molding Accessories: Butt to adjacent materials and tightly adhere to substrates throughout length of each piece. Install reducer strips at edges of carpet and resilient floor covering that would otherwise be exposed.

3.5 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protection of resilient products.

B. Perform the following operations immediately after completing resilient product installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect resilient products from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover resilient products until Substantial Completion.

END OF SECTION 096513

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. Rubber floor tile.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Samples: Full-size units of each color and pattern of floor tile required.

C. Samples for Initial Selection: For each type of floor tile indicated.

D. Samples for Verification: Full-size units of each color and pattern of floor tile required.

E. Product Schedule: For floor tile. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each type of floor tile to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Floor Tile: Furnish one box for every 50 boxes or fraction thereof, of each type, color, and pattern of floor tile installed.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs workers for this Project who are competent in techniques required by manufacturer for floor tile installation and seaming method indicated.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store floor tile and installation materials in dry spaces protected from the weather, with ambient temperatures maintained within range recommended by manufacturer, but not less than 50 deg F (10 deg C) or more than 90 deg F (32 deg C). Store floor tiles on flat surfaces.

1.9 FIELD CONDITIONS

A. Maintain ambient temperatures within range recommended by manufacturer, but not less than 70 deg F (21 deg C) or more than 95 deg F (35 deg C), in spaces to receive floor tile during the following time periods:

1. 48 hours before installation.
2. During installation.
3. 48 hours after installation.

B. After installation and until Substantial Completion, maintain ambient temperatures within range recommended by manufacturer, but not less than 55 deg F (13 deg C) or more than [95 deg F (35 deg C).

C. Close spaces to traffic during floor tile installation.

D. Close spaces to traffic for 48 hours after floor tile installation.

E. Install floor tile after other finishing operations, including painting, have been completed.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Fire-Test-Response Characteristics: For resilient tile flooring, as determined by testing identical products according to ASTM E 648 or NFPA 253 by a qualified testing agency.

1. Critical Radiant Flux Classification: Class I, not less than 0.45 W/sq. cm.

B. FloorScore Compliance: Resilient tile flooring shall comply with requirements of FloorScore certification.

C. Low-Emitting Materials: Flooring system shall comply with the testing and product requirements of the California Department of Public Health's "Standard Method for the Testing

and Evaluation of Volatile Organic Chemical Emissions from Indoor Sources Using Environmental Chambers."

2.2 RUBBER FLOOR TILE

A. Products: Subject to compliance with requirements, provide one of the following:

1. Mondo Rubber International, Inc; .
2. Nora Rubber Flooring, Freudenberg Building Systems, Inc;
3. Roppe Corporation, USA; .

B. Tile Standard: ASTM F 1344, Class I-B, homogeneous rubber tile, through mottled or Class II-A, laminated rubber tile, solid-color wear layer.

C. Hardness: Manufacturer's standard hardness, measured using Shore, Type A durometer per ASTM D 2240.

D. Wearing Surface: Smooth or Textured.

E. Thickness: 0.125 inch (3.2 mm).

F. Size: 24 by 24 inches (610 by 610 mm).

G. Colors and Patterns: As selected by Architect from full range of industry colors and patterns.

2.3 INSTALLATION MATERIALS

A. Trowelable Leveling and Patching Compounds: Latex-modified, portland cement based or blended hydraulic-cement-based formulation provided or approved by floor tile manufacturer for applications indicated.

B. Adhesives: Water-resistant type recommended by floor tile and adhesive manufacturers to suit floor tile and substrate conditions indicated.

1. Adhesives shall comply with the following limits for VOC content:

a. Vinyl Composition Tile Adhesives: 50 g/L or less.
b. Rubber Floor Adhesives: 60 g/L or less.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, with Installer present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

1. Verify that finishes of substrates comply with tolerances and other requirements specified in other Sections and that substrates are free of cracks, ridges, depressions, scale, and foreign deposits that might interfere with adhesion of floor tile.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Prepare substrates according to floor tile manufacturer's written instructions to ensure adhesion of resilient products.

B. Concrete Substrates: Prepare according to ASTM F 710.

1. Verify that substrates are dry and free of curing compounds, sealers, and hardeners.
2. Remove substrate coatings and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, using mechanical methods recommended by floor tile manufacturer. Do not use solvents.
3. Alkalinity and Adhesion Testing: Perform tests recommended by floor tile manufacturer. Proceed with installation only after substrate alkalinity falls within range on pH scale recommended by manufacturer in writing, but not less than 5 or more than 9 pH.
4. Moisture Testing: Proceed with installation only after substrates pass testing according to floor tile manufacturer's written recommendations, but not less stringent than the following:

   a. Perform anhydrous calcium chloride test according to ASTM F 1869. Proceed with installation only after substrates have maximum moisture-vapor-emission rate of 3 lb of water/1000 sq. ft. (1.36 kg of water/92.9 sq. m) in 24 hours.
   b. Perform relative humidity test using in situ probes according to ASTM F 2170. Proceed with installation only after substrates have a maximum 75 percent relative humidity level.

C. Fill cracks, holes, and depressions in substrates with trowelable leveling and patching compound; remove bumps and ridges to produce a uniform and smooth substrate.

D. Do not install floor tiles until they are the same temperature as the space where they are to be installed.

1. At least 48 hours in advance of installation, move resilient floor tile and installation materials into spaces where they will be installed.

E. Immediately before installation, sweep and vacuum clean substrates to be covered by resilient floor tile.

3.3 FLOOR TILE INSTALLATION

A. Comply with manufacturer's written instructions for installing floor tile.

B. Lay out floor tiles from center marks established with principal walls, discounting minor offsets, so tiles at opposite edges of room are of equal width. Adjust as necessary to avoid using cut widths that equal less than one-half tile at perimeter.

1. Lay tiles square with room axis.

C. Match floor tiles for color and pattern by selecting tiles from cartons in the same sequence as manufactured and packaged, if so numbered. Discard broken, cracked, chipped, or deformed tiles.

1. Lay tiles with grain running in one direction.

D. Scribe, cut, and fit floor tiles to butt neatly and tightly to vertical surfaces and permanent fixtures including built-in furniture, cabinets, pipes, outlets, and door frames.

E. Extend floor tiles into toe spaces, door reveals, closets, and similar openings. Extend floor tiles to center of door openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on floor tiles as marked on substrates. Use chalk or other nonpermanent marking device.

G. Install floor tiles on covers for telephone and electrical ducts, building expansion-joint covers, and similar items in finished floor areas. Maintain overall continuity of color and pattern between pieces of tile installed on covers and adjoining tiles. Tightly adhere tile edges to substrates that abut covers and to cover perimeters.

H. Adhere floor tiles to flooring substrates using a full spread of adhesive applied to substrate to produce a completed installation without open cracks, voids, raising and puckering at joints, telegraphing of adhesive spreader marks, and other surface imperfections.

3.4 CLEANING AND PROTECTION

A. Comply with manufacturer's written instructions for cleaning and protecting floor tile.

B. Perform the following operations immediately after completing floor tile installation:

1. Remove adhesive and other blemishes from exposed surfaces.
2. Sweep and vacuum surfaces thoroughly.
3. Damp-mop surfaces to remove marks and soil.

C. Protect floor tile from mars, marks, indentations, and other damage from construction operations and placement of equipment and fixtures during remainder of construction period.

D. Cover floor tile until Substantial Completion.

END OF SECTION 096519

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. Modular, carpet tile to match existing on third floor.
2. Direct applied Broadloom.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Review methods and procedures related to carpet installation including, but not limited to, the following:

a. Review delivery, storage, and handling procedures.
b. Review ambient conditions and ventilation procedures.
c. Review subfloor preparation procedures.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Carpet: For each type indicated. Include manufacturer's written data on physical characteristics, durability, and fade resistance.
2. Include installation recommendations for each type of substrate.

B. Shop Drawings: Show the following:

1. Columns, doorways, enclosing walls or partitions, built-in cabinets, and locations where cutouts are required in carpet tiles.
2. Carpet tile type, color, and dye lot.
3. Type of subfloor.
4. Type of installation.
5. Pattern of installation.
6. Pattern type, location, and direction.
7. Pile direction.
8. Type, color, and location of insets and borders.
9. Type, color, and location of edge, transition, and other accessory strips.

10. Transition details to other flooring materials.

C. Samples: For each of the following products and for each color and texture required. Label each Sample with manufacturer's name, material description, color, pattern, and designation indicated on Drawings and in schedules.

1. Carpet Tile: Full-size Sample.
2. Exposed Edge, Transition, and Other Accessory Stripping: 12-inch- (300-mm-) long Samples.
3. Carpet Seam: 6-inch (150-mm) Sample.
4. Mitered Carpet Border Seam: 12-inch- (300-mm-) square Sample. Show carpet pattern alignment.

D. Product Schedule: For carpet tile. Use same designations indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Test Reports: For carpet tile, for tests performed by a qualified testing agency.

C. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For carpet tiles to include in maintenance manuals. Include the following:

1. Methods for maintaining carpet tile, including cleaning and stain-removal products and procedures and manufacturer's recommended maintenance schedule.
2. Precautions for cleaning materials and methods that could be detrimental to carpet tile.

1.7 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Carpet Tile: Full-size units equal to 5 percent of amount installed for each type indicated, but not less than 10 sq. yd. (8.3 sq. m).

1.8 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified by the International Certified Floorcovering Installers Association at the Commercial II certification level.

B. Fire-Test-Response Ratings: Where indicated, provide carpet tile identical to those of assemblies tested for fire response according to NFPA 253 by a qualified testing agency.

C. Mockups: Build mockups to verify selections made under Sample submittals and to demonstrate aesthetic effects and set quality standards for fabrication and installation.

1. Build mockups at locations and in sizes shown on Drawings.
2. 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. Comply with CRI 104.

1.10 FIELD CONDITIONS

A. Comply with CRI 104 for temperature, humidity, and ventilation limitations.

B. Environmental Limitations: Do not deliver or install carpet until spaces are enclosed and weathertight, wet work in spaces is complete and dry, and ambient temperature and humidity conditions are maintained at occupancy levels during the remainder of the construction period.

C. Where demountable partitions or other items are indicated for installation on top of carpet tiles, install carpet tiles before installing these items.

1.11 WARRANTY

A. Special Warranty for Carpet: Manufacturer agrees to repair or replace components of carpet tile installation that fail in materials or workmanship within specified warranty period.

1. Warranty does not include deterioration or failure of carpet tile due to unusual traffic, failure of substrate, vandalism, or abuse.
2. Failures include, but are not limited to, more than 10 percent edge raveling, snags, runs, dimensional stability, loss of face fiber, and delamination.
3. Warranty Period: 10 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 CARPET TILE

A. Carpet CPT-1: Subject to compliance with requirements, carpet tile to match existing on third floor office wing.

2.2 TUFTED CARPET (for installation in auditorium, foyers, lobbies and other existing carpeted areas outside of Office wing.)

A. Basis-of-Design Product: Subject to compliance with requirements, provide <Insert manufacturer's or carpet supplier's name; product name or designation> or comparable product by one of the following:

1. <To be clarified in addendum.>

B. Color: As selected by Architect from manufacturer's full range] <Insert color>.

C. Pattern: <Insert pattern>.

D. Applied Soil-Resistance Treatment: Manufacturer's standard material.

2.3 INSTALLATION ACCESSORIES

A. Trowelable Leveling and Patching Compounds: Latex-modified, hydraulic-cement-based formulation provided or recommended by carpet tile manufacturer.

B. Adhesives: Water-resistant, mildew-resistant, nonstaining, pressure-sensitive type to suit products and subfloor conditions indicated, that complies with flammability requirements for installed carpet tile and is recommended by carpet tile manufacturer for releasable installation.

1. Adhesives shall have a VOC content of 50 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

C. Seam Adhesive: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for sealing and taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

D. Metal Edge/Transition Strips: Extruded aluminum with mill finish of profile and width shown, of height required to protect exposed edge of carpet, and of maximum lengths to minimize running joints.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting carpet tile performance. Examine carpet tile for type, color, pattern, and potential defects.

B. For raised access flooring systems, verify the following:

1. Access floor substrate is compatible with carpet tile and adhesive if any.

2. Underlayment surface is flat, smooth, evenly planed, tightly jointed, and free of irregularities, gaps greater than 1/8 inch (3 mm), protrusions more than 1/32 inch (0.8 mm), and substances that may interfere with adhesive bond or show through surface.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. General: Comply with CRI 104, Section 6.2, "Site Conditions; Floor Preparation," and with carpet tile manufacturer's written installation instructions for preparing substrates indicated to receive carpet tile installation.

B. Use trowelable leveling and patching compounds, according to manufacturer's written instructions, to fill cracks, holes, depressions, and protrusions in substrates. Fill or level cracks, holes and depressions 1/8 inch (3 mm) wide or wider and protrusions more than 1/32 inch (0.8 mm) unless more stringent requirements are required by manufacturer's written instructions.

C. Remove coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone, without using solvents. Use mechanical methods recommended in writing by carpet tile manufacturer.

D. Broom and vacuum clean substrates to be covered immediately before installing carpet tile.

3.3 INSTALLATION

A. Comply with CRI 104 and carpet manufacturer's written installation instructions for the following:

1. Direct-Glue-Down Installation: Comply with CRI 104, Section 9, "Direct Glue-Down Installation."
2. Double-Glue-Down Installation: Comply with CRI 104, Section 10, "Double-Glue-Down Installation."
3. Stair Installation: Comply with CRI 104, Section 13, "Carpet on Stairs" for glue-down installation.

B. Installation Method: Glue down; install every tile with full-spread, releasable, pressure-sensitive adhesive.

C. Maintain dye lot integrity. Do not mix dye lots in same area.

D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.

E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.

F. Maintain reference markers, holes, and openings that are in place or marked for future cutting by repeating on finish flooring as marked on subfloor. Use nonpermanent, nonstaining marking device.

G. Install carpet tile pattern parallel to walls and borders, running same direction as on third floor office wing.

H. Install sheet carpet pattern parallel to walls and borders to comply with CRI 104, Section 15, "Patterned Carpet Installations" and with carpet manufacturer's written recommendations.

I. Stagger joints of carpet tiles so carpet tile grid is offset from access flooring panel grid. Do not fill seams of access flooring panels with carpet adhesive; keep seams free of adhesive.

3.4 CLEANING AND PROTECTION

A. Perform the following operations immediately after installing carpet tile:

1. Remove excess adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet tile manufacturer.
2. Remove yarns that protrude from carpet tile surface.
3. Vacuum carpet tile using commercial machine with face-beater element.

B. Protect installed carpet tile to comply with CRI 104, Section 16, "Protecting Indoor Installations."

C. Protect carpet tile against damage from construction operations and placement of equipment and fixtures during the remainder of construction period. Use protection methods indicated or recommended in writing by carpet tile manufacturer.

END OF SECTION 096813

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 surface preparation and the application of paint systems on the following exterior substrates:

1. Ferrous metals.
2. Aluminum (not anodized or otherwise coated).

1.3 DEFINITIONS

A. Gloss Level 1: Not more than 5 units at 60 degrees and 10 units at 85 degrees, according to ASTM D 523.

B. Gloss Level 3: 10 to 25 units at 60 degrees and 10 to 35 units at 85 degrees, according to ASTM D 523.

C. Gloss Level 4: 20 to 35 units at 60 degrees and not less than 35 units at 85 degrees, according to ASTM D 523.

D. Gloss Level 5: 35 to 70 units at 60 degrees, according to ASTM D 523.

E. Gloss Level 6: 70 to 85 units at 60 degrees, according to ASTM D 523.

F. Gloss Level 7: More than 85 units at 60 degrees, according to ASTM D 523.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product. Include preparation requirements and application instructions.

B. Samples for Initial Selection: For each type of topcoat product.

C. Samples for Verification: For each type of paint system and each color and gloss of topcoat.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.
2. Printout of current "MPI Approved Products List" for each product category specified, with the proposed product highlighted.
3. VOC content.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Paint: not less than 1 gal. (3.8 L) of each material and color applied.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.7 FIELD CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints in snow, rain, fog, or mist; when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Behr Process Corporation.
2. Benjamin Moore & Co.
3. California Paints.
4. ICI Paints.
5. PPG Architectural Finishes, Inc.
6. Pratt & Lambert.
7. Sherwin-Williams Company (The).
8. Zinsser.

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content: Provide materials that comply with VOC limits of authorities having jurisdiction.

D. Colors: As selected by Architect from manufacturer's full range or Match Architect's samples.

2.3 BLOCK FILLERS

A. Block Filler, Latex, Interior/Exterior: MPI #4.

2.4 PRIMERS/SEALERS

A. Primer, Bonding, Solvent Based:[MPI #69.]

2.5 METAL PRIMERS

A. Primer, Alkyd, Anti-Corrosive for Metal: MPI #79.

B. Primer, Alkyd, Quick Dry, for Metal: MPI #76.

C. Primer, Galvanized: As recommended in writing by topcoat manufacturer.

D. Primer, Quick Dry, for Aluminum: MPI #95.

2.6 SOLVENT-BASED PAINTS

A. Alkyd, Exterior Flat (Gloss Level 1): MPI #8.]

B. Alkyd, Exterior, Semi-Gloss (Gloss Level 5): MPI #94.

C. Alkyd, Exterior Gloss (Gloss Level 6):[MPI #9.]

2.7 ALUMINUM PAINT

A. Aluminum Paint: MPI #1.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

C. Proceed with coating application only after unsatisfactory conditions have been corrected.

1. Application of coating indicates acceptance of surfaces and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Manual" applicable to substrates and paint systems indicated.

B. Remove hardware, covers, plates, and similar items already in place that are removable and are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection.

C. Clean substrates of substances that could impair bond of paints, including dust, dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers or apply tie coat as required to produce paint systems indicated.

D. Steel Substrates: Remove rust, loose mill scale, and shop primer if any. Clean using methods recommended in writing by paint manufacturer.

1. SSPC-SP 2, "Hand Tool Cleaning."
2. SSPC-SP 3, "Power Tool Cleaning."

E. Shop-Primed Steel Substrates: Clean field welds, bolted connections, and abraded areas of shop paint, and paint exposed areas with the same material as used for shop priming to comply with SSPC-PA 1 for touching up shop-primed surfaces.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Aluminum Substrates: Remove loose surface oxidation.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions and recommendations in "MPI Manual."

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable items same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed items with prime coat only.
3. Paint both sides and edges of exterior doors and entire exposed surface of exterior door frames.
4. Paint entire exposed surface of metal frames and sashes.
5. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.
6. Primers specified in painting schedules may be omitted on items that are factory primed or factory finished if acceptable to topcoat manufacturers.

B. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

C. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

D. Painting Fire Suppression, Plumbing, HVAC, Electrical, Communication, and Electronic Safety and Security Work:

1. Paint the following work where exposed to view:

a. Equipment, including panelboards.
b. Uninsulated metal piping.
c. Uninsulated plastic piping.
d. Pipe hangers and supports.
e. Metal conduit.

3.4 FIELD QUALITY CONTROL

A. Dry Film Thickness Testing: Owner may engage the services of a qualified testing and inspecting agency to inspect and test paint for dry film thickness.

1. Contractor shall touch up and restore painted surfaces damaged by testing.
2. If test results show that dry film thickness of applied paint does not comply with paint manufacturer's written recommendations, Contractor shall pay for testing and apply

additional coats as needed to provide dry film thickness that complies with paint manufacturer's written recommendations.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 EXTERIOR PAINTING SCHEDULE

A. Steel Substrates:

1. Alkyd System:

a. Prime Coat: Primer, alkyd, anticorrosive for metal, MPI #79.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94.

2. Aluminum Paint System:

a. Prime Coat: Primer, alkyd, anti-corrosive for metal, MPI #79.
b. Prime Coat: Shop primer specified in Section where substrate is specified.
c. Intermediate Coat: Aluminum paint, MPI #1.
d. Topcoat: Aluminum paint, MPI #1.

B. Galvanized-Metal Substrates:

1. Alkyd System:

a. Prime Coat: Primer, galvanized metal, as recommended in writing by topcoat manufacturer for exterior use on galvanized-metal substrates with topcoat indicated.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94.

C. Aluminum Substrates:

1. Alkyd System:

a. Prime Coat: Primer, quick dry, for aluminum, MPI #95.
b. Intermediate Coat: Exterior alkyd enamel matching topcoat.
c. Topcoat: Alkyd, exterior, semi-gloss (Gloss Level 5), MPI #94.

END OF SECTION 099113

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 surface preparation and the application of paint systems on interior substrates.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Samples for Initial Selection: For each type of topcoat product indicated.

C. Samples for Verification: For each type of paint system and in each color and gloss of topcoat indicated.

1. Submit Samples on rigid backing, 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

D. Product List: For each product indicated, include the following:

1. Cross-reference to paint system and locations of application areas. Use same designations indicated on Drawings and in schedules.

2. Printout of current "MPI Approved Products List" for each product category specified in Part 2, with the proposed product highlighted.

1.4 QUALITY ASSURANCE

A. MPI Standards:

1. Products: Complying with MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: Comply with requirements in "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

B. Mockups: Apply benchmark samples of each paint system indicated and each color and finish selected to verify preliminary selections made under sample submittals and to demonstrate aesthetic effects and set quality standards for materials and execution.

1. Architect will select one surface to represent surfaces and conditions for application of each paint system specified in Part 3.
2. Apply benchmark samples after permanent lighting and other environmental services have been activated.
3. Final approval of color selections will be based on benchmark samples.

a. If preliminary color selections are not approved, apply additional benchmark samples of additional colors selected by Architect at no added cost to Owner.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.6 PROJECT CONDITIONS

A. Apply paints only when temperature of surfaces to be painted and ambient air temperatures are between 50 and 95 deg F (10 and 35 deg C).

B. Do not apply paints when relative humidity exceeds 85 percent; at temperatures less than 5 deg F (3 deg C) above the dew point; or to damp or wet surfaces.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that are from same production run (batch mix) as materials applied and that are packaged for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 5 percent, but not less than 1 gal. (3.8 L) of each material and color applied.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Benjamin Moore & Co.
2. ICI Paints.
3. PPG Architectural Finishes, Inc.
4. Sherwin-Williams Company (The).

2.2 PAINT, GENERAL

A. MPI Standards: Provide products that comply with MPI standards if indicated and that are listed in its "MPI Approved Products List."

B. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each coat in a paint system, provide products recommended in writing by manufacturers of topcoat for use in paint system and on substrate indicated.

C. VOC Content of Field-Applied Interior Paints and Coatings: Provide products that comply with the following limits for VOC content, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24); these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Flat Paints, Coatings, and Primers: VOC content of not more than 50 g/L.
2. Nonflat Paints, Coatings, and Primers: VOC content of not more than 150 g/L.
3. Primers, Sealers, and Undercoaters: 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.
5. Zinc-Rich Industrial Maintenance Primers: 340 g/L.
6. Pretreatment Wash Primers: 420 g/L.
7. Floor Coatings: 100 g/L.

D. Chemical Components of Field-Applied Interior Paints and Coatings: Provide topcoat paints and anti-corrosive and anti-rust paints applied to ferrous metals that comply with the following chemical restrictions; these requirements do not apply to paints and coatings that are applied in a fabrication or finishing shop:

1. Aromatic Compounds: Paints and coatings shall not contain more than 1.0 percent by weight of total aromatic compounds (hydrocarbon compounds containing one or more benzene rings).
2. Restricted Components: Paints and coatings shall not contain any of the following:

a. Acrolein.
b. Acrylonitrile.
c. Antimony.
d. Benzene.
e. Butyl benzyl phthalate.
f. Cadmium.
g. Di (2-ethylhexyl) phthalate.
h. Di-n-butyl phthalate.

i. Di-n-octyl phthalate.
j. 1,2-dichlorobenzene.
k. Diethyl phthalate.
l. Dimethyl phthalate.
m. Ethylbenzene.
n. Formaldehyde.
o. Hexavalent chromium.
p. Isophorone.
q. Lead.
r. Mercury.
s. Methyl ethyl ketone.
t. Methyl isobutyl ketone.
u. Methylene chloride.
v. Naphthalene.
w. Toluene (methylbenzene).
x. 1,1,1-trichloroethane.
y. Vinyl chloride.

E. Colors: As selected by Architect from manufacturer's full range.

2.3 BLOCK FILLERS

A. Interior/Exterior Latex Block Filler: MPI #4.

2.4 PRIMERS/SEALERS

A. Interior Latex Primer/Sealer: MPI #50.

B. Primer, Latex, for Interior Wood: MPI #39.

C. Wood-Knot Sealer: Sealer recommended in writing by topcoat manufacturer for use in paint systems indicated.

2.5 METAL PRIMERS

A. Rust-Inhibitive Primer (Water Based): MPI #107.

B. Waterborne Galvanized-Metal Primer: MPI #134.

C. Quick-Drying Primer for Aluminum: MPI #95.

2.6 LATEX PAINTS

A. Institutional Low-Odor/VOC Latex (Semigloss): MPI #147 (Gloss Level 5).

2.7 FLOOR COATINGS

A. Interior/Exterior Clear Concrete Floor Sealer (Water Based): MPI #99.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of work.

B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:

1. Masonry (Clay and CMU): 12 percent.
2. Wood: 15 percent.
3. Gypsum Board: 12 percent.
4. Plaster: 12 percent.

C. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.

D. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

1. Beginning coating application constitutes Contractor's acceptance of substrates and conditions.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in "MPI Architectural Painting Specification Manual" applicable to substrates indicated.

B. Remove plates, machined surfaces, and similar items already in place that are not to be painted. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and painting.

1. After completing painting operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.
2. Do not paint over labels of independent testing agencies or equipment name, identification, performance rating, or nomenclature plates.

C. Clean substrates of substances that could impair bond of paints, including dirt, oil, grease, and incompatible paints and encapsulants.

1. Remove incompatible primers and reprime substrate with compatible primers as required to produce paint systems indicated.

D. Masonry Substrates: Remove efflorescence and chalk. Do not paint surfaces if moisture content or alkalinity of surfaces to be painted exceeds that permitted in manufacturer's written instructions.

E. Steel Substrates: Remove rust and loose mill scale. Clean using methods recommended in writing by paint manufacturer.

F. Galvanized-Metal Substrates: Remove grease and oil residue from galvanized sheet metal fabricated from coil stock by mechanical methods to produce clean, lightly etched surfaces that promote adhesion of subsequently applied paints.

G. Gypsum Board Substrates: Do not begin paint application until finishing compound is dry and sanded smooth.

3.3 APPLICATION

A. Apply paints according to manufacturer's written instructions.

1. Use applicators and techniques suited for paint and substrate indicated.
2. Paint surfaces behind movable equipment and furniture same as similar exposed surfaces. Before final installation, paint surfaces behind permanently fixed equipment or furniture with prime coat only.
3. Paint front and backsides of access panels, removable or hinged covers, and similar hinged items to match exposed surfaces.

B. Tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Tint undercoats to match color of topcoat, but provide sufficient difference in shade of undercoats to distinguish each separate coat.

C. Primer coat not required if substrate surface has existing paint coating that is in good condition and is suitable for finish coat(s).

D. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

E. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

F. Painting Mechanical and Electrical Work: Paint items exposed in occupied spaces including, but not limited to, the following:

1. Mechanical Work:

a. Uninsulated metal piping.
b. Uninsulated plastic piping.
c. Pipe hangers and supports.
d. Tanks that do not have factory-applied final finishes.

e. Visible portions of internal surfaces of metal ducts, without liner, behind air inlets and outlets.
f. Duct, equipment, and pipe insulation having paintable jacket material.
g. Mechanical equipment that is indicated to have a factory-primed finish for field painting.
h. Access panels.

2. Electrical Work:

a. Switchgear.
b. Panelboard frames and covers.
c. Electrical equipment that is indicated to have a factory-primed finish for field painting.

3.4 FIELD QUALITY CONTROL

A. Testing of Paint Materials: Owner reserves the right to invoke the following procedure at any time and as often as Owner deems necessary during the period when paints are being applied:

1. Owner will engage the services of a qualified testing agency to sample paint materials being used. Samples of material delivered to Project site will be taken, identified, sealed, and certified in presence of Contractor.
2. Testing agency will perform tests for compliance with product requirements.
3. Owner may direct Contractor to stop applying paints if test results show materials being used do not comply with product requirements. Contractor shall remove noncomplying-paint materials from Project site, pay for testing, and repaint surfaces painted with rejected materials. Contractor will be required to remove rejected materials from previously painted surfaces if, on repainting with complying materials, the two paints are incompatible.

3.5 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing paint application, clean spattered surfaces. Remove spattered paints by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from paint application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities of other trades, touch up and restore damaged or defaced painted surfaces.

3.6 INTERIOR PAINTING SCHEDULE

A. Latex, Interior, Eggshell, (Gloss Level 2): MPI #52.

B. Latex, Interior, Semi-Gloss, (Gloss Level 5): MPI #54.

C. Latex, Interior, Gloss, (Gloss Level 6, except minimum gloss of 65 units at 60 degrees): MPI #114.

D. Masonry Substrates:

1. Prime Coat: Interior/exterior latex block filler.
2. Intermediate Coat: low-odor/VOC interior latex matching topcoat.
3. Topcoat: low-odor/VOC interior latex gloss.

E. Steel Substrates:

1. Prime Coat: Rust-inhibitive primer (water based).
2. Intermediate Coat: low-odor/VOC interior latex matching topcoat.
3. Topcoat: low-odor/VOC interior latex gloss.

F. Galvanized-Metal Substrates:

1. Prime Coat: Waterborne galvanized-metal primer.
2. Intermediate Coat: low-odor/VOC interior latex matching topcoat.
3. Topcoat: low-odor/VOC interior latex semigloss.

G. Gypsum Board and Plaster Substrates:

1. Prime Coat: Interior latex primer/sealer.
2. Intermediate Coat: low-odor/VOC interior latex matching topcoat.
3. Topcoat: low-odor/VOC interior latex semigloss.

END OF SECTION 099123

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 surface preparation and application of fire-retardant intumescent paint to interior items and surfaces.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated.

1. Product List: Cross-reference to coating system and locations of application areas. Use same designations indicated on Drawings and in schedules. Include manufacturer's recommended spreading rate for each separate coat for each type of substrate indicated.
2. Printout of current "MPI Approved Products List" for each product category specified in Part 2 that specifies coatings approved by MPI, with the proposed product highlighted.

B. Samples for Verification: For each type of coating system and each color and gloss of intumescent paint finish indicated.

1. Submit Samples on rigid backing, not less than 8 inches (200 mm) square.
2. Step coats on Samples to show each coat required for system.
3. Label each coat of each Sample.
4. Label each Sample for location and application area.

1.4 INFORMATIONAL SUBMITTALS

A. Material Test Reports: For each intumescent paint.

1.5 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that are from same production run (batch mix) as materials applied and that are packaged with protective covering for storage and identified with labels describing contents.

1. Quantity: Furnish an additional 1 gal. (3.8 L) of each material and color applied.

1.6 QUALITY ASSURANCE

A. Source Limitations: Obtain each paint system from single source from single manufacturer or provide a system approved in writing by intumescent paint manufacturer.

B. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84 by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 450 or less.

C. MPI Standards: Comply with indicated requirements for the following:

1. Products: MPI standards indicated and listed in "MPI Approved Products List."
2. Preparation and Workmanship: "MPI Architectural Painting Specification Manual" for products and paint systems indicated.

D. Preinstallation Conference: Conduct conference at Project site.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Store materials not in use in tightly covered containers in well-ventilated areas with ambient temperatures continuously maintained at not less than 45 deg F (7 deg C).

1. Maintain containers in clean condition, free of foreign materials and residue.
2. Remove rags and waste from storage areas daily.

1.8 PROJECT CONDITIONS

A. Apply waterborne intumescent paints only when temperatures of surfaces to be painted and ambient air temperatures are between 50 and 90 deg F (10 and 32 deg C).

PART 2 - PRODUCTS

2.1 INTUMESCENT PAINT MATERIALS, GENERAL

A. Material Compatibility:

1. Provide materials for use within each paint system that are compatible with one another and substrates indicated, under conditions of service and application as demonstrated by manufacturer, based on testing and field experience.
2. For each material or coat, provide products and spreading rates recommended in writing by intumescent paint manufacturer for use on substrate indicated. Comply with

requirements for fire-retardant coating classification and surface-burning characteristics indicated.

B. VOC Content: Products shall comply with the following VOC limits, exclusive of colorants added to a tint base, when calculated according to 40 CFR 59, Subpart D (EPA Method 24)].

1. Flat Paints and Coatings: 50 g/L.
2. Nonflat Paints and Coatings: 150 g/L.
3. Primers, Sealers, and Undercoaters: VOC not more than 200 g/L.
4. Anticorrosive and Antirust Paints Applied to Ferrous Metals: 250 g/L.

C. Colors and Gloss: Match Architect's samples. Color will be dark.

2.2 INTERIOR, PIGMENTED, INTUMESCENT PAINT SYSTEM

A. Primer: Intumescent paint manufacturer's recommended primer compatible with substrate and other materials indicated.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Albi Manufacturing, a division of StanChem, Inc.; primer approved by Albi.
b. NoFire Technologies, Inc.; primer approved by manufacturer.
c. Contego International

B. Fire-Retardant Intumescent Paint: Water-based, latex-type, fire-retardant paint for interior wood and other combustible surfaces; MPI #64.

1. Products: Subject to compliance with requirements, provide one of the following:

a. Albi Manufacturing, a division of StanChem, Inc; Albi-Cote FRL; flat finish.
b. NoFire Technologies, Inc; A-18; flat finish.
c. Contego International

2. VOC Content: E Range of E2.

C. Topcoat/Overcoat: Water-based, latex-type, pigmented, fire-inert, protective-finish coating that will not affect fire-retardant class of intumescent coating; MPI #67.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Albi Manufacturing, a division of StanChem, Inc; Albi-Cote TC Latex Semi Gloss.
b. NoFire Technologies, Inc; latex-based coating approved by NoFire.
c. Contego International

2. VOC Content: E Range of E2.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and conditions, with Applicator present, for compliance with manufacturer's requirements for surface treatments, shop-primed surfaces, maximum moisture content, and other conditions affecting performance of the Work.

B. Verify suitability of substrates, including surface conditions, and compatibility with existing finishes and primers.

C. Begin coating application only after unsatisfactory conditions have been corrected and surfaces are dry.

3.2 PREPARATION

A. Comply with manufacturer's written instructions and recommendations in the "MPI Architectural Painting Specification Manual" applicable to substrates and coating systems indicated.

B. Remove hardware and hardware accessories, plates, machined surfaces, light fixtures, and similar items already installed that are not to be coated. If removal is impractical or impossible because of size or weight of item, provide surface-applied protection before surface preparation and coating.

1. After completing coating operations, use workers skilled in the trades involved to reinstall items that were removed. Remove surface-applied protection if any.

C. Clean substrates of substances, including dirt, oil, grease, and incompatible paints and encapsulants, that could impair bond of coatings. Do not coat surfaces if surface moisture content or alkalinity exceeds that permitted in manufacturer's written instructions.

1. Remove incompatible primers, and reprime substrate with compatible primers as required to produce coating systems indicated.
2. Perform cleaning and coating application so dust and other contaminants from cleaning process will not fall on wet, newly coated surfaces.

3.3 APPLICATION

A. General: Apply intumescent paints according to manufacturer's written instructions and to comply with requirements for fire-retardant coating classification.

1. Use equipment and techniques best suited for substrate and type of material being applied.
2. Coat surfaces behind movable items the same as similar exposed surfaces.
3. Apply each coat separately according to manufacturer's written instructions.

B. Apply coatings to prepared surfaces as soon as practical after preparation and before subsequent surface soiling or deterioration.

C. Apply coatings to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.

1. Pigmented Finishes: If undercoats or other conditions show through pigmented topcoat/overcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

3.4 CLEANING AND PROTECTION

A. At end of each workday, remove rubbish, empty cans, rags, and other discarded materials from Project site.

B. After completing coating application, clean spattered surfaces. Remove spattered coatings by washing, scraping, or other methods. Do not scratch or damage adjacent finished surfaces.

C. Protect work of other trades against damage from coating application. Correct damage to work of other trades by cleaning, repairing, replacing, and refinishing, as approved by Architect, and leave in an undamaged condition.

D. At completion of construction activities, touch up and restore damaged or defaced coated surfaces.

3.5 PAINT SYSTEM SCHEDULE

A. Prime Coat: If required and approved by intumescent paint manufacturer.

B. Fire-Retardant Intumescent Coating: Minimum two coats to comply with requirements for fire-retardant coating classification and surface-burning characteristics indicated.

C. Topcoat/Overcoat: Apply for selected color finish or required or recommended and approved by intumescent paint manufacturer.

END OF SECTION 099646

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. Room-identification signs, to match existing.

1.3 DEFINITIONS

A. Accessible: In accordance with the accessibility standard.

1.4 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: For panel signs.

1. Include fabrication and installation details and attachments to other work.
2. Show sign mounting heights, locations of supplementary supports to be provided by others, and accessories.
3. Show message list, typestyles, graphic elements, including raised characters and Braille, and layout for each sign at least half size.

C. Samples for Initial Selection: For each type of sign assembly, exposed component, and exposed finish.

1. Include representative Samples of available typestyles and graphic symbols.

D. Samples for Verification: For each type of sign assembly showing all components and with the required finish(es), in manufacturer's standard size unless otherwise indicated and as follows:

1. Room-Identification Signs: Full-size Sample.
2. Polycarbonate Sheet: 8 by 10 inches (200 by 250 mm) for each color required.

E. Sign Schedule: Use same designations specified or indicated on Drawings.

1.5 INFORMATIONAL SUBMITTALS

A. Sample Warranty: For special warranty.

1.6 CLOSEOUT SUBMITTALS

A. Maintenance Data: For signs to include in maintenance manuals.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

B. Source Limitations for Signs: Obtain each sign type indicated from one source from a single manufacturer.

C. Regulatory Requirements: Comply with applicable provisions in ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.8 WARRANTY

A. Special Warranty: Manufacturer agrees to repair or replace components of signs that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Deterioration of finishes beyond normal weathering.
b. Deterioration of embedded graphic image.
c. Separation or delamination of sheet materials and components.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 SIGNS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product indicated or comparable product by the following:
1. Similar to Best Sign Systems Inc.
2. Signage style & colors shall match existing on third floor office wing.

B. Room-Identification Sign: Sign with smooth, uniform surfaces; with message and characters having uniform faces, sharp corners, and precisely formed lines and profiles; and as follows:

1. Basis-of-Design Product: Best Signs, Graphic Blast.

2. Laminated-Sheet Sign: Sandblasted polymer face sheet with raised graphics laminated to backing sheet to produce composite sheet.

   a. Composite-Sheet Thickness: Manufacturer's standard for size of sign.
   b. Color(s): As selected by Architect from manufacturer's full range.
   c. Size: 7" x 7"

3. Sign-Panel Perimeter: Finish edges smooth.

   a. Edge Condition: Square cut.
   b. Corner Condition in Elevation: Square.

4. Mounting: adhesive or two-face tape.
5. Text and Typeface: Accessible raised characters and Braille typeface as selected by Architect from manufacturer's full range and variable content as scheduled. Finish raised characters to contrast with background color, and finish Braille to match background color. Provide international wheelchair symbol where indicated on the final Signage Schedule

2.2 ACCESSORIES

A. Adhesives: As recommended by sign manufacturer and with a VOC content of 70 g/L or less for adhesives used inside the weatherproofing system and applied on-site when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

B. Two-Face Tape: Manufacturer's standard high-bond, foam-core tape, 0.045 inch (1.14 mm) thick, with adhesive on both sides.

2.3 FABRICATION

A. Surface-Engraved Graphics: Machine engrave characters and other graphic devices into panel surface indicated to produce precisely formed copy, incised to uniform depth.

   1. Engraved Plastic Laminate: Engrave through exposed face ply of plastic-laminate sheet to expose contrasting core ply.

2.4 GENERAL FINISH REQUIREMENTS

A. Protect mechanical finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

B. Appearance of Finished Work: Noticeable variations in same piece are not acceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

C. Directional Finishes: Run grain with long dimension of each piece and perpendicular to long dimension of finished trim or border surface unless otherwise indicated.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of signage work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install signs using mounting methods indicated and according to manufacturer's written instructions.

1. Install signs level, plumb, true to line, and at locations and heights indicated, with sign surfaces free of distortion and other defects in appearance.
2. Install signs so they do not protrude or obstruct according to the accessibility standard.
3. Before installation, verify that sign surfaces are clean and free of materials or debris that would impair installation.

B. Room-Identification Signs and Other Accessible Signage: Install in locations on walls as indicated and according to accessibility standard.

C. Mounting Methods:

1. Adhesive: Clean bond-breaking materials from substrate surface and remove loose debris. Apply linear beads or spots of adhesive symmetrically to back of sign and of suitable quantity to support weight of sign after cure without slippage. Keep adhesive away from edges to prevent adhesive extrusion as sign is applied and to prevent visibility of cured adhesive at sign edges. Place sign in position, and push to engage adhesive. Temporarily support sign in position until adhesive fully sets.
2. Two-Face Tape: Clean bond-breaking materials from substrate surface and remove loose debris. Apply tape strips symmetrically to back of sign and of suitable quantity to support weight of sign without slippage. Keep strips away from edges to prevent visibility at sign edges. Place sign in position, and push to engage tape adhesive.

3.3 ADJUSTING AND CLEANING

A. Remove and replace damaged or deformed signs and signs that do not comply with specified requirements. Replace signs with damaged or deteriorated finishes or components that cannot be successfully repaired by finish touchup or similar minor repair procedures.

B. Remove temporary protective coverings and strippable films as signs are installed.

C. On completion of installation, clean exposed surfaces of signs according to manufacturer's written instructions, and touch up minor nicks and abrasions in finish. Maintain signs in a clean condition during construction and protect from damage until acceptance by Owner.

3.4 ROOM SIGNAGE SCHEDULE

A. General:

1. Count shall be based on door schedule, text and room number shall be as indicated on schedule and/or floor plans.
2. Vendor shall obtain Owner's final text approval prior to sign fabrication.
3. Mounting Location: The sign shall be installed on the wall adjacent to the latch side of the door. Where there is no wall space to the latch side of the door, including double lead doors, signs shall be placed on the nearest adjacent wall. Mounting location shall be so that a person may approach within 3" of signage without encountering protruding objects or standing within the swing of a door.
4. Mounting Height: As indicated.

B. Doors:

1. Provide one (1) sign for each door, as noted on Door Schedule, with copy to be selected by the Architect.
2. Where noted on the Door Schedule, include Wheelchair Handicapped Symbol as part of the sign or in addition to the door sign.

C. Toilet Room Doors:

1. Provide one (1) sign at each Toilet Room as noted on Door Schedule with message. Include Wheelchair Handicapped Symbol at the Toilet Rooms.

D. Miscellaneous Signs: See Door Schedule for locations and notes.

E. Additional Signage: Verify all quantities. Provide five (5) miscellaneous signs with a maximum of 18 letters each in addition to those shown on the door schedule. Final text to be determined at time of schedule submission. Included in the five additional signs shall be signs to be used and located to identify exterior accessible entrances.

END OF SECTION 101423

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Extruded aluminum horizontal blade equipment screens.

1.02 REFERENCES

A. AAMA 2604 – High Performance Organic Coatings on Architectural Extrusions and Panels.
B. AAMA 2605 – High Performance Organic Coatings on Architectural Extrusions and Panels.
C. AMCA 500-L – Test Methods for Louvers.
D. ASCE 7 – Minimum Design Loads for Buildings and Other Structures
E. ASTM B209 – Standard Specification for Aluminum and Aluminum-Alloy Sheet and Plate.
F. ASTM B221 – Standard Specifications for Aluminum and Aluminum-Alloy Extruded Bars, Rods, Wire, Profiles, and Tubes.
G. ASTM D4214 – Standard Test Method for Evaluating the Degree of Chalking of Exterior Paint Films.
H. ASTM D2244 – Standard Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.

1.03 SUBMITTALS

A. Submit under provisions of Section 01 30 00
B. Product Data: For each product to be used, including:
    1. Manufacturer's product data including performance data.
    2. Installation Instructions
    3. Maintenance and Operations Manuals
C. Shop Drawings
    1. Submit shop drawings indicating materials, construction, dimensions, accessories, and installation details.
D. Samples
    1. Submit color chip sample for units with factory-applied paint.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications:
    1. The manufacturer shall have implemented the management of quality objectives, continual improvement, and monitoring of customer satisfaction to assure that customer needs and expectations are met.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Deliver materials to site in manufacturer's original, unopened containers and packaging, with labels clearly indicating manufacturer and material.
B. Storage: Store materials in a dry area indoors, protected from damage and in accordance with manufacturer's instructions.

C. Handling: Protect materials and finishes during handling and installation to prevent damage
D. Store and dispose of solvent-based materials, and materials used with solvent-based materials, in accordance with requirements of local authorities having jurisdiction.

1.06 PROJECT CONDITIONS

A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by the manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.
B. Field Measurements: Verify actual dimensions of openings by field measurements before fabrication. Coordinate field measurements and fabrication schedule with construction progress to avoid construction delays.

1.07 WARRANTY

A. Manufacturer shall provide a standard limited warranty for louver systems for a period of 1 year from date of installation, no more than 18 months after shipment from manufacturing plant. When notified in writing from the Owner of a manufacturing defect, manufacturer shall promptly correct deficiencies without cost to the owner.
B. Manufacturer shall provide 20 year limited warranty for fluoropolymer-based finish on aluminum substrates.
    1. Finish Coating shall not peel, blister, chip, crack, or check.
    2. Chalking, fading, or erosion of finish when measured by the following tests:
        a. Finish coating shall not chalk in excess of 8 numerical ratings when measured in accordance with ASTM D4214.
        b. Finish coating shall not change color or fade in excess of 5 NBS units as determined by ASTM D2244 and ASTM D822
        c. Finish coating shall not erode at a rate in excess of .01 mils/year confirmed by Florida test samples.

PART 2 PRODUCTS

2.01 MANUFACTURER

1. Basis of design manufacturer: Industrial Louvers Inc. (ILI) - Contact: 511 South 7th Street, Delano, MN 55328; Telephone: (763) 972-2981.

2.02 EXTRUDED ALUMINUM HORIZONTAL BLADE EQUIPMENT SCREENS

A. Fabrication:
    1. Basis of design: Model: 450XPI
    2. Blades:
        a. Style: Horizontal
        b. Material: Extruded aluminum, 6063-T6
        c. Wall Thickness: 0.081 inch (2.1 mm), nominal
        d. Angle: 40 degrees
        e. Centers: 5 inches (127 mm), nominal

3. Supports: as required per wind and door loads.

2.03 FABRICATION

A. Fabrication Requirements:
   1. Performance: Fabricate as required for optimum performance with respect to strength, durability, and appearance.
   2. Size: Fabricate equipment screens to meet dimensions indicated on Contract Documents.
   3. Field Measurement: Verify size, location, and placement of equipment screens before fabrication.
   4. Shop Assembly:
      a. Fabricate to minimize field adjustments, splicing, mechanical joints and field assembly of units.
      b. Preassemble units in shop to greatest extent possible and disassemble as necessary for shipping and handling.
      c. Clearly mark units for reassemble and coordinated installation.
   5. Accessories: Include supports, anchorages and accessories required for complete assembly.
   6. Vertical Mullions: Provide vertical mullions of type and spacing indicated but not further apart than recommended by the manufacturer.
   7. Horizontal Mullions: Provide horizontal mullions at horizontal joints between louver units except where continuous vertical assemblies are indicated.
   8. Connections: Join frame and blade members to one another by mechanical fastener, except where field bolted connections between frame members are made necessary by size of louvers.
   9. Spacing: Maintain equal blade spacing to produce uniform appearance.

2.04 FINISHES (FACTORY)

A. General: Comply with NAAMM "Metal Finishes Manual" for finish designations and application recommendations, except as otherwise indicated. Apply finishes in factory. Protect finishes on exposed surfaces prior to shipment. Remove scratches and blemishes from exposed surfaces that will be visible after completing finishing process. Provide color as indicated or, if not otherwise indicated, as selected by architect.
B. Fluorocarbon Two Coat Coating
   1. Coating shall conform to AAMA 2605.
   2. Louvers to be finished with a minimum 1.0 mil (0.025 mm) thick full strength 70% resin, 2 coat Fluoropolymer system.
   3. All aluminum shall be thoroughly cleaned, etched, and given a chromatic conversion pretreatment before application of coating.
   4. Color: to match RAL 9001.

PART 3 EXECUTION

3.01 EXAMINATION

A. Examine substrates and openings for compliance with requirements for installation tolerances and other conditions affecting performance.
B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

A. Clean opening thoroughly prior to installation
B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install equipment screens at locations as indicated on the drawings and in accordance with the manufacturer's instructions.
B. Install equipment screens plumb, level and in alignment with adjacent work.
C. Install joint sealants as specified in Division 07.

3.04 CLEANING

A. Clean equipment screen surface in accordance with manufacturer's instructions.
B. Touch-up paint, repair or replace damaged products before Substantial Completion.

END OF SECTION 102100

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. Solid-polymer toilet compartments configured as toilet enclosures and urinal screens, colors & accessories to match existing on first floor office toilet rooms.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: For toilet compartments. Include plans, elevations, sections, details, and attachments to other work.

1. Show locations of cutouts for compartment-mounted toilet accessories.
2. Show locations of centerlines of toilet fixtures.
3. Show ceiling grid and overhead support or bracing locations.

C. Samples for Initial Selection: For each type of unit indicated. Include Samples of hardware and accessories involving material and color selection.

D. Samples for Verification: For the following products, in manufacturer's standard sizes unless otherwise indicated:

1. Each type of material, color, and finish required for units, prepared on 6-inch- (152-mm-) square Samples of same thickness and material indicated for Work.
2. Each type of hardware and accessory.

E. Product Certificates: For each type of toilet compartment, from manufacturer.

F. Maintenance Data: For toilet compartments to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Surface-Burning Characteristics: As determined by testing identical products according to ASTM E 84, or another standard acceptable to authorities having jurisdiction, by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

1. Flame-Spread Index: 25 or less.

2. Smoke-Developed Index: 450 or less.

B. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's "Americans with Disabilities Act (ADA) and Architectural Barriers Act (ABA) Accessibility Guidelines for Buildings and Facilities" and ICC/ANSI A117.1 for toilet compartments designated as accessible.

1.5 PROJECT CONDITIONS

A. Field Measurements: Verify actual locations of toilet fixtures, walls, columns, ceilings, and other construction contiguous with toilet compartments by field measurements before fabrication.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Aluminum Castings: ASTM B 26/B 26M.

B. Aluminum Extrusions: ASTM B 221 (ASTM B 221M).

C. Brass Castings: ASTM B 584.

D. Steel Sheet: Commercial steel sheet for exposed applications; mill phosphatized and selected for smoothness.

1. Electrolytically Zinc Coated: ASTM A 879/A 879M, 01Z (03G).
2. Hot-Dip Galvanized: ASTM A 653/A 653M, either hot-dip galvanized or galvannealed.

E. Stainless-Steel Sheet: ASTM A 666, Type 304, stretcher-leveled standard of flatness.

F. Stainless-Steel Castings: ASTM A 743/A 743M.

G. Zamac: Will not be accepted.

2.2 SOLID-POLYMER UNITS

A. Basis of Design Product: Subject to compliance with requirements, provide partitions from Scranton Products to match existing on third floor office wing.

1. Polymer: Color : Gravel, orange peel texture.

B. Toilet-Enclosure Style: Floor and wall anchored, overhead-braced.

C. Entrance-Screen Style: Floor and wall anchored, overhead-braced.

D. Urinal-Screen Style: Wall hung with floor post.

E. Door, Panel, Screen, and Pilaster Construction: Solid, high-density polyethylene (HDPE) panel material, not less than 1 inch (25 mm) thick, seamless, with eased edges, no-sightline system, and with homogenous color and pattern throughout thickness of material.

1. Integral Hinges: Configure doors and pilasters to receive integral hinges.
2. Heat-Sink Strip: Manufacturer's standard continuous, extruded-aluminum strip fastened to exposed bottom edges of solid-polymer components to prevent burning.
3. Color and Pattern: One color and pattern in each room as selected by Architect from manufacturer's full range.

F. Pilaster Shoes and Sleeves (Caps): Manufacturer's standard design; stainless steel.

G. Urinal-Screen Post: Manufacturer's standard post design of 1-3/4-inch- (44-mm-) square, aluminum tube with satin finish; with shoe and sleeve (cap) matching that on the pilaster.

H. Brackets (Fittings):

1. Stirrup Type: Ear or U-brackets, stainless steel.
2. Full-Height (Continuous) Type: Manufacturer's standard design; stainless steel.

a. Use for urinal wall brackets.

2.3 ACCESSORIES

A. Hardware and Accessories: Manufacturer's standard design, heavy-duty operating hardware and accessories.

1. Material: Stainless steel.
2. Hinges: Manufacturer's standard continuous, cam type that swings to a closed or partially open position.
3. Latch and Keeper: Manufacturer's standard surface-mounted latch unit designed for emergency access and with combination rubber-faced door strike and keeper. Provide units that comply with regulatory requirements for accessibility at compartments designated as accessible.
4. Coat Hook: Manufacturer's standard combination hook and rubber-tipped bumper, sized to prevent in-swinging door from hitting compartment-mounted accessories.
5. Door Bumper: Manufacturer's standard rubber-tipped bumper at out-swinging doors and entrance-screen doors.
6. Door Pull: Manufacturer's standard unit at out-swinging doors that complies with regulatory requirements for accessibility. Provide units on both sides of doors at compartments designated as accessible.
7. ADA Pull handle: meet the requirements of Section 404.2.7 of ICC/ANSI A117.1-2003.

B. Overhead Bracing: Manufacturer's standard continuous, extruded-aluminum head rail with antigrip profile and in manufacturer's standard finish.

C. Anchorages and Fasteners: Manufacturer's standard exposed fasteners of stainless steel or chrome-plated steel or brass, finished to match the items they are securing, with theft-resistant-type heads. Provide sex-type bolts for through-bolt applications. For concealed anchors, use stainless steel, hot-dip galvanized steel, or other rust-resistant, protective-coated steel.

2.4 FABRICATION

A. Floor-and-Ceiling-Anchored Units: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of pilasters. Provide shoes and sleeves (caps) at pilasters to conceal anchorage.

B. Urinal-Screen Posts: Provide manufacturer's standard corrosion-resistant anchoring assemblies with leveling adjustment at tops and bottoms of posts. Provide shoes and sleeves (caps) at posts to conceal anchorage.

C. Door Size and Swings: Unless otherwise indicated, provide 30-inch- (762-mm-) wide, in-swinging doors for standard toilet compartments and 36-inch- (914-mm-) wide, out-swinging doors with a minimum 32-inch- (813-mm-) wide, clear opening for compartments designated as accessible.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with manufacturer's written installation instructions. Install units rigid, straight, level, and plumb. Secure units in position with manufacturer's recommended anchoring devices.

1. Maximum Clearances:

a. Pilasters and Panels: 1/2 inch (13 mm).
b. Panels and Walls: 1 inch (25 mm).

2. Stirrup Brackets: Secure panels to walls and to pilasters with no fewer than three brackets attached at midpoint and near top and bottom of panel.

a. Locate wall brackets so holes for wall anchors occur in masonry or tile joints.
b. Align brackets at pilasters with brackets at walls.

B. Overhead-Braced Units: Secure pilasters to floor and level, plumb, and tighten. Set pilasters with anchors penetrating not less than 1-3/4 inches (44 mm) into structural floor unless otherwise indicated in manufacturer's written instructions. Secure continuous head rail to each pilaster with no fewer than two fasteners. Hang doors to align tops of doors with tops of panels, and adjust so tops of doors are parallel with overhead brace when doors are in closed position.

C. Urinal Screens: Attach with anchoring devices to suit supporting structure. Set units level and plumb, rigid, and secured to resist lateral impact.

D. Where accessible water closet compartments are provided, the compartment doors shall have a pull handle 6 inches from the hinge side of the compartment side of the door. This handle shall be mounted 30 inches from the floor and shall meet the requirements of Section 404.2.7 of ICC/ANSI A117.1-2003.

3.2 ADJUSTING

A. Hardware Adjustment: Adjust and lubricate hardware according to hardware manufacturer's written instructions for proper operation. Set hinges on in-swinging doors to hold doors open approximately 30 degrees from closed position when unlatched. Set hinges on out-swinging doors and doors in entrance screens to return doors to fully closed position.

END OF SECTION 102113

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. 1. Manually operated, paired panel operable partitions.

1.3 QUALITY ASSURANCE

A. Installer Qualifications: An experienced installer who is certified in writing by the operable partition manufacturer, as qualified to install the manufacturer's partition systems for work similar in material, design, and extent to that indicated for this Project.

B. Acoustical Performance: Test operable partitions in an independent acoustical laboratory in accordance with ASTM E90 test procedure to attain no less than the STC rating specified. Provide a complete and unedited written test report by the testing laboratory upon request.

C. Preparation of the opening shall conform to the criteria set forth per ASTM E557 "Standard Practice for Architectural Application and Installation of Operable Partitions."

D. Installer Qualifications: An entity that employs installers and supervisors who are trained and approved by manufacturer.

1.4 SUBMITTALS

A. Product Data: Material descriptions, construction details, finishes, installation details, and operating instructions for each type of operable partition, component, and accessory specified.

B. Shop Drawings: Show location and extent of operable partitions. Include plans, elevations, sections, details, attachments to other construction, and accessories. Indicate dimensions, weights, conditions at openings, and at storage areas, and required installation, storage, and operating clearances. Indicate location and installation requirements for hardware and track, including floor tolerances required and direction of travel. Indicate blocking to be provided by others.

1. Structural members to which suspension systems are attached.

C. Seismic Qualification Certificates: For operable panel partitions, tracks, accessories, and components, from manufacturer. Include seismic capacity of partition assemblies to remain in vertical position during a seismic event and the following:

1. Basis for Certification: Indicate whether certification is based on analysis, testing, or experience data, according to ASCE/SEI 7.
2. Detailed description of partition anchorage devices on which the certification is based and their installation requirements.

D. Setting Drawings: Show imbedded items and cutouts required in other work, including support beam punching template.

E. Samples: Color samples demonstrating full range of finishes available by architect. Verification samples will be available in same thickness and material indicated for the work.

F. Delegated-Design Submittal: For operable panel partitions.

1. Include design calculations for seismic restraints.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Clearly mark packages and panels with numbering systems used on Shop Drawings. Do not use permanent markings on panels.

B. Protect panels during delivery, storage, and handling to comply with manufacturer's direction and as required to prevent damage.

1.6 WARRANTY

A. Provide written warranty by manufacturer of operable partitions agreeing to repair or replace any components with manufacturing defects.

B. Warranty period: Two (2) years.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design seismic bracing of tracks to structure above.

B. Seismic Performance: Operable panel partitions shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

1. The term "withstand" means "the partition panels will remain in place without separation of any parts from the system when subjected to the seismic forces specified."

2.2 MANUFACTURERS, PRODUCTS, AND OPERATION

A. Manufacturers: Subject to compliance with requirements, provide product by the following:

Modernfold, Inc.
215 West New Road
Greenfield, IN 46140
Toll Free: 800.869.9685
email: info@modernfold.com
www.modernfold.com

B. Products: Subject to compliance with the requirements, provide the following product:

1. Acousti-Seal #932 manually operated paired panel operable partition.
2. Panel Width: As indicated.

2.3 OPERATION

A. Acousti-Seal #932: Series of paired flat panels hinged together in pairs, manually operated, top supported with operable floor seals.

B. Final Closure: Hinged panel closure

2.4 PANEL CONSTRUCTION

A. Nominal 3-inch (76mm) thick panels in manufacturer's standard 48-inch (1220mm) widths. All panel horizontal and vertical framing members fabricated from minimum 18-gage formed steel with overlapped and welded corners for rigidity. Top channel is reinforced to support suspension system components. Frame is designed so that full vertical edges of panels are of formed steel and provide concealed protection of the edges of the panel skin.

B. Panel Skin Options:

1. 1/2-inch (13mm) NAUF medium density fiberboard, single material or composite layers continuously bonded to panel frame, made with binder containing no urea formaldehyde.
2. Acoustical ratings of panels with this construction: 47 STC

C. Hinges for Panels, Closure Panels, Pass Doors, and Pocket Doors shall be:
1. Full leaf butt hinges, attached directly to panel frame with welded hinge anchor plates within panel to further support hinge mounting to frame. Lifetime warranty on hinges. Hinges mounted into panel edge or vertical astragal are not acceptable.

D. Panel Trim: No vertical trim required or allowed on edges of panels; minimal groove appearance at panel joints.

1. Panel Weights: 47 STC – 7 lbs./square foot

2.5 PANEL FINISHES

A. Panel face finish shall be reinforced heavy-duty vinyl with woven backing weighing not less than 27 ounces per lineal yard.

2.6 SOUND SEALS

A. Vertical Interlocking Sound Seals between panels: Roll-formed steel astragals, with reversible tongue and groove configuration in each panel edge for universal panel operation. Rigid plastic astragals or astragals in only one panel edge are not acceptable.

B. Horizontal Top Seals: Continuous contact extruded vinyl bulb shape with pairs of non-contacting vinyl fingers to prevent distortion without the need for mechanically operated parts.

C. Horizontal Bottom Seals:

1. Modernfold IA2 bottom seal: Automatic operable seals providing nominal 2-inch (51mm) operating clearance with an operating range of +1/2-inch (13mm) to –1-1/2-inch (38mm) which automatically drop as panels are positioned, without the need for tools or cranks.

2.7 SUSPENSION SYSTEM

A. #17 Suspension System

1. Suspension Tracks: Minimum 11-gage, 0.12-inch (3.04mm) roll-formed steel track, suitable for either direct mounting to a wood header or supported by adjustable steel hanger brackets, supporting the load-bearing surface of the track, connected to structural support by pairs of 3/8-inch (9.5mm) diameter threaded rods. Aluminum track is not acceptable.

2. Exposed track soffit: Steel, integral to track, and pre-painted off-white.
3. Carriers: One all-steel trolley with steel-tired ball bearing wheels per panel (except hinged panels). Non-steel tires are not acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. General: Comply with ASTM E557, operable partition manufacturer's written installation instructions, Drawings and approved Shop Drawings.

B. Install operable partitions and accessories after other finishing operations, including painting have been completed.

C. Match operable partitions by installing panels from marked packages in numbered sequence indicated on Shop Drawings.

D. Broken, cracked, chipped, deformed, or unmatched panels are not acceptable.

3.2 CLEANING AND PROTECTION

A. Clean partition surfaces upon completing installation of operable partitions to remove dust, dirt, adhesives, and other foreign materials according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to the manufacturer and Installer that insure operable partitions are without damage or deterioration at time of Substantial Completion.

3.3 ADJUSTING

A. Adjust operable partitions to operate smoothly, easily, and quietly, free from binding, warp, excessive deflection, distortion, nonalignment, misplacement, disruption, or malfunction, throughout entire operational range. Lubricate hardware and other moving parts.

3.4 EXAMINATION

A. Examine flooring, structural support, and opening, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of operable partitions. Proceed with installation only after unsatisfactory conditions have been corrected.

3.5 DEMONSTRATION

A. Demonstrate proper operation and maintenance procedures to Owner's representative.

B. Provide Operation and Maintenance Manual to Owner's representative.

END OF SECTION 102226

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. Corner guards.

1.3 ACTION SUBMITTALS

A. Product Data: Include construction details, material descriptions, impact strength, fire-test-response characteristics, dimensions of individual components and profiles, and finishes for each impact-resistant wall protection unit.

B. Shop Drawings: For each impact-resistant wall protection unit showing locations and extent. Include sections, details, and attachments to other work.

1. For installed products indicated to comply with design loads, include structural analysis data signed and sealed by the qualified professional engineer responsible for their preparation.

C. Samples for Initial Selection: For each type of impact-resistant wall protection unit indicated.

1. Include similar Samples of accent strips and accessories involving color selection.

D. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below.[Include Samples of accent strips to verify color selected.]

1. Corner Guards: 12 inches (300 mm) long. Include examples of joinery, corners, top caps, and field splices.

1.4 INFORMATIONAL SUBMITTALS

A. Material Certificates: For each impact-resistant plastic material, from manufacturer.

B. Material Test Reports: For each impact-resistant plastic material.

C. Warranty: Sample of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For each impact-resistant wall protection unit to include in maintenance manuals.

1. Include recommended methods and frequency of maintenance for maintaining optimum condition of plastic covers under anticipated traffic and use conditions. Include precautions against using cleaning materials and methods that may be detrimental to plastic finishes and performance.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Corner-Guard Covers: Full-size plastic covers of maximum length equal to 10 percent of each type, color, and texture of units installed, but no fewer than two, 4-foot-long units.

B. Include mounting and accessory components. Replacement materials shall be from same production run as installed units.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: An employer of workers trained and approved by manufacturer.

B. Source Limitations: Obtain impact-resistant wall protection units from single source from single manufacturer.

C. Surface-Burning Characteristics: Provide impact-resistant, plastic wall protection units with surface-burning characteristics as determined by testing identical products per ASTM E 84, NFPA 255, or UL 723 by UL or another qualified testing agency.

D. Regulatory Requirements: Comply with applicable provisions in the U.S. Architectural & Transportation Barriers Compliance Board's ADA-ABA Accessibility Guidelines and ICC/ANSI A117.1.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Store impact-resistant wall protection units in original undamaged packages and containers inside well-ventilated area protected from weather, moisture, soiling, extreme temperatures, and humidity.

1. Maintain room temperature within storage area at not less than 70 deg F (21 deg C) during the period plastic materials are stored.
2. Keep plastic sheet material out of direct sunlight.
3. Store plastic wall protection components for a minimum of 72 hours, or until plastic material attains a minimum room temperature of 70 deg F (21 deg C).

a. Store corner-guard covers in a vertical position.

1.9 PROJECT CONDITIONS

A. Environmental Limitations: Do not deliver or install impact-resistant wall protection units until building is enclosed and weatherproof, wet work is complete and dry, and HVAC system is operating and maintaining temperature at 70 deg F (21 deg C) for not less than 72 hours before beginning installation and for the remainder of the construction period.

1.10 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace components of impact-resistant wall protection units that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

a. Structural failures.
b. Deterioration of plastic and other materials beyond normal use.

2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. PVC Plastic: ASTM D 1784, Class 1, textured, chemical- and stain-resistant, high-impact-resistant PVC or acrylic-modified vinyl plastic with integral color throughout; material, thickness as indicated.

1. Impact Resistance: Minimum [25.4 ft-lbf/in. (1356 J/m)] <Insert value> of notch when tested according to ASTM D 256, Test Method A.
2. Chemical and Stain Resistance: Tested according to ASTM D 543.
3. Self-extinguishing when tested according to ASTM D 635.
4. Flame-Spread Index: 25 or less.
5. Smoke-Developed Index: 450 or less.

B. Stainless-Steel Sheet: ASTM A 240/A 240M.

C. Fasteners: Aluminum, nonmagnetic stainless-steel, or other noncorrosive metal screws, bolts, and other fasteners compatible with items being fastened. Use security-type fasteners where exposed to view.

D. Adhesive: As recommended by impact-resistant plastic wall protection manufacturer and with a VOC content of 70 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).

2.2 CORNER GUARDS

A. Surface-Mounted, Resilient, Plastic Corner Guards: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware; fabricated with 90- or 135-degree turn to match wall condition.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Floor Products Co., Inc.
   b. Arden Architectural Specialties, Inc.
   c. Balco, Inc.
   d. Construction Specialties, Inc.
   e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
   f. Korogard Wall Protection Systems; a division of RJF International Corporation.
   g. Musson Rubber Company.
   h. Pawling Corporation.
   i. Tepromark International, Inc.
   j. WallGuard.com.

2. Cover: Extruded rigid plastic, minimum 0.100-inch wall thickness; as follows:

   a. Profile: Nominal 3-inch- (75-mm-) long leg and 1/4-inch (6-mm) corner radius.
   b. Height: 8 feet.
   c. Color and Texture: As selected by Architect from manufacturer's full range.

3. Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum.
4. Retainer Clips: Manufacturer's standard impact-absorbing clips.
5. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

B. Surface-Mounted, Metal Corner Guards: Fabricated from one-piece, formed or extruded metal with formed edges; with 90- or 135-degree turn to match wall condition.

1. Material: Stainless steel, Type 304.

   a. Thickness: Minimum 0.0625 inch.
   b. Finish: Directional satin, No. 4.

2. Wing Size: Nominal 3-1/2 by 3-1/2 inches.
3. Corner Radius: 1/8 inch.
4. Mounting: Flat-head, countersunk screws through factory-drilled mounting holes.

2.3 END-WALL GUARDS

A. Surface-Mounted, Resilient, Plastic End-Wall Guard: Assembly consisting of snap-on plastic cover installed over continuous retainer; including mounting hardware.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

   a. American Floor Products Co., Inc.
   b. Arden Architectural Specialties, Inc.
   c. Balco, Inc.
   d. Construction Specialties, Inc.
   e. IPC Door and Wall Protection Systems; Division of InPro Corporation.
   f. Korogard Wall Protection Systems; a division of RJF International Corporation.
   g. Pawling Corporation.
   h. WallGuard.com.

2. Cover: Extruded rigid plastic, minimum 0.100-inch (2.5-mm) wall thickness; as follows:

   a. Profile: Nominal 3-inch- (75-mm-) long leg and 1/4-inch (6-mm) corner radius.
   b. Height: 8 feet (2.4 m).
   c. Color and Texture: As selected by Architect from manufacturer's full range.

3. Retainer: Minimum 0.060-inch- (1.5-mm-) thick, one-piece, extruded aluminum.
4. Top and Bottom Caps: Prefabricated, injection-molded plastic; color matching cover; field adjustable for close alignment with snap-on cover.

2.4 FABRICATION

A. Fabricate impact-resistant wall protection units to comply with requirements indicated for design, dimensions, and member sizes, including thicknesses of components.

B. Assemble components in factory to greatest extent possible to minimize field assembly. Disassemble only as necessary for shipping and handling.

C. Fabricate components with tight seams and joints with exposed edges rolled. Provide surfaces free of wrinkles, chips, dents, uneven coloration, and other imperfections. Fabricate members and fittings to produce flush, smooth, and rigid hairline joints.

D. Miter corners and ends of wood handrails for returns.

2.5 METAL FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

   1. Remove tool and die marks and stretch lines, or blend into finish.
   2. Grind and polish surfaces to produce uniform finish, free of cross scratches.
   3. Run grain of directional finishes with long dimension of each piece.
   4. When polishing is completed, passivate and rinse surfaces. Remove embedded foreign matter and leave surfaces chemically clean.

B. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates and wall areas, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of work.

B. Examine walls to which impact-resistant wall protection will be attached for blocking, grounds, and other solid backing that have been installed in the locations required for secure attachment of support fasteners.

C. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Complete finishing operations, including painting, before installing impact-resistant wall protection system components.

B. Before installation, clean substrate to remove dust, debris, and loose particles.

3.3 INSTALLATION

A. General: Install impact-resistant wall protection units level, plumb, and true to line without distortions. Do not use materials with chips, cracks, voids, stains, or other defects that might be visible in the finished Work.

3.4 CLEANING

A. Immediately after completion of installation, clean plastic covers and accessories using a standard, ammonia-based, household cleaning agent.

END OF SECTION 102600

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. Toilet accessories.
2. Under lavatory guards.
3. Custodial accessories.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Construction details and dimensions.
2. Anchoring and mounting requirements, including requirements for cutouts in other work and substrate preparation.
3. Material and finish descriptions.
4. Features that will be included for Project.
5. Manufacturer's warranty.

B. Product Schedule: Indicating types, quantities, sizes, and installation locations by room of each accessory required.

1. Identify locations using room designations indicated on Drawings.

C. Maintenance Data: For toilet and bath accessories to include in maintenance manuals.

1.4 QUALITY ASSURANCE

A. Source Limitations: For products listed together in the same articles in Part 2, provide products of same manufacturer unless otherwise approved by Architect.

1.5 COORDINATION

A. Coordinate accessory locations with other work to prevent interference with clearances required for access by people with disabilities, and for proper installation, adjustment, operation, cleaning, and servicing of accessories.

B. Deliver inserts and anchoring devices set into concrete or masonry as required to prevent delaying the Work.

1.6 WARRANTY

A. Special Mirror Warranty: Manufacturer's standard form in which manufacturer agrees to replace mirrors that develop visible silver spoilage defects and that fail in materials or workmanship within specified warranty period.

1. Warranty Period: 15 years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Stainless Steel: ASTM A 666, Type 304, 0.0312-inch (0.8-mm) minimum nominal thickness, unless otherwise indicated.

B. Brass: ASTM B 19 flat products; ASTM B 16 (ASTM B 16M), rods, shapes, forgings, and flat products with finished edges; or ASTM B 30, castings.

C. Steel Sheet: ASTM A 1008/A 1008M, Designation CS (cold rolled, commercial steel), 0.0359-inch (0.9-mm) minimum nominal thickness.

D. Galvanized Steel Sheet: ASTM A 653/A 653M, with G60 (Z180) hot-dip zinc coating.

E. Galvanized Steel Mounting Devices: ASTM A 153/A 153M, hot-dip galvanized after fabrication.

F. Fasteners: Screws, bolts, and other devices of same material as accessory unit and tamper-and-theft resistant where exposed, and of galvanized steel where concealed.

G. Chrome Plating: ASTM B 456, Service Condition Number SC 2 (moderate service).

H. Mirrors: ASTM C 1503, Mirror Glazing Quality, clear-glass mirrors, nominal 6.0 mm thick.

I. ABS Plastic: Acrylonitrile-butadiene-styrene resin formulation.

2.2 TOILET ACCESSORIES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers to math existing on third floor.

B. See drawings for specific items.

2.3 UNDERLAVATORY GUARDS

A. Install on ALL exposed plumbing below lavatories.

B. Underlavatory Guard:

1. Description: Insulating pipe covering for supply and drain piping assemblies that prevent direct contact with and burns from piping; allow service access without removing coverings.
2. Material and Finish: Antimicrobial, molded plastic, white.

C. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. Plumberex Specialty Products, Inc.
2. Truebro by IPS Corporation.

2.4 CUSTODIAL ACCESSORIES

A. Provide following accessories for each janitorial closet. Location to be determined by Architect.

B. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

1. A & J Washroom Accessories, Inc.
2. American Specialties, Inc.
3. Bobrick Washroom Equipment, Inc.
4. Bradley Corporation.
5. GAMCO Specialty Accessories; a division of Bobrick Washroom Equipment, Inc.

C. Utility Shelf :

1. Description: With exposed edges turned down not less than 1/2 inch (13 mm) and supported by two triangular brackets welded to shelf underside.
2. Size: 16 inches (406 mm) long by 6 inches (152 mm) deep.
3. Material and Finish: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel, No. 4 finish (satin).

D. Mop and Broom Holder :

1. Description: Unit with shelf, hooks, holders, and rod suspended beneath shelf.
2. Length: 36 inches (914 mm)
3. Hooks: Three
4. Mop/Broom Holders: Four, spring-loaded, rubber hat, cam type.
5. Material and Finish: Stainless steel, No. 4 finish (satin).
   a. Shelf: Not less than nominal 0.05-inch- (1.3-mm-) thick stainless steel.
   b. Rod: Approximately 1/4-inch- (6-mm-) diameter stainless steel.

2.5 FABRICATION

A. General: Fabricate units with tight seams and joints, and exposed edges rolled. Hang doors and access panels with full-length, continuous hinges. Equip units for concealed anchorage and with corrosion-resistant backing plates.

B. Keys: Provide universal keys for internal access to accessories for servicing and resupplying. Provide minimum of six keys to Owner's representative.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install accessories according to manufacturers' written instructions, using fasteners appropriate to substrate indicated and recommended by unit manufacturer. Install units level, plumb, and firmly anchored in locations and at heights indicated.

B. Grab Bars: Install to withstand a downward load of at least 250 lbf (1112 N), when tested according to method in ASTM F 446.

C. Contractor shall obtain product installation instructions for owner provided material prior to installing concealed wall reinforcing.

3.2 ADJUSTING AND CLEANING

A. Adjust accessories for unencumbered, smooth operation. Replace damaged or defective items.

B. Remove temporary labels and protective coatings.

C. Clean and polish exposed surfaces according to manufacturer's written recommendations.

END OF SECTION 102800

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. Portable, hand-carried fire extinguishers.
2. Fire extinguisher cabinets

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rating and classification, material descriptions, dimensions of individual components and profiles, and finishes for fire extinguisher and mounting brackets.

B. Operation and Maintenance Data: For fire extinguishers to include in maintenance manuals.

C. Warranty: Sample of special warranty.

1.4 QUALITY ASSURANCE

A. NFPA Compliance: Fabricate and label fire extinguishers to comply with NFPA 10, "Portable Fire Extinguishers."

B. Fire Extinguishers: Listed and labeled for type, rating, and classification by an independent testing agency acceptable to authorities having jurisdiction.

1. Provide fire extinguishers approved, listed, and labeled by FMG.

C. Fire-Rated, Fire Protection Cabinets: Listed and labeled to comply with requirements in ASTM E 814 for fire-resistance rating of walls where they are installed.

D. Preinstallation Conference: Conduct conference at Project site.

1.5 COORDINATION

A. Coordinate type and capacity of fire extinguishers with fire protection cabinets to ensure fit and function.

1.6 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace fire extinguishers that fail in materials or workmanship within specified warranty period.

1. Failures include, but are not limited to, the following:

    a. Failure of hydrostatic test according to NFPA 10.
    b. Faulty operation of valves or release levers.

2. Warranty Period: Six years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PORTABLE, HAND-CARRIED FIRE EXTINGUISHERS

A. Fire Extinguishers: Type, size, and capacity for each fire protection cabinet indicated.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

    a. Amerex Corporation.
    b. J. L. Industries, Inc.; a division of Activar Construction Products Group.
    c. Kidde Residential and Commercial Division; Subsidiary of Kidde plc.
    d. Larsen's Manufacturing Company.

B. Multipurpose Dry-Chemical Type in Steel Container UL-rated 2-A:10-B:C, 5-lb (2.3-kg) nominal capacity, with monoammonium phosphate-based dry chemical in enameled-steel container.

2.2 FIRE EXTINGUISHER CABINET

A. Cabinet Type: Suitable for fire extinguisher.

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

    a. J. L. Industries, Inc., a division of Activar Construction Products Group
    b. Kidde Residential and Commercial Division, Subsidiary of Kidde plc.
    c. Larsen's Manufacturing Company.

B. Cabinet Construction:

C. Cabinet Material: Steel sheet.

D. Semirecessed Cabinet: Cabinet box partially recessed in walls of sufficient depth to suit style of trim indicated; with one-piece combination trim and perimeter door frame overlapping surrounding wall surface with exposed trim face and wall return at outer edge (backbend). Provide where walls are of insufficient depth for recessed cabinets but are of sufficient depth to accommodate semirecessed cabinet installation.

1. Square-Edge Trim: 1-1/4- to 1-1/2-inch (32- to 38-mm) backbend depth.
2. Rolled-Edge Trim: 4-inch (102-mm) backbend depth.

E. Cabinet Trim Material: Steel sheet.

F. Door Material: Steel sheet

G. Door Style: Vertical duo panel with frame.

H. Door Glazing: Tempered float glass (clear**)**

I. Door Hardware: Manufacturer's standard door-operating hardware of proper type for cabinet type, trim style, and door material and style indicated.

J. Accessories:

1. Identify fire extinguisher in fire protection cabinet with the words "FIRE EXTINGUISHER."

a. Location: Applied to cabinet door.
b. Application Process: Silk-screened.
c. Lettering Color: Red.
d. Orientation: Vertical.

K. Finishes:

1. Manufacturer's standard baked-enamel paint for the following:

a. Exterior of cabinet door, and trim except for those surfaces indicated to receive another finish.
b. Color: white

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine fire extinguishers for proper charging and tagging.

1. Remove and replace damaged, defective, or undercharged fire extinguishers.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General: Install fire extinguisher cabinets in locations indicated and in compliance with requirements of authorities having jurisdiction.

B. Mounting height: so as to have fire extinguisher handle at 48" maximum above floor.

END OF SECTION 104416

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. Cooking equipment.
2. Self-contained refrigeration equipment.
3. Walk-in refrigeration equipment.
4. Ice maker.

B. Owner-Furnished Equipment: Where indicated, Owner will furnish equipment for installation by Contractor.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product indicated. Include the following:

1. Manufacturer's model number.
2. Accessories and components that will be included for Project.
3. Clearance requirements for access and maintenance.
4. Utility service connections for water, drainage, power, and fuel; include roughing-in dimensions.

B. Shop Drawings: For fabricated equipment. Include plans, elevations, sections, roughing-in dimensions, fabrication details, utility service requirements, and attachments to other work.

C. Samples for Initial Selection: For units with factory-applied color finishes.

D. Samples for Verification: For each factory-applied color finish required, in manufacturer's standard sizes.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: For foodservice facilities.

1. Indicate locations of foodservice equipment and connections to utilities.
2. Key equipment using same designations as indicated on Drawings.
3. Include plans and elevations; clearance requirements for equipment access and maintenance; details of equipment supports; and utility service characteristics.

B. Warranty: Samples of special warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: For foodservice equipment to include in emergency, operation, and maintenance manuals. In addition to items specified in Section 017700 "Closeout Procedures" and Section 017823 "Operation and Maintenance Data," include the following:

1. Product Schedule: For each foodservice equipment item, include the following:

a. Designation indicated on Drawings.
b. Manufacturer's name and model number.
c. List of factory-authorized service agencies including addresses and telephone numbers.

1.6 QUALITY ASSURANCE

A. NSF Standards: Provide equipment that bears NSF Certification Mark or UL Classification Mark certifying compliance with applicable NSF standards.

B. BISSC Standards: Provide bakery equipment that complies with BISSC/Z50.2.

C. UL Certification: Provide electric and fuel-burning equipment and components that are evaluated by UL for fire, electric shock, and casualty hazards according to applicable safety standards, and that are UL certified for compliance and labeled for intended use.

D. Regulatory Requirements: Install equipment to comply with the following:

1. ASHRAE 15, "Safety Code for Mechanical Refrigeration."
2. NFPA 54, "National Fuel Gas Code."
3. NFPA 70, "National Electrical Code."

E. Seismic Restraints: Comply with SMACNA's "Kitchen Ventilation Systems and Food Service Equipment Fabrication and Installation Guidelines," Appendix A, "Seismic Restraint Details," unless otherwise indicated.

1.7 PROJECT CONDITIONS

A. Field Measurements: Verify actual dimensions of construction contiguous with foodservice equipment by field measurements before fabrication. Indicate measurements on Coordination Drawings.

1.8 COORDINATION

A. Coordinate foodservice equipment layout and installation with other work, including layout and installation of lighting fixtures, HVAC equipment, and fire-suppression system components.

B. Coordinate locations and requirements of utility service connections.

C. Coordinate sizes, locations, and requirements of the following:

1. Overhead equipment supports.
2. Equipment bases.
3. Floor depressions.
4. Roof curbs, equipment supports, and penetrations.

1.9 WARRANTY

A. Refrigeration Compressor Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace compressors that fail in materials or workmanship within specified warranty period.

1. Failure includes, but is not limited to, inability to maintain set temperature.
2. Warranty Period: Five years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 COOKING EQUIPMENT

A. Baking Ovens:

1. Products: Subject to compliance with requirements, provide the following:

a. Blodgett: MODEL DFG-200, .

2. Description: Full-size Dual Flow Gas Convection Oven.

a. Double deck.
b. Accessories:

1) Extra Oven Rack(s): One per oven chamber.
2) 4" (102mm) low profile casters (double only).
3) Down-draft flue connector.
4) Solid state digital control with LED display, cook and hold, and Pulse Plus.
5) Solid stainless steel back, oven liner and solid stainless steel doors.
6) Gas manifold.

c. Electrical Service: Equip unit for connection to 3-wire, 6 Amp, 115 VAC, 1 phase, 60 Hz. 1/3 H.P., 2 speed motor, 1140 and 1725 RPM.
d. Gas Service: Natural gas.

e. Location: Areas 407 and 604.

B. Counter Ovens:

1. Products: Subject to compliance with requirements, provide the following:

a. Blodgett: MODEL CTBR, .

2. Description: Half-size Electric Convection Oven.

a. Counter mounted.
b. Accessories:

1) Extra Oven Rack.
2) 4" (102mm) low profile legs.
3) Vent riser.
4) Solid state digital control with LED display, cook and hold, and Pulse Plus.
5) Solid stainless steel back, oven liner and solid stainless steel doors.

c. Electrical Service: Equip unit for connection to 208 VAC, 5.6 KW.
d. Location: Area 128.

2.2 SELF-CONTAINED REFRIGERATION EQUIPMENT

A. Refrigerators:

1. Products: Subject to compliance with requirements, provide the following:

a. TRAULSEN, model: AHT232DUT-FHS

2. Description: "D-width" Reach-in type.

a. Exterior Finish: Stainless steel.
b. Interior Finish: Manufacturer's standard].
c. Doors: Full length.
d. Accessories:

1) Casters.
2) Locking Hasps (padlocks supplied by others).
3) Set of Four (4) 4-5/8" High Casters In Lieu of Legs.
4) Tray Slides: No. 2 type tray slides to accommodate (1) 18" x 26" sheet pans, adjustable to 2" O.C..
5) Stainless-Steel Shelves.
6) Two Year Service/Labor Warranty .

e. Electrical Service: Equip unit with plug and cord.

B. Ice-Making Machine: .

1. Products: Subject to compliance with requirements, provide the following:

a. Manitowoc: QD-0132A Air cooled ice cub machine.

2. Description: Freestanding units.

a. Electrical Service: Equip unit for connection to 115v/1 phase/ 7.0 amps.

2.3 WALK-IN REFRIGERATION EQUIPMENT

A. Walk-in Refrigeration Units: .

1. Basis-of-Design Product: Subject to compliance with requirements, provide walk-in cooler as manufactured by: U.S. Cooler. Local distributor: Adams Restaurant Equipment, Norwich, CT v: 860.887.8052, web: http://adamsrestequip.fastcooler.com/dealer/products.asp.

2. Description: Walk-in Cooler with modular ceiling & custom wall panels, fastened & sealed to existing concrete floor. Rear access door & cuts for sprinkler work to be provided & coordinated.

3. **Clear working space is 84" floor to obstructions above. Bidders shall confirm they can accommodate all vertical clearances & obstructions prior to submitting bid.**

a. Wall and Ceiling Panels:

1) 4" foamed-in-place polyurethane manufactured in an HFC and CFC free process.
2) Interlocking 26 gauge embossed galvalume insulating panels.

b. Flush mounted 36" wide door:

1) Hinges: chrome plated cam lift hinges; three per door.
2) Doors shall be provided with Vision port, suitable sweep and magnetic gaskets. Door shall be provided with door closer, one pre-wired vapor proof light fixture, light switch with pilot light, dial thermometer, manual internal lock override, and chrome plated door latches with strike.

c. Wall Panel customization: after wall panel install, some wall panels may have to be drilled to accept sprinkler pipe to pass thru walk-in cooler. All penetration voids to be filled with expanding foam and sealed with sealant.

d. Vapor proof Lighting Fixtures: LED, 4' vapor proof.

1) Control: Neon pilot light and toggle switch located on exterior of door panel.

B. Refrigeration System: Complete operating system consisting of a condensing unit and a evaporator coil.

1. Condensing Unit: See item specification for condensing unit requirement for this project.

a. General: Condenser fan motors of under 1 h.p. must use electronically commutated (EC) motors or permanent split capacitator-type (PSP) motors; splash lubrication system using Mobil EAL Arctic 22 polyester synthetic refrigeration oil; oil sight glass; removable oil drain plug; label indicating oil used; high/low pressure control; suction line filter; suction and discharge service valves and copper/brass vibration isolators; receiver with fusible plug or relief valve; liquid line shut-off valve; sight glass; molecular sieve filter dryer; main power supply fused disconnect switch
b. Air-Cooled: Air-cooled condenser with ball-bearing permanently lubricated fan motor.
c. Outdoor: Weather proof housing; crank case heater and low ambient temperature controls required to insure proper and efficient operation; fan cycling controls where ambient temperatures do not fall below -15°.

2. Evaporator Coil: Forced convection style; match to condensing unit and suspend with air discharged parallel to the ceiling; lifetime sealed motors with inherent motor protection; evaporator fan motors of under 1 hp and less than 460 volts must use electronically commutated (EC) motors; enclose coil section and fans within aluminum housing

a. Refrigerator: Air defrost
b. Freezer and Low Temperature Refrigerator: Electric heater and controls for positive automatic defrost
c. Installation: Hang using plastic or nylon fasteners; spread coil weight evenly over ceiling panels; support long span ceiling panels as required.
d. Temperature Monitoring System: Electronic monitoring and remote audible alarm system that warns when temperatures register 10 deg F (6 deg C) above or below set temperature.
e. Closure Panels and Trim: Include closure panels and trim.
f. Electrical Service: Equip unit for connection to service indicated on Drawings.

3. Finishes:

a. Exposed Exterior Finish: Stucco-patterned aluminum
b. Unexposed Exterior Finish: Stucco-patterned, metallic-coated steel.
c. Interior Finish: Stucco-patterned aluminum.
d. Closure Panels and Trim: Matched to exposed exterior finish of panels.

4. Floor Screeds

a. Provide vinyl floor screeds, and have NSF® approved cove both inside and out.

2.4 MISCELLANEOUS MATERIALS

A. Installation Accessories, General: NSF certified for end-use application indicated.

B. Elastomeric Joint Sealant: ASTM C 920; silicone. Type S (single component), Grade NS (nonsag), Class 25, Use NT (nontraffic) related to exposure, and Use M, G, A, or O as applicable to joint substrates indicated.

1. Public Health and Safety Requirements:

    a. Sealant is certified for compliance with NSF standards for end-use application indicated.
    b. Washed and cured sealant complies with the FDA's regulations for use in areas that come in contact with food.

2. Cylindrical Sealant Backing: ASTM C 1330, Type C, closed-cell polyethylene, in diameter greater than joint width.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install foodservice equipment level and plumb, according to manufacturer's written instructions.

    1. Connect equipment to utilities.
    2. Provide cutouts in equipment, neatly formed, where required to run service lines through equipment to make final connections.

B. Complete equipment assembly where field assembly is required.

    1. Provide closed butt and contact joints that do not require a filler.
    2. Grind field welds on stainless-steel equipment until smooth and polish to match adjacent finish.

C. Install equipment with access and maintenance clearances that comply with manufacturer's written installation instructions and with requirements of authorities having jurisdiction.

D. Install cabinets and similar equipment on bases in a bed of sealant.

E. Install closure-trim strips and similar items requiring fasteners in a bed of sealant.

F. Install joint sealant in joints between equipment and abutting surfaces with continuous joint backing unless otherwise indicated. Produce airtight, watertight, vermin-proof, sanitary joints.

3.2 CLEANING AND PROTECTING

A. After completing installation of equipment, repair damaged finishes.

B. Clean and adjust equipment as required to produce ready-for-use condition.

C. Protect equipment from damage during remainder of the construction period.

3.3 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain foodservice equipment.

END OF SECTION 114000

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. Horizontal louver blinds with aluminum slats to match existing in office wing.

B. Location of Blinds:

1. Provide blinds on interior side of all new toilet rooms.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

B. Shop Drawings: Show fabrication and installation details for horizontal louver blinds.

C. Samples: For each exposed product and for each color and texture specified, 12 inches (300 mm) long.

D. Samples for Verification: For type and color of horizontal louver blind indicated.

1. Slat: Not less than 12 inches (300 mm) long.
2. Horizontal Louver Blind: Full-size unit, not less than 16 inches (400 mm) wide by 24 inches (600 mm) long.
3. Valance: Full-size unit, not less than 12 inches (300 mm) wide.

E. Window-Treatment Schedule: For horizontal louver blinds. Use same designations indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Product Certificates: For each type of horizontal louver blind.

B. Product Test Reports: For each type of horizontal louver blind, for tests performed by manufacturer and witnessed by a qualified testing agency.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For horizontal louver blinds to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials, from the same product run, that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Horizontal Louver Blinds: Full-size units equal to 5 percent of quantity installed for each size, color, texture, pattern, and gloss indicated, but no fewer than five units.

1.7 DELIVERY, STORAGE, AND HANDLING

A. Deliver horizontal louver blinds in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.8 FIELD CONDITIONS

A. Environmental Limitations: Do not install horizontal louver blinds until construction and wet and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where horizontal louver blinds are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Source Limitations: Obtain horizontal louver blinds from single source from single manufacturer.

2.2 HORIZONTAL LOUVER BLINDS, ALUMINUM SLATS

A. Basis-of-Design Product: Subject to compliance with requirements, provide product to match existing.

B. Slats: Aluminum; alloy and temper recommended by producer for type of use and finish indicated; with crowned profile and radius corners.

1. Width: 1 inch (25 mm).
2. Thickness: 8 guage.

3. Spacing: Manufacturer's standard.
4. Finish: Ionized antistatic, dust-repellent, baked polyester finish.

C. Headrail: Formed steel or extruded aluminum; long edges returned or rolled. Headrails fully enclose operating mechanisms on three sides.

1. Capacity: Two blinds per headrail unless otherwise indicated.
2. Ends: Manufacturer's standard.
3. Manual Lift Mechanism:

   a. Lift-Cord Lock: Variable; stops lift cord at user-selected position within blind full operating range.
   b. Operator: Extension of lift cord(s) through lift-cord lock mechanism to form cord pull.

4. Manual Tilt Mechanism: Enclosed worm-gear mechanism and linkage rod that adjusts ladders.

   a. Tilt: Full.
   b. Operator: Clear-plastic wand.
   c. Over-Rotation Protection: Manufacturer's detachable operator or slip clutch to prevent over rotation of gear.

5. Manual Lift-Operator and Tilt-Operator Lengths: Length required to extend to 48 inches (1219 mm) above floor level when blind is fully closed.
6. Manual Lift-Operator and Tilt-Operator Locations: both on same side, located on side most accessible around furniture and cabinets. Coordinate with furniture plan, unless otherwise indicated.
7. Integrated Headrail/Valance: manufacturer's standard.

D. Bottom Rail: Formed-steel or extruded-aluminum tube that secures and protects ends of ladders and lift cords and has plastic- or metal-capped ends.

1. Type: Manufacturer's standard.

E. Lift Cords: Manufacturer's standard braided cord.

F. Ladders: Evenly spaced across headrail at spacing that prevents long-term slat sag.

G. Valance: Manufacturer's standard.

H. Mounting Brackets: With spacers and shims required for blind placement and alignment indicated.

1. Type: To match existing.
2. Intermediate Support: Provide intermediate support brackets to produce support spacing recommended by blind manufacturer for weight and size of blind.

I. Colors, Textures, Patterns, and Gloss:

1. Slats: To match existing.
2. Components: Provide rails, cords, ladders, and materials exposed to view matching or coordinating with slat color unless otherwise indicated.

2.3 HORIZONTAL LOUVER BLIND FABRICATION

A. Product Safety Standard: Fabricate horizontal louver blinds to comply with WCMA A 100.1 including requirements for corded, flexible, looped devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Between (Inside) Jamb Installation: Width equal to jamb-to-jamb dimension of opening in which blind is installed less 1/4 inch (6 mm) per side or 1/2 inch (13 mm) total, plus or minus 1/8 inch (3.1 mm). Length equal to head-to-sill dimension of opening in which blind is installed less 1/4 inch (6 mm), plus or minus 1/8 inch (3.1 mm).
2. Outside of Jamb Installation: Width and length as indicated, with terminations between blinds of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Concealed Components: Noncorrodible or corrosion-resistant-coated materials.

1. Lift-and-Tilt Mechanisms: With permanently lubricated moving parts.

D. Mounting and Intermediate Brackets: Designed for removal and reinstallation of blind without damaging blind and adjacent surfaces, for supporting blind components, and for bracket positions and blind placement indicated.

E. Installation Fasteners: No fewer than two fasteners per bracket, fabricated from metal noncorrosive to brackets and adjoining construction; type designed for securing to supporting substrate; and supporting blinds and accessories under conditions of normal use.

F. Color-Coated Finish:

1. Metal: For components exposed to view, apply manufacturer's standard baked finish complying with manufacturer's written instructions for surface preparation including pretreatment, application, baking, and minimum dry film thickness.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance.

1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. Install horizontal louver blinds level and plumb, aligned and centered on openings, and aligned with adjacent units according to manufacturer's written instructions.

1. Locate so exterior slat edges are not closer than 2 inches (51 mm) from interior faces of glass and not closer than 1-1/2 inches (38 mm) from interior faces of glazing frames through full operating ranges of blinds.
2. Install mounting and intermediate brackets to prevent deflection of headrails.
3. Install with clearances that prevent interference with adjacent blinds, adjacent construction, and operating hardware of glazed openings, other window treatments, and similar building components and furnishings.

3.3 ADJUSTING

A. Adjust horizontal louver blinds to operate free of binding or malfunction through full operating ranges.

3.4 CLEANING AND PROTECTION

A. Clean horizontal louver blind surfaces after installation according to manufacturer's written instructions.

B. Provide final protection and maintain conditions in a manner acceptable to manufacturer and Installer and that ensures that horizontal louver blinds are without damage or deterioration at time of Substantial Completion.

C. Replace damaged horizontal louver blinds that cannot be repaired in a manner approved by Architect before time of Substantial Completion.

END OF SECTION 122113

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. Manually operated light blocking roller shades with single rollers.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product.

1. Include styles, material descriptions, construction details, dimensions of individual components and profiles, features, finishes, and operating instructions for roller shades.

B. Shop Drawings: Show fabrication and installation details for roller shades, including shadeband materials, their orientation to rollers, and their seam and batten locations.

C. Samples: For each exposed product and for each color and texture specified, 10 inches (250 mm) long.

D. Samples for Initial Selection: For each type and color of shadeband material.

1. Include Samples of accessories involving color selection.

E. Samples for Verification: For each type of roller shade.

1. Shadeband Material: Not less than [10 inches (250 mm)] [3 inches (76 mm)] square. Mark inside face of material if applicable.
2. Roller Shade: Full-size operating unit, not less than 16 inches (400 mm) wide by 36 inches (900 mm) long for each type of roller shade indicated.
3. Installation Accessories: Full-size unit, not less than 10 inches (250 mm) long.

F. Roller-Shade Schedule: Use same area designations as indicated on Drawings.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For Installer.

B. Product Certificates: For each type of shadeband material, signed by product manufacturer.

1.5 CLOSEOUT SUBMITTALS

A. Maintenance Data: For roller shades to include in maintenance manuals.

1.6 MAINTENANCE MATERIAL SUBMITTALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.

1. Roller Shades: Full-size units equal to 5 percent of quantity installed for each size, color, and shadeband material indicated, but no fewer than two units.

1.7 QUALITY ASSURANCE

A. Installer Qualifications: Fabricator of products.

B. Mockups: Build mockups to verify selections made under Sample submittals, to demonstrate aesthetic effects, and to set quality standards for materials and execution.

1. Approval of mockups does not constitute approval of deviations from the Contract Documents contained in mockups unless Architect specifically approves such deviations in writing.
2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Deliver roller shades in factory packages, marked with manufacturer, product name, and location of installation using same designations indicated on Drawings.

1.9 FIELD CONDITIONS

A. Environmental Limitations: Do not install roller shades until construction and finish work in spaces, including painting, is complete and dry and ambient temperature and humidity conditions are maintained at the levels indicated for Project when occupied for its intended use.

B. Field Measurements: Where roller shades are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication and indicate measurements on Shop Drawings. Allow clearances for operating hardware of operable glazed units through entire operating range. Notify Architect of installation conditions that vary from Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. BTX Window Automation, Inc.
2. DFB Sales.
3. Draper Inc.
4. Hunter Douglas Contract.
5. Lutron Electronics Co., Inc.
6. MechoShade Systems, Inc.
7. Nysan Solar Control Inc.; Hunter Douglas Company.
8. OEM Shades Inc.
9. Shade Techniques, LLC.
10. Silent Gliss USA, Inc.
11. SM Automatic, Inc.

B. Source Limitations: Obtain roller shades from single source from single manufacturer.

2.2 MANUALLY OPERATED SHADES WITH SINGLE ROLLERS

A. Chain-and-Clutch Operating Mechanisms: With continuous-loop bead chain and clutch that stops shade movement when bead chain is released; permanently adjusted and lubricated.

1. Bead Chains: Stainless steel.

a. Loop Length: Full length of roller shade.
b. Limit Stops: Provide upper and lower ball stops.
c. Chain-Retainer Type: Chain tensioner, jamb mounted.

2. Spring Lift-Assist Mechanisms: Manufacturer's standard for balancing roller-shade weight and lifting heavy roller shades.

a. Provide for shadebands that weigh more than 10 lb (4.5 kg) or for shades as recommended by manufacturer, whichever criteria are more stringent.

B. Rollers: Corrosion-resistant steel or extruded-aluminum tubes of diameters and wall thicknesses required to accommodate operating mechanisms and weights and widths of shadebands indicated without deflection. Provide with permanently lubricated drive-end assemblies and idle-end assemblies designed to facilitate removal of shadebands for service.

1. Roller Drive-End Location: Right side of inside face of shade.
2. Direction of Shadeband Roll: Regular, from back of roller
3. Shadeband-to-Roller Attachment: Removable spline fitting integral channel in tube.

C. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

D. Shadebands:

1. Shadeband Material: Light-blocking fabric.
2. Shadeband Bottom (Hem) Bar: Steel or extruded aluminum.

a. Type: Exposed with endcaps and integral light seal where bottom (sill) channels are indicated.
b. Color and Finish: As selected by Architect from manufacturer's full range.

E. Installation Accessories:

1. Exposed Headbox: Rectangular, extruded-aluminum enclosure including front fascia, top and back covers, endcaps, and removable bottom closure.

a. Height: Manufacturer's standard height required to enclose roller and shadeband when shade is fully open, but not less than 4 inches (102 mm).

2. Endcap Covers: To cover exposed endcaps.

3. Closure Panel and Wall Clip: Removable aluminum panel designed for installation at bottom of site-constructed ceiling recess or pocket and for snap-in attachment to wall clip without fasteners.

4. Side Channels: With light seals and designed to eliminate light gaps at sides of shades as shades are drawn down. Provide side channels with shadeband guides or other means of aligning shadebands with channels at tops.
5. Bottom (Sill) Channel or Angle: With light seals and designed to eliminate light gaps at bottoms of shades when shades are closed.
6. Installation Accessories Color and Finish: As selected from manufacturer's full range.

F. Mounting Hardware: Brackets or endcaps, corrosion resistant and compatible with roller assembly, operating mechanism, installation accessories, and mounting location and conditions indicated.

2.3 SHADEBAND MATERIALS

A. Shadeband Material Flame-Resistance Rating: Comply with NFPA 701. Testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.

B. Light-Blocking Fabric: Opaque fabric, stain and fade resistant.

1. Source: Roller-shade manufacturer.

2. Type: to be selected by Architect from manufacturer's full range of light blocking fabrics.
3. Thickness: to be selected by Architect from manufacturer's full range of light blocking fabrics..
4. Weight: to be selected by Architect from manufacturer's full range of light blocking fabrics.
5. Roll Width: to fully cover window to prevent light infiltration.
6. Orientation on Shadeband: Up the bolt.
7. Features: Washable with Antistatic treatment.
8. Color: To be white.

2.4 ROLLER-SHADE FABRICATION

A. Product Safety Standard: Fabricate roller shades to comply with WCMA A 100.1, including requirements for flexible, chain-loop devices; lead content of components; and warning labels.

B. Unit Sizes: Fabricate units in sizes to fill window and other openings as follows, measured at 74 deg F (23 deg C):

1. Outside of Jamb Installation: Width and length as recommended, with terminations between shades of end-to-end installations at centerlines of mullion or other defined vertical separations between openings.

C. Shadeband Fabrication: Fabricate shadebands without battens or seams to extent possible except as follows:

1. Vertical Shades: Where width-to-length ratio of shadeband is equal to or greater than 1:4, provide battens and seams at uniform spacings along shadeband length to ensure shadeband tracking and alignment through its full range of movement without distortion of the material.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, for compliance with requirements for installation tolerances, operational clearances, and other conditions affecting performance of the Work.

B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ROLLER-SHADE INSTALLATION

A. Install roller shades level, plumb, and aligned with adjacent units according to manufacturer's written instructions.

1. Opaque Shadebands: Located so shadeband is not closer than 2 inches (51 mm) to interior face of glass. Allow clearances for window operation hardware.

B. Location: all 6th floor windows except rest rooms.

3.3 ADJUSTING

A. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.

3.4 CLEANING AND PROTECTION

A. Clean roller-shade surfaces after installation, according to manufacturer's written instructions.

B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer, that ensure that roller shades are without damage or deterioration at time of Substantial Completion.

C. Replace damaged roller shades that cannot be repaired, in a manner approved by Architect, before time of Substantial Completion.

END OF SECTION 122413

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 plastic-laminate countertops.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of product, including high-pressure decorative laminate adhesive for bonding plastic laminate.

1. Include data for fire-retardant treatment from chemical-treatment manufacturer and certification by treating plant that treated materials comply with requirements.

B. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.

1. Show locations and sizes of cutouts and holes for plumbing fixtures, electrical switches and outlets and other items installed in plastic-laminate countertops.
2. Apply AWI Quality Certification Program standards to Shop Drawings.

C. Samples for Initial Selection:

1. Plastic laminates.

D. Samples for Verification:

1. Plastic laminates, 8 by 10 inches (200 by 250 mm), for each type, color, pattern, and surface finish, with one sample applied to core material and specified edge material applied to one edge.

1.4 INFORMATIONAL SUBMITTALS

A. Qualification Data: For fabricator.

B. Product Certificates: For the following:

1. Composite wood and agrifiber products.
2. High-pressure decorative laminate.
3. Chemical-resistant, high-pressure decorative laminate.
4. Adhesives.

C. Evaluation Reports: For fire-retardant-treated materials, from ICC-ES.

1.5 QUALITY ASSURANCE

A. Fabricator Qualifications: Shop that employs skilled workers who custom fabricate products similar to those required for this Project and whose products have a record of successful in-service performance.

B. Installer Qualifications: Fabricator of products.

C. Woodwork Quality Standard Compliance: It is NOT the intent of this section to have the millworker registered with the AWI Quality Certification program. It IS the intent to have all work meet or exceed AWI Quality standards as indicated.

D. Testing Agency Qualifications: For testing agency providing classification marking for fire-retardant-treated material, an inspection agency acceptable to authorities having jurisdiction that periodically performs inspections to verify that the material bearing the classification marking is representative of the material tested.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Do not deliver countertops until painting and similar operations that could damage countertops have been completed in installation areas. If countertops must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.7 FIELD CONDITIONS

A. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature and relative humidity at occupancy levels during the remainder of the construction period.

B. Environmental Limitations: Do not deliver or install countertops until building is enclosed, wet work is complete, and HVAC system is operating and maintaining temperature between 60 and 90 deg F (16 and 32 deg C) and relative humidity between 25 and 55 percent during the remainder of the construction period.

C. Field Measurements: Where countertops are indicated to fit to other construction, verify dimensions of other construction by field measurements before fabrication, and indicate measurements on Shop Drawings. Coordinate fabrication schedule with construction progress to avoid delaying the Work.

D. Established Dimensions: Where countertops are indicated to fit to other construction, establish dimensions for areas where countertops are to fit. Provide allowance for trimming at site, and coordinate construction to ensure that actual dimensions correspond to established dimensions.

PART 2 - PRODUCTS

2.1 PLASTIC-LAMINATE COUNTERTOPS

A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades indicated for construction, installation, and other requirements.

B. Grade: Premium.

C. Regional Materials: Plastic-laminate countertops shall be manufactured within 500 miles (800 km) of Project site.

D. Certified Wood: Plastic-laminate countertops shall be made from wood products certified as "FSC Pure" or "FSC Mixed Credit" according to FSC STD-01-001, "FSC Principles and Criteria for Forest Stewardship," and FSC STD-40-004, "FSC Standard for Chain of Custody Certification."

E. High-Pressure Decorative Laminate: NEMA LD 3, .

F. Colors, Patterns, and Finishes: Provide materials and products that match existing on third floor office wing.

G. Edge Treatment: Provide materials and products that match existing edge treatment on third floor office wing.

H. Core Material: Medium-density fiberboard.

I. Core Material at Sinks: exterior-grade plywood.

J. Core Thickness: 3/4 inch (19 mm).

1. Build up countertop thickness as indicated at front, back, and ends with additional layers of core material laminated to top.

K. Backer Sheet: Provide plastic-laminate backer sheet, NEMA LD 3, Grade BKL, on underside of countertop substrate.

2.2 WOOD MATERIALS

A. Wood Products: Provide materials that comply with requirements of referenced quality standard unless otherwise indicated.

1. Wood Moisture Content: 5 to 10 percent.

B. Composite Wood and Agrifiber Products: Provide materials that comply with requirements of referenced quality standard for each type of woodwork and quality grade specified unless otherwise indicated.

1. Recycled Content of Medium-Density Fiberboard and Particleboard: Postconsumer recycled content plus one-half of preconsumer recycled content not less than 25 percent.
2. Medium-Density Fiberboard: ANSI A208.2, Grade 130, made with binder containing no urea formaldehyde.

2.3 FIRE-RETARDANT-TREATED MATERIALS

A. Fire-Retardant-Treated Materials, General: Where fire-retardant-treated materials are indicated, use materials complying with requirements in this article that are acceptable to authorities having jurisdiction and with fire-test-response characteristics specified as determined by testing identical products per test method indicated by a qualified testing agency.

1. Use treated materials that comply with requirements of referenced woodworking standard. Do not use materials that are warped, discolored, or otherwise defective.
2. Use fire-retardant-treatment formulations that do not bleed through or otherwise adversely affect finishes. Do not use colorants to distinguish treated materials from untreated materials.
3. Identify fire-retardant-treated materials with appropriate classification marking of qualified testing agency in the form of removable paper label or imprint on surfaces that will be concealed from view after installation.

B. Fire-Retardant-Treated Lumber and Plywood: Products with a flame-spread index of 25 or less when tested according to ASTM E 84, with no evidence of significant progressive combustion when the test is extended an additional 20 minutes, and with the flame front not extending more than 10.5 feet (3.2 m) beyond the centerline of the burners at any time during the test.

1. Kiln dry lumber and plywood after treatment to a maximum moisture content of 19 and 15 percent, respectively.
2. Mill lumber after treatment within limits set for wood removal that do not affect listed fire-test-response characteristics, using a woodworking shop certified by testing and inspecting agency.
3. Mill lumber before treatment and implement special procedures during treatment and drying processes that prevent lumber from warping and developing discolorations from drying sticks or other causes, marring, and other defects affecting appearance of treated woodwork.

2.4 ACCESSORIES

A. Grommets for Cable Passage through Countertops: 2-1/8inch (51-mm) OD, molded-plastic grommets and matching plastic caps with slot for wire passage.

1. Product: Subject to compliance with requirements, provide "SP series" by Doug Mockett & Company, Inc.

2. Color: to be selected by architect from full color range.

2.5 MISCELLANEOUS MATERIALS

A. Adhesives: Do not use adhesives that contain urea formaldehyde.

B. Adhesive for Bonding Plastic Laminate: Unpigmented contact cement.

1. Adhesive for Bonding Edges: Hot-melt adhesive or adhesive specified above for faces].

C. VOC Limits for Installation Adhesives and Sealants: Use products that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):

1. Wood Glues: 30 g/L.
2. Multipurpose Construction Adhesives: 70 g/L.
3. Structural Wood Member Adhesive: 140 g/L.
4. Architectural Sealants: 250 g/L.

2.6 FABRICATION

A. Sand fire-retardant-treated wood lightly to remove raised grain on exposed surfaces before fabrication.

B. Fabricate countertops to dimensions, profiles, and details indicated. Provide front and end overhang of 1 inch (25 mm) over base cabinets. Ease edges to radius indicated for the following:

1. Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.

C. Complete fabrication, including assembly, to maximum extent possible before shipment to Project site. Disassemble components only as necessary for shipment and installation. Where necessary for fitting at site, provide ample allowance for scribing, trimming, and fitting.

1. Trial fit assemblies at fabrication shop that cannot be shipped completely assembled. Install dowels, screws, bolted connectors, and other fastening devices that can be removed after trial fitting. Verify that various parts fit as intended and check measurements of assemblies against field measurements before disassembling for shipment.

D. Shop cut openings to maximum extent possible to receive appliances, plumbing fixtures, electrical work, and similar items. Locate openings accurately and use templates or roughing-in diagrams to produce accurately sized and shaped openings. Sand edges of cutouts to remove splinters and burrs.

1. Seal edges of openings in countertops with a coat of varnish.

PART 3 - EXECUTION

3.1 PREPARATION

A. Before installation, condition countertops to average prevailing humidity conditions in installation areas.

B. Before installing countertops, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

A. Grade: Install countertops to comply with same grade as item to be installed.

B. Assemble countertops and complete fabrication at Project site to the extent that it was not completed in the shop.

1. Provide cutouts for appliances, plumbing fixtures, electrical work, and similar items.

C. Field Jointing: Where possible, make in the same manner as shop jointing, using dowels, splines, adhesives, and fasteners recommended by manufacturer. Prepare edges to be joined in shop so Project-site processing of top and edge surfaces is not required. Locate field joints where shown on Shop Drawings.

1. Secure field joints in plastic-laminate countertops with concealed clamping devices located within 6 inches (150 mm) of front and back edges and at intervals not exceeding 24 inches (600 mm). Tighten according to manufacturer's written instructions to exert a constant, heavy-clamping pressure at joints.

D. Install countertops level, plumb, true, and straight. Shim as required with concealed shims. Install level and plumb to a tolerance of 1/8 inch in 96 inches (3 mm in 2400 mm).

E. Scribe and cut countertops to fit adjoining work, refinish cut surfaces, and repair damaged finish at cuts.

F. Fire-Retardant-Treated Wood: Handle, store, and install fire-retardant-treated wood to comply with chemical treatment manufacturer's written instructions, including those for adhesives used to install woodwork.

G. Countertops: Anchor securely by screwing through corner blocks of base cabinets or other supports into underside of countertop.

1. Install countertops with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) sag, bow, or other variation from a straight line.
2. Secure backsplashes to walls with adhesive.
3. Seal junctures of tops, splashes, and walls with mildew-resistant silicone sealant or another permanently elastic sealing compound recommended by countertop material manufacturer.

3.3 ADJUSTING AND CLEANING

A. Repair damaged and defective countertops, where possible, to eliminate functional and visual defects; where not possible to repair, replace woodwork. Adjust joinery for uniform appearance.

B. Clean countertops on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

END OF SECTION 123623.13

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. Solid-surface-material countertops and backsplashes.
2. Solid-surface-material window sills and aprons.

