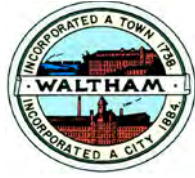


City of Waltham, Massachusetts



**Invites,
in accordance with
the Massachusetts General Law Chapter 149 §44 A-J,
Interested Parties
To respond with the best Bid**

For the:

Exterior Historical Renovation of the Cardinal Cottage

282 Trapelo Road Waltham, MA 02452

Site Inspection and Briefing: 10:00 AM Friday February 23, 2018

(Meet at 282 Trapelo Road, Waltham, MA 02452)

Last Day for written questions: 12:00 Noon Monday February 26, 2018

(Written questions via email ONLY at Jpedulla@city.waltham.ma.us)

General Bid Due: 10:00 AM Thursday March 8, 2018

HISTORICAL RESTORATION - CARDINAL COTTAGE

282 Trapelo Road
Waltham, MA

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CITY OF WALTHAM MASSACHUSETTS

SECTION 00 05 00

**NOTICE TO BIDDERS,
CARDINAL COTTAGE EXTERIOR HISTORIC RENOVATION**

The City of Waltham, Massachusetts invites sealed bids from Contractors for the Cardinal Cottage Exterior Historic Renovation located at 282 Trapelo Road, Waltham, Massachusetts. The work includes the exterior renovation of the building excluding the garage and any work outside a radius of five (5) feet from the Building. The Cardinal Cottage is listed in the State and National Register of Historic Places as a contributing element of the Walter E. Fernald State School Historic District. The renovation of this structure shall be consistent with the recommended approaches in *the Secretary of the Interior's Standard for Rehabilitation of Historic Properties (see the Reports Section at the end of this bid document)*.

PLANS, SPECIFICATIONS and other Contract Documents may be obtained by visiting the City's Web Site at www.city.waltham.ma.us/bids

Copies of Addenda will be e- mailed to the registered Bidders without charge. Addenda will also be posted on the web site above

Sealed **GENERAL BIDS** for this project will be accepted from eligible bidders at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 until **10:00 AM Thursday March 8, 2018**, at which place and time they shall be publicly opened, read aloud and recorded for presentation to the Awarding Authority.

A **PRE-BID CONFERENCE** will be held for all interested parties at **10:00 AM Friday February 23, 2018** at the site at the **Cardinal Cottage, 219 Trapelo Rd, Waltham, MA**. Attendance at this pre-bid conference is strongly recommended, but it is not required, for parties submitting a bid. It will be the only opportunity to visit the site prior to the bid opening.

Last day for Written Questions is 12 Noon Monday February 26, 2018 via email only to Jpedulla@city.waltham.ma.us

Each general bid shall be accompanied by a bid deposit in the form of a bid bond, certified check, or a treasurer's or cashier's check issued by a responsible bank or trust company, payable to the City of Waltham in the amount of five percent (5%) of the value of the bid. Bid deposits will be dealt with as provided in Massachusetts General Laws, Chapter 149, Section 44B.

EXPERIENCE

To be given consideration, all general bids shall produce evidence of at least 10 years of experience working with historic restoration projects of similar scope or larger. The General Contractor's experience shall be that of the company with non- transient individual employees who have been with the company for a substantial number or years and shall furnish evidence that all previous work of this type was properly and promptly completed. Evidence by the General Contractor of Historic Certification by the State or any licensing organization as a restorer shall be given greater consideration for selection.

Bids shall be made on the basis of the Prevailing Wage Rates as determined by the Commissioner of

Labor and Industries, Pursuant to the Provisions of Chapter 149, Sections 26 to 27D inclusive of Massachusetts General Laws, a copy shall be found at www.city.waltham.ma.us/bids and is made a part of the Contract.

Bidders' selection procedures and contract award shall be in conformity with applicable statutes of the Commonwealth of Massachusetts.

Performance and Labor & Materials payment bonds in the full amount of the contract price will be required from the successful bidder.

The Awarding Authority reserves the right to reject any or all general bids, if it be in the public interest to do so, and to reject any sub-bid on any sub-trade if it determines that such sub-bid does not represent the sub-bid of a person competent to perform the work as specified or that less than three such sub-bids were received and that the prices are not reasonable for acceptance without further competition.

The successful bidder will be required to furnish a Certificate of Insurance, naming the City of Waltham as a Named Additional Insured with a waiver of subrogation, for General Liability and Vehicle Liability in the amount of \$500,000 per occurrence and \$1,000,000 in the aggregate and Worker's Compensation Insurance as prescribed by law.

In accordance with M.G.L.Ch 149 the undersigned certifies that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by OSHA that is at least 10 hours in duration at the time the employee begins work and shall furnish documentation of successful completion of said course with the first certified payroll report for each employee.

CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

CITY OF WALTHAM

Joseph Pedulla, CPO
Purchasing Department
City Hall, 610 Main Street
Waltham, MA 02452

SECTION 00 10 00 - INSTRUCTION TO BIDDERS

PART 1 - GENERAL

1.1 SCHEDULE OF DATES

- A. Advertisement appears in Central Register, Plans and Specifications ready for Bidders at the Offices of the Waltham Purchasing Agent after 8:30 P.M. on September 15, 2015.
- B. **Pre-bid** walkthrough **10:00 AM Friday February 23, 2018** at 219 Trapelo Rd. Waltham, MA.
- C. Questions and requests for interpretations may be submitted in writing via e-mail ONLY to Jpedulla@city.waltham.ma.us up to and including: **12 Noon Monday February 26, 2018**.
- D. Addenda will be issued with interpretations as determined by the Purchasing Department only via e-mail and posting on the web site.
- E. General Bids Deadline: **10:00 A.M. on Thursday March 8, 2018**, in the Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, Attn: J. Pedulla, CPO, where the bids will be publicly open and read.

1.2 BIDDING PROCEDURE

- A. Bids for the work are subject to the provisions of General Laws, Chapter 149, Sections 44A-44L inclusive, as amended. Regulations governing the bidding procedures as set forth in the above mentioned amended General Laws must be followed.
- B. In the event of any inconsistencies between any of the provisions of these Contract Documents and of the cited statute, anything herein to the contrary notwithstanding, the provisions of the said statute shall control.
- C. No General Bid received by the Awarding Authority after the time respectively established herein for the opening of General Bids will be considered, regardless of the cause for the delay in the receipt of any such bid.

1.3 WITHDRAWAL OF BIDS

- A. Bids may be withdrawn prior to the time respectively established for the opening of General Bids only on written request to the Awarding Authority.

1.4 INTERPRETATION OF CONTRACT DOCUMENTS

- A. No oral interpretation will be made to any bidder. All questions or requests for interpretations must be made in writing to the Architect.
- B. Every interpretation made to a bidder will be in the form of an Addendum to the drawings and/or specifications, which will be made available to all persons to whom Contract Documents have been issued.
- C. Failure of the Awarding Authority to send, or of any bidder to receive any such Addendum shall not relieve any bidder from obligation under his bid as submitted.
- D. All such Addenda shall become a part of the Contract Documents.

1.5 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

- A. Each bidder may visit the site of the proposed work and acquaint himself with conditions as they exist, and shall also thoroughly examine the Contract Documents. Failure of any bidder to visit the site and acquaint himself with the Contract Documents shall not relieve any bidder from any obligation with respect to his bid.
- B. By submitting a bid, the bidder agrees that the Contract Documents are adequate and that the required result for a full and complete installation can be produced. The successful bidder shall furnish any and all labor, materials, insurance, permits and all other items needed to produce the required result to the satisfaction of the Awarding Authority.

1.6 BID SECURITY

- A. The General Contractor's bid must be accompanied by bid security in the amount of five percent (5%) of the bid.
- B. At the option of the bidder, the security may be a bid bond, certified, treasurer's or cashier's check issued by a responsible bank or trust company. No other type of bid security is acceptable. Bid Bonds shall be issued by a Surety Company qualified to do business under the laws of the Commonwealth of Massachusetts.
- C. Certified, Treasurer's or Cashier's check shall be made payable to the City of Waltham, Massachusetts.
- D. The bid security shall secure the execution of the Contract and the furnishing of a Performance and Payment Bond by the successful General Bidder for 100% of the contract value.
- E. Should any General Bidder to whom an award is made fail to enter into a contract therefore within five (5) days, Saturdays, Sundays and Legal Holidays, excluded, after

notice of award has been mailed to him or fail within such time to furnish a Performance Bond and also a Labor and Materials or Payment Bond as required, the amount so received from such General Bidder through his Bid Bond, Certified, Treasurer's or Cashier's check as bid deposit shall become the property of the City of Waltham, Massachusetts as liquidated damages; provided that the amount of the bid deposit, which becomes the property of the City of Waltham, Massachusetts, shall not in any event exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that, in case of death, disability, bona fide clerical error or mechanical error of a substantial nature, or other unforeseen circumstances affecting the General Bidder, his deposit shall be returned to him.

1.7 BID FORM

- A. General Bids shall be submitted on the "FORM FOR GENERAL BID" enclosed. Erasures or other changes must be explained or noted over the signature of the bidder.
- B. Bid forms must be completely filled in. Bids which are incomplete, conditional, or obscure, or which contain additions not called for will be rejected.
- C. General Bidders shall submit one set of executed bid forms to the Awarding Authority.

1.8 SUBMISSION OF BIDS AND BID SECURITIES

- A. Each bid submitted by a General Contractor shall be enclosed in a sealed envelope that shall be placed with the bid security in an outer envelope. The outer envelope shall be sealed and clearly marked as follows:

(Firm Name): _____
General Bid and Bid Security for:
Cardinal Cottage, 219 Trapelo Rd., Waltham, MA

1.9 AWARD OF CONTRACT

- A. The Contract shall be awarded to the lowest responsible and eligible General Bidder possessing the best value and experience and on the basis of competitive bids in accordance with the procedure set forth in the provision of Section 44B-44L inclusive, as amended or inserted, of Chapter 149 of the General Laws of the Commonwealth of Massachusetts.
- B. If the bidder selected as the General Contractor fails to perform his agreement to execute a contract in accordance with the terms of his General Bid, and furnish a Performance Bond and also a Labor and Materials or Payment Bond, as stated in his General Bid in accordance with Section 44F, an award shall be made to the next lowest responsible and eligible bidder.
- C. The words "lowest responsible and eligible bidder" shall be the bidder whose name is

the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work and who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, on the work. Essential information in regard to such qualifications shall be submitted in such form as the Awarding Authority may require.

D. EXPERIENCE

To be given consideration, all general bids shall produce evidence of at least 10 years of experience working with historic restoration projects of similar scope or larger. The General Contractor's experience shall be that of the company with non-transient individual employees who have been with the company for a substantial number of years and shall furnish evidence that all previous work of this type was properly and promptly completed. Evidence by the General Contractor of Historic Certification by the State or any licensing organization as a restorer shall be given greater consideration for selection.

E. Action on the award will be taken within sixty (60) days, Saturdays, Sundays and Legal Holidays excluded after the opening of the bids.

1.10 SECURITY FOR FAITHFUL PERFORMANCE

A. The successful bidder must deliver to the Awarding Authority simultaneously with his delivery of the executed contract, an executed Performance Bond, and also a Labor and materials or Payment Bond, each issued by a surety company qualified to do business under the laws of the Commonwealth and satisfactory to the Awarding Authority and each in the sum of One Hundred Percent (100%) of the Contract Price, as surety for the faithful performance of his contract, and for the payment of all persons performing labor or furnishing materials in connection therewith. Said bonds shall provide that, if the General Contractor fails or refuses to complete the Contract, the Surety Company will be obligated to do so.

B. Premiums are to be paid by the General Contractor, and are to be included in the Contract Price.

1.11 EQUAL OPPORTUNITY

A. The City of Waltham is an Equal Opportunity employer and will require compliance with the minority business enterprise plan (MBE) on file in the Purchasing Department

1.12 PRE-BID WALK-THRU

A. A pre-bid conference will be held at the site **10:00 AM Friday February 23, 2018**. Interested parties are encouraged to attend given that this will be the only time the building is open prior to the submission of bids. Further, prior to the bid opening, potential bidders may not go onto the site any time other than the aforementioned pre-bid conference.

1.13 SITE VISITS

A. Prospective bidders are prohibited from going onto the site prior to the Bid Opening or any time other than the pre-bid walk-thru, as set forth in Section 1.12 above, unless authorized by the City in an Addendum to the bid documents.

INSTRUCTION TO BIDDERS

1.14 CONTRACT DOCUMENTS

- A. The Awarding Authority shall make available the bid documents and addenda in the City Web site at www.city.waltham.ma.us/bids. No plans will be mailed.

1.15 EQUALITY

- A. Except where otherwise specifically provided to the contrary, the words “or approved equal” are hereby inserted immediately following the name or description of each article, assembly, system, or any component part thereof in the Contract Documents. It is the Contractor’s responsibility to provide all the research and documentation that would prove a product or assembly is “equal”. Failure to provide research or documentation does not alleviate the Contractor’s responsibility to meet the schedule.

1.16 TAX FREE NUMBER

- A. The City of Waltham has a tax-free number, ST-2 and St-S Forms.

1.17 SCHEDULE

- A. The work of the Contract shall be Substantially Complete in **120 calendar days** after the date of the Notice-to-Proceed.

1.18 LIQUIDATED DAMAGES

- A. If the work is not completed as specified in 1.17, the Contractor shall be charged Five Hundred Dollars (\$500.00) per day to pay for consulting and testing fees required to manage and arrange for the completion of the project. Late fees will be deducted from the Contract via Change Order.

1.19 WEEKLY JOB MEETINGS

- A. There will be a weekly job meeting at the site on the same agreed-upon day and time. Time will be provided to discuss and view the progress of the work and to answer questions. The Contractor’s job Superintendent and Project Manager shall attend each meeting. Weekly Job meetings shall be held on the job site

1.20 PROJECT SUPERINTENDENT

- A. The Contractor shall provide the same person as Superintendent for the entire duration of the project. Failure to maintain the same person in this position shall result in a One Thousand Dollar (\$1,000.00) penalty per incident which shall cover the Architect’s time to re-orient new personnel.

1.21 AWARD

- A. The Awarding Authority reserves the right to reject any or all bids if it be in the public interest to do so, and to act upon the bids and make its award in any lawful manner.

1.22 PREVAILING WAGE SCHEDULE

- A. Bids shall be made on the basis of the Prevailing Wage Schedule, as determined by the Commissioner of Labor and Industries, pursuant to the provision of Chapter 149, Section 26 to 27D inclusive, of the Massachusetts General Laws. The Prevailing wage Schedule for this project can be found in the City's web Site at [www.city.waltham.ma.us/ bids](http://www.city.waltham.ma.us/bids)

1.23 CONFLICT OF INTEREST

- A. A bidder filing a proposal thereby certifies that the proposal is made in good faith, without fraud, collusion, or connection of any kind with any other bidder for the same work, and that the bidder is competing solely on its own behalf without connection with, or obligation to, any undisclosed person or firm.

1.24 PROCEED ORDERS

- A. No bidder is to proceed without a proceed order as set out in the contract.

1.25 STAGING

- A. The General Contractor shall provide all the vertical access (which includes staging, vertical lifts, etc.) for the work of the Contract for the General Bidder and his/her non File Sub-bid subcontractor.

1.26 COMPLIANCE WITH MASSACHUSETTS GENERAL LAWS

- A. Pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, I certify under the penalty of perjury that I, to the best of my knowledge and belief have filed all state tax returns and paid all the state taxes required under law.

1.27 CONSTRUCTION BARRICADES

- A. The General Contractor shall provide all barricades to enclose the work area to prevent unauthorized access to the site.
 - 1. The barricades shall provide enough room for all construction activities to be performed while separated from pedestrians, students, and staff on site.
 - 2. Safety is the sole responsibility of the Contractor and any barricades necessary to protect the work and the public shall be provided.
 - 3. Provide entrance protection.

1.28 INSURANCE

A. The contractor shall purchase and maintain, at his expense all insurance required by the Contract. Documents and all insurance required by the applicable laws of Massachusetts, including but not limited to, General Laws, Chapter 146, in connection with all hoisting equipment.

B. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and from claims for damages because of bodily injury, including death and all property damage including, without limitation, damage to buildings and adjoining the site of construction which might arise from and during operations under this contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them including:

1. Statutory Worker's Compensation and Employer's Liability

The contractor shall provide insurance for the payment of compensation and the furnishing of other benefits under Chapter 152 of the General Laws (so-called Worker's Compensation Act) to all persons to be employed under this contract and shall continue in force such insurance as aforesaid shall be deemed a material breach of this Contract and shall operate as an immediate termination thereof. The contractor shall, without limiting the generality of the foregoing, conform to the provisions of Section 34A of Chapter 149 of the General Laws, which Section is incorporated herein by reference and made a part of hereof.

2. Comprehensive General Liability Insurance

Minimum bodily injury limits of \$ 500,000 per person and \$ 1,000,000 per accident, and property damage limits of \$ 500,000 per accident and \$ 1,000,000 aggregate during any 12 month period, shall include the following:

- a. Public liability (bodily injury and property damage)
- b. X.C.U. (explosion, collapse, and underground utilities)
- c. Independent contractor's protective liability.
- d. Products and completed operations.
- e. Save harmless agreement for Owner and Architects set forth in ARTICLE 10.11 of the GENERAL CONDITIONS.

3. Comprehensive All Risk Motor Vehicle Liability Insurance

Minimum bodily injury limits of \$ 500,000 per person, \$ 1,000,000 per accident, and property damage limit of \$ 1,000,000 per accident.

4. All Risk Insurance

Covering all Contractors' equipment with a provision for Waiver of Subrogation against the Owner.

5. Excess Liability Insurance in Umbrella Form with combined Bodily Injury and Property Damage Limit of \$ 1,000,000.

6. City of Waltham is a Named Additional Insured for General Liability with a Waiver of Subrogation on the insurance policy for this project.

1.29 SITE ACCESS

- A. The General Contractor shall gain access to the site via routes approved by the Owner.
 1. The General Contractor as part of the bid price will restore all roads, curbs, driveways, walks and grassed or landscaped areas damaged during construction.

1.30 CONSTRUCTION TRAILER

- A. The General Contractor shall locate the construction trailer at locations approved by the City.
- B. The General Contractor shall locate all on site stored or staged materials within the enclosed area designated by the City.

1.31 BUILDING PERMIT FEES

- A. Building permit fees will be waived for this project. However, the General Contractor is expected to obtain all proper permits as required by State Laws and City Ordinances

1.32 COMPLETE BID FORMS

- A. Please Note: Each bidder must fill in all the blanks on all the bid forms, even if the information is “zero dollars” or “not applicable”. Also, please acknowledge all Addenda as received by your company.

1.321 READ ALL DOCUMENTS.

Bidders should familiarize themselves with all the documents contained herein; it is mandatory that all Bids be in compliance with all the provisions contained in said documents.

1.33. FORMS AND ATTACHMENTS.

Bids are to be completed on the forms provided ONLY and enclosed in a sealed envelope marked on the outside “BID (title)” and the name and address of bidder. Attachments submitted in addition to the Waltham Purchasing Department produced forms may not be considered.

1.34. PRINTED OR TYPED RESPONSE.

All information must be typewritten or printed in ink, including the price the bidder offers in the space as provided on the bid form.

1.35. CORRECTIONS.

Bids that are submitted containing cross outs, white outs or erasures, will be rejected. All corrections or modifications to the original bid are to be submitted in a separate envelope, properly marked on the outside, "CORRECTION/ MODIFICATION TO BID (title)" and submitted prior to the bid opening.

ALL DOCUMENTS SUBMITTED WITH YOUR RESPONSE WILL BE INCORPORATED INTO THE CONTRACT.

1.36. PRICE IS ALL INCLUSIVE.

Bid prices shall encompass everything necessary for furnishing all items, materials, supplies or services as specified, and in accordance with the specifications, including proper packing, cost of delivery, and in the case of services, completion of same, as per specifications.

1.37. PRICE DISCREPANCY.

In the event of a discrepancy between the Unit Price and the Extension, the Unit Price shall prevail.

1.38. EXPLANATIONS, EXCEPTIONS

Explanations, exceptions or other information pertinent to the specifications may be made in writing and included in the same envelope with the bid.

1.39. BID DEPOSITS.

Bid deposits are to be made payable to the City of Waltham. In the event that the successful bidder fails to execute a Contract within (10) days of the receipt of said contract, such security shall be retained by the city as liquidated damages. Unsuccessful bidders' deposits will be returned immediately following the award to said successful bidder.

1.40. WITHDRAW.

A Bid may be withdrawn by written request prior to the schedule for the Bid Opening. No withdrawals are permitted after the bid opening date and time. Withdrawals after the bid opening date will cause the forfeit of the bid Deposit.

1.41. TIME of AWARD.

Bids will be awarded not later than (90) ninety days after the scheduled bid opening date, unless otherwise stated, in the specifications. Unless otherwise specified, bids will be evaluated on the basis of, completeness of your RFP response, responsiveness, responsibility, best price and experience.

1.42. AWARD CRITERIA.

Qualified and responsive proposals will be evaluated based on Price, Experience, Technical, and Compliance requirements. See also paragraphs 1.21, 1.41 and 1.9.

1.43. DISCOUNTS.

Discounts for prompt payments will be considered when making awards.

1.44. TAX EXEMPT.

Purchases by the City of Waltham are exempt from any Federal, State or Massachusetts Municipal Sales and/or Excise Taxes.

1.45. SAMPLES.

The City of Waltham may require the submission of samples either before or after the awarding of a contract. Samples are to be submitted, at no charge to the City, so as to ascertain the product's suitability. If specifically stated in the Bid that samples are required, said samples must be submitted with the Bid prior to the Official Bid Opening. Failure to submit said samples would be cause for rejection of Bid. All samples must be called for and picked up within (30) thirty days of award or said samples will be presumed abandoned and will be disposed of.

1.46. ACTIVE VENDOR LIST.

Vendors who wish to remain on the Active Bid List must either submit a Bid, No Bid, or a letter requesting same, no later than the Official Bid Opening. This is applicable to those vendors who have received the Invitation to Bid.

1.47. FUNDS APPROPRIATION.

THE CONTRACT OBLIGATION ON BEHALF OF THE CITY IS SUBJECT TO PRIOR APPROPRIATION OF MONIES FROM THE GOVERNMENTAL BODY AND AUTHORIZATION BY THE MAYOR.

1.48. THE AWARDING AUTHORITY RESERVES THE RIGHT TO REJECT ANY OR ALL BIDS, OR ANY PART OF ANY BID, WHICH IN THE OPINION OF THE AWARDING AUTHORITY, IS IN THE BEST INTERESTS OF THE CITY OF WALTHAM.

1.49. THE TAX ATTESTATION CLAUSE, CERTIFICATION OF NON-COLLUSION AND THE CERTIFICATE OF VOTE AUTHORIZATION, are required by statute and are an integral part of the Invitation for Bid and must be completed and signed by the person submitting the Bid, or by the person/persons who are officially authorized to do so. Failure to do so may disqualify the bid.

1.50. STANDARD OF QUALITY.

Where, in the specifications, one certain kind, type, catalog number, brand or manufacturer of material is named, it shall be regarded as the required standard of quality. Where two or more are named, these are presumed to be equal and the Bidder

may select one or the other. If the Bidder proposes to offer a substitute as an equal, he shall so indicate on the Bid Form, the kind, type, catalog number, brand, or manufacturer of material that is offered as an equal, and describe where it differs from the specifications. Substituted items must be capable of performing all the functions and/or operational features described or indicated in the specifications. Failure to indicate the description of any substitute item on the Bid will be interpreted to mean that the Bidder will furnish the item or service as specified.

1.51. MODIFICATION.

No agreement, understanding, alteration or variation of the agreement, terms or provisions herein contained shall bind the parties, hereto unless made and executed in writing by the parties hereto.

1.52. ASSIGNMENT.

The final payment for work done under this Contract shall be made only after the Contractor has signed a statement under the penalty of perjury, certifying that he has completed the work described in the final estimate. Neither party hereto shall assign this Contract or sublet it in part or as a whole without the prior written consent of the other party hereto. The Contractor shall not assign any sum or sums due or becoming due to him hereunder without the prior written consent of the City.

1.53. DELIVERIES:

a) The Contractor shall pay all freight and delivery charges. The City Of Waltham does not pay for shipping and packaging expenses. Items must be delivered as stipulated in the specifications. All deliveries must be made to the inside of city buildings. Sidewalk deliveries will not be accepted. City personnel are not required to assist in the deliveries and contractors are cautioned to notify their shippers that adequate assistance must be provided at the point of delivery, when necessary.

b) All items of furniture must be delivered inside the building, set up, in place and ready for use. Deliveries are to be made between the hours of 8:30 a.m. and 3:00 p.m., Monday through Friday, except on holidays.

c) All damaged items, or items which do not comply with specifications will not be accepted and title therefore will not vest to the Waltham Purchasing Department until such items are accepted and signed for, in good order, by the receiving department.

d) The contractor must replace, without further cost to the Waltham Purchasing Department, such damaged or non-complying items before payment will be made.

1.54. LABELING.

All packages cartons or other containers must be clearly marked with (a) building and room destination; (b) description of contents of item number from specifications; (c) quantity; (d) City of Waltham Purchase Order Number and (e) Vendor's name and order number.

1.56. GUARANTEES.

Unless otherwise stipulated in the specifications, furniture, equipment and similar durable items shall be guaranteed by the contractor for a period of not less than one year from the

date of delivery and acceptance by the receiving department. In addition, the manufacturer's guarantee shall be furnished. Any items provided under this contract which are or become defective during the guarantee period shall be replaced the contractor free of charge with the specific understanding that all replacements shall carry the same guarantee as the original equipment. The contractor shall make such replacement immediately upon receiving notice from the Purchasing Agent.

1.57. CHANGE ORDERS.

Change orders are not effective until, if, as and when signed by the Mayor and no work is to commence until the change orders are fully executed.

1.58. BID OPENING INCLEMENT WEATHER

If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

Signature of Individual or Corporate Name

By:

(Signature of Corporate Officer if applicable)

Title: _____

Federal Identification Number: _____

END OF SECTION

SECTION 00 11 00

BID BOND

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

BIDDER *(Name and Address)*:

SURETY *(Name and Address of Principal Place of Business)*:

OWNER *(Name and Address)*:

BID

Bid Due Date:

Description *(Project Name and Include Location)*:

BOND

Bond Number:

Date *(Not earlier than Bid due date)*:

Penal sum _____ \$ _____
(Words) (Figures)

Surety and Bidder, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Bid Bond to be duly executed by an authorized officer, agent, or representative.

BIDDER

SURETY

Bidder's Name and Corporate Seal (Seal)

Surety's Name and Corporate Seal (Seal)

By: _____
Signature

By: _____
Signature (Attach Power of Attorney)

Print Name

Print Name

Title

Title

Attest: _____

Attest: _____

Signature

Signature

Title

Title

Note: Above addresses are to be used for giving any required notice. Provide execution by any additional parties, such as joint venturers, if necessary.

1. Bidder and Surety, jointly and severally, bind themselves, their heirs, executors, administrators, successors, and assigns to pay to Owner upon default of Bidder the penal sum set forth on the face of this Bond. Payment of the penal sum is the extent of Bidder's and Surety's liability. Recovery of such penal sum under the terms of this Bond shall be Owner's sole and exclusive remedy upon default of Bidder.
2. Default of Bidder shall occur upon the failure of Bidder to deliver within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents.
3. This obligation shall be null and void if:
 - 3.1 Owner accepts Bidder's Bid and Bidder delivers within the time required by the Bidding Documents (or any extension thereof agreed to in writing by Owner) the executed Agreement required by the Bidding Documents and any performance and payment bonds required by the Bidding Documents, or
 - 3.2 All Bids are rejected by Owner, or
 - 3.3 Owner fails to issue a Notice of Award to Bidder within the time specified in the Bidding Documents (or any extension thereof agreed to in writing by Bidder and, if applicable, consented to by Surety when required by Paragraph 5 hereof).
4. Payment under this Bond will be due and payable upon default of Bidder and within 30 calendar days after receipt by Bidder and Surety of written notice of default from Owner, which notice will be given with reasonable promptness, identifying this Bond and the Project and including a statement of the amount due.
5. Surety waives notice of any and all defenses based on or arising out of any time extension to issue Notice of Award agreed to in writing by Owner and Bidder, provided that the total time for issuing Notice of Award including extensions shall not in the aggregate exceed 120 days from Bid due date without Surety's written consent.
6. No suit or action shall be commenced under this Bond prior to 30 calendar days after the notice of default required in Paragraph 4 above is received by Bidder and Surety and in no case later than one year after Bid due date.
7. Any suit or action under this Bond shall be commenced only in a court of competent jurisdiction located in the state in which the Project is located.
8. Notices required hereunder shall be in writing and sent to Bidder and Surety at their respective addresses shown on the face of this Bond. Such notices may be sent by personal delivery, commercial courier, or by United States Registered or Certified Mail, return receipt requested, postage pre-paid, and shall be deemed to be effective upon receipt by the party concerned.

9. Surety shall cause to be attached to this Bond a current and effective Power of Attorney evidencing the authority of the officer, agent, or representative who executed this Bond on behalf of Surety to execute, seal, and deliver such Bond and bind the Surety thereby.

10. This Bond is intended to conform to all applicable statutory requirements. Any applicable requirement of any applicable statute that has been omitted from this Bond shall be deemed to be included herein as if set forth at length. If any provision of this Bond conflicts with any applicable statute, then the provision of said statute shall govern and the remainder of this Bond that is not in conflict therewith shall continue in full force and effect.

11. The term "Bid" as used herein includes a Bid, offer, or proposal as applicable.

SECTION 00 52 00

AGREEMENT

This Agreement is made this ____ **day of** _____, **2018** between the City of Waltham, Herein called **the City of Waltham, and** _____ **(Co)** hereinafter called Contractor.

City of Waltham and Contractor hereby agree as follows:

ARTICLE 1 WORK

1.1 Contractor shall complete all Work as specified or indicated in the Contract Documents.

ARTICLE 2 ENGINEER

2.1 Engineer will act as the City of Waltham's representative, assuming all duties and responsibilities, rights and authority assigned to Engineer in the Contract Documents in connection with the completion of the Work in accordance with the Contract Documents.

ARTICLE 3 CONTRACT TIMES

3.1 Dates for Final Payment

A. The Work will be completed and ready for final payment **within 120 days from the date of the Notice to Proceed.**

3.2 Liquidated Damages

A. Contractor and the City of Waltham recognize that time is of the essence and that the City of Waltham will suffer financial loss if the Work is not completed within the times specified in Paragraph 3.1 above, plus any extensions thereof allowed in accordance with Article 12 of the General Conditions. The parties also recognize the delays, expense, and difficulties involved in proving in a legal litigation proceeding the actual loss suffered by the City of Waltham if the Work is not completed on time. Accordingly, instead of requiring any such proof, the City of Waltham and Contractor agree that as liquidated damages for delay (but not as a penalty), Contractor shall pay the City of Waltham **\$500.00 for each day** that expires after the time specified in Paragraph 3.1 for completion and readiness for final payment until the Work is completed and ready for final payment.

ARTICLE 4 CONTRACT PRICE

- 4.1 The City of Waltham shall pay Contractor for completion of the Work in accordance with the Contract Documents an amount in current funds equal to the prices stated in Contractor's Bid, attached hereto as an exhibit.
- 4.2 The total amount will be adjusted by measurement of actual installed quantities in strict conformity with the provisions contained herein.
- 4.3 The total amount will be adjusted on a monthly basis when the monthly cost change for each of the following exceeds plus or minus five percent: fuel (both diesel and gasoline), asphalt, and Portland cement contained in concrete. Section 01270 contains monthly price adjustment provisions for each of the above materials.

ARTICLE 5 PAYMENT PROCEDURES

- 5.1 Applications for Payment shall be processed in accordance with Article 14 of the General Conditions and in accordance with Massachusetts General Law.
- 5.2 The City of Waltham shall make progress payments on account of the Contract Price on the basis of processed Applications for Payment monthly during construction. All progress payments will be measured by the schedule of values established in Paragraph 2.07.A of the General Conditions, or in the event there is no schedule of values, as provided in the General Requirements.
- 5.3 The City of Waltham shall retain from progress payments 5 percent of the value of Work completed.
- 5.4 A retainage of 5% for materials and 5% for labor shall be applied to all payment requests.

ARTICLE 6 CONTRACTOR'S REPRESENTATIONS

- 6.1 Contractor makes the following representations:
 - A. Contractor has examined and carefully studied the Contract Documents and the other related data identified in the Bidding Documents.
 - B. Contractor has visited the site and become familiar with and is satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the Work.
 - C. Contractor is familiar with and is satisfied as to all federal, state, and local Laws and Regulations that may affect cost, progress, and performance of the Work.
 - D. Contractor has carefully studied all:
 - 1. reports of explorations and tests of subsurface conditions at or contiguous to the Site and all drawings of physical conditions relating to existing surface or subsurface structures at the Site (except

Underground Facilities), if any, that have been identified in Paragraph SC-4.02 of the Supplementary Conditions as containing reliable “technical data,” and

- E. Contractor has considered the information known to Contractor; information commonly known to contractors doing business in the locality of the Site; information and observations obtained from visits to the Site; and the Site-related reports and drawings identified in the Contract Documents, with respect to the effect of such information, observations, and documents on (1) the cost, progress, and performance of the Work; (2) the means, methods, techniques, sequences, and procedures of construction to be employed by Contractor, including any specific means, methods, techniques, sequences, and procedures of construction expressly required by the Contract Documents; and (3) Contractor’s safety precautions and programs.
- F. Based on the information and observations referenced in Paragraph 6.1 above, Contractor does not consider that any further examinations, investigations, explorations, tests, studies, or data are necessary for the performance of the Work at the Contract Price, within the Contract Times, and in accordance with the other terms and conditions of the Contract Documents.
- G. Contractor is aware of the general nature of Work to be performed by City of Waltham and others at the Site that relates to the Work as indicated in the Contract Documents.
- H. Contractor has given the City of Waltham written notice of all conflicts, errors, ambiguities, or discrepancies that Contractor has discovered in the Contract Documents, and the written resolution thereof by Engineer is acceptable to Contractor.
- I. The Contract Documents are generally sufficient to indicate and convey understanding of all terms and conditions for performance and furnishing of the Work.

ARTICLE 7 CONTRACT DOCUMENTS

7.1 Contents

- A. The Contract Documents consist of the following:
 - 1. This Agreement (pages 00520-1 to 00520-7, inclusive);
 - 2. Performance Bond;
 - 3. Payment Bond;
 - 4. General Conditions (title pages, table of contents, and pages 00700-1 to 00700-62, inclusive);
 - 5. Supplementary Conditions (pages 00800-1 to 00800-13, inclusive);

00520-3

Agreement

6. General Requirements (Division 1);
 7. Specifications (Divisions 2 and 13);
 8. Appendices to the Specifications (Appendix A, B, and C);
 9. Drawings consisting of a cover sheet and sheets numbered 1 through 16, inclusive, with each sheet bearing the following general title: SSO Mitigation Project, Area 1314A, Sanitary Sewer System Rehabilitation;
 10. Addenda (numbers ____ to ____, inclusive);
 11. Compliance Documents
 12. Exhibits to this Agreement (enumerated as follows):
 - a. Contractor's Bid (pages 00410-1 to 00410-13, inclusive);
 - b. Documentation submitted by Contractor prior to Notice of Award;
 13. The following which may be delivered or issued on or after the Effective Date of the Agreement and are not attached hereto:
 - a. Notice to Proceed;
 - b. Written Amendments;
 - c. Work Change Directives;
 - d. Change Order(s).
- B. The documents listed in Paragraph 7.1.A are attached to this Agreement (except as expressly noted otherwise above).
- C. There are no Contract Documents other than those listed above in this Article 7.
- D. The Contract Documents may only be amended, modified, or supplemented as provided in paragraph 3.04 of the General Conditions.

ARTICLE 8 MISCELLANEOUS

8.1 Terms

- A. Terms used in this Agreement will have the meanings indicated in the General Conditions and the Supplementary Conditions.

8.2 Assignment of Contract

- A. No assignment by a party hereto of any rights under or interests in the Contract will be binding on another party hereto without the written consent of the party sought to be bound; and, specifically but without limitation, moneys that may become due and moneys that are due may not be assigned without such consent (except to the extent that the effect of this restriction

may be limited by law), and unless specifically stated to the contrary in any written consent to an assignment, no assignment will release or discharge the assignor from any duty or responsibility under the Contract Documents.

8.3 Successors and Assigns

- A. The City of Waltham and Contractor each binds itself, its partners, successors, assigns, and legal representatives to the other party hereto, its partners, successors, assigns, and legal representatives in respect to all covenants, agreements, and obligations contained in the Contract Documents.

8.4 Severability

- A. Any provision or part of the Contract Documents held to be void or unenforceable under any Law or Regulation shall be deemed stricken, and all remaining provisions shall continue to be valid and binding upon the City of Waltham and Contractor, who agree that the Contract Documents shall be reformed to replace such stricken provision or part thereof with a valid and enforceable provision that comes as close as possible to expressing the intention of the stricken provision.

8.5 Contractor Certifications

- A. Contractor certifies that it has not engaged in corrupt, fraudulent, collusive, or coercive practices in competing for or in executing the Contract. For the purposes of this Paragraph 8.5:
 - 1. “corrupt practice” means the offering, giving, receiving, or soliciting of any thing of value likely to influence the action of a public official in the bidding process or in the Contract execution;
 - 2. “fraudulent practice” means an intentional misrepresentation of facts made (a) to influence the bidding process or the execution of the Contract to the detriment of the City of Waltham, (b) to establish Bid or Contract prices at artificial non-competitive levels, or (c) to deprive the City of Waltham of the benefits of free and open competition;
 - 3. “collusive practice” means a scheme or arrangement between two or more Bidders, with or without the knowledge of the City of Waltham, a purpose of which is to establish Bid prices at artificial, non-competitive levels; and
 - 4. “coercive practice” means harming or threatening to harm, directly or indirectly, persons or their property to influence their participation in the bidding process or affect the execution of the Contract.

- 8.6 The fair share goals for disadvantaged business enterprise (DBE) participation for this contract are a minimum of 7.24 percent D/MBE participation and 3.60 percent D/WBE participation, applicable to the total dollar amount paid for the construction contract. The Contractor shall take all affirmative steps necessary to achieve this

goal, and shall provide reports documenting the portion of contract and subcontract dollars paid to DBEs, and its efforts to achieve the goals, with each invoice submitted or at such greater intervals as specified by the City of Waltham. The Contractor shall require similar reports from its subcontractors.

- 8.7 The Contractor shall not discriminate against or exclude any person from participation herein on grounds of race, religion, color, sex, age, or national origin; and that it shall take affirmative actions to insure that applicants are employed, and that employees are treated during their employment, without regard to race, religion, color, sex, age, handicapped status, or national origin.
- 8.8 The Contractor shall not participate in or cooperate with an international boycott, as defined in Section 999 (b)(3) and (4) of the Internal Revenue code 1986, as amended, or engage in conduct declared to be unlawful by Section 2 of Chapter 151E of the Massachusetts General Laws.
- 8.9 The Contractor agrees that it will fully comply with Subpart C of 2 CFR Part 180 and 2 CFR Part 1532, entitled Responsibilities of Participants Regarding Transactions (Doing Business with Other Persons). The Contractor shall not award any subcontracts or purchase any materials from suppliers that appear on the Excluded Parties List System. The Contractor shall include this requirement in each subcontract and require it to be included in all subcontracts regardless of tier. The Contractor shall maintain reasonable records to demonstrate compliance with these requirements.

IN WITNESS WHEREOF, the City of Waltham and Contractor have signed this Agreement. Counterparts have been delivered to the City of Waltham and Contractor. All portions of the Contract Documents have been signed or identified by the OwnerCity of Waltham and Contractor or on their behalf.

This Agreement will be effective on _____, _____ (which is the Effective Date of the Agreement).

CITY OF WALTHAM:

CONTRACTOR:

By: Jeannette A. McCarthy
Title: Mayor _____
|

By: _____
Title: _____
[CORPORATE SEAL]

Catherine Cagle, Planning Director
Date: _____

Attest _____
Address for giving notices:

Joseph Pedulla, Purchasing Agent
Date: _____

License No. _____
(Where applicable)

(If Contractor is a corporation or a partnership, attach evidence of authority to sign.)

Luke Stanton Asst. City Solicitor
Date: _____

As to form only

Paul Centofanti, Auditor
Date: _____

Robert Waters, Housing Supervisor
Date: _____

Attests as to the availability of funds
As required by M.G.L. Chapter 44 Section 31c, this is to certify that the City of Waltham has an appropriation which is adequate to cover the cost of this Contract.

END OF SECTION

SECTION 00 53 00
GENERAL CONDITIONS

1. INFORMATION

All information shall come from the Office of the City Purchasing Agent. The Contractor shall inquire at this office for any information needed. Wherever the words “or equal as approved” are used, it is to be understood that the opinion of the City Purchasing Agent shall govern.

2. SUITS

The Contractor shall assume defense of and shall indemnify and hold the City and its agents harmless from all suits and claims against the City and its sub-contractors arising from the use of any invention, patent right labor or employment, or from any act of omission or neglect of the City, its agents, employees or any subcontractor in performing the work, under this contract.

3. LAWS AND REGULATIONS

The Contractor shall conform to all the applicable rules, regulations, laws and ordinances of the City of Waltham, the Commonwealth of Massachusetts, the United States of America and all agencies having jurisdiction over this contract.

4. PROTECTION OF PROPERTY

The Contractor shall take all proper precautions to protect the City’s property from damage and unnecessary inconvenience. Any City property damaged by the Contractor in carrying out the provisions of this contract shall be restored to its original condition, by and at the expense of the Contractor.

5. PROTECTION OF PERSONS

The Contractor shall take all proper precautions to protect persons from injury, unnecessary inconvenience, and shall be responsible for his failure to do so. The Contractor agrees to hold the City harmless from any and all liabilities of every nature and description, which may be suffered through bodily injury, including death, to any person, by reason of negligence of the Contractor, his agents or employees, or any subcontractor.

6. INSURANCE

A. WORKMAN’S COMPENSATION: The Contractor shall provide by insurance for the payment of compensation and furnishing of other benefits under Chapter 152 of the General Laws of the Commonwealth of Massachusetts to all persons to be employed under this contract, the premiums for which shall be paid by the Contractor.

B. COMPREHENSIVE GENERAL LIABILITY

Bodily Injury:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate
Property Damage:	\$1,000,000 Each Occurrence
	\$2,000,000 Aggregate

C. AUTOMOBILE (VEHICLE) LIABILITY

Bodily Injury	\$2,000,000 Each Occurrence
Property Damage	\$1,000,000 Aggregate

D. UMBRELLA POLICY

General liability	\$2,000,000
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Your bid response must include a Certificate of Insurance with the above limits as a minimum. In addition, the Certificate of Insurance must have the following text contained in the bottom left box of the Certificate: "The City of Waltham is a named Additional Insured for all Insurance". The Certificate of Insurance must be mailed directly to:

Office of the Purchasing Agent
Purchasing Department
City of Waltham
610 Main Street
Waltham, MA 02452

7. PERFORMANCE and PAYMENT BONDS

The Contractor agrees to execute and deliver to the City, a Performance and Payment Bond each equal to 100% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond shall be issued by a company licensed by the Commonwealth of Massachusetts. See also Sections 00 61 00 and 00 65 00

8. PERSONNEL:

The Contractor shall employ a competent supervisor and all properly licensed personnel necessary to perform the services required in this contract. The City Purchasing Agent shall have the right to require the Contractor to remove and/or replace any of the personnel for nonperformance or for unprofessional behavior. The City Purchasing Agent may require the Contractor to submit a weekly performance record of the areas and of the work performed, on forms approved by the City Purchasing Agent. The Contractor or his supervisor shall be available to inspect such work as required by the City Purchasing Agent.

9. PREVAILING WAGES

The Contractor is required to pay the prevailing wages as determined under the provisions of Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority. The prevailing Wage schedule will be found at www.city.waltham.ma.us/-bids . See also Section 00 71 00

10. MATERIALS

The City or its Agent reserves the right to approve or reject any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any supplies, material or equipment used by the Contractor. The Contractor agrees to replace any rejected supplies, materials or equipment, to the satisfaction of the City or its Agents.

11. TERMINATION OF CONTRACT

This contract may be terminated by the City upon deliverance to the Contractor of a five-day written notice of said termination.

12. CONTRACT OBLIGATIONS

Contract obligations on behalf of the City are subject to an annual appropriation to cover the contract obligation.

13. BIDDER EXPERIENCE EVALUATION

Each bidder shall submit with his bid, all the information relative to their experience and qualifications in performing the work required under this contract and shall have been in business for a minimum of five (5) years, in order for their bid to be considered.

14. NOT-TO-EXCEED AMOUNT

The bid amount proposed in your company’s response is a “not-to- Exceed” amount unless the City makes changes, in writing, to the scope of work to be performed. The Change Order must be signed and approved by the City’s Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided

15. FINANCIAL STATEMENTS.

The City may require, within five (5) days after the bid opening, a complete and detailed Financial Statement prepared by a Certified Public Account, to determine a bidder’s financial stability.

16. BREACH OF CONTRACT/ NON PERFORMANCE

If the Contractor shall provide services in a manner, which is not to the satisfaction of the City, the City may request that the Contractor refurnish services at no additional cost to the City until approved by the City. If the Contractor shall fail to provide services, which are satisfactory to the City, the City in the alternative may make any reasonable purchase or Contract to purchase services in substitution for those due from the Contractor. The City may deduct the cost of any substitute Contract for nonperformance of services together with incidental and consequential damages from the Contract price and shall withhold such damages from sums due or to become due to the Contractor. If the damages sustained by the City exceed sums due or to become due, the Contractor shall pay the difference to the City upon demand. The Contractor shall not be liable for any damages sustained by the City due to the Contractor's failure to furnish services under the terms of this Contract if such failure is in fact caused by the occurrence of a contingency the nonoccurrence of which was a basic assumption under which this Contract was made, including a state of war, embargoes, expropriation of labor strike or any unanticipated federal, state or municipal governmental regulation of order, provided that the Contractor has notified the City in writing of such cause within seven (7) days after its occurrence.

17. RIGHT TO AUDIT

The City of Waltham has the right to review and audit documents related to this contract. This right extends to any subcontractor, supplier or other entity used by the prime contractor to fulfill the obligations under this contract.

18. CITY ORDINANCE. APPROVAL OF CONTRACTS BY MAYOR, SEC. 3-12 OF THE CITY ORDINANCES.

All contract made by any department, board or commission where the amount involved is two thousand dollars (\$2,000) or more shall be in writing, and no such contract shall be deemed to have been made or executed until the approval of the Mayor is affixed thereto. Any construction contract shall, and all other contracts may, where the contract exceed five thousand dollars (\$5,000) be required to be accompanied by a bond with sureties satisfactory to the Mayor.

19. BID OPENING INCLEMENT WEATHER

If, at the time of the originally scheduled bid opening, City Hall is closed to inclement weather or another unforeseeable event, the bid opening will be extended until 2:00 PM on the next normal business day. Bids will be accepted until that date and time.

20. CHANGE ORDERS.

Change orders are not effective until, if, as and when signed by the Mayor and no work is to commence until the change orders are fully executed. Change Order must be signed and approved by the City's Purchasing Agent, City Auditor, Law Department and the Mayor prior to the commencement of the change order work. No work is to begin until the proper approvals have been obtained. A change order will be priced at the unit price. Failure to comply with this procedure will result in the cancellation of the contract and the non-payment of services provided.

SECTION 00 61 00

PERFORMANCE BOND

CONTRACTOR (*name and address*):

SURETY (*name and address of principal place of business*):

OWNER (*name and address*):

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description (*name and location*):

BOND

Bond Number:

Date (*not earlier than the Effective Date of the Agreement of the Construction Contract*):

Amount:

Modifications to this Bond Form: None See Paragraph 16

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Performance Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

_____ (*seal*)

Contractor's Name and Corporate Seal

_____ (*seal*)

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature (*attach power of attorney*)

Print Name

Print Name

Title

Title

Attest: _____

Attest: _____

Signature

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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 Paragraph 3.

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

3.1 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 Paragraph 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;

3.2 The Owner declares a Contractor Default, terminates the Construction Contract and notifies the Surety; and

3.3 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 Paragraph 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 Paragraph 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 Owners 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 Paragraph 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:

5.4.1 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

5.4.2 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 Paragraph 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 Paragraph 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.

7. If the Surety elects to act under Paragraph 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:

7.1 the responsibilities of the Contractor for correction of defective work and completion of the Construction Contract;

7.2 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 Paragraph 5; and

7.3 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 Paragraph 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 periods of limitations 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 for the Contractor for 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.

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:

SECTION 00 61 50

PAYMENT BOND

CONTRACTOR *(name and address)*:

SURETY *(name and address of principal place of business)*:

OWNER *(name and address)*:

CONSTRUCTION CONTRACT

Effective Date of the Agreement:

Amount:

Description *(name and location)*:

BOND

Bond Number:

Date *(not earlier than the Effective Date of the Agreement of the Construction Contract)*:

Amount:

Modifications to this Bond Form: None See Paragraph 18

Surety and Contractor, intending to be legally bound hereby, subject to the terms set forth below, do each cause this Payment Bond to be duly executed by an authorized officer, agent, or representative.

CONTRACTOR AS PRINCIPAL

SURETY

_____ *(seal)*

Contractor's Name and Corporate Seal

_____ *(seal)*

Surety's Name and Corporate Seal

By: _____

Signature

By: _____

Signature *(attach power of attorney)*

Print Name

Print Name

Title

Title

Attest: _____

Signature

Attest: _____

Signature

Title

Title

Notes: (1) Provide supplemental execution by any additional parties, such as joint venturers. (2) Any singular reference to Contractor, Surety, Owner, or other party shall be considered plural where applicable.

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 Paragraph 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 Paragraph 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,
 - 5.1.1 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
 - 5.1.2 have sent a Claim to the Surety (at the address described in Paragraph 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 Paragraph 13).
6. If a notice of non-payment required by Paragraph 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 Paragraph 5.1.1.
7. When a Claimant has satisfied the conditions of Paragraph 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 Paragraph 7.1 or 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 Paragraph 7.1 or 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 Paragraph 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.
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 Paragraph 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 requests 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 of "labor, materials, or equipment" that part of the 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.

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:

FORM OF GENERAL BID

SECT. 00 62 00

EXTERIOR HISTORICAL RESTORATION OF THE CARDINAL COTTAGE

282 Trapelo Road

WALTHAM, MASSACHUSETTS

ORIGINAL "WET" SIGNATURES ARE REQUIRED

DUE: March 8, 2018 - 10:00 Am

To the Awarding Authority: City Of Waltham, Massachusetts

The undersigned Bidder proposes to furnish all labor and materials required for the EXTERIOR HISTORICAL RESTORATION OF THE CARDINAL COTTAGE Waltham, Massachusetts, in accordance with the accompanying plans and specifications for the Contract price specified below, subject to additions and deductions according to the terms of the specifications.

A. This bid includes addenda numbered: _____, _____, _____, _____, _____, _____, _____, _____.

B. The proposed BASE contract price is:	\$ _____
1. Allowance for Police Details	\$ 2,000.00
2. Allowance for Unforeseen Conditions	\$ 10,000.00

Grand Total	\$ _____
--------------------	-----------------

Allowances are discretionary City expenses. The amounts listed in this section shall be used only if needed and following the written approval by the Architect and the City. The Police Detail Allowance if used is paid back to the Contractor on a reimbursable basis while the Unforeseen Conditions amount is paid ONLY after the City and the Architect agree in writing to the necessity of the expense.

The undersigned agrees that, if he is selected as general contractor, he will within five days, Saturdays, Sundays and legal holidays excluded, after presentation thereof by the awarding authority, execute a contract in accordance with the terms of this bid and furnish a performance bond and also a labor and materials or payment bond, each of a surety company qualified to do business under the laws of the commonwealth and satisfactory to the awarding authority and each in the sum of the contract price, the premiums for which are to be paid by the general contractor and are included in the contract price; provided, however, that if there is more than 1 surety company, the surety companies shall be jointly and severally liable.

The undersigned hereby certifies that he is able to furnish labor that can work in harmony with all other elements of labor employed or to be employed on the work; that all employees to be employed at the worksite will have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first certified payroll report for each employee; and that he will comply fully with all laws and regulations applicable to awards made subject to section 44A.

Historic Restoration, Cardinal Cottage

The undersigned further certifies under the penalties of perjury that this bid is in all respects bona fide, fair and made without collusion or fraud with any other person. As used in this subsection the word "person" shall mean any natural person, joint venture, partnership, corporation or other business or legal entity. The undersigned further certifies under penalty of perjury that the said undersigned is not presently debarred from doing public construction work in the commonwealth under the provisions of section twenty-nine F of chapter twenty-nine, or any other applicable debarment provisions of any other chapter of the General Laws or any rule or regulation promulgated thereunder.

The Bidder has familiarized itself with the nature and extent of the Contract Documents, Work, site, locality, and all local conditions and Laws and Regulations that in any manner may affect cost, progress, performance or furnishing of the Work.

This Bid is genuine and not made in the interest of or on behalf of any undisclosed person, firm or corporation and is not submitted in conformity with any agreement or rules of any group, association, organization or corporation; the Bidder has not directly or indirectly induced or solicited any other Bidder to submit a false or sham Bid; the Bidder has not solicited or induced any person, firm or corporation to refrain from bidding; and the Bidder has not sought by collusion to obtain for itself any advantage over any other Bidder or over Owner.

The Bidder certifies that it has reviewed the insurance requirements contained in the Contract Documents and certifies that it can meet them. The Bidder also certifies its completion of the attached Contractor Certification forms.

THIS BID SUBMITTED ON 2017

Name of General Bidder: _____

By _____, _____

Authorized Signature Printed Name

Printed Title

(Corporate Seal)

Attest

Business Address:

.....

Phone Number: ()

E-mail Address:

ORIGINAL "WET" SIGNATURES ARE REQUIRED

SECTION 00 65 00

COMPLIANCE FORMS

(PLEASE COMPLETE AND SUBMIT THESE FORMS WITH YOUR RESPONSE)

NON-COLLUSION FORM AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

The undersigned certifies under penalties of perjury that this bid or proposal has been made and submitted in good faith and without collusion or fraud with any other person. As used in this certification, the word "person" shall mean any natural person, business, partnership, corporation, union, committee, club, or other organization, entity or group of individuals. The undersigned certifies that no representations made by any City officials, employees, entity, or group of individuals other than the Purchasing Agent of the City of Waltham was relied upon in the making of this bid

_____, _____
(Signature of person signing bid or proposal) Date

(Name of business)

TAX COMPLIANCE CERTIFICATION

Pursuant to M.G.L. c. 62C, & 49A, I certify under the penalties of perjury that, to the best of my knowledge and belief, I am in compliance with all laws of the Commonwealth relating to taxes, reporting of employees and contractors, and withholding and remitting child support.

_____, _____
Signature of person submitting bid or proposal Date

Name of business

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

CERTIFICATE OF VOTE OF AUTHORIZATION

Date:

I _____, Clerk of _____ hereby certify that at a meeting of the Board of Directors of said Corporation duly held on the _____ day of _____ at which time a quorum was present and voting throughout, the following vote was duly passed and is now in full force and effect:

VOTED: That _____ (*name*) is hereby authorized, directed and empowered for the name and on behalf of this Corporation to sign, seal with the corporate seal, execute, acknowledge and deliver all contracts and other obligations of this Corporation; the execution of any such contract to be valid and binding upon this Corporation for all purposes, and that this vote shall remain in full force and effect unless and until the same has been altered, amended or revoked by a subsequent vote of such directors and a certificate of such later vote attested by the Clerk of this Corporation.

I further certify that _____ is duly elected/appointed _____ of said corporation

SIGNED:

(Corporate Seal)

Clerk of the Corporation:

Print Name: _____

COMMONWEALTH OF MASSACHUSETTS

County of _____

Date:

Then personally appeared the above named and acknowledged the foregoing instrument to be their free act and deed before me, _____

Notary Public;

My Commission expires: _____

CORPORATION IDENTIFICATION

The bidder for the information of the Awarding Authority furnishes the following information.

If a Corporation:

Incorporated in what state _____
President _____
Treasurer _____
Secretary _____
Federal ID Number _____

If a foreign (out of State) Corporation – Are you registered to do business in Massachusetts?

Yes _____, No _____

If you are selected for this work you are required under M.G.L.ch. 30S, 39L to obtain from the Secretary of State, Foreign Corp. Section, State House, Boston, a certificate stating that you Corporation is registered, and furnish said certificate to the Awarding Authority prior to the award.

If a Partnership: (Name all partners)

Name of partner _____
Residence _____
Name of partner _____
Residence _____

If an Individual:

Name _____
Residence _____

If an Individual doing business under a firm’s name:

Name of Firm _____
Name of Individual _____
Business Address _____
Residence _____
Date _____
Name of Bidder _____
By _____

Signature _____

Title _____

Business Address _____ (POST OFFICE BOX NUMBER NOT ACCEPTABLE)

City _____ State _____ Telephone Number _____ Today’s Date _____

WEEKLY PAYROLL RECORDS REPORT & STATEMENT OF COMPLIANCE

In accordance with Massachusetts General Law c. 149, §27B, a true and accurate record must be kept of all persons employed on the public works project for which the enclosed rates have been provided, A Payroll Form has been printed on the reverse of this page and includes all the information required to be kept by law. Every contractor or subcontractor is required to keep these records and preserve them for a period of three years from the date of completion of the contract. In addition, every contractor and subcontractor is required to submit, on a weekly basis, a copy of his or her weekly payroll records to the awarding authority. For every week in which an apprentice is employed, a photocopy of the apprentice's identification card must be attached to the payroll report. Once collected, the awarding authority is also required to preserve those reports for three years. In addition, each such contractor, subcontractor, or public body shall furnish to the awarding authority directly, within fifteen days after completion of its portion of the work, a statement, executed by the contractor, subcontractor or public body who supervises the payment of wages, in the following form:

STATEMENT OF COMPLIANCE

_____, 201__

I _____,
(Name of signatory party) _____ (Title)

I do hereby state that I pay or supervise the payment of the persons employed by
_____ On the _____
(Contractor, subcontractor or public body) (Building or project)

and that all mechanics and apprentices, teamsters, chauffeurs and laborers employed on said project have been paid in accordance with wages determined under the provisions of sections twenty-six and twenty-seven of chapter one hundred and forty nine of the General Laws.

Signature _____, Title _____

Print _____, Date _____

WEEKLY PAYROLL REPORT FORM

Company Name: _____ Prime Contractor

Project Name: _____ Subcontractor

Awarding Auth.: _____ List Prime Contractor: _____

Work Week Ending: _____ Employer Signature: _____

Final Report _____ Print Name & Title: _____

Employee Name & Address	Work Classification	Hours Worked							(A) Tot. Hrs.	(B) Hourly Base Wage	Employer Contributions			(F) [B+C+D+E] Hourly Total Wage (prev. wage)	(G) [A*F] Weekly Total Amount	
		S	M	T	W	T	F	S			(C) Health & Welfare	(D) Pension	(E) Supp. Unemp.			

NOTE: Every contractor and subcontractor is required to submit a copy of their weekly payroll records to the awarding authority.

RIGHT TO KNOW LAW

Any vendor who receives an order or orders resulting from this invitation agrees to submit a Material Safety Data Sheet (MSDS) for each toxic or hazardous substance or mixture containing such substance, pursuant to M.G.L. c. 111F, §§8,9 and 10 and the regulations contained in 441 CMR 21.06 when deliveries are made. The vendor agrees to deliver all containers properly labeled pursuant to M.G.L. c. 111F §7 and regulations contained in 441 CMR 21.05. Failure to furnish MSDS and/or labels on each container may result in civil or criminal penalties, including bid debarment and action to prevent the vendor from selling said substances, or mixtures containing said substances within the Commonwealth. All vendors furnishing substances or mixtures subject to Chapter 111F or M.G.L. are cautioned to obtain and read the laws, rules and regulations referenced above. Copies may be obtained from the State House Bookstore, Secretary of State, State House, Room 117, Boston, MA (617) 727-2834.

Authorized Signature Indicating Compliance with the Right-to-know laws:

Signature

Date

Print Name

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package may cause the disqualification of your proposal.

DEBARMENT CERTIFICATION

In connection with this bid and all procurement transactions, by signature thereon, the respondent certifies that neither the company nor its principals are suspended, debarred, proposed for debarment, declared ineligible, or voluntarily excluded from the award of contracts, procurement or non procurement programs from the Commonwealth of Massachusetts, the US Federal Government and /or the City of Waltham. "Principals" means officers, directors, owners, partners and persons having primary interest, management or supervisory responsibilities with the business entity. Vendors shall provide immediate written notification to the Purchasing Agent of the City of Waltham at any time during the period of the contract of prior to the contract award if the vendor learns of any changed condition with regards to the debarment of the company or its officers. This certification is a material representation of fact upon which reliance will be placed when making the business award. If at any time it is determined that the vendor knowingly misrepresented this certification, in addition to other legal remedies available to the City of Waltham, the contract will be cancelled and the award revoked.

Company Name _____

Address _____

City _____, State _____, Zip Code _____

Phone Number (____) _____

E-Mail Address _____

Signed by Authorized Company Representative: _____

Print name. _____, Date _____

10 HOURS OSHA TRAINING CONFIRMATION

Chapter 306 of the Acts of 2004

CONSTRUCTION PROJECTS

AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC

The undersigned hereby certifies that all employees to be employed at a worksite for construction, reconstruction, alteration, remodeling, repair, installation, demolition, maintenance or repair of any public work or any public building estimated to cost more than \$10,000.00 have successfully completed a course in construction safety and health approved by the United States Occupational Safety and Health Administration that is at least 10 hours in duration at the time the employee begins work and who shall furnish documentation of successful completion of said course with the first payroll report for each employee and will comply with all laws and regulations applicable to awards of subcontracts subject to section 44F.

Company Name: _____

Address: _____

Signature: _____

Title: _____

Print Name _____

Date _____

See following Chapter 306 of the Acts of 2004

NOTE

Failure to submit any of the required documents, in this or in other sections, with your bid response package will be cause for the disqualification of your company.

PROOF OF CONTRACTOR'S RESPONSIBILITY

Before a contract will be awarded to any bidder, he/she will be required to furnish evidence satisfactory to the City that he/she has all of the following qualifications:

- A. Ability, equipment, organization, and financial resources sufficient or enable him/her to construct and complete the work successfully within the time required.
- B. Experience during the past three (3) years in the successful completion of turf restoration projects, the magnitude of which shall be not less than one-half (1/2) the work herein specified. In this connection, the attention of the bidder is directed to the "Bidder's Experience" attached hereto, which shall be used in determining the responsibility of the bidder. The City may require additional information as necessary to determine the responsibility of the bidder.
- C. An experienced bidder shall be construed to mean that the bidder has an individual within his/her organization with the experience to supervise a job of this nature.

In the event the bidder fails, refuses, or neglects to submit any required information within the reasonable time stated in any request or fails to qualify as a responsible bidder, his/her bid guaranty shall be forfeited to the use of the owner, not as a penalty, but as liquidated damages.

The determination of whether a bidder is responsible shall rest solely with the City.

BIDDER'S EXPERIENCE

The following is a list of the projects similar in character and scope to the work specified under this contract, which have been successfully completed by this bidder during the past three years.

This information must be furnished by each bidder. A completed project is one that has been accepted and the final payment received from the City or authorized representative.

Bidder's Signature

Date

COMPLETE ONLY IF YOUR COMPANY IS AN LLC

**CERTIFICATE OF AUTHORITY
LIMITED LIABILITY COMPANY**

The undersigned, being (a/the) duly elected, qualified and active (member / manager) of _____, a Massachusetts limited Liability Company (hereinafter "the Company")

Does Hereby Certify that

1. The Articles of Organization of the Company were duly filed with the Office of the Secretary of State of the State of Massachusetts on _____, and the Articles of Organization have not been (further) amended.

2. The Company has complied with the publication requirements contained in Section 67 of the Limited Liability Company Law.

3. There exists an Operating Agreement of the Company and that the said Operating Agreement has not been amended or repealed and that the said Operating Agreement remains in full force and effect as of this date.

4. Neither the Articles of Organization nor the Operating Agreement (as amended) require any further act to be taken or a meeting to be held by its members other than as follows:

5. All said requirements, whether as contained in the Articles of Organization or in the Operating Agreement or by operation of law as to the transaction of _____, 20____ have been met.

6. The following person or persons has/have been duly authorized by the Company to execute all documents in connection with said transaction and that the signature appearing to the right of their name(s) is his/her genuine signature.

NAME	OFFICE HELD	SIGNATURE
_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

IN Witness Whereof, the undersigned has executed this Certificate of Authority this _____ day of _____, 20____.

(Signature)

STATE OF MASSACHUSETTS, COUNTY OF _____

On the ____ day of _____, 20____, before me, the undersigned personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/ they executed the same in his/her/their capacity(ies), and that by his/her/their signature(s) on the instrument, the individual(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

Notary Public: _____

My Commission Expires: _____

Notary Stamp:

Section 00 71 00

Massachusetts Prevailing Wage Rates

Are found at www.city.waltham.ma.us/bids

DIVISION 1: GENERAL REQUIREMENTS



CITY OF WALTHAM PLANNING DEPARTMENT
ROBERT WATERS, HOUSING SUPERVISOR
119 SCHOOL STREET, TOP FLOOR
WALTHAM, MA 02451
TEL: 781-314-3381

HISTORICAL RESTORATION CARDINAL COTTAGE

TRAPELO ROAD
WALTHAM, MA

PROJECT MANUAL

Issued for: Contract Documents

ALEX J. KNOX AIA
80 Oak Street, Needham, MA 02492
617-306-3475

SECTION 01 00 00 - CONSOLIDATED GENERAL REQUIREMENTS

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PART 1 - GENERAL

1.1. RELATED DOCUMENTS

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. This Section applies to all Work performed under the Contract.
- C. Owner identification: See title page.
- D. Owner Standards are made part of this Project Manual and incorporated by reference. See Owner for copies.
- E. Comply with the special requirements of Owner and attached or referenced documents.

1.2. SUMMARY OF WORK & PROJECT REQUIREMENTS

- A. Project Identification: As listed on cover page and in header.
- B. The work consists of:
 - 1. Alterations, additions and improvements.
 - 2. Demolition and all MEP trade.
 - 3. A separate hazardous waste abatement contract entered into by the Owner to provide removal of lead paint, asbestos and similar toxic materials. This contract shall not relieve the present bidder/contractor from verifying conditions and from properly preparing conditions to receive work of this contract.
 - 4. Coordination with the vendors, suppliers and installers of this Contract.
- C. Pricing & Contracting Requirements: Refer to Owner and Article 1.9 below.
- D. Comply with the Owner Standards. Specific attention is directed to:
 - 1. Written reports to be provided detailing subcontractors at the site, workers per sub, mandated minority or women owned subcontractor workers per sub, Contractor's workers and minority workers at the site,

- weather conditions, description of work done, deliveries, Owner/Architect instructions and decisions. Deliver report to Owner PM office the next following working day.
2. Requirements for regular project meetings, at intervals required by Owner or Architect.
 3. Construction Scheduling.
 4. Work hours, which are typically 7:00 to 3:00 unless otherwise arranged and approved in writing.
 5. Comply with requirements for permits, details, fire watch and shut downs. Note that addition fees for accelerated construction and off hours work and scheduling of work during on holidays or other times will not be permitted regardless of the fact that authorities having jurisdiction may prohibit work at certain hours or on certain days.
 6. Management of fire detectors and coordination with Fire Marshalls in locality having jurisdiction.
 7. Parking arrangements.
 8. The requirement for progress photos.
 9. Punch list staffing and requirements
 10. Compliance with Factory Mutual Standards.
 11. The Owner's right to occupy and place equipment in completed areas of the building prior to Substantial Completion which does not interfere with the completion of the Work.
 12. Construction Management software: Where required by Owner or Architect, it is a contract requirement that software compatible with Architect/Owner systems be used during all construction phases. This included management and scheduling software.
 13. Owner Tax Exempt Status: Comply with the requirements of state statutes for payment of state taxes in connection with construction projects performed for tax exempt entities. Verify Owner status.
- E. Sustainable Design Intent: The following requirements are made a part of the Contract Requirements for this Project:
1. Compliance with Institution/Local/State/Agency sustainability requirements and regulations and applicable building code standards.
 2. Take notice of Section 01 51 50, Construction Indoor Air Quality (IAQ) Management and Section 01 57 10, Construction Waste Management. See other sections and specific requirements throughout the contract.
 3. Provide green housekeeping methods at final closeout.
 4. Comply with Owner recycling goal for demolition and construction waste removed from the site.
- F. Project Requirements for Temporary Utilities and Facilities:
1. Utility Costs: The Contractor shall meter and pay for cost of utility services consumed, including electricity, water, gas and temporary heat.
 2. Temporary Offices: Provide field offices.
 3. Toilet Facilities: Provide toilet facilities for construction personnel.
- G. Permits and Fees: Apply for, obtain, and pay for permits, fees, and utility company backcharges required to perform the work. Submit copies to Architect and Owner immediately upon receipt.
- H. Dimensions: Verify dimensions indicated on drawings with field dimensions before fabrication or ordering of materials. Do not scale drawings.
- I. Existing Conditions: Notify Architect of existing conditions differing from those indicated on the drawings. Do not proceed with work that requires deviation from the design with Architect's written approval.
- J. Contractor's Conduct on Premises: The Contractor and his employees shall behave in a respectful, courteous and safe manner. Abusive, harassing, and lewd behavior is prohibited. Music playing is prohibited. Alcohol, tobacco and drug use is prohibited.