1.3 ACTION SUBMITTALS

A. Product Data: For countertop materials and sinks.

B. Shop Drawings: For countertops. Show materials, finishes, edge and backsplash profiles, methods of joining, and cutouts for plumbing fixtures.

C. Samples for Initial Selection: For each type of material exposed to view.

D. Samples for Verification: For the following products:

1. Countertop material, 6 inches (150 mm) square.
2. One full-size solid-surface-material countertop, with front edge and backsplash, 8 by 10 inches (200 by 250 mm), of construction and in configuration specified.

1.4 PROJECT CONDITIONS

A. Field Measurements: Verify dimensions of countertops by field measurements after base cabinets are installed but before countertop fabrication is complete.

1.5 COORDINATION

A. Coordinate locations of utilities that will penetrate countertops or backsplashes.

PART 2 - PRODUCTS

2.1 SOLID-SURFACE-MATERIAL COUNTERTOPS

A. Countertops: 1/2-inch- (12.7-mm-) thick, solid surface material with front edge built up with same material.

B. Backsplashes: 1/2-inch- (12.7-mm-) thick, solid surface material.

C. Fabrication: Fabricate tops in one piece with shop-applied edges unless otherwise indicated. Comply with solid-surface-material manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.

1. Fabricate with loose backsplashes for field assembly.

2.2 COUNTERTOP MATERIALS

A. Certified Wood Materials: Fabricate countertops with wood and wood-based products 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."

B. Particleboard: ANSI A208.1, Grade M-2-Exterior Glue, made with binder containing no urea formaldehyde.

C. Plywood: Exterior softwood plywood complying with DOC PS 1, Grade C-C Plugged, touch sanded.

D. Adhesives: Adhesives shall not contain urea formaldehyde.

E. Solid Surface Material: Homogeneous solid sheets of filled plastic resin complying with ANSI SS1.

1. Manufacturers: Subject to compliance with requirements, provide product to match existing third floor office simulated stone.
2. Colors and Patterns: to match existing third floor office simulated stone.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install countertops level to a tolerance of 1/8 inch in 8 feet (3 mm in 2.4 m).

B. Fasten countertops by screwing through corner blocks of base units into underside of countertop. Pre-drill holes for screws as recommended by manufacturer. Align adjacent surfaces and, using adhesive in color to match countertop, form seams to comply with manufacturer's written instructions. Carefully dress joints smooth, remove surface scratches, and clean entire surface.

1. Install backsplashes to comply with manufacturer's written instructions for adhesives, sealers, fabrication, and finishing.
2. Seal edges of cutouts in particleboard subtops by saturating with varnish.

END OF SECTION 123661

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and General Provisions of Contract, including General and Supplementary Conditions and Division 01 Specification sections, apply to work of this section.

B. Related Sections include the following:

1. Section 310500 – General Requirements For Earthwork

C. Concrete shall conform to RIDOT Standard Specification for Road and Bridge Construction latest edition, section 600.

1.2 DESCRIPTION OF WORK

A. Furnish labor, materials and equipment to install a total fence system of standard picket space ornamental steel design. The system shall include 6' and 8' fencing, gates as shown on the detail plans and all components required for the operation of the system (i.e., panels, posts, gates, hardware and gate operating accessories).

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1.3 SUBMITTALS

A. Changes in specification are only upon written approval by Owner.

B. Shop Drawings: Shall consist of dimensions, sizes, finishes, slide gate components and post foundations/mounting on existing concrete wall.

C. Product Data: Manufacturer's literature prior to installation.

D. Samples: Color selections for polyester powder coated finishes. Samples of fence components delivered to Owner.

1.4 QUALITY ASSURANCE

A. The contractor shall provide laborers and supervisors who are thoroughly familiar with the type of construction involved and materials and techniques specified.

1.5 REFERENCES

ASTM A653/A653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy Coated (Galvannealed) by the Hot-Dip Process.
ASTM B117 - Practice for Operating Salt-Spray (Fog) Apparatus.
ASTM D523 - Test Method for Specular Gloss
ASTM D714 - Test Method for Evaluating Degree of Blistering in Paint.

ASTM D822 - Practice for Conducting Tests on Paint and Related Coatings and Materials using Filtered Open-Flame Carbon-Arc Light and Water Exposure Apparatus.
ASTM D1654 - Test Method for Evaluation of Painted or Coated Specimens Subjected to Corro sive Environments.
ASTM D2244 - Test Method for Calculation of Color Differences from Instrumentally Measured Color Coordinates.
ASTM D2794 - Test Method for Resistance of Organic Coatings to the Effects of Rapid Defor mation (Impact).
ASTM D3359 - Test Method for Measuring Adhesion by Tape Test.
ASTM F2408 – Ornamental Fences Employing Galvanized Steel Tubular Pickets.

1.6 PRODUCT HANDLING AND STORAGE

A. Upon receipt at the job site, all materials shall be checked to ensure that no damage occurred during shipping or handling. Materials shall be stored in such a manner to ensure proper ventilation and drainage, and to protect against damage, weather, vandalism and theft.

PART 2 - PRODUCTS

2.1 ORNAMENTAL FENCE AND GATE

A. Ornamental Fencing and Gates shall be Black Steel and shall have 3 (three) rails at a minimum 1 1/2" sq. Pickets shall be a minimum of 3/4" sq x 17 Ga. tubing. Posts shall be a minimum of 3" sq. except dumpster fence posts and slide gate fence posts shall be 4" sq. Fence posts and gate posts shall meet the minimum size requirements of the manufacturer. Post caps shall be "ball cap" style and constructed of aluminum or steel to form a weather-tight closure.

B. Fence Post Base Plate shall be 6" x 6" x ½". Dumpster fence post base plate to be 8"x8"x1/2".

C. Handicap Rail Mounting Bracket shall be #218 Steel as manufactured by Julius Blum or equal.

D. Material for pickets shall be 3/4" square x 17 Ga. tubing. The rails shall be steel channel, 13/4"

E. Manufacturer:
Montage Plus (3-Rail) as manufactured by Ameristar Fence Products, or approved equivalent.

F. Slide Gate System accessories to be provided by Ameristar Fence Products:
a. Gate Operator: two (2) Hy-Security SLSDC15
b. Photo Cell: four (4) EMX IRB-325
c. Photo Cell Protective Hood: four(4) EMX IRB-325-HD-SET

d. Loops: three (3) BD Loops SC52-50
e. Loop Detectors: two (2) Hy-Security MX000041
f. Safety Edge Receiver: two (2) Linear MCS109950
g. Safety EdgeTransmitter : four (4) LinearMCS302210
h. Safety Edge: four (4) Miller Edge MGO20-2E-06
i. Proximity Reader: one (1) Doorking 1520-080
j. Proximity Cards: fifty (50) Doorking 1508-020
k. Gooseneck: one (1) Linear GNB1
l. Transformer Box: one (1) Doorking 1200-080

G. Touchbar style exit device: Manufactured by Stanley Security Solutions, Apex 2000 Series, satin stainless steel finish.

2.2 FABRICATION

A. Pickets, rails and posts shall be pre-cut to specified lengths. Rails shall be pre-punched to accept pickets.

B. Pickets shall be inserted into the pre-punched holes in the rails and shall be aligned to standard spacing using a specially calibrated alignment fixture. The aligned pickets and rails shall be joined at each picket-to-rail intersection by Ameristar's fusion welding process, thus completing the rigid panel assembly (Note: The process produces a virtually seamless, spatter-free good-neighbor appearance, equally attractive from either side of the panel).

C. The manufactured panels and posts shall be subjected to an inline electrode position coating (E-Coat) process consisting of a multi-stage pretreatment/wash (with zinc phosphate), followed by a duplex application of an epoxy primer and an acrylic topcoat. The mini mum cumulative coating thickness of epoxy and acrylic shall be 2 mils (0.058 mm). The color shall be Black. The coated panels and posts shall be capable of meeting the performance requirements for each quality characteristic shown in Table 2 (Note: The requirements in Table 2 meet or exceed the coating performance criteria of ASTM F2408).

D. The manufactured fence system shall be capable of meeting the vertical load, horizontal load, and infill performance requirements for Industrial weight fences under ASTM F2408.

E. Gates shall be fabricated using fusion welded ornamental panel material and 1-3/4" sq. x 14ga. gate ends. All rail and upright intersections shall be joined by welding. All picket and rail intersections shall also be joined by welding. Metal plate for touchbar device shall be joined by welding.

F. Handicap rail mounting bracket shall be joined to the posts by welding as shown on the plans.

2.3 SETTING MATERIALS

A. Concrete: Concrete shall conform to RIDOT Standard Specification for Road and Bridge Construction latest edition, section 600.

B. Post: Posts shall be mounted on concrete footings or existing wall as shown on the plans.

PART 3 – EXECUTION

3.1 FENCE INSTALLATION

A. Fence post shall be spaced according to Table 3, plus or minus ¼". For installations that must be raked to follow sloping grades, the post spacing dimension must be measured along the grade. Fence panels shall be attached to posts with brackets supplied by the manufacturer. Posts shall be set in concrete footers having a minimum depth of 36" (Note: In some cases, local restrictions of freezing weather conditions may require a greater depth). The "Earthwork" and "Concrete" sections of this specification shall govern material requirements for the concrete footer. Posts setting by other methods such as plated posts or grouted core-drilled footers are permissible only if shown by engineer ing analysis to be sufficient in strength for the intended application. Install and secure specified post tops.

3.2 FENCE INSTALLATION MAINTENANCE

A. When cutting/drilling rails or posts adhere to the following steps to seal the exposed steel surfaces; 1) Remove all metal shavings from cut area. 2) Apply zinc-rich primer to thoroughly cover cut edge and/or drilled hole; let dry. 3) Apply 2 coats of custom finish paint matching fence color. Failure to seal exposed surfaces per steps 1-3 above will negate warranty. Ameristar spray cans or paint pens shall be used to prime and finish exposed surfaces; it is recommended that paint pens be used to prevent overspray. Use of non-Ameristar parts or components will negate the manufactures' warranty.

3.3 GATE INSTALLATION

A. Gate posts shall be spaced according to the manufacturers' gate drawings, dependent on standard out-to-out gate leaf dimensions and gate hardware selected. Type and quantity of gate hinges shall be based on the application; weight, height, and number of gate cycles. The manufacturers' gate drawings shall identify the necessary gate hardware required for the application. Gate hardware and slide gate components shall be provided by the manufacture of the gate and shall be installed per manufacturer's recommenda-tions.

3.4 CLEANING

A. The contractor shall clean the jobsite of excess materials.

END OF SECTION

SECTION 260000 - GENERAL

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Work that applies to all sections of DIVISION 26
2. Temporary electrical wiring
3. Electrical services
4. Removals (demolition) and relocations

1.2 RELATED DOCUMENTS

A. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 of the specification are part of Division 26, 27 and 28 which shall consist of all labor, equipment, materials and other costs necessary to complete all ELECTRICAL MATERIALS AND METHODS work indicated on the drawings, herein specified or both.

1.3 RELATED WORK SPECIFIED UNDER OTHER SECTIONS: (Read these DIVISIONS carefully. For purposes of bidding, assume that all work of the DIVISION referenced is to be performed under that DIVISION unless specifically indicated therein to be performed under the ELECTRICAL DIVISION.)

A. Temporary wiring for building construction - see DIVISION 1.

B. Cutting and patching - see DIVISION 1

C. Allowances – see DIVISION 1.

D. Alternatives - see DIVISION 1.

E. Concrete - see DIVISION 3.

F. Magnetic door release - see DIVISION 8.

G. Access panels - see DIVISION 8.

H. Painting of all backboards (on all sides and edges before mounting); painting of panels (trims and doors - 2 coats before mounting); painting of exposed electrical raceways, boxes and fittings - see DIVISION 9.

I. Elevators - see DIVISION 14.

J. Sprinkler flow switches and gate valve switches - see DIVISION 21.

K. Furnishing of manual and magnetic starters for HVAC equipment - see DIVISION 25.

L. Temperature controls, temperature control wiring, interlock wiring, and boiler control wiring (except as indicated on the electrical drawings) - see DIVISION 23.

M. Motor operated doors for smoke control – see Division 8.

1.4 DEFINITIONS

A. Provide: Furnish and install.

B. Wiring: Wire, raceways, boxes and fittings.

1.5 PERMITS AND FEES

A. Obtain all permits for the work of this section

B. Pay all fees, including a FIRE ALARM REVIEW FEE and FINAL INSPECTION FEES.

1.6 SUBMITTALS

A. Product Data: For each product indicated

B. Shop Drawings: Wiring and connection diagrams

C. Manufacturers: Where the drawings or specifications list specific brands or catalog numbers, only these products may be used unless the words: "or approved equal" or "but are not limited to" are included.

D. Limitations of approval: The Contractor shall not be relieved of responsibility for deviations from requirements of the Contract Documents by the Engineer's approval of Shop Drawings, Product Data, Samples or similar submittals unless the Contractor has specifically informed the Engineer in writing of such deviation, in a separate cover letter on Contractor's letterhead, at the time of submittal and the Engineer has given written approval to the specific deviation. The Contractor shall not be relieved of responsibility for errors or omissions in Shop Drawings, Product Data, Samples or similar submittals by the Engineer's approval thereof.

E. Contractor's responsibility: It is the responsibility of the Contractor to check all dimensions and details on shop drawings, <u>before</u> <u>submission</u> to the Engineer, reject same if necessary and only forward to the Engineer shop drawings which he is reasonably certain fulfill the requirements of the contract documents and the work. The approval of shop drawings by the Engineer shall be general only in character and not mean dimensions on drawings have been checked, and will in no way relieve the Contractor of the responsibility for proper fitting and construction of the work, nor from the necessity of furnishing materials or doing the work

required by the drawings and/or specifications, which may not be indicated on the shop drawings when approved. All shop drawings shall be checked by the Contractor, and must bear the Contractor's stamp of approval; drawings submitted without this stamp of approval will not be considered.

F. Samples: Provide all samples requested by the Engineer.

G. Tests: Test the complete installation to prove it free from shorts, grounds, opens and faulty connections. Make any corrections necessary before acceptance.

1. Test each function of each system including each device.

H. Certification: Upon request, provide "Certification" (by a recognized testing agency or a Professional Engineer registered in the state where the project is located) that submitted items of equipment are suitable for their intended use.

I. Record of Addenda and Change Orders: To avoid overlooking addenda and change order modifications, mark all changes on all copies of drawings and specifications, in a manor acceptable to the Engineer. One method of accomplishing this is to make copies and tape them on the back of the preceding page (tape all edges). Also, circle the changed area and note: see addenda #1, etc. If whole pages or sheets change, either remove the superseded document or put a bold **"X"** through it.

J. Record Drawings: Owner's record drawings shall be updated as the project progresses. Maintain documents in a safe, dry location. Indicate clearly and accurately any changes necessitated by field conditions and dimension all raceways built into or under concrete slabs or buried under ground.

K. Operating Instructions and Manuals: Provide the Owner or his representative with complete operating instructions by qualified personnel of all electrical systems. Provide three (3) bound sets (indexed and bound in three sturdy three-ring binders) of operating and maintenance instructions of all electrical systems employed and all shop drawings.

L. Manuals: Provide one (1) extra bound set of all shop drawings. Bind in a sturdy 3-ring binder.

M. Letter of Confirmation: Include in the above manuals a letter confirming that the following items have been completed. Provide written receipt signed by the Owner or his representative indicating that the first 4 items listed below have been received.

1. The number of circuit breaker locks called for have been provided.
2. Keys have been provided for all locked electrical equipment.
3. The provisions of the "Operating Instructions and Manuals" paragraph of these specifications have been met.
4. Spare fuses have been provided.
5. Identification is complete and in accordance with these specifications.
6. As-built electrical drawings have been completed and submitted.
7. All tests are complete and in accordance with these specifications.
8. All required shop drawings have been submitted and approved.

9. The entire installation has been accepted by all authorities.

1.7 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Do all wiring and provide all equipment in accordance with the prevailing issue of the National Electrical Code, State Building Code, State Fire Code, OSHA and any additional local rules or requirements.

C. Obtain and pay for all necessary permits, certificates, reviews, etc. Present satisfactory proof of final inspection and approval by all inspection authorities.

D. Consider the most current edition (as of the date of this specification) of the following Industry Standards as minimum requirements for all materials, equipment and systems where such standards are established for materials in question:

1. National Board of Fire Underwriters
2. National Electrical Manufacturers Association
3. National Fire Protection Association
4. Institute of Electrical and Electronic Engineers
5. Local Electric Utility Company
6. Local Telephone Company
7. A nationally recognized testing laboratory (UL, ETL, etc.)
8. Factory Mutual
9. Americans with Disabilities Act
10. American National Standards Institute
11. TIA/EIA
12. BICSI TDDM

E. Where applicable, this installation shall comply with the most recent edition of the following NECA (National Electrical Contractors Association) "National Electrical Installation Standards." Except, if there is a conflict between this specification and these standards, the requirements of this specification shall prevail.

1.	NECA 1	Standard Practices for Good Workmanship in Electrical Contracting
2.	NECA 101	Standard for Installing Steel Conduit (Rigid, EMT)
3.	NECA/AA 104	Recommended Practice for Installing Aluminum Building Wire and Cable
4.	NECA 400	Recommended Practice for Installing and Maintaining Switchboards

5. NECA/IESNA 500 Recommended Practice for Installing Indoor Commercial Lighting Systems

6. NECA/BICSI 568(B) Telecommunications

1.8 COORDINATION

A. Coordinate chases, slots, inserts, sleeves, and openings for electrical supports, raceways, and cable with general construction work.

B. Sequence, coordinate, and integrate installing electrical materials and equipment for efficient flow of the Work. Coordinate installing large equipment that requires positioning before closing in the building.

C. Coordinate electrical service connections to components furnished by utility companies.

D. Electrical Contractor shall review that portion of submittals from other Divisions which effects the electrical equipment and adjust the sizing of conductors, conduits and over current protection devices according to substitutions made. Monetary settlement for such substitutions shall be between Electrical Contractor and the party making the substitution.

1.9 TEMPORARY ELECTRICAL WIRING:

A. Refer to DIVISION 1 of these specifications and add the following:

B. Provide all required connections, panels, circuit breakers, feeders, branch circuit wiring, transformers, lighting fixtures, lamps, receptacles, switches, etc. for a complete and operating temporary electrical system.

C. Provide a minimum of 5 footcandles of temporary general illumination throughout the floor area of the building, including all corridors and stairways.

D. Existing lighting may be used where it is sufficient and remains energized.

E. Provide feeders of sufficient capacity for the requirements of the work, sufficient number of outlets conveniently located so that extension cords not exceeding 100 feet will reach all work requiring artificial light or power.

F. All receptacles must be GFCI protected and the entire installation must comply with all applicable OSHA requirements.

G. At the end of the day's work, disconnect all lights and power, other than the minimum required security illumination.

H. Provide replacement light bulbs and maintenance of the temporary wiring system, as required, throughout the period of construction.

I. Conform to all codes and regulations.

1.10 CHANGE ORDERS/PROPOSAL REQUESTS:

A. Refer to DIVISION 1 of these specifications and add the following:

B. During the course of construction, changes in the work may occur. When a significant change is to be made, a Proposal Request will be issued.

C. Provide a complete cost breakdown when responding to each Proposal Request.

D. Each item of work to be priced separately.

E. Each line item to be broken down including quantities and listing separately labor and material.

F. Both credits and extras shall be separately and clearly quantified.

G. Allowances for overhead and profit shall be as listed in the supplementary conditions.

H. If you become aware of a field condition, code requirement, error, or omission that you feel should result in a change to the work, please contact the Engineer for discussion. The Engineer may be able to clarify the situation and avoid unnecessary paperwork.

1.11 INSPECTIONS/SITE OBSERVATIONS

A. The authority having jurisdiction (usually the Municipal Electrical Inspector) shall be notified at periodic intervals that an inspection is requested. Inspections shall be requested at points of progress, meeting the approval of the inspector and as a minimum include the following:

1. Prior to enclosing walls.
2. Prior to enclosing ceilings.
3. Prior to installation of panel panel/switchgear trims/covers.
4. For observation of connections and grounding at switchboards, transformers and generators.

B. Do not cover the work before the Engineer has had a chance to observe it in completed form. The electrical foreman shall request a meeting with the Engineer within 10 days after the start of electrical construction to assure that there is agreement on the scope of work and to answer questions.

C. The electrical foreman shall provide assistance to the Engineer during site observations:

1. Describe the progress of the electrical work in detail.
2. Accompany the Engineer on his tour of the site, upon request.
3. Provide use of a suitable ladder, scaffolding or bucket truck to observe the work, upon request.

4. Remove ceiling tiles, panel trims, junction box covers, etc. for observation of the work, upon request.
5. Provide use of project drawings, specifications and shop drawings.

1.12 GUARANTEES/WARRANTIES:

A. Refer to Division 1 of these specifications and add the following:

B. A minimum warrantee time of one year from date of acceptance by the Engineer.

C. The Owner reserves the right to make appropriate modifications or extensions of systems and equipment furnished under this contract during the guarantee/warranty period without "voiding" or modifying the guarantee/warranty of equipment and wiring installed under this contract. If manufacturer voids guarantee, it shall not relieve this contractor of his responsibilities for guarantee/warranty period.

1.13 MISCELLANEOUS

A. Provide all systems complete. Drawings and Specifications form complementary requirements; provide work specified and not shown, and work shown and not specified as though explicitly required by both.

B. Although work is not specifically shown or specified, provide supplementary or miscellaneous items, appurtenances, devices and materials obviously necessary for a sound, secure and complete installation.

C. All wiring and connections to be done with associated circuit de-energized.

PART 2 - PRODUCTS

2.1 MATERIALS - General:

A. All materials and equipment to be <u>new</u> unless specifically stated otherwise.

B. Materials and equipment shall be suitable for their intended use and for the environment in which they are installed. For example, equipment located outside shall be weatherproof and constructed of materials that will not rust. This includes brackets, screws, etc.

C. Coordinate all dimensions to make sure that boxes, raceways, equipment, fixtures, etc., fit properly in the finished construction. If special provisions, such as shallow boxes, are required, they shall be provided at no increase in contract price, regardless of catalog numbers listed in contract documents or on shop drawings.

D. As it is not practical to enumerate in these specifications (or show on the drawings) all details of fittings and accessory equipment required for proper operation of the various electrical systems

herein described, it is understood that they will be supplied without extra compensation. Provide all fittings, terminations, relays, components of panels and equipment, etc., needed for the best performance possible at the present state-of-the-art.

2.2 EQUIPMENT FOR UTILITY COMPANY'S ELECTRICITY METERING

A. Comply with requirements of electrical power utility company for current transformer cabinets, meter sockets, and modular meter centers.

B. For existing services where utility company current transformers are removed, provide bus extensions as necessary.

2.3 EQUIPMENT BACKBOARDS

A. Where not otherwise specified, equipment backboards shall be fire rated, exterior grade, AC grade, installed with 'A' side exposed.

PART 3 - EXECUTION

3.1 ELECTRICAL EQUIPMENT INSTALLATION

A. Headroom Maintenance: If mounting heights or other location criteria are not indicated, arrange and install components so as to allow for safe personnel movement and maintenance access.

B. Materials and Components: Install level, plumb, and parallel and perpendicular to other building systems and components, unless otherwise indicated.

C. Equipment: Install to facilitate service, maintenance, and repair or replacement of components. Connect for ease of disconnecting, with minimum interference with other installations.

D. Right of Way: Give to raceways and piping systems installed at a required slope.

3.2 LAYOUTS

A. The electrical system layouts indicated are generally diagrammatic and locations of outlets and equipment are approximate only. Exact routing of wiring and locations of outlets and equipment shall be governed by structural conditions and obstructions. This is not to be construed to permit redesigning systems. Interconnect as shown.

B. Locate all equipment requiring maintenance and operation so that it will be readily accessible. The right is reserved to make any reasonable change in location of outlets and equipment prior to roughing-in without involving additional expense. This may involve slightly longer wiring runs, longer stems, additional mounting provisions, etc. Allow for this in your bid because

additional compensation will not be provided. Items not specifically located on the plans shall (for the purposes of bidding) be assumed to be in the farthest, most difficult location. Exact location to be as directed in the field.

3.3 ELECTRICAL SERVICE:

A. The existing 3000 AMP service and switchboard shall remain.

B. Service to be as indicated on the drawings.

3.4 ELECTRICAL SUPPORTING DEVICE APPLICATION

A. Damp Locations and Outdoors: Hot-dip galvanized materials, slotted channel system components.

B. Dry Locations: Steel materials.

C. Strength of Supports: Adequate to carry present and future loads, times a safety factor of at least four with, 200-lb (90-kg) minimum design load for each support element.

3.5 SEQUENCE AND BALANCE:

A. Maintain correct phase sequence of all feeders and circuits by establishing phase identification and maintaining correct relationship throughout the system. Provide line balance within 10% of normal loads.

3.6 ELECTRICITY METERING EQUIPMENT

A. Make provisions for utility company metering equipment according to utility company's written requirements. Provide grounding and empty conduits as required by utility company.

3.7 FIRESTOPPING

A. Refer to Division 7 of these specifications and add the following:

B. Apply firestopping to cable and raceway sleeves and other penetrations of fire-rated floor and wall assemblies to restore original undisturbed fire-resistance ratings of assemblies.

C. Penetrations through exterior surfaces shall be made watertight.

D. Floor boxes, fed from floor below, shall be fire-rated, poke-through type with UL labeled fire rating to match floor rating.

3.8 WORK INTERFERING WITH EXISTING WIRING:

A. Make any necessary re-circuiting, extensions of existing circuits and relocations required to properly re-energize remaining existing devices or equipment that may be interfered with by new construction or removals.

3.9 REMOVALS (DEMOLITION) AND RELOCATIONS:

A. Coordinate with DIVISION 1 section "Selective Demolition."

B. Do all removal work in a neat and orderly manner so as not to endanger lives nor cause damage. Removal work to include all associated hangers, couplings, supports, raceway and wiring, etc., and shall be complete in every way.

C. Remove and dispose of, off-site in a legal manner, all raceways and wire indicated to be removed.

D. Carefully remove and store on-site, where directed by the Owner, all electrical equipment indicated to be REMOVED. After the Owner has examined this equipment, remove and dispose of, off-site in a legal manner, all of this equipment that the Owner does not want. All remaining equipment shall remain the property of the Owner. Relocate the remaining equipment to a permanent storage location on site where directed by the Owner.

E. The electrical removal (demolition) drawings show the general extent of removals. However it is impractical to show every item; some of which may be concealed. Therefore, assume that you will be required to perform an additional 10% of removal work, without additional compensation. Items not shown to be removed or to remain shall remain or be removed, as directed.

F. Prior to removing any electrical equipment, properly de-energize all associated wiring. Remove wires from terminals of supply switches or circuit breakers. Properly tape supply and load end conductors of all wiring remaining and not re-used. Properly tag both ends.

G. Provide outlet boxes, knock-out seals, receptacle cover plates, etc. to leave remaining installation in finished condition.

H. Take special care in removing equipment indicated to be RELOCATED and properly and thoroughly clean and lubricate this equipment. Renew fuses and overload elements in starters and switches being relocated, if required to properly serve the new installation.

I. Adjust outlet and junction boxes as required to suit new finished surfaces.

J. When necessary to perform your work, carefully remove ceiling tiles and properly re-install them. Make sure that hands are clean and take special care to avoid damage. If tiles become damaged, provide new tiles to exactly match existing. If exiting tiles have yellowed with age, it may be necessary to relocate existing undamaged tiles from utility spaces (closets, etc.) and install new tiles in their place.

K. For relocation of lighting fixtures, see sections entitled "Interior Lighting" and "Exterior Lighting."

L. Protect existing electrical equipment and installations indicated to remain. If damaged or disturbed in the course of the Work, remove damaged portions and install new products of equal capacity, quality, and functionality.

M. Accessible Work: Remove exposed electrical equipment and installations, indicated to be demolished, in their entirety.

N. Abandoned Work: Cut and remove buried raceway and wiring, indicated to be abandoned in place, 2 inches (50 mm) below the surface of adjacent construction. Cap raceways and patch surface to match existing finish.

O. Remove, store, clean, reinstall, reconnect, and make operational components indicated for relocation. Extend existing circuits to the new location for items to be relocated, unless otherwise noted.

3.10 CUTTING AND PATCHING

A. Refer to Division 1 of these specifications and add the following:

B. This trade (specification section) is responsible for its respective cutting and patching.

C. Do not endanger any work by cutting or altering work or any part of it.

D. Do not cut or alter work of another Contractor without written consent of the Engineer.

E. Prior to cutting which affects structural safety of project, or work of another Contractor, submit written notice to the Engineer, requesting consent to proceed with cutting.

F. Perform all work of fitting, adjustment, cutting, patching, finishing and restoration to perfectly match the quality as specified throughout these specifications. Painting, **under DIVISION 9**, shall match and be feathered into adjacent surfaces.

3.11 CORE DRILLING:

A. Refer to Division 1 of these specifications and add the following:

B. All holes through masonry surfaces must be "core drilled". This trade (specification section) is responsible for its respective core drilling, if any.

C. Do not endanger any work by drilling or altering work or any part of it.

D. Do not drill or alter work of another Contractor without written consent of the Engineer.

E. Prior to drilling which affects structural safety of project, or work of another Contractor, submit written notice to the Engineer, requesting consent to proceed with cutting.

F. Perform all work of core drilling to perfectly match the quality as specified throughout these specifications.

3.12 ACCESS PANELS:

A. Refer to Division 8 of these specifications and add the following:

B. This trade (specification section) is responsible for determining the number of access panels required for existing and new electrical work (including one under each above ceiling thermodetector) and furnishing them to the mason or drywall contractor for installation.

3.13 CLEANING, PAINTING AND REFINISHING:

A. Refer to Division 1 of these specifications and add the following:

B. Paint all new plywood backboards on all sides and edges before mounting, under DIVISION 9.

C. Thoroughly clean all new electrical equipment, devices and enclosures upon completion of all work.

D. Refinish any new electrical equipment whose finish is damaged or rusted, as determined by the Engineer.

END OF SECTION 260000

SECTION 260519 - CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Building wires and cables rated 600 V and less.
2. Connectors, splices, and terminations rated 600 V and less.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 CONDUCTORS AND CABLES

A. **Aluminum and Copper** Conductors: Comply with NEMA WC 70.

B. Conductor Insulation: Comply with NEMA WC 70 for Types **THW**, **THHN-THWN** and **XHHW.**

C. Multiconductor Cable: Comply with NEMA WC 70 for **metal-clad cable, Type MC**.

2.2 CONNECTORS AND SPLICES

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. AFC Cable Systems, Inc.
2. Hubbell Power Systems, Inc.
3. O-Z/Gedney; EGS Electrical Group LLC.
4. 3M; Electrical Products Division.
5. Tyco Electronics Corp.
6. Thomas & Betts

C. Description: Factory-fabricated connectors and splices of size, ampacity rating, material, type, and class for application and service indicated.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders: **Copper for feeders smaller than No. 4 AWG; copper or aluminum for feeders No. 4 AWG and larger**. Drawings indicate all wire sizes in copper. When contractor makes aluminum substitutions, contractor assumes responsibility for any consequential changes to design. These may include but are not limited to; conduit sizing, junction and pull boxes, and terminations. If aluminum wire is used, conductors must be UL listed AA-8000 series, electrical grade, and must have an ampacity equal to that of the copper feeder specified.

B. Branch Circuits: Copper.

C. At terminations of devices, provide solid conductor in sizes #10 and smaller; stranded wire may be used with fork type crimp connectors or with clamp type termination on the device. Do not wrap stranded wire under screw heads. Do not use back wired devices with spring type connection.

3.2 CONDUCTOR INSULATION AND MULTICONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Exposed Feeders: **Type THHN-THWN, single conductors in raceway.**

B. Feeders Concealed in Ceilings, Walls, Partitions, and Crawlspaces: [**Type THHN-THWN, single conductors in raceway**] [**Armored cable, Type AC**] [**Metal-clad cable, Type MC**] [**Mineral-insulated, metal-sheathed cable, Type MI**] [**Nonmetallic-sheathed cable, Type NM**].

C. Feeders Concealed in Concrete, below Slabs-on-Grade, and Underground: **Type THHN-THWN, single conductors in raceway.**

D. Exposed Branch Circuits, Including in Crawlspaces: **Type THHN-THWN, single conductors in raceway.**

E. Branch Circuits Concealed in Ceilings, Walls, and Partitions: **Type THHN-THWN, single conductors in raceway or Metal-clad cable, Type MC**.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors, unless otherwise indicated.

B. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.

C. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.

D. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.

E. Support cables according to Division 16 Section "Electrical Supports and Seismic Restraints."

F. Identify and color-code conductors and cables according to Division 16 Section "Electrical Identification."

G. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A and UL 486B.

H. Make splices and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.

1. Use oxide inhibitor in each splice and tap conductor for aluminum conductors.

3.4 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly according to Division 7 Section "Through-Penetration Firestop Systems."

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

B. Tests and Inspections:

1. After installing conductors and cables and before electrical circuitry has been energized, test the emergency system and conductors for compliance with requirements.

2. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3. Infrared Scanning: After Substantial Completion, but not more than 60 days after Final Acceptance, to perform an infrared scan of each splice in cables and conductors No. 3 AWG and larger and the existing service entrance switchgear and distribution equipment. Engineer of record is available to provide quotation for Infrared scanning services. Remove box and equipment covers so splices are accessible to portable scanner.

C. Test Reports: Prepare a written report to record the following:

1. Test procedures used.
2. Test results that comply with requirements.
3. Test results that do not comply with requirements and corrective action taken to achieve compliance with requirements.

D. Remove and replace malfunctioning units and retest as specified above.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes methods and materials for grounding systems and equipment.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Field quality-control test reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with UL 467 for grounding and bonding materials and equipment.

PART 2 - PRODUCTS

2.1 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.

B. Bare Copper Conductors shall conform to ASTM B3 and B8 as applicable.

2.2 CONNECTORS

A. Listed and labeled by a nationally recognized testing laboratory acceptable to authorities having jurisdiction for applications in which used, and for specific types, sizes, and combinations of conductors and other items connected.

B. Bolted Connectors for Conductors and Pipes: Copper or copper alloy, bolted pressure-type, listed for use.

1. Pipe Connectors: Clamp type, sized for pipe.

C. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.

2.3 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. **10** AWG and smaller, and stranded conductors for No. **8** AWG and larger, unless otherwise indicated.

B. Underground Grounding Conductors: Install bare copper conductor, No. **2/0** AWG minimum. Bury at least 24 inches (600 mm) below grade.

C. Conductor Terminations and Connections:

1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
2. Underground Connections: Welded connectors, except at test wells and as otherwise indicated.
3. Connections to Ground Rods at Test Wells: Bolted connectors.
4. Connections to Structural Steel: Welded connectors.

3.2 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors in all circuits.

B. Water Heater, Heat-Tracing, and Antifrost Heating Cables: Bond conductor to heater units, piping, connected equipment, and components.

C. Isolated Equipment Enclosure Circuits: For designated equipment supplied by a branch circuit or feeder, isolate equipment enclosure from supply circuit raceway with a nonmetallic raceway fitting listed for the purpose. Install fitting where raceway enters enclosure, and install a separate insulated equipment grounding conductor. Isolate conductor from raceway and from panelboard grounding terminals. Terminate at equipment grounding conductor terminal of the applicable derived system or service or at isolated ground bar in panelboard.

D. Coordinate paragraph and subparagraphs below with Drawings and Sections for signal and communication equipment.

E. Signal and Communication Equipment: For telephone, alarm, voice and data, and other communication equipment, provide No. 4 AWG minimum insulated grounding conductor in raceway from grounding electrode system to each Telecommunications Main Ground Bar (TMGB), and from the TMGB to each Telecommunications Ground Bar (TGB). Provide No. 6

AWG minimum insulated grounding conductor from TGB to each terminal cabinet, rack, or equipment.

1. Service Locations: Terminate grounding conductor on a TMGB.
2. Equipment Locations and Wiring Closets: Terminate grounding conductor on a TGB.
3. Terminal Cabinets, Rack or Equipment: Terminate grounding conductor on grounding terminal.

3.3 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible, unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.

B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade, unless otherwise indicated.

1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating, if any.
2. For grounding electrode system, install at least **three** rods spaced at least one-rod length from each other and located at least the same distance from other grounding electrodes, and connect to the service grounding electrode conductor.

C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance, except where routed through short lengths of conduit.

1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install so vibration is not transmitted to rigidly mounted equipment.
3. Use exothermic-welded connectors for outdoor locations, but if a disconnect-type connection is required, use a bolted clamp.

D. Grounding and Bonding for Piping:

1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes, using a bolted clamp connector or by bolting a lug-type connector to a pipe flange, using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.

2. Water Meter Piping: Use bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.

E. Bonding Interior Metal Ducts: Bond metal air ducts to equipment grounding conductors of associated fans, blowers, electric heaters, and air cleaners. Install bonding jumper to bond across flexible duct connections to achieve continuity.

3.4 FIELD QUALITY CONTROL

A. Perform the following tests and inspections and prepare test reports:

1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
2. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal, and at ground test wells.

   a. Measure ground resistance not less than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
   b. Perform tests by fall-of-potential method according to IEEE 81.

B. Report measured ground resistances that exceed the following values:

1. Power and Lighting Equipment or System with Capacity 500 kVA and Less: **10** ohms.
2. Power and Lighting Equipment or System with Capacity 500 to 1000 kVA: **5** ohms.
3. Power and Lighting Equipment or System with Capacity More Than 1000 kVA: **3** ohms.

C. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes:

1. Hangers and supports for electrical equipment and systems.
2. Construction requirements for concrete bases.

1.2 PERFORMANCE REQUIREMENTS

A. Delegated Design: Design supports for multiple raceways, including comprehensive engineering analysis by a qualified professional engineer, using performance requirements and design criteria indicated.

B. Design supports for multiple raceways capable of supporting combined weight of supported systems and its contents.

C. Design equipment supports capable of supporting combined operating weight of supported equipment and connected systems and components.

D. Rated Strength: Adequate in tension, shear, and pullout force to resist maximum loads calculated or imposed for this Project, with a minimum structural safety factor of **five** times the applied force.

1.3 SUBMITTALS

A. Product Data: For steel slotted support systems.

B. Shop Drawings: Show fabrication and installation details and include calculations for the following:

1. Trapeze hangers. Include Product Data for components.
2. Steel slotted channel systems. Include Product Data for components.
3. Equipment supports.

C. Welding certificates

1.4 QUALITY ASSURANCE

A. Welding: Qualify procedures and personnel according to AWS D1.1/D1.1M, "Structural Welding Code - Steel."

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Comply with MFMA-4, factory-fabricated components for field assembly.

1. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
2. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

   a. Allied Tube & Conduit.
   b. Cooper B-Line, Inc.; a division of Cooper Industries.
   c. ERICO International Corporation.
   d. GS Metals Corp.
   e. Thomas & Betts Corporation.
   f. Unistrut; Tyco International, Ltd.
   g. Wesanco, Inc.
   h. Power Strut

3. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
4. Nonmetallic Coatings: Manufacturer's standard PVC, polyurethane, or polyester coating applied according to MFMA-4.
5. Painted Coatings: Manufacturer's standard painted coating applied according to MFMA-4.
6. Channel Dimensions: Selected for applicable load criteria.

B. Raceway and Cable Supports: As described in NECA 1 and NECA 101.

C. Conduit and Cable Support Devices: Steel and malleable iron hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.

D. Support for Conductors in Vertical Conduit: Factory-fabricated assembly consisting of threaded body and insulating wedging plug or plugs for non-armored electrical conductors or cables in riser conduits. Plugs shall have number, size, and shape of conductor gripping pieces as required to suit individual conductors or cables supported. Body shall be malleable iron.

E. Structural Steel for Fabricated Supports and Restraints: ASTM A 36/A 36M, steel plates, shapes, and bars; black and galvanized.

F. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:

1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Hilti Inc.
      2) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      3) MKT Fastening, LLC.
      4) Simpson Strong-Tie Co., Inc.; Masterset Fastening Systems Unit.

2. Mechanical-Expansion Anchors: Insert-wedge-type, [**zinc-coated**] [**stainless**] steel, for use in hardened portland cement concrete with tension, shear, and pullout capacities appropriate for supported loads and building materials in which used.

   a. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:
   b. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

      1) Cooper B-Line, Inc.; a division of Cooper Industries.
      2) Empire Tool and Manufacturing Co., Inc.
      3) Hilti Inc.
      4) ITW Ramset/Red Head; a division of Illinois Tool Works, Inc.
      5) MKT Fastening, LLC.

3. Concrete Inserts: Steel or malleable-iron, slotted support system units similar to MSS Type 18; complying with MFMA-4 or MSS SP-58.

4. Clamps for Attachment to Steel Structural Elements: MSS SP-58, type suitable for attached structural element.
5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM A 325.

6. Toggle Bolts: All-steel springhead type.
7. Hanger Rods: Threaded steel.

2.2 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted, structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.

B. Materials: Comply with requirements in Division 5 Section "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with NECA 1 and NECA 101 for application of hangers and supports for electrical equipment and systems except if requirements in this Section are stricter.

B. Maximum Support Spacing and Minimum Hanger Rod Size for Raceway: Space supports for EMT, IMC, and RMC as scheduled in NECA 1, where its Table 1 lists maximum spacings less than stated in NFPA 70. Minimum rod size shall be 1/4 inch in diameter.

C. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity (weight bearing and raceway / cable accommodation) exceeds the current need by 25%.

1. Secure raceways and cables to these supports with conduit clamps listed for the use.

D. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this Article.

B. Raceway Support Methods: In addition to methods described in NECA 1, EMT, IMC, and RMC may be supported by openings through structure members, as permitted in NFPA 70.

C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.

D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:

1. To Wood: Fasten with lag screws or through bolts.
2. To New Concrete: Bolt to concrete inserts.
3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
4. To Existing Concrete: Expansion anchor fasteners.
5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
6. To Steel: Welded threaded studs complying with AWS D1.1/D1.1M, with lock washers and nuts, Beam clamps (MSS Type 19, 21, 23, 25, or 27) complying with MSS SP-69, or Spring-tension clamps.
7. To Light Steel: Sheet metal screws.
8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that meet seismic-restraint strength and anchorage requirements.

E. Drill holes for expansion anchors in concrete at locations and to depths that avoid reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Comply with installation requirements in Division 5 Section "Metal Fabrications" for site-fabricated metal supports.

B. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.

C. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes raceways, fittings, boxes, enclosures, and cabinets for electrical wiring.

B. See Division 2 Section "Underground Ducts and Utility Structures" for exterior ductbanks and manholes, and underground handholes, boxes, and utility construction.

1.2 SUBMITTALS

A. Product Data: For surface raceways, wireways and fittings, floor boxes, hinged-cover enclosures, and cabinets.

B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, details, and attachments to other work.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 METAL CONDUIT AND TUBING

A. Rigid Steel Conduit: ANSI C80.1.

B. IMC: ANSI C80.6.

C. EMT: ANSI C80.3.

D. FMC: Zinc-coated steel.

E. LFMC: Flexible steel conduit with PVC jacket.

F. Fittings for Conduit (Including all Types and Flexible and Liquidtight), EMT, and Cable: NEMA FB 1; listed for type and size raceway with which used, and for application and environment in which installed.

1. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 886.
2. Fittings for EMT: **Steel, set-screw** type or compressed type.

2.2 NONMETALLIC CONDUIT AND TUBING

A. ENT: NEMA TC 13.

B. RNC: NEMA TC 2, **Type EPC-40-PVC** unless otherwise indicated.

C. LFNC: UL 1660.

D. Fittings for ENT and RNC: NEMA TC 3; match to conduit or tubing type and material.

E. Fittings for LFNC: UL 514B.

2.3 METAL WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper B-Line, Inc.
2. Hoffman.
3. Square D; Schneider Electric.

C. Description: Sheet metal sized and shaped as indicated, NEMA 250, Type **3R**, unless otherwise indicated.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

E. Wireway Covers: **Screw-cover type**

F. Finish: Manufacturer's standard enamel finish.

2.4 NONMETALLIC WIREWAYS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Hoffman.
2. Lamson & Sessions; Carlon Electrical Products.

C. Description: PVC plastic, extruded and fabricated to size and shape indicated, with snap-on cover and mechanically coupled connections with plastic fasteners.

D. Fittings and Accessories: Include couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. Sheet Metal Outlet and Device Boxes: NEMA OS 1.

B. Cast-Metal Outlet and Device Boxes: NEMA FB 1, **ferrous alloy**, Type FD, with gasketed cover.

C. Nonmetallic Outlet and Device Boxes: NEMA OS 2.

D. Nonmetallic Floor Boxes: Nonadjustable, round.

E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.

F. Cast-Metal Access, Pull, and Junction Boxes: NEMA FB 1, **cast aluminum** with gasketed cover.

G. Hinged-Cover Enclosures: NEMA 250, Type 1, with continuous-hinge cover with flush latch, unless otherwise indicated.

1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
2. Nonmetallic Enclosures: Plastic.

H. Cabinets:

1. NEMA 250, Type 1, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.
2. Hinged door in front cover with flush latch and concealed hinge.
3. Key latch to match panelboards.
4. Metal barriers to separate wiring of different systems and voltage.

5. Accessory feet where required for freestanding equipment.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below, unless otherwise indicated:

1. Exposed Conduit: **Rigid steel conduit**, **EMT, RNC, Type EPC-80-PVC**.
2. Concealed Conduit, Aboveground: **Rigid steel conduit**, **EMT**
3. Underground Conduit: RNC, Type EPC-**40**-PVC, with 3" of concrete on all sides.
4. Boxes and Enclosures, Aboveground: NEMA 250, Type **3R**.

B. Comply with the following indoor applications, unless otherwise indicated:

1. Exposed, Not Subject to Physical Damage: **EMT**.
2. Concealed in Ceilings and Interior Walls and Partitions: **EMT**.
3. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
4. Damp or Wet Locations: **Rigid steel conduit or Schedule 80.**
5. Raceways for Optical Fiber or Communications Cable: **EMT**.
6. Boxes and Enclosures: NEMA 250, Type 1, except use NEMA 250, Type 4, in damp or wet locations.

C. Minimum Raceway Size: **1/2-inch** trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.

1. Rigid Steel Conduit: Use threaded rigid steel conduit fittings, unless otherwise indicated.

3.2 INSTALLATION

A. Comply with NECA 1 for installation requirements applicable to products specified in Part 2 except where requirements on Drawings or in this Article are stricter.

B. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

C. Complete raceway installation before starting conductor installation.

D. Support raceways as specified in Division 16 Section "Electrical Supports and Seismic Restraints."

E. Arrange stub-ups so curved portions of bends are not visible above the finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for communications conduits, for which fewer bends are allowed.

Conceal conduit and EMT within finished walls, ceilings, and floors, unless otherwise indicated.

G. Raceways Embedded in Slabs:

1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Change from ENT to RNC, Type EPC-40-PVC, rigid steel conduit, or IMC before rising above the floor.

H. Raceway Terminations at Locations Subject to Moisture or Vibration: Use insulating bushings to protect conductors, including conductors smaller than No. 4 AWG.

I. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire.

J. Raceways for Optical Fiber and Communications Cable: Install as follows:

1. 3/4-Inch Trade Size and Smaller: Install raceways in maximum lengths of 50 feet.
2. 1-Inch Trade Size and Larger: Install raceways in maximum lengths of 75 feet.
3. Install with a maximum of two 90-degree bends or equivalent for each length of raceway unless Drawings show stricter requirements. Separate lengths with pull or junction boxes or terminations at distribution frames or cabinets where necessary to comply with these requirements.

K. Install raceway sealing fittings at suitable, approved, and accessible locations and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces. Install raceway sealing fittings at the following points:

1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where otherwise required by NFPA 70.

L. Flexible Conduit Connections: Use maximum of 72 inches of flexible conduit for **recessed and semirecessed lighting fixtures,**]equipment subject to vibration, noise transmission, or movement; and for transformers and motors.

1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

M. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall.

N. Set metal floor boxes level and flush with finished floor surface.

O. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly. Firestopping materials and installation requirements are specified in Division 7 Section "Through-Penetration Firestop Systems."

END OF SECTION 260533

SECTION 260553 - ELECTRICAL IDENTIFICATION

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Identification for conductors.
2. Warning labels and signs.
3. Instruction signs.
4. Equipment identification labels.

1.2 SUBMITTALS

A. Product Data: For each electrical identification product indicated.

1.3 QUALITY ASSURANCE

A. Comply with ANSI A13.1.

B. Comply with NFPA 70.

C. Comply with 29 CFR 1910.144 and 29 CFR 1910.145.

D. Comply with ANSI Z535.4 for safety signs and labels.

E. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks used by label printers, shall comply with UL 969.

PART 2 - PRODUCTS

2.1 CONDUCTOR IDENTIFICATION MATERIALS

A. Color-Coding Conductor Tape: Colored, self-adhesive vinyl tape not less than 3 mils thick by 1 to 2 inches wide.

WARNING LABELS AND SIGNS

B. Comply with NFPA 70 and 29 CFR 1910.145.

C. Self-Adhesive Warning Labels: Factory-printed, multicolor, pressure-sensitive adhesive labels, configured for display on front cover, door, or other access to equipment unless otherwise indicated.

D. Baked-Enamel Warning Signs:

1. Preprinted aluminum signs, punched or drilled for fasteners, with colors, legend, and size required for application.
2. 1/4-inch grommets in corners for mounting.
3. Nominal size, 7 by 10 inches.

E. Warning label and sign shall include, but are not limited to, the following legends:

1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."

2.2 EQUIPMENT IDENTIFICATION LABELS

A. Adhesive Film Label with Clear Protective Overlay: Machine printed, in black, by thermal transfer or equivalent process. Minimum letter height shall be 3/8 inch. Overlay shall provide a weatherproof and UV-resistant seal for label.

B. Self-Adhesive, Engraved, Laminated Acrylic or Melamine Label: Adhesive backed, with white letters on a black background. Minimum letter height shall be 3/8 inch.

2.3 MISCELLANEOUS IDENTIFICATION PRODUCTS

A. Paint: Comply with requirements in Division 9 painting Sections for paint materials and application requirements. Select paint system applicable for surface material and location (exterior or interior).

B. Fasteners for Labels and Signs: Self-tapping, stainless-steel screws or stainless-steel machine screws with nuts and flat and lock washers.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Location: Install identification materials and devices at locations for most convenient viewing without interference with operation and maintenance of equipment.

B. Apply identification devices to surfaces that require finish after completing finish work.

C. Self-Adhesive Identification Products: Clean surfaces before application, using materials and methods recommended by manufacturer of identification device.

D. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.

E. System Identification Color-Coding Bands for Raceways and Cables: Each color-coding band shall completely encircle cable or conduit. Place adjacent bands of two-color markings in contact, side by side. Locate bands at changes in direction, at penetrations of walls and floors, at 50-foot maximum intervals in straight runs, and at 25-foot maximum intervals in congested areas.

3.2 IDENTIFICATION SCHEDULE

A. Accessible Raceways and Cables within Buildings: Identify the covers of each junction and pull box of the following systems with self-adhesive vinyl labels with the wiring system legend and system voltage. System legends shall be as follows:

1. Emergency Power.
2. Power.
3. UPS.

B. Power-Circuit Conductor Identification, 600 V or Less: For conductors in vaults, pull and junction boxes, manholes, and handholes, use color-coding conductor tape to identify the phase.

1. Color-Coding for Phase and Voltage Level Identification, 600 V or Less: Use colors listed below for all conductors.

a. Color shall be factory applied or field applied for sizes larger than No. 10 AWG.
b. Colors for 208/120-V Circuits:

1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral: White
5) Ground: Green
6) Isolated Ground: Green with trace ID

c. Field-Applied, Color-Coding Conductor Tape: Apply in half-lapped turns for a minimum distance of 6 inches from terminal points and in boxes where splices or taps are made. Apply last two turns of tape with no tension to prevent possible unwinding. Locate bands to avoid obscuring factory cable markings.

C. Warning Labels for Indoor Cabinets, Boxes, and Enclosures for Power:

1. Comply with 29 CFR 1910.145.
2. Identify system voltage with black letters on an orange background.
3. Apply to exterior of door, cover, or other access.
4. For equipment with multiple power or control sources, apply to door or cover of equipment including, but not limited to, the following:

   a. Power transfer switches.
   b. Controls with external control power connections.

D. Operating Instruction Signs: Install instruction signs to facilitate proper operation and maintenance of electrical systems and items to which they connect. Install instruction signs with approved legend where instructions are needed for system or equipment operation.

E. Emergency Operating Instruction Signs: Install instruction signs with white legend on a red background with minimum 3/8-inch high letters for emergency instructions at equipment used for power transfer or load shedding.

F. Equipment Identification Labels: On each unit of equipment, install unique designation label that is consistent with wiring diagrams, schedules, and the Operation and Maintenance Manual. Apply labels to disconnect switches and protection equipment, central or master units, control panels, control stations, terminal cabinets, and racks of each system. Systems include power, lighting, control, communication, signal, monitoring, and alarm systems unless equipment is provided with its own identification.

1. Labeling Instructions:

   a. Indoor Equipment: Self-adhesive, engraved, laminated acrylic or melamine label. Unless otherwise indicated, provide a single line of text with 1/2-inch high letters on 1-1/2-inch high label; where two lines of text are required, use labels 2 inches high.

END OF SECTION 260553

SECTION 260933 – CENTRAL DIMMING CONTROLS

PART 1 - GENERAL

1.1 SUMMARY

A. The following specification details the minimum performance and related criteria for a lighting control system proposed for this project. Any deviations from this specification must be documented in writing and submitted to the Architect prior to the issuance of any contracts and must also include all associated cost savings or additions, including, but not limited to, equipment, equipment installation, power wiring labor and materials, programming, documentation and project management.

1.2 SECTION INCLUDES

A. Provide, install and test an architectural lighting control system as specified herein for the areas indicated on the drawings, specifications and load schedule(s).

1.3 RELATED SECTIONS

A. Section 26 09 36 (Modular Dimming Controls)

B. Section 26 51 13 (Interior Lighting Fixtures, Lamps and Ballasts)

1.4 REFERENCES

A. Underwriters Laboratories Inc.

B. American National Standards Institute

C. Institute of Electrical and Electronic Engineers

1.5 SYSTEM DESCRIPTION

A. System shall consist of factory pre-assembled, convection-cooled, dimming and switching panels, and low voltage wallstations and/or control interfaces. Additional items may also be required and are described herein and/or shown on the drawings.

1.6 SUBMITTALS

A. Shall include a load schedule, which indicates the actual connected load and load type per circuit, circuits and their respective control zones, circuits that are on emergency (if applicable), and the capacity, phase, and corresponding circuit numbers (per the electrical drawings).

B. Shall include a complete schematic of the system.

C. Shall include catalog cut-sheets with performance specifications demonstrating compliance to the specifications herein.

D. Shall include all exceptions taken to the Specification.

E. Manufacturer shall provide additional information as required by Specifier to demonstrate conformance with Part 2 of this specification.

1.7 QUALITY ASSURANCE

A. Manufacturer shall have a minimum of 40 years continuous experience in the manufacturing of lighting controls.

B. Lighting control system shall be UL and cUL listed. Manufacturer shall provide evidence of compliance on request.

C. Lighting control system shall be bid separately from all other lighting equipment. Packages of lighting equipment and dimming systems shall not be acceptable.

1.8 PROJECT/SITE CONDITIONS

A. Lighting controls shall operate in an ambient temperature range of 0°C (32°F) to 40°C (104°F) and 90% non-condensing relative humidity without the requirement of a regularly scheduled maintenance program for air filtration components.

1.9 WARRANTY

A. Manufacturer shall provide a full one-year warranty on all equipment supplied. Warranty shall cover 100% of the cost to repair or replace any parts required during the first one year, which are directly attributable to the manufacturer.

1.10 FACTORY START-UP

A. The contractor shall provide the manufacturer with 20 working days notice of the requested factory start-up date.

B. Upon completion of the installation, if factory start-up has been chosen as an add-on option, the system shall be completely field verified for proper functionality by a factory-certified technician. The check-out will be performed after all loads have been tested live for continuity and freedom from defects and that all control wiring has been connected and checked for proper continuity. The factory-certified technician shall demonstrate and educate the owner's representative(s) on the system capabilities, operation, and maintenance.

C. Manufacturer shall offer the additional option of an extended warranty, based upon successful factory start-up.

PART 2 - PRODUCTS

2.1 POWER PANELS

A. Panels shall be UL and cUL listed. Panels dimensions shall not exceed 29" H x 10.75" W x 7.5" D (120V) or 37" H x 10.75" W x 7.5" D (277V) for twelve or less circuits. Panel weight shall not exceed 53 lbs. (120V) or 69 lbs. (277V) for twelve or less circuits. Applications requiring more than twelve circuits shall utilize additional panels of the referenced size and weight until the required number of circuits has been met. Panels exceeding these size and weight parameters shall not be acceptable.

B. Panels shall be wall-mounted and NEMA grade, of a gauge as required by UL508. Contractor shall reinforce wall, if structurally necessary.

C. Panels shall be completely pre-assembled and factory tested by the manufacturer. The contractor shall be required to provide input feed wiring, load wiring, and control wiring. No other wiring or assembly by the contractor shall be permitted. All input feed, load, and control terminals shall be front accessible without the need to remove dimmer assemblies or other components.

D. Unless the panel is a dedicated feed-through switching panel or otherwise indicated, panels shall contain branch circuit protection for each dimming assembly. Dimming panel or branch circuit breakers shall have the following performance characteristics:

1. Be UL Listed under UL 489 as a molded case circuit breaker for use on lighting circuits.
2. Contain a visual trip indicator and shall be rated at 10,000 AIC (120V) or, optionally, up to 14,000 AIC (277V). Manufacturer shall be able to provide up to 100,000 AIC (120V) or 150,000 AIC (277V) fault current rating for the panel, as an option.
3. Be thermal-magnetic or thermal-hydraulic in construction for both overload and dead short protection.
4. Be replaceable without removing dimmer assemblies or other components of the panel.

E. Activation of a circuit protection device shall affect only the single circuit that it is wired to protect.

F. Panels requiring the neutral feeder to be sized larger than any individual phase feeder shall not be acceptable.

G. Panels shall be capable of maintaining dimmers at current light levels in the event of a control failure. Systems that fail-to-OFF during a control failure are not acceptable.

H. Panels shall be convection-cooled. Specifically, panels shall be passively cooled via free-convection, unaided by fans. Systems that are fan dependent or fan assisted, or that recommend regularly scheduled maintenance for air filtration components are not acceptable.

I. Panels shall provide a minimum of 54 square inches of cooling surface area for each semiconductor.

J. Panel shall provide the capability to electronically assign each circuit to any zone in the dimming system. Panels using mechanical switches, rewiring, or EPROMs shall not be acceptable. All circuits shall be capable of being operated (dimmed or switched where appropriate) from the panel.

K. Multiple panels shall be capable of being linked together and operated as one large system.

L. For panels fed with a normal/emergency feeder, panel shall have available optional electronics to bring all circuits to an emergency full-ON condition upon the loss of normal power and the subsequent presence of emergency power. Designated circuits shall be controlled imultaneously with other lighting circuits within the designated control zone during the presence of normal utility or generator power.

M. Panels listed as emergency shall have all circuits immediately go to a full-ON condition. All dimmers shall operate at 100% of input voltage. All local control stations are inoperable during this period. Once normal power is restored, all lighting zones shall revert back to their status prior to the emergency condition without requiring any action on the part of the user. Restoration to some other "default" level is not acceptable.

N. This type of emergency full-ON may be used with a normal/emergency generator, a UPS, or IPS system with true sine wave output and maximum of 10% THD. The generator, UPS, or IPS system must be capable of operating under no load conditions or a constant hot secondary utility feed where the emergency transfer occurs on the line side (upstream) of the dimming panel and requires that only a single normal/emergency feeder be brought to the Emergency Dimmer Panel.

O. System shall be capable of meeting local jurisdictions requiring special conditions such as minimum light levels during normal operation or full function, even during emergency power.

2.2 MODULAR DIMMING ASSEMBLIES

A. Semiconductor devices shall be back-to-back SCRs. Products utilizing single triac construction shall not be acceptable.

B. Dimmer shall be capable of withstanding inrush current of 40 times operating current. In addition, under fully-loaded operating conditions, all semiconductor devices shall operate at a minimum 20ºC (68ºF) safety margin below the component temperature rating.

C. A positive air gap switch shall be employed with each dimmer in the panel to ensure that the load circuits are open when the "OFF" function is selected from the control system.

D. Each dimmer shall compensate for incoming line voltage variations such as changes in RMS voltage, frequency shifts, harmonics and line noise. Dimmer shall be capable of maintaining constant light level with no visible flicker under the following conditions:

1. ±2% change in RMS voltage/cycle
2. ±2 Hz change in frequency/second

Dimmers that do not regulate the dimmer output in real time shall be unacceptable.

E. Each dimmer shall incorporate an electronic "soft-start" default at initial turn-on that smoothly ramps the lights up to the appropriate levels within 0.5 seconds.

F. Once installed as part of a complete system, the semiconductor used to control the power furnished to the loads shall be both designed and tested to withstand surges, without impairment to performance, of 6000V, 3000A (equivalent to a near lightning strike) as specified by ANSI/IEEE std. C62.41.

G. One type of dimmer shall be used for all sources, line voltages, and frequencies. Systems requiring different types of modules shall not be acceptable. Dimmer shall be capable of electronic assignment to any source and any zone. Upon replacement of a dimmer, only that dimmer shall require replacement, and no re-programming shall be required.

H. Filtering shall be provided for each dimmer so that current rise time shall be at least 350µsec as measured from 10-90% of the load current waveform and at least 525µsec as measured from 0-100% of the load current waveform at 50% rated dimmer capacity at a 90ø conduction angle. Current rise time shall be at least 400µsec as measured from 10-90% of the load current waveform and at least 600µsec as measured from 0-100% of the load current waveform at 100% rated dimmer capacity at a 90ø conduction angle. At no point should current rise faster than 30mA/µsec.

I. Dimmer output voltage shall be a minimum 95% of input voltage at maximum intensity setting.

J. Dimmer shall include diagnostic LEDs to verify proper operation and assist in any system troubleshooting.

2.3 MODULAR SWITCHING ASSEMBLIES

A. Semiconductor devices shall be back-to-back SCRs. Products utilizing single triac construction shall not be acceptable.

B. Assembly shall be capable of withstanding inrush current 75 times operating current. In addition, under fully-loaded operating conditions, all devices shall operate at a minimum 20ºC (68ºF) safety margin below the component temperature rating.

C. A positive air gap switch shall be employed with each circuit in the power panel to ensure that the load circuits are open when the "OFF" function is selected from the control system.

D. Once installed as a complete system, the relays used to control the power furnished to the loads shall be both designed and tested to withstand surges, without impairment to performance, of 6000V, 3000A (equivalent to near lighting strike) as specified by ANSI/IEEE std. C62.41.

E. Relays shall be rated for at least 17 Amps continuous duty. Relays rated only for resistive loads shall not be acceptable.

F. Average rated life of relay shall be at least 1,000,000 cycles.

2.4 SOURCES

A. Dimming assemblies shall operate the following sources/load types with a smooth continuous Square Law dimming curve. Dimmers that have visible "steps" of light intensity throughout the control range shall not be acceptable. Dimmers shall also be capable of operating the following sources on a non-dim basis. Dimmers shall be electronically assigned to the appropriate load type/dimming curve and can be reassigned at any time. Universal-type dimmers that do not adjust the dimming curve shall not be acceptable.

Simplicity™ Series digital dimming panels for two-wire, phase-control loads:

1. Incandescent, Tungsten and Magnetic Low Voltage Transformer
2. Electronic Low Voltage Transformer (selected transformers as approved by factory, only)
   a. Dimming shall not adversely affect sound rating of the electronic transformers. In addition, no flicker or interaction shall occur at any point in the dimming range.
   b. Dimmers shall provide the ability to dim lamps down to 0% (blackout). Minimum light levels shall be user adjustable in order to compensate for different loading of each dimmer.
3. Fluorescent Electronic Dimming Ballast (two-wire, phase-control)
   a. Refer to general section 16580 for dimming ballast specifications and performance.
   b. See fixture schedule and/or load schedule for specific ballast model numbers.
   c. Contact factory for a current list of approved two-wire, phase-control ballast manufacturers and their model numbers.
4. Neon and Cold Cathode (magnetic transformers, only)
   a. Dimmer shall provide the ability to dim lamps down to 10% of full light output when used with normal (low) power factor transformers.
   b. The lamp performance over the range specified shall be continuous and free of flicker or striations.
   c. Neon/cold cathode lamps shall be manufactured with strict attention paid to proper lamp pressurization and exclusion of any impurities to ensure best dimming performance.
   d. Transformers shall be sized per transformer sizing tables developed by the dimming manufacturer.
   e. The electrical contractor is responsible for proper neon or cold cathode lamp and wiring installation.

Simplicity™ Series digital dimming panels for four-wire, 0-10VDC controlled loads:

1. Fluorescent Electronic Dimming Ballast (four-wire, 0-10 VDC controlled)
   a. Refer to general section 16580 for dimming ballast specifications and performance.
   b. See fixture schedule and/or load schedule for specific ballast model numbers.
   c. Contact factory for a current list of approved four-wire, 0-10VDC controlled ballast manufacturers and their model numbers.

2.5 CONTROLS

A. Definitions: A "scene" or "preset" is a specific look or mood created by different lighting zones set at different intensities. A "zone" is one or more lighting circuits that are controlled together as a group.

B. Control shall provide power failure memory. Should power be interrupted and subsequently returned, the lights will come back on to the same levels set prior to the power interruption without requiring any actions on the part of the user. Restoration to some other default level is not acceptable, unless specifically noted elsewhere.

C. Wiring from dimming and switching panel(s) to preset control unit(s) and wallstations and control interfaces shall be low voltage type Class 2 wiring (PELV).

D. Faceplate shall attach using no visible means of attachment.

E. Controls shall be engraved with appropriate zone and/or scene descriptions, furnished to the manufacturer prior to fabrication. Size and style of engraving type shall be determined by the Architect. Any silk-screened borders, logos, graduations, etc., shall use a graphic process that chemically bonds or engraves the graphics to the faceplate, resisting removal by scratching, cleaning, etc.

F. Controls shall provide an immediate, local LED response upon button activation to indicate that a system command action has been requested. LED will remain lit contingent upon receiving system confirmation of the successful completion of the command.

G. Each system shall contain a minimum of 1 control, up to a maximum of 256 controls.

H. Up to 1024 circuits may be programmed to be controlled via any control.

I. Wall controls and control interfaces shall be capable of recalling preset lighting scenes.

2.6 0-10 BUTTON CONTROL(S)

A. Control shall mount individually in standard manufacturer supplied single gang U.S. wallbox.

B. Control shall be available with zero to 10 buttons, configurable in any design fitting a standard "H-shaped" pattern.

C. Each button can be programmed to be Raise, Lower, OFF, or scene selections. Each button can be programmed to control any circuit or zone.

D. Control shall have the capability to be used with an infrared wireless remote control.

E. Lighting levels shall fade smoothly between scenes at time intervals of 0 seconds to 63 minutes. The fade time shall be separately selectable for each scene. Pressing a scene select button will

illuminate the corresponding scene LED and simultaneously begin changing the lighting levels to reflect the currently selected scene.

2.7 0-24 BUTTON CONTROL(S)

A. Control shall mount individually in standard manufacturer supplied 3-gang U.S. wallbox.

B. Control shall be available with zero to 24 buttons, configurable in any design fitting six across and four down.

C. Each button can be programmed to be Raise, Lower, OFF, or scene selections. Each button can be programmed to control any circuit or zone.

D. Control shall have the capability to be used with an infrared wireless remote control.

E. Lighting levels shall fade smoothly between scenes at time intervals of 0 seconds to 63 minutes. The fade time shall be separately selectable for each scene. Pressing a scene select button will illuminate the corresponding scene LED and simultaneously begin changing the lighting levels to reflect the currently selected scene.

2.8 LCD TOUCHSCREEN CONTROL(S)

A. LCD Touchscreen shall mount individually in manufacturer-supplied wallbox.

B. Each LCD Touchscreen shall have the capability of emulating any pushbutton control in the system.

C. The LCD Touchscreen can have up to 30 custom graphics pages. Password protection is optional.

D. LCD Touchscreen shall have the capability to be used with an infrared wireless remote control.

2.9 INFRARED REMOTE TRANSMITTER(S)

A. Standard Remote
The system shall have an accessory infrared remote control unit consisting of a hand-held customized transmitter. The transmitter shall have the capability to select up to 32 scenes, master scene raise/lower and select the scenes relating to the control at which it is aimed.

B. Programming Remote
A programming infrared remote control shall be available for the basic re-programming or fine-tuning of preconfigured light levels consistent with adjustments made during LEED commissioning of a lighting control system. Systems not offering this capability shall not be acceptable.

2.10 CONTROL INTERFACE(S)

A. RS232 Interface(s)
Control shall provide integration of preset control unit(s) to user-supplied PC or digital audiovisual equipment using RS232 serial communication. Control provides access to scene selections, scene lockout (prohibits manual light level changes), sequencing, zone lockout (prohibits permanent scene changes), and fine-tuning of light levels with individual zone raise/lower. Control shall provide status monitoring through button feedback and scene-status updates. Control must be mounted within 50 feet (15 meters) of the RS232 source.

B. Programmer Interface(s)
Control shall provide an integral timeclock with a minimum of 60 events per schedule. Control shall provide integration of preset control unit(s) to user-supplied PC or digital audiovisual equipment using RS232 serial communication. Control shall provide access to scene selections, scene lockout (prohibits manual light level changes), sequencing for a minimum of 60 steps, zone lockout (prohibits permanent scene changes), and fine-tuning of light levels with individual zone raise/lower. Control shall provide status monitoring through button feedback and scene-status updates. Where indicated, control shall provide capability of complete setup of all parameters via an IBM-compatible PC. Parameters shall include scenes (including both light levels in 0.5% increments and fade times), load types, low-end trim, tamperproof protection of scenes, and communication between control units (if applicable). Interrogation of the above parameters, including control unit type, shall also be available via the RS232 connection. Permanent installation of the PC shall not be required unless indicated on the drawings. Manufacturer must supply windows-based software. Control must be mounted within 50 feet (15 meters) of the RS232 source.

C. DXM512 Interface(s)
Control shall be capable of receiving DMX512 input for control, as an option.

D. Contact Closure Interface(s)
Control shall provide two way interface between four scene preset controls and dry contact closure devices such as from Timeclock Inputs, Building Management Systems, Fire Alarm Systems, Security Systems, and Occupancy Sensors. Control shall provide a minimum of five input and five output terminals. Input terminals must be able to accept maintained or momentary inputs with a minimum pulse time of 40msec. Inputs must have an on-state saturation voltage less than 2.0VDC and an off-state leakage current less than 10mA. Outputs must be capable of controlling other manufacturers' equipment. Customer provided output indicators must not exceed 200mA at 30VDC. Control shall be capable of providing the following functions: scene selection, panic mode, sequencing, zone and scene lockouts, and partitioning.

2.11 SOURCE QUALITY CONTROL

A. Equipment shall be 100% tested for proper operation at two different levels: printed circuit board, end of line prior to shipment from the factory. Manufacturers sample testing at the end of the production line shall not be acceptable.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Equipment shall be installed utilizing manufacturer's catalog cut sheets and installation instructions and in accordance with these specifications.

B. Contractor shall furnish all equipment, labor, system setup and other services necessary for the proper installation of the products/system as indicated on the drawings and specified herein. System setup shall include defining each dimmer's load type, assigning each load to a zone and setting the control functions.

3.2 MANUFACTURERS' FIELD SERVICES

A. Upon completion of the installation, if factory start-up has been chosen as an add-on option, the system shall be completely field tested by a factory-certified technician. The check-out will be performed after all loads have been tested live for continuity and freedom from defects and that all control wiring has been connected and checked for proper continuity. The factory-certified technician shall demonstrate and educate the owner's representative on the system capabilities, operation, and maintenance.

B. Manufacturer shall offer an upgraded warranty, as an additional option, based upon a successful factory start-up.

C. Manufacturer shall provide technical support during normal business hours.

END OF SECTION 260933

SECTION 261216 - LOW-VOLTAGE TRANSFORMERS

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following types of dry-type transformers rated 600 V and less.

1. Distribution transformers.

1.2 SUBMITTALS

A. Product Data: For each product indicated.

B. Shop Drawings: Indicate dimensions and weights.

1. Wiring Diagrams: Power, signal, and control wiring.

C. Manufacturer Seismic Qualification Certification: Submit certification that transformers, accessories, and components will withstand seismic forces.

D. Field quality-control test reports.

E. Operation and maintenance data.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with IEEE C57.12.91, "Test Code for Dry-Type Distribution and Power Transformers."

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. ACME Electric Corporation; Power Distribution Products Division.
2. Eaton Electrical Inc.; Cutler-Hammer Products.
3. General Electric Company.
4. Siemens Energy & Automation, Inc.

5. Square D; Schneider Electric.

2.2 GENERAL TRANSFORMER REQUIREMENTS

A. Description: Factory-assembled and -tested, air-cooled units for 60-Hz service.

B. Cores: Grain-oriented, non-aging silicon steel.

C. Coils: Continuous windings without splices except for taps.

1. Internal Coil Connections: Brazed or pressure type.
2. Coil Material: **Copper**.

2.3 DISTRIBUTION TRANSFORMERS

A. Comply with NEMA ST 20, and list and label as complying with UL 1561.

B. Provide transformers that are constructed to withstand seismic forces specified in Division 16 Section "Electrical Supports and Seismic Restraints."

C. Cores: One leg per phase.

D. Indoor Enclosures: **Ventilated**, NEMA 250, Type 2.

1. Core and coil shall be encapsulated within resin compound, sealing out moisture and air.

E. Transformer Enclosure Finish: Comply with NEMA 250.

1. Finish Color: **Gray**

F. Taps for Transformers Smaller Than 15 kVA: **None**.

G. Taps for Transformers 15 to 24 kVA: **One 5 percent tap above and one 5 percent tap below normal full capacity**.

H. Taps for Transformers 25 kVA and Larger: **Two 2.5 percent taps above and two 2.5 percent taps below normal full capacity**.

I. Insulation Class: 220 deg C, UL-component-recognized insulation system with a maximum of **115** deg C rise above 40 deg C ambient temperature.

J. Energy Efficiency for Transformers Rated 15 kVA and Larger:

1. Complying with NEMA TP 1, Class 1 efficiency levels.
2. Tested according to NEMA TP 2.

K. K-Factor Rating: Transformers indicated to be K-factor rated shall comply with UL 1561 requirements for nonsinusoidal load current-handling capability to the degree defined by designated K-factor.

1. Unit shall not overheat when carrying full-load current with harmonic distortion corresponding to designated K-factor.
2. Indicate value of K-factor on transformer nameplate.

2.4 IDENTIFICATION DEVICES

A. Nameplates: Engraved, laminated-plastic or metal nameplate. Nameplates are specified in Section 260553 Section "Electrical Identification."

PART 3 - EXECUTION

3.1 INSTALLATION

A. Install wall-mounting transformers level and plumb with wall brackets fabricated by transformer manufacturer.

1. Brace wall-mounting transformers as specified in Division 16 Section "Electrical Supports and Seismic Restraints."

B. Construct concrete bases and anchor floor-mounting transformers according to manufacturer's written instructions, **seismic codes applicable to Project,** and requirements in Division 16 Section "Electrical Supports and Seismic Restraints."

3.2 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.

3.3 ADJUSTING

A. Adjust transformer taps to provide optimum voltage conditions at secondary terminals. Optimum is defined as not exceeding nameplate voltage plus 10 percent and not being lower than nameplate voltage minus 3 percent at maximum load conditions. Submit recording and tap settings as test results.

END OF SECTION 261216

SECTION 262416 - PANELBOARDS

PART 1 - GENERAL

1.1 SUMMARY

A. Section includes distribution panelboards and lighting and appliance branch-circuit panelboards.

1.2 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Panelboards shall withstand the effects of earthquake motions determined according to **SEI/ASCE 7**.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified **and the unit will be fully operational after the seismic event**."

1.3 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: For each panelboard and related equipment.

1. Include dimensioned plans, elevations, sections, and details. Show tabulations of installed devices, equipment features, and ratings.
2. Detail enclosure types and details for types other than NEMA 250, Type 1.
3. Detail bus configuration, current, and voltage ratings.
4. Short-circuit current rating of panelboards and overcurrent protective devices.
5. Include evidence of NRTL listing for series rating of installed devices.
6. Detail features, characteristics, ratings, and factory settings of individual overcurrent protective devices and auxiliary components.
7. Include wiring diagrams for power, signal, and control wiring.
8. Include time-current coordination curves for each type and rating of overcurrent protective device included in panelboards.

C. Seismic Qualification Certificates: Submit certification that panelboards, overcurrent protective devices, accessories, and components will withstand seismic forces defined in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

D. Field quality-control reports.

E. Panelboard schedules for installation in panelboards.

F. Operation and maintenance data.

1.4 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NEMA PB 1.

C. Comply with NFPA 70.

1.5 WARRANTY

A. Special Warranty: Manufacturer's standard form in which manufacturer agrees to repair or replace transient voltage suppression devices that fail in materials or workmanship within specified warranty period.

1. Warranty Period: **One** year from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS FOR PANELBOARDS

A. Fabricate and test panelboards according to IEEE 344 to withstand seismic forces defined in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

B. Enclosures: **Surface**-mounted cabinets.

1. Rated for environmental conditions at installed location.

a. Indoor Dry and Clean Locations: NEMA 250, **Type 1**
b. Basement Locations: NEMA 250, **Type 3R**.
c. Kitchen Areas: NEMA 250, **Type 4X**.

2. Front: Secured to box with concealed trim clamps. For surface-mounted fronts, match box dimensions; for flush-mounted fronts, overlap box.
3. Hinged Front Cover: Entire front trim hinged to box and with standard door within hinged trim cover.
4. Directory Card: Inside panelboard door, mounted in transparent card holder.
5. Type load type and location.

C. Incoming Mains Location: **Top and bottom**.

D. Phase, Neutral, and Ground Buses: **Tin-plated aluminum**

E. Conductor Connectors: Suitable for use with conductor material and sizes.

1. Material: **Hard-drawn copper, 98 percent conductivity**.

2. Main and Neutral Lugs: **Compression** type.
3. Ground Lugs and Bus Configured Terminators: **Compression** type.
4. Feed-Through Lugs: **Compression** type, suitable for use with conductor material. Locate at opposite end of bus from incoming lugs or main device.
5. Subfeed (Double) Lugs: **Compression** type suitable for use with conductor material. Locate at same end of bus as incoming lugs or main device.

F. Service Equipment Label: NRTL labeled for use as service equipment for panelboards with one or more main service disconnecting and overcurrent protective devices.

G. Future Devices: Mounting brackets, bus connections, filler plates, and necessary appurtenances required for future installation of devices.

H. Panelboard Short-Circuit Current Rating: Fully rated to interrupt symmetrical short-circuit current available at terminals.

2.2 DISTRIBUTION PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer
2. General Electric Company
3. Siemens
4. Square D

B. Panelboards: NEMA PB 1, power and feeder distribution type.

C. Doors: Secured with vault-type latch with tumbler lock; keyed alike; hinged door and trim.

D. Branch Overcurrent Protective Devices: Bolt on or Square D I-Line or equal.

2.3 LIGHTING AND APPLIANCE BRANCH-CIRCUIT PANELBOARDS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer
2. General Electric Company

3. Siemens
4. Square D

B. Panelboards: NEMA PB 1, lighting and appliance branch-circuit type.

C. Branch Overcurrent Protective Devices: Bolt-on circuit breakers, replaceable without disturbing adjacent units.

D. Panelboards for dormitory panels can be load centers with Plug-on circuit breakers, replaceable without disturbing adjacent units.

E. Contactors in Main Bus: NEMA ICS 2, Class A, mechanically held, general-purpose controller, with same short-circuit interrupting rating as panelboard.

1. External Control-Power Source: **120-V branch circuit**.

F. Doors: Concealed hinges; secured with flush latch with tumbler lock; keyed alike; door in door hinged trim.

2.4 DISCONNECTING AND OVERCURRENT PROTECTIVE DEVICES

A. : Subject to compliance with requirements, provide products by one of the following:

1. Eaton Electrical Inc.; Cutler-Hammer
2. General Electric Company
3. Siemens
4. Square D

B. Molded-Case Circuit Breaker (MCCB): Comply with UL 489, with interrupting capacity to meet available fault currents.

1. Thermal-Magnetic Circuit Breakers: Inverse time-current element for low-level overloads, and instantaneous magnetic trip element for short circuits. Adjustable magnetic trip setting for circuit-breaker frame sizes 250 A and larger.
2. Adjustable Instantaneous-Trip Circuit Breakers: Magnetic trip element with front-mounted, field-adjustable trip setting.
3. Electronic trip circuit breakers with rms sensing; field-replaceable rating plug or field-replicable electronic trip; and the following field-adjustable settings:

a. Instantaneous trip.
b. Long- and short-time pickup levels.
c. Long- and short-time time adjustments.
d. Ground-fault pickup level, time delay, and I^2t response.

4. Current-Limiting Circuit Breakers: Frame sizes 400 A and smaller; let-through ratings less than NEMA FU 1, RK-5.
5. GFCI Circuit Breakers: Single- and two-pole configurations with Class A ground-fault protection (6-mA trip).
6. Ground-Fault Equipment Protection (GFEP) Circuit Breakers: Class B ground-fault protection (30-mA trip).
7. Arc-Fault Circuit Interrupter (AFCI) Circuit Breakers: Comply with UL 1699; 120/240-V, single-pole configuration.
8. Molded-Case Circuit-Breaker (MCCB) Features and Accessories:

    a. Standard frame sizes, trip ratings, and number of poles.

    b. Lugs: Compression or Mechanical style, suitable for number, size, trip ratings, and conductor materials.
    c. Application Listing: Appropriate for application; Type SWD for switching fluorescent lighting loads; Type HID for feeding fluorescent and high-intensity discharge (HID) lighting circuits.
    d. Ground-Fault Protection: Integrally mounted relay and trip unit with adjustable pickup and time-delay settings, push-to-test feature, and ground-fault indicator.
    e. Communication Capability: Communication module with functions and features compatible with power monitoring and control system specified in Division 16 Section "Electrical Power Monitoring and Control."
    f. Shunt Trip: 120-V trip coil energized from separate circuit, set to trip at **55** percent of rated voltage.
    g. Handle Padlocking Device: Fixed attachment, for locking circuit-breaker handle in on or off position.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Receive, inspect, handle, store and install panelboards and accessories according to **NECA 407**.

B. Comply with mounting and anchoring requirements specified in Division 16 Section "Vibration and Seismic Controls for Electrical Systems."

C. Mount panelboard cabinet plumb and rigid without distortion of box. Mount recessed panelboards with fronts uniformly flush with wall finish and mating with back box.

D. Install overcurrent protective devices and controllers not already factory installed.

    1. Set field-adjustable, circuit-breaker trip ranges.

E. Install filler plates in unused spaces.

F. Stub four 1-inch empty conduits from panelboard into accessible ceiling space or space designated to be ceiling space in the future.

G. Arrange conductors in gutters into groups and bundle with tie wraps.

H. Comply with NECA 1.

3.2 IDENTIFICATION

A. Identify field-installed conductors, interconnecting wiring, and components; provide warning signs complying with Division 16 Section "Electrical Identification."

B. Create a directory to indicate installed circuit loads and incorporating Owner's final room designations. Obtain approval before installing. Use a computer or typewriter to create directory; handwritten directories are not acceptable.

C. Panelboard Nameplates: Label each panelboard with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification."

D. Device Nameplates: Label each branch circuit device in distribution panelboards with a nameplate complying with requirements for identification specified in Division 16 Section "Electrical Identification."

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections.

B. Acceptance Testing Preparation:

1. Test each panelboard bus, component, connecting supply, feeder, and control circuit for shorts and grounds.

C. Tests and Inspections:

1. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
2. Correct malfunctioning units on-site, where possible, and retest to demonstrate compliance; otherwise, replace with new units and retest.

D. Panelboards will be considered defective if they do not pass tests and inspections.

E. Report any unsatisfactory results to engineer.

END OF SECTION 262416

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 SUMMARY

A. This Section includes the following:

1. Receptacles, receptacles with integral GFCI, and associated device plates.
2. Wall-box motion sensors.
3. Snap switches and wall-box dimmers.
4. Solid-state paddle fan speed controls.
5. Wall-switch and exterior occupancy sensors.

B. See Division 16 Section "Voice and Data Communication Cabling" for workstation outlets.

1.2 SUBMITTALS

A. Product Data: For each type of product indicated.

B. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

C. Operation and Maintenance Data: For wiring devices to include in all manufacturers' packing label warnings and instruction manuals that include labeling conditions.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Device Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc.
2. Hubbell Incorporated; Wiring Device-Kellems.
3. Leviton Mfg. Company Inc.
4. Pass & Seymour/Legrand; Wiring Devices & Accessories

B. Switch Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc.
2. Hubbell Incorporated; Wiring Device-Kellems
3. Leviton Mfg. Company Inc.
4. Pass & Seymour/Legrand; Wiring Devices & Accessories

C. Paddle Fan Control Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc.
2. Hubbell Incorporated; Wiring Device-Kellems
3. Leviton Mfg. Company Inc.
4. Pass & Seymour/Legrand; Wiring Devices & Accessories
5. Lutron

D. Wall Box Dimmer Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Leviton Mfg. Company Inc.
2. Pass & Seymour/Legrand; Wiring Devices & Accessories
3. Lutron

E. Occupancy Sensor Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Cooper Wiring Devices; a division of Cooper Industries, Inc.
2. Hubbell Incorporated; Wiring Device-Kellems
3. Leviton Mfg. Company Inc.
4. Pass & Seymour/Legrand; Wiring Devices & Accessories
5. Watt Stopper

2.2 SPECIAL APPLICATION

A. Tamper Resistant – All dwelling unit receptacles shall be listed tamper resistant types.

B. Weather Resistant – All outdoor receptacles shall be listed weather resistant types.

2.3 STRAIGHT BLADE RECEPTACLES

A. Convenience Receptacles, 125 V, 20 A: Comply with NEMA WD 1, NEMA WD 6 configuration 5-20R, and UL 498. **Heavy Duty Commercial Specification** grade.

2.4 GFCI RECEPTACLES

A. General Description: Straight blade type. Comply with NEMA WD 1, NEMA WD 6, UL 498, and UL 943, Class A, 125 V, 20 A and include indicator light that is lighted when device is tripped. **Heavy Duty Commercial Specification** grade.

2.5 SNAP SWITCHES

A. **Heavy Duty Commercial Specification** grade.

B. Comply with NEMA WD 1 and UL 20.

C. Switches, 120/277 V, 20 A:

D. Pilot Light Switches, 20 A:

1. Description: Single pole, with neon-lighted handle, illuminated when switch is "ON."

E. Key-Operated Switches, 120/277 V, 20 A:

1. Description: Single pole, with factory-supplied key in lieu of switch handle.

F. Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors.

G. Key-Operated, Single-Pole, Double-Throw, Momentary Contact, Center-Off Switches, 120/277 V, 20 A; for use with mechanically held lighting contactors, with factory-supplied key in lieu of switch handle.

2.6 OCCUPANCY SENSORS

A. Heavy Duty Commercial Specification grade.

B. Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft.

C. Wall-Switch Sensors:

1. Description: Adaptive-technology type, 120/277 V, adjustable time delay up to 20 minutes, 180-degree field of view, with a minimum coverage area of 900 sq. ft.

D. Long-Range Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, with a minimum coverage area of 1200 sq. ft.

E. Long-Range Wall-Switch Sensors:

1. Description: Dual technology, with both passive-infrared- and ultrasonic-type sensing, 120/277 V, adjustable time delay up to 30 minutes, 110-degree field of view, and a minimum coverage area of 1200 sq. ft.

F. Wide-Range Wall-Switch Sensors:

1. Description: Passive-infrared type, 120/277 V, adjustable time delay up to 30 minutes, 150-degree field of view, with a minimum coverage area of 1200 sq. ft.

G. Exterior Occupancy Sensors:

1. Description: Passive-infrared type, 120/277 V, weatherproof, adjustable time delay up to 15 minutes, 180-degree field of view, and 110-foot detection range. Minimum switch rating: 1000-W incandescent, 500-VA fluorescent.

2.7 WALL PLATES

A. Single and combination types to match corresponding wiring devices.

1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: **Smooth, high-impact thermoplastic.**
3. Material for Unfinished Spaces: **Galvanized steel**.
4. Material for Damp Locations: **Thermoplastic** with spring-loaded lift cover, and listed and labeled for use in "wet locations."

B. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with type 3R weather-resistant , **die-cast aluminum** with lockable cover. Must be in use weatherproof rated.

2.8 FINISHES

A. Color: Wiring device catalog numbers in Section Text do not designate device color.

1. Wiring Devices finished to be **as selected by Architect**, unless otherwise indicated.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including the mounting heights listed in that standard, unless otherwise noted.

B. Coordination with Other Trades:

1. Take steps to insure that devices and their boxes are protected. Do not place wall finish materials over device boxes and do not cut holes for boxes with routers that are guided by riding against outside of the boxes.
2. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
3. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
4. Install wiring devices after all wall preparation, including painting, is complete.

C. Conductors:

1. Do not strip insulation from conductors until just before they are spliced or terminated on devices.
2. Strip insulation evenly around the conductor using tools designed for the purpose. Avoid scoring or nicking of solid wire or cutting strands from stranded wire.
3. The length of free conductors at outlets for devices shall meet provisions of NFPA 70, Article 300, without pigtails.
4. Existing Conductors:

   a. Cut back and pigtail, or replace all damaged conductors.
   b. Straighten conductors that remain and remove corrosion and foreign matter.
   c. Pigtailing existing conductors is permitted provided the outlet box is large enough.

D. Device Installation:

1. Replace all devices that have been in temporary use during construction or that show signs that they were installed before building finishing operations were complete.
2. Keep each wiring device in its package or otherwise protected until it is time to connect conductors.
3. Do not remove surface protection, such as plastic film and smudge covers, until the last possible moment.
4. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
5. When there is a choice, use side wiring with binding-head screw terminals. Wrap solid conductor tightly clockwise, 2/3 to 3/4 of the way around terminal screw.
6. Use a torque screwdriver when a torque is recommended or required by the manufacturer.
7. When conductors larger than No. 12 AWG are installed on 15- or 20-A circuits, splice No. 12 AWG pigtails for device connections.

8. Tighten unused terminal screws on the device.
9. Device must be securely fastened against box / wall. Cover plate to tightly mate with wall without gap.

E. Receptacle Orientation:

1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the left.

F. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.

G. Dimmers:

1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device listing conditions in the written instructions.

H. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.

3.2 IDENTIFICATION

A. Comply with Division 16 Section "Electrical Identification.".

3.3 FIELD QUALITY CONTROL

A. Perform tests and inspections and prepare test reports.

1. Test Instruments: Use instruments that comply with UL 1436.
2. Test Instrument for Convenience Receptacles: Digital wiring analyzer with digital readout or illuminated LED indicators of measurement.

B. Tests for Convenience Receptacles:

1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under full Load: A value of higher than 5 percent is not acceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
6. The tests shall be diagnostic, indicating damaged conductors, high resistance at the circuit breaker, poor connections, inadequate fault current path, defective devices, or similar

problems. Correct circuit conditions, remove malfunctioning units and replace with new, and retest as specified above.

7. Report any testing deficiencies to engineer.

END OF SECTION 262726

SECTION 263600 - TRANSFER SWITCHES

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 transfer switches rated 600 V and less, including the following:

1. Automatic transfer switches.

1.3 SUBMITTALS

A. Product Data: For each type of product indicated. Include rated capacities, weights, operating characteristics, furnished specialties, and accessories.

B. Shop Drawings: Dimensioned plans, elevations, sections, and details showing minimum clearances, conductor entry provisions, gutter space, installed features and devices, and material lists for each switch specified.

1. Single-Line Diagram: Show connections between transfer switch, power sources, and load; and show interlocking provisions for each combined transfer.

C. Manufacturer Seismic Qualification Certification: Submit certification that transfer switches accessories, and components will withstand seismic forces defined in Division 26 Section "Vibration and Seismic Controls for Electrical Systems." Include the following:

1. Basis for Certification: Indicate whether withstand certification is based on actual test of assembled components or on calculation.

a. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified."
b. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event."

2. Dimensioned Outline Drawings of Equipment Unit: Identify center of gravity and locate and describe mounting and anchorage provisions.
3. Detailed description of equipment anchorage devices on which the certification is based and their installation requirements.

D. Qualification Data: For manufacturer and testing agency.

E. Field quality-control test reports.

F. Operation and Maintenance Data: For each type of product to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:

1. Features and operating sequences, both automatic and manual.
2. List of all factory settings of relays; provide relay-setting and calibration instructions, including software, where applicable.

1.4 QUALITY ASSURANCE

A. Manufacturer Qualifications: Maintain a service center capable of providing training, parts, and emergency maintenance repairs within a response period of less than eight hours from time of notification.

B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a member company of the InterNational Electrical Testing Association or is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.

1. Testing Agency's Field Supervisor: Person currently certified by the InterNational Electrical Testing Association or the National Institute for Certification in Engineering Technologies to supervise on-site testing specified in Part 3.

C. Source Limitations: Obtain automatic transfer switches through one source from a single manufacturer.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.

E. Comply with NEMA ICS 1.

F. Comply with NFPA 70.

G. Comply with NFPA 99.

H. Comply with NFPA 110.

I. Comply with UL 1008 unless requirements of these Specifications are stricter.

1.5 PROJECT CONDITIONS

A. Interruption of Existing Electrical Service: Do not interrupt electrical service to facilities occupied by Owner or others unless permitted under the following conditions and then only after arranging to provide temporary electrical service:

1. Notify Architect no fewer than five days in advance of proposed interruption of electrical service.
2. Do not proceed with interruption of electrical service without Architect's written permission.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:

1. Contactor Transfer Switches:

a. Caterpillar; Engine Div.
b. Emerson; ASCO Power Technologies, LP.
c. Generac Power Systems, Inc.
d. Kohler Power Systems; Generator Division.

2.2 GENERAL TRANSFER-SWITCH PRODUCT REQUIREMENTS

A. Indicated Current Ratings: Apply as defined in UL 1008 for continuous loading and total system transfer, including tungsten filament lamp loads not exceeding 30 percent of switch ampere rating, unless otherwise indicated.

B. Tested Fault-Current Closing and Withstand Ratings: Adequate for duty imposed by protective devices at installation locations in Project under the fault conditions indicated, based on testing according to UL 1008.

1. Where transfer switch includes internal fault-current protection, rating of switch and trip unit combination shall exceed indicated fault-current value at installation location.

C. Solid-State Controls: Repetitive accuracy of all settings shall be plus or minus 2 percent or better over an operating temperature range of minus 20 to plus 70 deg C.

D. Resistance to Damage by Voltage Transients: Components shall meet or exceed voltage-surge withstand capability requirements when tested according to IEEE C62.41. Components shall meet or exceed voltage-impulse withstand test of NEMA ICS 1.

E. Electrical Operation: Accomplish by a nonfused, momentarily energized solenoid or electric-motor-operated mechanism, mechanically and electrically interlocked in both directions.

F. Switch Characteristics: Designed for continuous-duty repetitive transfer of full-rated current between active power sources.

1. Limitation: Switches using molded-case switches or circuit breakers or insulated-case circuit-breaker components are not acceptable.
2. Switch Action: Double throw; mechanically held in both directions.
3. Contacts: Silver composition or silver alloy for load-current switching. Conventional automatic transfer-switch units, rated 225 A and higher, shall have separate arcing contacts.

G. Neutral Terminal: Solid and fully rated, unless otherwise indicated.

H. Battery Charger: For generator starting batteries.

1. Float type rated 10 A.
2. Ammeter to display charging current.
3. Fused ac inputs and dc outputs.

I. Annunciation, Control, and Programming Interface Components: Devices at transfer switches for communicating with remote programming devices, annunciators, or annunciator and control panels shall have communication capability matched with remote device.

J. Factory Wiring: Train and bundle factory wiring and label, consistent with Shop Drawings, either by color-code or by numbered or lettered wire and cable tape markers at terminations. Color-coding and wire and cable tape markers are specified in Division 26 Section "Identification for Electrical Systems."

1. Designated Terminals: Pressure type, suitable for types and sizes of field wiring indicated.
2. Power-Terminal Arrangement and Field-Wiring Space: Suitable for top, side, or bottom entrance of feeder conductors as indicated.
3. Control Wiring: Equipped with lugs suitable for connection to terminal strips.

K. Enclosures: General-purpose NEMA 250, Type 1, complying with NEMA ICS 6 and UL 508, unless otherwise indicated.

2.3 AUTOMATIC TRANSFER SWITCHES

A. Comply with Level 1 equipment according to NFPA 110.

B. Switching Arrangement: Double-throw type, incapable of pauses or intermediate position stops during normal functioning, unless otherwise indicated.

C. Manual Switch Operation: Under load, with door closed and with either or both sources energized. Transfer time is same as for electrical operation. Control circuit automatically disconnects from electrical operator during manual operation.

D. Manual Switch Operation: Unloaded. Control circuit automatically disconnects from electrical operator during manual operation.

E. Signal-Before-Transfer Contacts: A set of normally open/normally closed dry contacts operates in advance of retransfer to normal source. Interval is adjustable from 1 to 30 seconds.

F. Transfer Switches Based on Molded-Case-Switch Components: Comply with NEMA AB 1, UL 489, and UL 869A.

G. Automatic Transfer-Switch Features:

1. Undervoltage Sensing for Each Phase of Normal Source: Sense low phase-to-ground voltage on each phase. Pickup voltage shall be adjustable from 85 to 100 percent of nominal, and dropout voltage is adjustable from 75 to 98 percent of pickup value. Factory set for pickup at 90 percent and dropout at 85 percent.
2. Adjustable Time Delay: For override of normal-source voltage sensing to delay transfer and engine start signals. Adjustable from zero to six seconds, and factory set for one second.
3. Voltage/Frequency Lockout Relay: Prevent premature transfer to generator. Pickup voltage shall be adjustable from 85 to 100 percent of nominal. Factory set for pickup at 90 percent. Pickup frequency shall be adjustable from 90 to 100 percent of nominal. Factory set for pickup at 95 percent.
4. Time Delay for Retransfer to Normal Source: Adjustable from 0 to 30 minutes, and factory set for 10 minutes to automatically defeat delay on loss of voltage or sustained undervoltage of emergency source, provided normal supply has been restored.
5. Test Switch: Simulate normal-source failure.
6. Switch-Position Pilot Lights: Indicate source to which load is connected.
7. Source-Available Indicating Lights: Supervise sources via transfer-switch normal- and emergency-source sensing circuits.

    a. Normal Power Supervision: Green light with nameplate engraved "Normal Source Available."
    b. Emergency Power Supervision: Red light with nameplate engraved "Emergency Source Available."

8. Unassigned Auxiliary Contacts: Two normally open, single-pole, double-throw contacts for each switch position, rated 10 A at 240-V ac.
9. Transfer Override Switch: Overrides automatic retransfer control so automatic transfer switch will remain connected to emergency power source regardless of condition of normal source. Pilot light indicates override status.
10. Engine Starting Contacts: One isolated and normally closed, and one isolated and normally open; rated 10 A at 32-V dc minimum.
11. Engine-Generator Exerciser: Solid-state, programmable-time switch starts engine generator and transfers load to it from normal source for a preset time, then retransfers and shuts down engine after a preset cool-down period. Initiates exercise cycle at preset intervals adjustable from 7 to 30 days. Running periods are adjustable from 10 to 30 minutes. Factory settings are for 7-day exercise cycle, 20-minute running period, and 5-minute cool-down period. Exerciser features include the following:

a. Exerciser Transfer Selector Switch: Permits selection of exercise with and without load transfer.
b. Push-button programming control with digital display of settings.
c. Integral battery operation of time switch when normal control power is not available.

2.4 SOURCE QUALITY CONTROL

A. Factory test and inspect components, assembled switches, and associated equipment. Ensure proper operation. Check transfer time and voltage, frequency, and time-delay settings for compliance with specified requirements. Perform dielectric strength test complying with NEMA ICS 1.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Design each fastener and support to carry load indicated by seismic requirements and according to seismic-restraint details. See Division 26 Section "Vibration and Seismic Controls for Electrical Systems."

B. Identify components according to Division 26 Section "Identification for Electrical Systems."

C. Set field-adjustable intervals and delays, relays, and engine exerciser clock.

3.2 CONNECTIONS

A. Ground equipment according to Division 26 Section "Grounding and Bonding for Electrical Systems."

B. Connect wiring according to Division 26 Section "Low-Voltage Electrical Power Conductors and Cables."

3.3 FIELD QUALITY CONTROL

A. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections. Report results in writing.

1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installation, including connections, and to assist in testing.
2. After installing equipment and after electrical circuitry has been energized, test for compliance with requirements.

3. Perform each visual and mechanical inspection and electrical test stated in NETA Acceptance Testing Specification. Certify compliance with test parameters.
4. Measure insulation resistance phase-to-phase and phase-to-ground with insulation-resistance tester. Include external annunciation and control circuits. Use test voltages and procedure recommended by manufacturer. Comply with manufacturer's specified minimum resistance.

    a. Check for electrical continuity of circuits and for short circuits.
    b. Inspect for physical damage, proper installation and connection, and integrity of barriers, covers, and safety features.

5. After energizing circuits, demonstrate interlocking sequence and operational function for each switch at least three times.

    a. Simulate power failures of normal source to automatic transfer switches and of emergency source with normal source available.
    b. Simulate loss of phase-to-ground voltage for each phase of normal source.
    c. Verify time-delay settings.
    d. Verify pickup and dropout voltages by data readout or inspection of control settings.
    e. Perform contact-resistance test across main contacts and correct values exceeding 500 microhms and values for 1 pole deviating by more than 50 percent from other poles.
    f. Verify proper sequence and correct timing of automatic engine starting, transfer time delay, retransfer time delay on restoration of normal power, and engine cool-down and shutdown.

6. Ground-Fault Tests: Coordinate with testing of ground-fault protective devices for power delivery from both sources.

    a. Verify grounding connections and locations and ratings of sensors.

3.4 DEMONSTRATION

A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain transfer switches and related equipment as specified below. Refer to Division 01 Section "Demonstration and Training."

B. Coordinate this training with that for generator equipment.

END OF SECTION 263600

SECTION 265100 - INTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Interior lighting fixtures, lamps, and ballasts.
2. Emergency lighting units.
3. Exit signs.
4. Lighting fixture supports.

B. Related Sections:

1. Division 16 Section "Wiring Devices" for manual wall-box dimmers for incandescent lamps.
2. Division 16 Section "Lighting Control Devices" for automatic control of lighting, including time switches, photoelectric relays, occupancy sensors, and multipole lighting relays and contactors.

1.2 SUBMITTALS

A. Product Data:
1. For each type of lighting fixture, arranged in order of fixture designation. Include data on features, accessories, and finishes.
2. For each type of lamp.

B. Shop Drawings: Show details of nonstandard or custom lighting fixtures. Indicate dimensions, weights, methods of field assembly, components, features, and accessories. Product Certificates: For each type of ballast for bi-level and dimmer-controlled fixtures, from manufacturer.

C. Field quality-control reports.

1.3 QUALITY ASSURANCE

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Comply with NFPA 70.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Products:
   1. Fixtures: Subject to compliance with requirements, provide as indicated on Drawings.
   2. Lamps: Provide from one of the following manufacturers;
      a. GE
      b. Sylvania
      c. Philips

2.2 GENERAL REQUIREMENTS FOR LIGHTING FIXTURES AND COMPONENTS

A. Recessed Fixtures: Comply with NEMA LE 4 for ceiling compatibility for recessed fixtures.

B. Incandescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5A.

C. Fluorescent Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5 and NEMA LE 5A as applicable.

D. HID Fixtures: Comply with UL 1598. Where LER is specified, test according to NEMA LE 5B.

E. Metal Parts: Free of burrs and sharp corners and edges.

F. Sheet Metal Components: Steel unless otherwise indicated. Form and support to prevent warping and sagging.

G. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position.

H. Diffusers and Globes:

   1. Acrylic Lighting Diffusers: 100 percent virgin acrylic plastic. High resistance to yellowing and other changes due to aging, exposure to heat, and UV radiation.

      a. Lens Thickness: At least **0.125 inch** unless otherwise indicated.
      b. UV stabilized.

   2. Glass: Annealed crystal glass unless otherwise indicated.

   3. Air-Supply Units: Slots in one or both side trims join with air-diffuser-boot assemblies.

2.3 BALLASTS FOR LINEAR FLUORESCENT LAMPS

A. General Requirements for Electronic Ballasts:

1. Comply with UL 935 and with ANSI C82.11.
2. Designed for type and quantity of lamps served.
3. Ballasts shall be designed for full light output unless another BF, dimmer, or bi-level control is indicated.
4. Sound Rating: **Class A**
5. See Evaluations for discussion on harmonic considerations.
6. Total Harmonic Distortion Rating: Less than **10** percent.
7. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
8. Operating Frequency: **42** kHz or higher.
9. BF: **0.88** or higher.
10. Power Factor: **0.95** or higher.

2.4 BALLASTS FOR COMPACT FLUORESCENT LAMPS

A. Description: Electronic-programmed rapid-start type, complying with UL 935 and with ANSI C 82.11, designed for type and quantity of lamps indicated. Ballast shall be designed for full light output unless dimmer or bi-level control is indicated:

1. Lamp end-of-life detection and shutdown circuit.
2. Automatic lamp starting after lamp replacement.
3. Sound Rating: Class A.
4. Total Harmonic Distortion Rating: Less than 20 percent.
5. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
6. Operating Frequency: 20 kHz or higher.
7. BF: 0.95 or higher unless otherwise indicated.
8. Power Factor: **0.95** or higher.
9. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.

2.5 BALLASTS FOR HID LAMPS

A. Electromagnetic Ballast for Metal-Halide Lamps: Comply with ANSI C82.4 and UL 1029. Include the following features unless otherwise indicated:

1. Ballast Circuit: Constant-wattage autotransformer or regulating high-power-factor type.
2. Minimum Starting Temperature: Minus 22 deg F for single-lamp ballasts.
3. Rated Ambient Operating Temperature: 104 deg F.
4. Open-circuit operation that will not reduce average life.
5. Low-Noise Ballasts: Manufacturers' standard epoxy-encapsulated models designed to minimize audible fixture noise.

B. Electronic Ballast for Metal-Halide Lamps: Include the following features unless otherwise indicated:

1. Minimum Starting Temperature: Minus 20 deg F for single-lamp ballasts.
2. Rated Ambient Operating Temperature: 130 deg F.
3. Lamp end-of-life detection and shutdown circuit.
4. Sound Rating: Class A.
5. Total Harmonic Distortion Rating: Less than **10** percent.
6. Transient Voltage Protection: IEEE C62.41.1 and IEEE C62.41.2, Category A or better.
7. Lamp Current Crest Factor: 1.5 or less.
8. Power Factor: 0.90 or higher.
9. Interference: Comply with 47 CFR 18, Ch. 1, Subpart C, for limitations on electromagnetic and radio-frequency interference for nonconsumer equipment.
10. Protection: Class P thermal cutout.

2.6 EXIT SIGNS

A. General Requirements for Exit Signs: Comply with UL 924; for sign colors, visibility, luminance, and lettering size, comply with authorities having jurisdiction.

B. Internally Lighted Signs:
1. Lamps for AC Operation: LEDs, 50,000 hours minimum rated lamp life.
2. Self-Powered Exit Signs (Battery Type): Integral automatic charger in a self-contained power pack.

   a. Battery: Sealed, maintenance-free, type **rated to 0 degrees F.**
   b. Charger: Fully automatic, solid-state type with sealed transfer relay.
   c. Operation: Relay automatically energizes lamp from battery when circuit voltage drops to 80 percent of nominal voltage or below. When normal voltage is restored, relay disconnects lamps from battery, and battery is automatically recharged and floated on charger.
   d. Test Push Button: Push-to-test type, in unit housing, simulates loss of normal power and demonstrates unit operability.
   e. LED Indicator Light: Indicates normal power on. Normal glow indicates trickle charge; bright glow indicates charging at end of discharge cycle.

2.7 FLUORESCENT LAMPS

A. T8 rapid-start lamps, rated 32 W maximum, nominal length of 48 inches, 2800 initial lumens (minimum), CRI 85 (minimum), color temperature **3500**, and average rated life 20,000 hours unless otherwise indicated.

B. T8 rapid-start lamps, rated 17 W maximum, nominal length of 24 inches, 1300 initial lumens (minimum), CRI 85 (minimum), color temperature **3500** K, and average rated life of 20,000 hours unless otherwise indicated.

C. Compact Fluorescent Lamps: 4-Pin, CRI 80 (minimum), color temperature **3500** K, average rated life of 10,000 hours at three hours operation per start**,** unless otherwise indicated.

1. 13 W: T4, double or triple tube, rated 900 initial lumens (minimum).
2. 18 W: T4, double or triple tube, rated 1200 initial lumens (minimum).
3. 26 W: T4, double or triple tube, rated 1800 initial lumens (minimum).
4. 32 W: T4, triple tube, rated 2400 initial lumens (minimum).
5. 42 W: T4, triple tube, rated 3200 initial lumens (minimum).
6. 57 W: T4, triple tube, rated 4300 initial lumens (minimum).
7. 70 W: T4, triple tube, rated 5200 initial lumens (minimum).
8. 85 W: T4, triple tube, rated 6000 initial lumens (minimum).
9. 120 W: T4, triple tube, rated 9000 initial lumens (minimum).

D. For dimmable fluorescent lamps provide 100 hour burn-in prior to dimming.

2.8 HID LAMPS

A. High-Pressure Sodium Lamps: ANSI C78.42, CRI 21 (minimum), color temperature **1900** K, and average rated life of 24,000 hours, minimum.

B. Metal-Halide Lamps: ANSI C78.43, with minimum CRI **65**, and color temperature **3200** K.

C. Pulse-Start, Metal-Halide Lamps: Minimum CRI 65, and color temperature **3000** K.

D. Ceramic, Pulse-Start, Metal-Halide Lamps: Minimum CRI **80**, and color temperature **3000** K.

2.9 LIGHTING FIXTURE SUPPORT COMPONENTS

A. Comply with Division 16 Section "Hangers and Supports for Electrical Systems" for channel- and angle-iron supports and nonmetallic channel and angle supports.

B. Single-Stem Hangers: 1/2-inch steel tubing with swivel ball fittings and ceiling canopy. Finish same as fixture.

C. Wires: ASTM A 641/A 641M, Class 3, soft temper, zinc-coated steel, **12 gage.**

D. Wires for Humid Spaces: ASTM A 580/A 580M, Composition 302 or 304, annealed stainless steel, **12 gage.**

PART 3 - EXECUTION

3.1 INSTALLATION

A. Lighting fixtures: Set level, plumb, and square with ceilings and walls. Install lamps in each fixture.

B. Comply with NFPA 70 for minimum fixture supports.

C. Adjust aimable lighting fixtures to provide required light intensities.

D. Connect wiring according to Division 16 Section "Conductors and Cables."

3.2 FIELD QUALITY CONTROL

A. Test for Emergency Lighting: Interrupt power supply to demonstrate proper operation. Verify transfer from normal power to battery and retransfer to normal.

B. Prepare a written report of tests, inspections, observations, and verifications indicating and interpreting results. If adjustments are made to lighting system, retest to demonstrate compliance with standards.

END OF SECTION 265100

SECTION 28310 – FIRE ALARM SYSTEM

Part 1 - General:

1.1 RELATED DOCUMENTS

A. The General Conditions, Supplementary Conditions, and applicable portions of Division 1 of the specifications are part of this section which shall consist of all labor, equipment, materials and other costs necessary to complete all **electrical** work indicated on the drawings, herein specified or both.

1.2 SUMMARY

A. Provide an addition and modification to the existing automatic and manual, auxiliary connected fire alarm system, according to the following specifications to be wired, connected, tested and left in first class operating condition. All equipment shall be Underwriters' Laboratories approved for the intended us and shall meet with the approval of the local authority. The complete system shall be as manufactured by Simplex to match existing.

B. The complete system shall be installed in accordance with applicable sections of NFPA standards, section 72, 101 Life Safety, the State of Rhode Island Building Codes, the State of Rhode Island Fire Safety Codes and all local codes and requirements.

C. Utilize existing devices as indicated on drawings. Replace any existing equipment and wiring that is not compatible with the equipment that you provide or the modifications that you make, without additional compensation.

D. Modify the control panel and add additional components as necessary to provide a fully functional fire alarm system in compliance with all current codes. All control panel components must be one manufacturer. This also includes modifications and equipment necessary to accomplish functions specified in other sections, such as elevator capture. Provide battery calculations demonstrating that the entire fire alarm system will have full 60 hours of backup, per code.

E. As it is not practical to enumerate in these specifications all details of fittings and accessory equipment required for proper operation of the system herein described, it is understood that they will be supplied by the contractor without extra compensation. Provide all fittings, terminations, etc., needed for the best performance possible at the present state-of-the-art.

1.3 QUALITY ASSURANCE

A. Each and all items of the Fire Alarm System shall be listed as a product of a SINGLE fire alarm system manufacturer under the appropriate category by Underwriters' Laboratories, Inc. (UL), and shall bear the "U.L." label, and be FM approved. All control equipment is to be listed under UL category UOJZ as a single control unit. Partial listing shall NOT be acceptable.

B. Equipment and materials shall be supplied by an authorized and factory trained Distributor of the manufacturer within the territory of the project location. It will be the responsibility of the supplier to ensure proper specification adherence for system operation, final connection, test, turnover, warranty compliance, and after-market service.

C. To assure prompt service, the equipment supplier's facility must be located within 50 miles of the project site. It shall not be sufficient to merely have an employee who happens to live nearby.

D. All installation and maintenance personnel must be employees of the equipment supplier certified and factory trained for the provided equipment and must be licensed by the state covering fire alarm systems.

E. Keep this existing fire alarm system operational at all times during the renovations of the 4th, 5th and 6th floors.

1.4 SUBMITTALS:

A. Submit shop drawings to and obtain written approval from the authority having jurisdiction, prior to ordering fire alarm equipment and prior to installation of wiring and equipment. General requirements are as follows:

1. A riser diagram of the complete fire alarm system. (Typical riser diagrams are not acceptable.)

2. A complete point-to-point installation diagram. (Typical diagrams are not acceptable.)

3. A complete list of current drain requirements during normal supervisory, trouble and alarm condition. Battery standby calculations showing total standby power required to meet the specified system requirements.

4. Manufacturer's original catalog data and description information shall be supplied for all major components of the equipment to be supplied.