- K. Hazardous Waste: Refer to Owner. Hazardous waste is outside the scope of responsibility of the Architect and his consultants.
- L. Contractor's Management Staff Requirements: Provide staff necessary to manage project and acceptable to Owner.
 - 1. Experience, Qualifications: Minimum 10 years experience with projects similar to this Contract.
 - 2. Reassignment or Replacement: If requested by the Owner or Architect at any time during the Contract, replace Contractor's management staff with personnel acceptable to the Owner and Architect. Do not reassign or replace management staff, unless preapproved by the Owner.
 - 3. On Site: Contractor's Management Staff shall be on site whenever work is in progress.
 - 4. Work Restrictions: Contractor's Management Staff shall manage, supervise, coordinate, plan, and direct the work. Contractor's Management Staff shall not work with tools and provide production work.
 - 5. Installation/MEP Coordinator: Provide the services of an experienced installation coordinator to direct, manage and supervise the Coordination Drawing process and the installation of all building systems including interface with structure and architecture.
- M. Restrictions on Noise: Comply with requirements of authorities having jurisdiction.
 - 1. Use equipment with well maintained mufflers.
 - 2. Use the least noisy techniques practical.
 - 3. Schedule noisy activities when ambient background noise level is highest.
 - 4. Turn off all unneeded and idling equipment and engines.
 - 5. Locate noise sources as far as practical from noise sensitive locations.
 - 6. Orient noise sources away from noise sensitive locations

1.3. SPECIFICATION INFORMATION

- A. These specifications are a specialized form of technical writing edited from master specifications and contain deviations from traditional writing formats. Capitalization, underlining and bold print are only used to assist readers in finding information and no other meaning is implied.
- B. Except where specifically indicated otherwise, the subject of all imperative statements is the Contractor.
- C. Sections are generally numbered in conformance with Construction Specifications Institute Masterformat System. Numbering sequence is not consecutive. Refer to the table of contents for names and numbers of sections included in this Project.
- D. Pages are numbered separately for each section. Each section is noted with "End of Section" to indicate the last page of a section.
- E. Specification sections are only a portion of the Contract Documents. All Contract Documents including Conditions of the Contract, Division 1 General Requirements apply to each section. Each section applies to all specification section and work of the Contract.

1.4. DEFINITIONS

- A. General: Basic Contract definitions are included in the Conditions of the Contract.
- B. "Approved": When used to convey Architect's action on Contractor's submittals, applications, and requests, "approved" is limited to Architect's duties and responsibilities as stated in the Conditions of the Contract.
- C. "Directed": A command or instruction by Architect. . Other terms including "requested," "authorized," "selected," "approved," "required," and "permitted" have the same meaning as "directed."
- D. "Indicated": Requirements expressed by graphic representations or in written form on Drawings, in Specifications, and in other Contract Documents. Other terms including "shown," "noted," "scheduled," and "specified" have the same meaning as "indicated."
- E. "Regulations": Laws, ordinances, statutes, and lawful orders issued by authorities having jurisdiction, and rules, conventions, and agreements within the construction industry that control performance of the Work.

- F. "Furnish": Supply and deliver to Project site, ready for unloading, unpacking, assembly, installation, and similar operations.
 - G. "Install": Operations at Project site including unloading, temporarily storing, unpacking, disposing of packaging, assembling, erecting, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning, and similar operations.
 - H. "Provide": Furnish and install, complete, in place, and ready for the intended use.
 - I. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
 - J. "Project Site": Space available for performing construction activities. The extent of Project site is shown on Drawings and may or may not be identical with the description of the land on which Project is to be built.
 - K. "As shown, if not": As shown or indicated in the Contract Documents and if not so shown, then provide the item(s) following "if not,".
 - L. "Section includes": unless otherwise noted, shall mean, "Section includes, without limitation, providing".
 - M. "As indicated" or "As shown" or "As scheduled" shall mean as indicated on the drawings or finish schedule or finish legend.
- 1.5. INDUSTRY STANDARDS
- A. Referenced standards are part of the Contract Documents and have the same force and effect as if bound with these specifications.
 - B. Except where specifically indicated otherwise, comply with the current standard in effect as of the date of the Owner/Contractor Agreement. Obtain copies of industry standards directly from publisher.
 - C. The titles of industry standard organizations are commonly abbreviated; full titles may be found in Encyclopedia of Associations or consult Architect.
- 1.6. CODES AND REGULATIONS
- A. Comply with all applicable codes, ordinances, regulations and requirements of authorities having jurisdiction:
 - B. Submit copies of all permits, licenses, certifications, inspection reports, releases, notices, judgments, and communications from authorities having jurisdiction to the Architect.
- 1.7. PROGRESS SCHEDULE
- A. Provide comprehensive bar chart schedule showing all major and critical minor portions of the work, sequence of work and duration of each activity. Update and reissue regularly, but not less than monthly. Comply with the following:
 - B. Contract Progress Schedules and Reports: Provide Critical Path Method [CPM] progress schedules and reports.
 - 1. Software Program: Subject to approval by Owner and Architect.
 - 2. First Submittal: Within 30 days after executed Owner Contractor Agreement.
 - 3. Updated Submittals: Required at least once per month.
 - 4. Subcontractors: Shall provide information requested by the General Contractor.
 - 5. Contract Progress Schedule and Schedule of Values: Make the Contract Progress Schedule work items with the Schedule of Value work items the same.
 - C. Contract Progress Schedule Content: Include at least the following information.
 - 1. All major and critical minor Contract activities.
 - 2. Sequence and duration of each activity.
 - 3. Project milestones.
 - 4. Early start and early finish for each activity.
 - 5. Late start and late finish for each activity.

6. Total float time for each activity.
 7. Submittals related to each activity including dates of first submittal and last date for approval.
 8. Fabrication and delivery time for each item requiring off site fabrication.
 9. Start and completion dates for each mock up and sample including in place samples.
 10. The critical path of work.
- D. Contract Progress Schedule Reports: Submit reports including at least the following information:
1. The critical path of work and all work items on the critical path.
 2. Bar chart plot.
 3. Plot showing the content specified above.
 4. Monthly activity plots for each month.
 5. Two week "look ahead" plots.
 6. "Executive Summary" indicating if on schedule or, if not on schedule, problem areas.
- E. Contract Progress Schedule Updates: Update at least once per month, and as follows:
1. Unless otherwise agreed, submit with Application for Payment.
 2. Incorporate actual start and complete dates.
 3. Update whenever the Contract Time is revised by Change Order.
- F. Recovery Plan: Prepare and submit a "Recovery Plan" whenever the work is 10 calendar days or more behind schedule. Show how the project will be managed **back to "on schedule" condition**.

1.8. SCHEDULE OF VALUES

- A. Comply with Architect and Owner requirements and provide a Standard Schedule of Values in formats and minimum line items unless waived by the Owner. Prepare Schedule of Values to coordinate with application for payment breakdown. Submit at least 10 days before first payment application. Update and reissue regularly, but not less than monthly.

1.9. PAYMENT REQUESTS

- A. Provide three copies of each request on completely filled out copies of AIA G702 and continuation sheet G703. Substantiate requests with complete documentation; include change orders to date. Provide partial [interim] lien waivers for work in progress and full lien waivers for completed work. Waiver of liens shall sum to the total of the applicable line items on the G702 AIA form.
- B. Record Drawing Certification: Certify as a part of each application for payment that the project record documents are current at the time of application is submitted. The Contractor shall require such drawings to be current as a condition of approving any payment to the Trade Contractors and Subcontractors.
- C. Before first payment application, provide the following:
1. List of subcontractors, suppliers and fabricators.
 2. Schedule of values.
 3. Progress schedule.
 4. Submittal schedule keyed to project schedule.
 5. List of Contractor's key project personnel.
 6. Copies of permits and other communications from authorities.
 7. Contractor's certificate of insurance.
 8. Performance and payment bonds if required.
 9. Unit price schedule.
 10. Construction Waste Management Plan, other specified sustainable construction management plans.
- D. For typical payment application, provide the following:
1. Updated Schedule of values,
 2. Progress schedule.
 3. Submittal schedule keyed to project schedule.

4. Release of liens.
 5. Other documents required by Owner or municipalities.
 6. Certificate of title and insurance for goods stored off-site.
 7. Construction Waste Management Plan reports.
 8. Materials cost data as required to document recycled content, certified wood, location of manufacturing, and other sustainable requirements
- E. Before final payment application, provide and complete the following:
1. Complete close out requirements.
 2. Complete punch list items.
 3. Settle all claims.
 4. Transmit record documents to Architect.
 5. Prove that all taxes, fees and similar obligations have been paid.
 6. Remove temporary facilities and surplus materials.
 7. Change lock cylinders or cores.
 8. Clean the work,
 9. Submit consent of surety, if any, for final payment.

1.10. PROCEDURES AND CONTROLS

- A. Project Meetings: Arrange for and attend project meetings with the Architect and such other persons as the Architect requests to have present. The Contractor shall be represented by a principal, project manager, general superintendent or other authorized main office representative, as well as by the Contractor's field superintendent. An authorized representative of any subcontractor or sub-subcontractor shall attend such meetings if the representative's presence is requested by the Architect. Such representatives shall be empowered to make binding commitments on all matters to be discussed at such meetings, including costs, payments, change orders, time schedules and manpower. Any notices required under the Contract may be served on such representatives. Written reports of meeting minutes shall be prepared and distributed to attendees, the Architect, Contractor(s), and Owner in advance of the next meeting. Minutes shall be prepared by Architect or Contractor, as mutually agreed, except where Owner or agencies mandate minutes to be prepared by Architect.
1. Pre-Construction Conference: Attendance by Architect, Contractor, major subcontractors. Agenda shall include: Quality of workmanship, coordination, interpretations, job schedule, submittals, approvals, requisition procedures, testing, protection of construction, indoor air quality, and construction waste management.
- B. Emergency Addresses: Furnish the Owner and Architect, in writing, the names addresses and telephone numbers of individuals to be contacted in the event of an out-of-hours emergency at the building site. Post a similar list readily visible from the outside of the field office or a location acceptable to the Architect.
- C. Layout: Layout work and be responsible for all lines, elevations, and measurements of the work executed under the contract. Where required to complete the work properly, the Contractor shall engage and pay for a professional land surveyor.
- D. Field Measurements: Verify measurements at the building prior to ordering materials or commencing work. No extra charge or compensation will be allowed because of differences between actual dimensions and measurements indicated on the Drawings. Differences which may be found shall be submitted to the Architect for decision before proceeding with the work.
- E. Field Measurements for Fixed Equipment: Dimensions for fixed equipment to be supplied under this Contract or separate contracts shall be determined by field measurements taken jointly by the Contractor and the equipment supplier involved. A record of the field measurements shall be kept until time of substantial completion of the project, or until the equipment has been fully installed and accepted by the Owner, whichever is later. Responsibility for fixed equipment fabricated accurately to field measurements for proper fit and operation shall be that of the Contractor. Contractor shall pay all costs involved in correcting any mis-fitting fixed equipment as fabricated.

- F. Project Limit Line: The boundaries of the site do not limit the responsibility of the Contractor to perform the work in its entirety. Make utility connections as indicated.
- G. Matching: Where matching is indicated, the Architect shall be the sole and final judge of what is an acceptable match. Mockups and sample submissions are required.
- H. Observation: Notify the Architect and authorities having jurisdiction at least thirty-six hours in advance of concealing any work.
- I. Utilities: Prior to interrupting utilities, services or facilities, notify the utility owner and the Owner and obtain their written approval a minimum 48 hours in advance.
- J. Furnishings, Fixtures, and Equipment: Cooperate and permit the Owner to install his furnished items. Installation of such furnishings or equipment does not signify Owner's acceptance of any portion of the work.
- K. Clean-Up: Frequently clean-up all waste, remove from site regularly, and legally dispose of off-site.
- L. Installer's Acceptance of Conditions: All installers shall inspect substrates and conditions under which work is to be executed and shall report in writing to the Contractor all conditions detrimental to the proper execution and completion of the work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning work means installer accepts previous work and conditions.
- M. Coordination: The Contractor shall be fully responsible for coordinating all trades, coordinating construction sequences and schedules, and coordinating the actual installed location and interface of all work.
 - 1. Prior to beginning mechanical, electrical and fire protection work, the Contractor shall prepare coordination drawings on mylars or other acceptable media showing the exact alignment, physical location and configuration of the mechanical, electrical and fire protection installations and demonstrating to the Contractor's satisfaction that the installations will clear all obstructions, permit proper clearances for the Work of other trades, and present an orderly appearance where exposed. The Contractor shall be solely liable and responsible for any costs and delays resulting from the Contractor's failure to prepare any such coordination drawings or from the negligent preparation of such coordination drawings. At the completion of the work turn over all coordination drawings to the Architect and Owner. Provide drawings as follows:
 - a. Scale: ¼ inch = 1'-0" or larger scale.
 - b. Color: Color code each trade in a clearly different color.
 - c. Conflicts: Indicate all conflicts by means of a clear symbol and note.
 - 2. Exact locations and groupings of mechanical, electrical and fire protection fixtures, switches, heads, devices and outlets shall be obtained from the Architect before the Work is roughed in, if not already indicated. Work installed without such information from the Architect shall be relocated at the Contractor's expense if the Architect so requests.
- N. Request For Interpretation (RFIs):
 - 1. Procedure: Immediately on discovery of the need for interpretation of the Contract Documents, and prepare and submit an RFI in the form specified.
 - a. RFIs shall originate with Contractor. RFIs submitted by entities other than Contractor will be returned with no response.
 - b. Submit RFI electronically unless otherwise agreed.
 - 2. Content of the RFI: Include a detailed, legible description of item needing interpretation.
 - 3. Architect's Action: Architect will review each RFI, determine action required, and return it. Allow 5 working days for Architect's response for each RFI and 7 where Architect's consultants are involved. RFIs received after 1:00 p.m. will be considered as received the following working day.
 - 4. The following RFIs will be returned without action:
 - a. Requests for approval of submittals.
 - b. Requests for approval of substitutions.
 - c. Requests for coordination information already indicated in the Contract Documents.
 - d. Requests for adjustments in the Contract Time or the Contract Sum.
 - e. Requests for interpretation of Architect's actions on submittals.
 - f. Incomplete RFIs or RFIs with numerous errors.

- O. Existing Articles of Unusual Value: If during demolition, excavation, or disposal work articles of unusual value or of historical or archaeological significance are encountered, the ownership of such articles is retained by the Owner, and information regarding their discovery shall be immediately furnished to the Architect. If the nature of the article is such that work cannot proceed without danger of damage, work in the area shall be immediately discontinued until the Architect has determined the proper procedure to be followed. Delays in time thereby shall be a condition for which the time of the Contract may be extended. Costs incurred after discovery in the salvaging of such articles shall be borne by the Owner.
- P. Quality Control & Testing Services: Coordinate with the Owner and Architect in the event testing is required. Provide services necessary to enable inspectors, testing laboratory representatives and the like to perform their work.
- Q. Progress Photos: Comply with the following:
1. Photographer: Any competent person approved by the Owner and Architect.
 2. Digital Photographs: Minimum 8 million pixel, clearly legible, "jpeg" file images.
 3. Digital Submission: Submit compact disc with digital photograph files each month.
 4. Prints: Not required.
 5. Lighting: Provide supplemental lighting as needed to provide clear, detailed images.
 6. Construction Photographs:
 - a. Purpose: To document the progress of the work.
 - b. Quantity: At least 20 images per week.
 - c. Photo Identity: Give each photo a unique identity number.
 - d. Record: Date and time photo taken, included in filename.
 7. Preconstruction Photographs - New Construction: Record existing conditions with emphasis on nearby existing improvements indicated to remain. Clearly record existing damage, if any.
- R. Daily Reports: Provide daily reports and submit to Owner and Architect once per week.
- S. Long Lead Time Items: Time is of the essence in the Contract. Expedite and provide special management for "long lead time" items.
- T. Contractor's Responsibilities Related To The Owner's Management Staff:
1. Cooperate with the Owner's management staff.
 2. Provide "Weekly Work Plan" each Monday morning by 8:00 am.
 3. Provide immediate notification of all unusual conditions and occurrences at the site.
 4. Identify all persons at the site, both workers and visitors.
- U. Documents On Site: Maintain the following documents on site and up-to-date:
1. Contract Documents.
 2. Modifications and changes to Contract Documents.
 3. Coordination drawings.
 4. Meeting notes for all types of meetings: progress, safety, preinstallation, special, and others.
 5. Progress schedules and related information.
 6. Project photographs.
 7. Daily reports.
 8. Submittal log and all submittals.
- 1.11. SUBMITTALS
- A. Form of Submittal: Use Architect's electronic system unless otherwise directed in writing. Comply with Architect's formatting and tel/data requirements. Where the Architect does not use a dedicated ftp site or server, submit documentation via scanned documents and email. Comply with required transmittal and data formats using numbering system approved by Architect.

Required Submittals: Submit shop drawings, product data, initial selection samples, verification samples, calculations, coordination drawings, schedules, and all other submittals as specified in individual specification sections.

1. Provide submittals for cleaning and maintenance products to be used during construction and final cleaning.
- B. Submittal Schedule: Within 30 days after award of contract and before first application for payment, prepare list of submittals in chronological sequence showing all submittals and proposed date first due at Architects office and proposed date due to be returned to Contractor. Note relevant specification section number.
- C. Contractor's Preparation of Submittals: Modify and customize all submittals to show interface with adjacent work and attachment to building. Identify each submittal with name of project, date, Contractor's name, subcontractor's name, manufacturer's name, submittal name, relevant specification section numbers, and Submittal Schedule reference number. Stamp and sign each submittal to show the Contractor's review and approval of each submittal before delivery to Architect's office; unstamped and unsigned submittals will be returned without action by the Architect. Leave 4" x 6" open space for Architect's "action" stamp.
- D. Product Data: Provide manufacturer's preprinted literature including, without limitation, manufacturer's standard printed description of product, materials and construction, recommendations for application and use, certification of compliance with standards, instructions for installation, and special coordination requirements. Collect data into one submittal for each unit of work or system; mark each copy to show which choices and options are applicable to project
 1. Submittal Quantities: Unless otherwise requested, provide only electronic format. If hardcopy is requested, submit at least 1 reproducible copy and three additional copies.
 2. Installer Copy: Verify that the Installer has a current copy of the relevant product data, including installation instructions, before permitting installation to begin.
- E. Shop Drawings: Provide accurately prepared, large scale and detailed shop drawings prepared specifically for this project on scannable or reproducible sheets. Show adjacent conditions and related work. Show accurate field dimensions and clearly note field conditions. Identify materials and products in the work shown. Note special coordination required.
 1. PDF files: Contractor shall submit copies of portable document format files for review. At his discretion, the Architect may request hardcopy as per paragraph 2 below.
 2. Submittal Quantities: Submit at least 1 scannable copy and, if requested, three blackline prints of Shop Drawing submittals.
 3. After Architect's action, follow specified distribution procedure.
- F. Samples: Provide units identical with final materials and products to be installed in the work. Where indicated, prepare samples to match Architect's sample. Label each sample with description, source, generic name or manufacturer's name and model number. Architect will review samples for confirmation of visual design intent, color, pattern, texture and type only; Architect will not test samples for compliance with quality and other Contract requirements which shall remain the exclusive responsibility of the Contractor.
 1. Initial Selection Samples Submittal Quantities: Unless a specific, unique product is specified, for initial selection purposes, submit 1 set of samples showing the complete range of colors and finishes available.
 2. Verification Samples Submittal Quantities: For verification of an initial selection, submit 3 sets of samples; one set will be returned to Contractor to be maintained at project site for quality control comparisons.
- G. Timing of Submittals: Submit submittals in a timely fashion to allow at least 10 business days for each office's review and handling. The Architect and their consultants make no commitments as to the duration of review of submittals. This is a condition of the work and Contractors agree that delay claims are exempt from shop drawing review time. This means that submittals which have to be reviewed by the Architect and one of his consultants require at least 20 business days for review and handling. Add ten business days for each additional consultant who must review a submission.
- H. Architect's Action on Submittals: Architect will review submittals, stamp with "action stamp", mark action, and return to Contractor. Architect will review submittals only for conformance with the design concept of the project. The Contractor is responsible for confirming compliance with other Contract requirements, including

without limitation, performance requirements, field dimensions, fabrication methods, means, methods, techniques, sequences and procedures of construction, coordination with other work. The Architect's review and approval of submittals shall be held to the limitations stated in the Owner/Architect Agreement and the Conditions of the Contract. In no case shall approval or acceptance by the Architect be interpreted as a release of Contractor of his responsibilities to fulfill all of the requirements of the Contract Documents.

1. Required Re-submittal: Unless submittal is noted "reviewed and approved" or "reviewed and approved except as noted, resubmission not required," make corrections or changes to original and resubmit to Architect.
 2. Distribution: When submittal is noted "approved" or "approved as noted, resubmittal not required," make prints or copies and distribute to Owner, Subcontractors involved, and to all other parties requiring information from the submittal for performance or coordination of related work. Print shop drawings for distribution only from the final approved drawings showing all notations and comments.
- I. Mock-ups – General: Provide mock-ups where specified in individual sections or shown on drawings.
- J. Mock-ups – Type 1: Shall be disposable and not considered "In-Place Sample Mock-ups" are required unless otherwise indicated. All mock-ups shall be type 2 below, unless otherwise noted. Purpose and requirements are as follows:
1. To permit Owner and Architect to review and approve assemblies prior to ordering and to be used as sample of acceptable work.
 2. Construct mock-ups as early as possible and before ordering products.
 3. Provide actual materials indicated.
 4. Locate mock-ups as directed by architect.
 5. Develop and prepare mock-up construction drawings.
 6. Protect mock-ups until no longer needed by Owner and Architect.
 7. Demolish, remove and dispose of mock-ups as directed.
 8. Provide indicated mock-ups including the following:
Typical exterior wall assembly not less than 6x8 feet showing each exterior skin assembly, window, window frames, each glass type, flashings, weeps, roof edges, visible joints sealants
Concealed assemblies including concealed exterior wall construction, skin support, framing, concealed flashing, air barriers, dampproofing, waterproofing, concealed joint sealants and other elements concealed in typical assemblies.
- K. Mock-ups – Type 2 : Provide mock-ups indicated in specifications sections which unless otherwise indicated may be left in place if approved after review. Applicable requirements of Type 1 apply to this type of mock-up. All mock-ups shall be type 2 unless otherwise noted.
- I. Sustainable Construction Submittals : Comply with Sustainable Design specifications and requirements, including local municipality regulations and provisions.
- J. Maintain all necessary records in current form throughout the execution of the Work.
- M. The Architect's general approval of a submittal is not intended to modify or waive any requirements of the drawings and specifications. If a submittal proposes to modify materials, size, assembly, quality or appearance as required by the drawings and specifications, said proposed modification will be clearly and boldly marked upon the submittal. Absent Architect's explicit approval of this boldly marked modification, said proposed modification shall not be deemed approved.
- 1.12. WARRANTIES
- A. Warranties Required: Refer to individual trade sections for specific product warranty requirements.
- B. Procurement: Where a warranty is required, do not purchase or subcontract for materials or work until it has been determined that parties required to countersign warranties are willing to do so.

- C. Warranty Forms: Submit written warranty to Owner through Architect for approval prior to execution. Furnish two copies of executed warranty to Owner for his records; furnish two additional conformed copies where required for maintenance manual
- D. Work Covered: Contractor shall remove and replace other work of project which has been damaged as a result of failure of warranted work or equipment, or which must be removed and replaced to provide access to work under warranty. Unless otherwise specified, warranty shall cover full cost of replacement or repair, and shall not be pro-rated on basis of useful service life.
- E. Warranty Extensions: Work repaired or replaced under warranty shall be warranted until the original warranty expiration date or for ninety days whichever is later in time.
- F. Warranty Effective Starting Date: Guarantee period for all work, material and equipment shall begin on the date of substantial completion, not when subcontractor has completed his work nor when equipment is turned on. In addition to the one year guarantees for the entire work covered by these Contract Documents, refer to the various sections of the specifications for extended guarantee or maintenance requirements for various material and equipment.

1.13. CUTTING AND PATCHING

- A. Limitations: Do not cut and patch any work in a manner that would result in a failure of the work to perform as intended, decreased energy performance, increased maintenance, decreased operational life, or decreased safety.
 - 1. Structural Work: Do not cut structural work or bearing walls without written approval from Architect. Where cutting and patching of structural work is necessary and approved by Architect, perform work in a manner which will not diminish structural capacity nor increase deflection of member. Provide temporary shoring and bracing as necessary. Ensure the safety of people and property at all times.
- B. Cutting and Patching Materials: Use materials identical to materials to be cut and patched. If identical materials are not available or cannot be used, use materials that match existing materials to the greatest extent possible. Provide finished work that will result in equal to or better than existing performance characteristics.
- C. Inspection: Before cutting and patching, examine surfaces and conditions under which work is to be performed and correct unsafe and unsatisfactory conditions prior to proceeding.
- D. Protection: Protect adjacent work from damage. Protect the work from adverse conditions.
- E. Cutting: Cut work using methods least likely to damage adjoining work. Use tools designed for sawing or grinding, not hammering or chopping. Use saws or drills to ensure neat, accurately formed holes to sizes required with minimum disturbance to adjacent work. Temporarily cover openings ; maintain weather-tightness and safety.
 - 1. Utilities: Locate utilities before cutting. Provide temporary utilities as needed. Cap, valve, or plug and seal ends of abandoned utilities to prevent entrance of moisture or other foreign matter.
- F. Patching: Patch with seams and joints which are durable and not visible. Comply with specified tolerances for similar new work; create true even planes with uniform continuous appearance. Restore finishes of patched areas and, if necessary, extend finish restoration onto adjoining unpatched area to eliminate evidence of patching and refinishing. Repaint entire assemblies, not just patched area. Remove and replace work which has been cut and patched in a visually unsatisfactory manner as determined by the Architect.
- E. Qualifications: Retain experienced and specialized firms, original installers if possible, to perform cutting and patching. Workmen shall be skilled in type of cutting and patching required.

- F. Cutting and patching includes coring and core drilling. Cutting and patching not performed by trades shall be performed by the (General) Contractor.

1.14. FIELD ENGINEERING

- A. Provide required field engineering including property metes, bounds and elevation surveying of both land and structures, civil engineering services and structural engineering services.
- B. Field engineering submittals include:
 - 1. Certificates signed by the Land Surveyor or Professional Engineer certifying that the location, layout and elevation of improvements comply with the Contract Documents.
 - 2. Final Property Survey: Where the contract documents or the regulation of the municipality have jurisdiction require survey drawings, submit one copy for the Owner, one for the Architect and however many are required by the municipality..
 - 3. Project Record Documents: Submit a record of Work performed and record survey data as required under provisions of Sections "Submittals" and "Project Closeout".
- C. Quality Assurance: Engage a Registered Land Surveyor registered or where required, a professional engineer in the State where the project is located, to perform land surveying services required.
- D. Surveys & Control Points: Upon request, the Owner will identify existing control points and property line of which he is aware, and when available, will provide copies of site surveys. Where property surveys are not included in the contract documents, generate the needed property survey information as part of the work of this contract.
- E. Verify layout information shown on the Drawings, in relation to the property survey and existing benchmarks before proceeding to layout the Work. Locate and protect existing benchmarks and control points. Preserve permanent reference points during construction.
 - 1. Do not change or relocate benchmarks or control points without prior written approval. Promptly report lost or destroyed reference points, or requirements to relocate reference points because of necessary changes in grades or locations.
 - 2. Promptly replace lost or destroyed project control points. Base replacements on the original survey control points.
- F. Establish and maintain a minimum of two permanent benchmarks on the site, referenced to data established by survey control points.
- G. Record benchmark locations, with horizontal and vertical data, on Project Record Documents.
- H. Existing utilities and equipment: The existence and location of underground and other utilities and construction indicated as existing are not guaranteed. Before beginning sitework, investigate and verify the existence and location of underground utilities and other construction.
- I. Prior to construction, verify the location and invert elevation at points of connection of sanitary sewer, storm sewer, water service piping, and other underground utilities affected by the work.
- J. Performance: Working from lines and levels established by the property survey, establish benchmarks and markers to set lines and levels at each story of construction and elsewhere as needed to properly locate each element of the Project. Calculate and measure required dimensions within indicated or recognized tolerances. Do not scale Drawings to determine dimensions.
- K. Advise entities engaged in construction activities, of marked lines and levels provided for their use.
- L. As construction proceeds, check every major element for line, level and plumb.
- M. Surveyor's Log: Maintain a surveyor's log of control and other survey Work. Make this log available for reference.

- N. Record deviations from required lines and levels, and advise the Architect when deviations that exceed indicated or recognized tolerances are detected. On Project Record Drawings, record deviations that are accepted and not corrected.
- O. On completion of foundation walls, major site improvements, and other Work requiring field engineering services, prepare a certified survey showing dimensions, locations, angles and elevations of construction and sitework.
- P. Site Improvements: Locate and lay out site improvements, including pavements, stakes for grading, fill and topsoil placement, utility slopes and invert elevations by instrumentation and similar appropriate means.
- Q. Building Lines and Levels: Locate and lay out batter boards for structures, building foundations, column grids and locations, floor levels and control lines and levels required for mechanical and electrical Work.
- R. Existing Utilities: Furnish information necessary to adjust, move or relocate existing structures, utility poles, lines, services or other appurtenances located in, or affected by construction. Coordinate with local authorities having jurisdiction.
- S. Final Property Survey: Before Substantial Completion, prepare a final property survey showing significant features (real property) for the Project. Include on the survey a certification, signed by the Surveyor, to the effect that principal metes, bounds, lines and levels of the Project are accurately positioned as shown on the survey.
- T. Recording: At Substantial Completion, have the final property survey recorded by or with local governing authorities as the official "property survey".

1.15. TEMPORARY FACILITIES AND UTILITIES

- A. Scope of Temporary Work: This article is not intended to limit the scope of temporary work required under the Contract. Provide all temporary facilities and utilities needed and to maintain on-going building operations in the case of existing facilities.
- B. Permits and Fees: Obtain and pay for all permits, fees and charges related to temporary work.
- C. Codes and Authorities Having Jurisdiction for Temporary Facilities and Utilities: Comply with all requirements of authorities having jurisdiction, codes, utility companies, OSHA, and industry standards including, but not limited to the following:
 - 1. NFPA Code 241, Building Construction and Demolition Operations.
 - 2. ANSI-A10 Series, Safety Requirements for Construction and Demolition.
 - 3. NECA National Joint Guideline NJG-6, Temporary Job Utilities and Services.
 - 4. Electrical Service: NEMA, NECA, and UL.
- D. Field Offices: Provide Contractor's field offices as needed. Keep current copies of all Contract Documents and project paperwork neatly on file at jobsite. Permit Architect's unrestricted use of Contractor's field office facilities including copiers, telephones, plan tables, and other equipment. Furnish, maintain, and pay for light, power, phone, fax, and other field office services.
- E. Equipment and Tools: Provide all equipment including, but not limited to, hoists, lifts, scaffolding, machines, tools and the like, as needed for execution of the work. Provide safe access to all parts of the work.
- F. Temporary Enclosures: Provide temporary enclosures to maintain proper temperatures and in no case less than 50 degrees F once temperature or humidity sensitive components are in place and to prevent weather damage, pollutions, dust or excessive noise. Always maintain legal means of egress. Comply with the provisions of "Weather Protection" given below.
- G. For cold weather climates only, Snow and Ice: Remove all snow and ice which interferes with work or safety.

- H. Streets, Walks and Grounds: Maintain public and private roads and walks clear of debris caused by construction operations. Repair all damage caused to streets, drives, curbs, sidewalks, fences, poles and similar items where disturbed or damaged by building construction and leave them in as good condition after completion of the work as before operations started.
- I. Protection: Protect nearby property and the public from construction activities. Provide and maintain barricades, warning signs and lights, railings, walkways and similar items. Immediately repair damaged property to its condition before being damaged.
- J. Security: Secure site against unauthorized entry at all times. Provide secure, locked temporary enclosures. Protect the work at all times. Provide watchman service, if necessary, to protect the work.
- K. Signs: Erect project identification signs in compliance with details to be provided by Architect. Signs shall be minimum 4' x 8' exterior grade plywood and shall contain the names of the project, Owner, Architect, major Consultants, Contractor, and major financing institution. Except for safety and warning signs, no other signs are permitted. Location as acceptable to the Architect.
- L. Fire Prevention: Take every precaution to prevent fire. Provide and maintain in good operating condition suitable and adequate fire protection equipment and services, and comply with recommendations regarding fire protection made by the representative of the fire insurance company carrying insurance on the Work or by the local fire chief or fire marshal. The area within the site limits shall be kept orderly and clean, and all combustible rubbish shall be promptly removed from the site.
- M. Egress: Maintain safe and legal means of egress at all times. At all times, provide at least two separate means of egress.
- N. Temporary Elevators, Hoists & Cranes: Provide equipment required to complete the Work as required and to comply with approved schedules. Do not use project elevators for project or construction purposes without express written permission from the elevator manufacturer, the elevator installer and the Owner.

Provide design and engineering services of professional engineers registered in the locality to evaluate temporary elevators, hoists and crane. Systems used shall be based upon engineered documents stamped the Engineer of Record. Such Engineers shall have professional liability insurance covering the value of the Work.

- O. Temporary Roads, Parking and Staging: Provide facilities necessary to accomplish the Work. Build temporary roads of adequate grade, substrate, and layout to provide safe, effective, efficient site work and access. Maintain roads and provide adequate temporary drainage. Provide parking required, whether on or off site. Pay all costs in connection with providing parking and ensure local traffic in, on, and around site is not adversely affected by workers or construction parking.

Provide staging or ensure staging is provided by subcontractors. Ensure staging is properly designed and where required, employ professional engineers in the locality to design or evaluate structural integrity of systems.

Where required provide or ensure subcontractors provide adequate closures of staging to ensure proper work temperatures and environmental safety.

- P. Protecting Installed Construction: Comply with the requirements of Section 01 70 00 Execution and protect work until acceptance and Substantial Completion. Protect work not accepted at Substantial Completion or not yet installed and approved until Final Acceptance.
- Q. Weather protection:
 - a. Provide temporary enclosures and heat to permit construction work to be carried out continuously including during the months of November through March in compliance with M.G.L. Chapter 149, Section 44D(G).

- b. Enclosures or heat for operations that are not feasible, practical or appropriate in the judgment of the Designer will not be required, and such as site work, steel erection, non-temperature sensitive exterior façade components, roofing and the like.
 - c. Weather protection definition: Temporary protection for work adversely affected by moisture, wind, and cold, by means of covering, enclosing and/or heating.
 - d. The General Contractor shall furnish and install all weather protection material and be responsible for all costs, including heating required to maintain a minimum temperature of 50 degrees F. at the working surface.
 - e. Comply with safety regulations, and provide proper ventilation and fire protection systems. Prevent damage to surfaces, finishes and components.
 - f. Monitoring: Provide thermometers throughout work areas spaced at not less than one for every 2000 sf. Submit documentation weekly of temperature recordings at intervals acceptable to the Architect, but taken not less than daily.
- R. Heating during construction:
- a. Submit for approval temporary heating methods within 30 days of contract award or within 14 days of need for same, whichever is sooner.
 - b. The General Contractor shall provide and pay for temporary heating.
 - c. Provide temporary heat continuously as required to provide proper temperatures around, in, and on the Work, its surfaces or components and to prevent the build up of improper amounts of moisture, humidity or other damaging conditions.
 - d. Provide the temperature ranges necessary for the proper condition of the work, but within the range of 50 to 75 degrees F.
 - e. Use of permanent heating system: Subject to review and approval of the Architect and their consultants, the system may be used. The system shall be turned over once the project is complete in like-new condition, completely clean and with warranties unaffected by this use. The General contractor shall pay costs of this use including fuel, power, and labor necessary for the maintaining, operating, monitoring and cleaning of systems to both for utility usage and to subcontractors responsible for providing systems used.
- 1.16. PRODUCTS AND SUBSTITUTIONS
- A. Specified Products: In all cases in which a manufacturer's name, trade name or other proprietary designation is used in connection with materials or articles to be furnished under this Contract, whether or not the phrase "or equal" is used after such name, the Contractor shall provide the product of the named manufacturers without substitution, unless a written request for a substitution has been submitted by the Contractor and approved in writing by the Architect as follows.
 - B. Deviations from Detailed Requirements: If the Contractor proposes to use material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, the Contractor shall inform the Architect in writing of the nature of such deviations at the time the material is submitted for approval, and shall request written approval of the deviation from the requirements of the Contract Documents.
 - C. Approval of Substitutions: In requesting approval of deviations or substitutions, the Contractor shall provide evidence, including, but not limited to manufacturer's data, leading to a reasonable certainty that the proposed substitution or deviation will provide a quality of result at least equal to that attainable if the detailed requirements of the Contract Documents were strictly follows. If, in the opinion of the Architect, the evidence presented by the Contractor does not provide a sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation without further investigation.
 - C. Intent of Contract Documents: The Contract Documents are intended to produce a building of consistent character and quality of design. All components of the building including visible items of mechanical and electrical equipment have been selected to coordinate with the Design in relation to the overall appearance of the building. The Architect shall judge the design and appearance of proposed substitutes on the basis of the suitability in relation to the overall design of the Project, as well as for their intrinsic merits. The Architect

will not approve, as equal to materials specified proposed, substitutes which in the Architect's opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Project. In order to permit coordinated design of color and finishes the Contractor shall furnish the substituted material in any color, finish texture, or pattern which would have been available from the manufacturer originally specified, at no additional cost to the owner.

- D. Additional Costs or Impact: Any additional cost, or any loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the contractor, notwithstanding approval or acceptance of such substitution by the Owner or the Architect, unless such substitution was made at the written request or direction of the Owner and the Architect. Any decrease in the cost of the substitution shall be returned to the Owner.
- E. Manufacturers: To the greatest degree possible, provide primary materials and products from one manufacturer for each type or kind. Provide secondary materials as recommended by manufacturers of primary materials.
- G. Substitution Requests: Refer to relevant section and Substitution Request Form. Submit 3 copies. Identify product to be replaced by substitute by reference to specification sections and drawing numbers. Provide Contractor's certification and evidence to prove compliance with Contract. Document requirements as acceptable to Architect.
- H. Substitution Conditions: Substitution requests will be returned without action unless one of the following conditions is satisfied. The Contractor shall state which of the following conditions applies to the requested substitution:
 - 1. Request is due to an "or equal" clause.
 - 2. Specified material or product cannot be coordinated with other work.
 - 3. Specified material or product is not acceptable to authorities having jurisdiction.
 - 4. Substantial advantage is offered Owner in terms of cost, time, or other valuable consideration.
 - 5. Specified material or product is not available.
 - 6. Invalid Substitutions: Contractor's submittal and Architect's acceptance of shop drawings, samples, product data or other submittal is not a valid request for, nor an approval of a substitution unless the Contractor presents the information when first submitted as a Request for Substitution.
 - 7. Requests do not meet or exceed Sustainable Design Goals and Requirements.

1.17. DELIVERY, STORAGE AND HANDLING

- A. Manufacturer's Criteria: Strictly comply with manufacturer's instructions and recommendations and prevent damage, deterioration and loss, including theft. Minimize long-term storage at the site. Maintain environmental conditions, temperature, ventilation, and humidity within range permitted by manufacturers of materials and products used.

1.18. MANUFACTURER RECOMMENDATIONS

- A. Handle, store work as above. Install work according to manufacturer's recommendations, instructions, literature and product limitations. Where conflicts existing between these specifications and manufacturer recommendations, advise Architect in writing and obtain written recommendations to resolve conflict. Failure to install work according to standards, instructions and recommendations shall be the responsibility of the contractor. Replace work at no cost to Owner where not installed according to written requirements, instructions or recommendations.

1.19. LABELS

- A. Labels, Trademarks, & Trade names: Locate required labels on inconspicuous surfaces. Do not provide labels, nameplates, or trademarks, which are not required. Provide permanent data plate on each item of equipment stating manufacturer, model, serial number, capacity, ratings and all other essential data.

1.20. RECORD DOCUMENTS

- A. General: Keep record documents neatly and accurately. Record information as the work progresses and deliver to Architect at time of final acceptance. Include in record documents all field changes made, all relevant dimensions, and all relevant details of the work. Keep record documents up to date with all field orders and change orders clearly indicated.

Form of Record documents: DVD, or Compact disks, and if required posted on FTP site and only if requested as hard copy.

- B. Drawings: Keep four separate sets of prints at the site, one set each for mechanical, electrical, plumbing, and architectural/structural disciplines. Neatly and accurately note all deviations from the Contract Documents and the exact actual location of the work as installed. Marked-up and colored prints will be used as a guide to determine the progress of the work installed. Requisitions for payment will not be approved until the record documents are accurate and up-to-date

1. Work Outside Building: Record data outside of building to an accuracy of plus or minus 1 inch and determine and record the invert elevation of all drain lines.
2. At completion of the work, submit one complete set of marked-up prints for review. After acceptance these marked-up prints shall be used in the preparation of the record drawings.
3. Architect shall furnish Contractor with their standard computer-aided design files [hereafter "CAD"] for originals of the Contract Drawings. Make modifications to these files as shown on the marked-up prints. Remove superseded data to show the completed installation.
4. Deliver the completed CAD record drawings on reproducible sheets and on an acceptable type of media [such as Flash drive] of the computer files, in the same version as Contract Drawings [unless otherwise directed by the Owner to provide a different CAD version], properly titled and dated to the Architect. Indicate preparer of record drawings. These record drawings shall become the property of the Owner.

- C. Specifications: Maintain one clean copy of complete specifications [including addenda, modifications, and bulletins with changes, substitutions, and selected options clearly noted. Circle or otherwise clearly indicate which manufacturer and products are actually used.

- D. Operating and Maintenance Manuals: Manuals shall be submitted which contain the following:

1. Description of the system provided.
2. Handling, storage, and installation instructions.
3. Detailed description of the function of each principal component of the systems or equipment.
4. Operating procedures, including pre-startup, startup, normal operation, emergency shutdown, normal shutdown and troubleshooting.
5. Maintenance procedures including lubrication requirements, intervals between lubrication, preventative and repair procedures, and complete spare parts list with cross reference to original equipment manufacturer's part numbers.
6. Control and alarm features including schematic of control systems, control loop electric ladder diagrams, controller operating set points, settings for alarms and shutdown systems, pump curves and fan curves.
7. Safety and environmental considerations.

- E. Copies of Operating and Maintenance Manuals: Three copies of the manuals shall be provided within sufficient time to allow for training of Owner's personnel. Submit one copy of the manuals to the Architect for review no later than 90 calendar days prior to substantial completion, or building turn over, whichever comes first. Submit the remaining five copies within 15 days after first review set is returned to contractor. Progress payment may be withheld if this requirement is not met.

- F. Additional Requirements for Operating and Maintenance Manuals: The requirements for manuals applies to each packaged and field-fabricated operating system. The manuals shall be provided in three-ring side binders with durable plastic covers. The manuals shall contain a detailed table of contents and have tab dividers for major sections and special equipment.
 - G. Framed Data: Provide charts and lists of all valves, circuits, switches, controls and equipment. Install on walls under glass at locations directed by Architect
- 1.21. EXTRA STOCK MATERIALS [aka "ATTIC" or "MAINTENANCE "STOCK"]
- A. Provide extra stock materials specified throughout Project Manual. Provide quantities indicated, where extra stock is specified but quantities not indicated carry 1% of surface area of material installed; include at one of every color provided. Provide work in unopened boxes or containers of same lot or run of installed products. Identify, label and store products where directed.
- 1.22. SYSTEM DEMONSTRATION & TRAINING
- A. Provide system demonstration and training as specified throughout the Project Manual and as follows, whether or not specified elsewhere:
 - 1. Demonstrate project equipment and systems to ensure Owner personnel understand operation, functioning and long-term and short term maintenance of equipment and systems.
 - 2. Explain and demonstrate systems restrictions, safety procedures and operational limitations.
 - 3. Provide trained personnel which previous experience training and demonstrating systems. Devote sufficient time to each piece of equipment or system to ensure personnel have an effective understanding of requirements to operate and maintain work being demonstrated.
 - 4. Provide follow-up and additional training where Owner advises that personnel need additional time to fully understand systems or equipment.
 - 5. In general demonstration and training shall be conducted for all systems containing microprocessors, are programmable, convey people or goods, are affected by or part of safety or fire suppression systems, are part of environmental controls or require training in order to use or operate properly.
 - 6. Make a video of demonstration session(s) and provide electronic files of same to the Owner.
- 1.23. PROJECT CLOSE OUT
- A. Complete the following prior to Substantial Completion:
 - 1. Provide Contractor's Punch List of incomplete items stating reason for incompleteness and value of incompleteness.
 - 2. Advise Owner of insurance change over requirements.
 - 3. Submit all warranties, maintenance contracts, final certificates and similar documents.
 - 4. Obtain Certificate of Occupancy and similar releases which permit the Owner's full and unrestricted use of the areas claimed "Substantially Complete".
 - 5. Submit record documents.
 - 6. Deliver maintenance stocks of materials where specified.
 - 7. Make final change over of lock cylinders or cores and advise Owner of change of security responsibility.
 - 8. Complete startup of all systems and instruct Owner's personnel in proper operation and routine maintenance of systems and equipment.
 - 9. Complete clean up and restoration of damaged finishes
 - 10. Satisfy all commissioning requirements.
 - 11. Remove all temporary facilities and utilities that are no longer needed.
 - 12. Request Architect's inspection for Substantial Completion.
 - B. Architect will either issue a Certificate of Substantial Completion or notify Contractor of work which must be performed prior to issue of certificate
 - C. Complete the following prior to Final Acceptance and payment:

1. Obtain Certificate of Substantial Completion.
 2. Submit final application for payment, showing final accounting of changes in the work.
 3. Provide final releases and lien waivers not previously submitted.
 4. Submit certified copy of final punch list stating that Contractor has completed or corrected each item.
 5. Submit final meter readings, record of stored fuel and similar information.
 6. Submit Consent of Surety for final payment.
 7. Submit evidence of Contractor's continuing insurance coverage (if required by Contract Documents).
- D. Form of documents: DVD or Compact disks, and if required, posted on FTP site and only if requested, as hard copy
- 1.24. REMEDIAL WORK
- A. Extent/Applicability: Remedial work includes cutting and patching associated with:
1. Defective, non-conforming, ill timed, and improperly fitting work.
 2. Removing samples of installed work for testing, inspection, and verification.
 3. Patching of sample removal locations.
- B. Comply with the following:
1. Patching Materials: Identical in quality and appearance to materials to be cut and patched.
 2. Craft: Employ highly skilled trade workers for all patching work.
 3. Subcontractors: Coordinate their work with the General Contractor to minimize remedial work.
 4. Make durable, permanent patches.
 5. Comply with specified tolerances for similar new work.
 6. Match the visual quality and character of adjacent unpatched work in good condition.
 7. Create true, even surfaces with uniform, continuous appearance.
 8. Extend patched area onto adjoining unpatched areas to eliminate visible evidence of patching.
 9. Repaint entire assemblies, not only the patched area, to nearest major change of plane.
 10. Obtain Architect's approval of each patch.
 11. Visible evidence of patching is sufficient cause for rejection and replacement.
- 1.25. FINAL CLEANING AND REPAIR
- A. The following is a resume of requirements. Refer to section 01 77 00. Note that sequencing and other operations may be superseded by Section 01 49 00 Build Clean Requirements for projects involving cleanrooms and cleanroom-like environments.
- B. Clean Up: immediately prior to the Architect's inspection for Substantial Completion, the Contractor shall completely clean the premises and clean and prepare the completed work in order for it to be used for its intended purpose in accordance with the Contract Documents. Such work shall include, but not be limited to the following:
1. Concrete and ceramic surfaces shall be cleaned and washed.
 2. Resilient coverings shall be cleaned, waxed and buffed as applicable.
 3. Woodwork shall be dusted and cleaned.
 4. Sash, fixtures and equipment shall be thoroughly cleaned.
 5. Stains, spots, dust, marks and smears shall be removed from all surfaces.
 6. Hardware and metal surfaces shall be cleaned and polished.
 7. Glass and plastic surfaces shall be thoroughly cleaned by professional window cleaners. Clean windows inside and outside.
 8. Damaged, broken or scratched glass or plastic shall be replaced by the Contractor at the Contractor's expense.
 9. Vacuum carpeted and soft surfaces with high efficiency particulate arrestor (HEPA) vacuum.
 10. Use low-emitting, environmentally friendly cleaning agents and procedures.
 11. Comply with Owner's requirements for Green Housekeeping.
- C. Repairs: Repair and touch-up all damaged and deteriorated products and surfaces.

1.26. E-DOC & CAD TRANSMITTAL REQUIREMENTS

- A. Provide Electronic exchange of information and acceptable formats and file types; Where practical, all project documents.
- B. Intent / purpose:
 - 1. Purpose: Expediting exchange of information and approvals, and minimize time, cost and paper use, handling and storage.
 - 2. Intent: To extent possible, provide required documentation in form of computer-readable files - hereafter: "e-docs".
 - 3. Signing & sealing: As necessary, sign digitally and version-protect project documents so they are legally binding.
 - 4. Use of paper is discouraged. Unless impractical, paper documents will have corresponding e-docs available and distributed to all parties.
- C. Scope & Exceptions: Unless determined to be impractical for an acceptable reason, provide each of the following as an e-doc:
 - 1. General purpose communications, contact information, meeting scheduling.
 - 2. RFI inquiries and responses.
 - 3. Sketches and sketch revisions.
 - 4. Most submittals, including shop drawings, product information, MSDS representations, manufacturer's catalogs (complete or partial), and other customary submittals, along with Architect disposition of same.
 - 5. Contractor's progress schedules.
 - 6. Field orders.
 - 7. Change order requests and proposals.
 - 8. Photo documentation.
 - 9. Punch lists.
 - 10. Draft versions and review copies of documents requiring original signatures and/or notarization, including payment applications and executed change orders.
- D. Produce and distribute hard copy paper records in quantities required in addition to the e-doc record for at least the following, subject to confirmation with the Architect:
 - 1. Documents requiring multiple original signatures and/or notarization.
 - 2. Applications for Payment.
 - 3. Changer Orders.
 - 4. Warranties.
 - 5. Equipment operation & maintenance manuals.
- E. File formats & Information Exchange: Comply with the following:
 - 1. Preferred file format: Portable document format, PDF, Adobe Acrobat V.8 or later.
 - 2. Combined pages: Submit related documents incorporated into single PDF files, as though stapled together. Include transmittal as part of file.
 - 3. Acceptability: Properly identified, digitally signed/countersigned, pdf documents shall be binding upon the Project and its parties as if issued in paper form.
- F. Email: Electronic email shall be an acceptable e-docs, binding upon the Project and its parties and equal in force to hardcopy or PDFs.
 - 1. Use email applications having interoperability with all parties of the Project.
 - 2. Use project name in subject line of each and every email issued; and include writer's name, address, telephone number and position in each email.
- G. Acceptable picture / graphic file formats: "TIF", "GIF", and "JPEG".
 - 1. Color in files: Acceptable, but not required.
 - 2. Do not use other formats without approval of all parties.
- H. Proprietary file formats: Do not use for e-docs unless all parties agree. These include:
 - 1. MS Word.
 - 2. PowerPoint.

3. FileMaker.
 4. MS Excel.
 5. Photoshop.
- I. File sizes, formats and naming conventions:
1. Use only agreed to, Project-accepted naming conventions for e-docs.
 2. File sizes: Acceptable to internet service providers and parties servers.
 3. Large files: Use FTP file transfer protocol up/down loads to pre-agreed servers.
 4. Large files: DVD / CD ROMs disks may be used, only if FTP or DropBox sites are not available.
 5. Maximum file size: Do not exceed 25 MGs without prior agreement of parties.
 6. Files compression: Do not use Stuff-It, PK-ZIP or the like without prior agreement.
 7. Unacceptable files: Unopenable, illegible, damaged, unintelligible files will be discarded without action. Originator shall correct and re-issue.
- J. Cost of E-Doc Management: Each party to e-doc exchange shall maintain staff, programs and equipment, and storage adequate for generation, processing and archiving of e-docs as appropriate to their needs. Costs of for e-doc exchange and management shall be an internal overhead and administrative cost absorbed by each party.
- K. Paper documents not also issued electronically and received by the Architect from the Contractor will be sent out for scanning to e-doc file and charged to Contractor or deducted from the Contract Sum.
- L. If requested, Contractor, vendors, suppliers and subcontractors shall create their submittals in BIM file formats per Owner requirements with appropriate tags for facility management applications.
- M. Terms, Conditions and requirements for transmittal of CAD files:
1. Unless otherwise indicated, computer-aided-design files will be furnished as "shells" only of architect/engineer drawings.
 2. As a condition of receipt of files of this kind, sign a release in the form provided by the Architect – who, upon receipt of same, will issue the indicated drawings.
 3. Comply with the following:
 - a. The Contractor may use information for preparation of base sheets for "Coordination Drawings" and "Record Drawings", but not for "Shop Drawings".
 - b. The Architect and the Architect's consultants retain all copyrights to their documents.
 - c. The Architect and the Architect's consultants give the Contractor a limited and nontransferable license to use their documents for the sole purpose of preparing "Coordination Drawings" and "Record Drawings" for this project only. No other use or purpose is authorized or permitted.
 - d. The Contractor shall not copy, distribute, or disseminate the documents furnished to him for any use or purpose other than the purposes authorized by this Agreement.
 - e. The Architect and the Architect's consultants do not warrant that the documents furnished to the Contractor are complete or accurate. All addenda and modifications may not have been incorporated into the documents furnished to the Contractor.
 - f. The documents will be furnished in their existing layering, filing, and directories. No special layering, file organization, directory organization, or compilation will be created for the Contractor.
 - g. The Architect and the Architect's consultants do not warrant that the electronic documents furnished to the Contractor are usable with any computer hardware or software other than the computer hardware and software used by the Architect and the Architect's consultants. The Architect and the Architect's consultants may have used multiple different and non compatible computer hardware and software systems and products.
 - h. The Contractor shall check the information contained in the documents furnished by the Architect and the Architect's consultants. The Contractor shall be solely responsible for the completeness and accuracy of the "Coordination Drawings" and "Record Drawings" prepared using the documents furnished by the Architect and the Architect's consultants.
 - i. The Contractor shall remove the Architect's and the Architect's consultants! professional seals from "Coordination Drawings" and "Record Drawings" prepared using the documents furnished to him.

- j. The Contractor shall indemnify and hold harmless the Architect and the Architect's consultants and the officers, employees, and assigns of the Architect and the Architect's consultants from all damages and claims resulting from the use of documents furnished to him.
- k. Documents will be made available to the Contractor on an internet FTP [File Transfer Protocol] site.
 - 1) A user ID and password may be required to access information.
- l. These terms and conditions constitute the complete Agreement between the Contractor and the Architect and the Architect's consultants.
- m. These terms and conditions may only be modified in writing by mutual agreement of all parties to this Agreement.
- n. This Agreement is governed by the laws of the state where the Architect has their principal place of business.

PART 2 -PRODUCTS [Not Used]

PART 3 -EXECUTION [Not Used]

END OF SECTION

**SECTION 01 25 10
SUBSTITUTION REQUEST FORM**

No substitutions will be considered without this completed substitution request form and supporting documentation.

Substitutions made without completion of this form will be considered defective work as defined by the General Conditions of the Contract.

Date: _____ No.: _____

Project Name: _____

Project address: _____

To: Architect of Record

Re: _____

The Contractor proposes the following substitution in accordance with the Contract Documents.

Scope of Substitution _____

Spec. Section Reference _____

Drawing Reference _____

Drawing Reference _____

Reason for proposed Substitution _____

Impact on project cost _____

Impact on sustainable design characteristics _____

Impact on project Schedule _____

Impact on project _____

Guarantees & Warranties _____

Coordination _____

SECTION 01 25 10

required
with adjacent
materials
and systems

List deviations
from specified
requirements

Coordination
required
with adjacent
materials
and systems

Attachments: Attach supporting documentation sufficient for Architect to evaluate substitution.
[Substitution forms lacking adequate documentation will be returned without review.]

Attachments

Response date: List date by which response by Architect is requested to maintain project schedule and allow sufficient time for inclusion of proposed substitution.

Response Date

Submitted by
Firm
Address

Signature below signifies acceptance of responsibility for accuracy and completeness of information included in this Substitution Request Form.

Authorized
signature

ARCHITECT'S RESPONSE

Notations listed below shall have the same meaning as on Architect's approval stamp. Clarifications to or changes in project schedule or time shall be processed on standard project forms.

- Architect's Response
- Approved
 - Approved as corrected
 - Revise and resubmit
 - Rejected
 - Returned without review

Remarks

Date

Signed

END OF FORM

SECTION 01 35 30 - SAFETY

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Work place safety.
 - 2. Public safety.
 - 3. Compliance with OSHA and applicable safety provisions in force.
 - 4. Safety officers.
 - 5. Safety plan.
 - 6. Emergency response.
 - 7. Safety and accident reporting.
- C. Extent: The Contractor is solely responsible for providing for job site, work place and public safety and for complying with:
 - 1. Applicable codes, laws, rules, regulations, and requirements of authorities having jurisdiction including, without limitation, Building Codes and OSHA regulations.

1.2 REFERENCES

- A. Review safety provisions requirements. Confer with authorities having jurisdiction including:
 - 1. Building officials.
 - 2. Fire Department.
 - 3. Police Department.
- B. Without limitation, ensure compliance with:
 - 1. 29 CFR, Part 1910: Occupational Safety and Health Administration (OSHA) General Industry and Health Standards.
 - 2. 29 CFR, Part 1926: OSHA Construction Industry Standards.
 - 3. 40 CFR, Part 61: National Emission Standards for Hazardous Air Pollutants.
 - 4. 40 CFR, Part 261: Environmental Protection Agency (EPA) Characteristics of Hazardous Waste.
 - 5. 40 CFR, Part 761, EPA Polychlorinated Biphenyls (PCBs), Manufacturing, Processing, Distribution in Commerce and Use Prohibitions.
 - 6. 40 CFR, Part 763: EPA Asbestos.
 - 7. Building code mandated Fire Protection Plan, aka 241 Plan.

1.3 SAFETY OFFICERS

- A. Designate a Primary Safety Officer and Deputy Safety Officer. Each Safety Officer shall:
 - 1. Be responsible for safety at the Project site.
 - 2. Have at least 5 years experience as a Safety Officer.
 - 3. Be formally trained:
 - a. With at least 10 hours of OSHA regulations training.
 - b. In first aid and CPR.
 - c. In Federal, State, and Local environmental rules and regulations.
 - 4. Be on site whenever any Contract activity is in progress.
 - 5. Have the authority to direct all workers and subcontractors to prevent unsafe conditions.
 - 6. Have the authority to penalize subcontractors and workers for safety violations.
 - 7. Be subject to approval of the Owner and Architect. Replace unacceptable persons.
- B. The Safety Officer may be the Project Superintendent or other employees.
- C. The Deputy Safety Officer may cover the Primary Safety Officer's reasonable absences.

1.4 SAFETY PLAN

- A. Documentation: At least 10 days prior to beginning any work on site, prepare and submit a written Safety Plan.
1. The Owner and Architect may review the safety plan and may make suggestions.
 2. The Owner's and Architect's option to review and suggest does not transfer any safety responsibility to the Owner or Architect. The Contractor remains solely responsible for safety.
 3. Submit draft copy of Fire Protection plan to Owner to assist in obtaining building permit. Verify Owner department requiring copy, including:
 - a. Harvard Energy and Facilities Dept.
- B. Enforcement: The General Contractor shall enforce the Safety Plan and require all on-site workers to comply with the Safety Plan.
- C. Plan Content: Address at least the following topics:
1. OSHA requirements including 29CFR1926 and applicable parts of 29CFR1910.
 2. Applicable State and local regulations.
 3. Safety Officer identification and responsibilities including daily inspections.
 4. Deputy Safety Officer identification and responsibilities including daily inspections.
 5. Safety Officer and Deputy Safety Officer shall meet the OSHA "Competent Person Standard".
 6. Emergency response procedures.
 7. Accident avoidance.
 8. Hazard communications including HazCom program and MSDS program.
 9. Work Hazard Analysis and Response created and followed for each work activity.
 10. Safety Plan orientation for all workers prior to their beginning work on site.
 11. Weekly safety meetings and training with attendance required and attendance log maintained.
 12. Accident Reports within 24 hours after each incident. See additional requirements below.
 13. Principal's Meeting within 72 hours after each Lost Time Accident.
 14. Action Plan for immediate dangers to health and safety.
 15. Worker discipline program including verbal warning, written warning, and dismissal.
 16. Subcontractor discipline program including warnings and penalties.
 17. Personal Protective Equipment standards including, without limitation:
 - a. Hard hats.
 - b. Safety glasses.
 - c. Foot wear.
 - d. Clothing including shirt sleeves and pants length.
 - e. Occupational noise protection.
 - f. Respirators.
 18. Controlled substances including illegal drugs and alcohol.
 19. Worker disputes and fighting.
 20. Possession of weapons on site.
 21. Daily scaffolding inspection and documentation.
 22. Fall protection including without limitation:
 - a. "Baker" stages and working platforms 48 inches or higher.
 - b. Steel erection with 100 percent individual worker restraint as primary protection.
 - c. Holes, pits, excavations, openings in decks, and similar hazards.
 23. "Hot work" permits, fire prevention, and fire watches.
 24. Independent third party inspection of cranes, hoists, lifts, and similar machines.
 25. Temporary electric power including ground fault circuit interrupter protection.
 26. Electric powered tools including double insulation requirements.
 27. Electric extension power cords including condition, grounding, and capacity requirements.
 28. Confined spaces special procedures including OSHA 1910.146.
 29. House keeping, general cleaning, and combustible waste storage and removal.
 30. Flammable material use, storage, and disposal requirements.
 31. Protection of public ways and management of danger to the public.
 32. Additional topics determined by the Contractor.

1.5 SPECIAL FIRE SAFETY & HOT WORK PRECAUTIONS

- A. Comply with section 01 73 60; if not included, as follows:
- B. Ensure operations involving use of open-flame, electrical arc equipment or flammable substances are not conducted until a permit for welding, cutting, and burning has been completed, signed and issued by authorities having jurisdiction.
- C. Prior to commencing operations, a positive determination shall be made that it is impractical to conduct the hot work in a shop area or outside of the building. Coordinate suitable locations for hot equipment operations agreeable to Owner's Representatives.
- D. Provide precautions recommended by the Fire Department and at least the following:
 - 1. Absences of flammable liquids or vapors in the vicinity of the work.
 - 2. Minimum radius of combustibles near the work, or provision of fire blankets or other suitable protectives and baffles.
 - 3. Inspection of hot work areas not less than 60 minutes after completion.
 - 4. Portable fire extinguishers or operational sprinkler system.
 - 5. Trained fire watch personnel.

1.6 EMERGENCY RESPONSE

- A. Plans: As part of the Safety Plan, prepare "Emergency Response Plans" which identify actions to be taken, persons responsible for each action, contact telephone numbers of all authorities having jurisdiction, governmental emergency telephone numbers, and other information. Prepare separate "Emergency Response Plans" for each of the following situations.
 - 1. Personal injury.
 - 2. Fire.
 - 3. Explosion.
 - 4. Chemical hazard.
 - 5. Environmental hazard.
 - 6. Electrical hazard.
 - 7. Wind storm.
- B. First Aid: Provide and maintain, well supplied, industrial quality, first aid kits.
- C. Emergency Assistance Access: Post emergency telephone numbers for medical, fire, and police in clearly visible locations. Provide readily available and accessible telephones and radios.
- D. Accident Reports: Prepare detailed, written reports for each incident including:
 - 1. A brief summary of the incident.
 - 2. A chronological list of the sequence of events.
 - 3. Names of all persons involved in the incident.
 - 4. List of injuries and damage with as much detail as possible.
 - 5. The actions and emergency response to the incident including names of persons taking action.
 - 6. Other important and relevant information.
 - 7. Comply with insurance carrier requirements and unless otherwise indicated submit accident reports to within time required, as specified herein or less.

1.7 FINES & PENALTIES

- A. Fines and penalties assessed by authorities having jurisdiction for safety violations are not a valid cost of the work and will not be paid or reimbursed by the Owner.
- B. Payment: Pay assessments promptly to prevent delay of work.

PART 2 - PRODUCTS Not used.

PART 3 - EXECUTION.

3.1 EMERGENCY SUSPENSION OF WORK

- A. When the Contractor becomes aware or is notified of non-compliance with safety or health provisions immediately, correct the unsafe or unhealthy condition.
 - 1. When, in the opinion of authorities having jurisdiction, satisfactory corrective action has been taken by the Contractor, work shall resume.
 - 2. No extension of time or compensation for damages in connection with a work stoppage for an unsafe or unhealthy condition will be permitted.

3.2 PROTECTION OF PERSONNEL

- A. Take all necessary precautions to prevent injury to the public, occupants, or damage to property of others. The public and occupants includes all persons not employed by the Contractor or a subcontractor.
- B. Wherever practical, the work area shall be fenced, barricaded or otherwise blocked off from the public or occupants to prevent unauthorized entry into the work area.
 - 1. Provide traffic barricades and traffic control signage where construction activities occur in vehicular areas.
 - 2. Corridors, aisles, stairways, doors and exitways shall not be obstructed or used in a manner to encroach upon routes of ingress or egress utilized by the public or occupants, or to present an unsafe or unhealthy condition to the public or occupants.
 - 3. Store, position and use equipment, tools, materials, scraps and trash in a manner that does not present a hazard to the public or occupants by accidental shiftings, ignition or other hazardous activity.
 - 4. Store and transport refuse and debris in a manner to prevent unsafe and unhealthy conditions for the public and occupants. Cover refuse containers, and remove refuse on a frequent regular basis acceptable to the Contracting Officer. Use tarpaulins or other means to prevent loose transported materials from dropping from trucks.

3.3 ENVIRONMENTAL PROTECTION

- A. Dispose of solid, liquid and gaseous contaminants in accordance with local codes, laws, ordinances and regulations.
- B. Comply with applicable federal, state and local noise control laws, ordinances and regulations, including but not limited to 29 CFR 1910.95 and 29 CFR 1926.52.

END OF SECTION

SECTION 01 35 45 – EXISTING PAINT CONTAINING LEAD

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. General requirements relative to paint containing lead.
- C. Available information:
 - 1. Refer to Table of Contents and information available to Contractor.
 - 2. If the Contract Documents do not include existing conditions information related to lead paint, assume all surfaces which may have been painted prior to 1978 are coated with paint containing detectable lead.
- D. Lead paint removal:
 - 1. General lead paint removal and deleading is not required, except remove lead paint from specific locations subject to the following activities: cutting, torching, welding, brazing, soldering, grinding, abrading, sanding, and chipping.
- E. OSHA: Comply with US Department of Labor, OSHA, Lead in Construction Industry Standard, 29 CFR1926.62, and the following:
 - 1. There is no minimum level of lead for OSHA.
 - 2. Any measurement or quantity of detectable lead requires OSHA compliance.
 - 3. OSHA compliance includes, without limitation, lead hazard and protection training of workers.
 - 4. Protect workers from lead exposure.
 - 5. Train employees for safety including respirator use and fit.
 - 6. Provide personal protection devices including, without limit, coveralls, goggles, respirators.
 - 7. Provide facilities for clothes changing and showering.
- F. US EPA: Comply with US Environmental Protection Agency, Hazardous Waste Disposal
- G. Regulations, 40CFR 260 through 271.
 - 1. Protect the environment from lead contamination.
 - 2. Collect and control lead contaminated debris.
 - 3. Prevent lead contamination of soil and water.
- H. State and Other Regulations: Comply with requirements of authorities having jurisdiction.
- I. Disposal of Metal Materials Coated With Paint Containing Detectable Lead: Send materials to a recycling facility. Notify the recycling facility in writing of the presence of lead.
- J. Disposal of Non Metal Materials Coated With Paint Containing Detectable Lead:
 - 1. Comply with US EPA 747-R93-006 Applicability of RCRA [Resource Conservation and Recovery Act] Disposal Requirements to Lead Based Paint.
 - 2. Provide US EPA Test Method SW-846, Method 1311, Toxicity Characteristic Leachate Procedure testing for each waste container.
 - 3. If test results exceed EPA limits, dispose of waste as required by authorities having jurisdiction.
- K. Additional Owner requirement: Use HEPA vacuum shrouded tools for all drilling, cutting, and abrasion of surfaces coated with paint containing lead.

END OF SECTION

SECTION 01 45 50 – ENGINEERING BY CONTRACTOR

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: All Contract Documents, including Drawings, General and Supplementary Conditions and Division 1 General Requirements apply to this Section.
- B. Section includes, without limitation, administrative and procedural requirements for engineering services and:
 - 1. General requirements for engineering by the Contractor.
 - 2. Civil engineering services.
 - 3. Structural engineering services.
- C. Related work: Section 01 00 00 –Consolidated General Requirements: Field Engineering.

1.2 REQUIREMENTS

- A. General: Certain sections require work of the Contract to be engineered by qualified professionals employed by the Contractor. The following requirements apply:
 - 1. Professional Liability Errors & Omissions Insurance [PLE&O]: Professional Engineers employed by the Contractor shall provide the same base insurance coverage and limits required by the Contract, except insurance shall cover design and engineering work. Coverage shall not be less than the value of replacement being designed and shall be in force for not less than the statute of limitations.
 - 2. Minimum intent: Meet the design intent, performance, appearance and minimums indicated in the Contract Documents. Even when engineering may provide for lesser values do not reduce specified or indicated minimums, such as metal gage, wind speeds and the like.
- B. Engineers' responsibilities shall include:
 - 1. Being solely professionally responsible for the work.
 - 2. Calculate, design, engineer, and document the work.
 - 3. Meet requirements of authorities having jurisdiction including applicable Codes.
 - 4. Meet requirements specified in Contract Documents including visual requirements.
 - 5. Meet applicable industry standards, unless higher are indicated herein.

1.3 SUBMITTALS

- A. Comply with Division 01 and:
 - 1. Prepare, professionally seal, sign and submit calculations, shop fabrication drawings, erections and installation drawings and other documents needed to show compliance with Contract requirements.
 - 2. Architect's [of Record] Review: Limited solely to review of visual appearance and design intent.
 - 3. Project Record Documents: Submit a record of Work performed required under provisions of Sections "Submittals" and "Project Closeout".

1.4 QUALITY ASSURANCE / SUBSTITUTIONS

- A. Engineer: Engage a Professional Engineer of the discipline required, registered in the state in which the Project is located, to perform required engineering services.
- B. Work engineered by the Contractor which deviates from Contract requirements shall comply requirements affecting Substitutions.

PART 2 - PRODUCTS (Not Applicable)

PART 3 - EXECUTION

3.1 EXAMINATION & PERFORMANCE

- A. Comply with the following:
 - 1. Verify layout information shown on the Drawings, and existing benchmarks before proceeding to design, engineer or layout the Work.
 - 2. Coordinate with and comply with requirements of Division 01 where Field engineering is required.
 - 3. Engineer construction and assemblies required by or indicated in the Contract Documents.

END OF SECTION

SECTION 01 51 50 - CONSTRUCTION INDOOR AIR QUALITY

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing, maintaining and managing:
 - 1. Minimum indoor air quality (IAQ) performance during the construction period and before occupancy.
 - 2. Compliance with performance standards.
 - 3. Construction Indoor air quality management plan.

1.2 PERFORMANCE REQUIREMENTS

- A. Comply with minimum requirements of Sections 4 through 7 of ASHRAE 62.1-2007, Ventilation for Acceptable Indoor Air Quality and approved Addenda.
 - 1. Coordinate with requirements of Division 23 –HVAC.
 - 2. Coordinate with requirements of Section 01 91 00 Commissioning.
- B. Prevent exposure of building systems to environmental tobacco smoke during construction. At a minimum, take the following measures:
 - 1. Do not allow smoking in enclosed portions of the project site.
 - 2. Do not allow smoking adjacent to fresh air intakes for the building and operable windows.
- C. During construction meet or exceed the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, Chapter 3.
- D. Protect occupied portions of the building from transfer of dust and particulate matter, noise and odor emissions generated during construction in compliance with the minimum requirements of the recommended Control Measures of the Sheet Metal and Air Conditioning National Contractors Association (SMACNA) IAQ Guidelines for Occupied Buildings under Construction, Chapter 3.
- E. Protect absorptive materials from moisture damage when stored on-site and after installation.
- F. Use materials and products in compliance with the VOC content limits as established in LEED credit IEQc4, Low Emitting Materials, Groups 1 through 5.
- G. During construction, comply with the following requirements:
 - 1. Develop and implement a moisture control plan to ensure dry conditions will be maintained to protect absorptive materials stored on site. Include criteria for protecting the building from moisture intrusion and occupant exposure to mold spores.
 - 2. If permanently installed air handlers are used during construction, filtration media with a Minimum Efficiency Reporting Value (MERV) of 8 shall be used at each return air grille, as determined by ASHRAE 52.2-1999. Protect active outdoor air intakes and return air grilles with applicable filtration media. Periodically inspect temporary media and replace as necessary. Replace filtration media immediately prior to occupancy.
 - 3. Develop and implement a plan to reduce noise and emissions on the construction site; address the following:
 - a. Surrounding community noise and vibration impacts. Determine which areas on and adjacent to the site will require special protection from noise.
 - b. Construction Worker training and protective equipment. Determine construction activities that may require the use of protective gear or specialty equipment and properly train workers in their use and/or operation.
 - c. Source Reduction. Develop and implement policies to limit truck and equipment idling on site and to limit vibration and noise from demolition and construction activities
- H. After construction ends but before occupancy, comply with one of the following requirements:
 - 1. Perform a building flush-out with outside air.
 - 2. Conduct IAQ testing for air contaminant levels in the building.

1.3 SUBMITTALS

- A. Construction Indoor Air Quality Management Plan: With the completed Form of Bidder's Proposal, the Contractor shall submit a preliminary Construction IAQ Management Plan.
1. Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall submit to the Owner a finalized Construction IAQ Management Plan.
 2. The proposed Plan shall comply with Division 23 -HVAC requirements.
 3. The proposed Plan shall include, but not be limited to, the following:
 - a. Protection of ventilation system components during construction
 - b. Contaminant source control.
 - c. Cleaning and replacing contaminated ventilation system components after construction, including filtration media.
 - d. Pathway interruption.
 - e. Temporary ventilation.
 - f. Protection of absorptive materials from moisture damage when store on- site and after installation, including exterior wall rain protection.
 - g. Protection of occupied spaces
 - h. Noise reduction and emissions
 - i. Sequence of finish installation plan.
 - j. Selection of cleaning products and procedures to be used during construction and final cleaning.
 - k. Scheduling.
 4. Coordinate Construction IAQ Management Plan with Owner's current IAQ management plans and procedures.
- B. Indoor Air Quality (IAQ) Data:
1. Submit emission test data as required, with testing laboratory and date clearly identified.
 2. Submit test results for final building flush out or final IAQ test procedure.
- C. Material Safety Data Sheets (MSDS):
1. Submit MSDS for materials as required, with date clearly identified.
 2. MSDS must contain specific chemical content data identifying the percent of the total product mass represented by each listed chemical.
- D. Product data: Submit documentation from manufacturer indicating LEED requirements for materials and products of this Section and include:
1. Each type of filtration media used during construction and installed immediately prior to occupancy, include and highlight MERV values the documentation provided.

1.4 PRODUCT REQUIREMENTS

- A. Comply with product requirements, delivery storage and handling provisions of Division 1 and the following:
1. Do not deliver materials until job is ready for installation.
 2. Store products in ventilated dry area; protect from dampness, freezing, and direct sun light.
 3. Take special care to prevent accumulation of moisture on materials and within packaging prevent development of mold and mildew in packaging and on products.
 4. When not in use, store products in original sealed containers, in a designated location.
 5. Immediately remove from site and properly dispose of materials showing signs of mold and mildew, including materials with moisture stains.

PART 2 - PRODUCTS

2.1 FILTRATION MEDIA

- A. Filtration Media: Comply with ASHRAE 52.2-1999 and provide filtration media with compliant MERV ratings as required.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 Execution requirements and 01 77 00 Close out procedures - including requirements related to:
 - 1. Inspection and examination.
 - 2. Approvals, inspections and filed quality control.
 - 3. Cleaning.
 - 4. Final cleaning
 - 5. Protection.

3.2 CONSTRUCTION IAQ MANAGEMENT PLAN IMPLEMENTATION

- A. IAQ Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Construction IAQ Management Plan for the Project.
- B. Distribution: The Contractor shall distribute copies of the Construction IAQ Management Plan to the Job Site Foreman, each subcontractor, the Owner, and the Architect.
- C. Instruction: The Contractor shall provide on-site instruction of appropriate procedures and methods to be used by all parties at the appropriate stages of the Project.
- D. Preconditioning: allow products, which have odors and significant VOG emissions, to off-gas in a dry, well ventilated space for sufficient period to dissipate odors and emissions prior to delivery to Project.
 - 1. Remove containers and packaging from materials prior to conditioning to maximize off-gassing of VOCs.
 - 2. Condition products in ventilated warehouse or other building.
- E. Coordinate Construction IAQ Management Plan with final cleaning.

END OF SECTION

SECTION 01 57 10 - CONSTRUCTION WASTE MANAGEMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Implementation of waste management controls and systems for the duration of the Work.
- C. Specific responsibilities:
 - 1. Masonry subcontractor is responsible for waste management of masonry work.
 - 2. Roofing and flashing subcontractor is responsible for waste management of roofing and flashing work.
- D. Related work includes, without limitation:
Section 01 81 10 – Sustainable design requirements:

1.2 INTENT

- A. The intent of this Section is to develop and implement a waste management plan, quantifying material diversion by either weight or volume to recycle and/or salvage at least the percentage of non-hazardous construction and demolition debris indicated.
 - 1. Recycling rate required to achieve target: Refer to Owner and Architect.
 - 2. Incineration even for power generation: Not an acceptable recycling method.
- B. The Owner and Architect have established that this Project shall generate the least amount of waste practical and that processes that ensure the generation of as little waste as possible due to error, poor planning, breakage, mishandling, contamination, or other factors shall be employed.
- C. Of the waste that is generated, as many of the waste materials as economically feasible shall be reused, salvaged, or recycled. Waste disposal in landfills shall be minimized to the greatest extent practical.
- D. With regard to these goals the Contractor shall develop, for the Architect's review, a Waste Management Plan for this Project.
- E. Each Subcontractor shall be responsible for segregating his own waste into different dumpsters as directed by the Contractor. In particular:
- F. Contractor shall be responsible for ensuring that debris will be disposed of at appropriately designated licensed solid waste disposal facilities.

1.3 SUBMITTALS

- A. Waste Management Plan: Within 21 calendar days after receipt of Notice to Proceed, the Contractor shall provide a plan containing the following:
 - 1. Analysis of the proposed job site waste to be generated, including types and rough quantities.
 - 2. Landfill Options: The name of the landfills where trash and building debris will be disposed of, the applicable landfill tipping fees, and the projected cost of disposing of all Project waste in the landfills.
 - 3. Off-Site Sorting: Materials collected in co-mingled containers on site and sorted off-site must be documented as follows:
 - a. Provide a detailed breakdown of the weight of each material after sorting including landfilled materials for each container
 - b. OR Provide the annual average recycling rate for each off site sorting facility. Information must be included in a letter from each sorting facility. Provide documentation that the facility is State regulated.
 - 4. Landfill Certification: Contractor's statement of verification that landfills proposed for use are licensed for types of waste to be deposited and have sufficient capacity to receive waste from this project.

5. Alternatives to Land filling: A list of each material proposed to be salvaged or recycled during the course of the Project. Include the following and any additional items proposed:
 - a. Cardboard.
 - b. Clean dimensional wood.
 - c. Beverage containers.
 - d. Land clearing debris.
 - e. Concrete.
 - f. Bricks and masonry.
 - g. Asphalt.
 - h. Metals from framing, banding, stud trim, ductwork, piping, rebar, roofing, other trim, steel, iron, galvanized sheet steel, stainless steel, aluminum, copper, zinc, lead, brass, and bronze.
 - i. Mechanical and electrical equipment.
 - j. Building components which can be removed relatively intact from existing construction.
 - k. Packaging materials.
 - l. Glass.
 - m. Scraps from new gypsum wall board.
 - n. Carpet and pad.
 - o. Acoustical ceiling panels.
 - p. Plastics.
 5. Meetings: A description of the regular meetings to be held to address waste management.
 6. Materials Handling Procedures: A description of the means by which any waste materials identified above will be protected from contamination, and a description of the means to be employed in recycling the above materials consistent with requirements for acceptance by designated facilities.
 7. Transportation: A description of the means of transportation of the recyclable materials (whether materials will be site-separated and self-hauled to designated centers, or whether mixed materials will be collected by a waste hauler and removed from the site) and destination of materials.
- B. Waste Management Progress Report: Concurrent with each Application for Payment, submit a written Waste Management Progress Report in the same format as required for Final Report.
- C. Waste Management Final Report: Prior to Substantial Completion, submit a written Waste Management Final Report summarizing the types and quantities of materials recycled and disposed of under the Waste Management Plan. Include the name and location of disposal facilities. Quantity may be measured by either weight or volume; be consistent in calculations. Include the following:
1. Material category.
 2. Generation point of waste.
 3. Total quantity of waste, by weight.
 4. Quantity of waste salvaged, both estimated and actual.
 5. Quantity of waste recycled, both estimated and actual.
 6. Total quantity of waste recovered (salvaged plus recycled).
 7. Total quantity of waste recovered (salvaged plus recycled) as a percentage of total waste.
- D. Other Submittals:
1. Records of Donations: Indicate receipt and acceptance of salvageable waste donated to individuals and organizations. Indicate whether organization is tax exempt.
 2. Records of Sales: Indicate receipt and acceptance of salvageable waste sold to individuals and organizations. Indicate whether organization is tax exempt.
 3. Recycling and Processing Facility Records: Indicate receipt and acceptance of recyclable waste by recycling and processing facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.
 4. Landfill and Incinerator Disposal Records: Indicate receipt and acceptance of waste by landfills and incinerator facilities licensed to accept them. Include manifests, weight tickets, receipts, and invoices.

PART 2 PRODUCTS Not Used.

PART 3 EXECUTION

3.1 RECYCLING

- A. Metal, including but not limited to aluminum stairs, structural beams and sections, and reinforcing steel shall be recycled.
- B. Wood that is not painted and does not contain preservatives (i.e. creosote, arsenic, and chromium-containing preservatives) shall be segregated and recycled.

3.2 WASTE MANAGEMENT PLAN IMPLEMENTATION

- A. Manager: The Contractor shall designate an on-site person responsible for instructing workers and overseeing and documenting results of the Waste Management Plan for the Project.
- B. Distribution: The Contractor shall distribute copies of the Waste Management Plan to the Job Site Foreman, each Subcontractor, the Owner and the Architect.
- C. Instruction: The Contractor shall provide on-site instruction of appropriate separation, handling, and recycling, salvage, reuse, and return methods to be used by all parties at the appropriate stages of the Project.
- D. Separation Facilities: The Contractor shall lay out and label a specific area to facilitate separation of materials for recycling, salvage, reuse, and return. Recycling and waste bin areas are to be kept neat and clean and clearly marked in order to avoid contamination of materials. Location shall be acceptable to the Architect.
- E. Hazardous Wastes: Any unforeseen hazardous wastes shall be separated, stored, and disposed of according to local regulations and as directed by the Owner.

END OF SECTION

SECTION 01 70 00 - EXECUTION REQUIREMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: All of the Contract Documents, including the Drawings, the General and Supplementary Conditions and Division 1 General Requirements apply to the work of this Section.
- B. Section includes: General execution requirements.

1.2 INSPECTION & EXAMINATION

- A. Examine and inspect work daily to ensure compliance with Contract Documents and comply with the following:
 - 1. Inspection by Contractor, subcontractors or installers: Inspect work of other trades to ensure areas are ready to receive next phase of work. Examine previous work, related work and conditions. Take action to ensure defects are corrected.
 - 2. Notify in writing Contractor, Architect and where applicable, Owner, of deficiencies or conditions detrimental to proper completion of the Work.
- B. Acceptance: Beginning installation or execution of work constitutes acceptance and approval of previous work, related work and conditions.

1.3 TOLERANCES & MEASUREMENT

- A. Confirm measurements and dimensions and comply with the following:
 - 1. Do not deviate from measurements and dimensions of Contract documents without written authorization to do so from the Architect.
 - 2. Field check measurements and tolerances periodically and regularly.
 - 3. Notify Architect in writing of differences between field and Contract Documents. Submit drawings showing differences.
 - 4. Confirm tolerances and do not allow them to grow or accumulate.
- B. Tolerances: Unless otherwise shown, indicated, specified or approved in writing, install work plumb, aligned, and straight as follows:
 - 1. 48 inches or less: within 0.06 inch.
 - 2. 10 feet or less: within 0.125 inch.
 - 3. 20 feet or less: within 0.18 inch.
 - 4. Over 20 feet: With 0.25 inch.

1.4 APPROVALS, INSPECTIONS, FIELD QUALITY CONTROL

- A. Obtain required inspections and approvals of authorities having jurisdiction before concealing applicable work.
- B. Field Quality Control: Perform or coordinate with those performing, required field quality control, field tests and the like.

1.5 LAYOUT

- A. Employ skilled, experienced person to establish lines, elevations and layout of the work and comply with the following:
 - 1. Provide and maintain layout lines, benchmarks, and necessary working points.
 - 2. Do not change, deviate or alter indicated lines and elevations without prior written approval from the Architect.
- B. Architect's review of interior layout:
 - 1. Layout interior partitions and doorways floor.

2. Do not continue to work without Architect's approval.
 3. Do not alter layout without written approval from Architect.
- C. Floor finishes: Unless otherwise specifically indicated:
1. Extend floor finishes under open bottom items, movable items, furnishings, equipment and casework.
 2. Extend into closets, recesses, alcoves and toe spaces.
 3. Extend tight to walls, columns, permanent work.
- 1.6 ADJUSTING
- A. Adjust operable items to operate freely and properly.
- 1.7 AIR INFILTRATION & FREEZE PROTECTION
- A. General: Ensure the building envelope provides a continuous barrier to air infiltration and to freeze damage. Upon completion the building envelope shall:
1. Separate all occupied and mechanical spaces from exterior temperatures with weather tight construction as necessary to protect against freezing or excessive heat loss.
 2. Provide solid blocking, sheathing and/or framing to support construction to accomplish this requirement.
- B. Extent of Contractor obligation: As part of this Contract, be responsible for any and all damages which occur due to lack of weather tight construction.
- C. Air Infiltration: Comply with provisions of other sections. Ensure different components forming the air infiltration barrier system are interconnected and sealed together without discontinuities or open penetrations.
- D. Freeze protection: Construct assemblies to ensure the typical thermal and air barrier systems are on the cold-in-winter side of work subject to freezing. In particular, soffits, ceilings and chases subject to freezing shall only be constructed after typical assemblies are insulated and finished off.
- 1.8 CLEANING
- A. Clean work areas daily. Do not permit debris to accumulate.
- B. Clean completed work using appropriate materials complying with Contract Documents and manufacturer recommendations, instructions and limitations.
- C. Comply with application sustainability requirements, if any, including:
1. Cleaning materials.
 2. Indoor air quality.
 3. Construction waste disposal.
- 1.9 PROTECTION / ISOLATION
- A. Protect installed work from damage or deterioration and as follows:
1. Restrict traffic from completed protected work or areas.
 2. Prohibit traffic, storage or other work from waterproofing and roofing.
 3. Protect doors, frames, and hardware.
 4. Protect glass from damage, scratches, or stains.
 5. Maintain proper humidity levels and protect work from dampness, moisture, stains, marks or abrasions.
 6. Replace work with evidence of growths, mold or mildew.
 7. Replace damaged or deteriorated work with new acceptable work complying with Contract Documents.
- B. Isolate dissimilar metals from galvanic action or corrosion with non-absorptive dielectric material, tape or coatings of type recommended by manufacturer or approved by Architect.

PART 2 - PRODUCTS Not used

PART 3 - EXECUTION Not used

END OF SECTION

SECTION 02 22 00 – EXISTING CONDITIONS ASSESSMENT

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Assessing existing conditions.
 - 2. Reviewing available existing conditions documentation.
- C. Existing conditions information:
 - 1. Was collected by Owner and Architect for use in designing the project.
 - 2. Is not part of Contract Documents.
 - 3. Is not guaranteed by Owner nor Architect as complete or accurate.
 - 4. Made available to Contractor solely as a courtesy.
 - 5. Used by the Contractor at their sole risk, liability and judgment.
- D. Additional Existing Conditions Information Obtained By Contractor: The Contractor may obtain additional existing condition information and may perform selective exploratory demolition by making a specific written request to the Owner and obtaining his pre-approval.
- E. Concealed and Unknown Conditions: Comply with the Conditions of the Contract for Construction. The following conditions are not "concealed" or "unknown" for the purposes of claims:
 - 1. Conditions shown on existing building drawings or record drawings.
- F. Existing Building Drawings: Certain existing building drawings are available for Contractor's review.
- G. Submit Drawing:

1.2 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Existing conditions drawings: Show location and elevation of each measurement required or indicated below.
 - a. Field Measurements: Take accurate field measurements and indicate same on drawings.

PART 2 - PRODUCTS

2.1 NEW MATERIALS USED IN CONNECTION WITH ASSESSEMENT

- A. Match existing.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 - especially requirements related to:
 - 1. Inspection and examination. Tolerances and measurement.
 - 2. Approvals, inspections and filed quality control.
 - 3. Layout. Adjusting.
 - 4. Cleaning. Protection.
- B. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.

3.2 EXISTING ROOF DECKS:

- A. Survey existing roofs to record elevations of existing structural decks under roofs. Take at least the following elevation measurements as follows:

1. Within ± 0.125 inch tolerance.
 2. Locate penetrations and chimneys.
 3. Show edges of new work and differential between areas of work to remain and to be replaced.
- B. Repair Roof: Patch and repair roof at each measurement location and prevent leaks to spaces below.

END OF SECTION

SECTION 02 41 10 – SELECTIVE DEMOLITION

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Selective demolition activities.
 - 2. Confer with Owner to verify extent to which demolition waste is to be re-cycled. Meet Owner recycling percentage targets if any are established.
 - 3. Removal of demolished materials from the site and legal disposal.
 - 5. Related Sections, without limitation, include:
 - a. Section 07 31 12 Asphalt Shingle Roofing Renovations: Removal of roofing.

1.2 SUBMITTALS

- A. Schedule: Submit for approval selective demolition schedule, including schedule and methods for capping utilities to be abandoned and maintaining existing utility service. Comply with requirements of Section 01 57 00, Construction Waste Management.

1.3 QUALITY ASSURANCE

- A. Codes and Regulations: Comply with governing codes and regulations, and obtain required permits. Use experienced workers.
 - 1. Occupational Safety and Health Standards (29 CFR 1910).
 - 2. State Department of Public Health regulations.
 - 3. State Waste Specific Restrictions.
 - 4. ANSI/NFPA 241 – Building Construction and Demolition Operations.

PART 2 - PRODUCTS

2.1 DEMOLITION APPLICATIONS

- A. Selective building demolition and removal of designated components include:
 - 1. Selective demolition of interior partitions, systems, and building components designated to be removed.
 - 2. Exterior facade, structures, and components.
 - 3. Protection of portions of building adjacent to or affected by selective demolition.
 - 4. Removal of abandoned utilities and wiring systems.
 - 5. Notification to Owner of schedule of shut-off of utilities which serve occupied spaces.
 - 6. Pollution control during selective demolition, including noise control.
 - 7. Removal and legal disposal of materials.
 - 8. Protection: Designated site improvements and adjacent construction.
 - 9. Salvage: Designated items, if shown.
 - 10. Utilities: Interruption, capping or removal as applicable.
 - 11. Hazardous Materials, if any: Removed under separate prior contract.
 - 12. Protect building components affected by demolition until final finish or envelop assemblies are installed.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Division 01.

3.2 INSTALLATION

- A. Install components plumb and level, accurately fitted, free from distortion or defects, and as follows:
 - 1. Anchor assemblies securely to structure.

2. Separate dissimilar materials with bushings, gaskets, grommets, washers or coatings where required to prevent electrolytic corrosion.
 3. Use manufacturer's supplied components and hardware unless otherwise shown.
- B. Demolition Operations: Do not damage building elements and improvements indicated to remain. Items of salvage value, not included on schedule of salvage items to be returned to Owner, shall be removed from structure. Storage or sale of items at project site is prohibited.
 - C. Utilities: Locate, identify, disconnect, and seal or cap off utilities in buildings to be demolished.
 - D. Shoring and Bracing: Provide and maintain interior and exterior shoring and bracing. Use specialized, experienced personnel.
 - E. Occupied Spaces: Do not close or obstruct streets, walks, drives or other occupied or used spaces or facilities without the written permission of the Owner and the authorities having jurisdiction. Do not interrupt utilities serving occupied or used facilities without the written permission of the Owner and authorities having jurisdiction. If necessary, provide temporary utilities.
 - F. Operations: Cease operations if public safety or remaining structures are endangered. Perform temporary corrective measures until operations can be continued properly.
 - G. Security: Provide adequate protection against accidental trespassing. Secure project after work hours.
 - H. Public protection: Take protective measures as required to prevent spread of dirt and debris, damage to adjacent properties, and injury to occupants and passers-by. Control noise, vibration, and spread of dust; keep all life-safety hazards enclosed, and take measures as required to prevent and suppress fire. Make provisions for medical first-aid as required.
 - I. Barriers: Within the area of the work, provide safety barriers, rails and closures as required at all hazardous areas including floor and roof edges and openings. Take all measures as required by O.S.H.A. and by other Government Authorities and as prudent to protect workers against, hazards to health and safety. Do not allow dust or odors to migrate into adjacent occupied areas.
 - J. Restoration: Restore finishes of patched areas.
 - K. Cutting new openings to remain visible: Do not over-cut openings. Make cuts clean, true, plumb and square.
 - L. Cleaning: Remove debris daily. Clean soil and dust from surfaces to remain.

3.3 SCHEDULE

- A. Refer to drawings.

END OF SECTION

**SECTION 025000
ASBESTOS ABATEMENT**

PART 1 - GENERAL

1.01 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all sections within DIVISION 1 – GENERAL REQUIREMENTS that are hereby made a part of this Section. Note also all Alternates and Addenda.
- B. For the purpose of this Section, the following definitions apply:
 - "Site" shall refer to the property located at 282 Trapelo Road, Waltham, Massachusetts
 - "Contractor" shall refer to the Asbestos Abatement Contractor.
 - "Architect" shall refer to Alex Knox, AIA
 - "Consultant" shall refer to EFI Global, Inc.
 - "ACM" shall refer to asbestos-containing material
 - "ACWM" shall refer to asbestos-containing waste material

1.02 RELATED REQUIREMENTS

- A. Examine the Project Drawings prepared by the Architect and all other specification sections for requirements affecting the work of this Section whether or not such work is specifically mentioned in this Section.
- B. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under the Contract.

1.03 DESCRIPTION OF WORK

A. PROJECT DESCRIPTION

The Contractor shall furnish all labor, materials, equipment, and services for the removal and disposal of all specified asbestos-containing roofing materials, as outlined in the specifications and Project Drawings.

- 1. The project involves the exterior removal of asbestos cement siding shingles, door caulking, and roofing tars/felts as identified below. The black tar paper behind the asbestos cement siding shingles shall be disposed as asbestos-ACWM. The Contractor is responsible for removal and proper disposal of all ACM and ACWM.

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The types and estimated quantities of ACMs to be removed as part of this project are as follows:

Material Description	Material Location	Estimated Quantity
Cement shingle siding	Exterior	5,500 SF
Black roof tar	Storage Building Roof	400 SF
Grey exterior door caulk	Exterior doors	40 LF

SF – square feet

LF – linear feet

2. Bidders are required to verify the quantities of all materials prior to the bid deadline, including the dimensions and locations of areas requiring abatement as well as the types of materials to be abated. If further investigation time is required for the quantity verification, arrangements shall be made as needed. This estimation shall be performed prior to the submission of the bid. Bidders shall inform the Consultant and the Architect of any discrepancies between the quantities and types of materials specified herein and those verified to be present by the Bidder. If appropriate, an adjustment shall be made as to the types and/or quantities to be included in the Bid. If no discrepancies with the types and/or quantities of materials to be abated are brought to the attention of the Consultant and the Architect prior to the Bid due date, it will be understood that the Bidders are in agreement with the types and quantities of materials specified herein, and no change orders will be allowed for these materials.
3. Pre-cleaning and disposal of all debris present and clean-up of contaminated items shall also be conducted in each work area.
4. In the event that additional (currently obscured) types and/or quantities of materials are to be removed, the Contractor shall refer to the Unit Pricing Section for applicable unit pricing to be used in the work of this project. Unit prices shall be submitted as specified in the Bid Forms of these specifications. No change orders shall be granted for the types of materials identified in these specifications. For a material to be verified as an extra, the Contractor shall notify the Consultant and the Architect of the conditions believed to warrant a claim, prior to the disturbance of the material. The Consultant and the Architect shall field verify the Contractor's claim, and if deemed an extra, the contract price shall be adjusted by the unit price or through negotiation. No claims for any increase in the contract price shall be considered if the material has been removed by the Contractor without prior authorization by the Consultant and the Architect.
5. The quantities and locations of the ACM and ACWM depicted in the inventory table and on the Project Drawings are approximate only. The Contractor is responsible for identification, field verification, and removal of all ACM and ACWM specified herein and on the Drawings.
6. The Contractor is responsible for conducting all OSHA related safety and structural investigations for roofing conditions that could pose a hazard to their workers. The Contractor shall include in their base bid all costs for performing

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these investigations and corrective measures required to abate any unsafe conditions and protect workers during abatement activities.

7. The Contractor is responsible for demolition to access, investigate, and remove all ACM and ACWMs specified. The Contractor shall include in the base bid all costs for demolition to access all ACM and ACWM identified herein.

B. GENERAL SCOPE OF WORK

The following is the General Scope of Work at a minimum, required to be performed by the Contractor for asbestos abatement work in each of the work areas identified below. The Contractor shall adhere to the Scope of Work outlined below and depicted by the drawings as well as any additional requirements stated herein.

1. Work area preparation, including pre-cleaning, installation of critical barriers and polyethylene sheeting, construction of decontamination facilities, work area enclosures, sealing, isolation, and other activities as directed by the Consultant or the Architect.
2. For full containment removal (as appropriate), installation and operation of HEPA filtration units sufficient to achieve a minimum of four to six air changes per hour in each containment (if full containment removal is utilized). The exact locations of HEPA filtration units, decontamination units, and other stationary equipment shall be coordinated with other contractors, Owner, Architect, and the Consultant.
3. Removal and disposal of all specified ACM, ACWM, asbestos contaminated materials and non-asbestos containing materials as specified herein and on the Project Drawings.
4. Pre-cleaning of all asbestos-containing debris, as necessary, in all work areas prior to abatement.
5. Encapsulation of all abated surfaces in each work area.
6. Furnishing of all labor, materials, equipment, insurance, and services required for all work included in this specification.
7. Compliance with all applicable federal, state, and local regulations, as well as, all requirements set forth in these specifications.
8. Decontamination, teardown, and clean up following abatement activities.
9. Performance of any other work or activities required by this specification, applicable regulations, or as necessary to perform a complete job to the satisfaction of the Owner, Architect, and Consultant.
10. The Consultant reserves the right to collect samples of any suspect ACM and ACWM in order to verify that the asbestos has been satisfactorily removed by the Contractor in accordance with the Specifications.

C. SPECIFIC SCOPE OF WORK

The following Work shall be conducted for this project. Examine all Project Drawings and specifications for full extent and location of work to be conducted.

1. General Building Areas

- a. The Contractor is responsible for all hookups to existing water and electricity at the Site to conduct the required asbestos abatement activities. The Contractor is responsible for retaining licensed and qualified electricians and plumbers to perform electrical and water hookups as necessary to perform the asbestos abatement activities specified herein. The Contractor is responsible for payment of all electrical permit and connection fees. The Contractor is responsible for the installation of temporary lighting in all work areas, backflow protection, sanitary facilities, and shall include all costs to provide a licensed electrician to assess the facilities and provide generators, transformers and temporary electrical hookups as necessary. The Contractor shall supplement the existing electricity available at the site with generators as necessary throughout the project, due to temporary or permanent electrical shutdowns.
- b. Remove and dispose of ACM and ACWM from exterior building areas which are to be disturbed as part of the project, as depicted on the Project Drawings. Coordinate this work with other contractors at the site, the Architect and the Consultant. Coordinate all system shutdowns with the Consultant, Architect, and Owner in advance.

2. Exterior

The Contractor is responsible for the removal of exterior roofing materials as specified on the Project Drawings.

3. Refer to the Bid Forms for the scope of work required by unit prices and the pricing of same. Unit prices shall be part of the base bid and shall be utilized for ACM and ACWM not addressed in the Contract Documents.
4. Refer to the Bid Forms for a description of alternates associated with this project.

D. PROJECT SCHEDULE

The project shall begin as soon as the 10 business day notifications take effect and upon receipt of written authorization to proceed from the Owner and the Architect. The Contractor is responsible to complete work in each building area as specified on the Project Drawings. Completion of work includes obtaining satisfactory air clearance results and tear-down of each work area.

1.04 SEQUENCE OF WORK

The following provisions shall apply for asbestos abatement work as identified by this section. The Contractor shall apply these provisions to all work areas throughout the buildings.

- A. The Contractor shall decontaminate, remove and properly dispose of all specified ACM and ACWM located throughout each identified work area.

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- B. Prior to the commencement of the work, all stored items and general items in each area and other miscellaneous items in all work areas deemed to be non-contaminated, except as noted herein, shall be removed from each work area by the Contractor and left for disposal by others. All non-contaminated non-movable items in all work areas, including but not limited to HVAC units, ductwork, roof vents, etc. shall be covered with two (2) layers of 6-mil polyethylene sheeting and sealed with duct tape.
- C. A three-chambered decontamination unit shall be erected at the entrance to each work area. The three-chambered decontamination unit shall consist of a clean room, a shower room, and an equipment room.
- D. All critical barriers shall be sealed with two (2) layers of six-mil polyethylene sheeting and negative pressure established.
- E. The Contractor shall pre-clean all floor areas, floor drains, and non-movable items of any asbestos debris present. Pre-cleaning shall include the use of wet misting, wet wiping and/or HEPA vacuuming of all affected surfaces.
- F. All exterior siding, caulking, and roof removal work shall take place utilizing exterior removal processes as outlined in Massachusetts DLS asbestos regulations or under full containment.
- G. All work shall be performed in accordance with all federal, state, and local regulations governing asbestos abatement. The Contractor shall assume full responsibility and liability for compliance with all applicable federal, state, and local regulations pertaining to work practices, hauling and disposal of asbestos waste, and protection of workers, visitors to the work site, and persons occupying areas adjacent to the work site.
- H. The scheduling and sequencing of the Work of this Contract shall be determined by the Architect and the Owner.

1.05 WORK INCLUDED

The total scope of work shall not be based solely on the information provided in this specification. The Contractor is required to perform quantity take-offs and measurements of the amount of material to be removed using all Drawings and based on a site visit. Work shall be based on the Contractor's own quantity take-offs of the work required by examination of the drawings and site conditions.

1.06 SPECIAL CONSIDERATIONS

For full containment work - The Owner will pay for the first set of final clearance air sampling and analyses for each work area. In the event that these analyses do not pass the clearance criteria, all subsequent air sampling and analyses for the affected work areas that need to be rerun will be paid for by the Contractor. Phase Contrast Microscopy (PCM) shall be utilized for clearance of all areas (for full containment removal). All additional monitoring and sampling costs will be automatically deducted from the Contractor's contract price until the area in question passes the clearance criteria established in this section.

1.07 SUBMITTALS

- A. Before preparations are allowed to begin, the Owner, Architect, and Contractor shall submit the following to the Consultant for approval:

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1. Copies of all notifications, permits, applications, licenses, and like documents required by federal, state, or local regulations obtained or submitted in proper fashion;
2. Copies of Contractor's DLS licenses for asbestos;
3. A sketch of the proposed containment(s) that includes all entrances, HEPA exhausts and critical barriers;
4. A proposed timetable for the complete job that shows the preparation, removal and disposal, clean up, testing, and teardown portions of the job for each work area. A critical path showing completion dates for each area shall be included;
5. Proof of the abatement supervisor's certification and training, including the most recent refresher course completed and current DLS licenses for asbestos;
6. Proof of each asbestos abatement worker's certification and training, including the most recent refresher courses completed and current DLS licenses for asbestos;
7. Written site-specific Respiratory Protection Program for employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used on this specific job;
8. Proof that the asbestos abatement supervisor and workers have been fit-tested within the past twelve months for using both a negative-pressure respirator equipped with HEPA filter cartridges and a PAPR;
9. Proof that the abatement supervisor and workers have been examined by a qualified physician within the past 12 months, and are capable of wearing respiratory protection and are able to perform asbestos abatement work and other related activities;
10. Proposed electrical safeguards to be implemented, including but not limited to location of transformers, GFCI outlets, lighting, and power panels necessary to safely perform the job, including a description of electrical hazards safety plan for common practices in the work area;
11. A list of all equipment to be used on site, by make and model, including ventilation equipment, HEPA vacuums, etc.;
12. Chain of Command of responsibility at work site including supervisors, foreman, and competent person, their names, and resumes;
13. Proposed Emergency Plan and route of egress from work areas in case of fire or injury, including the name, directions/map and phone number of nearest medical assistance center;
14. The name and address of the Contractor's personal air monitoring and testing laboratory including certification of Massachusetts DLS accreditation and proof of NIOSH proficiency in the asbestos P.A.T. Program;
15. An MSDS or equivalent, in accordance with the OSHA Hazard Communication Standard (29 CFR 1910.1200) for all products and materials proposed for use on the project. Include a separate attachment for each sheet indicating the specific worker protective equipment proposed for use with the material indicated. A copy of the Contractor's complete OSHA Hazard Communication

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Standard will also be submitted and be kept on site at all times describing the Contractor's Asbestos and Hazardous Materials HazCom Program;

16. A current negative exposure assessment in accordance with OSHA 1926.1101 providing recent data (less than six months old) showing personal exposures to airborne asbestos during Class I operations for comparable workers. This data must show that workers' exposures to airborne asbestos on an eight-hour time weighted average (TWA) basis are less than 0.1 fibers per cubic centimeter of air (f/cc);
 17. Name, address, and ID number of the asbestos waste hauler, and proposed disposal site(s);
 18. Any other documentation that applies and is called for by this or other sections of the specifications;
 19. No work on the project will be allowed to begin until Owner, Architect, and Consultant as listed herein approve the Pre-Job Submittals. Any delay caused by the Contractor's refusal to submit this documentation in a timely manner does not constitute a cause for change order or a time extension;
 20. Contractor's written site-specific Health and Safety Plan that includes Hazcom, Respiratory Protection, Lockout/Tagout and Confined Space Entry Programs with site-specific written plans; and,
- B. Upon completion of the asbestos abatement work, the Contractor shall submit the following to the Consultant for approval:
1. All manifests and landfill receipts detailing disposal of all asbestos and asbestos-containing waste materials generated by the work.
 2. All analytical results of personal asbestos air samples collected in accordance with OSHA regulations to verify that the 8-hour time weighted average (TWA) concentrations of asbestos fibers in the breathing zone of the workers has not exceeded the permissible exposure limit (PEL) of 0.1 f/cc.
 3. A notarized copy of the entry-exit logbook.

1.08 TRAINING AND QUALIFICATIONS

A. Worker Training

All workers who work on this project shall be provided training, at a minimum, on the following topics:

1. The health hazards of asbestos including the nature of asbestos related diseases, routes of exposure, known dose-response relationships, the synergistic relationship between asbestos exposure and cigarette smoking, latency periods, and health basis for standards.
2. Personal protective equipment including the types and characteristics of respirator classes, limitations of respirators, proper selection, inspection, donning, use, maintenance and storage of respirators, field testing the face piece to face seal (positive and negative pressure fit tests), qualitative and quantitative fit testing procedures, variations between laboratory and field fit factors, factors that affect respirator fit, selection and use of disposable clothing,

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use and handling of washable clothing, non-skid shoes, gloves, eye protection, and hard hats.

3. Medical monitoring requirements for workers including required and recommended tests, reasons for medical monitoring and employee access to records.
 4. Air monitoring procedures and requirements for workers including description of equipment and procedures, reasons for monitoring, types of samples and current standards with recommended changes.
 5. Work practices for asbestos and hazardous materials abatement including purpose, proper construction and maintenance of airtight plastic barriers, job set-up of airlocks, posting of warning signs, Architecting controls, electrical and ventilation system lockout, proper working techniques, waste clean-up, storage and disposal.
 6. Personal hygiene including entry and exit procedures for the work area, use of showers and prohibition of eating, drinking, smoking, and chewing in the work area.
 7. Special safety hazards that may be encountered including electrical hazards, air contaminants (CO, wetting agents, encapsulants), fire and explosion hazards, scaffold and ladder hazards, slippery surfaces, confined spaces, heat stress, and noise.
 8. Workshops allowing both supervisory personnel and abatement workers the opportunity to observe and experience the construction of containment barriers and decontamination facilities.
 9. Lockout/Tagout and Confined Space Entry procedures.
- B. Site Supervisor Qualifications
1. The Contractor shall provide one Site Supervisor, whose responsibilities include coordination, safety, security, and execution of all phases of the asbestos abatement project. The Site Supervisor will not be used as an abatement worker, and will be assigned full-time to the project.
 2. The Site Supervisor shall be fully qualified and trained in all aspects of asbestos abatement practices and procedures. The asbestos training course will cover all topics listed above as well as training in contract specifications, liability insurance and bonding, legal considerations related to abatement, establishing respiratory protection medical surveillance programs, EPA and OSHA record-keeping programs, as well as any other topics requested by the Owner.
 3. At least one licensed asbestos supervisor should be on site at all times who is certified in CPR and Emergency First Aid by an appropriate authority, as well as having received the required training under the OSHA Bloodborne Pathogen Standard.

1.09 REGULATORY SUBMITTALS

- A. The Contractor shall notify the following agencies in appropriate manner and place of impending work, and shall provide evidence of notifications at the pre-construction meeting:

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1. Massachusetts Dept. of Environmental Protection
205 Lowell Street
Wilmington, Massachusetts 01887
(10 business days in advance)
2. Massachusetts Division of Occupational Safety
Division of Occupational Safety
1001 Watertown Street
West Newton, Massachusetts 02165
(10 business days in advance)
3. Local Fire and Police Departments, Building Department, and other state or town agencies as required by law or ordinance.

B. Permits

The Contractor shall be responsible for securing and paying for all necessary permits for asbestos and hazardous materials related work, including hauling, removal and disposal, building, cut and torch, fire watch, and materials usage, sidewalk Police and Fire details, or any other permits required to perform the specified work.

C. Fees, Licenses, Patents, and Copyrights

1. The Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or process in the performance of the job specified herein. The Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights.
2. The Contractor shall hold the Owner, Architect, and the Consultant harmless from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights.
3. If the Contract Specification requests the use of any product, design, invention, or process that requires a licensing fee or royalty fee for use in the performance of the job, the Contractor shall be responsible for the fee or royalty fee and shall disclose the existence of such rights.
4. The Contractor shall be responsible for costs of all licensing requirements, where applicable, and notification requirements and all other fees related to the Contractor's ability to perform the work in this section.

1.10 SAFETY CONSIDERATIONS

- A. This project is subject to compliance with Public Law 91-596, "Occupational Safety and Health Act of 1970" (OSHA), with respect to all Rules and Regulations pertaining to construction, including Volume 36, Numbers 75 and 105, of the Federal Register, as amended, and as published by the U.S. Department of Labor.
- B. In addition to any detailed requirements of the Specification, the Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of Federal, State, Regional and Local Authorities regarding handling and storage of asbestos, lead and other hazardous waste materials.
- C. All staging and scaffolding (if needed) shall be furnished and erected by the Contractor in accordance with all applicable requirements, and be maintained in safe condition by him at no additional cost to the Owner.
- D. The Contractor is responsible for using safe procedures to avoid electrical hazards. When a hazard exists, work will be stopped and power will be shut off and checked before work begins again. All electrical panels and exposed wires within the work site shall be de-energized prior to the commencement of any wetting or removal operations. All extension cords and power tools used within the work area shall be attached to Ground Fault Circuit Interrupters (G.F.C.I.) in accordance with 1910.120 and the Contractor's Lockout/Tagout and Confined Space Entry programs.

1.11 SECURITY

- A. The Owner will provide specific access as required during the project to the Contractor and personnel assigned to the project. The access shall be determined by the Owner and the Architect. The Contractor will be responsible for the security of each building involved in the abatement project. The Contractor shall maintain security in all buildings using appropriate secure barriers and locks. It will also be the Contractor's responsibility to allow only authorized personnel into each work area, and to secure all assigned entrances and exits at the end of the workday. Authorized personnel include licensed Contractor staff, the industrial hygienist, and all other personnel with the appropriate training, medical approval, respirator fit testing, and personal protective equipment. The Contractor shall cover each window, door, grate, or other opening made by abating these components with secured plywood coverings to prevent unauthorized access into the building.
- B. Any person entering or leaving the contained areas must sign the Contractor's bound logbook and enter the date and time. The logbook must be located immediately outside the entrance to the Decontamination Unit at all times, and be open for inspection by the Consultant.

1.12 REFERENCES

The following references are cited as applicable publications:

- A. Environmental Protection Agency
Asbestos Regulations (NESHAPS) Title 40 CFR Part 61, as currently amended.
Guidance for Controlling Friable Asbestos Containing Materials in Buildings, Final Rule and Notice. Asbestos Hazard Emergency Response Act (AHERA) Title 40 CFR Part 763.
- B. Occupational Safety and Health Administration
Title 29 CFR 1910.1001 (amended)
Title 29 CFR 1926.1101 (amended)
Title 29 CFR 1926.62 (amended)
- C. Commonwealth of Massachusetts
Department of Labor and Workforce Development
453 CMR 6.00, The Removal, Containment, or Encapsulation of Asbestos
- D. Commonwealth of Massachusetts
Department of Environmental Protection
310 CMR 7.15
- E. U.S. Department of Transportation Regulations
49 CFR Parts 172 and 173
- F. All regulations by these and other governing agencies in their most recent version are applicable. These specifications refer to many requirements found in these references, but in no way intend to cite or reiterate all provisions therein or elsewhere. It is the Contractor's responsibility to know, understand, and abide by all such regulations and common practices.
- G. Other provisions contained in these references may from time to time during the execution of this contract be enforced by the Owner at his own discretion.
- H. Toxic Substances and Control Act (TSCA) (40 CFR 761).
- I. Massachusetts Waste Disposal Regulations (310 CMR 7.15).
- J. Hazard Communication Standard (29 CFR 1926.59).
- K. Hazardous Waste Operations and Emergency Response (29 CFR 1910.120).
- L. National Contingency Plan (CERCLA, Section 105).
- M. Spill Prevention Control and Countermeasures Plan (40 CFR, Part 112).

PART 2 - PRODUCTS

2.01 MATERIALS AND EQUIPMENT

The Contractor shall provide new materials and new or used equipment in undamaged and serviceable condition. Only materials and equipment that are recognized as being suitable for the intended use, by compliance with appropriate standards, are to be used during the project.

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A. Fire Extinguishers

The Contractor shall provide multi-purpose ABC minimum rating to A40BC fire extinguishers. The Contractor shall comply with the applicable recommendations of NFPA Standard 10 "Standard for Portable Fire Extinguishers." Fire extinguishers shall be located where they are most convenient and effective for their intended purpose, but provide not less than one extinguisher inside each work area in the Equipment Room and one outside each work area in the Clean Room.

B. Construction Lumber

Construction lumber for critical barrier walls shall consist of nominal, fire-retardant, 2" x 4" framing, sixteen inches center to center.

C. Plastic Sheeting

The Contractor shall provide non-combustible, fire-retardant, 6-mil thick clear, frosted, or black plastic sheeting in the largest size possible to minimize seams in accordance with local fire department requirements. Spray plastic will not be allowed for use on this project.

D. Adhesive Materials

The Contractor shall provide duct tape in 2" or 3" widths, with an adhesive that is formulated to aggressively stick to plastic sheeting. The Contractor may also provide spray adhesive in aerosol cans that is specifically formulated to stick tenaciously to plastic sheeting.

E. Shower Assembly

1. The Contractor shall provide a leak tight shower enclosure with integrated drain pan fabricated from fiberglass or other durable waterproof material, approximately 3' x 3' square with minimum 6' high sides and back. The Contractor shall structurally support the unit as necessary for stability and equip it with a hose bib, mounted at approximately 4'-0" above drain pan.
2. The Contractor shall provide a factory made shower-head producing a spray of water that can be adjusted for spray size and intensity. The Contractor shall feed shower with water mixed from hot and cold supply lines, arranged so that control of water temperature, flow rate, and shutoff is from inside shower without outside aid.
3. The Contractor shall provide a totally submersible waterproof sump pump with an integral float switch. The unit shall be sized to pump two times the flow capacity of all showers or hoses supplying water to the sump, through the filters specified herein when they are loaded to the extent that replacement is required. The unit shall be capable of pumping debris, sand, plaster or other materials washed off during decontamination procedures without damage to mechanism of pump. The Contractor shall adjust float switch so that a minimum of 3" remains between top of liquid and top of sump pan.

F. Negative Air Filtration System

The Contractor shall provide air-filtering equipment capable of filtering particles to 0.3 micrometers at 99.97% efficiency and of sufficient quantity and capacity to cause a complete air change within the work area at least once every 15 minutes. Such equipment shall exhaust the filtered air so as to maintain a negative pressure inside the work area. Air shall flow in through the Decontamination Unit and exhaust through the negative air filtration unit by means of flexible duct leading outside the work area, preferably outside of the building. Negative air filtration shall be in operation at all times.

G. HEPA Vacuum

The Contractor shall utilize high efficiency filter vacuums to filter particles of 0.3 micrometers or larger at 99.97% efficiency or greater. The Contractor shall obtain HEPA vacuum attachments, such as various size brushes, crevice tools, and angular tools to be used for varied application, and service the HEPA vacuum routinely to assure proper operation. Caution shall be used any time the vacuum is opened for HEPA filter replacement or debris removal. Operators shall wear protective clothing and respirators when using the HEPA vacuum. Vacuuming by conventional means is unacceptable.

H. Amended Water

For wetting prior to disturbance of asbestos-containing materials, the Contractor shall use an amended water solution. The Contractor shall provide water to which a commercial surfactant (i.e., not dish detergent) has been added. The Contractor shall use a mixture of surfactant and water, which results in wetting of the asbestos-containing material and retardation of fiber release during disturbance of the material, equal to or greater than that provided by the use of one ounce of a surfactant, consisting of 50% polyoxyethylene ester and 50% polyoxyethylene ether mixed with five gallons of water.

I. Disposal Bags

The Contractor shall provide appropriately labeled 6-mil thick leak tight plastic bags of sufficient size for application.

J. Water Service

All temporary water connections to the Owner's water system shall include back-flow protection. The Contractor shall provide heavy-duty abrasion-resistant hoses with a pressure rating greater than the maximum pressure of the water distribution system to provide water into the work area and to the Decontamination Unit. The Contractor shall provide a UL rated 40-gallon electric hot water heater to supply hot water for each Decontamination Unit shower.

K. Electrical Service

1. The Contractor shall provide temporary power service to the Decontamination Unit sub panel with minimum 60 amp, 2 pole circuit breaker or fused disconnect connected to the auxiliary power source. The sub panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion of the work. The Contractor shall comply with applicable NEMA,

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NECA, and UL standards and governing regulations for materials and layout of temporary electric service.

2. The Contractor shall provide identification-warning signs of voltage differences at power outlets that are other than 110-120 volt power and provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets. Dry type transformers shall be provided where required to provide voltages necessary for work operations.
3. The Contractor shall provide receptacle outlets equipped with ground-fault circuit interrupters (GFCI), with reset button and pilot light, for plug-in connection of power tools and equipment. No electrically powered tools or equipment shall be operated without a Ground-Fault Interrupter. The Contractor shall provide the Consultant with documentation proving that the GFCI's are in proper working order.
4. The Contractor shall use only grounded extension cords. Use "hard-service" cords where exposed to abrasion and traffic. Single lengths of electric cord shall be used or waterproof connectors shall be used to connect separate lengths of electric cords, if single lengths will not reach areas of work.
5. The Contractor shall provide general service incandescent lamps of wattage required for adequate illumination (in accordance with OSHA 29 CFR 1910.56, "Illumination"). Lamps shall be equipped with guard cages or tempered glass enclosures where fixtures are exposed to breakage by construction operations. Exterior fixtures shall be provided where fixtures are exposed to the weather or moisture.

PART 3 - PROJECT EXECUTION

3.01 GENERAL CONSIDERATIONS

A. Approvals And Inspection

All temporary facilities, work procedures, equipment, materials, services, and agreements must strictly adhere to and meet these contract specifications along with EPA, OSHA, NIOSH, regulations and recommendations as well as any other federal, state, and local regulations. Where there exists overlap of these regulations, the most stringent one applies. All work performed by the Contractor is further subject to approval of the Consultant. Modifications to these isolation and sealing methods, procedures, and design may be considered if all elements of proper and safe procedures to prevent contamination and exposure can be demonstrated. Written modifications to these specifications must be made to the Consultant for review before they can be used for work on this project.

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B. Damage And Repairs To The Work Site

Abatement and disposal shall be performed without damage to the building, including, but not limited to, structural members, ceilings, walls, pipes, duct work, light fixtures, etc., except where specified under demolition. The Contractor shall provide protection of these items and materials as part of the work area preparation. The Contractor shall not perform any demolition activity that could result in the loss of integrity of any building or equipment-related structural member. Where asbestos abatement activity causes damage, the Contractor shall patch, repair, replace or otherwise restore same to its original condition at no additional cost to the Owner.

C. HVAC Systems

Wherever possible, shut down and lock out/tag out electric power to all work areas. Provide temporary power and lighting according to these specifications. Coordinate with the Consultant in advance prior to conducting shutdowns and lockouts. Whenever the work area cannot be completely de-energized, the Contractor will provide the Consultant with a plan for protecting workers and electrical equipment. Shut down and lock out all heating, cooling, and air conditioning system (HVAC) components that are within, supply, or pass through the work area. This will be done with the advice and counsel of the Consultant, but the Contractor is responsible to ensure all systems are shut down and it is impossible to re-energize until clearance is obtained.

1. Investigate the work area and agree on pre-abatement condition with the Owner.
2. Seal all intake and exhaust vents in the work area with tape and 2 layers of 6-mil polyethylene.
3. Seal any seams in system components that pass through the work area.
4. Remove all HVAC system filters and place in labeled, 6-mil polyethylene bags for staging and eventual disposal as asbestos-contaminated waste.

D. Barriers and Isolation Areas

1. The Contractor shall construct and maintain suitable critical barriers to separate work areas from spaces occupied by the Owner or other tradesmen. Critical barriers shall be of sufficient size and strength to prevent building occupants, the public, and others from entering the work areas.
2. Warning signs shall be posted on all critical barriers at the commencement of the work area preparation, as required in 1926.1101 of the Occupational Safety and Health Standards.
3. The signs shall display the proper legend in the lower panel, with letter sizes and styles of a visibility at least equal to that specified in OSHA Standard 1926.1101. The signs will read as follows:

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**DANGER
ASBESTOS
CANCER AND LUNG DISEASE HAZARD
AUTHORIZED PERSONNEL ONLY
RESPIRATOR AND PROTECTIVE CLOTHING
REQUIRED IN THIS AREA**

4. The signs shall be posted at the perimeters of asbestos removal, demolition or construction areas where the asbestos-containing material to be removed exists.
5. The Contractor shall maintain all temporary and critical barriers, facilities and controls as long as necessary for the safe and proper completion of the work. All containments shall consist of floors and walls covered with 2 layers of 6-mil poly sheeting, except in those instances where such floors are deemed impervious by the Consultant.
6. Any breaches in the containment will be corrected at the beginning of each shift and as necessary during the workday. Work will not be allowed to commence until all control systems are in place and operable.
7. No barriers shall be removed until the work areas are thoroughly cleaned and all debris has been properly bagged and removed from work areas, and the air has passed final clearance tests, in accordance with provisions detailed herein.

3.02 ACM & ACWM LOCATION PREPARATION AND REMOVAL

A. Area Cleaning and Preparation

1. **PRE-CLEANING:** In areas designated under the Sequence of Work as having asbestos debris on surfaces, remedial cleaning will be required. Cleaning will be done using HEPA vacuums and wet methods. Pre-removal cleaning will be required in areas where visible asbestos debris is present on the floors and other surfaces as described in Section 1.0. Respiratory protection and protective clothing will be required as defined by OSHA regulation 1926.1101. All pre-cleaning will be inspected by the Consultant. During pre-cleaning activities, the work area shall have its primary and critical barriers in place and be under adequate negative pressure as described herein. Any changes to this shall be at the approval of the Consultant. It should be noted that pre-cleaning shall take place in all work areas prior to commencement of abatement. Pre-cleaning shall include wet wiping and HEPA vacuuming of the floor areas and non-movable items. In addition, all movable items deemed "contaminated" by the Consultant shall also be pre-cleaned.
2. **PRIMARY BARRIERS:** Prior to the construction of each asbestos abatement area, all primary barriers shall be sealed with a minimum of one layer of 6-mil plastic sheeting and duct tape on plywood. Primary barriers consist of all windows, vents, closed and locked doors, and openings to adjacent spaces from the work area. Plywood shall be utilized to cover any doors, elevators, or other entrances to the work area(s) that may be accessible by unauthorized personnel.

B. Decontamination Unit And Procedures

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1. It is the Contractor's responsibility to provide decontamination chambers consisting of a Clean Room, Shower Room, Equipment Room, and Equipment/Waste Decontamination Room for personnel and waste/equipment involved in asbestos abatement. Each of the four rooms shall be of sufficient size to accommodate authorized personnel. Shower shall be completely functional as described in 3.02 (B)(7).
2. Each room shall be separated from other rooms by a double flap of 6-mil polyethylene sheeting acting as an airlock. This shall be designed to minimize fiber migration and airflow between the decontamination unit rooms. A separate equipment and waste decontamination unit shall also be constructed. This can be adjacent to the personnel shower room.
3. The rooms shall be framed with 2" X 4" lumber, masked, sealed and attached to the entry/exit ways of asbestos/lead work areas.
4. The rooms together shall be referred to as the Decontamination Unit. A Decontamination Unit will be required for each separate containment area, if work is to be divided into sections.
5. For those areas deemed acceptable for the utilization of glovebags, a remote Decontamination Unit can be used.
6. The Equipment Room shall serve as a transfer room for decontamination procedures to occur in. This room shall be vacuumed and washed whenever necessary in order to prevent asbestos dust and debris accumulations or when required by the Consultant. Workers leaving the containment shall remove and dispose of disposable protective suits in the Equipment Room and proceed into the Shower Room.
7. The Shower Room shall contain an appropriate number of shower heads supplied with hot and cold water adjustable at the tap. Uncontaminated soap, shampoo, and towels shall be available at all times. The shower water shall be drained, collected, and filtered through a system with at least 5.0-micron particle size collection capability. A system containing a series of several filters with progressively smaller pore sizes shall be used to avoid rapid clogging of the filtration system by large particles. Filtered wastewater shall either be discharged in accordance with the applicable local codes or otherwise disposed of as asbestos waste. Contaminated filters shall be disposed of as asbestos waste.
8. The Clean Room shall store abatement workers' clean protective clothing and clean respirator equipment. Contaminated clothing, respirators, tools, equipment, or other materials shall not be allowed into the Clean Room or beyond. The Clean Room will serve as an access for personnel entering the work area, and for the donning of respiratory protection and protective clothing. The Contractor shall provide space in the Clean Room for the workers' personal clothing. This shall be in the form of lockable lockers.

C. HEPA Filtration

Adequate negative pressure shall be provided within the enclosure (if full containment removal is utilized) as specified below.

1. After asbestos work area is totally isolated, and prior to commencement of work, the Consultant will perform a visual inspection of the work area. This will consist of checking the integrity of barriers including smoke testing the containment if deemed necessary by the Consultant. This does not in any way relieve the Contractor's responsibilities to ensure the isolation of the work area. The volume of air within the contained work area shall be changed a minimum of four (4) times per hour. A pressure differential reading of -0.02 inches of water shall be maintained in the negative pressure work area relative to adjacent areas. A manometer with a strip chart recorder shall be used to show that the proper pressure differential is being maintained.
2. Equipment used for producing a negative pressure work area shall have a filtering device that is at least 99.97% efficient at a 0.3-micron pore size. Filters meeting these standards are referred to as High Efficiency Particulate Absolute (HEPA) filters. The HEPA filtration units shall be equipped with the following:
 - a. Magnehelic gauge to monitor the unit's air pressure difference across the filters and be able to interpret magnehelic readings to cubic feet per minute (CFM).
 - b. An affixed label, clearly marked and conspicuous, showing the most recent installation date and hour reading of the primary internal HEPA filter.
 - c. A clock to record the unit's operation time.
 - d. Automatic shut off for filter failure or absence.
 - e. Audible alarm for unit shutdown.
 - f. Amber flashing warning light for filter loading.
 - g. The unit must be equipped with a safety system that prevents it from being operated with the HEPA filter in an improper orientation.
 - h. All flexible ducting, vent tubing, adapter plates and other equipment used for the passage of filtered air shall be undamaged, uncontaminated, and free of air leaks at all points.
3. Pre-filters shall be changed frequently during the abatement.
4. All HEPA units shall exhaust to the outside of the building. All HEPA units shall be DOP tested on-site by the Contractor.
5. Air movement shall flow uninterrupted from outside the work area through the Decontamination Unit into the work area. There shall be no other openings for air to enter the containment unless approved by the Consultant in writing.
6. HEPA filtration units shall be placed as far as possible from the air intake to the containment to prevent short cycling of fresh air.

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7. This containment, along with the decontamination chamber, shall constitute the critical containment of the work area from the surrounding areas. All openings to this critical containment are to be sealed except where air must enter the work site due to the use of exhaust equipment.
8. Unless approved by the Consultant, air shall enter the critical containment only through the Decontamination Unit. A pressure differential meter will be installed and maintained. If pressure differential drops below -0.02 inches of water, stop work until proper negative pressure is restored.
9. Written modifications to these isolation and sealing methods, procedures, and design may be considered if all elements of proper and safe procedures to prevent contamination and exposure can be demonstrated.
10. Written modifications to these specifications must be made to the Architect and Consultant for review before they can be used for work on this project.

D. ACM & ACWM Removal

1. Asbestos removal will not begin until the Architect and Consultant have given authorization to proceed. This authorization will be given after the removal area has passed a visual inspection by the Consultant based on the criteria presented herein. The Owner reserves the right to inspect the work area prior to start of abatement. The Owner also reserves the right to inspect the work area at any time and to order the Contractor to stop work.
2. All materials shall be sufficiently saturated/wetted to reduce fiber release so that the airborne fiber concentration does not exceed the established OSHA Permissible Exposure Limits (PEL's).
3. Dry removal will not be permitted at any time during this project.
4. All asbestos-containing material shall be carefully removed and placed into double 6-mil polyethylene bags or fiber drums for disposal. All bags, containers or wrapped materials transported out of the work area shall be labeled with preprinted labels required by Federal EPA, OSHA and the Department of Transportation regulations. The name of the waste generator (Owner) and the project location address shall also be placed on each bag/drum.
5. Fine cleaning of residual asbestos-containing material shall consist of carefully scraping or brushing the material from surfaces. The recommended method for brushing a substrate after gross removal has taken place is to use a nylon brush. Wetting of the substrate shall also occur while this brushing is performed, since the chance of airborne fiber generation during fine cleaning still exists.
6. Air testing will be performed continuously outside the asbestos work areas. If fiber concentrations exceed 0.010 fibers/cc, or background levels, work shall stop and the Contractor shall perform clean-up activities in the affected areas and check the integrity of all barriers.
7. Clean-up activities shall include but not be limited to wet-wiping and vacuuming surfaces with a HEPA equipped vacuum. Work may continue only after the source of contamination is identified, corrected, and proper cleaning activities are implemented.

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8. Air testing will be performed by the Consultant on site in the affected areas. If the results of these air tests are not below 0.010 fibers/cc, the Contractor shall perform a thorough decontamination of the affected areas.
9. After brushing and scraping, surfaces shall be free of visible debris and fibers. A final wipe-down of the substrate with wet, lint-free cloths shall take place in order to ensure proper cleaning. All surfaces including floors, walls, ceilings, and suspended ceiling grid-work shall also be HEPA vacuumed clean.
10. All visible asbestos-containing material is to be removed by the Contractor before encapsulation procedures are allowed to begin. The Consultant will conduct an inspection of the work area prior to giving approval to begin encapsulation of the work area. The removal substrate must be clean and bare, and the entire work area must be free and clear of any suspect material for the Contractor to pass this visual inspection and begin encapsulation.

E. Asphalt-Based Asbestos Roofing Material Removal

1. Operations involving the cutting or abrading of asphalt-based asbestos-containing roofing material is considered to release sufficient friable material to constitute an asbestos abatement activity and shall be conducted by a Massachusetts licensed asbestos abatement contractor. All work using such equipment must be performed by licensed asbestos workers in a negative pressure enclosure. These restrictions may be lifted if the Contractor uses slicing equipment or manual means to remove the asbestos materials and USEPA and/or state guidance on abatement of roofing materials is followed.
2. Work Procedure
 - a. Perform whatever procedures are necessary including the application of wet methods and covering materials to ensure that release of asbestos materials is reduced to no visible emissions. Work using any cutting or abrading equipment must be performed in a negative pressure enclosure.
 - b. Remove asbestos roofing materials using tools and equipment specified in regulatory guidance documents.
 - c. Continuously mist the work area as asbestos roofing materials are being removed from the structure.
 - d. All asbestos roofing materials must be removed intact.
 - e. All loose debris shall be immediately collected via HEPA vacuum or wet wiping. The vacuum debris and wipe materials shall be segregated and disposed as asbestos-contaminated waste.
 - f. Wet methods shall be used whenever operations call for the scraping of resilient roofing materials or mastic.
 - g. Where cutting and abrading is prohibited, a negative pressure enclosure is not required. Waste must be lowered manually via stairs or by a crane or hoist, in accordance with applicable regulations.

F. Asbestos Containing Cement Shingle Siding and Door Caulk Removal

1. Operations involving the cutting or breaking of asbestos containing cement shingle siding and caulking is considered to release sufficient friable material to

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constitute an asbestos abatement activity and shall be conducted by a Massachusetts licensed asbestos abatement contractor. All work using such equipment must be performed by licensed asbestos workers in a negative pressure enclosure. These restrictions may be lifted if the Contractor uses slicing equipment or manual means to remove the asbestos materials and USEPA and/or state guidance on abatement of roofing materials is followed. Additionally, the identified ACM door caulk is attached to the cement shingles and will be removed concurrently with the cement shingles and door frame. These materials will be treated as asbestos contaminated debris.

2. Work Procedures

- a. Caulking, asbestos cement shingles, siding, and panels shall not be broken, sanded, sawed, or drilled at any time during removal or subsequent handling.
- b. Polyethylene sheeting shall be spread on the ground under the areas where the shingles, siding, and panels are being removed. The polyethylene sheeting shall be a minimum of 6-mil in thickness and extend a minimum of 10-feet away from the edge of the building to catch any debris generated by the work operation. Polyethylene sheeting shall be cleaned of accumulated debris no later than the end of each work shift.
- c. Openings on the side of the building where asbestos abatement activities are taking place shall be closed or sealed with polyethylene sheeting and duct taped in a manner sufficient to prevent leakage of dust/debris to interior spaces.
- d. Nails securing shingles shall be cut or pulled to allow intact shingle removal. Cementitious asbestos-containing shingles, siding and panels shall be removed whole and intact to the greatest extent feasible. Methods likely to break shingles, siding, or panels during removal shall not be used.
- e. Each panel, siding, or shingle shall be adequately wetted with amended water prior to removal. Door caulk will also be adequately wetted with amended water prior to removal.
- f. Shingles, siding, or panels shall be carefully lowered to the ground in a manner to avoid breakage
- g. Removed shingles, siding, or panels and associated debris shall be containerized in leak-proof metal, plastic, or plastic-lined drums or boxes or wrapped with double thickness plastic sheeting (six-mil minimum thickness each layer), sealed with duct tape no later than the end of each work shift.
- h. Uncontained asbestos cement shingles, siding, or panels shall not be bulk loaded into a truck, dumpster, or trailer for storage, transport, or disposal.
- i. For activities that disturb friable ACM, no visible emissions shall be discharged to the outside air during the collection, processing, packaging, or transporting of any ACM or ACWM.

G. Encapsulation Procedures

1. The polyethylene barriers shall be cleaned of gross contamination before a lockdown sealant can be applied to the substrate.

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2. After the substrate has been cleaned and all polyethylene barriers of the work area are cleaned of all visible debris, the Contractor shall request a visual inspection of the work area by the Consultant.
3. Workers performing lockdown must wear disposable protective clothing and respirators suitable for asbestos. The encapsulation process shall not be treated any differently from the removal process in this respect.
4. All surfaces from which asbestos-containing materials have been removed shall be encapsulated. A minimum of one coat of lockdown encapsulant will be applied to both the substrate and the polyethylene sheeting serving as the containment barrier. If the lockdown material is being applied to irregular, grooved, or corrugated surfaces, it shall be administered from the opposing side, or at a right angle to the direction of the previous application.
5. The encapsulant shall be left to dry before the commencement of final air testing. After final clearance and inspection criteria have been met (See Section 4.1 regarding Final Clearances), the Contractor shall begin final take-down procedures.

H. Removal of Critical Barriers

1. No critical barrier shall be taken down until the final visual inspection and final clearance air tests are found to be below 0.010 fibers/cc by PCM.
2. After a successful final visual inspection, encapsulation, and a successful final air test, the Contractor shall conduct the post abatement takedown.
3. All encapsulated polyethylene sheeting used in the construction of the Decontamination Unit and Containment Area shall be bagged and disposed of as asbestos contaminated waste.
4. Areas exposed during this process shall be examined for traces of suspect material.
5. If any is found, it will be picked up by HEPA vacuuming and wet cleaning, and a coat of encapsulant shall be applied to the affected areas. Based on the amount of suspect material found, the Consultant may request the use of misters in the surrounding area.
6. The Contractor will then implement the use of misters as a precautionary measure.

3.03 DISPOSAL OF ASBESTOS WASTE (ACWM)

- A. All waste removal procedures shall be conducted in accordance with local, state and federal regulations.
- B. The Contractor shall provide proof that disposal sites for all waste materials have current and valid permits to accept specific wastes at the time of the pre-construction meeting.
- C. Receipts shall be obtained by the Contractor from the disposal/recycling site(s), and submitted to the Consultant upon request for final payment.

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- D. Warning labels having permanent, waterproof print and adhesive shall be affixed to all asbestos bags, trucks, drums (lids and sides), and other containers used to store and/or transport asbestos-containing material. Labels must be conspicuous and legible and contain the following warning:

CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD

- E. The Contractor shall be responsible for all necessary precautions to prevent pollution by spilling during the performance of services and shall assume full responsibility for all Contractor caused spills, which shall be cleaned up at the Contractor's expense.
- F. Temporary storage of asbestos waste on-site (inside) will be allowed in designated non-work areas only.