5. Supplier's qualifications indicating years in business, service policies, warranty definitions, and a list of similar installations

6. Contractor's qualifications indicating years in business, prior experience with installations that include the type of equipment that is to be supplied. Rhode Island License # and type of license.

Part 2 – Product

2.1 EQUIPMENT:

A. Provide equipment as indicated on the drawings.

B. Carefully remove and store existing devices to be re-installed in the new installation.

2.2 WIRING

A. The electrical subcontractor shall provide in accordance with manufacturer's instructions, all wiring, conduit and outlet boxes required for installation of a complete system as described herein and as shown on the plans. Provide all wiring in metallic raceway. Provide No. 14 gauge, THWN, solid conductors and color code as required.

B. Tag all wires at all junction points and test free from grounds or crosses between conductors. Carry the wiring system through all equipment. Provide red painted terminal cabinets with hinged lockable covers at all junction points. Make all conductor splices on screw type terminal blocks; wire nuts shall not be used. Properly label all terminals within terminal cabinets. Make final connections between control equipment and the wiring system under direct supervision of a representative of the manufacturer.

C. Provide supply and return loops in separate raceways with separation as required to meet code requirements.

2.3 GURANTEE AND FINAL TEST:

A. Guarantee all new equipment and wiring to be free from inherent mechanical and electrical defects for a period of one year from the date of final acceptance.

B. Before this installation shall be considered complete and acceptable to the awarding authorities, a complete test on the system shall be performed as follows: The electrical contractor's job foreman, in the presence of a representative of the manufacturer and a representative of the locala fire department, shall operate each alarm initiating device and verify zone annunciation, audible and visual signaling and proper operation of the master box. Each circuit shall be opened at its most remote point to check for the correctness of the supervisory circuitry. When the above test has been completed to the satisfaction of the manufacturer's representative, the electrical subcontractor's job foreman, and the local fire department, a letter witnessed and co-signed by all attesting to the completion of this testing shall be forwarded to the Engineer. Test to include both new and existing wiring and equipment. Quarterly testing, as required b y the Rhode Island Fire Safety Code is not part of this contract.

C. Service calls resulting from acts of vandalism, acts of nature, or acts which are beyond the control of the equipment manufacturer are excluded under the guarantee and shall be considered a billable call.

SECTION 13852 - ADDRESSABLE FIRE-ALARM SYSTEM

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Fire-alarm control unit.
2. Manual fire-alarm boxes.
3. System smoke detectors.
4. Non system smoke detectors.
5. Heat detectors.
6. Notification appliances.
7. Magnetic door holders.
8. Remote annunciator.
9. Addressable interface device.
10. Digital alarm communicator transmitter.

1.2 SYSTEM DESCRIPTION

A. Non coded, addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.

B. The system shall include, but not be limited to, all control equipment, power supply, initiating devices, audible and visual notification appliances as appropriate, conduit, wiring, fittings, and all other accessories necessary to provide a complete and operable system.

1.3 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Fire-alarm control unit and raceways shall withstand the effects of earthquake motions determined according to **SEI/ASCE 7**.

1. The term "withstand" means "the unit will remain in place without separation of any parts from the device when subjected to the seismic forces specified and the unit will be fully operational after the seismic event.

1.4 SUBMITTALS

A. General Submittal Requirements:

1. Submittals shall be approved by authorities having jurisdiction prior to submitting them to Architect.
2. Shop Drawings shall be prepared by persons with the following qualifications:

   a. Trained and certified by manufacturer in fire-alarm system design.
   b. NICET-certified fire-alarm technician, **Level III** minimum.

B. Product Data: For each type of product indicated.

C. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.

1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter of NFPA 72.
2. Include voltage drop calculations for notification appliance circuits.
3. Include battery-size calculations during normal, supervisory, trouble, and alarm conditions.
4. A complete point-to-point installation diagram. (Typical diagrams are not acceptable.)

   A riser diagram of the complete fire alarm system. (Typical riser diagrams are not acceptable.)
   Battery standby calculations showing total standby power required to meet the specified system requirements.

   Manufacturer's original catalog data and description information shall be supplied for all major components of the equipment to be supplied.

   Supplier's qualifications indicating years in business, service policies, warranty definitions, and a list of similar installations.

   Contractor's qualifications indicating years in business, prior experience with installations that include the type of equipment that is to be supplied, and installer's License # and type of license.

D. Seismic Qualification Certificates: For fire-alarm control unit, accessories, and components, from manufacturer.

E. Field quality-control reports.

F. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 1 Section "Operation and Maintenance Data," include the following:

1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
3. Record copy of site-specific software.
4. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:

    a. Frequency of testing of installed components.
    b. Frequency of inspection of installed components.
    c. Requirements and recommendations related to results of maintenance.
    d. Manufacturer's user training manuals.

5. Manufacturer's required maintenance related to system warranty requirements.
6. Abbreviated operating instructions for mounting at fire-alarm control unit.

G. Software and Firmware Operational Documentation:

1. Software operating and upgrade manuals.
2. Complete System Program: On CDROM
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.

B. Installer Qualifications: Installation shall be by personnel certified by NICET as fire-alarm Level II technician.

C. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer. Components shall be compatible with, and operate as, an extension of existing system.

D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

1.6 SOFTWARE SERVICE AGREEMENT

A. Comply with UL 864.

B. Technical Support: Beginning with Substantial Completion, provide software support for one year.

C. Upgrade Service: Update software to latest version at Project completion. Install and program software upgrades that become available within one year from date of Substantial Completion. Upgrading software shall include operating system. Upgrade shall include new or revised licenses for use of software.

1. Provide a 30 day notice to Owner to allow scheduling and access to system and to allow Owner to upgrade computer equipment if necessary.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by the following manufacturer to match the existing control panel.

1. Simplex

2.2 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices **or systems**:

1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Automatic sprinkler system.
6. Fire-extinguishing system operation.
7. Fire standpipe system.

B. Fire-alarm signal shall initiate the following actions:

1. Continuously operate alarm-notification appliances.
2. Identify alarm at the fire-alarm control unit **and remote annunciators**.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Unlock electric door locks in designated egress paths.
5. Release fire and smoke doors held open by magnetic door holders.
6. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
7. Recall elevators to primary or alternate recall floors.
8. Activate emergency lighting control if code required.
9. Activate emergency shutoffs for gas and fuel supplies if code required.
10. Record events in the system memory.
11. <**Insert signal-initiating actions**>.

C. Supervisory signal initiation shall be by one or more of the following devices and actions:

1. Valve supervisory switch.

2. Low-air-pressure switch of a dry-pipe sprinkler system.
3. Elevator shunt-trip supervision.
4. Duct smoke detectors.
5. <**Insert supervisory signal-initiating devices and actions**>.

D. System trouble signal initiation shall be by one or more of the following devices and actions:

1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.
5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.
9. Fire-pump power failure, including a dead-phase or phase-reversal condition.
10. Low-air-pressure switch operation on a dry-pipe or preaction sprinkler system.
11. <**Insert trouble signal-initiating devices and actions**>.

E. System Trouble and Supervisory Signal Actions: Annunciate at fire-alarm control unit **and remote annunciators**.

2.3 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit:

1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by UL or FM.

   a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
   b. Include a real-time clock for time annotation of events on the event recorder and printer.

2. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.

1. Annunciator and Display: Liquid-crystal type, **3** lines **80** characters, minimum.
2. Keypad: Arranged to permit entry and execution of programming, display, and control commands **and to indicate control commands to be entered into the system for control of smoke-detector sensitivity and other parameters**.

C. Circuits:

1. Initiating Device, Notification Appliance, and Signaling Line Circuits: NFPA 72, Class A.

   a. Initiating Device Circuits: **Style D**.
   b. Notification Appliance Circuits: Style Z.
   c. Signaling Line Circuits: Style 6.
   d. Panel to Panel: Style 7

D. Notification Appliance Circuit: Operation shall sound in a Temporal 3 pattern.

E. Elevator Recall:

1. Smoke detectors at the following locations shall initiate automatic elevator recall.[**Alarm-initiating devices, except those listed, shall not start elevator recall. consider when non RI job**]

   a. Elevator lobby detectors except the lobby detector on the designated floor.
   b. Smoke detector in elevator machine room.
   c. Smoke detectors in elevator hoistway.

2. Elevator lobby detectors located on the designated recall floors shall be programmed to move the cars to the alternate recall floor.
3. Water-flow alarm connected to sprinkler in an elevator shaft and elevator machine room shall shut down elevators associated with the location without time delay.

   a. Water-flow switch associated with the sprinkler in the elevator pit may have a delay to allow elevators to move to the designated floor.

F. Door Controls: All door hold-open devices shall **be** connected to fire-alarm system.

G. [**Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.**] (delete for RI jobs)

H. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory signals and digital alarm radio transmitters shall be powered by 24-V dc source.

1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

I. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.

1. Batteries: Sealed lead calcium, mark with date of installation.

J. Instructions: Computer printout or typewritten instruction card mounted behind a plastic or glass cover in a stainless-steel or aluminum frame. Include interpretation and describe appropriate response for displays and signals. Briefly describe the functional operation of the system under normal, alarm, and trouble conditions.

2.4 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.

1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
2. Station Reset: Key -operated switch.
3. Indoor Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm. Lifting the cover actuates an integral battery-powered audible horn intended to discourage false-alarm operation.
4. Weatherproof Protective Shield: Factory-fabricated clear plastic enclosure hinged at the top to permit lifting for access to initiate an alarm.

2.5 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:

1. Comply with UL 268; operating at 24-V dc, nominal.
2. Detectors shall be two wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

B. Photoelectric Smoke Detectors:

1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

    a. Primary status.
    b. Device type.
    c. Present average value.

d. Present sensitivity selected.
e. Sensor range (normal, dirty, etc.).

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A. *(Coordinate with mechanical engineer to see if they are providing)*

1. **[Furnished]** and installed by mechanical contractor, [**Furnished]** and wired electrical contractor.

2. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
3. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:

   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

4. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
5. Each sensor shall have multiple levels of detection sensitivity.
6. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
7. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.6 NONSYSTEM SMOKE DETECTORS

A. Single-Station Smoke Detectors:

1. Comply with UL 217; suitable for NFPA 101, residential occupancies; operating at 120-V ac[**with 9-V dc battery as the secondary power source. Provide with "low" or "missing" battery chirping-sound device**].
2. Auxiliary Relays: One [**Form C rated at 0.5 A**] [**Form A and one Form C, both rated at 0.5 A**].
3. Audible Notification Appliance: Piezoelectric sounder rated at 90 dBA at 10 feet (3 m) according to UL 464.
4. Visible Notification Appliance: 177-cd strobe.
5. Test Switch: Push to test; simulates smoke at rated obscuration.
6. Interconnection: Allow interconnection of number of indicated detectors; alarm on one detector shall actuate notification on all connected detectors.
7. Self-Restoring: Detectors shall not require resetting or readjustment after actuation to restore them to normal operation.
8. Integral Visual-Indicating Light: LED type indicating detector has operated and power-on status.

2.7 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of **135 deg F (57 deg C)** or a rate of rise that exceeds **15 deg F (8 deg C)** per minute unless otherwise indicated.

1. Mounting: Adapter plate for outlet box mounting orTwist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

C. Heat Detector, Fixed-Temperature Type: Actuated by temperature that exceeds a fixed temperature of **190 deg F (88 deg C)**.

1. Mounting: Adapter plate for outlet box mounting or Twist-lock base interchangeable with smoke-detector bases.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.8 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

B. Chimes, Low-Level Output: Vibrating type, 75-dBA minimum rated output.

C. Chimes, High-Level Output: Vibrating type, 81-dBA minimum rated output.

D. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet (3 m) from the horn.

E. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on a faceplate. The word "FIRE" is engraved in minimum 1-inch- (25-mm-) high letters on the lens.

1. Rated Light Output:
   a. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.
3. For units with guards to prevent physical damage, light output ratings shall be determined with guards in place.

4. Flashing shall be in a temporal pattern, synchronized with other units.
5. Strobe Leads: Factory connected to screw terminals.
6. Mounting Faceplate: Factory finished, [**red**] [**white**].

2.9 MAGNETIC DOOR HOLDERS

A. Description: Units are equipped for wall or floor mounting as indicated and are complete with matching doorplate.

1. Electromagnet: Requires no more than 3 W to develop 25-lbf (111-N) holding force.
2. Wall-Mounted Units: Flush mounted unless otherwise indicated.
3. Rating: [24-V ac] [24-V dc] [120-V ac].

2.10 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: [**Flush**] [**Surface**] cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.11 ADDRESSABLE INTERFACE DEVICE

A. Microelectronic Monitor Module: Listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Control Relay Module:
1. Capable of providing a direct signal [to elevator controller to initiate elevator recall] [to circuit-breaker shunt trip for power shutdown] <Insert functions>.
2. Provide Control Relay Module for each HVAC unit 2000 cfm and greater. Refer to mechanical plans.

2.12 MUNICIPAL CONNECTION

A.

The fire alarm system shall be connected via leased telephone lines to a central station or remote station.

OR

The fire alarm system shall be connected to a local energy city master box.

The panel shall contain a disconnect switch to allow testing of the system without notifying the fire department.

Central Station Option

The fire department shall be consulted as to the authorized central station companies serving the municipality.

The fire alarm system shall transmit both alarm and trouble signals with the alarm having priority over the trouble signal.

The contractor shall be responsible for all installation charges, while the customer shall be responsible for the line lease charges.

Remote Station Option

The fire department shall be consulted as to the authorized remote station serving the municipality.

The fire alarm system shall transmit both alarm and trouble signals with the alarm having priority over the trouble signal.

The contractor shall be responsible for all installation charges, while the customer shall be responsible for the line lease charges.

Local Energy City Master Box Option

The local energy city master box shall be coded and timed in accordance with the requirements of the fire department.

The box shall be (surface/flush) mounted and located as specified by the building engineer and the fire department.

Multiplex Configuration

The system shall be designed to accommodate modules installed at either a central location or from one to fifteen remote locations. System integration shall utilize the FCINET multiplex communications with a true "Distributed Processing" of system intelligence.

The system shall be capable of maintaining degrade modes (reference Section 2.2) to assure maximum survivability of the system in the event of either the loss of system communications or failure of any or all microprocessors.

If remote panels are to be coded, provision must be made for the synchronization of the coded patterns with those generated at the central control panel to assure proper phasing of alarm signals.

2.13 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture [**one**] [**two**] telephone line(s) and dial a preset number for a remote central station. When contact is made with central station(s), signals shall be transmitted. If service on[**either**] line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:

1. Verification that both telephone lines are available.
2. Programming device.
3. LED display.
4. Manual test report function and manual transmission clear indication.
5. Communications failure with the central station or fire-alarm control unit.
6. <**Insert local function**>.

D. Digital data transmission shall include the following:

PART 3 - EXECUTION

3.1 EQUIPMENT INSTALLATION

A. Comply with NFPA 72, NFPA 70, state and local codes, manufacturer's instructions, and as indicated on the Drawings for installation of fire-alarm equipment.

B. Conceal conduit, junction boxes, and conduit supports and hangers in finished areas. Conceal or expose conduit, junction boxes, and conduit supports and hangers in unfinished areas.

C. Do not install smoke detectors before system programming and test period. If construction is ongoing during this period, take measures to protect smoke detectors from contamination and physical damage.

D. Flush-mount fire detection and alarm system devices in finished areas. Flush-mount or surface-mount fire detection and alarm system devices in unfinished areas.

E. Ensure manual stations are suitable for surface mounting or semi-flush mounting as indicated on the Drawings. Install not less than 42 inches, nor more than 48 inches, above finished floor measured to operating handle.

F. Install wall-mounted equipment, with tops of cabinets not more than 72 inches (1830 mm) above the finished floor.

G. Smoke- or Heat-Detector Spacing:

1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
3. Smooth ceiling spacing shall not exceed 30 feet.
4. HVAC: Locate detectors not closer than **3 feet** from air-supply diffuser or return-air opening.
5. Lighting Fixtures: Locate detectors not closer than 12 inches from any part of a lighting fixture.

3.2 WIRING

Provide in accordance with manufacturer's instructions, all wiring, conduit and outlet boxes required for installation of a complete system as described herein and as shown on the drawings. Wiring shall be NFPA class A.

Provide all wiring in metallic raceway with steel couplings and box connectors. An equipment bonding conductor shall be provided in all flexible metallic raceways. However, at concealed dry locations type MC cable rated as FPLP and 2-hour fire rated for penetrations by UL may be used in lieu of metal raceway.

It shall be the installer's responsibility to coordinate with the supplier, regarding the correct wiring procedures before installing any raceways or conductors.

Conductors shall be minimum 14 AWG solid copper type THHN/THWN. Conductors size shall be increased as required to maintain maximum voltage drop within acceptable manufacturer tolerances for all operating conditions. All AC and DC portions of the system shall be installed in separate raceway. Addressable loop wiring may be 16 AWG providing manufacturer's recommended distances are observed. If the system provided requires a different kind of wire or additional conductors, they shall be provided at no additional cost. Alarm speaker circuits shall be twisted shielded pairs. Emergency fire fighters telephone shall be twisted shielded pairs. Notification appliance circuits shall meet survivability requirements.

Junctions shall not be allowed unless approved by the AHJ.

Red painted covers shall be provided at all junction points. All conductor splices shall be made on screw type terminal blocks, wire nuts shall not be used. All terminals within terminal cabinet shall be properly labeled. Provide terminal cabinet at each building cable entrance and at other locations as required.

All fire alarm initiating zone and signal wiring shall be wired Class A. Separate raceways shall be provided for outgoing and return conductors.

Final connections between the equipment and the wiring system shall be made under the direct supervision of a representative of the manufacturer.

Provide override for all fans, controlled via fire alarm system, from control panel.

Upon completion of the installation of fire alarm equipment, the Contractor shall provide to the Engineer a signed statement substantially in the form as follows:

The undersigned having been engaged as the Contractor on this project confirms the fire alarm equipment was installed in accordance with the specifications and also in accordance with wiring diagrams, instructions, and directions provided by the manufacturer.

3.3 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 16 Section "Electrical Identification."

B. Install framed instructions in a location visible from fire-alarm control unit.

3.4 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.5 PROGRAMMING

Provide all required programming as required for a fully operating system and meeting approval of owner and the authority having jurisdiction. All room names and other wording must meet approval of the owner.

Prior to programming, submit a complete list of all device addresses to the AHJ for final approval.

All required program changes and all owner requested program changes during the first year following final approval and acceptance shall be provided at no charge to the owner.

3.6 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide service of competent, factory-trained technician authorized by manufacturer to technically supervise and participate during pre-testing and acceptance testing of system.

B. To assure prompt service, the equipment supplier's facility must be located within 50 miles of the project site. It shall not be sufficient to merely have an employee who happens to live nearby.

C. All installation and maintenance personnel must be employees of the equipment supplier and must be licensed by the state covering fire alarm systems.

END OF SECTION 283100

SECTION 22 05 03 - PIPES AND TUBES FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Pipe and pipe fittings for following systems:
   1. Domestic water piping , within 5 feet of building.
   2. Sanitary sewer piping , within 5 feet of building.
   3. Storm water piping , within 5 feet of building.
   4. Equipment drains and over flows.
   5. Unions and flanges.

1.2 SUBMITTALS

A. Product Data: Pipe materials and fittings; manufacturer's catalog information.

1.3 QUALITY ASSURANCE

A. Perform Work according to ASME B31.9 code for installation of piping systems, and ASME Section IX for welding materials and procedures.

B. Perform Work according to Rhode Island Plumbing Code standards.

C. Manufacturer: Company specializing in manufacturing products specified in this Section with three years' experience.

D. Installer: Company specializing in performing Work of this Section with 5 years' experience .

PART 2 PRODUCTS

2.1 DOMESTIC WATER PIPING, ABOVE GRADE

A. Copper Tubing: ASTM B88, Type L, drawn.
   1. Fittings: ASME B16.18, cast copper alloy or ASME B16.22, wrought copper and bronze.
   2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead-free solder ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver solder AWS A5.8 Classification BCuP-3 or BCuP-4 silver braze.

2.2 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.
   1. Fittings: Cast iron, ASTM A74.
   2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

C. ABS Pipe: ASTM D2751 or ASTM F628, Schedule 40, DWV, Acrylonitrile-Butadiene-Styrene (ABS) material.
   1. Fittings: ABS, ASTM D2751.
   2. Joints: ASTM D2235, solvent weld.

D. ABS Pipe: ASTM D2661 or ASTM D2751, Acrylonitrile-Butadiene-Styrene (ABS) material.
   1. Fittings: ABS, ASTM D2661.
   2. Joints: ASTM D2235, solvent weld.

E. PVC Pipe: ASTM D2729.
   1. Fittings: ASTM D2729, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

F. PVC Pipe: ASTM D2665.
   1. Fittings: ASTM D2665, PVC.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

G. PVC Pipe: ASTM D1785 Schedule 40 or ASTM D2241 SDR-26 for not less than 150 psi pressure rating.
   1. Fittings: ASTM D2466, Schedule 40, PVC .
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 Solvent cement.

2.3 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
   1. Fittings: Cast iron, CISPI 301.
   2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. PVC Pipe: ASTM D2665 or ASTM D3034 SDR 26.
   1. Fittings: PVC, ASTM D2665 or ASTM D3034.
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.4 EQUIPMENT DRAINS AND OVERFLOWS

A. Copper Tubing: ASTM B88, Type L, drawn.
   1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
   2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, [**lead-free**] solder.

B. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
   1. Fittings: ASTM D2466, Schedule 40, PVC .
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.5 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
   1. Copper Piping: Class 150, bronze unions with soldered .
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
   3. PVC Piping: PVC.
   4. CPVC Piping: CPVC.

B. Flanges for Pipe 2-1/2 inches and Larger:
   1. Copper Piping: Class 150, slip-on bronze flanges.
   2. PVC Piping: PVC flanges.
   3. CPVC Piping: CPVC flanges.
   4. Gaskets: 1/16 inch thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION - BURIED PIPING SYSTEMS

A. Verify connection to existing piping system size, and locationare as indicated on Drawings.

B. Route pipe in straight line.

C. Install pipe to allow for expansion and contraction without stressing pipe or joints.

3.3 INSTALLATION - ABOVE GROUND PIPING

A. Group piping whenever practical at common elevations.

B. Sleeve pipe passing through partitions, walls and floors. Refer to Section 22 05 29.

C. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. .

D. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. .

E. Provide access where valves and fittings are not accessible.

F. Establish invert elevations, slopes for drainage to 1/8 inch per foot minimum. Maintain gradients.

G. Slope piping and arrange systems to drain at low points.

H. Protect piping systems from entry of foreign materials by temporary covers, completing sections of Work, and isolating parts of completed system.

I. Install piping penetrating roofed areas to maintain integrity of roof assembly.

J. Install valves according to Section 22 05 23.

K. Install piping specialties according to Section 23 21 16.

L. Insulate piping. Refer to Section 22 07 00.

M. Install pipe identification according to Section 22 05 53.

3.4 INSTALLATION - DOMESTIC WATER PIPING SYSTEMS

A. Install domestic water piping system according to ASME B31.9.

3.5 INSTALLATION - SANITARY WASTE AND VENT PIPING SYSTEMS

A. Install sanitary waste and vent piping systems according to local plumbing code.

3.6 FIELD QUALITY CONTROL

A. Test domestic water piping system according to applicable code .

B. Test sanitary waste and vent piping system according to applicable code .

C. Test storm drainage piping system according to .

3.7 CLEANING

A. Clean and disinfect domestic water distribution system according to Section 22 11 00.

END OF SECTION

SECTION 22 05 23 - GENERAL-DUTY VALVES FOR PLUMBING PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Ball valves.
2. Check valves.

1.2 SUBMITTALS

A. Product Data: Manufacturer's catalog information with valve data and ratings for each service.

1.3 QUALITY ASSURANCE

A. For drinking water service, provide valves complying with NSF 61.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary protective coating on cast iron and steel valves.

PART 2 PRODUCTS

2.1 BALL VALVES

A. 2 inches (50 mm) and Smaller: MSS SP 110, 400 psi (2760 kPa) WOG , one piece bronze body, chrome plated brass ball, full port, teflon seats, blow-out proof stem, solder or threaded ends , lever handle .

2.2 CHECK VALVES

A. Horizontal Swing Check Valves:
1. 2 inches (50 mm) and Smaller: MSS SP 80, , bronze body and cap, bronze seat, teflon disc, solder or threaded ends.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install 3/4 inch (20 mm) ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

D. Install valves with clearance for installation of insulation and allowing access.

E. Provide access where valves and fittings are not accessible.

F. Refer to Section [22 05 29] for pipe hangers.

G. Refer to Section [22 07 00] for insulation requirements for valves.

H. Refer to Section [22 05 03] for piping materials applying to various system types.

3.2 VALVE APPLICATIONS

A. Install shutoff and drain valves at locations indicated on Drawings and according to this Section.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

END OF SECTION

SECTION 22 05 29 - HANGERS AND SUPPORTS FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pipe hangers and supports.
2. Hanger rods.
3. Sleeves.
4. Formed steel channel.

1.2 SYSTEM DESCRIPTION

A. Firestopping Materials: Comply with requirements of Section 07 84 00.

1.3 SUBMITTALS

A. Product Data:
1. Hangers and Supports: Manufacturers catalog data including load capacity.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Plumbing Piping - Water:
1. Conform to ASME B31.9 ASTM F708 MSS SP58 MSS SP69 MSS SP89.
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable ironor Carbon steel, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 inches (50 mm) and Larger: Carbon steel, adjustable, clevis.
4. Hangers for Hot Pipe Sizes 2 to 4 inches (50 to 100 mm): Carbon steel, adjustable, clevis.
5. Wall Support for Pipe Sizes 3 inches (76 mm) and Smaller: Cast iron hook.
6. Wall Support for Pipe Sizes 4 inches (100 mm) and Larger: Welded steel bracket and wrought steel clamp.
7. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Floor Support for Hot Pipe Sizes 4 inches (100 mm) and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
9. Copper Pipe Support: Copper-plated, Carbon-steel ring.

2.2 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

2.3 SLEEVES

A. Sleeves for Pipes Through Non-Fire-Rated Floors: 18 gage (1.2 mm) thick galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage (mm) thick galvanized steel.

C. Sealant: Acrylic .

2.4 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gage (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

2.5 FIRESTOPPING

A. Firestopping Materials: Comply with requirements of Section 07 84 00.

PART 3 EXECUTION

3.1 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Obtain permission from Architect/Engineer before using powder-actuated anchors.

D. Obtain permission from Architect/Engineer before drilling or cutting structural members.

3.2 INSTALLATION

A. Support horizontal piping as scheduled.

B. Install hangers with minimum 1/2 inch (13 mm) space between finished covering and adjacent work.

C. Place hangers within 12 inches (300 mm) of each horizontal elbow.

D. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.

E. Support horizontal cast iron pipe adjacent to each hub, with 5 feet (1.5 m) maximum spacing between hangers.

F. Support vertical piping at every other floor. Support vertical cast iron pipe at each floor at hub.

G. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.

H. Support riser piping independently of connected horizontal piping.

I. Provide copper plated hangers and supports for copper piping .

J. Design hangers for pipe movement without disengagement of supported pipe.

K. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.

L. Flashing:
   1. Provide flexible flashing and metal counterflashing where piping penetrates weather or waterproofed walls, floors, and roofs.
   2. Flash vent and soil pipes projecting 3 inches (75 mm) minimum above finished roof surface with lead worked 1 inch (25 mm) minimum into hub, 8 inches (200 mm) minimum clear on sides with 24 x 24 inches (600 x 600 mm) sheet size. For pipes through outside walls, turn flanges back into wall and caulk, metal counter-flash, and seal.
   3. Flash floor drains in floors with topping over finished areas with lead, 10 inches (250 mm) clear on sides with minimum 36 x 36 inch (910 x 910 mm) sheet size. Fasten flashing to drain clamp device.
   4. Seal [**floor**] [**shower**] [**mop sink**] <_____> drains watertight to adjacent materials.
   5. Adjust storm collars tight to pipe with bolts; caulk around top edge. Use storm collars above roof jacks. Screw vertical flange section to face of curb.

M. Sleeves:
   1. Exterior watertight entries: Seal with mechanical sleeve seals.
   2. Set sleeves in position in forms. Provide reinforcing around sleeves.
   3. Size sleeves large enough to allow for movement due to expansion and contraction. Provide for continuous insulation wrapping.
   4. Extend sleeves through floors 1 inch (mm) above finished floor level; caulk sleeves.

3.3 SCHEDULES

PIPE HANGER SPACING		
PIPE MATERIAL	MAXIMUM HANGER SPACING Feet (m)	HANGER ROD DIAMETER Inches (mm)
ABS (All sizes)	4 (1.2)	3/8 (9)
Aluminum (All sizes)	10 (3)	1/2 (13)
Brass		
Cast Iron (All Sizes)	5 (1.5)	5/8 (15)
Cast Iron (All Sizes) with 10 foot (3 m) length of pipe	10 (3)	5/8 (15)

CPVC, 1 inch (25 mm) and smaller	3 (0.9)	1/2 (13)
CPVC, 1-1/4 inches (32 mm) and larger	4 (1.2)	1/2 (13)
Copper Tube, 1-1/4 inches (32 mm) and smaller	6 (1.8)	1/2 (13)
Copper Tube, 1-1/2 inches (38 mm) and larger	10 (3)	1/2 (13)
Fiberglass	4 (1.2)	1/2 (13)
Glass	8 (2.4)	1/2 (13)
Polybutylene	2.67 (0.8)	3/8 (9)
Polypropylene	4 (1.2)	3/8 (9)
PVC (All Sizes)	4 (1.2)	3/8 (9)
Steel, 3 inches (75 mm) and smaller	12 (3.7)	1/2 (13)
Steel, 4 inches (100 mm) and larger	12 (3.7)	5/8 (15)

END OF SECTION

SECTION 22 05 53 - IDENTIFICATION FOR PLUMBING PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Pipe markers.

PART 2 PRODUCTS

2.1 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Identify valves in main and branch piping with tags.

C. Identify piping, concealed or exposed, with plastic tape pipe markers . Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

END OF SECTION

SECTION 22 07 00 - PLUMBING INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Plumbing piping insulation, jackets and accessories.

1.2 SUBMITTALS

A. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

1.3 QUALITY ASSURANCE

A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding 450 in accordance with ASTM E84

B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.

C. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature before, during, and after installation for minimum period of 24 hours.

PART 2 PRODUCTS

2.1 PIPE INSULATION

A. TYPE P-1: ASTM C547, molded glass fiber pipe insulation.
   1. Thermal Conductivity: 0.23 at 75 degrees F (0.034 at 24 degrees C).
   2. Operating Temperature Range: 0 to 850 degrees F (minus 18 to 454 degrees C).

3. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self-sealing adhesive joints.
4. Jacket Temperature Limit: minus 20 to 150 degrees F (minus 29 to 66 degrees C).

B. TYPE P-5: ASTM C534, Type I, flexible, closed cell elastomeric insulation, tubular.
1. Thermal Conductivity: 0.27 at 75 degrees F (0.039 at 25 degrees C).
2. Operating Temperature Range: Range: Minus 70 to 180 degrees F (minus 57 to 82 degrees C).

2.2 PIPE INSULATION JACKETS

A. Vapor Retarder Jacket:
1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
2. Water vapor transmission: ASTM E96/E96M; 0.02 perm-inches.

2.3 PIPE INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Piping 1-1/2 inches (40 mm) diameter and smaller: Galvanized steel insulation protection shield. MSS SP-69, Type 40. Length: Based on pipe size and insulation thickness.

D. Piping 2 inches (50 mm) diameter and larger: Wood insulation saddle, hard maple. Inserts length: not less than 6 inches (150 mm) long, matching thickness and contour of adjoining insulation.

E. Closed Cell Elastomeric Insulation Pipe Hanger: Polyurethane insert with aluminum single piece construction with self adhesive closure. Thickness to match pipe insulation.

F. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

G. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

H. Insulating Cement: ASTM C195; hydraulic setting on mineral wool.

I. Adhesives: Compatible with insulation.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify piping has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION - PIPING SYSTEMS

A. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.

B. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

C. Polyisocyanurate Foam Insulation Extruded Polystyrene Insulation:
   1. Wrap elbows and fitting with vapor retarder tape.
   2. Seal butt joints with vapor retarder tape.

D. Hot Piping Systems less than 140 degrees F (degrees C):
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
   3. Do not insulate unions and flanges at equipment, but bevel and seal ends of insulation at such locations.

E. Inserts and Shields:
   1. Piping 1-1/2 inches (mm) Diameter and Smaller: Install galvanized steel shield between pipe hanger and insulation.
   2. Piping 2 inches (mm) Diameter and Larger: Install insert between support shield and piping and under finish jacket.
      a. Insert Configuration: Minimum 6 inches (150 mm) long, of thickness and contour matching adjoining insulation; may be factory fabricated.
      b. Insert Material: Compression resistant insulating material suitable for planned temperature range and service.
   3. Piping Supported by Roller Type Pipe Hangers: Install [**galvanized**] steel shield between roller and inserts.

F. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers .

3.3 SCHEDULES

A. Water Supply Services Piping Insulation Schedule:

PIPING SYSTEM	INSULATION TYPE	PIPE SIZE	INSULATION THICKNESS inches (mm)

Domestic Hot Water Supply and Recirculation	P-1	1-1/4 inches (32 mm) and smaller 1-1/2 inches (40 mm) and larger	0.5 (13) 1.0 (25)
Domestic Cold Water	P-1	1-1/4 inches (32 mm) and smaller 1-1/2 inches (40 mm) and larger	0.5 (13) 1.0 (25)

END OF SECTION

SECTION 22 13 00 - FACILITY SANITARY SEWERAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Sanitary sewer piping above grade.
2. Floor drains.
3. Cleanouts.

1.2 QUALITY ASSURANCE

A. Perform Work according to Rhode Island Plumbing Code standards.

1.3 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 SANITARY SEWER PIPING, ABOVE GRADE

A. Cast Iron Pipe: ASTM A74, service weight.
1. Fittings: Cast iron, ASTM A74.
2. Joints: ASTM C564, rubber gasket joint devices or lead and oakum.

B. Cast Iron Pipe: CISPI 301, hub-less, service weight.
1. Fittings: Cast iron, CISPI 301.
2. Joints: CISPI 310, neoprene gaskets and stainless steel clamp-and-shield assemblies.

C. Copper Tube: ASTM B88 (ASTM B88M) Type L .
1. Fittings: ASME B16.23, cast bronze, or ASME B16.29, wrought copper.
2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead-free solder

D. ABS Pipe: ASTM D2751 or ASTM F628, Schedule 40, DWV.
1. Fittings: ABS, ASTM D2751.
2. Joints: ASTM D2235, solvent weld.

E. ABS Pipe: ASTM D2661 or ASTM D2751.
1. Fittings: ABS, ASTM D2661.
2. Joints: ASTM D2235, solvent weld.

F. PVC Pipe: ASTM D2729.

1. Fittings: ASTM D2729, PVC.
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

G. PVC Pipe: ASTM D2665.
1. Fittings: ASTM D2665, PVC.
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches (50 mm) and Smaller:
1. Copper Piping: Class 150, bronze unions with soldered .
2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.
3. PVC Piping: PVC.

B. Flanges for Pipe 2-1/2 inches (65 mm) and Larger:
1. Copper Piping: Class 150, slip-on bronze flanges.
2. PVC Piping: PVC flanges.
3. Gaskets: 1/16 inch (1.6 mm) thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.3 FLOOR DRAINS

A. Floor Drain (FD-1): ASME A112.21.1; lacquered cast iron two piece body with double drainage flange, weep holes, and round, adjustable nickel-bronze strainer.

2.4 CLEANOUTS

A. Exterior Surfaced Areas (CO-1): Round cast nickel bronze access frame and non-skid cover.

B. Exterior Unsurfaced Areas (CO-2): Line type with lacquered cast iron body and round epoxy coated cover wit gasket.

C. Interior Finished Floor Areas (CO-3): cast iron body with anchor flange, threaded top assembly, and round scored cover with gasket in service areas and depressed cover with gasket to accept floor finish in finished floor areas.

D. Interior Finished Wall Areas (CO-4): Line type with lacquered cast iron body and round epoxy coated cover with gasket, and round stainless steel access cover secured with machine screw.

E. Interior Unfinished Accessible Areas (CO-5): Calked or threaded type. Provide bolted stack cleanouts on vertical rainwater leaders.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Prepare piping connections to equipment with flanges or unions.

C. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Aboveground Piping:
1. Establish invert elevations, slopes for drainage to 1/8 inch per foot (percent) minimum. Maintain gradients.
2. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearances at cleanout for snaking drainage system.
3. Encase exterior cleanouts in concrete flush with grade.
4. Install floor cleanouts at elevation to accommodate finished floor.
5. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
6. Install piping to maintain headroom. Do not spread piping, conserve space.
7. Group piping whenever practical at common elevations.
8. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 21 05 16.
9. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.
10. Provide access where valves and fittings are not accessible. [**Coordinate size and location of access doors with Section** 08 31 13**.**]
11. Install piping penetrating roofed areas to maintain integrity of roof assembly.
12. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
13. Prepare exposed, unfinished pipe, fittings, supports, and accessories ready for finish painting. Refer to Section 09 90 00.
14. Install bell and spigot pipe with bell end upstream.
15. Sleeve pipes passing through partitions, walls and floors.
16. Support cast iron drainage piping at every joint.

3.3 FIELD QUALITY CONTROL

A. Test sanitary waste and vent piping system according to applicable code .

END OF SECTION

SECTION 22 14 00 - FACILITY STORM DRAINAGE

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Storm water piping above grade.
2. Unions and flanges.

1.2 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 STORM WATER PIPING, ABOVE GRADE

A. Cast Iron Pipe: CISPI 301, hubless, service weight.
1. Fittings: Cast iron, CISPI 301.
2. Joints: Neoprene gaskets and stainless steel clamp-and-shield assemblies.

B. Copper Tube: ASTM B306, DWV.
1. Fittings: ASME B16.23, cast bronze, or ASME B16.29 wrought copper.
2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead-free solder

C. ABS Pipe: ASTM D2680 or ASTM D2751, Acrylonitrile-Butadiene-Styrene (ABS) material.
1. Fittings: ABS.
2. Joints: ASTM D2235, solvent weld.

D. PVC Pipe: ASTM D2665 or ASTM D3034 SDR 26.
1. Fittings: ASTM D2665 or ASTM D3034, PVC.
2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches (50 mm) and Smaller:
1. PVC Piping: PVC.
2. CPVC Piping: CPVC.

B. Flanges for Pipe 2-1/2 inches (65 mm) and Larger:
1. PVC Piping: PVC flanges.
2. CPVC Piping: CPVC flanges.
3. Gaskets: 1/16 inch (1.6 mm) thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

2.3 CLEANOUTS

A. Exterior Surfaced Areas (CO-1): Round cast nickel bronze access frame and non-skid cover.

B. Exterior Unsurfaced Areas (CO-2): Line type with lacquered cast iron body and round epoxy coated cover with gasket.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify excavations are to required grade, dry, and not over-excavated.

3.2 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Prepare piping connections to equipment with flanges or unions.

C. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.3 INSTALLATION

A. Aboveground Piping:
1. Establish invert elevations, slopes for drainage to 1/8 inch per foot (1 percent) <_____> minimum. Maintain gradients.
2. Extend cleanouts to finished floor or wall surface. Lubricate threaded cleanout plugs with mixture of graphite and linseed oil. Provide clearance at cleanout for snaking drainage system.
3. Encase exterior cleanouts in concrete flush with grade.
4. Install floor cleanouts at elevation to accommodate finished floor.
5. Install non-conducting dielectric connections wherever jointing dissimilar metals.
6. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
7. Install piping to maintain headroom. Group piping to conserve space.
8. Group piping whenever practical at common elevations.
9. Support cast iron drainage piping at every joint.
10. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 21 05 16.
11. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.
12. Provide access where valves and fittings are not accessible.

13. Install piping penetrating roofed areas to maintain integrity of roof assembly.
14. Where pipe support members are welded to structural building framing, scrape, brush clean, and apply one coat of zinc rich primer to welding.
15. Sleeve pipes passing through partitions, walls and floors. Refer to Section 22 05 29.
16. Install firestopping at fire rated construction perimeters and openings containing penetrating sleeves and piping. Refer to Section 07 84 00.

END OF SECTION

SECTION 22 40 00 - PLUMBING FIXTURES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Water closets.
2. Urinals.
3. Lavatories.
4. Sinks.
5. Service sinks.

1.2 SUBMITTALS

A. Product Data: Submit manufacturer's literature for plumbing fixtures.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit literature and parts list.

1.4 QUALITY ASSURANCE

A. Provide plumbing fixture fittings in accordance with ASME A112.18.1 that prevent backflow from fixture into water distribution system.

PART 2 PRODUCTS

2.1 FLUSH VALVE WATER CLOSETS

A. Bowl: vitreous china closet with elongated rim, 1-1/2 inch spud, china bolt caps; maximum 1.6 gallon flush volume.

B. Flush Valve: Exposed chrome plated, diaphragm type with oscillating handle, escutcheon, seat bumper, integral screwdriver stop and vacuum breaker.

C. Seat: Solid plastic, open front, extended back, brass bolts, without cover.

D. Wall Mounted Carrier: Adjustable cast iron frame, integral drain hub and vent, adjustable spud. lugs for floor and wall attachment, threaded fixture studs with nuts and washers.

2.2 WALL HUNG URINALS

A. Urinal: ASME A112.19.2M or ANSI Z124.9, vitreous china, wall hung urinal with shields, integral trap, 3/4 inch top spud, steel supporting hanger; maximum 1.0 gallon flush volume.

B. Flush Valve: Exposed chrome plated, diaphragm type with oscillating handle, escutcheon, integral screwdriver stop, vacuum breaker.

C. all Mounted Carrier: Cast iron and steel frame with tubular legs, lugs for floor and wall attachment, threaded fixture studs for fixture hanger, bearing studs.

2.3 LAVATORIES

A. Vitreous China Counter Top Lavatory: Vitreous china self-rimming counter top lavatory, **x** inches with drillings on 4 inch centers, front overflow, seal of putty, caulking, or concealed vinyl gasket.

B. Trim: Chrome plated solid brass supply fitting with open grid strainer, water economy aerator with maximum 2.0 gpm flow, chrome plated brass P-trap with clean-out plug and arm with escutcheon.

2.4 SINKS

A. Single Compartment Bowl: Single compartment **xx** inch outside dimensions, 20 gage thick, Type stainless steel, self-rimming with undercoating, 3/1/2 inch crumb cup and chromed brass drain, ledge back drilled for trim.

2.5 SERVICE SINKS

A. Bowl: 36 24 x 24 x 10 inch high white _____ molded stone, floor mounted, with one inch wide shoulders, stainless steel strainer.

B. Trim: Exposed wall type supply with lever handles, spout wall brace, vacuum breaker, hose end spout, strainers, eccentric adjustable inlets, integral screwdriver stops with covering caps and adjustable threaded wall flanges. Five feet of 1/2 inch diameter plain end reinforced plastic hose, hose clamp and mop hanger.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify adjacent construction is ready to receive rough-in work of this section.

B. Review millwork shop drawings. Confirm location and size of fixtures and openings before rough in and installation.

3.2 INSTALLATION

A. Install each fixture with chrome plated rigid or flexible supplies with screwdriver stops, reducers, and escutcheons.

B. Adjust stops or valves for intended water flow rate to fixtures without splashing, noise, or overflow.

END OF SECTION

SECTION 23 05 03 - PIPES AND TUBES FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes: Pipe and pipe fittings for following systems:
   1. Heating water piping.
   2. Equipment drains and over flows.
   3. Natural gas piping.
   4. Unions and flanges.

1.2 SUBMITTALS

A. Product Data: Pipe materials and fittings. Submit manufacturers catalog information.

1.3 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 HEATING WATER PIPING, ABOVEGROUND

A. Copper Tubing: ASTM B88, Type L, drawn.
   1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
   2. Tee Connections: Mechanically extracted collars with notched and dimpled branch tube.
   3. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead-free solder .

2.2 EQUIPMENT DRAINS AND OVERFLOWS

A. Copper Tubing: ASTM B88, Type L, drawn.
   1. Fittings: ASME B16.18, cast brass, or ASME B16.22 solder wrought copper.
   2. Joints: ASTM B32, Alloy Grade Sb5 tin-antimony, or Alloy Grade Sn95 tin-silver, lead-free solder.

B. PVC Pipe: ASTM D1785, Schedule 40, or ASTM D2241, SDR 21 or 26.
   1. Fittings: ASTM D2466, Schedule 40, PVC .
   2. Joints: ASTM D2855, solvent weld with ASTM D2564 solvent cement.

2.3 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M forged steel welding type.

2. Joints: Threaded for pipe 2 inch and smaller; welded for pipe 2-1/2 inches and larger.

2.4 UNIONS AND FLANGES

A. Unions for Pipe 2 inches and Smaller:
1. Copper Piping: Class 150, bronze unions with soldered .
2. PVC Piping: PVC.
3. CPVC Piping: CPVC.

B. Flanges for Pipe 2-1/2 inches and Larger:
1. Copper Piping: Class 150, slip-on bronze flanges.
2. PVC Piping: PVC flanges.
3. CPVC Piping: CPVC flanges.
4. Gaskets: 1/16 inch thick preformed neoprene gaskets.

C. PVC Pipe Materials: For connections to equipment and valves with threaded connections, furnish solvent-weld socket to screwed joint adapters and unions, or ASTM D2464, Schedule 80, threaded, PVC pipe.

PART 3 EXECUTION

3.1 PREPARATION

A. Ream pipe and tube ends. Remove burrs.

B. Prepare piping connections to equipment with flanges or unions.

C. Keep open ends of pipe free from scale and dirt. Protect open ends with temporary plugs or caps.

3.2 INSTALLATION

A. Aboveground Piping:
1. Route piping in orderly manner and maintain gradient. Route parallel and perpendicular to walls.
2. Install piping to maintain headroom without interfering with use of space or taking more space than necessary.
3. Group piping whenever practical at common elevations.
4. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 29.
5. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment. Refer to Section 23 05 16.
6. Provide clearance in hangers and from structure and other equipment for installation of insulation and access to valves and fittings. Refer to Section 23 07 00.
7. Provide access where valves and fittings are not accessible.
8. Slope piping and arrange systems to drain at low points.
9. Protect piping systems from entry of foreign materials by temporary covers, completing sections of Work, and isolating parts of completed system.

10. Install piping penetrating roofed areas to maintain integrity of roof assembly.
11. Install valves according to Section 23 05 23.
12. Install hydronic piping specialties according to Section 23 21 16.
13. Insulate piping. Refer to Section 23 07 00.
14. Install pipe identification according to Section 23 05 53.

B. Heating Piping Systems:
1. Install heating water piping according to ASME B31.1 ASME B31.9.

C. Gas Piping Systems:
1. Install natural gas piping according to NFPA 54.

3.3 FIELD QUALITY CONTROL

A. Test heating water piping system according to ASME B31.9 .

B. Pressure test natural gas piping according to NFPA 54.

3.4 CLEANING

A. After completion, fill, clean, and treat heating water piping system . Refer to Section 23 25 00 .

END OF SECTION

SECTION 23 05 23 - GENERAL-DUTY VALVES FOR HVAC PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Ball valves.
2. Check valves.

1.2 SUBMITTALS

A. Product Data: Manufacturers catalog information with valve data and ratings for each service.

B. Manufacturer's Installation Instructions: Hanging and support methods, joining procedures.

C. Manufacturer's Certificate: Products meet or exceed specified requirements.

1.3 DELIVERY, STORAGE, AND HANDLING

A. Provide temporary protective coating on cast iron and steel valves.

PART 2 PRODUCTS

2.1 BALL VALVES

A. 2 inches (50 mm) and Smaller: MSS SP 110, 400 psi (2760 kPa) WOG , one piece bronze body, chrome plated brass ball, full port, teflon seats, blow-out proof stem, solder or threaded ends , lever handle .

B. 1-1/4 inch (32 mm) to 3 inch (76 mm): MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, conventional port.

2.2 CHECK VALVES

A. Horizontal Swing Check Valves:
1. 2 inches (50 mm) and Smaller: MSS SP 80, Class 150 , bronze body and cap, bronze seat, teflon disc, solder or threaded ends.
2. 2-1/2 inches (65 mm) and Larger: MSS SP 71, Class 250 , cast iron body, bolted cap, bronze or cast iron disc, flanged ends.

B. Spring-Loaded Check Valves:
1. 2 inches (50 mm) and Smaller: MSS SP 80, Class 250 , bronze body, in-line spring lift check, silent closing, teflon disc, integral seat, solder or threaded ends.

2. 2-1/2 inches (65 mm) and Larger: MSS SP 71, Class 125 , globe style, cast iron body, bronze seat, center guided bronze disc, stainless steel spring and screws, flanged ends.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install valves with stems upright or horizontal, not inverted.

B. Install brass male adapters each side of valves in copper piped system. Solder adapters to pipe.

C. Install 3/4 inch (20 mm) ball valves with cap for drains at main shut-off valves, low points of piping, bases of vertical risers, and at equipment.

D. Install valves with clearance for installation of insulation and allowing access.

E. Provide access where valves and fittings are not accessible.

F. Refer to Section 23 05 29 for pipe hangers.

G. Refer to Section 23 07 00 for insulation requirements for valves.

H. Refer to Section 23 05 03 for piping materials applying to various system types.

3.2 VALVE APPLICATIONS

A. Install shutoff and drain valves at locations indicated on Drawings according to this Section.

B. Install ball valves for shut-off and to isolate equipment, part of systems, or vertical risers.

C. Install ball valves in heating water systems for shut-off service.

D. Install plug valves in natural gas systems for shut-off service.

END OF SECTION

SECTION 23 05 29 - HANGERS AND SUPPORTS FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Pipe hangers and supports.
2. Hanger rods.
3. Flashing.
4. Sleeves.
5. Formed steel channel.
6. Equipment bases and supports.

1.2 SYSTEM DESCRIPTION

A. Firestopping Materials: Comply with requirements of Section 07 84 00.

1.3 PERFORMANCE REQUIREMENTS

A. Firestopping Materials: Comply with requirements of Section 07 84 00.

1.4 SUBMITTALS

A. Product Data:
1. Hangers and Supports: Manufacturers catalog data including load capacity.
2. Firestopping: Data on product characteristics, performance and limitation criteria.

B. Manufacturer's Installation Instructions:
1. Hangers and Supports: Special procedures and assembly of components.
2. Firestopping: Preparation and installation instructions.

1.5 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 PIPE HANGERS AND SUPPORTS

A. Hydronic Piping:
1. Conform to ASME B31.9 .
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or Carbon steel, adjustable swivel, split ring.
3. Hangers for Cold Pipe Sizes 2 inches (50 mm) and Larger: Carbon steel, adjustable, clevis.

4. Hangers for Hot Pipe Sizes 2 to 4 inches (50 to 100 mm): Carbon steel, adjustable, clevis.
5. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
6. Wall Support for Pipe Sizes 3 inches (76 mm) and Smaller: Cast iron hooks.
7. Wall Support for Pipe Sizes 4 inches (100 mm) and Larger: Welded steel bracket and wrought steel clamp.
8. Vertical Support: Steel riser clamp.
9. Floor Support for Cold Pipe: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
10. Floor Support for Hot Pipe Sizes 4 Inches (100 mm) and Smaller: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
11. Copper Pipe Support: Copper-plated, carbon steel ring.

B. Refrigerant Piping:
1. Conform to ASME B31.5 .
2. Hangers for Pipe Sizes 1/2 to 1-1/2 inch (13 to 38 mm): Malleable iron or Carbon steel, adjustable swivel, split ring.
3. Hangers for Pipe Sizes 2 inches (50 mm) and Larger: Carbon steel, adjustable, clevis.
4. Multiple or Trapeze Hangers: Steel channels with welded spacers and hanger rods.
5. Wall Support for Pipe Sizes 3 inches (75 mm) and Smaller: Cast iron hook.
6. Vertical Support: Steel riser clamp.
7. Floor Support: Cast iron adjustable pipe saddle, lock nut, nipple, floor flange, and concrete pier or steel support.
8. Copper Pipe Support: Copper-plated carbon-steel ring.

2.2 ACCESSORIES

A. Hanger Rods: Mild steel threaded both ends, threaded on one end, or continuous threaded.

2.3 SLEEVES

A. Sleeves for Pipes Through Non-fire Rated Floors: 18 gage (1.2 mm) thick galvanized steel.

B. Sleeves for Pipes Through Non-fire Rated Beams, Walls, Footings, and Potentially Wet Floors: Steel pipe or 18 gage (mm) thick galvanized steel.

C. Sleeves for Round Ductwork: Galvanized steel.

D. Sleeves for Rectangular Ductwork: Galvanized steel or wood.

E. Sealant: Acrylic .

2.4 FORMED STEEL CHANNEL

A. Product Description: Galvanized 12 gage (2.8 mm) thick steel. With holes 1-1/2 inches (38 mm) on center.

2.5 FIRESTOPPING ACCESSORIES

A. Installation Accessories: Comply with requirements of Section 07 84 00.

****** [OR] ******

PART 3 EXECUTION (Not Applicable)

3.1 EXAMINATION

A. Verify openings are ready to receive sleeves.

B. Verify openings are ready to receive firestopping.

3.2 PREPARATION

A. Clean substrate surfaces of dirt, dust, grease, oil, loose material, or other matter affecting bond of firestopping material.

B. Remove incompatible materials affecting bond.

C. Obtain permission from Architect/Engineer before using powder-actuated anchors.

D. Obtain permission from Architect/Engineer before drilling or cutting structural members.

3.3 INSTALLATION

A. Pipe Hangers and Supports:
1. Support horizontal piping as scheduled.
2. Install hangers with minimum 1/2 inch (13 mm) space between finished covering and adjacent Work.
3. Place hangers within 12 inches (300 mm) of each horizontal elbow.
4. Use hangers with 1-1/2 inch (38 mm) minimum vertical adjustment.
5. Support vertical piping at every other floor.
6. Where piping is installed in parallel and at same elevation, provide multiple pipe or trapeze hangers.
7. Support riser piping independently of connected horizontal piping.
8. Provide copper plated hangers and supports for copper piping .
9. Design hangers for pipe movement without disengagement of supported pipe.
10. Provide clearance in hangers and from structure and other equipment for installation of insulation. Refer to Section 22 07 00.

B. Equipment Bases and Supports:
1. Provide [**housekeeping pads**] <_____> of concrete, minimum 3-1/2 inches (87 mm) thick and extending 1 inche (150 mm) beyond supported equipment . Refer to Section 03 30 00.

2. Using templates furnished with equipment, install anchor bolts, and accessories for mounting and anchoring equipment.
3. Construct supports of steel members <_____>. Brace and fasten with flanges bolted to structure.
4. Provide rigid anchors for pipes after vibration isolation components are installed. Refer to Section 21 05 48.

C. Flashing:
1. Provide flexible flashing and metal Counterflashing where piping and ductwork penetrate weather or waterproofed walls, floors, and roofs.
2. Provide acoustical lead flashing around ducts and pipes penetrating equipment rooms for sound control.

D. Sleeves:
1. Extend sleeves through floors 1 inch (mm) above finished floor level. Caulk sleeves.
2. Where piping or ductwork penetrates floor, ceiling, or wall, close off space between pipe or duct and adjacent Work with firestopping insulation and caulk airtight. Provide close fitting metal collar or escutcheon covers at both sides of penetration.
3. Install stainless steel escutcheons at finished surfaces.

E. Firestopping:
1. Firestopping Materials: Comply with requirements of Section 07 84 00.

****** [OR] ******

3.4 SCHEDULES

A. Copper and Steel Pipe Hanger Spacing:

PIPE SIZE Inches (mm)	COPPER TUBING MAXIMUM HANGER SPACING Feet (m)	STEEL PIPE MAXIMUM HANGER SPACING Feet (m)	COPPER TUBING HANGER ROD DIAMETER Inches (mm)	STEEL PIPE HANGER ROD DIAMETER Inches (mm)
1/2 (12)	5 (1.5)	7 (2.1)	3/8 (9)	3/8 (9)
3/4 (20)	5 (1.5)	7 (2.1)	3/8 (9)	3/8 (9)
1 (25)	6 (1.8)	7 (2.1)	3/8 (9)	3/8 (9)
1-1/4 (32)	7 (2.1)	7 (2.1)	3/8 (9)	3/8 (9)
1-1/2 (38)	8 (2.4)	9 (2.7)	3/8 (9)	3/8 (9)
2 (50)	8 (2.4)	10 (3)	3/8 (9)	3/8 (9)
2-1/2 (65) (Note 2)	9 (2.7)	11 (3.4)	1/2 (13)	1/2 (13)
3 (75)	10 (3)	12 (3.7)	1/2 (13)	1/2 (13)
4 (100)	12 (3.7)	14 (4.3)	1/2 (13)	5/8 (15)
5 (125)	13 (4)	16 (4.9)	1/2 (13)	5/8 (15)
6 (150)	14 (4.3)	17 (5.2)	5/8 (15)	3/4 (19)

8 (200)	16 (4.9)	19 (5.8)	3/4 (19)	3/4 (19)
10 (250)	18 (5.5)	22 (6.1)	3/4 (19)	7/8 (22)
12 (300)	19 (5.8)	23 (7)	3/4 (19)	7/8 (22)
14 (350)	22 (6.1)	25 (7.6)	7/8 (22)	1 (25)
16 (400)	23 (7)	27 (8.2)	7/8 (22)	1 (25)
18 (450)	25 (7.6)	28 (8.5)	1 (25)	1 (25)
20 (500)	27 (8.2)	30 (9.1)	1 (25)	1-1/4 (32)
24 (600)	28 (8.5)	32 (9.8)	1-1/4 (32)	1-1/4 (32)

B. Plastic and Ductile Iron Pipe Hanger Spacing:

PIPE MATERIAL	MAXIMUM HANGER SPACING Feet (m)	HANGER ROD DIAMETER Inches (mm)
ABS (All sizes)	4 (1.2)	3/8 (9)
FRP (All Sizes)	4 (1.2)	3/8 (9)
Ductile Iron (Note 2)		
PVC (All Sizes)	4 (1.2)	3/8 (9)

C. Note 1: Refer to manufacturer's recommendations for grooved end piping systems.

D. Note 2: 20 feet (6.1 m) maximum spacing, minimum of one hanger for each pipe section close to joint behind bell. Provide hanger at each change of direction and each branch connection. For pipe sizes 6 inches (150 mm) and smaller, subjected to loadings other than weight of pipe and contents, limit span to maximum spacing for water service steel pipe.

END OF SECTION

SECTION 23 05 53 - IDENTIFICATION FOR HVAC PIPING AND EQUIPMENT

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Nameplates.
   2. Tags.
   3. Pipe markers.

1.2 SUBMITTALS

A. Product Data: Manufacturers catalog literature for each product required.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of tagged valves; include valve tag numbers.

1.4 QUALITY ASSURANCE

A. Conform to ASME A13.1 for color scheme for identification of piping systems and accessories.

PART 2 PRODUCTS

2.1 NAMEPLATES

A. Product Description: Laminated three-layer plastic with engraved black letters on light contrasting background color.

2.2 TAGS

A. Tag Chart: Typewritten letter size list of applied tags and location plastic laminated.

2.3 PIPE MARKERS

A. Color and Lettering: Conform to ASME A13.1.

PART 3 EXECUTION

3.1 PREPARATION

A. Degrease and clean surfaces to receive adhesive for identification materials.

3.2 INSTALLATION

A. Install identifying devices after completion of coverings and painting.

B. Install plastic nameplates with corrosive-resistant mechanical fasteners, or adhesive.

C. Install labels with sufficient adhesive for permanent adhesion and seal with clear lacquer. For unfinished canvas covering, apply paint primer before applying labels.

D. Install tags using corrosion resistant chain. Number tags consecutively by location.

E. Identify air handling units, pumps, heat transfer equipment, tanks, and water treatment devices with plastic nameplates . Identify in-line pumps and other small devices with tags.

F. Identify control panels and major control components outside panels with plastic nameplates.

G. Identify valves in main and branch piping with tags.

H. Tag automatic controls, instruments, and relays. Key to control schematic.

I. Identify piping, concealed or exposed, with plastic tape pipe markers . Identify service, flow direction, and pressure. Install in clear view and align with axis of piping. Locate identification not to exceed 20 feet on straight runs including risers and drops, adjacent to each valve and tee, at each side of penetration of structure or enclosure, and at each obstruction.

J. For exposed natural gas lines other than steel pipe, attach yellow pipe labels with "GAS" in black lettering, at maximum 5 foot (spacing.

END OF SECTION

SECTION 23 05 93 - TESTING, ADJUSTING, AND BALANCING FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Testing adjusting, and balancing of air systems.
   2. Testing adjusting, and balancing of hydronic systems.

1.2 SUBMITTALS

A. Draft Reports: Submit for review prior to final acceptance of Project.

B. Test Reports: Submit prior to final acceptance of Project and for inclusion in operating and maintenance manuals. Assemble in soft cover, letter size, 3-ring binder, with table of contents page and tabs, and cover identification. Include reduced scale drawings with air outlets and equipment identified to correspond with data sheets, and indicating thermostat locations.

1.3 QUALITY ASSURANCE

A. Report Forms: AABC MN-1 National Standards for Total System Balance formsor Forms prepared following ASHRAE 111 .

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 EXAMINATION

A. Before starting work, verify systems are complete and operable.

B. Report defects, deficiencies, or abnormal conditions in mechanical systems preventing system balance.

C. Beginning of work means acceptance of existing conditions.

3.2 INSTALLATION TOLERANCES

A. Air Handling Systems: Adjust to within plus or minus 5 percent of design for supply systems and plus or minus 10 percent of design for return and exhaust systems.

B. Air Outlets and Inlets: Adjust to within plus or minus 10 percent of design.

C. Hydronic Systems: Adjust to within plus or minus 10 percent of design.

3.3 AIR SYSTEM PROCEDURE

A. Adjust air handling and distribution systems to deliver design supply, return, and exhaust air quantities within previously stated tolerances.

B. Make air flow rate measurements in ducts by traverse of entire cross sectional area of duct.

C. Measure air quantities at air inlets and outlets of new duct systems.

D. Use volume control devices to regulate air quantities only to extent those adjustments do not create objectionable air motion or sound levels. Change volume using dampers mounted in ducts.

E. Vary total system air quantities by adjustment of fan speeds. Provide drive changes to accomplish system air flow. Vary branch air quantities by damper regulation.

F. Measure static air pressure conditions on air supply units, including filter and coil pressure drops, and total pressure across fan. Allow for pressure drop equivalent to 50 percent loading of filters.

G. Adjust automatic outside air, return air, and exhaust air dampers for design conditions.

H. At modulating damper locations, take measurements and balance at extreme conditions.

3.4 WATER SYSTEM PROCEDURE

A. Adjust water systems after air balancing to deliver design quantities within previously stated tolerances.

B. Use calibrated fittings or equipment and pressure gages to determine flow rates for system balance. Where not installed, base flow balance on temperature difference across heat transfer elements.

C. Change system balance with automatic control valves fully open to heat transfer elements.

D. Change adjustment of water distribution systems by means of balancing cocks, valves, and fittings.

3.5 FIELD QUALITY CONTROL

A. Verify recorded data represents actually measured or observed conditions.

B. Permanently mark settings of valves, dampers, and other adjustment devices. Set and lock memory stops.

END OF SECTION

SECTION 23 07 00 - HVAC INSULATION

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. HVAC piping insulation, jackets and accessories.
   2. HVAC ductwork insulation, jackets, and accessories.

1.2 SUBMITTALS

A. Product Data: Submit product description, thermal characteristics and list of materials and thickness for each service, and location.

B. Manufacturer's Installation Instructions: Submit manufacturers published literature indicating proper installation procedures.

C. Manufacturer's Certificate: Certify products meet or exceed specified requirements.

1.3 QUALITY ASSURANCE

A. Test pipe insulation for maximum flame spread index of 25 and maximum smoke developed index of not exceeding 450 in accordance with ASTM E84.

B. Pipe insulation manufactured in accordance with ASTM C585 for inner and outer diameters.

C. Factory fabricated fitting covers manufactured in accordance with ASTM C450.

1.4 DELIVERY, STORAGE, AND HANDLING

A. Accept materials on site in original factory packaging, labeled with manufacturer's identification, including product density and thickness.

B. Protect insulation from weather and construction traffic, dirt, water, chemical, and damage, by storing in original wrapping.

1.5 ENVIRONMENTAL REQUIREMENTS

A. Install insulation only when ambient temperature and humidity conditions are within range recommended by manufacturer.

B. Maintain temperature before, during, and after installation for minimum period of hours.

PART 2 PRODUCTS

2.1 PIPE INSULATION

A. TYPE P-1: ASTM C547, molded glass fiber pipe insulation.
   1. Thermal Conductivity: 0.23 at 75 degrees F (0.034 at 24 degrees C).
   2. Operating Temperature Range: 0 to 850 degrees F (minus 18 to 454 degrees C).
   3. Vapor Barrier Jacket: ASTM C1136, Type I, factory applied reinforced foil kraft with self-sealing adhesive joints.
   4. Jacket Temperature Limit: minus 20 to 150 degrees F (minus 29 to 66 degrees C).

2.2 PIPE INSULATION JACKETS

A. Vapor Retarder Jacket:
   1. ASTM C921, white Kraft paper with glass fiber yarn, bonded to aluminized film.
   2. Water vapor transmission: ASTM E96/E96M; 0.02 perm-inches.

B. PVC Plastic Pipe Jacket:
   1. Product Description: ASTM D1785, One piece molded type fitting covers and sheet material, off-white color.
   2. Thickness: 10 mil (mm).
   3. Connections: Pressure sensitive color matching vinyl tape.

C. Field Applied Glass Fiber Fabric Jacket System:
   1. Insulating Cement/Mastic: ASTM C195; hydraulic setting on mineral wool.
   2. Glass Fiber Fabric:
      a. Cloth: Untreated; 9 oz/sq yd (305 g/sq m) weight.
      b. Blanket: 1.0 lb/cu ft (16 kg/cu m) density.

2.3 PIPE INSULATION ACCESSORIES

A. Vapor Retarder Lap Adhesive: Compatible with insulation.

B. Covering Adhesive Mastic: Compatible with insulation.

C. Piping 1-1/2 inches (40 mm) diameter and smaller: Galvanized steel insulation protection shield. MSS SP-69, Type 40. Length: Based on pipe size and insulation thickness.

D. Piping 2 inches (50 mm) diameter and larger: Wood insulation saddle, hard maple. Inserts length: not less than 6 inches (150 mm) long, matching thickness and contour of adjoining insulation.

E. Closed Cell Elastomeric Insulation Pipe Hanger: Polyurethane insert with [**aluminum**] [**stainless steel jacket**] single piece construction with self adhesive closure. Thickness to match pipe insulation.

F. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

G. Mineral Fiber Hydraulic-Setting Thermal Insulating and Finishing Cement: ASTM C449/C449M.

H. Insulating Cement: ASTM C195; hydraulic setting on mineral wool.

I. Adhesives: Compatible with insulation.

2.4 DUCTWORK INSULATION

A. TYPE D-1: ASTM C1290, Type III, flexible glass fiber, commercial grade with factory applied reinforced aluminum foil jacket meeting ASTM C1136, Type II.
   1. Thermal Conductivity: 0.27 at 75 degrees F (0.039 at 24 degrees C).
   2. Maximum Operating Temperature: 250 degrees F (121 degrees C).
   3. Density: 1.0 pound per cubic foot (16 kilogram per cubic meter).

B. TYPE D-2: ASTM C612, Type IA or IB, rigid glass fiber, with factory applied reinforced aluminum foil facing meeting ASTM C1136, Type II.
   1. Thermal Conductivity: 0.23 at 75 degrees F (0.033 at 24 degrees C).
   2. Density: 2.25 pound per cubic foot (36 kilogram per cubic meter).

C. TYPE D-8: Inorganic blanket encapsulated with scrim reinforced foil meeting UL 1978.
   1. Thermal Conductivity: 0.42 at 500 degrees F (0.060 at 260 degrees C).
   2. Weight: 1.4 pound per square foot (6.73 kilogram per square meter).
   3. Surface Burning Characteristics: Maximum 0/0 flame spread/smoke developed index when tested in accordance with ASTM E84.

2.5 DUCTWORK INSULATION JACKETS

A. Vapor Retarder Jacket:
   1. 0.0032 inch (0.081 mm) vinyl.
   2. Water vapor transmission: ASTM E96/E96M; [**0.02**] [**1.3**] perm.
   3. Secure with pressure sensitive tape.

B. Canvas Duct Jacket: UL listed, 6 oz/sq yd (220 g/sq m), plain weave cotton fabric with fire retardant lagging adhesive compatible with insulation.

2.6 DUCTWORK INSULATION ACCESSORIES

A. Vapor Retarder Tape:
   1. Kraft paper reinforced with glass fiber yarn and bonded to aluminized film, with pressure sensitive rubber based adhesive.

B. Vapor Retarder Lap Adhesive: Compatible with insulation.

C. Adhesive: Waterproof , ASTM E162 fire-retardant type.

D. Liner Fasteners: Galvanized steel, self-adhesive pad with press-on head.

E. Tie Wire: 0.048 inch (1.22 mm) stainless steel with twisted ends on maximum 12 inch (300 mm) centers.

F. Lagging Adhesive: Fire retardant type with maximum 25/450 flame spread/smoke developed index when tested in accordance with ASTM E84.

G. Impale Anchors: Galvanized steel, 12 gage self-adhesive pad.

H. Adhesives: Compatible with insulation.

I. Membrane Adhesives: As recommended by membrane manufacturer.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify piping, equipment and ductwork has been tested before applying insulation materials.

B. Verify surfaces are clean and dry, with foreign material removed.

3.2 INSTALLATION - PIPING SYSTEMS

A. Piping Exposed to View in Finished Spaces: Locate insulation and cover seams in least visible locations.

B. Continue insulation through penetrations of building assemblies or portions of assemblies having fire resistance rating of one hour or less. Provide intumescent firestopping when continuing insulation through assembly. Finish at supports, protrusions, and interruptions. Refer to Section 07 84 00 for penetrations of assemblies with fire resistance rating greater than one hour.

C. Piping Systems Conveying Fluids Below Ambient Temperature:
   1. Insulate entire system including fittings, valves, unions, flanges, strainers, flexible connections, pump bodies, and expansion joints.
   2. Furnish factory-applied or field-applied vapor retarder jackets. Secure factory-applied jackets with pressure sensitive adhesive self-sealing longitudinal laps and butt strips. Secure field-applied jackets with outward clinch expanding staples and seal staple penetrations with vapor retarder mastic.
   3. Insulate fittings, joints, and valves with molded insulation of like material and thickness as adjacent pipe. Finish with glass cloth and vapor retarder adhesive or PVC fitting covers.

D. Glass Fiber Board Insulation:
   1. Apply insulation close to equipment by grooving, scoring, and beveling insulation. Fasten insulation to equipment with studs, pins, clips, adhesive, wires, or bands.
   2. Fill joints, cracks, seams, and depressions with bedding compound to form smooth surface. On cold equipment, use vapor retarder cement.
   3. Cover wire mesh or bands with cement to a thickness to remove surface irregularities.

E. Hot Piping Systems greater than 140 degrees F (60 degrees C):
   1. Furnish factory-applied or field-applied standard jackets. Secure with outward clinch expanding staples or pressure sensitive adhesive system on standard factory-applied jacket and butt strips or both.
   2. Insulate fittings, joints, and valves with insulation of like material and thickness as adjoining pipe. Finish with glass cloth and adhesive or PVC fitting covers.
   3. Insulate flanges and unions at equipment.

F. Inserts and Shields:
   1. Piping 1-1/2 inches (40 mm) Diameter and Smaller: Install galvanized steel shield between pipe hanger and insulation.
   2. Piping 2 inches (50 mm) Diameter and Larger: Install insert between support shield and piping and under finish jacket.
      a. Insert Configuration: Minimum 6 inches (150 mm) long, of thickness and contour matching adjoining insulation; may be factory fabricated.
      b. Insert Material: Compression resistant insulating material suitable for planned temperature range and service.
   3. Piping Supported by Roller Type Pipe Hangers: Install galvanized steel shield between roller and inserts.

G. Insulation Terminating Points:
   1. Coil Branch Piping 1 inch (25 mm) and Smaller: Terminate hot water piping at union upstream of the coil control valve.
   2. Chilled Water Coil Branch Piping: Insulate chilled water piping and associated components up to coil connection.
   3. Condensate Piping: Insulate entire piping system and components to prevent condensation.

H. High Temperature Pipe Insulation:
   1. Install in multiple layers to meet thickness scheduled.
   2. Attach each layer with bands. Secure first layer with bands before installing next layer.
   3. Stagger joints between layers.
   4. Finish with canvas jacket .

I. Pipe Exposed in Mechanical Equipment Rooms or Finished Spaces (less than 10 feet (3 meters) above finished floor): Finish with PVC jacket and fitting covers .

J. Prepare pipe insulation for finish painting. Refer to Section 09 90 00.

3.3 INSTALLATION - DUCTWORK SYSTEMS

A. Duct dimensions indicated on Drawings are finished inside dimensions.

B. Insulated ductwork conveying air below ambient temperature:
   1. Provide insulation with vapor retarder jackets.
   2. Finish with tape and vapor retarder jacket.
   3. Continue insulation through walls, sleeves, hangers, and other duct penetrations.

4. Insulate entire system including fittings, joints, flanges, fire dampers, flexible connections, and expansion joints.

C. Insulated ductwork conveying air above ambient temperature:
1. Provide with or without standard vapor retarder jacket.
2. Insulate fittings and joints. Where service access is required, bevel and seal ends of insulation.

D. Ductwork Exposed in Mechanical Equipment Rooms or Finished Spaces (below 10 feet (3 meters) above finished floor): Finish with canvas jacket sized for finish painting .

E. External Glass Fiber Duct Insulation:
1. Secure insulation with vapor retarder with wires and seal jacket joints with vapor retarder adhesive or tape to match jacket.
2. Secure insulation without vapor retarder with staples, tape, or wires.
3. Install without sag on underside of ductwork. Use adhesive or mechanical fasteners where necessary to prevent sagging. Lift ductwork off trapeze hangers and insert spacers.
4. Seal vapor retarder penetrations by mechanical fasteners with vapor retarder adhesive.
5. Stop and point insulation around access doors and damper operators to allow operation without disturbing wrapping.

F. Kitchen Exhaust Ductwork:
1. Cover duct by wrapping with insulation using overlap method .
2. Overlap seams of each method by 3 inches (76 mm).
3. Attach insulation using steel banding or by welded pins and clips.
4. Install insulation without sag on underside of ductwork. Use additional fasteners to prevent sagging.

G. Prepare duct insulation for finish painting. Refer to Section 09 90 00.

3.4 SCHEDULES

A. Heating Services Piping Insulation Schedule:

PIPING SYSTEM	INSULATION TYPE	PIPE SIZE	INSULATION THICKNESS inches (mm)
Heating Water Supply and Return 141 to 200 degrees F (61 to 93 degrees C)	P-1	3 inches (76 mm) and smaller 4 inches (100 mm) and larger	1.0 (25) 1.5 (40)

B. Ductwork Insulation Schedule:

DUCTWORK SYSTEM	INSULATION TYPE	INSULATION THICKNESS inches (mm)
Outside Air Intake	D-2	1.5 (40)
Supply Ducts (externally insulated) Thickness indicated is installed thickness.	D-1	1.0 (25)
Return Ducts (externally insulated) Thickness indicated is installed thickness.	D-1	1.0 (25)
Kitchen Exhaust Duct (2 layers of 1-1/2 inch (40 mm) each)	D-8	3.0 (76)
Supply Air, Return Air, (exterior to building on roof)	D-2	2.0 (50)
Exhaust Ducts Within 10 feet (3 m) of Exterior Openings Thickness indicated is installed thickness.	D-1	1.0 (25)

END OF SECTION

SECTION 23 09 00 - INSTRUMENTATION AND CONTROL FOR HVAC

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Operator workstation.
2. Portable operator's terminal.
3. Control units.
4. Local area network.
5. Operating system software.
6. Control panel enclosures.
7. Receiver controllers.
8. Control valves.
9. Electric valve actuators.
10. Control air dampers.
11. Electric damper actuators.
12. Thermostats.
13. Differential pressure monitor.

B. Provide conduit and electrical wiring for complete system.

1.2 SUBMITTALS

A. Shop Drawings: Indicate operating data, system drawings, piping and wiring diagrams, and written detailed operational description of sequences.
1. Include trunk cable schematic showing programmable control unit locations and trunk data conductors.
2. List connected data points, including connected control unit and input device.
3. Include system graphics for monitored systems, indicating data (connected and calculated) point addresses, and operator notations.
4. Show system configuration with peripheral devices, batteries, power supplies, diagrams, modems, and interconnections.
5. Label with settings, adjustable range of control and limits. Include written description of control sequence.
6. Include flow diagrams for each control system, graphically depicting control logic.
7. Include description and sequence of operation of operating, user, and application software.
8. Submit schedule of valves indicating size, flow, and pressure drop for each valve.
9. For automatic dampers indicate arrangement, velocities, and static pressure drops for each system.

B. Product Data: Submit description and engineering data for each control system component. Include sizing. Submit data for each system component and software module.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls including thermostats and humidistats remotely located from equipment in pipes ducts and walls.

B. Operation and Maintenance Data: Submit:
1. Systems descriptions, set points, and controls settings and adjustments.
2. Inspection period, cleaning methods, recommended cleaning materials, and calibration tolerances.
3. Interconnection wiring diagrams complete field installed systems with identified and numbered system components and devices.
4. Keyboard illustrations and step-by-step procedures indexed for each operator function.

1.4 MAINTENANCE SERVICE

A. Furnish manufacturer's maintenance services on control system for _2 year from Date of Substantial Completion.

B. Furnish complete service of controls systems, including callbacks. Make minimum of ____4____ complete normal inspections of approximately _4___ hours duration in addition to normal service calls to inspect, calibrate, and adjust controls. Submit written report after each inspection.

PART 2 PRODUCTS

2.1 DIRECT DIGITAL CONTROLS

A. Manufacturers:
1. Andover Continuum, Schneider Electric.
2. Honeywell, Building Control Solutions.
3. Johnson Controls, Inc.
4. Substitutions: Not Permitted.

2.2 OPERATOR WORKSTATION

A. Furnish each operator workstation consisting of the following:

B. Personal Computer: IBM PC compatible with sufficient memory and hard drive storage to support graphics, reports, and communication requirements. Furnish with the following minimum configuration requirements:
1. Processor: Pentium 4 with HT Technology, 3.2 GHz.
2. Hard Drive: 500 Gigabyte.
3. Memory: 4 Gigabyte DDR SDRAM.
4. Drive 1: 48x CD Burner, DVD combination .
5. Ports: Required serial, parallel, network communications, USB, and cables for proper system operation.
6. Expansion Slots: 1 used for LAN card, 1 available.

7. LAN Card: Ethernet - RJ45 (100 base-T minimum).
8. Mouse: two-button optical type .
9. Keyboard: 104 key.

C. Monitor: Minimum of [17 inch (432 mm) **color, flat panel display**.

D. Operating System: Windows <**8**>.

E. System Support: Minimum ten (10) work stations connected to multi-user, multi-tasking environment with concurrent capability to:
1. Access DDC network.
2. Access or control same control unit.
3. Access or modify same control unit database.
4. Archive data, alarms, and network actions to hard disk regardless of what application programs are being currently executed.
5. Develop and edit database.
6. Implement and tune DDC control.
7. Develop graphics.
8. Control facility.

2.3 PORTABLE OPERATOR'S TERMINAL

A. Furnish device capable of accessing system data and capable of being connected to any point on system network or connected directly to any controller for programming, set-up, and troubleshooting. Portable Operators Terminal uses Read (Initiate) and Write (Execute) Services as defined in Clauses 15.5 and 15.8, respectively, of ASHRAE Standard 135, to communicate with BACnet objects in internetwork. Objects supported include: Analog input, analog output, analog value, binary input, binary output, binary value, device.

B. System Support: Minimum ten (10) work stations connected to multi-user, multi-tasking environment with concurrent capability to access DDC network, develop and edit database, and control facility.

2.4 CONTROL UNITS

A. Units: Modular in design and consisting of processor board with programmable RAM memory, local operator access and display panel, and integral interface equipment.

B. Battery Backup: For minimum of 48 hours for complete system including RAM without interruption, with automatic battery charger.

C. Control Units Functions:
1. Monitor or control each input/output point.
2. Independent with hardware clock/calendar and software to maintain control independently.
3. Acquire, process, and transfer information to operator station or other control units on network.

4. Accept, process, and execute commands from other control unit's or devices or operator stations.
5. Access both database and control functions simultaneously.
6. Record, evaluate, and report changes of state or value occurring among associated points. Unit continues to perform associated control functions regardless of status of network.

D. Input/output Capability:
1. Discrete/digital input (contact status).
2. Discrete/digital output.
3. Analog input.
4. Analog output.
5. Pulse input (5 pulses/second).
6. Pulse output (0-655 seconds in duration with 0.01 second resolution).

E. Test Mode Operation: Place input/output points in test mode to allow testing and developing of control algorithms on line without disrupting field hardware and controlled environment.

2.5 LOCAL AREA NETWORKS (LAN):

A. Provide communication between control units over local area network (LAN).

B. LAN Capacity: Not less than 60 stations or nodes.

C. Transmission Media: Fiber optic or single pair of solid 24 gauge twisted, shielded copper cable.

D. Network Support: Time for global point to be received by any station, less than 3 seconds. Furnish automatic reconfiguration when station is added or lost. When transmission cable is cut, reconfigure two sections with no disruption to system's operation, without operator intervention.

2.6 OPERATING SYSTEM SOFTWARE

A. Input/output Capability From Operator Station: Display current values or status, command equipment, initiate logs and reports, add, delete, or change points or descriptors, develop or modify color graphic displays, automatically archive select data.
1. Operator System Access: Via software password with minimum 30 access levels at work station and minimum 3 access levels at each control unit.
2. Data Base Creation and Support: Use standard procedures. Control unit automatically checks workstation data base files upon connection and verify data base match.
3. Dynamic Color Graphic Displays:
   a. Uses custom symbols or system supported library of symbols.
   b. Sixteen (16) colors.
   c. Sixty (60) outputs of dynamic data for each graphic.
   d. 1,000 separate graphic pages.
4. Alarm Processing:
   a. Off normal condition: Cause alarm and appropriate message.
   b. Critical alarm or change-of-state: Display message, stored on disk for review and sort, or print.

c. Display alarm reports on video.
d. Allow unique routing of specific alarms.
e. Operator specifies when alarm requires acknowledgment.

5. Automatic Restart: Automatically restart field equipment on restoration of power. Furnish time delay between individual equipment restart and time of day start/stop.
6. Maintenance Management: Run time monitoring and maintenance scheduling targets with scheduling.

2.7 LOAD CONTROL PROGRAMS

A. General: Support inch-pounds and S.I. metric units of measurement.

B. Duty Cycling: Periodically stops and starts loads, based on space temperature, and according to various On/Off patterns.

C. Automatic Time Scheduling: Automatic start/stop/scheduling of building loads.

D. Start/Stop Time Optimization: Perform optimized start/stop as function of outside conditions, inside conditions, or both.

E. Night Setback/Setup Program: Reduce heating space temperature setpoint or raise cooling space temperature setpoint during unoccupied hours; in conjunction with scheduled start/stop and optimum start/stop programs.

2.8 HVAC CONTROL PROGRAMS

A. General: Support inch-pounds and S.I. metric units of measurement.

B. Optimal run time.

C. Supply air reset.

D. Enthalpy switchover.

2.9 CONTROL PANEL ENCLOSURES

A. Furnish for each system under automatic control with relays and controls mounted in cabinet and temperature indicators, pressure gages, pilot lights, push buttons and switches flush on cabinet panel face.

B. Construction: NEMA 250, Type 3 steel [**plastic**] enclosure.

C. Covers: Continuous hinge, held closed by flush latch operable by hasp and staple for padlock.

D. Enclosure Finish: Manufacturer's standard enamel <_____>.

2.10 CONTROL VALVES

A. Ball Valves:
   1. Threaded ends for 2-way valves 3 inches (76 mm) and smaller. Threaded ends for 3-way valves 2 inches (50 mm) and smaller.
   2. Forged brass body, chrome plated brass ball and blowout proof stem and EPDM O-rings with minimum 600 psig (4135 kPa) rating.
   3. Fluid Temperature Range: minus 20 to 250 degrees F (minus 29 to 121 degrees C).
   4. Sizing: 3 psig (20 kPa) maximum pressure drop at design flow rate.
   5. Flow Characteristics: Furnish 2-way valves with equal percentage characteristics. Furnish 3-way valves with equal percentage characteristic through control port and linear characteristic through bypass port.
   6. Size 2-way valve actuators to close valves against pump shut off head.

2.11 ELECTRIC VALVE ACTUATORS

A. Fully factory assembled. Size to operate with sufficient reserve power to provide smooth modulating action or two-position action under every condition.

B. Motor: Permanent split-capacitor or shaded-pole type. Gear trains completely oil immersed and sealed. Furnish spring-return motors with integral spiral-spring mechanism in housings designed for easy removal for service or adjustment of limit switches, auxiliary switches, or feedback potentiometer.

C. Actuator: Direct-coupled type non-hydraulic designed for minimum 100,000 full-stroke cycles at rated torque. Furnish actuator with rating of not less than twice thrust needed for actual operation of valve.
   1. Coupling: V-bolt and V-shaped, toothed cradle.
   2. Overload Protection: Electronic overload or digital rotation-sensing circuitry.
   3. Fail-Safe Operation: Mechanical, spring-return mechanism. Furnish external, manual gear release on non-spring-return actuators.
   4. Furnish spring-return actuators with manual override. Complete manual override to take no more than 10 turns.
   5. Power Requirements:
      a. Two-Position Spring Return: 24 volt AC or DC, maximum 10 vA.
      b. Modulating: 24 volt AC, maximum 15 vA.
   6. Proportional Signal: 2 to 10 volt dc or 4 to 20 mA, and 2 to 10 volt dc position feedback signal.
   7. Temperature Rating: minus 22 to 140 degrees F (minus 30 to 60 degrees C).
   8. Run Time: 200 seconds open, 40 seconds closed.

D. Size for torque required for valve close-off at maximum pump differential pressure, regardless of water loop system pressures.

2.12 CONTROL AIR DAMPERS

A. Frames: Stainless steel, welded or riveted with corner reinforcement, minimum 12 gage (2.7 mm) .

B. Blades: , maximum blade size 6 inches (150 mm) wide, 48 inches (1200 mm) long, minimum 22 gage (0.85 mm) , attached to minimum 1/2 inch (13 mm) shafts with set screws.

C. Blade Seals: Synthetic elastomeric mechanically attached, field replaceable.

D. Jamb Seals: Stainless steel spring.

E. Shaft Bearings: Lubricant free, stainless steel, single row, ground, flanged, radial, anti-friction type with extended inner race.

F. Linkage Bearings: Graphite impregnated nylon.

G. Damper Leakage: Maximum 2 percent at 4 inch wg (1 kPa) differential pressure when sized for 2000 fpm (10 m/s) face velocity.

****** [OR] ******

H. Maximum Pressure Differential: 6 inches wg (1.5 kPa).

I. Temperature Limits: - 40 to 200 degrees F (-40 to 93 degrees C).

2.13 ELECTRIC DAMPER ACTUATORS

A. Operation: Reversing type proportional motor, .

B. Enclosure Rating: NEMA 250 Type 3 .

C. Mounting: Direct mount.

D. Stroke: 90 seconds end to end full stroke, 15 seconds return to normal for spring return.

E. Protection: Electronic stall protection.

F. Control Input: 0-10 VDC or 0-20 mA DC.

G. Power: Nominal 24 volt AC.

H. Torque: Size for minimum 150 percent of required duty.

I. Duty cycle: rated for 65,000 cycles.

J. Accessories:

1. Cover mounted transformer.
2. Auxiliary potentiometer.
3. Damper linkage.
4. Direct drive feedback potentiometer.
5. Output position feedback.
6. Field selectable rotational, spring return direction, field adjustable zero and span.
7. End switch.

2.14 THERMOSTATS

A. Electric Room Thermostats:
1. Type: NEMA DC 3, 24 volts , with setback/setup temperature control.
2. Service: cooling and heating .
3. Covers: Locking with concealed setpoint, .

B. Line Voltage Thermostats:
1. Integral manual On/Off/Auto selector switch, single or two-pole.
2. Dead band: Maximum 2 degrees F (one degree C).
3. Cover: Locking with set point adjustment setpoint indication , .
4. Load Motor capacity rating.

C. Electric High Limit Duct Thermostat:
1. Snap acting, single pole, single throw, automatic reset switch tripping when temperature sensed across any 12 inches (300 mm) of bulb length is equal to or above set point.
2. Bulb length: Minimum 20 feet (6 m) .
3. Furnish one thermostat for every 20 sq. ft (1.86 sq m) of coil surface.

D. Fire Thermostats:
1. UL labeled, factory set in accordance with NFPA 90A.
2. Normally closed contacts, manual reset.

2.15 DIRECT DIGITAL CONTROL SYSTEM COMPONENTS

A. Temperature Sensors:
1. Type: Resistance temperature detector (RTD) or thermistor.
2. Accuracy:
   a. Plus or minus 1 degree F for standard applications. Where high accuracy is required, furnish accuracy of plus or minus 0.2 degrees F.
   b. Sensing Accuracy: Plus or minus 0.5 degree F.
   c. Display Accuracy and Resolution: Minimum of plus or minus 1 degree F.
3. Built-in communications port.
4. Space Sensors: Digital with LCD display, day-night override button, and set point slide adjustment override options. Set point slide adjustment capable of being software limited by automation system to limit amount of room adjustment.
5. Outside Air Sensors: Watertight inlet fitting, furnish with shield from direct sunlight.
6. Duct Temperature Sensors:

a. Rigid or averaging type as indicated in sequence of operations. Averaging sensor minimum length: 5 feet (1.5 meters) in length.
b. Duct Cross Sections Greater Than 10 square feet (0.9 square meters): Furnish serpentine averaging element to sense stratified air temperatures.

7. Piping Temperature Sensors: Furnish with separable brass well.

B. Humidity Sensors:
1. Type: Capacitance or bulk polymer resistance.
2. Drift: Not to exceed 3 percent of full scale per year.
3. Room Sensors:
   a. Sensing Range: 20 to 80 percent.
   b. Accuracy of plus or minus 5 percent relative humidity.
4. Duct Sensors:
   a. Sensing Range: 20 to 80 percent.
   b. Accuracy of plus or minus 5 percent relative humidity.
   c. Furnish with sampling chamber.
   d. Element guard.
   e. Mounting plate.
5. Outdoor Air Humidity Sensors:
   a. Sensing Range: 20 to 95 percent relative humidity.
   b. Suitable for ambient conditions of minus 40 to 170 degrees F (minus 40 to 77 degrees C).
   c. Accuracy: Plus or minus 2 percent relative humidity at 77 degrees F (25 degrees C).
   d. Element guard.
   e. Mounting plate.

C. Differential Pressure Switches:
1. Furnish as specified in sequences of operation for status purposes in air and water applications.
2. Fully adjustable differential pressure settings.
3. UL Listed, SPDT snap-acting, pilot duty rated (125 VA minimum).
4. NEMA 250 Type 1 enclosure.
5. Scale range and differential suitable for intended application.

D. Static Pressure Sensor:
1. Non-directional sensor with suitable range for expected input, and temperature compensated.
2. Accuracy: plus or minus 1 percent of full scale with repeatability of 0.5 percent.
3. Output: 4 to 20 mA, 0-5 vDC, 0-10 vDC.
4. Building Static Pressure Range: minus 0.1 to 0.1 inches water column (minus 25 to 25 Pa), minus 0.25 to 0.25 inches water column (minus 60 to 60 Pa), minus 0.5 to 0.5 inches water column (minus 125 to 125 Pa), minus 1.0 to 1.0 inches water column (minus 250 to 250 Pa), jumper selectable.
5. Duct Static Pressure Range: 0 to 1 inches water column (0 to 250 Pa), 0 to 2.5 inches water column (0 to 620 Pa), 0 to 5 inches water column (0 to 1,245 Pa), 0 to 10 inches water column (0 to 2,490 Pa), jumper adjustable.

E. Static Pressure Sensors:

1. Differential pressure type.
2. Sensor range closely matched to system static pressure, minus 0.5 to 0.5 inches water column (minus 125 to 125 Pa), minus 1 to 1 inches water column (minus 250 to 250 Pa) or 0 to 2.5 inches water column (0 to 620 Pa).
3. Accuracy: Plus or minus 5 percent of sensing range.

F. Carbon Dioxide Sensors:
1. Sensors designed for indoor carbon dioxide levels in accordance with ASHRAE Standard 62.
2. 4 to 20 ma. linear output over range of 0 to 2000 ppm (0 to 2000 mg/kg) of carbon dioxide for interface to DDC control system.
3. For duct mounted sensors furnish air tight enclosure complete with sampling tube.

G. Air Flow Switches:
1. Paddle or differential pressure type, as indicated in sequences of operation.
2. UL Listed, SPDT snap-acting with pilot duty rating (125 VA minimum).
3. Appropriate scale range and differential adjustment.
4. Adjustable sensitivity.
5. NEMA 250 Type [**1**] <_____> enclosure.

H. Carbon Dioxide Sensor and Transmitter: Single detectors, using solid-state infrared sensors, suitable over a temperature range of 23 to 130 degrees F (minus 5 to 54 degrees C), calibrated for 0 to 2 percent, with continuous or averaged reading, 4 to 20 mA output, and wall mounted.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify conditioned power supply is available to panels and to operator workstation.

B. Verify field end devices, wiring, and pneumatic tubing is installed prior to installation proceeding.

C. Coordinate installation of system components with installation of mechanical systems equipment including air handling units, and air terminal units.

3.2 INSTALLATION

A. Install control units and other hardware in position on permanent walls where not subject to excessive vibration.

B. Install software in control units and in operator workstation. Implement features of programs to specified requirements and appropriate to sequence of operation.

C. Install thermostats, humidistats, space temperature sensors, and other exposed control sensors after locations are coordinated with other Work.

D. Install freeze protection thermostats using flanges and element holders.

E. Install outdoor reset thermostats and outdoor sensors indoors, with sensing elements outdoors with sun shield.

F. Provide separable sockets for liquids and flanges for air bulb elements. Refer to Section 23 20 00.

G. Install valves with position indicators and with pilot positioners where sequenced with other controls.

H. Install isolation (two-position) dampers of parallel blade construction.

I. Install control panels adjacent to associated equipment on vibration free walls or freestanding supports. Install engraved plastic nameplates for instruments and control components inside cabinets and engraved plastic nameplates on each cabinet face. Label with appropriate equipment or system designation.

J. Install "hand/off/auto" selector switches to override automatic interlock controls when switch is in "hand" position.

****** [OR] ******

3.3 FIELD QUALITY CONTROL

A. Start and commission systems. Allow adequate time for start-up and commissioning prior to placing control systems in permanent operation.

B. Furnish service technician employed by system installer to instruct Owner's representative in operation of systems plant and equipment for 1 day period.

C. After completion of installation, test and adjust control equipment. Submit data showing set points and final adjustments of controls.

3.4 DEMONSTRATION AND TRAINING

A. Furnish basic operator training for <_____> persons on data display, alarm and status descriptors, requesting data, execution commands and log requests. Include a minimum of 4 hours instructor time.

B. Demonstrate complete operation of systems, including sequence of operation prior to Date of Substantial Completion.

C. Demonstrate complete and operating system to Owner.

END OF SECTION

SECTION 23 09 93 - SEQUENCE OF OPERATIONS FOR HVAC CONTROLS

PART 1 GENERAL

1.1 SUMMARY

A. Section includes sequence of operation for:
   1. Cabinet Heaters.
   2. Central fan systems.
   3. Fan coil units.
   4. Radiation
   5. Convectors.
   6. Unit heaters.

1.2 SUBMITTALS

A. Shop Drawings: Indicate mechanical system controlled and control system components.
   1. Label with settings, adjustable range of control and limits. Submit written description of control sequence.
   2. Submit flow diagrams for each control system, graphically depicting control logic.
   3. Submit draft copies of graphic displays indicating mechanical system components, control system components, and controlled function status and value.
   4. Coordinate submittals with information requested in Section [23 09 00]].

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of components and set points of controls, including changes to sequences made after submission of shop drawings.

PART 2 PRODUCTS

Not Used.

PART 3 EXECUTION

3.1 CENTRAL FAN SYSTEM: AuRTU-2

A. Unoccupied Mode Heating: Operate heating zone control valve sequences to provide 55 degree F (adjustable) set point (Stage, Auditorium Seating Space, and Auditorium North Lobby). If heating zone cannot maintain set point, activate AuRTU-2 to provide additional heat to maintain set point. Set dampers at Minimum Fresh Air Intake (FAI) (*intended to pressurize building)*. Cycle over heated zones off as the zone with the greatest heat demand requires heat from the AuRTU-2.

B. Unoccupied Mode Heating Warm-up: Operate heating zone control valve sequences to provide 65degree F (adjustable) set point (Stage, Autorium Seating Space, and Auditorium North Lobby).

If heating zone cannot maintain set point, activate AuRTU-2 to provide additional heat to maintain set point. Set dampers at Minimum Fresh Air Intake (FAI). Cycle over heated zones off as the zone with the greatest heat demand requires heat from the AuRTU-2.

C. Occupied Mode Heating: Operaate AuRTU-2 continuously. Set dampers for minimum FAI. Operate heating zone control valve sequences to provide 68 degree F (adjustable) set point (Stage, Autorium Seating Space, and Auditorium North Lobby). If heating zone valves cannot maintain set point, modulate gas heating section to maintain set point. Override (FAI) to provide ventilation as required controlling maximum CO2. Override Cycle over heated zones off as the zone with the greatest heat demand requires heat from AuRTU-2.

D. Unoccupied Mode Cooling: Cycle AuRTU-2 and provide full cooling capacity to until temperature is below 85 degrees F (adjustable) set point in the Auditorium seating space. Set dampers at Minimum Fresh Air Intake (FAI).

E. Occupied Mode, Cool Down: Activate AuRTU-2 to run continuously. Operate cooling stages to maintain 65 degrees F (adjustable) set point in the Auditorium seating space. Set dampers at Minimum Fresh Air Intake (FAI).

F. Occupied Mode, Cooling: Continue to run AuRTU-2 continously and stage cooling to maintain 68 degrees F (adjustable) set point in the Auditorium seating space. Set dampers at Minimum Fresh Air Intake (FAI). Override (FAI) to provide ventilation as required controlling maximum CO2 up to ventilation FAI as indicated on the drawings. Override CO2 control to minimum FAI if required to maintain temperature set point.

G. Fan Operation: Start and stop supply and return fans. Determine fan status by current sensing devices. When fan fails to start as commanded, signal alarm.

H. Safety Devices:
   1. High Temperature Protection: Stop fans and close outside dampers when temperature in return air is above 300 degrees F (150 degrees C); signal alarm.

I. 1.Outside, Return, and Relief (Spill) Dampers:
   1. When supply fan (return fan runs when supply fan is running) is not running, outside and relief dampers are closed and return damper is open.
   2. When supply fan is running, dampers are controlled and operate with outside and relief dampers opening, and return damper closing to control space CO2 level Maximum Fresh Air Intake (FAI) as indicated on the drawings.
   3. For cooling and outside air temperatures below 55 degrees F (12 degrees C), modulate dampers in sequence with DX cooling stages to maintain adjustable zone temperature set point.
   4. For cooling and outside air temperatures above 55 degrees F (12 degrees C) compare return and outside air temperatures . When return air temperature is lower, drive outside damper to minimum, close relief damper, and open return damper.
   5. For outside air temperatures above 79 degrees F (26 degrees C), drive outside damper to minimum, close relief damper, and open return damper.
   6. For heating, drive outside damper to minimum, close relief damper, and open return damper.
   7. In heating or cooling modes, during occupied mode, override minimum positions to control maximum CO2 levels, with maximum FAI as indicated on the drawings.

J. Display:
   1. System graphic.
   2. System ON-OFF indication.
   3. System OCCUPIED – UNOCCUPIED-WARMUP-COOLDOWN mode.
   4. Supply fan ON-OFF indication.
   5. Return fan ON-OFF indication.
   6. Zone Heating Control Valve OPEN – CLOSED Command Status
   7. Gas heatingsection status indication.
   8. Coling Stages (4) ON-OFF indication.
   9. Outside air temperature indication.
   10. Mixed air temperature indication.
   11. System discharge air temperature indication.
   12. Zone air temperature indications.
   13. Return humidity indication.
   14. Fan discharge temperature control point adjustment.
   15. Zone (Auditorium Seating Space) control point adjustment.

3.2 FAN COIL UNITS

A. Auditorium Seating Space: Cycle zone control valve, open and closed, from Building Automation System (BAS) to maintain heating set point as required by Unoccupied, Warm-up, or Occupied modes. Sequence with AuRTU-2 as described for that unit. Single-temperature thermostat on return heating water line energizes unit on temperatures above 100 degrees F (35 degrees C)

B. Auditorium Lobby Space, North: Cycle master zone control valve, open and closed, from Building Automation System (BAS) to enable heating. Cycle Fan Coil Unit Fans on or off to maintain temperature set point, 55 degree F unoccupied (adjustable) and 68 degree F (adjustable) occupied. Provide separate zone control for second and third floors. Single-temperature thermostat on return heating water line de-energizes unit on temperatures below 95 degrees F (35 degrees C) .

C.

3.3 RADIATION AND CONVECTORS

A. Cycle master zone control valve, open and closed, from Building Automation System (BAS) to maintain temperature set point, 50 degree F unoccupied (adjustable) and 68 degree F (adjustable) occupied.

B. If master controle valve is open, cycle slave zone control valve, open and closed, from Building Automation System (BAS) to maintain temperature set point, 55 degree F unoccupied (adjustable) and 68 degree F (adjustable) occupied.

3.4 UNIT HEATERS

A. Control valve is cycled, open and closed, by Building Automation System (BAS) to maintain 68 degrees F (adjustable).

B. Single-temperature thermostat on return heating water line de-energizes unit on temperatures below 95 degrees F (35 degrees C) .

C. Cycle zone control valve, open and closed, from Building Automation System (BAS) to maintain heating set point as required by Unoccupied, or Occupied modes. Single-temperature thermostat on return heating water line energizes unit on temperatures above 100 degrees F (35 degrees C)

D. Auditorium Plenum Space, First Floor Single-temperature room thermostat set at 55 degrees F (20 degrees C) (adjustable) maintains constant space temperature by cycling unit fan motor. Single-temperature thermostat on return heating water line energizes unit on temperatures above 100 degrees F (35 degrees C) . .

END OF SECTION

SECTION 23 11 23 - FACILITY NATURAL-GAS PIPING

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Natural gas piping above grade.
   2. Unions and flanges.
   3. Valves.
   4. Strainers.
   5. Natural gas pressure regulators.

1.2 SYSTEM DESCRIPTION

A. Where more than one piping system material is specified, provide compatible system components and joints. Use non-conducting dielectric connections when joining dissimilar metals in systems.

B. Provide flanges, unions, or couplings at locations requiring servicing. Use unions, flanges, or couplings downstream of valves and at equipment connections. Do not use direct welded or threaded connections to valves, equipment.

C. Use plug, or ball, valves for shut-off and to isolate equipment, part of systems, or vertical risers.

1.3 SUBMITTALS

A. Product Data:
   1. Piping: Data on pipe materials, fittings, and accessories. Submit manufacturers catalog information.
   2. Valves: Manufacturers catalog information with valve data and ratings for each service.
   3. Piping Specialties: Manufacturers catalog information including capacity, rough-in requirements, and service sizes for following:
      a. Strainers.
      b. Natural gas pressure regulators.

B. Welders Certificates: AWS certified within previous 12 months.

1.4 QUALITY ASSURANCE

A. Perform natural gas Work according to NFPA 54.

B. Perform Work according to applicable code Code and local gas company requirements.

C. Perform Work according to ASME B31.9 code for installation of piping systems and ASME Section IX for welding materials and procedures.

D. Furnish shutoff valves complying with ASME B16.33 or ANSI Z21.15.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Furnish temporary protective coating on cast iron and steel valves.

1.6 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 NATURAL GAS PIPING, ABOVE GRADE

A. Steel Pipe: ASTM A53/A53M Schedule 40 black.
   1. Fittings: ASME B16.3, malleable iron, or ASTM A234/A234M forged steel welding type.
   2. Joints: Threaded for pipe 2 inch (50 mm) and smaller; welded for pipe 2-1/2 inches (65 mm) and larger.

2.2 UNIONS AND FLANGES

A. Unions for Pipe 2 inches (50 mm) and Smaller:
   1. Ferrous Piping: Class 150, malleable iron, threaded.
   2. Dielectric Connections: Union with galvanized or plated steel threaded end, copper solder end, water impervious isolation barrier.

B. Flanges for Pipe 2-1/2 inches (65 mm) and Larger:
   1. Ferrous Piping: Class 150, forged steel, slip-on flanges.
   2. Gaskets: 1/16 inch (1.6 mm) thick preformed neoprene gaskets.

2.3 BALL VALVES

A. 1/4 inch (6 mm) to 1 inch (25 mm): MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, full port.

B. 1-1/4 inch (32 mm) to 3 inch (76 mm): MSS SP 110, Class 125, two piece, threaded ends, bronze body, chrome plated bronze ball, reinforced teflon seats, blow-out proof stem, lever handle, UL 842 listed for flammable liquids and LPG, conventional port.

2.4 PLUG VALVES

A. 2 inches (50 mm) and Smaller: MSS SP 78, Class 150 , construction, round port, full pipe area , pressure lubricated, teflon packing, threaded ends. Furnish one plug valve wrench for every ten plug-valves with minimum of one wrench.

B. 2-1/2 inches (65 mm) and Larger: MSS SP 78, Class 150 , construction, port, full pipe area , pressure lubricated, teflon packing, flanged ends. Furnish worm gear-operated.

2.5 STRAINERS

A. 2 inch (50 mm) and Smaller: Screwed brass or iron body for 175 psig (1200 kPa) working pressure, Y pattern with 1/32 inch (0.8 mm) stainless steel perforated screen.

B. 2-1/2 inch (65 mm) to 4 inch (100 mm): Flanged iron body for 175 psig (1200 kPa) working pressure, Y pattern with 3/64 inch (1.2 mm) stainless steel perforated screen.

C. 5 inch (125 mm) and Larger: Flanged iron body for 175 psig (1200 kPa) working pressure, basket pattern with 1/8 inch (3.2 mm) stainless steel perforated screen.

2.6 NATURAL GAS PRESSURE REGULATORS

A. Product Description: Spring loaded, general purpose, self-operating service regulator including internal relief type diaphragm assembly and vent valve. Diaphragm case can be rotated 360 degrees in relation to body.
   1. Comply with ANSI Z21.80.
   2. Temperatures: minus 20 degrees F (29 degrees C) to 150 degrees F (66 degrees C).
   3. Body: Steel.
   4. Spring case, lower diaphragm casing, union ring, seat ring and disk holder: Aluminum.
   5. Disk, diaphragm, and O-ring: Nitrile .
   6. Maximum inlet pressure: 150 psig (1030 kPa).

PART 3 EXECUTION

3.1 PREPARATION

A. Prepare piping connections to equipment with flanges or unions.

3.2 INSTALLATION

A. Aboveground Piping Systems:
   1. Install natural gas piping according to NFPA 54.
   2. Provide non-conducting dielectric connections wherever jointing dissimilar metals.
   3. Route piping in orderly manner and maintain gradient.
   4. Where required, bend pipe with pipe bending tools according to procedures intended for that purpose.
   5. Install piping to conserve building space and not interfere with use of space.
   6. Size and install gas piping to provide sufficient gas to supply maximum appliance demand at pressure higher than appliance minimum inlet pressure.
   7. Group piping whenever practical at common elevations.
   8. Install piping to allow for expansion and contraction without stressing pipe, joints, or connected equipment.

9. Sleeve pipe passing through partitions, walls and floors. Refer to Section 23 05 29.
10. Provide clearance for installation of insulation and access to valves and fittings.
11. Install valves with stems upright or horizontal, not inverted.
12. Protect piping systems from entry of foreign materials by temporary covers, completing Sections of Work, and isolating parts of completed system.
13. Install medium pressure gas pressure regulator with tee fitting between regulator and upstream shutoff valve. Cap or plug one opening of tee fitting.

3.3 FIELD QUALITY CONTROL

A. Where gas appliance will be damaged by test pressure, disconnect appliance and cap piping during pressure test. Reconnect appliance after pressure test and leak test connection.

B. Where gas appliance is designed for operating pressures equal to or greater than piping test pressure, provide gas valve to isolate appliance or equipment from gas test pressure.

C. Pressure-test natural gas piping according to NFPA 54.

D. Inspect, test and purge gas piping according to applicable code and local gas company requirements.

E. Where new branch piping is extended from existing system, pressure-test new branch piping only. Leak-test joint between new and existing piping with noncorrosive leak detection fluid or other approved method.

F. When pressure tests do not meet specified requirements, remove defective Work, replace and retest.

G. Immediately after gas is applied to a new system, or a system has been restored after gas service interruption, check pipe for leakage.
   1. Where leakage is detected, shut off gas supply until necessary repairs are complete.

H. Do not place appliances in service until leak testing and repairs are complete.

END OF SECTION

SECTION 23 31 00 - HVAC DUCTS AND CASINGS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Duct Materials.
2. Flexible ducts.
3. Insulated flexible ducts.
4. Single wall spiral round ducts.
5. Single wall spiral flat oval ducts.
6. Double wall spiral insulated round ducts.
7. Double wall spiral insulated flat oval ducts.
8. Ductwork fabrication.
9. Kitchen hood exhaust ductwork fabrication.

1.2 PERFORMANCE REQUIREMENTS

A. Variation of duct configuration or sizes other than those of equivalent or lower loss coefficient is not permitted except by written permission. Size round ducts installed in place of rectangular ducts according to ASHRAE table of equivalent rectangular and round ducts.

1.3 SUBMITTALS

A. Shop Drawings (for AuRTU-2): Duct fabrication drawings, drawn to scale not smaller than 1/4 inch equals 1 foot, on drawing sheets same size as Contract Documents, indicating:
1. Fabrication at AuRTU-2, including plans, elevations and attachments to other Work.
2. Reinforcing details and spacing.
3. Seam and joint construction details.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of ducts and duct fittings. Record changes in fitting location and type. Show additional fittings used.

1.5 QUALITY ASSURANCE

A. Perform Work according to SMACNA - HVAC Duct Construction Standards - Metal and flexible.

B. Construct ductwork to NFPA 90A and NFPA 96 standards.

C. Installer: Company specializing in performing Work of this Section with three years' experience .

1.6 ENVIRONMENTAL REQUIREMENTS

A. Do not install duct sealant when temperatures are less than those recommended by sealant manufacturers.

B. Maintain temperatures during and after installation of duct sealant.

1.7 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

PART 2 PRODUCTS

2.1 DUCT MATERIALS

A. Galvanized Steel Ducts: ASTM A653/A653M galvanized steel sheet, lock-forming quality, having G60 ( ) zinc coating of in conformance with ASTM A90/A90M.

B. Fasteners: Rivets, bolts, or sheet metal screws.

C. Hanger Rod: ASTM A36/A36M; steel, galvanized; threaded both ends, threaded one end, or continuously threaded.

2.2 DUCTS

A. Flexible Ducts:
1. Product Description: UL labeled multiple layers of aluminum laminate supported by helical wound spring steel wire.
a. Pressure Rating: 10 inches w.g. (2.5 kPa) positive and 1.0 inches (250 Pa) negative.
b. Maximum Velocity: 4,000 fpm (20.3 m/s).
c. Temperature Range: Minus 20 degrees F to plus 210 degrees F (minus 28 degrees C to plus 99 degrees C).

B. Insulated Flexible Ducts:
1. Product Description: Multiple layers of aluminum laminate supported by helical wound spring steel wire; fiberglass insulation; aluminized vapor barrier film.
a. Pressure Rating: 10 inches w.g. (2.5 kPa) positive and 1.0 inches (250 Pa) negative.
b. Maximum Velocity: 4,000 fpm (20.3 m/s).
c. Temperature Range: Minus 20 degrees F to plus 210 degrees F (minus 28 degrees C to plus 99 degrees C).
d. Thermal Resistance: 4.2 sq ft-hr-degree F per BTU (0.7 sq m- K per Watt) .

****** [OR] ******

C. Single Wall Spiral Round Ducts:
1. Product Description: UL 181, Class 1, round spiral lockseam duct constructed of galvanized steel.

2. Duct Coating: Polyvinyl chloride plastic, 4 mil (0.1 mm) thick on both sides. Temperature range: Minus 30 degrees F (minus 34 degrees C) to plus 200 degrees F (93 degrees C).
3. Construct duct with following minimum gages:

Diameter	Gage
3 inches to 14 inches	26
15 inches to 26 inches	24
28 inches to 36 inches	22
38 inches to 50 inches	20
52 inches to 84 inches	18

4. Construct fittings with following minimum gages:

Diameter	Gage
3 inches to 14 inches	24
15 inches to 26 inches	22
28 inches to 36 inches	20
38 inches to 50 inches	20
52 inches to 60 inches	18
62 inches to 84 inches	16

D. Single Wall Spiral Flat Oval Ducts:
1. Product Description: Machine made from round spiral lockseam duct constructed of galvanized steel; rated for 10 inches w.g. (2.5 kPa) pressure.
2. Joints: Either fully welded or bolted flange with gasket material according to manufacturer's recommendations.
3. Construct duct with following minimum gages:

Major Axis Dimension	Gage
7 inches to 24 inches	24
25 inches to 48 inches	22
50 inches to 70 inches	20
72 inches to 82 inches	18
84 inches and larger	16

4. Construct fittings with following minimum gages:

Major Axis Fitting Dimension	Gage
7 inches to 36 inches	20
37 inches to 60 inches	18
62 inches and larger	16

E. Double Wall Spiral Insulated Round Ducts:
1. Product Description: Machine made from round spiral lockseam duct with light reinforcing corrugations, galvanized steel outer wall, 1 inch (mm) thick glass fiber insulation, perforated galvanized steel inner wall; fittings manufactured with perforated inner wall.