3.04 SCRAP METALS REMOVAL

- A. Precious, semi-precious, and scrap metals, including, but not limited to, copper, aluminum, silver, gold, brass, and steel shall not be cut and removed from the Site by the Abatement Contractor unless specifically required by the Asbestos Abatement provisions of these specifications and by written authorization from the Owner and Architect.

3.05 HOUSEKEEPING

- A. Throughout the work period, the Contractor shall maintain the building and site in a standard of cleanliness as specified throughout these specifications.
1. Contaminated disposable clothing, respirator filters, and other debris shall be bagged and sealed at the end of each workday.
 2. All asbestos generated by either removal or repair shall be bagged immediately and not be allowed to be left exposed at the end of each workday.
 3. Respirators shall be thoroughly cleaned at the end of each workday and stored for the next day's use.
 4. The Contractor shall retain all stored items in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection materials.
 5. The Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the work.
 6. The Contractor shall provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the environment.
 7. Daily, and more often if necessary, the Contractor shall inspect the work areas and adjoining spaces, and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
 8. The Contractor shall maintain the site in a neat and orderly condition at all times.

3.06 QUALITY CONTROL

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- A. The Owner has retained the Consultant, to provide project administration, monitoring of Contractor work practices and performance, inspection of the work sites, bulk fiber identification, and air sampling and analysis throughout the asbestos and hazardous materials abatement project.
- B. Many references to Owner will in fact be managed by the Consultant in lieu of the Owner, at the Owner's request, and the Contractor is required to regard the requests and interpretations of the Consultant as having full force unless expressly informed otherwise by the Owner.
- C. Air Monitoring
 - 1. The air clearance acceptance criteria for this project is <0.010 fibers per cubic centimeter of air (f/cc) by Phase Contrast Microscopy (PCM) using the NIOSH 7400 Method.
 - 2. Background (pre-testing) air and appropriate dust samples may be taken to represent conditions before the Contractor starts masking and sealing operations.
 - 3. During removal, area samples will be collected by the Consultant outside major openings in the containment: in the clean room, at other critical points outside the work areas, just outside the clean room, inside the contained work sites, and at HEPA exhaust locations. The Contractor shall be responsible for all OSHA personal sampling. Final clearance air samples will be collected inside each removal area after acceptance of visual inspection and encapsulation.
 - 4. NOTE: Encapsulation on all surfaces (including floor) must be dry prior to final air sampling.
 - 5. A sufficient number of samples to reliably characterize the work place air quality will be taken. Air will be agitated by means of a small leaf blower prior to the test, and kept agitated by means of a small electric fan. The results of all samples must comply with the regulations set forth in this specification. Failure to meet the specified criteria will require the Contractor to re-clean the designated work site and then the Consultant to repeat the final air clearance testing. All repeat air testing shall be the Contractor's financial responsibility. Cleaning and testing will be repeated until the specified criteria are met.

D. Work Review

1. The Consultant and the Architect will review the Contractor's work practices prior to the start of, and during all asbestos related work, and will report any specification violations to the Contractor. If the Contractor fails to correct deficiencies in a timely manner, the Contractor will be notified in writing, and work may be stopped.
2. The Consultant will review the containment structure and negative air conditions before work begins and after the Contractor Site Supervisor has given approval. Outside containment airborne fiber concentrations must not exceed 0.010 fibers/cc or pre-abatement levels, whichever is greater.
3. If concentrations exceed this level, then work must be stopped, conditions reviewed as to the probable cause, and then corrected. A description of procedures regarding fiber concentrations greater than 0.010 fibers/cc outside the containment can be found above.
4. The Consultant will keep a daily log of the Contractor's work practices and will make these daily logs a part of the final project documents.

3.07 PERSONAL PROTECTION

A. Respirators and Protective Clothing

1. Protective Clothing
 - a. Personal protection, in the form of disposable Tyvek suits, and NIOSH approved respirators, are required for mechanics, Contractor supervision, Owner, Consultant, and visitors at the work site during the set-up, removal, and cleaning operations.
 - b. The Contractor shall provide all this protective equipment for workers, Owner, Consultant, and authorized personnel to access this work site.
 - c. Each worker shall be supplied with a minimum of two complete disposable uniforms every day.
 - d. Removal workers shall not be limited to two uniforms, and the Contractor will be required to supply additional uniforms as is necessary. Under no circumstances will anyone entering the removal area be allowed to reuse a contaminated uniform.
 - e. Work clothes shall consist of disposable full body suits, head covers, gloves, footwear, and eye protection. Street clothes are forbidden in the work area at all times, even under protective suits.
2. Respiratory Protection
 - a. The Contractor shall supply workers and supervisory personnel with NIOSH approved protective respirators and HEPA filters.
 - b. Appropriate respirator selection shall be determined by the daily personal samples being taken and strictly follow the guidelines set forth in the OSHA respiratory program 29 CFR 1910.134 and the Massachusetts DLS Regulations 453 CMR 6.00. The respirators shall be sanitized and

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maintained according to the manufacturer's specifications. Appropriate respirators shall be selected using the information provided in OSHA Title 29 CFR Part 1910.1926 Final Rules. This determination has been made for this project. The Contractor shall utilize full-face Powered-air Purifying (PAPR) respirators equipped with HEPA filters for all work. Disposable respirators shall not be considered acceptable in any circumstance.

- c. The Contractor will maintain on site a sufficient supply of disposable HEPA filters to allow workers and supervisory personnel to change contaminated filters at least three (3) times daily. The Contractor is solely responsible for means and methods used and for compliance with applicable regulations.
 - d. Respirators shall be individually assigned to removal workers for their exclusive use.
 - e. All respiratory protection shall be provided to workers in accordance with the written submitted respiratory protection program, which includes all items in OSHA 29 CFR 1910.134 (b) (1-11). A copy of this program shall be kept at the work site, and shall be posted in the Clean Room of the Decontamination Unit.
 - f. Workers must perform negative and positive pressure fit tests each a time a respirator is put on, whenever the respirator design permits.
 - g. Workers shall be given a qualitative fit test in accordance with procedures detailed in the OSHA 29 CFR 1910.1025, Appendix D, Qualitative Fit Test Protocols, for all respirators to be used on this abatement project. An appropriately administered quantitative fit test may be substituted for the qualitative fit test.
 - h. Upon leaving the active work area, the pre-filter shall be discarded, cartridges removed, and respirators cleaned in disinfectant solution and clean water rinse. Clean respirators shall be stored in plastic bags when not in use. The Contractor shall inspect respirators daily for broken, missing, or damaged parts.
3. Personal Sampling
- a. The Contractor shall provide daily personal sampling to check personal asbestos exposure levels for the purpose of establishing respiratory protection needs.
 - b. Samples shall be taken for the duration of the work shift or for eight hours, whichever is less.
 - c. Personal samples need not be taken every day after the first day if working conditions remain consistent, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work, or during any changes in personnel. Sampling will be to determine eight-hour Time Weighted Averages (TWA). The Contractor is responsible for personal sampling as outlined in OSHA Standard 1926.1101.
 - d. Sampling personnel shall be proficient in the taking of asbestos air samples as prescribed by NIOSH 7400, and must be supervised by an individual who has completed the NIOSH 582, or equivalent, training course.

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- e. Asbestos air sampling results shall be available for posting at the job site in written form no more than twenty-four (24) hours after the completion of a sampling cycle. The document shall list each sample's result, sampling time and date, individual monitored, flow rate, sampling duration, microscope field area, number of fibers per fields counted, cassette size, and analyst's name and company. Air sample analysis results will be reported in fibers per cubic centimeter.

END OF ASBESTOS ABATEMENT

SECTION 026000

MISCELLANEOUS HAZARDOUS MATERIALS REMOVAL

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 1 - GENERAL REQUIREMENTS that are hereby made a part of this Section of the Specifications.
- B. Equality of material, article, assembly or system other than those named or described in this Section shall be determined in accordance with the provisions of Article V of the CONTRACT AND GENERAL CONDITIONS.

1.2 DESCRIPTION OF THE WORK

- A. The Contractor shall provide labor, materials, and equipment to complete the work specified in this Section including, but not limited to, the removal and lawful disposal of hazardous materials, hazardous wastes, and special wastes. Generally, the management of miscellaneous hazardous materials shall include, but not be limited to:
 - 1. Characterization (any testing that may be required by a disposal facility), removal, and disposal of hazardous materials or potentially hazardous materials.
 - 2. Characterization (any testing that may be required by a disposal facility), removal, and disposal of fluorescent light ballasts, capacitors, and transformers throughout the site building.
 - 3. Characterization (any testing that may be required by a disposal facility), removal, and disposal of contained gear oils, hydraulic oils and refrigeration liquids, etc. from various pieces of machinery and equipment, throughout the site building and structures to be demolished.
 - 4. Characterization (any testing that may be required by a disposal facility), removal, and disposal of all containers, drums, and unknown materials throughout the site building and structures to be demolished.
 - 5. Characterization (any testing that may be required by a disposal facility), removal, and disposal of loose paint chips and flaking and peeling paint from walls and floors throughout the site building and structures to be demolished.

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6. File all necessary notices, obtain all permits and licenses, and pay all governmental taxes, fees, and other costs in connection with the work. Obtain all necessary approvals of all governmental departments having jurisdiction.
 7. Perform all sampling and testing required to properly profile the material for waste disposal. This shall also include all testing required by the disposal or recycling facility.
 8. All costs for the testing shall be borne by the Contractor.
 9. Comply with the Contractor's submitted Health and Safety Plan.
- B. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 025000 – ASBESTOS ABATEMENT AND RELATED WORK
- C. The following miscellaneous hazardous materials are to be removed and disposed as part of the scope of work:

Material Description (Hazard)	Material Location	Estimated Quantity
275-Gallon Aboveground Fuel Oil Storage Tank	Basement	2 Units
Air Conditioner	Basement	1 Unit
Refrigerator Units	Kitchen	1 Units
Fire Extinguishers	Throughout Interior	2 Units
Mercury Switches	Throughout Interior	4 Units
Smoke Alarms	Throughout Interior	3 Units
TV/Computer Monitors	Throughout Interior	7 Units
Paint Cans	Throughout Interior	30 Units
Petroleum in Garbage Buckets	Exterior	50 Gallons

The Contractor shall perform a detailed inventory of the building and remove and properly remove of all containerized wastes present on the interior and exterior.

1.3 SCHEDULING AND SEQUENCING

- A. The Contractor shall develop a hazardous materials removal schedule for each phase of the work at the Pre-Construction Conference. The Architect may choose to alter the work sequence as they see fit.
- B. The Contractor shall update the schedule and submit any schedule changes for review by the Architect at the weekly construction meetings.

1.4 LOCATION OF WORK

- A. Location of work areas, descriptions, estimated types and quantities of hazardous materials are described in the HAZARDOUS MATERIALS INVENTORY appended hereto in APPENDIX B. If additional hazardous materials are encountered, the Contractor shall notify the Architect immediately and be prepared to remediate the material.
- B. The HAZARDOUS MATERIALS INVENTORY identifies hazardous materials encountered and enumerated during the survey. The quantities are provided for general guidance and may not correspond exactly to the quantity to be removed. The Contractor is responsible to investigate all structures for the presence of all hazardous materials. The Contractor shall determine quantities of hazardous materials for bidding purposes.
- C. Handling, containerizing, packaging, re-handling, hauling and disposal of all items identified are to be included in the lump sum bid item of the Contract.

1.5 REFERENCES

- A. The Contractor is advised to thoroughly review the documents referenced in this Section. Strict adherence to the hazardous materials, noise, air and water pollution regulations and requirements is required.
 - 1. Code of Federal Regulations
 - a. 29 CFR 1910, "Occupational Safety and Health Standards" (General Industry Standards)
 - b. 29 CFR 1910.20, "Access to Employee Exposure and Medical Records"
 - c. 29 CFR 1910.134, "Respiratory Protection"
 - d. 29 CFR 1910.146 "Permit Required Confined Space"
 - e. 29 CFR 1910.1025 "Lead"
 - f. 29 CFR 1910.1200, "Hazard Communication"
 - g. 29 CFR 1926, "Safety and Health Regulations for Construction" (Construction Industry Standards)
 - h. 29 CFR 1926.62, "Lead-Construction"
 - i. 40 CFR 50, "National Primary and Secondary Ambient Air Quality Standards"

- j. 40 CFR 60, "Standards of Performance for New Stationary Sources," Appendix B, "Test Methods"
 - k. 40 CFR 117, "Determination of Reportable Quantities for Hazardous Substances"
 - l. 40 CFR 122, "EPA Administered Permit Program: The National Pollutant Discharge Elimination System"
 - m. 40 CFR 172, "Hazardous Waste Transportation"
 - n. 40 CFR 261, "Identification and Listing of Hazardous Waste"
 - o. 40 CFR 262, "Standards Applicable to Generators of Hazardous Waste"
 - p. 40 CFR 263, "Standards Applicable to Transporters of Hazardous Waste"
 - q. 40 CFR 268, "Land Disposal Restrictions"
 - r. 40 CFR 300, "National Oil and Hazardous Substances Pollution Contingency Plan"
 - s. 40 CFR 302, "Designation, Reportable Quantities, and Notification"
- 2. Occupational Safety and Health Administration OSHA Booklet 3126 "Working with Lead in the Construction Industry"
 - 3. National Institute for Occupational Health and Safety
 - a. NIOSH Method 7082, "Lead"
 - 4. American Society for Testing and Materials
 - a. ASTM D3335, "Test Method for Low Concentration for Lead, Cadmium, and Cobalt in Paint by Atomic Absorption Spectroscopy"
 - 5. EPA (Environmental Protection Agency) Publications
 - a. SW-846, "Test Methods for Evaluating Solid Waste – Physical/Chemical Methods"
 - b. EPA Method 3050, "Acid Digestion of Sediments, Sludges, and Soils"
 - 6. Steel Structures Painting Council

- a. SSPC Guide 61 (CON) Guide for Containing Debris Generated During Paint Removal Operations
 - b. SSPC Guide 71 (DIS) Guide for the Disposal of Lead Contaminated Surface Preparation Debris
7. Commonwealth of Massachusetts Department of Environmental Protection
- a. 310 CMR 40 Massachusetts Contingency Plan
 - b. 310 CMR 30 Hazardous Waste Regulations
 - c. 310 CMR 1-7 Clean Water Act
 - d. 310 CMR 16, 19 Solid Waste Regulations
 - e. 314 CMR 7-8 Clean Air Act
8. Other
- a. 454 CMR 10-23 Division of Industrial Safety

1.6 SUBMITTALS

- A. The Contractor shall submit each item in this Article according to the Conditions of the Contract, for information only, unless otherwise indicated.
- B. The Contractor shall submit a Waste Management Plan as specified in Section 017418. The Plan shall include identification of the proposed waste hauler and disposal facility with copies of all applicable licenses, registrations and approvals.
- C. The Contractor shall provide copies of all worker certifications associated with OSHA 40 Hour Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120.
- D. The Contractor shall provide the Architect with all required documentation relating to the proper removal and disposal of any hazardous or regulated waste that leaves the site in accordance with the Waste Management Plan.
- E. After completion of the hazardous materials removal, provide a final report documenting removal, transportation and disposal activities. The document shall include copies of manifests, shipping slips, permits, and licenses for this Project.

1.7 QUALITY ASSURANCE

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- A. Examination of Existing Conditions: The Contractor shall examine the Contract Drawings for hazardous waste identification, handling, removal, and disposal requirements and provisions for new work.
- B. Hazardous Waste Removal and Transportation Firm Qualifications: An experienced firm that has specialized in hazardous waste work similar in material and extent to that indicated for this Project.
- C. Refrigerant Recovery Technician Qualifications: Certified by an EPA-approved certification program.
- D. Regulatory Requirements: Comply with governing EPA, DEP, and local municipality notification regulations and permitting before beginning removing any hazardous waste materials. Comply with hauling and disposal regulations of authorities having jurisdiction

PART 2 – MATERIALS

2.1 PROTECTIVE EQUIPMENT

- A. Provide health and safety equipment required to protect workers and to comply with the Health and Safety Plan.

2.2 DISPOSAL BAGS

- A. Disposal Bags: Provide 6 mil (0.15 mm) thick leak-tight polyethylene bags.

2.3 DRUMS

- A. DOT Hazardous Waste Disposal Drums: Provide DOT 17-H Open -Top Drums (55 gallon) in accordance with DOT regulations title 49 CFR Parts 173, 178, and 179.

2.4 LABELS

- A. DOT Hazardous Waste Labels: in accordance with DOT regulations, Title 49 CFR parts 173, 178, and 179.

PART 3 – EXECUTION

3.1 GENERAL WORK AREA SET UP

- A. Signage: Prior to the preparation for work that will disturb hazardous materials, the Contractor shall place warning signs immediately outside all entrances and exits to the area.
- B. Access to Work Areas: The Contractor shall allow only authorized personnel into the work area. Barrier tape shall be used to limit access to the exterior work area.

3.2 GENERAL HAZARDOUS WASTE MANAGEMENT

- A. Do not mix potentially hazardous waste streams. Where feasible, separate each type of hazardous waste from other types of hazardous wastes, from asbestos waste and from construction waste.
- B. Segregate, package, label, transport and dispose of Hazardous Waste in accordance with DOT, EPA, State and Local regulations.
- C. A schedule of materials that must be managed as hazardous waste is attached in Appendix B.

- D. The following wastes are designated as Hazardous Wastes and are non-salvageable:
1. Waste Type A PCB waste to include PCB-containing ballasts from fluorescent light fixtures.
 2. Waste Type B Mercury-containing waste to include thermostats and temperature gages with mercury switches, fluorescent, and mercury-vapor lamps.
 3. Waste Type C lead base paint debris to include containers of paint and paint chips/debris.
 4. Waste Type D characteristic hazardous metal containing waste.
 5. Waste Type E HVAC and refrigerator refrigerant.
- E. In the event of an apparent conflict between the requirements of these specifications and the requirements of the Massachusetts Hazardous Waste Regulations (310 CMR 30.000) the Contractor shall bring the apparent conflict to the attention of the Architect for resolution. The Contractor shall not seek to review the apparent conflict with other parties prior to resolution with the Architect.

3.3 HAZARDOUS WASTE PACKAGING AND LABELING

- A. Package each segregated Hazardous Waste Type A, B, C, D and E in separate specified containers as follows. **IMPORTANT: Do Not Mix Waste Streams:**
1. Waste Type A to be packaged in DOT 17-H open-top drums. Fill to capacity only with Waste Type A (Do Not Mix Waste Stream types). Install gasket on lid, apply lock ring, and seal. Apply Hazardous Waste Label to drum side. Enter DOT Shipping Data as follows: RQ Waste Polychlorinated Biphenyls, 9, UN-2315, PG-II, (M001). Adjacent to each label, enter the date indicating when waste was first placed in each drum.
 2. Waste Type B to be packaged in DOT 17-H open-top drums with polyethylene disposal Bag liners. Fill liner bags only with Waste Type B (do not mix waste stream types). After full, neck liner bags down into DOT 17-H open-top drum and seal with duct tape. Install gasket on lid, apply lock ring, and seal. Apply Hazardous Waste Label to drum side. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009). Adjacent to each label, enter the date indicating when waste was first placed in each drum.
 3. Waste Type C to be packaged in DOT 17-H Open-Top Drums. Fill to capacity only with Waste Type C (do not mix waste stream types). Install gasket on lid, apply lock ring, and seal. Apply Hazardous Waste Label to drum side. Enter DOT Shipping Data as follows: RQ Hazardous Waste

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Solid, NOS, 9, NA3 077, PG-III, (~D009). Adjacent to each label, enter the date indicating when waste was first placed in each drum.

4. Waste Type D to be packaged in DOT 17-H open-top drums. Fill to capacity only with Waste Type D (do not mix waste stream types). Install gasket on lid, apply lock ring, and seal. Apply Hazardous Waste Label to drum side. Enter DOT Shipping Data as follows: RQ Hazardous Waste Solid, NOS, 9, NA3077, PG-III, (D009). Adjacent to each label, enter the date indicating when waste was first placed in each drum.
 5. For Waste Type E, HYAC and refrigerator refrigerant shall be reclaimed for recycling from each unit by an EPA licensed contractor. The refrigerant shall be reclaimed using evacuation gas containers and submitted for recycling in accordance with the EPA Clean Air Act, Stratospheric Ozone Protection Regulations.
- B. Maintain all containers in a continuously sealed condition after they have been filled. Do not reopen sealed containers or place additional waste in previously sealed containers.

3.4 MERCURY

- A. Under current federal regulations, items containing mercury may be classified as hazardous waste. These include, but are not limited to fluorescent lamps, high-intensity discharge lamps, manometer thermostats and relay switches. The following shall be followed for disposal of all mercury items:
1. Collection, characterization and proper disposal of all fluorescent tubes and mercury items found throughout the facility.
 2. Care must be taken to not break these items, as that may cause mercury exposure to individuals handling them and may require additional clean-up and decontamination.
 3. All materials leaving the site shall become the property of Contractor.
 4. Provide all waste shipment records or recycling records and incorporate in the final report.

3.5 HAZARDOUS MATERIALS/CONTAINERIZED WASTE

- A. All hazardous materials shall be characterized and disposed of in accordance with applicable regulations. Disposal manifests shall be provided for all waste disposal.
- B. Workers who handle hazardous materials shall be licensed and trained in safe and proper hazardous materials handling procedures. At a minimum, this shall include OSHA 40 Hour Hazardous Waste Site Health and Safety Training in accordance with 29 CFR 1910.120.

C. Any hazardous materials containers in poor condition shall be removed as soon as possible.

D. Handling Hazardous Waste

1. Place waste in DOT approved containers and label the containers for transport to a licensed disposal site.
2. Use an authorized hazardous waste transporter to haul waste to a hazardous waste facility.
3. Follow all record keeping, chain-of-custody and reporting requirements including a copy of the hazardous waste manifest. -
4. Accurately measure and weigh the volume of each container or load of waste removed from the site. Submit records of waste volumes to the Architect.
5. Special attention shall be given to the time of storage, amount of material stored at any one time, use of proper containers and personnel training.
6. Paint debris shall not be placed on the unprotected ground and shall be shielded to prevent dispersion of the debris by wind or precipitation.
7. Provide appropriate notifications to regulatory agencies if there is a release to the environment exceeding the CERCLA reporting requirements (e.g. lead - 1 pound).
8. Any evidence of improper storage shall be cause for immediate shutdown of the project until corrective action is taken.
9. Provide legal transportation of the waste to the disposal landfill, and complete or obtain all required licenses, manifests, landfill slips, or other forms. Copies of all forms or licenses, and the signed original of the Waste Manifest for each waste load, shall be given to the Architect.

3.6 LEAD-BASED PAINT

A. Lead-based paint and lead-containing paint is present on many surfaces throughout the interior and exterior of the building. The Contractor shall assume that all painted surfaces are coated with paint containing lead. Any of the Contractor activities that may generate leaded dust or impact a leaded surface shall be responsible for regulating his work area so that dust migration is contained properly within the regulated area. Once the work is complete, the Contractor shall be responsible for the proper clean up and disposal of leaded dust and materials.

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- B. All lead based paint and paint containing lead work must be reflected in the lump sum bid of this contract. The Contractor shall refer to the project drawings for the scope of work for lead painted component removal/disposal or for components which are to be chemically stripped of lead paint.
- C. Contractor shall remove loose, flaking and peeling paint from the interior walls, floors and ceiling surfaces in designated buildings as indicated on the Project Drawings. Clean up and drum lead paint utilizing wet methods and negative air filtration, as applicable.
- D. In areas where lead based paint is co-mingled with ceiling and wall plaster materials, Contractor shall dispose of co-mingled materials as lead waste.
- E. Work Areas Affected - In general, the following activities are minimum requirements of this Section and affect the demolition performed on the painted components:
 - 1. No torch cutting, mechanical sanding or stripping or abrasive methods shall occur on painted surfaces without the use of HEPA vacuum attachments and/or other Engineering controls to minimize work exposure and the spread of lead dust and fumes to the building and environment.
 - 2. No demolition activities may occur that increase the workers' exposure above the Action Level of 30 $\mu\text{g}/\text{m}^3$. Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.
 - 3. Workers shall be informed of the components to be demolished that have been identified as containing lead.
 - 4. Worker protection, at a minimum, shall comply with the OSHA Lead Standard 29 CFR 1926.62. Worker Right to Know and Health and Safety Standards of 1926.62 shall also apply to the work of this Section.
 - 5. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same vicinity as demolition involving components identified as containing lead.
 - 6. Cleanup Activities: The Contractor shall maintain the demolition work zones free of accumulated debris and materials containing lead.
- G. Disposal of Lead Contaminated Material.
 - 1. The Contractor must comply fully with SSPC – Guide 71 (DIS) as well as all current regulations concerning the testing, handling, hauling, labeling, and disposal of all lead paint waste generated during this project.
 - a. At a minimum, the Contractor shall collect and submit samples for Toxicity Characteristic Leaching Procedure (TCLP) Method 1311 in accordance with Appendix II of 40 CFR 261 to a Massachusetts

Certified Laboratory. The Contractor shall collect at least four samples from each media scheduled for disposal.

- b. All painted or coated building components shall be disposed off-site.
- c. All visible paint and painted debris shall be removed from the ground within and surrounding the work site prior to building demolition. All material shall be properly disposed of off-site.
- d. Lead-containing material that exceeds the TCLP criteria shall be disposed in accordance with applicable hazardous waste regulations.

3.7 REFRIGERANT

- A. Collect and analyze refrigerant samples, as necessary, to identify system gases from all refrigerant-containing vessels and systems. These systems include, but are not limited to, HVAC systems, air conditioners, refrigerators, and water coolers.
- B. Evacuate all refrigerant-containing vessels and systems using a vacuum pump. Furnish and install all necessary valves and fittings required to capture and collect the refrigerant in DOT-approved recovery cylinders or drums. Properly label all recovery cylinders and drums
- C. All activities associated with the removal and reclamation of refrigerant gases shall be in accordance with Section 608 of the Federal Clean Air Acts Amendment of 1991.
- D. After removal of refrigerants, tanks, vessels, piping, white goods, and other items shall be disposed of in accordance with applicable regulations. The Architect shall not pay for disposal until complete documentation of lawful disposal is received by the Architect.

3.8 ABOVEGROUND STORAGE TANKS (ASTs)

- A. During removal activities, lower explosive limit (LEL) shall be monitored utilizing appropriate air monitoring equipment by the Contractor.
- B. Drain all fluids from the ASTs. Decontaminate all systems, including piping, by means of steam cleaning or triple rinsing, or both, with a compatible fluid to remove all visible contamination.
- C. Collect and drum all fluids, including decontamination fluids drained from the above described equipment.
- D. Label drums for transport and disposal.

- E. After removal of all hazardous components, dispose of remaining equipment carcasses and piping in accordance with applicable regulations. The Contractor shall submit documentation verifying removal, transportation, and disposal at the approved disposal facility.
- F. the Architect shall not pay for disposal until complete documentation of lawful disposal is received by the Architect.

3.9 WHITE GOODS AND OTHER ITEMS

- A. Remove and properly dispose of all environmentally hazardous items and systems components installed in white good item before proper disposal of the unit. This work includes, but is not limited to:
 - 1. Stoves.
 - 2. Air conditioners.
 - 3. Refrigerators.
- B. White good items which do not contain environmentally hazardous materials, and white good item carcasses from which the Contractor has removed environmentally hazardous materials prior to removal from the building, shall be removed, transported and disposed of at an approved facility(ies).
- C. The Architect shall not pay for disposal until complete documentation of lawful disposal is received by the Architect.

3.10 FIRE EXTINGUISHERS

- A. Fire extinguishers may contain corrosive agents (monoammonium phosphate, ammonium phosphate) and may be reactive in water.
- B. De-pressurize prior to disposal.
- C. Fire extinguishers and their contents shall be landfilled in accordance with regulatory requirements. Do not discharge to the ground or to surface water. Do not cross contaminant with other fire extinguisher agents.
- D. Submit proof of disposal to DCAM.

3.11 ANIMAL DROPPINGS

- A. Prior to cleaning, an animal control expert shall inspect the building to determine if animals are present and will appropriately remove the animals from the building.
- B. Broken windows and other means of access shall be secured to prevent re-infestation of the Site building. Food and other materials (i.e., clothing, blankets, etc.) shall be removed to prevent attraction of animals.

- C. Clean all animal droppings and contaminated media present within the Site building.

3.12 TEMPORARY STORAGE

- A. Partially filled containers of hazardous waste may be stored at the work site for intermittent packaging provided that:
 - 1. Each container is properly labeled when it is first placed in service;
 - 2. Each container remains closed at all times except when compatible waste types are added; and
 - 3. When moved from site to site, each container remains within the geographic boundaries of the facility without moving or crossing public access highways.

3.13 TRANSPORTATION, DISPOSAL AND/OR RECYCLING OF HAZARDOUS WASTES

- A. Continuously maintain custody of all hazardous material generated at the work site. Provide security, short-term storage, transportation and disposition until custody is transferred to an approved properly permitted disposal site or recycling center. Document continuous chain-of custody.
- B. Do not remove, or cause to be removed, hazardous waste from the Commonwealth's property without a legally executed Uniform Hazardous Waste manifest.
- C. At completion of hauling and disposal of each load submit copy of waste manifest, chain of custody form, and landfill receipt to the Architect.
- D. Recycling and Recovery: Turn over waste that contains materials for which recovery and/or recycling is possible to an approved recycling center. Materials subject to recycling include:
 - 1. Fluorescent light tubes.
 - 2. Thermostats with mercury switches.
 - 3. Lead acid batteries
 - 4. Refrigerant

END OF SECTION

SECTION 028000

**LEAD BASED COATINGS REMOVAL
AND
LEAD DUST CLEANUP**

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Attention is directed to the CONTRACT AND GENERAL CONDITIONS and all Sections within DIVISION 01 - GENERAL REQUIREMENTS which are hereby made a part of this Section of the Specifications.
- B. This Section specifies renovation or demolition of structures and building components coated with paint containing lead and lead-containing dust.
- C. Examine all Drawings and all other Sections of the Specifications for requirements of related sections affecting the work of this Section. A lead determination of the Site building indicates that various painted components are considered to be lead-containing.
- D. The work of this Section shall be performed as stated herein. In performing the work of this Section, the Contractor shall refer to other Sections for additional procedures. The Contractor is responsible for the coordination of the work of this Section with related work. No delays in completion of the work may be claimed for lack of coordination.
- E. Contractor shall comply with all applicable local, state, and federal guidelines and regulations regarding all work involving the presence of lead-containing paint and lead-containing dust.
- F. The work of this Section references work of the Contractor performing the demolition. Additionally, requirements of the Contractor regarding coordination and related work are identified in this Section and shall be considered the responsibility of the Contractor.

1.2 DESCRIPTION OF WORK

- A. The work of this Section includes demolition of building components or chemical stripping paint from window/door frames coated with paint containing lead. The specific scope of work is specified on the Project Drawings. The procedures described herein apply to all demolition work where a worker may be occupationally exposed to lead as well as to the disposal of the demolition debris. The Contractor shall assume that any painted surface not tested under this specification shall be assumed to contain lead paint and it shall be the Contractor's responsibility to protect workers performing under this Contract. This may require additional testing by the Contractor to verify lead content.
- B. The Contractor shall assume full responsibility and liability for the compliance with all applicable Federal, State and local regulations pertaining to work practices, hauling and disposal of hazardous waste, protection of workers and visitors to the site, and persons occupying areas adjacent to the site. The Contractor shall hold the Designer and Owner harmless for failure to comply with any applicable work, hauling, disposal, safety, health or regulation on the part of himself, his workers or his subcontractors.
- C. The Contractor is required to ensure the protection of workers performing any related demolition work that will affect surfaces coated with lead containing paint, lead-containing dust, fumes, as well as, protecting the public and the environment from exposure to lead dust and fumes.

D. Upon completion of demolition activities, the Contractor shall perform a general cleaning of the work areas within of the Site building. The Contractor shall also perform lead waste characterization as specified herein.

E. CODES AND STANDARDS

1. All work shall conform to the standards set by applicable Federal, State and local laws, regulations, ordinances, and guidelines in such form in which they exist at the time of the work on the contract and as may be required by subsequent regulations.

2. In addition to any detailed requirements of the Specification, the Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of Federal, State, Regional and Local Authorities regarding handling and storing of lead waste material.

3. The following references are cited as applicable standard and regulations as amended:

a. Code of Federal Regulations (CFR) Publications:

29 CFR 1910	General Industry
29 CFR 1926.55	Gases, Vapors, Fumes, Dusts and Mists
29 CFR 1926.57	Ventilation
29 CFR 1926.62	Lead in Construction
29 CFR 1926.200	Signs, Signals and Barricades
29 CFR 1926.354	Welding, Cutting and Heating in Way of Preservative Coatings
29 CFR Subpart T	Demolition
40 CFR 50	National Primary and Secondary Ambient Air Quality Standards for Lead
40 CFR 61 Subpart A	General Provisions
40 CFR 61.152	Standard for Waste Manufacturing, Demolition, Renovation, Spraying, and Fabricating Operations.
40 CFR 241	Guidelines for the Land Disposal of Solid Wastes
40 CFR 257	Criteria for Classification of Solid Waste
40 CFR 261 and 262	Waste Disposal Facilities and Practices

b. Massachusetts Regulations:

454 CMR 23.00	Occupational Lead Exposure
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c. American National Standards Institute (ANSI) Publications:

29.2-79	Fundamentals Governing the Design and Operation of Local Exhaust Systems
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288.2-80 Practices for Respiratory Protection

- d. National Institute of Occupational Safety and Health (NIOSH) Publications:
Manual of Analytical Methods, 4th Ed.
- e. Underwriters Laboratories, Inc. (UL) Fire Resistance Directory Publications:
586-77 (R 1982) Test Performance of High Efficiency Particulate, Air Filter Units

F. All regulations by the above and other governing agencies in their most current version are applicable throughout this project. Where there is a conflict between this Specification and the cited State, Federal, or local regulations, the more restrictive or stringent requirements shall prevail.

THIS SECTION REFERS TO MANY REQUIREMENTS FOUND IN THESE REFERENCES, BUT IN NO WAY IS IT INTENDED TO CITE OR REITERATE ALL PROVISIONS THEREIN OR ELSEWHERE. IT IS THE CONTRACTOR'S RESPONSIBILITY TO KNOW, UNDERSTAND, AND ABIDE BY ALL SUCH REGULATIONS AND COMMON PRACTICES.

1.03 DEFINITIONS

- A. The following definitions apply to the performance of the work of this project.
 - 1. Action Level: An airborne concentration of lead above 30 micrograms per cubic meter ($\mu\text{g}/\text{m}^3$) as a time weighted average (TWA) for more than 30 days per year.
 - 2. Area Monitoring: Sampling of lead concentrations within the work area and outside the work area which is representative of the airborne concentrations of lead.
 - 3. Clean Room: An uncontaminated change room directly adjacent to the work area having facilities for storage of employees' personal clothing and uncontaminated work clothes, materials and equipment provided when the airborne exposure to lead is above the PEL.
 - 4. Contractor: The Contractor who is performing work involving lead containing paint under this Section.
 - 5. Decontamination Area: A contained area adjacent to or connected to the abatement work area and consisting of an equipment room, shower area, and clean room which is used for decontamination of workers, materials and equipment.
 - 6. HEPA Filter Equipment: High efficiency particulate air (HEPA) filtered vacuuming or exhaust ventilation equipment with a UL 586 filter system. Filters shall be of 99.97 percent efficiency for retaining 0.3 micrometer diameter particles.
 - 7. Lead-Containing Paint: Paint, varnish, or stain, which contains lead in excess of 0.0% lead by weight.
 - 8. Lead Permissible Exposure Limit (PEL): 50 $\mu\text{g}/\text{m}^3$ of air, based upon an 8-hour time weighted average.
 - 9. Sample Location: Area or place where an air or wipe sample is collected.

10. Time Weighted Average (TWA): The TWA is an 8-hour time weighted average for the test of the concentration of lead for worker exposure.
11. Wet Cleaning: The process of removing lead contamination from building surfaces, equipment and other objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as lead contaminated wastes.
12. Work Area: A controlled-access work area, which has no plastic sheeting or other containment barriers, erected to separate the trades.

1.4 SUBMITTALS

A. NOTIFICATIONS

1. Provide in proper and timely fashion, all necessary notifications to relevant federal, state, and local authorities and obtain and comply with provisions of all permits or applications required by the work specified, as well as make all required submittals required under those auspices. Contractor shall indemnify the Owner, Consultant, and Designer from, and pay for all claims resulting from failure to adhere to these provisions. Costs for all permits, applications, and the like are to be assumed by Contractor. Required notifications include but are not limited to the following:
 - a. Massachusetts Department of Environmental Protection, Form AQ06 - Construction/Demolition Notification.

B. Provide copies of the following Submittals at least 4 weeks prior to commencement of the work of the contract:

1. Copies of all notifications, permits, applications, licenses and like documents required by Federal, State, or local regulations and this specification obtained or submitted in proper fashion,
2. Copies of written medical opinions for each employee who may be occupationally exposed to lead as required by 29 CFR 1926.62 (j)(3)(v),
3. Copies of supervisors' and workers' training certificates,
4. Record of successful respirator fit testing performed by a qualified individual within the previous 6 months for each employee to be used on this project with the employee's name and social security number with each record,
5. Employer's Lead Compliance Program as required by 29 CFR 1926.62, including proposed respiratory protection program and medical monitoring for all employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used; worker orientation plan; written description of all proposed procedures, methods, or equipment to be utilized, including those that may differ from the Contract Specifications. In all instances, Contractor must comply with all applicable federal, state and local regulations.
6. Proposed number and type (i.e., hazardous waste or non-hazardous waste, open top, front loading, etc.) of dumpsters for waste, proposed location(s),
7. A list of all equipment to be used on site, by make and model,

8. Chain of Command of responsibility at work site including supervisors and competent person, their names, resumes and certificates of training and phone numbers,
9. List of total number of supervisors and workers intended to be assigned to the project, including name and lead awareness qualifications,
10. Material Safety Data Sheets on potentially hazardous materials to be used on the project,
11. Waste Disposal Plan which describes the waste stream and the disposal means (i.e. landfill, recycle, etc.) and includes the name, address, and ID number of the proposed hazardous waste hauler, waste transfer route, and proposed disposal reclamation or treatment facility,
12. Name and address of the proposed construction debris site,
13. Construction schedule including sequence of critical work.

No work on the project will be allowed to begin until the Pre-Construction Submittals as listed herein are accepted by the Designer. Any delay caused by the Contractor's refusal to submit this documentation in a timely fashion does not constitute a claim for extra compensation or a time extension.

C. Submit the following to the Designer as a Post-Construction submittal package:

1. Copies of waste manifests and receipts acknowledging disposal of all lead waste material from the project, showing delivery date, quantity, and appropriate signature of landfill's authorized representative,
2. DEP approval for all waste reduction techniques, if utilized,
3. A notarized copy of the daily list of workers and site entry-exit logbook,
4. All personnel monitoring results,
5. All TCLP testing results.

1.5 GENERAL WORK PROCEDURES

- A. Work shall be carried out in sequential phases. Inspection and approval of each phase by the Designer shall be sought and gained before proceeding to the next phase and in accordance with the schedule approved. This shall include demolition requirements for work area clearance and work area release before other work. As a Contract requirement, any reasonable delay caused by this requirement will not constitute a basis for claim against the Owner or Designer. Contractor must coordinate the work of this section with the work of all other trades.
- B. At no time will the Owner permit storage of lead waste materials generated from demolition activities inside the Site building, and any storage of materials will be subject to the Owner's approval. Assure security of lead waste materials at all times.

1.6 SPECIAL CONSIDERATIONS

A. TESTING REFERENCES

1. Testing for lead paint has been performed on a representative number of painted components. If a painted building component is encountered that has not be tested, then

the Contractor shall presume that the building component is coated with paint containing lead.

- B. The Contractor shall follow the requirements of this Section regarding component removal, demolition, worker exposure and protection, work area cleaning, and waste disposal.
- C. Work Affected – In general, the following activities are minimum requirements of this Section and affect the demolition performed on the painted components:
 - 1. No torch cutting, mechanical sanding, or abrasive methods of paint removal shall occur. Chemical stripping of wood components must be conducted as indicated on the Project Drawings. Chemical stripping paste waste and residue must be characterized by the Contractor prior to disposal and disposed as a lead hazardous waste, as applicable.
 - 2. No demolition activities may occur which increase the workers' exposure above the Action Level of 30 $\mu\text{g}/\text{m}^3$. Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.
 - 3. Workers shall be informed of the components to be renovated or demolished that have been identified as containing lead.
 - 4. Worker protection, at a minimum, shall comply with the OSHA Lead Standard 29 CFR 1926.62. Worker Right to Know and Health and Safety Standards of 1926.62 shall also apply to the work of this Section.
 - 5. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same vicinity as demolition-involving components identified with lead.
 - 6. Clean-up Activities: The Contractor shall maintain work zones free of accumulated debris, lead dust, and paint chips.
- C. Lead Dust Clean-Up
 - 1. All demolition dust and debris within each work area shall be removed and all horizontal and vertical surfaces thoroughly cleaned by the Contractor prior to occupancy by construction tradesmen and building occupants.
 - 2. The Contractor shall perform TCLP testing of all dust, debris, and contaminated materials and properly package and dispose of these stored materials. If TCLP results are greater than 5.0 mg/L lead, the materials shall be disposed as a lead hazardous waste at a permitted hazardous waste landfill. If TCLP results are less than 5.0 mg/L, the materials shall be disposed as construction debris at an approved facility.
 - 3. At the completion of demolition activities and TCLP testing, the Contractor shall perform a wash-down of lead-contaminated dust on the interior of the Site building. At the completion of the wash-down, no visible dust and debris shall remain within the building.

1.7 FEES, PERMITS & LICENSE

- A. The Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or process in the performance of the work specified in this Section. The Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights. The Contractor shall hold the Designer and Designer harmless from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights. If the Contract Specification requests the use of

any product, design, invention, or process that requires a licensing, patent or royalty fee for use in the performance of the job, the Contractor shall be responsible for the fee or royalty fee and shall disclose the existence of such rights.

- B. Contractor shall be responsible for costs for all licensing requirements, where applicable and notification requirements and all other fees related to the Contractor's ability to perform the work in this Section.
- C. Secure all necessary permits for work under this Section, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.

1.8 CLEAN-UP

- A. Maintain the work site in a neat and orderly manner at all times, so as not to interrupt or infringe upon the work of other trades.
- B. Comply with all requirements for release of work areas as described in the project specification.
- C. It is the prerogative of the Designer to inspect whenever deemed necessary, the Contractor is responsible for meeting, and correcting any deficiencies discovered which do not meet the current applicable regulations and requirements of these specifications.

1.9 COORDINATION

- A. At no time shall Contractor cause or allow to be caused conditions which may cause risk or hazard to the general public or conditions that might impair safe use of the facility.
- B. Coordinate the work of this Section with that of all other trades. Phasing and scheduling of this project will be subject to the approval of the Designer. The work of this Section shall be scheduled and performed so as not to impede the progress of the project as a whole. Work shall not proceed in any area without the express consent of the Designer. The Contractor shall be available within 24 hours notice for additional work if after acceptance of the work it is found that complete demolition was not achieved from the initial work effort as determined by the Designer.
- C. The proposed schedule for the work in this Section shall show the time involved from start to finish of demolition operations, including preparation, removal, clean-up, Designer's inspections and demobilization portions of the job.
- D. A final schedule shall then be prepared and coordinated with the Designer. The final scheduling shall be submitted in writing before the commencement of work.
- E. Complete activities in the phases of the agreed upon final schedule. The work must be completed in a continuous, uninterrupted operation.
- F. Unless specifically authorized by the Designer, the work of this project shall be conducted according to the hours established in Division 1.
- G. Inspections: The Consultant or the Designer may perform visual inspections during the work of this section, as described below. Contractor shall not proceed with work until Contractor has received Designer's approval at the stages identified below:
 - 1. During: Before the commencement of a proposed alternative method other than specified.
 - 2. Post Inspection: At the completion of work and final clean-up, before clearance or removal of any critical barriers and decontamination unit from the work area.

3. Waste Removal Inspection: Notify Designer of the removal of hazardous waste from the site.

1.10 AUTHORITY TO STOP WORK

- A. The Designer has the authority to stop the lead-based coatings removal and lead dust cleanup work at any time the Designer determines that conditions are not within the Specifications and applicable regulations. The stoppage of work shall continue until conditions have been corrected and corrective steps have been taken to the satisfaction of the Designer. Standby time required to resolve violations shall be at the Contractor's expense, and shall not be cause for extending the completion date.

1.11 EMERGENCY PRECAUTIONS

- A. The Contractor shall establish emergency and fire exits from the work area.
- B. When an injury occurs, the Contractor shall stop work until the injured person has been removed from the work area.

1.12 DISPOSAL OF WASTE MATERIAL

A. GENERAL

1. Contractor and transporting Contractor will be required to comply with the Resource Conservation and Recovery Act (RCRA) and with all applicable federal, state, and local regulations.
2. Contractor shall be responsible for disposing of all waste via the toxicity characteristic leaching procedure (TCLP) to be hazardous. If TCLP testing has not been performed, the Demolition Contractor shall be responsible for testing the waste.
3. Contractor and all sub-contractors shall comply with all EPA regulations.

PART 2 – PRODUCTS

2.1 GENERAL REQUIREMENTS

- A. The Contractor shall deliver all materials and equipment to the site in the original containers bearing the name of the manufacturer, and details for proper storage and use.
- B. All materials or equipment delivered to the site shall be unloaded, temporarily stored, and transferred to the work area in a manner that shall not interfere with other trades working in the area.
- C. Unloading and temporary storage sites, and transfer routes, must be approved in advance by the Owner and Designer.
- D. Damaged or deteriorated materials may not be used and must be promptly removed from the premises. Material that becomes contaminated shall be packaged and legally disposed in an approved, secure landfill.

2.2 MATERIALS

- A. All materials and equipment proposed to be used on this project shall be subject to the acceptance of the Designer. The list of required materials shall include, but not necessarily limited to the following:
 - 1. Fire retardant polyethylene sheeting, minimum thickness of six (6)-mil.
 - 2. Plastic bags, minimum thickness of six (6)-mil.
 - 3. Duct Tape, up to 3 inch width
 - 4. Lead Warning Signs, as required by the MassDLS Regulations (if applicable) and OSHA Hazard Communication requirements.
 - 5. Flexible duct for ventilation units (if required)
 - 6. Spray adhesive, fire retardant
 - 7. Personal Protective Equipment, NIOSH approved respirators
 - 8. Ventilation units with HEPA filtration and exhaust fans.
 - 9. HEPA vacuums
 - 10. Trisodium-Phosphate (TSP) or Lead Dissolve, or equivalent, and product data
 - 11. Cloth tarpaulin

2.3 TOOLS AND EQUIPMENT

- A. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transporting, an unloading waste without exposure to persons or property. All over-the-road transportation equipment must carry the appropriate hazardous waste transport licenses and insurance.

- B. Vacuum Equipment: All vacuum equipment utilized in the work area shall utilize HEPA filtration systems.
- C. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for water application.
- D. Other Tools and Equipment: The Contractor shall provide other suitable tools including but not limited to: rounded edge shovels, rakes, brooms, and carts.
- E. The Contractor shall provide ground fault circuit interrupters (GFCI) to protect all electrical cord and connections.
- F. Approved lighting equipment for use in the work area.
- G. Scaffolding: Scaffolding, as required to accomplish specified work, shall meet all applicable Federal, State and local safety regulations and used in accordance with manufacturer's specifications.

PART 3 – EXECUTION

3.1 SCHEDULING

- A. The Contractor shall coordinate all scheduling with the Designer. A schedule of work shall be submitted to the Designer before contract performance.

3.2 UTILITIES

- A. Provide all necessary connections for temporary utilities in the workplace during work. Shut down and disconnect all electrical power to the work area so that there is no possibility of reactivation and electrical shock during the work. The temporary electrical power shall be in accordance with all OSHA requirements.

3.3 IDENTIFICATION OF HAZARDS

- A. Prior to any work involving lead-containing items, the contractor shall identify all work activities in which a worker may be occupationally exposed to lead.
- B. The Contractor shall initially determine if any worker may be exposed to lead above the action level.

3.4 BARRIERS AND ISOLATION AREAS

- A. All lead in demolition work areas shall remain isolated from all other trades on the project and remain inaccessible to the public. Contractor shall monitor the access to the demolition work areas. The below listed items are required to control the generation of lead-containing dust during demolition activities. The Contractor is ultimately responsible for cleaning all generated dust and paint debris from demolition operations and must maintain work areas free from lead dust generated from demolition activities.
 - 1. Signs shall be posted at all approaches to the work area warning that work-involving lead is being conducted in the vicinity. Signs shall be in bold lettering not smaller than two inches tall.
 - 2. Barriers shall not be removed until the work areas are thoroughly cleaned and approved by the Designer.

3.5 APPROVALS AND INSPECTIONS

- A. All temporary facilities, work procedures, equipment, materials, services, and agreements must strictly adhere to and meet this Section along with EPA, OSHA, regulations and recommendations as well as federal, state, and local regulations. Where there exists overlap of these regulations, the most stringent one applies. All work performed by the Contractor is further subject to approval of the Designer and the Consultant.

3.6 PERSONAL SAMPLING – CONTRACTOR

- A. Perform personal air sampling during all demolition work to determine worker exposure limits. The results of such sampling shall be posted, provided to individual workers, and submitted to Designer as described herein.
- B. Provide sampling to check personal exposure levels. Representative sampling shall be taken for the duration of the work shift or for eight hours, whichever is less. Personal samples need not be taken for repeated working conditions if working conditions remain unchanged, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work. Sampling will be used to determine eight-hour Time-Weighted-Averages (TWA). Personal sampling shall be as outlined in OSHA Standard 29 CFR 1926.62.
- C. Air sampling results shall be transmitted to the Designer and individual workers available at the job site in written form no more than forty-eight (48) hours after the completion of a sampling cycle. The reporting document shall list each sample's result, sampling time and date, personnel monitored and their social security numbers, flow rate, sample duration, sample yield, cassette size, and analyst's name and company, and shall include an interpretation of the results. Air sample analysis results will be reported in micrograms/cubic meter ($\mu\text{g}/\text{m}^3$).
- D. The Contractor's testing lab shall be AIHA accredited for analysis of metals. Contractor shall submit for Designer's review and acceptance the name and address of the laboratory, certification(s) of AIHA accreditation for metal analysis, listing of relevant experience in air lead analysis, and presentation of a documented Quality Assurance and Quality Control program.
- E. Air monitoring frequency will be established in accordance with the requirements set forth in 29 CFR 1926.62.

3.7 WORK PROCEDURES

- A. The contractor shall initiate, and continue, sufficient engineering and work practice controls, as described in the Contractor's Lead Compliance Program, to reduce and maintain worker exposures to lead at or below the Action Level.
- B. The following work practices are specifically required by these specifications:
 - 1. All persons except those directly involved in the work shall be excluded from the work area. Physical barriers shall be used, where necessary, to limit access to the work area for the duration of the demolition operations. Warning signs may be posted in accordance with applicable regulations.
 - 2. Provide hand-washing facilities and assure that all workers thoroughly wash their hands and face upon exiting the work area. Workers shall pay careful attention to cleanse the hands and face when decontaminating. Provide hygiene facilities, including shower, as required based on initial assessment and continued monitoring.
 - 3. Thoroughly wet the building materials or areas to be demolished and mist the air to reduce the potential for creating airborne lead and dust.
 - 4. All equipment used by the workers inside the work area shall be either left in the work area or thoroughly decontaminated before being removed from the area. Extra work clothing (in addition to the disposable suits supplied by the Contractor) shall be left in the clean area until the completion of work in that area. The clean area shall be cleaned of all visible debris and disposable materials daily.

5. Under no circumstances shall workers or supervisory personnel eat, drink, smoke, chew gum, or chew tobacco in the work area; to do so shall be grounds for the Designer to stop all demolition operations. Only in the case of life threatening emergency shall workers or supervisory personnel be allowed to remove their protective respirators while in the work area. In this situation, respirators are to be removed for as short a duration as possible.

3.8 WORK PROCEDURES

- A. Feasible engineering controls shall be implemented by the Contractor as described in the Lead Compliance Program to minimize the possibility of contamination of areas adjacent to the work area. The following activities are the minimum requirements of this section and affect the demolition performed on the painted components:
 1. No torch cutting, mechanical sanding, stripping, or abrasive methods of paint removal shall occur.
 2. No demolition activities may occur which increase the workers exposure above the Action Level of 30 $\mu\text{g}/\text{m}^3$. Contractor shall fully comply with the OSHA lead standard 29 CFR 1926.62.
- B. Workers shall be informed of the components to be renovated that are identified as containing lead.
- C. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same areas as demolition involving components identified as containing lead. Other trades may not enter these areas until clean-up procedures are completed.

3.9 STORAGE OF WASTE

- A. Use of waste containers on site shall be controlled under the following requirements:
 1. Location of waste containers on site shall be subject to Owner's approval.
 2. The waste containers lined shall be lined with two layers of six-mil polyethylene sheeting, be solid, enclosed containers, locked and sealed at all times. This requirement applies to waste classified as hazardous based on TCLP testing.
 3. Contractor shall comply with all federal, state, and local regulations and ordinances regarding lead waste storage.

END OF SECTION

Section 03 30 00

Concrete

PART 1 – GENERAL

1.0 RELATED DOCUMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1-Specification sections, apply to work of this section.

1.01 DESCRIPTION

- A. Work Included: Work consists of furnishing all labor, material, and equipment necessary for completion of all concrete work including, but not necessarily limited to, the following:

1. Formwork, complete with required shoring, reshoring, bracing, and anchorage.
2. Reinforcing, complete with required supports, spacers, and related accessories.
3. Vapor barrier under interior slabs on grade.
4. Accessories including water stops.
5. Cast-in-place concrete including footings, grade beams, tie beams, walls, columns, beams, structural floor and roof systems, slabs-on-grade, toppings, concrete on metal deck, stairs, piers, pilasters and encasement of structural members.
6. Finish and cure for floor slabs and toppings.
7. Miscellaneous concrete work such as equipment bases, splash pads, and under floor duct encasement.
8. Reinforcing bars drilled and epoxied into existing

- B. Related Work:

1. Sidewalks, Curbs and Gutter, Section 04- Masonr
2. Railing Sleeves: Furnished under Section 055000 Miscellaneous Metals

1.02 QUALITY CONTROL

- A. Requirements of Regulatory Agencies: The Work under this section shall be subject to all applicable provisions of the state and local building and safety codes.

- B. Reference Standards: Comply with following standards except where more stringent requirements are shown or specified:
1. American Concrete Institute (ACI):
 - a. ACI 214, "Recommended Practice for Evaluation of Strength Test Results of Concrete."
 - b. ACI 301, "Specifications for Structural Concrete for Buildings."
 - c. ACI 302.1R "Guide for Concrete Floor and Slab Construction."
 - d. ACI 305R, "Hot Weather Concreting."
 - e. ACI 306R, "Cold Weather Concreting."
 - f. ACI 318, "Building Code Requirements for Reinforced Concrete."
 - g. ACI 347, "Recommended Practice for Concrete Formwork."
 - h. ACI SP-66, "ACI Detailing Manual."
 - i. ACI SP-15, "ACI Field Reference Manual."
 2. American Society for Testing and Materials (ASTM):
 - a. ASTM C31, "Method of Making and Curing Concrete Test Specimen in the Field."
 - b. ASTM C33, "Specifications for Concrete Aggregates."
 - c. ASTM C39, "Test Method for Compressive Strength of Cylindrical Concrete Specimens."
 - d. ASTM C94, "Specifications for Ready-Mixed Concrete."
 - e. ASTM C, "Test Method for Compressive Strength for Hydraulic Cement Mortars Using (2-in or 50-mm Cube Specimens)."
 - f. ASTM C, "Test Method for Unit Weight, Yield, and Air Content (Gravimetric) of Concrete."
 - g. ASTM C143, "Test Method for Slump of Portland Cement Concrete."
 - h. ASTM C150, "Specification for Portland Cement."

- i. ASTM C172, "Method of Sampling Freshly Mixed Concrete."
- j. ASTM C173, "Test Method for Air Content of Freshly Mixed Concrete by the Volumetric Method."
- k. ASTM C231, "Test Method for Air Content of Freshly Mixed Concrete by the Pressure Method."
- l. ASTM C260, "Specifications for Air-Entraining Admixtures for Concrete."
- m. ASTM C311, "Methods of Sampling and Testing Fly Ash or Natural Pozzolans for Use as an Mineral Admixture in Portland Cement Concrete."
- n. ASTM C457, "Practice for Microscopical Determination of Air-Void Content and Parameter of the Air-Void System in Hardened Concrete."
- o. ASTM C494, "Specifications for Chemical Admixtures for Concrete."
- p. ASTM C567, "Test Method for Unit Weight of Structural Lightweight Concrete."
- q. ASTM C618, "Specification for Fly Ash and Raw or Calcined Natural Pozzolan for Use as an Mineral Admixture in Portland Cement Concrete."
- r. ASTM C672, Test for Method for Scaling Resistance of Concrete Surfaces Exposed to Deicing Chemicals.
- s. ASTM C685, "Standard Specification for Concrete made by Volumetric Batching and Continuous Mixing."
- t. ASTM C1077, "Standard Practice for Testing Concrete and Concrete Aggregates for Use in Construction and Criteria for Laboratory Evaluations."

3. Other:

- a. Concrete Reinforcing Steel Institute CRSI MSP-2, "Manual of Standard Practice."
- b. AASHTO T 260, "Sampling and Testing for Total Chloride Ion in Concrete and Concrete Raw Materials."

4. Contractor shall have following ACI publications at Project construction site:

- a. ACI SP-15, "Specifications for Structural Concrete for Buildings CI301-84 (Revised 1989) with selected ACI and ASTM References.
 - b. ACI 302.1R, "Guide for Concrete Floor and Slab Construction."
 - c. ACI 305R, "Hot Weather Concreting."
 - d. ACI 306R, "Cold Weather Concreting."
 - e. ACI 306.1, "Standard Specification for Cold Weather Concreting."
- C. Design Criteria:
- 1. Concrete: See General Notes on Structural Drawings and ACI 301, Chapter 3.
- D. The Contractor is responsible for quality control, including workmanship and materials furnished by his subcontractors and suppliers.
- 1. Inspection or testing by the Owner does not relieve the Contractor of his responsibility to perform the Work in accordance with the Contract Documents.
 - 2. Workmanship: The Contractor is responsible for and shall bear the cost of correcting concrete work which does not conform to the specified requirements including, but not limited to, strength, tolerances, finishes and flatness/levelness. Correct deficient concrete by means acceptable to the Architect and Structural Engineer. The cost of extra work incurred by the Architect and Structural Engineer to approve corrective work shall be borne by the Contractor.
- E. Record of Work: A record shall be kept by the General Contractor listing the time and date of placement of all concrete for the structure. Such record shall be kept until the completion of the project and shall be available to the Architect and Structural Engineer for examination at any time.
- F. All concrete batch trip tickets will be collected and retained by the Contractor. Concrete batch trip tickets shall contain information specified in ASTM C94, Paragraph entitled "Batch Ticket Information," including items 15.2.1 through 15.2.8. Batch trip ticket shall also show the total amount of water in the mix as batched (including water present in the aggregate before batching) and the amount of water required by the design mix proportions.

1.03 QUALITY ASSURANCE

- A. General Contractor's Quality Control System:

1. Perform sufficient inspection and tests of all items of work, including that of his subcontractors, to ensure conformance to the Contract Documents for materials, workmanship, construction, finish, functional performance and identification. Contractor's quality control system is the means by which he assures himself that his construction complies with the requirements of the Contract Documents. Controls shall be adequate to cover all construction operations.
 2. Records: Contractor shall maintain correct records on an appropriate form for all inspections and tests performed, instructions received from the Architect, Structural Engineer or Testing Agency, and actions taken as a result of those instructions.
 3. These records shall include evidence that the required inspections or tests have been performed (including type and number of inspections or tests, nature of defects, causes for rejection, etc.), proposed or directed remedial action, and corrective action taken. Contractor shall document inspections and tests as required by this section.
- B. The Owner will employ an Independent Testing Laboratory acceptable to the Architect and Structural Engineer to provide testing services specified in paragraph 1.04 Testing and Inspection.
- C. The Architect, Structural Engineer, and Independent Testing Laboratory shall be offered uninterrupted access to the ready-mix batching plant at all time that the work is in progress.
- D. Provide the Testing Agency with the following:
1. Incidental labor required to facilitate testing.
 2. Minimum one day's advance notice when concrete is to be placed.
 3. Storage facilities for concrete test cylinders.
 4. Materials, samples, and access to materials as required for testing.
 5. Reimbursement of costs for testing and inspection resulting as a consequence of the following:
 - a. Work not in compliance with the Contract Documents.
 - b. Testing requested by Contractor or Subcontractor such as additional cylinders for early breaks, etc.
 - c. Testing to verify the adequacy of work done, without prior notice, without proper supervision, or contrary to standard construction practice.

- E. All concrete flat work finishers on project shall hold current ACI concrete flat work finisher certification.

1.04 TESTING AND INSPECTION

- A. Concrete inspection and testing will be made in accordance with building code requirements, and Contract Documents, and will include the following:
 1. Testing concrete for strength, slump, air content, temperature, and unit weight.
 2. Marking and testing concrete cylinders, including furnishing cylinder containers for specimens.
 3. Transporting and storing of all specimens involved in testing and inspection. Test cylinders are to be transported to laboratory not later than 24 hours after casting, not earlier than 16 hours after casting.
 4. Inspection of mixing and placing of concrete at the site, including recording of: amount and location of concrete placement, method of placing concrete, and any other pertinent information. Verify compliance with requirements of this specification for concrete placement and curing (including Section 1.07).
 5. Testing for slab levelness as per Section 3.13B.
- B. Test Specimens: The Testing laboratory will take specimens of each class of concrete from different locations on the job as follows: At least one set of four cylinders for each 100 cubic yards or fraction thereof of each class of concrete, but not less than one set for any one day's operations.
 1. For concrete placed by pumping, test specimens and concrete used for determination of slump, air content, and weight are to be taken at the point of placement of concrete. Sample concrete for test cylinders to be used for verification of concrete compressive strength for post-tensioning as near as possible to actual tendon anchorage.
 2. Samples will be obtained in accordance with ASTM C172.
 3. Marking, curing and subsequent handling of test cylinders, except as modified herein, shall be in accordance with ASTM C31. Testing shall be in accordance with ASTM C39.
 4. Cure test specimens for ASTM C31 as follows:

- a. To verify 28-day compressive strength unless otherwise noted:
 - 1) The cylinders shall be placed in laboratory storage under moist curing conditions at approximately 70 degree F within 24 hours after molding, and maintained therein until tested.
- b. To verify compressive strength for form removal or for additional test cylinders required due to cold weather concreting conditions:
 - 1) Store test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure as specimen represents.
 - 2) Transport to test laboratory no more than 4 hours before testing. Remove molds from specimen immediately before testing.
5. One cylinder shall be tested at 7 days for information.
6. Two cylinders shall be tested at 28 days for acceptance. The acceptance test results shall be the average strength of these two cylinders.
7. One cylinder shall be kept for eventual testing at 56 days to verify any marginal results of 28-day tests. If not required to be tested, cylinder will be discarded after 28 days.
- C. Test Reports: Reports of cylinder tests shall be submitted as specified herein within five days of laboratory testing. Test reports shall, as a minimum, include:
 1. Project data including project name and address, concrete supplier, supplier's delivery ticket number and mix identification number, Testing Agency's test or cylinder identification number, and location of pour.
 2. Results of field testing at time of sampling including date and time of sampling, amount of water added at site prior to sampling, ambient air temperature and concrete temperature, concrete slump and air content, and concrete wet unit weight.
 3. Results of laboratory testing including date test specimens were transported to laboratory, date and age of concrete at time of testing, compressive strength of each cylinder tested, average compressive strength of tested cylinders, and specified design strength of concrete represented by the test.
- D. Additional Testing: Contractor shall bear the cost of testing and inspection resulting as a consequence of the following:

1. Work not in compliance with the Contract Documents.
 2. Testing requested by the Contractor or Subcontractor such as additional cylinders for early breaks, etc.
 3. Testing to verify the adequacy of work done without prior notice, without proper supervision, or contrary to standard construction practice.
- E. Reinforcing Steel Inspection: Concrete reinforcing shall be inspected prior to closing of concrete form work or placing of concrete. Refer to Section 3.03 for placing requirements. Inspect all reinforcing for conformance with contract requirements. Submit written reports of all inspections in accordance with Test reports herein. Such reports shall include a description of each area inspected and deficiencies noted. Deficiencies observed shall immediately be brought to the attention of the contractor's field superintendent. Corrections made by contractor to resolve such deficiencies must be addressed and listed in the report. It is not sufficient to simply document that deficiencies were observed and brought to the contractor's attention.
- F. Weldable Reinforcing Steel: Review materials report of 1.05I if submitted. Verify reinforcing to be welded meets ASTM A706 prior to welding. Provide 100% visual and magnetic particle inspection of all fillet and partial penetration groove welds at reinforcing bars. Provide 100% U.T. inspection of all full penetration welds at reinforcing bars.
- G. Mix Designs: Review of concrete mix designs for compliance with ACI 318 Chapter 4 and Sections 5.2, 5.4. 5.8 is not required by the testing agency.

1.05 SUBMITTALS

- A. All submittals to be in accordance with Section 013300.
- B. Mix Designs:
1. Submit substantiating data for each concrete mix design contemplated for use to the Architect and Structural Engineer not less than three weeks prior to first concrete placement. Data for each mix shall, as a minimum, include the following:
 - a. Mix identification designation (unique for each mix submitted).
 - b. Statement of intended use for mix.
 - c. Mix proportions, including all admixtures used.

- d. Manufacturer's data and/or certifications verifying conformance of all mix materials, including admixtures, with specified requirements.
- e. Wet and dry unit weight, ASTM C138.
- f. Entrained air content, ASTM C173.
- g. Design slump, ASTM C143.
- h. Required average strength qualification data per ACI 301 3.9.1 and 3.9.2.

Submit separate qualification data for each production facility, which will supply concrete to the project.
- i. Average strength qualification data (trial mix data or field test data per ACI 301 3.9.3). When field test data is used to qualify average strength, submit separate qualification data for each production facility, which will supply concrete to the project.
- j. Field test data submitted for qualification of average strength under ACI 301 3.9.1, 3.9.2, and 3.9.3 shall include copies of the Concrete Testing Agency's reports from which the data was compiled.
- k. Submit one copy of a representative concrete batch trip ticket containing information as specified herein.

2. Separate design mixes are required for each strength and class of concrete, each type and/or quantity of mix materials including admixtures, each change in slump limits, and each change in entrained air content.

- D. Submit shop drawings for fabrication, bending and placement of concrete reinforcement. Comply with ACI Detailing Manual (SP 66). Provide scale elevations of all walls with reinforcing shown. Include special reinforcement required at openings through concrete structure. Include all accessories specified and required to support reinforcement. Obtain from General Contractor location of proposed construction joints and show them on the shop drawings.
- E. Formwork Layout Drawings:

1. Formwork layout drawings are not required.

F. Product Data:

1. Submit product data with application and installation instructions for proprietary materials and items including reinforcement and forming accessories, admixtures, patching compounds, epoxies, grouts, dry-shake finish material, hardeners, sealer, water stops, joint systems and others as required by the Architect.

2. Submit curing compound product data and verification of its compatibility with other finish materials and surface treatments required.

G. Submit samples of concrete materials if requested by the Architect, including names, sources, and descriptions.

H. Substitutions: Any request for product substitution must be submitted for acceptance, with all necessary documentation prior to time of bid.

I. Weldable Reinforcing Steel: All reinforcing bars to be welded that do not meet ASTM A706 require submission of a report of material properties stating conformance with the welding procedures specified in AWS D1.4.

1.06 DELIVERY, STORAGE, AND HANDLING

A. Delivery of Materials: Deliver materials in manufacturer's unopened containers fully identified with manufacturer's name, trade name, type, class, grade, size, and color.

B. Storage of Materials: Store materials in unopened containers. Store off ground and under cover, protected from damage.

C. Reinforcing: Unload and store reinforcing bars so they will be kept free of mud and damage.

D. Concrete: No water is to be added after the addition of super plasterizers.

1. Non-Silica Fume Concrete

a. Hauling Time: Discharge all concrete transmitted in a truck mixer, agitator, or other transportation device not later than 1-1/2 hours, or 300 revolutions of the drum after the mixing water has been added, whichever is earliest.

b. Extra Water: Deliver concrete to the job in exact quantities required by the design mix. Should extra water be required before depositing the concrete, the Contractor's Superintendent shall have sole authority to authorize the addition of water. Any additional water added to the mix after leaving the batch plant shall be indicated on the trip ticket and signed by the person responsible. Where extra water is added to the

concrete, it shall be mixed thoroughly for 30 revolutions of the drum at mixing speed. Water may be added at the site only once to each batch.

1.07 JOB CONDITIONS

A. Cold Weather Concreting (ACI 306R):

1. When concrete is placed after the first frost or under conditions of cold weather concreting (defined as period when mean daily temperature drops below 40 degrees F. for more that three successive days), take additional precautions as specified in this Section and in ACI 306R, when placing, curing, monitoring, and protecting fresh concrete.

2. Warm mix water, sand and aggregated so that no frozen lumps or ice, snow or aggregate will survive mixing but do not overheat ingredients to cause flash setting of concrete or loss of entrained air.

3. Place and maintain internal concrete temperature at or above the minimums given in the following table: Least Dimension of the Member Minimum Internal Concrete Temperature as Placed and Maintained less than

12 inches 55 degrees F

12 to 36 inches 50 degrees F

36 to 72 inches 45 degrees F

greater than 72 inches 40 degrees F

Do not exceed given minimum placement temperature by more than 20 degrees F.

a. Cure slabs on grade, foundations, and substructures other than grade beams not subject to early loading, at placement temperature for 2 days minimum.

b. Temporary heaters used to maintain temperature of air surrounding exposed, uncured concrete during curing operations shall be vented type, vented to outside of protection envelope.

c. Before placing concrete topping, structure upon which topping is to be placed shall be preheated to placement temperature of topping.

d. Cure and protect concrete for supported slabs, beams, columns at temperature specified above until attainment of 75 percent design strength.

e. Determine strength of curing concrete by either of following methods:

1) Calculate maturity factor based upon curing time and measured internal concrete temperature as described in ACI 306R, Chapter 7.

- 2) Cast and field cure at least six test specimens from last 100 cubic yards of concrete but no fewer than three specimens for each two hours of entire placing time or for each 100 cubic yards, whichever yields greatest number of specimens. Make specimens in accordance with ASTM C31. Cover specimens properly, immediately after finishing. Protect outside surfaces of cardboard molds, if used, from contact with sources of water for first 24 hours after molding.
 - 3) Field cure test specimens on structure as near to point of sampling as possible and protect from elements in same manner as that given to portion of structure specimen represents. Test cylinders in accordance with ASTM C31 and C39.
 - 4) Cast expandable thermistors or thermocouples in concrete at rate of at least one per 100 cubic yards of concrete placed for supported structure. Monitor internal temperature of concrete at twelve-hour maximum intervals throughout curing process.
 - 5) During operation, maintain temperature of placed concrete as constant as possible, and protect from rapid atmospheric temperature changes.
 - 6) Maintain concrete in continually moist condition during curing process by leaving forms in place as long as possible and by use of steam or moisture retaining covers on unformed surfaces.
 - 7) Following curing operation, avoid rapid changes in concrete temperature. Do not allow internal temperature of concrete to change at rate exceeding 50 degrees F. in any 24-hour period or 5 degrees F. in any one hour.
 - 8) Do not place concrete without approval of the Structural Engineer on days when temperature at 9:00 a.m. is below 30 degrees F and wind velocity exceeds 10 knots.
 - 9) The non-chloride accelerator specified in Section 033000 or high-early strength type III cement may be used when accepted by the Structural Engineer.
- B. Hot Weather Concreting (ACI 305R): Hot weather is defined as any combination of high temperature; low humidity and high wind velocity which causes rate of evaporation in excess of 0.2 pounds per square ft. per hour as determined by ACI 305R, figure 2.1.5. When concrete is placed under conditions of hot weather concreting, Contractor shall provide extra protection of concrete against excessive placement temperatures and excessive drying throughout placing and curing operations and follow Items 1-5 below.

1. Forms, reinforcement, and air shall be cooled by water fog spraying immediately before placing concrete. Placement temperature of concrete shall not exceed 90 degrees F.
 2. Protect concrete during finishing operations by one of the following:
 - a. Continuous fog spray between finishing operations.
 - b. Immediately following screening, applying evaporation retarding agent in accordance with recommendations of manufacturer.
 3. Immediately following screening, apply specified evaporation retarding agent in accordance with recommendations of manufacturer. Plastic cracking conditions may require application of compound several times during concrete finishing sequence.
 4. During curing operation cover concrete with wet burlap or cotton mats. Keep mats constantly wet for 7 days minimum. Leave mats in place for 3 additional days after discontinuing wetting process.
 5. When the air temperature is forecast to exceed 92 degrees F. at any time during the duration of a concrete pour, the contractor shall obtain acceptance from the Structural Engineer of the procedures to be used in protecting, depositing, finishing, and curing the concrete.
- C. Protection: Protect newly finished slabs from rain damage. Protect finished slabs from mortar polyethylene or otherwise protect from damage due to pouring of concrete.

PART 2 – PRODUCTS

2.00 GENERAL

- A. All materials shall be in accordance with ACI 301 unless amended or superseded by requirements of following articles or General Notes on the structural drawings.

2.01 FORM MATERIALS AND SYSTEMS

- A. Forms for Exposed Finish Concrete: Unless otherwise indicated, construct formwork for exposed concrete surfaces with plywood, metal, metal-framed plywood faced or other acceptable panel-type materials, to provide continuous, straight, smooth, exposed surfaces. Furnish in largest practicable sizes to minimize number of joints and to conform to joint system shown on drawings. Provide form material with sufficient thickness to withstand pressure of newly placed concrete without bow or deflection.
- B. Forms for Unexposed Finish Concrete: Form concrete surfaces, which will be unexposed in finished structure with plywood, lumber, metal, or other acceptable material. Provide lumber dressed on at least two edges and one side for tight fit.
- C. Slab Construction Joint Forms: Galvanized steel with continuous tongue and groove.

1. Subject to compliance with requirements, provide one of the following: "Keyed Kold" - Burke Co. "Super Screed" - Vulcan Metal Products.
- D. Chamfer Strips: 3/4", 45 degree job-cut wood.
- E. Rustication Strips: Job-cut wood, size and shape as indicated on the drawings
- F. Form Coatings: Provide commercial formulation form-coating compounds that will not bond with, stain, or adversely affect concrete surfaces and will not impair subsequent treatments of concrete surfaces. Provide the following or equal: "Nox-Crete PSC from Coating," manufactured by Non-Crete Inc., Omaha, NE Tele: 800-228-7170.

2.02 REINFORCING MATERIALS

- A. General: Sizes, types, grade or yield strengths as indicated on the drawings. Use 60,000 psi yield strength if not otherwise indicated. Use reinforcing conforming to ASTM A706 where welding of reinforcing is required unless otherwise indicated. Provide uncoated finish unless otherwise indicated.
- B. Deformed Bars: ASTM A615 plus supplementary requirement (S1), Deformed Billet Steel Bars or ASTM A706, Low-Alloy Steel Deformed Bars unless otherwise indicated.
- C. Smooth Bars for Masonry Joint Reinforcement: Conform to requirements of ASTM A615 plus supplementary requirement (S1) or ASTM A706.
- D. Smooth Wire for Spiral Reinforcement: ASTM A82, Cold-Drawn Steel Wire for Concrete Reinforcement having a yield strength, measured at a strain of 0.35 percent, of 70,000 psi.
- E. Welded Wire Fabric: Mesh size and gauge as indicated on the drawings. Conform to ASTM A185, plain, or in flat sheets.
- F. Coatings:
1. Epoxy Coated: ASTM A775. Apply after fabrication and bending. Film thickness of coating after curing to be 8 to 12 mils when measured in accordance with Method G12. Provide epoxy coated reinforcing where indicated on the drawings. See 3.03A.6 for field touch up.
- G. Tie Wire: Tie wire shall be No. 16 American Wire Gage or heavier black annealed or Plastic Coated as specified.
- H. Supports for Reinforcement: Provide supports for reinforcement including bolsters, chairs, spacers and other devices for spacing, supporting and fastening reinforcing bars and welded wire fabric in place within specified tolerances. Use wire bar-type supports complying with CRSI, Class 1 or 2, unless otherwise acceptable.

1. Use supports with sand plates or horizontal runners for slab-on-grade where base material will not support chair legs.
 2. All materials that come in direct contact with epoxy coated bars, such as slab bolsters, high chairs, tie wires, etc., shall be plastic coated.
 3. Provide accessories and supports for welded wire fabric and reinforcement in slabs as required to maintain position as shown on the drawings.
- I. Reinforcing Splices: Mechanical splices for reinforcing shall develop 125% of the specified yield strength F_y of the bar.
1. Subject to compliance with the requirements use one of the following:
 - a. DB Grout sleeve system by Richmond Screw Anchor Co.
 - b. NMB splice sleeve type O-X by Sleeve Splice North America, Inc. c. Or approval equal.

2.03 CONCRETE MATERIALS

A. Cementitious Materials:

1. General: Provide materials of the same brand or source throughout the project unless otherwise specified.
2. Portland Cement: ASTM C150 Type I and II.
3. Fly Ash:
 - a. ASTM C618, Class C or F, except maximum loss on ignition: 3.0%. Maximum percent retained on #325 sieve: 28%, Maximum water requirement, stated as percentage of control: 100%.
 - b. Testing: ASTM C311
 - c. Percentage of fly ash in mix design shall be by weight, not by volume. Water/cement ratio will be calculated as water/cementitious (total cement and fly ash) ratio.
 - d. Fly Ash Substitution:
 - 1) Class C fly ash may be substituted for up to 25% of minimum cement or cementitious at one for one (by weight) substitution rate, providing required strength at all specified ages is attained.

2) Class F fly ash may be substituted for up to 20% of minimum cement or cementitious at one for one (by weight) substitution rate sufficient to provide required strength at all specified ages.

3) Permitted only with written permission of Engineer following review of mix submittals.

e. Prohibited: Fly ash in same mix with Type IP blended cement.

f. Mix Submittals: Limited amounts of fly ash may be added to aid pumping: See 2.05H.4.

4. Portland blast-furnace slag cement: ASTM C-595, type IS or IS-CMS

5. Ground granulated blast-furnace slag: ASTM C-989

a. Subject to compliance with the requirements provide the following:

1) NEW CEM – Blue Circle Cement, Inc.

2) Approved Equal.

b. May be substituted for up to 50% of minimum cement or cementitious at one for one (by weight) substitution rate, providing required strength at all specified ages is attained.

B. Aggregates:

1. General: Provide aggregates from the same source throughout the project unless otherwise specified.

2. Normal Weight Aggregate: ASTM C33 containing no deleterious substances, which cause surface spalling. Certify that no alkali reactivity is produced with the proposed aggregate-cement combinations when tested in accordance with ASTM C227. Pea gravel shall be graded for 90% passing the 3/8 inch screen and 90% retained on the 1/4 inch screen. Use pea gravel only when acceptable to the Structural Engineer.

C. Maximum nominal aggregate size to be 3/4" unless otherwise approved by the structural engineer.

1. 1 1/2" maximum aggregate size may be used at foundation mats and footings. C. Water: Potable

D. Admixtures:

1. General: Unless specified, no admixtures may be used without specific approval of the Architect and Structural Engineer.

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2. Prohibited Products: Calcium chloride or admixtures containing more than 0.05% chloride ions or thiocyanates are not permitted.
3. Air-Entraining Admixture: ASTM C260:
 - a. Subject to compliance with requirements, provide one of the following: "Air Mix" - Euclid Chemical Co. "Daravair" - W. R. Grace "MB-VR" or "MB-AE" - Master Builders
4. Water Reducing Admixture: ASTM C494, Type A:
 - a. Subject to compliance with requirements, provide one of the following: "Eucon WR-75" - Euclid Chemical Co. "Pozzolith 200N" - Master Builders "Plastocrete 161" - Sika Chemical Co. "WRDA" - W.R. Grace & Co.
5. High Range Water Reducing Admixture (Superplasticizer): ASTM C494, Type F or G:
 - a. Subject to compliance with requirements, provide one of the following: "Eucon 37" - Euclid Chemical Co. "Pozzolith 400N" - Master Builders "Sikament" - Sika Chemical Co. "Daracem" - W.R. Grace & Co.
6. Non-Corrosive, Non-Chloride Accelerator: ASTM C494, Type C or E. The admixture manufacturer must have long-term, non-corrosive test data (of at least a year's duration) using an acceptable accelerated corrosion test method such as electrical potential measurements.
 - a. Subject to compliance with requirements, provide one of the following: "Accelguard 80" - Euclid Chemical Co. "Daraset Accelerator" - W. R. Grace & Co. "Pozzolith-40" - Master Builders
7. Retarding Admixture: ASTM C494, Type D
 - a. Subject to compliance with requirements, use one of the following: "Eucon Retarder 75" - Euclid Chemical Co. "Daratard" - W. R. Grace & Co. "Pozzolith 300-R" - Master Builders
8. Certification: Written certification of conformance to above requirements will be required from all admixture manufacturers prior to mix design review by the Structural Engineer.

2.04 RELATED MATERIALS

- A. Moisture Barrier: Provide moisture barrier cover indicated. Use only materials, which are resistant to decay when tested in accordance with ASTM E154, as follows: Polyethylene sheet, not less than 12 mils thickness.

- B. Water stops: Provide flat, sodium bentonite water stops at construction joints and other joints as indicated. Size to suit joints.
- C. Curing Compounds: Unless otherwise indicated on architectural or structural plans referenced to curing compound refers to a dissipating resin compound.
 - 1. Curing and Sealing Compound: (VOC Compliant) Federal Specification TT-C-800A, 30% solids content minimum, and have test data from an independent laboratory sq. ft. per gallon. Manufacturer's certification required.
 - a. Subject to compliance with requirements, provide one of the following: "Kurez Vox" – Euclid Chemical Company "Super-Rez Seal" or "Super Pliocure" - Euclid Chemical Co.

"Master Kure 30" - Master Builders
 - 2. Dissipating Resin Compound: ASTM C309, Type I. The film must chemically break down in a two to four week period allowable moisture loss shall not exceed 0.030 g/sq.cm
 - a. Subject to compliance with requirements, provide one of the following: CureCrete 309 – by CureCrete Distribution "W.B. Resin Cure = 30%" - Conspec Marketing & Manufacturing Co.,Inc. "Kurez DR" - Euclid Chemical Co. "Masterseal" - Master Builders
 - 3. Curing and Hardening Dustproofing Compound: Sodium silicate compound. Use for remedial curing and hardening subject to acceptance by Architect and Structural Engineer. Manufacturer shall supply 20 year warranty.
 - a. Subject to compliance with requirements, provide one of the following: Ashford Formula – by CureCrete CT Densifier – by Chemprobe
- D. Absorptive Cover: Burlap cloth made from jute or kenaf, weighing approximately 9 oz. per sq. yd., complying with AASHTO M182, Class 2.
- E. Moisture-Retaining Cover: One of the following, complying with ASTM C171: Waterproof paper

Polyethylene film

Polyethylene-coated burlap.
- F. Clear Penetrating Sealer: Material suitable for application on horizontal surfaces containing not less than 20 percent siloxane or 40 percent silane in mineral spirits or alcohol-based carrier. Provide certification of 90 percent chloride screen effectiveness when tested in accordance with the procedure of NCHRP Report No. 244, "Southern Climate Exposure" at manufacturer's recommended rate of application.

1. Subject to compliance with requirements, provide one of the following: Deck A Pell H2O – by Tnemec / Chemprobe "Chem-Treat BSM40" - Dynamit Nobel of America, Inc. "Consolideck SX" - ProSoCo, Inc. "Enviro Seal 40" – Harris Specialty Chemicals, Inc.
- G. Non-Slip Aggregate Finish: Provide fused aluminum oxide grits, or crushed emery, as abrasive aggregate for non-slip finish with emery aggregate containing not less than 40% aluminum oxide and not less than 25% ferric oxide. Use material that is factory-graded, packaged, rustproof and non-glazing, and is unaffected by freezing, moisture, and cleaning materials. Apply where indicated on architectural drawings.
- H. Colored Wear-Resistant Finish: Packaged, dry, combination of materials, consisting of Portland Cement, graded quartz aggregate, coloring pigments, and dispersing agents. Use coloring pigments that are finely ground, non-fading mineral oxides, inter-ground with cement. Color, as selected by Architect, unless otherwise indicated.
 1. Subject to compliance with requirements, provide one of the following: "Surflex" - Euclid Chemical Co. "Colorchron" - Master Builders
- I. Epoxy Products: Two component materials suitable for use on dry or damp surface, complying with ASTM C881, for use in all structural concrete repairs. Obtain prior approval of Structural Engineer as to methods and procedures.
 1. Injection Epoxy: Subject to compliance with requirements, provide one of the following: "Fx-751 Hydro-Ester Low Modulus LV" - Fox Industries "Sikadur 35, Hi Mod LV" - Sika Chemical Corp.
 2. Epoxy Mortar: Subject to compliance with requirements, provide one of the following: "Concresive 1310" - Adhesive Engineering Co. "Euco Thin Coat" or "Euco Concrete Coat" - Euclid Chemical Co. "Sikatop "Sikatoe 121 and 122" - Sika Chemical Corp.
 3. Epoxy Adhesive: Subject to compliance with requirements, provide one of the following: "Euco Epoxy #463" - Euclid Chemical Co. "Sikadur 32 Hi-Mod" - Sika Chemical Corp.
 4. Watertight Joint Compound: Subject to compliance with requirements, use one of the following: "Euco Epoxy #452" - Euclid Chemical Co. "Sikadur Hi-Mod" - Sika Chemical Corp.
- J. Epoxy Joint Filler: Three components, 100% solids epoxy compound, with a minimum shore D hardness of 50.
 1. Subject to compliance with requirements, provide one of the following: "Euco Epoxy #600 or #700" - Euclid Chemical Co. "Sikadur Lo-Mod" - Sika Chemical Corp.
- K. Bonding Compound: Polyvinyl acetate, rewettable type. Interior usage only.

1. Subject to compliance with requirements, provide one of the following: "Euco Weld" - Euclid Chemical Co."Weldcrete" - Larson Co. "Sikabond" - Sika Chemical Corp.
- L. Bonding Admixture: Acrylic latex, non-rewettable type. Interior or exterior usage.
1. Subject to compliance with requirements, provide one of the following: "SBR Latex" or "Flex-Con" - Euclid Chemical Co."Daraweld C" - W.R. Grace Co. "Acryl 60" - Standard Dry Wall
- M. Underlayment Compound: Free flowing, self-leveling, pumpable cementitious base compound. 7 day minimum strength = 4000 psi.
1. Subject to compliance with requirements, provide one of the following: "SilFlo 300" – Slipro Corp."Flo-Top" - Euclid Chemical Co. "Pourcrete" - Master Builders
- N. Expansion Anchors: See Section 051200. O. Adhesive Anchors: See Section 051200. P. Non-Shrink Grout: See Section 036000.
- Q. Dovetail Anchor Slots: 1 inch wide x 1 inch deep with 5/8 inch wide throat, 24 gage galvanized steel with polyurethane filler, one of the following:
1. No. 100, Heckmann Building Products, Inc.
 2. No. AA 100, AA Wire Products Co.
 3. NO D/100, Dur – O – Wall.
- R. Metal Pan Stair Safety Nosing: Extruded aluminum nosing for sloped riser steel pan stair, 3 inch wide with abrasive non-skid inserts, extending the full width of stair tread. Provide with continuous extruded arrow anchor. Provide one of the following:
1. Type 8511, American Safety Tread Co.
 2. Type R – 305LP, Balco Metalines
 3. Type 138, Wooster Products
- 2.05 PROPORTIONING AND DESIGN OF MIXES
- A. Strength: Proportion mixes to attain compressive strengths as indicated on the drawings in 28 days unless higher strengths are specified herein. Strength requirements for high-early strength concrete based on 7-day compressive strength.
- B. Durability: Conform to ACI 301 3.4 as modified herein:
1. Concrete Exposed to Weather or Freeze-Thaw Cycles such as paving, site work, loading docks, and exterior slabs: Meet requirements of ACI 301 3.4.1.

2. Concrete Exposed to Deicers or Other Aggressive Chemicals: Meet requirements of ACI 301 3.4.3 except that normal weight concrete shall have a water-cement ratio not exceeding 0.40 and lightweight concrete shall be proportioned for a minimum compressive strength of 5000 psi.
- C. Slump Limits: Slump of concrete, measured at point of placement, shall fall within the following limits:
1. Concrete Containing HRWR (Superplasticizer): 8 inches maximum unless otherwise directed by the Structural Engineer.
 2. Pumped Lightweight Concrete: 5-1/2 inches maximum.
 3. All Other Structural Concrete: 4 inches maximum.
- D. Minimum Cementitious Materials Content (Portland Cement plus Fly Ash and/or blast furnace slag):
1. Interior slabs on Ground: 517 lbs. per cu. yd.
 2. City Sidewalks and Pumped Lightweight Concrete: 564 lbs. per cu. yd.
 3. Concrete exposed to freezing and thawing:
 - a. 564 Lbs. per cu. yd. at concrete specified to have $f_c' = 4000$ psi
 - b. 607 Lbs. per cu. yd. at concrete specified to have $f_c' = 4500$ psi
 - c. 650 Lbs. per cu. yd. at concrete specified to have $f_c' = 5000$ psi or greater.
 4. All Other Structural Concrete: 470 lbs. per cu. yd.
- E. Fly Ash/Portland Cement Replacement: See 2.03 A.3.
- F. Blast furnace slab replacement. See 2.03 A.5.
- G. Concrete for Floors: Conform to ACI 301 3.14 as modified herein.
1. Parking slabs, vehicular ramps, and loading docks exposed to freezing and thawing or deicing salts: Class 4, F_c as indicated on the drawing, except that the maximum water-cement ratio shall be 0.40.
- H. Selection of Proportions: Use method of ACI 301 3.9. Proportioning based on method of ACI 301 3.10 not allowed.
1. Field test records used for documentation of the average strength produced by a proposed mix in accordance with ACI 301 3.9.3.2 shall, in addition to the requirements there listed, comply with the following:

The test record shall represent production concrete from a single design mix, produced during the past year, and may be composed of 30 or more consecutive tests.

The test record shall represent concrete made with identical materials and proportions (including admixtures) to the proposed mix.

The test record shall represent concrete proportioned to produce the maximum slump allowed by these specifications, and for air-entrained concrete, within +/- 0.5 percent of the maximum air content allowed.

2. Mixes proportioned on the basis of trial mixtures shall meet the provisions of ACI 301 3.9.3.3.
 - I. Air Entrainment: (Non Latex Modified Concrete):
 1. For nominal maximum aggregate size of $\frac{3}{4}$, total air content to be 4 $\frac{1}{2}$ % - 7 $\frac{1}{2}$ % at concrete exposed to freezing and thawing.
 2. Interior slabs of normal weight concrete not exposed to freezing and thawing to have 3% maximum air content.

PART 3 – EXECUTION

3.00 GENERAL

- A. Perform concrete work in accordance with ACI 301 except as specified herein and on the drawings.
- B. Use ready-mixed concrete conforming to ASTM C94.

3.01 CONCRETE CAST ON EARTH

- A. Preparation:
 1. Foundation Bearing Surfaces: Excavate to smooth, level surface in undisturbed, natural soil unless otherwise indicated or accepted by the Geotechnical Engineer.
 2. Slab Subgrade: Underslab surfaces shall be fine graded to smooth, level surface prior to installation of slab forms.
 3. Vapor Barrier: Install over prepared base material directly below slab on grade.
 4. Earth Cuts: Earth cuts may be used as forms for perimeter wall footings only. When using earth forms, hand trim sides and bottoms, square edges, and remove loose dirt prior to placing concrete.

- B. Inspection: All foundation bearing surfaces shall be inspected and accepted by the Soils Engineer prior to start of formwork.

3.02 FORMWORK

A. General:

1. Design, construct, brace, and maintain formwork in accordance with ACI 301 and ACI 347 as modified herein.
2. Fabricate forms for easy removal. Provide crush plates or wrecking plates where stripping may damage concrete surfaces. Kerf wood inserts for forming keyways, reglets, recesses, and the like, to facilitate removal.
3. Provide temporary openings where interior area of formwork is inaccessible for clean out, for inspection before concrete placement, or for placement of concrete. Securely brace temporary openings and seal to forms to prevent loss of concrete mortar.
4. Composite beams that require temporary shoring shall remain shored until the slab has attained 75% of 28-day design strength. At least two levels of temporary shoring shall be used to support a floor on which concrete is being placed.

B. Preparation of Form Surfaces:

1. Clean reused forms of concrete matrix residue, repair and patch as required to return forms to acceptable surface condition.
2. Coat contact surfaces of forms with specified form coating compound before reinforcement is placed in conformance with manufacturer's instructions.
3. Thin form-coating compounds only in conformance with manufacturer's instructions. Do not allow excess form-coating material to accumulate in forms or to come into contact with concrete surfaces against which fresh concrete will be placed.

C. Chamfer Strips: Install 45 degree chamfer strips at exposed outside corners.

D. Inspection of Formwork: All formwork surfaces that will provide the finish surface of exposed concrete must be approved by the Architect before depositing concrete.

3.03 PLACING REINFORCEMENT

A. General:

1. Comply with Concrete Reinforcing Steel Institute's "Recommended Practice for Placing Reinforcing Bars," and as herein specified.

2. Clean reinforcement of loose rust and mill scale, earth, ice, and other materials, which reduce or destroy bond with concrete.
 3. Accurately position, support, and secure reinforcement against displacement by construction or concrete placement operations with metal chairs, runners, bolsters, spacers, hangers, or other means acceptable to the Structural Engineer. On vertical formwork, use approved bar chairs or spacers as required to maintain proper concrete cover and bar position.
 4. Install reinforcement to tolerances given in ACI 301 5.4.
 5. Install welded wire fabric in the longest lengths practical. Lap adjoining pieces at least one full mesh and wire together. Offset end laps in adjacent widths to prevent continuous laps.
 6. Handling of Epoxy-Coated Bars: All systems for handling coated bars shall have padded contact areas. All bundling bands shall be padded. Touch up all damaged or missing epoxy coating on reinforcement prior to pouring concrete.
- B. Welding of Reinforcement: Welding-reinforcing bars not permitted except where specifically indicated. Protect exposed bars intended for bonding with future construction from corrosion by providing adequate covering.
- C. Field Bending of Reinforcement: Reinforcement partially embedded in concrete shall not be field bent except as shown on the drawings or specifically permitted by the Structural Engineer.
- D. Inspection of Reinforcement: Completed installation of concrete reinforcement must be accepted by the Testing Agency before depositing concrete.
- E. Drilled-in dowels: Provided drilled-in dowels to existing work where called for on the drawings. Drill holes in existing concrete, insert steel dowels and pack solidly with non-shrink grout or epoxy as specified. Do not core holes. Do not penetrate existing reinforcing without prior written approval of Structural Engineer. Dowels may be re-spaced to avoid existing reinforcing. Tolerance on drilled-in dowels to be \pm spacing/2.

3.04 INSTALLATION OF EMBEDDED ITEMS

- A. General
1. Coordinate work with requirements of other trades and notify Architect and Structural Engineer of all conflicts and nonconforming conditions.
 2. Coordinate the requirements for installation of embedded items specified and furnished in other sections of the specifications. Obtain templates and instructions for setting embedded items.

3. Do not install sleeves in concrete slabs, beams, walls, or columns except where shown on the structural drawings or approved by the Architect and Structural Engineer.

B. Embedded Pipes and Conduits: Conform to requirements of ACI 318 6.3.

C. Anchor Bolts, Inserts, Form Block-outs, and other items built into the concrete shall be securely fastened to formwork or held in place with templates. Insertion into concrete after casting is not allowed.

3.05 JOINTS

A. Construction Joints in Formed Elements:

1. General: Locate and install construction joints as indicated on the drawings or, if not shown on drawings, locate so as not to impair strength or appearance of the structure. Submit construction joint locations not shown on drawings to Architect and Structural Engineer for acceptance.
2. Keyways: Provide keyways as detailed on the drawings. Where not detailed, provide 1-1/2" minimum depth continuous keyways in all construction joints in walls and slabs and between walls and footings.
3. Place construction joints in the center one-third of spans of beams, suspended slabs and mats unless indicated otherwise. Continue reinforcement across construction joints. Submit construction joint locations not shown on the drawings for Structural Engineer's acceptance.
4. Water stops: Provide water stops in construction joints continuously at all construction joints below grade. Install water stops to form continuous diaphragm in each joint. Make provisions to support and protect exposed water stops during progress of work. Fabricate field joints in water stops in accordance with manufacturer's instructions.

B. Joints in Slabs on Ground:

1. Construction Joints: Form joints as shown on the drawings with specified slab construction joint form.

C. Bonding of Construction Joints: Apply specified watertight joint compound in accordance with manufacturer's instructions at all joints below grade.

3.06 CONCRETE PLACEMENT

A. Preplacement Inspection: Formwork installation, reinforcing steel placement, and installation of all items to be embedded or cast-in to be verified by the Contractor prior to placement.

B. General: Comply with ACI 301, ACI 304, and as herein specified.

1. Do not place concrete in freestanding water, over ice, or on frozen subgrade.
 2. Concrete shall not be placed within 20 feet of pile driving. Concrete shall have cured a minimum of 24 hours before pile driving commences within a distance of 20 feet.
 3. Refer to geotechnical report for additional limitations related to foundation installation.
- C. Conveying: Convey concrete from the mixer to point of deposit without segregation. D. Placing:
1. Wet exposed subgrade, masonry filler units, precast concrete, previously placed concrete, and uncoated wood forms immediately prior to placing concrete (except during freezing temperatures).
 2. Deposit concrete continuously or in layers of such thickness that no concrete will be placed on concrete which has hardened sufficiently to cause the formation of seams or planes of weakness. If a section cannot be placed continuously, provide construction joints as herein specified. Deposit concrete as nearly as practicable to its final location to avoid segregation.
 3. Placing Concrete in Forms: Deposit concrete in forms in horizontal layers not deeper than 24" and in a manner to avoid inclined joints. Where placement consists of several layers, place each layer while preceding layer is still plastic to avoid cold joints.

Guide the flow of concrete in walls and columns for vertical drop between the reinforcing. Free fall, except in walls and columns, shall not exceed five feet. Free fall in walls and columns shall not exceed 10 feet without prior acceptance by Structural Engineer.
 4. Placing Concrete Slabs: Deposit and consolidate concrete slabs in a continuous operation, within limits of construction joints, until the placing of a panel or section is completed.

Continuous intermediate screed strips at intervals not greater than 15 feet set prior to concrete placement are required. For slabs cast over metal deck, place screeds along beam lines. Set screeds and adjust as necessary to achieve proper slab elevation and minimum thickness, allowing for beam camber and deflection of deck and framing members.
 5. Do not add water to compensate for slump loss at fiber reinforced concrete that does not contain a superplasticizer.
- E. Consolidating:
1. Maintain one standby vibrator for every three vibrators used.

2. Consolidate placed concrete by internal vibrating equipment with a minimum frequency of 7000 rpm, supplemented by hand spading, rodding, or tamping. Use equipment and procedures for consolidation of concrete in accordance with ACI 309.
3. Do not use vibrators to transport concrete inside forms. Insert and withdraw vibrators vertically at uniformly spaced locations not farther than visible effectiveness of machine. Place vibrators to rapidly penetrate placed layer and at least 6" into preceding layer. Do not insert vibrators into lower layers of concrete that have begun to set. At each insertion, limit duration of vibration to time necessary to consolidate concrete and complete embedment of reinforcement and other embedded items without causing segregation of mix.
4. Consolidate concrete during placing operations so that concrete is thoroughly worked around reinforcement and other embedded items and into corners.

3.07 FINISH OF FORMED SURFACES

- A. Definitions: Refer to ACI 301 Chapter 10, for formed surface finish definitions.

3.08 SLAB SURFACE FINISHES

- A. Definitions: Refer to ACI 301 11.7 for definition of slab surface finishes.
- B. Provide slab surface finishes as defined on the Architectural drawings. See Section 3.12B for specific slab levelness requirements.

3.09 CONCRETE CURING, PROTECTION AND SURFACE TREATMENTS

- A. General:
 1. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures. Maintain concrete with minimal moisture loss at a relatively constant temperature for the period necessary for hydration of the cement and hardening of concrete.
 2. Curing shall commence as soon as free water has disappeared from the concrete surface after placing and finishing. The curing period shall be seven days for all concrete except high-early strength concrete, which shall be cured for three days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods, are tested with the average compressive strength equal to 70% of the specified 28-day strength.
 3. Curing shall be in accordance with ACI 301 procedures. Avoid rapid drying at the end of the curing period. During hot and cold weather, cure concrete in accordance with ACI 305 and ACI 306.

- B. Curing Methods: Perform concrete curing by using moisture curing, moisture-retaining cover curing, curing compound, or by a combination of these methods, as specified herein. The Contractor shall choose a curing method based on compatibility with the requirements for subsequent material usage (finishes etc.) on the concrete surface and/or as specifically called for on the drawings. The curing period shall be seven days minimum for all concrete except high early strength concrete, which shall be cured for three days minimum, unless test cylinders, made and kept adjacent to the structure and cured by the same methods are tested with the average compressive strength equal to 70% of the specified 28-day strength.
1. Provide moisture curing when specified by one of the following methods:
 - a. Keep concrete surface continuously wet by covering with water.
 - b. Continuous water-fog spray.
 - c. Covering concrete surface with specified absorptive cover, thoroughly saturating cover with water and keeping it continuously wet. Place absorptive cover to provide coverage of concrete surfaces and edges, with 4" lap over adjacent absorptive covers.
 2. Provide moisture-cover curing as follows:
 - a. Cover concrete surfaces with moisture retaining cover for curing concrete, placed in widest practical width with sides and ends lapped at least 3" and sealed by waterproof tape or adhesive. Immediately repair any holes or tears during curing period using cover material and waterproof tape.
 3. Provide dissipating curing and sealing compound to interior slabs with resilient flooring, carpet over cushion, or left exposed, and to exterior slabs, walks and curbs as follows:
 - a. Apply specified curing and sealing compound to concrete slabs as soon as final finishing operations are complete (within 30 minutes). Apply uniformly in continuous operation by power-spray or roller in accordance with manufacturer's directions. Recoat areas subjected to rainfall within three hours after initial application.
 - b. Maintain continuity of coating and repair damage during curing period.
 - c. Use moisture curing as specified above in lieu of membrane curing compounds on surfaces which are to be covered with coating material applied directly to concrete such as liquid floor hardener, waterproofing, damp-proofing, membrane roofing, flooring (such as ceramic or quarry tile, glue-down carpet), painting, and other coatings and finish materials.

- C. Curing Formed Surfaces: Where wooden forms are used, cure formed concrete surfaces, including undersides of beams, supported slabs and other similar surfaces by moist curing with forms in place for full curing period or until forms are removed. When forms are removed, continue curing by methods specified above for specified curing time.
- D. Curing Unformed Surfaces: Cure unformed surfaces, such as slabs, floor topping, and other flat surfaces by application of appropriate curing method.

Final cure concrete surfaces to receive liquid floor hardener or finish flooring by use of moisture-retaining cover, unless otherwise directed.

- E. Environmental conditions: See Section 1.07 for cold and hot weather concreting requirements.
- F. Exposed surfaces: In addition to requirements of 3.11 herein all surfaces to be painted/stained or left permanently exposed are to have additional surface rubbing or otherwise as required either by the manufacturer or architects.

3.10 FORM REMOVAL AND RESHORING

- A. Removal of Forms: Supplement and Modify ACI 301 as follows:

1. ACI 301 4.5.4: Formwork not supporting weight of concrete such as sides of beams, walls, columns and similar parts of the work, may be removed after cumulatively curing at not less than 50 degrees F. for 24 hours after placing the concrete, provided the concrete is sufficiently cured to be undamaged by form removal operations, provided that supplementary curing and protection is provided for the exposed concrete, and provided that the concrete strength required by the general notes for form removal has been met.
2. ACI 301 4.5.5: Formwork supporting weight of concrete such as beam soffits, joists, slabs and other structural elements may not be removed in less than 14 days or until concrete has attained 75% of 28-day design strength.
 - a. Form removal time may be altered if a reshoring program is used that is acceptable to the Architect and Structural Engineer.
 - b. Compressive strength of cast-in-place concrete shall be determined by testing field-cured concrete specimens representative of the concrete location for the members in question.

Field-cured concrete specimens (if required by the Contractor for early form removal) shall be made and tested by the Owner's testing facility and paid for by the Contractor.

3. ACI 301 4.5.6: Form facing material may be removed four days after placement only if shores and other vertical supports have been designed and arranged to permit removal of form facing material without loosening or disturbing shores and supports.

B. Reshoring: (Supplement and Modify ACI 301 as follows):

1. ACI 301 4.6: Remove shores and reshore in a planned sequence to avoid damage to partially cured concrete. Locate and provide adequate reshoring to safely support the work without excessive stress or deflection.
2. Keep reshores in place a minimum of 15 days after placing upper tier, and longer if required until the concrete has attained its required 28-day strength and until heavy loads due to construction operations have been removed.

3.11 REPAIR OF SURFACE DEFECTS

A. Formed Surfaces:

1. Allow Architect and Structural Engineer to observe concrete surfaces immediately upon removal of forms.
2. Modify or replace concrete not conforming to required lines, details, and elevations.
3. Repair or replace concrete not properly placed resulting in excessive honeycombing and other defects. Patch, repair, or replace exposed architectural finished concrete as directed by the Architect.
4. Patching of tie holes is not required.
5. Repair defects in structural concrete elements as follows:
 - a. Deep Defects Exposing Reinforcing: Chip to sound concrete and clean thoroughly to removed all loose concrete and dust. Apply thin coat of specified epoxy adhesive. Form and pour, or dry pack with specified non-metallic, non-shrink grout, prior to development of tack-free condition of epoxy adhesive. Strip forms after grout has hardened and provide specified finish. Moist cure or apply specified clear curing and sealing compound immediately after finishing.
 - b. Defects Greater Than 1/2 Inch Depth Not Exposing Reinforcing: Chip, clean, and apply specified epoxy adhesive. Dry pack using specified non-metallic, non-shrink grout prior to development of tack-free condition of epoxy adhesive. Provide specified finish and cure as specified above.
 - c. Defects Less Than 1/2 Inch Depth and Tie Holes:

- 1) For concrete having a specified compressive strength of 5,000 psi or less: Chip and clean as specified above. Dry pack, finish, and cure as specified above.
 - 2) For concrete having a specified compressive strength greater than 5,000 psi: Chip and clean as specified above. At Contractor's option, dampen surface and apply specified epoxy mortar, followed by specified finish (no curing required); or apply thin coat of the specified bonding compound followed by dry pack, finish and cure as specified above.
- d. Other equivalent repair procedures may be used subject to review and acceptance by the Architect and Structural Engineer.

B. Unformed Surfaces:

1. Test unformed surfaces, such as monolithic slabs, for smoothness and verify surface plane to tolerances specified for each surface and finish. Correct low and high areas as herein specified. Test unformed surfaces sloped to drain for trueness of slope, in addition to smoothness using a template having required slope.
2. Correct high areas in unformed surfaces by grinding or other methods acceptable to the Architect after concrete has cured a minimum of 14 days.
3. Correct low areas in unformed surfaces during or immediately after completion of surface finishing operations by cutting out low areas and replacing with fresh concrete. Finish repaired areas to blend with adjacent concrete. Where acceptable to the Architect and Structural Engineer, the specified underlayment compound, applied in accordance with the manufacturer's instructions, may be used.
4. Repair defective areas, except random cracks and single holes not exceeding 1" diameter, by cutting out and replacing with fresh concrete. Remove defective areas to sound concrete with clean, square cuts and expose reinforcing steel with a least 3/4" clearance all around. Dampen concrete surfaces in contact with patching concrete and apply specified bonding compound. Mix patching concrete of same materials to provide concrete of same type or class as original concrete. Place, compact, and finish to blend with adjacent finished concrete. Cure in same manner as adjacent concrete.
5. Repair isolated random cracks and single holes not over 1" in diameter by dry-pack method. Groove top of cracks and cut out holes to sound concrete and clean of dust, dirt and loose particles. Dampen cleaned surfaces and apply specified bonding compound. Mix dry pack, consisting of one part Portland Cement to 2-1/2 parts fine aggregate passing a No. 16 mesh sieve, using only enough water as required for handling and placing. Place dry pack after bonding compound has dried. Compact dry

pack mixture in place and finish to match adjacent concrete. Keep patched area continuously moist for not less than 72 hours.

3.12 TOLERANCES

A. Slab Finishing Tolerances: Floor flatness (FF) and Levelness (FL) tolerances shall conform to the criteria listed below except Floor Levelness (FL) does not apply to slabs on un-shored steel deck. Measure (FL) on shored floor slabs prior to removing shores.

1. Scratch Finish:

- a. Scratch finish slab surfaces that are to receive concrete floor topping or mortar setting beds for tile, stone and other bonded applied cementitious finish flooring material.
- b. After placing slabs, plane surface to a flatness number for the floor surface (FF) not less than 15 and a levelness number (FL) not less than 13. Slope surfaces uniformly to drains where required. After leveling, roughen surface before final set with stiff brushes, brooms or rakes. No less than 80% of the floor surface profile shall fall outside a plus or minus $\frac{1}{2}$ " envelope within any 10'-0" length at the time of testing.

2. Float Finish:

- a. Apply float finish to monolithic slab surfaces to receive trowel finish and other finishes as hereinafter specified, and slab surfaces which are to be covered with membrane or elastic waterproofing, membrane or elastic roofing, and as otherwise indicated.
- b. After screeding, consolidating, and leveling concrete slabs, does not work surface until ready for floating. Begin floating when surface water has disappeared or when concrete has stiffened sufficiently to permit operation of power-driven floats, or both. Consolidate surface with power-driven floats, or by hand floating if area is small or inaccessible to power units. Check and level surface plane to a flatness number for the floor surface (FF) not less than 20 and a levelness number (FL) not less than 15. Cut down high spots and fill low spots. Uniformly slope surfaces to drains. Immediately after leveling, re-float surfaces to a uniform, smooth, granular texture. No less than 80% of the floor surface profile shall fall outside a plus or minus $\frac{5}{16}$ " envelope within any 10'-0" length at the time of testing.

3. Trowel Finish:

- a. Apply trowel finish to monolithic slab surfaces to be exposed to view, and slab surfaces to be covered with wood flooring, resilient flooring, carpet, thin-set tile and stone, paint or other thin film finish coating system.
- b. At elevated slabs: After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free or trowel marks, uniform in texture and appearance. Flatness number for the floor surface to be (FF) not less than 25 and levelness number (FL) not less than 15. Grind smooth surface defects, which could telegraph through applied floor covering system. No less than 80% of the floor surface profile shall be outside a plus or minus $\frac{1}{4}$ " envelope within any 10'-0' length at the time of testing.
- c. At slabs on grade: After floating, begin first trowel finish operation using a power-driven trowel. Begin final troweling when surface produces a ringing sound as trowel is moved over surface. Consolidate concrete surface by final hand-troweling operation, free or trowel marks, uniform in texture and appearance. Flatness number for than 15. Grind smooth surface defects, which could telegraph through applied floor covering system. No less than 80% of the floor surface profile shall be outside a plus or minus $\frac{1}{4}$ " envelope within any 10'-0' length at the time of testing.

B. Embedded Items: Unless noted otherwise on drawings, tolerances shall be as follows:

1. Anchor Bolts

- a. Adjacent anchor bolts in a group receiving a single fabricated setting piece: $\pm \frac{1}{8}$ "
- b. Location and alignment of anchor bolt groups from designated location and alignment: $\pm \frac{1}{4}$ "

2. Embedded Plates and Weldments:

- a. Location: ± 1 " vertical, ± 2 " horizontal
- b. Plumb and alignment: $\frac{1}{4}$ " in 12"

3.13 EVALUATION AND ACCEPTANCE CRITERIA

A. General: Evaluation and acceptance of work under this section shall be in accordance with the provisions of ACI 301 Chapters 17 and 18.

B. Floor Flatness:

1. Measurement Criteria:

- a. FF defines the maximum floor curvature allowed over 24". Computed on the basis of successive 12" elevation differentials, FF is commonly referred to as the "Flatness F Number". $FF = 4.45 / \text{Maximum difference in elevation in decimals of inches, between successive 12" elevation differences.}$
- b. FL defines the relative conformity of the floor surface to a horizontal plane as measured over a 10 foot distance. FL is commonly referred to as the "Levelness F Number". $FL = 12.5 / \text{Maximum difference in elevation in decimals of inches, between two (2) points separated by 120" (10'-0").}$
- c. All floors shall be measured in accordance with ASTM E1155 "Standard Test Method for Determining floor flatness and levelness using the "F Number" system" (Inch-Pound Units).
- d. Measure instruments must be capable of measuring point elevations at 12" centers such as dipstick floor profile or F-meter. 24 hours after placement. Results will be reported to the architect and structural engineer not later than 72 hours after installation. All tests shall be performed before forms and shoring has been removed.
- e. Floor tolerance compliance testing shall be performed as follows:
 1. At all interior slabs only. Remedial action to floor surfaces not meeting flatness criteria specified herein will not proceed until test results have been reviewed by Structural Engineer. Any costs associated with remedial action will be at the contractor's expense.

3.14 MISCELLANEOUS CONCRETE REQUIREMENTS

- A. All other concrete work indicated on the drawings shall be provided and installed, even though not specifically mentioned herein, to complete the work, which may include the following: Refer also to architectural drawings.
- B. Anchors: Install anchors furnished under other sections in accordance with shop approved drawings and/or setting instructions.
- C. Equipment Bases: Install concrete bases for all pumps, boilers, tanks, fans, transformers, floor mounted electrical equipment, etc., including anchor bolts and inserts in accordance with setting instructions furnished by the Contractor responsible for installing the equipment. Finish all bases in a workmanlike manner with a troweled finish. The bases shall be located and sizes determined by the Contractor furnishing the equipment.
- D. Splash Blocks: Install precast concrete splash blocks under all downspouts or roof drain leaders emptying onto unpaved areas.

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- E. Light Pole Bases: Form, reinforce, and pour light pole bases as indicated on electrical drawings. Coordinate installation of conduit and anchor bolts with electrical contractor.

END OF SECTION

SECTION 04 01 05 – MASONRY RENOVATIONS & REPAIRS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- C. Section Includes, without limitation, providing:
 - 1. Repointing existing masonry.
 - 2. Brick masonry assemblies and repairs.
 - 3. Renovations and repairs.
 - 4. Cutting, patching and toothing-in.
 - 5. Repairing stone masonry, including replacing whole and partial units.
 - 6. Removing abandoned anchors.
 - 7. Painting steel uncovered during the work.
 - 8. Cleaning masonry after repointing.
- D. Extent, without limitation, includes: Repairs and connecting new work to existing.
 - 1. Refer to drawings; this section describes masonry repair work procedures and methods.
 - 2. Note: Flashing, and wood repair work methods are covered under their respective sections for convenience of creating specifications. The intent is that the work will be carried out in an integrated fashion by a single masonry contractor.

1.2 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Submit manufacturers' technical data for each product indicated including recommendations for their application and use. Include test reports and certifications substantiating that products comply with requirements of these specifications.
 - 2. Restoration Program: Submit written program for each phase of repointing process including protection of surrounding materials of building and site during operations. Describe in detail materials, methods and equipment to be used for each phase of restoration work.
 - 3. If alternative methods and materials to those indicated are proposed for any phase of restoration work, provide a written description and evidence of successful use on other, comparable projects, and description of proposed testing to demonstrate quality for use on this project.
 - 4. Pull out test results if repair anchors are used.
 - 5. Cold-Weather and Hot-Weather Procedures: Detailed description of methods, materials, and equipment to be used to comply with requirements.
 - 6. Product submittals shall include:
 - Product cuts of each item proposed for use
 - Patching compound specifications
 - Manufacturer's installation guides
 - Data for epoxies, pins, grouts, and fills

1.3 QUALITY ASSURANCE

- A. Comply with Division 01 requirements and governing codes and regulations and as follows:
 - 1. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers.
 - 2. Deliver, handle, and store materials in accordance with manufacturer's instructions.
 - 3. Masonry standard: Comply with ACI 530.1/ASCE 6/TMS 602 unless modified by requirements in the Contract Documents.
 - 4. Mock-ups: As required to demonstrate quality of workmanship. Unless otherwise indicated or approved, provide free standing assembly showing all components built into masonry.

- B. Cold-Weather Requirements: Do not use frozen materials or materials mixed or coated with ice or frost. Do not build on frozen substrates. Remove and replace unit masonry damaged by frost or by freezing conditions. Comply with cold-weather construction requirements contained in ACI 530.1/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.
- C. Hot-Weather Requirements: Comply with hot-weather construction requirements contained in ACI 530.1/ASCE 6/TMS 602.

1.4 SEQUENCING AND SCHEDULING

- A. Order sand and required type of portland cement for colored mortar immediately after approval of samples or mockups. Take delivery of and store at Project site enough quantity to complete Project.
- B. Work Sequence: Perform stone repair work in the following sequence, which includes work specified in this and other Sections:
 - 1. Remove plant growth.
 - 2. Inspect masonry for open mortar joints and permanently or temporarily point them before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
 - 3. Remove paint.
 - 4. Clean stone.
 - 5. Rake out mortar from joints surrounding stone to be replaced and from joints adjacent to stone repairs along joints.
 - 6. Repair stonework, including replacing existing stone with new stone.
 - 7. Rake out mortar from joints to be repointed.
 - 8. Point mortar and sealant joints.
 - 9. After repairs and repointing have been completed and cured, perform a final cleaning to remove residues from this work.
 - 10. Where water repellents are to be used on or near stonework, delay application of these chemicals until after pointing and cleaning.

PART 2 - PRODUCTS

2.1 MASONRY MATERIALS

- A. Provide the following materials:
 - 1. Provide hard durable stone, free of chips, cracks, discolorations or other defects. Match color, texture and character of existing sound stone. Provide stone from recognized quarries and only from members of the Building Stone Institute. Match existing stone to be repair, replaced or duplicated.
 - 2. New brick: Match existing.
 - a. Grade: SW.
 - b. Type: FBX.
 - c. Meeting ASTM C216, but no absorption waivers will be permitted. Do not use brick adopting allowable waivers.
 - d. Testing: ASTM C67.
 - e. Rated: Not effloresced.
 - 3. Existing salvaged brick to be reused shall meet the following criteria:
 - a. Sound solid brick, free of cracks, chips or exposed inner surface at heads and faces.
 - b. Free of mortar, stains.
 - c. Consistent shape and size matching typical brick.
 - 4. Mortar: Match existing type, color, aggregate and tooling and the following:
 - a. Brick faced walls – Type N
 - b. Colored mortars at all exterior conditions – Type N.
 - c. Pointing mortar: To exactly match existing in appearance, color and texture when new and existing mortars are wet and when full cured. Mix suitable for pointing. Refer to Section 04 01 20 for renovation repair pointing work.
 - d. Portland Cement: ASTM C 150, Type I or II, except Type III for cold-weather.
 - e. Color: Natural color or white cement to produce mortar color selected.
 - f. Hydrated Lime: ASTM C 207, Type S.

- g. Portland Cement-Lime Mix: Packaged blend of portland cement and hydrated lime containing no other ingredients.
 - h. Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes, complying with ASTM C 979.
 - i. Aggregate for Mortar: ASTM C 144.
 - j. Water: Potable.
 - k. Mortar for Unit Masonry: Comply with ASTM C 270, Proportion.
5. Grout: Comply with ASTM C 476.
 6. Reinforcement, ties & anchors: To match existing, where none exist but are required provide hot dipped galvanized adjustable brick ties manufactured by Dur O Wall, Hooffmann & Bernard or equal of type recommended by manufacturer for the application.
 7. Embedded flashing through wall materials: To match existing metallic flashing, where none exists use 16 ounce zinc-tin coated copper. Refer to Section 07 65 10 for balance of requirements for this flashing, to be furnished and installed under this section.
 8. Limitations: Do not use pre-bagged masonry cements nor exceed 12% entrained air.

2.2 MASONRY ACCESSORIES

- A. Provide the following materials of equal or superior grades:
 1. Compressible Filler: Premolded strips complying with ASTM D 1056, Grade 2A1.
 2. Preformed Control-Joint Gaskets: Designed to fit standard sash block and to maintain lateral stability in masonry wall; made from styrene-butadiene rubber or PVC.
 3. Bond-Breaker Strips: Asphalt-saturated, organic roofing felt complying with ASTM D 226, Type I (No. 15 asphalt felt).
 4. Weep Holes: Type as shown, if not, Cellular-plastic extrusion, full height and width of head joint, color to as selected by architect.
 5. Cavity Drainage Material: Free-draining polymer mesh, full depth of cavity with dovetail shaped notches that prevent mortar clogging.
 6. Proprietary Acidic Masonry Cleaner: Product expressly approved for intended use by cleaner manufacturer and manufacturer of masonry units.

2.3 GENERAL REPAIR MATERIALS

- A. Stone Patching Compound: Factory-mixed cementitious product that is custom manufactured for patching stone.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Cathedral Stone Products, Inc.](#)
 - b. [Conproco Corporation.](#)
 - c. [Edison Coatings, Inc.](#)
 2. Use formulation that is vapor and water permeable (equal to or more than the stone), exhibits low shrinkage, has lower modulus of elasticity than stone units being repaired, and develops high bond strength to all types of stone.
 3. Use formulation having working qualities and retardation control to permit forming and sculpturing where necessary.
 4. Formulate patching compound in colors, textures, and grain to match stone being patched. Provide sufficient number of colors to enable matching of each piece of stone.
- B. Cementitious Crack Filler: Ultrafine superplasticized grout that can be injected into cracks, is suitable for application to wet or dry cracks, exhibits low shrinkage, and develops high bond strength to all types of stone.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Cathedral Stone Products, Inc.](#)
 - b. [Edison Coatings, Inc.](#)
- C. Stone-to-Stone Adhesive: Two-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 deg F (21 deg C), recommended in writing by adhesive manufacturer for type of stone repair indicated, and matching stone color.
 1. **Manufacturers:** Subject to compliance with requirements, provide products by one of the following:
 - a. [Akemi North America.](#)
 - b. [Bonstone Materials Corporation.](#)
 - c. [Edison Coatings, Inc.](#)

2.4 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, including, but are not limited to, the following:
 - a. Diedrich Technologies, Inc.
 - b. EaCo Chem, Inc.
 - c. ProSoCo, Inc.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 – Execution.
- B. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- C. Comply with cold weather and warm weather protection procedures as recommended in BIA Tech Notes, and as specified in this section.
- D. Provide fire-rated assemblies complying with ASTM E 119.

3.2 PROTECTION

- A. Prevent mortar from staining face of surrounding stone and other surfaces.
1. Cover sills, ledges, and other projecting items to protect them from mortar droppings.
 2. Keep wall area wet below rebuilding and repair work to discourage mortar from adhering.
 3. Immediately remove mortar splatters in contact with exposed stone and other surfaces.

3.3 INSTALLATION, GENERAL

- A. Comply with PCA Recommended Practices for Laying Concrete Block, Brick Institute of America BIA Tech Notes, and NCMA TEK Bulletins and the following:
1. Cut masonry units with saw. Install with cut surfaces and, where possible, cut edges concealed.
 2. Mix units for exposed unit masonry from several pallets or cubes as they are placed to produce uniform blend of colors and textures.
 3. Matching Existing Masonry: Match coursing, bonding, color, and texture of existing masonry.
 4. Maintain uniform joint width. Provide full bed, head and collar joints except at weepholes.
 5. Stopping and Resuming Work: Rack back units; do not tooth.
 6. Fill cores in hollow concrete masonry units with grout 24 inches (600 mm) under bearing plates, beams, lintels, posts, and similar items unless otherwise indicated.
 7. Build non-load-bearing interior partitions, basement walls or brick wythes full height and install compressible filler in joint between top of partition and underside of structure above.
 8. Tool exposed joints slightly concave when thumbprint hard unless otherwise indicated.
 9. Keep cavities clean of mortar droppings and other materials during construction.
- B. Mortar which has begun to set or is not used within 2-1/2 hours after initial mixing shall be discarded. Mortar which has stiffened due to evaporation within the 2-1/2 hour period shall be retempered to restore its workability. Retempering mortar which has partially hardened, will not be permitted.
- C. Proportions shall be by volume. One bag of Portland cement (94 pounds) shall be considered as one cubic foot; one bag of lime (50 pounds) as 1-1/4 cubic foot; and sand shall be measured in dry condition (80 pounds being equal to one cubic foot).
- D. Mortars proportions for above grade masonry shall be as follows:

Material	Portland Cement	Lime	Damp Sand
Brick:	1 to 1.25 Part	1 to 1.5 Parts	6 to 8 Parts
Face Pointing:	Mixed in accordance with manufacturer's specification to match existing.		

- E. Anti-freeze admixtures will not be allowed to be in the mortar.
 - F. Mortar mix above is nominal. Comply with ASTM C270 and conduct tests using the ingredients specified, and make recommendations as to mix that will produce the most satisfactory results depending on the conditions prevailing at the time of mixing the proportions.
 - G. Lintels: Install lintels where indicated or required, minimum of 8 inches bearing each side.
 - H. Reinforcement, anchors & ties:
 - 1. Except where more frequent spacing shown, comply with applicable codes and regulations for spacing of ties and horizontal reinforcing.
 - 2. Install anchors or ties each side of expansion joints, at edges of openings and within 8 inches of openings and corners.
 - I. Flashing & Weep holes:
 - 1. Install embedded flashing and weep holes in masonry at shelf angles, lintels, ledges, other obstructions to the downward flow of water in the wall, and where indicated.
 - 2. Place through-wall flashing on sloping bed of mortar and cover with mortar.
 - 3. Seal penetrations in flashing before covering with mortar.
 - 4. Extend flashing 4 inches (100 mm) into masonry at each end and turn up 2 inches (50 mm) to form a pan.
 - 5. Trim wicking material used in weep holes flush with outside face of wall after mortar has set.
 - J. Brick expansion and control joints: Provide expansion and control joints in accordance with BIA and NCMA.
 - K. Damaged units: Remove and replace.
- 3.4 STONE REMOVAL AND REPLACEMENT
- A. At locations indicated, remove stone that has deteriorated or is damaged beyond repair[or is to be reused]. Carefully remove entire units from joint to joint, without damaging surrounding stone, in a manner that permits replacement with full-size units.
 - B. Support and protect remaining stonework that surrounds removal area.
 - C. Maintain flashing, reinforcement, lintels, and adjoining construction in an undamaged condition. Coordinate with new flashing, reinforcement, and lintels, which are specified in other Sections.
 - D. Notify Architect of unforeseen detrimental conditions including voids, cracks, bulges, and loose units in existing stone or unit masonry backup, rotted wood, rusted metal, and other deteriorated items.
 - E. Remove in an undamaged condition as many whole stone units as possible.
 - 1. Remove mortar, loose particles, and soil from stone by cleaning with hand chisels, brushes, and water.
 - 2. Remove sealants by cutting close to stone with utility knife and cleaning with solvents.
 - 3. Store stone for reuse. Store off ground, on skids, and protected from weather.
 - 4. Deliver cleaned stone not required for reuse to Owner unless otherwise indicated.
 - F. Clean stone surrounding removal areas by removing mortar, dust, and loose particles in preparation for stone replacement.
 - G. Replace removed damaged stone with other removed stone in good condition, where possible, or with new stone matching existing stone, including direction of rift or natural bedding planes. Do not use broken units unless they can be cut to usable size.
 - H. Install replacement stone into bonding and coursing pattern of existing stone. If cutting is required, use a motor-driven saw designed to cut stone with clean, sharp, unchipped edges. Finish edges to blend with appearance of edges of existing stone. Comply with Section 04 01 20 Masonry Repointing and the following:
 - 1. Maintain joint width for replacement stone to match existing joints.
 - 2. Use setting buttons or shims to set stone accurately spaced with uniform joints.
 - I. Set replacement stone with rebuilding (setting) mortar and with completely filled bed, head, and collar joints. Butter vertical joints for full width before setting, and set units in full bed of mortar unless otherwise indicated. Replace existing anchors with new anchors of size and type indicated, if not shown, match existing configuration.
 - 1. Tool exposed mortar joints in repaired areas to match joints of surrounding existing stonework.

2. Rake out mortar used for laying stone before mortar sets according to Section 040140.62 "Stone Repointing." Point at same time as repointing of surrounding area.
 3. When mortar is hard enough to support units, remove shims and other devices interfering with pointing of joints.
- J. Curing: Cure mortar by maintaining in thoroughly damp condition for at least 72 consecutive hours, including weekends and holidays.
1. Hairline cracking within the mortar or mortar separation at edge of a joint is unacceptable. Completely remove such mortar and repoint.
- 3.5 CUTTING, TOOTHING-IN, PIECING-IN, MATCHING
- A. Comply with requirements of Division 01 for cutting and patching and the following:
1. Use skilled mechanics with masonry renovation experience
 2. Saw cut joints using narrow blades. DO NOT OVER CUT. REPLACE OVERCUT WORK WITH NEW.
 3. Remove mortar by hand where required for proper installation, free of damaged joints or edges.
 4. Tooth or piece in work to match courses.
 5. Make new work look like existing.
 6. Install new work in regular pattern of consistent appearance.
 7. When matching mortar, match wet new samples to wet existing samples to ensure color match. Intent of mortar match is achieve uniform look when mortar has dried, set-up and aged several months.
- 3.6 REPOINTING
- A. General: Comply with BIA 46 and the following:
1. Tuck pointing mortar color: Match colors of existing wet to new wet mixes.
 2. Use approved mock-up or field sample as basis for mix.
 3. Removal: Using approved tools, experienced workers and without damage to masonry to remain. Thin saw-blades applied only to center of joint are permitted.
 4. Cleaning and preparation: BIA 7F, clean and saturate wall, without apparent standing water.
 5. Tuck pointing: BIA 7F, not less than 3 layers, 0.25 inch maximum each.
 6. Final result: New pointed wall looks like cleaned original wall.
- B. Joint preparation for repointing
1. Remove all unsound, weathered, and deteriorated mortar to whatever depth encountered and as follows:
 2. Not less than 1 inch deep.
 3. Not less than 2 times joint width, but never less than 1.0 inch for horizontal joints.
 4. Remove mortar fins 3/16 inch and larger.
 5. Raking – Comply with the following:
 - a. Remove existing mortar with control and care and without damaging masonry units.
 - b. Do not widen mortar joints, nor damage, chip, or chamfer edges of masonry units.
 - c. Use of power chisels is forbidden.
 - d. Use of power saws is acceptable provided as follows:
 - .1) Only thinnest saw blades manufactured are used.
 - .2) Blade is applied only to center of mortar joint.
 - .3) Only mortar is cut, without damaging, abrading or cutting masonry.
 - .4) Skill of application of each worker is demonstrated and approved by appropriate Owner representative or consultant.
- C. Mortar mixing: Use only known volumes. Do not batch by shovel. Proportion precisely and accurately and comply with the following:
1. Mechanically mix all ingredients for 5 minutes with minimum water quantity to produce a workable mix.
 2. Mix small batches for only one hours work.
- D. Repointing: Comply with the following:
1. Saturate surfaces with water and allow standing water to disappear immediately before pointing.
 2. Install mortar in 3 equal layers.
 3. Tool and compress each layer of pointing mortar to form dense, weather tight surfaces.
 4. Allow each layer to cure to thumb print hardness before installing next layer.
 5. To not feather edge mortar.
 6. Do not point mortar in a manner which may spall.

7. Do not spread mortar over masonry faces.
8. Do not make repointed mortar joints visually larger than original joints.
9. After mortar is thumb print hard, tool mortar to match exactly tooling of original mortar in good condition as approved by Architect.
10. Dry brush excess mortar from masonry surfaces as work progresses and before mortar sets.
11. Moist cure mortar at least 72 hours.
12. Allow work to cure 7 days or more before cleaning with chemicals, detergents or water.

3.7 FINAL CLEANING

- A. All work shall be kept as clean as possible so that cleaning down may be accomplished easily; protect all masonry from stain at all times to guard from discoloration. Splashing at staging levels shall be avoided, either by covering the courses at these levels, or by cleaning the masonry so spattered while the mortar is still fresh.
- B. All masonry shall be thoroughly washed and cleaned with clear water and fiber brushed to remove mortar stains, dirt and dust.
- C. At concrete block units, joints and units shall be lightly stoned down to remove excess mortar and aggregate projections.
- D. If difficulty is encountered removing mortar stains from masonry using only water, this trade if approved by the Architect, may use stiff fiber brushes and not over a 5% solution of muriatic acid after he has demonstrated to the Architect that acid is necessary. Protect all surfaces above and below from acid.
- E. Immediately after cleaning, the masonry surfaces shall be rinsed down with clean water.

3.8 CLEAN-UP

- A. Remove from the site and legally dispose of at the end of each day, all cartons, broken masonry, rubbish and debris resulting from the work of this section.

END OF SECTION

SECTION 04 42 06 - EXTERIOR STONE CHIMNEY CAPS

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Provide exterior cut chimney cap stonework.
- C. Extent: As shown, including new window sills; comply with masonry installation requirements given other sections.
- D. Related work: Division 04 Masonry Repairs.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Limestone:
 - 1. Manufacturers: Architectural Stone Company; Buechel Stone Corp.; Cantera Especial; Eden Stone Co., Inc.; Krukowski Stone Co., Inc.; Natural Stone Veneers International; Pierrexpert, Inc.; Valders Stone & Marble, Inc., Division of Eden Stone Co.; or approved equal.
 - 2. Application: Chimney caps to match existing size and shape.
 - 3. Building Stone Standard: ASTM C 568.
 - 4. Type: Match existing, if indeterminate, use high density dolomitic limestone.
 - 5. Grade and Color: Match existing, if indeterminate, Select, buff.
 - 6. Finish: Match existing.
 - 7. Joints: Sealant, only at flue to cap and top, exterior butt joints.
 - 8. Joints: Mortar, ASTM C270, Type S.
 - a. Portland cement: ASTM C 150, Type I or II.
 - b. Hydrated Lime: ASTM C 207, Type S.
 - c. Aggregate: ASTM C 144.
 - d. Colored Mortar Pigments: Iron oxides and chromium oxides.
 - e. Latex Additive: Water emulsion type.
 - 9. Anchors and Attachments: Stainless steel, ASTM A 666, Type 304.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ensure existing work to receive new stone work are properly prepared, and in sound condition.

3.2 INSTALLATION

- A. Dress joints straight and at 90 degree angle; provide 3/8-inch joints or as indicated.
- B. Install exterior work by utilizing standard stainless steel strap anchors and dowels to structural support. Provide mortar joints, color as approved. Seal indicated joints with elastomeric sealant; vent and weep cavities.
- C. Set sills on flashing assemblies provided under other sections and ensure assembly has end, side, and rear dams and that assembly will drain to exterior. Set stone on non-corrosive shims to ensure mortar remains at correct bed height.
- D. Install to tolerances of plumb, alignment and level of plus or minus 1/8 inch in 20 feet.
- E. Remove and replace damaged units. Clean using methods recommended by stone supplier.

END OF SECTION

SECTION 05 08 50 – HOT DIPPED GALVANIZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Hot dip galvanizing.
- C. Extent, without limitation, includes:
 - 1. Ferrous metals indicated to be galvanized.
 - 2. Ferrous metals in exterior assemblies whether exposed to weather or not.
 - 3. Exterior ferrous metals.
- D. Related work includes, without limitation:
 - Section 05 08 00 - Factory applied metal coatings
 - Section 05 08 60 - Shop coatings on galvanizing
 - Division 09 – Painting.
- E. Work of this section is affected by Alternates; refer to Division 01.

1.2 REFERENCES

- A. Comply with reference standards, and as follows:
 - 1. ASTM A123 – Standard Specification for zinc [hot dipped galvanizing] coatings on Iron & Steel
 - 2. ASTM A153 - Standard Specification for zinc [hot dipped galvanizing] coatings on ferrous hardware
 - 3. ASTM A143 – Recommended practice for safeguarding against embrittlement and detecting same.
 - 4. ASTM A384 – Practice for safeguarding against warping and distortion during hot dip galvanizing
 - 5. ASTM A385 – Standard practice for providing high quality zinc coatings, hot dipped.
 - 6. ASTM A653 – Standard specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
 - 7. NAAMM Metal Finishes Manual
 - 8. Steel Structure Painting Manual, Volumes 1 and 2
 - 9. Occupational Safety and Health Standards
 - 10. State Building Code and Regulations applicable to building systems.
- B. Grade Stamps: All galvanized metal shall bear a stamp indicating ASTM number and weight of zinc coating in ounces per square foot.

1.3 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Shop drawings: Indicate specifications for shop finishes and galvanizing on shop drawings
 - 3. Maintenance Data: Provide recommended maintenance procedures.
 - 4. Certification: Certify submitted materials comply with requirements, specifications and referenced standards
- B. LEED Submittals: Comply with Division 01 and applicable Sustainability requirements.

1.4 PRODUCTS DELIVERY AND STORAGE

- A. Store galvanized members at the project site above ground on platforms, skids or other supports. Store beams with webs vertical.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Materials shall conform to the latest edition of the specifications or manufacturer's standards.
 - 1. Zinc: ASTM B6, Prime Western Grade or High Grade

2. Galvanizing ASTM A-123, , or A-153 as applicable; 2.0 ounces zinc per square foot, unless otherwise indicated; provide under its section.
 3. Galvanized Sheet Steel ASTM A-526 or A-526, G-90
 4. Provide nickel zinc galvanizing bath where shop applied primers or top coats are required containing .05-.09% nickel and other earthy materials.
 5. Perforated sheet metal shall be perforated steel hot dip galvanized and shop primed steel with perforations fabricated to sizes and locations shown. Where perforations are not indicated provide 1/4 inch perforations with approximately 50% free area. Acceptable manufacturer is McNichols Co. of Tampa, Florida. Shop priming shall comply with requirements below.
- B. Galvanizing Repair Paint: High zinc dust content paint complying with the following:
1. Designed specifically for field and shop repair of hot dip galvanizing
 2. ASTM A 780 Galvanizing repair specification with 65 per cent zinc dust content of dry film or more.
 3. SSPC-Paint 20 Type II Organic.
 4. DOD-P-21035A for "Paint, High Zinc Dust Content, Galvanizing Repair."
 5. Single-component
 6. Apply by brush, roller or spray
 7. Applicable VOC standards
 8. Acceptable product: ZRC Galviline Galvanizing Repair Compound.