2. Duct Coating: Polyvinyl chloride plastic, 4 mil (0.1 mm) thick on both sides. Temperature range: Minus 30 degrees F (minus 34 degrees C) to plus 200 degrees F (93 degrees C).
3. Construct round duct with following minimum gages:

Diameter	Gage
3 inches to 14 inches	26
15 inches to 26 inches	24
28 inches to 36 inches	22
38 inches to 50 inches	20
52 inches to 84 inches	18

4. Construct round fittings with following minimum gages:

Diameter	Gage
3 inches to 14 inches	24
15 inches to 26 inches	22
28 inches to 36 inches	20
38 inches to 50 inches	20
52 inches to 60 inches	18
62 inches to 84 inches	16

F. Double Wall Spiral Insulated Flat Oval Ducts:
1. Product Description: Machine made from round spiral lockseam duct with light reinforcing corrugations, galvanized steel outer wall, 1 inch (mm) thick glass fiber insulation, perforated galvanized steel inner wall; fittings manufactured with perforated inner wall.
2. Construct flat oval duct with following minimum gages:

Major Axis Dimension	Gage
7 inches to 24 inches	24
25 inches to 48 inches	22
50 inches to 70 inches	20
72 inches to 82 inches	18
84 inches and larger	16

3. Construct flat oval fittings with following minimum gages:

Major Axis Fitting Dimension	Gage
7 inches to 36 inches	20
37 inches to 60 inches	18
62 inches and larger	16

4. Fabricate and support rectangular ducts according to SMACNA HVAC Duct Construction Standards - Metal and Flexible and . Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
5. Fabricate and support round ducts with longitudinal seams according to SMACNA HVAC Duct Construction Standards - Metal and Flexible (Round Duct Construction Standards), and . Provide duct material, gages, reinforcing, and sealing for operating pressures indicated.
6. Construct T's, bends, and elbows with minimum radius 1-1/2 times centerline duct width. Where not possible and where rectangular elbows are used, provide [**airfoil**] turning vanes. Where acoustical lining is indicated, furnish turning vanes of perforated metal with glass fiber insulation.

7. Increase duct sizes gradually, not exceeding 15 degrees divergence wherever possible; maximum 30 degrees divergence upstream of equipment and 45 degrees convergence downstream.
8. Fabricate continuously welded round and oval duct fittings two gages heavier than duct gages indicated in SMACNA Standard. Minimum 4 inch (100 mm) cemented slip joint, brazed or electric welded. Prime coat welded joints.
9. Provide standard 45-degree lateral wye takeoffs. When space does not allow 45-degree lateral wye takeoff, use 90-degree conical tee connections.
10. Seal joints between duct sections and duct seams with welds, gaskets, mastic adhesives, mastic plus embedded fabric systems, or tape.
    a. Sealants, Mastics and Tapes: Conform to UL 181A. Provide products bearing appropriate UL 181A markings.
    b. Do not provide sealing products not bearing UL approval markings.

G. Kitchen Hood Exhaust Ductwork Fabrication:
1. Fabricate according to SMACNA HVAC Duct Construction Standards - Metal and Flexible and NFPA 96.
2. Exposed Kitchen Hood Exhaust Ducts: Construct of stainless steel ASTM ASTM A240/A240M OR ASTM 666, type 304 using continuous external welded joints.
3. Concealed Kitchen Hood Exhaust Ducts: Construct of 16 gage (1.37 mm) carbon steel or 18 gage (1.09 mm) stainless steel ASTM ASTM A240/A240M OR ASTM 666, Type 304 using continuous external welded joints.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify sizes of equipment connections before fabricating transitions.

3.2 INSTALLATION

A. Install and seal ducts according to SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. Install glass fiber ducts according to SMACNA Fibrous Glass Duct Construction Standards. Obtain manufacturer's inspection and acceptance of fabrication and installation at beginning of installation.

C. During construction, install temporary closures of metal or taped polyethylene on open ductwork to prevent construction dust from entering ductwork system.

D. Use crimp joints with or without bead or beaded sleeve couplings for joining round duct sizes 8 inch (mm) and smaller.

E. Install duct hangers and supports according to Section 23 05 29.

F. Use double nuts and lock washers on threaded rod supports.

G. Connect flexible ducts to metal ducts with draw bands.

H. Kitchen hood exhaust ducts: Use stainless steel for ductwork exposed to view and stainless steel or carbon steel where ducts are concealed.

END OF SECTION

SECTION 23 33 00 - AIR DUCT ACCESSORIES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Duct access doors.
2. Static fire dampers.
3. Ceiling fire dampers.
4. Volume control dampers.
5. Flexible duct connections.
6. Duct test holes.

1.2 SUBMITTALS

A. Shop Drawings: Indicate shop-fabricated assemblies including volume control dampers duct access doors .

B. Product Data:
1. Shop-fabricated assemblies and hardware used.
2. Flexible duct connections.
3. Volume control dampers.
4. Duct access doors.
5. Duct test holes.

1.3 QUALITY ASSURANCE

A. Test, rate, and label dampers according to latest UL requirements.

B. Damper pressure drop ratings based on tests and procedures performed according to AMCA 500.

C. Manufacturer: Company specializing in manufacturing products specified in this Section with three years' experience.

1.4 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication.

1.5 COORDINATION

A. Coordinate Work with building control Work.

PART 2 PRODUCTS

2.1 DAMPERS

A. Static Fire Dampers:
   1. Fire Rating: UL 555 classified and labeled as a 3 hour static fire damper.
   2. Air Flow Rating: UL approved for dual directional air flow.
   3. Integral Sleeve Frame: Minimum 20 gage by 12 inches roll formed, galvanized steel.
      a. Factory Sealant: Apply to dampers in HVAC systems with pressures to maximum 4 inches w.g..
   4. Blades:
      a. Style: Curtain type, in airstream.
      b. Action: Spring or gravity closure upon fusible link release.
      c. Orientation: Horizontal.
      d. Material: Minimum 24 gage roll formed, galvanized steel.
   5. Closure Springs: Type 301 stainless steel, constant force type, if required.
   6. Temperature Release Device:
      a. Fusible link, 165 degrees F .
      b. Mounting: Horizontal.
   7. Duct Transition Connection, Damper Style:
      a. A style - rectangular connection, frame and blades in air stream.
      b. B style - rectangular connection, blades out of air stream, high free area.
      c. G style - A style connection, grille mounting tabs at end of sleeve for grille.
      d. R style - round connection, blades in air stream, non-sealed.
      e. RA style - round connection, frame and blades in air stream.
      f. LR style - round connection, blades out of air stream, non-sealed.
      g. LO style - oval connection, non-sealed.
   8. Finish: Mill galvanized.
   9. Picture Frame Mounting Angles:
      a. One-piece, roll formed retaining angles [**1-1/2 x 1-1/2 inches**] [**1-1/2 x 2-1/2 inches**].
      b. Factory matched and shipped attached to damper.

B. Volume Control Dampers:
   1. Manufacturers:
   2. Fabricate according to SMACNA HVAC Duct Construction Standards - Metal and Flexible[**, and as indicated**].
   3. Splitter Dampers:
      a. Material: Same gage as duct to 24 inches size in both dimensions, and two gages heavier for sizes over 24 inches.
      b. Blade: Fabricate of single thickness sheet metal to streamline shape, secured with continuous hinge or rod.
      c. Operator: Minimum 1/4 inch diameter rod in self aligning, universal joint action, flanged bushing with set screw.
      d. Single Blade Dampers: Fabricate for duct sizes up to 12 x 48 inch. **.**
   4. Multi-Blade Damper: Fabricate of opposed blade pattern with maximum blade sizes 8 x 72 inch. Assemble center and edge crimped blades in prime coated or galvanized frame channel with suitable hardware.

5. End Bearings: Except in round ductwork 12 inches and smaller, furnish end bearings. On multiple blade dampers, furnish oil-impregnated nylon or sintered bronze bearings. Furnish closed end bearings on ducts having pressure classification over 2 inches w.g..
6. Quadrants:
   a. Furnish locking, indicating quadrant regulators on single and multi-blade dampers.
   b. On insulated ducts mount quadrant regulators on standoff mounting brackets, bases, or adapters.
   c. Where rod lengths exceed 30 inches furnish regulator at both ends.

2.2 DUCT ACCESS DOORS

A. Fabricate according to SMACNA HVAC Duct Construction Standards - Metal and Flexible[**, and as indicated**].

B. Fabrication: Rigid and close fitting of galvanized steel with sealing gaskets and quick fastening locking devices. For insulated ductwork, furnish minimum 1 inch thick insulation with sheet metal cover.
   1. Less than 12 inches square, secure with sash locks.
   2. Up to 18 inches Square: Furnish two hinges and two sash locks.
   3. Up to 24 x 48 inches: Three hinges and two compression latches [**with outside and inside handles**].
   4. Larger Sizes: Furnish additional hinge.
   5. Access panels with sheet metal screw fasteners are not acceptable.

2.3 FLEXIBLE DUCT CONNECTIONS

A. Connector: Fabric crimped into metal edging strip.
   1. Fabric: UL listed fire-retardant neoprene coated woven glass fiber fabric conforming to NFPA 90A, minimum density 30 oz per sq yd .
   2. Net Fabric Width: Approximately 3 inches wide.
   3. Metal: 3 inch wide, galvanized steel .

B. Leaded Vinyl Sheet: Minimum 0.55 inch thick, 0.87 lb per sq ft, 10 dB attenuation in 10 to 10,000 Hz range.

2.4 DUCT TEST HOLES

A. Permanent Test Holes: Factory fabricated, air tight flanged fittings with screw cap. Furnish extended neck fittings to clear insulation.

PART 3 EXECUTION

3.1 INSTALLATION

A. Install according to NFPA 90A, and follow SMACNA HVAC Duct Construction Standards - Metal and Flexible. Conform to Section 23 31 00 for duct construction and pressure class.

****** [**OR**] ******

B. Access Doors: Install access doors at following locations :
   1. Before and after each fire damper .

   2. Install at locations for cleaning kitchen exhaust ductwork according to NFPA 96.

C. Access Door Sizes: Install minimum 8 x 8 inch size for hand access, 18 x 18 inch size for shoulder access, and . Review locations prior to fabrication.
   1. Mark access doors for fire and smoke dampers on outside surface, with minimum 1/2 inch high letters reading: FIRE/SMOKE DAMPER, SMOKE DAMPER, OR FIRE DAMPER.

D. Install temporary duct test holes required for testing and balancing purposes. Cut or drill in ducts. Cap with neat patches, neoprene plugs, threaded plugs, or threaded or twist-on metal caps.

E. Install fire dampers at locations as indicated. Install with required perimeter mounting angles, sleeves, breakaway duct connections, corrosion resistant springs, bearings, bushings and hinges.
   1. Install smoke dampers and combination smoke and fire dampers according to NFPA 92A.
   2. Install dampers square and free from racking with blades running horizontally.
   3. Do not compress or stretch damper frame into duct or opening.
   4. Handle damper using sleeve or frame. Do not lift damper using blades, actuator, or jack shaft.
   5. Install bracing for multiple section assemblies to support assembly weight and to hold against system pressure. Install bracing as needed.

END OF SECTION

SECTION 23 37 00 - AIR OUTLETS AND INLETS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Diffusers.
2. Registers
3. Grilles.
4. Louvers.

1.2 SUBMITTALS

A. Product Data: Sizes, finish, and type of mounting. Submit schedule of outlets and inlets showing type, size, location, application, and noise level.

1.3 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of air outlets and inlets.

1.4 QUALITY ASSURANCE

A. Test and rate diffuser, register, and grille performance according to ASHRAE 70.

B. Test and rate louver performance according to AMCA 500.

PART 2 PRODUCTS

2.1 ROUND CEILING DIFFUSERS

A. Product Description: Type: Round, stamped or spun, multi-core diffuser to discharge air in 360-degree pattern, with sector baffles where indicated. Diffuser collar not more than 1 inch (25 mm) above ceiling.

B. Fabrication: Steel with baked enamel finish.

C. Accessories: Radial opposed-blade damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.2 RECTANGULAR CEILING DIFFUSERS

A. Fabrication: Steel with baked enamel finish.

B. Accessories: damper and multi-louvered equalizing grid with damper adjustable from diffuser face.

2.3 CEILING EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, minimum depth, 3/4 inch (19 mm) maximum spacing, with blades set at 45 degrees, face.

B. Frame: 1 inch (mm) margin with concealed mounting.

C. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, steel and aluminum with 20 gage (0.90 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish, color as selected.

D. Damper: Integral, gang-operated, opposed blade type with removable key operator, operable from face where not individually connected to exhaust fans.

E. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.

2.4 CEILING GRID CORE EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Fixed grilles of 1/2 x 1/2 x 1 inch (13 x 13 x 25 mm) louvers.

B. Fabrication: Aluminum with factory baked enamel finish.

C. Frame:
1. 1 inch (mm) margin with concealed mounting.

D. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.

2.5 WALL SUPPLY REGISTERS/GRILLES

A. Type: Streamlined and individually adjustable blades, minimum depth, 3/4 inch (19 mm) maximum spacing with spring or other device to set blades, horizontal face, double deflection.

B. Frame: 1 inch (mm) margin with concealed mounting and gasket.

C. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, steel and aluminum with 20 gage (0.90 mm) minimum frame, or aluminum extrusions, with factory baked enamel finish, color to be selected.

D. Damper: Integral, gang-operated opposed blade type with removable key operator, operable from face.

E. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.

2.6 WALL EXHAUST AND RETURN REGISTERS/GRILLES

A. Type: Streamlined blades, minimum depth, 3/4 inch (19 mm) maximum spacing, with spring or other device to set blades, horizontal face.

B. Frame: 1 inch (mm) margin with concealed mounting.

C. Fabrication: Steel with 20 gage (0.90 mm) minimum frames and 22 gage (0.80 mm) minimum blades, or Aluminum extrusions, with factory baked enamel finish, color to be selected.

D. Damper: Integral, gang-operated, opposed-blade type with removable key operator, operable from face.

E. Gymnasiums: Furnish front pivoted or welded in place blades, securely fastened to be immobile.

2.7 LOUVERS

A. Product Description:
1. Drainable .

****** [OR] ******

2. "Thinline."

B. Type: 4 inch (mm) deep with blades on 45 degree slope , heavy channel frame.

C. Fabrication: 12 gage (2.50 mm) thick extruded aluminum, welded assembly, with factory baked enamel fluoropolymer spray finish color to be selected.

D. Mounting: Furnish with exterior angle flange for installation.

E. Bird Screen: Bird screen with 1/2 inch (13 mm) square mesh for exhaust and 3/4 inch (19 mm) for intake.

F. Insect Screen: Aluminum mesh, set in aluminum frame.

2.8 GOOSENECKS

A. Fabricate according to SMACNA HVAC Duct Construction Standards - Metal and Flexible, of minimum 18 gage (1.20 mm) galvanized steel.

2.1 ROOF CURBS

A. Height: 12 inches (300 mm) .

B. Self-flashing construction with continuously welded seams and built-in cant strips.

C. Factory-installed nail strip, 1 inch (25 mm) insulation and curb bottom .

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify inlet and outlet locations.

B. Verify systems are ready for installation.

3.2 INSTALLATION

A. Install diffusers to ductwork with airtight connection.

B. Install balancing dampers on duct take-off to diffusers, grilles, and registers, whether or not dampers are furnished as part of diffuser, grille, and register assembly. Refer to Section 23 33 00.

C. Paint visible portion of ductwork behind air outlets and inlets matte black. Refer to Section 09 90 00.

D. Do not locate air registers, diffusers or grilles in floors of toilet or bathing rooms.

3.3 INTERFACE WITH OTHER PRODUCTS

A. Check location of outlets and inlets and make necessary adjustments in position to conform to architectural features, symmetry, and lighting arrangement.

END OF SECTION

SECTION 23 52 99 - CONDENSING BOILERS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Condensing boilers.
2. Boiler controls.
3. Hot water boiler trim.
4. Natural gas fired burner.
5. Expansion Tank.

1.2 SUBMITTALS

A. Product Data: Capacities and accessories included with boiler. Include general layout, dimensions, size and location of water, , fuel, electric and vent connections, electrical characteristics, weight and mounting loads.

B. Manufacturer's Installation Instructions: Assembly, support details, connection requirements, and include start-up instructions.

C. Manufacturer's Certificate: Products meet or exceed specified requirements.

D. Manufacturers Field Reports: Indicate condition of equipment after start-up including control settings and performance chart of control system.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Include manufacturer's descriptive literature, operating instructions, cleaning procedures, replacement parts list, and maintenance and repair data.

1.4 QUALITY ASSURANCE

A. Boiler Performance Requirements: Conform to minimum thermal efficiency of 95.0% as prescribed by UsS. Standard ANSI Z21.13/CSA 4.9 .

B. Conform to applicable code for internal wiring of factory-wired equipment.

1.5 FIELD MEASUREMENTS

A. Verify field measurements prior to fabrication and indicate on Shop Drawings.

1.6 WARRANTY

A. Furnish five -year manufacturer's warranty for boilers.

1.7 MAINTENANCE SERVICE

A. Furnish service and maintenance of boilers for one year from date of Substantial Completion. during warranty period.

PART 2 PRODUCTS

2.1 CONDENSING BOILERS

A. Manufacturers:
1. Viessmann Vitocrossal 200, CM2-620 (Bases of Design)
2. AERCO Benchmark
3. Lockinvar CREST Series FB .<**Click here to find, evaluate, and insert list of manufacturers from SpecAgent**>.
4. Substitutions: Not permitted.

B. Product Description: Hot Water boilers with forced draft, insulated jacket, sectional cast iron heat exchanger, gas burning system, controls. and boiler trim and fill system consisting of diaphragm type expansion tank, pressure regulating valve, fill valve and automatic air vent.

****** [OR] ******

C. Hot Water Boiler Trim:
1. ASME rated pressure relief valve psig (kPa).
2. Low water cut-off to prevent burner operation when boiler water falls below safe level.
3. High limit temperature controller with manual reset for burner to prevent boiler water temperature from exceeding 210 F.

D. Boiler Fuel Burning System:
1. Burner Operation: modulating .
2. Gas Burner: Forced draft type for **natural gas** adjustable combustion air supply, pressure regulator, gas valves, manual shut-off, intermittent spark or glow coil ignition, flame sensing device, and automatic 100 percent shut-off.
3. Collector and Draft Hood:
   a. Stainless steel vent pipe and Polypropelene combustion air intake as required by manufacture's installation instructions. .

2.2 DIAPHRAGM-TYPE EXPANSION TANK

A. Construction: Welded steel, tested and stamped according to ASME Section VIII; rated for working pressure of 125 psig (860 kPa), with flexible diaphragm sealed into tank, and steel legs or saddles.

B. Accessories: Pressure gage and air-charging fitting, tank drain; pre-charge to 12 psig (kPa) .

PART 3 EXECUTION

3.1 INSTALLATION

A. Assemble boiler from knockdown configuration after transporting into boiler room. Perform pressure test on boiler after assembly according to following:
   1. Pressure test before connecting [**natural gas**] [**propane gas**] [**fuel oil**] piping, electrical connections, and controls.
   2. Install boiler drain and pressure gage.
   3. Plug remaining openings.
   4. Fill boiler with water and vent air.
   5. Pressure test to [**45 to 55 psi (300 to 370 kPa) for steam boilers**] [**1-1/2 times working pressure for water boilers**] for 10 minutes with no leaks.
   6. Repair leaks and retest.
   7. After successful test, drain and remove plugs from openings to be used for piping connections and controls.

B. Install boilers plumb and level, to plus or minus 1/16 inch (2 mm) over boiler base.

C. Maintain manufacturer's recommended clearances around and over boilers.

D. Install boiler on concrete housekeeping pad, minimum 3-1/2 inches (87 mm) high .Connect natural gas piping according to NFPA 54.

E. Connect natural gas piping to boiler, full size of boiler gas train inlet. Arrange piping with clearances for burner removal and service.

F. Install following piping accessories. Conform to Section [23 21 13] [23 22 13].
   1. On Supply:
      a. Thermometer well and thermometer.
      b. Well for control system temperature sensor.
      c. Strainer.
      d. Pressure gage.
      e. Shutoff ball valve.
   2. On Return:
      a. Thermometer well and thermometer.
      b. Well for control system temperature sensor.
      c. Pressure gage.
      d. Shutoff ball valve.
      e. Balancing valve.

G. Install following piping accessories on natural gas piping connections. Conform to Section 23 11 23.
   1. Strainer.
   2. Pressure gage.
   3. Shutoff valve.
   4. Pressure reducing valve.

****** [OR] ******

H. Install discharge piping from relief valves and drain valves to nearest floor drain.

I. Install boiler trim and accessories furnished loose for field mounting.

J. Install electrical devices furnished loose for field mounting.

K. Install control wiring between boiler control panel and field mounted control devices.

L. Connect flue to boiler outlet and inlet, full size of outlet and inlet.

3.2 MANUFACTURER'S FIELD SERVICES

A. Start-up boilers according to manufacturer's start-up instructions and in presence of boiler manufacturer's representative .

B. Test controls and demonstrate compliance with requirements.

C. Replace damaged or malfunctioning controls and equipment.

3.3 DEMONSTRATION

A. Demonstrate operation and maintenance procedures.

B. Furnish services for manufacturer's technical representative for __4 hours_____ to instruct Owner's personnel in operation and maintenance of boilers. Schedule training with Owner, and provide at least seven days' notice to Architect/Engineer of training date.

END OF SECTION

SECTION 23 54 00 - FURNACES

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Forced air furnaces with humidifiers, refrigerant cooling coils, and condensing units.

1.2 SUBMITTALS

A. Product Data: Submit dimensions, connections, arrangement, accessories, capacities, manufacturer's installation instructions and controls.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit spare parts lists.

1.4 QUALITY ASSURANCE

A. Furnace Performance Requirements: Conform to minimum efficiency prescribed by ASHRAE 90.1 when tested in accordance with DOE 10 CFR UL 727.

B. Cooling Performance Requirements: , Energy Efficiency Rating (EER) not less than prescribed by ASHRAE 90.1 when used in combination with compressors and evaporator coils when tested in accordance with ARI 210/240.

PART 2 PRODUCTS

2.1 FORCED AIR FURNACES

A. Manufacturers:
   1. Lennox Industries, Inc.
   2. Carrier Corp.
   3. The Trane Company.<Substitutions: Not Permitted.

B. Units: Self-contained, packaged, factory assembled, pre-wired unit consisting of cabinet, supply fan, heating element, controls, air filter, humidifier, and accessories; wired for single power connection with control transformer.
   1. Air Flow Configuration: Upflow .
   2. Heating: Natural gas fired .
   3. Electric Refrigeration: Refrigerant cooling coil and outdoor package containing compressor, condenser coil and condenser fan.
   4. Accessories: Concentric wall termination kit for combustion air intake and venting of products of combustion. .

C. Cabinet: Steel with baked enamel finish and access doors with safety interlock switch.

D. Supply Fan: Centrifugal type rubber mounted with direct or belt drive, adjustable variable pitch motor pulley, multiple speed motor.

E. Gas Burner:
   1. Gas valve capable of 100 percent safety gas shut-off; 24 volt combining pressure regulation, safety pilot, manual set (On-Off), pilot filtration, automatic electric valve.
   2. Electronic pilot ignition, with electric spark igniter.
   3. Non-corrosive combustion air blower with permanently lubricated motor.

F. Furnace Operating Controls:
   1. Room Thermostat: Cycles burner to maintain room temperature setting.
   2. Supply Fan Control: Energize from bonnet temperature independent of burner controls, with adjustable timed off delay and fixed timed on delay, with manual switch for continuous fan operation. Furnish continuous fan operation.

G. Air Filters: 1 inch (25 mm) thick glass fiber, disposable type.

H. Humidifier:
   1. Type: Wetted plate, pan type with float controlled water supply, thermoplastic water pan for mounting on furnace return air plenum.
   2. Room Humidistat: Electric, adjustable, to energize humidifier when fan operating, to maintain setting.

I. Furnace Refrigeration Package:
   1. Evaporator Coil: Copper tube aluminum fin assembly, galvanized drain pan, drain connection, refrigerant piping connections, restricted distributor or thermostatic expansion valve, steel cabinet with baked enamel finish and insulation.
   2. Compressor: Hermetic, 3600 rpm, resiliently mounted integral with condenser, with positive lubrication, crankcase heater, high pressure control, motor overload protection, service valves and drier. Include time delay control to prevent short cycling and rapid speed changes.
   3. Refrigeration Accessories: Filter Drier, high-pressure switch (manual reset), low pressure switch (automatic reset), service valves and gauge ports, and thermometer well (in liquid line). Furnish thermostatic expansion valves. Furnish refrigerant lines, factory cleaned, dried, pressurized and sealed, with insulated suction line.
   4. Air Cooled Condenser: ARI 520; aluminum fin and copper tube coil, with direct drive axial propeller fan resiliently mounted, galvanized fan guard.
   5. Refrigeration Operating Controls:
      a. Room Thermostat: Cycles condensing unit and supply fan to maintain room temperature setting.
      b. Low Ambient Kit: Furnish refrigerant pressure switch to cycle condenser fan.

J. Drain Pan: Galvanized steel or plastic drain pan with drain outlet. Match pan size to dimensions of furnace.

K. Electric solid state microcomputer based room thermostat with remote sensor:
   1. Automatic switching from heating to cooling.
   2. Preferential rate control to minimize overshoot and deviation from setpoint.
   3. Set-up for four separate temperatures for each day.

4. Instant override of setpoint for continuous or timed period from one hour to 31 days.
5. Short cycle protection.
6. Programming based on every day of week.
7. Selection features including degree F or degree C display, 12 or 24-hour clock, keyboard disable, remote sensor, fan on-auto.
8. Battery replacement without program loss.

PART 3 EXECUTION

3.1 INSTALLATION

A. Mount counter flow furnaces installed on combustible floors on additive base.

B. Install cold water makeup water piping to humidifier. Refer to Section 22 10 00.

C. Install drain piping from cooling coils humidifiers drain pan down to condensate drains on third floor. . Refer to Section 23 20 00.

D. Install refrigerant piping to remote condenser. Refer to Section 23 20 00.

E. Install condenser supply and return piping to water cooled condenser. Refer to Section 23 20 00.

F. Connect natural gas piping to supply. Refer to Section 22 10 00.

G. Mount air cooled condenser-compressor package on creosote treated 4 inches x 4 inches (83 mm x 83 mm) wood timbers.

H. Install flexible duct connections on inlet and outlet of furnaces. Refer to Section 23 30 00.

I. Install control wiring between indoor and outdoor units .

END OF SECTION

SECTION 23 81 09 - PACKAGED ROOFTOP AIR CONDITIONING UNITS - LARGE CAPACITY

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Packaged rooftop air conditioning unit.

1.2 DEFINITIONS

A. Energy Efficiency Ratio (EER): Ratio of net cooling capacity in BTUH to total rate of electric input in watts under designated operating conditions.

B. Integrated Part-Load Value (IPLV): Single-number figure of merit based on part-load EER, COP, or kW/ton expressing part-load efficiency for air-conditioning and heat pump equipment on basis of weighted operation at various load capacities for equipment.

1.3 SUBMITTALS

A. Product Data:
   1. Cooling and heating capacities.
   2. Dimensions.
   3. Weights.
   4. Rough-in connections and connection requirements.
   5. Duct connections.
   6. Electrical requirements with electrical characteristics and connection requirements.
   7. Controls.
   8. Accessories.

B. Test Reports: Results of factory test at time of unit shipment .

C. Manufacturer's Installation Instructions: Assembly, support details, connection requirements, and startup instructions.

D. Manufacturer's Certificate: Products meet or exceed specified requirements .

E. Manufacturer's Field Reports: Startup report for each unit.

1.4 CLOSEOUT SUBMITTALS

A. Project Record Documents: Record actual locations of controls installed remotely from units.

1.5 QUALITY ASSURANCE

A. Cooling Capacity: Rate according to ARI 340/360.

B. Sound Rating: Measure according to ARI 270.

C. Insulation and Adhesives: Meet requirements of NFPA 90A.

D. Minimum Heating Efficiency: 80 percent.

E. Performance Requirements: Conform to minimum EER prescribed by ASHRAE 90.1 when tested according to ARI 340/360.

F. Outside Air Damper Leakage: Test according to AMCA 500.

G. Installer: Company specializing in performing Work of this Section and approved by manufacturer.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Protect units from damage by storing off roof until roof mounting curbs are in place.

1.7 COORDINATION

A. Coordinate installation of roof curbs with roof structure, roof deck and roof membrane installation.

1.8 WARRANTY

A. Furnish five -year manufacturer's warranty for compressors.

B. Furnish five -year manufacturer's warranty for heat exchanger.

1.9 MAINTENANCE SERVICE

A. Furnish service and maintenance of equipment for one year from date of Substantial Completion.

PART 2 PRODUCTS

2.1 PACKAGED ROOFTOP AIR CONDITIONING UNIT

A. Manufacturers:
1. Seasons 4 Engineering and Manufacturing.
2. Buffalo Fan Company.
3. Governair.
4. Substitutions: Not permitted.

B. Product Description: Self-contained, packaged, factory assembled and wired unit, consisting of cabinet, casing, and frame; supply fan section; variable frequency drive; DX cooling coil section; compressor; condensing section; refrigerant circuit; gas-fired heating section; filter section; outdoor and return air section; electrical; controls; and accessories.

C. Configuration:
1. Air delivery: Horizontal .

D. Identification: Furnish units with decals and tags to indicate caution areas and aid in unit service. Fix unit nameplates to main control panel door. Attach electrical wiring diagrams to control panels.

E. Cabinet, Casing, and Frame:
   1. Designed for outdoor installation with weatherproof construction.
   2. Frame and Unit Base: Constructed of galvanized steel. Base overhangs roof curb for water runoff and constructed with formed recess seating on roof curb gasket for positive weather tight seal. Furnish lifting brackets on unit base with lifting holes to accept cable or chain hooks.
   3. Insulation: Minimum of 3 inch (thick, 1.5 lb per cu ft [density neoprene coated glass fiber secured to panels.

F. Discharge Plenum Section:
   1. Duct connections: As indicated.

G. Supply Fan Section:

H. Supply Fan Modulation:
   1. Variable Frequency Drive:
      a. Factory installed in blank access section.
      b. Furnished for supply fan .
      c. Factory installed, wired, and tested.
      d. With bypass.
      e. Full digital control.
      f. Insulated Gate Bi-Polar Transistors used to produce output pulse width modulation waveform allowing quiet operation.
      g. NEMA 250 Type 1 enclosure.
      h. Self-diagnostics.
      i. Proportional-integral-derivative setpoint control.
      j. Communication port.
      k. Electronic thermal overload protection.
   2. Furnish field adjustable duct high limit safety control to protect ductwork from excessive duct pressure.

I. Condensing Section:
   1. Condenser coils: Constructed of copper tubing mechanically bonded to [**aluminum**] [**copper**] fins. Factory leak tested under water.
   2. Condenser fans: Direct drive, propeller type, vertical air discharge. Fan blades constructed of steel. Condenser fan motors [**high efficiency**] totally enclosed type with internal motor overload protection, three-phase non-reversing type with permanently lubricated ball bearing and integral rain shield.
   3. [**Furnish factory installed coil guard.**]
   4. [**Furnish coil with corrosion resistant coating.**]

J. Refrigeration circuit:
   1. Dehydrate and factory charge each circuit with oil and refrigerant.
   2. Furnish following for each circuit:
      a. Thermal expansion device.

b. Filter-drier.
c. Replaceable core filter drier.
d. Suction, discharge, and liquid line service valves with gauge ports.
e. Sight glass.
f. High and low pressure safety controls.
g. Liquid line solenoid valve.
h. Sub-cooler circuit to provide 15 degrees of liquid sub-cooling.

3. Capacity control:
   a. By cycling compressors cycling multi-speed compressors.
   b. Hot gas bypass: Factory installed on each refrigerant circuit including hot gas bypass valve, solenoid valve and hot gas bypass piping.
4. Furnish control to provide low ambient cooling to zero degrees F (minus 18 degrees C) .

K. Gas-fired Heating Section:
1. Fuel: natural gas .
2. Heat exchanger: Constructed of stainless steel primary combustion chamber, stainless steel header, stainless steel tube bundles within aluminized steel or stainless steel secondary tubes. Furnish heat exchanger with condensate drain.
3. Control: . modulating with 10 to 1 turndown ratio.
4. Burner: Induced draft type with pre-purge timing, flame supervision, combustion air proving switch, and spark ignition.
5. Gas Train: Furnish with following: redundant gas valves, pressure regulator, shutoff valve, pilot gas valve, pilot pressure regulator, and pilot valve.
6. Factory test and adjust burner.
7. Location: Downstream of fan section.

L. Filter Section:
1. Location: Upstream of fan section.

M. Outdoor and Return Air Section:
1. Outside Air Damper Leakage: Maximum 3.0 cfm per sq ft (0.13 L/s per sq m) at inches w.g. (Pa) pressure differential.

N. Controls: Furnish interface to Direct Digital Control System] as specified in Section [23 09 23].

O. Accessories:
1. <_____>.

2.2 SOURCE QUALITY CONTROL

A. Perform factory test of [**each**] [**representative**] unit. Test includes:
1. Dynamic trim balance of completed fan assembly.
2. Complete run check of electrical components and safety controls, including control sequencing.
3. Pressure test, at manufacturer's rated pressure, of refrigerant coils and condenser coils prior to unit assembly.
4. Leak check of completed refrigerant circuits.
5. Compressor run check.

B. Make completed unit available for inspection at manufacturer's factory prior to packaging for shipment. Notify Owner at least seven days before inspection is allowed.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify roof curbs are installed and dimensions are as shown on Shop Drawings.

3.2 INSTALLATION

A. Connect units to supply and return ductwork with flexible connections. Conform to Section 23 33 00.

B. Install condensate piping with trap and route from drain pan to splash block on roof . Conform to Section 23 21 13.

C. Install components furnished loose for field mounting.

D. Install electrical devices furnished loose for field mounting.

E. Install control wiring between unit and field installed accessories.

3.3 INSTALLATION - NATURAL GAS HEATING SECTION

A. Connect natural gas piping according to NFPA 54.

B. Connect natural gas piping to unit, full size of unit gas train inlet. Arrange piping with clearances for burner service.

C. Install following piping accessories on natural gas piping connections. Conform to Section 23 11 23.
1. Strainer.
2. Pressure gage.
3. Shutoff valve.
4. Pressure reducing valve.

D. Install natural gas piping accessories above roof .

****** [OR] ******

3.4 MANUFACTURER'S FIELD SERVICES

A. Furnish initial start-up and shutdown during first year of operation, including routine servicing and checkout.

3.5 CLEANING

A. Vacuum clean coils and inside of unit cabinet.

B. Install new throwaway filters in units at Substantial Completion.

****** [OR] ******

3.6 DEMONSTRATION

A. Demonstrate unit operation and maintenance.

END OF SECTION

SECTION 23 82 00 - CONVECTION HEATING AND COOLING UNITS

PART 1 GENERAL

1.1 SUMMARY

A. Section Includes:
1. Finned Tube Radiation.
2. Convectors.
3. Unit heaters.
4. Cabinet unit heaters.

1.2 SUBMITTALS

A. Product Data: Submit schedules for equipment and radiation enclosures indicating length and number of pieces of element and enclosure, corner pieces, end caps, cap strips, access doors, pilaster covers, and comparison of specified heat required to actual heat output of equipment. Submit coil and frame configurations, and rough-in dimensions.

1.3 CLOSEOUT SUBMITTALS

A. Operation and Maintenance Data: Submit operating instructions, maintenance and repair data, and parts lists.

PART 2 PRODUCTS

2.1 FINNED TUBE RADIATION

A. Heating Elements: 1-1/4 inch (32 mm) ID seamless copper tubing, mechanically expanded into evenly spaced aluminum fins, suitable for soldered fittings.

B. Element Hangers: Ball bearing cradle type on enclosure brackets.

C. Enclosures: 0.0478 inch (1.2 mm) thick steel up to 18 inches (450 mm) in height, 0.0598 inch (1.5 mm) steel over 18 inches (450 mm) in height. Support rigidly, on wall or floor mounted brackets.

D. Finish: Factory applied baked primer coat.

E. Access Doors: 6 x 7 inch (150 x 175 mm) minimum size, integral with cabinet.

2.2 CONVECTORS

A. Heating Elements: Seamless copper tubing mechanically expanded into evenly spaced aluminum fins and cast iron headers.

B. Cabinet: 0.0598 inch (1.5 mm) thick steel front and top, 0.0478 inch (1.2 mm) steel back and ends; exposed corners rounded.

C. Finish: Factory applied baked primer coat.

D. Damper: Knob-operated at enclosure air outlet.

E. Access Doors: 6 x 7 inch (150 x 175 mm) minimum size, integral with cabinet.

2.3 UNIT HEATERS

A. Coils: Seamless copper tubing, 0.025 inch (0.64 mm) minimum wall thickness, silver brazed to steel headers, and with evenly spaced aluminum fins mechanically bonded to tubing.

B. Casing: 0.0478 inch (1.2 mm) thick steel with threaded pipe connections for hanger rods.

C. Finish: Factory applied baked enamel of color as selected.

D. Fan: Direct drive propeller type with fan guard.

E. Air Outlet: Adjustable pattern diffuser on projection models and four way louvers on horizontal throw models.

F. Motor: Permanently lubricated sleeve bearings on horizontal models, grease lubricated ball bearings on vertical models.

G. Control: Local disconnect switch.

2.4 CABINET UNIT HEATERS

A. Coils: Evenly spaced aluminum fins mechanically bonded to copper tubes, designed for 100 psi (1379 kPa) and 220 degrees F (104 degrees C).

B. Cabinet: 0.00478 inch (1.5 mm) thick steel with exposed corners and edges rounded, glass fiber insulation, and integral air outlet and inlet grilles.

C. Finish: Factory applied baked primer coat.

D. Fans: Centrifugal forward-curved double-width wheels, direct driven.

E. Motor: Sleeve bearings, resiliently mounted.

F. Control: Multiple speed switch, factory wired, located in cabinet.

G. Filter: Easily removed 1 inch (25 mm) thick glass-fiber throwaway type.

PART 3 EXECUTION

3.1 EXAMINATION

A. Verify wall construction and ductwork are ready for installation.

B. Verify concealed blocking and supports are in place and connections are correctly located.

3.2 INSTALLATION

A. Install air coils in ducts and casings in accordance with SMACNA HVAC Duct Construction Standards - Metal and Flexible.

B. For water coils, install shut-off valve on supply piping and balancing valve on return piping. Install water supply at bottom of supply header and return water connection at top. Install air vents at high points. Install coils to allow draining Install drain connection at low points. Refer to Section 23 20 00.

C. For finned tube radiation, install shut-off valve on supply piping and balancing valve on return piping. Install air vents on radiation. Install to allow draining Install drain connection at low points. Refer to Section 23 20 00.

D. For convectors, unit heaters, and cabinet unit heaters, install shut-off valve on supply piping and balancing valve on return piping. Install air vent on coil. Install drain connection at low points. Refer to Section 23 20 00.

E. Install unit heaters from building structure. Support independently from piping. Mount minimum 4 feet (mm) above floor .

F. Install cabinet unit heaters as indicated on Drawings . Coordinate to assure correct recess size for recessed units.

G. Touch-up marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.

END OF SECTION

THE VETS

VETERANS MEMORIAL AUDITORIUM
PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

ARCHITECTS:

NORTHEAST COLLABORATIVE ARCHITECTS, LLC
333 WESTMINSTER STREET
PROVIDENCE RI 02903
401.272.2144

CIVIL ENGINEERS:

VANASSE, HANGEN, & BRUSTLIN, INC
CIVIL ENGINEERS
10 DORRANCE STREET, SUITE 400
PROVIDENCE, RI 02903
V: 401-272-8100

LANDSCAPE ARCHITECTS:

GATES, LEIGHTON, & ASSOCIATES, INC
LANDSCAPE ARCHITECTURE
861 A WATERMAN AVENUE
EAST PROVIDENCE, RI 02914
V: 401-438-2071

STRUCTURAL ENGINEERS:

ODEH ENGINEERS, INC
STRUCTURAL ENGINEERS
1223 MINERAL SPRING AVENUE
NORTH PROVIDENCE, RI 02904
V: 401-724-1771

MECHANICAL & PLUMBING ENGINEER:

J. MADISON, INC
18 SHORT ROAD
EXETER, RI 02822
TEL: 401-397-2730

ELECTRICAL ENGINEER:

FIRE PROTECTION ENGINEER:

HUGHES ASSOCIATES, INC.
117 METRO CENTER BLVD. | SUITE 1002
WARWICK, RI 02886
V: 401-736-8992

DOC DATE: 8.12.13

ABBREVIATIONS

A.N.	AS NOTED
AFF	ABOVE FINISHED FLOOR
AP	ACOUSTICAL CEILING PANEL
ADD	ADDENDUM
ADJ	ADJUSTABLE
ALT	ALTERNATE
ALUM	ALUMINUM
AB	ANCHOR BOLT
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
BIT	BITUMINOUS
BLK(G)	BLOCK(ING)
BLDG	BUILDING
B.B.	BULLETIN BOARD
	CENTER LINE
CG	CORNER GUARD
CB	CHALK BOARD
CCT	CUBICLE CURTAIN TRACK
	CLEAR
CLG	CEILING
CEM	CEMENT
	CERAMIC TILE
CTR	CENTER
	CHANNEL
COL	COLUMN
CONC	CONCRETE
CMU	CONCRETE MASONRY UNIT
CONST.	CONSTRUCTION
CONT.	CONTINUE/CONTINUOUS
C.J.	CONTROL JOINT
CORR.	CORRIDOR
CPT.	CARPET
DET	DETAIL
DIAM	DIAMETER
DIFF.	DIFFUSER
DIM(S)	DIMENSION(S)
	DOWN
EA.	EACH
ELEC.	ELECTRIC
EL(ELEV)	ELEVATION
	EQUAL
E.J.	EXPANSION JOINT
	ELECTRICAL PANEL
EQUIP.	EQUIPMENT
EXIST.	EXISTING
EPDM	ETHYLENE PROPYLENE DIENE MONOMER
EXT.	EXTERIOR
EIFS	EXTERIOR INSULATION FINISH SYSTEM
EWC	ELECTRIC WATER COOLER
	EMERGENCY SHOWER
	FINISHED FLOOR
FLASH	FLASHING
	FLOOR
FTG	FOOTING
FDTN	FOUNDATION
	FIRE EXTINGUISHER

GA	GAUGE
GALV	GALVANIZED
GB	GRAB BAR
G.C.	GENERAL CONTRACT(OR)
GL	GLASS(GLAZING)
GYP BD.	GYPSUM WALL BOARD
HP	HANDICAPPED
HVAC	HEATING, VENTILATING, AND AIR CONDITIONING
HT(H)	HEIGHT(HIGH)
HM	HOLLOW METAL
HORIZ	HORIZONTAL
INCL	INCLUDE(D)
INSUL	INSULATE(D),(ION)
INT	INTERIOR
JAN	JANITOR
JT	JOINT
L	LOCKABLE
MFR	MANUFACTURE(R)
MAS	MASONRY
M.O.	MASONRY OPENING
MAT	MATERIAL(S)
MAX	MAXIMUM
MECH	MECHANICAL
MEMB	MEMBRANE
MTD	MOUNTED
MTL(MET)	METAL
MIN	MINIMUM
MIR	MIRROR
MISC	MISCELLANEOUS
MB	MARKER BOARD
MR	MIRROR UNIT
MBH	MOP & BROOM HOLDER
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
NO.	NUMBER
O.C.	ON CENTER
O.H.	OPPOSITE HAND
PR	PAIR
PL	PLATE
PLYWD	PLYWOOD
P.T.	PRESSURE TREATED WOOD
PTD.	PAINTED
P.S.	PROJECTION SCREEN
Q.T.	QUARRY TILE

RAD(R)	RADIUS
REFL	REFLECT(ED)
REINF	REINFORCE(D),(ING)
R.C.P.	REFLECTED CEILING PLAN
R	RISER
RD	ROOF DRAIN
RM	ROOM
RND	ROUND
RSD	RECESSED SOAP DISH
S.C.D.	SEAT COVER DISPENSER
SCHED	SCHEDULE
SECT	SECTION
SHELV'G	SHELVING
SHT	SHEET
SIM	SIMILAR
SQ	SQUARE
SF	SQUARE FEET(FOOT)
SNR	SANITARY NAPKIN RECEPTACLE
SND	SANITARY NAPKIN DISPENSER
SS	STAINLESS STEEL
STA	STATION
STD	STANDARD
STL	STEEL
STOR	STORAGE
SDW	SOAP DISPENSER(WALL MOUNTED)
STRUCT	STRUCTURAL
SRC	SHOWER ROD & CURTAIN
SRD	SOUND RATED DOOR
SH	SHOWER HOOKS
SHD	SHOWER HEAD
TB	TACKBOARD
TD	TOILET TISSUE DISPENSER
T.T	TOILET TISSUE
T.O.	TOP OF
T	TREAD
T.S	TUBE STEEL
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
U.O.N..	UNLESS OTHERWISE NOTED
UR	URINAL
UC	UNDER CUT
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VERT	VERTICAL
VEST	VESTIBULE
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
WR	WALL RAIL
W.B.	WASTE BASKET
W.C.	WATER CLOSET
WP	WALL PROTECTION
W.G.	WIRE GLASS
W/	WITH,
W/O	WITHOUT
WD	WOOD

SYMBOLS

- (A) COLUMN LINE
- EXISTING WALL/PARTITION
- NEW WALL/PARTITION
- SMOKE PARTITION
- 1HR — 1 HOUR RATED WALL
- 2HR — 2 HOUR RATED WALL
- ITEM ABOVE OR BELOW
- N.I.C. — ITEM NOT IN CONTRACT
- 1 / A-20 — WALL SECTION
- INTERIOR ELEVATION TAG / DETAIL APPEARS ON THIS SHEET / VIEW DIRECTION
- ENLARGED PLAN OR DETAIL
- 000 — DOOR NUMBER
- ROOM NAME 000 — ROOM NAME & NUMBER
- A — WALL TYPE
- 1 — WINDOW NUMBER
- ELEV SHT — ELEVATIONS
- 5'-0" DIAMETER WHEELCHAIR TURNING RADIUS
- ACOUSTICAL CEILING PANEL
- CEILING WITH 6" SOUND INSULATION ABOVE
- FLOURESCENT OR INCANDESCENT RECESSED LIGHT FIXTURE
- SURFACE OR PENDANT MOUNTED (CEILING) FLOURESCENT LIGHT FIXTURE
- FLOURESCENT WALL SLOT WITH BAFFELS
- HVAC SUPPLY DIFFUSER/RETURN GRILLE
- ACT-2 / 8'-0" — CEILING SYMBOL: CEILING TYPE, CEILING HEIGHT
- 101 FE FEC — FIRE EXTINGUISHER ON WALL BRACKET OR RECESSED
- TRENCH DRAIN
- FD — FLOOR DRAIN
- FLOORING / FLOORING — FINISH LIMITS USUALLY REQUIRING TRANSITION STRIP

DRAWING LIST

GENERAL

	COVER SHEET
A-001	GENERAL INFORMATION
A-010	CODE SHEET SB & B
A-011	CODE SHEET 1 & 2
A-012	CODE SHEET 3 & 4
A-013	CODE SHEET 5 & 6

SITE/CIVIL

C-1	LEGEND & GENERAL NOTES
C-2	SITE DEMOLITION
C-3	SITE PLAN
C-4	DETAILS 1
C-5	DETAILS 2

LANDSCAPE

L-1.00	SITE IMPROVEMENTS PLAN
L-3.01	SITE IMPROVEMENTS DETAILS

ARCHITECTURAL

A-020	WALL TYPES
A-030	SCHEDULES & DOOR ELEVATIONS
A-031	FINISH SCHEDULE & DETAILS
A-040	DOOR DETAILS
A-100	SUB BSMT & BSMT PART DEMO & CONST PLANS
A-110	1st FL DEMO & CONSTRUCTION PLANS
A-111	1st FLOOR & LOADING DOCK DEMO & CONSTRUCTION PLANS
A-120	2nd FLOOR CONSTRUCTION PLANS
A-130	3rd FL PART CONSTRUCTION & RC PLANS
A-140	4th FL ADDITION FINISH PLAN & AUDITORIUM HAND RAIL LAYOUT
A-141	4th FLOOR OFFICE DEMO & CONST PLANS
A-142	4th FLOOR OFFICE RC & FINISH PLANS
A-143	4th FLOOR OFFICE FURNITURE PLAN
A-150	5th FLOOR OFFICE DEMO & CONST PLANS
A-151	5th FLOOR OFFICE RC & FINISH PLANS
A-152	5th FLOOR OFFICE FURNITURE PLAN
A-160	6th FLOOR OFFICE DEMO & CONST PLANS
A-161	6th FLOOR OFFICE RC & FINISH PLANS
A-162	6th FLOOR OFFICE FURNITURE PLANS
A-170	ROOF PLAN
A-201	EXTERIOR SOUTH ELEVATION
A-202	EXTERIOR WEST & EAST ELEVATIONS
A-401	INTERIOR ELEVATIONS & MILLWORK DETAILS
A-402	MILLWORK DETAILS
A-403	SERVICE BAR MILLWORK DETAILS
A-404	MEZZANINE COUNTERS PLANS & SECTIONS
A-405	MEZZANINE COUNTERS ELEVATIONS & SECTION
A-410	PAINT FINISH SCHEMES - LOBBY
A-411	PAINT FINISH SCHEMES - AUDITORIUM
A-412	PAINT FINISH SCHEMES - AUDITORIUM
A-413	PAINT FINISH SCHEMES - AUDITORIUM
A-414	PAINT FINISH SCHEMES - AUDITORIUM
A-415	PAINT FINISH SCHEMES - AUDITORIUM
A-416	PAINT FINISH SCHEMES - UPSTAIRS LOBBY
A-417	PAINT FINISH SCHEMES - STAIRWAY
A-418	PAINT FINISH SCHEMES - STAIRWAY
A-501	STAIR PLANS & SECTIONS
A-502	STAIR DETAILS
A-610	PLAN DETAILS
A-620	ROOF DETAILS

STRUCTURAL

S-000	GENERAL NOTES
S-100	NEW EGRESS STAIR FRAMING PLANS
S-110	ROOF TOP DUNNAGE FRAMING PLAN
S-300	ROOF TOP DUNNAGE SECTIONS
S-301	ROOF TOP DUNNAGE SECTIONS & GENERAL NOTES
S-310	BUILDING ELEVATIONS
S-600	FRAMING DETAILS
S-601	FRAMING DETAILS

FIRE SUPPRESSION

FP0.0	SPRINKLER NOTES
FP0.1	DETAILS
FP0.2	DETAILS
FP1.0	FIRE SPRINKLER PLANS

MECHANICAL

HD.01	SUB BASEMENT HVAC DEMOLITION PLAN
HD.02	BASEMENT HVAC DEMOLITION PLAN
HD.03	FIRST FLOOR HVAC DEMOLITION PLAN
HD.04	SECOND FLOOR HVAC DEMOLITION PLAN
HD.05	THIRD FLOOR HVAC DEMOLITION PLAN
HD.06	FORTH FLOOR HVAC DEMOLITION PLAN
HD.07	FIFTH FLOOR HVAC DEMOLITION PLAN
HD.08	SIXTH FLOOR HVAC DEMOLITION PLAN
HD.09	ROOF LEVEL HVAC DEMOLITION PLAN
H0.01	HVAC SCHEDULES AND DETAILS
H0.02	HVAC SCHEDULES AND DETAILS 2
H0.03	HVAC SCHEDULES AND DETAILS 3
H1.01	SUB BASEMENT HVAC
H1.02	BASEMENT HVAC
H1.03	FIRST FLOOR HVAC
H1.04	SECOND FLOOR HVAC
H1.05	THIRD FLOOR HVAC
H1.06	FORTH FLOOR HVAC
H1.07	FIFTH FLOOR HVAC
H1.08	SIX FLOOR HVAC
H1.09	ROOF LEVEL HVAC

PLUMBING

P0.01	PLUMBING SCHEDULES AND NOTES
PD.01	PLUMBING DEMOLITION
P1.01	BASEMENT & FOURTH FLOOR PLUMBING
P1.02	FIFTH FLOOR PLUMBING
P1.03	SIXTH FLOOR PLUMBING

ELECTRICAL

E-001	SCHEDULES, NOTES, LEGEND & DETAILS
E-100	BASEMENT LIGHTING PLAN
E-101	FIRST FLOOR LIGHTING PLAN
E-102	SECOND & THIRD FLOOR LIGHTING PLAN
E-103	FOURTH, FIFTH & SIXTH FLOOR LIGHTING PLAN
E-200	BASEMENT & SUB BASEMENT POWER/SYSTEMS PLAN
E-201	FIRST FLOOR POWER & SYSTEMS PLAN
E-202	SECOND FLOOR POWER & SYSTEMS PLAN
E-203	3rd, 4th & 5th FLOOR POWER & SYSTEMS PLAN
E-204	6th FL POWER & SYSTEMS PLAN & ROOF POWER PLAN
E-301	SCHEMATICS
E-302	SCHEMATICS
E-302	SCHEDULES

ARCHITECTURAL GENERAL NOTES

1. CONTRACTOR TO COORDINATE DEMOLITION TO ACCEPT NEW CONSTRUCTION
2. CONTRACTOR TO VERIFY ALL DIMENSIONS AND CONDITIONS IN FIELD (V.I.F.)
3. CONTRACTOR TO COORDINATE ALL DEMOLITION WITH NEW CONSTRUCTION AS INDICATED BY ALL TRADES.
4. DEMOLITION OF UTILITIES TO BE INVESTIGATED AS TO SOURCE AND LAST SERVICE PRIOR TO DEMOLITION.
5. DRAWINGS DO NOT PURPORT TO SHOW ALL EXISTING OBJECTS. CONTRACTORS TO FIELD VERIFY ALL EXISTING CONDITIONS AND ELEMENTS TO BE PRESERVED BEFORE WORK COMMENCES, AND REPORT TO THE ARCHITECT ANY DISCREPANCIES OR QUESTIONABLE ITEMS.
6. CONTRACTORS SHALL USE ALL MEANS NECESSARY TO PROTECT AND PRESERVE EXISTING CONDITIONS AND OBJECTS DESIGNATED TO REMAIN. IN THE EVENT OF DAMAGE, IMMEDIATELY MAKE ALL REPAIRS AND REPLACEMENTS NECESSARY.
7. PRIOR TO COMMENCING THE WORK, THE CONTRACTOR SHALL REVIEW EXISTING UTILITIES AT THE SITE AND DETERMINE METHODS FOR DISCONNECTING, CAPPING, REMOVING OR PROTECTING SAME, IN ACCORDANCE WITH THE REQUIREMENTS OF THE UTILITY COMPANY.
8. THE CONTRACTOR SHALL REMOVE, REROUTE AND/OR CAP OFF ALL UNUSED UTILITIES COMING INTO THE SPACES. ALL ABANDONED UTILITIES SHALL BE CAPPED OFF OUTSIDE OF BUILDING - REFER TO MEP DWGS FOR FULL SCOPE OF WORK. ALL CAPPED UTILITIES TO BE CAPPED BEHIND FINISHED SURFACES.
9. NOTIFY THE ARCHITECT AT LEAST (2) TWO FULL DAYS PRIOR TO COMMENCING DEMOLITION WORK.
10. REFER TO MEP DWGS FOR REMOVAL OF ALL ELECTRICAL ITEMS INCLUDING BUT NOT LIMITED TO LIGHTING, OUTLETS, CONDUITS, JUNCTION BOXES, PANELS, ETC. REMOVE ALL ATTACHMENTS AS WELL, INCLUDING BUT NOT LIMITED TO BRACKETS, CLAMPS, BOLTS, AND LAG SCREWS. DAMAGED EXISTING WOOD OR MASONRY THAT IS TO REMAIN WILL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO OWNER.
12. REFER TO MEP DWGS FOR REMOVAL OF ALL MECHANICAL ITEMS INCLUDING BUT NOT LIMITED TO PIPING, FAN COILS, WATER LINES, WASTE LINES, ETC. REMOVE ALL ATTACHMENTS AS WELL, INCLUDING BRACKETS, CLAMPS, BOLTS, AND LAG SCREWS. DAMAGED EXISTING WOOD OR MASONRY THAT IS TO REMAIN WILL BE REPAIRED OR REPLACED AT NO ADDITIONAL COST TO OWNER.
13. PATCH ALL HOLES REMAINING FROM REMOVAL OF EXISTING CONSTRUCTION W/ NEW MATERIALS THAT MATCH ADJACENT EXISTING. (INCLUDING PIPE HOLES, ELECTRICAL BOXES, CONDUIT HOLES, ETC.)
14. DEMOLISH ALL PLUMBING FIXTURES INCLUDING BUT NOT LIMITED TO ALL WATER AND WASTE LINES, ALL FLANGES AND ATTACHMENTS, REFER TO MEP DWGS FOR FULL SCOPE OF WORK
15. REFER TO DEMOLITION PLANS, REFLECTED CEILING PLANS, ELEVATIONS & PROJECT MANUAL FOR FULL SCOPE OF DEMOLITION WORK, NOT ALL DEMOLITION ITEMS ARE SHOWN ON EACH DRAWING.
16. PROVIDE TEMPORARY SHORING AS REQUIRED AT ALL DEMOLITION AREAS THAT REMOVE EXISTING STRUCTURAL MEMBERS, AND LINTELS
17. THE CONTRACTOR IS RESPONSIBLE FOR SITE SAFETY INCLUDING TEMPORARY FLOOR AND RAILINGS AT ALL NEWLY CREATED FLOOR OPENINGS.
18. CONTRACTOR TO VISIT SITE TO DETERMINE MAKE-UP OF ITEMS TO BE REMOVED, AND APPROPRIATE METHODS FOR THEIR REMOVAL.
19. ALL DEMOLITION DEBRIS IS TO BE REMOVED FROM THE SITE AS WASTE MATERIAL.
20. CONTRACTOR MUST PROTECT EXTERIOR MASONRY TO REMAIN DURING DEMOLITION. EXISTING MASONRY MUST BE PROTECTED FROM DEMOLITION AND DEMOLITION DEBRIS. THE CONTRACTOR WILL BE RESPONSIBLE FOR REPAIR OF EXISTING MASONRY DAMAGED BY DEMOLITION ACTIVITY.
21. ALL NEW WALLS, PARTITIONS, BUILT-INS, AND EQUIPMENT LOCATIONS SHALL BE CHALKED-OFF ON THE FLOOR AND VERIFIED BY THE GENERAL CONTRACTOR PRIOR TO ERECTION. IN THE EVENT OF CONFLICT, CONTACT ARCHITECT IMMEDIATELY.
22. THE CONTRACTOR SHALL COORDINATE THE SETTING OF ALL GROUNDS AND BLOCKING REQUIRED FOR THE INSTALLATION OF THE WORK OF THE VARIOUS TRADES.
23. INFILL ALL EXISTING HOLES AT RATED MASONRY WALLS WITH CMU & CEMENT GROUT TO MAINTAIN FIRE RATING.
24. INSTALL ALL PUBLIC DOORS TO PROVIDE 18" ON THE PULL SIDE AND 12" ON PUSH SIDE (IF CLOSER INSTALLED) TO CONFORM WITH THE A.D.A. CODES ON ACCESSIBILITY.
25. ALL NEW DOORS OPENINGS TO BE 6" FROM FACE OF ADJACENT WALL (HINGE SIDE) UON.
26. THE CONTRACTOR SHALL ERECT AND MAINTAIN ALL NECESSARY DUST BARRIERS AS REQUIRED (LOCATIONS TO BE APPROVED BY THE OWNER) TO PREVENT DIRT AND DUST FROM LEAVING THE JOB-SITE AREA AND INFILTRATING AREAS NOT INVOLVED IN THE PROJECT AND SHALL IN GENERAL CONTROL CLEANING.
27. THE CONTRACTOR IS RESPONSIBLE FOR COORDINATION AND NOTIFICATION OF ANY AND ALL PENETRATIONS IN BEARING MASONRY WALLS. THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS IDENTIFYING LOCATIONS AND SIZES OF OPENINGS PRIOR TO THE ERECTION OF SAID WALLS. IF SHOP DRAWINGS ARE NOT SUBMITTED FOR APPROVAL, THE CONTRACTOR SHALL ASSUME THE RESPONSIBILITY FOR THE INTEGRITY (STRUCTURALLY, AND ARCHITECTURALLY) OF MASONRY LOAD BEARING WALL PENETRATIONS.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

GENERAL INFORMATION

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: A-001

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SYMBOL LEGEND

EXIT CAPACITY

- 77 / 100 — ACTUAL DOOR CAPACITY / MAX. ALLOWABLE DOOR CAPACITY
- 297 DOO — MAXIMUM ROOM OCCUPANCY LOAD
- 77 / 100 — ACTUAL STAIR CAPACITY / MAX. ALLOWABLE STAIR CAPACITY
- 77 — DIRECTION OF TRAVEL WITH ACCUMULATED OCCUPANCY LOAD
- 100 — MAXIMUM TRAVEL DISTANCE FROM FURTHEST POINT (200 FEET MAXIMUM ALLOWED TRAVEL DISTANCE IN SPRINKLERED BUILDING)
- FE — FIRE EXTINGUISHER LOCATION

SEE LIGHTING DRAWINGS FOR EXIT SIGNS & GENERATOR DRIVEN EMERGENCY LIGHTING

FIRE SEPARATION

- 1HR — 1 HOUR RATED PARTITION (TIGHT TO DECK ABOVE UNLESS NOTED OTHERWISE) RE: WALL TYPES
- 2HR — 2 HOUR RATED PARTITION (TIGHT TO DECK ABOVE UNLESS NOTED OTHERWISE) RE: WALL TYPES

CODE REVIEW

GROUP CLASSIFICATION (CHAPTER 3): MIXED SEPERATED
A-1 (ASSEMBLY), B (BUSINESS), U (UTILITY), S-1 (STORAGE)

CONSTRUCTION TYPE: III

BUILDING HEIGHT (CHAPTER 5):
ALLOWABLE BUILDING HEIGHT: 160FT (11 STORIES)
ACTUAL BUILDING HEIGHT: 92' +/- & 6 STORIES

BUILDING AREA (CHAPTER 5, TABLE 503):
EXISTING CONSTRUCTION: 20,320 SQUARE FT
NEW CONSTRUCTION: 3,200 SQUARE FT
ALLOWABLE BUILDING AREA: UNLIMITED

AREA MODIFICATIONS TO TABLE 503:
NOT REQUIRED.

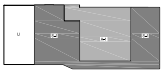
MIXED OCCUPANCY - SEPARATED USES (TABLE 302,3.2)

A. ALLOWABLE AREA PER FLOOR (TABULAR X ADJUSTED)

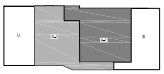
USE GROUP >>	A-1	B	S-1	U
ALLOWABLE:	UL	UL	48,000	UL

B. ACTUAL AREAS

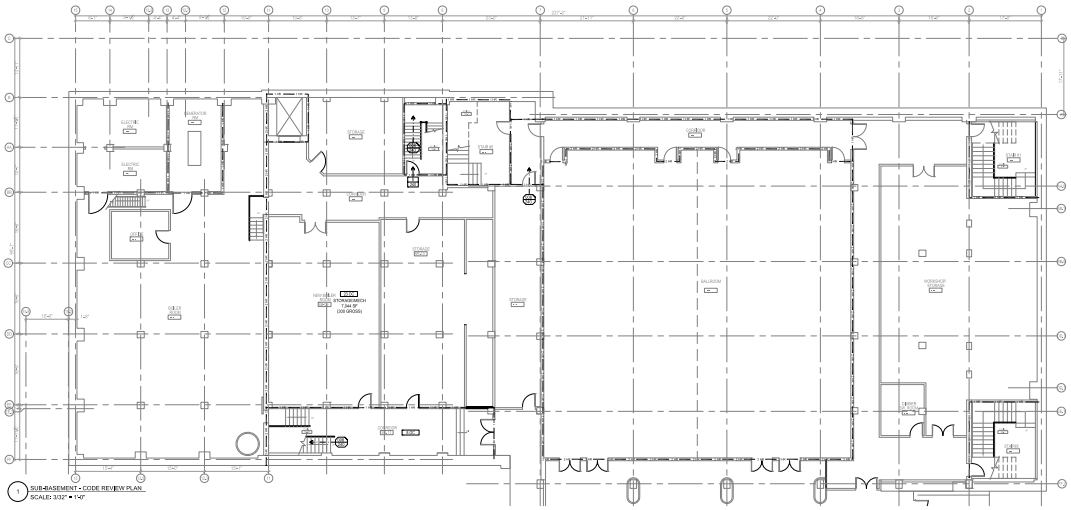
USE GROUP >>	A-1	B	S-1	U
SIXTH FLOOR	–	4,143	–	–
FIFTH FLOOR	8,805	4,143	–	–
FOURTH FLOOR	9,503	4,143	–	–
THIRD FLOOR	11,352	4,143	–	–
SECOND FLOOR	17,153	4,205	–	–
FIRST FLOOR	17,348	4,205	–	–
BASEMENT	6,198	4,462	5,740	4,088
SUB-BASEMENT	6,610	–	9,623	4,088
TOTALS:	76,939	26,444	15,363	8,176



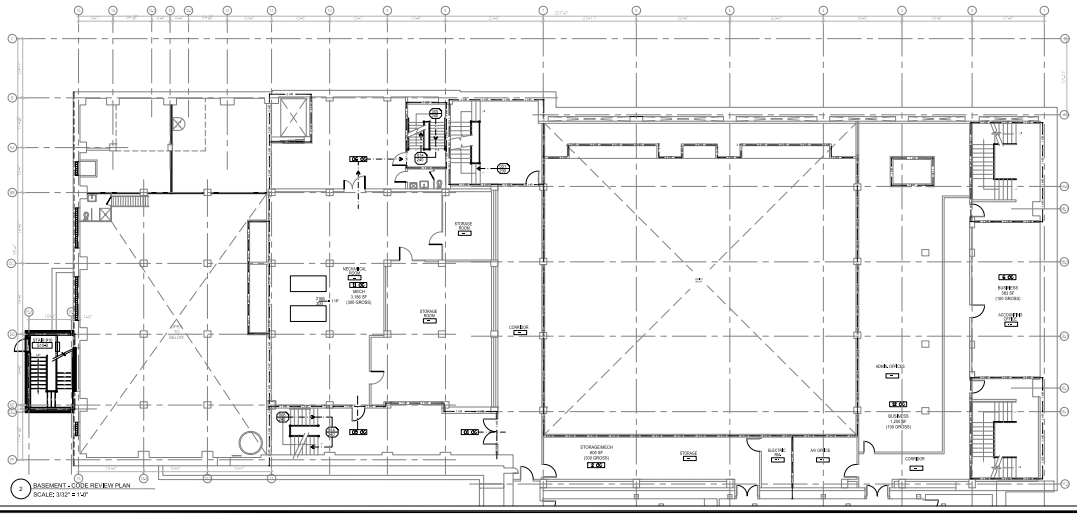
SUB-BASEMENT USE PLAN



BASEMENT USE PLAN



1 SUB-BASEMENT - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"



2 BASEMENT - CODE REVIEW PLAN
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SUB-BASEMENT & BASEMENT CODE PLANS

DATE: AUGUST 20, 2013

NCA JOB NO.: 1046.20

DRAWING NO.: **A-010**

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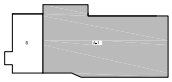
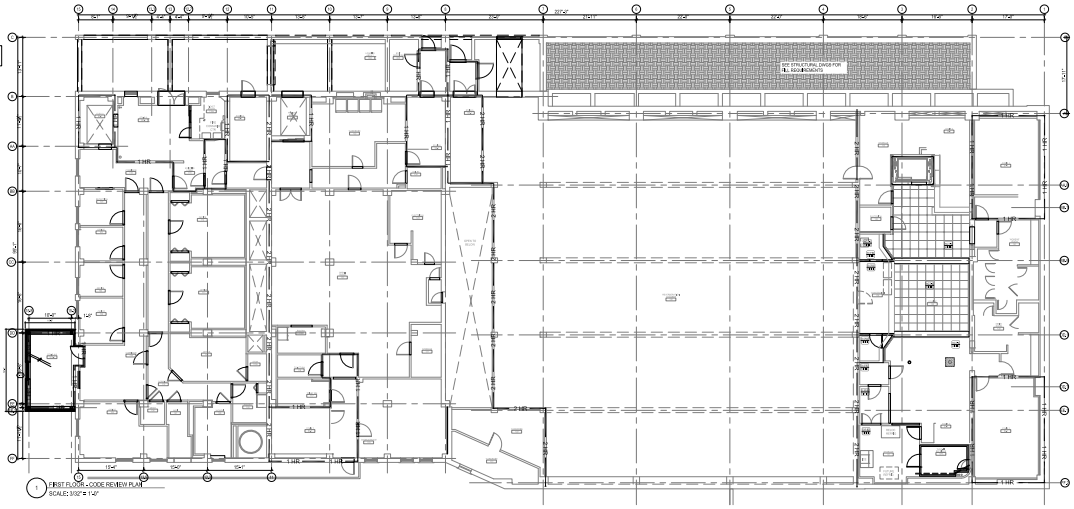


FIRST FLOOR USE PLAN



1 FIRST FLOOR - CODE REVIEW PLAN
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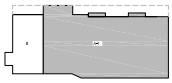
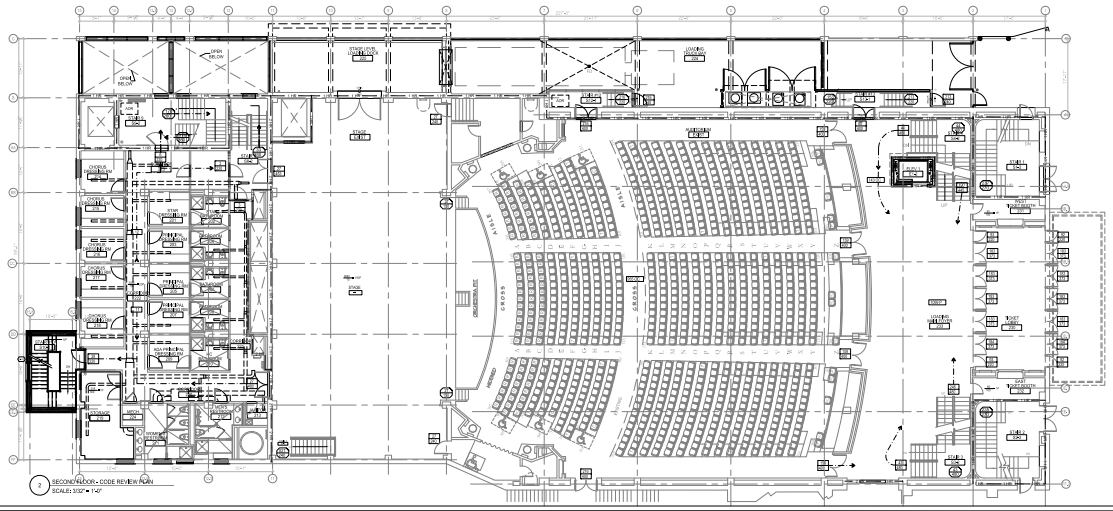


SECOND FLOOR USE PLAN



2 SECOND FLOOR - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"

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83 PARK STREET
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REVISIONS:

1st & 2nd FLOOR CODE PLANS

DATE: AUGUST 20, 2013

NCA JOB NO.: 1046.20

DRAWING NO.: **A-011**

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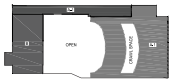
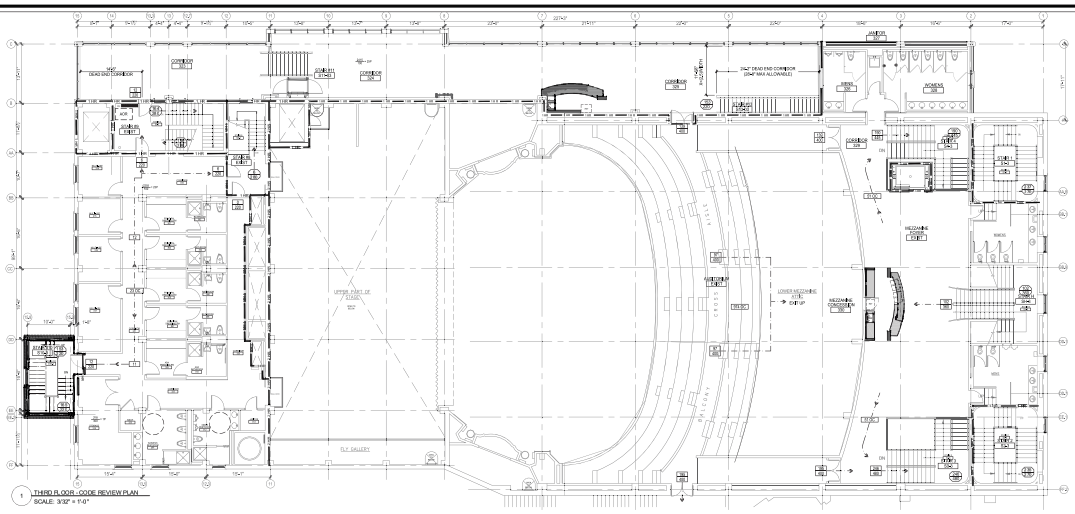
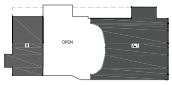


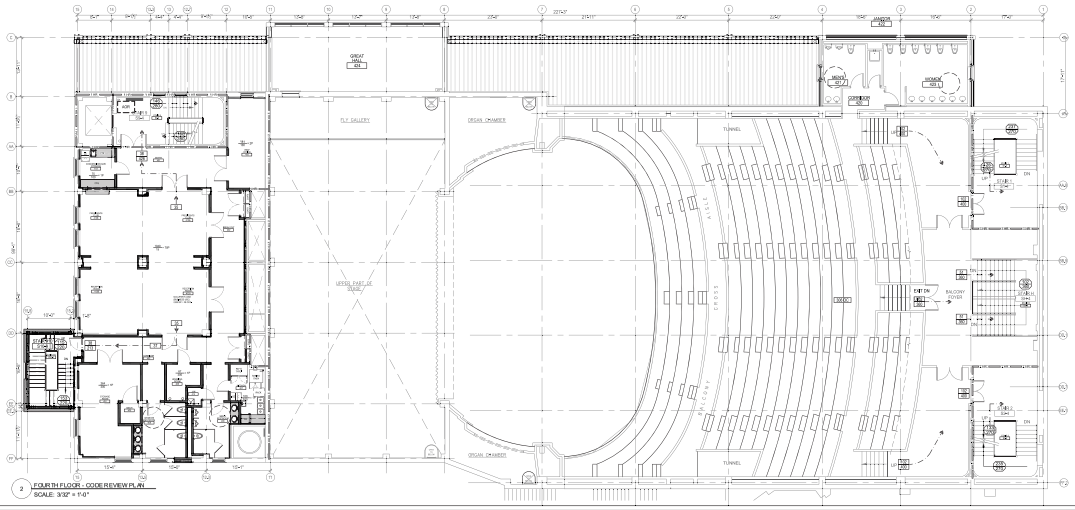
THIRD FLOOR USE PLAN



1 THIRD FLOOR - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"



FOURTH FLOOR USE PLAN



2 FOURTH FLOOR - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"

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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

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3rd & 4th FLOOR CODE PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

A-012

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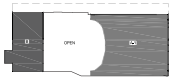
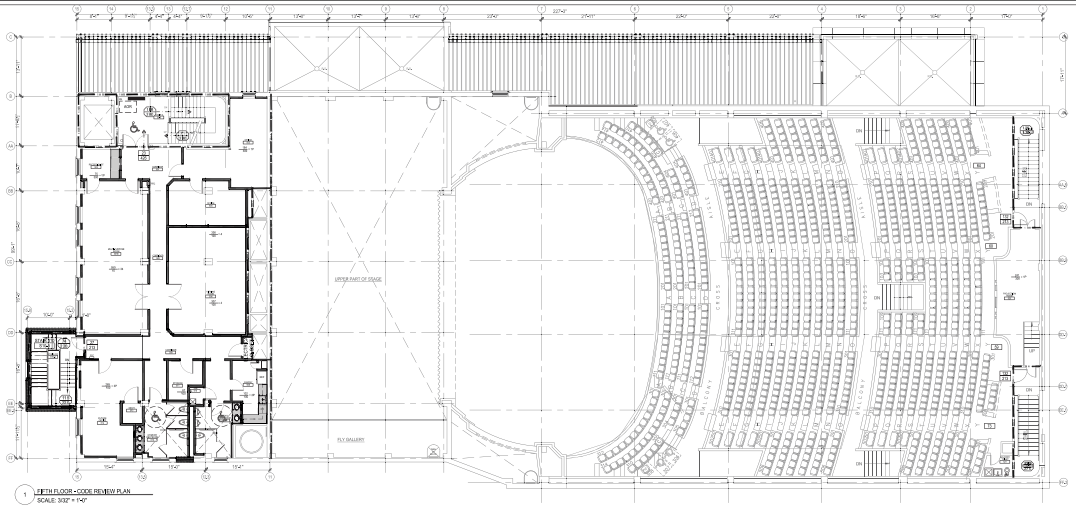
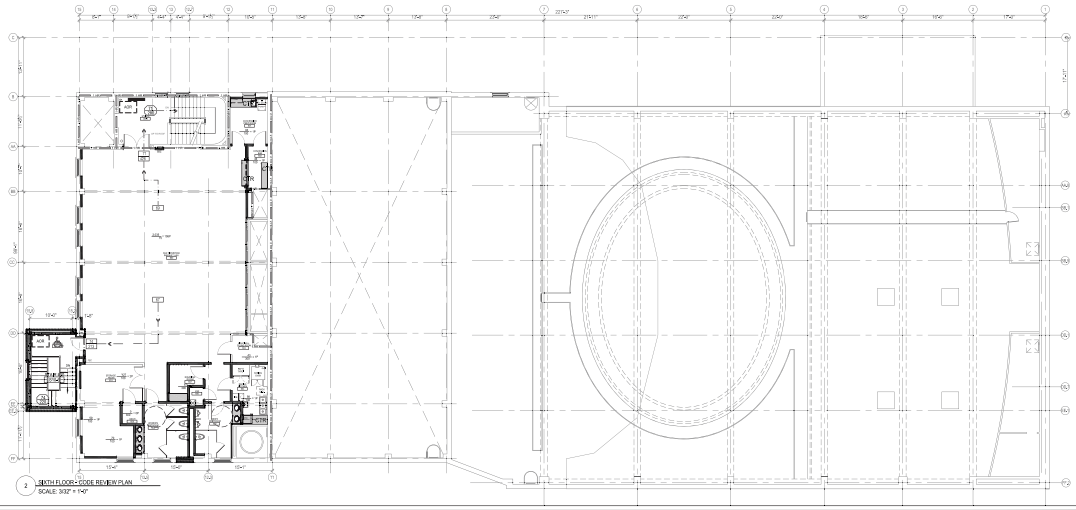


FIFTH FLOOR USE PLAN



1 FIFTH FLOOR - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"

SIXTH FLOOR USE PLAN



2 SIXTH FLOOR - CODE REVIEW PLAN
SCALE: 3/32" = 1'-0"

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83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

5th & 6th FLOOR CODE PLANS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	A-013

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Legend

Exist.	Prop.	
		PROPERTY LINE
		PROJECT LIMIT LINE
		RIGHT–OF–WAY/PROPERTY LINE
		EASEMENT
		BUILDING SETBACK
		PARKING SETBACK
10+00	10+00	BASELINE
		CONSTRUCTION LAYOUT
		ZONING LINE
		TOWN LINE
		LIMIT OF DISTURBANCE
		WETLAND LINE WITH FLAG
		FLOODPLAIN
BLSF		BORDERING LAND SUBJECT TO FLOODING
BZ		WETLAND BUFFER ZONE
NDZ		NO DISTURB ZONE
200'RA		200' RIVERFRONT AREA
		GRAVEL ROAD
EOP		EDGE OF PAVEMENT
BB	BB	BITUMINOUS BERM
BC	BC	BITUMINOUS CURB
CC	CC	CONCRETE CURB
	CG	CURB AND GUTTER
CC	ECC	EXTRUDED CONCRETE CURB
CC	MCC	MONOLITHIC CONCRETE CURB
CC	PCC	PRECAST CONC. CURB
SGE	SGE	SLOPED GRAN. EDGING
VGC	VGC	VERT. GRAN. CURB
		LIMIT OF CURB TYPE
		SAWCUT
		BUILDING
	EN	BUILDING ENTRANCE
	LD	LOADING DOCK
		BOLLARD
D	D	DUMPSTER PAD
		SIGN
		DOUBLE SIGN
		STEEL GUARDRAIL
		WOOD GUARDRAIL
		PATH
		TREE LINE
		WIRE FENCE
		FENCE
		STOCKADE FENCE
		STONE WALL
		RETAINING WALL
		STREAM / POND / WATER COURSE
		DETENTION BASIN
		HAY BALES
		SILT FENCE
4	4	MINOR CONTOUR
20	20	MAJOR CONTOUR
10	10	PARKING COUNT
	C10	COMPACT PARKING STALLS
DYL	DYL	DOUBLE YELLOW LINE
SL	SL	STOP LINE
		CROSSWALK
		ACCESSIBLE CURB RAMP
		ACCESSIBLE PARKING
VAN	VAN	VAN–ACCESSIBLE PARKING

Exist.	Prop.	
		CONCRETE
		HEAVY DUTY PAVEMENT
		RIPRAP
		CONSTRUCTION ENTRANCE
27.35 TC×	27.35 TC×	TOP OF CURB ELEVATION
26.85 BC×	26.85 BC×	BOTTOM OF CURB ELEVATION
132.75 ×	132.75 ×	SPOT ELEVATION
45.0 TW× 38.5 BW	45.0 TW× 38.5 BW	TOP & BOTTOM OF WALL ELEVATION
		BORING LOCATION
		TEST PIT LOCATION
MW	MW	MONITORING WELL
UD	UD	UNDERDRAIN
12"D	12"D	DRAIN
6"RD	6"RD	ROOF DRAIN
12"S	12"S	SEWER
FM	FM	FORCE MAIN
OHW	OHW	OVERHEAD WIRE
6"W	6"W	WATER
4"FP	4"FP	FIRE PROTECTION
	2"DW	DOMESTIC WATER
3"G	G	GAS
E	E	ELECTRIC
STM	STM	STEAM
T	T	TELEPHONE
FA	FA	FIRE ALARM
CATV	CATV	CABLE TV
		CATCH BASIN
		DOUBLE CATCH BASIN
		GUTTER INLET
D		DRAIN MANHOLE
TD		TRENCH DRAIN
		PLUG OR CAP
CO	CO	CLEANOUT
		FLARED END SECTION
		HEADWALL
S		SEWER MANHOLE
CS	CS	CURB STOP & BOX
WV	WV	WATER VALVE & BOX
TSV	TSV	TAPPING SLEEVE, VALVE & BOX
		SIAMESE CONNECTION
HYD	HYD	FIRE HYDRANT
WM	WM	WATER METER
PIV	PIV	POST INDICATOR VALVE
W	W	WATER WELL
GG	GG	GAS GATE
GM	GM	GAS METER
E	EMH	ELECTRIC MANHOLE
EM	EM	ELECTRIC METER
		LIGHT POLE
T	TMH	TELEPHONE MANHOLE
T	T	TRANSFORMER PAD
		UTILITY POLE
		GUY POLE
		GUY WIRE & ANCHOR
HH	HH	HAND HOLE
PB	PB	PULL BOX
	Matchline	MATCHLINE

Abbreviations

General

ABAN	ABANDON
ACR	ACCESSIBLE CURB RAMP
ADJ	ADJUST
APPROX	APPROXIMATE
BIT	BITUMINOUS
BS	BOTTOM OF SLOPE
BWLL	BROKEN WHITE LANE LINE
CONC	CONCRETE
DYCL	DOUBLE YELLOW CENTER LINE
EL	ELEVATION
ELEV	ELEVATION
EXIST	EXISTING
FDN	FOUNDATION
FFE	FIRST FLOOR ELEVATION
GRAN	GRANITE
GTD	GRADE TO DRAIN
LA	LANDSCAPE AREA
LOD	LIMIT OF DISTURBANCE
MAX	MAXIMUM
MIN	MINIMUM
NIC	NOT IN CONTRACT
NTS	NOT TO SCALE
PERF	PERFORATED
PROP	PROPOSED
REM	REMOVE
RET	RETAIN
R&D	REMOVE AND DISPOSE
R&R	REMOVE AND RESET
SWEL	SOLID WHITE EDGE LINE
SWLL	SOLID WHITE LANE LINE
TS	TOP OF SLOPE
TYP	TYPICAL

Utility

CB	CATCH BASIN
CMP	CORRUGATED METAL PIPE
CO	CLEANOUT
DCB	DOUBLE CATCH BASIN
DMH	DRAIN MANHOLE
CIP	CAST IRON PIPE
COND	CONDUIT
DIP	DUCTILE IRON PIPE
FES	FLARED END SECTION
FM	FORCE MAIN
F&G	FRAME AND GRATE
F&C	FRAME AND COVER
GI	GUTTER INLET
GT	GREASE TRAP
HDPE	HIGH DENSITY POLYETHYLENE PIPE
HH	HANDHOLE
HW	HEADWALL
HYD	HYDRANT
INV	INVERT ELEVATION
I=	INVERT ELEVATION
LP	LIGHT POLE
MES	METAL END SECTION
PWW	PAVED WATER WAY
PVC	POLYVINYLCHLORIDE PIPE
RCP	REINFORCED CONCRETE PIPE
R=	RIM ELEVATION
SMH	SEWER MANHOLE
TSV	TAPPING SLEEVE, VALVE AND BOX
UG	UNDERGROUND
UP	UTILITY POLE

Notes:

General

1. CONTRACTOR SHALL NOTIFY "DIG–SAFE" (1–888–344–7233) AT LEAST 72 HOURS BEFORE EXCAVATING.
2. CONTRACTOR SHALL BE RESPONSIBLE FOR SITE SECURITY AND JOB SAFETY. CONSTRUCTION ACTIVITIES SHALL BE IN ACCORDANCE WITH OSHA STANDARDS AND LOCAL REQUIREMENTS.
3. ACCESSIBLE ROUTES, PARKING SPACES, RAMPS, SIDEWALKS AND WALKWAYS SHALL BE CONSTRUCTED IN CONFORMANCE WITH THE FEDERAL AMERICANS WITH DISABILITIES ACT AND WITH STATE AND LOCAL LAWS AND REGULATIONS (WHICHEVER ARE MORE STRINGENT).
4. WITHIN THE LIMITS OF THE BUILDING FOOTPRINT, THE SITE CONTRACTOR SHALL PERFORM EARTHWORK OPERATIONS REQUIRED UP TO SUBGRADE ELEVATIONS.
5. WORK WITHIN THE LOCAL RIGHTS–OF–WAY SHALL CONFORM TO LOCAL MUNICIPAL STANDARDS. WORK WITHIN STATE RIGHTS–OF–WAY SHALL CONFORM TO THE LATEST EDITION OF THE STATE HIGHWAY DEPARTMENTS STANDARD SPECIFICATIONS FOR HIGHWAYS AND BRIDGES.
6. UPON AWARD OF CONTRACT, CONTRACTOR SHALL MAKE NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN NECESSARY PERMITS, PAY FEES, AND POST BONDS ASSOCIATED WITH THE WORK INDICATED ON THE DRAWINGS, IN THE SPECIFICATIONS, AND IN THE CONTRACT DOCUMENTS. DO NOT CLOSE OR OBSTRUCT ROADWAYS, SIDEWALKS, AND FIRE HYDRANTS, WITHOUT APPROPRIATE PERMITS.
7. TRAFFIC SIGNAGE AND PAVEMENT MARKINGS SHALL CONFORM TO THE MANUAL OF UNIFORM TRAFFIC CONTROL DEVICES.
8. AREAS OUTSIDE THE LIMITS OF PROPOSED WORK DISTURBED BY THE CONTRACTOR'S OPERATIONS SHALL BE RESTORED BY THE CONTRACTOR TO THEIR ORIGINAL CONDITION AT THE CONTRACTOR'S EXPENSE.
9. IN THE EVENT THAT SUSPECTED CONTAMINATED SOIL, GROUNDWATER, AND OTHER MEDIA ARE ENCOUNTERED DURING EXCAVATION AND CONSTRUCTION ACTIVITIES BASED ON VISUAL, OLFACTORY, OR OTHER EVIDENCE, THE CONTRACTOR SHALL STOP WORK IN THE VICINITY OF THE SUSPECT MATERIAL TO AVOID FURTHER SPREADING OF THE MATERIAL, AND SHALL NOTIFY THE OWNER IMMEDIATELY SO THAT THE APPROPRIATE TESTING AND SUBSEQUENT ACTION CAN BE TAKEN.
10. CONTRACTOR SHALL PREVENT DUST, SEDIMENT, AND DEBRIS FROM EXITING THE SITE AND SHALL BE RESPONSIBLE FOR CLEANUP, REPAIRS AND CORRECTIVE ACTION IF SUCH OCCURS.
11. DAMAGE RESULTING FROM CONSTRUCTION LOADS SHALL BE REPAIRED BY THE CONTRACTOR AT NO ADDITIONAL COST TO OWNER.
12. CONTRACTOR SHALL CONTROL STORMWATER RUNOFF DURING CONSTRUCTION TO PREVENT ADVERSE IMPACTS TO OFF SITE AREAS, AND SHALL BE RESPONSIBLE TO REPAIR RESULTING DAMAGES, IF ANY, AT NO COST TO OWNER.

Utilities

1. THE LOCATIONS, SIZES, AND TYPES OF EXISTING UTILITIES ARE SHOWN AS AN APPROXIMATE REPRESENTATION ONLY. THE OWNER OR IT'S REPRESENTATIVE(S) HAVE NOT INDEPENDENTLY VERIFIED THIS INFORMATION AS SHOWN ON THE PLANS. THE UTILITY INFORMATION SHOWN DOES NOT GUARANTEE THE ACTUAL EXISTENCE, SERVICEABILITY, OR OTHER DATA CONCERNING THE UTILITIES, NOR DOES IT GUARANTEE AGAINST THE POSSIBILITY THAT ADDITIONAL UTILITIES MAY BE PRESENT THAT ARE NOT SHOWN ON THE PLANS. PRIOR TO ORDERING MATERIALS AND BEGINNING CONSTRUCTION, THE CONTRACTOR SHALL VERIFY AND DETERMINE THE EXACT LOCATIONS, SIZES, AND ELEVATIONS OF THE POINTS OF CONNECTIONS TO EXISTING UTILITIES AND, SHALL CONFIRM THAT THERE ARE NO INTERFERENCES WITH EXISTING UTILITIES AND THE PROPOSED UTILITY ROUTES, INCLUDING ROUTES WITHIN THE PUBLIC RIGHTS OF WAY.
2. WHERE AN EXISTING UTILITY IS FOUND TO CONFLICT WITH THE PROPOSED WORK, OR EXISTING CONDITIONS DIFFER FROM THOSE SHOWN SUCH THAT THE WORK CANNOT BE COMPLETED AS INTENDED, THE LOCATION, ELEVATION, AND SIZE OF THE UTILITY SHALL BE ACCURATELY DETERMINED WITHOUT DELAY BY THE CONTRACTOR, AND THE INFORMATION FURNISHED IN WRITING TO THE OWNER'S REPRESENTATIVE FOR THE RESOLUTION OF THE CONFLICT AND CONTRACTOR'S FAILURE TO NOTIFY PRIOR TO PERFORMING ADDITIONAL WORK RELEASES OWNER FROM OBLIGATIONS FOR ADDITIONAL PAYMENTS WHICH OTHERWISE MAY BE WARRANTED TO RESOLVE THE CONFLICT.
3. SET CATCH BASIN RIMS, AND INVERTS OF SEWERS, DRAINS, AND DITCHES IN ACCORDANCE WITH ELEVATIONS ON THE GRADING AND UTILITY PLANS.
4. RIM ELEVATIONS FOR DRAIN AND SEWER MANHOLES, WATER VALVE COVERS, GAS GATES, ELECTRIC AND TELEPHONE PULL BOXES, AND MANHOLES, AND OTHER SUCH ITEMS, ARE APPROXIMATE AND SHALL BE SET/RESET AS FOLLOWS:
   A. PAVEMENTS AND CONCRETE SURFACES: FLUSH
   B. ALL SURFACES ALONG ACCESSIBLE ROUTES: FLUSH
   C. LANDSCAPE, LOAM AND SEED, AND OTHER EARTH SURFACE AREAS: ONE INCH ABOVE SURROUNDING AREA AND TAPER EARTH TO THE RIM ELEVATION.
5. THE LOCATION, SIZE, DEPTH, AND SPECIFICATIONS FOR CONSTRUCTION OF PROPOSED PRIVATE UTILITY SERVICES SHALL BE INSTALLED ACCORDING TO THE REQUIREMENTS PROVIDED BY, AND APPROVED BY, THE RESPECTIVE UTILITY COMPANY (GAS, TELEPHONE, ELECTRIC, FIRE ALARM, ETC.). FINAL DESIGN LOADS AND LOCATIONS TO BE COORDINATED WITH OWNER AND ARCHITECT.
6. CONTRACTOR SHALL MAKE ARRANGEMENTS FOR AND SHALL BE RESPONSIBLE FOR PAYING FEES FOR POLE RELOCATION AND FOR THE ALTERATION AND ADJUSTMENT OF GAS, ELECTRIC, TELEPHONE, FIRE ALARM, AND ANY OTHER PRIVATE UTILITIES, WHETHER WORK IS PERFORMED BY CONTRACTOR OR BY THE UTILITIES COMPANY.
7. CONTRACTOR SHALL COORDINATE WITH ELECTRICAL CONTRACTOR AND SHALL FURNISH EXCAVATION, INSTALLATION, AND BACKFILL OF ELECTRICAL FURNISHED SITEWORK RELATED ITEMS SUCH AS PULL BOXES, CONDUITS, DUCT BANKS, LIGHT POLE BASES, AND CONCRETE PADS. SITE CONTRACTOR SHALL FURNISH CONCRETE ENCASEMENT OF DUCT BANKS IF REQUIRED BY THE UTILITY COMPANY AND AS INDICATED ON THE DRAWINGS.
8. CONTRACTOR SHALL EXCAVATE AND BACKFILL TRENCHES FOR GAS IN ACCORDANCE WITH GAS COMPANY'S REQUIREMENTS.
9. ALL DRAINAGE AND SANITARY STRUCTURE INTERIOR DIAMETERS (4' MIN.) SHALL BE DETERMINED BY THE MANUFACTURER BASED ON THE PIPE CONFIGURATIONS SHOWN ON THESE PLANS AND LOCAL MUNICIPAL STANDARDS. FOR MANHOLES THAT ARE 20 FEET IN DEPTH AND GREATER, THE MINIMUM DIAMETER SHALL BE 5 FEET.

Layout and Materials

1. DIMENSIONS ARE FROM THE FACE OF CURB, FACE OF BUILDING, FACE OF WALL, AND CENTER LINE OF PAVEMENT MARKINGS, UNLESS OTHERWISE NOTED.
2. CURB RADII ARE 5 FEET UNLESS OTHERWISE NOTED.
3. CURBING SHALL BE PCC WITHIN THE SITE UNLESS OTHERWISE INDICATED ON THE PLANS.
4. SEE ARCHITECTURAL DRAWINGS FOR EXACT BUILDING DIMENSIONS AND DETAILS CONTIGUOUS TO THE BUILDING, INCLUDING SIDEWALKS, RAMPS, BUILDING ENTRANCES, STAIRWAYS, UTILITY PENETRATIONS, CONCRETE DOOR PADS, COMPACTOR PAD, LOADING DOCKS, BOLLARDS, ETC.
5. PROPOSED BOUNDS AND ANY EXISTING PROPERTY LINE MONUMENTATION DISTURBED DURING CONSTRUCTION SHALL BE SET OR RESET BY A PROFESSIONAL LICENSED SURVEYOR.
6. PRIOR TO START OF CONSTRUCTION, CONTRACTOR SHALL VERIFY EXISTING PAVEMENT ELEVATIONS AT INTERFACE WITH PROPOSED PAVEMENTS, AND EXISTING GROUND ELEVATIONS ADJACENT TO DRAINAGE OUTLETS TO ASSURE PROPER TRANSITIONS BETWEEN EXISTING AND PROPOSED FACILITIES.
7. SYMBOLS AND LEGENDS OF PROJECT FEATURES ARE GRAPHIC REPRESENTATIONS AND ARE NOT NECESSARILY SCALED TO THEIR ACTUAL DIMENSIONS OR LOCATIONS ON THE DRAWINGS. THE CONTRACTOR SHALL REFER TO THE DETAIL SHEET DIMENSIONS, MANUFACTURERS' LITERATURE, SHOP DRAWINGS AND FIELD MEASUREMENTS OF SUPPLIED PRODUCTS FOR LAYOUT OF THE PROJECT FEATURES.
8. CONTRACTOR SHALL NOT RELY SOLELY ON ELECTRONIC VERSIONS OF PLANS, SPECIFICATIONS, AND DATA FILES THAT ARE OBTAINED FROM THE DESIGNERS, BUT SHALL VERIFY LOCATION OF PROJECT FEATURES IN ACCORDANCE WITH THE PAPER COPIES OF THE PLANS AND SPECIFICATIONS THAT ARE SUPPLIED AS PART OF THE CONTRACT DOCUMENTS.
9. REFER TO LANDSCAPE PLANS FOR SPECIAL SURFACE TREATMENTS, CONCRETE SIDEWALK SCORING PATTERNS, FENCING, ETC.

Demolition

1. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING MANMADE SURFACE FEATURES WITHIN THE LIMIT OF WORK INCLUDING BUILDINGS, STRUCTURES, PAVEMENTS, SLABS, CURBING, FENCES, UTILITY POLES, SIGNS, ETC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS. REMOVE AND DISPOSE OF EXISTING UTILITIES, FOUNDATIONS AND UNSUITABLE MATERIAL BENEATH AND FOR A DISTANCE OF 10 FEET BEYOND THE PROPOSED BUILDING FOOTPRINT INCLUDING EXTERIOR COLUMNS.
2. EXISTING UTILITIES SHALL BE TERMINATED, UNLESS OTHERWISE NOTED, IN CONFORMANCE WITH LOCAL, STATE AND INDIVIDUAL UTILITY COMPANY STANDARD SPECIFICATIONS AND DETAILS. THE CONTRACTOR SHALL COORDINATE UTILITY SERVICE DISCONNECTS WITH THE UTILITY REPRESENTATIVES.
3. CONTRACTOR SHALL DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.
4. THE DEMOLITION LIMITS DEPICTED IN THE PLANS IS INTENDED TO AID THE CONTRACTOR DURING THE BIDDING AND CONSTRUCTION PROCESS AND IS NOT INTENDED TO DEPICT EACH AND EVERY ELEMENT OF DEMOLITION. THE CONTRACTOR IS RESPONSIBLE FOR IDENTIFYING THE DETAILED SCOPE OF DEMOLITION BEFORE SUBMITTING ITS BID/PROPOSAL TO PERFORM THE WORK AND SHALL MAKE NO CLAIMS AND SEEK NO ADDITIONAL COMPENSATION FOR CHANGED CONDITIONS OR UNFORESEEN OR LATENT SITE CONDITIONS RELATED TO ANY CONDITIONS DISCOVERED DURING EXECUTION OF THE WORK.
5. UNLESS OTHERWISE SPECIFICALLY PROVIDED ON THE PLANS OR IN THE SPECIFICATIONS, THE ENGINEER HAS NOT PREPARED DESIGNS FOR AND SHALL HAVE NO RESPONSIBILITY FOR THE PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF HAZARDOUS MATERIALS, TOXIC WASTES OR POLLUTANTS AT THE PROJECT SITE. THE ENGINEER SHALL NOT BE RESPONSIBLE FOR ANY CLAIMS OF LOSS, DAMAGE, EXPENSE, DELAY, INJURY OR DEATH ARISING FROM THE PRESENCE OF HAZARDOUS MATERIAL AND CONTRACTOR SHALL INDEMNIFY AND HOLD HARMLESS THE ENGINEER FROM ANY CLAIMS MADE IN CONNECTION THEREWITH. MOREOVER, THE ENGINEER SHALL HAVE NO ADMINISTRATIVE OBLIGATIONS OF ANY TYPE WITH REGARD TO ANY CONTRACTOR AMENDMENT INVOLVING THE ISSUES OF PRESENCE, DISCOVERY, REMOVAL, ABATEMENT OR DISPOSAL OF ASBESTOS OR OTHER HAZARDOUS MATERIALS.

Erosion Control

5. PRIOR TO STARTING ANY OTHER WORK ON THE SITE, THE CONTRACTOR SHALL NOTIFY APPROPRIATE AGENCIES AND SHALL INSTALL EROSION CONTROL MEASURES AS SHOWN ON THE PLANS AND AS IDENTIFIED IN FEDERAL, STATE, AND LOCAL APPROVAL DOCUMENTS PERTAINING TO THIS PROJECT.
6. CONTRACTOR SHALL INSPECT AND MAINTAIN EROSION CONTROL MEASURES, AND REMOVE SEDIMENT THEREFROM ON A WEEKLY BASIS AND WITHIN TWELVE HOURS AFTER EACH STORM EVENT AND DISPOSE OF SEDIMENTS IN AN UPLAND AREA SUCH THAT THEY DO NOT ENCUMBER OTHER DRAINAGE STRUCTURES AND PROTECTED AREAS.
7. CONTRACTOR SHALL BE FULLY RESPONSIBLE TO CONTROL CONSTRUCTION SUCH THAT SEDIMENTATION SHALL NOT AFFECT REGULATORY PROTECTED AREAS, WHETHER SUCH SEDIMENTATION IS CAUSED BY WATER, WIND, OR DIRECT DEPOSIT.
8. CONTRACTOR SHALL PERFORM CONSTRUCTION SEQUENCING SUCH THAT EARTH MATERIALS ARE EXPOSED FOR A MINIMUM OF TIME BEFORE THEY ARE COVERED, SEEDED, OR OTHERWISE STABILIZED TO PREVENT EROSION.
9. UPON COMPLETION OF CONSTRUCTION AND ESTABLISHMENT OF PERMANENT GROUND COVER, CONTRACTOR SHALL REMOVE AND DISPOSE OF EROSION CONTROL MEASURES AND CLEAN SEDIMENT AND DEBRIS FROM ENTIRE DRAINAGE AND SEWER SYSTEMS.

Existing Conditions Information

1. BASE PLAN: THE PROPERTY LINES, TOPOGRAPHY, AND PHYSICAL FEATURES ARE BASED ON AN ACTUAL FIELD SURVEY PERFORMED ON THE GROUND BY VHB IN JULY 2004 AND UPDATED IN MARCH 2011.
1. TOPOGRAPHY: ELEVATIONS ARE BASED ON THE CITY OF PROVIDENCE MEAN HIGH WATER DATUM.
2. GEOTECHNICAL DATA INCLUDING TEST PIT AND BORING LOCATIONS AND ELEVATIONS WERE OBTAINED FROM PAUL B ALDINGER & ASSOCIATES, INC., DATED MARCH 15, 2011.

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III
83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

LEGEND & GENERAL NOTES

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: C0.01

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Demolition Operations

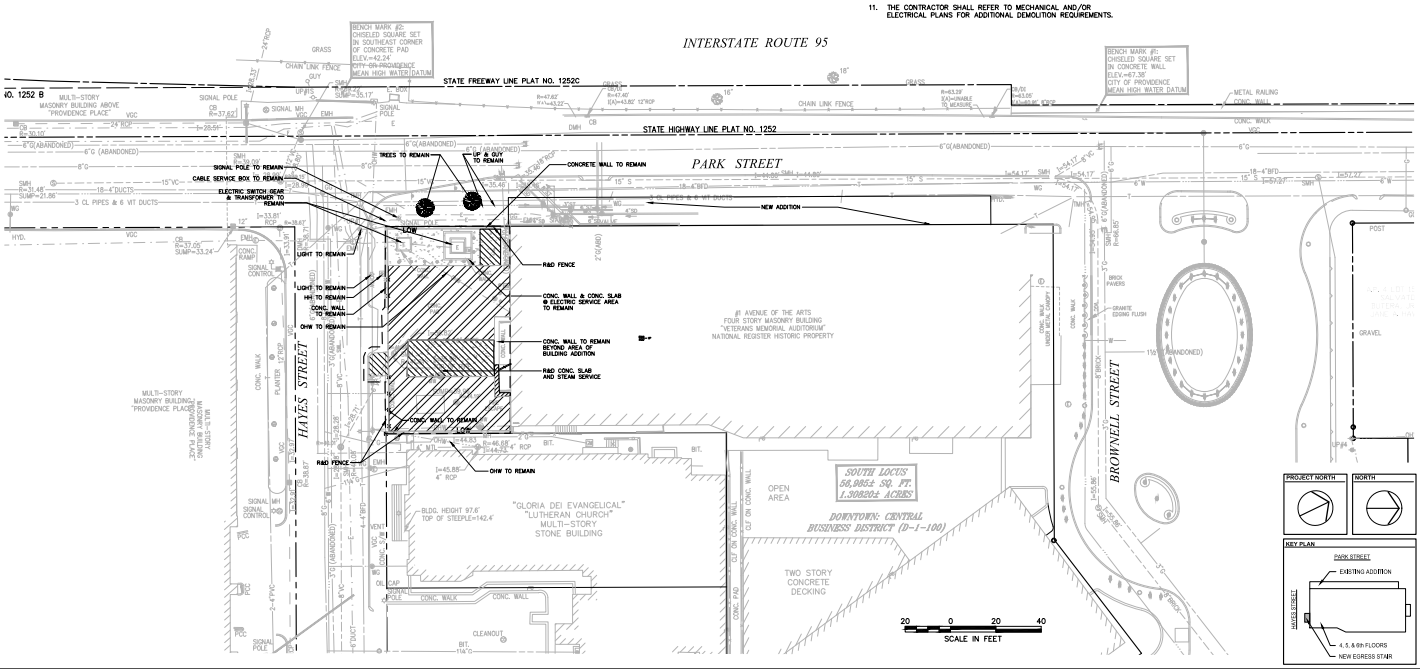
1. THE CONTRACTOR SHALL KEEP ADJOINING STREETS AND PROPERTIES FREE OF DEBRIS RESULTING FROM THE DEMOLITION AND SHALL BROOM AND/OR WATER CLEAN ON A DAILY BASIS IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
2. HOURS OF CONSTRUCTION OPERATIONS ARE TO BE PER LOCAL ORDINANCES.
3. UNDERGROUND STORAGE TANKS (UST) MAY BE ENCOUNTERED. IF AN UST IS ENCOUNTERED, THE CONTRACTOR SHALL IMMEDIATELY NOTIFY THE OWNER AND CEASE DEMOLITION IN THE AREA OF THE UST.
4. REFER TO SPECIFICATION SECTION 02000, GENERAL REQUIREMENTS, AND 02210, SITE PREPARATIONS AND DEMOLITION, FOR ADDITIONAL INFORMATION.
5. THE CONTRACTOR IS RESPONSIBLE FOR MAINTAINING AND PROTECTING ALL EXISTING SITE FEATURES TO REMAIN. ANY DAMAGE TO SAID FEATURES SHALL BE REPAIRED OR REPLACED AT THE OWNER'S DISCRETION AND AT THE CONTRACTOR'S EXPENSE.
6. AT LEAST SEVENTY-TWO (72) HOURS PRIOR EXCAVATION, THE CONTRACTOR SHALL NOTIFY ALL UTILITY COMPANIES AND/OR ALL LOCAL, STATE AND FEDERAL AGENCIES WHOSE FACILITIES MIGHT BE AFFECTED BY ANY WORK TO BE PERFORMED BY THE CONTRACTOR.
7. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING EXISTING UTILITIES TO REMAIN AND PROTECTING SAME AGAINST DAMAGE DURING DEMOLITION OPERATIONS. THE CONTRACTOR IS RESPONSIBLE FOR ALL REPLACEMENT AND COORDINATION COSTS ASSOCIATED WITH ANY DAMAGE TO EXISTING ACTIVE UTILITIES.
8. THE CONTRACTOR SHALL FURNISH, ERECT AND MAINTAIN ALL TEMPORARY BARRICADES, FENCES, COVERINGS, ENCLOSURES, SIGNS AND LIGHTING AS MAY BE REQUIRED TO CARRY ON DEMOLITION WORK IN ACCORDANCE WITH ALL APPLICABLE LOCAL, STATE AND FEDERAL REGULATIONS.
9. WHILE DEMOLITION AND CONSTRUCTION IS BEING PERFORMED, THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS PERTAINING TO HAULING /DISPOSAL OF DEMOLITION DEBRIS AND PUBLIC SAFETY
10. THE CONTRACTOR SHALL PLACE EROSION CONTROLS PRIOR TO DEMOLITION AND MAINTAIN THESE EROSION CONTROLS THROUGHOUT DURATION OF THE PROJECT.
11. THE USE OF EXPLOSIVES IS PROHIBITED ON THIS PROJECT.
12. ALL REMOVED MATERIAL SHALL BE DISPOSED OF AT AN OFF SITE LOCATION APPROVED BY ALL APPLICABLE FEDERAL, STATE, AND LOCAL AUTHORITIES. ALL HAULING OPERATIONS SHALL BE CONDUCTED IN STRICT CONFORMANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.
13. DUST CONTROL TREATMENTS SHALL BE APPLIED AS NECESSARY TO CONTROL AND REDUCE THE AMOUNT OF DUST THAT MAY CAUSE OFF SITE DAMAGE, BE A HEALTH HAZARD TO HUMANS, WILDLIFE, AND PLANT LIFE, OR POSE A HAZARD TO TRAFFIC SAFETY.
14. THE CONTRACTOR SHALL MAINTAIN FIRE TRUCK ACCESS TO THE EXISTING BUILDINGS TO REMAIN THROUGHOUT CONSTRUCTION AND AS DIRECTED BY THE FIRE DEPARTMENT.
15. ANY EXISTING MONUMENTS DISTURBED DURING DEMOLITION SHALL BE RESET BY A LICENSED PROFESSIONAL LAND SURVEYOR (PLS) AT THE CONTRACTORS EXPENSE.
16. THE CONTRACTOR SHALL MAKE ALL NECESSARY CONSTRUCTION NOTIFICATIONS AND APPLY FOR AND OBTAIN ALL NECESSARY PERMITS, PAY ALL FEES AND POST ALL BONDS ASSOCIATED WITH THE DEMOLITION WORK INDICATED ON THESE PLANS.
17. TREES TO REMAIN SHALL BE PROTECTED FROM DAMAGE DURING ALL OPERATIONS.

Demolition Notes

1. CONTRACTOR SHALL NOTIFY "DIG-SAFE" (1-888-344-7233) AT LEAST 72 HOURS BEFORE EXCAVATING.
2. THE LIMIT OF UTILITY DEMOLITION SHALL BE THE "LOD" OR "LIMIT OF DISTURBANCE" DEFINED ON THE PLANS.
3. CONTRACTOR SHALL REMOVE AND DISPOSE OF EXISTING MANMADE SURFACE FEATURES WITHIN THE LIMIT OF DISTURBANCE INCLUDING STRUCTURES, PAVEMENTS, SLABS, CURBING, FENCES, SIGNS, ETC. UNLESS INDICATED OTHERWISE ON THE DRAWINGS. CONTRACTOR SHACLL REMOVE AND DISPOSE OF EXISTING FOUNDATIONS AND UNSUITABLE MATERIAL UNLESS OTHERWISE NOTED..
4. CONTRACTOR SHALL DISPOSE OF DEMOLITION DEBRIS IN ACCORDANCE WITH APPLICABLE FEDERAL, STATE AND LOCAL REGULATIONS, ORDINANCES AND STATUTES.
5. ALL BELOW GRADE UTILITIES SHALL REMAIN AND BE PROTECTED UNLESS OTHERWISE NOTED.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING WHETHER EXISTING UTILITY LINES, PIPES, AND STRUCTURES ARE ACTIVE OR INACTIVE.
7. ACTIVE UTILITY LINES AND STRUCTURES NOT SPECIFICALLY NOTED ON PLANS, BUT WHICH ARE ENCOUNTERED TO BE IN CONFLICT WITH THE PROPOSED BUILDING REHABILITATION / SITE DEVELOPMENT PROGRAM, SHALL BE EXTENDED, PROTECTED, OR REWORKED BY THE CONTRACTOR AS DIRECTED OR REQUIRED BY THE UTILITY COMPANY OR OWNER.
8. THE CONTRACTOR SHALL PROTECT AND MAINTAIN ALL BUILDINGS TO REMAIN AND ALL ACTIVE UTILITIES THAT SERVICE THE BUILDINGS TO REMAIN. REFER TO ARCHITECTURAL PLANS FOR BUILDING DEMOLITION INFORMATION.
9. CONTRACTOR SHALL COORDINATE THE CUTTING AND CAPPING OF ALL UTILITIES WITH ALL APPLICABLE UTILITY COMPANIES HAVING JURISDICTION.
10. ALL TEST WELLS TO REMAIN UNLESS OTHERWISE NOTED.
11. THE CONTRACTOR SHALL REFER TO MECHANICAL AND/OR ELECTRICAL PLANS FOR ADDITIONAL DEMOLITION REQUIREMENTS.

Legend

	R&D CONCRETE
	R&D PAVEMENT
	TREE TO REMAIN
ABAN	ABANDON
LOD	LIMIT OF DISTURBANCE
REM	REMOVE
RET	RETAIN
R&D	REMOVE AND DISPOSE
R&S	REMOVE AND STOCKPILE
R&R	REMOVE AND RESET
TYP	TYPICAL



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

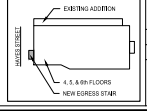
83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PROJECT NORTH | NORTH

KEY PLAN



SITE DEMOLITION

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: C0.02

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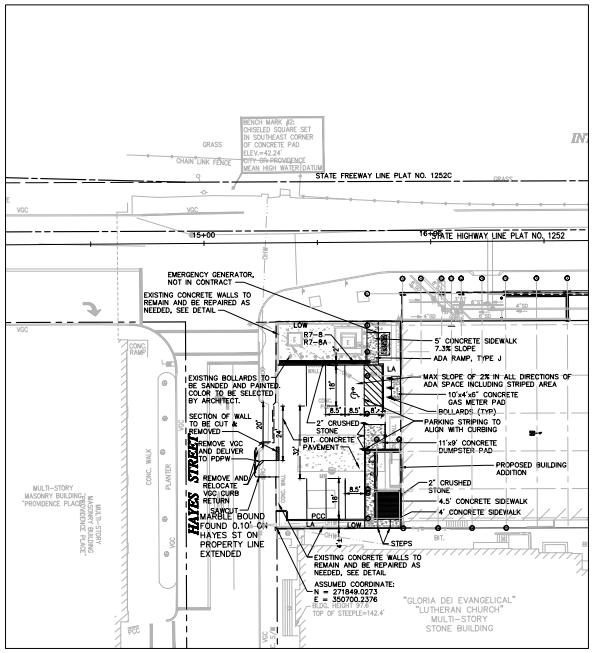
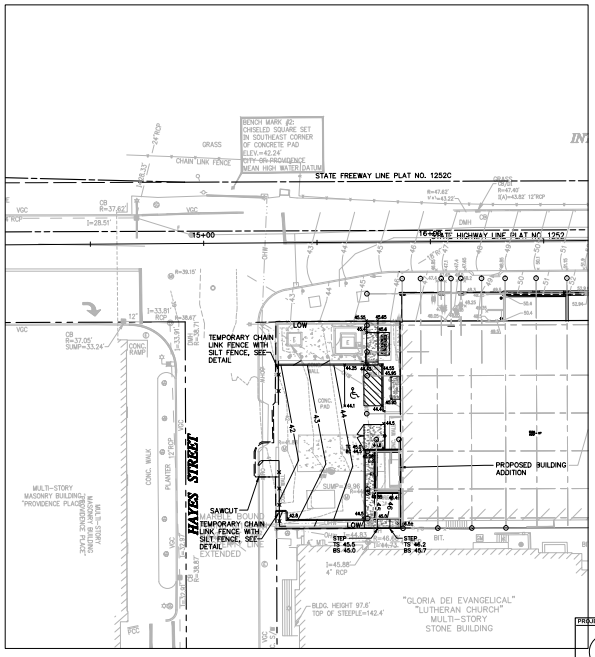
Sign Summary

M.U.T.C.D. Number	Specification Width	Specification Height	Desc.
R7-8	12"	18"	NO PARKING
R7-8A	12"	6"	ANYTIME

NOTE:
1. REFER TO SITE IMPROVEMENT AND LANDSCAPE PLANS FOR LIMITS OF SIDEWALK SCORING PATTERN, SPECIAL SIDEWALK SURFACE TREATMENT, FENCING, HANDRAILS, AND PLANTINGS.
2. CONDITIONS SHOWN HEREIN ALONG PARK STREET ARE APPROXIMATE BASED ON DESIGN PLANS NOT AN AS-BUILT SURVEY.



LAYOUT & MATERIALS PLAN



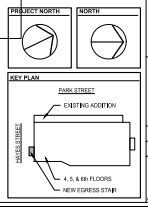
GRADING DRAINAGE AND EROSION CONTROL PLAN

20 0 20 40
SCALE IN FEET

PROJECT NORTH

NORTH

KEY PLAN



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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SITE PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: C0.03

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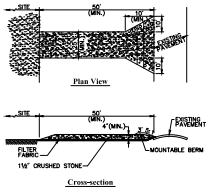
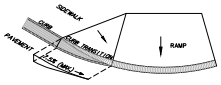


Notes:

1. ENTRANCE WIDTH SHALL BE A TWENTY-FIVE (25) FOOT MINIMUM, BUT NOT LESS THAN THE FULL WIDTH AT POINTS WHERE INGRESS OR EGRESS OCCURS.
2. THE ENTRANCE SHALL BE MAINTAINED IN A CONDITION WHICH SHALL PREVENT TRACKING OR FLOWING OF SEDIMENT ONTO PUBLIC RIGHTS-OF-WAY. THIS MAY REQUIRE PERIODIC TOP DRESSING WITH ADDITIONAL STONE AS CONDITIONS DEMAND AND REPAIR OR CLEANOUT OF ANY MEASURES USED TO TRAP SEDIMENT. ALL SEDIMENT SPILLED, DROPPED, WASHED OR TRACKED ONTO PUBLIC RIGHTS-OF-WAY MUST BE REMOVED IMMEDIATELY. BERM SHALL BE PERMITTED. PERIODIC INSPECTION AND MAINTENANCE SHALL BE PROVIDED AS NEEDED.
3. STABILIZED CONSTRUCTION EXIT SHALL BE REMOVED PRIOR TO FINAL FINISH MATERIALS BEING INSTALLED.

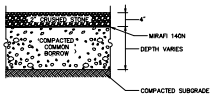
Stabilized Construction Exit 6/08
N.T.S. Source: VHB LD_682



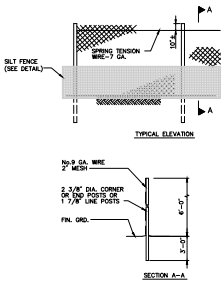
Notes:

1. GRANITE CURB SHALL BE 7 INCH WIDTH IN ACCORDANCE WITH CITY OF PROVIDENCE STANDARDS.
2. ACCESSIBLE RAMP SHALL BE CONSTRUCTED IN ACCORDANCE WITH R.I. STD. 43.3.1.

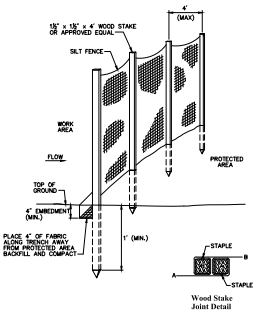
Sloped Face to Flush Granite Curb 11/10
N.T.S. Source: VHB REV LD_604



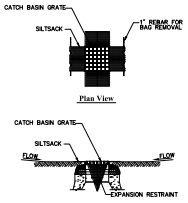
Stone Surface Section 2/12
N.T.S. Source: VHB



Temporary Chain Link Fence
S-1356RI N.T.S.



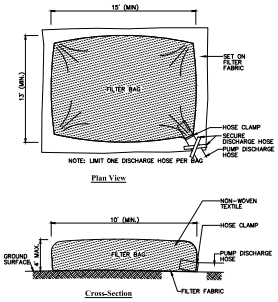
Silt Fence Barrier 6/08
N.T.S. Source: VHB LD_650



Notes:

1. INSTALL SILTSACK IN ALL CATCH BASINS WHERE INDICATED ON THE PLAN BEFORE COMMENCING WORK OR IN PAVED AREAS AFTER BINDER COURSE IS PLACED AND HAY BALES HAVE BEEN REMOVED.
2. GRATE TO BE PLACED OVER SILTSACK.
3. SILTSACK SHALL BE INSPECTED PERIODICALLY AND AFTER ALL STORM EVENTS AND CLEANING OR REPLACEMENT SHALL BE PERFORMED PROMPTLY AS NEEDED. MAINTAIN UNTIL UPSTREAM AREAS HAVE BEEN PERMANENTLY STABILIZED

Siltsack Sediment Trap 6/08
N.T.S. Source: VHB LD_674



Note:

BAG TO BE USED IN ACCORDANCE WITH MANUFACTURERS RECOMENDATIONS.

Dewatering Filter Bag 6/08
N.T.S. Source: VHB LD_691

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

DETAILS 1

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: C0.04

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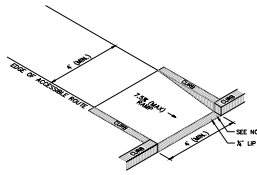
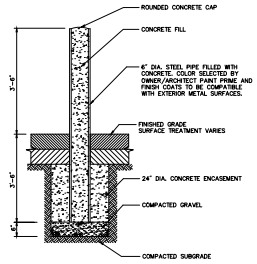


Notes:

1. THE MAXIMUM ALLOWABLE SIDEWALK AND CURB RAMP CROSS SLOPES SHALL BE 1.5 (1% MIN.).
2. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE EXCLUDING CURB RAMPS SHALL BE 5%.
3. THE MAXIMUM ALLOWABLE SLOPE OF ACCESSIBLE ROUTE AT CURB RAMPS SHALL BE 7.5%.
4. A MINIMUM OF 3 FEET CLEAR SHALL BE MAINTAINED AT ANY PERMANENT OBSTACLE IN ACCESSIBLE ROUTE (I.E., HYDRANTS, UTILITY POLES, TREE WELLS, SIGNS, ETC.).
5. CURB TREATMENT VARIES, SEE PLANS FOR CURB TYPE.
6. RAMP, CURB, AND ADJACENT PAVEMENTS SHALL BE GRADED TO PREVENT PONDING.
7. TYPICAL SIDEWALK SECTION FOR RAMP SECTION CONSTRUCTION.
8. WHERE ACCESSIBLE ROUTES ARE LESS THAN 5' IN WIDTH (EXCLUDING CURBING) A 5' x 5' PASSING AREA SHALL BE PROVIDED AT INTERVALS NOT TO EXCEED 200 FEET.
9. ELIMINATE CURBING AT RAMP WHERE IT ABUTS ROADWAY, EXCEPT WHERE VERTICAL CURBING IS INDICATED ON THE DRAWINGS TO BE INSTALLED AND SET FLUSH.

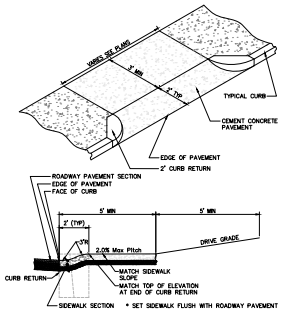
Accessible Curb Ramp (ACR) Type 'J' 11/10

N.T.S. Source: VHB LD_509



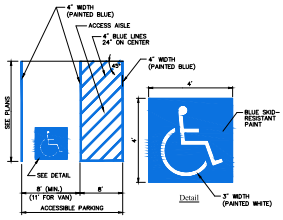
Bollard 6/08

N.T.S. Source: VHB LD_700



Driveway Cross Section (at 2' Curb Return) REV 5/04

N.T.S. Source: VHB R-CURB RETURN



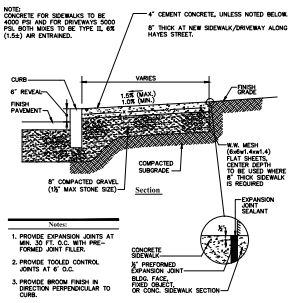
Notes:

1. ALL DIMENSIONS TO EDGES OF 4" PAVEMENT STRIPING.
2. 8' STALL WIDTH REFERS TO 8' CLEAR BETWEEN INSIDE EDGES OF PAVEMENT MARKINGS.
3. ALL SLOPES THROUGHOUT THE ACCESSIBLE PARKING AND AISLE AREAS SHALL NOT EXCEED 1.5%.

Accessible Parking Space 11/10

N.T.S. Source: VHB LD_592

NOTE:
CONCRETE FOR SIDEWALKS TO BE 4000 PSI AND FOR DRIVEWAYS 5000 PSI. BOTH MIXES TO BE TYPE II, 6% (1.5±) AIR ENTRAINED.

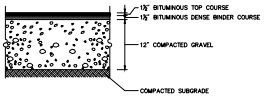


Notes:

1. PROVIDE EXPANSION JOINTS AT MIN. 50 FT. O.C. WITH PRE-FORMED JOINT FILLER.
2. PROVIDE TOOLED CONTROL JOINTS AT 6' O.C.
3. PROVIDE BROOM FINISH IN DIRECTION PERPENDICULAR TO CURB.
4. CONCRETE SHALL CONFORM TO RIDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGE CONSTRUCTION LATEST EDITION, SECTION 600.
5. REFER TO SPECIFICATIONS FOR EXPOSED AGGREGATE SURFACE, AS SHOWN ON PLANS.

Concrete Sidewalk 4/11

N.T.S. Source: VHB REV LD_420

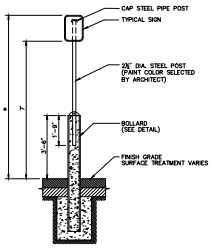


Note:

ASPHALT SHALL CONFORM TO RIDOT STANDARD SPECIFICATONS FOR ROAD AND BRIDGE CONSTRUCTION LATEST EDITION, PART 400.

Bituminous Concrete Pavement Section 12/11

N.T.S. Source: VHB LD_430



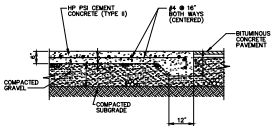
* THIS DIMENSION SHALL BE A MINIMUM OF 5' AND A MAXIMUM OF 8' FOR ACCESSIBLE SIGNAGE.

Note:

SIGN SHALL CONFORM TO RIDOT STANDARD SPECIFICATONS FOR ROAD AND BRIDGE CONSTRUCTION LATEST EDITION, SECTION 7.15.

Bollard Mounted Sign 6/08

N.T.S. Source: VHB LD_703



Notes:

1. SIZE OF PAD TO BE AS INDICATED ON PLANS.
2. CONSTRUCTION JOINTS SHALL BE SPACED NO MORE THAN 30 FEET ON CENTER AND SHALL BE EQUALLY SPACED OVER THE LENGTH AND WIDTH OF THE PAD.
3. CONCRETE SHALL CONFORM TO RIDOT STANDARD SPECIFICATIONS FOR ROADS AND BRIDGE CONSTRUCTION LATEST EDITION, SECTION 600.

Dumpster Pad 4/11

N.T.S. Source: VHB LD_710

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

DETAILS 2

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: C0.05

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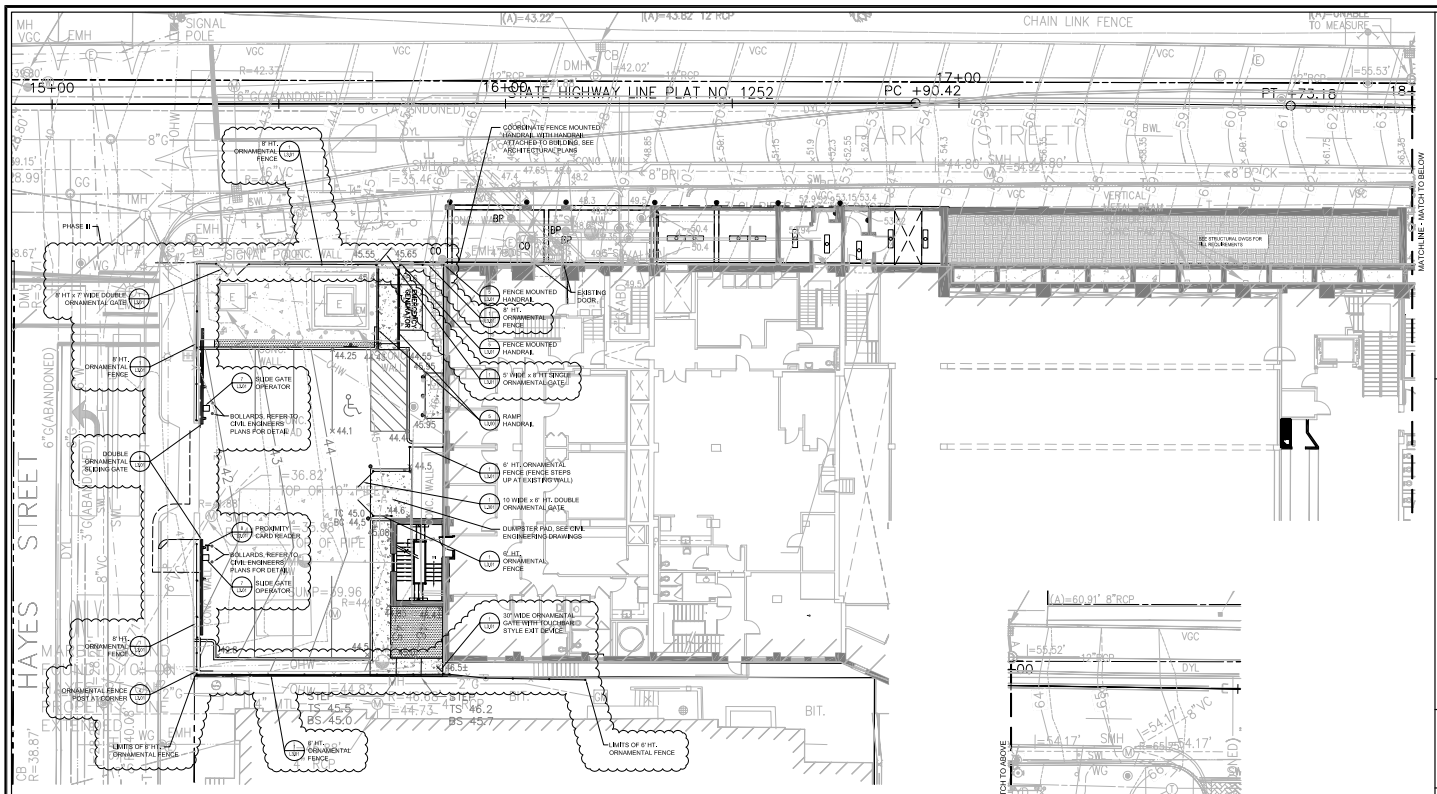


NOTES:
1. REFER TO CIVIL ENGINEERING DRAWINGS FOR GRADING PLANS AND ADDITIONAL SITE WORK.
2. COORDINATE REMOVAL OF TREE GRATES WITH SITE DEMOLITION.

SCALE IN FEET

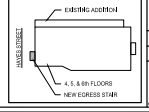
SCALE: 1"=10'

0 5 10 20 40

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SITE IMPROVEMENTS PLAN

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	L1.00

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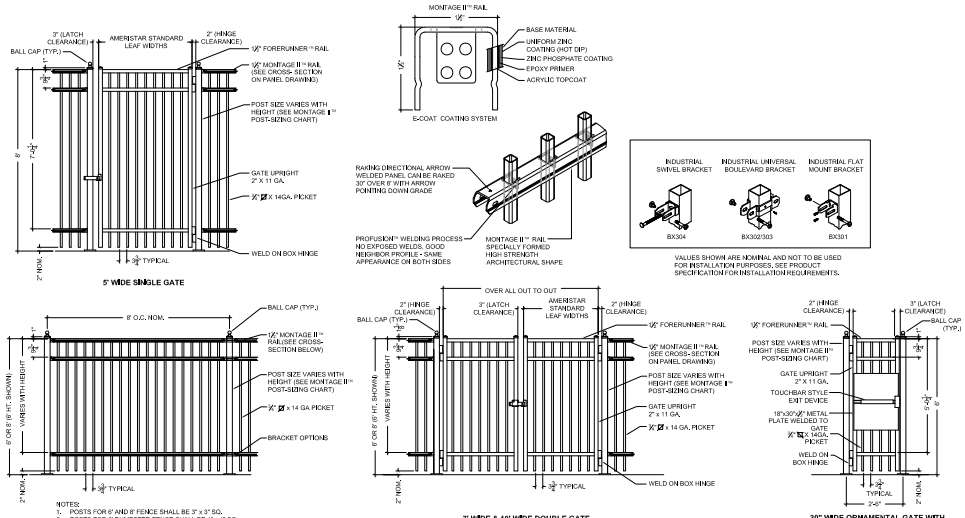
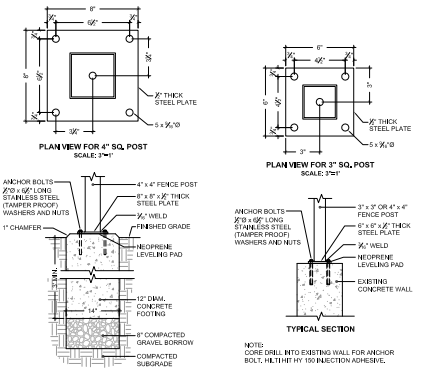
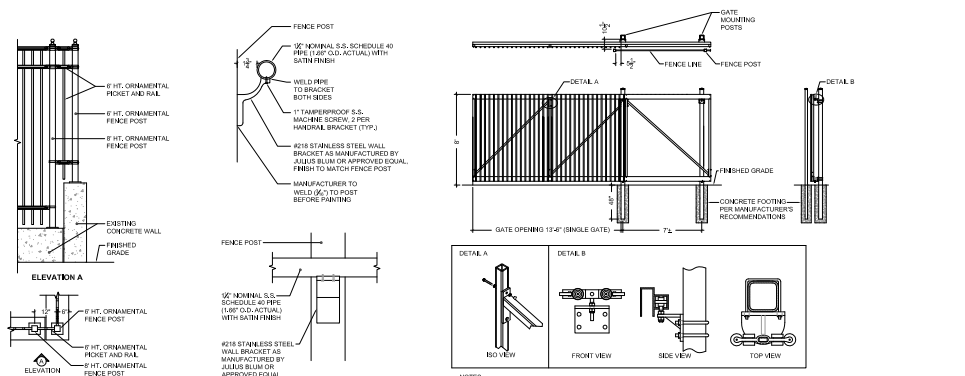


1 6' & 8' HEIGHT ORNAMENTAL FENCE AND GATES
SCALE: 1/2"=1'



2 DUMPSTER ENCLOSURE ORNAMENTAL FENCE FOOTING
SCALE: 1"=1'

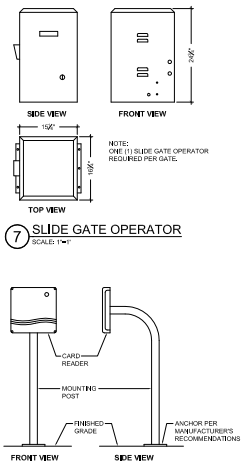
3 ORNAMENTAL FENCE BASE PLATE
SCALE: 1"=1'



4 6' & 8' HEIGHT ORNAMENTAL FENCE AT CORNER
SCALE: 1/2"=1'

5 FENCE MOUNTED HANDRAIL
SCALE: 3"=1'

6 DOUBLE ORNAMENTAL SLIDING GATE
SCALE: 1/4"=1'



7 SLIDE GATE OPERATOR
SCALE: 1"=1'

8 PROXIMITY CARD READER
SCALE: 1"=1'

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83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SITE IMPROVEMENTS DETAILS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: L3.01

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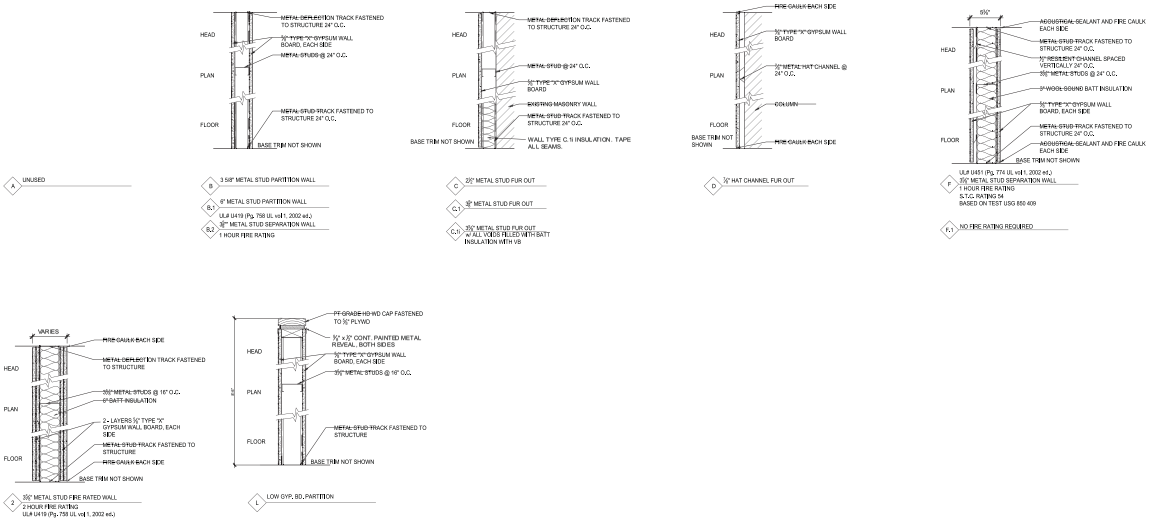

1 WALL TYPE ASSEMBLIES
SCALE: N.T.S.

NOTE: ANY WALL TYPE WITH AN "I" SHALL HAVE ALL VOIDS FILLED WITH BATT INSULATION.

GENERAL NOTES:

1. PROVIDE MOISTURE RESISTANT GYP. BOARD AT ALL WALLS AND CEILINGS IN PUBLIC RESTROOMS.
2. ALL ELECTRICAL OUTLETS IN A FIRE RATED WALLS MUST BE OFFSET BY 2'-0" MIN. ON OPPOSITE SIDES OF THE WALL.
3. ALL OUTLETS AND JUNCTION BOXES IN EXTERIOR WALLS ARE TO BE SEALED WITH CAULKING TO PREVENT AIR LEAKAGE.
4. REFER TO FINISH SCHEDULES FOR ADDITIONAL INFORMATION, INCLUDING FLOOR, WALL & BASE FINISHES, NOT SHOWN FOR CLARITY.
5. ALL WALL AND FLOOR PENETRATIONS SHOULD BE SEALED FOR THE PREVENTION OF SOUND TRANSMISSION.
6. PROVIDE FIRE CAULKING AROUND ALL PENETRATIONS THRU RATED ASSEMBLIES INCLUDING BUT NOT LIMITED TO PIPING, DUCTWORK, CONDUIT, ETC.
7. CONTRACTOR SHALL INFILL ANY AND ALL MISC OPENINGS OR DAMAGE IN THE EXISTING TERRA COTTA FIRE PROOFING OF BEAMS AND COLUMNS WITH MASONRY AS REQUIRED TO MAINTAIN FIRE RATING.
8. CONTRACTOR SHALL FURNISH AND INSTALL ALL FASTENERS, CABLE, MISC METAL AND/OR STEEL AS REQUIRED TO PROPERLY ANCHOR AND SUPPORT ALL MEP/FP/ELECTRICAL EQUIPMENT TO STRUCTURAL STEEL, PLANK AND/OR TERRA COTTA.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

WALL TYPES

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: A020

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DOOR SCHEDULE

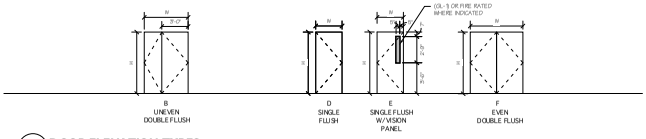
DOOR NUMBER	DOOR: DESCRIPTION	DOOR TYPE	WIDTH	HEIGHT	THICK-NESS	DOOR MATERIAL	DOOR FINISH	FRAME: FRAME TYPE	FRAME JAMB	FRAME HEAD	FRAME SILL	FRAME MATERIAL	FRAME FINISH	HDW	RATING	REMARKS
BASEMENT																
010-5	STAIR #10	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	1		
00-01	CORRIDOR	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	2	J.1	H.1	S.3	H.M.	PTD.	5	60 MIN.	
FIRST FLOOR																
110	TOILET BOOTH	D	M.W.	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	4		MAXIMIZE DOOR WIDTH IN EXISTING OPENING
126	CONCESSION	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	4		
127	STORAGE ROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	4		
010-1	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	1	60 MIN.	
SECOND FLOOR																
010-2	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	2	J.1	H.1	S.2	H.M.	PTD.	1	60 MIN.	
THIRD FLOOR																
010-3	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	1	60 MIN.	
FOURTH FLOOR																
400	VMAF OFFICE	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
403	CLOSET	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	11		
404	CLOSET	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	11		
406	NURSING ROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	4		
407	KITCHEN	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	8		
408	MENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
409	WOMENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
410	MECHANICAL	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
411	STORAGE ROOM	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	3		
412A	PRESIDENTS CLUB	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
412B	PRESIDENTS CLUB	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
412C	RECEPTION ROOM	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
412D	RECEPTION ROOM	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
413	CONCESSIONS BAR	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	8		
414	JANITOR	D	2'-8"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
010-4	STAIR #10	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	2	60 MIN.	
010-4	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	1	60 MIN.	
FIFTH FLOOR																
502	RECEPTIONIST	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	8		
503	OFFICE	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	3		
504	OFFICE	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	3		
506	VIEWING ROOM	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
507A	MULTI-PURPOSE ROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	7		
507B	MULTI-PURPOSE ROOM	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	6		
508	ELECTRICAL CLOSET	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
509	PANTRY	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	8		
510	MENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
511	STORAGE	B	5'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	3		
512	WOMENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
513	MECHANICAL	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
514	OFFICE	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	8		
515	JANITOR	D	2'-8"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	4		
010-5	STAIR #10	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	2	60 MIN.	
010-5	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	1	60 MIN.	
SIXTH FLOOR																
601	CONCESSION PREP	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	8		
602	CONCESSION BAR	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	8		
603	LIGHTING & SOUND ROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
604	KITCHEN	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	8		
605	MENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
606	JANITOR	D	2'-8"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	4		
607	DRESSING ROM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	8		
608	WOMENS RESTROOM	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.1	H.M.	PTD.	9		
609	MECHANICAL	D	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	5		
610	STORAGE	B	5'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.3	H.M.	PTD.	3		
010-6	STAIR #10	F	6'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	2	60 MIN.	
010-6	STAIR #10	E	3'-0"	7'-0"	1 3/4"	H.M.	PTD.	1	J.2	H.2	S.2	H.M.	PTD.	1	60 MIN.	

F.1 A-020 **DOOR SCHEDULE**
SCALE: NTS

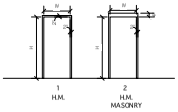
WINDOW SCHEDULE

NUMBER	TYPE	WIDTH	HEIGHT	DESCRIPTION	MATERIAL	FRAME JAMB	FRAME HEAD	FRAME SILL	FINISH	REMARKS
010-1				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC
010-2				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC
010-3				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC
010-4				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC
010-5				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC
010-6				DOUBLE HUNG	ALUM.	03/A/020	03/A/020	F3/A/020		FURNISHED BY OWNER, INSTALLED BY GC

A.4 A-020 **WINDOW SHEDULE**
SCALE: NTS



C.4 A-020 **DOOR ELEVATION TYPES**
SCALE: 1/4" = 1'-0"



D.4 A-020 **FRAME TYPES**
SCALE: 1/4" = 1'-0"

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

DOOR SCHEDULE AND ELEVATIONS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046-3
DRAWING NO.:
A-030

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FINISH SCHEDULE

ITEM		FLOOR		WALLS				REMARKS
ROOM NUMBER	DESCRIPTION	MATERIAL	BASE	WEST	NORTH	EAST	SOUTH	
SUB-BASEMENT								
SB-12	STORAGE	EXIST	–	–	–	PTD CMU	–	PAINT TO MATCH EXISTING
SB-11	CORRIDOR	–	–	PTD CMU				PAINT TO MATCH EXISTING
FIRST FLOOR								
102	CHORUS ROOM	CPT-1	WB-1	PTD PLASTER	PTD PLASTER	PTD PLASTER	PTD PLASTER	EPOXY PAINT ON TANNING DIAS SIDES & FLOOR SURFACES
101-1	STAIR	EXISTING	EXISTING	PLASTER	PLASTER	PLASTER	PLASTER	PAINT ALL EXISTING PAINTED SURFACES INCLUDING CEILING
SECOND FLOOR								
-	-	-	-	-	-	-	-	
THIRD FLOOR								
FOURTH FLOOR								
400	VMAF OFFICE	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
401	ENTRY	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
402	BREAK-OUT	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP SOFFIT
403	CORRIDOR	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
406	WARMING ROOM	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
407	PANTRY	FT-3	BT-3	FRP	FRP	FRP	FRP	
408	MEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	TO MATCH FIRST FLOOR
409	WOMEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	TO MATCH FIRST FLOOR
410	MECHANICAL	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
411	STORAGE ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
412A	PRESIDENT'S CLUB	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
412B	RECEPTION ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
413	CONCESSIONS BAR	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
414	JANITOR	VCT-1	WB-2	FRP	FRP	FRP	FRP	
424	UPPER CORRIDOR	–	–	CONC. COATING	CONC. COATING	CONC. COATING	CONC. COATING	
FIFTH FLOOR								
501	CORRIDOR	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
502	RECEPTIONIST	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
503	OFFICE	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
504	OFFICE	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP SOFFIT
505	CORRIDOR	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP SOFFIT
506	VIEWING ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
507	MULTI-PURPOSE ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
508	CORRIDOR	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
509	PANTRY	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
510	MEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	TO MATCH FIRST FLOOR
511	STORAGE ROOM	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
512	WOMEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	TO MATCH FIRST FLOOR
513	MECHANICAL	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
514	OFFICE	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP SOFFIT
515	JANITOR	VCT-1	WB-2	FRP	FRP	FRP	FRP	
521	BALCONY TOILET	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	ALL FINISHES TO MATCH AREA 510
SIXTH FLOOR								
600	BANQUET HALL	WD-1/CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	IN TUMESCENT PAINT ON EXPOSED TRUSSES
601	CONCESSION PREP	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
602	CONCESSION BAR	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
603	LIGHTING & SOUND ROOM	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
604	KITCHEN	FT-3	BT-3	FRP	FRP	FRP	FRP	
605	MEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	
606	STORAGE	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
607	WOMEN'S RESTROOM	FT-VFT-2	BT-1	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	WT-V PTD. GYP.	
608	DRESSING ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
609	MECHANICAL	VCT-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
610	ANTE ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
611	DRESSING ROOM	CPT-1	WB-1	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
STAIRS								
S9	STAIR #9	TZ-1	WB-2	PTD.	PTD.	PTD.	PTD.	PAINT WALLS ON FLOORS 4, 5, & 6
S10	STAIR #10	K-1	WB-2	PTD .GYP.	PTD .GYP.	PTD .GYP.	PTD .GYP.	
S11	STAIR #11	K-1	WB-2	PTD .GYP.	–	PTD .GYP.	–	

FINISH SCHEDULE INDEX

ITEM	TAG	DESCRIPTION	TYPE MATERIAL	MANUFACTURER/ MODEL#	COLOR	REMARKS
FLOORS						
	FT-1	TOILET ROOMS	FLOOR TILE – FIELD	DALTILE – KEYSTONES MOSAIC 19 1/6Q	D59 – BISCUIT	
	FT-2	TOILET ROOMS	FLOOR TILE- CUSTOM BORDER	DALTILE – CUSTOM BORDER, KEYSTONES, MOSAIC 1 1/1 SQ.	D59 – BISCUIT D59- BLACK	
	FT-3	KITCHEN	8 X8 CERAMIC TILE	TBD	TBD	
	CPT-1	ALL PUBLIC SPACES	CARPET TILE	SHAW CONTRACT GROUP, TO MATCH 3RD FLOOR	TO MATCH 3RD FLOOR	
	VCT-1	SERVICE AREAS	VCT	TO MATCH 3RD FLOOR	TO MATCH 3RD FLOOR	
	TZ-1	STAIR #9	EXIST. TERRAZZO FLOOR			REPAIR, GRIND AND POLISH
	WD-1	BANQUET HALL	WOOD FLOOR SYSTEM	TBD	TBD	
	K-1	STAIRS	RUBBER FLOORING AND TREADS	TBD	TBD	
	SC-1	UTILITY AREAS	SEALED CONCRETE	TBD	CLEAR.	
BASE						
	BT-1	TOILET ROOMS	COVE TILE	DALTILE – S-3609T 6X6	K175 – BISCUIT (SEMI-GLOSS)	
	BT-2	TOILET ROOMS	COVE TILE	DALTILE – S-3609T 6X6	K175 – BISCUIT (SEMI-GLOSS)	
	BT-3	KITCHEN	COVE TILE	TBD	TBD	
	VWB-1	AT CARPETED FLOORS	VINYL WALL BASE (STRAIGHT)	JOHNSONITE WALL BASE	TO MATCH 3RD FLOOR	
	VWB-2	AT VCT AND RUBBER FLOORS	VINYL WALL BASE (COVE)	JOHNSONITE WALL BASE	TO MATCH 3RD FLOOR	
WALLS						
	WT-1	TOILET ROOMS	WALL TILE – FIELD TILE	DALTILE 3X6	K175 – BISCUIT (SEMI-GLOSS)	
	WT-2	TOILET ROOMS	WALL TILE - BULLNOSE	DALTILE: S-4369 – 3X6	K175 – BISCUIT (SEMI-GLOSS)	
	P-1	CORRIDORS	PAINT	BENJAMIN MOORE	TO MATCH 3RD FLOOR	EGGSHELL FINISH
	P-2	TOILET ROOMS	PAINT	BENJAMIN MOORE	TO MATCH 3RD FLOOR	SEMI-GLOSS FINISH
	P-3	WOOD TRIM	PAINT	BENJAMIN MOORE	TO MATCH 3RD FLOOR	SEMI-GLOSS FINISH
	P-4	CEILING GYP. BD.	PAINT	BENJAMIN MOORE	TO MATCH 3RD FLOOR	FLAT FINISH
	FRP	KITCHEN & LOADING DOCK	FRP	TBD	TBD	
THRESHOLD						
	M-1	TOILET ROOMS	3/4" MARBLE	TO MATCH 3RD FLOOR	WHITE CARRARA	RE: SHOP DRAWINGS FOR DETAIL
MILLWORK						
	SSM-2	TOILET ROOMS	SOLID SURFACE MATERIAL	CORIAN TO MATCH 3RD FLOOR	TO MATCH 3RD FLOOR	
	PL-1&2	KITCHENS, PANTRIES, COUNTERS	TO MATCH 3RD FLOOR	TO MATCH 3RD FLOOR	TO MATCH 3RD FLOOR	

GENERAL NOTES:

1. ALL NEW OFFICE TOWER RESTROOMS WALL AND FLOOR FINISHES TO MATCH EXISTING THIRD FLOOR TOILET ROOMS.

2. PAINT ALL EXISTING & NEW HANDRAILS, NEW GUARD RAILS, METAL STAIRS AND BALLASTERS IN OFFICE WING STAIR #9 AND 10.

3. ALL NEW EXTERIOR CONCRETE SURFACES SHALL RECEIVE CEMENTIOUS COATING, U.O.N.

4. ALL NEW INTERIOR CONCRETE SURFACES SHALL RECEIVE PAINT, U.O.N.

5. ALL SURFACES AND FLOORS IN PROJECT AREAS SHALL RECEIVE FINISH.

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

FINISH SCHEDULE AND DETAILS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046-3

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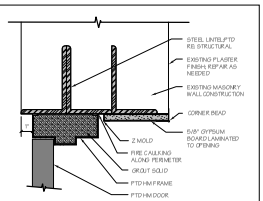
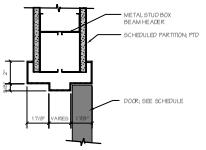
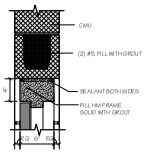


H.1 **DOOR HEAD DETAIL**
SCALE: 3" = 1'-0"

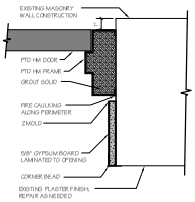


H.2 **DOOR HEAD DETAIL**
SCALE: 3" = 1'-0"

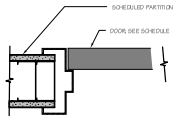


H.3 **CMU DOOR HEAD DETAIL**
SCALE: 3" = 1'-0"

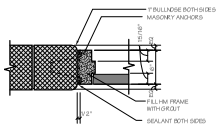
E 5 / A-030 **DOOR HEAD DETAILS**
SCALE 3" = 1'-0"



J.1 **DOOR JAMB DETAIL**
SCALE 3" = 1'-0"

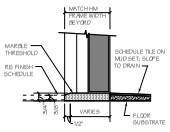


J.2 **DOOR JAMB DETAIL**
SCALE 3" = 1'-0"

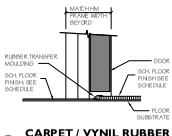


J.3 **CMU DOOR JAMB DETAIL**
SCALE: 3" = 1'-0"

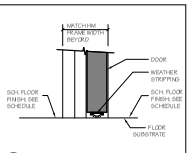
E 6 / A-030 **DOOR JAMB DETAILS**
SCALE 3" = 1'-0"



S.1 **MARBLE SILL DETAIL**
SCALE: 3" = 1'-0"



S.2 **CARPET / VYNIL RUBBER TRANSFER DETAIL**
SCALE 3" = 1'-0"



S.3 **CONTINUOUS FLOORING**
SCALE: 3" = 1'-0"

F 5 / A-030 **DOOR SILL DETAIL**
SCALE 3" = 1'-0"

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

DOOR DETAILS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046-3
DRAWING NO.:	**A-040**

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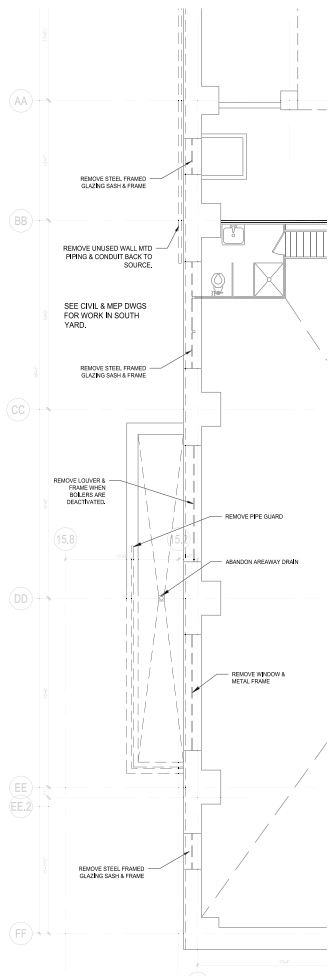
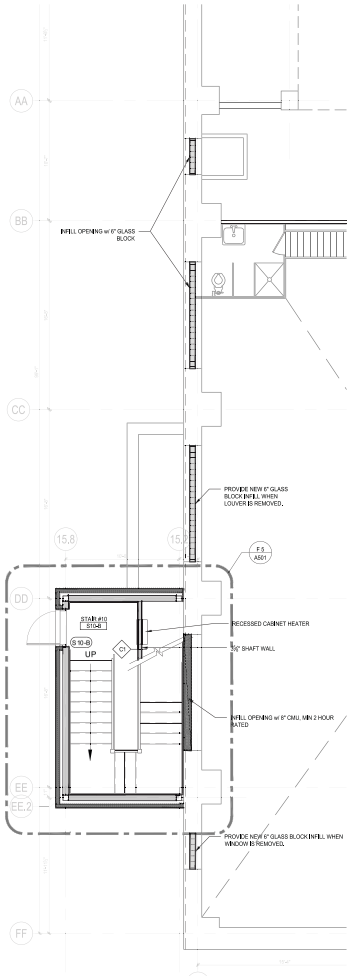
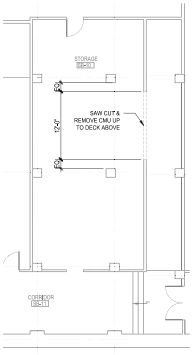


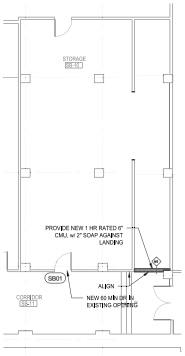
F1 BASEMENT - PART DEMOLITION PLAN
1/4" = 1'-0"



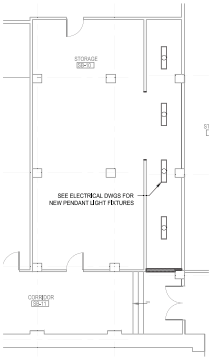
F3 BASEMENT - PART CONSTRUCTION PLAN
1/4" = 1'-0"



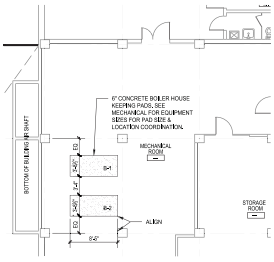
C4 SUB-BASEMENT - PART DEMOLITION PLAN
1/8" = 1'-0"



C5 SUB-BASEMENT - PART CONSTRUCTION PLAN
1/8" = 1'-0"



E4 SUB-BASEMENT - PART RC PLAN
1/8" = 1'-0"



F5 BASEMENT - PART CONSTRUCTION PLAN
1/8" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED TO INSTALL THEIR WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A-001 FOR NEW SOUTH SITE PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND ALL ITEMS ATTACHED THERETO.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL UNUSED ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING PIPES & EQUIPMENT TO SOURCE.
6. DEMOLISH EXISTING CONCRETE ALL LOOSE LINTELS PRIOR TO DEMOLISHING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT INFILL FOR CLOSING ALL RATED SHAFT PENETRATIONS.
2. ALL WINDOW INTERIOR SURROUNDS - JAMBS, HEADS & SILLS - SHALL BE 1" THICK, SOLID WOOD, SHAPED TO MATCH SASH & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE DYN. BOARD SURFACE ON CHICAGO SUSPENSION SYSTEM.
4. ALL INTERIOR PARTITIONS SHALL BE TYPE 'B' UON.
5. MOVABLE PARTITION SUPPORT: PROVIDE NEW WINCH SYSTEM, SEE MECHANICAL DWGS FOR SPECS. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER'S. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

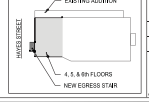
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SUB BASEMENT & BASEMENT DEMO & CONST PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A100

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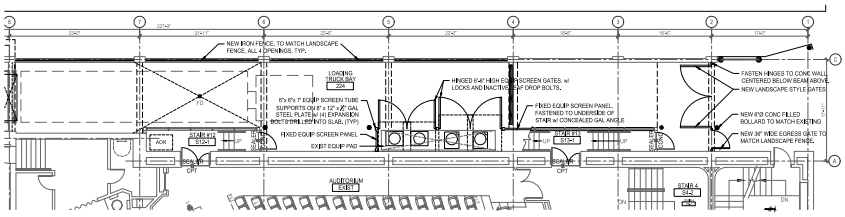
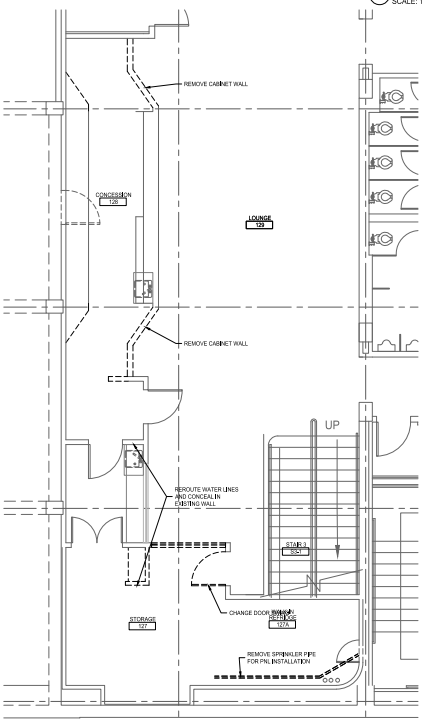
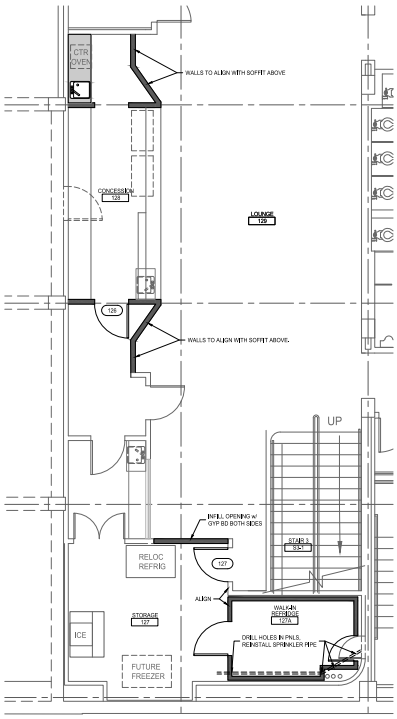


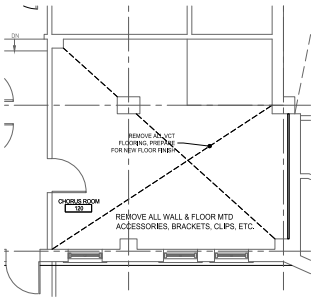
B3 LOADING DOCK EQUIPMENT SCREEN & FENCE PLAN
SCALE: 1/4" = 1'-0"



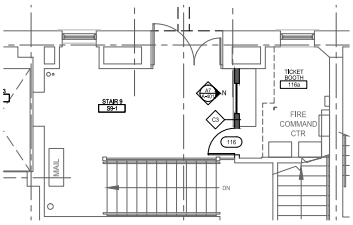
F1 PART FIRST FLOOR DEMOLITION
SCALE: 1/4" = 1'-0"



F3 PART FIRST FLOOR CONSTRUCTION PLAN
SCALE: 1/4" = 1'-0"



C2 CHORUS ROOM DEMOLITION
SCALE: 1/4" = 1'-0"



F5 TICKET BOOTH CONSTRUCTION PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED TO INSTALL THEIR WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND ALL ITEMS ATTACHED THERETO.
3. REMOVE ALL CULRIGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL UNUSED ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND WIRES BACK TO SOURCE.
6. REMOVE ALL ITEMS AND INSTALL ALL LOOSE (INTO & BACK TO SOUND) MASONRY WALLS. SEE STRUCTURAL DWGS FOR DETAIL DESIGN.

CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT WALL FOR CLOSING ALL RATED SHAFT PENETRATIONS.
2. ALL WINDOW/INTERIOR SURROUNDS - JAMBS, HEADS & CHALKBOARD STOND SILLS - SHALL MATCH DIMENSIONS, MATERIALS, FINISH ON 3RD FLOOR HISTORY SURROUNDS.
3. ALL EXPOSED CEILING SLAB & BEAMS - SHALL HAVE SPRAY BOARD SURFACE ON CHICAGO SUSPENSION SYSTEM.
4. ALL INTERIOR PARTITIONS SHALL BE TYPE 'B' UON.
5. REMABLE PARTITION SUPPORT: PROVIDE NEW WIN24 REMABLE PARTITION SUPPORT SYSTEM, INCLUDING ALL BEARING COMPONENTS, LIGHT GAUGE METAL FRAMING, MANUFACTURER'S SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH | NORTH

KEY PLAN

1st FLOOR & LOADING DOCK - DEMO & CONSTRUCTION PLANS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: A110

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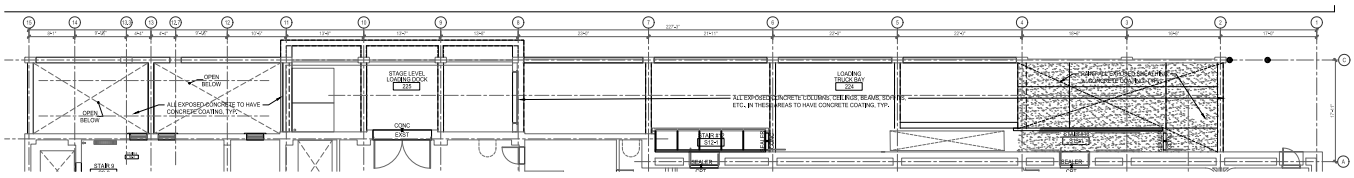
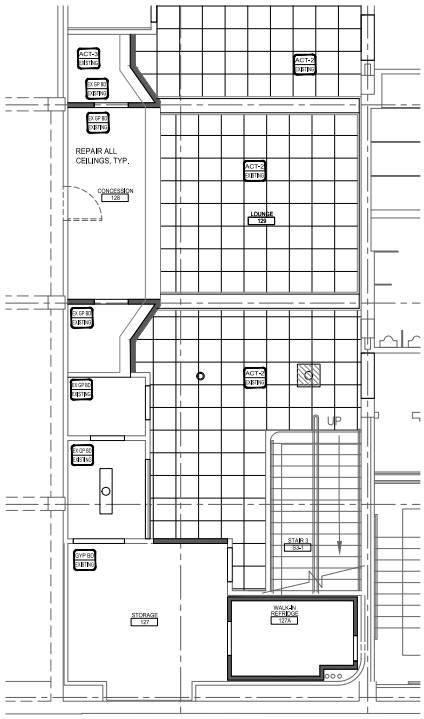
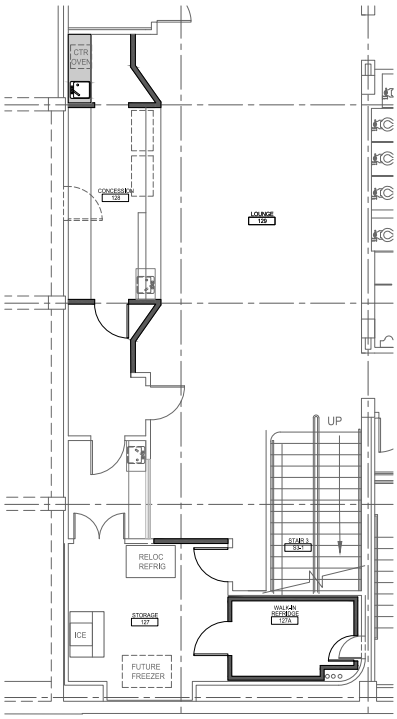


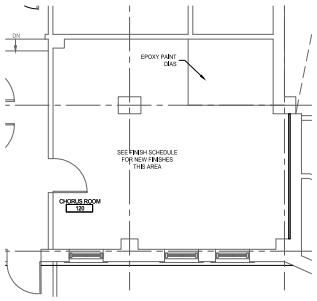
B3 ADDITION FINISH PLAN
SCALE: 1/4" = 1'-0"



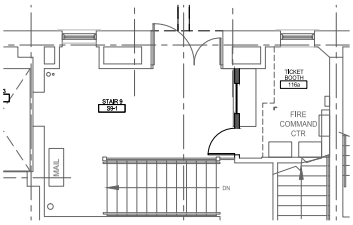
F1 PART FIRST FLOOR REFLECTED CEILING PLAN
SCALE: 1/4" = 1'-0"



F3 PART FIRST FLOOR FINISH PLAN



D6 CHORUS ROOM FINISH PLAN
SCALE: 1/4" = 1'-0"



F5 TICKET BOOTH FINISH PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE REP & PP DRAWINGS FOR ADDITIONAL INFORMATION.

REF CEILING NOTES

1. ALL LIGHT FIXTURES AND CEILING GRIDS SHALL BE CENTERED IN ROOM UON.
2. ALL HUNG CEILINGS SHALL BE INSTALLED UON.
3. ALL ACP SHALL BE ACM-1 UON.
4. CENTER ALL CEILING DEVICES IN CEILING TILE UON.
5. HANGERS SHALL BE SECURELY ATTACHED TO STRUCTURE. SECURE HANGERS SHALL NOT BE LESS THAN 12 GA. ANCHORS SHALL BE SPACED PER CODE.
6. ALL EMBEDDED BUILDING EQUIPMENT SHALL BE SUSPENDED INDEPENDENTLY OF THE CEILING. SUCH ITEMS INCLUDE BUT ARE NOT LIMITED TO LIGHTS, DIFFUSERS, SPEAKERS, PIPING & DUCTWORK.
7. CEILING SUSPENSION SYSTEMS SHALL NOT BE CONNECTED TO ANY OTHER SYSTEM FOR SUPPORT.
8. ALL DAMAGED GYP BD AND ACT TILE SHALL BE REPLACED ON NEW CEILINGS. ALL DAMAGED GYP BD SHALL BE REPAIRED AND REFINISHED AFTER REP & PP WORK IS COMPLETE.

FINISH NOTES

1. ALL FLOORS, WALLS, HARD CEILINGS AND GYP BD SHALL RECEIVE FINAL, MEDIUM SHEEN, EGGSHELL AND BEST FOR ANY SURFACE VERSUS A SPECIFIED FINISH PRIOR TO SUBMITTING BID. BIDDERS SUBMITTING BID AGREE THAT ALL SURFACES HAVE A FINAL FINISH.
2. ALL WALLS, METAL & FLOOR FINISHES TO MATCH 3RD FLOOR UON.
3. ALL EXPOSED BUILDING MASONRY ENCLOSED BY NEW ADDITION SHALL BE WASHED AND (2) COATS PAINT FINISH, TYP. UON.
4. NEW REST ROOM WINDOWS SHALL HAVE NEW HORIZONTAL SLAT BLINDS TO MATCH OFFICE BLINDS.
5. ALL ELECTRICAL PLATES SHALL BE RENEWED PRIOR TO PAINTING WALL SURFACE.
6. [illegible]
7. [illegible]

PROJECT NORTH | NORTH

KEY PLAN

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

1st FLOOR REFLECTED CEILING & FINISH PLANS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: A111

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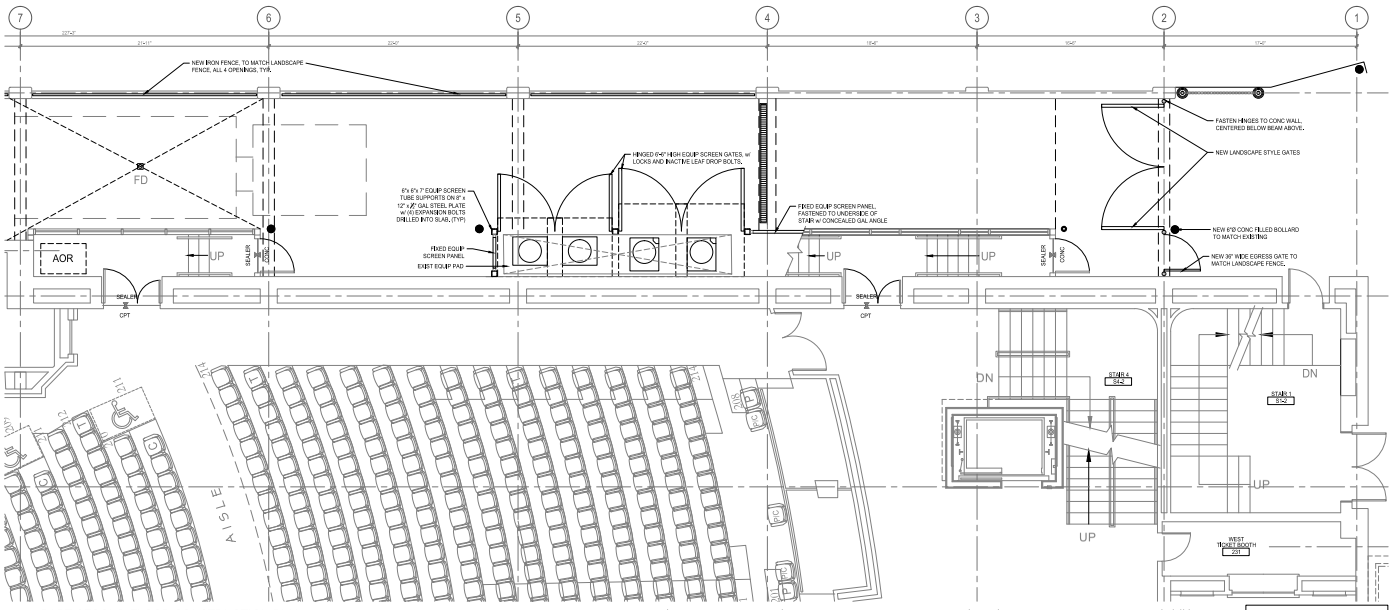
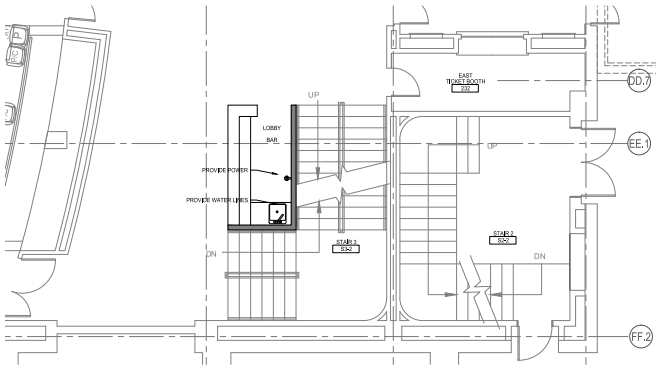
9/12/2013 4:27:46 PM



D1 PART SECOND FLOOR CONSTRUCTION PLAN.
SCALE: 1/4" = 1'-0"



F3 PART SECOND FLOOR CONSTRUCTION PLAN
SCALE: 1/4" = 1'-0"

GENERAL NOTES

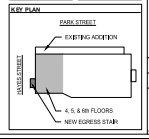
1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL DIMENSIONS SHOWN ARE FOR REFERENCE ONLY. NEEDED TO INSTALL THEIR WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT INFILL FOR CLOSING ALL INTERIOR WALL OPENINGS.
2. ALL WINDOW INTERIOR SURROUNDS ... JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE CUT, BOARD SURFACE ON DENSAKO SUSPENSION SYSTEM.
4. ALL INTERIOR PARTITIONS SHALL BE 3 5/8" STUD WITH BATHROOM FOR ALL TILE, TO ACCOMMODATE NEW WALL SCHEDULE FOR DETAILS. REFER TO STRUCTURE ABOVE, COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
5. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

PROJECT NORTH | NORTH

KEY PLAN



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Mechanical &Plumbing Engineer
J. Madison, Inc.
15 Short Road
Exeter, RI 02822
v 401.397.2250

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7753

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.6992

THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

2nd FLOOR CONSTRUCTION PLANS

DATE: AUGUST 20, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: **A120**

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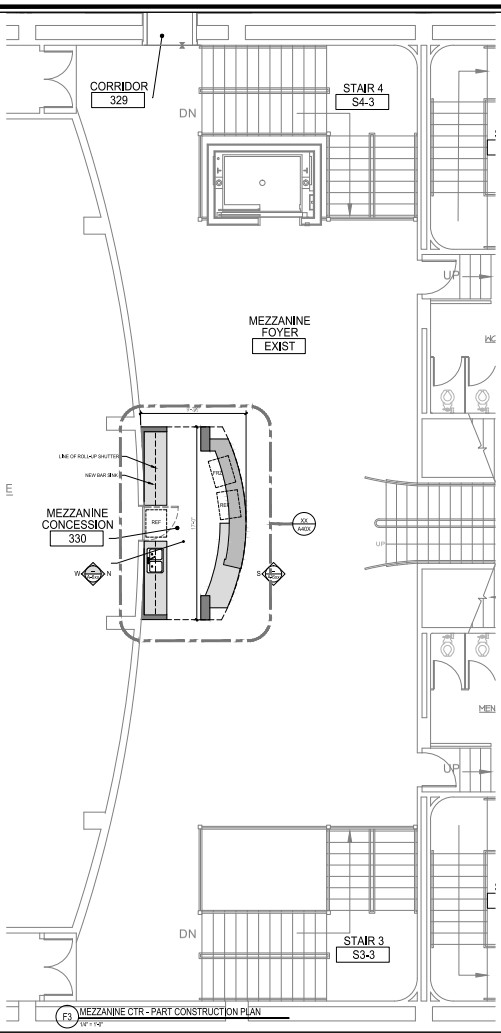
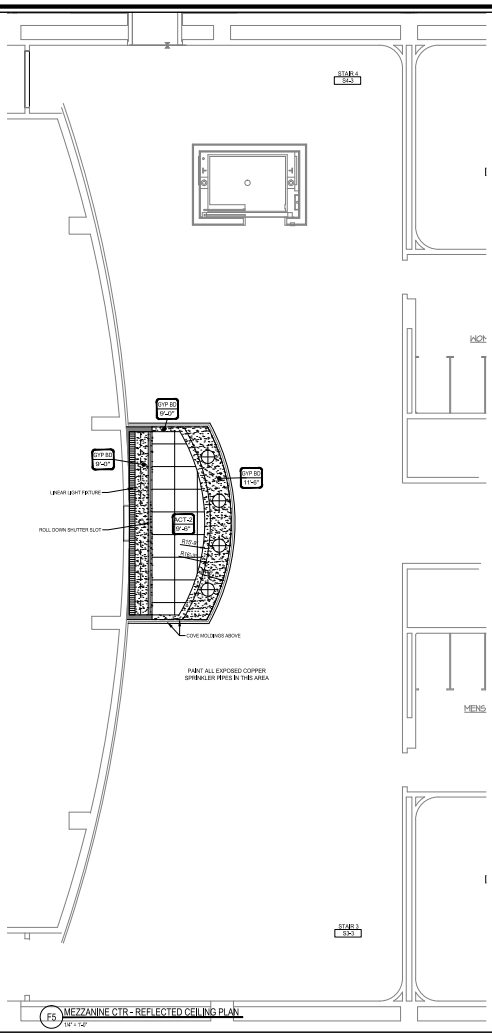


F3 MEZZANINE CTR - PART CONSTRUCTION PLAN
1/4" = 1'-0"



F5 MEZZANINE CTR - REFLECTED CEILING PLAN
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR INSTALL FINISH WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND ASSOCIATED FINISHES AND TRIM.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL UNUSED ELECTRICAL WIRES, CONDUITS BACK TO SOURCE; LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND HEATER BACK TO SOURCE.
6. REMOVE ALL WINDOWS, INSTALL ALL LOOSE LINTELS PRIOR TO DEMOLISHING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

1. ALL 6W 150 SF OF 4" SOLID CMU SHAFT INFILL FOR CLOSING ALL RATED SHAFT PENETRATIONS.
2. ALL WINDOW INTERIOR SURROUNDS - JAMBS, HEADS & SILLS - TO BE PAINTED. ALL WOOD TRIM & SURROUNDING MATERIALS FINISH ON 3RD FLOOR INTERIOR SURROUNDS, USE PAINT GRADE HARD WOOD FOR ALL INDOOR TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE GYP. BOARD SURFACE ON CHICAGO SUSPENSION SYSTEM.
4. ALL INTERIOR PARTITIONS SHALL BE TYPE 'B' UON.
5. MOVABLE PARTITION SUPPORT: PROVIDE NEW WOOD BLOCKING AT CEILING FOR SUPPORT OF NEW WALLS. COORDINATE ALL PUNCHOUT HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO AIS FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

REF CEILING NOTES

1. ALL LIGHT FIXTURES AND CEILING GRIDS SHALL BE CENTERED IN ROOMS UON.
2. ALL ACP SHALL BE ARMSTRONG OR EQUAL.
3. ALL ACP SHALL BE ADA1 UON.
4. CENTER ALL CEILING DEVICES IN CEILING TILE UON.
5. HANGERS SHALL BE SECURELY ATTACHED TO STRUCTURE ABOVE. WIRE HANGERS SHALL NOT BE LESS THAN 12 GA. AND SHALL BE SADDLE TIED TO MAIN RUNNERS.
6. ALL ITEMS INCLUDING EQUIPMENT SHALL BE SUSPENDED FROM STRUCTURE. ITEMS SHALL INCLUDE BUT ARE NOT LIMITED TO LIGHTS, DIFFUSERS, SPEAKERS, PIPING & DUCTWORK.
7. CEILING SUSPENSION SYSTEMS SHALL NOT BE CONNECTED TO DUCTWORK, PIPING, ETC., FOR SUPPORT.
8. ALL EXISTING GYP BD AND HUNG CEILINGS DAMAGED ON FLOORS BELOW 4th FLOOR SHALL BE REPAIRED AND REFINISHED AFTER MEP & FP WORK IS COMPLETE.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

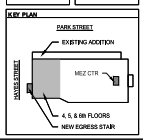
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



3rd FLOOR CONST & REFLECTED CEILING PLANS

DATE: AUGUST 20, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A130

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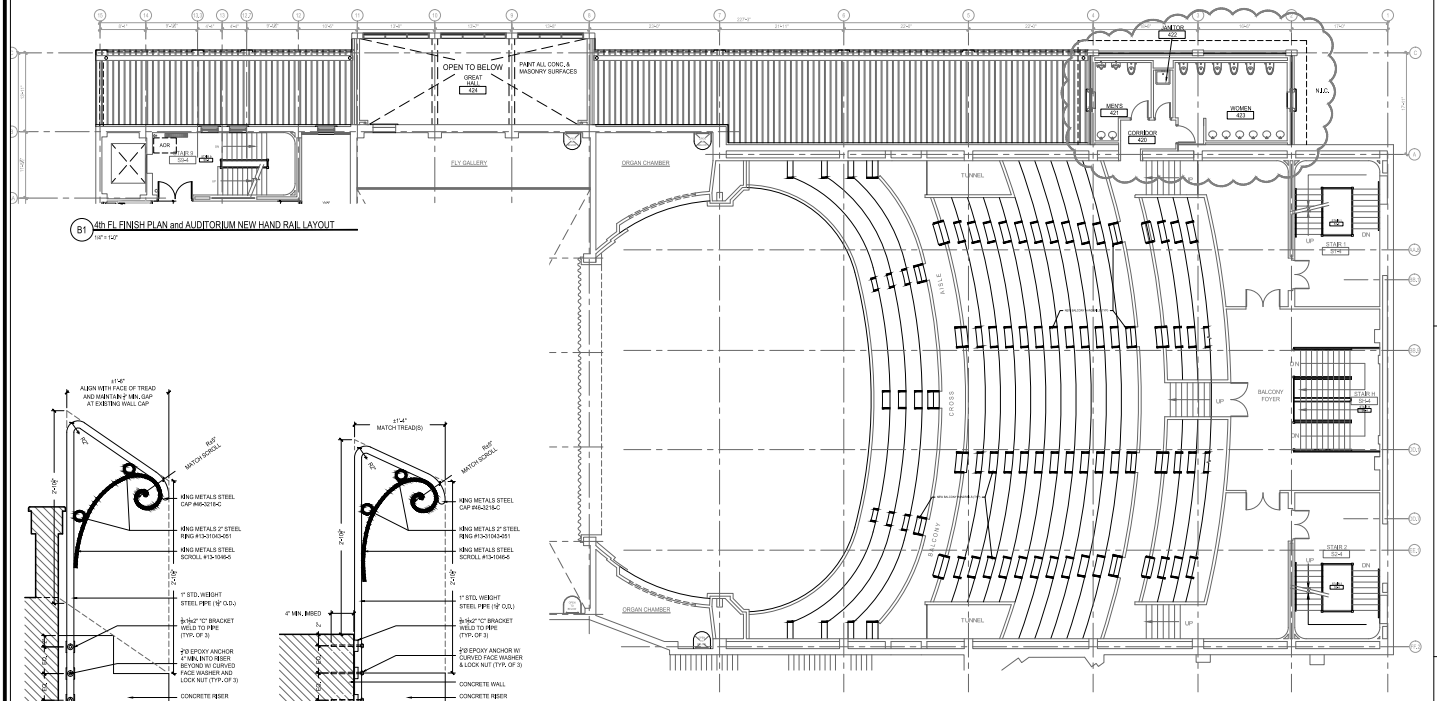
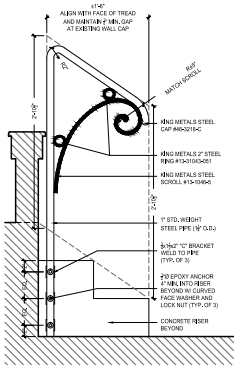
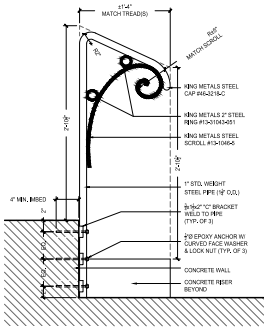


B1 4th FL FINISH PLAN and AUDITORIUM NEW HAND RAIL LAYOUT
1/8" = 1'-0"



E1 THREE RISER BALCONY HANDRAIL DETAIL
1/8" = 1'-0"



E2 TYPICAL BALCONY HANDRAIL DETAIL
1/8" = 1'-0"

NOTE
1. ALL EXPOSED STEEL PIPE, CHANNELS, BRACKETS, ETC.ALL SHALL BE POWDER COATED, COLOR TO BE SELECTED FROM ENTIRE RAL COLOR CHART.
2. ALL FASTENERS TO BE UNCOATED STAINLESS STEEL.

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED TO INSTALL THEIR WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

FINISH NOTES

1. ALL FLOORS, WALLS, HARD CEILINGS AND DRYWALL SHALL RECEIVE FINISH. BIDDER SHALL CONTACT ARCHITECT FOR ANY SURFACE WITHOUT A SPECIFIED FINISH PRIOR TO SUBMITTING BID. BIDDERS SUBMITTING BIDS AGREE THAT ALL SURFACES HAVE A FINAL FINISH.
2. ALL WALLS, METAL & FLOOR FINISHES TO MATCH 3RD FLOOR UON.
3. ALL EXTERIOR BUILDING MASONRY ENCLOSED BY NEW ADDITION SHALL BE WASHED AND (2) COATS PAINT COATING APPLIED.
4. NEW REST ROOM WINDOWS SHALL HAVE NEW HORIZONTAL SLAT BLINDS TO MATCH OFFICE BLINDS.
5. ALL ELECTRICAL PLATES SHALL BE REMOVED PRIOR TO PAINTING WALL SURFACE.
6. <u>PAINTING OF OFFICE TOWER AND ADDITION ALL AREAS INCLUDING OFFICE TOWER AND ADDITION, BUILDING NOT OCCUPIED TO ACCOMMODATE OTHER BALCONIES LONGER TO REMAIN.</u>
7. <u>PAINTING AND SPRAY TEXTURE PLASTER REPAIR, CARPET & PAINTING SHALL COMMENCE JUNE 15, 2012 AND BE COMPLETED BY AUGUST 30, 2013.</u>

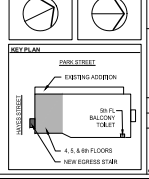
CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT WALL FOR CLOSING ALL RATED SHAFT PENETRATIONS.
2. ALL WINDOW INTERIOR SURROUNDS - JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING & FLR BEAMS SHALL HAVE LOTS, SCRATCHES, DENTS & ALL SIGNS OF WEAR.
4. ALL INTERIOR PARTITIONS SHALL BE TYPE 'D' UON.
5. <u>MOVABLE PARTITION SUPPORT</u>: PROVIDE NEW WALL BETWEEN COLUMNS TIGHT TO STRUCTURE ABOVE. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

PROJECT NORTH

NORTH

KEY PLAN



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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

4th FL ADDITION
FINISH PLAN &
AUDITORIUM HAND
RAIL LAYOUT

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A140**

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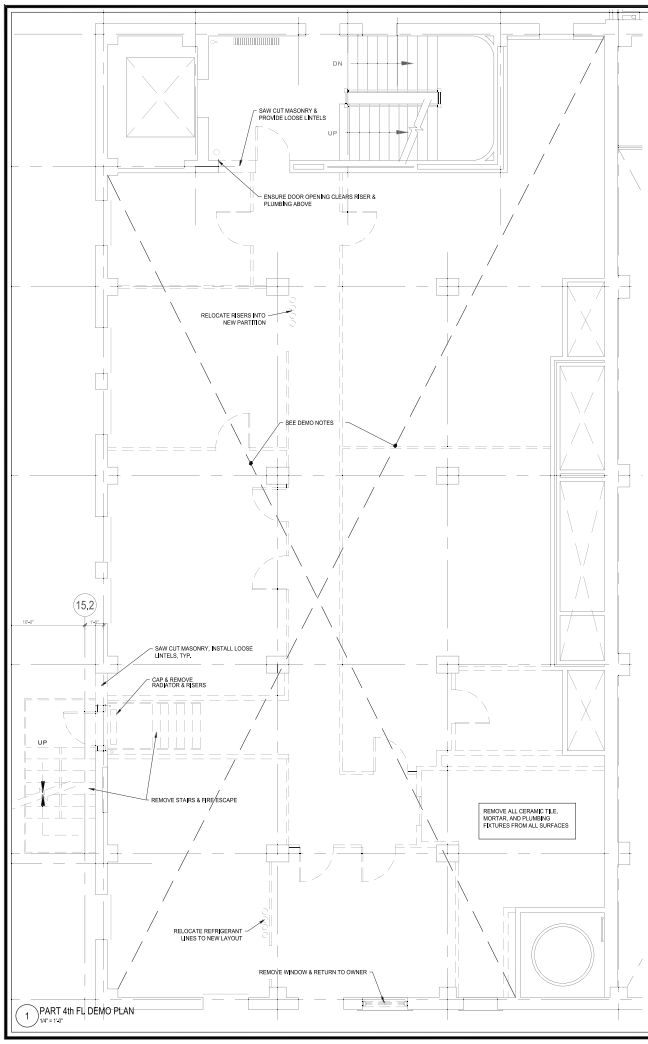
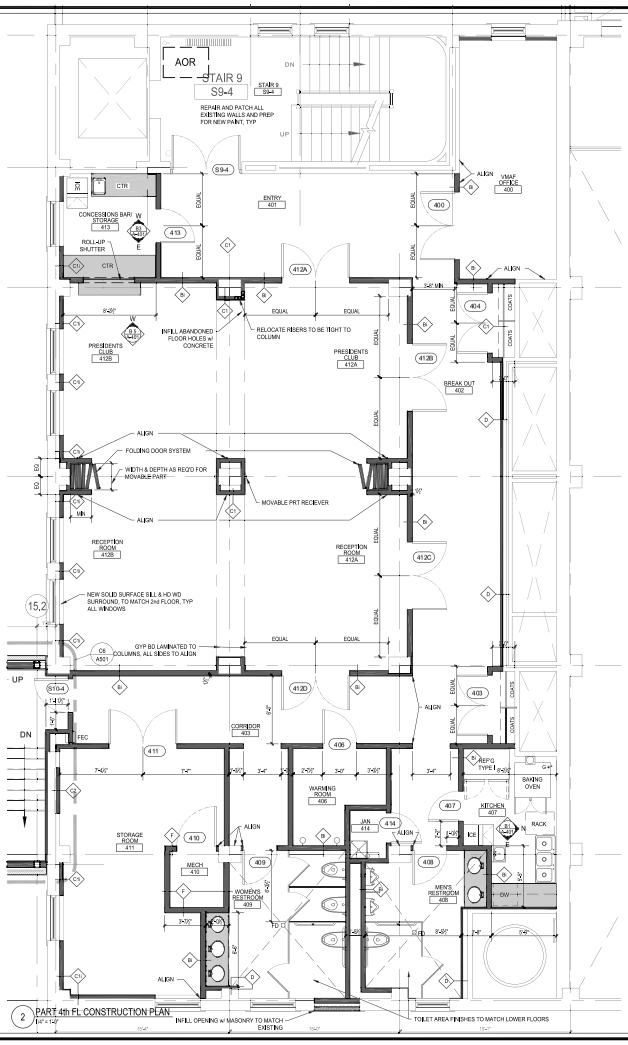


1 PART 4th FL DEMO PLAN
1/8" = 1'-0"



2 PART 4th FL CONSTRUCTION PLAN
1/8" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED TO INSTALL THEIR WORK PRIOR TO PROCEEDING. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET S-001 FOR NEW NORTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND WALL MOUNTED ACCESSORIES.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL UNUSED ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, UNLESS NOTED OTHERWISE.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND PIPERS BACK TO SOURCE.
6. DEMO CONTRACTOR TO INSTALL ALL LOOSE LINTELS PRIOR TO DEMOING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL NOTES.

CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT WALL FOR CLOSING ALL RATED SHAFT PENETRATIONS.
2. ALL NEW FLOOR TILE, BASE, TRANSITIONS + JAMBS, HEADS & ENGINEERED STONE SILLS + SHALL MATCH DIMENSIONS, MATERIALS & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PART GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE GYP. BOARD SURFACE ON CHICAGO SUSPENSION SYSTEM.
4. ALL INTERIOR PARTITIONS SHALL BE TYPE 'B' UON.
5. ALL NEW GYP BD LAMINATED TO COLUMNS, ALL SIDES TO ALIGN BETWEEN COLUMNS. SIGHT TO STRUCTURE ABOVE. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO AIA FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

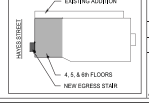
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



4th FL OFFICE DEMO and CONST PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A141**

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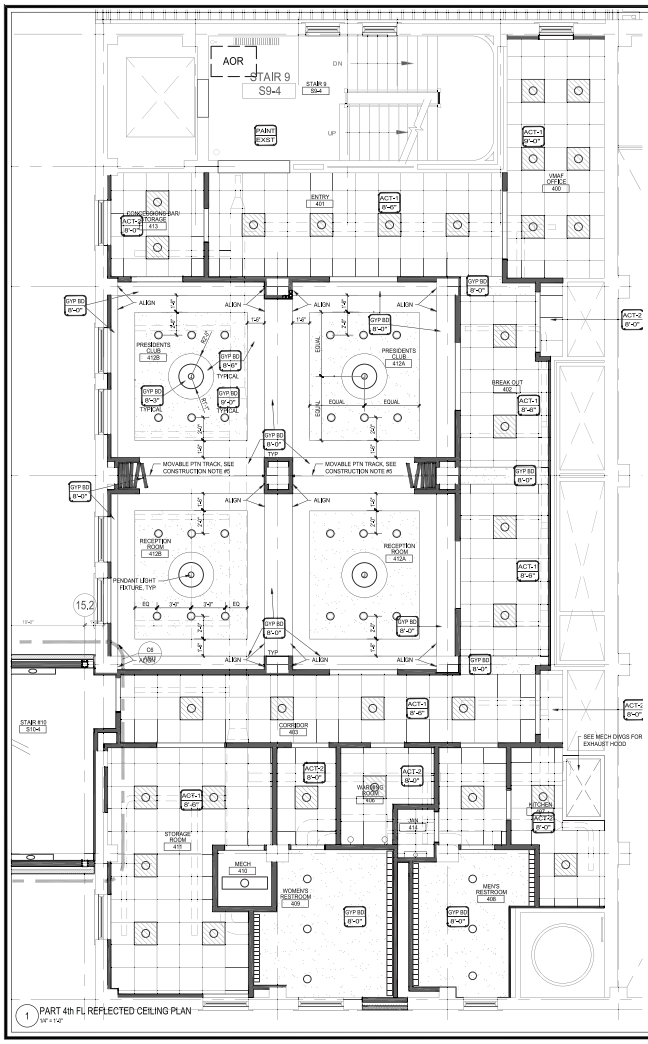
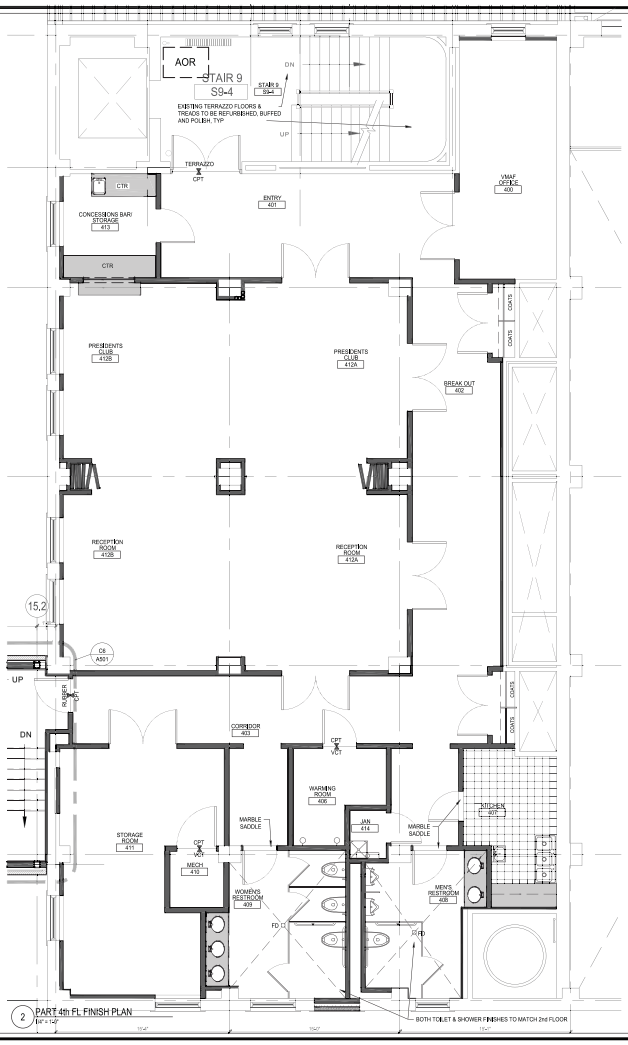


1 PART 4th FL REFLECTED CEILING PLAN
1/8" = 1'-0"



2 PART 4th FL FINISH PLAN
1/8" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.

REF CEILING NOTES

1. ALL LIGHT FIXTURES AND CEILING GRIDS SHALL BE CENTERED IN ACT-1 CEILINGS.
2. ALL HUNG CEILINGS SHALL BE 9'-0" AFF UON.
3. ALL ACP SHALL BE ACP-1 UON.
4. CENTER ALL CEILING FIXTURES IN CEILING TILE UON.
5. HANGERS SHALL BE SECURELY ATTACHED TO STRUCTURE ABOVE. MIN HANGERS SHALL NOT BE LESS THAN 12 GA, AND SHALL BE SPACED TO TO MANUFACTURER'S RECOMMENDATIONS. CEILING SYSTEMS SHALL BE SUSPENDED INDEPENDENTLY OF THE CEILING. SUCH ITEMS INCLUDE BUT ARE NOT LIMITED TO LIGHTS, DIFFUSERS, SPRINKLERS, PIPING & DUCTWORK.
6. CEILING SUSPENSION SYSTEMS SHALL NOT BE CONNECTED TO ELECTRICAL, PIPING, ETC. FOR SUPPORT.
7. ALL EXISTING GYP BD AND HUNG CEILINGS SHALL BE REMOVED OR REPAIRED AS NEEDED TO BE COMPLETELY REFINISHED AFTER MEP & FP WORK IS COMPLETE.

FINISH NOTES

1. ALL FLOORS, WALLS, HARD CEILINGS AND GYP BD SHALL RECEIVE FINISH. BIDDER SHALL CONTACT ARCHITECT FOR COLOR SELECTION. ALL FINISHES SHALL BE NEW IN SURROUNDING BAL UNLESS SURROUNDINGS ALREADY THAT ALL SURFACES HAVE A FINAL FINISH.
2. ALL WALLS, METAL & FLOOR FINISHES TO MATCH 3RD FLOOR UON.
3. ALL EXPOSED BUILDING MASONRY ENCLOSED BY NEW ADDITION SHALL BE WASHED AND (2) COATS PAINT TO MATCH 3RD FLOOR.
4. NEW WEST ROOM WINDOWS SHALL HAVE NEW HORIZONTAL SLAT BLINDS TO MATCH OFFICE BLINDS.
5. ALL ELECTRICAL PLATES SHALL BE REMOVED PRIOR TO PAINTING WALL SURFACE.
6. RETURNS FINISHES IN NEW ADDITION CORRIDOR AND STAIRWELL ARE COMPLETED BY CONTRACTOR 1, SEE SPECIFICATIONS AND SUBMITTAL REPORT. PAINTING SHALL COMMENCE JUNE 15, 2014, AND BE COMPLETED BY AUGUST 31, 2014.

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THE VETS

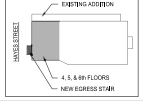
VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH | NORTH

KEY PLAN



4th FL OFFICE REFLECTED CEILING & FINISH PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A142

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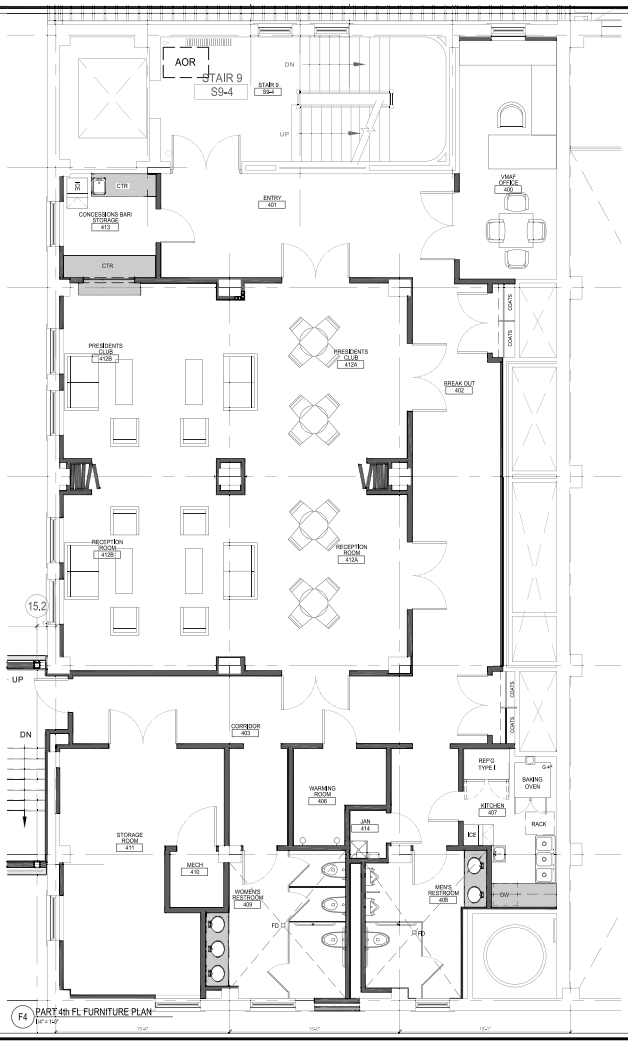

F4 PART 4th FL FURNITURE PLAN
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. ALL CASE AND SOFT GOODS FURNITURE ARE N.I.C. AND ARE SHOWN FOR COORDINATION PURPOSES ONLY.

FURNITURE NOTES

1. CONTRACTOR SHALL INSTALL OWNER FURNISHED WINDOW TREATMENTS FOR ALL EXISTING OFFICE WING WINDOWS ON 4, 5, & 6TH FLOORS.
2. NEW REST ROOM WINDOWS SHALL HAVE NEW HORIZONTAL SLAT BLINDS TO MATCH OFFICE BLINDS.

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Bold Waterway Inc
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v 401.434.2011

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

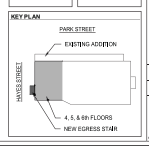
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



4th FL OFFICE FURNITURE PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A143

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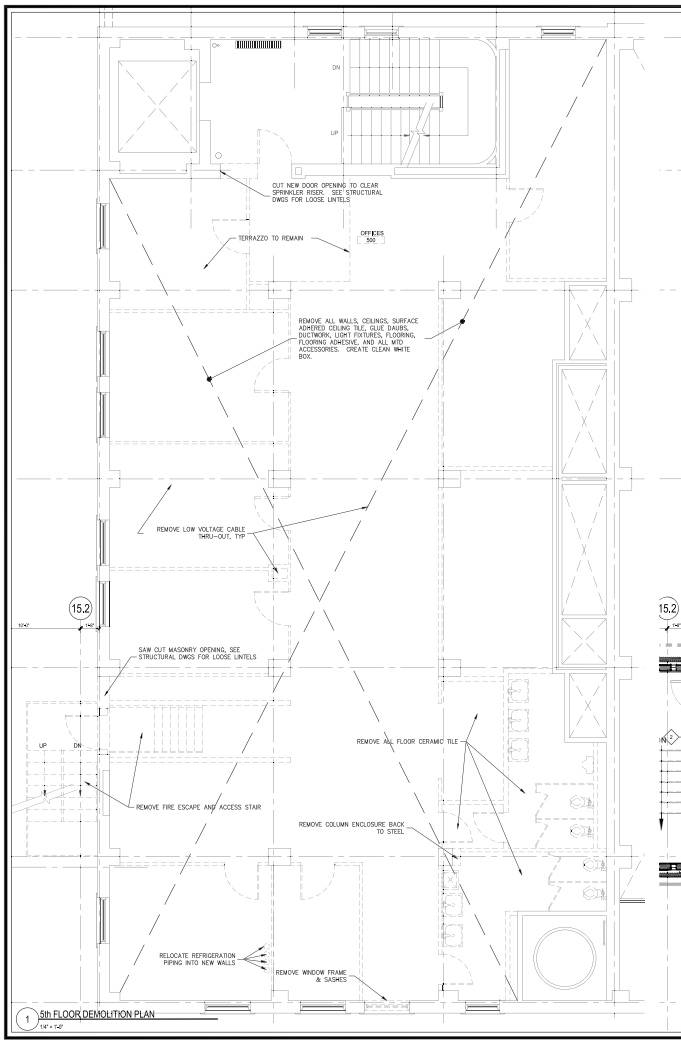
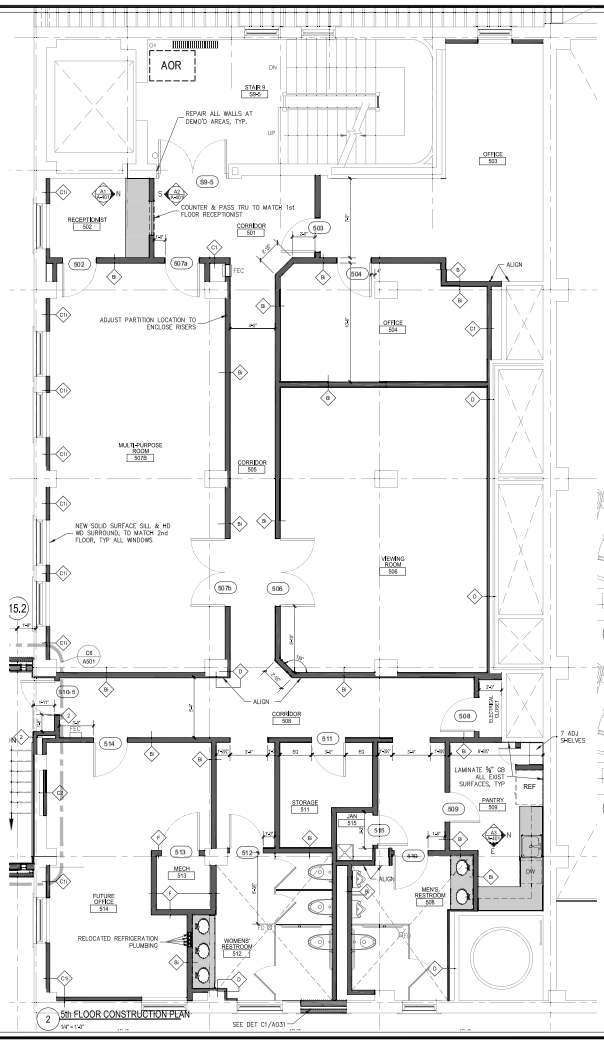


1 5th FLOOR DEMOLITION PLAN
1/4" = 1'-0"



2 5th FLOOR CONSTRUCTION PLAN
1/4" = 1'-0"

GENERAL NOTES

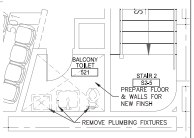
1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT PRIOR TO INSTALLATION. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

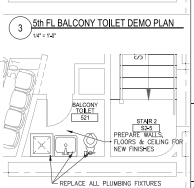
1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND WALL MOUNTED ACCESSORIES.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL ELECTRICAL, ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND PIPES BACK TO SOURCE.
6. DEMO CONTRACTOR TO INSTALL ALL LOOSE LINTELS PRIOR TO DEMOING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

1. ALIGN 100 GE OF 4" SOLID GAS SHAFT WALL FOR CLOSING ALL OPEN SHAFT PENETRATIONS.
2. ALL WINDOW INTERIOR SURROUNDS - JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING BEAMS & BEAMS SHALL HAVE GYP. BOARD BOX BEAMS TO MATCH ALL SURROUNDING.
4. ALL INTERIOR PARTITIONS SHALL BE STOPPED TO DECK.
5. MOVABLE PARTITION SUPPORT: PROVIDE NEW WALLS BETWEEN COLUMNS. TIGHT TO STRUCTURE ABOVE. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.



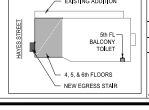
3 5th FL BALCONY TOILET DEMO PLAN
1/4" = 1'-0"



4 5th FL BALCONY TOILET CONST. PLAN
1/4" = 1'-0"

PROJECT NORTH | NORTH

KEY PLAN



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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

5th FL DEMOLITION & CONSTRUCTION PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A150**

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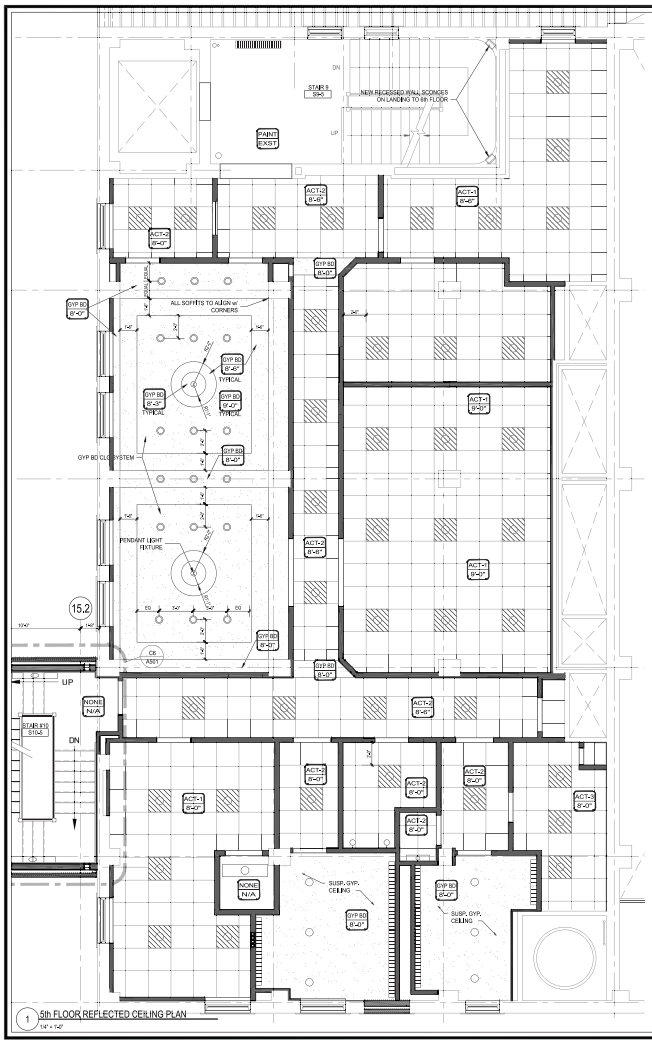
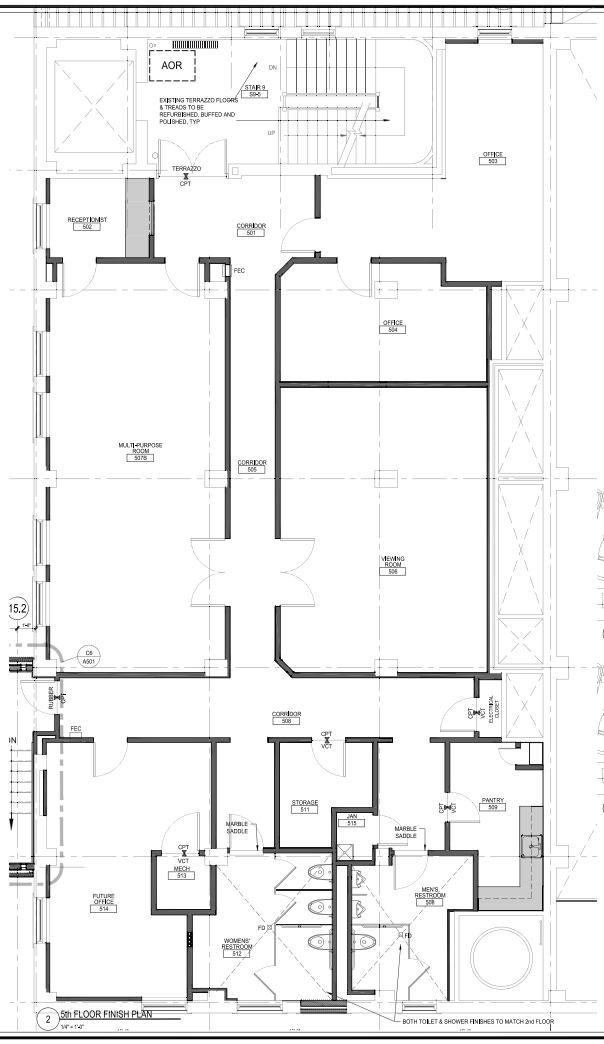
A150.DWG 8/12/2013 8:00:00 AM



1 5th FLOOR REFLECTED CEILING PLAN
1/4" = 1'-0"



2 5th FLOOR FINISH PLAN
1/4" = 1'-0"

GENERAL NOTES

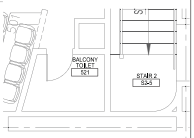
1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT, DUCTWORK, PIPING, ETC. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

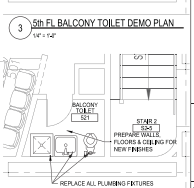
1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND WALL MOUNTED ACCESSORIES.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL ABANDONED ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND PIPES BACK TO SOURCE.
6. DEMO CONTRACTOR TO INSTALL ALL LOOSE LINTELS PRIOR TO DEMOLISHING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

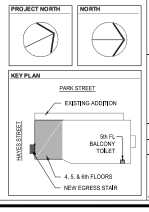
1. ALLOW 100 SF OF 4" SOLID GYP SHEETWALL FOR CLOSING ALL FIRE RATED SHAFT PENETRATIONS.
2. ALL WINDOW INTERIOR SURROUNDS - JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS & FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING BEAM & BEARING SHALL HAVE GYP. BOARD CLOUD SYSTEM. ALL BEAM SUSPENDED CEILINGS TO BE GYP. BOARD.
4. ALL INTERIOR PARTITIONS SHALL BE GYP. BOARD TO DECK.
5. MOVABLE PARTITION SUPPORT: PROVIDE NEW WALL BETWEEN COLUMNS, TIGHT TO STRUCTURE ABOVE. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO AE FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.



3 5th FL BALCONY TOILET DEMO PLAN
1/4" = 1'-0"



4 5th FL BALCONY TOILET CONST. PLAN
1/4" = 1'-0"



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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

5th FL REFLECTED CEILING & FINISH PLANS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	A151

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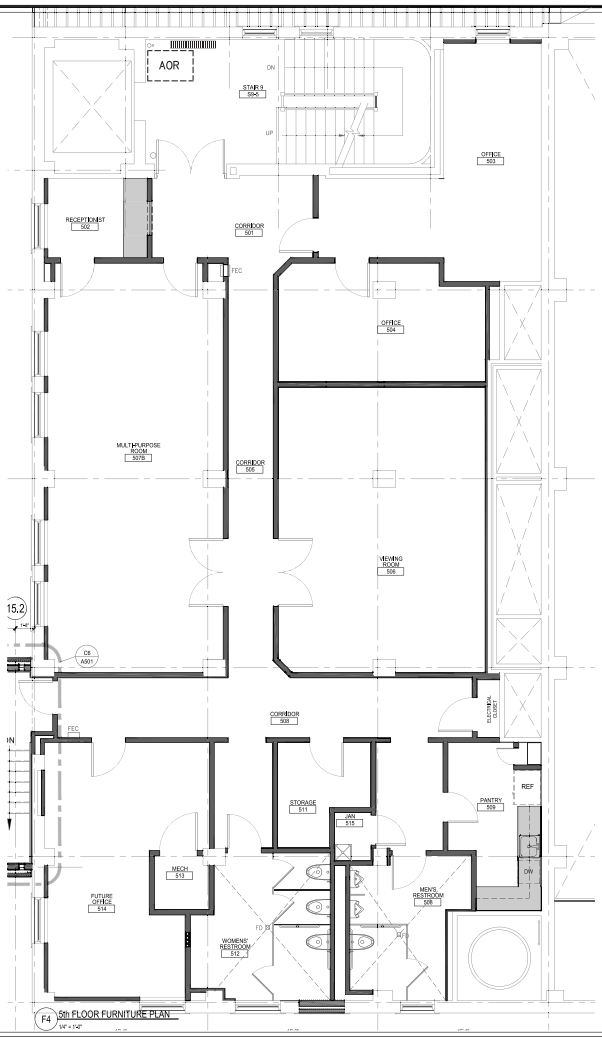

F4 5th FLOOR FURNITURE PLAN
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT, DUCTWORK, PIPING, ETC. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

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VETERANS MEMORIAL AUDITORIUM - PHASE III

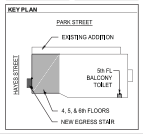
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



5th FL REFLECTED CEILING & FINISH PLANS

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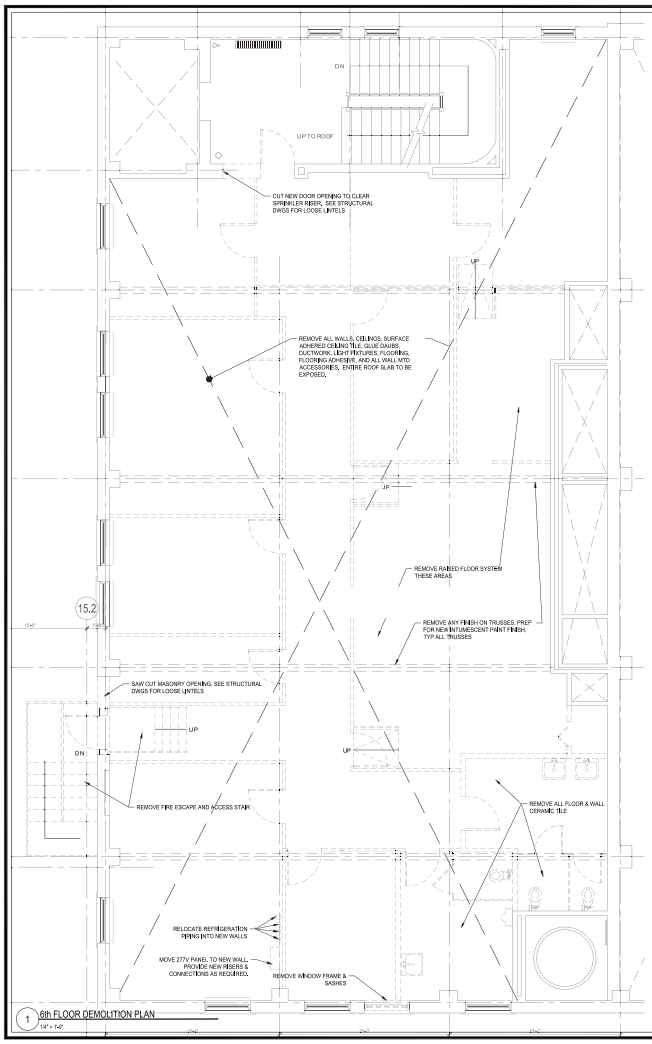
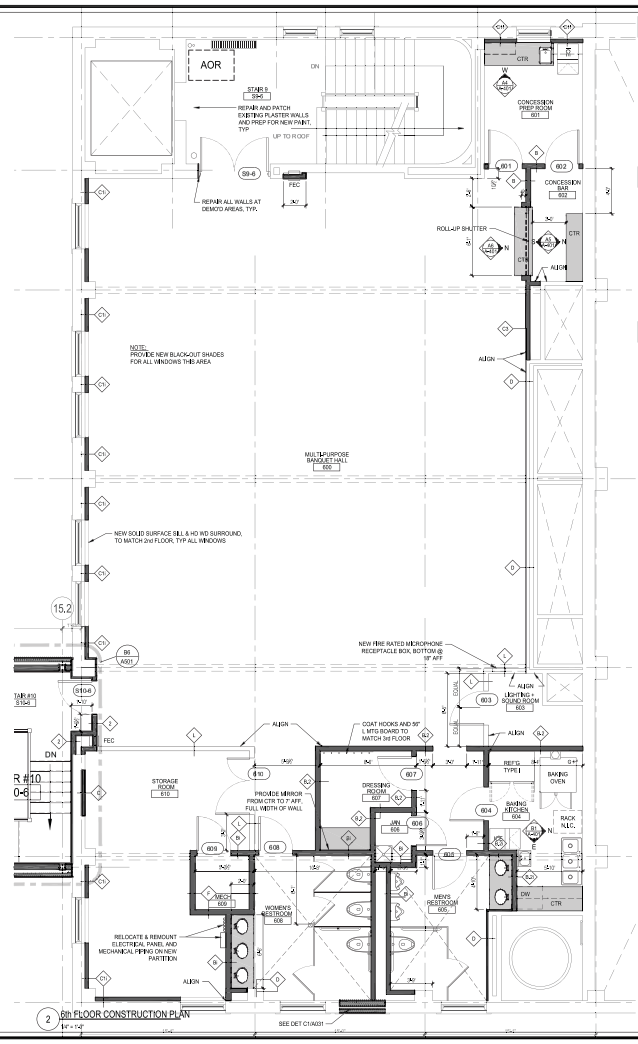


1 6th FLOOR DEMOLITION PLAN
1/4" = 1'-0"



2 6th FLOOR CONSTRUCTION PLAN
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT PRIOR TO ANY DEMOLITION. CONSULT ARCHITECT PRIOR TO ANY DEMOLITION.
4. SEE SHEET A-001 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND WALL MOUNTED ACCESSORIES.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE, LEAVE HANGERS.
4. REMOVE ALL ELECTRICAL & ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND WIRES BACK TO SOURCE.
6. DEMO CONTRACTOR TO INSTALL ALL LOOSE LINTELS PRIOR TO DEMO'ING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

1. ALLOW 150 SF OF 4" SOLID CMU SHAFT WALL FOR CLOSING UP OPENINGS IN EXTERIOR WALL.
2. ALL WINDOW/DOOR SURROUNDS - JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE DRY, BOARD SURFACE ON CHICAGO SUSPENSION SYSTEM.
4. ALL PARTITIONS SHALL BE 3-5/8" METAL STUD.
5. MOVABLE PARTITION SUPPORT. PROVIDE NEW WALLS BETWEEN COLUMNS, TIGHT TO STRUCTURE ABOVE, COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN

6th FL DEMOLITION & CONSTRUCTION PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A160

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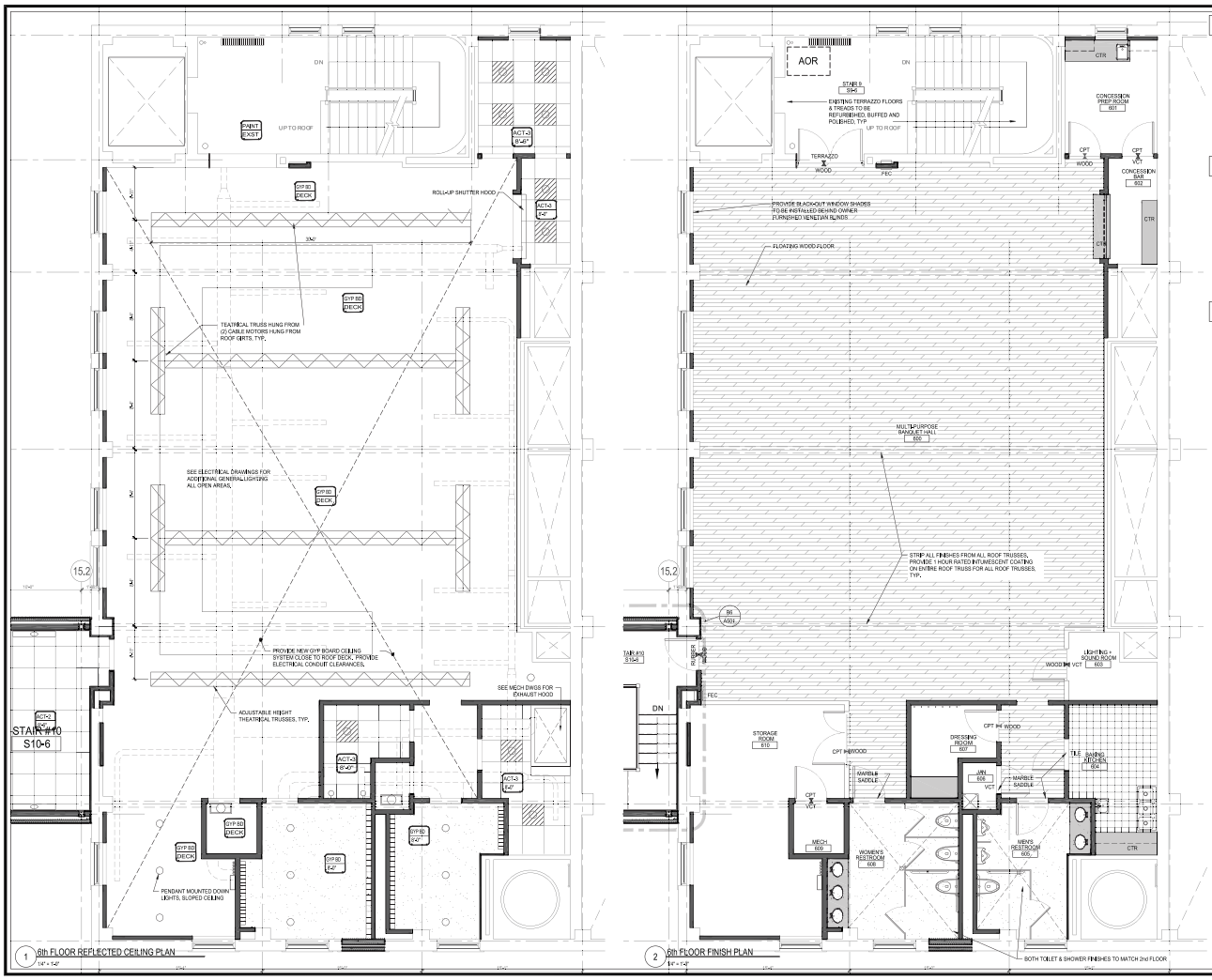

1 6th FLOOR REFLECTED CEILING PLAN
1/4" = 1'-0"

2 6th FLOOR FINISH PLAN
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT PRIOR TO ANY DEMOLITION. CONSULT ARCHITECT FOR ANY DISCREPANCIES.
4. SEE SHEET A-001 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

DEMO NOTES

1. REMOVE ALL FLOORINGS AND ADHESIVES TO BARE CONCRETE.
2. REMOVE ALL WALLS, DOORS, COUNTERS, CABINETS, AND WALL MOUNTED ACCESSORIES.
3. REMOVE ALL CEILINGS TO EXPOSE BEAMS & STRUCTURE ABOVE. LEAVE HANGERS.
4. REMOVE ALL ELECTRICAL, ELECTRICAL WIRES, CONDUITS BACK TO SOURCE, LIGHT FIXTURES, ETC.
5. REMOVE ALL PLUMBING FIXTURES, UNUSED PLUMBING AND PIPES BACK TO SOURCE.
6. DEMO CONTRACTOR TO INSTALL ALL LOOSE LINTELS PRIOR TO DEMOLISHING MASONRY WALLS. SEE STRUCTURAL DWGS FOR LINTEL SIZES.

CONSTRUCTION NOTES

1. ALLOW 135 SF OF 4" SOLID CMU SHAFT WALL FOR CLOSING OF ELEVATOR SHAFT. SEE STRUCTURAL.
2. ALL WINDOW/MIRROR SURROUNDS - JAMBS, HEADS & ENGINEERED STONE SILLS - SHALL MATCH DIMENSIONS, MATERIALS FINISH ON 3RD FLOOR WINDOW SURROUNDS. USE PAINT GRADE HARD WOOD FOR ALL WINDOW TRIM.
3. ALL EXPOSED CEILING SLAB & BEAMS SHALL HAVE GYP. BOARD SURFACE ON CHICAGO SUPERMESH SYSTEM.
4. ALL PARTITIONS TO BE 3-5/8" METAL STUDS, TYP.
5. MOVABLE PARTITION SUPPORT: PROVIDE NEW WALK BETWEEN COLUMNS, TIGHT TO STRUCTURE ABOVE. COORDINATE ALL PUNCHED HOLES WITH PARTITION MANUFACTURER. SUBMIT CONNECTION DETAILS TO A/E FOR REVIEW PRIOR TO FABRICATION AND CONSTRUCTION.
6. ALL NEW PRECAST SHALL MATCH ADDITION PRECAST COLORS.