2.2 FABRICATION AND WORKMANSHIP

- A. Comply with reference standards and the following:
1. Vents: For all hollow members, size as shown, if not, 0375 inch.
 2. Vent locations: Where shown, if not, where approved by Architect.
 3. Do not galvanize until all welds have been ground smooth.
 4. Minimize surface imperfections (eg: flux inclusions), by dipping material in a solution of Zinc Ammonium Chloride (pre-flux) immediately prior to galvanizing.
 5. Flux blanket overlaying molten zinc will not be permitted.
 6. ASTM A 153 for galvanizing iron and steel hardware, zinc thickness in accordance with standard.
 7. ASTM A 123 for galvanizing rolled, pressed and forged steel shapes, plates, bars and strip 1/8" thick and heavier, grade 85 unless otherwise indicated.
 8. ASTM A 386 for galvanizing assembled steel products, with 2 ounces per square foot unless otherwise indicated.
 9. After galvanizing, chromate material by dipping material in a 0.2% chromic acid solution.

2.3 SHOP COATINGS AFTER GALVANIZING

- A. Where indicated, Section 05 08 60.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with general requirements and if applicable, Section 01 70 00 – Execution, and the following:
1. Inspect field conditions and correct imperfections affecting work.
 2. Touch-Up of Shop Primers: Touch up field welds and unprimed steel using specified shop primers and following procedures specified for shop work.
 3. Galvanizing: Repair all zinc-coating that has been damaged in handling or transporting or in welding, riveting, or bolting by wire brushing to bright metal and applying two (2) coats of a galvanizing repair paint conforming to specifications.

END OF SECTION

SECTION 05 08 60 – SHOP COATINGS ON GALVANIZING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Solvent primers.
 - 2. Solvent top coats.
 - 3. Thermoset primers.
 - 4. Thermoset topcoats.
- C. Extent of work without limitation, includes:
 - 1. Indicated coatings applied on hot dipped galvanized metal visible from or exposed to exterior.
 - 2. Wherever such coatings are indicated on drawings.

1.2 QUALITY ASSURANCE

- A. Comply with the following:
 - 1. Galvanizing method and facility: - acceptable to coating fabricator/manufacturer.
 - 2. Coordinate work, shop drawings and processes.
 - 3. Fabricator: 10 years experience or more in coating processes.

1.3 SUBMITTALS

- A. In accordance with provisions of Division 1 submit the following:
 - 1. Product Data: For all product types specified in this section.
 - 2. Shop Drawings: Indicate specifications for shop finishes on shop drawings.
 - 3. Certification: Furnish a notarized certificate of compliance with specifications and referenced standards.

1.4 PRODUCTS DELIVERY AND STORAGE

- A. Store coated members at the project site above ground on platforms, skids or other supports. Store beams with webs vertical.

1.5 WARRANTY

- A. Warranty: Provide a 20 year warranty against rust and 15 year warranty against coating failure.

PART 2 - PRODUCTS

2.1 PRIME COATINGS AFTER GALVANIZING

- A. Coating products & Materials / Type 1 - Baked-on, solvent based:
 - 1. Duncan Galvanizing of Everett, MA "PrimerGalv"
 - 2. Valmont Coatings / Applied Coating Technology, Mendota Heights, MN 55120
 - 3. Approved equal.
- B. Factory-Applied Universal Primer: Provide factory-applied polyamide epoxy or urethane primer, 2.0 mils dry film thickness minimum. Apply primer within twelve (12) hours after galvanizing at the galvanizer's plant in a controlled environment meeting applicable environmental regulations, and as recommended by coating manufacturer utilizing a cure facility capable of reaching 130 degrees F.
 - 1. In the event coatings are not applied within 12 hours of exposure to oxygen, work shall be re-galvanized or Zinc Hydroxide formations shall be completely removed.
 - 2. Color shall be appropriate for finish color selected by Architect. Two contrasting color application where noted.

- C. On members to be left exposed to view, remove burrs as necessary during fabrication and galvanizing process to provide smooth defect free surfaces.
- D. Schedule of shop finishing:
 - 1. Galvanized work exposed to view [whether partially or wholly].
 - 2. Fabricated assemblies exposed to view including tube and pipe assemblies.

2.2 TOP COATINGS AFTER PRIMING

- A. Finish coat: Comply with following:
 - 1. Basis of design: Duncan Galvanizing, "ColorGalv" or if approved ", ColorThermoset 15."
 - 2. Type: Factory-applied color-pigmented architectural finish.
 - 3. Finish coat application: Applied at galvanizer's plant.
 - 4. Schedule of shop top coats: All fabricated assemblies exposed to view including tube and pipe assemblies.
 - 5. Color:
 - a. Finish color: As selected by Architect.
 - b. Number of colors: 2 contrasting color applications unless more are indicated.
 - c. Standard colors: Yes.
 - d. Custom color: Not unless noted or scheduled.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with requirements of Division 1, and the following:
 - 1. Inspect field conditions and correct imperfections affecting work.
 - 2. Galvanizing: Repair zinc-coating damaged by handling or transporting, welding, riveting, or bolting with wire brushing to bright metal and apply two (2) coats of galvanizing repair paint conforming to specifications.
 - 3. Touch-Up of Shop Primers and if applicable, topcoats: Touch up field welds and damaged steel finish surfaces using specified shop primers and topcoats. Follow procedures specified for shop work.

END OF SECTION

SECTION 05 50 00 - MISCELLANEOUS METAL FABRICATIONS

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Miscellaneous metal fabrications.
 - 2. Shop applied ferrous metals priming paint
 - 3. Anchorages, brackets, supports, inserts and backing required for a complete job but not included in other sections.
 - 4. All other ferrous or non-ferrous metal work not specifically given to other Sections and necessary for a complete job.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
 - 1. Shop drawings shall be prepared and stamped by a qualified engineer licensed in the jurisdiction of the project.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. As required by application and including:
 - 1. Kee Industrial Products, Inc.
 - 2. ACL Industries, Inc.; ALACO Ladder Co.
 - 3. DeMuth Steel Products, Inc.;
 - 4. Jomy Products, Inc.;
 - 5. O'Keeffe's, Inc.;

2.2 APPLICATIONS

- A. Applications are as shown and may include:
 - 1. Rough hardware.
 - 2. Loose bearing and leveling plates.
 - 3. Remodeling of existing metal fabrications.

2.3 MATERIALS

- A. Ferrous Materials:
 - 1. Steel Plates, Shapes and Bars: ASTM A 36.
 - 2. Rolled Steel Floor Plates: ASTM A 786.
 - 3. Steel Tubing: ASTM A 500 or A 501.
 - 4. Uncoated Structural Steel Sheet: ASTM A 611 or A 570.
 - 5. Uncoated Steel Sheet: ASTM A 366 or A 569.
 - 6. Galvanized Steel Sheet: ASTM A 653, G90.
 - 7. Steel Pipe, Black Finish: ASTM A 53.

8. Steel Pipe, Galvanized Finish: ASTM A 53.
 9. Gray Iron Castings: ASTM A 48, Class 30.
 10. Malleable Iron Castings: ASTM A 47, Grade 32510.
 11. Reinforcing Bars: ASTM A 615, Grade 60.
 12. Brackets, Flanges, and Anchors: Cast or formed metal.
 13. Concrete Inserts: Threaded or wedge type.
 14. Welding Rods and Bare Electrodes: AWS specifications.
 15. Zinc-Coating: Hot-dip galvanized coating for materials in exterior assemblies or exterior walls.
- B. Fasteners & hangers:
1. Bolts and Nuts: Hexagon head type, ASTM A 307, Grade A.
 2. Lag Bolts: Square head, FS FF-B-561.
 3. Machine Screws: Cadmium plated steel, FS FF-S-92.
 4. Wood Screws: Flat head carbon steel, FS FF-S-111.
 5. Plain Washers: Round carbon steel, FS FF-W-92.
 6. Drilled-In Expansion Anchors: FS FF-S-325.
 7. Toggle Bolts: Tumble-wing type, FS FF-B-588.
 8. Lock Washers: Spring type carbon steel, FS FF-W-84.
 9. Zinc-Coating: Fasteners in exterior assemblies or exterior walls.
 10. Hangers and suspension: Where required, provide "Uni-strut" A1000 or assemblies of types recommended by manufacturer for application; see www.unistrut.us/
- C. Auxiliary Materials:
1. Nonshrink Metallic Grout: ASTM C 1107.
 2. Nonshrink Nonmetallic Grout: ASTM C 1107.
 3. Interior Anchoring Cement: Hydraulic expansion cement.
 4. Exterior/Interior Anchoring Cement: Erosion-resistant hydraulic expansion cement.
 5. Shop Primer: Fast curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79, compatible with topcoats, containing pigments distinguishable from zinc-rich primer.
 6. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
 7. Galvanizing Repair Paint: SSPC - Paint 20.
 8. Bituminous Paint: Asphalt mastic, SSPC - Paint 12.

2.4 FABRICATION

- A. Fabricate work where manufactured assemblies are not available, using proper methods and means to provide true, straight, function assemblies of proper strength and durability.
- B. Where indicated or if exposed to weather, and unless provided under other sections, hot dip galvanize work as follows:
1. Comply with Section 05 08 50 Hot Dip Galvanizing and the following.
 2. Zinc: ASTM B6, Prime Western Grade or High Grade
 3. Galvanizing ASTM A-123, A-386, or A-153 as applicable; 2.0 ounces zinc per square foot, unless otherwise indicated.
 4. Galvanized Sheet Steel ASTM A-526 or A-526, G-90.

2.5 SHOP PRIMING

- A. For priming galvanized work: Comply with Section 05 08 60 Shop Coatings on Galvanizing.
- B. Shop priming uncoated ferrous metals:
1. Preparation: SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
 2. Primer: Zinc rich primer unless otherwise approved.
 3. Primer application: SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel.
- C. Field coats: Comply with Painting sections in Division 09.

2.6 FABRICATION

- A. General: Fabricate work 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. Comply with the following:

1. Shop assemble work 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.
2. 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.
3. Form work true to line and level with accurate angles and surfaces.
4. Fabricate connections that are exposed to weather in a manner that excludes water. Provide weep holes where water may accumulate.
5. Cut, reinforce, drill, and tap as indicated to receive finish hardware, screws, and similar items.
6. Connections: Fabricate work with welded connections unless otherwise indicated.
7. 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.
 - a. Use materials and methods that minimize distortion and develop strength and corrosion resistance of base metals. Obtain fusion without undercut or overlap. Remove flux immediately.
 - b. At exposed connections, finish exposed surfaces smooth and blended so no roughness shows after finishing and welded surface matches contours of adjoining surfaces.
8. Nonwelded Connections: Connect members with concealed mechanical fasteners and fittings. Fabricate members and fittings to produce flush, smooth, rigid, hairline joints.
9. 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.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Take field measurements prior to preparation of shop drawings and fabrication. Do not delay job; allow for cutting and fitting if field measurement not practical.
- B. Form work true to line with sharp angles and edges. Weld continuously, grind flush and make smooth on exposed surfaces.
- C. Install work plumb and level with hairline joints and ground flush welds.
- D. Touch up damaged coatings with shop primer and galvanize repair paint.
- E. Paint items scheduled in accordance with painting section.

END OF SECTION

SECTION 05 52 10 – STEEL RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Steel hand and guard rail assemblies.
 - 2. Finishes.
 - 3. Engineering.
 - 4. Modifications of existing work to install new work.
- C. Extent: As shown, including, carbon steel railings of pipe, solid and rolled shapes.

1.2 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 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.

1.3 ACTION SUBMITTALS

- A. Submit under provisions of Division 1 and as follows:
 - 1. Product Data: Submit manufacturer's product data and installation instructions for each material and product used. Include:
 - a. Manufactured products,
 - b. Railing support brackets.
 - c. Grout, anchoring cement, and paint products.
 - 2. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
 - a. Field Measurements: Verify actual locations of walls and other construction contiguous with metal fabrications by field measurements before fabrication.
 - 3. Samples: Provide upon request.
 - 4. Engineering Calculations: Provide calculations stamped by a professional engineer registered in the project jurisdiction work of this section. Comply with section 01 45 50 Engineering by Contractor.

1.4 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers/fabricators, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Handrail and Railing Structural Performance:
 - 1. Comply with requirements of State Code for railing assembly, wall rails, and attachments to resist concentrated and uniform loading of components without permanent deformation and with structural performance per ASTM E985.
 - 2. Comply with applicable requirements of ADA and ANSI-117.1.
- C. Reference Standards include the latest editions of:
 - 1. Standard Code for Welding in Building Construction of the American Welding Society.
 - 2. NAAMM Pipe Railing Manual

3. Steel Structure Painting Manual, Volumes 1 and 2
- D. Welding Qualifications: Qualify procedures and personnel according to the following:
 1. AWS D1.1/D1.1M, "Structural Welding Code - Steel."
 2. AWS D1.2/D1.2M, "Structural Welding Code - Aluminum."
 3. AWS D1.6/D1.6M, "Structural Welding Code - Stainless Steel."

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Delegated Design: Engage a qualified professional engineer, as defined in Division 01 to design railings, including attachment to building construction.
- B. Structural Performance: Railings, 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. 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.

2.2 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.
 1. Bracket type: As shown, if not, flange tapped for concealed anchorage to threaded hanger bolt

2.3 MATERIALS

- A. Carbon Steel Pipe, Bar and Tube Railing Systems:
 1. Steel Pipe, Galvanized Finish: ASTM A 53.
 2. Steel Pipe, Black Finish: ASTM A 53.
 3. Steel Tubing: ASTM A 500 or A 501.
 4. Steel Plates, Shapes and Bars: ASTM A 36.
 5. Gray Iron Castings: ASTM A 48, Class 30.
 6. Malleable Iron Castings: ASTM A 47, Grade 32510.
 7. Interior Finish: Primed.
 8. Interior Finish / damp locations: Galvanized and shop primed.
 9. Exterior Finish: Galvanized and shop primed.
- B. Auxiliary Materials:
 1. Nonshrink Nonmetallic Grout: CE CRD-C621.
 2. Interior Anchoring Cement: Hydraulic expansion cement.
 3. Exterior/Interior Anchoring Cement: Erosion-resistant hydraulic expansion cement.
 4. Shop Primer: Fast-curing, lead- and chromate-free, universal modified-alkyd primer complying with MPI#79, compatible with topcoats. Apply within 12 hours of hot dip galvanizing.
 5. Zinc-Rich Primer: Complying with SSPC-Paint 20 or SSPC-Paint 29 and compatible with topcoat.
 6. Galvanizing Repair Paint: SSPC - Paint 20.
 7. Bituminous Paint: Asphalt mastic, SSPC - Paint 12.
- C. Pipe thickness minimums: Provide work not less than the following strengths/gages:
 1. Steel pipe railing: As shown, if not, 0.188" wall thickness Type/Schedule 40.

2. Hollow balusters: 0.093" wall thickness or better or use solid stock balusters.

- D. Brackets: Provide type indicated, including custom fabricated. Spacing of brackets per fabricator but not more than 48 inches on center. For manufactured brackets products include:
1. Julius Blum #378

2.4 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. Comply with fabrication requirements of Section 05 50 00 Miscellaneous Metal Fabrications.
- C. For changes in direction made by bending, use jigs to produce uniform curvature for each repetitive configuration required. Maintain cross section of member throughout entire bend without buckling, twisting, cracking, or otherwise deforming exposed surfaces of components.
- D. Close exposed ends of railing members with prefabricated end fittings.
- E. 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.
- F. Brackets, Flanges, Fittings, and Anchors: Provide wall brackets, flanges, miscellaneous fittings, and anchors to interconnect railing members to other work unless otherwise indicated.
1. At brackets and fittings fastened to plaster or gypsum board partitions, provide crush-resistant fillers or other means to transfer loads through wall finishes to structural supports and prevent bracket or fitting rotation and crushing of substrate.
- G. 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.
- H. Toe Boards: Where indicated, provide toe boards at railings around openings and at edge of open-sided floors and platforms. Fabricate to dimensions and details indicated.

2.5 GALVANIZED FINISHES

- B. Where indicated or if exposed to weather, and unless provided under other sections, hot dip galvanize work as follows:
1. Comply with Section 05 08 50 Hot Dip Galvanizing and the following.
 2. Zinc: ASTM B6, Prime Western Grade or High Grade
 3. Galvanizing ASTM A-123, A-386, or A-153 as applicable; 2.0 ounces zinc per square foot, unless otherwise indicated.
 4. Galvanized Sheet Steel ASTM A-526 or A-526, G-90.

2.6 SHOP PRIMING

- A. For priming galvanized work: Comply with Section 05 08 60 Shop Coatings on Galvanizing.
- B. Shop priming uncoated ferrous metals:
1. Preparation: SSPC-SP 6/NACE No. 3, Commercial Blast Cleaning.
 2. Primer: Zinc rich primer unless otherwise approved.
 3. Primer application: SSPC-PA 1, "Shop, Field, and Maintenance Painting of Steel."
- C. Field coats: Comply with Painting sections in Division 09.

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine plaster and gypsum board assemblies, where reinforced to receive anchors, to verify that locations of concealed reinforcements are clearly marked for Installer. Locate reinforcements and mark locations if not already done.

3.2 INSTALLATION, GENERAL

- A. Take field measurements prior to fabrication, where possible, and comply with the following:
 - 1. Form to required shapes and sizes with true, straight edges, lines and angles. Provide light-tight, hairline joints. Grind exposed joints flush and smooth with adjacent finish surface. Ease exposed edges to small uniform radius.
 - 2. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction. Coordinate with work of other sections.
 - 3. Railings: Provide sizes, profiles and dimensions indicated. Provide mitered joints at 90 degree turns and smooth sweeps at bends. Provide wall returns, end caps, brackets, fittings, and toe boards.
 - 4. Coordinate with work of other sections; provide inserts and templates as needed. Install work plumb and level with uniform appearance.
- B. Fit exposed connections together to form tight, hairline joints.
- C. 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 are 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 (6 mm in 3.5 m).
- 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. Coat, with a heavy coat of bituminous paint, concealed surfaces that are in contact with grout, concrete, masonry, wood, or dissimilar metals.
- E. Adjust railings before anchoring to ensure matching alignment at abutting joints.
- F. 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 EXISTING ASSEMBLIES

- A. Modify existing assemblies to install new work as shown. Provide new plates, bars, shapes, pipe and tube as required and assemble to make seamless connections between new and old work. Finishes of modifications and new work are to match.

3.4 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 the same material as used for shop painting to comply with SSPC-PA 1 requirements 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.

3.5 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

SECTION 06 01 45 - EXTERIOR WOOD RESTORATION & REPAIR

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes without limitation, providing:
 - 1. Repair of existing exterior woodwork.
 - 2. New woodwork for wood to be repaired or restored.
- C. Related work, includes, without limitation:
 - 1. Section 06 40 20 - Interior Architectural Millwork: Standards for wood working.
 - 2. Division 09 - Painting: paint of new work, materials for coating repaired wood.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Use experienced subcontractors and mechanics with prior experience on comparable jobs.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

- A. Subject to compliance with specifications and based upon wood restoration product lines only, available manufacturers include:
 - 1. System Three, T-88 or approved equal. See www.systemthree.com.
 - 2. Abatron, <http://www.abatron.com>
 - 3. Mohawk wood repair line, distributed through Wood Repair Products, www.woodrepairproducts.com
 - 4. Consev Epoxy LLC, www.conservepoxy.com
 - 5. ABR Products, Inc., www.abrp.com
- B. Advance Repair Technology "Primatrate" epoxy primer and "Flex-Tec HV" epoxy shall be used because it is a flexible epoxy that acts more like wood. Other acceptable manufacturers include the following:
 - 1. ABATRON
 - 2. REPAIR CARE
 - 3. WEST SYSTEM

2.2 RESTORATION & REPAIR PRODUCTS AND MATERIALS

- A. Paint and surface cleaners: Water solution of trisodium phosphate.
- B. New Wood: Match species, grain, grade and wood characteristics. Use re-milled antique wood where recent timber types do not match existing wood.
- C. Wood Repair: Fill open or loose joints between stiles and rails with epoxy paintable waterproof bonding structural-grade adhesives.

1. Low-viscosity elastic epoxy primer/stabilizer.
 2. Slow-curing elastic epoxy repair compound.
 3. Medium viscosity elastic epoxy, used for sealing end-grain wood, or as an adhesive.
 4. Manufacturer/supplier: System Three, T-88 or approved equal. See www.systemthree.com.
 5. Finish: Paint repaired doors to match existing.
- D. Wood consolidant: Product designed for application and which does not damage existing finishes
1. Acceptable product: Abatron "LiquidWood".
 2. Wood: For splicing, dutchman or solid wood fill repairs shall be of species, cut, grade, etc. to match existing work being repaired. Kiln dried wood to a moisture content of 6 to 12 percent at time of fabrication. Wood shall be free from shakes, large or loose knots, and all imperfections which might impair its strength, durability, or appearance.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Clean and protect work from damage.
- B. Clean existing wood surfaces to remain. After preliminary cleaning, investigate condition of wood and advise Architect of work not already noted to be repaired or restored.
- C. Repair damaged, missing or unsound wood surfaces and members using materials and techniques to exactly match existing sound components.
- D. Where shown, replace parts of doors damaged by earlier work to return doors to original design.
- E. Complete cleaning and re-finish wood work to remain using methods to reproduce original work.

3.2 WOOD REPAIR AND RESTORATION

- A. Preservation and Seating of Seams and Joints: Areas which are open are to be further cut open to a depth of 10 mm. (3/8 inch) and width of 4 mm. (1/8 inch). Remove soft wood, weathered wood and all decayed wood. Check the moisture content and hardness of the wood structure with moisture meter. Continue with repairs when the moisture content is 18% or less. Sand the bare wood, thoroughly remove all loose fibers, paint, sawdust and dirt.
 1. Pre-treat bare and sanded wood thoroughly with elastic epoxy primer. Let epoxy primer penetrate a minimum of 30 minutes and a maximum of 2 hours. Allow epoxy primer to penetrate until surface of wood attains a dull appearance. Remove excess areas of pre-treatment with absorbing paper. Follow manufacturer's specific primer instructions.
 2. Apply elastic epoxy repair compound with small modeling knife. Epoxy shall have optional contact with wood. Avoid inclusion of air pockets in epoxy. Seal joint full, even and smooth in a single application. Allow cure time of +/- 16 hours.
 3. After curing, sand surface even and smooth. Transitions and irregularities between wood and epoxy shall not be visible after sanding. Remove sanding dust thoroughly.
 4. Smooth any remaining irregularities with fast repair compound applied with a modeling knife. Sand lightly, remove sanding dust and apply the specified paint system.
- B. Repair of Cracks or Checks in Wood: At each end of crack, drill a hole 3/8-inch in dia. and a minimum of 1/2-inch deep. Cut crack to a depth of 10 mm. (3/8-inch) with router and round cutter (10 mm./ 3/8-in dia.) Remove all decayed wood. Check moisture content and hardness of the wood structure in and around the crack with moisture meter. Continue with repairs when moisture content is less than 18% displayed. Sand the bare wood, thoroughly remove all loose fibers, paint, saw dust and dirt.
 1. Follow same procedure as above, see A. 1 through 4.
- C. Repair of Natural Defects (Knots): Cut out defects to a depth of 10 mm. (3/8-inch) and width of 4 mm. (1/8-inch) with a round cutter (10 mm./ 3/8-inch dia.). Remove soft, weathered wood with router and round cutter (10 mm./ 3/8-inch dia.). Remove decayed wood. Check moisture content and hardness of the wood structure in and around the knot with moisture meter. Continue with repairs when moisture content is less than 18%. Sand the bare wood thoroughly

to remove all loose fibers, paint, saw dust and dirt.

1. Follow same procedure as above, see A. I through 4.

D. Sealing of Bare Sides and End Grain Wood: All surfaces requiring treatment shall be sanded to bare wood. Remove weathered and decayed wood. Check moisture content and hardness of the wood structure 'm and around the subject area with a moisture meter. Continue with work when moisture content is less than 18%. Sand the bare wood thoroughly remove all loose fibers, paint, saw dust and dirt.

1. Pre-treat bare and sanded wood thoroughly with epoxy primer. Let epoxy primer penetrate a minimum of 30 minutes and a maximum of 2 hours. Allow epoxy primer to penetrate until surface of wood attains a dull appearance. Remove excess areas of pre-treatment with absorbing paper.

2. With brush, apply a layer of medium viscosity elastic epoxy to pre-treated wood. Coating thickness shall be +/- .5 mm. (1/32-inch).

3. After curing, sand lightly; remove sanding dust and apply the specified paint system.

3.3 CLEAN UP & PROTECTION

A. Clean and protect work in compliance with Division 1. Protect work until acceptance.

END OF SECTION

SECTION 06 01 47 – ROUGH CARPENTRY REPAIRS & FRAMING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes without limitation, providing:
 - 1. Repair of existing rough carpentry plank sheathing.
 - 2. Removal of unsound planking.
 - 3. New, sound planking.
 - 4. Re-nailing.
 - 5. Repair and replacement of timber framing shown or found to be unsound, or repaired.
 - 6. Miscellaneous wood framing.
- C. Extent: As shown, but including:
 - 1. Existing board plank sheathing repairs and replacements using both planks and plywood sheathing.
 - 2. Repair, replacement and/or piecing in new timber framed sill plates.
 - 3. Rafter repairs, sistering or replacement
 - 4. Rafter tail repairs, sistering and replacements.
 - 5. Removing and providing new fasteners.
 - 6. See drawings for extent of work or percentages to be replaced.
- D. Related work, includes, without limitation:
 - 1. Section 02 41 10 – Selective demolition.
 - 2. Section 06 01 46 – Exterior wood restoration and repair.
- E. Work of this section may be affected by allowances, unit prices and alternates. Refer to Division 01.

1.2 REFERENCES

- A. Comply with reference standards, and as follows:
 - 1. NeLMA: Northeastern Lumber Manufacturers' Association.
 - 2. NLGA: National Lumber Grades Authority.
 - 3. RIS: Redwood Inspection Service.
 - 4. SPIB: The Southern Pine Inspection Bureau.
 - 5. WCLIB: West Coast Lumber Inspection Bureau.
 - 6. WWPA: Western Wood Products Association.
 - 7. Table 2304.9.1, "Fastening Schedule," in ICC's International Building Code.
- B. Fastener reference standards:
 - 1. Table R602.3(1), "Fastener Schedule for Structural Members".

1.3 PERFORMANCE REQUIREMENTS

- A. Provide new and existing work in sound condition, free of damaged or defective pieces, securely fastened in place and sufficiently plane to accept new work without adversely affecting other installations.

1.4 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Shop drawings: Large scale drawings for fabrication, installation and erections including plans, elevations, details, anchorages, connections and accessories along with sill and joining details and component lengths. Provide templates for work installed by others.
 - a. Field Measurements: Take accurate field measurements before fabrication and indicate same on shop drawings.
 - 3. Samples: 8 inch piece of existing and new plank.

1.5 QUALITY ASSURANCE

- A. Comply with Division 01 requirements and governing codes and regulations.
- A. Provide products of acceptable for use in similar service. Deliver, handle, and store materials in accordance with manufacturer's instructions. Use experienced installers, subcontractors and mechanics with prior experience on comparable jobs.

PART 2 - PRODUCTS

2.1 STRUCTURAL NOTES AND DRAWINGS

- A. In the event of conflict with this section, the greater strength or quality shall govern.

2.2 WOOD PRODUCTS GENERAL

- A. Lumber: DOC PS 20 and applicable rules of grading agencies indicated. If no grading agency is indicated, provide lumber that complies with the applicable rules of any rules-writing agency certified by the ALSC Board of Review. Provide lumber graded by an agency certified by the ALSC Board of Review to inspect and grade lumber under the rules indicated.
 - 1. Factory mark each piece of lumber with grade stamp of grading agency.
 - 2. Where nominal sizes are indicated, provide actual sizes required by DOC PS 20 for moisture content specified. Where actual sizes are indicated, they are minimum dressed sizes for dry lumber.
 - 3. Provide dressed lumber, S4S, unless otherwise indicated. Rough sawn may be used subject to compliance with other parts of specifications and Architect approval.
 - 4. Maximum Moisture Content of Lumber: 19%

2.3 TREATED LUMBER

- A. Comply with section 06 08 00.
- B. Preservative Application: Treat items indicated on Drawings, and the following:
 - 1. Wood framing and furring attached directly to the interior of below-grade exterior masonry or concrete walls.
 - 2. Wood framing members that are less than 18 inches (460 mm) above the ground in crawlspaces or unexcavated areas.
 - 3. Wood floor plates that are installed over concrete slabs-on-grade.

2.4 TIMBER FRAMING MATERIALS

- A. Provide timber framing matching existing; where this cannot be determined, comply with the following requirements, according to grading rules of grading agency indicated:
 - 1. Species and Grade: Douglas fir-larch, Douglas fir-larch (north), or Douglas fir-south; Select Structural No. 1 grade; NLGA, WCLIB, or WWPA.
 - 2. Species and Grade: Hem-fir or hem-fir (north); Select Structural or No. 1 grade; NLGA, WCLIB, or WWPA.
 - 3. Species and Grade: Mixed oak; Select Structural or No. 1 grade; NeLMA.
 - 4. Species and Grade: Southern pine; Select Structural or No. 1 grade; SPIB.
 - 5. Maximum Moisture Content: 20% percent.

2.5 DIMENSION LUMBER FRAMING

- A. Provide timber framing, 2x framing and wood for support or attachment of other work including cant strips, bucks, nails, , stripping and similar members. Provide lumber of sizes indicated, worked into shapes shown, and as follows:
- B. Factory mark each piece of lumber with type, grade, mill and grading agency.
- C. Minimum Lumber Grade:
 - 1. Blocking: Refer to Section 06 10 50 – Wood Blocking.
 - 2. Timber framing over 2" nom. Select structural or better.
 - 3. Light structural framing: Select structural.
 - 4. In the event of a conflict between lumber grades and stress grades, stress grade requirements shall govern.

- D. Minimum stress grades: Joists, beams, girders, columns, carriages, and studs shall have the following stress requirements (In the event of a conflict with the structural drawings and specifications, the more stringent requirements shall govern):
1. $F_b = 1200$ psi allowable bending stress (except as noted)
 2. $F_t = 725$ psi allowable tension
 3. $F_v = 95$ psi horizontal shear
 4. $F_c = 875$ psi at columns
 5. $E = 1,700,000$ psi Young's Modulus
- E. Acceptable lumber species, subject to requirements above:
1. Joists, beams and girders: #2 Douglas Fir-Larch or better, or Southern Yellow Pine meeting stress grades above.

2.6 ROUGH CARPENTRY SHEATHING PLANKS & PLYWOOD

- A. Existing: Sound, dry, plane products securely fastened in place on sound support framing. Do not re-use unsupported, defective, out of acceptable plane or otherwise unsound work.
- B. New: Solid wood plank matching existing dimensions. Where existing planks have dimensions that differ from current standard, ensure new work produces smooth plane installation. Match dimensions or provide continuous shims below to make surfaces align.
- C. Plywood sheathing: Comply with Section 06 16 10 - Wood Sheathing.

2.7 FASTENERS

- A. General: Provide fasteners of size and type indicated that comply with requirements specified in this article for material and manufacture.
1. Where wood work 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 or of Type 304 stainless steel.
 2. Material at membrane roofing and shingle roofing: Hot dipped galvanized or stainless steel.
- B. Standards:
1. Nails, Brads, and Staples: ASTM F 1667.
 2. Power-Driven Fasteners: NES NER-272.
 3. Wood Screws: ASME B18.6.1.
 4. Lag Bolts: ASME B18.2.1 (ASME B18.2.3.8M).
 5. 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.
- C. Sizes comply with reference standards but do not use fasteners of smaller size or strength than existing.

2.8 MISCELLANEOUS MATERIALS

- A. Sill-Sealer Gaskets: Glass-fiber-resilient insulation, fabricated in strip form, for use as a sill sealer; nominal thickness, compressible to ; selected from manufacturer's standard widths to suit width of sill members indicated.
- B. Construction Adhesive: Type 1, waterproof, resorcinol based. Available product subject to approval by Architect and structural engineer:
1. Henkel 1059703 Loctite Universal T.A.C. Construction Adhesive

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Division 01 and in particular, Section 01 70 00.
- B. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- C. Examination: Verify that:
1. Field conditions are acceptable and are ready to receive work.

2. Framing intended to support planking is sound, dry, free defective parts and suitable to support existing or new work.

D. Preparation:

1. Remove unsound work.
2. Examine framing exposed by removal and framing not exposed by removal.
3. Perform required repairs to unsound framing where not provided for under other sections or trades.

3.2 INSTALLATION & REPAIRS - GENERAL

- A. Set rough carpentry to required levels and lines, with members plumb, true to line, cut, and fitted. Fit rough carpentry to other construction; scribe and cope as needed for accurate fit. Locate supports to comply with requirements for attaching other construction. Support short ends of plank. In general planks are to span at least 3 framing members. Provide blocking as required.
- B. Repair damaged, missing or unsound wood surfaces and members using materials and techniques to exactly match existing sound components.
 1. Sister 2x construction framing components or replace entire; screw sisters in place.
- C. 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.
- D. Do not splice structural members between supports unless otherwise indicated.
- E. Securely attach rough 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.
 3. Spacing of new, re-installed or replaced fasteners shall be at least as frequent as existing fastener spacing.
- F. Use stainless steel or hot dipped ring shank nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections between members. Install fasteners without splitting wood. Drive nails snug but do not countersink nail heads unless otherwise indicated.
- G. Comply with AWWPA 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.

3.3 TIMBER FRAMING INSTALLATION

- A. Install timber with crown edge up and provide not less than 4 inches (102 mm) of bearing on supports. Provide continuous members unless otherwise indicated; tie together over supports as indicated if not continuous.
- B. Where beams or girders are framed into pockets of exterior concrete or masonry walls, provide 1/2-inch (13-mm) air space at sides and ends of wood members.
- C. Install wood posts using metal anchors indicated.
- D. Treat ends of timber beams and posts exposed to weather by dipping in water-repellent preservative for 15 minutes.
- E. When piecing in sill plates and similar members, use lap joints and glue assemblies. Clamp pieces together using framing screws all the way through first piece and embedded not less than 2 inches in second piece.

3.4 RE-NAILING

- A. Comply with the following:
 1. Examine conditions of existing nails.
 2. Remove damaged or unsound fasteners. Unsound fasteners include non-corrosive coated fasteners. Non-corrosive fasteners may be left in place provide new stainless steel or hot dipped fasteners are installed adjacent.
 3. Install new plank, trim or the like and nail in place. Perform pull out test on newly nailed plank.

4. Perform pull out test on existing planking and wood either before or after re-nailing existing planking or other work.
5. Provide existing planking and framing with same or better pull out resistance to newly installed new work. This may require complete re-nailing.

3.5 CLEANING / PROTECTION

- A. Protect rough carpentry from weather. If, despite protection, rough carpentry becomes wet, apply EPA-registered borate treatment. Apply borate solution by spraying to comply with EPA-registered label.

END OF SECTION

SECTION 06 08 00 - WOOD PRESERVATIVE & FIRE RETARDANT TREATMENTS

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation:
 - 1. Preservative wood treatments.
 - 2. Fire retardant wood treatments.
- C. Related sections, without limitation, include:
 - 1. Section 06 10 50 - Wood blocking.
 - 2. Section 06 45 00 - Interior Wood Trim.

1.2 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. Include data for fire-retardant treatment from chemical treatment manufacturer and certification by treating plant that treated materials comply with requirements. Include physical properties of treated materials based on testing by a qualified independent testing agency.
 - 3. For fire-retardant treatments, include physical properties of treated lumber both before and after exposure to elevated temperatures, based on testing by a qualified independent testing agency according to ASTM D 5664.
 - 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.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For the following, from ICC-ES:
 - 1. Wood-preservative-treated wood.
 - 2. Fire-retardant-treated wood.

1.4 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 MANUFACTURERS

- A. Subject to compliance with specifications, provide Fire retardant treatment products equal or superior to
 - 1. Arch Chemicals Inc. "Dricon"
 - 2. Hoover "Pyro-guard 3rd Generation Fire Retardent Treatment" - for dry interiors
 - 3. Hoover "ExteriorFireX" for plywood only for damp interior and exterior applications.
 - 4. Products shall be certified paintable or stainable.

2.2 PRESERVATIVE & FIRE RETARDANT TREATMENTS

- A. Pressure Applied Preservative Treatment [PT]:

1. Material: ACQ – Alkaline Copper Quat, AWPA Standards P26, 27, 28, & 29.
2. Treatment Standard: AWPA C2 for lumber and C22 for panels.
3. Retention level: 0.25 lbs. per cubic foot; or
4. Moisture content: Kiln dried to 19% before delivery to job site.
5. Treated products shall conform to American Wood Preservers Bureau Standard LP-2 and be so stamped on each piece delivered.
6. Coordinate preservative treatment with roofing materials to ensure compatibility.
7. Fasteners used with PT: Hot dipped galvanized or stainless steel.
8. Use of electroplated fasteners: Not permitted.
9. Usage: Where shown and all plywood and lumber, exterior and interior, having direct contact with concrete or masonry and all blocking, nailing strips, curbs, wood battens and other wood embedded in or in contact with roofing.
10. Coatings: Coat concealed blocking to intended to abut sheet metal other than stainless steel with application of bituminous paint.

B. Fire Retardant Treatment [FRT]:

1. Standard: AWPA P17, formulations FR-1.
2. UL listed treatment adequate to achieve Class I rating with flame spread equal to 0-25 when tested in accordance with ASTM E84 and show no evidence of significant progressive combustion when test is continued for an additional 20 minutes. Provide treatments compatible with locations - interior or exterior.
3. Provide fire retardant treated wood products as shown or required by code.
4. I-2 Occupancies: Fire retardant treat all wood products.

C. Fire Retardant Plywood:

1. Class A material conforming to ASTM E-84, NFPA 255, UL 723.
2. Provide certification by manufacturer of conformity to standards.
3. Provide fasteners meeting manufacturers approval and requirements.
4. Acceptable manufacturer: Arch Chemicals Inc., "Dricon FRT"

D. Water-Repellent Preservative: NWWDA tested and accepted formulation containing 3-iodo-2-propynyl butyl carbamate, combined with an insecticide containing chloropyrifos as its active ingredient.

2.3 APPLICATIONS

A. Pressure preservative treatments; provide as shown and including:

1. Treat above-ground wood exposed to deterioration by moisture
2. Wood in contact with the ground or fresh water.
3. Wood in contact with concrete or masonry.

B. Fire retardant treatments; provide as shown and including:

1. Where shown.
2. Where required by code.

2.4 FIRE-RETARDANT-TREATED MATERIAL GENERAL REQUIREMENTS

A. Comply with the following:

1. Use treatment that does not promote corrosion of metal fasteners.
2. Exterior Type: Comply with requirements specified for fire-retardant-treated lumber and plywood by pressure process after being subjected to accelerated weathering according to ASTM D 2898. Use for exterior locations and where indicated.
3. Interior Type A: Treated materials shall have a moisture content of 28 percent or less when tested according to ASTM D 3201 at 92 percent relative humidity. Use where exterior type is not indicated.
4. Kiln-dry lumber after treatment to a maximum moisture content of 19 percent.
5. Identify fire-retardant-treated wood with appropriate classification marking of qualified testing agency.
6. For exposed lumber indicated to receive a stained or natural finish, mark end or back of each piece or omit marking and provide certificates of treatment compliance issued by testing agency].
7. For exposed items indicated to receive a stained or natural finish, use chemical formulations that do not bleed through, contain colorants, or otherwise adversely affect finishes.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 - especially requirements related to:
 - 1. Inspection and examination.
 - 2. Tolerances and measurement.
 - 3. Approvals, inspections and filed quality control.
 - 4. Protection.
- B. Apply two coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber, in accordance with AWPA M4.

3.2 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.

END OF SECTION

SECTION 06 10 50 - WOOD BLOCKING

PART 1 - GENERAL

1.1 SUMMARY

- A. All of Contract Documents, including Drawings, the General and Supplementary Conditions and Division 1 General Requirements apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Dimension lumber wood blocking.
 - 2. Wood nailers, furring, sleepers and cants.
 - 3. Strapping.
 - 4. Priming, back-painting, and treating of field cuts.
 - 5. Rough hardware.
 - 6. Backerboards for electrical and telephone equipment.
- C. Scope/extent includes, without limitation:
 - 1. MEP, telephone, cable, and low voltage backer panels.
 - 2. Wood fire stopping not provided by wood framing.
- D. Related Work includes, without limitation:
 - 1. Section 06 08 00 - Wood preservative & fire retardant treatments.

1.2 SUBMITTALS

- A. Product Data: Submit treatment manufacturers' and suppliers information on at least the following items and giving species, grades, actual sizes and moisture contents, finishes, and treatments as applicable
 - 1. List of project wood and blocking products provided under this section.
 - 2. List of fasteners and rough hardware by type, size, finish and typical applications for same

1.3 QUALITY STANDARDS

- A. Comply with the following:
 - 1. Lumber Standards and Grade Stamps: PS 2/16, American Softwood Lumber Standard and inspection agency grade stamps.
 - 2. Construction Panel Standards: PS 1, U.S. Product Standard for Construction and Industrial Plywood; APA PRP-108.
 - 3. Fasteners and Nailing: Comply with Appendix C requirements of Massachusetts State Building Code, and as specified.
 - 4. APA Design/Construction Guidelines.
- B. Provide the following:
 - 1. Official grade mark on lumber.
 - 2. Mark of treating company certifying type of treatment applied on fire retardant treated and pressure preservative treated lumber and plywood.
 - 3. American Plywood Association trade mark indicating type, grade and class of plywood panel.

1.4 PRODUCT DELIVERY AND STORAGE

- A. Keep materials dry at all times. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood, and provide air circulation within stacks.

PART 2 - PRODUCTS

2.1 LUMBER & PLYWOOD

- A. Moisture content: 15% max. for 2" or less nominal thickness, except as noted .
- B. Surfacing: Use S4S material (surfaced four sides) free of warp, wanes and defects, unless specified otherwise.

- C. Blocking species: No. 2 or better Douglas or Hem-Fir, or #2 Spruce Pine Fir, or, where plywood is indicated, use CDX waterproof glue APA exterior plywood.
- D. 12 gage electrogalvanized sheet metal may be substituted for blocking at metal stud walls if sufficient strength is developed to support actual and code-mandated loads. Refer to other sections for requirements.
- E. Blocking layout and size: Continuous and solid, fire retardant 3/4 inch plywood or fire retardant 2x4 or larger where additional support is required.
- F. Provide blocking in addition to any indications on the drawings as follows:
 - 1. Between joists at all points requiring support.
- G. Wood fire stopping: Equal or better than blocking material. Do not use sheet metal for firestopping.
- H. Provide firestopping as follows:
 - 1. As required by code.
- I. Provide fire retardant treated lumber where indicated, meeting the requirements for such plywood as given below. Provide fire retardant treated wood products as shown or required by code .
- J. Furring: Solid wood sized to match the condition.
- K. Strapping shall be 1" x 3.00" nom. solid wood stock, not less than 0.75 inch thick.
- L. Bridging shall be 1" x 3" or approved galvanized steel cross bridging at intervals not to exceed 8'-0". Do not nail bottoms of bridging until subflooring is installed.

2.2 PLYWOOD

- A. General: Provide only APA grade stamped softwood plywood meeting requirements of U.S. Dept. of Commerce PS-1 in thickness shown and in grades and strengths recommended by APA for specific locations and uses. Where indicated, provide preservative or fire retardant treatment.
- B. Exposure: Exposure 1 or better.
- C. Plywood backer panels:
 - 1. Material: APA C-D Plugged Exposure 1 with exterior glue
 - 2. Pressure treatment: Fire retardant.
 - 3. Coatings: Fire retardant paint, 6 sides, applied before installation.
 - 4. Coating color: As shown or directed, if not, black.
 - 5. Thickness: As indicated, if not, 0.75 inches.

2.3 ROUGH HARDWARE

- A. Furnish and install all bolts, nuts, expansion shields, lag screws, toggle bolts, wood screws, nails, flat cap metal nailing discs, staples, power driven anchors and other rough hardware as required.
- B. Rough hardware items shall be of appropriate type and proper capacity and size as required for each specific application.
- C. Concrete and masonry anchors: Where anchors are not included in concrete or masonry construction, anchors shall be galvanized machine screws or bolts with standard expansion-shield type concrete anchors, Phillips "Red Head" Masonry Anchors as manufactured by Weg-It Expansion Products, Inc., or approved equal, of sizes and types noted on Drawings or as required. Do not use expansion bolts or anchors where other type anchors are shown or noted on Drawings.

- D. Power-driven fasteners: "Drive-It" system of Powder Power Tool Corporation, "Ramset" system of Ramset Fasteners, Inc., or equivalent system of Remington-DuPont may be used where approved by construction manager and Architect. Use washers with all inserts.
 - E. Fasteners used at treated wood:
 - 1. Fasteners meeting manufacturers approval and requirements.
 - 2. Where manufacturer specific recommendations are not available: Use stainless steel.
- 2.4 FIRE & PRESERVATIVE TREATMENT OF LUMBER & PLYWOOD
- A. Wood treatment: Comply with requirements of Section 06 0800.
 - B. Extent for wood to be preservative treated: As shown and as follows:
 - 1. Treat above-ground wood exposed to deterioration by moisture
 - 2. Wood in contact with the ground or fresh water.
 - 3. Wood in contact with concrete or masonry
 - C. Extent for wood to be fire retardant treated: As shown and as follows.
 - 1. Exposed or semi-exposed wood in fire rated assemblies and in spaces having limited flame spreads for exposed combustibles.
 - 2. Blocking concealed in fire rated assemblies
 - 3. Where required by code.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 - especially requirements related to:
 - 1. Inspection and examination.
 - 2. Tolerances and measurement.
 - 3. Approvals, inspections and filed quality control.

3.2 MISCELLANEOUS CARPENTRY INSTALLATION - GENERAL REQUIREMENTS

- A. Construct work plumb, level, and true, with tight, close fitting joints, securely attached and braced to surrounding construction all in a first-class workmanlike manner. Counter-bore for bolt heads, nuts, and washers where required to avoid interference with other materials.
- B. Unless otherwise indicated, wood nailers, furring, strapping, etc., less than 2 in. nominal thickness shall be secured to back-up material by use of appropriate fasteners located 4 in. from ends and spaced not greater than 16 in. o.c. along lengths of members. Type and length of fastening devices shall develop sufficient anchorage to back-up material.
- C. Where nailing or power-driving into concrete or masonry, avoid puncturing conduits, pipes, ducts, etc. embedded in such work.
- D. Where anchorage to steel structural members is indicated, steel members will be prepared to receive anchor bolts, etc., as indicated, by structural steel trade.
- E. Apply two coats of same preservative used in original treatment to all sawed or cut surfaces of treated lumber, in accordance with AWPA M4.
- F. Power-driven fasteners used on concrete surfaces or at rough window and door openings shall be used in accordance with manufacturer's recommendations, especially in regard to edge distance, curbs or at rough window and door openings.
- G. Do not space fasteners more than recommended or approved distances apart spacing and comply with applicable building codes, APA guide lines and best practices of the trade.

3.3 INSTALLATION OF BLOCKING AND NAILERS

- A. Blocking: Locate blocking to facilitate installations of finish materials, fixtures and specialty items.
- B. Attach Blocking as follows:

WOOD BLOCKING

1. In metal stud partitions: Screw attach through stud flanges.
 2. At masonry: With oval head toggle bolts and washers or with epoxy tube and sleeve systems.
 3. At concrete: With expansion shield bolts.
 4. At steel: With flat head bolts/nuts or approved power actuated fasteners.
- C. Blocking shall be approved material capable of supporting items such as grab bars with a load of 250 lbs. for 5 minutes or more if so required by code. Provide fire retardant treated materials where indicated.
- D. Blocking members shall be of the sizes indicated on the drawings not less than 3/4" plywood or lumber 3-1/2" wide unless otherwise noted on the drawings. Blocking members shall be secured with minimum of 5/16" galvanized steel bolts of sufficient length to provide a minimum of 3" of embedment in concrete or as required when bolting into steel members and as shown.
- E. Bolts shall be located not over 2'-0" on centers and within 4" of end joints. End joints and intermediate joints shall be in alignment. Intermediate joints shall be spliced. Counterbore wood so that washer and nut, and end of bolt are recessed below the top surface of curbs and blocking. In no case shall there be less than two bolts per length in any member.
- F. Nailers for wood trim and finish shall be provided and secured to the masonry, concrete, wood framing or other receiving surfaces as the work progresses. Nailers shall be not less than 1" nominal thickness and of such other dimensions and profiles as are required or shown.
- G. Universal and barrier free design: Whether or not shown on the drawings, provide blocking for grab bars and other barrier free assemblies. Include the following:
1. Future grab bars for so-called group 1 and group 2 bathrooms:
 - a. Water closets: Blocking adjacent to and behind water closets installed from 32 to 38 inches above finish floor; and 6 inches beyond water closet each side or to corner.
 - b. Tubs: Blocking from 6 to 48 inches above tub rim, length and width of tub @ Group 1, to 60" above tub rim @ Group 2..
 - c. Showers: Blocking from 6 to 48 inches above finish floor, full width, length of stall @ Group 1, to 60" above floor @ Group 2.
 2. Indicated grab bars: As shown, if not, as above.
- 3.4 INSTALLATION OF FURRING AND STRAPPING
- A. Furring and strapping at masonry walls to receive drywall shall be 16" o.c. unless otherwise shown. All furring and strapping shall be double nailed, secured to masonry or concrete with masonry nails.
- B. All furring and strapping shall be shimmed and blocked to assure plumb and level furred wall surfaces.
- 3.5 INSTALLATION OF BACKER / UTILITY PANEL MOUNTS
- A. Provide and install fire retardant plywood backings for surface mounted electric panel boards, meter mounts, protection cabinets, motor control panels and the like. Boards shall be rigidly built and securely fastened to wood-furred strapping at walls in approved manner. See Electrical Drawings for locations of devices which require mounting on backerboards. Provide plywood backings for Telephone and Protection (Security) panels.
- 3.6 CLEAN UP & PROTECTION
- A. Clean up work areas daily, remove packaging, debris, sawdust and scraps, and dispose of properly.
- B. Repair or replace work of other trades damaged or soiled as a result of work of this Section.
- C. Protect substrates, underlayments, finishes and other work subject to damage until installation of work by the next trade.

END OF SECTION

SECTION 06 16 10 - WOOD SHEATHING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Wall sheathing.
 - 2. Roof sheathing.
 - 3. Sheathing joint and penetration treatment.
- C. Related Requirements:
 - 1. Section 06 08 00 - Wood preservative & fire-retardant treatments.
 - 2. Section 06 10 50 - Wood blocking.
 - 3. Section 06 12 00 - Wood subfloors.
 - 4. Section 06 16 20 - Gypsum sheathing.

1.2 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 and fire retardant.

1.3 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Stack panels flat with spacers beneath and between each bundle to provide air circulation. Protect sheathing from weather by covering with waterproof sheeting, securely anchored. Provide for air circulation around stacks and under coverings.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

- A. Fire-Test-Response Characteristics: At fire rated assemblies, provide materials and construction identical to tested assemblies, including:
 - 1. UL's "Fire Resistance Directory."
 - 2. GA-600, "Fire Resistance Design Manual."

2.2 WOOD PANEL PRODUCTS - GENERAL

- A. Comply with the following:
 - 1. Plywood: DOC PS 1.
 - 2. Treated plywood: Refer to Section 06 08 00.
 - 3. Oriented Strand Board: DOC PS 2. [Permitted only if shown on drawings.]
 - 4. Thickness: As needed to comply with requirements specified, but not less than thickness indicated.
 - 5. Factory mark panels to indicate compliance with applicable standard.

2.3 WALL SHEATHING

- A. Plywood Wall Sheathing: Exterior, Structural I. sheathing.
 - 1. Span Rating: Not less than 32/16. Nominal Thickness 16" stud spacing: As shown, if not, not less than 15/32 inch.
 - 3. Nominal Thickness 24" stud spacing: As shown, if not, not less than 19/32 inch

3. Size: As required by application. Install vertically unless otherwise indicated. .

2.4 ROOF SHEATHING

- A. Plywood Roof Sheathing: Exterior, Structural I.
 - 1. Span Rating: As shown, if not, Not less than 42/20.
 - 2. Nominal Thickness: Not less than 5/8 inch
- B. Sheathing below horizontal roofing insulation: Refer to Division 07.

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. For roof and wall] sheathing, provide fasteners with hot-dip zinc coating complying with ASTM A 153/A or Type 304 stainless steel].
- B. Nails, Bradss: ASTM F 1667.
- C. Power-Driven Fasteners: NES NER-272.
- D. Wood Screws: ASME B18.6.1.
- E. Screws for Fastening Wood Structural Panels to Cold-Formed Metal Framing: ASTM C 954, except with wafer heads and reamer wings, length as recommended by screw manufacturer for material being fastened.
 - 1. For wall and roof sheathing panels, provide screws with organic-polymer or other corrosion-protective coating having a salt-spray resistance of more than 800 hours according to ASTM B 117.
- F. 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 less than 0.0329 inch (0.835 mm) thick, use screws that comply with ASTM C 1002.
 - 2. 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.

2.6 MISCELLANEOUS MATERIALS

- A. Adhesives for Field Gluing Panels to Framing: Formulation complying with APA AFG-01 or ASTM D 3498] that is approved for use with type of construction panel indicated by manufacturers of both adhesives and panels.

PART 3 - EXECUTION

3.1 EXECUTION, GENERAL

- A. Comply with the provisions of Section 01 70 00 - especially requirements related to:
 - 1. Inspection and examination.
 - 2. Tolerances and measurement.
 - 3. Approvals, inspections and filed quality control.
 - 4. Layout.
 - 5. Adjusting.
 - 6. Cleaning.
 - 7. Protection.

3.2 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."
 3. Table R602.3(1), "Fastener Schedule for Structural Members," and Table R602.3(2), "Alternate Attachments," in ICC's "International Residential Code for One- and Two-Family Dwellings."
- D. Use common wire nails unless otherwise indicated. Select fasteners of size that will not fully penetrate members where opposite side will be exposed to view or will receive finish materials. Make tight connections. Install fasteners without splitting wood.
 - E. Coordinate wall and roof 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.
 - F. Do not bridge building expansion joints; cut and space edges of panels to match spacing of structural support elements.
 - G. 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.
- 3.3 AIR / INFILTRATION / WEATHER BARRIERS
- A. Coordinate with work of applicable sections.
- 3.4 WOOD STRUCTURAL PANEL INSTALLATION
- A. General: Comply with applicable recommendations in APA Form No. E30, "Engineered Wood Construction Guide," for types of structural-use panels and applications indicated.
 - B. Fastening Methods: Fasten panels as indicated below:
 1. Wall and Roof Sheathing:
 - a. Nail to wood framing.
 - b. Screw to cold-formed metal framing.
 - c. Space panels 1/8 inch (3 mm) apart at edges and ends.

END OF SECTION

SECTION 06 44 40 - ORNAMENTAL HISTORIC REPRODUCTION WOOD COLUMNS & PILASTERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: All of the Contract Documents, including the Drawings, the General and Supplementary Conditions and Division 1 General Requirements apply to the work of this Section.
- B. Section includes, without limitation, providing:
 - 1. Wood columns.
 - 2. Wood pilasters.
 - 3. Bases.
 - 4. Moldings.
 - 5. Historically accurate shapes.
 - 6. Preservative treatments.
 - 7. Shop priming.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used; include:
 - 1. Wood shafts.
 - 2. Capitals.
 - 3. Bases.
 - 4. Moldings.
 - 5. Preservative treatment.
 - 6. Shop primers.
 - 7. Adhesives.
 - 8. Fasteners and attachment clips.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction. Show natural and character of molding curves and whether or not they are formed with sections of circles or parabolas. Indicate deviations from classically derived architectural column orders and shapes.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Standards: Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards."
- C. Preservative Treatment: Non-pressure method, exterior type, AWPA N1
- D. Warranty:
 - 1. Columns and pilasters: Manufacturer 10 year warranty.
 - 2. Finishes: For finishes provided by manufacturer, provide 10 year warranty.

PART 2 - PRODUCTS

2.1 COLUMNS & PILASTERS

- A. Provide custom fabricated, architecturally correct, wood columns and pilasters as shown and complying with the following:
 - 1. Basis of design manufacturer HB&G Building Products, Inc.; <https://www.hbgcolumns.com/>.
 - 2. Material: Solid wood tongue and groove pieces laminated together in the factory; finger jointed material is acceptable as long as warranty remains 10 years and manufacturer approves application in writing.
 - 3. Column type: Load bearing.

4. Species for Opaque Finish: Cedar, Ponderosa pine, or mahogany.
5. Shape: Provide full length, one piece units unless otherwise approved by Architect.
6. Column:
 - a. Shape: Round.
 - b. Type: Classic, architecturally correct with entasis.
 - c. Shaft: As shown, if not, fluted, roman ionic style flutes.
 - d. Shaft diameter: As shown.
 - e. Stave thickness: As recommended by manufacturer for column size, height and loading.
 - f. Capital: As shown, if not, Roman Doric.
 - g. Base: Round Roman Doric on square aluminum base.
7. Pilaster:
 - a. Shape: "L" shaped corner style pilaster returns on both leg to meet trim.
 - b. Entasis: Not required unless shown.
 - c. Capital and base: Match column molding shapes but use with rectangular shape.
 - d. Size: As shown.
 - e. Stave thickness: As recommended by manufacturer for the application, and sufficiently stiff to be free of deflections and deformation under wind loads.
8. Grade: AWI Premium.
9. Preservative treatment: Required, with double application on end grain.
10. Finish: Two coats of shop applied prime paint, on six sides, aka all surfaces, outside, inside, top and bottom.

2.2 ACCESSORIES

- A. Provide accessories as required for a complete, secure installation. Include:
 1. Fasteners and anchors: Type 304 Stainless steel, size and type suitable for application.
 - a. Installation: Conceal or set and fill with epoxy base wood filler.
 - b. Adhesives: Polyurethane construction adhesive of type recommended by manufacturer for the application.
 - c. Weather resistance: Install fasteners to drain, not to pocket moisture.
 2. Flashing: Zinc coated copper flashing to cover exposed horizontal components and deflect water away from assembly.
 3. Asphalt roofers paint: Type recommended by manufacturer for coating inner 4 inches of inside of shaft.
 4. Prime paint: Type recommended by manufacturer to coat field cuts. Apply not less than 2 coats.
 5. Paintable sealant: Type recommended by manufacturer and complying with requirements of Division 07 for use to comply with installation instructions.
- B. Blocking: Provide pressure treated and flashed plywood blocking to allow assembly and installation of columns and pilasters. Flash installation as required, using zinc coated copper or dead-soft stainless steel per section 07 62 00.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Provide work to sizes, shapes, and profiles indicated. Install work to comply with quality standards referenced. Back prime work and install plumb, level, plane and straight with tight joints; scribe work to fit.
- B. Quality Standard: Install woodwork to comply with AWI Section 1700 for the same grade specified for type of woodwork involved.
- C. Install materials and systems in accordance with manufacturer's instructions for wood column/pilaster installation and approved submittals. Install materials and systems in proper relation with adjacent construction. Use stainless steel fasteners for exterior work. Blind "nail" or conceal fasteners. Coordinate with work of other sections. Ensure required vents are not blocked.
- D. Assemble work to allow for expansion and contraction with damage or permanent deformation.
- E. Comply with manufacturer's requirements for cutting, handling, fastening and working treated materials.
- F. Repair minor damage, clean and protect.

END OF SECTION

SECTION 06 46 10 - EXTERIOR WOOD TRIM & MOLDINGS

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing: Exterior finish wood trim and moldings not provide by other sections.
- C. Extent, without limitation, includes, AWI standards for:
 - 1. Trim and moldings shown on drawings.
- D. Related work:
 - 1. Section 06 65 19 Polymeric Fly Ash Composite Trim [Boral]
 - 2. Section 06 44 40 Ornamental Historic Reproduction Wood Columns & Pilasters.
 - 3. Section 08 52 02 Historic Reproduction Wood Replacement Windows.

1.2 SUBMITTALS

- A. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
 - 1. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
 - 2. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Standards: Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards." Provide grades indicated, if not, premium.
- C. Wood treatment: As shown; comply with Section 06 08 00 Wood preservative & fire retardant treatments.
- D. Wood Products: Comply with the following:
 - 1. Solid lumber: AWI Section 100, and per specified grade.
 - 2. Standing & running trim: AWI Section 300, per specified grade.
- E. Mock-Ups: Provide mock-up as required to demonstrate quality of workmanship of each type of trim required.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Components: Comply with AWI standards and grade specified.
 - 1. Lumber: Sound, kiln dried, meeting AWI standards and grade specified.
 - 2. Solid lumber stock: As shown. Casing, base, frames and the like:
- B. Trim & moldings for opaque finish:
 - 1. Moldings: Ponderosa pine or equal.
 - 2. Flat stock: Eastern white pine, ponderosa pine, or approved equal.
 - 3. Poplar: Not permitted for exterior.
 - 4. Exposed edges: Sanded and filled, or mitered..

5. Exposed edge grain: Not permitted.

C. Finishing:

1. Shop finish: Prime painted six sides.
2. Field coats: Immediately primed.
3. Site Finish: Field paint under Division 09.
4. Site Finish: Opaque finish.
5. Use of finger jointed stock: If approved.

D. Auxiliary Materials:

1. Screws: FS FF-S-111; screws are preferred and shall be finish head type.
2. Nails: FS FF-N-105.
3. Anchors: Type required for secure anchorage.
4. Adhesives: Low VOC types.
5. Material or coating: Use type 304 stainless steel fasteners or hot dipped galvanized coatings.

2.2 TYPES, MOLDINGS, SELECTIONS

A. Types of trim to be used include: As shown.

PART 3 EXECUTION

3.1 EXAMINATION

A. Examine and verify conditions per Section 01 70 00 and as follows:

1. Verify substrates and underlying work is within tolerances specified.
2. Verify structural, backing and support components are properly placed and adequate.
3. Before installation, examine rough-in and built-in construction for mechanical/electrical and other systems to verify required work is in place.
4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION

A. General:

1. Provide work to sizes, shapes, and profiles indicated. Install work to comply with quality standards referenced.
2. Install trim in proper relation with adjacent construction.
3. Coordinate with work of other sections.
4. Back prime work and secure plumb, level and straight with tight joints.
5. Scribe work to fit.

B. Quality Standard:

1. Install woodwork to comply with [AWI Section 17 0 00] [WI Manual of Millwork] for the same grade specified for type of woodwork involved.
2. Where not otherwise indicated, use Premium grade.

C. Mechanical fasteners:

1. Use non-corrosive fasteners.
2. Countersink heads at exposed and semi-exposed surfaces.

3.3 ADJUSTING & TOUCH-UP / COMPLETION

A. Sand out or fill and re-touch minor nicks, chips and scratches.

1. Replace damaged work which cannot be repaired acceptably.

B. Clean installed items of working marks and signs of workmanship and leave area broom clean. Protect work until acceptance.

END OF SECTION

SECTION 06 46 20 – EXTERIOR WOOD RAILINGS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section Includes:
 - 1. Wood railings.
 - 2. Shop priming railings.

1.2 SUBMITTALS

- A. Shop Drawings: Show location of each item, dimensioned plans and elevations, large-scale details, attachment devices, and other components.
 - 1. Show fasteners, accessories, adhesives, grain, edges, and the like.
- B. Samples for Initial Selection:
 - 1. Shop-applied opaque finishes.
- C. Qualification Data: For fabricator and installer.
- E. Woodwork Quality Standard Compliance Certificates: AWI Quality Certification Program certificates or approved equivalent.

1.3 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.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Do not deliver wood railings until painting and similar operations that could damage woodwork have been completed in installation areas. If wood stairs and railings must be stored in other than installation areas, store only in areas where environmental conditions comply with requirements specified in "Field Conditions" Article.

1.5 FIELD CONDITIONS

- A. Field Measurements: Where wood stairs and railings 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 woodwork by field measurements before being enclosed, and indicate measurements on Shop Drawings.

1.6 COORDINATION

- A. Coordinate sizes and locations of framing, blocking, furring, reinforcements, and other related units of Work specified in other Sections to ensure that wood stairs and railings can be supported and installed as indicated.

PART 2 - PRODUCTS

2.1 WOOD RAILINGS

- A. Quality Standard: Unless otherwise indicated, comply with the "Architectural Woodwork Standards" for grades of architectural woodwork indicated for construction, finishes, installation, and other requirements.
- B. Grade: Premium.
- C. Wood for Opaque Finish:
 - 1. Eastern white pine, sugar pine, or western white pine.

- D. Finishes for Stair Parts: As shown, if not, as follows:
 - 1. Balusters: Opaque.
 - 2. Handrails: Opaque.
 - 3. Scotia, Cove, and Other Moldings: Opaque.

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. Dressed 4 sides.
 - 2. Wood Moisture Content: 8 to 13 percent.
- B. Composite Wood Products: Not permitted.

2.3 MISCELLANEOUS MATERIALS

- A. Furring, Blocking, Shims, and Hanging Strips: kiln dried to less than 15 percent moisture content.

2.4 FABRICATION

- A. Fabricate wood railings to dimensions, profiles, and details indicated. Ease edges to radius indicated for the following:
 - 1. Corners of Solid-Wood (Lumber) Members: 1/16 inch (1.5 mm) unless otherwise indicated.
- B. Complete fabrication, including assembly, finishing, 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.

2.5 SHOP FINISHING

- A. Shop Priming: Shop apply the prime coat including backpriming. Comply with requirements of Division 09

PART 3 - EXECUTION

3.1 PREPARATION

- A. Before installation, condition wood stairs and railings to average prevailing humidity conditions in installation areas.
- B. Before installing wood railings, examine shop-fabricated work for completion and complete work as required, including removal of packing and backpriming.

3.2 INSTALLATION

- A. Railings:
 - 1. General: Install rails with no more than 1/8 inch in 96-inch (3 mm in 2400-mm) variation from a straight line.
 - 2. Stair Rails: Glue and dowel or pin balusters to treads and railings, and railings to newel posts.
 - 3. Wall Rails: Support rails on indicated metal brackets securely fastened to wall framing.
 - a. Space rail brackets: As shown, but not more than 32 o.c.
- B. Touch up finishing work specified in this Section after installation of wood stairs and railings. Fill nail holes with matching filler where exposed.
 - 1. Apply specified finish coats, including stains and paste fillers if any, to exposed surfaces where only sealer/prime coats are applied in shop.

3.3 ADJUSTING AND CLEANING

- A. Repair damaged and defective wood stairs and railings, where possible, to eliminate functional and visual defects; where not possible to repair, replace wood stairs and railings. Adjust joinery for uniform appearance.
- B. Clean wood stairs and railings on exposed and semiexposed surfaces. Touch up shop-applied finishes to restore damaged or soiled areas.

SECTION 06 49 19 - CUSTOM WOOD SHUTTERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Exterior custom wood shutters.
 - 2. Sizes to fit windows.
 - 3. Shop prime.
 - 4. Shop finish [topcoats]
 - 5. Accessories.

1.2 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. Include:
 - 1. Wood species.
 - 2. Paint product materials.
- B. Shop drawings: Provide:
 - 1. Elevations and sections. List each required size separately.
 - 2. Details of assembly.
 - 3. Make field measurements of each window size and type. Include field measurements on shop drawings.
- C. Samples:
 - 1. For Initial Selection: For each type of product involving selection of colors, profiles, or textures.
 - 2. For Verification: Finished shutter corner assembly, 40 square inches minimum; provide painted color samples on correct wood species.
- D. Warranties: Provide copy sample manufacturer's warranties.

1.3 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than three years of documented experience.
- B. Allowable Tolerances:
 - 1. Variation in component length: -0.00 / +1.00"
 - 2. Variation in component width: $\pm 1/16"$
 - 3. Variation in component thickness: $\pm 1/16"$
 - 4. Variation in component edge cut: $\pm 2?$
 - 5. Variation in Density -0% + 10%
- C. Workmanship, Finish, and Appearance:
 - 1. Wood surfaces that is homogeneous and free of voids, holes, cracks, and foreign inclusions and other defects. Edges must be square, and top and bottom surfaces shall be flat with no convex or concave deviation.
 - 2. Uniform surface free from cupping, warping, and twisting.

1.4 DELIVERY, STORAGE, AND HANDLING

- A. Protect materials from weather by covering with impermeable, breathable, heat-reflective sheeting, securely anchored. Stack materials level and flat on a full shipping pallet with spacers between each bundle. Provide for air circulation within and around stacks and under temporary coverings.
- B. Store formed or pre-fabricated pieces in the manufacturer's crates until ready for use. If necessary to remove from crates, store in crated position with duplicate supports as originally crated.

1.5 WARRANTY

- A. Warranty - General: Manufacturer's warranty, signed by manufacturer, Installer, and Contractor, in which manufacturer agrees to repair or replace trim that fails due to defects in manufacturing.

PART 2 - PRODUCTS

2.1 SHUTTER ASSEMBLIES

- A. Manufacturers:
 - 1. Shuttercraft, Inc.; www.shuttercraft.com/.
 - 2. Approved equal.
- B. Basis of design: As shown, if not, Shuttercraft "Exterior Fixed Louver Standard Duty x Red Cedar"

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. Material: Clear Western Red Cedar.
 - 2. Shutter thickness: 1.125 inch.
 - 3. Louvers: Open to permit air passage, 1.375 inch.
 - 4. Center rail: Yes.
 - 5. Horns: Cut horns flush, at proper angle to marry to window assembly.
 - 6. Profile: Flush stiles and rails.
 - 7. Height: As shown, and as required by windows sizes.
 - 8. Wood Moisture Content: 7 to 12 percent.
 - 9. Shop prime x 1 coat and shop finish x 2 coats; over prepared and sanded surfaces.
- B. Hardware: Manufacturers standard including New England hinge sets and New England spring latch sets.

2.3 INSTALLATION MATERIALS

- A. Nails and screws: Bronze, Aluminum, hot-dip galvanized or stainless steel.
 - 1. Provide self-drilling screws for metal-framing supports.
- B. Anchors: Select material, type, size, and finish required for each substrate for secure anchorage. Provide nonferrous-metal or hot-dip-galvanized anchors and inserts unless otherwise indicated. Provide toothed-steel or lead expansion sleeves for drilled-in-place anchors.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Quality Standard: Install wood shutters to comply with same grade as item to be installed, and as follows:
 - 1. Install wood shutters true and straight with no distortions. 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).
 - 2. Examine substrates, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance.
 - 3. Examine materials before installation. Reject materials that are damaged.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 ADJUSTING

- A. Replace exterior finish carpentry that is damaged or does not comply with requirements. Exterior 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.

3.3 CLEANING

- A. Clean exterior finish carpentry on exposed and semiexposed surfaces. Touch up factory-applied finishes to restore damaged or soiled areas.

END OF SECTION

SECTION 06 65 19 - POLYMERIC FLY ASH COMPOSITE TRIM

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section
- B. Section Includes, without limitation, providing fiber cement:
 - 1. Poly-ash exterior trim.
 - 2. Factory finishes.
- C. Related Sections:
 - 1. Division 06 - Wood blocking wood treatments.
 - 2. Section 07 46 49 – Polymeric fly ash composite siding.
 - 3. Division 07 - Flashing.
 - 4. Division 09 - Field finishes.

1.2 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Samples for Verification: For each type, color, texture, and pattern required.
 - 1. 12-inch long-by-actual-width Sample of siding, and siding components.
- C. Qualification Data: For qualified Installer.
- D. Warranty: Sample of special warranty.
- E. Test reports: From independent testing agencies.

1.3 DELIVERY STORAGE & HANDLING

- A. Comply with requirements of Division 01 and manufacturer recommendations, limitations and restrictions.

1.4 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace trim that fail(s) in materials or workmanship within specified warranty period.
 - 1. Warranty Period: 20 years from date of Substantial Completion.
 - 2. Items covered include: Decay due to rot, excess swelling from moisture, termite damage.

PART 2 - PRODUCTS

2.1 POLYMERIC FLY ASH COMPOSITE TRIM

- A. General: Autoclaved glass fiber-reinforced polymeric blended fly ash composite board, and noncombustible when tested according to ASTM E 136; and complying with properties specified below.
- B. Basis-of-Design Product: Subject to compliance with requirements, provide the following or approved equal: Manufacturer: Boral Composites, Inc.; www.boraltruexterior.com/.
 - 2. Product: Poly-Ash "Boral TruExterior Trim".
- C. Configuration: As shown, if not as follows:
 - 1. Material type: Nonstructural material.
 - 2. Provide sizes shown on drawings from among the following:

Nominal Size	Actual Size
1 x 4	3/4" x 3-1/2"
1 x 6	3/4" x 5-1/2"

1 x 8	3/4" x 7-1/4"
1 x 10	3/4" x 9-1/4"
1 x 12	3/4" x 11-1/4"
5/4 x 4	1" x 3-1/2"
5/4 x 6	1" x 5-1/2"
5/4 x 8	1" x 7-1/4"
5/4 x 10	1" x 9-1/4"
5/4 x 12	1" x 11-1/4"
5/8x6 Beadboard	5/8" x 5 1/4"

- D. Manufacturing Tolerances:
1. Width: Plus or minus 1/16 inch.
 2. Thickness: Plus or minus 1/16 inch.
 3. Length: Plus 2 inches, minus 0 inch.
 4. Edge Cut: Plus or minus 2 degrees.
- E. Performance, properties & testing:
1. Listings and Reports:
 - a. Cal Fire (WUI), CA SFM 12.7A-1: Listing No. 8140-2134:0103.
 - b. Product Evaluation Report: Pei Evaluation Service, Report PER-13069.
 2. Recycled Content:
 - a. Post-Industrial Recycled Content: Minimum 70 percent, by weight.
 - b. Post-Consumer Recycled Content: Minimum 2 percent, by weight.
 3. Properties:
 - a. Density, ASTM D 1622: 40 to 50 pcf.
 - b. Flexural Strength, ASTM D 6109: Greater than 1,600 psi.
 - c. Coefficient of Linear Expansion, ASTM D 6341: Less than 1.40 E-05 in/in/degree F.
 - d. Impact Resistance, ASTM D 1037: Greater than 50 inches.
 4. Performance:
 - a. Fungi Rot, AWPA E10:
 - 1) Brown Rot: Negligible loss.
 - 2) White Rot: Negligible loss.
 - b. Termite Resistance, AWPA E1: Greater than 9.0 (10 being best).
 - c. Water Absorption, ASTM D 570: Less than 1.5 percent.
 - d. Coefficient of Linear Expansion, ASTM D 6341, Typical: 1.40E-05 in/in/degree F, tested at minus 30 to 140 degrees F.
 - e. Surface Burning Characteristics, ASTM E 84:
 - 1) Flame Spread Index: Less than 30.
 - 2) Smoke Developed Index: Less than 450.
 5. Mechanical properties:
 - a. Flexural Strength, ASTM C 1185: Greater than 1,600 psi.
 - b. Nail Withdrawal, ASTM D 1761: Greater than 40 lbf/in.
- F. Fasteners:
1. Material: Stainless steel, type 304 unless otherwise recommended by manufacturer.
 2. Type, size: As recommended by manufacturer for substrate and structural materials.
 3. Color coated heads: Where exposed, required; match finish color.
 4. Type: Finish head stainless steel screws or ring shank nails with blunt or diamond point and head of size recommended by manufacturer. Use nails of sufficient length to penetrate wood studs 1 inch.
 - a. Unless otherwise approved or recommended, provide 8d x 2.5 inch long stainless steel ring shank nails.
 5. Spacing: Maximum of 24 inches on center and within 2 inches of end of boards.

- G. Finish: Provide finishes indicated, if not, as follows:
1. Primer: Factory applied latex acrylic primer of type recommended by manufacturer, low VOC formulation.
 2. Top coat: Field applied per Division 09.
 3. Texture: Provide smooth surface unless otherwise selected by Architect.
 4. Application: 5 sides of siding components; back seal – as recommended by manufacturer.

2.2 ACCESSORIES

- A. Trim Accessories, General: Provide items as recommended by siding manufacturer for building configuration.
1. Provide accessories made from same material as matching color and texture of adjacent siding unless otherwise indicated.
- B. Aluminum Accessories: Where aluminum accessories are indicated, provide accessories complying with AAMA 1402.
1. Texture: Smooth.
 2. Nominal Thickness: 0.024 inch or more.
 3. Finish: 3 coat PVDF coil coating, to match siding top coat color.
- C. Flashing: Provide aluminum flashing complying with Section 07 62 00 "Sheet Metal Flashing and Trim" at window and door heads and where indicated.
1. Finish for Aluminum Flashing: Siliconized polyester coating or 3 coat PVDF, same color as finished siding

2.3 AIR INFILTRATION BARRIER

- A. Provide air infiltration under its own section in Division 07.

2.4 BLOCKING

- A. Provide blocking under its own section in Division 06.

PART 3 - EXECUTION

3.1 INSTALLATION -- GENERAL

- A. Comply with manufacturer installation instructions and recommendations, except where more stringent requirements are specified. Use tools and cutting methods recommended, and as follows:
1. Install work plumb, level, true and straight with no distortions. Shim as required using concealed shims.
 2. Work shall be properly framed, closely fitted and accurately set to the required lines and levels and shall be rigidly secured in place. Layout work before installation.
 3. Stock: Provide as long lengths as practicable, and spliced only where necessary, and approved by Architect.
 4. Scribe and cut work to fit adjoining work, and refinish cut surfaces or repair damaged finish at cuts.
 5. Cutting: In general cuts shall be made with saws. Where cut edges are exposed to view or weather use diamond blades.
 6. Where face fastening in finished work is accepted or approved, set nails 1/16 inch with a nail set and screws as recommended, except where manufacturer specifically recommends an alternative method such as flush application which do not indent surfaces.
 7. Use colored fasteners to match where exposed.
 8. Fasten materials into studs depth recommended by manufacturer, but not less than 1 inch for nails and 0.75 inches for screws and into framing spaced no more than 24 inches on center.
 9. Touch up all field cut edges before installing.

3.2 INSTALLATION OF SIDING PANELS

- A. Lay butt joints only over stud or solid blocking. Do not use splice plates or other devices to install butt joints over spaces between studs or blocking.
- B. Reveal joints: Provide solid backing at least 8 times width of joint. Use either matching board panel or pre-finished aluminum. Unless otherwise indicated ensure joint is caulked under its section. Do not expose blocking materials such as plywood or treated wood.
- C. Install approved corrosion resistant nails or screws driven perpendicular to a snug fit. Do not overdrive nail heads or drive nails at an angle. If nail is countersunk, caulk nail hole with approved material, such as acrylic caulk, wood filler

or auto body filler. Pneumatic nail guns may be used if provided with flush mount attachment and pressure set from proper snug (not overdriven) fit. Use of staples is not permitted. Where pre-finished material is used, use pre-finished fasteners.

- D. Where fasteners are chipping, cracking or otherwise damaging trim surface, provide pre-drilled holes for fasteners. Unless specifically not recommended by manufacturer, stock greater than 5/16 inch thick shall be pre-drilled before fasteners are installed. Subject to review and approval by the Architect, repair minor dents and chips with approved patching compounds of type recommended by manufacturer. Cracked siding and siding not considered acceptable by the Architect shall be replaced with new acceptable work.
- E. Install joint sealants as specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

3.3 FABRICATED ASSEMBLIES & SHAPES

- A. Exterior decorative or finished work provided under this section, wherever practical, shall be cut to size and shape in the shop. Scrolls, shapes, and cutouts shall conform to detail and meet with the approval of the Architect before erection. Where not provided under this section, coordinate with work of other sections to ensure tight proper fit.

3.4 RAINSCREEN INSTALLATION

- A. Install trim as indicated above. Install rainscreen systems over indicated substrate such as galvanized furring or wood blocking provided under other sections.
- B. Ensure substrate, furring and the like is plumb, plane and true or that defects are corrected.
- C. Ensure air pathways are clear and enclosed by insect mesh. Ensure water which penetrates assemblies is weeped and flashed out to daylight. Provide over-lapped flashing and pan and side flashing to ensure water may not back up into wall assemblies.
- D. Install decorative trim, corners, reveals and the like where required or shown.
- E. Install joint sealants as at all panels joints and where specified in Section 07 92 00 "Joint Sealants" and to produce a weathertight installation.

3.5 ADJUSTING AND CLEANING

- A. Remove damaged, improperly installed, or otherwise defective materials and replace with new materials complying with specified requirements.
- B. Clean finished surfaces according to manufacturer's written instructions and maintain in a clean condition during construction.

3.6 FIELD APPLIED TOP COAT

- A. As part of the work of this section, ensure siding is top coated within 150 days of installation, by trades or subcontractors providing work of Division 09.

END OF SECTION

SECTION 07 21 30 - FOAM GAP INSULATION

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Foamed-in-place gap insulation.
 - 2. Sill sealers.
- C. Extent: Where shown and:
 - 1. Fill all gaps in building thermal envelope not addressed by the sections and including:
 - 2. Envelope joints, seams, and penetrations.
 - 3. Openings or gaps between door and window assemblies.
 - 4. Utility penetrations.
 - 5. Rim and band joist junctions.
 - 6. At penetrations and holes in thermal envelope.

1.2 REFERENCED CODES AND STANDARDS

- A. All references to codes, specifications and standards referred to herein shall become a part of this section as though written out, and shall mean, and is intended to be the latest edition, amendment, and/or revision of such reference unless otherwise specified.
 - ASTM - American Standards for Testing and Materials.
 - NRCA - National Roofing Contractors Association.

1.3 SUBMITTALS

- A. Submittals: Conform to requirements of Division 1 and submit:
- B. Manufacturer's Data Sheets: Provide data on product characteristics, performance criteria limitations and insulation values.

1.4 DELIVERY, STORAGE AND HANDLING

- A. Deliver materials to project site in manufacturer's original packaging. Clearly identify manufacturer, contents, brand name, applicable standard, and R-value.
- B. Store materials off ground. Protect against weather, condensation, and damage; immediately remove damaged material from site.

PART 2 - PRODUCTS

2.1 SPRAY FOAM GAP INSULATION

- A. Manufacturers:
 - 1. Basis of design: Todol Products, Pur Fill IG.
 - 2. Dow Chemical.
 - 3. Hilti.
 - 4. Approved equal.
- B. Material: Sprayed-in-place expanding urethane foam with the following characteristics:
 - 1. Materials: One-component, water-cure closed cell polyurethane containing no urea-formaldehyde and no CFCs ; maximum 100% expansion.
 - 2. Thermal Performance: Approximately R6 per inch.
 - 3. Burn Characteristics: ASTM E 84, flame spread less than 25, smoke development less than 210, fuel contribution 0.
 - 4. Water Absorption: Hydrophobic.
 - 5. Closed-Cell Formulation: 80% per ASTM D 2856.
 - 6. Expansion rate: As recommended by manufacturer for application:

2.2 FOUNDATION SILL SEALER

- A. Provide resilient foam sill sealer between bottom to sill plates and top of bearing surfaces. Sill sealers shall not be less than 0.50 inches less wide than sill plate.
- B. Acceptable air leakage prevention products include:
 - 1. WEATHERMATE™ SILL SEAL a flexible polyurethane foam gasket, by Dow Chemical.
 - 2. Reflectix Sill Sealer by Reflectix Inc, a ribbed polyethylene foam gasket.
 - 3. GreenGuard Sill Sealer by GreenGuard, a ribbed polyethylene foam gasket.

2.3 VAPOR RETARDERS

- A. Refer to Section 07 26 10 or applicable sections with integral vapor barriers.

PART 3 - EXECUTION

3.1 ACCEPTANCE OF SURFACES

- A. Starting work under the section shall be construed as accepting of all surfaces as being satisfactory, and any defects in this work resulting from the accepted surface shall be corrected by this applicator without additional cost to the Owner.

3.2 INSTALLATION, GENERAL

- A. Comply with insulation manufacturer's written instructions applicable to products and applications indicated.
- B. Spray-Applied Insulation: Do not apply insulation until installation of pipes, ducts, conduits, wiring, and electrical outlets in walls is completed and windows, electrical boxes, and other items not indicated to receive insulation are masked. After insulation is applied, make flush with face of studs or framing elements by using method recommended by insulation manufacturer.
- C. Miscellaneous Voids: Install insulation in miscellaneous voids and cavity spaces where required to prevent gaps in insulation.
- D. Install sill sealers continuously under sill stud plates.
- E. Install insulating sealants to complete installation and provide a continuous, seamless thermal barrier.

3.3 CLEAN-UP

- A. This installer shall remove all equipment, materials and debris from the work and storage areas and leave those areas in clean, undamaged and acceptable condition.

END OF SECTION

SECTION 07 25 10 – SHEET WEATHER BARRIERS

PART 1 - GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Building wrap.
 - 2. Flexible flashing.
 - 3. Seam tape.
- C. Related Requirements:
 - 1. Section 06 16 20 "Sheathing" for sheathing joint and penetration treatment.

1.2 ACTION SUBMITTALS

- A. Product Data: For each type of product.
 - 1. For building wrap, include data on air and water-vapor permeance based on testing according to referenced standards.

1.3 INFORMATIONAL SUBMITTALS

- A. Evaluation Reports: For water-resistive barrier and flexible flashing, from ICC-ES.

1.4 QUALITY ASSURANCE

- A. Qualifications:
 - 1. Installer shall have experience with installation of installed weather barrier assemblies under similar conditions.
 - 2. Installation shall be in accordance with weather barrier manufacturer's installation guidelines and recommendations.
 - 3. Source Limitations: Provide weather barrier and accessory materials produced by single manufacturer.
- B. Install in-place field sample for review and approval; not less than 100 square feet, complete with all elements required for final installation.
- C. Pre-installation conference: Hold meeting if requested by Architect with:
 - 1. Contractor, Architect, installer, Owner's Representative, and weather barrier manufacturer's designated representative.
- D. Delivery storage and handling: Comply with Division 01 and manufacturer recommendations.
- E. Warranty: Weather barrier manufacturer's warranty for weather barrier for a period of ten (10) years from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 WATER-RESISTIVE BARRIER

- A. Building Wrap: ASTM E 1677 (Specification for Air Retarder Material or System for Framed Building Walls), Type I air barrier; UV stabilized; and acceptable to authorities having jurisdiction and with the following performance:
 - 1. Air Penetration: 0.001 cfm/ft² at 75 Pa when tested in accordance with ASTM E2178. Type 1 when tested in accordance with ASTM E 1677. ≤0.04 cfm/ft @ 75 Pa when tested in accordance with ASTM E2357.
 - 2. Water Vapor Transmission: 28 perms, when tested in accordance with ASTM E 96, Method B.
 - 3. Water Penetration Resistance: 280 cm when tested in accordance with AATCC Test Method 127.
 - 4. Basis Weight: 2.7 oz/yd², when tested in accordance with TAPPI Test Method T-410.
 - 5. Air Infiltration Resistance: Air infiltration at >1500 seconds, when tested in accordance with TAPPI Test Method T-460.

6. Tensile Strength: 38/35 lbs/in., when tested in accordance with ASTM D 822 , Method A.
 7. Surface Burning Characteristics: Class A, when tested in accordance with ASTM E 84. Flame Spread: 10, Smoke Developed: 10.
 8. Allowable UV Exposure Time: Not less than three months.
- B. Basis of design: Subject to compliance with requirements, provide:
1. Spunbonded polyolefin, non-woven, non-perforated, weather barrier is based upon DuPont™ Tyvek® and related assembly components, of the following type:
 - a. CommercialWrap.

2.2 MISCELLANEOUS MATERIALS

- A. Flexible Flashing: Subject to compliance with requirements, provide the following DuPont products or comparable as recommended by the manufacture for the application:
1. FlexWrap™: Flexible membrane flashing materials for window openings and penetrations.
 2. FlexWrap™ NF: Flexible membrane flashing materials for window openings and penetrations.
 3. StraightFlash™: Straight flashing membrane materials for flashing windows and doors and sealing penetrations such as masonry ties, etc.
 4. StraightFlash™ VF: Dual-sided flashing membrane materials for brick mold and non-flanged windows and doors.
 5. Thru-Wall Surface Adhered Membrane with Integrated Drip Edge: Thru-Wall flashing membrane materials for flashing at changes in direction or elevation (shelf angles, foundations, etc.) and at transitions between different assembly materials.
 6. Preformed Inside and Outside Corners and End Dams as distributed by DuPont: Preformed three-dimensional shapes to complete the flashing system used in conjunction with DuPont™ Thru-Wall Flashing.
- B. Alternative Flexible flashing: Henry BlueskinVP 160 or approved equal. Use where shown, and as specified in section 07 27 30.
- C. Primer for Flexible Flashing: Product recommended by manufacturer of flexible flashing for substrate.
- D. Adhesives: adhesive recommended by weather barrier manufacturer.
- E. Building-Wrap Tape: Pressure-sensitive plastic tape recommended by building-wrap manufacturer for sealing joints and penetrations in building wrap. Acceptable seam tape products include:
1. 3" DuPont™ Tyvek® Tape.
 2. Approved equal.
- F. Nails and Staples: ASTM F 1667, and as recommended by manufacturer for application, which include, for Tyvek:
1. For Steel Frame Construction) DuPont™ Tyvek® Wrap Cap Screws,: 1-5/8 inch rust resistant screw with 2-inch diameter plastic cap fasteners.
 2. For Wood Frame Construction) DuPont™ Tyvek® Wrap Caps: [#4 nails with large 1-inch plastic cap fasteners] [1-inch minimum plastic cap staple with leg length sufficient to achieve a minimum penetration of 5/8-inch into the wood stud].
 3. For Masonry Construction) Masonry tap-con fasteners with DuPont™ Tyvek® Wrap Caps: 2-inch diameter plastic cap fasteners.

PART 3 - EXECUTION

3.1 WATER-RESISTIVE BARRIER INSTALLATION

- A. Cover exposed exterior surface of sheathing with water-resistive barrier securely fastened to framing immediately after sheathing is installed.
- B. Cover sheathing with water-resistive barrier as follows:
1. Cut back barrier 1/2 inch (13 mm) on each side of the break in supporting members at expansion- or control-joint locations.
 2. Apply barrier to cover vertical flashing with a minimum 4-inch (100-mm) overlap unless otherwise indicated.
- C. Building Wrap: Comply with manufacturer's written instructions.
1. Seal seams, edges, fasteners, and penetrations with tape.

2. Extend into jambs of openings and seal corners with tape.

3.2 FLEXIBLE FLASHING INSTALLATION

- A. Apply flexible flashing where indicated to comply with manufacturer's written instructions.
 1. Prime substrates as recommended by flashing manufacturer.
 2. Lap seams and junctures with other materials at least 4 inches (100 mm) except that at flashing flanges of other construction, laps need not exceed flange width.
 3. Lap flashing over water-resistive barrier at bottom and sides of openings.
 4. Lap water-resistive barrier over flashing at heads of openings.
 5. After flashing has been applied, roll surfaces with a hard rubber or metal roller to ensure that flashing is completely adhered to substrates.

END OF SECTION

SECTION 07 26 11 - UNDER SLAB VAPOR RETARDER

PART 1 - GENERAL

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
 - B. Section includes, without limitation, providing:
 - 1. Vapor retarders under slabs-on-grade.
 - C. Related Work: The following items are not included in this Section and are specified under the designated Sections:
 - 1. Section 03 30 00 - Cast-In-Place Concrete.
 - D. Alternates: Work of this section is affected by Alternates. Refer to Division 01.
- 1.2 SUBMITTALS
- A. Product Data: For each type of product indicated.
- 1.3 DELIVERY, STORAGE, AND HANDLING
- A. Protect materials from physical damage and from deterioration by 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 MANUFACTURERS
- A. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
 - 1. Grace Construction Products.
 - 2. Raven Industries Inc.
 - 3. Stego Industries, LLC.
- 2.2 VAPOR BARRIER
- A. Vapor Barrier shall have the following qualities:
 - 1. Permeance of less than 0.01 perms per ASTM F 1249 or ASTM E 96.
 - 2. ASTM E 1745 Class A.
 - 3. Thickness: 15 mils.
 - 4. Basis-of-Design: Stego Wrap Vapor Barrier by Stego Industries LLC.
 - B. Accessories:
 - 1. Seam Tape:
 - a. Permeance less than 0.3 perms per ASTM F 1249 or ASTM E 96.
 - b. Basis-of-Design: Stego Tape by Stego Industries LLC.
 - 2. Vapor Proofing Mastic:
 - a. Permeance less than 0.3 perms per ASTM F 1249 or ASTM E 96.
 - b. Basis-of-Design: Stego Mastic by Stego Industries LLC.
 - 3. Pipe Boots: Construct pipe boots from vapor barrier material, pressure sensitive tape and/or mastic per manufacturer's instructions.
 - 4. Termination Bar

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Installer present, for compliance with requirements of Sections in which substrates and related work are specified and for other conditions affecting performance.
 - 1. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

- A. Clean substrates of substances harmful to vapor retarders, including removing projections capable of puncturing vapor retarders.

3.3 INSTALLATION

- A. Install vapor retarder membrane in accordance with ASTM E1643 and manufacturer's instructions.
- B. Unroll vapor retarder membrane with longest dimension parallel to direction of slabs-on-grade concrete pour.
- C. Lap vapor retarder membrane over footings and seal to foundation walls in accordance with manufacturer's recommendations.
- D. Lap vapor retarder membrane joints a minimum of 6 inches and seal with seam tape.
- E. Seal vapor retarder membrane penetrations by applying penetration seal or by constructing boots from vapor retarder membrane and seam tape.
- F. Repair damaged areas by cutting patches of vapor retarder membrane, extending 6 inches, minimum, beyond damaged area. Seal patch perimeter with seam tape.

3.4 PROTECTION

- A. Protect installed vapor retarders from damage due to harmful weather exposures, physical abuse, and other causes.

END OF SECTION

SECTION 07 31 12 - ASPHALT SHINGLE RENOVATIONS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Asphalt shingles.
 - 2. Underlayments.
 - 3. Ridge vents.
 - 4. Accessories.
 - 5. Removal and disposal of asphalt shingles and other work interfering with new construction.
 - 6. Protection of roofing.
 - 7. Coordination with work of other trades.
- C. Related work without limitation includes:
 - 1. Division 06 – Carpentry.
 - 2. Section 06 01 47 Rough Carpentry Repairs & Framing: Roof sheathing and planking repairs.
 - 3. Section 07 71 33 Fabricated Wood Gutters & Metal Downspouts

1.2 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Initial Selection samples: Provide samples of color and material ranges.
 - 3. Maintenance Data: Provide recommended maintenance procedures.
 - 4. Certification: Certify submitted materials comply with requirements.
 - 5. Attic stock: Not less than 50 square feet or 3 bundles.
- B. Quality Assurance submittals:
 - 1. Mock-Up/Field Samples: Prior to installation, provide mock up of each type of system proposed for use for approval. Accepted mock-ups may be incorporated into the work unless otherwise noted.
 - 2. Product test reports.
 - 3. Research/evaluation reports.
 - 4. Warranties: Sample of special warranties.
 - 5. Maintenance data.

1.3 QUALITY ASSURANCE

- A. Fire-Resistance Characteristics: Where indicated, provide asphalt shingles and related roofing materials identical to those of assemblies tested for fire resistance per test method below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify products with appropriate markings of applicable testing agency.
 - 1. Exterior Fire-Test Exposure: Class ,A ASTM E 108 or UL 790, for application and roof slopes indicated.
- B. Preinstallation Conference: Required.

1.4 WARRANTY

- A. Special Warranty: Standard form in which manufacturer agrees to repair or replace asphalt shingles that fail in materials or workmanship within specified warranty period, starting at Substantial completion.
 - 1. 15-year 60 mph wind-resistance warranty. Where upgrades are available, advise Owner of cost in writing attached to bid or proposals.
 - 2. Material Warranty Period: **40** years, prorated, transferable, with first 30 years nonprorated.
 - 3. Algae-Discoloration Warranty Period: Asphalt shingles will not discolor 15 years from date of Substantial Completion.

1.5 EXTRA MATERIALS

- A. Provide 50 square feet minimum in wrapped bundles or 3 bundles, whichever is more.

1.6 MAINTENANCE CONTRACT

- A. As part of base bid, provide a 2 year maintenance contract as part of base bid, to include field work to check and to seal all tabs at end of first year after date of substantial completion.

1.7 GLASS-FIBER-REINFORCED ASPHALT SHINGLES

- A. Laminated-Strip Asphalt Shingles: Laminated, 3 tab, glass-fiber reinforced, mineral-granule surfaced, and self-sealing.
1. Subject to compliance with requirements, provide or comparable product by one of the following:
 - a. Owens Corning Corporation.
 - b. CertainTeed Corporation.
 - c. Elk Premium Building Products, Inc.; an ElkCorp company.
 - d. GAF Materials Corporation.
 2. Basis of design: GAF "Royal Sovereign" series.
- B. Components and characteristics:
1. Mineral-surfaced, self-sealing, laminated multi-ply overlay construction fiberglass based strip shingle
 2. Weight: Manufacturer standard for specified shingle in lbs. per square
 3. Standards: Meet and provide the following standards and performance:
 - a. UL Class A fire resistance – UL 790
 - b. UL Wind resistance – UL 997.
 - c. UL certified to meet ASTM D3462
 - d. UL certified to meet ASTM 3018 Type I
 - e. UL 2218 Class 2 impact resistance rating
 - f. ASTM D3161, Type 1 Class F, wind resistance
 - g. Conforms to CSA standard A123.5
 - h. UL External fire exposure label.
 - i. UL "Wind Resistant" label
 4. Strip Size: Manufacturer's standard, not less than 36 inches.
 5. Algae Resistance: Granules treated to resist algae discoloration.
 6. Color and Blends: As selected by Architect from manufacturer's full range.
- C. Hip and Ridge Shingles: Manufacturer's standard units to match asphalt shingles .
- D. Starter strip: Manufacturer standard.

1.8 UNDERLAYMENT MATERIALS

- A. Self-Adhering Sheet Underlayment, High Temperature: Minimum of 30- to 40-mil- (0.76- to 1.0-mm-) thick, slip-resisting, polyethylene-film-reinforced top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release paper backing; cold applied. Provide primer for adjoining concrete or masonry surfaces to receive underlayment.
1. Thermal Stability: Stable after testing at 240 deg F (116 deg C); ASTM D 1970.
 2. Low-Temperature Flexibility: Passes after testing at minus 20 deg F (29 deg C); ASTM D 1970.
 3. Note: Whether or not shown on drawings, cover entire roof areas, at slopes of 4 in 12 and less.
 4. Granular surface: Provide for slopes in excess of 6 in 12.
 5. Acceptable products include:
 - a. Grace Vycor; Grace Construction Products.
 - b. CCW WPI 200; Carlisle Coatings & Waterproofing.
 - c. Eaveguard Shingle Underlayment; The Henry Company
- C. Felt: If shown, provide ASTM D 226 or ASTM D 4869, Type I Type II, asphalt-saturated organic felts, nonperforated.
- D. Underlayment where SBS leak barrier / ice and water shield type is not required nor indicated:

1. Premium, water repellent, breather type non-asphaltic underlayment. UV stabilized polymer construction. Meets or exceeds ASTM D226 and D4869. Approved by Dade County, Florida Building Code, and ICC; GAF Available products include:
 - a. GAF Deck-Armor.
 - b. CertainTeed Diamond Deck.
 - c. Owens Corning ProArmo Synthetic Roof Underlayment.
 - d. Approved equal.

1.9 RIDGE VENTS

- A. Rigid Ridge Vent: If shown, Manufacturer's standard, rigid section high-density polypropylene or other UV-stabilized plastic ridge vent with nonwoven geotextile filter strips and external deflector baffles; for use under ridge shingles. Available products include:
 1. Cobra Ridge Vent II, by GAF Materials Corporation.
 2. ShingleVent II, by Air Vent Inc., a CertainTeed Company.
 3. Xtractor Vent X18, by Obdyke, Benjamin Incorporated.
 4. Trimline Ridge Vent, by Trimline Building Products.

1.10 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Roofing Nails: ASTM F 1667; aluminum, stainless-steel, copper, or hot-dip galvanized-steel wire shingle nails, minimum 0.120-inch- (3-mm-) diameter, barbed smooth shank, sharp-pointed, with a minimum 3/8-inch- (9.5-mm-) diameter flat head and of sufficient length to penetrate 3/4 inch (19 mm) into solid wood decking or extend at least 1/8 inch (3 mm) through OSB or plywood sheathing.
 1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.
- C. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch (25-mm) minimum diameter.

1.11 METAL FLASHING AND TRIM

- A. General: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
 1. Sheet metal: Pre-finished aluminum, 0.032 inch thick or heavier.
- B. Fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of the item.

PART 2 - EXECUTION

2.1 EXAMINATION

- A. Verify existing site conditions under provisions of Division 01 and the following:
 1. Roof penetrations and plumbing stacks are in place and flashed to deck surfaces.
 2. Deck surfaces are dry and free of ridges, warps or voids.

2.2 ROOF DECK PREPARATION

- A. Remove existing roofing materials and penetrations. Coordinate with work by others.
- B. Verify deck has been properly repaired. Refer to Section 06 01 47 Rough Carpentry Repairs & Framing.
- C. Follow shingle manufacturer's recommendations for acceptable roof deck material.
- D. Broom clean deck surfaces under eave protection and underlayment prior to their application.

2.3 UNDERLAYMENT INSTALLATION

- A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

- B. Single-Layer Felt Underlayment: Where felt is the indicated material as shown, on drawings, install on roof deck parallel with and starting at the eaves. Lap sides a minimum of over underlying course. Lap ends a minimum of . Stagger end laps between succeeding courses at least . Fasten with felt underlayment roofing nails.
 - a. Install felt underlayment on roof deck not covered by self-adhering sheet underlayment. Lap sides of felt over self-adhering sheet underlayment not less than 3 inches (75 mm) in direction to shed water. Lap ends of felt not less than 6 inches (150 mm) over self-adhering sheet underlayment.
 - b. Install fasteners at no more than 36 inch (900 mm)o.c.
- A. Self-Adhering Sheet Underlayment [SASU]: Install, wrinkle free, on roof deck. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below on Drawings, lapped in direction to shed water. Lap sides not less than 3-1/2 inches (89 mm). Lap ends not less than 6 inches (150 mm) staggered 24 inches (600 mm) between courses. Roll laps with roller. Cover underlayment within seven days. Install SASU as shown on drawings but in no case less than the following:
 - 1. 36 inch in each direction a dormers, cheek walls and valleys. As an example, at step flashing this requirement means 36 inches up vertical face and 36 inches along horizontal surface.
 - 2. Not less than 36 inches at roof edge, nor less than 24 inches beyond the inside face of exterior wall inner face of finish, regardless of the distance of the fascia from the roof edge.

2.4 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
 - 1. Install metal flashings according to recommendations in ARMA's "Residential Asphalt Roofing Manual" and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

2.5 ASPHALT SHINGLE INSTALLATION

- A. General: Install asphalt shingles according to manufacturer's written instructions, recommendations in ARMA's "Residential Asphalt Roofing Manual," and asphalt shingle recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."
- B. Install starter strip along lowest roof edge, consisting of an asphalt shingle strip with tabs removed at least 7 inches (175 mm) wide with self-sealing strip face up at roof edge.
 - 1. Extend asphalt shingles 3/4 inch (19 mm) over fasciae at eaves and rakes.
 - 2. Install starter strip along rake edge.
- C. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- D. Install first and remaining courses of asphalt shingles stair-stepping diagonally across roof deck with manufacturer's recommended offset pattern at succeeding courses, maintaining uniform exposure.
- E. Install asphalt shingles by single-strip column or racking method, maintaining uniform exposure. Install full-length first course followed by cut second course, repeating alternating pattern in succeeding courses.
- F. Fasten asphalt shingle strips with a minimum of six roofing nails located according to manufacturer's written instructions.
 - 1. Where roof slope exceeds 20:12, seal asphalt shingles with asphalt roofing cement spots after fastening with additional roofing nails.
 - 2. Where roof slope is less than 4:12, seal asphalt shingles with asphalt roofing cement spots, and apply over continuous self-adhering underlayment.
 - 3. When ambient temperature during installation is below 50 deg F (10 deg C), seal asphalt shingles with asphalt roofing cement spots.
- G. Closed-Cut Valleys: Extend asphalt shingle strips from one side of valley 12 inches (300 mm) beyond center of valley. Use one-piece shingle strips without joints in valley. Fasten with extra nail in upper end of shingle. Install asphalt shingle courses from other side of valley and cut back to a straight line 2 inches (50 mm) short of valley centerline. Trim upper concealed corners of cut-back shingle strips.
- H. Ridge Vents: Install continuous ridge vents over asphalt shingles according to manufacturer's written instructions. Fasten with roofing nails of sufficient length to penetrate sheathing.

- I. Ridge and Hip Cap Shingles: Maintain same exposure of cap shingles as roofing shingle exposure. Lap cap shingles at ridges to shed water away from direction of prevailing winds. Fasten with roofing nails of sufficient length to penetrate sheathing.
 1. Fasten ridge cap asphalt shingles to cover ridge vent without obstructing airflow.

END OF SECTION

SECTION 07 46 25 – HISTORIC REPRODUCTION WOOD CLAPBOARD SIDING

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 providing:
 - 1. Wood clapboard siding.
 - 2. Shop or field priming before installation.
 - 3. Accessories and fasteners
- B. Related Sections:
 - 1. Section 06 01 47 Rough Carpentry Repairs & Framing.
 - 2. Section 06 44 40 Ornamental Historic Reproduction Wood Columns & Pilasters.
 - 3. Section 06 46 10 Exterior Wood Trim & Molding.
 - 4. Section 06 65 19 Polymeric Fly Ash Composite Trim [Boral].
 - 5. Section 07 25 10 Sheet Weather Barriers.

1.3 DEFINITIONS

- A. Roofing Terminology: See ASTM D 1079 and glossary in NRCA's "The NRCA Roofing and Waterproofing Manual" for definitions of terms related to roofing work in this Section.

1.4 SUBMITTALS

- A. Comply with general requirement and submit:
 - 1. Product Data: For each type of product indicated and installation instructions for each material and product used.
 - 2. Samples: For the following products, of sizes indicated:
 - a. Wood siding: Full size.
 - b. Fasteners.
 - c. Flashing.
 - 3. Qualification Data: Installer experience and representative projects.
 - 4. Warranties: Sample of special warranties.
 - 5. Maintenance Data: For wood siding to include in maintenance manuals.

1.5 MAINTENANCE MATERIALS

- A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
 - 1. Wood Shingles: 100 sq. ft. (9.3 sq. m) of each type, in unbroken bundles

1.6 QUALITY ASSURANCE

- A. Grading Agency Qualifications: An independent testing and inspecting agency recognized by authorities having jurisdiction as qualified to label wood siding for compliance with referenced grading rules.
- B. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- C. Mock-Ups: Provide mock-up as required to demonstrate quality of workmanship.
- D. Special Warranty: Warranty to repair or replace wood shingles that fail in materials within specified warranty period. Material failures include manufacturing defects that result in leaks.

1. Materials-Only Warranty Period:
 - a. 10 years for siding units, from date of Substantial Completion.
 - b. Wind speed: Not less than 100 mph shall be covered in warranty

PART 2 - PRODUCTS

2.1 HORIZONTAL WOOD CLAPBOARD SIDING

- A. Provide products meeting the following criteria:
 1. Species: As specified below.
 2. Condition: Sound wood, free of decay, insects, damage, warpage, wanes, knots, sap, and the like.
- B. Wood siding finish:
 1. Oil-based or if approved, water-based primer, stain blocking, shop or field applied.
 2. Color: Compatible with selected finish color.
- C. Wood clapboard siding: Smooth-sawn eastern white clapboards.
 1. Grading Standards: As established by recognized fabricator/suppliers specified here.
 2. Acceptable supplier / fabricators:
 - a. Ward Clapboard Mill; www.wardclapboardmill.com/.
 - b. Approved equal.
 3. Material:
 - a. Spruce; botanical name: *Picea rubens*
 - b. Cut: Quarter sawn, vertical [edge] grain.
 - c. Grade: Extra clear, free of imperfections and knots.
 - d. Size: Nominal 6 inch. [Not 5.5 nor 6.5 inch]
 4. Type and condition:
 - a. Kiln dried.
 - b. Dressing: Sanded S4S, no saw marks.
 5. Special shapes: As shown, if not, bevel.
 6. Exposure: As shown, if not: 4 inch.
 7. Lap: 1 inch minimum.

2.2 WOOD TRIM

- A. Provided under other sections. See drawings and Division 06.
 1. Where shapes or moldings are shown, match profiles indicated.

2.3 UNDERLAYMENT MATERIALS

- A. Section 07 25 10 Sheet Weather Barriers.

2.4 ACCESSORIES

- A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.
- B. Drainage "Venting" Mat: Manufacturer's standard, compression-resisting, three-dimensional, nonwoven, entangled filament, nylon mat designed to permit air movement and drain incidental moisture by gravity.
 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. Obdyke, Benjamin Incorporated.
- C. Nails:
 1. Acceptable manufacturer: Tremont Nail Co. a division of Acorn Manufacturing Co.; www.TremontNail.com/.
 2. Type: Blunt point, square cut nail with formed head.
 3. Pneumatically driven nails: Not permitted.
 4. Finish: Hot dipped galvanized.
 5. Size: 5d [1.75 inch long] or 6d [2 inch long] as required to penetrate into studs 1.5 inches. Obtain written approval specifically from Architect for size.

6. Installation: Face nailing. Verify extent of set with Architect.
 7. Spacing: In each stud and in regular pattern to ensure visual uniform appearance.
- D. Staples: Not permitted.
- E. Wood Lath Strip: Western red cedar, clear heartwood, a minimum of 1-1/2 inches (38 mm) wide.
- F. Primer paint:
1. Comply with requirements of Section 09 91 13 Exterior Painting.
 2. Preparations for Finishing: Comply with the Architectural Woodwork Standards for sanding, filling countersunk fasteners, sealing concealed surfaces, and similar preparations for finishing exterior architectural woodwork, as applicable to each unit of work.
 3. Provide one coat on 6 sides with an additional coat on end grain.
- 2.5 METAL FLASHING AND TRIM
- A. General: Comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
1. Sheet Metal: As shown, if not, Zinc-tin alloy-coated copper.
- B. Fabricate sheet metal flashing and trim to comply with recommendations that apply to design, dimensions, metal, and other characteristics of the item in SMACNA's "Architectural Sheet Metal Manual."
1. Apron Flashings: As shown, but at least complying with the the following:
 - a. Fabricate with lower flange extending a minimum of :
 - 1) 6 inches up the vertical surface.
 2. Step Flashings: Fabricate with a head lap of 3 inches (75 mm) and a minimum extension of 4 inches both horizontally and vertically.

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. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provision has been made for flashings and penetrations through wood siding.

3.2 PREPARATION

- A. Prime clapboards six sides in field or shop before installation. Comply with requirements of Section 09 91 13 Exterior Painting.

3.3 UNDERLAYMENT INSTALLATION

- A. Section 07 25 10 Sheet Weather Barriers. Verify condition is acceptable and free of conditions adversely affecting siding installation.

3.4 FIXTURE ATTACHMENT BLOCKS

- A. Install finished trimmed blocks for attaching components to exterior such as light fixtures and the like. Flash in place. Use primed material.

3.5 METAL FLASHING INSTALLATION

- A. General: Install metal flashings and other sheet metal to comply with requirements in Section 07 62 00 "Sheet Metal Flashing and Trim."
1. Install metal flashings according to recommendations for wood roofing in NRCA's "The NRCA Roofing and Waterproofing Manual."
 2. Apron Flashings: Extend lower flange over and beyond each side of downslope wood roofing and up the vertical surface.

3. Step Flashings: Install with a head lap of 3 inches (75 mm) and extend both horizontally and vertically. Install with lower edge of flashing just upslope of, and concealed by, butt of overlying shingle or shake. Fasten to roof deck only.

3.6 HORIZONTAL WOOD CLAPBOARD INSTALLATION

- A. Install wood wall siding according to manufacturer's written instructions and recommendations in CSSB's "Exterior and Interior Wall Manual."
- B. Use only shop or field primed materials, coated 6 sides. Prime field cuts with 2 coats of primer.
- C. Install first course of wood over starter course spaced 1/8 inch above flashing. Offset joints between ends in succeeding courses a minimum of 1-1/2 inches (38 mm).
 1. Install siding in continuous straight-line courses.
 2. Offset butt joints of a minimum of 6 inches.
 3. Extend starter course as shown, if not, 1-1/2 inches below top of foundation wall.
 4. Install primed siding with sides abutting. Space clapboards butt joints apart as recommended by manufacturer depending upon season, water content of clapboards and other application conditions. Use a standard spacer such as narrow part of a nail.
 5. Fasten each board with at least two exposed nails driven parallel to butt, spaced 3/4 to 1 inch (19 to 25 mm) from edge and 1 inch (25 mm) above butt line of succeeding course.
 6. Drive fasteners flush with top surface of siding without crushing wood.
 7. Maintain weather exposure shown for entire clapboard length.
 8. Interior Corner Treatment: As shown, if not, one of the following approved by Architect.
 - a. Butted against wood stop:
 - b. Laced with flashing behind.
 9. Exterior Corner Treatment: As shown, if not, one of the following approved by Architect.
 - a. Butted against corner boards
 - b. Laced
 - c. Mitered.
- D. Use traditional methods to install clapboards, including:
 1. Use a story pole to ensure consistent lap and exposure.
 2. Apply sealant along the corner boards. Bed clapboard ends into it, leaving 1/16 inch space along the corner board.
 3. An inch above siding's butt edge, drive in one nail into each stud; ensure nails clear lower course. Replace units that are nailed too low, with new work.
 4. Replace cracked or damaged work as installation proceeds.
 5. Apply a bead of sealant along vertical juncture where wall meets corner boards or trim.
 6. Push the ends of the second course into the sealant. Align the butt edge with the story-pole marks on the corner boards.
 7. Stagger joints up wall.
 8. Notch top of clapboard to fit beneath window or other work.
 9. Flash and seal work to permit trapped moisture to leach or leak out.
 10. Ensure sizing and spacing of fasteners, gaps, and exposure is regular, uniform and consistent.

END OF SECTION

SECTION 07 62 00 - SHEET METAL FLASHING & TRIM

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Sheet metal flashing and trim.
 - 2. Standards and requirements for flashing furnished and installed by others.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 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.
- B. Source Limitations: Obtain materials of a uniform quality, including color for exposed work, from single manufacturer for each component.
 - 1. Standards: Comply with applicable requirements, recommendations and details of *SMACNA Architectural Sheet Metal Manual*.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. In general, provide manufactured products, where not practical, shop fabricate work. Acceptable manufactures include:
 - 1. Beach Sheet Metal Co., Inc.; Berger Building Products, Inc.; Englert, Inc.; Fiberweb Clark/Hammerbeam Corp.; Hohmann & Barnard, Inc.; National Sheet Metal Systems, Inc.; Nervastral Inc.; Petersen Aluminum Corp.; Quickflash Weatherproofing Products, Inc.; Sandell Construction Solutions; SBC Industries Flashings; or approved equal.

2.2 APPLICATIONS

- A. Applications are as shown.

2.3 MATERIALS

- A. Provide materials shown, but complying with the following minimum gages, composition and types:
 - 1. Metal: Sheet aluminum.
 - a. Standard: ASTM B 209, alloy 3003,
 - b. Thickness As shown, if not, 20 gauge (.0359 inch).
 - c. Exposed Finish [visible]: Prefinished 2-coat 70 percent fluoropolymer
 - d. Concealed Finish: Clear anodized or prefinished 2-coat 70 percent fluoropolymer.
 - 2. Peel and stick flexible Sheet Membrane Flashing: Composite self-adhering flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film with release liner.
 - a. Products: Subject to compliance with requirements, products include:

- 1). GCP Applied Technologies [aka WR Grace] Vycor Plus
 - 2). Tremco Exo Air 110/110LT.
 - 3). Carlisle SynTec CCW-705 TWF.
 - 4). Hohmann & Barnard, Inc.; Textroflash.
 - 5). Fortifiber Building Systems Group.
 - 6). Approved equal.
2. Rubberized-Asphalt Flashing: Composite self-adhering flashing product consisting of a pliable, adhesive rubberized-asphalt compound, bonded to a high-density, cross-laminated polyethylene film with release liner.
- a. Minimum thickness: 0.040 inch.
 - b. Products: Subject to compliance with requirements, products include:
 - 1) GCP Applied Technologies [aka WR Grace] Vycor Plus
 - 2) Tremco Exo Air 110/110LT.
 - 3) Carlisle SynTec CCW-705 TWF.
 - 4) Hohmann & Barnard, Inc.; Textroflash.
 - 5) Approved equal.
3. Laminated Composition Sheet Flashing: 5 ounce copper sheet laminated between 2 layers of bituminous impregnated Kraft paper or saturated fabric. Furnish and install under Section 04 01 05.
- C. Zinc-Coated Copper Flashing: Provide 16 oz. per sq. ft., cold-rolled, copper sheet conforming to ASTM B 370, H00 temper, coated with zinc at rate of 7-1/2 lb. per side per 100 sq. ft., conforming to ASTM B 101, type 1, class A.
- D. "Metallic" flashing: Where drawings refer to "metallic" flashing, use dead soft, untempered stainless steel, as follows:
1. Acceptable product/ supplier: [for through wall applications] Mastercraft Metals Interlocking Mechanically-keyed Through-Wall Flashing; www.mastercraftmetals.net/.
 2. Material: Stainless Steel, per ASTM A 167, type 302/304, 2D finish [aka, dull rough finish, with lead-like appearance].
 3. Temper: Fully annealed or dead soft temper.
 4. Through wall applications configurations:
 - a. Mechanically-keyed with ribs formed at 3" intervals in a
 - b. Sawtooth, interlocked pattern to provide positive bond to mortar and allow drainage of moisture to exterior.

2.4 MISCELLANEOUS MATERIALS

- A. Components include:
1. Fasteners: Match material being fastened for both type of material and finish.
 2. Isolation Coating: SSPC paint 12.
 3. Slip Sheet: 5 lb. rosin building paper.
 4. Plastic Underlayment: 6 mil carbonated polyethylene film, FS L-P-512.
 5. Reglets: Metal units of type and profile indicated or required which are compatible with flashings used.
 6. Solder: ASTM B 32, as required.
 7. Accessories: Provide all clips, cleats, straps, anchors and similar items necessary to properly complete the work. Provide accessories that are compatible with sheet metal materials used and which are of sufficient size and gage to perform as intended.
 8. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane or silicone polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.
 9. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied for hooked-type expansion joints with limited movement.
 10. Bituminous Coating: Cold-applied asphalt emulsion according to ASTM D 1187.
 11. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.5 FABRICATION

- A. Shop fabricate work to the greatest extent possible. Fabricate work to be truly straight, plumb, level and square, and to provide the best possible watertight, weatherproof performance with expansion provisions in running work.
- B. Provide work to sizes, shapes, and profiles indicated on approved shop drawings. Comply with referenced standards. Minimize oil-canning, buckling, tool marks and other defects.

- C. Make work with uniform, watertight joints. Make seams as inconspicuous as possible.
- D. Isolate dissimilar materials with isolation coating or other permanent separation acceptable to the Architect.
- E. Scuppers: Make work to detail shown, if not, comply with CDA or SMACNA reference manuals for applications indicated.

PART 3 EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Section 01 70 00 - especially requirements related to:
 - 1. Inspection and examination. Tolerances and measurement.
 - 2. Approvals, inspections and filed quality control.
 - 3. Layout. Adjusting.
 - 4. Cleaning. Protection.

3.2 EXAMINATION

- A. Examine and verify conditions per Section 01 70 00 and as follows:
 - 1. Verify substrates and underlying work is within tolerances specified.
 - 2. Verify structural components are properly placed.
 - 3. Before installation, examine rough-in and built-in construction for mechanical/electrical and other systems to verify actual locations of connections.
 - 4. Proceed with installation only after unsatisfactory conditions have been corrected.

3.3 TOLERANCES

- A. For exposed work, the following allowable installed tolerances are allowable variations from locations and dimensions indicated by the Contract Document and shall not be added to allowable tolerances indicated for other work.
 - 1. Allowable Variation from True Plumb, Level, and Line: +/- 1/8" in 20'-0"
 - 2. Allowable Variation from True Plane of Adjacent Surfaces: +/- 1/16"
- B. Other Installation Tolerances: Shim and align sheet metal flashing and trim within installed tolerances specified in MCA's "Guide Specification for Residential Metal Roofing."

3.4 INSTALLATION

- A. Install flashing in continuous uninterrupted manner to accomplish 'intent' complete with all transitions, laps, splices, folds, seams necessary to ensure the diversion of water to the exterior. Work in close coordination with installation of exterior masonry, roofing, window, joint sealer, louver, and the like.
 - 1. Apply materials within manufacturer's requirements for temperature and weather conditions.
 - 2. Do not apply to wet or frozen substrates.
 - 3. Do not allow contamination with dust or dirt.
 - 4. Seal completely at edges, perimeter and penetrations.
- B. Strictly comply with manufacturer's instructions and recommendations and standard details and recommendations of SMACNA, except where more restrictive requirements are specified in this section. Locked and sealant locked joints as indicated on the Drawings.
- C. Securely anchor work, but allow for thermal movement and building movement. Use concealed fasteners to the greatest extent possible. Install work to be permanently weatherproof and watertight. Provide continuous cleats at all edge conditions.
- D. Provide reglets where indicated and where required. Coordinate installation with related and adjacent work.
- E. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at maximum of 10 feet with no joints within 24 inches of corner or intersection.
 - 1. Form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with sealant concealed within joints.
 - 2. Use lapped expansion joints only where indicated on Drawings.

- F. Fasteners: Use fastener sizes that penetrate wood or sheathing substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws and for other substrates not less than recommended by fastener manufacturer to achieve maximum pull-out resistance.
 - G. Through-wall flashing at masonry walls:
 - 1. Overlap adjacent pieces of flashing minimum 2" and roll all overlaps with steel hand roller.
 - 2. Trim bottom edge of flashing minimum of 1/2" back from exposed face of the building.
 - 3. Rivet or staple vertical and horizontal joints.
 - 4. At sheet metal seams, full solder non-moving joints.
 - 5. Apply a bead of sealant along top edge of flashing membrane and along seams and cuts as necessary and as recommended by manufacturer.
 - F. Provide flashing at every obstruction to the downward flow of water. Design and install flashing to control and divert water to the exterior. Form at least 4" high end pans above lintels and similar conditions to extend the entire length of the lintel where possible. Flashing shall extend 4" minimum beyond end of lintel before it is panned (dammed).
- 3.5 FIELD QUALITY CONTROL
- A. Owner Testing and Inspecting: Owner may engage special inspectors to perform tests and inspections and prepare reports. Allow inspectors access to scaffolding and work areas, as
 - B. Installer Testing and Inspecting:
 - 1. Flood test large areas of sheet metal work to test reliability of soldered seams and substrates.

END OF SECTION

SECTION 07 71 24 - FABRICATED GUTTERS & DOWNSPOUTS

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general Contract provisions, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation providing:
 - 1. Wood gutters
 - 2. Metal downspouts.
 - 3. Accessories.
 - 4. Splash blocks.
- C. Extent: This section recommends shop fabrication but permits field fabrication.
- D. Related Work includes, without limitation:
 - 1. Section 07 62 00 Flashing & Sheet Metal: Metal material types and standards

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 PRODUCTS

2.1 GALVANIZED STEEL DOWNSPOUTS

- A. Provide materials shown and complying with the following:
 - 1. Material: Metallic-Coated Steel Sheet: Zinc-coated (galvanized) steel sheet complying with ASTM A 653/A 653M, G90 (Z275) coating designation, or aluminum-zinc alloy-coated steel sheet complying with ASTM A 792/A 792M, Class AZ50 (Class AZM150) coating designation; structural quality
 - 2. Size: As shown, corrugated round, but 3 inch minimum dimension.
 - 3. Hangers: Spaced as shown, but not more than 60 inches on center, plus top and bottom. Use strap with nail like pintle installation. Equal to:
 - a. Rafferty Aluminum [www.raffertyaluminum.com/] HS3G model.

2.2 WOOD GUTTERS

- A. Provide materials shown and complying with the following:
 - 1. Available suppliers:
 - a. Sterritt Lumber.
 - b. JPMortuary
 - 2. Material: Provide one of the following:
 - a. Douglas Fir.
 - b. Western Red Cedar.
 - c. Spanish Cedar.
 - d. Grade: Clear; free of knots, cracks, waness, chips or checks.
 - 3. Sizes: As shown; calculated gutter size even if size is shown on drawings and confirm dimensions with Architect

- before ordering. Provide sizes including:
- a. 3x4, 4x5, or 4x6 inches.
 - b. Lengths: One piece along lengths up to 40 feet.
4. Provide shapes indicated. If not, and aluminum gutters are used provide:
 - a. Type "ogee" crown mold shape, approved by architect.
 5. Hangers: Not required.
 6. Spacers:
 - a. Primed and painted cedar spacers at 32 inches on center maximum to allow 0.50 inch breathing space between back of gutter and face of fascia.
 - b. Attach gutters with stainless steel screws or timber framing star headed fasteners equivalent to 20p nails for 4x6 gutter.
 - c. Predrill fasteners holes.
 7. Miter joints: Let in dead soft temper stainless steel to make transition smooth, even and flush. See Section 07 62 00. Use stainless steel fasteners or copper; Do not use copper at cedar.
 8. Pitch: Install gutters bowed with high point in middle and pitched to either end. Do not exceed 0.75 inch pitch.
 9. Treatment: Preservative treat wood gutters before or after installation with saturating coat of preservative or mineral spirits thinned boiled linseed oil, 1 part linseed x 2 parts thinner; using not less than 2 applications. Consider use of motor oil in lieu of linseed oil. Do not use linseed oil unthinned. Do not paint gutter interior.
 10. Downspout leader: Preformed stainless steel or lead piece, let into gutter

2.3 FABRICATION

- A. Shop fabricate work to the greatest extent possible. Fabricate work to be truly straight, plumb, level and square, and to provide the best possible watertight, weatherproof performance with expansion provisions in running work.
- B. Provide work to sizes, shapes, and profiles indicated on approved shop drawings. Comply with referenced standards. Minimize oil-canning, buckling, tool marks and other defects.
- C. Make work with uniform, watertight joints. Make seams as inconspicuous as possible.
- D. 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.
- E. Isolate dissimilar materials with isolation coating or other permanent separation acceptable to the Architect.
- F. Gutters: Fabricate to cross section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 480 in. long sections. Fabricate expansion joints, and gutter accessories.
- G. Downspouts: Fabricate to cross section indicated, complete with mitered, welded elbows. Furnish with metal hangers and anchors, from same material as downspouts. Downspouts shall be one continuous unit without joints.
- H. Form expansion joints of intermeshing hooked flanges, not less than 1 inch (25 mm) deep, filled with butyl sealant concealed within joints.
- I. 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.

2.4 SPLASH BLOCKS

- A. Provide Portland cement or fiberglass splash blocks at all downspouts, unless otherwise shown.

2.5 ACCESSORIES

- A. Provide connecting boots where downspouts do not terminate over splash block, catch basin or gravel drainage bed. Coordinate boot type, material and connections with site work components.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Install work in continuous uninterrupted manner to accomplish 'intent' complete with all transitions, laps, splices, folds, seams necessary to ensure the diversion of water to the exterior to downspouts and away from building. Work in close coordination with installation of exterior fascias, roofing, and siding assemblies.
 - 1. Isolate dissimilar metals to prevent galvanic corrosion.
 - 2. Apply materials within manufacturer's requirements for temperature and weather conditions.
 - 3. Do not apply to wet or frozen substrates.
 - 4. Do not allow contamination with dust or dirt.
 - 5. Seal completely at edges, perimeter and penetrations.
- A. Where gutters are joints required, do no permit joints to fall above stairs, windows or doors.
- B. Comply with instructions and recommendations and standard details of SMACNA, except where more restrictive requirements are specified in this section.
- C. Securely anchor work, but allow for thermal movement and building movement. Use concealed fasteners to the greatest extent possible. Install work to be permanently weatherproof and watertight..

END OF SECTION

SECTION 07 92 00 - JOINT SEALANTS

PART 1 GENERAL

1.1 SUMMARY

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation providing:
 - 1. Joint sealers.
 - 2. Joint fillers.
 - 3. Confirmation of adhesion.
- C. Extent:
 - 1. Where shown.
 - 2. Exterior surfaces of basement foundation walls exposed during construction and to be backfilled.
 - 3. Exterior steel embedded in concrete.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
 - 1. Include manufacturer's full range of color and finish options if additional selection is required.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Field-Constructed Mock-Ups: Each joint type.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Exterior Joints in Vertical Surfaces, Silicone:
 - 1. Manufacturers: Dow Corning; GE Silicones; Tremco; or approved equal.
 - 2. Materials: Two component silicone sealant.
- B. Exterior Joints in Vertical Surfaces, Urethane:
 - 1. Manufacturers: Pecora Corp.; Sika Corp.; Sonneborn; Tremco; or approved equal.
 - 2. Materials: Two-component urethane sealant.
- C. Exterior Joints in Vertical Surfaces, Preformed Compression Seals:
 - 1. Manufacturers: Watson-Bowman Acme Corp.; or approved equal.
 - 2. Materials: Preformed precompressed foam sealant.
- D. Exterior Joints in Horizontal Surfaces, Urethane:
 - 1. Manufacturers: Pecora Corp.; Sandell Construction Solutions; Sika Corp.; Sonneborn; Tremco; or approved equal.
 - 2. Materials: Self-leveling urethane sealant, ASTM C 920.
- E. Exterior Joints Immersed in Water, Polysulfide:
 - 1. Manufacturers: W. R. Meadows; Pecora Corp.; Sonneborn Building Products; or approved equal.
 - 2. Materials: Two-part polysulfide, for water immersion, ASTM C 920.

- F. Exterior Paving Joint Fillers, Bituminous:
 - 1. Manufacturers:
 - 2. Materials: Bituminous fiber.

- G. Interior Joints, Limited Movement, Acrylic:
 - 1. Manufacturers: Bostik; Pecora Corporation; Polymeric Systems, Inc.; Sonneborn Building Products; Tremco; or approved equal.
 - 2. Materials: Acrylic-emulsion, ASTM C 834.
 - 3. VOC Content: Less than 50 g/L.

- H. Colors:
 - 1. Closely match at least of one of adjacent surfaces.

- I. Colors:
 - 1. Closely match at least of one of adjacent surfaces; colors shall be selected by Architect.

- J. Joint Backing Materials
 - 1. Acceptable manufacturers include:
 - a. Backer Rod Manufacturing & Supply Co. ["Mile High Foam"]
 - b. Dow Chemical Co.
 - c. Williams Products Co.
 - d. Woodmont Products Co.
 - 2. Joint backer: Compressible polyethylene foam rod or other compatible non-waxing, non-extruding, non-staining resilient material in dimension 25 percent to 50 percent wider than joint width as recommended by sealant manufacturer for conditions and exposures indicated. Unless otherwise noted, provide closed cell non-absorptive material.
 - 3. Joint backing for general use at joints in horizontal surfaces shall be 2 rows of butyl rubber or neoprene foam rods in contact with one another and compressed to approximately 2/3 original width when in place.
 - 4. Provide miscellaneous materials of type that will not bleed through sealant, discolor surface, or produce deleterious effects. Select size to provide profile concave to the rear of the sealant, and equipped with a bond-breaking film.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Examine substrate; report unsatisfactory conditions in writing. Beginning work means acceptance of substrates.
- B. Provide sealants in colors as selected from manufacturer's standards.
- C. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Clean and prime joints, and install bond breakers, backer rods and sealant as recommended by manufacturers.
- D. Depth shall equal width up to 1/2 inch wide; depth shall equal 1/2 width for joints more than 1/2 inch wide.
- E. Cure and protect sealants as directed by manufacturers. Replace or restore damaged sealants. Clean adjacent surfaces to remove spillage.

END OF SECTION

SECTION 08 17 44 - RESIDENTIAL EXTERIOR DOOR & WOOD FRAME ASSEMBLIES

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Insulated steel doors.
 - 2. Wood frames.
 - 3. Pre-hung hardware, weatherstripping and thresholds.
 - 4. Glazing.
 - 5. Transoms.
 - 6. Sidelites.
 - 7. Energy Star rating compliance.
- C. Related sections, without limitation, include:
 - 1. Section 08 71 00 – Hardware.

1.2 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Shop drawings: Large scale drawings for fabrication, installation and erections including plans, elevations, details, anchorages, connections and accessories along with head, jamb, sill and joining details. Provide templates for work installed by others.
 - a. Field Measurements: Take accurate field measurements before fabrication and indicate same on shop drawings.
 - 3. Initial Selection samples: Provide samples of color and material ranges.
 - 4. Verification: Submit final samples of selected products. Include samples showing full variation of color and finish expected.
 - 5. Maintenance Data: Provide recommended maintenance procedures.
 - 6. Certification: Certify submitted materials comply with requirements.
 - 7. Provide warranty documentation.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Mock-Up/Field Samples: Prior to installation, provide mock up of each type of system proposed for use for approval. Accepted mock-ups may be incorporated into the work unless otherwise noted.
- C. Meet or comply with applicable requirements of the following:
 - 1. AAMA 1304 - Voluntary Specification for Forced Entry Resistance of Side-Hinged Door Systems.
 - 2. AAMA 506; Voluntary Specifications for Hurricane and Impact and Cycle Testing of Fenestration Products.
 - 3. NFRC 100; Procedure for Determining Fenestration Thermal Properties.
 - 4. NFRC 200; Solar Heat Gain Coefficient and Visible Transmittance.
 - 5. WDMA I.S.4; Water Repellent Preservative Non-Pressure Treatment for Millwork.
 - 6. Glass standards:
 - a. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and ANSI Z97.1.
 - b. GANA Publications: GANA's "Glazing Manual." and "Laminated Glass Design Guide."
 - c. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."
- D. Warranty: Provide manufacturer's standard warranty. Include labor and materials to repair or replace defective materials.

1. Door Slab: 10 Years.
2. Door System : 10 Years.
3. Wood Frame: Not less than 10 years, provide lifetime when available from manufacturer such as Jen-Weld Auralast frame.

PART 2 PRODUCTS

2.1 MANUFACTURERS

- A. Manufacturers: Subject to compliance with requirements, provide residential entry door assemblies doors by one of the following:
1. Clopay Door; www.clopaydoor.com/.
 2. Jeld-Wen; www.jeld-wen.com/.
 3. Therma Tru Doors; www.thermatru.com/.
 4. Approved equal.
- B. Basis of design: Therm Tru insulated steel doors and wood frame assemblies.

2.2 PERFORMANCE REQUIREMENTS FOR ENTRY DOOR ASSEMBLIES:

- A. Provide assemblies meeting Energy Star ratings for the locality and complying with the following:
1. NFRC Requirements – Provide doors capable of complying with the following total door ratings:
 - a. U-Factor, in accordance with NFRC 100: 0.40 .
 - b. Solar Heat Gain Coefficient (SHGC), in accordance with NFRC 200: 0.40 .
 2. Fire ratings and holding capacity: See below.

2.3 ENTRY DOOR & FRAME ASSEMBLY MATERIALS

- A. Door panels:
1. Faces material: 0.021-inch (24 gauge) minimum thickness, tension-leveled cold rolled steel, zinc-coated, conversion-coated to permit paint bond.
 2. Door edges: Machinable, kiln-dried pine or engineered lumber mechanically locked to door faces, four-sided full thermal break provided.
 - a. Bottom and top rails: Rot resistant composite material.
 3. Thickness: As shown, if not, 1.75 inch.
 4. Lock area reinforced with solid blocking in full area of passage and deadbolt locksets. May be prepared for cylindrical or full-mortise locksets. Door bottom edge: moisture- and decay-resistant composite.
 5. Core: foamed-in-place polyurethane, density, 1.9 pcf minimum.
 - a. Where fire ratings are indicated, provide fire rated mineral core meeting rating and energy requirements.
 6. Shape, configuration: As shown, provide embossed panels and transoms if shown.
 7. Finish: Factory applied, see below. Smooth surface.
- B. Glazing:
1. Glass type: Insulating glass units as follows:
 - a. Coating: Low-E
 - b. Safety glazing: Tempered or laminated as required by code and indicated standards.
 - c. Sizes: As required or shown.
 - d. Insulating spacer: Provide warm edge technology.
 - e. Bite: Minimum bite to perimeter frame, per manufacturer standard.
 - f. Glass sheet thickness: Manufacturer standard, but not less than 0.125 inch.
 - g. Air space: Manufacturer standard, but not less than 0.375 inch and as required to comply with energy standards.
 - h. Air space fill: Argon.
 2. Color/Tint: As shown or scheduled, if not, clear
 3. Inserts (lites): perimeter frames in raised-molding patterns, molded from composite, wood-grained in natural hardwood patterns, paintable, screw-fastened to doors, screw holes concealed with grained plugs in matching material.
 - a. Tested to withstand high service temperatures resulting from exposure behind storm doors or dark finishes.
 4. Grilles or divided lites: Provide manufacturer standard when shown on drawings.
 5. Glazing tapes, sealants and materials: Manufacturer standard to maintain watertight conditions.

6. Transoms: Provide when shown, in sash frame if so indicated, glazing to match door and this specification.
- C. Wood frames:
1. Material: 5/4 Hard pine, kiln dried, or where required, fire rated materials of sufficient screw holding power, with depth to match details and wall thickness.
 2. Treatment: Preservative treatment meeting WDMA I.S.4.
 3. Frame/stop type: As shown, if not indicated applied or integral stop.
 4. Width: Face of wall finish to face of wall finish; see partition types or other wall conditions.
 5. Split jambs: Not permitted unless specifically shown and identified as same.
 6. Back kerf cuts: Required.
 7. Finish: Match door
- D. Hardware, sills & weatherstripping: See below.
- E. Casing and trim: Doors may include pre-applied casing or trim; match Architect details for profiles and dimensions; if none, provide eased edge flat casing. Finger jointed stock may be used for opaque finishes with Architect approval.
- 2.4 BLOCKING & CORE CAPACITY
- A. Comply with the following:
1. Screw withdrawal minimums: Face – 700 lbs.; Edge – 400 lbf.
 2. Blocking: Required.
 3. Blocking Material: Composite lumber core laminated construction for screw holding capacity and split resistance.
 4. Usage: To include - hinge stiles, locks, latches, closers, armor plates, exit devices, kicks & the like.
- B. Large glass lites: For doors with large glass lites, provide special door core construction to provide cut-outs and sizes indicated without lite/lock conflicts or invalidating door warranty.
- 2.5 FACTORY FINISHING
- A. General:
1. Doors to receive finish baked-on at factory; from one of the following options determined by the Architect:
 - a. Factory applied primer.
 - b. Factory applied primer and final topcoat.
 - c. Color: As selected by Architect from available options.
- 2.6 HARDWARE, SILLS & WEATHERSTRIPPING
- A. Provide factory applied hardware complying with requirements of Section 08 71 00; unless other types are approved in advance of installation by Architect.
1. Where door manufacturer hardware style or types of hardware are permitted, notwithstanding other approvals provide UL rated and approved hardware shall be used.
 2. Weatherstripping shall comply with Section 08 71 00, if not indicated, as follows:
 - a. Material: Jacketed thermoset open-cell foam, or neoprene or vinyl bulb; permanently flexible.
 - b. Installation: Press-fit in kerfs at jamb stops in frames.
 - c. Bottom door kerf: Extruded thermoplastic elastomer, finned and chambered design, press-fit into kerf. Provide sweep with fins and double bulb style bottom.
 - d. Corner pads: Provide at bottom margin corners from jacketed thermoset open-cell foam.
 - e. Double-door models: Provide interlocking astragal weatherstripping.
 3. Sills: Adjustable type, complying with Access Code. Clear or dark anodized aluminum over composite or grouted assembly set in mastic. Sill color as selected by Architect from available options.
- 2.7 FABRICATION & MACHINING
- A. Fabrication: Comply with the following:
1. Shop set up: Shop assemble frames required.
 2. Provide temporary, removable bottom strut to hold jamb bottoms if sill is not pre-installed..
 3. Provide single piece jambs and heads.
 4. Attach head into jamb dado then glue and screw.
- B. Machining: Comply with the following:
1. Pre-machine frames for hardware listed on final approved hardware submittals

2. Shop pre-fit frames to actual door sizes from approved door submittals.
3. Provide long jamb bottom to allow field cutting to accommodate viable subfloor elevations.