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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

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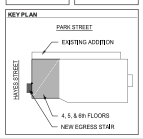
KEY PLAN



6th FL REFLECTED CEILING & FINISH PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A161

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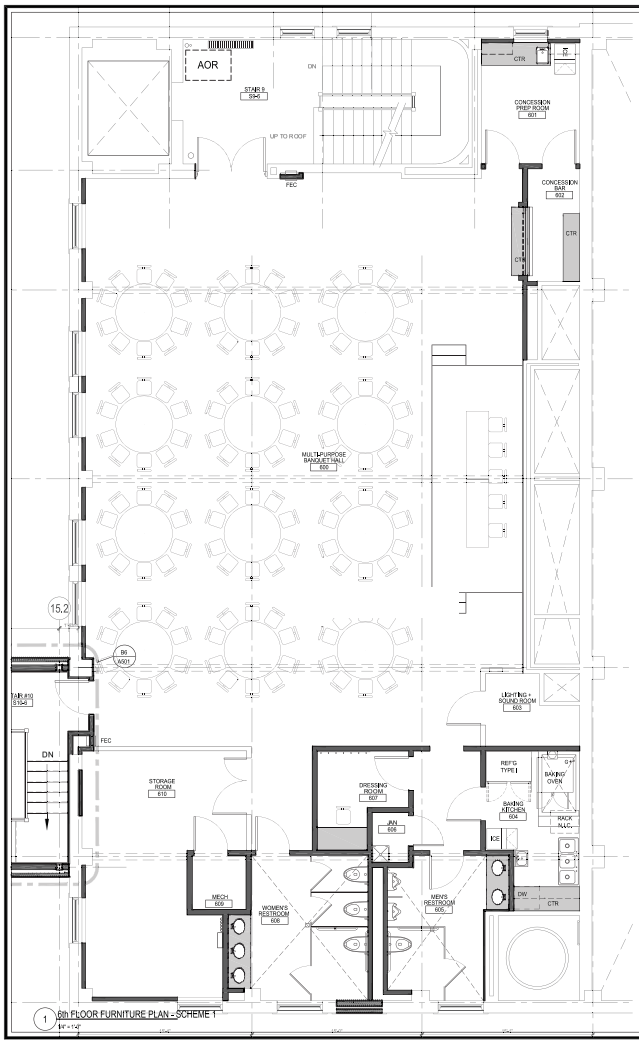
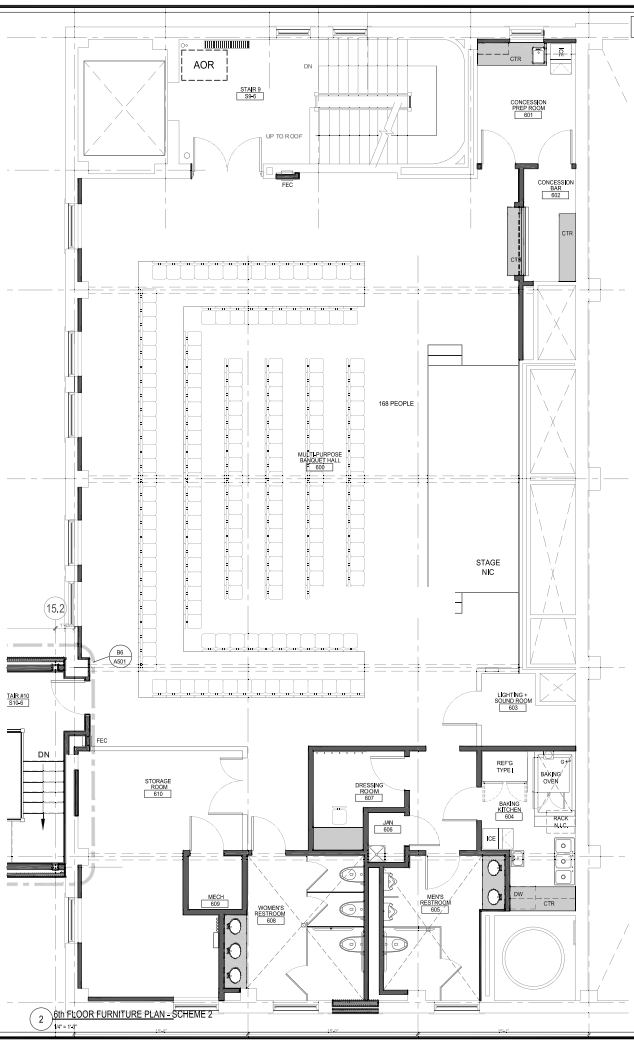


1 6th FLOOR FURNITURE PLAN - SCHEME 1
1/4" = 1'-0"



2 6th FLOOR FURNITURE PLAN - SCHEME 2
1/4" = 1'-0"

GENERAL NOTES

1. SEE PROJECT MANUAL FOR ADDITIONAL INFORMATION.
2. SEE MEP & FP DRAWINGS FOR ADDITIONAL INFORMATION.
3. ALL CONTRACTORS SHALL CONFIRM CLEARANCES NEEDED FOR EQUIPMENT, FIXTURES, AND ACCESSORIES. CONSULT ARCHITECT WITH ANY DISCREPANCIES.
4. SEE SHEET A401 FOR NEW SOUTH STAIR PLANS AND SECTIONS. STAIR TO BE BUILT ON EXISTING FOUNDATION.

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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

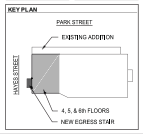
THE VETS

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



6th FL FURNITURE PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A162

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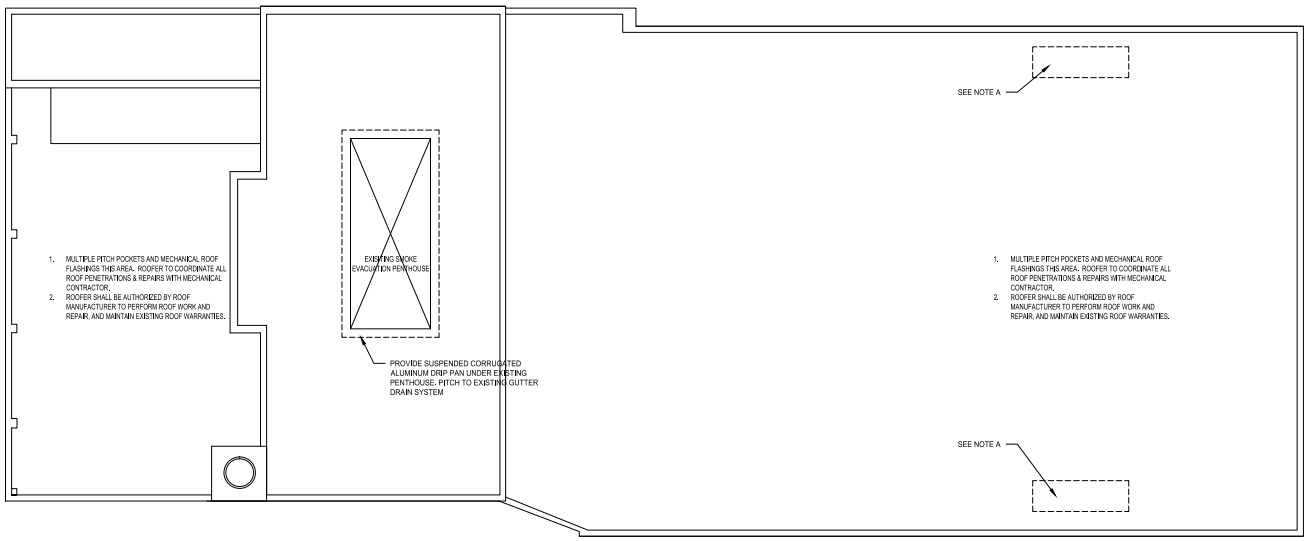


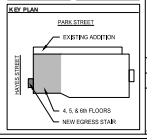
E1 ROOF REPAIR PLAN
1/8" = 1'-0"

NOTE 'A':
THERE IS WATER DAMAGE TO THE AUDITORIUM CEILING. THERE ARE EXISTING ROOF DRAINS IN THESE AREAS. GC TO CHECK DRAIN MEMBRANE FLASHING AND PLUMBING CONNECTIONS BELOW ROOF TO FIND LEAK SOURCE. REPAIR LEAK SOURCE.

PROJECT NORTH

NORTH

KEY PLAN



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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

ROOF PLAN

DATE:	AUGUST 20, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	A170

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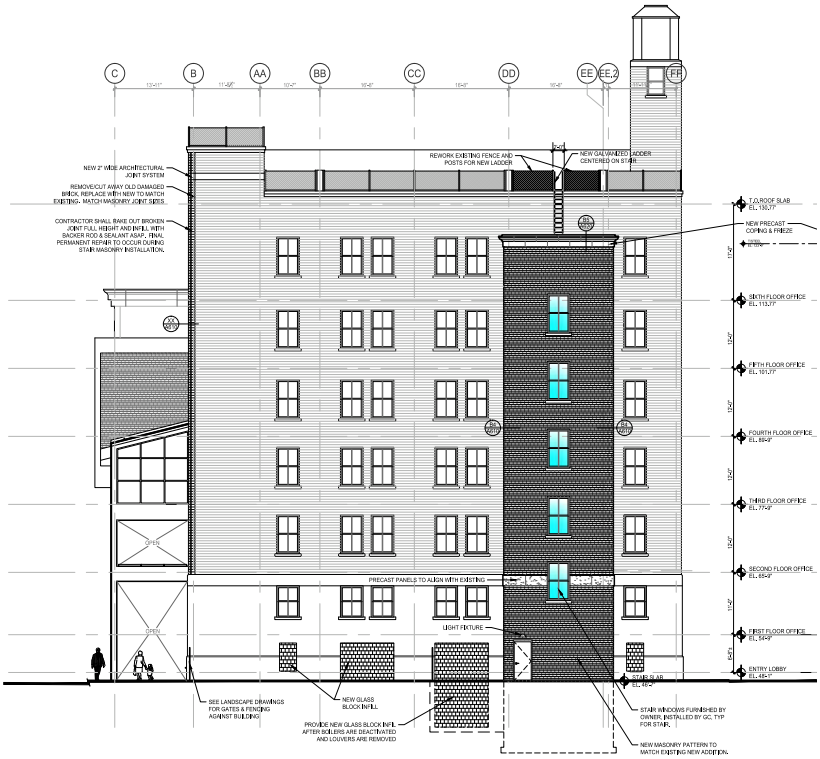

1 SOUTH ELEVATION
SCALE: 1/8" = 1'-0"

NOTE:
1. ALL NEW CONCRETE FLOOR SLAB ELEVATIONS TO BE FIELD VERIFIED. ALL NEW FLOOR SLABS SHALL ALIGN WITH EXISTING FLOORS UON.

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83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

EXTERIOR SOUTH ELEVATION

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: A201

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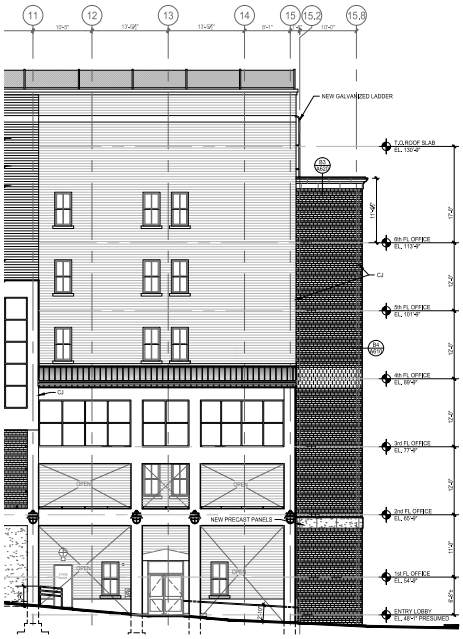
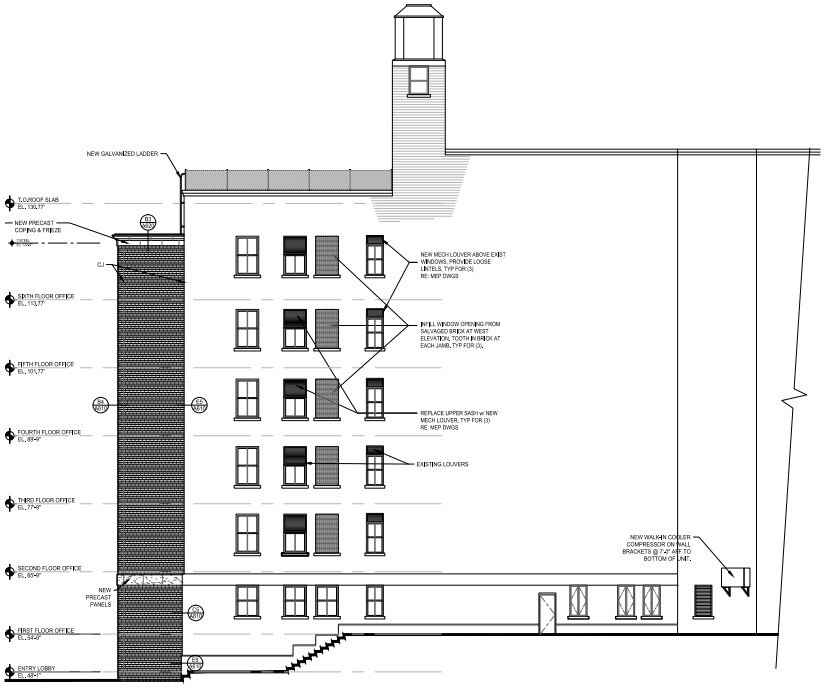
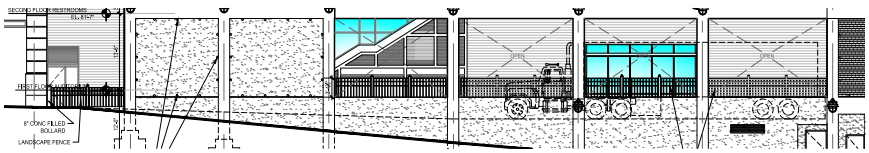
9/4/2013 9:10:31 AM



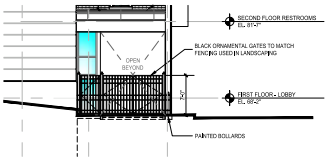
1 WEST ELEVATION - STAIR TOWER
SCALE: 1/8" = 1'-0"



2 EAST ELEVATION - STAIR TOWER
SCALE: 1/8" = 1'-0"



3 WEST ELEVATION - ORNAMENTAL FENCE
SCALE: 1/8" = 1'-0"



3 NORTH ELEVATION - ORNAMENTAL FENCE AND GATE
SCALE: 1/8" = 1'-0"

NOTE:
1. ALL NEW CONCRETE FLOOR SLAB ELEVATIONS TO BE FIELD VERIFIED. ALL NEW FLOOR SLABS SHALL ALIGN WITH EXISTING FLOORS U.O.N.

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THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

EXTERIOR WEST & EAST ELEVATIONS

DATE: AUGUST 12, 2013
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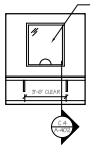
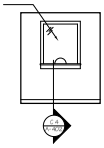
DRAWING NO.: A202

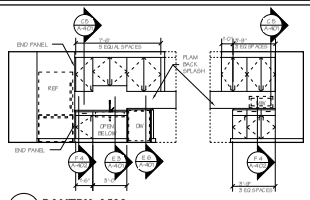
9/4/2013 9:13:43 AM



A.1 / A-401 **RECEPTIONIST A502**
SCALE: 1/4"= 1'-0"



A.2 / A-401 **CORRIDOR A501**
SCALE: 1/4"= 1'-0"



A.3 / A-401 **PANTRY A509**
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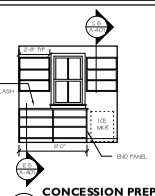
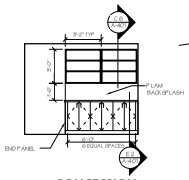
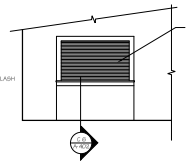


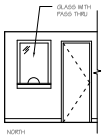
A.4 / A-401 **CONCESSION PREP ROOM A600**
SCALE: 1/4"= 1'-0"



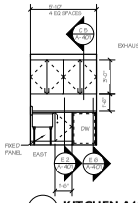
A.5 / A-401 **CONCESSION ROOM A601**
SCALE: 1/4"= 1'-0"

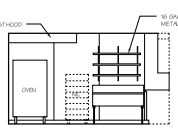


A.6 / A-401 **BANQUET HALL A602**
SCALE: 1/4"= 1'-0"

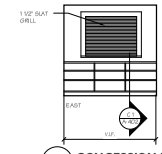


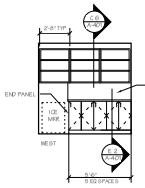
A.7 / A-401 **STAIR S9-1**
SCALE: 1/4"= 1'-0"



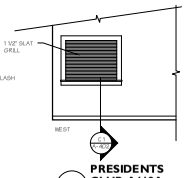


B.1 / A-401 **KITCHEN A407 & A604**
SCALE: 1/4"= 1'-0"

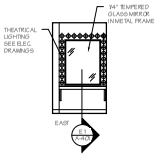




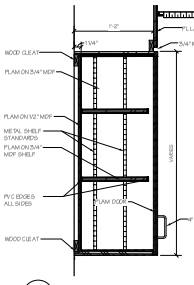
B.3 / A-401 **CONCESSION BAR A413**
SCALE: 1/4"= 1'-0"



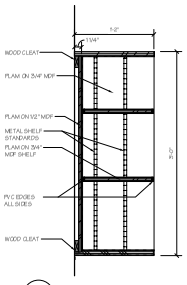
B.5 / A-401 **PRESIDENT'S CLUB A412A**
SCALE: 1/4"= 1'-0"



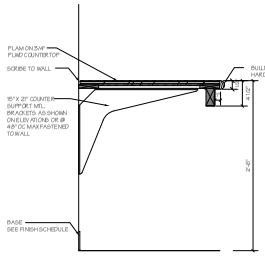
C.1 / A-401 **DRESSING ROOM A607**
SCALE 1/4"= 1'-0"



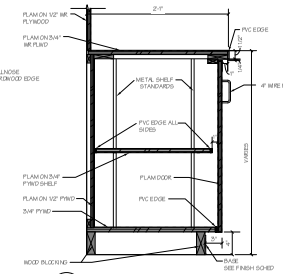
C.5 / A-401 **UPPER WALL CABINET**
SCALE: 1 1/2"=1'-0"



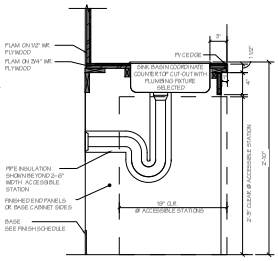
C.6 / A-401 **OPEN SHELVING**
SCALE: 1 1/2"=1'-0"



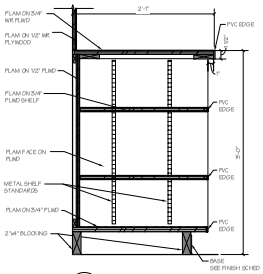
E.1 / A-401 **COUNTER**
SCALE 1 1/2"=1'-0"



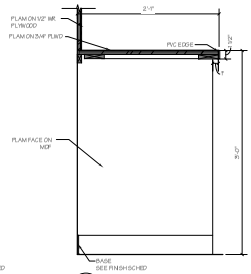
E.2 / A-401 **BASE CABINET**
SCALE 1 1/2"=1'-0"



E.3 / A-401 **ACCESSIBLE SINK & COUNTER DETAIL**
SCALE 1 1/2"=1'-0"



E.5 / A-401 **OPEN SHELVING BASE**
SCALE: 1 1/2"=1'-0"



E.6 / A-401 **BASE OPENING**
SCALE 1 1/2"=1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

INTERIOR
ELEVATIONS
MILLWORK
DETAILS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046-3

DRAWING NO.:

A-401

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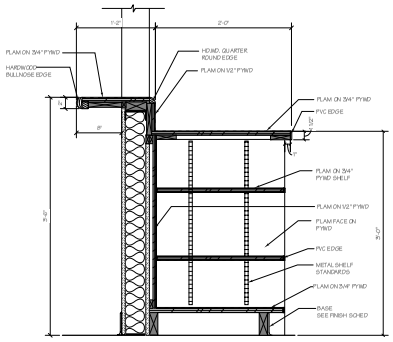
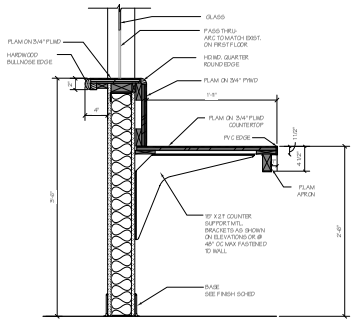
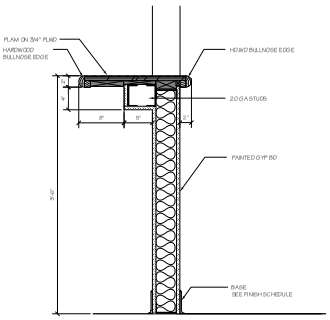


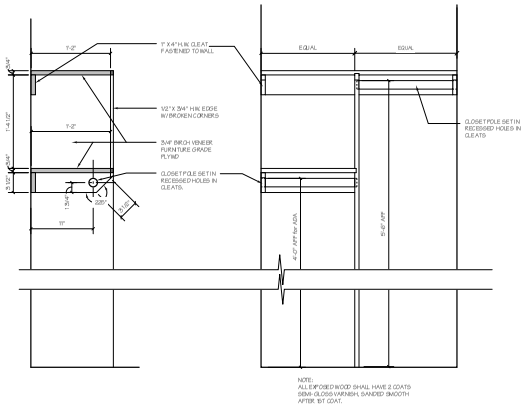
C1 / A-402 **CONCESSIONS BAR @ A413**
SCALE: 1 1/2"=1'-0"



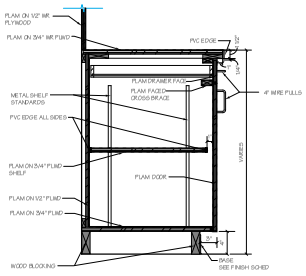
C4 / A-402 **RECEPTIONIST @ A502/A501**
SCALE: 1 1/2"=1'-0"



C6 / A-402 **CONCESSIONS BAR @ A601/A602**
SCALE: 1 1/2"=1'-0"



F1 / A-402 **TYPICAL COAT CLOSET SHELF ELEVATION & SECTION**
SCALE: 1-1/2"=1'-0"



F4 / A-402 **BASE CABINET WITH DRAWER**
SCALE: 1 1/2"=1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

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REVISIONS:

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DATE: AUGUST 12, 2013
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DRAWING NO.:

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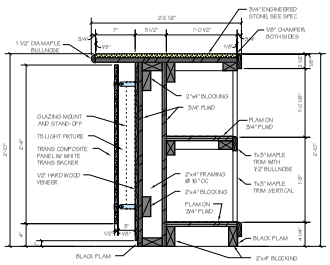
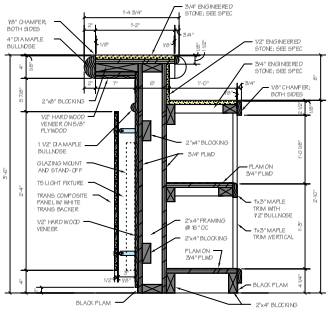
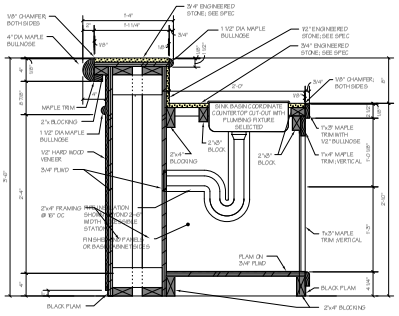


B 1 / A-403 **SECTION DETAIL @ SERVICE BAR**
SCALE: 1 1/2"=1'-0"



D 1 / A-403 **SECTION DETAIL @ SERVICE BAR**
SCALE: 1 1/2"=1'-0"



F 1 / A-403 **SECTION DETAIL @ SERVICE BAR**
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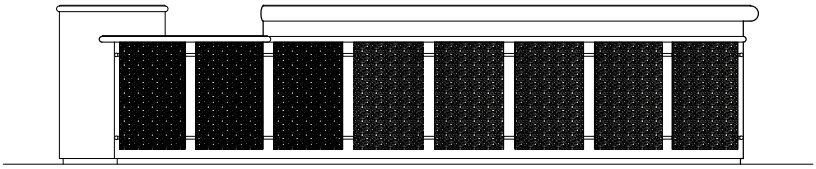
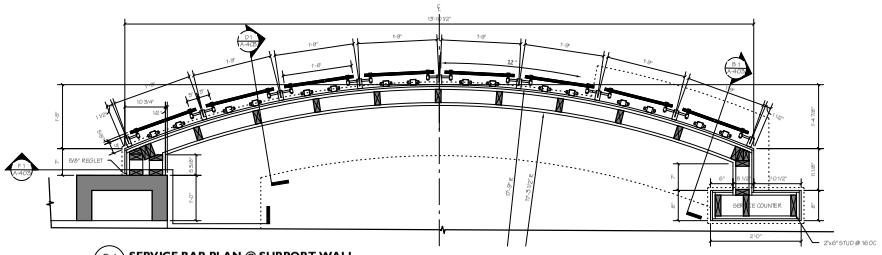
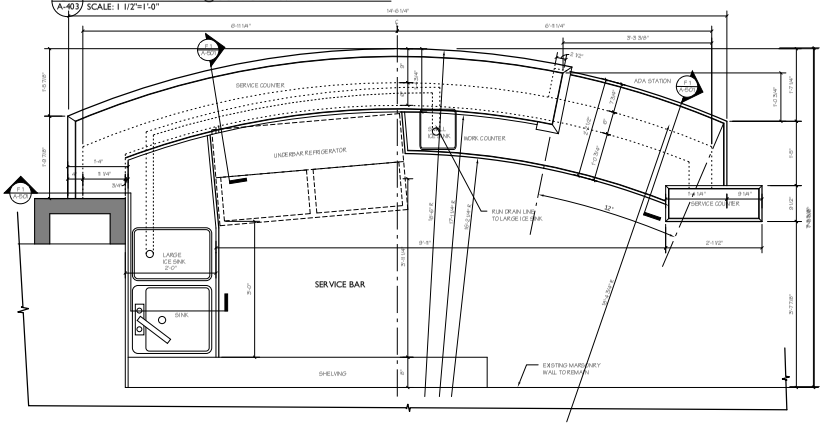


B 4 / A-403 **ELEVATION @ SERVICE BAR (FRONT)**
SCALE: 1 1/2"=1'-0"



D 4 / A-403 **SERVICE BAR PLAN @ SUPPORT WALL**
SCALE: 1 1/2"=1'-0"



F 4 / A-403 **SERVICE BAR PLAN @ UPPER COUNTERTOP**
SCALE: 1"=1'-0"

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v 401.272.8100

Landscape Architects
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East Providence, RI 02914
v 401.438.2201

Structural Engineers
Odeh Engineers, Inc.
1223 Manual Spring Avenue
North Providence, RI 02904
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Mechanical & Plumbing Engineer
J. Mattera Inc.
18 Shor Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Park way
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.6992

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

SERVICE BAR MILLWORK DETAILS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046-3
DRAWING NO.:	**A-403**

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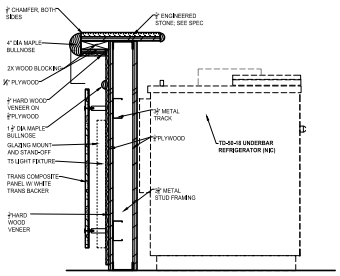
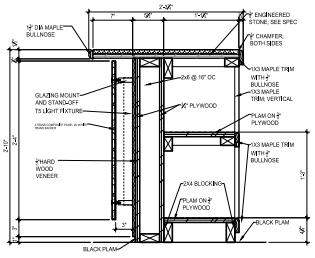
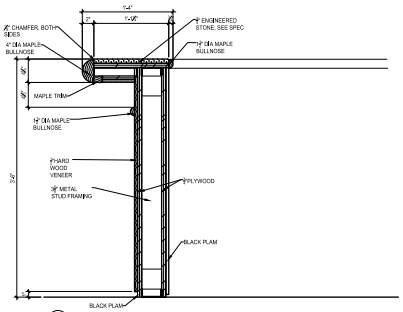


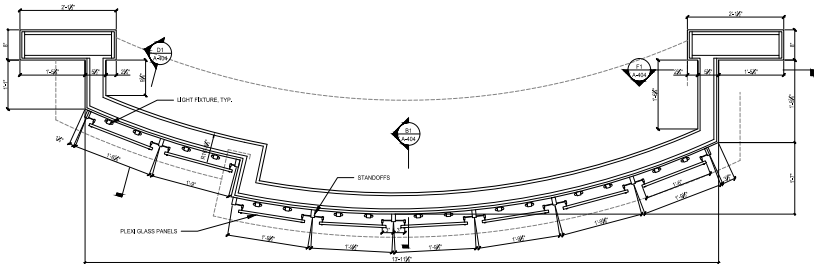
B1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



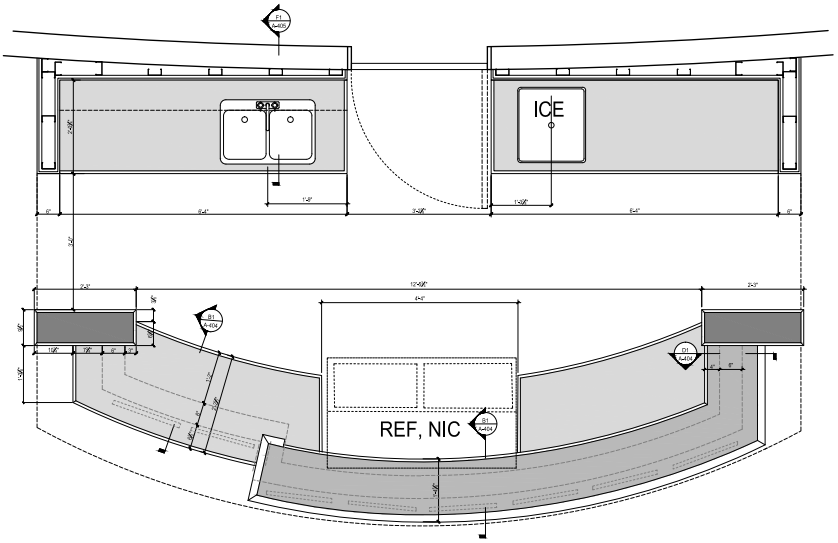
D1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



F1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



C3 FRONT COUNTER - LOWER HORIZONTAL SECTION
SCALE: 1" = 1'-0"



F3 FRONT COUNTER - PLAN VIEW
SCALE: 1" = 1'-0"

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Bryan Associates A Bluolin, Inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
1 Richmond Square, Suite
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1323 Hinsdale Spring Avenue
Cranston, RI 02908
v 401.784.1111

Mechanical & Plumbing Engineer
J. J. Mallon, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd, Suite 1002
Warwick, RI 02886
v 401.736.8866

THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

MEZZANINE COUNTER PLANS & SECTIONS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: **A404**

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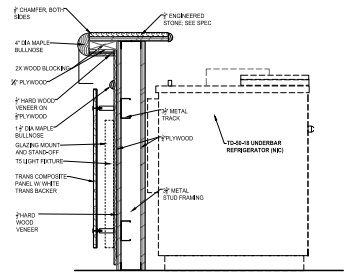
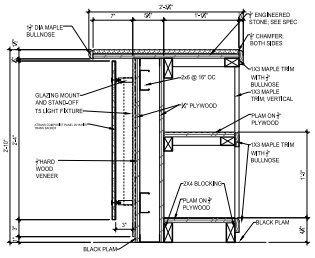
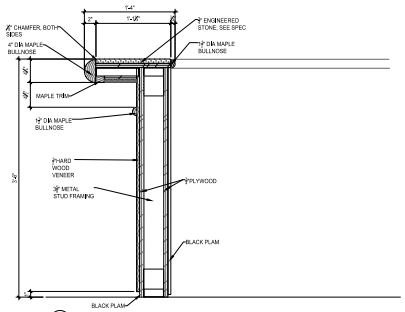


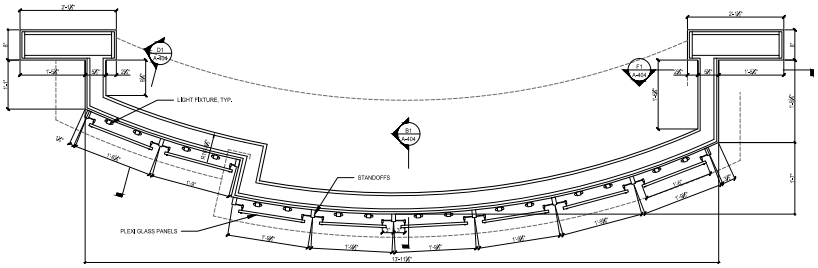
B1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



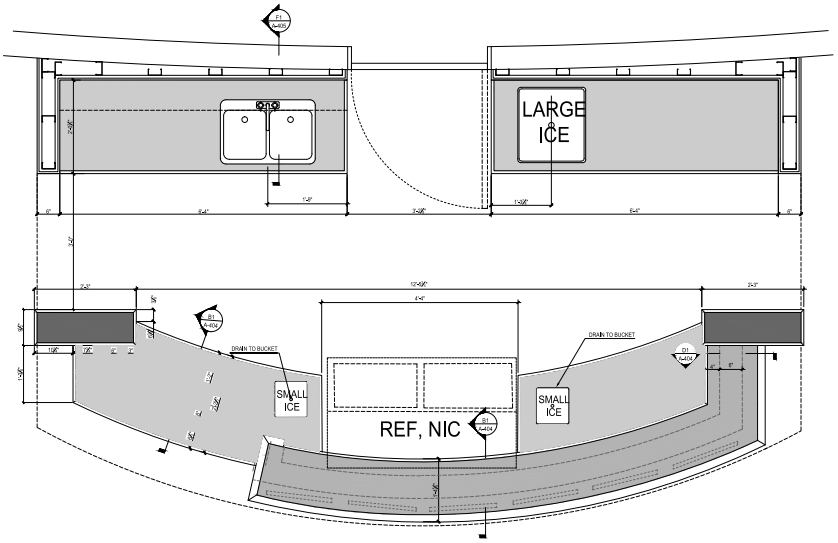
D1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



F1 SERVICE BAR SECTION
SCALE: 1 1/2" = 1'-0"



C3 FRONT COUNTER - LOWER HORIZONTAL SECTION
SCALE: 1" = 1'-0"



F3 FRONT COUNTER - PLAN VIEW
SCALE: 1" = 1'-0"

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Bryan Associates A Bonin, Inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
1 Richmond Square, Suite
East Providence, RI 02914
v 401.434.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Hillcrest Spring Avenue
Pawtucket, RI 02908
v 401.726.1311

Mechanical & Plumbing Engineer
J. Mallozzi, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd, Suite 1002
Warwick, RI 02886
v 401.736.8862

THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

MEZZANINE COUNTER PLANS & SECTIONS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: **A404**

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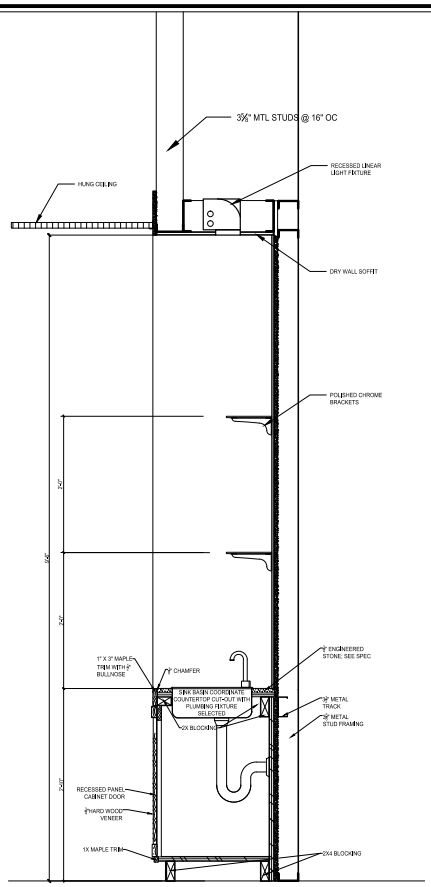
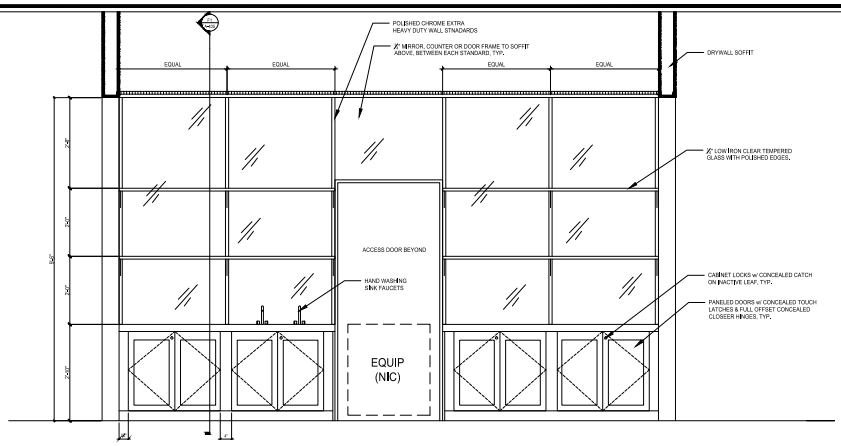
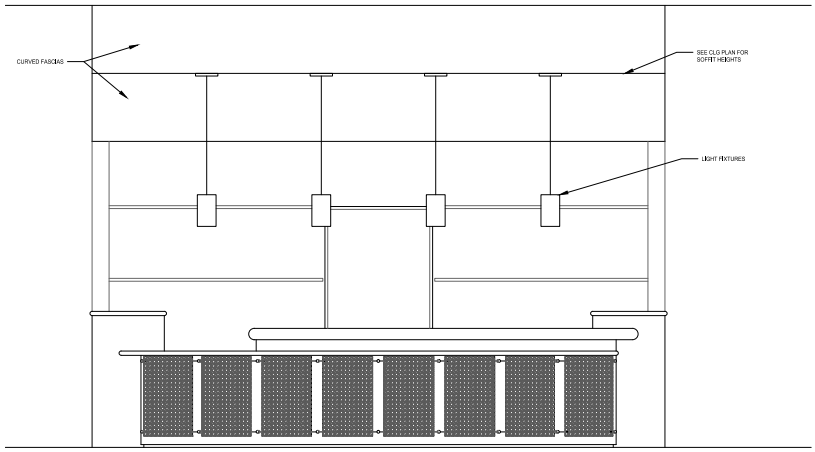


F1 REAR COUNTER - SECTION
SCALE: 1 1/2" = 1'-0"



C3 FRONT COUNTER - LOWER HORIZONTAL SECTION
SCALE: 1 1/2" = 1'-0"



F3 FRONT COUNTER - PLAN VIEW
SCALE: 1 1/2" = 1'-0"

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Bryant Associates A.B.Ecclin, Inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
1 Richmond Square, Inc.
East Providence, RI 02914
v 401.438.3071

Structural Engineers
Odeh Engineers, Inc.
1323 Hinsdale Spring Avenue
Cranston, Providence, RI 02908
v 401.784.1111

Mechanical & Plumbing Engineer
J. Mallozzi, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
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v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd, Suite 1002
Warwick, RI 02886
v 401.736.8862

THE VETS

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

MEZZANINE COUNTERS ELEVATIONS & SECTION

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: **A405**

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PAINT FINISH A
FLAT WHITE

PAINT FINISH B
DUTCH METAL FOIL ON
ALL RAISED DETAILS

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH B
DUTCH FOIL

PAINT FINISH B
DUTCH FOIL

PAINT FINISH D

PAINT FINISH F
DUTCH METAL FOIL

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH E

PAINT LETTERING KEY	
1046-3 VMA PHASE III	
A	WHITE SURFACES
B	DUTCH FOIL
C	CURRENT PINK
D	CURRENT BLUE
E	UNDER SIDE OF TRIM IN ENTRY LOBBY
F	UNDERNEATH COLUMNS/PANELLING IN AUDITORIUM
G	BASE MOLDING
H	BENEATH BASE MOLDING
I	CEILING DETAIL 1 IN AUDITORIUM
J	CEILING DETAIL 2 IN AUDITORIUM
K	INSIDE COLOR OF BALCONY DÉCOR PANELS
L	INTERIOR TRIM EDGE OF BALCONY DÉCOR PANELS
M	NEW WALL COLOR IN STAIRWAY

NOTE: ALL RAISED TRIM TO RECEIVE DUTCH METAL FOIL

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Vanasse, Hangen & Brustlin, inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd. Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PAINT FINISH SCHEMES - LOBBY

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A-410**

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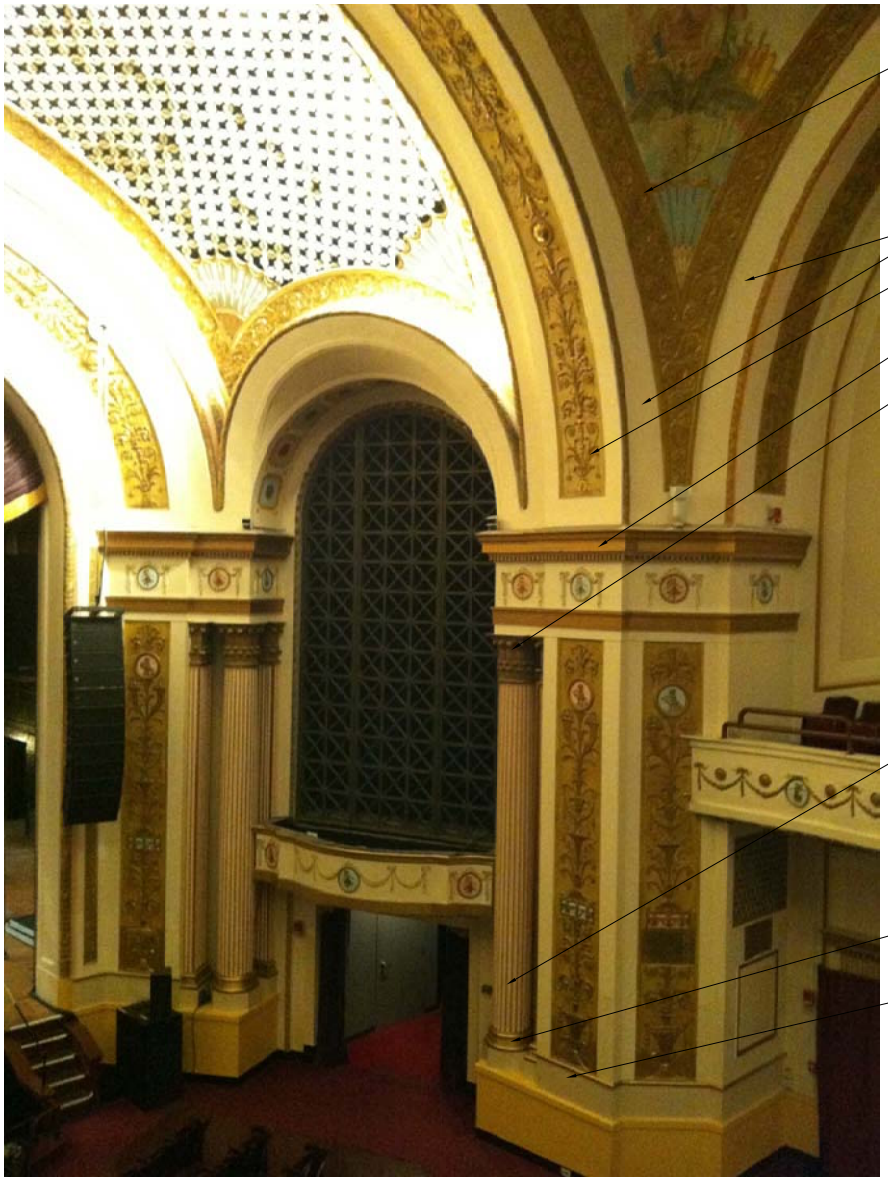

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH A
WHITE

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH A
COLUMN SHAFT
AND FLUTES

PAINT FINISH B

PAINT FINISH F

PAINT FINISH G

PAINT FINISH H

SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Vanasse, Hangen & Brustlin, Inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THEVETS

REVISIONS:

PAINT FINISH SCHEMES - AUDITORIUM

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: A-411

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PAINT FINISH A
WHITE

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH E

PAINT FINISH I

PAINT FINISH J

PAINT FINISH A
WHITE

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH D
(CURRENT BLUE)

NOTE: EXISTING MUNICIPAL SEALS AND NAMES PAINTED ON CANVAS TO REMAIN. REATTACH ALL LOOSE EDGES

SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Varasse, Hangen & Brustlin, inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THEVETS

REVISIONS:

PAINT FINISH SCHEMES - AUDITORIUM

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

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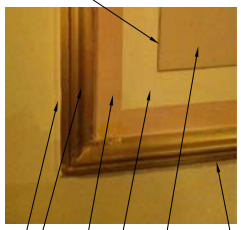
NOTE: GOLD PINSTRIPE



PAINT FINISH B COLOR TO WRAP EDGE OF TRIM

NOTE: REPLICATE 4 COLOR PANEL SCHEME ADJACENT

PAINT FINISH G

PAINT FINISH H

NOTE: FLOOR COLOR TO REMAIN

PAINT FINISH A WHITE

PAINT FINISH B (DUTCH FOIL)

PAINT FINISH C (CURRENT PINK)

PAINT FINISH D (CURRENT BLUE)

PAINT FINISH A

PAINT FINISH A

PAINT FINISH K

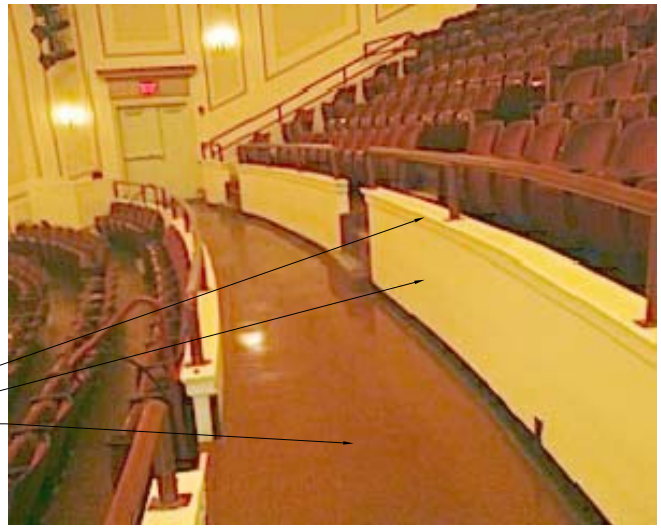
PAINT FINISH K

PAINT FINISH B NEW DUTCH METAL FOIL

UNATTACH EXISTING CANVAS PICTOGRAPH & RETAIN FOR REUSE

PAINT FINISH G

PAINT FINISH H



SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Varasse, Hangen & Brustlin, inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd. Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PAINT FINISH SCHEMES - AUDITORIUM

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A-413**

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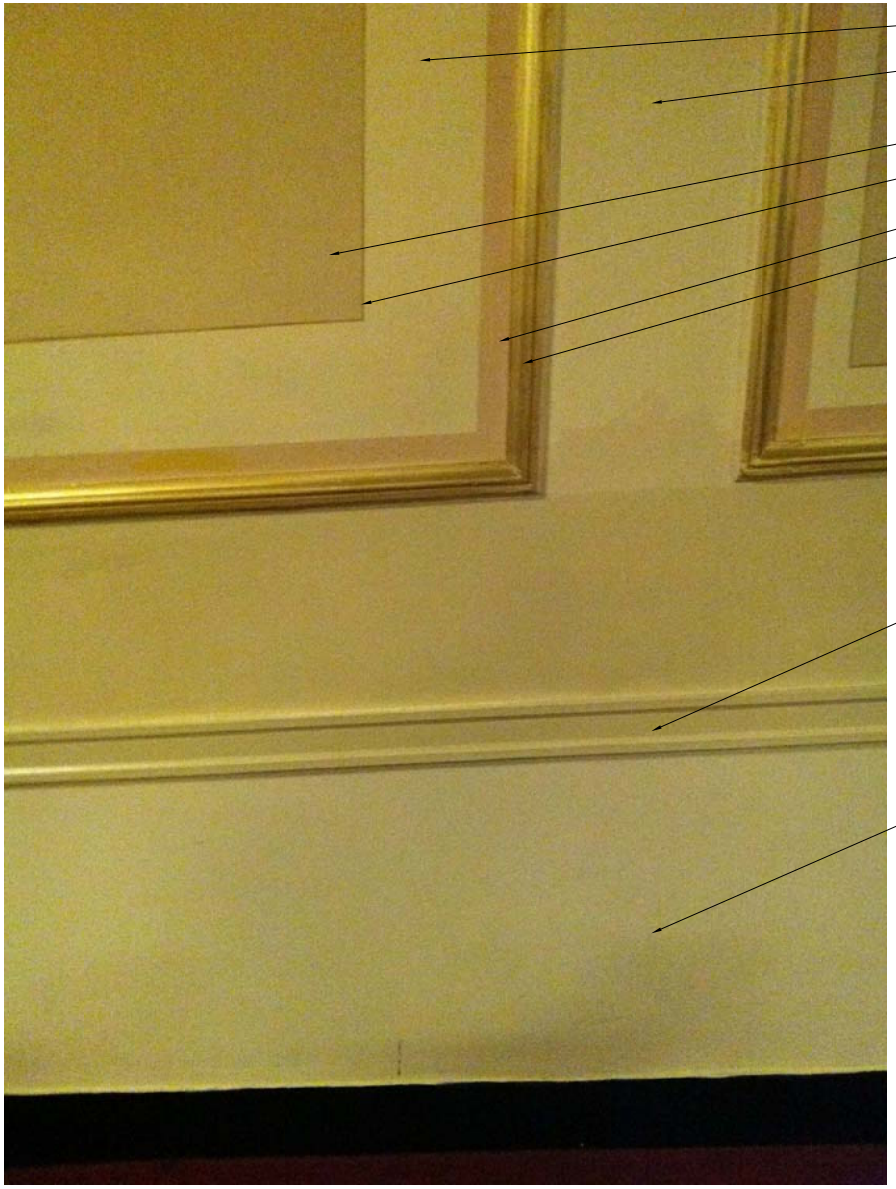


PAINT FINISH A

EXISTING WALL SURFACE PAINT FINISH A

PAINT FINISH K

GOLD PINSTRIPE

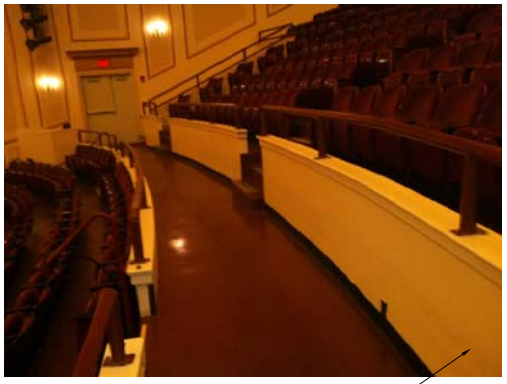
PAINT FINISH L

PAINT FINISH B
NEW DUTCH METAL FOIL

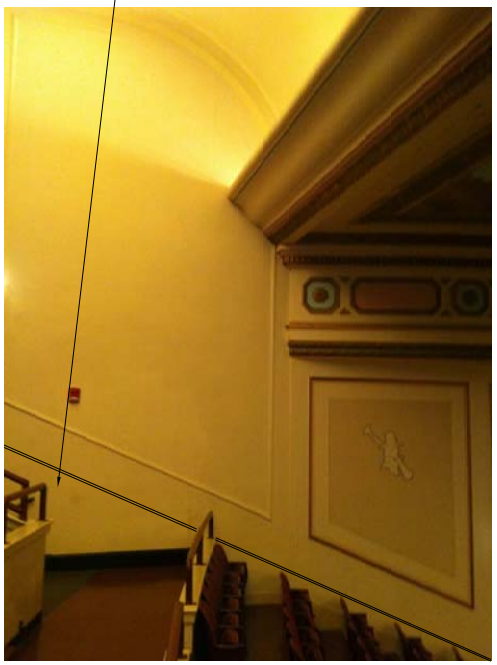
NOTE: COLOR TO WRAP MOLDING EDGE TO WALL

PAINT FINISH G
EXISTING MOLDING EDGE

PAINT FINISH H



REPEAT BASE DETAIL



SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

NCA
NORTHEAST COLLABORATIVE ARCHITECTS
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

Civil Engineers
Varasse, Hangen & Brustlin, inc.
10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
Gates, Leighton & Associates, Inc.
865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd. Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PAINT FINISH SCHEMES - AUDITORIUM

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: **A-414**

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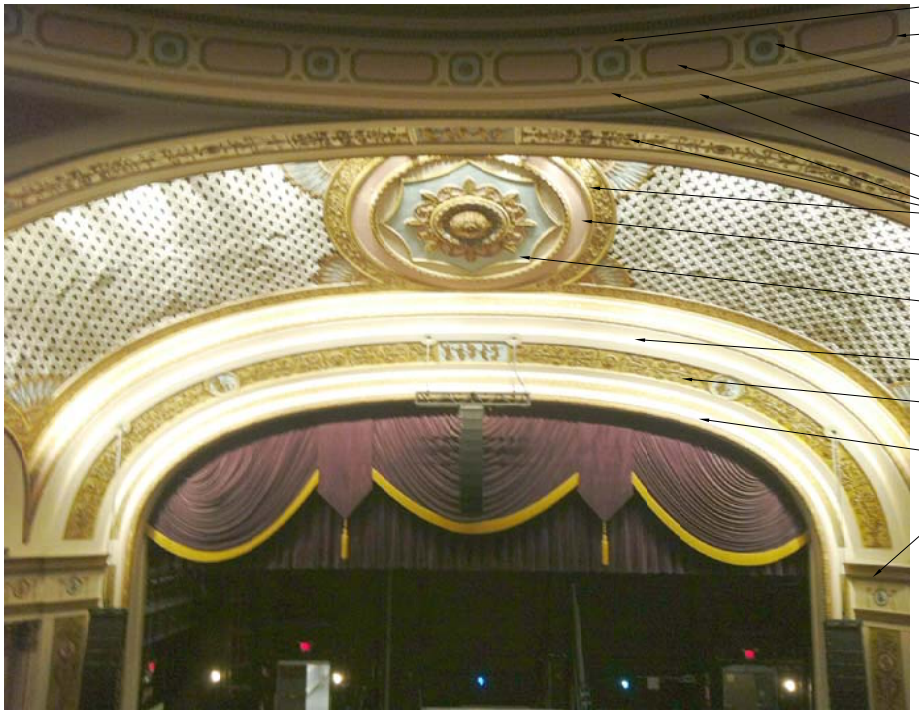


PAINT FINISH A

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH A

PAINT FINISH B
DUTCH FOIL

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH D
(CURRENT BLUE)

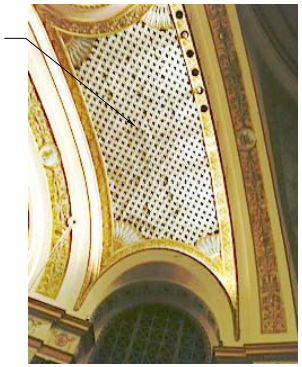
PAINT FINISH A
WHITE

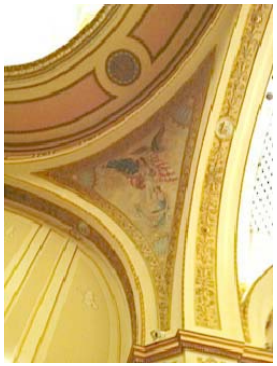
PAINT FINISH B
DUTCH FOIL

PAINT FINISH A

PAINT FINISH B
DUTCH FOIL

PAINT FINISH A





SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

NCA
NORTHEAST COLLABORATIVE ARCHITECTS, LLC
333 Westminster Street - 4th Floor
Providence, RI 02903
v 401.272.2144

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v 401.272.8100

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East Providence, RI 02914
v 401.438.2071

Structural Engineers
Odeh Engineers, Inc.
1223 Mineral Spring Avenue
North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
J. Madison, Inc.
18 Short Road
Exeter, RI 02822
v 401.397.2730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd. Suite 1002
Warwick, RI 02886
v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THEVETS

REVISIONS:

PAINT FINISH SCHEMES - AUDITORIUM

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

A-415

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PAINT FINISH A
WHITE

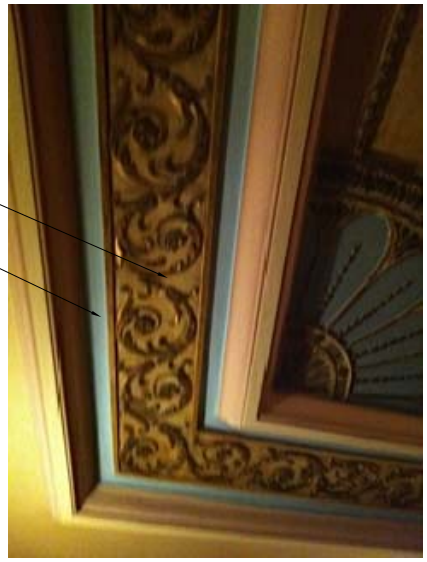
PAINT FINISH C
(CURRENT PINK0

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH D
(CURRENT BLUE)

PAINT FINISH B
DUTCH FOIL

PAINT FINISH A
WHITE



PAINT FINISH C
(CURRENT PINK)

PAINT FINISH A
WHITE

PAINT FINISH B
DUTCH FOIL

SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

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NORTHEAST COLLABORATIVE ARCHITECTS
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v 401.272.2144

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10 Dorrance Street, Suite 400
Providence, RI 02903
v 401.272.8100

Landscape Architects
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865A Waterman Ave.,
East Providence, RI 02914
v 401.438.2071

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v 401.724.1771

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Fire Protection Engineers
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v 401.736.8882

VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PAINT FINISH SCHEMES
UPSTAIRS LOBBY

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:
A-416

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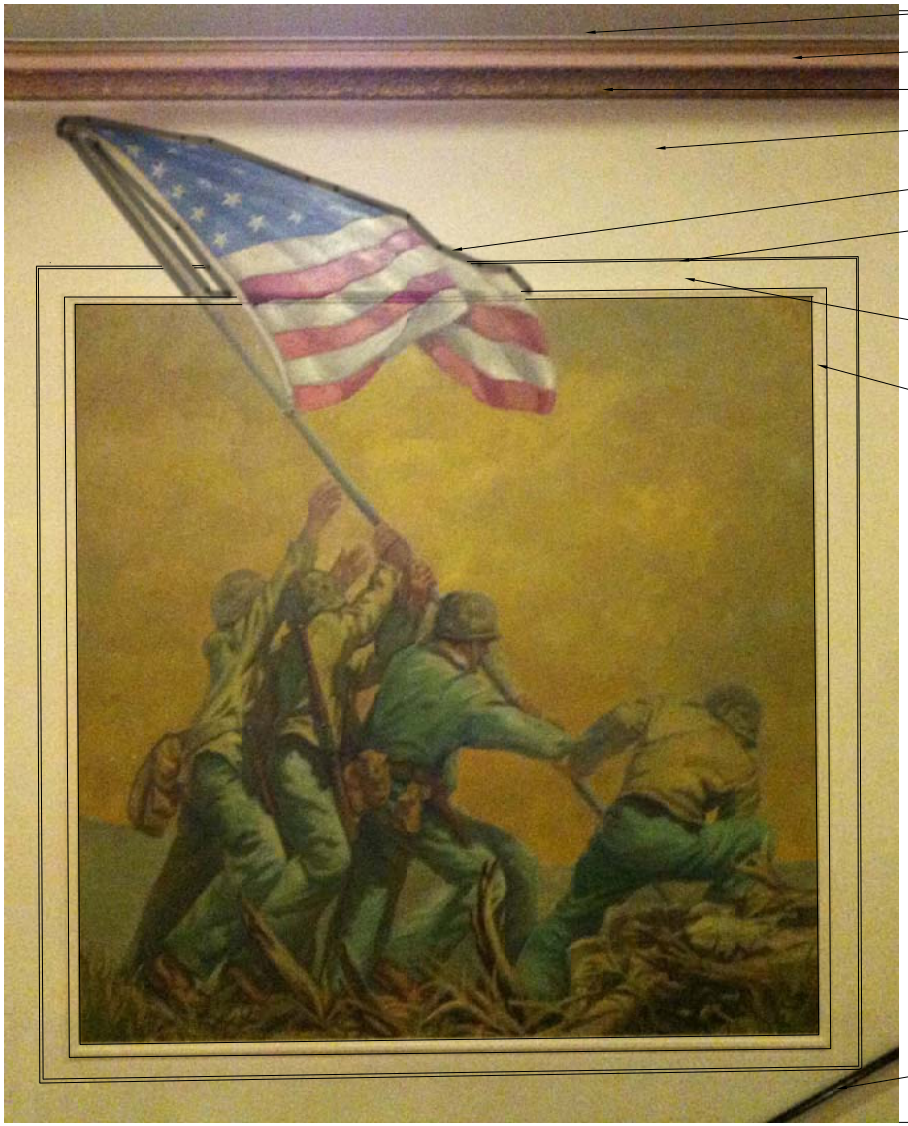

PAINT FINISH A
WHITE

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH B
DUTCH FOIL

PAINT FINISH M
NEW WALL
COLOR

1" BLACK
SHADOWLINE

NEW 1" HALF
ROUND MOLDING
PAINT FINISH G

6" EXISTING
WALL SURFACE
PAINT FINISH K

EXISTING MOLDING
GOLD FINISH

SPRINKLER PIPES
PAINT FINISH A
FLAT WHITE

EXISTING
HANDRAIL PAINT
FINISH J

SEE SHEET A410 FOR FINISH SCHEDULE AND ADDITIONAL INFORMATION.

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VETERANS MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PAINT FINISH
SCHEMES
STAIRWAY

DATE: AUGUST 12, 2013

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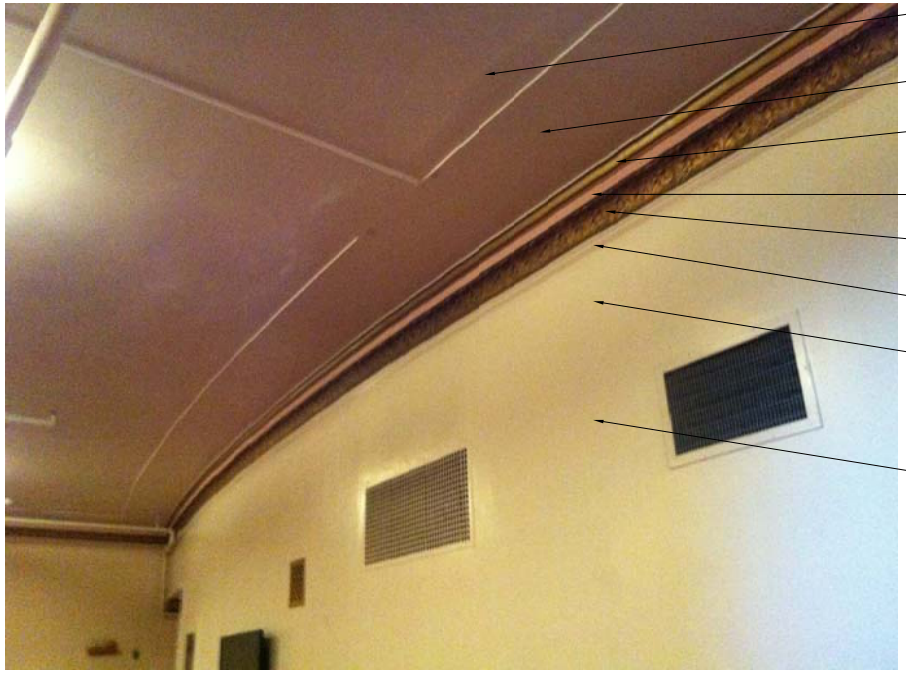

PAINT FINISH F
RECESSED
CEILING PANELS

PAINT FINISH A
WHITE

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH C
(CURRENT PINK)

PAINT FINISH B
NEW DUTCH
METAL FOIL

PAINT FINISH A
WHITE

PAINT FINISH E
NEW WALL COLOR

PAINT ALL
SPRINKLER PIPES
FLAT WHITE A

PAINT GRILLS
FINISH E
NEW WALL COLOR

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v 401.438.7733

Fire Protection Engineers
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Warwick, RI 02886
v 401.736.3892

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83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

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SCHEMES
STAIRWAY

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NCA JOB NO.: 1046.30

DRAWING NO.:
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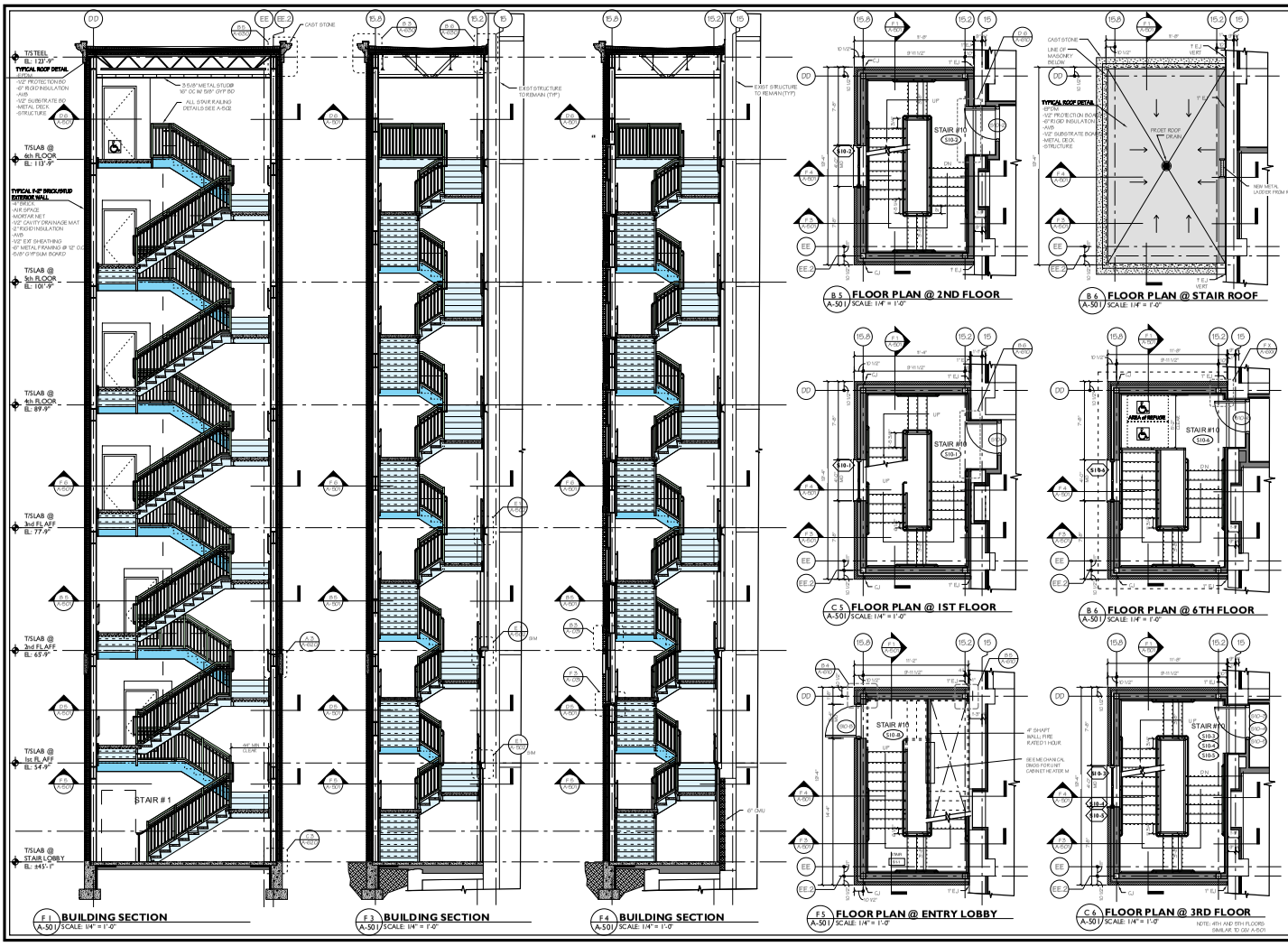

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Providence, RI 02903
v 401.272.8100

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v 401.438.2081

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Odeh Engineers, Inc.
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v 401.728.1771

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v 401.397.2730

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v 401.438.7733

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

STAIR SECTION AND DETAILS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046-3
DRAWING NO.:	A-501

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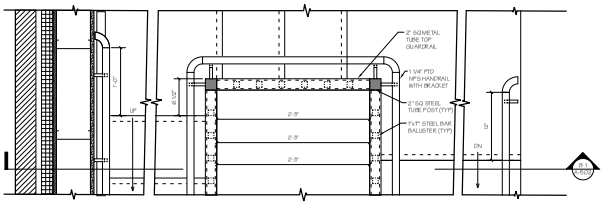
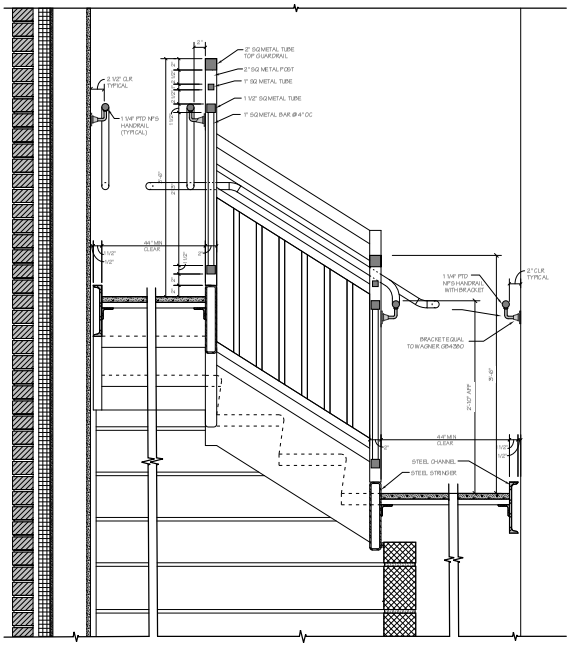
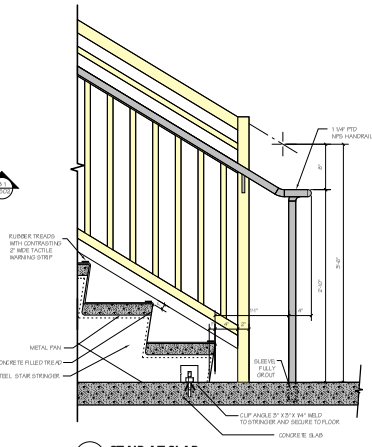


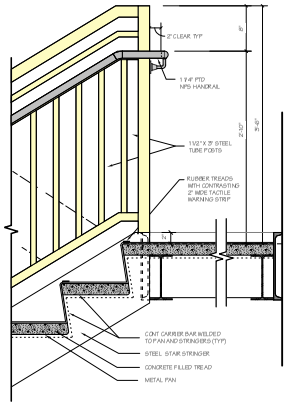
B 1 / A-502 **PLAN DETAIL @ STAIR RAILING**
SCALE: 1 1/2"=1'-0"



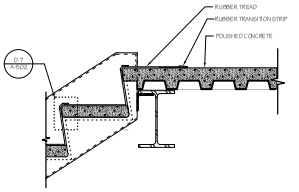
E 1 / A-502 **SECTION DETAIL @ STRINGER**
SCALE: 1 1/2"=1'-0"



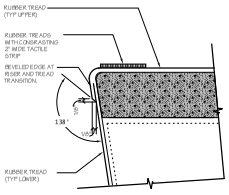
C 5 / A-502 **STAIR AT SLAB**
SCALE: 1-1/2" = 1'-0"



C 7 / A-502 **STAIR @ FLOOR LANDING**
SCALE: 1-1/2" = 1'-0"



D 7 / A-502 **DETAIL @ TOP OF STAIR**
SCALE: 1 1/2"=1'-0"



D 7 / A-502 **TYP. STAIR DETAIL @ TREAD COVERS**
SCALE 6" = 1'-0"

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865A Waterman Ave.
East Providence, RI 02914
v 401.438.2321

Structural Engineers
Odeh Engineers, Inc.
1223 Manville Spring Avenue
North Providence, RI 02904
v 401.728.1771

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Fire Protection Engineers
Hughes Associate, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.6992

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

STAIR DETAILS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046-3

DRAWING NO.:

A-502

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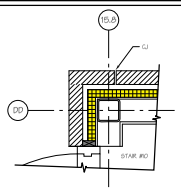
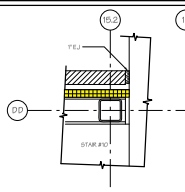
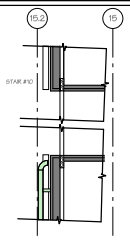


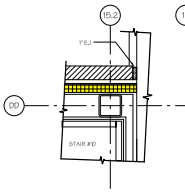
PLAN DETAIL @ COLUMN LINES DD & 15.8
B.4 / A-610 SCALE: 1 1/2" = 1'-0" SEE F5/ A-501



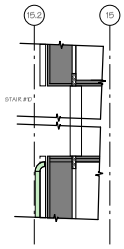
PLAN DETAIL @ COLUMN LINES DD & 15.2
B.5 / A-610 SCALE: 1 1/2" = 1'-0" SEE F5/ A-501



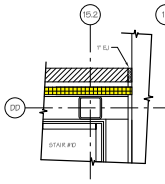
PLAN DETAIL @ COLUMN LINE 15.2
B.6 / A-610 SCALE: 1 1/2" = 1'-0" SEE C5/ A-501



PLAN DETAIL @ COLUMN LINES DD & 15.2 AT 1st FL
C.5 / A-610 SCALE: 1 1/2" = 1'-0" SEE C5/ A-501



PLAN DETAIL @ COLUMN LINE 15.2
D.6 / A-610 SCALE: 1 1/2" = 1'-0" SEE C5/ A-501

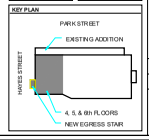


PLAN DETAIL @ COLUMN LINES DD & 15.2 AT 2nd FL
E.5 / A-610 SCALE: 1 1/2" = 1'-0" SEE B5/ A-501

PROJECT NORTH

NORTH

KEY PLAN



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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
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REVISIONS:

PLAN DETAILS

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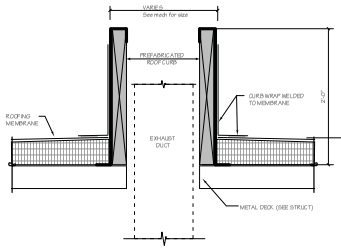
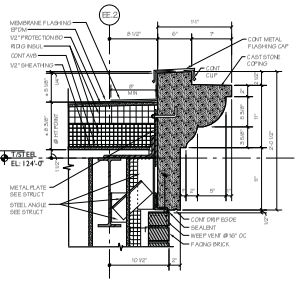
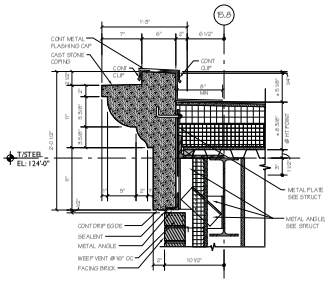


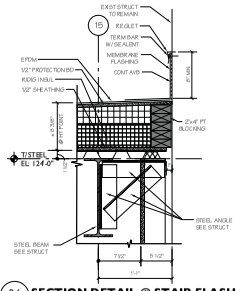
B.1 A-620 **ROOF CURB DETAIL**
SCALE: 1 1/2"=1'-0"



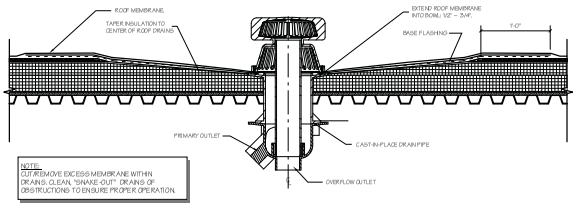
B.3 A-620 **SECTION DETAIL @ STAIR COPING**
SCALE: 1 1/2" = 1'-0"



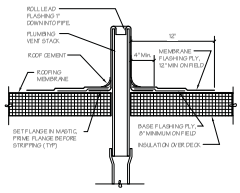
B.5 A-620 **SECTION DETAIL @ STAIR COPING**
SCALE: 1 1/2" = 1'-0"



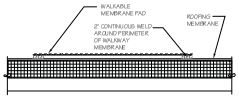
B.6 A-620 **SECTION DETAIL @ STAIR FLASHING**
SCALE: 1 1/2" = 1'-0"



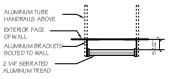
C.1 A-620 **TYPICAL NEW OVERFLOW ROOF DRAIN DETAIL**
SCALE: 1 1/2"=1'-0"



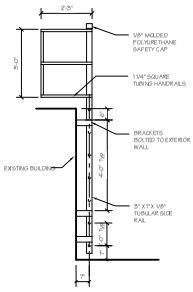
E.1 A-620 **PLUMBING STACK DETAIL**
SCALE: 1 1/2"=1'-0"



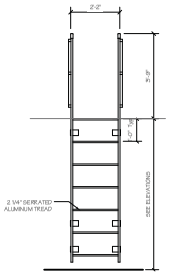
E.3 A-620 **TYP. ROOF WALKPAD DETAIL**
SCALE: 1 1/2"=1'-0"



E.4 A-620 **WALL MOUNTED FIXED ACCESS LADDER PLAN**
SCALE: 1/2" = 1'-0"



E.5 A-620 **WALL MOUNTED FIXED ACCESS LADDER SIDE ELEVATION**
SCALE: 1/2" = 1'-0"



E.6 A-620 **WALL MOUNTED FIXED ACCESS LADDER FRONT ELEVATION**
SCALE: 1/2" = 1'-0"

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50 Office Parkway
West Warwick, RI 02814
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Fire Protection Engineers
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Warwick, RI 02886
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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

ROOF DETAILS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046-3
DRAWING NO.: **A-620**

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GENERAL NOTES

I. GENERAL

1. ALL WORK SHALL CONFORM TO THE RHODE ISLAND STATE BUILDING CODE (IBC 2009 WITH AMENDMENTS) AND ITS APPLICABLE REFERENCED STANDARDS.
2. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AS THEY RELATE TO NEW CONSTRUCTION. REPORT TO THE ARCHITECT/ENGINEER ALL OBSERVATIONS AND ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
3. WHERE DETAILS FOR SPECIFIC CONDITIONS ARE NOT SHOWN ON THESE PLANS, USE DETAILS FOR THE MOST NEARLY SIMILAR CONDITIONS SHOWN ON THE STRUCTURAL DRAWINGS AS DETERMINED BY THE ARCHITECT AND STRUCTURAL ENGINEER OF RECORD. REPORT ANY COORDINATION ISSUES IMMEDIATELY TO THE ARCHITECT FOR REVIEW.
4. COORDINATE WITH ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING, AND FIRE PROTECTION DRAWINGS FOR LOCATIONS AND DIMENSIONS OF CHASES, OPENINGS, BEAM PENETRATIONS, AND OTHER INFORMATION NOT SHOWN ON THESE PLANS THAT IMPACT STRUCTURE AND FOUNDATIONS. INCLUDE ADDITIONAL FRAMING AND REINFORCEMENT FOR SUCH WORK (PER TYPICAL STRUCTURAL DETAILS IN THIS SET) IN BASE CONTRACT.
5. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE FOR A SAFE AND EFFICIENT METHOD OF SHORING AND/OR BRACING THE STRUCTURE DURING ALL CONSTRUCTION PHASES. SUBMIT AN OUTLINE OF PROPOSED PROCEDURE TO THE ARCHITECT/ENGINEER BEFORE CONSTRUCTION COMMENCES.
6. ALL WORK SHALL BE CONTINUOUSLY MONITORED AND INSPECTED BY AN INDEPENDENT TESTING AGENCY. SUBMIT ALL TEST AND INSPECTION REPORTS TO A/E FOR REVIEW.
7. STRUCTURAL MEMBERS SHALL NOT BE MODIFIED IN THE FIELD WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER. IN THE EVENT OF A CONSTRUCTION OR FABRICATION ERROR, THE CONTRACTOR SHALL PREPARE A SKETCH WITH A PROPOSED REPAIR, AND SUBMIT IT TO THE A/E FOR APPROVAL PRIOR TO PERFORMING ANY CORRECTIVE WORK.
8. ANY ANTICIPATED MODIFICATIONS TO THE CONSTRUCTION DOCUMENTS MUST BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND COMMENTS. THIS OFFICE CANNOT CERTIFY ANY UNAUTHORIZED DEVIATIONS TO THE CONSTRUCTION DOCUMENTS. THIS OFFICE RESERVES THE RIGHT TO REQUEST THE CONTRACTOR TO OBTAIN THE SERVICES OF AN INDEPENDENT STRUCTURAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND TO VISIT THE PROJECT SITE AND TO DESIGN ANY REQUIRED REPAIRS OR TO JUSTIFY THE INSTALLED MODIFICATION. ALL ENGINEERING CALCULATIONS AND SKETCHES MUST BE SUBMITTED TO THE DESIGN TEAM FOR REVIEW AND APPROVAL.
9. PRIOR TO A GENERAL CONTRACTOR/CONSTRUCTION MANAGER REQUEST FOR AN INSPECTION BY ODEH ENGINEERS FOR A COMPLETED STAGE OF CONSTRUCTION, THE GENERAL CONTRACTOR/ CONSTRUCTION MANAGER SHALL SUBMIT A STATEMENT STATING THAT "ALL WORK HAS BEEN COMPLETED IN CONFORMANCE WITH THE STRUCTURAL CONTRACT DRAWINGS AND SHOP DRAWINGS WITHOUT EXCEPTION OR HAS BEEN PERFORMED WITH FORMAL WRITTEN EXCEPTIONS ORIGINATING FROM OR AUTHORIZED BY ODEH ENGINEERS, INC." PRIOR TO RELEASE OF THE FINAL PROJECT CERTIFICATION TO THE BUILDING OFFICIAL, ODEH ENGINEERS REQUIRES A LETTER FROM THE PRINCIPAL OF THE GENERAL CONTRACTOR/CONSTRUCTION MANAGER STATING THAT "ALL WORK INDICATED ON THE STRUCTURAL DRAWINGS HAS BEEN PERFORMED WITHOUT EXCEPTION OR WAS PERFORMED WITH FORMAL WRITTEN EXCEPTIONS ORIGINATING FROM OR AUTHORIZED BY ODEH ENGINEERS, INC.".
10. THE TRADE CONTRACTORS SHALL SUBMIT SHOP AND ERECTION DRAWINGS (COLLECTIVELY KNOW HEREIN AS "SHOP DRAWINGS") FOR REVIEW PRIOR TO PROCEEDING WITH FABRICATION AND/OR CONSTRUCTION.
    a. THE SHOP DRAWINGS SHALL BE PREPARED IN ACCORDANCE WITH THE LATEST EDITION OF THE RESPECTIVE TRADES' CODES OF STANDARD PRACTICE. ALL SHOP DRAWINGS SHALL BE FULLY DEVELOPED BY THE TRADE CONTRACTORS OR BY AGENTS OF THE CONTRACTORS. CAD FILES, PHOTOCOPIES, OR OTHER REPRODUCTIONS OF THE CONTRACT DRAWINGS IN WHOLE OR IN PART SHALL NOT BE USED BY THE TRADE CONTRACTORS OR THEIR AGENTS FOR THE PREPARATION AND DEVELOPMENT OF SHOP DRAWINGS WITHOUT THE EXPRESSED WRITTEN CONSENT OF ODEH ENGINEERS, INC.
    b. ELECTRONIC SUBMISSIONS OF SHOP DRAWINGS WILL NOT BE ALLOWED. PRINTED (HARD) COPIES OF SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW.
11. THIS STRUCTURAL DRAWING SET IS BASED ON ARCHITECTURAL AUTOCAD FILES DATED 07/23/2013. THIS STRUCTURAL DRAWING SET HAS BEEN PREPARED USING ONLY THESE ARCHITECTURAL DRAWINGS AND ANY INFORMATION REGARDING OTHER TRADES THAT HAS BEEN REFLECTED ON THESE ARCHITECTURAL DRAWINGS.

II. DESIGN LOADS

ALL DESIGN LOADS ARE FOR NEW CONSTRUCTION ONLY AND ARE PROVIDED FOR REFERENCE ONLY

1. GENERAL DESIGN REQUIREMENTS (PER IBC 2009)
    a. OCCUPANCY CATEGORY II
2. FLOOR LIVE LOADS (PER IBC 2006 SECTION 1607)
    a. STAGE LOADING DOCK .... 150 PSF
    b. CORRIDORS .... 100 PSF
    c. BATHROOMS .... 100 PSF
    d. LIVE LOAD REDUCTION PER IBC 2006 1607.9 APPLIED TO COLUMNS ONLY
3. ROOF LIVE LOAD (PER IBC 2006 SECTION 1608)
    a. GROUND SNOW LOAD*, Pg .... 30 PSF
    b. SNOW EXPOSURE FACTOR, Ce 1.0
    c. THERMAL FACTOR, Ct 1.0
    d. SNOW LOAD IMPORTANCE FACTOR, Is 1.0
    *-MODIFIED FOR SNOW DRIFT PER IBC - SEE ROOF LOADING PLAN
    NOTE: ROOF DESIGN ASSUMES THE PRESENCE OF A CODE COMPLIANT SECONDARY DRAINAGE SYSTEM TO ELIMINATE PONDING INSTABILITY.
4. WIND LOADS (PER IBC 2006 SECTION 1609)
    a. BASIC WIND SPEED, V .... 100 MPH
    b. WIND LOAD IMPORTANCE FACTOR, Iw 1.0
    c. WIND EXPOSURE CATEGORY .... B
    d. MAIN WIND FORCE RESISTING SYSTEM DESIGN METHOD .... METHOD 1 (PER ASCE 7-05 CHAPTER 6)
    e. COMPONENTS AND CLADDING LOADS .... PER ASCE 7-05 CHAPTER 6
5. EARTHQUAKE LOADS (PER IBC 2006 SECTIONS 1613)
    a. SITE CLASS .... D
    b. SPECTRAL RESPONSE ACCELERATIONS
        i. Ss 0.234
        ii. S1 .... 0.061
    c. SPECTRAL RESPONSE COEFFICIENTS
        i. Sds 0.250
        ii. Sd1 .... 0.098
    d. SEISMIC DESIGN CATEGORY .... B
    e. SEISMIC IMPORTANCE FACTOR, Ie 1.0
    f. SEISMIC FORCE RESISTING SYSTEM:
    ORDINARY REINFORCED CONCRETE SHEAR WALLS: R=5, Ωo=2 1/2, Cd=4 1/2
    g. DESIGN BASE SHEAR .... PER ANALYSIS
    h. SEISMIC RESPONSE COEFFICIENT, Cs .... PER ANALYSIS
    i. ANALYSIS PROCEDURE .... EQUIVALENT LATERAL FORCE ANALYSIS PER ASCE 7-02 SECTION 9.5.5

III. STRUCTURAL STEEL

1. ALL WORK SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS AND ITS CODE OF STANDARD PRACTICE.
2. MATERIAL SPECIFICATIONS:
    W, WT SHAPES .... ASTM A992 (50 KSI)
    SQUARE & RECTANGULAR HSS .... ASTM A500, GRADE C (50 KSI)
    L SHAPES, MISC. PLATES & BARS........ ASTM A36
    THREADED RODS, THREADED FASTENERS .... ASTM A36
    BOLTS .... ASTM A325 OR A490
    ANCHOR RODS .... ASTM F1554, GRADE 36
    SHEAR STUD CONNECTORS .... ASTM A108
3. ALL WELDING OPERATIONS SHALL BE PERFORMED BY AWS CERTIFIED WELDERS IN CONFORMANCE WITH ALL APPLICABLE REQUIREMENTS. USE E-70XX WELDING ELECTRODES.
4. STRUCTURAL STEEL CONNECTIONS SHALL DEVELOP (1/2) OF MEMBERS' TOTAL UNIFORM LOAD CAPACITY AS DETERMINED FROM THE AISC STEEL CONSTRUCTION MANUAL, 13TH ED (LRFD). SEE NOTES ON THESE PLANS FOR COMPOSITE BEAM REQUIREMENTS.
5. ALL BOLTED CONNECTIONS SHALL USE ASTM A325 BOLTS OR A490 BOLTS (3/4"ø MINIMUM), UNLESS NOTED OTHERWISE. BOLTED CONNECTIONS SHALL BE DESIGNED PER THE AISC STEEL CONSTRUCTION MANUAL, 13TH EDITION (LRFD) AND THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS (LRFD).
6. ALL NEW STRUCTURAL STEEL SHALL BE GIVEN ONE COAT OF AN APPROVED SHOP PRIMER APPLIED IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS, UNLESS NOTED OTHERWISE. SURFACE PREPARATION OF STEEL PRIOR TO SHOP PAINTING SHALL CONFORM TO SSPC SP6.
7. AFTER ERECTION IS COMPLETE, TOUCH-UP ALL SHOP PRIMED COATS DAMAGED DURING TRANSPORTATION AND ERECTION, AND PRIME ALL FIELD WELDS USING THE SAME PAINT USED FOR SHOP PRIMING.
8. ALL STRUCTURAL STEEL TO RECEIVE SPRAY-ON FIREPROOFING SHALL BE FABRICATED WITHOUT ANY PRIMER COATINGS (COORDINATE WITH ARCHITECT).
9. ALL EXPOSED STRUCTURAL STEEL AND CONNECTIONS SHALL BE HOT-DIP GALVANIZED, OR MAY BE PRIMED AND PAINTED WITH AN APPROVED EPOXY PAINT SYSTEM. TOUCH UP ALL CONNECTIONS AND DAMAGED SURFACES WITH THE SAME PAINT SYSTEM.
10. BRACED FRAME CONNECTIONS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND. CONNECTIONS MUST BE DESIGNED TO DEVELOP THE FULL EXPECTED TENSILE CAPACITY OF THE BRACES (DEFINED AS RyFyAg) IN ACCORDANCE WITH THE AISC "SEISMIC PROVISIONS FOR STRUCTURAL STEEL BUILDINGS". SUBMIT STAMPED DRAWINGS AND CALCULATIONS FOR REVIEW.
11. ALL MEMBERS INDICATED AS A.E.S.S. IN THE CONTRACT DOCUMENTS SHALL CONFORM PER SPECIFICATION 05125 "ARCHITECTURALLY EXPOSED STRUCTURAL STEEL".
12. STRUCTURAL STEEL FRAME SHALL BE LEVEL AND PLUMB PRIOR TO COMPLETING CONNECTIONS.
13. SUBMIT ALL REQUIRED DESIGN CALCULATIONS (STAMPED BY A P.E. REGISTERED IN THE STATE OF RHODE ISLAND) AND SHOP DRAWINGS FOR REVIEW (SEE SECTION "I. GENERAL").

IV. COLD-FORMED METAL FRAMING

1. ALL METAL STUD WALLS SHALL BE DESIGNED BY THE METAL STUD SUPPLIER IN ACCORDANCE WITH THE REQUIREMENTS OF THE RHODE ISLAND STATE BUILDING CODE AND ITS APPLICABLE REFERENCED STANDARDS.
2. THE COLD-FORMED METAL STUD SUPPLIER SHALL DESIGN AND FABRICATE THE METAL STUD WALLS AS A SYSTEM. THIS SHALL INCLUDE ALL STICK FRAMED AND PANELIZED SECTIONS, ALL PERMANENT AND TEMPORARY LATERAL BRACING, AND WALL REQUIRED CONNECTIONS. COORDINATE WITH ARCHITECTURAL DRAWINGS FOR ALL DETAILS, DIMENSIONS, AND OTHER INFORMATION NOT INCLUDED IN THE STRUCTURAL DRAWINGS.
3. ALL EXTERIOR METAL STUD WALLS SHALL BE DESIGNED USING THE LOADING INFORMATION INCLUDED IN THESE DOCUMENTS.
4. ALL COLD-FORMED METAL STUDS SHALL BE 6"-18 GAUGE MINIMUM UNLESS NOTED OTHERWISE.
5. INSTALLATION, BRIDGING, AND CONNECTIONS SHALL BE DESIGNED IN STRICT ACCORDANCE WITH THE METAL STUD MANUFACTURER'S SPECIFICATIONS AND RECOMMENDATIONS.
6. ALL METAL STUD CURTAIN (NON-BEARING) WALLS SHALL BE BRACED AGAINST ROTATION BY DIAPHRAGM RATED SHEATHING BOARD APPLIED FULL HEIGHT TO EACH SIDE OF THE WALL. WHERE THE WALL IS NOT SHEATHED FULL HEIGHT EACH SIDE OR SHEATHED ON ONE SIDE ONLY, CONTINUOUS BRIDGING SPACED AT 5'-0" O.C. (OR AS RECOMMENDED BY COLD-FORMED MANUFACTURER) SHALL PROVIDE ROTATIONAL SUPPORT. THE CONTRACTOR IS RESPONSIBLE FOR BRACING THE WALLS DURING CONSTRUCTION.
7. ALL METAL STUD CURTAIN (NON-BEARING) WALLS SHALL HAVE SLIP CONNECTIONS TO ALLOW FOR VERTICAL DEFLECTION OF THE STRUCTURE WITHOUT LOADING THE NON-BEARING STUD WALL. PROVIDE FOR VERTICAL DEFLECTION OF 3/4" OR SPAN/360, WHICHEVER IS GREATER. DEFLECTION TRACK OR MARINO/WARE "WSC-SLIDE CLIPS", OR APPROVED EQUAL, SHALL BE USED TO ALLOW FOR VERTICAL DEFLECTION.
8. ALL METAL STUD WALLS USED AS BACK-UP FOR MASONRY OR BRICK VENEER SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/900. ALL OTHER METAL STUD WALLS SHALL BE DESIGNED FOR A MAXIMUM DEFLECTION OF L/360, UNLESS NOTED OTHERWISE.
9. SIZES OF COLD-FORMED MEMBERS INDICATED IN CONTRACT DRAWINGS REPRESENT THE MINIMUM FRAMING/SIZE REQUIREMENTS. THE FINAL DESIGN OF ALL COLD-FORMED MEMBERS AND SECTIONS SHALL BE DETERMINED/VERIFIED BY THE COLD-FORMED DESIGNER.
10. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND DESIGN CALCULATIONS (STAMPED BY A P.E. REGISTERED IN RHODE ISLAND) FOR REVIEW (SEE SECTION "I. GENERAL").

V. STEEL DECKS

1. ALL STEEL DECKING SHALL CONFORM TO THE STEEL DECK INSTITUTE (SDI) APPLICABLE REQUIREMENTS. INSTALLATION SHALL BE PER THE MANUFACTURER'S RECOMMENDATIONS IN ACCORDANCE WITH SDI SPECIFICATIONS.
2. STEEL DECK SHALL TYPICALLY BE STORED OFF THE GROUND AT THE JOBSITE, AND BE PROTECTED FROM THE ELEMENTS WITH A WATERPROOF COVERING WHERE REQUIRED.
3. DECK SHEETS SHALL BE PLACED IN ACCORDANCE WITH APPROVED ERECTION LAYOUT DRAWINGS (INCLUDING FASTENING SCHEDULE) SUPPLIED BY THE DECK MANUFACTURER, AND IN CONFORMANCE WITH THE MANUFACTURER'S STANDARDS. UNLESS NOTED OTHERWISE, END LAPS SHALL OCCUR OVER SUPPORTS, AND SHALL NOT BE LESS THAN 2 INCHES.
4. ALL STEEL TO BE USED FOR DECKING SHALL BE GALVANIZED, SEE SPECIFIC NOTES AT EACH FRAMING PLAN FOR INFORMATION.
5. PROVIDE 1/4" THICK (BOTTOM) & 20 GA. (TOP) GALVANIZED STEEL PLATES AT ALL RIDGES, VALLEYS AND LOCATIONS WHERE DECK CHANGES DIRECTION FOR CONTINUOUS EVEN SURFACE.
6. UNLESS NOTED OTHERWISE, PROVIDE THE FOLLOWING MINIMUM FASTENING FOR ROOF DECK:
    a. EACH SHEET SHALL BE FASTENED USING 5/8" PUDDLE WELDS WITH 36/7 WELD PATTERN AND (4)-#10 (36" O.C. MAX.) TEK SCREW SIDELAP FASTENERS PER SPAN MINIMUM.
    b. ROOF DECK FASTENING SHALL CONFORM TO FM APPROVAL GUIDE, CLASS I-90.
    c. ALL ROOF DECK MATERIALS & CONSTRUCTION SHALL CONFORM TO FM GLOBAL APPROVAL GUIDE, CLASS I-90.
    d. ROOF DECK FASTENING SHALL CONFORM TO FM GLOBAL PROPERTY LOSS DATA SHEET 1-29, SECTION 2.2.13.
    e. MINIMUM ROOF DECK FASTENER REQUIREMENTS SHALL BE AS FOLLOWS:
    FIELD & PERIMETER: SEE NOTE 7a (ABOVE).
    CORNERS: 2 WELDS IN EACH RIB (SEE "ii" BELOW)
        i. "PERIMETER" IS DEFINED AS A 10'-0" STRIP AROUND THE ENTIRE ROOF PERIMETER AS WELL AS AT ALL CANOPIES.
        ii. "CORNERS" ARE DEFINED AS THE COMMON AREAS SHARED BY TWO OR MORE INTERSECTING ROOF PERIMETER AREAS (10'-0"x10'-0")
7. ROOF DECK SHALL BE DESIGNED FOR INDICATED WIND UPLIFT LOADS PER RI STATE BUILDING CODE, FM APPROVAL GUIDE, AND "DESIGN LOAD" NOTES ABOVE.
8. NO PERMANENT SUSPENDED LOADS ARE TO BE SUPPORTED BY STEEL ROOF DECK. THIS INCLUDES PIPING, DUCTWORK, MECHANICAL UNITS, CEILINGS, ETC. ALL COMPONENTS ARE TO SUSPENDED FROM STRUCTURAL FRAMING MEMBERS, USING APPROVED ATTACHMENT DEVICES (SEE SPECIFICATIONS).
9. THE CONTRACTOR SHALL PROVIDE A SECONDARY FRAMING SYSTEM (i.e. UNISTRUT OR APPROVED EQUAL) ATTACHED TO STRUCTURAL FRAMING TO SUPPORT ALL PERMANENT SUSPENDED LOADS AT THE UNDERSIDE OF ALL METAL ROOF DECKS. THE SECONDARY FRAMING SYSTEM SHALL SPAN BETWEEN STRUCTURAL STEEL BEAMS AND SHALL NOT BE CONNECTED IN ANY WAY TO THE METAL DECK.

VI. ENGINEERING REQUIREMENTS FOR CONTRACTOR

1. **CURTAIN WALL FRAMING:**
   ALL CURTAIN WALL SYSTEMS SHALL BE DESIGNED BY THE CURTAIN WALL MANUFACTURER TO SPAN VERTICALLY BETWEEN FLOOR LEVELS. THE CURTAIN WALLS PRIMARY CONNECTIONS SHALL BE MADE TO THE CAST IN PLACE CONCRETE BEAMS AND FLOORS. ALL CURTAIN WALL CONNECTIONS TO THE STRUCTURE SHALL BE DETAILED BY THE CURTAIN WALL MANUFACTURER. ALL CUSTOM CONNECTIONS SHALL BE ENGINEERED BY THE CURTAIN WALL MANUFACTURER'S PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND. SHOP DRAWINGS AND CALCULATIONS, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND, SHALL BE SUBMITTED FOR REVIEW.
2. **COLD-FORMED WALL FRAMING:**
   COLD-FORMED METAL BACKUP WALLS SHALL BE DESIGNED TO SPAN VERTICALLY BETWEEN FLOOR LEVELS AND SHALL MAINTAIN THE DEFLECTION CRITERIA STATED IN THE GENERAL NOTES, UNLESS NOTED OTHERWISE. ALL COLD-FORMED METAL FRAMING SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND. SHOP DRAWINGS AND CALCULATIONS, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND, SHALL BE SUBMITTED FOR REVIEW.
3. **SAFETY SYSTEMS:**
   ALL SAFETY ANCHORS AND THEIR CONNECTIONS TO THE MAIN BUILDING STRUCTURE SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER PER THE APPLICABLE BUILDING CODE REQUIREMENTS. SHOP DRAWINGS AND CALCULATIONS, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND, SHALL BE SUBMITTED FOR REVIEW.
4. **STAIR DESIGN:**
   ALL STAIR STRUCTURES (NOT INCLUDING CAST-IN-PLACE CONCRETE STAIRS) SHALL BE DESIGNED BY A STAIR FABRICATOR IN ACCORDANCE WITH THE RHODE ISLAND STATE BUILDING CODE. STAIRS AND LANDINGS SHALL BE DESIGNED FOR 100 PSF LIVE LOAD CAPACITY AND MAY BE SUPPORTED FROM BUILDING FRAMING ELEMENTS UNLESS NOTED OTHERWISE. COORDINATE ALL STAIR DETAILS WITH ARCHITECTURAL DRAWINGS. SHOP DRAWINGS AND CALCULATIONS, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND, SHALL BE SUBMITTED FOR REVIEW.

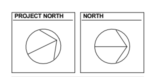
VII. SPECIAL INSPECTIONS

1. SPECIAL INSPECTIONS ARE REQUIRED FOR ALL STRUCTURAL SYSTEMS PER CHAPTER 17 OF THE RHODE ISLAND STATE BUILDING CODE.
2. REFER TO THE "STATEMENT OF SPECIAL INSPECTIONS" FOR SPECIFIC REQUIREMENTS.
3. CONTRACTOR SHALL COORDINATE SCHEDULE OF CONSTRUCTION TO ALLOW FOR ALL TESTS AND INSPECTIONS TO TAKE PLACE.
4. SPECIAL INSPECTIONS PROGRAM SHALL NOT RELIEVE THE CONTRACTOR OF QUALITY ASSURANCE AND TESTING REQUIREMENTS OF CODES AND STANDARDS REFERENCED HEREIN, AND SHALL BE SUPPLEMENTARY TO THIS QUALITY ASSURANCE AND TESTING.
5. IT IS RECOMMENDED THAT A PRE-CONSTRUCTION MEETING BE HELD WITH THE SPECIAL INSPECTIONS COORDINATOR, INSPECTORS, TESTING AGENCIES, CONTRACTOR AND SUBCONTRACTORS TO REVIEW THE INSPECTION AND TESTING PROGRAM AND IDENTIFY ALL PARTICIPANTS ROLES AND RESPONSIBILITIES.

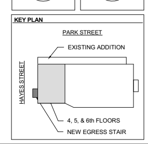
STRUCTURAL DRAWING LIST

S-000	GENERAL NOTES
S-100	NEW EGRESS STAIR FRAMING PLANS
S-110	ROOFTOP DUNNAGE FRAMING PLAN
S-300	ROOFTOP DUNNAGE SECTIONS
S-301	ROOF TOP DUNNAGE SECTIONS
S-310	BUILDING ELEVATIONS
S-600	FRAMING DETAILS
S-601	FRAMING DETAILS

PROJECT NORTH NORTH



KEY PLAN



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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

GENERAL NOTES

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: S-000

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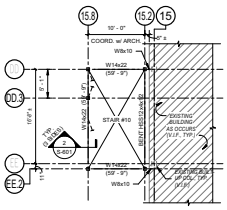
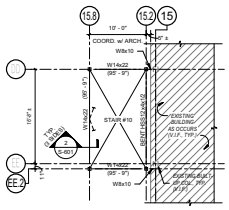
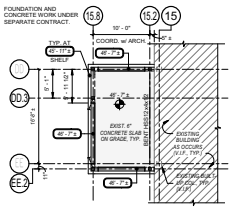
ODEH ENGINEERS PROJECT #: 2013-00133



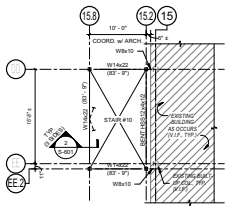
NEW EGRESS STAIR
SECOND FLOOR FRAMING PLAN
3 SCALE: 1/8" = 1'-0"



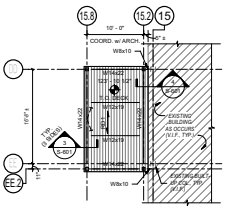
NEW EGRESS STAIR
FIFTH FLOOR FRAMING PLAN
6 SCALE: 1/8" = 1'-0"



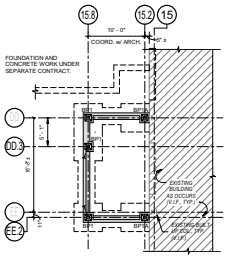
NEW EGRESS STAIR
FIRST FLOOR FRAMING PLAN
2 SCALE: 1/8" = 1'-0"



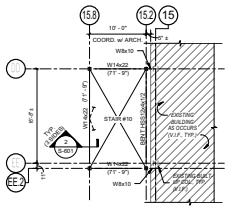
NEW EGRESS STAIR
FOURTH FLOOR FRAMING PLAN
5 SCALE: 1/8" = 1'-0"



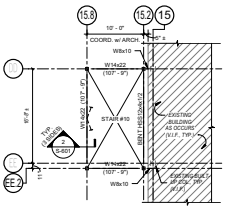
NEW EGRESS STAIR
ROOF FRAMING PLAN
8 SCALE: 1/8" = 1'-0"



NEW EGRESS STAIR
FOUNDATION PLAN
1 SCALE: 1/8" = 1'-0"



NEW EGRESS STAIR
THIRD FLOOR FRAMING PLAN
4 SCALE: 1/8" = 1'-0"



NEW EGRESS STAIR
SIXTH FLOOR FRAMING PLAN
7 SCALE: 1/8" = 1'-0"

NOTES REGARDING STAIR DESIGN

ALL STAIR STRUCTURES SHALL BE DESIGNED BY A STAIR FABRICATOR IN ACCORDANCE WITH THE RHODE ISLAND STATE BUILDING CODE. STAIRS AND LANDINGS SHALL BE DESIGNED FOR 100 PSF LIVE LOAD CAPACITY AND MAY BE SUPPORTED FROM THE NEW BUILDING FRAMING ELEMENTS ONLY. COORDINATE ALL STAIR DETAILS WITH ARCHITECTURAL DRAWINGS. SHOP DRAWINGS AND CALCULATIONS, STAMPED AND SIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND, SHALL BE SUBMITTED FOR REVIEW PRIOR TO THE START OF FABRICATION.

NOTE REGARDING BENT HSS BEAM

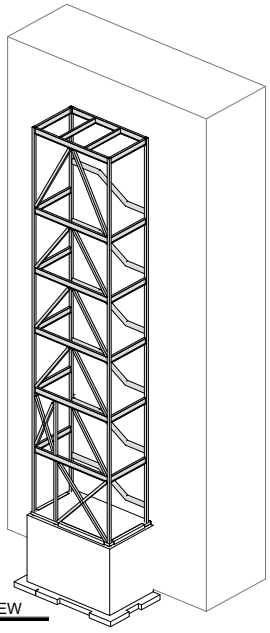
COORDINATE EXACT BENT BEAM DIMENSIONS WITH ARCHITECT PLANS. BENT BEAM PROFILE SHALL MATCH STAIR/LANDING PROFILE AT COLUMN LINE 16. COORDINATE WITH STAIR FABRICATOR AND ARCHITECT. STAIR FABRICATOR MAY UTILIZE THIS STEEL BEAM TO SUPPORT STAIR AND LANDING FRAMING.

NOTE REGARDING W8 CONNECTOR BEAMS

PROVIDE W8x10 CONNECTOR BEAM FROM NEW STEEL COLUMNS AT LINE 16 TO EXISTING BEAM AND/OR COLUMN AT EACH EXISTING FLOOR LEVEL. CONTRACTOR SHALL VERIFY ALL EXISTING STEEL FRAMING AND DIMENSIONS IN THE FIELD PRIOR TO FABRICATION AND CONSTRUCTION. SUBMIT CONNECTION DETAILS FOR REVIEW BY ENGINEER/ARCHITECT.

NOTES REGARDING EXISTING CONDITIONS

ALL EXISTING CONDITIONS ON THE PLANS ARE ASSUMED BASED ON LIMITED VISUAL INSPECTIONS AND/OR ORIGINAL DESIGN DRAWINGS. THE CONTRACTOR SHALL CARRY CONTINGENCY IN PRICING FOR DIFFERENCES IN CONDITIONS SHOWN, INCLUDING BUT NOT LIMITED TO:
a) DIFFERENT FRAMING CONDITIONS
b) DIFFERENT FOUNDATION CONDITIONS
c) HIDDEN DAMAGE OR DETERIORATION IN STRUCTURAL MEMBERS



9 3D VIEW
N.T.S.

NOTES:

1. COORDINATE ALL WORK (INCLUDING FLOOR ELEVATIONS, DIMENSIONS, FINISH DETAILS, PENETRATIONS, WINDOW AND DOOR LOCATIONS, ETC.) WITH ARCHITECTURAL DRAWINGS.
2. 98'-00" - INDICATES TOP OF EXIST. CONCRETE FOUNDATION WALL.
3. [94'-00"] - INDICATES BOTTOM OF NEW CONCRETE FOOTING ELEVATION.
4. BOTTOM OF ALL NEW EXTERIOR FOOTINGS AT EGRESS STAIR SHALL MATCH EXISTING BOTTOM OF FOOTING ELEVATION, TYP.
5. 98'-00" - INDICATES FLOOR ELEVATION (TYP., U.N.O.).
6. C# - INDICATES NEW WALL MARK. SEE "WALL SCHEDULE" ON THIS SHEET.
7. PROVIDE BENTONITE WATERSTOPS AT ALL CONSTRUCTION JOINTS BELOW GRADE, TYP.
8. P1 - INDICATES NEW CONCRETE PIER TYPE. SEE "PIER SCHEDULE" ON THIS SHEET. TOP OF ALL PIERS ARE 8" BELOW TOP OF SLAB, TYP.
9. BP1 - INDICATES NEW BASE PLATE TYPE. SEE DETAILS ON S700 FOR ADD'L INFO.
10. ALL STEEL COLUMNS IN THE NEW EGRESS STAIR SHALL BE HSS6x6x1/2, TYPICAL.
11. RD1 - INDICATES 1 1/2"-18 GA. (TYPE B) GALV. METAL ROOF DECK. SEE TYPICAL DETAILS.
12. RD - INDICATES ROOF DRAIN. ALL ROOF DRAINS SHALL BE COORDINATED WITH THE ARCHITECTURAL DRAWINGS. PROVIDE A C6x8.2 FRAME AT ALL ROOF DRAIN OPENINGS (TYP.)

PROJECT NORTH

NORTH

KEY PLAN

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f 401.272.7622

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Landscape Architects
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East Providence, RI 02914
v 401.438.2021

Structural Engineers
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North Providence, RI 02904
v 401.724.1771

Mechanical & Plumbing Engineer
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Electrical Engineers
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Fire Protection Engineers
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Warwick, RI 02886
v 401.736.8862

THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

NEW EGRESS STAIR FRAMING PLANS

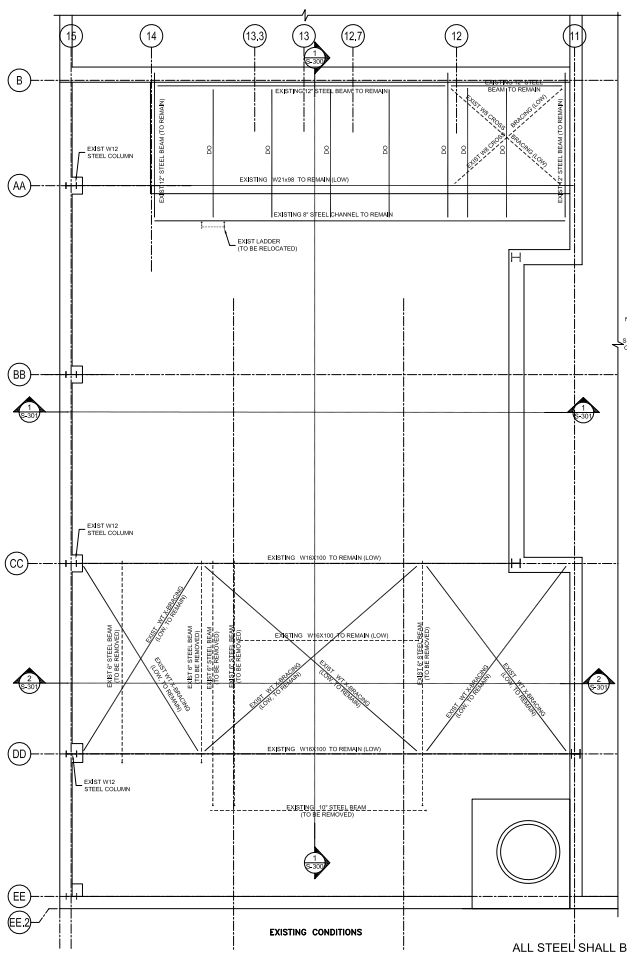
DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

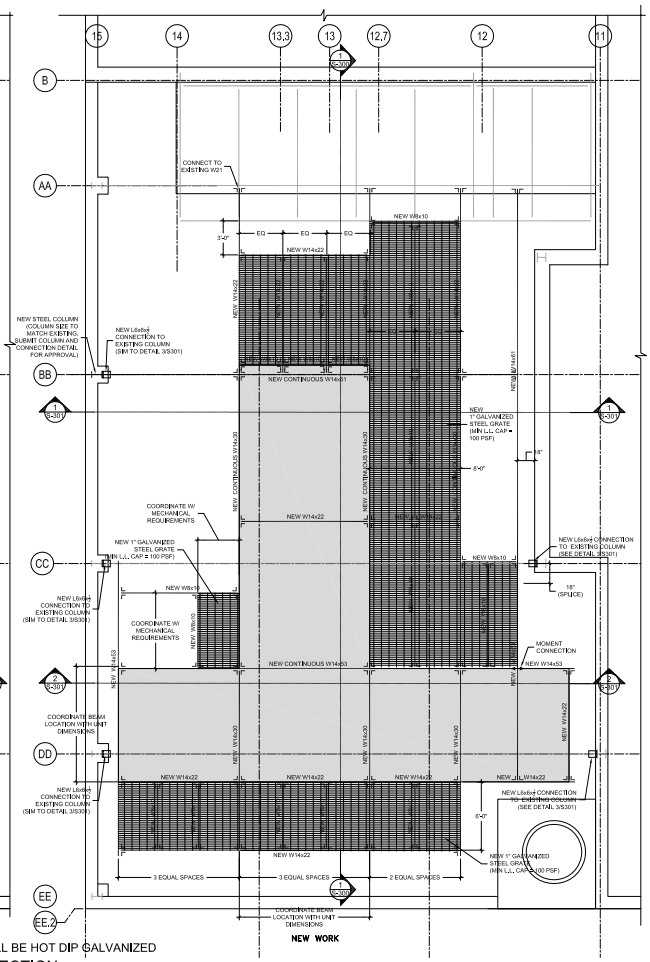
DRAWING NO.: S-100

© NORTHEAST COLLABORATIVE ARCHITECTS

CQLIT-ENGINEERS PROJECT # 2013-30133



EXISTING CONDITIONS



NEW WORK

ALL STEEL SHALL BE HOT DIP GALVANIZED

1 SECTION
1/4"=1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

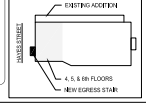
THE VETS

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN

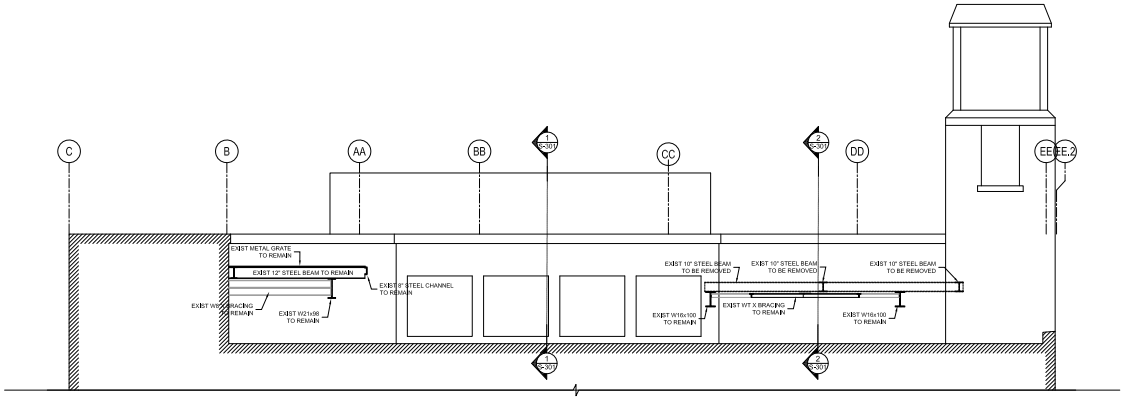


ROOF TOP DUNNAGE FRAMING PLAN

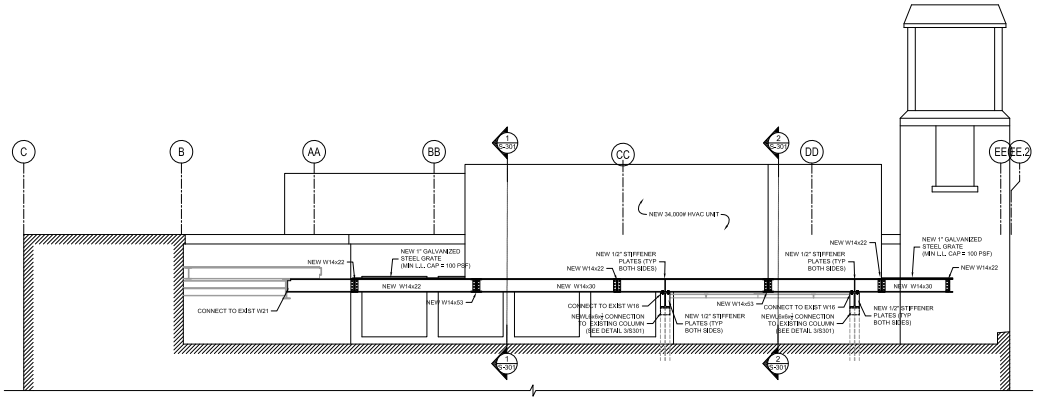
DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: S-110



EXISTING CONDITIONS



NEW WORK

ALL STEEL SHALL BE HOT DIP GALVANIZED

1 SECTION
1/4"=1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

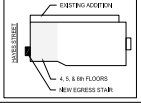
THE VETS

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN

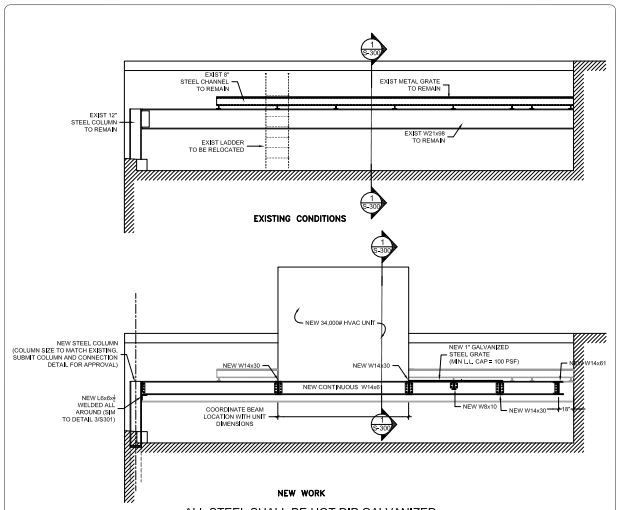


ROOF TOP DUNNAGE SECTIONS

DATE: AUGUST 12, 2013

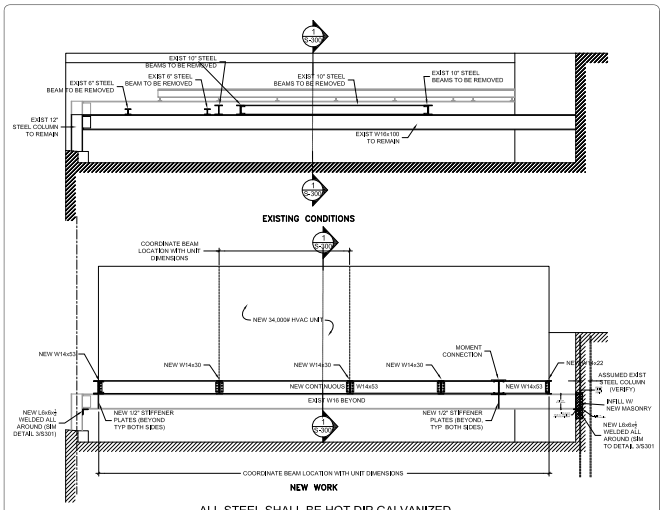
NCA JOB NO.: 1046.30

DRAWING NO.: S-300



ALL STEEL SHALL BE HOT DIP GALVANIZED

1 SECTION
1/4"=1'-0"



ALL STEEL SHALL BE HOT DIP GALVANIZED

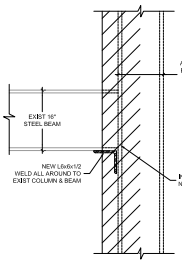
2 SECTION
1/4"=1'-0"

I. GENERAL

1. ALL WORK SHALL CONFORM TO THE RHODE ISLAND STATE BUILDING CODE, SBC-1 10th EDITION (IBC 2009 WITH AMENDMENTS) AND ITS APPLICABLE REFERENCED STANDARDS.
2. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS AS THEY RELATE TO NEW CONSTRUCTION. REPORT TO THE ARCHITECT/ENGINEER ALL OBSERVATIONS AND ANY DISCREPANCIES BEFORE PROCEEDING WITH WORK.
3. IF THE CONTRACTOR DEEMS IT NECESSARY TO MODIFY OR REMOVE ANY PORTION OF THE EXISTING STRUCTURE IN ORDER TO PERFORM THE WORK DESCRIBED WITHIN THE CONTRACT DOCUMENTS, THEN SUCH PORTIONS OF THE STRUCTURE SHALL BE REPAIRED OR REPLACED WITH EQUAL MATERIALS AND DETAILS TO MATCH THE EXISTING CONDITIONS AT NO ADDITIONAL COST TO THE OWNER. THIS WORK SHALL BE INCLUDED IN THE BASE PRICE OF THE CONTRACT.
4. IT IS THE RESPONSIBILITY OF THE GENERAL CONTRACTOR TO PROVIDE FOR A SAFE AND EFFICIENT METHOD OF SHORING AND/OR BRACING THE STRUCTURE DURING ALL CONSTRUCTION PHASES. SUBMIT AN OUTLINE OF PROPOSED PROCEDURE TO THE ARCHITECT/ENGINEER BEFORE CONSTRUCTION COMMENCES.
5. STRUCTURAL MEMBERS SHALL NOT BE MODIFIED IN THE FIELD WITHOUT WRITTEN APPROVAL FROM THE STRUCTURAL ENGINEER. IN THE EVENT OF A CONSTRUCTION OR FABRICATION ERROR, THE CONTRACTOR SHALL PREPARE A SKETCH WITH A PROPOSED REPAIR, AND SUBMIT IT TO THE A/E FOR APPROVAL PRIOR TO PERFORMING ANY CORRECTIVE WORK.
6. ANY ANTICIPATED MODIFICATIONS TO THE CONSTRUCTION DOCUMENTS MUST BE SUBMITTED TO THE ARCHITECT/ENGINEER FOR REVIEW AND COMMENTS. THIS OFFICE CANNOT CERTIFY ANY UNAUTHORIZED DEVIATIONS TO THE CONSTRUCTION DOCUMENTS. THIS OFFICE RESERVES THE RIGHT TO REQUEST THE CONTRACTOR TO OBTAIN THE SERVICES OF AN INDEPENDENT STRUCTURAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND TO VISIT THE PROJECT SITE AND TO DESIGN ANY REQUIRED REPAIRS OR TO JUSTIFY THE INSTALLED MODIFICATION. ALL ENGINEERING CALCULATIONS AND SKETCHES MUST BE SUBMITTED TO THE DESIGN TEAM FOR REVIEW AND APPROVAL.
7. ALL WORK SHALL BE CONTINUOUSLY MONITORED AND INSPECTED BY AN INDEPENDENT TESTING AGENCY. SUBMIT ALL TEST AND INSPECTION REPORTS TO A/E FOR REVIEW.
8. PRIOR TO A GENERAL CONTRACTOR/CONSTRUCTION MANAGER REQUEST FOR AN INSPECTION BY ODEH ENGINEERS FOR A COMPLETED STAGE OF CONSTRUCTION, THE GENERAL CONTRACTOR/ CONSTRUCTION MANAGER SHALL SUBMIT A STATEMENT STATING THAT "ALL WORK HAS BEEN COMPLETED IN CONFORMANCE WITH THE STRUCTURAL CONTRACT DRAWINGS AND SHOP DRAWINGS WITHOUT EXCEPTION OR HAS BEEN PERFORMED WITH FORMAL WRITTEN EXCEPTIONS ORIGINATING FROM OR AUTHORIZED BY ODEH ENGINEERS, INC.".
9. PRIOR TO RELEASE OF THE FINAL PROJECT CERTIFICATION TO THE BUILDING OFFICIAL, ODEH ENGINEERS REQUIRES A LETTER FROM THE PRINCIPAL OF THE GENERAL CONTRACTOR/CONSTRUCTION MANAGER STATING THAT "ALL WORK INDICATED ON THE STRUCTURAL DRAWINGS HAS BEEN PERFORMED WITHOUT EXCEPTION OR WAS PERFORMED WITH FORMAL WRITTEN EXCEPTIONS ORIGINATING FROM OR AUTHORIZED BY ODEH ENGINEERS, INC.".
10. THE TRADE CONTRACTORS SHALL SUBMIT SHOP AND ERECTION DRAWINGS (COLLECTIVELY KNOW HEREIN AS "SHOP DRAWINGS") FOR REVIEW PRIOR TO PROCEEDING WITH FABRICATION AND/OR CONSTRUCTION.
    a. THE SHOP DRAWINGS SHALL BE PREPARED IN ACCORDANCE WITH THE LATEST EDITION OF THE RESPECTIVE TRADES' CODES OF STANDARD PRACTICE. ALL SHOP DRAWINGS SHALL BE FULLY DEVELOPED BY THE TRADE CONTRACTORS OR BY AGENTS OF THE CONTRACTORS. CADD FILES, PHOTOCOPIES, OR OTHER REPRODUCTIONS OF THE CONTRACT DRAWINGS IN WHOLE OR IN PART SHALL NOT BE USED BY THE TRADE CONTRACTORS OR THEIR AGENTS FOR THE PREPARATION AND DEVELOPMENT OF SHOP DRAWINGS WITHOUT THE EXPRESSED WRITTEN CONSENT OF ODEH ENGINEERS, INC.
    b. ELECTRONIC SUBMISSIONS OF SHOP DRAWINGS WILL NOT BE ALLOWED. PRINTED (HARD) COPIES OF SHOP DRAWINGS SHALL BE SUBMITTED FOR REVIEW.
11. THIS STRUCTURAL DRAWING SET IS BASED ON MECHANICAL AUTOCAD AND PDF FILES DATED 6-12-2013 TO 7-16-2013. THIS STRUCTURAL DRAWING SET HAS BEEN PREPARED USING ONLY THESE ARCHITECTURAL DRAWINGS AND ANY INFORMATION REGARDING OTHER TRADES THAT HAS BEEN REFLECTED ON THESE ARCHITECTURAL DRAWINGS.

II. STRUCTURAL STEEL

1. ALL WORK SHALL CONFORM TO THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION SPECIFICATIONS AND ITS CODE OF STANDARD PRACTICE.
2. MATERIAL SPECIFICATIONS:
   W, WT SHAPES ..... ASTM A992 (50 KSI)
   S, M, HP, C, MC SHAPES ..... ASTM A572, GRADE 50
   SQUARE & RECTANGULAR HSS ..... ASTM A500, GRADE C (50 KSI)
   L SHAPES, MISC. PLATES & BARS ..... ASTM A36
   BOLTS ..... ASTM A325 OR A490
3. ALL WELDING OPERATIONS SHALL BE PERFORMED BY AWS CERTIFIED WELDERS IN CONFORMANCE WITH ALL APPLICABLE REQUIREMENTS. USE E-7000 WELDING ELECTRODES.
4. STRUCTURAL STEEL CONNECTIONS SHALL DEVELOP (½) OF MEMBERS' TOTAL UNIFORM LOAD CAPACITY AS DETERMINED FROM THE AISC MANUAL OF STEEL CONSTRUCTION, 13th EDITION (ASD LRFD). SEE NOTES ON THESE PLANS FOR COMPOSITE BEAM REQUIREMENTS.
5. ALL BOLTED CONNECTIONS SHALL USE ¾"Ø, ASTM A325 BOLTS OR A490 BOLTS, UNLESS NOTED OTHERWISE. BOLTED CONNECTIONS SHALL BE DESIGNED PER THE AISC MANUAL OF STEEL CONSTRUCTION, 13th EDITION (ASD LRFD) AND THE RCSC SPECIFICATION FOR STRUCTURAL JOINTS USING ASTM A325 OR A490 BOLTS (ASD LRFD).
6. ALL EXPOSED STRUCTURAL STEEL AND CONNECTIONS SHALL BE HOT-DIP GALVANIZED, OR MAY BE PRIMED AND PAINTED WITH AN APPROVED EPOXY PAINT SYSTEM. TOUCH UP ALL CONNECTIONS AND DAMAGED SURFACES WITH THE SAME PAINT SYSTEM.
7. MOMENT CONNECTIONS SHALL BE DESIGNED TO DEVELOP THE FULL MOMENT CAPACITY OF THE MEMBERS. ALL MOMENT CONNECTIONS SHALL BE DESIGNED BY A P.E. REGISTERED IN THE STATE OF RHODE ISLAND. SUBMIT STAMPED DRAWINGS AND CALCULATIONS FOR REVIEW.
8. STRUCTURAL STEEL FRAME SHALL BE LEVEL AND PLUMB PRIOR TO COMPLETING CONNECTIONS.
9. SUBMIT ALL MOMENT CONNECTION DESIGN CALCULATIONS (STAMPED BY A P.E. REGISTERED IN THE STATE OF RHODE ISLAND AND SHOP DRAWINGS FOR REVIEW (SEE ALSO SECTION I "GENERAL").



3 DETAIL
1"=1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

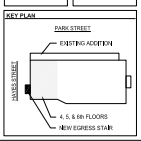
83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

PROJECT NORTH | NORTH

KEY PLAN



ROOF TOP DUNNAGE SECTIONS & GENERAL NOTES

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: S-301

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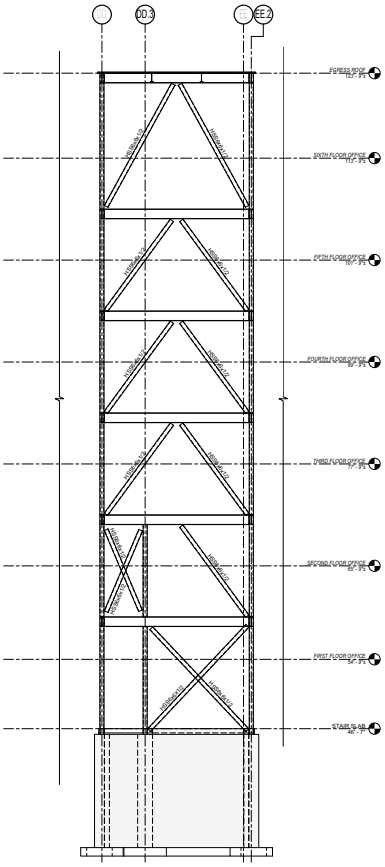
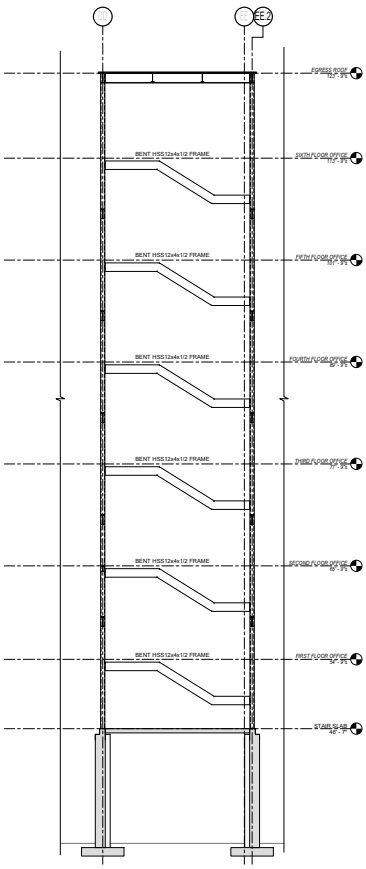
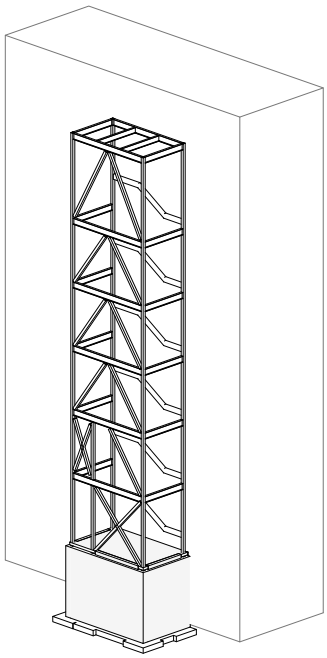


1 COLUMN LINE 17
SCALE: 3/16" = 1'-0"



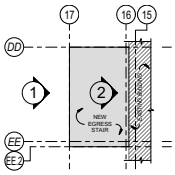
2 COLUMN LINE 16
SCALE: 3/16" = 1'-0"



4 3D VIEW
N.T.S.

NOTES REGARDING 3D VIEWS

ALL 3D VIEWS ARE FOR REFERENCE ONLY. THE 3D VIEWS ONLY SHOW BASIC STRUCTURAL ELEMENTS. THEY DO NOT INCLUDE DETAILS SUCH AS EXTERIOR RAMPS AND STAIRS, SLAB AND ROOF PITCHES, OR SPECIFIC STRUCTURAL DETAILS. REFER TO ALL PLANS, DETAIL SHEETS, AND ARCHITECTURAL DRAWINGS FOR ADDITIONAL INFORMATION. DO NOT SCALE OFF OF THIS DRAWING.

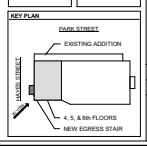


5 KEY PLAN
N.T.S.

PROJECT NORTH

NORTH

KEY PLAN



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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

BUILDING ELEVATIONS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: S-310

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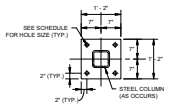
ODEH ENGINEERS PROJECT # 2013-30133

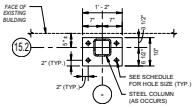
BASE PLATE ANCHOR ROD HOLE SIZES		
ANCHOR ROD DIAMETER, IN.	HOLE DIAMETER, IN.	MIN. WASHER DIAMETER*, IN.
1	1 13/16	3

*OR WIDTH FOR RECTANGULAR PLATE.



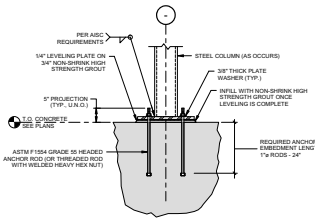
BASE PLATE 1'x14'x1'-2"
(WITH 4 - 1"ø ANCHOR RODS)

BP1 - BASE PLATE TYPE 1



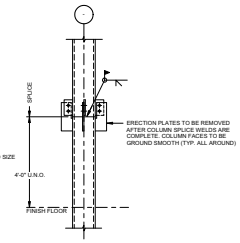
BASE PLATE 1"x10"x1'-2"
(WITH 4 - 1"ø ANCHOR RODS)

BP1A - BASE PLATE TYPE 1A



TYPICAL HEADED ANCHOR ROD DETAIL

1 TYPICAL BASE PLATE AND ANCHOR ROD DETAILS



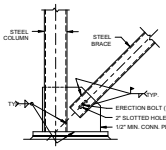
TUBE TO TUBE SPLICE

2 TYPICAL STEEL COLUMN SPLICE DETAILS

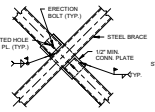
NO SCALE

NOTES:

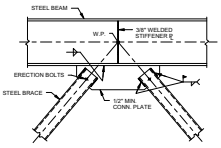
1. ALL COLUMN SPLICES SHALL BE DESIGNED FOR THE FULL TENSION CAPACITY OF THE COLUMN. SUBMIT CALCULATIONS WITH A RHODE ISLAND P.E. STAMP FOR REVIEW AND APPROVAL.



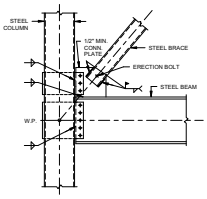
BRACING CONNECTION - COLUMN BASE



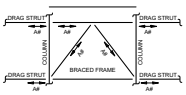
X-BRACE INTERSECTION



CHEVRON BRACE INTERSECTION



BRACING CONNECTION- COL. STRONG AXIS



AXIAL LOAD DIAGRAM

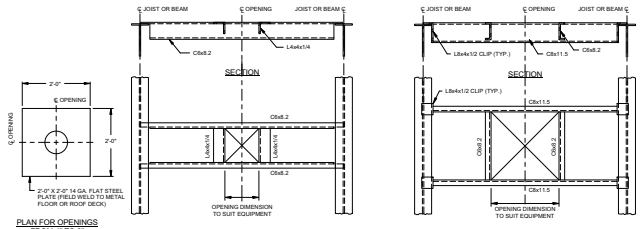
CONNECTION DESIGN NOTES

NOTES:

1. ALL FRAMING MEMBER CONNECTIONS IN LINE WITH BRACED FRAME (INCLUDING THE BRACED FRAME HORIZONTAL MEMBER) SHALL BE DESIGNED AS DRAG STRUT CONNECTIONS AND SHALL BE DESIGNED FOR THE AXIAL DRAG DESIGN FORCES SHOWN ON THE BRACE FRAME ELEVATIONS (OR 10 KIPS, UNFACTORED, IF NO FORCE IS SHOWN) COMBINED WITH THE GRAVITY SHEAR FORCE AND THE HORIZONTAL COMPONENT OF THE BRACE FORCE AS CALCULATED USING THE UNIFORM FORCE METHOD, FACTORED FOR STRENGTH DESIGN.
2. ALL BEAM AND BRACE CONNECTIONS SHALL BE DESIGNED FOR 50 KIP LOAD. ALL CONNECTIONS SHALL BE DESIGNED FOR THIS UNFACTORED LOAD BASED ON ALLOWABLE STRESS DESIGN, IN BOTH TENSION (T) AND COMPRESSION (C) ACTING SIMULTANEOUSLY INCLUDING THE REVERSAL IN LOAD ORIENTATIONS.
3. ALL BRACED FRAME CONNECTIONS SHALL BE DESIGNED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND AND SHALL BE PART OF THE STEEL FABRICATOR SUBMITTAL COMPLETE STAMPED AND SIGNED BRACING CONNECTION CALCULATIONS AND DRAWINGS, PRIOR TO SUBMISSION OF RELATED STRUCTURAL STEEL PIECE DRAWINGS.
4. THE STRUCTURAL STEEL CONTRACTOR MAY CHOOSE TO REPLACE WELDED CONNECTIONS WITH BOLTED CONNECTIONS WHERE NOT EXPOSED ARCHITECTURALLY. ALL BOLTED CONNECTIONS SHALL BE MADE WITH A325-SC BOLTS, 3/4"ø MINIMUM.
5. SLOTS IN STEEL TUBE SECTIONS SHALL BE SHOP CUT ONLY AND SHALL NOT EXTEND MORE THAN 1/2" PAST GUSSET PLATE.
6. THE CONTRACTOR'S ENGINEER SHALL DESIGN BRACE TO GUSSET PLATE CONNECTIONS, GUSSET PLATES, GUSSET TO COLUMN CONNECTIONS, GUSSET TO BEAM CONNECTIONS AND BEAM TO COLUMN CONNECTIONS. DESIGN OF CONNECTIONS AND DETERMINATION OF GUSSET PLATE GEOMETRY SHALL BE BY THE UNIFORM FORCE METHOD.
7. THE CONTRACTOR'S ENGINEER SHALL EVALUATE THE COLUMN OR BEAM TO WHICH THE BRACING ELEMENT CONNECTS TO DETERMINE THE NEED FOR STIFFENING ELEMENTS REQUIRED TO AVOID LOCAL WEB YIELDING, WEB CRIPPLING, COMPRESSION BUCKLING OF THE WEB, AND LOCAL FLANGE BENDING AND INDICATE SUCH ELEMENTS ON THE STRUCTURAL STEEL SHOP DRAWINGS.

4 TYPICAL HSS BRACE FRAME CONNECTION DETAILS

NO SCALE



PLAN FOR OPENINGS FROM 4" TO 8"

PLAN FOR OPENINGS FROM 8" TO 1'-6"

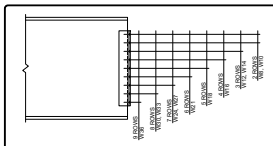
PLAN FOR OPENINGS FOR OVER 1'-6"

5 TYPICAL FRAMING DETAILS FOR ROOF DECK OPENINGS & R.T.U. CURB SUPPORT

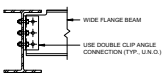
NO SCALE

NOTES:

1. THESE TYPICAL FRAMING DETAILS SHALL BE USED AT ALL LOCATIONS WHERE MECHANICAL UNITS, EXHAUST FANS, DUCTS, OPENINGS, ETC. ARE PRESENT AT ALL ROOF DECKS. THE LOCATIONS OF THESE ITEMS ARE NOT SHOWN ON THE STRUCTURAL DRAWINGS. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR COORDINATING THE EXACT LOCATIONS OF THESE ITEMS WITH MEP, ARCHITECTURAL, AND OTHER TRADES DRAWINGS.
2. WHERE MECHANICAL UNITS ARE PRESENT, COORDINATE LOCATION OF SUPPLEMENTAL FRAMING MEMBERS WITH SUPPORTING CURB REQUIREMENT DETAILS.



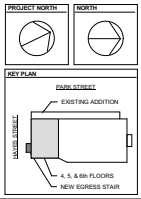
MINIMUM STEEL BEAM CONNECTION



BEAM TO GIRDER

6 SHEAR CONNECTION DETAILS

NO SCALE



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

THE VETS

REVISIONS:

FRAMING DETAILS

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	S-600

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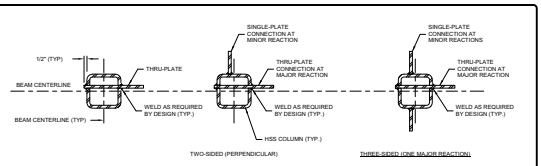
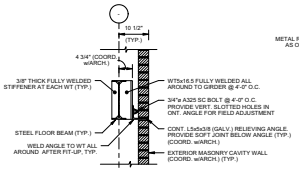


1 TYPICAL HSS COLUMN PLATE CONNECTION DETAILS

NO SCALE

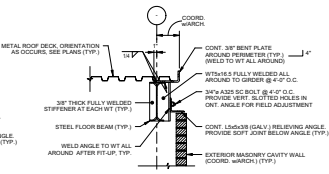
NOTES:

1. ALL BEAM-TO-COLUMN CONNECTION DETAILS SHALL BE DESIGNED BY THE STEEL FABRICATOR IN ACCORDANCE WITH THE REQUIREMENTS & STANDARDS OF THE MANUAL OF STEEL CONSTRUCTION, 13TH EDITION, PUBLISHED BY THE AMERICAN INSTITUTE OF STEEL CONSTRUCTION (AISC).



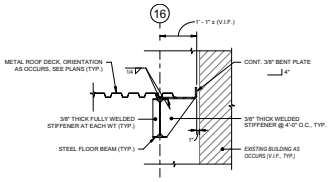
2 SECTION

SCALE: 3/4" = 1'-0"



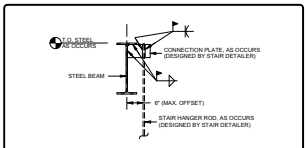
3 SECTION

SCALE: 3/4" = 1'-0"



4 SECTION

SCALE: 3/4" = 1'-0"

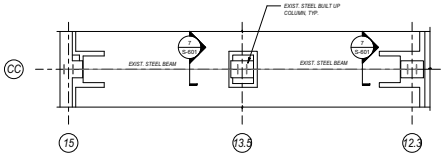


5 TYPICAL STAIR HANGER DETAIL

NO SCALE

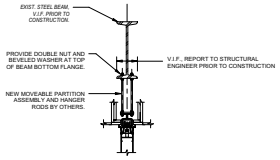
NOTES:

1. THIS DETAIL SHALL BE USED AT LOCATIONS WHERE STAIR FRAMING IS SUSPENDED FROM STRUCTURAL MEMBERS (COORD. LOCATIONS WITH ARCHITECT).



6 PARTIAL 5TH FLOOR FRAMING PLAN

SCALE: 1/4" = 1'-0"



7 SECTION

SCALE: 1" = 1'-0"

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

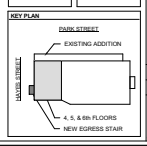
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



FRAMING DETAILS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: S-601

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C:\SBTI\ENGINEERS PROJECT & 2013-10-13

GENERAL NOTES

1. THIS DRAWING IS PROVIDED TO DEMONSTRATE THE CONFIGURATION OF MAJOR SYSTEM COMPONENTS INCLUDING SPRINKLER AND PIPING LOCATIONS. THE SPRINKLER CONTRACTOR SHALL FIELD VERIFY LOCATIONS OF ALL SPRINKLERS AND SYSTEM PIPING.
2. REFER TO ATTACHED HYDRAULIC CALCULATIONS FOR DESIGN PIPE SIZES. PIPE SIZES SHALL BE NO SMALLER THAN AS INDICATED BY THE DESIGN HYDRAULIC CALCULATIONS OR DESIGN DRAWINGS UNLESS VERIFIED THROUGH APPROVED CALCULATION SUBMITTAL. THE DESIGN SPECIFICATION AND HYDRAULIC CALCULATIONS ARE PART OF THESE DESIGN DOCUMENTS.
3. ACCURACY OF WALL LOCATIONS AND DIMENSIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR WITH REGARDS TO PIPE ROUTING AND PROXIMITY TO OBSTRUCTIONS.
4. THE CONTRACTOR SHALL PREPARE AND SUBMIT FOR APPROVAL SHOP DRAWINGS, SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF RHODE ISLAND. THE REQUIREMENTS FOR THE SUBMITTAL PACKAGE AND SHOP DRAWINGS ARE PROVIDED IN THE DESIGN SPECIFICATION. CHANGES IN THE LOCATIONS OF SPRINKLERS FROM THOSE SHOWN ON THE APPROVED SHOP DRAWINGS SHALL BE IDENTIFIED IN WRITING TO THE STATE FIRE MARSHALS OFFICE AND HAI PRIOR TO INSTALLATION. ALL CHANGES SHALL BE APPROVED IN WRITING PRIOR TO INSTALLATION OR ANY RELOCATIONS OR ADDITIONAL SPRINKLERS REQUIRED FOR COMPLIANCE AS A RESULT OF THE CHANGES SHALL BE FURNISHED AND INSTALLED AT THE EXPENSE OF THE CONTRACTOR.
5. THE SPRINKLER CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING WITH ANY NEW SITE SPECIFIC MODIFICATIONS THAT MAY BE MADE TO THE BUILDING DURING CONSTRUCTION SUCH AS NEW LIGHTS, DROP CEILINGS, ETC.
6. ALL SPRINKLER PIPING SHALL BE SECURED USING U.L. LISTED PIPE HANGERS, ANCHORS AND OTHER APPROVED MEANS TO PROPERLY SECURE THE PIPE.
7. ALL WET SPRINKLER SYSTEM PIPING 1-INCH THROUGH 2-INCH SHALL BE ASTM A53 SCHEDULE 40 WITH THREADED ENDS.
8. ALL WET SPRINKLER SYSTEM PIPING 2½-INCH AND LARGER SHALL BE ASTM A53 SCHEDULE 40 WITH THREADED ENDS OR SCHEDULE 10 WITH ROLLED-GROOVED ENDS.
9. ALL DRY SPRINKLER SYSTEM PIPING 1-INCH THROUGH 2-INCH SHALL BE ASTM A53 SCHEDULE 40 GALVANIZED WITH THREADED ENDS.
10. ALL DRY SPRINKLER SYSTEM PIPING 2½-INCH AND LARGER SHALL BE ASTM A53 SCHEDULE 40 GALVANIZED WITH THREADED ENDS OR CUT-GROOVED ENDS.
11. THE CONTRACTOR SHALL GUARANTEE IN WRITING ALL WORK AND EQUIPMENT ASSOCIATED WITH THIS PROJECT FOR ONE (1) YEAR AFTER INSTALLATION. REFER TO THE SPECIFICATION FOR ADDITIONAL WARRANTY REQUIREMENTS.
12. CONTRACTOR SHALL INSTALL AUXILIARY DRAINS AS NECESSARY AND AS REQUIRED BY NFPA 13, 2002.

DESIGN CRITERIA

1. DESIGN AND INSTALL THE SPRINKLER SYSTEMS TO MEET THE REQUIREMENTS OF:
   A. THE RHODE ISLAND FIRE LAWS AND RULES-2009, WHICH INCLUDES:
      i. TITLE 23-CHAPTER 28, FIRE SAFETY CODE-2009, AND AS AMENDED UNDER THE TITLE 23-CHAPTER 28, COMPREHENSIVE FIRE SAFETY ACT OF 2003, WHICH INCLUDES:
         a. THE RHODE ISLAND FIRE PREVENTION CODE (NFPA 1-2003), AND
         b. THE RHODE ISLAND LIFE SAFETY CODE (NFPA 101-2003);
   B. NFPA 13-2002, STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS.
   C. FM GLOBAL PROPERTY LOSS PREVENTION DATA SHEETS 3-0 AND 3-26
2. REFER TO TECHNICAL SPECIFICATIONS FOR MORE DETAILED INFORMATION AND ADDITIONAL REQUIREMENTS.
3. UNLESS OTHERWISE INDICATED ON THESE DRAWINGS, THE SPRINKLER SYSTEM IN ALL AREAS IN THE BUILDING SHALL BE DESIGNED AS LIGHT HAZARD.
4. THE SPRINKLER SYSTEM SHALL BE HYDRAULICALLY CALCULATED BY THE CONTRACTOR USING THE DENSITY/AREA DESIGN METHOD AS DESCRIBED IN NFPA 13-2002.
5. THE SPRINKLER SYSTEM SHALL BE HYDRAULICALLY CALCULATED AND SIZED IN ACCORDANCE WITH THE FOLLOWING CRITERIA:
   A. ALL LIGHT HAZARD (HC-1) OCCUPANCY AREAS SHALL MEET THE REQUIREMENTS OF FM GLOBAL AS FOLLOWS:
      i. AREA OF DEMAND: 1500 S.F.,
      ii. DENSITY: 0.10 GPM/S.F.,
      iii. HOSE STREAM: 250 GPM,
      iv. SAFETY MARGIN: 10 PSI SAFETY FACTOR,
   B. ALL ORDINARY HAZARD GROUP 1 (HC-2) OCCUPANCY AREAS SHALL MEET THE REQUIREMENTS OF FM GLOBAL AS FOLLOWS:
      i. AREA OF DEMAND: 1500 S.F.,
      ii. DENSITY: 0.15 GPM/S.F.,
      iii. HOSE STREAM: 250 GPM,
      iv. SAFETY MARGIN: 10 PSI SAFETY FACTOR,
   C. ALL ORDINARY HAZARD GROUP 2 (HC-3) OCCUPANCY AREAS SHALL MEET THE REQUIREMENTS OF FM GLOBAL AS FOLLOWS:
      i. AREA OF DEMAND: 2500 S.F.,
      ii. DENSITY: 0.20 GPM/S.F.,
      iii. HOSE STREAM: 250 GPM,
      iv. SAFETY MARGIN: 10 PSI SAFETY FACTOR
   D. AREA OF OPERATION INCREASES FOR SHALL BE INCLUDED FOR DRY-PIPE SYSTEMS, SLOPE CEILING, ETC.
6. ALL STANDARD SPRAY SPRINKLERS IN LIGHT HAZARD AREAS SHALL HAVE A MAXIMUM COVERAGE AREA OF 225 S.F. SO THAT THEY PROVIDE AT LEAST 0.10 GPM/S.F. OVER THE COVERAGE AREA OF THE SPRINKLER FOR LIGHT HAZARD SPACES.
7. ALL STANDARD SPRAY SPRINKLERS IN ORDINARY HAZARD GROUP 1 AND 2 AREAS SHALL HAVE A MAXIMUM COVERAGE AREA OF 130 S.F. SO THAT THEY PROVIDE AT LEAST 0.15 GPM/S.F. OVER THE COVERAGE AREA OF THE SPRINKLER FOR ORDINARY HAZARD SPACES.

REMOVE. IN PAINTER'S SCOPE.

SCOPE OF WORK

1. THE SCOPE OF WORK INCLUDES THE INSTALLATION OF A NEW AUTOMATIC SPRINKLER SYSTEM ZONES AS INDICATED ON THE DRAWINGS AND IN THE TECHNICAL SPECIFICATIONS.
2. THE SCOPE OF WORK INCLUDES DEMOLITION OF THE EXISTING SPRINKLER SYSTEM ON THE 4TH, 5TH AND 6TH FLOOR AS INDICATED ON THE DRAWINGS.
3. THE WORK INCLUDES FURNISHING AND INSTALLING SPRINKLERS INCLUDING PIPING, HANGERS AND OTHER ASSOCIATED COMPONENTS IN AREAS OF THE BUILDING DISCOVERED DURING SURVEY OR INSTALLATION THAT ARE NOT NECESSARILY REPRESENTED ON THE DESIGN DRAWINGS THAT ARE REQUIRED TO BE PROVIDED WITH SPRINKLER PROTECTION AT NO ADDITIONAL COST TO THE OWNER.
4. THE WORK INCLUDES THE INSTALLATION OF NEW MONITOR MODULES AND CONNECTION OF THE NEW WATER FLOW AND VALVE SUPERVISORY SWITCHES TO THE FIRE ALARM SYSTEM IN THE BUILDING. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ALL WIRING CONNECTIONS. ALL CONNECTIONS SHALL BE PERFORMED BY A LICENSED FIRE ALARM TECHNICIAN/ELECTRICIAN.
5. THE WORK INCLUDES THE INSTALLATION OF A NEW FREESTANDING FIRE DEPARTMENT CONNECTION OUTSIDE OF THE BUILDING, AS INDICATED ON THE DRAWINGS. THE FDC SHALL BE A 4-INCH BY 2½-INCH BY 2½-INCH CONNECTION AND INCLUDE A CHECK VALVE WITH BALL DRIP. THE CONTRACTOR IS RESPONSIBLE FOR ALL UNDERGROUND WORK, PENETRATION OF THE EXTERIOR WALL AND CONNECTION OF THE FREESTANDING FIRE DEPARTMENT CONNECTION TO THE EXISTING FIRE DEPARTMENT CONNECTION PIPING IN THE BASEMENT SPRINKLER VALVE ROOM AS SHOWN.
6. THE SCOPE OF WORK INCLUDES DEMOLISHING THE EXISTING WALL MOUNTED FIRE DEPARTMENT CONNECTION AND PATCH THE EXTERIOR WALL PENETRATION TO MATCH THE EXISTING FINISH IN THE AREA. THE CONTRACTOR SHALL DEMOLISH ALL INTERIOR FIRE DEPARTMENT CONNECTION PIPING UP TO THE BASEMENT VALVE ROOM AND PATCH ALL INTERIOR PENETRATION TO MATCH THE EXISTING FINISH IN THE AREA.
7. THE WORK INCLUDES INSTALLATION OF A ZONE CONTROL VALVE ASSEMBLY FOR EACH PORTION OF THE BUILDING. EACH ZONE ASSEMBLY SHALL CONTAIN AT A MINIMUM A SUPERVISED CONTROL VALVE, CHECK VALVE, INSPECTOR'S TEST CONNECTION, DRAIN VALVE, VANE-TYPE WATERFLOW SWITCH. CONTRACTOR SHALL CONNECT TEST AND DRAIN ASSEMBLY TO THE EXISTING DRAIN RISER.
8. THE WORK INCLUDES ALL CUTTING, DRILLING, CORE DRILLING, ETC. TO INSTALL THE FIRE SPRINKLER SYSTEM THROUGH THE EXISTING WALLS.
9. THE WORK INCLUDES PAINTING OF ALL NEW EXPOSED SPRINKLER PIPING TO MATCH EXISTING CONDITIONS. PIPE PAINTING SHALL BE COMPLETED BY A QUALIFIED PAINTING CONTRACTOR.
10. THE WORK INCLUDES FIRESTOPPING, PATCHING AND PAINTING OF ALL PENETRATIONS THAT WERE MADE FOR INSTALLATION OF NEW SPRINKLER PIPING THROUGH EXISTING INTERIOR AND EXTERIOR BUILDING WALLS. THE FIRESTOPPING SHALL BE CONDUCTED BY A MANUFACTURER'S TRAINED PERSONNEL ACCEPTABLE TO THE OWNER.
11. THE WORK INCLUDES ALL FEES AND ACTIVITIES REQUIRED TO SECURE APPROVALS FOR NECESSARY STATE AND LOCAL PERMITS.
12. THE WORK INCLUDES SUBMITTING DETAILED WORKING PLANS, HYDRAULIC CALCULATIONS AND PRODUCT DATA TO THE ENGINEER FOR REVIEW PRIOR TO SUBMITTING SAME TO LOCAL OFFICIALS FOR PERMIT. CONTRACTOR SHALL NOT FABRICATE PIPING, ASSEMBLE COMPONENTS OR BEGIN INSTALLATION UNTIL HAI HAS APPROVED THE SUBMITTAL DOCUMENTS.
13. THE WORK INCLUDES PERFORMING FIELD QUALITY CONTROL AND COMMISSIONING ACTIVITIES.
14. THE WORK INCLUDES DOCUMENTING AND SUBMITTING THE RESULTS OF INTEGRITY AND FUNCTIONAL TESTING.
15. THE WORK INCLUDES SUBMITTING AS-BUILT PLANS AND CLOSEOUT DOCUMENTATION TO HAI FOR REVIEW PRIOR TO SCHEDULING OWNER DEMONSTRATION TRAINING.
16. THE WORK INCLUDES TRAINING OWNER'S PERSONNEL ON THE OPERATION OF THE SYSTEM, REQUIRED MAINTENANCE TASKS AND FREQUENCIES, AND THE LOCATIONS OF ALL SPARE TOOLS AND EQUIPMENT, VALVES, FLOW SWITCHES, RISERS AND EQUIPMENT NECESSARY TO MAINTAIN AND OPERATE THE SPRINKLER SYSTEM.
17. THE WORK INCLUDES PERFORMING A HYDRANT FLOW TEST TO OBTAIN ACCURATE WATER FLOW DATA. THE HYDRAULIC CALCULATIONS SHALL REFLECT THE RESULTS OF THE HYDRANT FLOW TEST.

SPRINKLER LEGEND

SYMBOL	MANUFACTURER	MODEL	TYPE	RESPONSE	ORIFICE	K-FACTOR	FINISH	ESCUTCHEON
●	TYCO	TY3231	RECESSED PENDENT	QUICK	1/2"	5.6	WHITE	MATCH PAINT
○	TYCO	TY3131	UPRIGHT	QUICK	1/2"	5.6	BRASS	NONE
◐	TYCO	TY3235	DRY PENDENT	QUICK	1/2"	5.6	CHROME	NONE
○ 8K	TYCO	TY4131	UPRIGHT	QUICK	3/4"	8.0	BRASS	NONE
✕	TYCO	G1&G4	SPRINKLER GUARD	—	—	—	CHROME	—
CONTRACTOR SHALL USE THE ABOVE SPECIFIED SPRINKLERS OR EQUIVELENT								
REFER TO TECHNICAL SPECIFICATION FOR ADDITIONAL ACCEPTABLE MANUFACTURERS								

SYMBOLS LEGEND

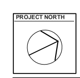
- ABOVE GROUND SPRINKLER PIPING
- EXISTING SPRINKLER SYSTEM PIPING
- NEW UNDERGROUND PIPING
- PRESSURE GUAGE
- WATERFLOW PRESSURE SWITCH AND PRESSURE SUPERVISORY SWITCH
- POINT OF CONNECTION
- FIRE DEPARTMENT CONNECTION
- MUNICIPAL FIRE HYDRANT
- POST INDICATING VALVE
- NON-INDICATING CURB VALVE
- DOUBLE CHECK VALVE BACKFLOW PREV.
- RISER CHECK VALVE WITH DRAIN
- OUTSIDE STEM AND YOKE (OS&Y) VALVE
- CHECK VALVE WITH BALL DRIP
- SPRINKLER RISER
- XXX — HYDRAULIC REFERENCE
- SUPERVISED BUTTERFLY VALVE
- FCA — ZONE CONTROL ASSEMBLY
- RMC — RISER MOUNTED COMPRESSOR AND AIR MAINTENANCE DEVICE
- DRY PIPE VALVE AND TRIM
- DRY SYSTEM TRIP TEST CONNECTION W/ORIFICE EQUIVALENT TO SINGLE SPRINKLER FLOW

0 1 2 4 8
1/8" = 1'-0"

HYDRANT WATERFLOW TEST RESULTS - PROVIDENCE VMA

TEST DATE:	DECEMBER 8, 2011 @ 10:35 AM	"GAUGE" HYDRANT LOCATION:	P1908
PERFORMED BY:	PROVIDENCE WATER	"FLOW" HYDRANT LOCATION:	P1907
STATIC:	67 PSI		
RESIDUAL:	60 PSI		
FLOW:	1100 GPM		

PROJECT NORTH



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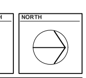
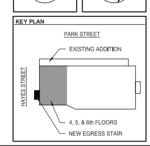


KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

Sprinkler Notes

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: FP0.0

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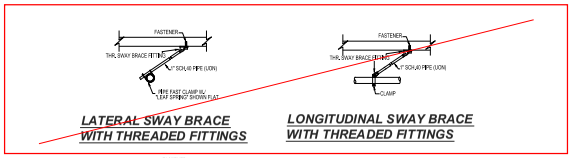
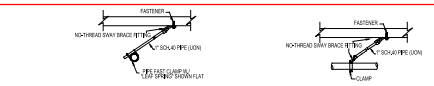


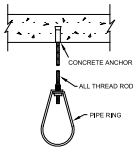
LATERAL SWAY BRACE WITH THREADED FITTINGS

LONGITUDINAL SWAY BRACE WITH THREADED FITTINGS

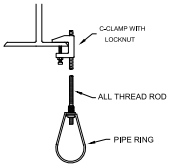


LATERAL SWAY BRACE WITH NON-THREADED FITTINGS

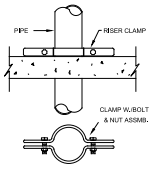
LONGITUDINAL SWAY BRACE WITH NON-THREADED FITTINGS



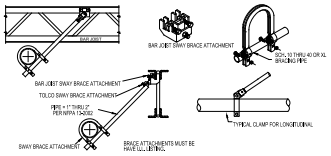
DRILLED CONCRETE ANCHOR HANGER



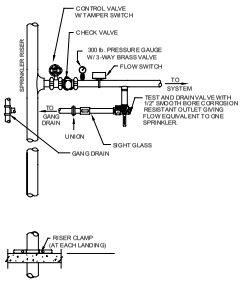
C-CLAMP HANGER



RISER CLAMP



BAR JOIST SWAY BRACE ATTACHMENT DETAILS



SPRINKLER RISER WITH FLOOR CONTROL VALVE ASSEMBLY

Not to Scale

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

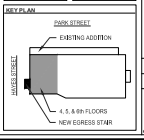
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



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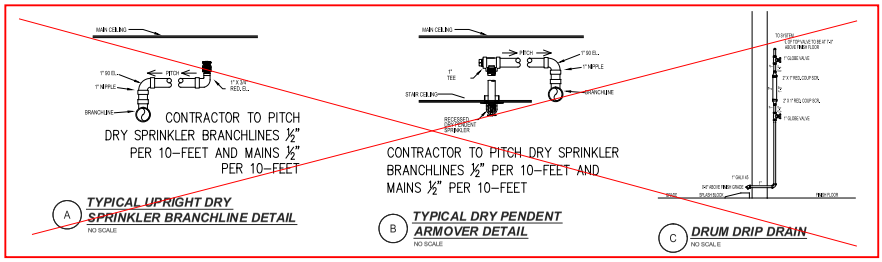

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83 PARK STREET
PROVIDENCE, RHODE ISLAND

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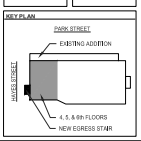
NORTH

KEY PLAN



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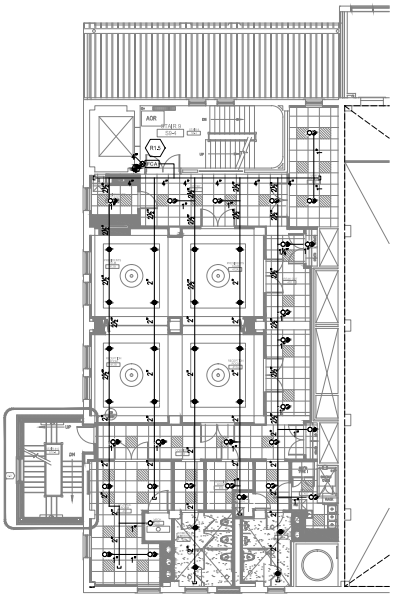
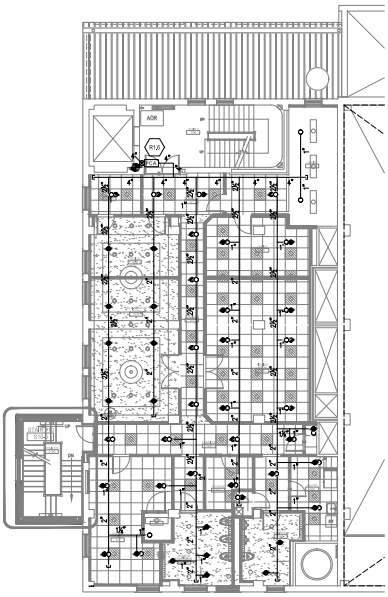
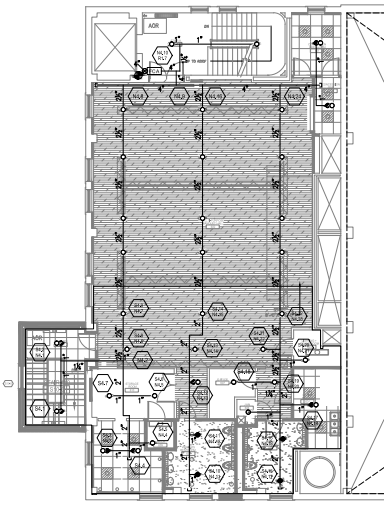


FOURTH FLOOR PLAN
SCALE: 1/8"=1'-0"



FIFTH FLOOR PLAN
SCALE: 1/8"=1'-0"



SIXTH FLOOR PLAN
SCALE: 1/8"=1'-0"

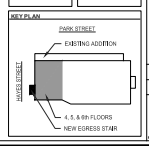
HYDRAULIC CALCULATION #4	
OCCUPANCY:	LIGHT HAZARD
DENSITY:	0.10 gpm/sq. ft.
AREA OF OPERATION:	1500 S.F.
SPRINKLER DEMAND:	350.0 gpm
AVAIL. PRESSURE (@ SOURCE):	64.5 psi
TOTAL DEMAND (@ SOURCE):	435.8 gpm @ 53.5 psi

ADD FIRST FLOOR NEW CONCESSION, WALK-IN FRIDGE, AND 3RD FLOOR MEZZANINE CONCESSION AREA.

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

Fire Sprinkler Plan

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

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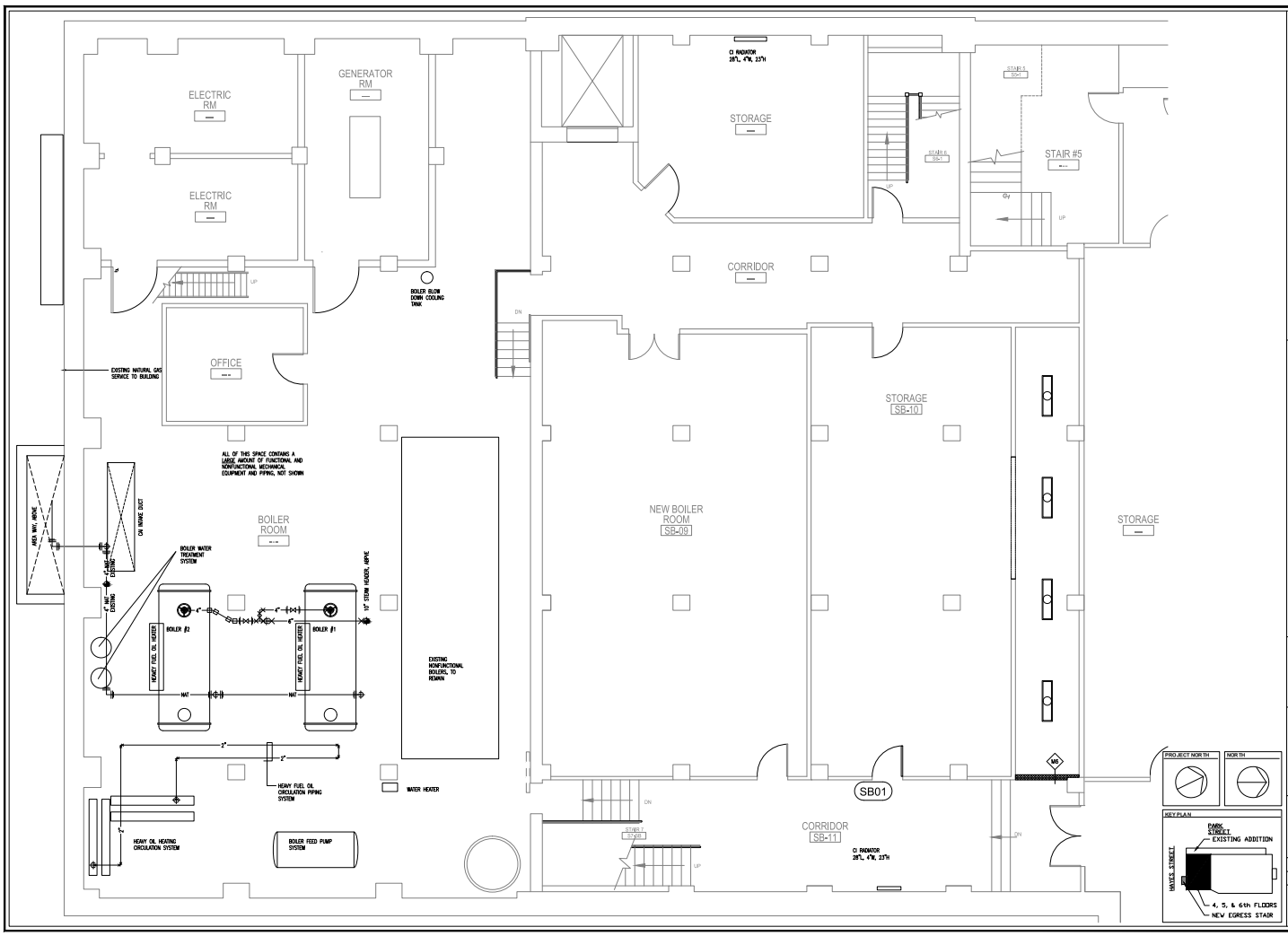

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN

SUB BASEMENT HVAC DEMOLITION PLAN

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	HD.01

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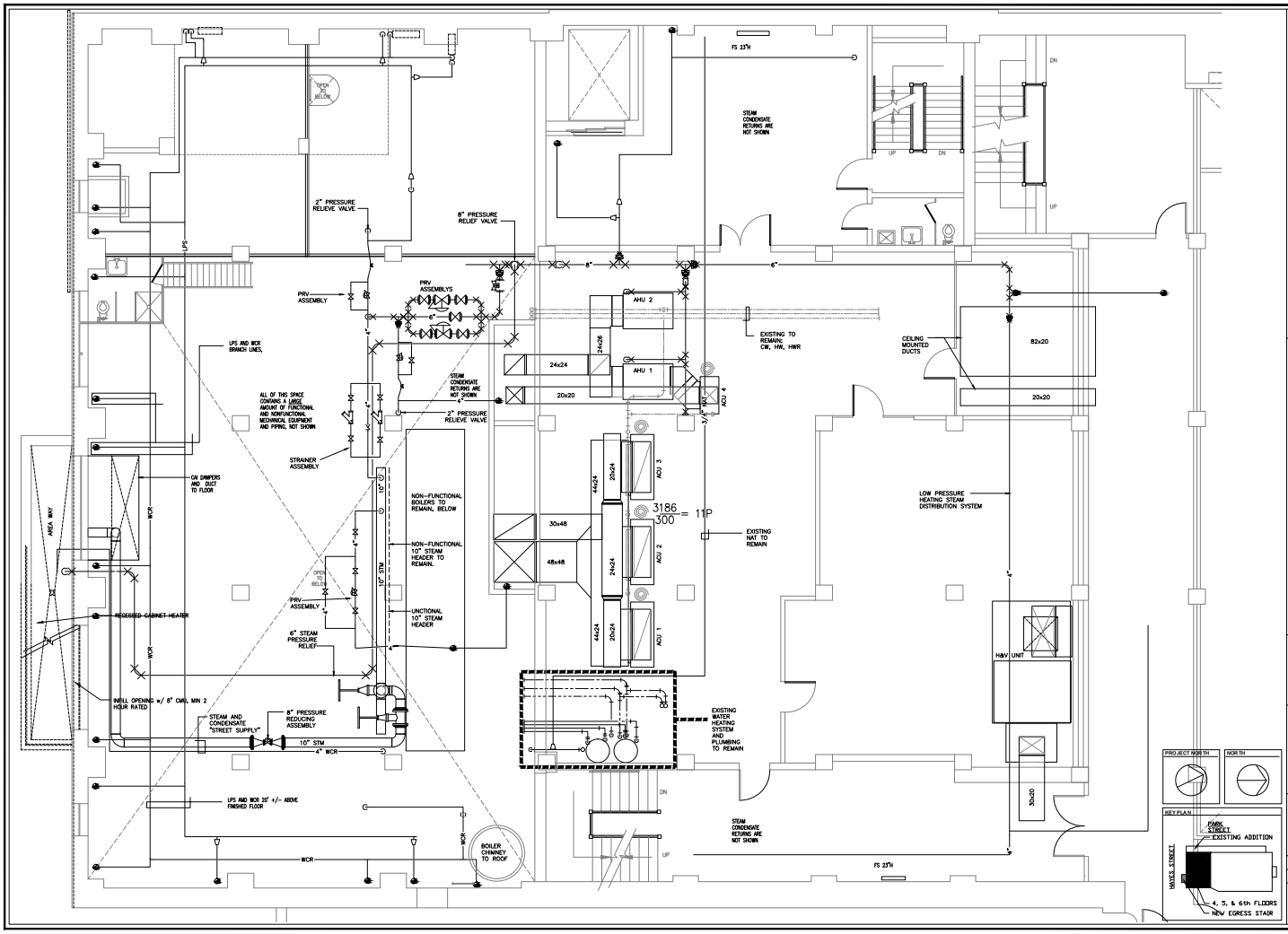

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

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KEY PLAN

BASEMENT HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

HD.02

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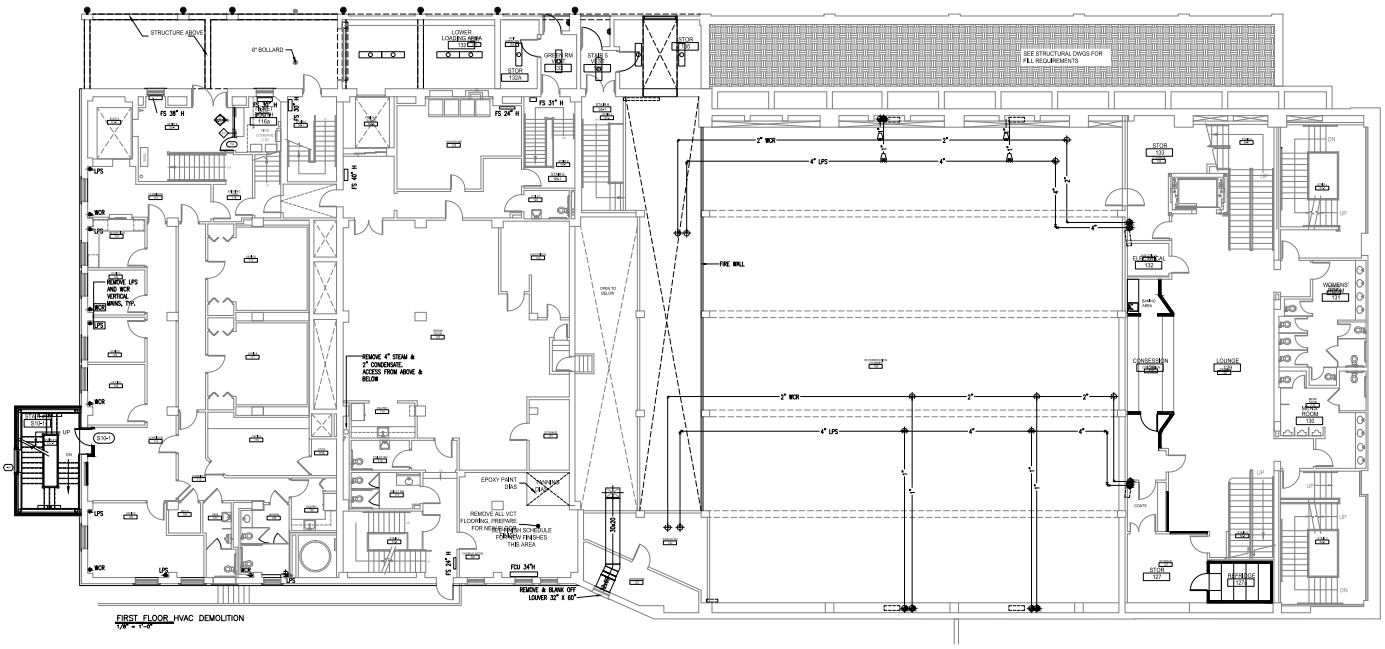

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

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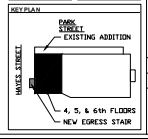
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



FIRST FLOOR HVAC DEMOLITION PALN

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	HD.03

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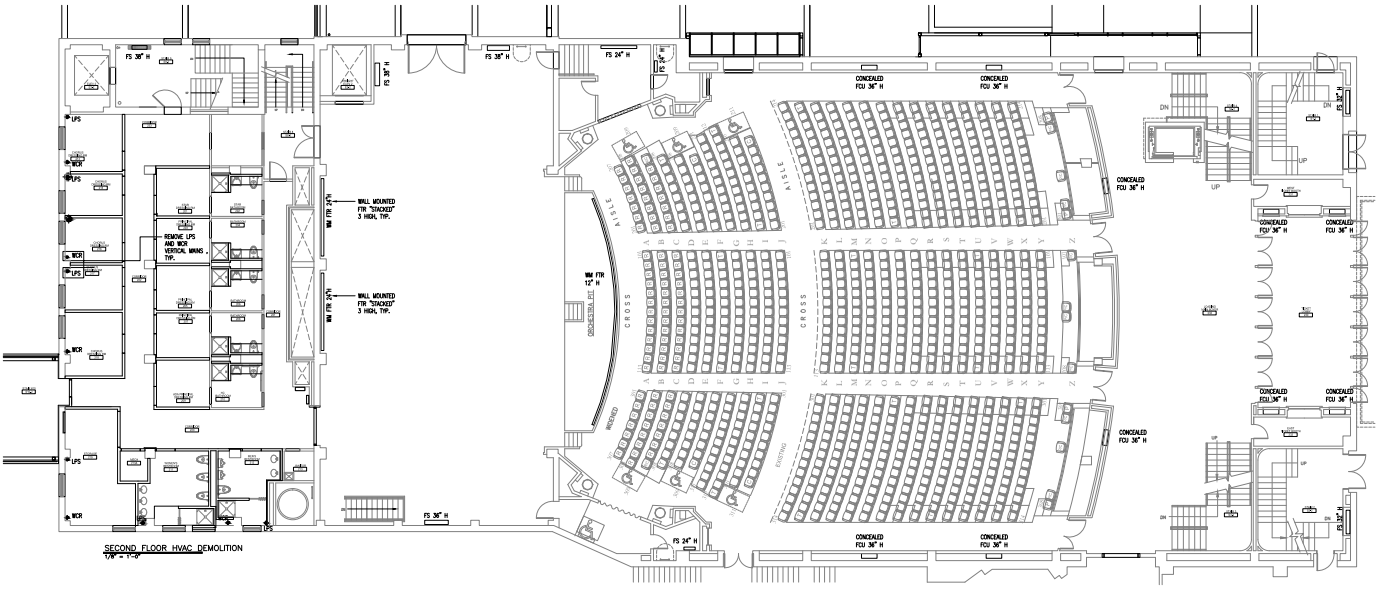

SECOND FLOOR HVAC DEMOLITION
1/8" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

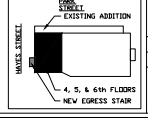
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SECOND FLOOR HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: HD.04

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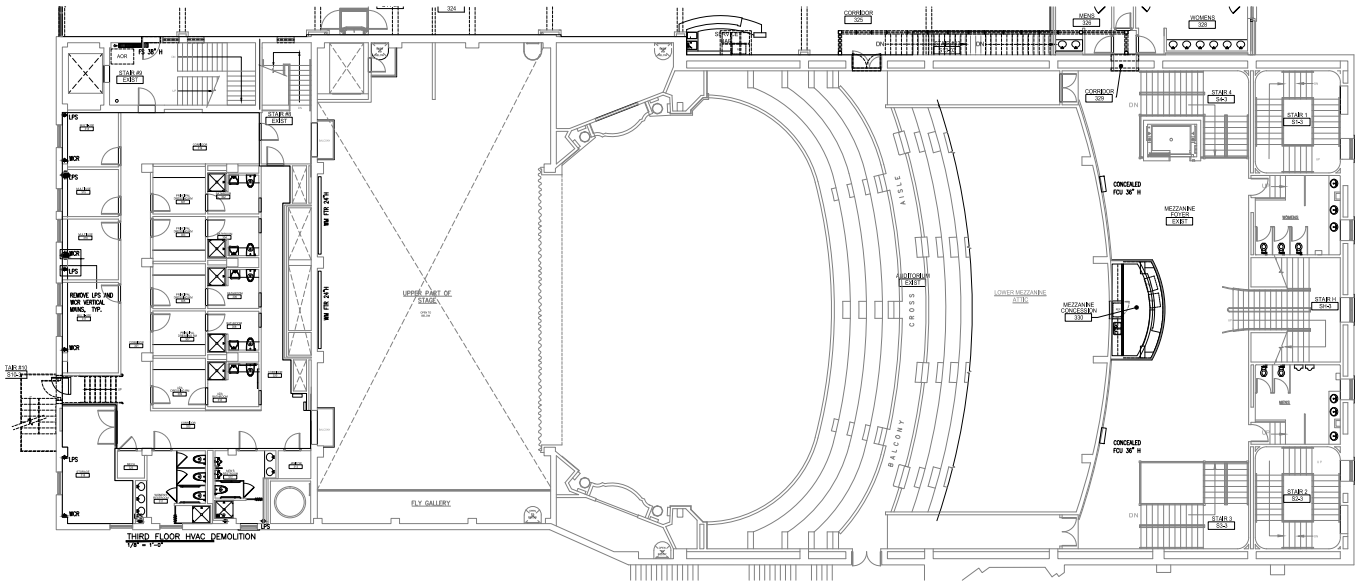

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

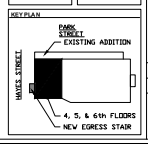
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



THIRH FLOOR HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

HD.05

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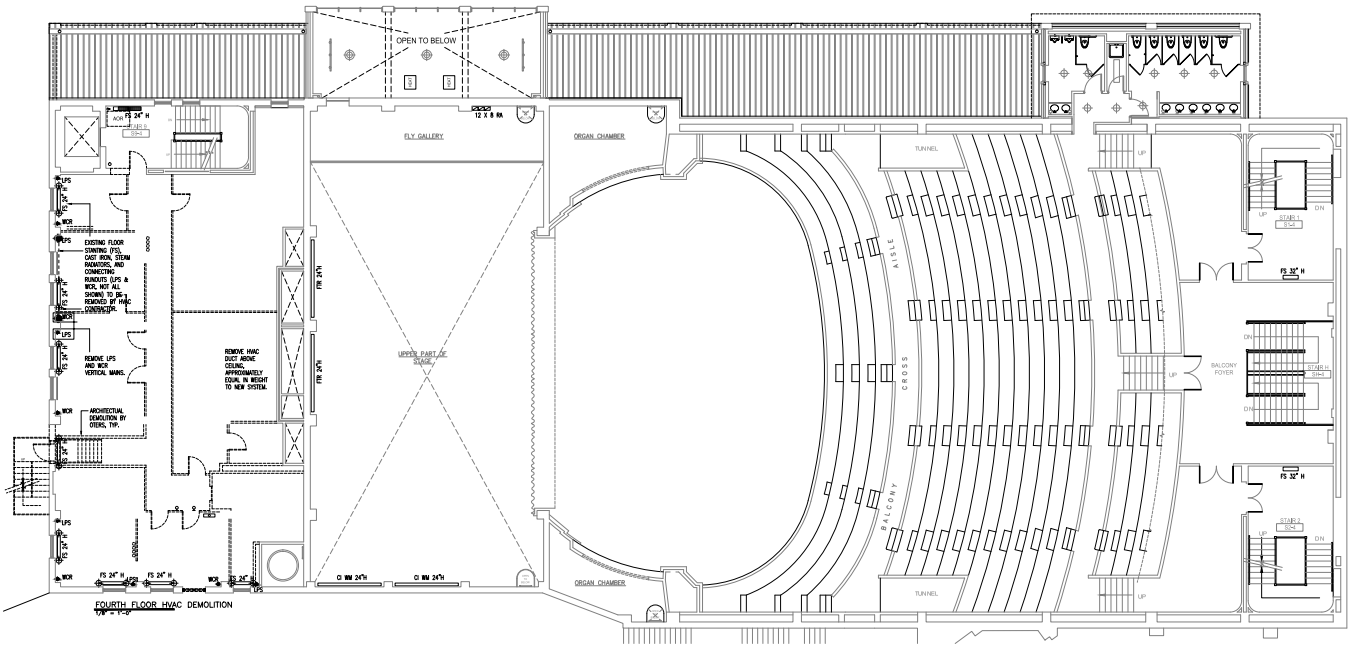

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

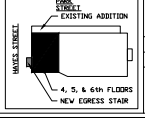
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



FOURTH FLOOR HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: HD.06

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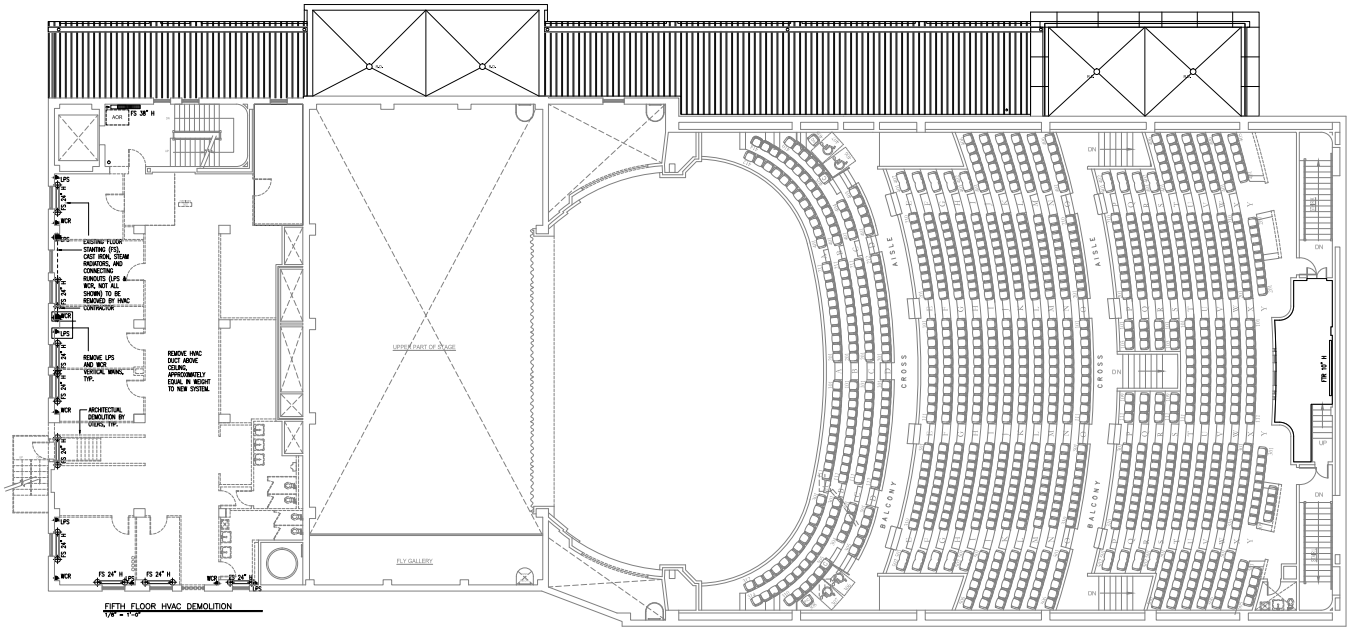

FIFTH FLOOR HVAC DEMOLITION
1/8" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

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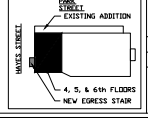
NORTH

KEY PLAN



FITH FLOOR HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: HD.07

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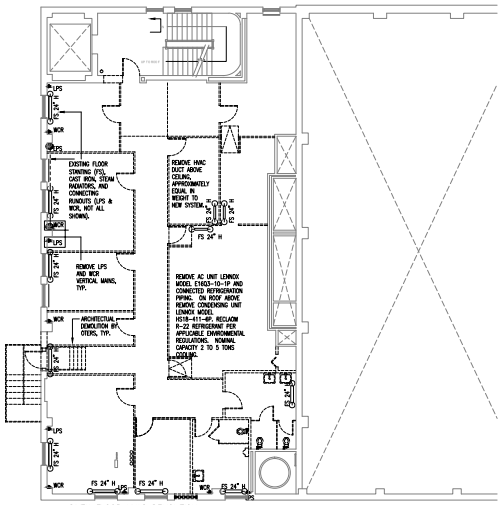

SIXTH FLOOR HVAC DEMOLITION
1/8" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

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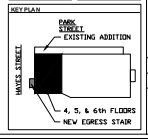
KEY PLAN



SIXTH FLOOR HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

HD.08

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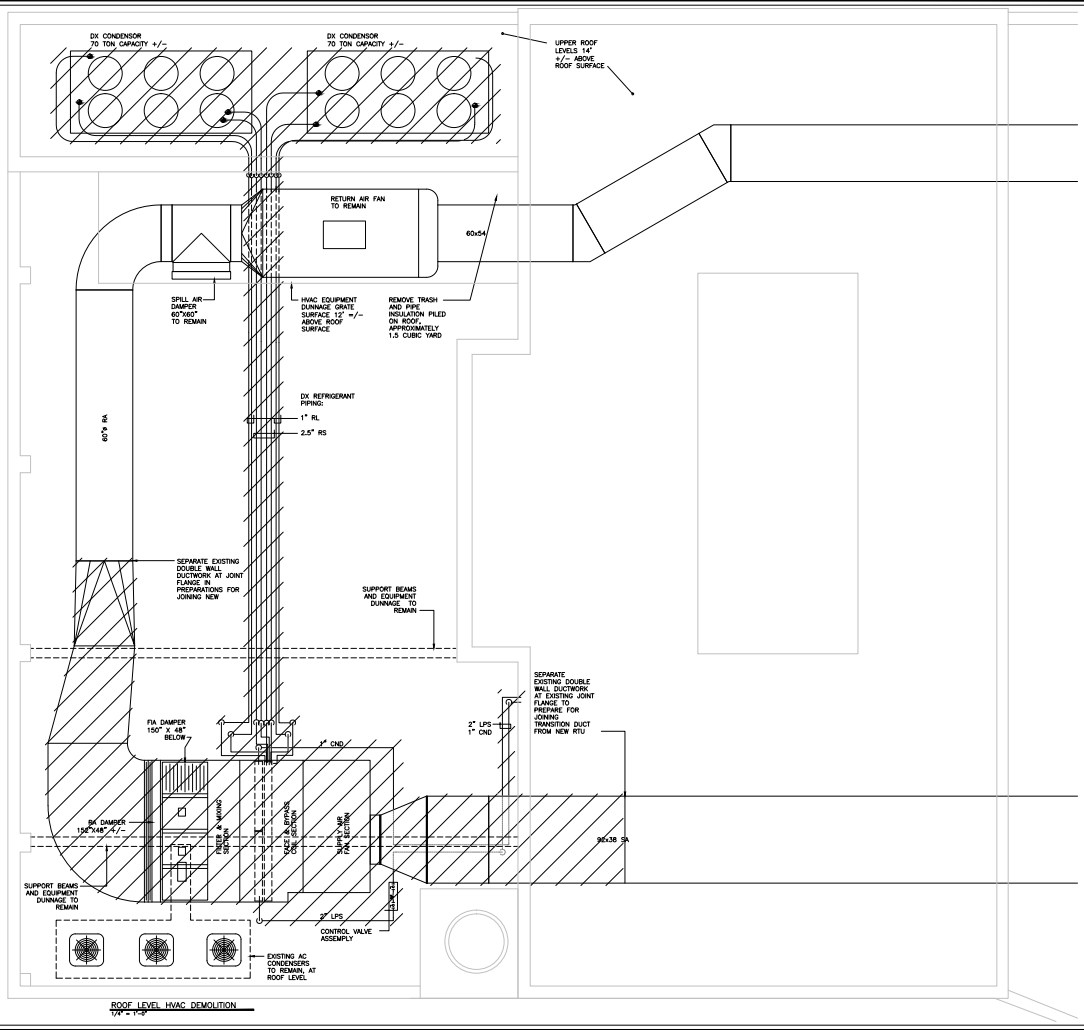

ROOF LEVEL HVAC DEMOLITION
1/4" = 1'-0"

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83 PARK STREET
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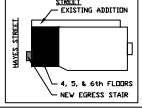

ROOF LEVEL HVAC DEMOLITION PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

HD.09

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OUTDOOR CENTRAL–STATION AIR–HANDLING UNIT SCHEDULE

MARK	BASES OF DESIGN		MIXING PLENUM SECTION					FAN SECTION								HEATING SECTION					COOLING SECTION: EVAPORATOR						COOLING SECTION: COMPRESSORS / CONDENSERS						REMARKS
	Manufacturer	Model	FILTERS	CONTROL SEQUENCE	RA	FAI	SPILL	SA	FRPM	TSP	EX SP	BHP	NOM HP	MCA	MCP	INPUT	OUTPUT	VOLTAGE	MCA	MCP	ASSEMBLY	ROWS/FPI	CIRCUITS	TMBH	SMBH	EAT DB/WB	EER	VOLTAGE	MCA	MCP			
AuRTU–2	SEASONS 4	6SSR61–1428–MR15–5ESE	2" PLEATED, MERV 7 118.1 SF	UNOCCUPIED	46000	4000	0	50000	4 X 1151	3.84	2.00	4 X 11.39 HP	4 X 15 HP	85	100	1500 MBH NAT GASS	120 TO 1200 MBH	460/3/60			1 & 2 TOTAL	4 / 10	8	1704.4	1340.7	84.0 / 68.0						COORDINATE WITH ELECTRICAL CONTRACTOR FOR MUTABLE POWER WIRING POINTS: TOTAL OF 4
				FULLY OCCUPIED	46000	11500	7500	50000													1							460/3/60	131	150			
				ECONIMIZER	46000	56000	52600	50000													2							460/3/60	131	150			

FAN–COIL UNIT SCHEDULE

Symbol	Bases of Design		Blower			Coil					Electrical, Single Point				Remarks
	Manufacturer	Model	CFM	ESP	HP	GPM	WPD	EWT	EAT	MBH	Voltage	Amps	FLC	MOPD	
FCU–04	Airtherm	Unitaire Series LCTF 04	390	NA	0.04	2.0	8.8	170 F	65 F	30.5	120 VAC 1Ph	0.54			Low Profile Concealed 45"W, 16–3/8"H 9–15/16"D
STEF 02 FCU	*	Unitaire Series STEF 02	230		0.03	2.0	8.2	170 F	65 F	19.3		0.38			Floor Mounted 49"W, 28 3/8"H, 9 1/2"D
CEFR 02 FCU		Unitaire Series CEFR 02	230		0.03	2.0	8.2	170 F	65 F	19.3		0.38			Ceiling Mounted 39"W, 10–3/8"H 25"D

UNIT HEATER SCHEDULE

Symbol	Bases of Design		Blower			Coil					Electrical, Single Point				Remarks
	Manufacturer	Model	CFM	ESP	HP	GPM	WPD	EWT	EAT	MBH	Voltage	Amps	FLC	MOPD	
HS–180	Sterling	HS–180	2200	NA	1/3	11.8	0.60	1802 F	60 F	101.1	120 VAC 1Ph	4.5			Horizontal Unit Heater
HS–72	Sterling	HS–72	100	NA	1/20	5.3	0.23	1802 F	60 F	40.3	120 VAC 1Ph	1.4			Horizontal Unit Heater

PIPING LEGEND

RL	REFRIGERANT – HIGH PRESSURE LIQUID LINE
RS	REFRIGERANT – LOW PRESSURE SUCTION
LPS	STEAM – LOW PRESSURE
MCR	STEAM CONDENSATE – WET RETURN
CND	CONDENSATE DRAIN
NG	NATURAL GAS – LOW PRESSURE
HWS	HEATING HOT WATER SUPPLY
HWR	HEATING HOT WATER RETURN

ABBREVIATIONS

RTU ROOF TOP UNIT (HVAC)
FS FLOOR STANDING CAST IRON RADIATOR
WM WALL MOUNTED CAST IRON RADIATOR
FTR WALL MOUNTED FINNED TUBE RADIATION
FCU FAN COIL UNIT
UH UNIT HEATER

GENERAL NOTES:

1. THE DRAWINGS ARE INTENDED TO BE DIAGRAMMATIC. DETERMINE IN THE FIELD EXACT LOCATION OF EQUIPMENT AND THE ROUTING OF WIRING, DUCT, AND PIPE. VERIFY THAT FIELD MEASUREMENTS AND ARRANGEMENTS ARE AS SHOWN ON DRAWINGS. REPORT ANY DISCREPANCIES TO ARCHITECT/ENGINEER BEFORE ANY INSTALLATIONS.

2. FOR ALL HEATING TERMINAL UNITS (FAN-COIL UNITS, UNIT HEATERS, CONVECTORS, AND FINNED TUBE RADIATION) PROVIDE ON THE INLET (HWS) SIDE: FLO PAC MODEL SV COMBINATION BALL VALVE, WYE STRAINER, AND UNION ; AND ON THE OUTLET SIDE (HWR) FLO PAC MODEL ARLB AUTOMATIC FLOW LIMITER WITH BALL VALVE AND UNION. PROVIDE SIZING (BASED ON PIPING DESIGN ON CONTRACT DRAWINGS), SET UP, TAGGING, AND PACKAGING, FOR EACH HEATING TERMINAL UNIT BY AUTHORIZED FACTORY TECHNICIAN S.

BOILER SCHEDULE

Symbol	Bases of Design		Heating Capacity			Remarks
	Manufacturer	Model	Gas Input MBH	Max. Output MBH		
B–1 & B–2	Viessmann	Vitocrossed 200, CM2–620	450 TO 2245	2132 Gross	1854 Net AHRI	

EXPANSION TANK SCHEDULE

Symbol	Bases of Design		Capacity		Remarks
	Manufacturer	Model	Volume	Acceptance	
EXT–1	Taco–hvac	CBX–4125	112 Gal.	61 Gal.	

CIRCULATOR PUMP SCHEDULE (PRELIMINARY)

Symbol	Service	Bases of Design		Selection				Electrical		Remarks
		Manufacturer	Model	GPM	Head	RPM	Nom. HP	Voltage	Amps	
P–1, P–2	System Pumps	Taco	VR30–2	160.0	30 Ft	NA	NA	200 – 240, 1Ph, 60Hz	8.0 @ 230 V	Web–enabled VFD for constant or variable differential pressure control

BOILER OPTIONS:

1. AIR ELIMINATOR: SPIROTHERM SERIES VSR-1 C-FA 4 INCH LINE SIZE.

2. CONDENSATE ACID NEUTRALIZERS PIPED TO FLOOR DRAIN.

3. UL 1738 STAINLESS STEEL VENTING SYSTEMS WITH ROOF PENETRATIONS AND WEATHER TIGHT TERMINATIONS.

4. UL 1738 POLYPROPYLENE/S COMBUSTION AIR INTAKE SYSTEMS WITH WALL PENETRATION, "GOOSENECK", AND INSECT SCREEN TERMINATIONS.

5. HWR AND HWS PRESSURE GAUGES AND THERMOMETERS.

CONVECTOR UNIT SCHEDULE

Symbol	Bases of Design		Coil				Remarkes
	Manufacturer	Model	GPM	WPD	EWT	EAT	MBH	
CV–20L	Airtherm	Series SW–A	0.38	0.4	170 F	65 F	3.05	Wall Hung Sloped Top 20"L, 32"H, 8"D
CV–24L			0.48				3.90	" 24"L
CV–28L			0.58				4.68	" 28"L
CV–32L			0.69				5.54	" 32"L
CV–36L			0.79				6.36	" 36"L
CV–40L			0.89				7.19	" 40"L
CV–44L			0.99				7.99	" 44"L
CV–48L			1.09				8.83	" 48"L
CV–52L			1.19				9.63	" 52"L
CV–56L			1.30				10.49	" 56"L
CV–60L			1.39				11.28	" 60"L
CV–64L			1.50				12.14	" 64"L

WALK IN COOLER EVAPORATOR UNIT

Symbol	Bases of Design		Cooling Coil			Electrical, Single Point			Remarks
	Manufacturer	Model	MBH	WB	DB	Voltage	MCA	MFA	
WEV–1	Trenton Refrigeration Products	TLP214MA–SIB	14.0	NA	25 F	208–230/ 1 / 60	2.3	15	

WALK IN COOLER OUTDOOR CONDENSING UNIT

Symbol	Bases of Design		Cooling Capacity			Electrical, Single Point			Remarks
	Manufacturer	Model	MBH	SST	OADB	Voltage	MCA	MFA	
WCU–1	Trenton Refrigeration Products	TEHA015E6H S2BB	15.2	25 F	95 F	208–230/ 1 / 60	19.1	30	

PROJECT NORTH

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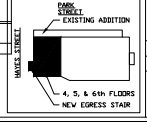

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

HVAC SCHEDULES & DETAILS 1

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: H0.01

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EXISTING BUILDING AUTOMATION SYSTEM (BAS) POINT LIST

SYSTEM POINT DESCRIPTION	ANALOG INPUT: SPECIAL	ANALOG INPUT: TEMPERATURE	ANALOG INPUT: CO2	ANALOG OUTPUT: HEATING CONTROL VALVE	ANALOG OUTPUT: DAMPER ACTUATOR	ANALOG OUTPUT: MODULATING SIGNAL	BINARY INPUT: START/STOP PROOF	BINARY INPUT: PROOF OPEN	BINARY INPUT: STATUS PROOF	BINARY OUTPUT: START / STOP	BINARY OUTPUT: OPEN / CLOSE	BINARY OUTPUT: ZONE VALVE	SYSTEM FEATURES PROGRAMS: START STOP TIME	SYSTEM FEATURES PROGRAMS: TEMPERATURE CONTROL	SYSTEM FEATURES PROGRAMS: LEAD – LAG SEQUENCE	SYSTEM FEATURES PROGRAMS: UNOCCUPIED SETPOINT	SYSTEM FEATURES ALARMS: HEAT/COOL	SYSTEM FEATURES ALARMS: HIGH / LOW ANALOUGE	SYSTEM FEATURES ALARMS: BINARY ALARM STATE	Remarks
OUTSIDE AIR		X															X			
ZONE SPACES (TYP. OF 20)		X		X								X		X		X		X		
AUDITORIUM		X										X		X		X	X	X		
NORTH LOBBY		X										X		X		X	X	X		
BALCONY		X												X		X	X	X		
BOILER ROOM		X																		
BOILERS 1 AND 2							X			X				X	X					
HEATING WATER RETURN (HWR)																				
HEATING WATER SUPPLY (HWS)																				
SYSTEM PUMPS: P–1, P–2							X			X					X					
EXISTING RETURN FAN							X			X									X	DIFFERENTIAL PRESSURE OF CURRENT SENSOR START / STOP PROOF
ROOFTOP AuAHU–2																	X			
SUPPLY FANS, ENABLE VFDs							X						X			X	X		X	OBTAIN CURRENT ON/OFF PROOF FROM VFD DRIVES
RETURN AIR		X																X		
MIXED AIR		X																X		AVERAGING BULB
COOLING COIL DISCHARGE		X												X				X		AVERAGING BULB
SUPPLY AIR DISCHARGE		X																		
GAS HEATING SECTION						X												X		
COOL STAGE 1 COMPRESSOR 1							X			X									X	
COOL STAGE 1 COMPRESSOR 2							X			X									X	Coordinate point quanity and type with Roof Top Unit (AuRTU–2)
COOL STAGE 2 COMPRESSOR 1							X			X									X	
COOL STAGE 2 COMPRESSOR 2							X			X									X	
SPILL DAMPER					X															
MIXED AIR DAMPER					X															
FRESH AIR INTAKE DAMPER					X															
OFFICE TOWER																				
BACK NET INTERFACE		X												X		X				ACCU–2 VRV SYSTEM SEQUENCE WITH AC–6
EXISTING ERV–1 THRU 4										X						X				FLOORS 1 THRU 3
NEW ERV–5 THRU 7										X						X				FLOORS 4 THRU 6
NEW ERV–8, 6TH FLOOR				X						X						X				SEQUENCE WITH ERV–7
EXISTING AC–1 THRU 3										X						X			X	FLOORS 1 THRU 3
NEW AC–4, AC–5										X						X			X	FLOORS 4 THRU 5
NEW AC–6																X				SEQUENCE WITH VRV SYSTEM
2ND FLOOR		X											X			X		X		
3RD FLOOR		X											X			X		X		
4TH FLOOR		X											X			X		X		
5TH FLOOR		X											X			X		X		
6TH FLOOR		X											X			X		X		

BUILDING AUTOMATION SYSTEM (BAS) POINT LIST

SYSTEM POINT DISCRIPTION	ANALOG INPUT: SPECIAL	ANALOG INPUT: TEMPERATURE	ANALOG INPUT: CO2	ANALOG OUTPUT: HEATING CONTROL VALVE	ANALOG OUTPUT: DAMPER ACTUATOR	BINARY INPUT: START/STOP PROOF	BINARY INPUT: PROOF OPEN	BINARY INPUT: STATUS PROOF	BINARY OUTPUT: START / STOP	BINARY OUTPUT: OPEN / CLOSE	SYSTEM FEATURES PROGRAMS: START STOP TIME	SYSTEM FEATURES PROGRAMS: TEMPERATURE CONTROL	SYSTEM FEATURES PROGRAMS: LEAD – LAG SEQUENCE	SYSTEM FEATURES PROGRAMS: UNOCCUPIED SETPOINT	SYSTEM FEATURES ALARMS: HIGH / LOW ANALOUGE	SYSTEM FEATURES ALARMS: BINARY ALARM STATE	Remarks
WEST ADDITION																	
ERV–1 & ERV–2									X	X				X			
BACK NET INTERFACE		X										X		X			ACCU–1 VRV SYSTEM
3RD FLOOR TOILETS		X										X		X		X	
4RD FLOOR TOILETS		X										X		X		X	
3RD FLOOR SOUTH		X										X		X		X	
3RD FLOOR CENTER		X										X		X		X	

CONTROL VALVE SCHEDULE

Mark: Master Zone	Mark: Slave Zone	Zone Name	Bases of Design: Manufacturer	Bases of Design: Model	Size	Gpm	CV	Remarks
V1		Stair Well: South	BELIMO	Series B2	Line Size		Full Port	
V2		Existing Boiler Room						
V3		Stair Well: South West						
V4		Lobby: Street Level, South West						
V5		Utility Rooms: Sub Basement & Basement Mezzanine, West						
V6		Utility Rooms: First & Second Floors, West						
V7		Utility Rooms & Stair Well: Sub Basement & Basement Mezzanine, East						
V8		Utility Rooms & Stair Well: Tanning Room & Stair Well, East						
V9		Stage: Second and Third Floor Levels						
V10		Green Room: First Floor						
V11		Auditorium Seating Space,						
	V12	Orchestra Pit						
V13		Auditorium North Lobby Tower						
	V14	Lounge: First Floor, North						
	V15	Stair Well: Lower North West						
	V16	Stair Well: Upper North West						
	V17	Stair Well: Lower North East						
	V18	Stair Well: Upper North East						
	V19	Women's Room, Third Floor						
	V20	Men's Room, Third Floor						
V21		Boiler Number 1						
V22		Boiler Number 2						

GENERAL NOTES:

1. THE DRAWINGS ARE INTENDED TO BE DIAGRAMMATIC. DETERMINE IN THE FIELD EXACT LOCATION OF EQUIPMENT AND THE ROUTING OF WIRING, DUCT, AND PIPE. VERIFY THAT FIELD MEASUREMENTS AND ARRANGEMENTS ARE AS SHOWN ON DRAWINGS. REPORT ANY DISCREPANCIES TO ARCHITECT/ENGINEER BEFORE ANY INSTALLATIONS.

2. PROVIDE ADDITIONAL POINTS AS REQUIRED TO FULFILL THE SEQUENCES OF OPERATION IN SPECIFICATION SECTION 23 0993.

3. PROVIDE ALL POINTS, LOCATED AS INDICATED ON THE DRAWINGS, AND TO OPERATE CONTROL VALVES AS SCHEDULED. SOME ZONES HAVE MORE THAN ONE TEMPERATURE SENSOR.

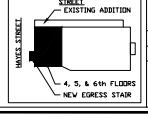
DRAWING SYMBOLS

- TT — SPACE TEMPERATURE TRANSMITTER
- HT — SPACE HUMIDITY TRANSMITTER
- CO2 — SPACE CARBON DIOXIDE TRANSMITTER

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

HVAC SCHEDULES & DETAILS 2

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

H0.02

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VARIABLE REFRIGERANT VAUME (VRV) HEAT PUMP SYSTEM INDOOR UNITS, OFFICE TOWER													
Symbol	Bases of Design		Blower		Cooling Coil			Nom. Heating Capacity		Electrical, Single Point			Remarks
	Manufacturer	Model	CFM (H/L)	Ext. SP WG	MBH	WB	DB	MBH	OADB	Voltage	MCA	MFA	
IU-9	Daikin	FXHQ36MVJU	820 / 670	NA	36.0	67 F	80 F	40.0	47 F	208-230/ 1 / 60	1.4	15	Ceiling Suspended Unit
IU-10	"	"	"	"	"	"	"	"	"	"	"	"	"

VARIABLE REFRIGERANT VALUME (VRV) HEAT PUMP SYSTEM OUTDOOR UNITS, OFFICE TOWER								
Symbol	Bases of Design		Electrical					Remarks
	Manufacturer	Model	Voltage	MCA	MFA	RLA	MSC	
ACCU-2	Daikin	RXYQ72PAYD	460 / 60 / 3	20.2	25	7.1	65	

SPLIT-SYSTEM HEATING AND AIR CONDITIONING, INDOOR EQUIPMENT																			
Symbol	Bases of Design		Blower			Furnace		Connections					DX Cooling Coil				Electrical, Single Point		Remarks
	Manufacturer	Model	CFM	ESP	Fan Power	Input, MBH	Output, MBH	NG	Condensate	CAI	Vent	CW	Model	MBH	WB	DB	Voltage	MCA	
AC-4 to AC-6	Lennox	Furnace: G61MPV-60C-110, Humidifier: HCWP3	1900	0.5" WG	665 W	75 - 110	72 - 99	1/2" IPS	3/4" PVC	2" PVC	2" PVC	1/4" **	CX34-62C-6F	59.5	67 F	80 F	120 VAC 1Ph	12	

** By Plumbing Contractor

SPLIT-SYSTEM HEATING AND AIR CONDITIONING, OUTDOOR EQUIPMENT															
Symbol	Bases of Design		Cooling Capacity			Fan			Connections		Electrical, Single Point			Remarks
	Manufacturer	Model	MBH	SEER	EER	CFM	NOM. HP	Power	Liquid Line	Suction Line	Voltage	MCA	MCP	
CU-4 to CU-6	Lennox	SSB060H4	59.5	14.50	11.50	4380	1/3	280 W	3/8"	7/8"	460V-3ph	12.3	20	

ENERGY RECOVERY VENTILATOR SCHEDULE, OFFICE TOWER											
Symbol	Location	Bases of Design		Supply		Exhaust		Electrical Single Point Wiring			Remarkes
		Manufacturer	Model	CFM	ESP	CFM	ESP	Voltage 60 Hz	Ampacity	Protection	
ERV-5	4th Floor	RenewAire	EV300	311	0.40	311	0.40	120 1Ph	3.3 FLA		
ERV-6	5th Floor										
ERV-7	6th Floor										
ERV-8	6th Floor		EV450IN	500	0.43	500	0.43	208 - 230 1Ph	3.9	15	

HOOD EXHAUST FAN SCHEDULE											
Symbol	Bases of Design	Service	CFM	FRPM	ESP	Nom HP	Break HP	V/C/P	FLA	Sones	Remarks
KXF-1, KXF-2	Captive Aire: DU30HFA		650	1280	0.500	0.25	NA	115/60/1	4.00	NA	

HOOD MAKEUP AIR FAN SCHEDULE											
Symbol	Bases of Design	Service	CFM	FRPM	ESP	Nom HP	Break HP	V/C/P	FLA	Sones	Remarks
MUF-1, MUF-2	Captive Aire: NSAU1-G10D		520	784	0.500	0.50	NA	115/60/1	6.80	NA	

LOUVER AND DAMPER SCHEDULE								
Symbol	Bases of Design		Size	CFM	Free Area	Pressuer Drop	Interlock	Remarks
	Manufacturer	Model						
MD-1	Greenheck	VCD-18	18 X 14	300		≤ 0.08 WG"	ERV-5	
MD-2							"	
MD-3							ERV-6	
MD-4							"	
MD-5							ERV-7	
MD-6							"	
MD-7			14 X 14	500			ERV-8	
MD-8			"	"			"	

DIFFUSER AND GRILL SCHEDULE, OFFICE TOWER					
Tag	Basis of Design		Type	Neck Size	Remarks
	Manufacturer	Model			
SD-1	Hart & Cooly	20 Round Diffuser	Duct Mounted Supply	6" Dia	
SD-2				6" Dia	
SD-3				8" Dia	
SD-4				8" Dia.	
SD-5		94 HOV Register	Side Wall Supply	6 x 4	
SD-6				6 x 5	
SD-7				8 x 6	
SD-8				8 x 7	
SD-9		SRS Diffuser	Ceiling Supply	6 x 4	
SD-10				6 x 5	
SD-11				8 x 6	
SD-12				8 x 7	
SD-13					
RG-1		94 Grill	Duct Mounted Return	18 X 12	
RG-2				18 X 14	
RG-3		94 Grill	Ceiling Return	6 x 4	
RG-4				6 x 5	
RG-5				8 x 5	
RG-6				8 x 6	

TRANSFER GRILL SCHEDULE					
Tag	Basis of Design		Type	Neck Size	Remarks
	Manufacturer	Model			
TG-1	Hart & Cooly	94 HOV Register	Outlet: (Side Wall Supply)	6 x 4	
		94 Grill	Inlet: (Side Wall Return)		
TG-2		94 HOV Register	Outlet: (Side Wall Supply)	6 x 5	
		94 Grill	Inlet: (Side Wall Return)		
TG-3		94 HOV Register	Outlet: (Side Wall Supply)	8 x 6	
		94 Grill	Inlet: (Side Wall Return)		

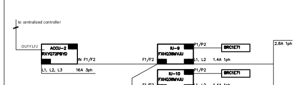
KITCHEN HOOD SCHEDULE																		
HOOD NO.	MODEL	LENGTH	MAX. COOKING TEMP.	EXHAUST PLENUM: TOTAL EXH. CFM	RISER(S): WIDTH	LENG.	DIA.	CFM	S.P.	SUPPLY PLENUM: TOTAL SUP. CFM	RISER(S): WIDTH	LENG.	DIA.	CFM	S.P.	HOOD CONSTRUCTION	HOOD CONFIG: END TO END	ROW
KH-1, KH-2	Captive Aire: 6624 VHB-PSP-F	3' 8.00"	700 Deg.	650			12"	650	-0.078"	520						430 SS 100%	ALONE	ALONE

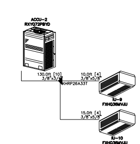
KITCHEN HOOD OPTIONS

FIELD	WRAPPER	18.00" High	Front, Left	

PERFORATED SUPPLY PLENUMS

HOOD NO.	POS.	LENGTH	WIDTH	HEIGHT	TYPE	RISER(S): WIDTH	LENG.	DIA.	CFM	S.P.
KH-1	Front	44"	14"	6"	MUA			10"	260	0.124"
KH-2	"	"	"	"	MUA			10"	260	0.124"





Daikin AC (Americas), Inc. - VRVIII Heat Pump

Additional HVAC Specifications:

Daikin VRV AC System: Multiple Evaporator, Direct Expansion (DX), Air-Cooled, Variable Capacity, Split System

Part 1 - GENERAL

1.01 SYSTEM DESCRIPTION

Daikin Variable Refrigerant Volume Series (heat or cool model) split system: Multiple evaporators, REFNET™ joints and headers, two-pipe refrigeration distribution system using PID control and Daikin VRV condenser unit.

Condenser: direct expansion (DX), air-cooled heat pump, multi-zone air-conditioning system with variable speed inverter driven compressors using R-410A refrigerant that may connect an indoor evaporator capacity up to 200% of the condensing unit capacity. Each zone capable of operating separately with individual temperature control.

Daikin condensing unit interconnections to indoor units: In accordance with Daikin's engineering data book detailing each indoor unit.

Connections to the condensing unit: Only Daikin's REFNET™ specified piping joints and headers to ensure correct refrigerant flow and balancing. T style joints are not acceptable.

Operation: Either cooling or heating of all of the indoor units simultaneously. Each indoor unit or group of indoor units able to provide set temperature independently via a local remote controller, an Intelligent Controller, an Intelligent Manager or a BMS interface.

1.02 VRVIII FEATURES

A. Oil Return Heating: Maintain continuous heating during oil return operation. Reverse cycle (cooling mode) oil return during heating operation is not permitted.
B. Independent Control: Dedicated electronic expansion valve for each indoor unit.
C. VFD Inverter Control, Each condensing unit: Variable speed "inverter" compressor coupled with inverter fan motors for part load performance. Compressor capacity modulated automatically to maintain constant suction and condensing pressures while varying the refrigerant volume for the needs of the cooling or heating loads.
D. Indoor units PID control: To control superheat to deliver room temperature condition and optimize efficiency
E. Wiring: 16/18 AWG, 2 wire, multi-stranded, non-shielded and non-polarized daisy chain control wiring.
F. Diagnostics: Self diagnostic, auto-check functions to detect a malfunction and display the type and location.
G. Controls: Remote controller capable of controlling up to 16 indoor units integrated with open protocol BACnet building management systems.

1.03 QUALITY ASSURANCE

A. Testing: By a Nationally Recognized Testing Laboratory (NRTL), in accordance with ANSI/UL 1995 - Heating and Cooling Equipment bearing the Listed Mark.
B. Wiring: In accordance with the National Electric Code (NEC).
C. Condensing units: factory charged with R410A.

1.04 DELIVERY, STORAGE AND HANDLING

A. All components and materials stored and handled according to the manufacturer's recommendations.

2.03 INSTALLATION REQUIREMENTS

Installation: By a Daikin factory trained contractor/dealer; submit training certification proof with bid documents. Contractor's installation price based on all of the systems installation requirements

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f 401.272.7622

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

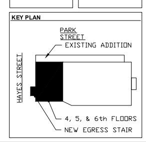
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



HVAC
SCHEDULES &
DETAILS 3

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: H0.03

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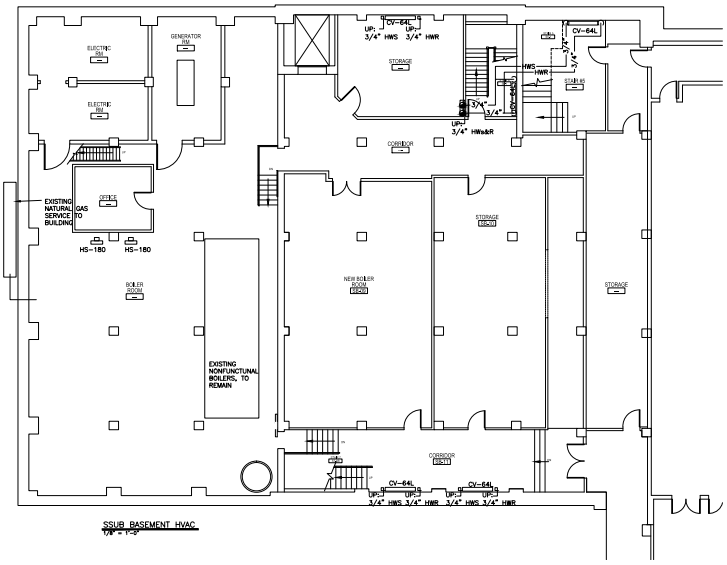

SSUB BASEMENT HVAC
1/8" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

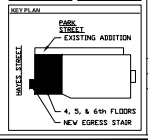
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SUB BASEMENT HVAC

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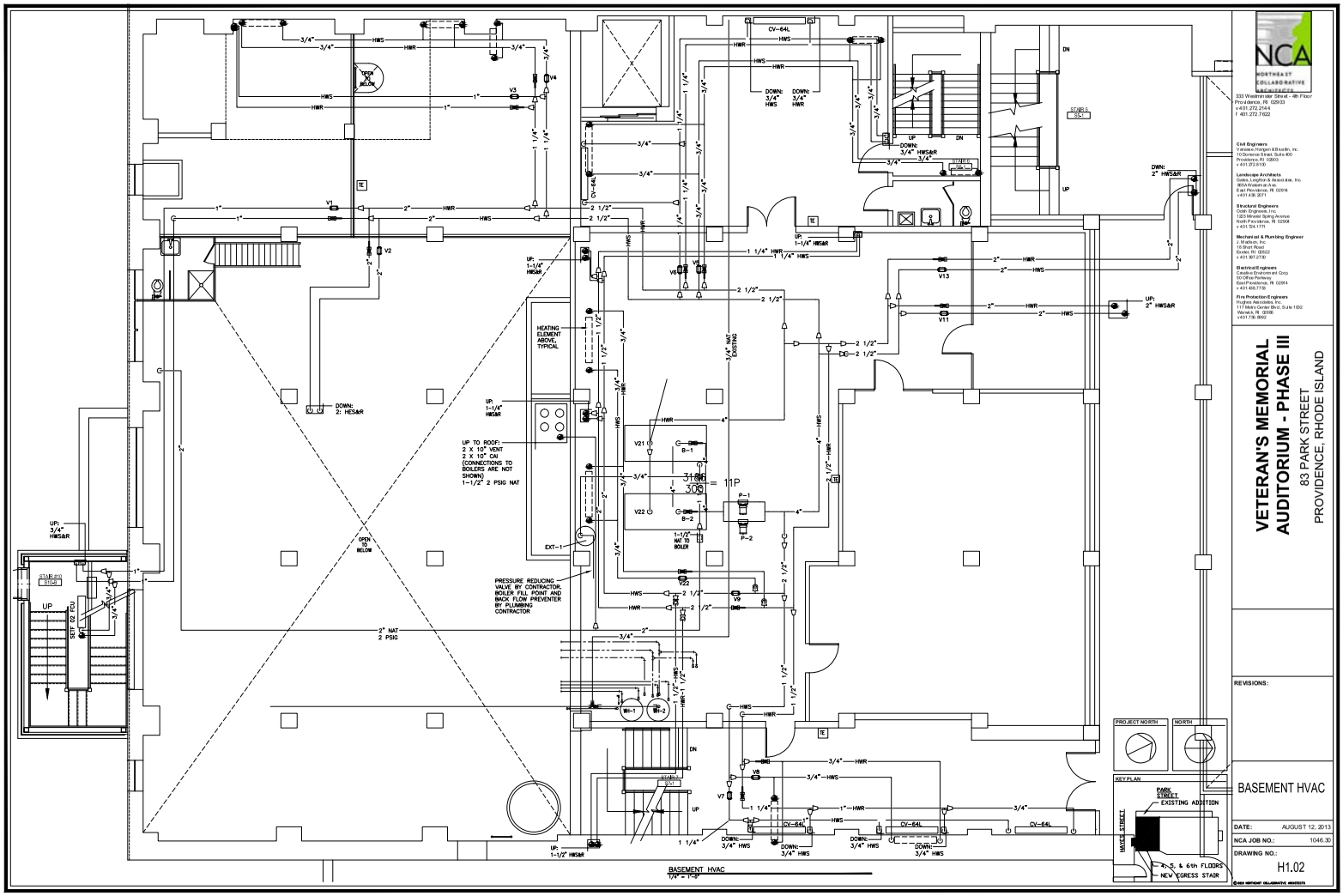

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

BASEMENT HVAC

DATE: AUGUST 12, 2013
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DRAWING NO.: H1.02

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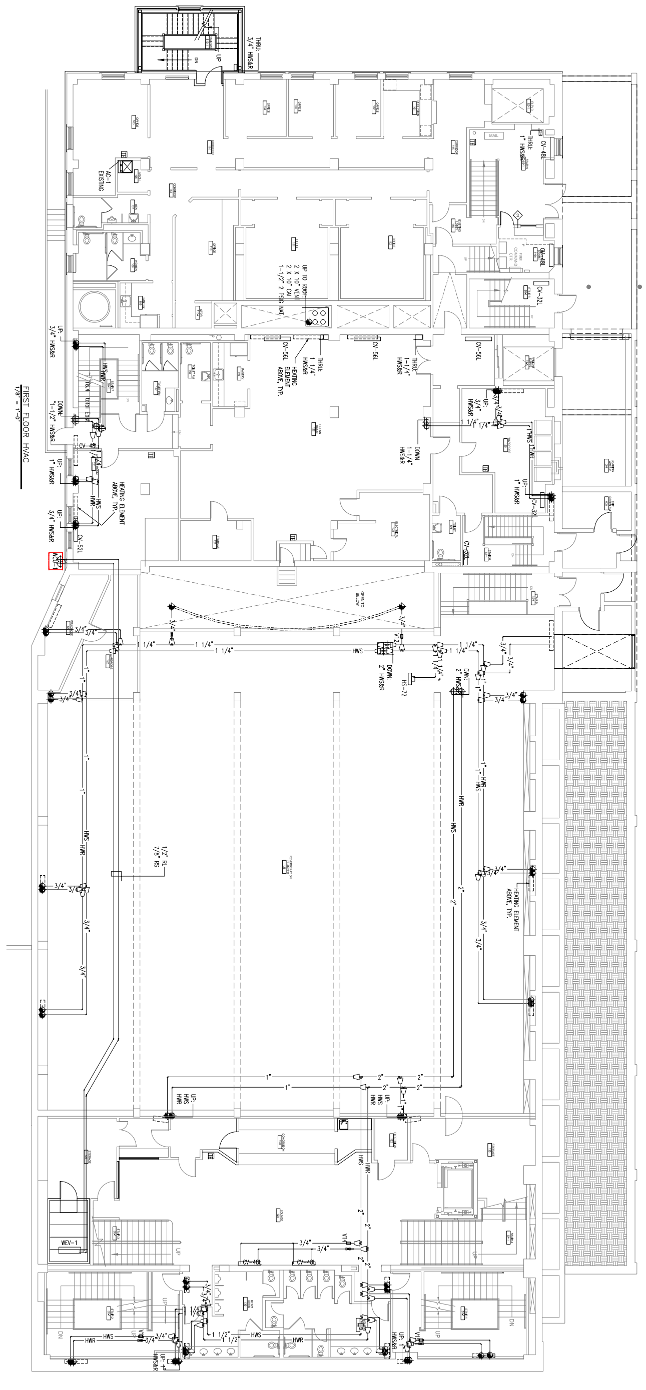

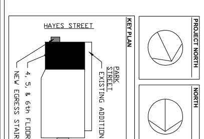

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

FIRST FLOOR
HVAC

DATE: AUGUST 12, 2013
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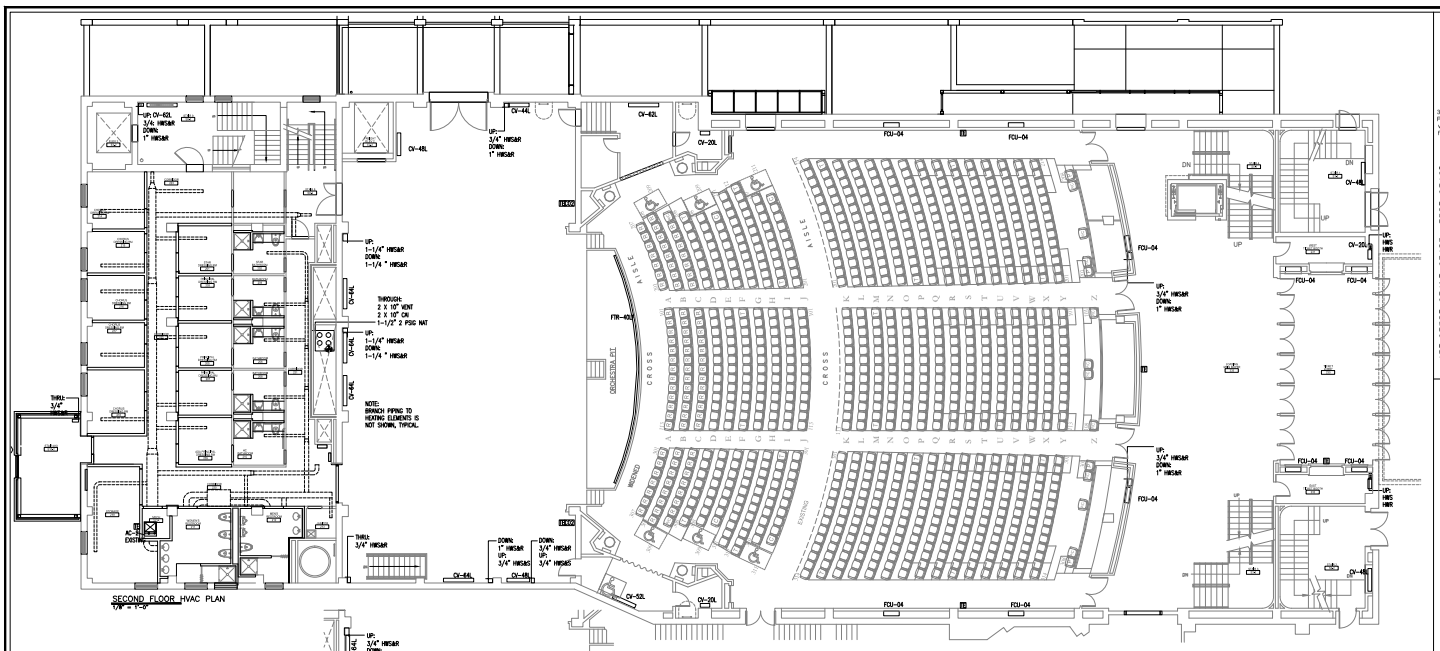

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

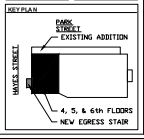
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SECOND FLOOR HVAC

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
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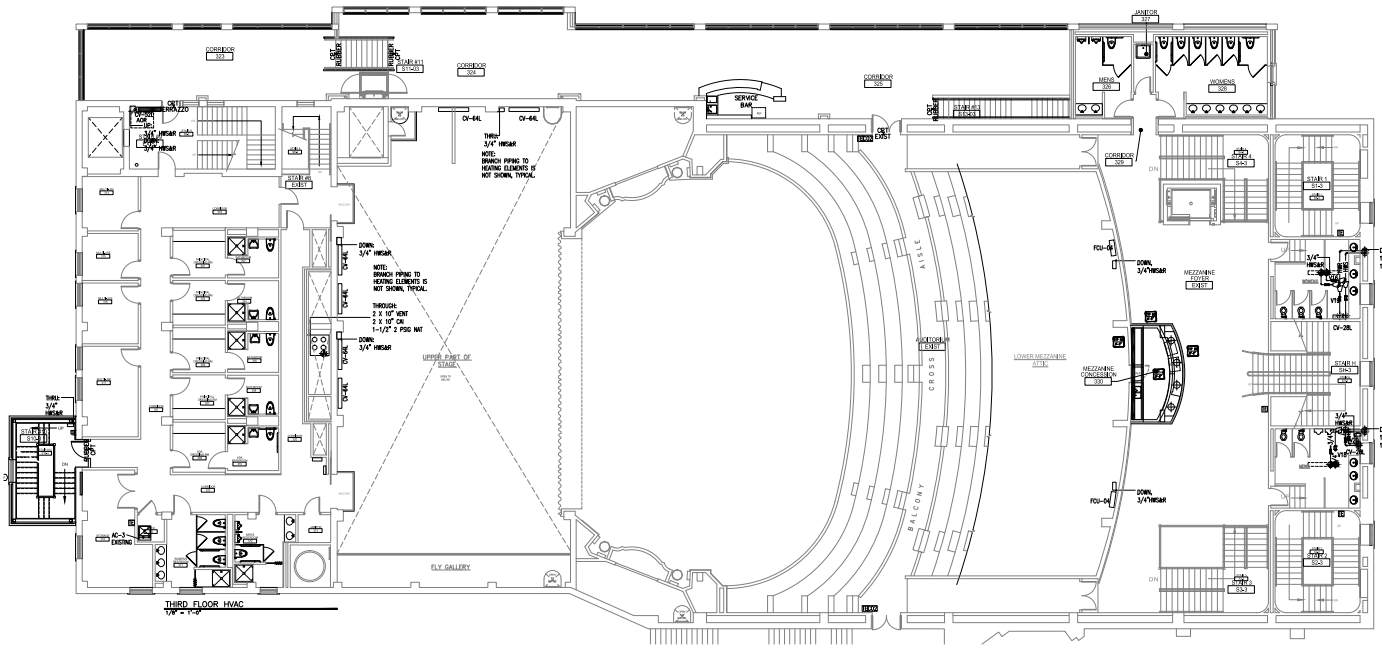

THIRD FLOOR HVAC
1/8" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

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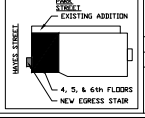
KEY PLAN



THIRD FLOOR HVAC

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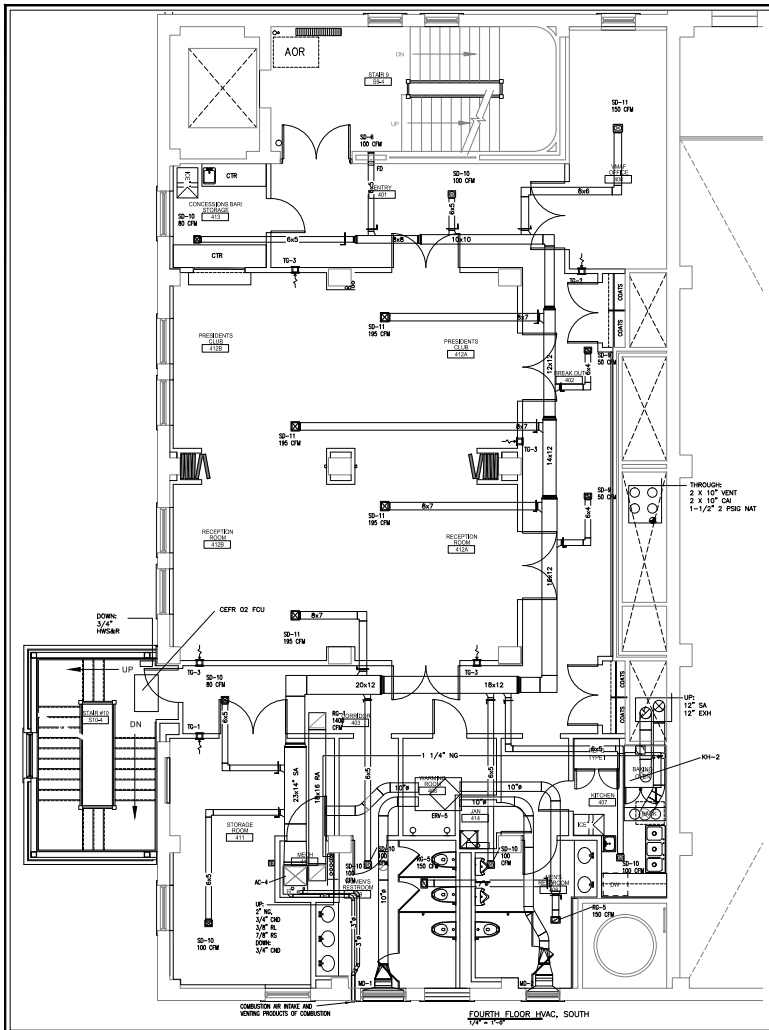
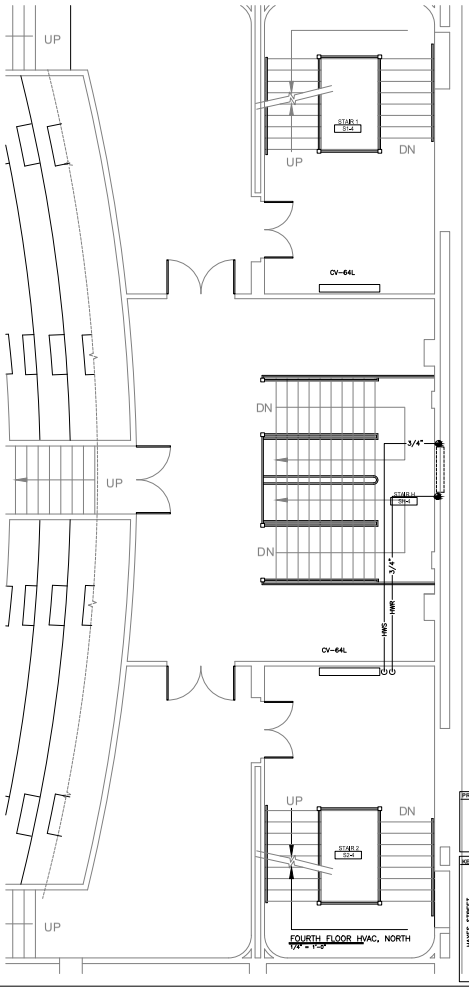


FOURTH FLOOR HVAC, SOUTH
1/4" = 1'-0"

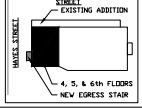


FOURTH FLOOR HVAC, NORTH
1/4" = 1'-0"

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

FOURTH FLOOR
HVAC

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	H1.06

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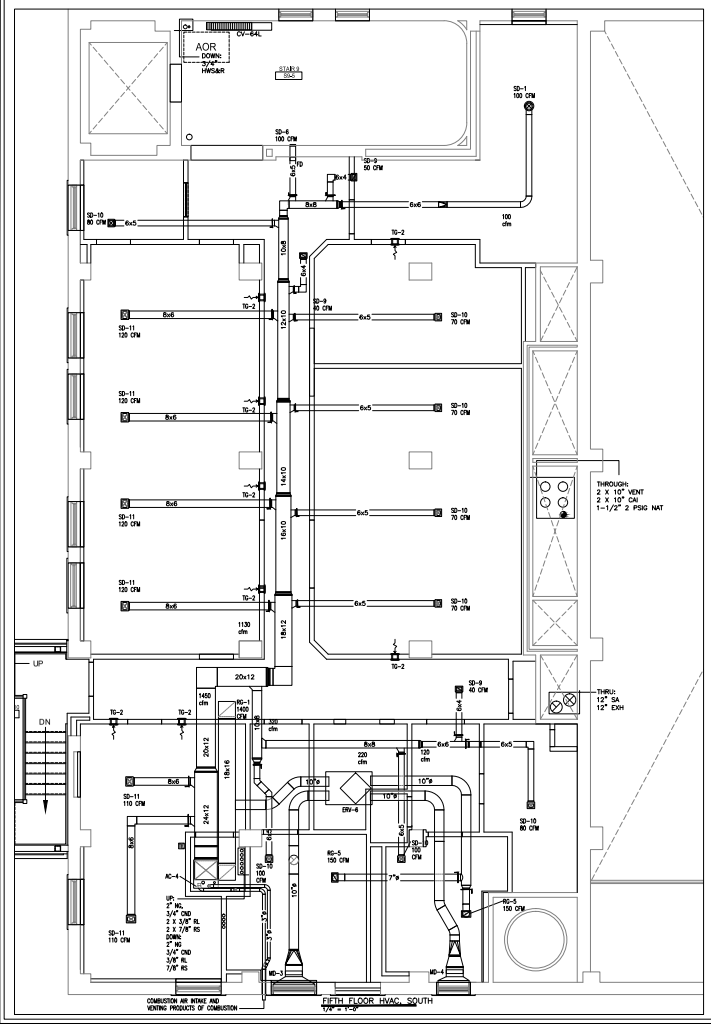
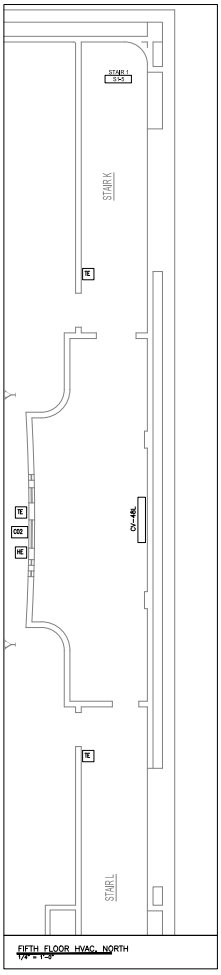


FIFTH FLOOR HVAC, SOUTH
1/4" = 1'-0"

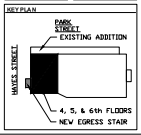


FIFTH FLOOR HVAC, NORTH
1/4" = 1'-0"

PROJECT NORTH

NORTH

KEY PLAN



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North Providence, RI 02904
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Fire Protection Engineers
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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

FIFTH FLOOR HVAC

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

H1.07

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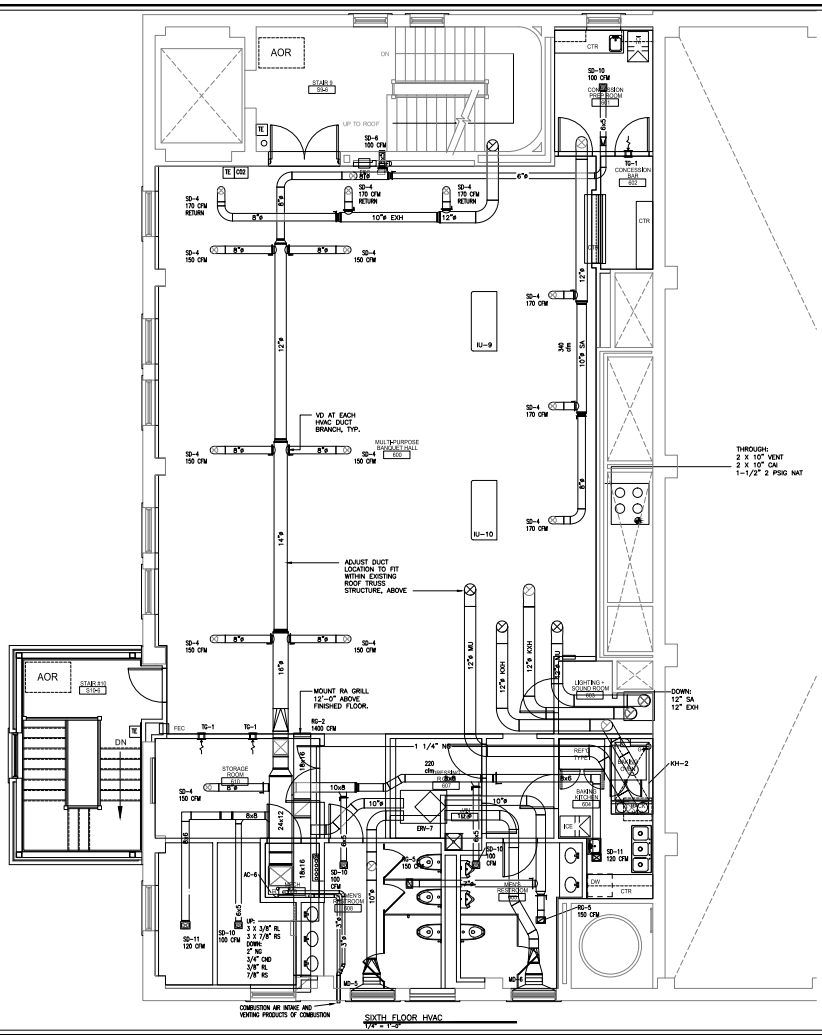

SIXTH FLOOR HVAC
1/4" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

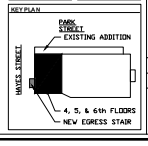
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SIXTH FLOOR
HVAC

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

H1.08

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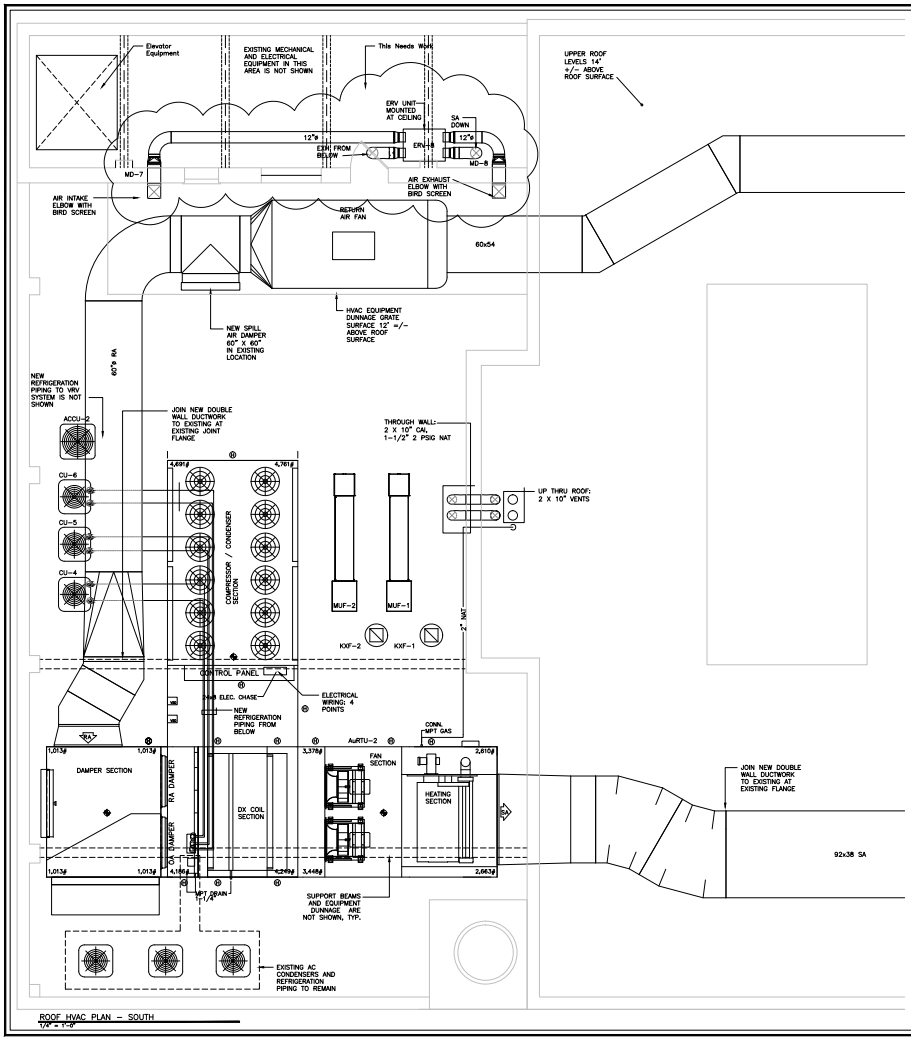
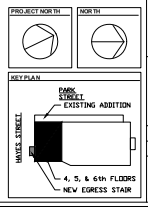


ROOF HVAC PLAN – SOUTH
1/8" = 1'-0"



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83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

ROOF LEVEL HVAC

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	H1.09

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PLUMBING FIXTURE SCHEDULE

Symbol	Bases of Design: Description	Bases of Design: Manufacturer	Bases of Design: Part Number	Carrier Mount	Carrier Mount: Manufacturer	Carrier Mount: Part Number	Connections: HW	Connections: CW	Connections: SD	Connections: ST	Connections: Electrical	Remarks
WC-1	Wall Mounted Water Closet	TOTO	CT708EG	Wall	Jossam	Series 12000	--		3"		--	ADA, Elongated Bowl, Top Spud, 1.28 gpf.
	Automatic Flush Valve	TOTO EcoPower	TET1LN-32#CP					1-1/2"				
WC-2	Floor Mounted Water Closet	TOTO		NA			--		3"			Elongated Bowl: 15" High, Top Spud, 1.28 gpf.
	Automatic Flush Valve	TOTO EcoPower	TET1LN-32#CP					1-1/2"				
WC-3	ADA Floor Mounted Water Closet	TOTO					--		3"			Elongated Bowl: 17-1/2" High, Top Spud, 1.28 gpf.
	Automatic Flush Valve	TOTO EcoPower	TET1LN-32#CP					1-1/2"				
UR-1	Wal Mounted Urinal	TOTO	UT447E	Wall	Jossam				2"			Wall Mounted, 3/4" Top spud, 0.5 gpf.
	Automatic Flush Valve	TOTO EcoPower	TEU2LN11#SS					1"				
CL-1	Countertop Lavatory	TOTO	LT569	Counter Top	NA				1-1/2"			Pennington, single hole drilling, no soap dispenser
	Faucet	GROHE	Euroemart 32 643		NA		1/2"	1/2"				
	Point of use Tempering Valve	Watts	Series MMV-M1									One per Groupe
WL-1	Wall hung Lavatory	TOTO	LT307(A)	Wall	JAY R. SMITH	Series 0700			1-1/2"			Hudson (tm) ADA compliant, single faucet hole
	Faucet	GROHE	Euroemart 32 643				1/2"	1/2"				
	Point of use Tempering Valve	Watts	Series MMV-M1									
CS-1	Countertop Sink	Elkay	LARD1522						1-1/2"			22W, 15L Overall, Gooseneck fauset w/ wrist blade handles
	Faucet	GROHE	Cpncetto 32 665				1/2"	1/2"				
CS-2	Countertop Ice Drain Sink	Elkay	LARD1517						1-1/2"			
	Faucet	NA	NA									
HS-2	Wall Mounted Hand Washing Sink	Elkay	CHS1716SACMC						1-1/2"			
	Faucet - Mixing Valve	Elkay	LK9722C - LK724				1/2"	1/2"				
KS-1	Kitchen Countertop Sink	Elkay	LARD2222						1-1/2"			
	Faucet	GROHE	Cpncetto 32 665				1/2"	1/2"				
KS-2	Kitchen 3 Bowl Countertop Sink	Krowne	HS-3819						2"			
	Faucet	Chicago Faucets	201-A317CP				1/2"	1/2"				
KS-3	Kitchen 2 Bowl Countertop Sink	Elkay							2"			
	Faucet	Chicago Faucets	201-A317CP				1/2"	1/2"				
SS-1	Service Sink	Stern Williams	SBC-1750	NA					3"			36"x36"x12" with 6" front drop at 45 degrees
	Faucet	Chicago Faucets	540-DL897SWXFCP	Wall	NA		1/2"	1/2"				
SH-1	Shower Enclosure	Lasco	1363CNT						2"			
	Shower Mixing Valve / Trim	Grohsafe / GROHE	35 015 / 19 458				1/2"	1/2"				Provide complete system: trim, shower head, etc.
SH-2	ADA Shower Enclosure	Aquelle	1363BFSC						2"			O.A. 36"x38-1/4", With all recommended ADA accessories
	Shower Mixing Valve / Trim	Grohsafe / GROHE	35 015 / 19 458				1/2"	1/2"				
CW-1	Clothes Washer	(By Others)							2"			Conform to ASSE 1007 for back flow protection
	Water Supply Assembly	Watts	2-M2-Duo-Claz				1/2"	1/2"				
IC-1	Ice Machine (by Others)							1/2"	1-1/2"			Indirect Drain with trap primer
DW-1	Dish Washer (by Others)							1/2"	1-1/2"			Indirect Drain
HM-1	HVAC Humidifier (by Others)											
	In line Vacuum Breaker	Watts	N9					1/2"				
FD-1	Floor Drain	Jossem	Series 30000-A	NA					3"			Mount trap primer at lavatories, typ. CW connections are not shown on drawings.
	Trap Primer	Watts	Series A 200					1/2"				
HB-1	Hose Bibb / Sill Fitting	Chicago Faucets	998-RCF					3/4"				With vacuum breaker
HB-2	Hose Bibb / Hydrant	Jossem	Series 7150					3/4"				Freeze Free, Vacuum Breaker
RD-1	Roof Drain	Froet Industries, LLC	100C6							3"		Bi-functional with overflow
OS-1	Roof Drain Downspout Nozzle	Jay R. Smith Mfg.	Figure 1770Y-2							4"		
TD-1	Outdoor Trench Drain	Jossem	Series 76000							3"		Freeze free trap below frost line
FD-2	Outdoor Floor Drain	Jossem								3"		Freeze free trap below frost line

GENERAL NOTES:

1. THE DRAWINGS ARE INTENDED TO BE DIAGRAMMATIC. DETERMINE IN THE FIELD EXACT LOCATION OF EQUIPMENT AND THE ROUTING OF WIRING DUCT AND PIPE. VERIFY THAT FIELD MEASUREMENTS AND ARRANGEMENTS ARE AS SHOWN ON DRAWINGS. REPORT ANY DISCREPANCIES TO ARCHITECT/ENGINEER BEFORE ANY INSTALLATIONS.

PIPING LEGEND

CW-E	EXISTING DOMESTIC COLD WATER
HW-E	EXISTING DOMESTIC HOT WATER - TEMPERED
HR-E	EXISTING DOMESTIC HOT WATER - TEMPERED
SD-E	EXISTING SANITARY SEWER - DRAIN
SV-E	EXISTING SANITARY SEWER - VENT
ST-E	EXISTING STORM DRAIN
CW	DOMESTIC COLD WATER
HW	DOMESTIC HOT WATER - TEMPERED
HW	DOMESTIC HOT WATER - UNTEMPERED
HR	DOMESTIC HOT WATER RECIRCULATION - TEMPERED
SD	SANITARY SEWER - DRAIN
SV	SANITARY SEWER - VENT
ST	ROOF STORM DRAIN
SO	ROOF STORM DRAIN OVERFLOW

ABBREVIATIONS

RTU	ROOF TOP UNIT (HVAC)
VTR	VENT THROUGH ROOF
CO	DRAIN CLEAN OUT
FCO	DRAIN CLEAN OUT AT FLOOR GRADE
WCO	DRAIN CLEAN OUT AT WALL SURFACE

BACK FLOW PREVENTER SCHEDULE

Symbol	Location	Bases of Design: Manufacturer	Bases of Design: Model	Size	Remarks
BFP-1	Boiler Room	Watts	009M2QT	1"	Reduced Pressure Zone Assembly: quarter-turn ball valve shutoffs.

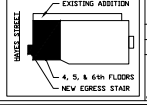
SHOCK ABSORBER SCHEDULE

Symbol	Fixture Unit Rating	Bases of Design: Manufacturer	Bases of Design: Model	Remarks
SA-A	1 to 11	Jossam	75001A	
SA-B	12 to 32	Jossam	75002B	
SA-C	33 to 60	Jossam	75003C	

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PLUMBING SCHEDULES AND NOTES

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: P0.01

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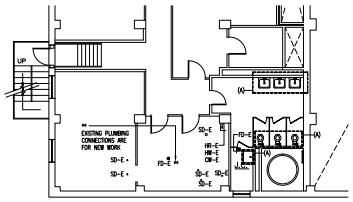
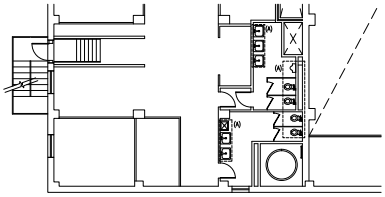
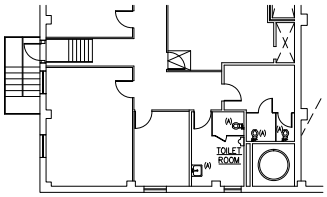


FOURTH FLOOR PLUMBING DEMOLITION
1/8" = 1'-0"



FIFTH FLOOR PLUMBING DEMOLITION
1/8" = 1'-0"



SIXTH FLOOR PLUMBING DEMOLITION
1/8" = 1'-0"

DEMOLITION NOTES:

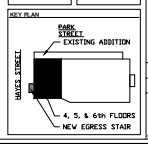
(A) REMOVE AND DISPOSE OF EXISTING FIXTURES AND CONNECTIONS. CUT AND CAP CW, HW, HWR, SD, AND SV IN PREPORATION FOR NEW CONSTRUCTION.

** PRESERVE EXISTING PLUMBING CONNECTIONS FROM THIRD FLOOR FOR NEW WORK.

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PLUMBING DEMOLITION

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: PD.01

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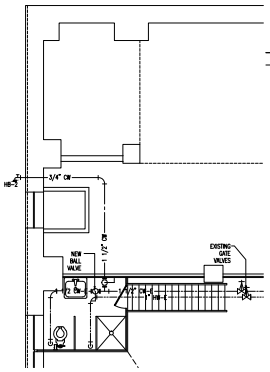
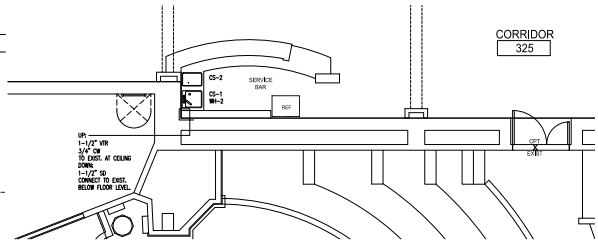
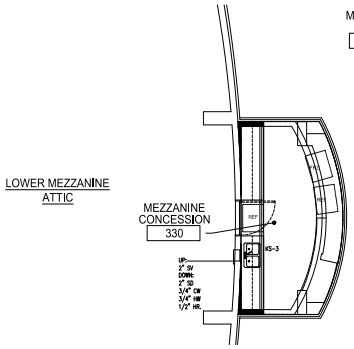


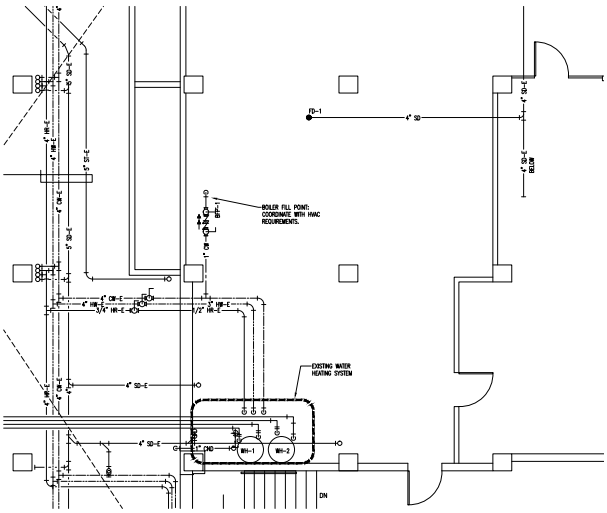
BASEMENT PLUMBING, SOUTH WEST
1/4" = 1'-0"



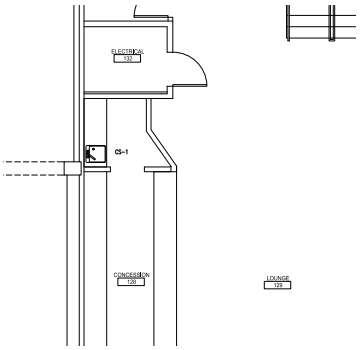
THIRD FLOOR WEST PLUMBING
1/4" = 1'-0"



THIRD FLOOR NORTH LOBBY PLUMBING
1/4" = 1'-0"



BASEMENT PLUMBING, BOILER ROOM
1/4" = 1'-0"

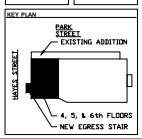


FIRST FLOOR NORTH LOBBY PLUMBING
1/4" = 1'-0"

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

BASEMENT, FIRST, AND THIRD FLOOR PLUMBING

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: P1.01

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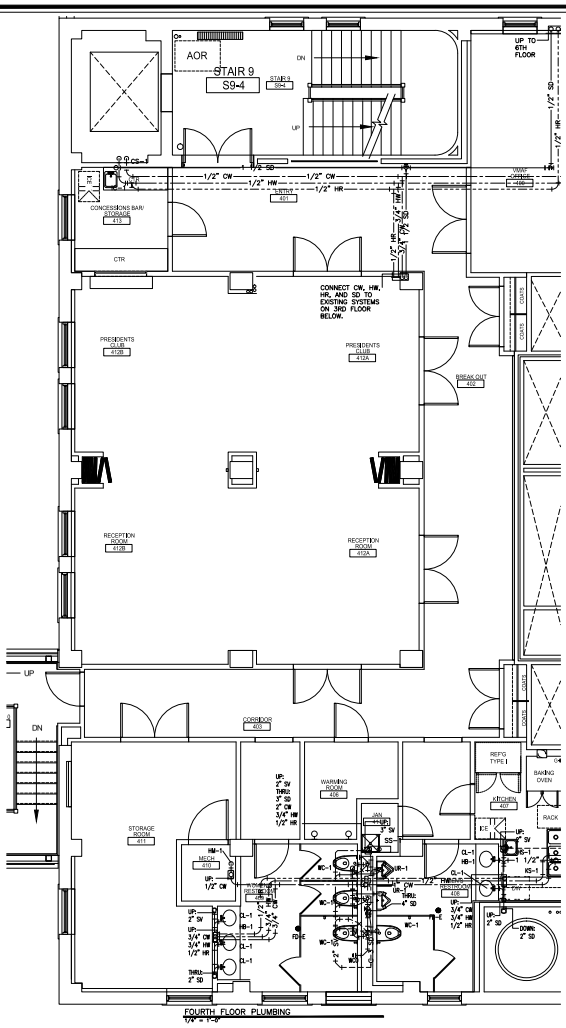
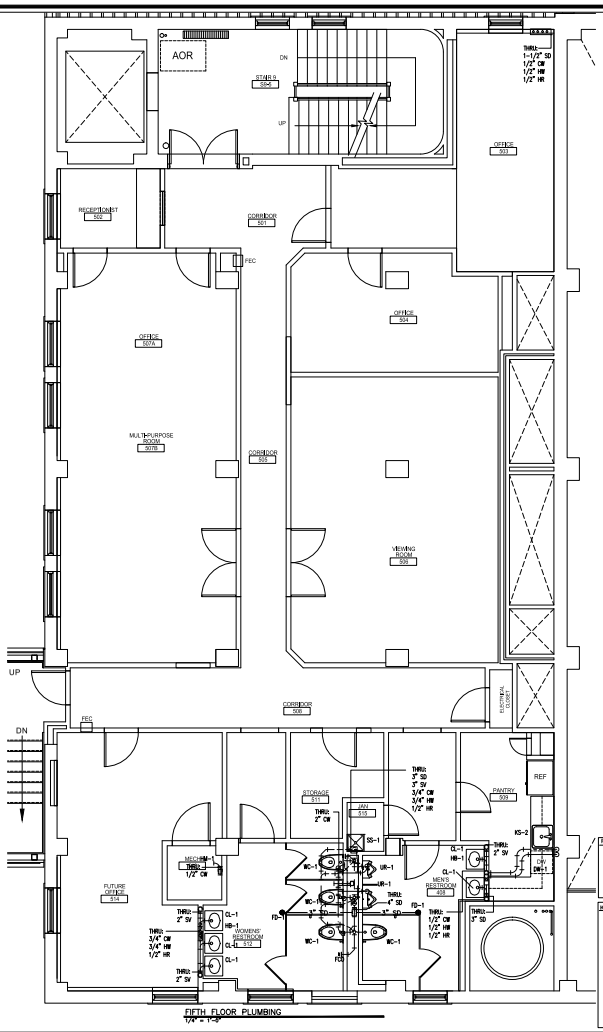


FOURTH FLOOR PLUMBING
1/4" = 1'-0"



FIFTH FLOOR PLUMBING
1/4" = 1'-0"

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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

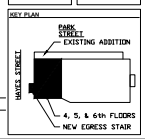
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



FOURTH AND FIFTH FLOOR PLUMBING

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: P1.02

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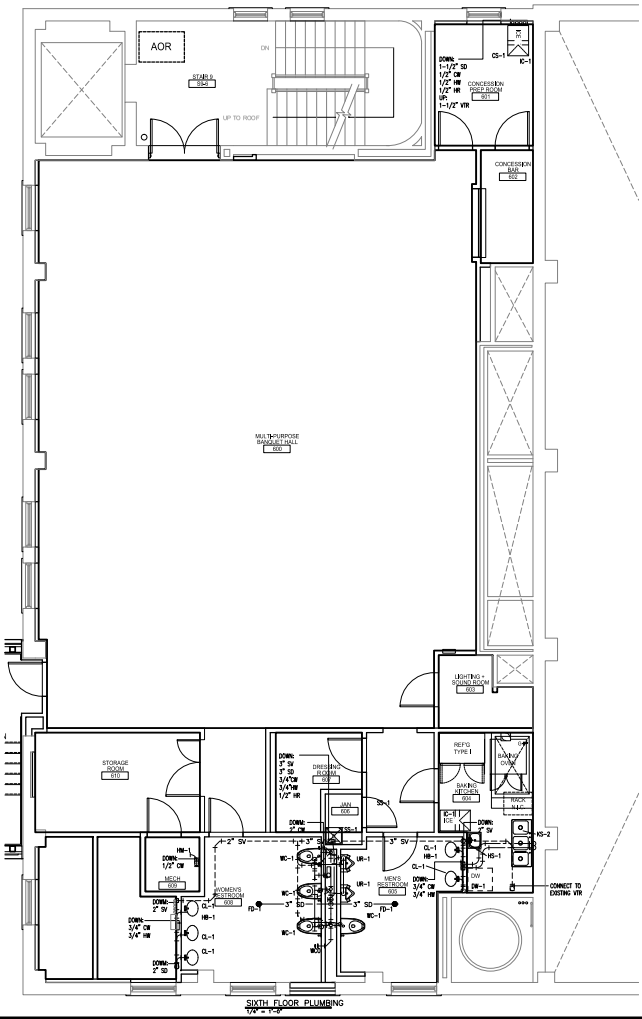
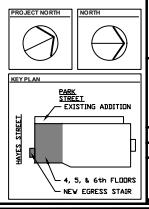


SIXTH FLOOR PLUMBING
1/4" = 1'-0"



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SIXTH FLOOR PLUMBING

DATE: AUGUST 12, 2013

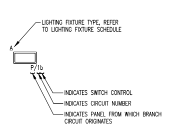
NCA JOB NO.: 1046.30

DRAWING NO.: P1.03

LIGHTING FIXTURE SCHEDULE

PROVIDE ENERGY SAVING LAMPS AND ELECTRONIC BALLASTS FOR ALL FLUORESCENT FIXTURES, ALL LAMPS TO BE 3500K IN COLOR TEMPERATURE (835)

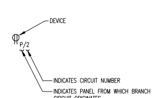
TYPE	MANUFACTURER	LAMPS WATTAGE	LAMPS TYPE	MOUNTING	DESCRIPTION
A	LEDALITE 332201-STB225S11E	2-25	TT5	RECESSED	2'X2' DIRECT/INDIRECT LAY-IN TROFFER
B	OMEGA OM61H32PLTFLR-CSFF	1-32	CFL TRIPLE TUBE	RECESSED	6" DIA. COMPACT FLUORESCENT W/ DECORATIVE RING
C	PINNACLE E4SP-2T5-12'-FL-120-1C-W-PM	4-28	T5	RECESSED	12 FT. X 4"W RECESSED LINEAR DIRECT/PARABOLIC LOUVER WALL SLOT LIGHTING FIXTURE
C1	PINNACLE E4SP-2T5-10'-FL-120-1C-W-PM	4-28	T5	RECESSED	10 FT. X 4"W RECESSED LINEAR DIRECT/PARABOLIC LOUVER WALL SLOT LIGHTING FIXTURE
C2	PINNACLE E4SP-2T5-6'-FL-120-1C-W-PM	2-28	T5	RECESSED	6 FT. X 4"W RECESSED LINEAR DIRECT/PARABOLIC LOUVER WALL SLOT LIGHTING FIXTURE
C3	PINNACLE E4SP-2T5-4'-FL-120-1C-W-PM	2-28	T5	RECESSED	4 FT. X 4"W RECESSED LINEAR DIRECT/PARABOLIC LOUVER WALL SLOT LIGHTING FIXTURE
D	SELECTED BY ARCH. CARRY $1000 EACH.			PENDANT	4 FT. DIAMETER DECORATIVE CHANDELIER
F	SCOTT 52380-1C57TPT	1-57	TTCF	PENDANT	6"DIA. X 18"L X 36" O.A.H. WITH WHITE OPAL SHIELD & PAINTED BODY. BOTTOM OF FIXTURE TO BE 10'-0" A.F.F.
G	SEA GULL LIGHTING 4740-98	8-100	G-25	WALL	48" SURFACE MOUNT "CENTER STAGE"
I	STERNBERG 1480FA-OA-150MHP-150/MED-ABZ	1-150	M.H.	WALL	MEDIUM BRONZE FINISH DECORATIVE BRACKET MOUNTED FIXTURE.
O	LAMAR LIGHTING DSLED-48	1-23	LED	WALL 6'-6" A.F.F.	LED WITH BUILT IN MOTION SENSORS AND (2) LEVEL LIGHT OUTPUT.
P	CAPRI CFR62H13QU-RI-PSH12P	2-13	C.F. ELECT.	RECESSED	SHOWER LIGHT
R	LIGHTOLIER PMOIL35SA1-SKO1-PA01	1-10	LED	PENDANT	DECORATIVE LED CABLE MOUNTED FIXTURE. BOTTOM OF FIXTURE TO BE 10'-0" A.F.F.
U	SELECTED BY ARCH. SEE PROJECT MANUAL FOR ALLOWANCES				
U1	SEA GULL LIGHTING 5962LE-98	2-32	T8	SURFACE	4 FT. UTILITY LIGHT
Y	LIGHTOLIER AGM4PWHDS328	3-28	T-5	PENDANT	48" LINEAR PENDANT FIXTURE
Z	PHILIPS COLOR KINETICS 523-000053-07	1-70	LED	SURFACE W/ ADJ. BRACKET	REFER TO FIXTURE "Z" WIRING SCHEMATIC AND SIDE VIEW SECTION
⊗ X1	CHLORIDE ERC2-AD		LED		CEILING MOUNTED EXIT SIGN
⊗ X2	CHLORIDE ERC2-AD		LED		WALL MOUNTED EXIT SIGN
EB	McPHILBEN CTX6L18WCSWC	2-9 WATT HALOGEN		SURFACE MOUNTED	EMERGENCY BATTERY UNIT WITH LIGHT HEADS
EB1	McPHILBEN CTXR6L24WCSWD	(2) 6 VOLTS 9 WATT		SURFACE MOUNTED	EMERGENCY BATTERY UNIT WITH LIGHT HEADS WITH REMOTE CAPABILITY
WP	McPHILBEN PDRW	(2) 6 VOLTS 6 WATT			REMOTE DUAL LAMP EMERGENCY LIGHT



NOTES:
THIS KEY APPLIES TO ALL LIGHTING FIXTURE TYPES, EXIT SIGNS, EMERGENCY BATTERY UNITS, ETC.

GENERAL NOTES:
1. WIRING (MC, NM, FAMC, CONDUIT, ETC.) SHALL BE REQUIRED BETWEEN ALL LIGHTING FIXTURES, EXIT SIGNS, EMERGENCY BATTERY UNITS, ETC. REFER TO ELECTRICAL SPECIFICATIONS FOR APPLICABLE WIRING METHOD.
2. ALTHOUGH BRANCH WIRING AND CONDUIT IS NOT SHOWN, IT IS INTENDED THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.

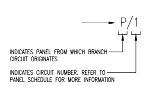
LIGHTING BRANCH CIRCUITING KEY
NOT TO SCALE



NOTES:
THIS KEY APPLIES TO ALL RECEPTACLE TYPES, JUNCTION BOXES, DISCONNECT SWITCHES, THERMAL SWITCHES, ETC.

GENERAL NOTES:
1. WIRING (MC, NM, FAMC, CONDUIT, ETC.) SHALL BE REQUIRED BETWEEN ALL RECEPTACLES, JUNCTION BOXES, DISCONNECT SWITCHES, THERMAL SWITCHES, ETC. REFER TO ELECTRICAL SPECIFICATIONS FOR APPLICABLE WIRING METHOD.
2. ALTHOUGH BRANCH WIRING AND CONDUIT IS NOT SHOWN, IT IS INTENDED THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.

DEVICE BRANCH CIRCUITING KEY
NOT TO SCALE



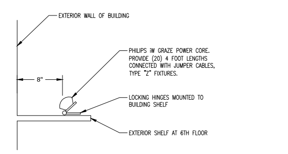
GENERAL NOTES:
1. UNLESS OTHERWISE INDICATED, WIRE SHALL BE #12, REFER TO PANEL SCHEDULES FOR NUMBER OF CIRCUIT BREAKER POLES FOR QUANTITY OF WIRES REQUIRED.

HOMERUN KEY
NOT TO SCALE

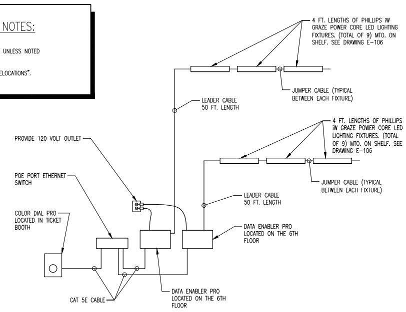
EXISTING ITEMS NOTES:
1. ITEMS SHOWN DASHED ARE EXISTING TO REMAIN UNLESS NOTED OTHERWISE.
2. SEE SPECIFICATION SECTION: "REMOVALS AND RELOCATIONS".

ELECTRICAL GENERAL NOTES

1. IT IS THE RESPONSIBILITY OF THE CONTRACTORS TO PROVIDE THEIR OWN FIRESTOPPING AT ALL PENETRATIONS, BETWEEN FLOORS AND RATED WALLS.
2. PERFORM ALL WORK IN ACCORDANCE WITH NATIONAL AND STATE ELECTRICAL CODES, LOCAL ORDINANCES, AND REQUIREMENTS OF THE LOCAL WIRING INSPECTOR.
3. MATERIALS
   A. ALL WIRING SHALL BE COPPER; #8 OR SMALLER SHALL BE 60 DEGREES C., #6 OR LARGER SHALL BE 75 DEGREES C. GENERAL BRANCH WIRING SHALL BE TYPE "MC" CABLE. GENERAL INTERIOR WIRING, EXPOSED BRANCH CIRCUIT WIRING WITHIN THE BUILDING SHALL BE INSTALLED IN E.M.T. WITH SET SCREW TYPE FITTINGS.
   B. ALL BRANCH CIRCUIT WIRING IN COMMON AREAS SHALL BE TYPE "MC" CABLE.
   C. ALL PRODUCTS AND DEVICES SHALL BE NEW AND BEAR THE UNDERWRITERS LABORATORIES LABEL. DEVICES SHALL BE SPECIFICATION GRADE AND COLOR BY ARCHITECT.
4. PERFORM ALL WORK IN A WORKMANLIKE AND TIMELY MANNER SUBJECT TO THE APPROVAL OF THE ARCHITECT.
5. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR ALL INSURANCE, PERMITS, FEES, AND INSPECTIONS REQUIRED FOR THE PERFORMANCE OF HIS WORK.
6. ELECTRICAL CONTRACTOR SHALL COORDINATE THE ELECTRICAL WORK WITH ALL OTHER TRADES. ANY CONFLICT SHALL BE PRESENTED TO THE GENERAL CONTRACTOR AND ARCHITECT PRIOR TO INSTALLATION OF WORK.
7. PANEL DIRECTORIES SHALL BE PROVIDED WITH TYPED DIRECTORIES, INDICATING TYPE LOAD AND LOCATION.
8. ALL PRODUCTS SHALL BE GUARANTEED FOR ONE YEAR AFTER ACCEPTANCE BY OWNER.
9. ALL WIRING AND EQUIPMENT ARE DEPICTED DIAGRAMATICALLY, FINAL LOCATIONS SHALL BE DETERMINED IN THE FIELD AND ANY CONFLICTS SHOULD BE BROUGHT TO THE ATTENTION OF THE ARCHITECT.
10. ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING TEMPORARY POWER AND LIGHTING, SPECIAL PURPOSE LIGHTING REQUIREMENTS SHALL BE PAID FOR BY THE TRADE REQUIRING SAME. (WELDERS COMPRESSORS ETC.)
11. SHOP DRAWINGS SHALL BE SUBMITTED ON ALL ELECTRICAL EQUIPMENT.
12. ALL WIRING INDICATED ON PLANS SHALL MATCH THE AMPERAGE OF THE CIRCUIT BREAKER INDICATED AT THE HOMERUN. WHERE NO BREAKER SIZE IS INDICATED THE BREAKER SHALL BE 20A/1P AND SHALL BE #12 AWG. CABLE.
13. ELECTRICAL CONTRACTORS SHALL REFER TO MECHANICAL DRAWINGS FOR EXACT LOCATIONS OF ALL MECHANICAL, AND HVAC EQUIPMENT.
14. ALL SPEAKERS TO BE TAPPED AT 1/4 WATT



BUILDING SECTION SHOWING SIDE VIEW OF TYPE "Z" FIXTURE
NOT TO SCALE



FIXTURE "Z" WIRING SCHEMATIC
NOT TO SCALE

ELECTRICAL SYMBOLS LEGEND

- XX — FLUORESCENT 1'x4' LIGHTING FIXTURE-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — SAME AS PRECEEDING SYMBOL, EXCEPT CONNECTED TO AN EMERGENCY SOURCE
- XX — FLUORESCENT 2'x2' LIGHTING FIXTURE-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — SAME AS PRECEEDING SYMBOL, EXCEPT CONNECTED TO AN EMERGENCY SOURCE
- XX — LED 1'x4' LIGHTING FIXTURE-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — SAME AS PRECEEDING SYMBOL, EXCEPT CONNECTED TO AN EMERGENCY SOURCE
- XX — DECORATIVE CHANDELIER LIGHTING FIXTURE-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — LED/INCANDESCENT/FLUORESCENT/HID LIGHTING FIXTURE-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — SAME AS PRECEEDING SYMBOL, EXCEPT CONNECTED TO AN EMERGENCY SOURCE
- XX — WALL MOUNTED LIGHTING OUTLET-LETTER INDICATES TYPE, SUBSCRIPT DENOTES CONTROL AND CIRCUIT NUMBER
- XX — SAME AS PRECEEDING SYMBOL, EXCEPT CONNECTED TO AN EMERGENCY SOURCE
- XX — EXIT SIGN, ONE OR TWO FACED. ARROWS DENOTE DIRECTION. SHADING DENOTES NUMBER AND ORIENTATION OF SIGN FACE(S).

SWITCHES (MOUNTED 48" A.F.F.)

- S_a — SINGLE POLE SWITCH. SUBSCRIPT INDICATES SWITCH CONTROL.
- S_{3a} — THREE-WAY SWITCH. SUBSCRIPT INDICATES SWITCH CONTROL.
- D_a — PRESET DIMMER SWITCH, MTD. 48" A.F.F. SUBSCRIPT INDICATES SWITCH CONTROL. LUTRON MODEL DVTV-WH.
- T_S — WATT STOPPER TS-200 TIMER SWITCH WIRED TO CLOSET ROOM LIGHTS.
- S_P — PILOT SWITCH
- DW — WATTSTOPPER #DW-100 OCCUPANCY SENSOR, WALL MOUNTED AT 48"AFF.

RECEPTACLES (MOUNTED 18" A.F.F. OR AS INDICATED ON DRAWINGS)

- J — JUNCTION BOX
- SINGLE RECEPTACLE
- DUPLEX RECEPTACLE MTD 18" A.F.F. TO CENTER. "C" INDICATES MTD 6" ABOVE COUNTER TOP. "F" INDICATES FLOOR MOUNTED. "IG" INDICATES ISOLATED GROUND TYPE.
- GROUND FAULT INTERRUPTING RECEPTACLE MTD 18" A.F.F. TO CENTER. "C" INDICATES MTD 6" ABOVE COUNTER TOP. "F" INDICATES FLOOR MOUNTED. "IG" INDICATES ISOLATED GROUND TYPE, "EWC" INDICATES ELECTRIC WATER COOLER, "D" INDICATES DOUBLE DUPLEX GFI.
- SAME AS ABOVE EXCEPT QUADRUPLEX
- XX-XXR — SPECIAL PURPOSE OUTLET WITH NEMA CONFIGURATION TO MATCH EQUIPMENT
- FM — FIRE-O-MATIC SWITCH, MTD. OVER BURNER & WATER HEATER. OMOC CAT. #: TC-1
- S_{EM} — BOILER EMERGENCY SWITCH. AROW-HART #: CS120 W/ MULLBERRY 41020 PLATE
- S_T — SINGLE POLE MOTOR RATED SWITCH W/ OVERLOAD HEATER (MANUAL MOTOR STARTER).
- FUSED DISCONNECT SWITCH WITH RATINGS
- 30/20/3/DE/1 — NEMA RATING. "WP" INDICATES RAINTIGHT; INDICATES DUAL ELEMENT FUSES; NUMBER OF POLES; FUSE SIZE. "NF" INDICATES NON FUSED; SWITCH SIZE
- MAGNETIC MOTOR STARTER
- MOTOR
- ELECTRIC PANEL, SURFACE MOUNTED
- SURFACE MOUNTED RACEWAY, DIVIDED RACEWAY WITH TELE/DATA AND DUPLEX RECEPTACLES
- HOMERUN, SEE HOMERUN KEY.
- AHU 1 — HVAC EQUIPMENT TAG, REFER TO HVAC DRAWINGS

FIRE ALARM

- SIMPLEX FIRE ALARM HORN/STROBE. MODEL #4906-9127.
- SIMPLEX FIRE ALARM STROBE, VISUAL ONLY. MODEL #4906-9101.
- SD — SIMPLEX FIRE ALARM PHOTO SENSOR SMOKE DETECTOR (MODEL #4098-9714) WITH SENSOR BASE, STANDARD (MODEL #4098-9792). PROVIDE SENSOR BASE WITH ISOLATOR (MODEL #4098-9793) WHERE THE I.D.C. GOES FROM ONE FLOOR TO ANOTHER.
- F — SIMPLEX FIRE ALARM MANUAL PULL STATION, DOUBLE ACTION. MODEL #4099-9003.
- M — SIMPLEX FIRE ALARM MONITOR MODULE. MODEL #4090-9106.
- IM — SIMPLEX FIRE ALARM ISOLATION MODULE. MODEL #4090-9116.
- R — SIMPLEX FIRE ALARM RELAY IAM. MODEL #4090-9002.
- PS — FIRE ALARM SPRINKLER PRESSURE SWITCH, PROVIDED BY FIRE PROTECTION CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
- FS — FIRE ALARM SPRINKLER FLOW SWITCH, PROVIDED BY FIRE PROTECTION CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
- TS — FIRE ALARM SPRINKLER TAMPER SWITCH, PROVIDED BY FIRE PROTECTION CONTRACTOR, WIRED BY ELECTRICAL CONTRACTOR.
- AR — AREA OF REFUGE CALL STATION

TELECOMMUNICATIONS
(MOUNTED 18" A.F.F. OR AS INDICATED ON DRAWINGS)

- TELEPHONE OUTLET
- TELEPHONE OUTLET FLOOR MOUNTED
- DATA OUTLET
- DATA OUTLET FLOOR MOUNTED
- COMBINATION TELE/DATA OUTLET
- CLEARCOM SPEAKER/INTERCOM

OCCUPANCY SENSOR LEGEND

- OS #1 — WATT STOPPER DT-200 DUAL TECHNOLOGY OCCUPANCY SENSOR. PROVIDE POWER PACK AND WIRING AS SHOWN ON 8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC ON SHEET E207.
- OS #2 — WATT STOPPER CX-100 PIR CORNER MOUNTED PASSIVE INFRARED OCCUPANCY SENSOR. PROVIDE POWER PACK AND WIRING AS SHOWN ON 8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC ON SHEET E207.
- OS #3 — WATT STOPPER WPIR PASSIVE INFRARED OCCUPANCY SENSOR. PROVIDE POWER PACK AND WIRING AS SHOWN ON 8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC ON SHEET E207.
- OS #4 — WATT STOPPER WT-1105 ULTRASONIC OCCUPANCY SENSOR. PROVIDE POWER PACK AND WIRING AS SHOWN ON 8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC ON SHEET E207.
- #5 — NOT USED
- OS #6 — WATT STOPPER WI-300 AUTOMATIC WALL SWITCH SENSOR. REPLACES ROOM SWITCH AND WIRED TO ROOM LIGHTS.
- OS #7 — WATT STOPPER WT-2250 ULTRASONIC OCCUPANCY SENSOR. PROVIDE POWER PACK AND WIRING AS SHOWN ON 8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC ON SHEET E207.
- OS #8 — WATT STOPPER HDLS1SS-7

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THE VETS

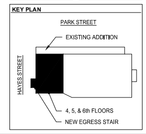
VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH | NORTH

KEY PLAN



SCHEDULES, NOTES, LEGEND & DETAILS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: E-001

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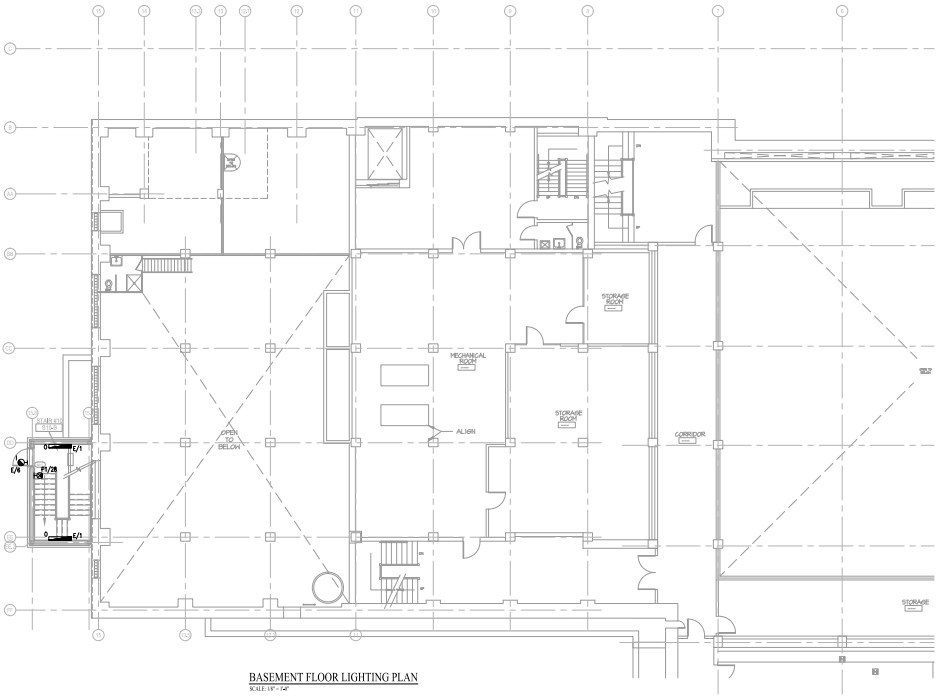

BASEMENT FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

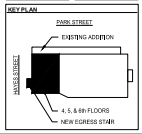
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



BASEMENT LIGHTING PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

E-100

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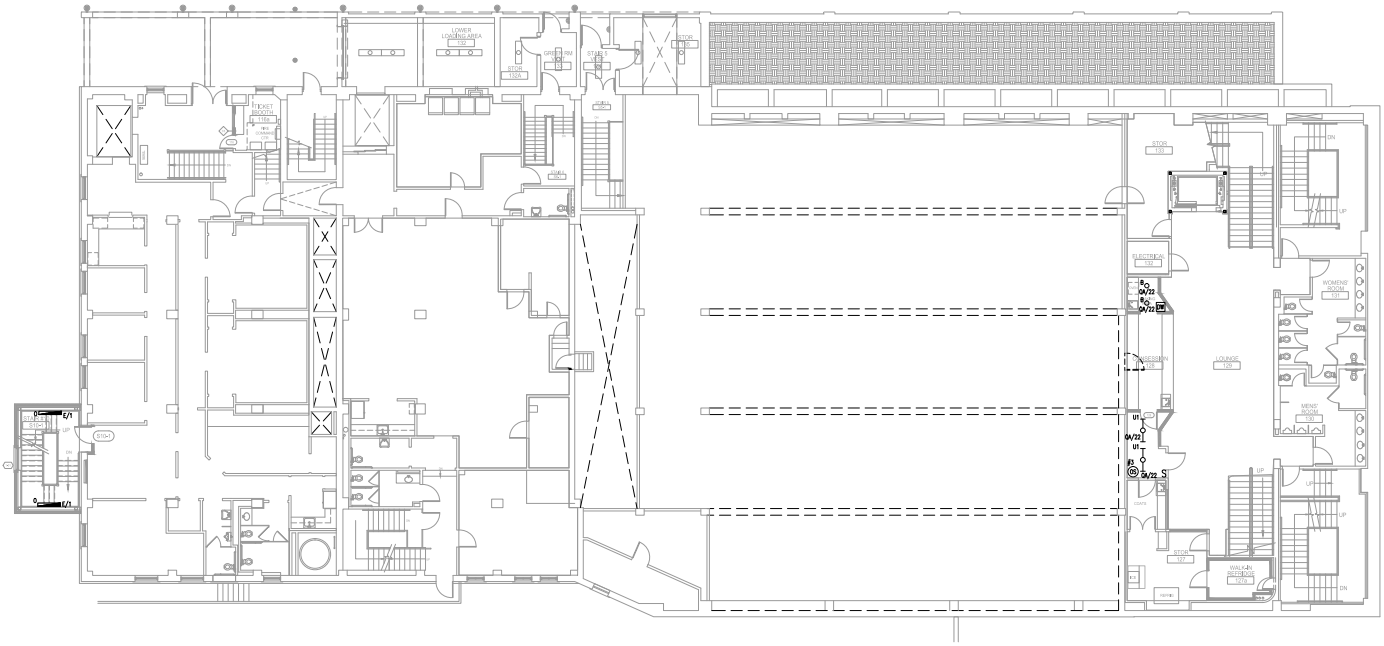

FIRST FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"

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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

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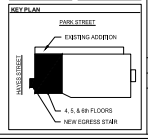
NORTH

KEY PLAN



FIRST FLOOR LIGHTING PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: E-101

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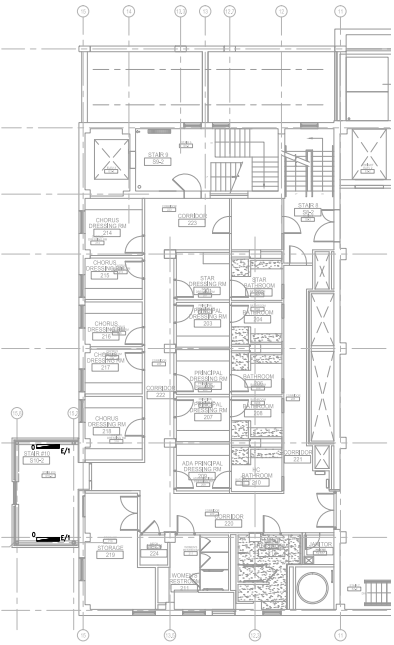
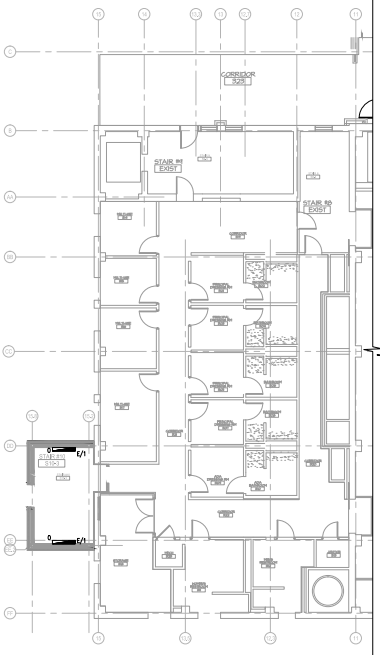
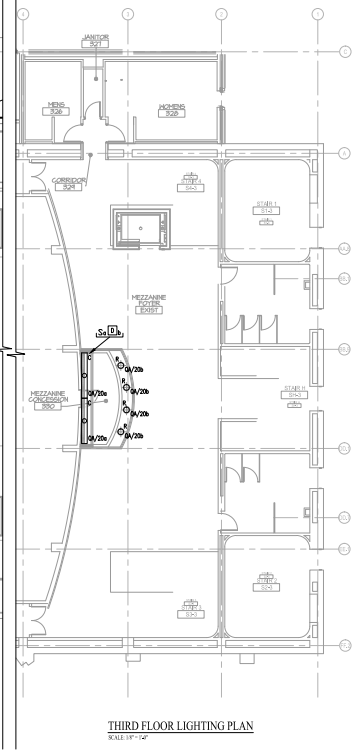


SECOND FLOOR LIGHTING
SCALE: 1/8" = 1'-0"



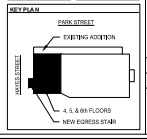
THIRD FLOOR LIGHTING PLAN
SCALE: 1/8" = 1'-0"



THIRD FLOOR LIGHTING PLAN
SCALE: 1/8" = 1'-0"

PROJECT NORTH	NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SECOND & THIRD FLOOR LIGHTING PLAN

DATE:	AUGUST 12, 2013
NCA JOB NO.:	1046.30
DRAWING NO.:	E-102

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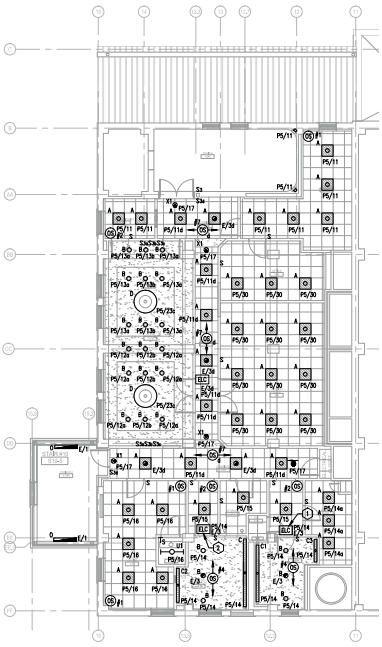
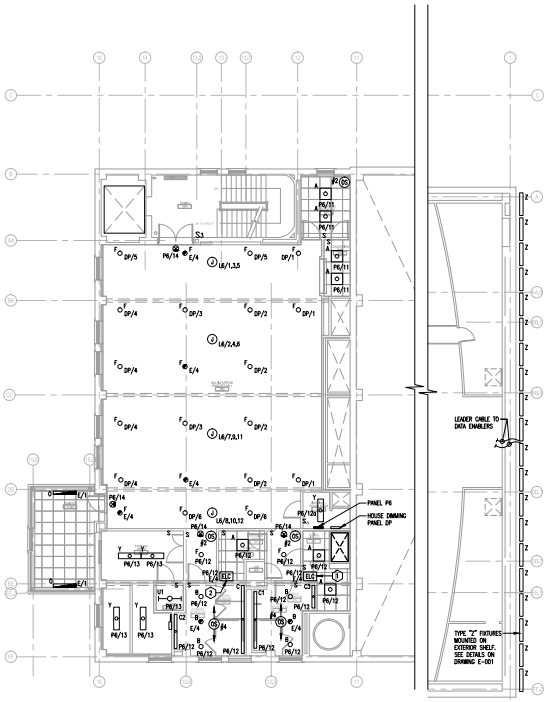
FOURTH FLOOR LIGHTING PLAN

SCALE: 1/8" = 1'-0"



FIFTH FLOOR LIGHTING

SCALE: 1/8" = 1'-0"



SIXTH FLOOR LIGHTING

SCALE: 1/8" = 1'-0"

SHEET NOTES:

1. LOCATE EMERGENCY LIGHTING CONTROL ABOVE ACOUSTICAL CEILING FOR LIGHTING IN MEN'S BATHROOM.
2. LOCATE EMERGENCY LIGHTING CONTROL ABOVE ACOUSTICAL CEILING FOR LIGHTING IN WOMEN'S BATHROOM.

DIMMING PANEL SCHEDULE

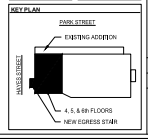
100 AMPS M.L.O 120/208 VOLTS

AREA	CIRCUIT #	LAMP TYPE	WATTS TOTAL	CONTROL ZONE	CONTROLLED BY
SIDES OF STAGE	DP/1	PAR 38	450	A	DIMMABLE
FRONT ROW	DP/2	PAR 38	600	B	DIMMABLE
CENTER ROW	DP/3	PAR 38	600	C	DIMMABLE
BACK ROW	DP/4	PAR 38	600	D	DIMMABLE
RIGHT SIDE	DP/5	PAR 38	600	E	DIMMABLE
LEFT SIDE	DP/6	PAR 38	450	F	DIMMABLE

PROJECT NORTH

NORTH

KEY PLAN



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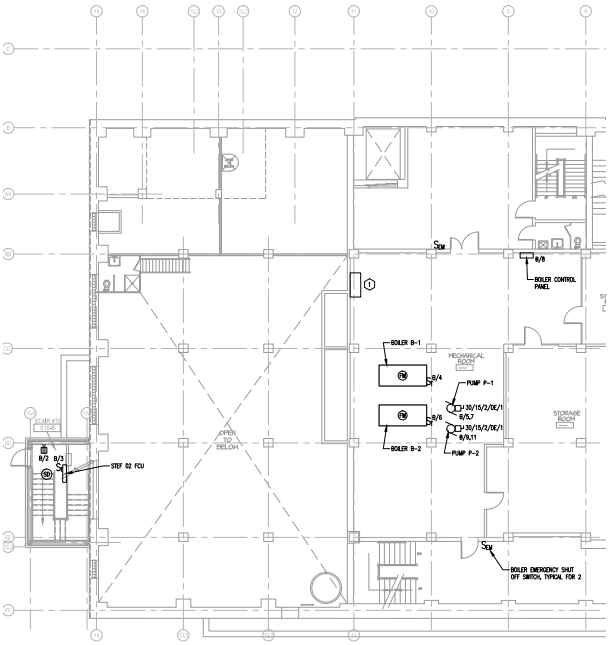
FOURTH, FIFTH & SIXTH FLOOR LIGHTING PLAN

DATE: AUGUST 12, 2013

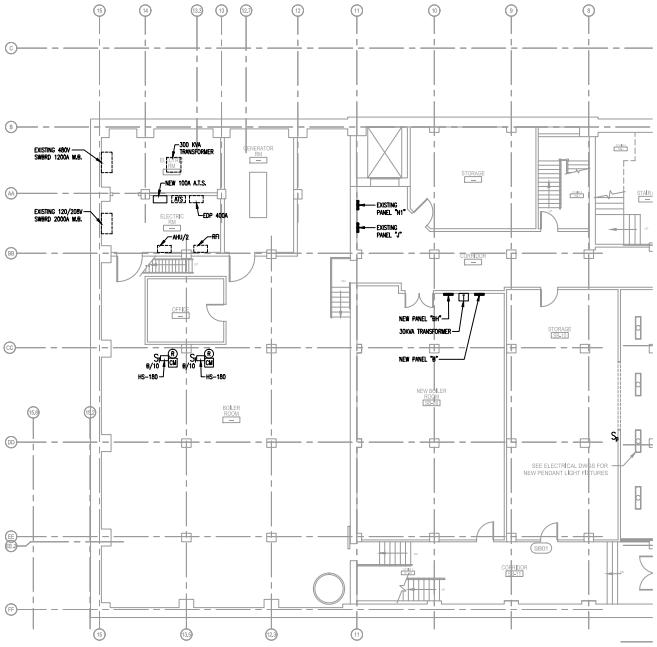
NCA JOB NO.: 1046.30

DRAWING NO.: E-103



BASEMENT POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"



SUB BASEMENT FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

SHEET NOTES:

1. DISCONNECT AND REMOVE BACK TO SOURCE POWER CIRCUITS SERVING (4) ABANDONED HVAC UNITS.

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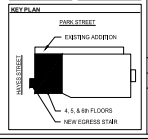
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



BASEMENT & SUB BASEMENT POWER/SYSTEMS PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: E-200

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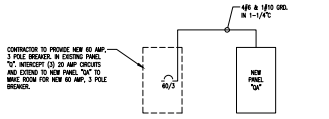
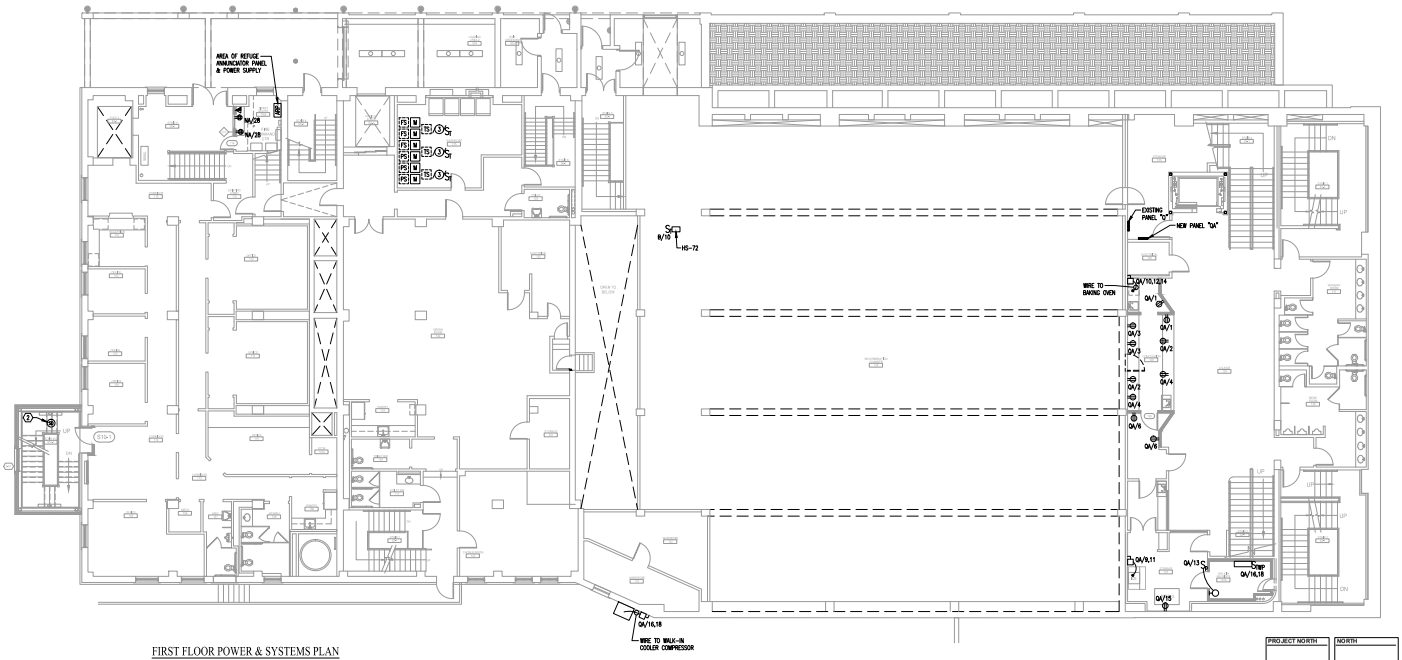


WIRING DIAGRAM FOR NEW PANEL "QA" FEEDER

SCALE: 1/8" = 1'-0"



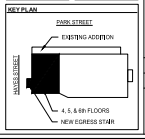
FIRST FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

PROJECT NORTH

NORTH

KEY PLAN



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83 PARK STREET
PROVIDENCE, RHODE ISLAND

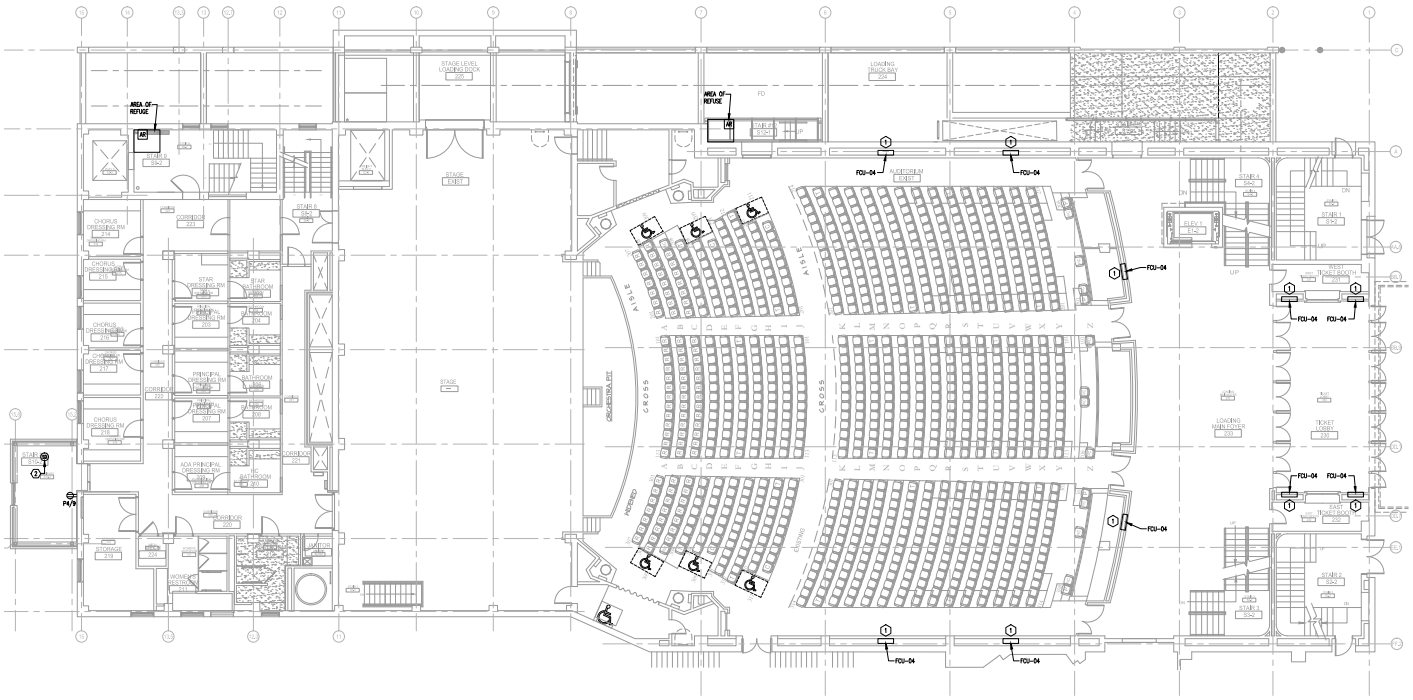
REVISIONS:

FIRST FLOOR POWER & SYSTEMS PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.: E-201



SECOND FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

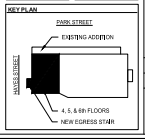
SHEET NOTES:

1. DISCONNECT EXISTING FEED TO FAN COIL UNIT AND RE-CONNECT CIRCUIT TO NEW FAN COIL UNIT. PROVIDE THERMAL TOGGLE SWITCH.

PROJECT NORTH

NORTH

KEY PLAN



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VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
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REVISIONS:

SECOND FLOOR POWER & SYSTEMS PLAN

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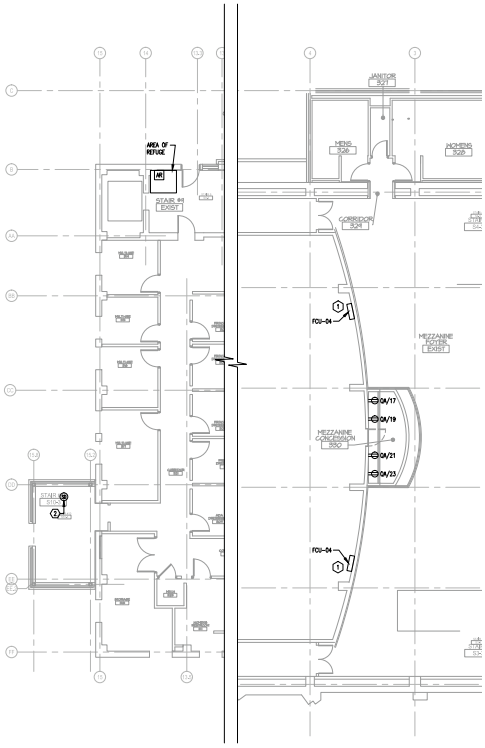
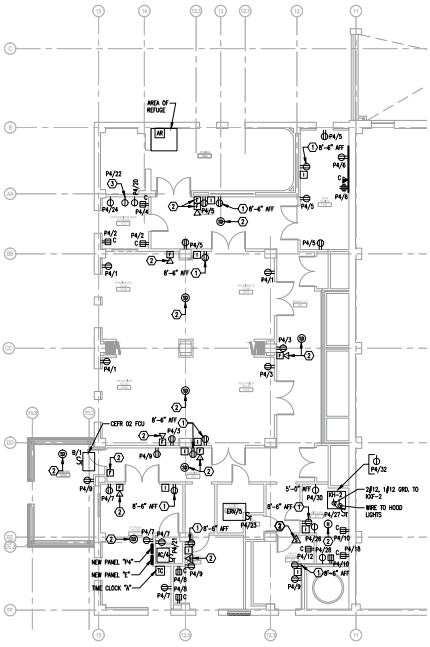


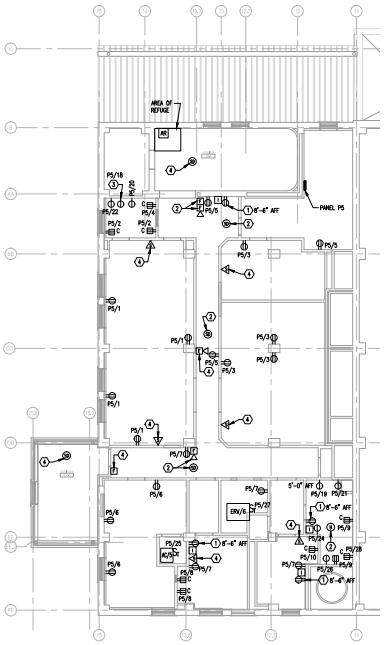
THIRD FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"



FOURTH FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"



FIFTH FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"

THIRD FLOOR KEY NOTES:

1. DISCONNECT EXISTING FEED TO FAN COIL UNIT AND RE-CONNECT CIRCUIT TO NEW FAN COIL UNIT. PROVIDE THERMAL TOGGLE SWITCH.

FOURTH FLOOR KEY NOTES:

1. SEE COM/VIDEO (CLEARCOM) DETAIL ON SHEET E3.1.
2. FLUSH MOUNT BOXES AND CONCEAL WIRING FOR EXISTING PULL STATION, HORN/STROBE AND SMOKE DETECTOR. CONNECT FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM IN BUILDING.
3. MOUNT RECEPTACLE INSIDE CABINET FOR MICROWAVE.

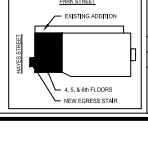
FIFTH FLOOR KEY NOTES

1. SEE COM/VIDEO (CLEARCOM) DETAIL ON SHEET E3.1.
2. FLUSH MOUNT BOXES AND CONCEAL WIRING FOR EXISTING PULL STATION, HORN/STROBE AND SMOKE DETECTOR. CONNECT FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM IN BUILDING.
3. MOUNT RECEPTACLE INSIDE CABINET FOR MICROWAVE.
4. PROVIDE NEW FIRE ALARM DEVICE AS SHOWN AND WIRE INTO EXISTING FIRE ALARM SYSTEM.

PROJECT NORTH

NORTH

KEY PLAN



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83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

THIRD, FOURTH & FIFTH FLOOR POWER & SYSTEMS PLANS

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

E-203

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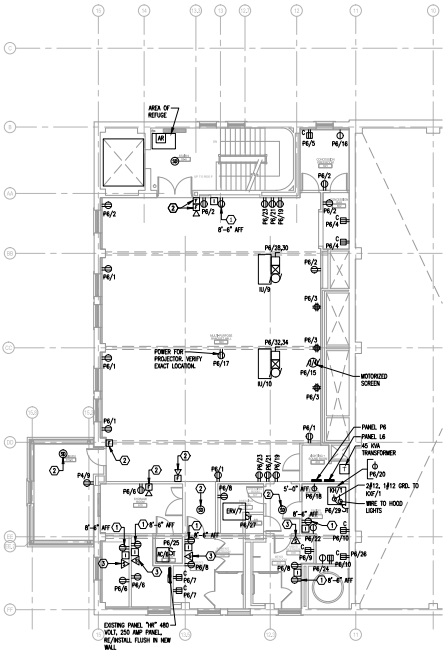
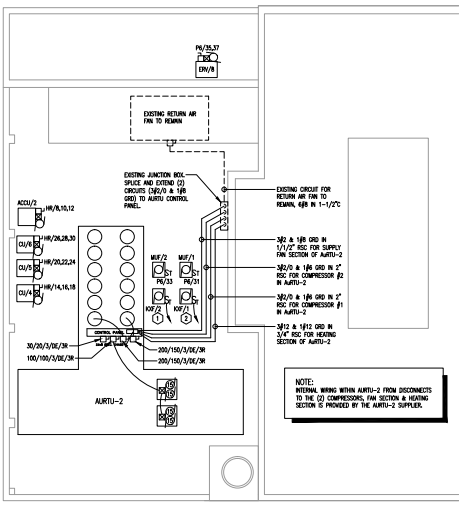
NOTE:
(#) INDICATES MECHANICAL EQUIPMENT TAG. SEE MECHANICAL CONNECTION SCHEDULE ON E-204 FOR DETAILS.



SIXTH FLOOR POWER & SYSTEMS PLAN

SCALE: 1/8" = 1'-0"



NOTE:
INTERNAL WIRING WITHIN AURTU-2 FROM DISCONNECTS TO THE (2) COMPRESSORS, FAN SECTION & HEATING SECTION IS PROVIDED BY THE AURTU-2 SUPPLIER.

ROOF POWER PLAN

SCALE: 1/8" = 1'-0"

SIXTH FLOOR KEY NOTES

1. SEE COM/VIDEO (CLEARCOM) DETAIL ON SHEET E3.1.
2. FLUSH MOUNT BOXES AND CONCEAL WIRING FOR EXISTING PULL STATION, HORN/STROBE AND SMOKE DETECTOR. CONNECT FIRE ALARM DEVICE TO EXISTING FIRE ALARM SYSTEM IN BUILDING.
3. PROVIDE NEW FIRE ALARM DEVICE AS SHOWN AND WIRE INTO EXISTING FIRE ALARM SYSTEM.

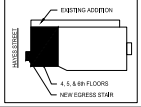
ROOF PLAN KEY NOTES:

1. DOWN TO RANGE EXHAUST HOOD ON 4TH FLOOR
2. DOWN TO RANGE EXHAUST HOOD ON 4TH FLOOR

PROJECT NORTH

NORTH

KEY PLAN



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83 PARK STREET
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REVISIONS:

SIXTH FLOOR POWER & SYSTEMS PLAN & ROOF POWER PLAN

DATE: AUGUST 12, 2013

NCA JOB NO.: 1046.30

DRAWING NO.:

E-204

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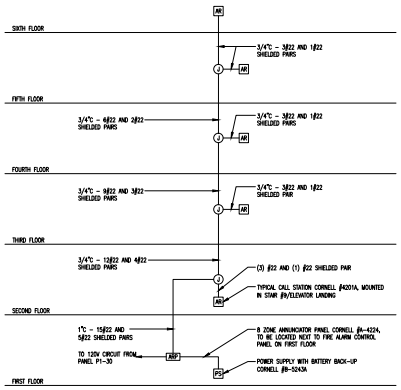
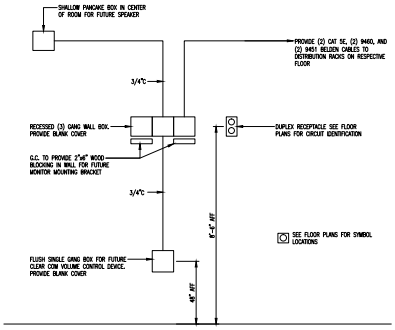


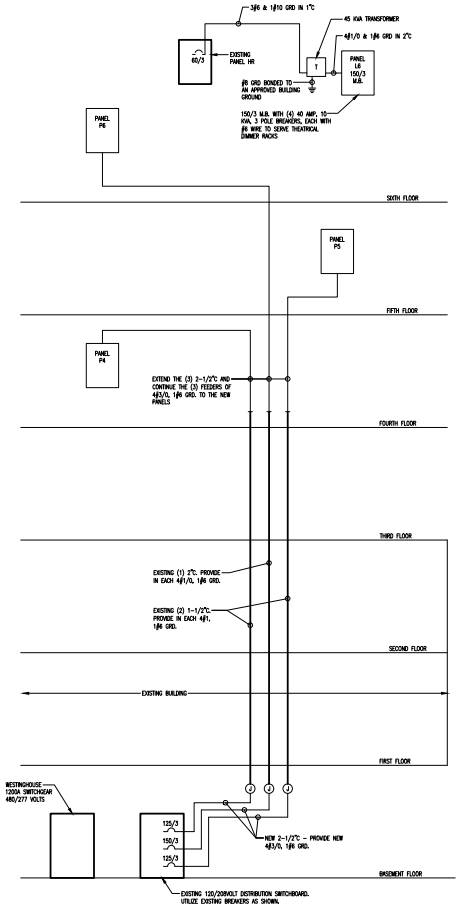
AREA OF REFUGE SCHEMATIC

NTS



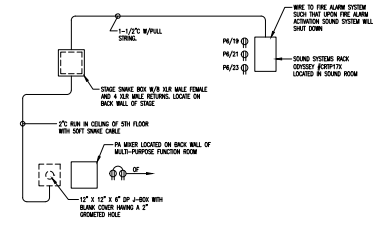
TYPICAL COM/VIDEO (CLEARCOM) OUTLET

NTS



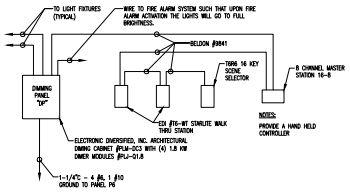
POWER DISTRIBUTION SCHEMATIC

NTS



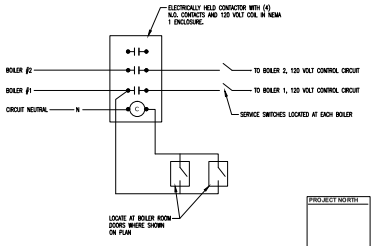
SOUND SYSTEM WIRING DIAGRAM

NTS



SIXTH FLOOR MULTIPURPOSE BANQUET HALL DIMMING SYSTEM

NTS

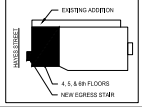


BOILER EMERG. SHUTDOWN SCHEMATIC

NTS

PROJECT NORTH | NORTH

KEY PLAN



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East Providence RI 02914
v 401.438.2211

Structural Engineers
Cosin Engineers, Inc.
1220 Mineral Spring Avenue
North Providence, RI 02904
v 401.726.1771

Mechanical & Plumbing Engineer
J. Mattson, Inc
16 Shaw Road
Exeter, RI 02822
v 401.397.3730

Electrical Engineers
Creative Environment Corp.
50 Office Parkway
East Providence, RI 02914
v 401.438.7733

Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.8692

THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SCHEMATICS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: E-301

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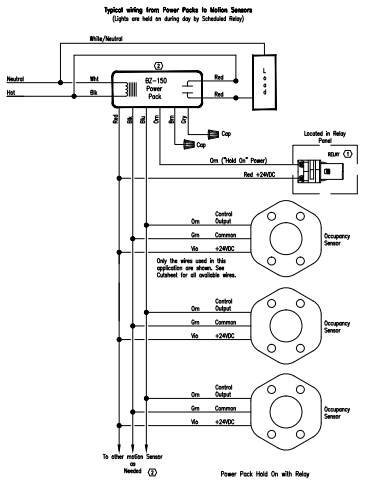
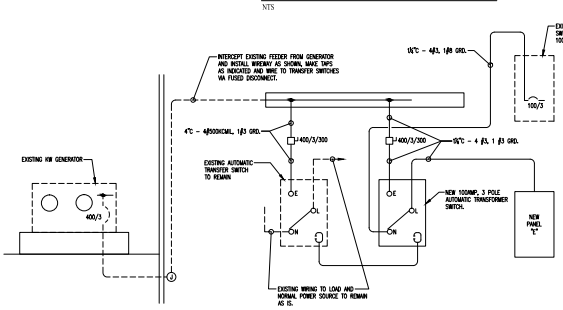


Notes:

1. Relay shall be assigned to a Schedule to keep Motion Sensors from turning lights off during "Occupied" hours. Relay on "Hold" lights on. Relay off allows full Sensor control of the lights.
2. BZ-150 Power Packs have 225mA @ 24VDC available for Motion Sensors.

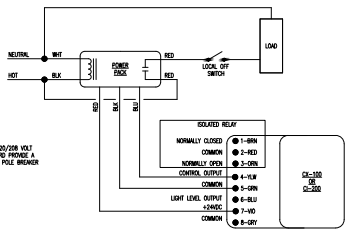
POWER PACK HOLD ON WITH RELAY

NTS



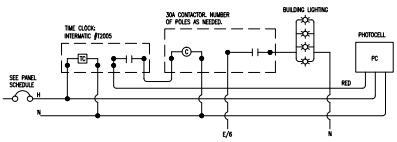
NEW LIFE SAFETY WIRING SCHEMATIC

NTS



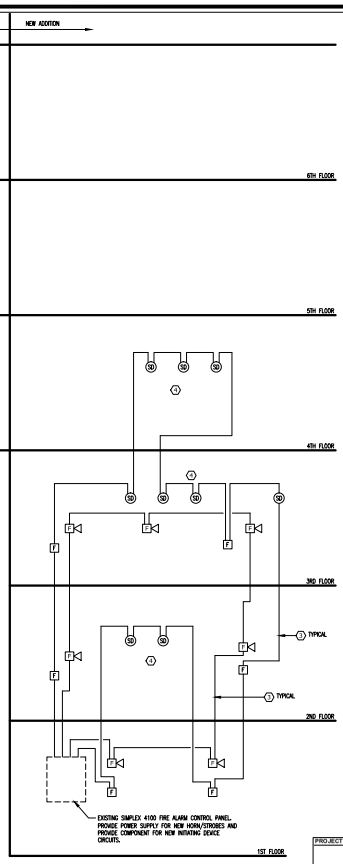
8-WIRE OCCUPANCY SENSOR STANDARD SCHEMATIC

NTS



TIMECLOCK/PHOTOCELL "A" DETAIL

NTS



FIRE ALARM SCHEMATIC - 3RD FLOOR

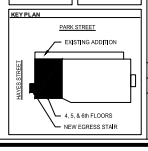
NTS

FIRE ALARM KEY NOTES

1. INTERCEPT EXISTING SUPPLY AND RETURN INITIATING DEVICE CIRCUIT THAT PRESENTLY SERVES EACH FLOOR.
2. EXTEND THE NEW NOTIFICATION CIRCUITS AND CONNECT TO THE EXISTING NOTIFICATION CIRCUIT THAT PRESENTLY SERVES EACH FLOOR.
3. PROVIDE WIRING TYPE AS REQUIRED FOR THE SIMPLEX DEVICES AS DIRECTED BY THE MANUFACTURES REPRESENTATIVE.
4. FOR EXACT QUANTITY OF DEVICES SEE POWER & SYSTEMS FLOOR PLANS.

PROJECT NORTH | NORTH

KEY PLAN



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Exeter Providence RI 02914
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Mechanical & Plumbing Engineer
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Fire Protection Engineers
Hughes Associates, Inc.
117 Metro Center Blvd., Suite 1002
Warwick, RI 02886
v 401.736.8692

THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

SCHEMATICS

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: E-302

PANEL: P4 — 125 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 125A

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
1	R	RECEPTACLES		12	0.6	1								2	R	RECEPTACLES		12	0.4	1							
3	R	RECEPTACLES		12	0.6	1								4	R	RECEPTACLES		12	0.2	1							
5	R	RECEPTACLES		12	1.0	1								6	R	RECEPTACLES		12	0.6	1							
7	R	RECEPTACLES		12	0.8	1								8	R	RECEPTACLES		12	0.4	1							
9	R	RECEPTACLES		12	0.6	1								10	R	RECEPTACLES		12	1.5	1							
11	L	LIGHTING		12	0.9	1								12	R	RECEPTACLES		12	0.2	1							
13	L	LIGHTING		12	0.8	1								14	L	LIGHTING		12	0.8	1							
15	L	LIGHTING		12	0.8	1								16	L	LIGHTING		12	1.0	1							
17	L	LIGHTING		12	1.0	1								18	R	RECEPTACLES		12	1.5	1							
19	L	LIGHTING		12	0.8	1								20	R	DISHWASHER		12	0.8	1							
21	M	AC-4		12	1.5	1								22	R	MICROWAVE		12	1.5	1							
23	M	ERV-5		12	0.4	1								24	R	ICE MAKER		12	0.6	1							
25		SPARE				1								26	R	ICE MAKER		12	0.6	1							
27	M	KXF-2 & HOOD LIGHTS		12	0.6	1								28	R	DISHWASHER		12	0.8	1							
29	L	EXIT SIGNS		12	0.4	1								30	R	REFRIGERATOR		12	1.8	1							
31		SPARE				1								32	R	GAS OVEN		12	0.1	1							
33		SPARE				1								34		SPARE				1							
35		SPARE				1								36		SPARE				1							
37		SPARE				1								38		SPARE				1							
39		SPARE				1								40		SPARE				1							
41		SPARE				1								42		SPARE				1							

Connected Load 23.6 KVA
R Receptacle Load 14.6 KVA Noncontinuous 12.3 KVA
L Lighting Load 6.5 KVA Continuous 8.1 KVA
M Mechanical and Power Load 2.5 KVA Noncontinuous 2.5 KVA
TOTAL LOAD 22.9 KVA

CIRCUIT BREAKER SIZE	20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	42	0	0	0	0	0	0	0

AMPERAGE: 64 AMP

PANEL: P5 — 125 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 125A

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
1	R	RECEPTACLES		12	0.8	1								2	R	RECEPTACLES		12	0.4	1							
3	R	RECEPTACLES		12	0.8	1								4	R	RECEPTACLES		12	0.2	1							
5	R	RECEPTACLES		12	0.6	1								6	R	RECEPTACLES		12	0.6	1							
7	R	RECEPTACLES		12	0.8	1								8	R	RECEPTACLES		12	0.4	1							
9	R	RECEPTACLES		12	1.5	1								10	R	RECEPTACLES		12	0.2	1							
11	L	LIGHTING		12	1.2	1								12	L	LIGHTING		12	0.7	1							
13	L	LIGHTING		12	0.4	1								14	L	LIGHTING		12	1.0	1							
15	L	LIGHTING		12	0.7	1								16	L	LIGHTING		12	0.4	1							
17	L	EXIT SIGNS		12	0.3	1								18	R	MICROWAVE		12	1.5	1							
19	R	REFRIGERATOR		12	1.8	1								20	R	DISHWASHER		12	0.8	1							
21	R	GAS OVEN		12	0.1	1								22	R	ICE MAKER		12	0.6	1							
23	L	LIGHTING		12	0.4	1								24	R	ICE MAKER		12	0.6	1							
25	M	AC-5		12	1.5	1								26	R	DISHWASHER		12	0.8	1							
27	M	ERV-6		12	0.4	1								28	R	RECEPTACLES		12	1.5	1							
29		SPARE				1								30	L	LIGHTING		12	0.6	1							
31		SPARE				1								32		SPARE				1							
33		SPARE				1								34		SPARE				1							
35		SPARE				1								36		SPARE				1							
37		SPARE				1								38		SPARE				1							
39		SPARE				1								40		SPARE				1							
41		SPARE				1								42		SPARE				1							

Connected Load 21.6 KVA
R Receptacle Load 14.0 KVA Noncontinuous 12.0 KVA
L Lighting Load 5.7 KVA Continuous 7.1 KVA
M Mechanical and Power Load 1.9 KVA Noncontinuous 1.9 KVA
TOTAL LOAD 21.0 KVA

CIRCUIT BREAKER SIZE	20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	42	0	0	0	0	0	0	0

AMPERAGE: 58 AMP

PANEL: P6 — 200 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 200A

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	60/3	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	60/3	CCC	DDD	EEE	FFF	GGG
1	R	RECEPTACLES		12	1.0	1								2	R	RECEPTACLES		12	1.0	1							
3	R	RECEPTACLES		12	0.6	1								4	R	RECEPTACLES		12	0.4	1							
5	R	RECEPTACLES		12	0.2	1								6	R	RECEPTACLES		12	0.6	1							
7	R	RECEPTACLES		12	0.4	1								8	R	RECEPTACLES		12	0.6	1							
9	R	RECEPTACLES		12	0.2	1								10	R	RECEPTACLES		12	1.5	1							
11	L	LIGHTING		12	0.5	1								12	L	LIGHTING		12	1.3	1							
13	L	LIGHTING		12	1.0	1								14	L	EXIT SIGNS		12	0.3	1							
15	M	MOTORIZED SCREEN		12	0.7	1								16	R	ICE MAKER		12	0.6	1							
17	R	PROJECTOR		12	0.8	1								18	R	REFRIGERATOR		12	1.8	1							
19	R	SOUND EQUIPMENT		12	0.4	1								20	R	GAS OVEN		12	0.1	1							
21	R	SOUND EQUIPMENT		12	0.4	1								22	R	ICE MAKER		12	0.6	1							
23	R	SOUND EQUIPMENT		12	0.4	1								24	R	DISHWASHER		12	0.8	1							
25	M	AC-6		12	1.5	1								26	R	RECEPTACLES		12	1.5	1							
27	M	ERV-7		12	0.4	1								28	M	IU-9		12	0.3		1						
29	M	KXF-1 & HOOD LIGHTS		12	0.6	1								30													
31	M	MUF-1		12	0.8	1								32	M	IU-10		12	0.3		1						
33	M	MUF-2		12	0.8	1								34													
35	M	ERV-8		12	0.8		1							36	M	DIMMING PANEL DP		6	3.3			1					
37														38													
39		SPARE				1								40													
41		SPARE				1								42		SPARE				1							

Connected Load 26.5 KVA
R Receptacle Load 13.9 KVA Noncontinuous 12.0 KVA
L Lighting Load 3.1 KVA Continuous 3.9 KVA
M Mechanical and Power Load 9.5 KVA Noncontinuous 9.5 KVA
TOTAL LOAD 25.3 KVA

CIRCUIT BREAKER SIZE	20/1	20/2	60/3	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	33	3	1	0	0	0	0	0

AMPERAGE: 70 AMP

PANEL: L6 — 200 A 208Y/120 V 3PH 4W 60HZ

22,000 AIC FULLY RATED
CIRCUITS: 30
BUS RATING: 200

MAIN LUG ONLY [ ] · MAIN CIRCUIT BREAKER [X] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	40/3	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	40/3	BBB	CCC	DDD	EEE	FFF	GGG
1	L	STAGE LIGHTING DIMMER		6	11.0		1							2	L	STAGE LIGHTING DIMMER		6	11.0		1						
3														4													
5														6													
7	L	STAGE LIGHTING DIMMER		6	11.0		1							8	L	STAGE LIGHTING DIMMER		6	11.0		1						
9														10													
11														12													
13		SPARE				1								14		SPARE				1							
15		SPARE				1								16		SPARE				1							
17		SPARE				1								18		SPARE				1							
19		SPARE				1								20		SPARE				1							
21		SPARE				1								22		SPARE				1							
23		SPARE				1								24		SPARE				1							
25		SPARE				1								26		SPARE				1							
27		SPARE				1								28		SPARE				1							
29		SPARE				1								30		SPARE				1							

Connected Load 44.0 KVA
R Receptacle Load 0.0 KVA Noncontinuous 0.0 KVA
L Lighting Load 44.0 KVA Continuous 55.0 KVA
M Mechanical and Power Load 0.0 KVA Noncontinuous 0.0 KVA
TOTAL LOAD 55.0 KVA

CIRCUIT BREAKER SIZE	20/1	40/3	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	18	4	0	0	0	0	0	0

AMPERAGE: 153 AMP

PANEL: HR — 100 A 480Y/277 V 3PH 4W 60HZ

65,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 100A

MAIN LUG ONLY [ ] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/3	30/3	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/3	30/3	BBB	CCC	DDD	EEE	FFF	GGG
1	M	EXISTING CONDENSATE UNIT			10.2	1								2	M	EXISTING CONDENSATE UNIT			10.2	1							
3														4													
5														6													
7	M	EXISTING CONDENSATE UNIT			10.2	1								8	M	ACCU-2		10	17.0		1						
9														10													
11														12													
13		SPARE												14	M	CU-4		12	10.0	1							
15		SPARE												16													
17		SPARE												18													
19		SPARE												20	M	CU-5		12	10.0	1							
21		SPARE												22													
23		SPARE												24													
25		SPARE												26	M	CU-6		12	10.0	1							
27		SPARE												28													
29		SPARE												30													
31		SPARE												32		SPARE											
33		SPARE												34		SPARE											
35		SPARE												36		SPARE											
37		SPARE												38		SPARE											
39		SPARE												40		SPARE											
41		SPARE												42		SPARE											

Connected Load 77.6 KVA
R Receptacle Load 0.0 KVA Noncontinuous 0.0 KVA
L Lighting Load 0.0 KVA Continuous 0.0 KVA
M Mechanical and Power Load 77.6 KVA Noncontinuous 77.6 KVA
TOTAL LOAD 77.6 KVA

CIRCUIT BREAKER SIZE	20/3	30/3	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	6	1	0	0	0	0	0	0

AMPERAGE: 93 AMP

PANEL: E — 100 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 100

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	AAA	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	AAA	BBB	CCC	DDD	EEE	FFF	GGG
1	L	EMERGENCY LIGHTING		12	0.4	1								2	L	EMERGENCY LIGHTING		12	0.4	1							
3	L	EMERGENCY LIGHTING		12	0.3	1								4	L	EMERGENCY LIGHTING		12	0.3	1							
5		SPARE				1								6	L	EMER. LTG. VIA TIME CLOCK "A"		12	0.2	1							
7		SPARE				1								8		SPARE				1							
9		SPARE				1								10		SPARE				1							
11		SPARE				1								12		SPARE				1							
13		SPARE				1								14		SPARE				1							
15		SPARE				1								16		SPARE				1							
17		SPARE				1								18		SPARE				1							
19		SPARE				1								20		SPARE				1							
21		SPARE				1								22		SPARE				1							
23		SPARE				1								24		SPARE				1							
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33		SPARE				1								34		SPARE				1							
35		SPARE				1								36		SPARE				1							
37		SPARE				1								38		SPARE				1							
39		SPARE				1								40		SPARE				1							
41		SPARE				1								42		SPARE				1							

Connected Load 1.6 KVA
R Receptacle Load 0.0 KVA Noncontinuous 0.0 KVA
L Lighting Load 1.6 KVA Continuous 2.0 KVA
M Mechanical and Power Load 0.0 KVA Noncontinuous 0.0 KVA
TOTAL LOAD 2.0 KVA

CIRCUIT BREAKER SIZE	20/1	AAA	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	42	0	0	0	0	0	0	0

AMPERAGE: 6 AMP

PANEL: QA — 100 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 100

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	30/3	30/2	20/2	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	30/3	30/2	20/2	DDD	EEE	FFF	GGG
1	R	RECEPTACLES		12	0.4	1								2	R	Receptacles		12	0.4	1							
3	R	RECEPTACLES		12	0.4	1								4	R	Receptacles		12	0.4	1							
5		SPARE				1								6	R	Receptacles		12	0.4	1							
7		SPARE				1								8		SPARE				1							
9	M	ICE MACHINE		10	5.0			1						10	M	BAKING OVEN		10	5.6		1						
11														12													
13	L	WALK-IN COOLER LIGHTS		12	0.4	1								14													
15	R	RECEPTACLES		12	0.4	1								16	M	WALK REFRIGERATOR		12					1				
17	R	RECEPTACLES		12	0.5	1								18													
19	R	RECEPTACLES		12	0.5	1								20	L	LIGHTING		12	0.3	1							
21	R	RECEPTACLES		12	0.5	1								22	L	LIGHTING		12	0.2	1							
23	R	RECEPTACLES		12	0.5	1								24		SPARE				1							
25		SPARE				1								26		SPARE				1							
27		SPARE				1								28		SPARE				1							
29		SPARE				1								30		SPARE				1							
31		SPARE				1								32		SPARE				1							
33		SPARE				1								34		SPARE				1							
35		SPARE				1								36		SPARE				1							
37		SPARE				1								38		SPARE				1							
39		SPARE				1								40		SPARE				1							
41		SPARE				1								42		SPARE				1							

Connected Load 15.9 KVA
R Receptacle Load 4.4 KVA Noncontinuous 4.4 KVA
L Lighting Load 0.9 KVA Continuous 1.1 KVA
M Mechanical and Power Load 10.6 KVA Noncontinuous 10.6 KVA
TOTAL LOAD 16.1 KVA

CIRCUIT BREAKER SIZE	20/1	30/3	30/2	20/2	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	35	1	1	1	0	0	0	0

AMPERAGE: 45 AMP

PANEL: B — 100 A 208Y/120 V 3PH 4W 60HZ

10,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 100

MAIN LUG ONLY [ ] · MAIN CIRCUIT BREAKER [X] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
IG	ISOLATED GROUND
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
1	M	FAN-COIL CEFR 02 FCU		12	0.1	1								2	R	RECEPTACLES		12	0.2	1							
3	M	FAN-COIL STEF 02 FCU		12	0.1	1								4	M	BOILER B-1		12	0.9	1							
5	M	BOILER PUMP P-1		12	1.7		1							6	M	BOILER B-2		12	0.9	1							
7														8	M	BOILER CONTROL PANEL		12	0.1	1							
9	M	BOILER PUMP P-2		12	1.7		1							10	M	UNIT HEATERS HS-180 & HS-72		12	1.3	1							
11														12		SPARE				1							
13		SPARE				1								14		SPARE				1							
15		SPARE				1								16		SPARE				1							
17		SPARE				1								18		SPARE				1							
19		SPARE				1								20		SPARE				1							
21		SPARE				1								22		SPARE				1							
23		SPARE				1								24		SPARE				1							
25		SPARE				1								26		SPARE				1							
27		SPARE				1								28		SPARE				1							
29		SPARE				1								30		SPARE				1							
31		SPARE				1								32		SPARE				1							
33		SPARE				1								34		SPARE				1							
35		SPARE				1								36		SPARE				1							
37		SPARE				1								38		SPARE				1							
39		SPARE				1								40		SPARE				1							
41		SPARE				1								42		SPARE				1							

Connected Load 7.0 KVA
R Receptacle Load 0.2 KVA Noncontinuous 0.2 KVA
L Lighting Load 0.0 KVA Continuous 0.0 KVA
M Mechanical and Power Load 6.8 KVA Noncontinuous 6.8 KVA
TOTAL LOAD 7.0 KVA

CIRCUIT BREAKER SIZE	20/1	20/2	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	38	2	0	0	0	0	0	0

AMPERAGE: 19 AMP

PANEL: BH — 100 A 480Y/277 V 3PH 4W 60HZ

65,000 AIC FULLY RATED
CIRCUITS: 42
BUS RATING: 100A

MAIN LUG ONLY [X] · MAIN CIRCUIT BREAKER [ ] · SURFACE MOUNTED [X] · FLUSH MOUNTED [ ] · FLOOR MOUNTED [ ]

NOTE	DESCRIPTION
E	EXISTING CIRCUIT & BREAKER
G	GFCI - 5mA TRIP
P	GFPE - 30 mA TRIP
S	SHUNT TRIP
L	LOCK ON
C	VIA LIGHTING CONTROL PANEL

SHUNT TRIP MAIN [ ] · 200% RATED NEUTRAL [ ] · ISOLATED GROUND [ ] · FEED THRU LUGS [ ] · 100% RATED MAIN BREAKER [ ] · GROUND FAULT MAIN C.B. [ ]

CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 50/3	AAA	BBB	CCC	DDD	EEE	FFF	GGG	CKT No.	Load Type	LOAD DESCRIPTION	Note	WIRE SIZE	LOAD kVA	CIRCUIT BREAKER 50/3	AAA	BBB	CCC	DDD	EEE	FFF	GGG
1	M	PANEL "B" VIA 30kVA XMFR		8	7.0	1								2		SPARE											
3														4		SPARE											
5														6		SPARE											
7		SPARE												8		SPARE											
9		SPARE												10		SPARE											
11		SPARE												12		SPARE											
13		SPARE												14		SPARE											
15		SPARE												16		SPARE											
17		SPARE												18		SPARE											
19		SPARE												20		SPARE											
21		SPARE												22		SPARE											
23		SPARE												24		SPARE											
25		SPARE												26		SPARE											
27		SPARE												28		SPARE											
29		SPARE												30		SPARE											
31		SPARE												32		SPARE											
33		SPARE												34		SPARE											
35		SPARE												36		SPARE											
37		SPARE												38		SPARE											
39		SPARE												40		SPARE											
41		SPARE												42		SPARE											

Connected Load 7.0 KVA
R Receptacle Load 0.0 KVA Noncontinuous 0.0 KVA
L Lighting Load 0.0 KVA Continuous 0.0 KVA
M Mechanical and Power Load 7.0 KVA Noncontinuous 7.0 KVA
TOTAL LOAD 7.0 KVA

CIRCUIT BREAKER SIZE	50/3	AAA	BBB	CCC	DDD	EEE	FFF	GGG
CIRCUIT BREAKER COUNT	1	0	0	0	0	0	0	0

AMPERAGE: 8 AMP

NORTHEAST COLLABORATIVE ARCHITECTS
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THE VETS

VETERAN'S MEMORIAL AUDITORIUM - PHASE III

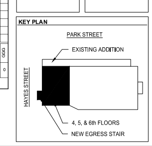
83 PARK STREET
PROVIDENCE, RHODE ISLAND

REVISIONS:

PROJECT NORTH

NORTH

KEY PLAN



SCHEDULES

DATE: AUGUST 12, 2013
NCA JOB NO.: 1046.30
DRAWING NO.: E-401

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