PART 3 EXECUTION

3.1 INSTALLATION & PROTECTION

- A. Comply with NWMA I.S. 1A and specified quality standard. Coordinate installation of doors.
- B. Prefit doors to frames. Premachine doors for hardware listed on final schedules. Factory bevel doors.
- C. Install doors with not more than 1/8 inch clearance at top and sides, 1/4 inch at bottom. Comply with NFPA 80 for rated assemblies.
- D. Installation: Comply with the following:
 1. Install work plumb, plane, level and true and flush to face of partition unless otherwise shown.
 2. Provide 0.25 inch furring space at framing for conventional construction and 0.50 space for fire rated construction.
 3. Place door unit into opening and level hinge side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
 4. Level latch side of jamb. Use shims fastened through jamb and stop to level and temporarily secure in place.
 5. Verify spacing between jamb and door is uniform on all sides. Adjust as necessary.
 6. Shim top of jamb in center of opening and fasten with nail.
 7. Re-check for square, level and even spacing around door. Fastenr securely in place through stop, jamb, shims and into studs every 12 inches.
 8. Shim each jamb in 3 or more places. Provide shims at butts and hinges.
 9. Attach frames to blocking or sub-framing with concealed, recessed finish head wood screws.
 10. Provide not less than 2 screws each side at hinge elevations.
 11. Pre-drill for screws to prevent wood splitting.
 12. Where required, field apply stops and conceal fasteners.
 13. Attach stops with 4d finish nails or finish screws 12 inches on center and within 6 inches of ends. Set nails.
 14. Coordinate casing installation.
- E. Install trim on both sides using nails every 12 to 16 inches.
- F. Adjust, clean, and protect.

END OF SECTION

SECTION 08 52 03 – HISTORIC REPRODUCTION WOOD REPLACEMENT WINDOWS [HEIRLOOM SYSTEM]

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Architectural wood replacement window system.
 - 2. Trim and casing.
 - 3. Mullion stiffeners.
 - 4. Insulating glass units.
 - 5. Marine glazing.
 - 6. Interior and exterior muntins.
 - 7. Insulating glass air space spacers.
 - 8. Screens.
 - 9. Factory finishes.
- C. Extent & Intent:
 - 1. Extent: All windows.
 - 2. Intent is to provide selective replacement of window components and leave others in place and clad same.
 - 3. Where the Contractor considers this system impractical, replace entire window assembly with new work matching components described in this section, and at no additional cost to the Owner.
 - 4. Contractors shall provide the work in place or shall remove the entire windows assembly and assembly new components in the shop and re-install complete window frame and sash units.
- D. Window operating types:
 - 1. Double hung, to include half screens.
 - 2. Fixed sash.
- E. Related Sections, without limitation, include:
 - 1. Section 06 65 19 Polymeric Fly Ash Composite Trim [Boral]: Requirements for Boral.
 - 2. Division 08 – Glazing: Glass performance requirements.

1.2 SYSTEM DESCRIPTION

- A. System general consists of the following:
 - 1. Jamb liners.
 - 2. Replacement sashes.
 - 3. Weather stripping and window hardware.
 - 4. Typical replacement sash consists of a 1-5/8" poplar mortise and tendon window frame prime painted.
 - 5. Exterior finish is Boral "Truexterior" cladding shop primed.
 - 6. Weather-stripping is designed to work in conjunction with jamb liner.
 - 7. Window sashes are held in place by friction of weather stripping and jamb liner.
 - 8. In no case shall any poplar be permit to be exposed to exterior whether painted or not.
 - 9. In no case shall any poplar be permitted to be exposed and unprimed. on the interior. This includes parts of the window system which are concealed after assembly.
 - 10. Intent is that all interior poplar is primed and all exterior poplar is clad.

1.3 REFERENCES

- A. Comply with reference standards, and as follows:
 - 1. AAMA/WDMA I.S. 2, "Standard Specification for Windows, Doors and Skylights" for operating force, air infiltration, water penetration, structural performance, and forced-entry resistance for wood windows.

1.4 PERFORMANCE REQUIREMENTS

- A. Comply with Section 08 50 00 Windows performance standards, but not exceeding:

1. Air infiltration: 0.15 CFM per square foot of surface area for fixed units and 0.30 CFM per foot of sash crack when tested in accordance with ASTM E283 at differential static pressure of 6.24 psf.
2. Water infiltration: No uncontrolled leakage when tested in accordance with ASTM E547 at test pressure of 6.24 psf, or 20 percent of full positive design wind load, whichever is greater.

1.5 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 2. Shop drawings: Large scale drawings for fabrication, installation and erections including plans, elevations, details, anchorages, connections and accessories along with sill and joining details and component lengths. Provide templates for work installed by others.
 - a. Details: Full or large scale, keyed to scale elevations. Show frame and sash construction, glazing, weep/vent provisions, hardware, weather-stripping and anchorage.
 - b. Installation: Clearly show relation to adjoining construction. Give blocking requirements, clearances, weather proofing & flashing recommendations and instructions necessary for proper installation.
 - c. Field Measurements: Take accurate field measurements before fabrication and indicate same on shop drawings.
 - d. Coordinate wall construction to ensure that the actual opening dimensions correspond to established dimensions
 3. Samples: Color and material ranges showing variation of color and finish, if any.
 - a. Wood samples: 2 samples for each species of unfinished, transparent and opaque finished wood.
 - b. Window corner section.
 - c. Glazing system.
 - d. Muntins.
 4. Maintenance Data: Provide recommended maintenance procedures.
 5. Certification: Certify submitted materials comply with requirements.

1.6 QUALITY ASSURANCE

- A. Comply with Division 01 requirements and governing codes and regulations.
- B. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for 10 years. Use experienced installers with at least 5 years experience on comparable installations.
- C. Mock-ups: Provide assembly showing fixed sash, fixed frames and operable sash and representative of the proposed design elements. Accepted assemblies may be used in the completed work.
- D. Testing: Certified independent testing agency reports to show compliance with specified window performance requirements. Tests shall have been made within 5 years of submission. Reports shall include test descriptions and results, as well as sufficient product descriptions to show that tested products are representative of those proposed for the project.

1.7 DELIVERY, STORAGE AND HANDLING

- A. Deliver, store and handle windows as recommended and as follows:
 1. Deliver factory-assembled, preglazed or unglazed windows in enclosed vans. Bundle and label loose materials as necessary to prevent loss and damage.
 2. Store products in a clean, protected, dry, well-ventilated building, on platforms or blocking at least 4 inches above floor. Stack products so they do not warp, bend or twist. Store windows upright, not flat or leaning, with at least ¼" air space between units.
 3. Protect glazing and frame components from adverse job conditions before, during, and after installation.

1.8 WARRANTY

- A. Provide written warranty signed by manufacturer stating that work is free from defective materials, defective workmanship, glass breakage due to defective design, and agreeing to replace components which fail under normal operation.
 1. Material and workmanship warranty term: 3 years from date of Substantial Completion.

- B. Provide written warranty agreeing to replace defective insulating glass units and stating that insulating glass units will be free from condensation, fogging and obstruction of vision due to film on internal surfaces for 10 years from date of installation. Replacement includes labor and materials.
1. Glass seal failure warranty term: 10 years from date of Substantial Completion.
 2. Warranty glass against stress cracks caused by manufacturing defects from (2) years from the original date of purchase

PART 2 - PRODUCTS

2.1 MANUFACTURER

- A. Acceptable manufacturers and fabricators include:
1. Basis of Design: Heirloom Windows, Crawfordsville IN; www.heirloomwindows.com/.
 2. Approved equal.

2.2 WINDOW ASSEMBLY

- A. Sash Description
1. Interior: Solid Poplar.
 2. Kiln dried to moisture content no greater than twelve (12) percent at time of fabrication
 3. Shop Primed including concealed surfaces.
 4. Sash thickness: 1 5/8" wood interior (plus 1/4" Boral cladding for total of 1 7/8" (47.5mm))
 5. Bottom rail bevel: Based upon field measurements and shop cut
 6. Interior Sash Sticking: As shown, if not, 0.25 inch Roman Ogee
- B. Glazing
1. Dual sealed, double-strength insulated glass with clients specified coating on surface 2
 2. Glazing method: Insulating glass
 3. Interior glazing seal: 1/32", double sided acrylic glazing
 4. Exterior glazing seal: Silicone embedding
 5. Glass Type: Clear, Low E with Argon,
 - a. Low E3 with or without Argon, Low E1 with or without Argon
 6. Interior spaces: Provide "in the air space" spacers of Architect approved color between inner and outer applied muntins.
- C. Finish
1. Interior/Exterior: Solid wood clad with Boral Truexterior
 2. Prime: Factory applied enamel primer.
 3. Interior Finish options: Factory primed of Architect approved tint.
- D. Weatherstripping:
1. Dual "Fin-Pile" along vertical edges. Q-Ion vinyl covered foam bulb at meeting rail and bottom rail / sill joint
 - a. Color: Hidden Fin Pile – Gray,
 - b. Color: Meeting and bottom rails seals: Bronze or white, Architect selected.
- E. Hardware balance system:
1. Constant Force Balance mortised into edge of sash and hung from jamb.
 2. Jamb track: Cellular PVC parting stop chemically welded to 1 mm Cellular PVC sheet
 3. Color: Paintable white
- F. Sash locks/lifts:
1. Oxidized bronze alloy latch designed to be manually operated. Finishes: Lacquered Red Bronze (US 20A), Oil Rubbed Bronze (US 10) and White Bronze (US 26D), as selected by Architect.
 2. Provide 2 for sash from 36 inches and wider.
 3. Lifts: Not part of contract.
- G. Simulated divided lites:
1. Interior Muntins:
 - a. Poplar, 7/8" deep, typically 3/4" wide.
 - b. Shape: Historically accurate profiles, approved and selected by Architect.
 2. Exterior Muntins: Cellular PVC, with beveled edges to replicate putty glazing

3. Pattern: As shown, if not rectangular, 2 over 2 style.
4. Finish: Match panel finish.
5. Provide "in the air space" spacers at every set of muntins, color Architect selected.
- 6.

2.3 INSECT SCREENS FOR OPERABLE SASH

1. Insect screen: Frames – 1" x 5/16" tubular aluminum extrusions in screen fabricator or manufacturer's standard colors.
2. Mesh – 18 x 16 screen mesh in manufacturer's standard materials and finishes: black fiber glass, charcoal aluminum, mill finish aluminum.
3. Size: Provide half size screens fitted below top sash at double hung units.
4. Provide receptor at jambs to secure unit in place or weather stripping and mechanical fastener.
5. Provide weather stripping at head and sill with weeps at sill.
6. Provide screens units that can be easily removed and re-installed.
7. Provide screens under the work of this section whether or not the wood window manufacturer normally provides screens.

2.4 GLAZING

- A. Products and installation: Satisfy the more stringent requirements specified in this section and Section 08 80 10 Exterior Glass.
- B. Glazing System: Use system recommended by manufacturer meeting requirements for marine glazing and for ocean-side site subject to severe northeastern storms.
 1. Wet Glazing: Provide two-part wet glazing system recommended by manufacturer for each type window specified
 2. Dry Glazing: Provide compression type design utilizing extruded neoprene or silicone glazing gasket system recommended by manufacturer.
- C. General:
 1. All units to be factory-pre-glazed.
 2. Glazing channel shall be weeped/pressure relief vented per window manufacturer's requirements.
 3. Where required, glass unit to be suitably tempered.

2.5 FABRICATION

- A. Fabricate systems in accord with approved shop drawings and the manufacturer's instructions, and as follows:
 1. Windows:
 - a. Produced from standard components.
 - b. Wood components shall be solid lumber.
 - c. Like parts shall be interchangeable.
 - d. Fitting, machining for hardware and glazing shall be done in the factory.
 2. Sash: AWI Custom Grade Finished Exterior Sash. Fixed and operable sash incorporate removable interior glass stops for ease of reglazing.
 3. Permanent Joints and Facings: Bonded with water-resistant adhesive.
- B. Fabricate components in accordance with manufacturer's tested assemblies. Shop fabricate, glaze, and finish to greatest extent practical to minimize field assembly. Disassemble only to extent necessary for shipping and handling limitations.
- C. Fabricate components true to detail and free from defects impairing appearance, strength or durability.

2.6 FINISHES FOR WOOD

- A. General: Corners and edges of units receiving film-forming finishes (Sikkens, paint, etc.) shall be eased/radiused to promote finish adhesion and maintain proper film thickness.
- B. Exterior finish options to be selected by Architect:
 1. One coat factory primed, with additional coats applied by others in field after installation.
- C. Interior finish options to be selected by Architect:
 1. Factory-primed finish by others in field after installation.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Division 01 and especially Section 01 70 00.
- B. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- C. Examination:
 - 1. Verify that field conditions are acceptable and are ready to receive work.
 - 2. Verify dimensions, tolerances, and method of attachment with other work.
 - 3. Inspect wall flashings, vapor retarders, water and weather barriers, and other built in components to ensure a weather tight installation.

3.2 INSTALLATION - REPLACEMENT WINDOWS SPECIAL REQUIREMENTS

- A. Become familiar with the replacement window sash system components prior to starting the installation.
- B. The re-conditioning of the existing window boxes is to include:
 - 1. Removing existing window sashes, interior window stops, window runners between sashes.
 - 2. Remove excess paint dirt and debris from window box.
 - 3. Repair areas where rot has occurred by pocketing out the rotted material and filling the area with a two-part epoxy wood filler. Refer to Section 06 01 44.
 - 4. Sand smooth the repaired area(s) of the repair to the level of the existing window.
- C. Install the jamb-liners, top bottom and sides in recognition of the manufacturer's specification.
- D. Insure that the jamb-liners adhere completely to the existing window jambs using building component adhesive.
- E. Install the replacement window sashes in recognition of the manufacturer's specifications.
- F. Where required and where no other method is practical, or will not produce acceptable results, remove entire window assembly and make renovations in the shop and re-install renovated assemblies. Provide new frames where existing are too damaged to provide acceptable results. This work shall be at no additional cost to the Owner.

3.3 INSTALLATION - GENERAL

- A. General: Install windows per approved shop drawings, in proper relation to adjoining construction. Do not twist frames or force fit them into poorly prepared openings. Anchor windows as required to satisfy design requirements. See manufacturer's installation instructions and shop drawings.
- B. Center window units in wall openings leaving a uniform interface caulking recess on all four sides. The manufacturer strongly suggests that sealant be selected for its adhesion compatibility with the specified exterior wood and adjacent wall materials. Consult the manufacturer for recommended sealant.
- C. Level Units: Install shims at bearing locations, anchors, and latchpoint, so they are not dislodged by subsequent operations. Test sash operation and sash alignment before permanently anchoring units.
- D. Anchorage: Install anchors through frame centerline beside shims. Anchor window units to wood blocking with wood screws and to metal framing with Tek screws; countersink anchor heads. All anchors shall be concealed by closed sash or with wood plugs.
- E. Installation to conform to window manufacturer's requirements as indicated in the manufacturer's product manual.

3.4 FIELD QUALITY CONTROL

- A. Field Tests: At the Owner's option, independent testing laboratory may perform air infiltration tests in accordance with ASTM E783, and water infiltration tests in accordance with AAMA 501.3.
 - 1. Cost of initial testing to be born by Owner.
 - 2. Costs for any remedial work and subsequent re-testing to be born by responsible party depending on nature of remedial work required.

3.5 CLEANING

- A. Clean surfaces in compliance with manufacturer's recommendations; remove excess mastic, mastic smears, foreign materials and other unsightly marks.
- B. Clean exposed surfaces exercising care to avoid damage.
 - 1. Remove adhered matter and excess sealant materials.
 - 2. Replace glass which is broken, cracked, chipped, scratched, abraded or damaged in other ways.
- C. Wash glass on interior and exterior to remove paint, soil, prints and foreign matter. It is strongly advised that procedures and methods outlined in the following documents be strictly adhered to when cleaning Architectural glass:
 - 1. Glass Association of North America (GANA) Technical Bulletin 01-0300: *Glass Cleaning Procedure*
 - 2. GANA Technical Bulletin TD-02-0402: *Heat-treated Glass Surfaces Are Different*
 - 3. PPG Glass Technical Document TD-142: *Glass Cleaning Recommendations*

3.6 PROTECTION

- A. Institute protective measures required throughout the construction period to ensure that both interior and exterior of wood doors will be without damage or deterioration, other than normal weathering.

END OF SECTION

Section 08 51 66

METAL WINDOW SCREENS

PART 1 GENERAL

1.0 RELATED DOCUMENTS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 01 – General requirements, which are hereby made part of this section of the Specifications.
- B. Division 8 – Openings.
- C. Division 6 – 06 49 19 Custom Fabricated Wood Shutters

1.01 DESCRIPTION

- A. Furnish and install window screens as indicated on drawing.
- B. Furnish all labor and materials.
- C. Furnish all equipment necessary.
- D. Include all the internal parts of the system including roll formed window screen frame, corner connectors, springs, pins, inserts and angles.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections and relationships with adjacent constructions.
- C. Samples: Submit representative samples, indicate visual characteristics and finishes.

1.3 QUALITY CONTROL

- A. Coordinate window screen system window manufacturer.
- B. Verify and confirm means and methods of window installation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Roll formed window screen frame, Screenco, FB03 7/16x1 box or equal. Finish black or dark bronze. Extruded aluminum with wall thickness not less than 0.062 inches

(1.6 mm); miter corners and join with corner keys 6063-T5 alloy and temper with minimum ultimate strength of 22,000 psi (152 MPa) and yield strength of 16,000 psi (110 MPa).

- B. Hardware and accessories: corner connectors, springs, pins, inserts and angles as proposed by screen assembly company
 - 1. Phantom Screens, Vintage doors, Allied Window, Inc.
 - a. Brusso, K-2 brass hole sleeves, or equal, corresponding to spring actuated pins in jambs.
 - b. Fiberglass screen, black finish, rubber screen spine. Screen Cloth: 18 by 16 mesh; charcoal color.
 - c. Corner Keys, black or dark bronze finish. Extruded aluminum.
 - d. Spring actuated pins in jambs, 4" from top and bottom, two pins per jamb, black or dark bronze finish.
 - e. Removable and reusable virgin vinyl glazing splines with neatly mitered corners.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ensure that modified window jambs are properly prepared to receive the window screen installation hardware.
- B. Ensure that the upper sash of the double hung window is properly prepared to receive the new window screen hardware.
- C. Ensure that the shutter hardware does not encumber the easy removal of the window screen.
- D. Devise a numbering system to ensure that manufactured screens match in size to their intended openings.
- E. Clean surfaces thoroughly prior to installation.

3.2 INSTALLATION

- A. Follow the window schedule and the internal organization established with the window manufacturer and systematically install the windows.
- B. The screens are intended to be installed from the inside.
- C. The window screens intended to be removable from the inside without the use of any tools.
- D. The removable window screens are designed to fit between the underside of the

upper window sash and the sill of the window.

- E. The upper sash of the replacement windows is not movable up and down.
- F. An additional .24 gauge aluminum angle may be necessary in order to ensure proper fit and removability of the new window screens.
- G. Magnetic tape may be necessary in order to ensure proper fit and removability of the new window screens.
- H. Follow manufacturer's instructions to ensure the installation carries a full manufacturer's warranty.
- I. Remove and replace damaged units.
- J. Do not begin installation until substrates have been properly prepared.
- K. If substrate preparation is the responsibility of another installer, notify the Architect, Property Manager or Owner of unsatisfactory preparation before proceeding.
- L. Weather-stripping will be installed on the top and bottom of each screen.
- M. Removable screen insert, which are only visible from the inside, are to be used to secure the screens in place.
 - 1. The removable screen inserts are to be housed within a ¾" wooden frame on the jambs of the window behind the exterior trim.
 - 2. The removable screen inserts will be black or dark bronze in color.
 - 3. Four removable screen inserts will be used to secure each screen mounted 4" from the top and bottom of the screen.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

Section 08 51 66

METAL WINDOW SCREENS

PART 1 GENERAL

1.0 RELATED DOCUMENTS

- A. Attention is directed to the Contract and General Conditions and all Sections within Division 01 – General requirements, which are hereby made part of this section of the Specifications.
- B. Division 8 – Openings.
- C. Division 6 – 06 49 19 Custom Fabricated Wood Shutters

1.01 DESCRIPTION

- A. Furnish and install window screens as indicated on drawing.
- B. Furnish all labor and materials.
- C. Furnish all equipment necessary.
- D. Include all the internal parts of the system including roll formed window screen frame, corner connectors, springs, pins, inserts and angles.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections and relationships with adjacent constructions.
- C. Samples: Submit representative samples, indicate visual characteristics and finishes.

1.3 QUALITY CONTROL

- A. Coordinate window screen system window manufacturer.
- B. Verify and confirm means and methods of window installation.

PART 2 PRODUCTS

2.1 MATERIALS

- A. Roll formed window screen frame, Screenco, FB03 7/16x1 box or equal. Finish black or dark bronze. Extruded aluminum with wall thickness not less than 0.062 inches

(1.6 mm); miter corners and join with corner keys 6063-T5 alloy and temper with minimum ultimate strength of 22,000 psi (152 MPa) and yield strength of 16,000 psi (110 MPa).

- B. Hardware and accessories: corner connectors, springs, pins, inserts and angles as proposed by screen assembly company
 - 1. Phantom Screens, Vintage doors, Allied Window, Inc.
 - a. Brusso, K-2 brass hole sleeves, or equal, corresponding to spring actuated pins in jambs.
 - b. Fiberglass screen, black finish, rubber screen spine. Screen Cloth: 18 by 16 mesh; charcoal color.
 - c. Corner Keys, black or dark bronze finish. Extruded aluminum.
 - d. Spring actuated pins in jambs, 4" from top and bottom, two pins per jamb, black or dark bronze finish.
 - e. Removable and reusable virgin vinyl glazing splines with neatly mitered corners.

PART 3 EXECUTION

3.1 PREPARATION

- A. Ensure that modified window jambs are properly prepared to receive the window screen installation hardware.
- B. Ensure that the upper sash of the double hung window is properly prepared to receive the new window screen hardware.
- C. Ensure that the shutter hardware does not encumber the easy removal of the window screen.
- D. Devise a numbering system to ensure that manufactured screens match in size to their intended openings.
- E. Clean surfaces thoroughly prior to installation.

3.2 INSTALLATION

- A. Follow the window schedule and the internal organization established with the window manufacturer and systematically install the windows.
- B. The screens are intended to be installed from the inside.
- C. The window screens intended to be removable from the inside without the use of any tools.
- D. The removable window screens are designed to fit between the underside of the

upper window sash and the sill of the window.

- E. The upper sash of the replacement windows is not movable up and down.
- F. An additional .24 gauge aluminum angle may be necessary in order to ensure proper fit and removability of the new window screens.
- G. Magnetic tape may be necessary in order to ensure proper fit and removability of the new window screens.
- H. Follow manufacturer's instructions to ensure the installation carries a full manufacturer's warranty.
- I. Remove and replace damaged units.
- J. Do not begin installation until substrates have been properly prepared.
- K. If substrate preparation is the responsibility of another installer, notify the Architect, Property Manager or Owner of unsatisfactory preparation before proceeding.
- L. Weather-stripping will be installed on the top and bottom of each screen.
- M. Removable screen insert, which are only visible from the inside, are to be used to secure the screens in place.
 - 1. The removable screen inserts are to be housed within a ¾" wooden frame on the jambs of the window behind the exterior trim.
 - 2. The removable screen inserts will be black or dark bronze in color.
 - 3. Four removable screen inserts will be used to secure each screen mounted 4" from the top and bottom of the screen.

3.3 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 71 20 - FIRE DEPARTMENT KEY ACCESS BOX

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: All of the Contract Documents, including the Drawings, the General and Supplementary Conditions and Division 1 General Requirements apply to the work of this Section.
- B. Provide fire department key access hardware.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers, which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 MATERIALS

- A. Provide unit acceptable to Owner and local fire department. Where no preferences or standards are indicated provide the units given below
- B. High security Commercial Key Access Box:
 - 1. Function/Operations: Hinged door box located at building exterior containing key or access card to permit firefighter to gain building access without breaking lockable openings.
 - 2. Face lock: UL listed Medeco lock keyed to local fire department master key.
 - 3. Surface mount faceplate size: 5 x 4 x 3.25 inch [WxHxD].
 - 4. Recessed faceplate size: 7 x 7 x 3.25 inch [WxHxD]. Provide recessed mounting kit
 - 5. Finish: TGIC powder coat, black.
 - 6. Security option: Where shown, alarm tamper switch.
 - 7. Product: Knox Co. Model 3200
 - 8. Mounting: Recessed mount, unless otherwise indicated.
 - 9. Attachment: Through wall bolts with large steel washers at inside of structural surface.
- C. Location: Coordinate with the Owner, Architect and local fire department.

PART 3 - EXECUTION

3.1 INSTALLATION

- A. Install materials and systems in accordance with manufacturer's instructions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections. Install assemblies complete with all hardware, anchors, inserts, supports and accessories. Test and adjust operation.
- B. Restore damaged finishes and test for proper operation. Clean and protect work from damage.

END OF SECTION

SECTION 08 80 10 - EXTERIOR GLASS

PART 1 GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing:
 - 1. Exterior glass and glazing requirements.
- C. Intent: To provide factory glazed work wherever practical, including windows.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, details of construction, connections, and relationship with adjacent construction.
- C. Samples: Submit two representative samples of each material specified indicating visual characteristics and finish. Include range samples if variation of finish is anticipated.
- D. Warranty: Submit manufacturer's standard warranty. Include labor and materials to repair or replace defective materials.
 - 1. Laminated Glass: Manufacturer's 5-year warranty.
 - 2. Coated Glass: Manufacturer's 10-year warranty.
 - 3. Insulating Glass: Manufacturer's 10-year warranty.

1.3 QUALITY ASSURANCE

- A. Comply with governing codes and regulations. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- B. Safety Glazing Products: Comply with testing requirements in 16 CFR 1201 and, for wired glass, ANSI Z97.1.
- C. Glazing Publications:
 - 1. GANA Publications: GANA's "Glazing Manual." and "Laminated Glass Design Guide."
 - 2. AAMA Publications: AAMA GDSG-1, "Glass Design for Sloped Glazing," and AAMA TIR-A7, "Sloped Glazing Guidelines."
 - 3. IGMA Publication for Sloped Glazing: IGMA TB-3001, "Sloped Glazing Guidelines."
 - 4. IGMA Publication for Insulating Glass: SIGMA TM-3000, "Glazing Guidelines for Sealed Insulating Glass Units."

PART 2 PRODUCTS

2.1 MATERIALS

- A. Glass and Glazing:
 - 1. Manufacturers: AFG Industries; ACH Glass Operations (formerly Visteon); Cardinal IG; Libby Owens Ford; Pilkington; Viracon; or approved equal.
 - 2. Type: High-performance insulating glass units with low-e coating, tempered at locations as required by code.
 - 3. Color/Tint: Clear.
 - 4. Auxiliary Materials:
 - a. Compression gaskets.
 - b. Elastomeric glazing sealants.
 - c. Preformed glazing tapes.

- d. Glazing gaskets.
- e. Setting blocks, spacers, and compressible filler rods.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Inspect framing and report unsatisfactory conditions in writing.
- B. Comply with GANA "Glazing Manual" and manufacturer's instructions and recommendations. Use manufacturer's recommended spacers, blocks, primers, sealers, gaskets and accessories.
- C. Install glass with uniformity of pattern, draw, bow and roller marks.
- D. Install sealants to provide complete wetting and bond and to create a substantial wash away from glass.
- E. Remove and replace damaged glass and glazing. Remove labels. Wash, polish and protect all glass supplied under this section or under this project.

END OF SECTION

SECTION 08 80 40 – CLEANING HISTORIC GLASS

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing:
 - 1. Cleaning existing historic glass.
- C. Extent, without limitation, includes: This procedure includes guidance on cleaning glass in existing windows. It also includes methods of cleaning historic glass where the glass is dirty, discolored or etched because of time and negligence.

1.2 DEFINITIONS

- A. Dirt accumulations on glass exposed to weather causes surface crazing and alkaline reaction opalescent films if not washed at least every several years.
- B. Discoloration is an oily film on the surface of the glass. It is caused by oil, coal, and other fossil fuels existing in the atmosphere, by magnesia dioxide photo-oxidizing in the glass under strong ultra-violet light, or by the addition of excessive alkali salts to produce a colorless product.
- C. Etching is scratching of the glass produced by vigorous cleaning, steel wool, abrasive papers, or kitchen scouring compounds. Etching can occur on windows that have been exposed to wind blown grit, or left unprotected during sandblasting of masonry buildings. Etching can also be caused by the hydrofluoric acid-based chemical cleaners for masonry. Etched glass usually requires full replacement of the affected pane.

1.3 SYSTEM DESCRIPTION

- A. A window glass in proper condition is free from streaks of dirt from rain water combined with atmospheric impurities.

1.4 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Maintenance Data: Provide recommended maintenance procedures.
 - 3. Certification: Certify submitted materials comply with requirements.

1.5 QUALITY ASSURANCE

- A. Comply with Division 01 requirements and governing codes and regulations.
- B. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for 5 years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.
- C. Mock-ups: One for each type of damage or dirt problem.
- D. Special qualifications for manufacturer or installer:
 - 1. Experienced with product surface preparation and application.
 - 2. A firm with at least 5 years experience with similar applications.
- E. Project/environmental conditions: Protect work according to best practices.

PART 2 - PRODUCTS

2.1 MATERIALS - GENERAL

- A. Chemical products are sometimes sold under a common name. This usually means that the substance is not as pure as the same chemical sold under its chemical name. The grade of purity of common name substances, however, is usually adequate for stain removal work, and these products should be purchased when available, as they tend to be less expensive. Common names are indicated below by an asterisk (*)

2.2 CLEANING MATERIALS & COMPONENTS

- A. Provide products proven to be effective without damaging glass; these include [or do not include]"
1. Washing liquid - washing soda (Arm & Hammer), e).
 2. Household Ammonia: Note – Do not use ammonia if hardware is bronze.
 - a. Cautions:
 - 1) do not mix ammonia with chlorine bleaches, a poisonous gas will result!
 - 2) Do not use bleach on bird droppings.
 - 3) Potential hazards: TOXIC; MAY IRRITATE THE EYES.
 - b. A weakly basic compound that is formed when ammonia dissolves in water and that exists only in solution.
 - c. Other chemical or common names include Ammonia water*; Ammonium Hydroxide; Aqua ammonia*.
 - d. Available from chemical supply house, grocery store or pharmaceutical supply distributor, or hardware store.
 3. Household Vinegar, clear, white.
 4. Commercial Window Cleaner - non-alkaline (without ammonia if hardware is bronze).
 5. Fine pumice, commercial whiting or old hardwood sawdust used as a scouring powder to clean and polish glass in combination with a commercial liquid window cleaner.
 - a. For use only with stubborn dirt.
 6. Clean, potable water
- B. Equipment:
1. Heavy gloves and protective gear.
 2. Very fine 0000 steel wool.
 3. Pliers and chisels.
 4. Sponges, natural or artificial, window washer tools, squeegee.
 5. Soft bristle brush.
 6. Clean, soft cloths, cotton or microfiber cotton.

PART 3 - EXECUTION

3.1 GENERAL

- A. Comply with the provisions of Division 01 and in particular, Section 01 70 00.
- B. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Install materials and systems in proper relation with adjacent construction and with uniform appearance. Coordinate with work of other sections.
- C. Examination:
1. Verify that field conditions are acceptable and are ready to receive work.

3.2 APPLICATION

- A. General Cleaning of Glass:
1. Brush surfaces with a soft bristle brush to remove abrasive dust and oil films which build up on the glass. These contain sharp dust particles which can scratch and degrade the glass.
 2. Wash the glass with a solution of non-sudsing household ammonia in water, -OR- vinegar in water.
 3. If the above procedure does not sufficiently clean the glass, apply commercial window cleaner and wash (starting at the top of the window) with natural or artificial sponge, or with window washer tools.
 - a. Use straight overlapping strokes and wash from side to side.
 - b. Wet the window thoroughly and use a wooden scraper with an up and down stroke to remove stubborn spots. Take care not to apply any pressure to the glass.
 4. If dirt is still stubborn, combine window cleaner with fine pumice, commercial whiting, or old sawdust to clean and polish glass.
 5. NOTE: DO NOT APPLY PRESSURE, AS THIS CAN ETCH THE GLASS.
 6. Wipe down painted metal components with metal cleaner. Rinse off immediately and dry.
- B. To dry the glass:
1. Wet the side of the squeegee and pull it across the window.
 2. Wipe the squeegee blade with a wiping cloth after each pull. Wipe corners of each pane.

3. Pick up water from the corners with the sponge braced with one finger. Wipe edges with a wiping cloth if necessary.
- C. For discoloration, wash the glass with a non-ionic detergent and very fine 0000 steel wool.
1. DO NOT APPLY TOO MUCH PRESSURE - IT WILL BREAK THE GLASS OR SCRATCH THE SURFACE OF THE GLASS.

3.3 ADJUSTING / CLEANING / PROTECTION

- A. Comply with recommendations and the following:
1. Remove temporary coverings and protection of adjacent work areas.
 2. Remove from project site and legally dispose of construction debris associated with this work
 3. Protect installed work until completion of project.
 4. Repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 08 95 19 – EAVE & WALL VENTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.
- B. Section Includes, without limitation, providing: Wall vents.
 - 1. Eave vent insect screening.
 - 2. Sheet metal aluminum wall vents.
 - 3. PVC pipe wall vents.

1.2 SUBMITTALS

- A. Comply with Division 01 General Requirements and submit for approval:
 - 1. Product Data: Manufacturer's literature including installation instructions, use restrictions and limitations.
 - 2. Shop drawings: Large scale drawings for fabrication, installation and erections including plans, elevations, details, anchorages, connections and accessories along with head, jamb, sill and joining details. Provide templates for work installed by others.
 - a. Field Measurements: Take accurate field measurements before fabrication and indicate same on shop drawings.
 - 3. Samples: Color and material ranges showing variation of color and finish, if any.

1.3 QUALITY ASSURANCE

- A. Comply with Division 01 requirements and governing codes and regulations.
- B. Provide products of acceptable manufacturers which have been in satisfactory use in similar service for three years. Use experienced installers. Deliver, handle, and store materials in accordance with manufacturer's instructions.

PART 2 - PRODUCTS

2.1 INSECT MESH VENTING MATERIALS

- A. Fabricator/ manufacturers, subject to specifications, include:
 - 1. McNichols: <http://www.mcnichols.com/products/>, for aluminum.
 - 2. Mosquito Curtains Inc.; <https://www.mosquitocurtains.com/>, for fiberglass.
 - 3. Approved equal.
- B. Material:
 - 1. Fiberglass or aluminum insect mesh.
 - 2. Stainless steel staples or screws.
 - 3. Size: As approved by Architect for required air flow, and including:
 - a. Aluminum: general around 18x14 mesh with 0.0110 wire x 68% open.
 - b. Fiberglass: 1.6 ounce/sq.yrd, 1.7 x 0.8mm hole, 85% air flow.
 - 4. Color: As selected by Architect to include black. Anodized finish for aluminum.

2.2 SHEET METAL ALUMINUM VENT MATERIALS

- A. Fabricator/ manufacturers, subject to specifications, include:
 - 1. ZM Sheet Metals; <http://www.zmsheetmetal.com/>.
 - 2. Famco; <http://www.zmsheetmetal.com/>.
 - 3. Artis Metals Co.; <http://www.artiscaps.com/>.
 - 4. Approved equal.
- B. Material:
 - 1. Sheet aluminum [Note, provide copper if shown.]
 - 2. Damper: Required, provide spring loaded type, gasket and back up 0.25 inch mesh screen.
 - 3. Flashing and attachment flange: Required.
 - 4. Tube/duct attachment: Required, size to fit duct; if none, as selected by Architect from 4 or 6 inch.
 - 5. Finished: Baked on primer.

6. Size: As approved by Architect for required air flow.
7. Color: As selected by Architect to include black.

2.3 PVC PIPE MATERIALS

- A. Fabricator/ manufacturers, subject to specifications, include:
 1. JM Eagle www.jmeagle.com/.
 2. North American Pipe; www.northamericanpipe.com/.
 3. Cresline Pipe Co.; www.cresline.com/.
 4. Charlotte Pipe Co.; www.charlottepipe.com/.
 5. Approved equal.
- B. Material:
 1. PVC or ABS plastic pipe, Schedule 40 with required fittings. Comply with ASTM D1784, D1785 & D2466, for PVC pipe and ASTM D2661 for ABS pipe. Pipe sizes per ASTM F628.
 2. Assembly: Two step process with primer and solvent of types recommended by manufacturer for application, per ASTM D2564. Primer is not normally required for ABS systems. Do not exceed 140 degrees F for ABS applications.
 3. Fittings: As required. Use goose necks or other methods to prevent water intrusion.
 4. Sizes: As shown or as required by application.
 5. Color: As selected by Architect to include black. Where black not available, sand material, prime and topcoat with materials of type recommended by manufacturer for exterior use.

PART 3 - EXECUTION

3.1 GENERAL

- A. Install materials and systems in accordance with manufacturer's instructions, limitations and restrictions and approved submittals. Coordinate with work of other sections.
- B. Install work, plumb, plane, level and true, free of abrasions, damage or improper angles or slopes, in correct alignment. Install materials and systems in proper relation with adjacent construction and with uniform appearance.
- C. Conceal fasteners, using approved non-corrosive type.
- D. Ensure assemblies have unimpeded air flow and free of any inside or fallen debris.

3.2 INSTALLATION – INSECT MESH

- A. Locate and place venting as above and free of ripples, waves or bunching which is visible or interferes with other assemblies.
- B. Layout mesh with a minimum of joints using the long direction of rolls. Lap or interlock and lap joints 4 inches and secure both faces. Extend mesh up over assemblies, lapped, hemmed or installed shingle style to ensure mesh is permanently secured in place once assemblies are fully installed.
- C. Ensure cavities are completely protected by mesh.

3.3 INSTALLATION OF ALUMINUM WALL VENTS

- A. Comply with general installation requirements. Test dampers for proper action. Ensure assemblies are tightly installed, properly gasketed and caulked in place.

3.4 INSTALLATION OF PVC PIPE VENTS

- A. Comply with general installation requirements. Test dampers and installation for proper action or air flow. Ensure assemblies are tightly installed, properly caulked in place.

SECTION 09 91 12 - EXTERIOR PAINTING

PART 1 - GENERAL

1.1 SUMMARY

- A. Related documents: Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Section includes, without limitation, providing for exterior substrates:
 - 1. Surface preparation.
 - 2. Application of prime and finish paint systems.
- C. Extent: Priming and finishing, without limitation include:
 - 1. Touch up of shop coats provided under other Sections unless specifically included in that Section.
 - 2. Finish painting of exposed piping, conduit, exposed raceways, metal hardware, exposed equipment including rooftop equipment supplied under mechanical and electrical trades, when such items have not been factory pre-painted.
 - 3. Touch up of factory finished items where permitted.
 - 4. Doors, windows and the like not shop finished.
 - 5. Finished carpentry and millwork not shop finished.
 - 6. New millwork,
 - 7. Re-painting indicated existing surfaces.
 - 8. Synthetic or composite materials such as "Boral".
- D. Painting not included:
 - 1. Pre-finished items, only when such items are chrome plated, stainless steel, or a finish which has been specifically called for herein.
 - 2. Finish metal surfaces such as chrome, bronze, and stainless steel.

1.2 SUBMITTALS

- A. Product Data: Literature for each type of product, including:
 - 1. Preparation requirements.
 - 2. Application instructions.
 - 3. Manufacturer's specifications, with paint label analysis.
- B. Color charts/packs: 2 copies of full range of colors with each type of coating submitted. Use compact pack of color chips when available
- C. Samples for Initial Selection: For each type of topcoat product.
- D. 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.

1.3 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.

1.4 QUALITY ASSURANCE

- A. Mockups: Apply mockups 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.

1.5 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 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 the following:
 - 1. Benjamin Moore [MOR]
 - 2. Sherwin Williams Co. [S-W] [includes Pratt & Lambert]
 - 3. Duron, Inc. [DUR]
 - 4. Pittsburgh Paints PPG] (includes Porter.)
 - 5. Tnemec Company, Inc. [TNE]
 - 6. DuPont Nemours Co. [DuP]
 - 8. Approved equal.

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."

PART 3 - EXECUTION

3.1 EXAMINATION

- A. Examine substrates and conditions, with Applicator present, for compliance with requirements for maximum moisture content and other conditions affecting performance of the Work.
- B. Maximum Moisture Content of Substrates: When measured with an electronic moisture meter as follows:
 - 1. Concrete: 12 percent.
 - 2. Masonry (Clay and CMU): 12 percent.
 - 3. Wood: 15 percent.
 - 4. Portland Cement Plaster: 12 percent.
 - 5. Gypsum Board: 12 percent.
- C. Portland Cement Plaster Substrates: Verify that plaster is fully cured.
- D. Exterior Gypsum Board Substrates: Verify that finishing compound is sanded smooth.
- E. Verify suitability of substrates, including surface conditions and compatibility with existing finishes and primers.
- F. 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.
- H. 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.
- K. Wood Substrates:
 - 1. Scrape and clean knots. Before applying primer, apply coat of knot sealer recommended in writing by topcoat manufacturer for exterior use in paint system indicated.
 - 2. Sand surfaces that will be exposed to view, and dust off.
 - 3. Prime edges, ends, faces, undersides, and backsides of wood.
 - 4. After priming, fill holes and imperfections in the finish surfaces with putty or plastic wood filler. Sand smooth when dried.
 - 5. To prevent rust showing from nail heads, nails shall be counter-sunk, except at siding. Nail holes and other openings should then be spot-primed with primer before puttying or caulking is done. After putty is set, prime complete surface.
- L. Plastic Trim Fabrication Substrates: Remove dust, dirt, and other foreign material that might impair bond of paints to substrates.
- M. Existing Plaster: Prepare and correct minor defects, cracks, dents, nicks, and the like under the work of this section. Sand repaired and restored surfaces and existing surfaces having ridges, cracks, holes or other rough surfaces. Make minor repairs where required to produce a smooth, flat even surface. Where plaster is exposed below the surface, wet down area before applying new plaster, spackle or compound.
- N. Existing Concrete & Masonry: Prepare and correct minor defects, cracks, ridges, holes, and the like under the work of this section. Make minor repairs where required to produce a smooth, flat even surface.
- O. Existing Paint: Prepare and correct minor defects, cracks, ridges, holes, and the like under the work of this section. Make minor repairs where required to produce a smooth, flat even surface. Before paint application, wash surfaces with TSP [tri-sodium phosphate] and allow to dry. Remove dust or other defects prior to paint application.

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 window 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. Tint undercoats same color as topcoat, but tint each undercoat a lighter shade to facilitate identification of each coat if multiple coats of same material are to be applied. Provide sufficient difference in shade of undercoats to distinguish each separate coat.
- C. If undercoats or other conditions show through topcoat, apply additional coats until cured film has a uniform paint finish, color, and appearance.

- D. Apply paints to produce surface films without cloudiness, spotting, holidays, laps, brush marks, roller tracking, runs, sags, ropiness, or other surface imperfections. Cut in sharp lines and color breaks.
- 3.4 BACK PRIMING
- A. Unless specifically required to be provided by another section, prime all 6 of exterior wood before erection. Seal the backs of panels that might cup due to being finished only on one face.
- B. At the contractor's option, but strongly recommended by the Architect, perform as much backpriming as possible in the shop or manufacturing facility.
- 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 – NEW CONSTRUCTION
- A. All Ferrous Metal Surfaces; Galvanized and Non-Galvanized (Unprimed):
1st Coat: Tnemec "Tneme-Zinc" Series 90-97 (min. 3.0 mils DFT).
2nd Coat: Tnemec "Hi-Build Epoxoline" Series 66 (min. 3.0 mils DFT).
3rd Coat: Tnemec "Endurashield III" Series 73 (min. 3.0 mils DFT).
- B. All Ferrous Metal Surfaces (Shop Primed):
1st Coat: Tnemec "Hi-Build Epoxoline" Series 66 (min. 3.0 mils DFT).
2nd Coat: Tnemec "Endurashield III" Series 73 (min. 3.0 mils DFT).
- C. Millwork, Siding and Wood Trim Alkyd/latex - flat sheen:
1st Coat: MOR Moorwhite Primer 100 Alkyd Wood (2.1 mils DFT).
2nd Coat: MOR Moorlife Latex House Paint (1.5 mils DFT).
3rd Coat: MOR Moorlife Latex House Paint (1.5 mils DFT).
- D. Wood Surfaces Natural Finish:
1st Coat: S-W Penetrating Sealer/Stain.
2nd Coat: S-W Exterior Clear Alkyd Varnish Gloss.
3rd Coat: S-W Exterior Clear Alkyd Varnish Gloss.
4th Coat: S-W Exterior Clear Alkyd Varnish Gloss.
(2nd Coat, reduce 1 part mineral spirit/gallon; rub between coats with steel wool.)
- E. Exterior soffits to paint: Modified latex - low lustre:
1st Coat: MOR Morcraft Latex Enamel Undercoater #253 (1.2 mils DFT).
2nd Coat: MOR Morgard Latex Low Lustre #103 (1.1 mils DFT).
3rd Coat: MOR Morgard Latex Low Lustre #103 (1.1 mils DFT).
- F. PVC trim: Acrylic latex:
Coat 1: MOR MorLife Acrylic Latex Enamel Undercoater #253 (1.2 mils DFT).
Coat 2: MOR MorLife Acrylic latex Low Lustre #103 (1.1 mils DFT).
Coat 3: MOR MorLife Acrylic latex Low Lustre #103 (1.1 mils DFT).
Or equal "Duration" by Sherwin Williams
Or equal "Manor Hall" by PPG
Note: Verify proposed colors have a light reflectance value of 55 or greater.
- G. Fly Ash Polymeric Trim and Panels (factory primed):
1. Finish Coat: SW A-100 Satin Latex House & Trim Paint, Semigloss, or other sheen approved by Architect.

3.7 PAINTING SCHEDULE: EXISTING SURFACES

- A. In addition to the new surfaces specified to be painted, paint all existing surfaces to remain or which are affected by alteration work. In general, such surfaces are indicated on the finish schedule or shown on drawings. Such surfaces shall be given at least one finish coat; where one coat will not cover, provide 2 finish coats. Match quality of materials specified for new work. Touch-up work shall match the existing colors (except as otherwise directed) and shall be applied so that proper blending is assured as approved by the Architect.

END OF SECTION

Section 10 24 00 – GRILLS AND SCREENS

PART 1 – GENERAL

1.0 SUMMARY

A. Related Documents:

1. Attention is directed to the Contract and General Conditions and all Sections within Division 01 – General requirements, which are hereby made part of this section of the Specifications.
2. Division 4 - Masonry
3. Division 5 - Metals

1.1 DESCRIPTION

- A. Sweep both of the existing chimneys.
- B. Furnish and install new spark arrestor and bird screen for fireplace chimney and abandon furnace flue.
- C. A chase cover may also be considered for the furnace flue.

1.2 SUBMITTALS

- A. Product Data: Submit manufacturer's product data and installation instructions for each material and product used.
- B. Shop Drawings: Submit shop drawings indicating material characteristics, detail construction, connections and relationships with adjacent construction.
- C. Samples: Submit representative samples, indicate visual characteristics and finishes.

1.3 QUALITY CONTROL

- A. Coordinate spark arrestor and bird screen installation with the installation of cut stone chimney cap.
- B. Comply with government codes and regulations. Use experienced people. The Chimney Sweep to be certified by the Chimney Safety Institute of America.
- C. Provide products from acceptable manufacturers which have been in satisfactory used in similar service for three years. Handle and store materials in accordance with manufacturer's instructions.

- D. The subcontractor shall examine the site and become familiar with conditions that may affect the work covered by this division of the Specifications in order to obtain a conclusive bid. Failure to do so shall not lessen the subcontractor's responsibility or entitle him to additional compensation for work not included in the bid.

1.4 COORDINATION

- A. Coordinate with masonry subcontractor and roofing subcontractor.

PART 2 – PRODUCTS

2.1 GENERAL

- A. The following manufacturers that are acceptable include but are not limited to.
 - 1. National Chimney 800-897-8481, Olympia Chimney Supply, Burnard Dalsin MFG, 800-729-9505, other manufacturers approved by the Hearth, Patio and Barbecue Association will also be considered.
- B. The spark arrestor and bird screen is expected to be a top mount but other mounting techniques may also be considered.

PART 3 - EXECUTION

3.1 PREPARATION

- A. The two chimneys are to be properly swept by a licensed chimney sweep prior to installation of the new spark arrestor / bird screen or chase cover being installed.
- B. Make sure the chimney caps are in the proper position and prepared to receive the new hardware.
- C. Before purchasing the new spark arrestor / bird screen or chase cover measure the top of the chimney caps and the openings in the chimney cap to be covered.
- D. Make sure the new spark arrestor / bird screen or chase cover is larger than the whole being covered and smaller than the cap.

3.2 INSTALLATION

- A. Dry fit the new spark arrestor / bird screen or chase cover, square up over the hole and, using a drill with a masonry bit, drill pilot holes into the cap at several points around the sides of the cage through the mounting flange.
- B. Drive masonry screws through the flange, into the holes to secure the cage to the cap.

Historic Restoration, Cardinal Cottage, Trapelo Road, Waltham MS

- C. Attach the roof of the new spark arrestor / bird screen to the cage.
- D. Mix mortar and, using a trowel, spread mortar over the mounting flange. Sculpt the mortar so that it slopes down from the center to the cap in all directions. Ensure that water rolls off the cap rather than ponding.

1.1 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

SECTION 24 00 00 - Demolition

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract, Including general and Supplementary Conditions and Division 1 Specification of Division 1 Specifications sections, apply to this section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes the provision and installation of components described:

1. Providing Demolition with a limited Project Scope.
 - a. The project scope is limited to the building exterior with only support interior components. Reference drawings.
 - b. The project scope includes individual components that will be fully utilized in future phases of the project, namely, Site Work, Cardinal Cottage, Trapelo Road, Waltham MA and Interior Remodeling and Restoration, Cardinal Cottage, Trapelo Road, Waltham MA
 - c. The project scope is further limited to the components that touch and/or go through the building.
 - d. The demolition subcontractor is instructed to verify all existing site dimensions in field.

C. Section Includes:

1. The Subcontractor shall furnish services, skilled and common labor, and apparatus and materials required for the complete installation as shown and within the intent of the drawings and these Specifications.
2. Work includes, but is not limited to, the following and shall be completed in accordance with the project construction drawings and specifications:
 - a. Remove existing: radiators, electric wiring, electric light fixtures, radiator piping, gas piping.
 - b. Consult with Project Manager about additional items to be removed after abatement is completed.
 - c. The removal of the garage is to be part of the Site Work, Cardinal Cottage, Trapelo Road, Waltham MA project and is not to be part of this project.
 - d. Coordinate the removal of debris accumulated by other trades on site.
 - e. Manage the pick and drop off of the site dumpster.

D. Related Sections:

1. Division 01 all sections
2. Division 02
3. Division 06
4. Division 07
5. Division 22
6. Division 26
7. Division 31
8. Division 33

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Refer to Division 01 Section
- B. All work to be in compliance with the current residential building code for existing buildings.

1.3 SUBMITTALS

- A. Submit under provisions of Division 01
- B. Submit proof that material are being disposed of by legal means.
- C. In the event that the demolition contract observes an un-safe or otherwise questionable structural condition submit a statement describing the observation to the Project Manager.

1.4 QUALITY ASSURANCE

- A. Inspections: Refer to Division 01
- B. Quality Control: Refer to Division 01
- C. Materials and Equipment: Refer to Division 01
- D. If the Drawings or Specifications may not appear clear or definite, the Subcontractor shall request the Project Manager through 'Request for Information' (RFI) process for an interpretation and decision of same, and shall have such questions decided before proceeding with the Work.
- E. Protection of Equipment:
 - 1. Care shall be exercised during construction to avoid damage or disfigurement. Equipment shall be protected from dust and moisture prior to and during construction.
 - 2. Failure of the Subcontractor to protect the equipment as outlined herein shall be grounds for rejection of the equipment and its installation.
- F. Qualifications and License Requirements:
 - 1. Prime, Sub, or Sub-Sub contractor performing demolition work on the project shall have contractor License from the State of Massachusetts, USA.
 - 2. Subcontractor to provide details regarding what is being removed to the project manager
 - 3. Certified plumbers shall have evidence of certification in their possession at all times. Non-certified personnel shall perform electrical work under the continuous supervision of a certified plumber.
- G. Approval of Materials:
 - 1. Refer to Division 01
 - 2. A complete list of materials and equipment to be removed are to be submitted to the Project Manager for approval.

1.5 EXISTING CONDITIONS

- A. The Subcontractor shall examine the site and become familiar with conditions that may affect the work covered by this division of the Specifications in order to obtain a conclusive bid. Failure to do so shall not lessen the subcontractor's responsibility or entitle him to additional compensation for work not included in the bid.

1.6 COORDINATION

- A. Refer to Division 01
- B. Coordinate the location of the dumpster with the abatement contract and the Project Manager.

1.7 MAINTENANCE

- A. Maintenance and Operating Instructions:
 - 1. See Division 01

1.9 GENERAL

- A. In addition to material and equipment specified, the subcontractor shall also provide incidental materials required to effect a complete demolition.
- B. Progress is to be consistent and in recognition of the project schedule.

2 EXECUTION

2.1 TESTS

- A. In the event that additional testing information is needed about items it will be requested by the Project Manager

2.2 GENERAL DEMOLITION METHODS

- A. Demolition work is to be done keeping in mind the work of other contractors around you.
- B. Safety is the primary concern with the removal of the heavy timber in the basement.
- C. Work with other trades to insure that building loads are adequately supported while demolition work is going on.
- D. If there is a question about the adequacy of temporary or completed structures contact the Project Manager. Submit a report documenting the observation.

- E. Provide all necessary equipment for accurate sawing and cutting.

END OF SECTION 22 00 00

SECTION 26 00 00 - ELECTRICAL

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract, including general and Supplementary Conditions and Division 1 Specification of Division 1 Specifications sections, apply to this section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes the provision and installation of components described:

1. Providing Electrical work with a limited Project Scope.
 - a. The project scope is limited to the building exterior with only support interior components. Reference drawings.
 - b. The project scope includes individual components that will be fully utilized in future phases of the project, namely, Site Work, Cardinal Cottage, Trapelo Road, Waltham MA and Interior Remodeling and Restoration, Cardinal Cottage, Trapelo Road, Waltham MA.
 - c. The project scope is further limited to the components that touch and/or go through the building.
 - d. The electrical subcontractor is instructed to verify all existing site dimensions in field.

C. Section Includes:

1. The Electrical Subcontractor shall furnish services, skilled and common labor, and apparatus and materials required for the complete installation as shown and within the intent of the drawings and these Specifications.
2. Work includes, but not limited to, the following and shall be completed in accordance with the project construction drawings and specifications:
 - a. Install a new electric service for (2) dwelling units.
 - b. Each new electrical service to be a 200 amp service (208/120-1ph)
 - c. Each having a 42-breaker panel, a general standard single residence service.
 - d. Install exterior lighting on the front and rear porches as shown on drawings,
 - e. Install exterior duplex receptacles as shown on drawings,
 - f. Include electrical for future air conditioning equipment.
 - g. Install the minimum amount of interior lighting as required by the section 105 CMR Department of Public Health, Minimum Standards of Fitness for Human Habitation (State Sanitary Code, Chapter 2, with specific reference to sections 410.254 and 410.354

D. Related Sections:

1. Division 01 all sections
2. Division 06 Section 06 01 47 "Rough Carpentry Repairs and Framing", Section 06 16 10 "Wood Sheathing", Section 06 46 10 "Exterior Trim and Molding"
3. Division 07 Section 07 31 30 "Foam Gap Insulation"
4. Division 22
5. Division 31
6. Division 33

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01 Section "General Requirements" for the list of applicable regulatory requirements.
- B. ANSI/NFPA 70 - National Electrical Code.
- C. ANSI - American National Standards Institute
- D. Illuminating Engineering Society of North America (IES)
- E. LBNL Facilities Department Lateral Force Design Criteria.
- F. National Electrical Safety Code (NESC)
- G. NFPA – National Fire Protection Association:
 - 1. Standard for Electrical Safety in the Workplace (NFPA 70E)
- H. NETA ATS - Acceptance Testing Specifications for Electrical Power Distribution Equipment and Systems

1.3 SUBMITTALS

- A. Submit under provisions of Division 01 Section "General Requirements" Paragraph 1.8.A, Submittals, and Division 01 Section "Special Procedures" Paragraph 1.6, Drawings and Specifications and as required by other sections of the Specifications.
- B. Shop Drawings: The Subcontractor shall submit for approval Shop Drawings prepared in accordance with Division 01 Section "General Requirements", Paragraph 1.11.E and as required by other sections of the Specifications.

1.4 QUALITY ASSURANCE

- A. Inspections: Refer to Division 01 Section 1.10 Procedures and Controls, Paragraph P "Quality Controls and Testing". Electrical Contractor to pull his or her own permits and have his or her own work inspected by city inspectional services.
- B. Quality Control: Refer to Division 01 Section 1.10 Procedures and Controls, Paragraph P "Quality Controls and Testing".
- C. Materials and Equipment: Refer to Division 01 Section "General Requirements" Paragraph 1.12, "Warrantees"
- D. If the Drawings or Specifications may not appear clear or definite, the Subcontractor shall request the Project Manager through 'Request for Information' (RFI) process for an interpretation and decision of same, and shall have such questions decided before proceeding with the Work.

- E. Manufacturer's Directions: Follow manufacturer's directions covering points not shown on the drawings or specified herein. Manufacturer's directions do not take precedence over drawings and Specifications. Where these are in conflict with the Drawings and Specifications, notify the Project Manager for clarification before installing the work.

- F. Protection of Equipment:
 - 1. Care shall be exercised during construction to avoid damage or disfigurement. Equipment shall be protected from dust and moisture prior to and during construction. The Subcontractor is cautioned that concrete finishing, painting, etc. in electrical rooms shall not proceed if unprotected equipment is installed.
 - 2. Where required or directed, construct temporary protection for equipment and installations so as to protect same from dust and debris caused by construction.
 - 3. All protection shall be substantially constructed with the use of clean canvas, heavy plastic, Visqueen and plywood as required and made tight and dust proof as directed.
 - 4. The Subcontractor shall repair by spray or brush painting, after properly preparing the surface, scratches or defects in the finish of the equipment. Only identical paint furnished by the equipment manufacturer shall be used for such purposes.
 - 5. Failure of the Subcontractor to protect the equipment as outlined herein shall be grounds for rejection of the equipment and its installation.

- G. Qualifications and License Requirements:
 - 1. Prime, Sub, or Sub-Sub contractor performing electrical construction work on the project shall have C-10 Electrical Construction License from the State of California, USA.
 - 2. Subcontractor performing electrical construction work shall provide details of the project experience addresses and references with names and phone numbers.
 - 3. Certified electricians shall have evidence of certification in their possession at all times. Non-certified personnel shall perform electrical work under the continuous supervision of a certified electrician.

- H. Materials and Equipment: Materials and equipment shall be new. Materials and equipment for which tests have been established by Underwriter's Laboratories, Inc. shall be approved by that body and shall bear its label of approval or the label of an OSHA approved nationally recognized testing laboratory [NRTL].
 - 1. In lieu of label or listing by Underwriter's Laboratories, Inc. or NRTL, consideration will be given to certified test reports of an adequately equipped, recognized independent test laboratory competent to perform such testing indicating conformance to requirements of the applicable Underwriter's Laboratories, Inc. standards.
 - 2. Unless otherwise approved by the Project Manager, the materials to be furnished under this Specification shall be the standard products of manufacturers regularly engaged in the production of such equipment equal to or superior to material specified, and shall be the manufacturer's latest standard design that complies with the Specification requirements.

- I. Approval of Materials:
 - 1. Refer to Division 01 Section "General Requirements" Paragraph 1.8.
 - 2. A complete list of materials and equipment proposed shall be submitted to the Project Manager for approval. The list shall include for each item: the manufacturer, the manufacturer's catalog number, type or class, the rating, capacity, size, etc.
 - 3. The Subcontractor shall submit a brochure containing catalog cuts or drawings and data for, but not limited to, the following items:
 - 4. Before installation of the equipment, the Subcontractor shall submit for approval detailed construction drawings for each item of fabricated equipment required for the electrical installation. Drawings shall be to scale and fully dimensioned and shall provide sufficient detail to clearly indicate the arrangement of equipment and its components.

5. Installation of approved substituted equipment is the Subcontractor's responsibility, and changes required to work included under other divisions for installations of approved substituted equipment must be made to the satisfaction of the Architect-Engineer and without change in contract price. Approval by the Architect-Engineer of substituted equipment and/or dimension drawings does not waive these requirements.

1.5 EXISTING CONDITIONS

- A. The Subcontractor shall examine the site and become familiar with conditions that may affect the work covered by this division of the Specifications in order to obtain a conclusive bid. Failure to do so shall not lessen the subcontractor's responsibility or entitle him to additional compensation for work not included in the bid.
- B. The electrical prime, sub or sub-sub contractor shall list separately in the bid quote exceptions taken from the construction documents and specifications. If none are specified in the bid quote, it shall be understood that the prime, sub or sub-sub contractor shall comply with the requirements of the construction documents and specifications in their entirety.

1.6 COORDINATION

- A. Refer to Division 01 Section "General Requirements" Paragraph 1.7.

1.7 MAINTENANCE

- A. Maintenance and Operating Instructions:
 1. See Division 01 Section 1.17 Delivery, Storage and Handling
 2. At time of occupancy, arrange for manufacturer's representatives to instruct building, operating and maintenance personnel in the use of equipment requiring operating and maintenance. Arrange for personnel to be instructed at one time. Pay the costs for such service.
 3. Maintenance and operating instructions and training for CONTRACTOR'S equipment will be provided by the equipment vendor. The Subcontractor shall be responsible for other equipment.

1.8 WARRANTY

- A. Refer to Division 01 Section "General Requirements" Paragraph 1.12, "Warrantees"

1.9 GENERAL

- A. In addition to material and equipment specified, the Subcontractor shall also provide incidental materials required to effect a complete installation. Such incidental materials include solders, tapes, caulking, mastics, gaskets and similar items that are approved for the purpose.
- B. Materials and equipment shall be uniform throughout the installation. Equipment of the same type shall be of the same manufacturer. Materials and equipment shall be new. Materials and equipment for which tests have been established by the Underwriter's Laboratories, Inc. shall have been approved by that body, or an equivalent testing firm (see Paragraph 1.4.C), and shall bear its label of approval.

PART 2 - EXECUTION

2.1 TESTS

- A. Upon completion of the electrical construction work, perform tests and provide test reports as specified in this and other sections.
- B. Tests shall be made in the presence of an LBNL Inspector or designated representative. The application or interruption of power shall be programmed and directed by the Project Manager.
- C. The Subcontractor shall submit to the Project Manager three (3) copies of test results, certified in writing, witnessed, signed and dated, immediately upon completion of work. Unsatisfactory condition revealed by these test results, or unsatisfactory methods of tests and/or testing apparatus and instruments, shall be corrected by the Subcontractor to the satisfaction of the Project Manager.
- D. The Project Manager reserves the right to require that the Subcontractor perform and repeat tests that are deemed necessary to complete or check the tests or the certified records of the Subcontractor at any time during the course of the work. The Subcontractor shall correct unsatisfactory portion of his work that is revealed by the tests or that may be due to progressive deterioration during this period, unless the item in question was a direct specification.

2.2 ARC FLASH HAZARD WARNING LABELING

- A. Switchgear, switchboards, panelboards, industrial control panels, motor control centers, and meter panels/enclosures shall be labeled to warn qualified persons of potential electric shock and/or
- B. Labels shall, as a minimum, display the following:
 - 1. Incident energy in Calories/cm² at the working distance.
 - 2. Flash hazard boundary distance.
 - 3. Personal protective equipment (PPE) category per NFPA 70E.
 - 4. Shock hazard voltage when covers are removed.
 - 5. Glove Class with leather protectors.
 - 6. Limited approach boundary.
 - 7. Restricted approach boundary.
 - 8. Prohibited approach boundary.

2.3 EQUIPMENT IDENTIFICATION

- A. Electrical Service: To include the mast with no less than two attachment points back to the wall, mast is to be one point or a minimal amount of joints. A weather head with a conductor separator. Include all the necessary accessory components of a complete unit. Tie to meters as require. Coordinate with Energy Provider.
- B. Panelboards: Panel boards shall be identified by circuit number, voltage, phase, and wire as shown on drawings or specified elsewhere in these Specifications.
- C. Schedules: Panelboards shall be furnished with a complete 8-1/2" x 11" typewritten schedule mounted on the inside of the inner door. If field changes are necessary, new schedules shall be provided by the Subcontractor. Forms will be provided by the Project Manager.

- D. Receptacles and Light Switches: Receptacles and light switches shall be identified by a circuit number as indicated on the drawings with 1/4 inches (6 mm) high white characters on 1/2 inch (12 mm) wide dark contrasting stick-on embossing tape placed directly above the device.
- E. Equipment: Properly identify circuit breakers and other devices on switchboards, motor disconnect switches, starters, time clocks, and other apparatus used for operation of, or control of circuits, appliances or equipment by means of 3/32 inch thick black laminated phenolic nameplate with white core. For switchboards and panelboards, fed by standby or emergency power sources, use 3/32-inch thick yellow laminated phenolic nameplate with black core. Engrave characters a minimum of 1/2 inch size for device numbers, except that transformer bank identification shall use a minimum size of 1-1/2 inch character height and 15kV switchgear shall use 1 inch character height, Helvetica style font. Attach nameplates with No. 4-36 RH nickel-plated brass machine screws.
- F. Conductors: The main incoming power will be delivered to the building site with the A phase, B phase, C phase and Neutral phase (if applicable) cables positively identified. The phase sequence rotation shall be A-B-C clockwise.
 - 1. Conductors shall be identified using plastic or metal labels, factory colored wires or by using color bands or tape intended for the purpose and approved for wet, outdoor applications at terminations, junctions and wherever the conductors are accessible in pull boxes. Phases of 12.47 kV conductors shall be identified with tags. Conductors are not color coded, but identified as "A Phase", "B Phase", and "C Phase".
 - 2. For color coding of low voltage conductors, see Division 26 Section "600 Volt Conductors and Cable", Paragraph 2.1.
 - 3. Feeder circuit cables shall be identified with embossed metal or plastic labels with 1/2" characters permanently attached to the feeder circuit cables. Feeder circuits shall be identified with the circuit number per the drawings.
 - 4. Branch circuit identification shall be by use of wrap-around labels such as manufactured by Brady, Thomas and Betts, or equal. Labels shall be placed on conductors at outlets (switch, receptacle, fixture, etc.), panelboards, junction boxes, relays, disconnect switches, motor starters, and controls. Branch circuit conductors shall be identified with the circuit number.

2.4 NOISE AND VIBRATION

- A. The Subcontractor shall cooperate in reducing objectionable noise or vibration. If noise or vibration is a result of improper material or installation, these conditions shall be corrected at no cost to the University.

2.5 GENERAL INSTALLATION METHODS

- A. Carpentry, Cutting, Patching, and Core Drilling:
 - 1. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment specified in the scope of work.
 - 2. Do not cut, core, or drill structural members without consent of the Project Manager.
 - 3. Seismic Mounting: Electrical material and equipment, including floor mounted equipment, suspended raceways and light fixtures, shall be installed with bracing, cabling, or anchoring to comply with the latest edition of the CBC and Standard and Division 01 Section "Lateral Force Provisions." See 031500 – Concrete Accessories for approved anchors.
- B. Waterproof Construction:

1. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashings at exterior roof penetrations. Caulk penetrations of foundation walls and floors watertight. Provide membrane clamps at penetrations of waterproof membranes.
 2. Provide waterproof NEMA 3R enclosures for equipment or devices mounted outside or otherwise exposed to the weather.
- C. Sleeves, Conduit Stubs, and Slab Penetrations: See Division 09 Section "Painting".
- D. Painting of Electrical Equipment and Hardware:
1. Provide moisture resistant paint for exterior painting.
 2. Colors shall be as shown on the drawings unless specified.
 3. Refer to individual Sections and Construction Drawings for painting requirements of electrical equipment.
 4. Exposed conduits, raceways and gutters inside and outside the building shall be painted to match the wall color.
- E. Equipment Concrete Pads:
1. Equipment located on concrete floors inside the building or on grade outside the building, shall be mounted on a concrete base. The concrete base shall be four inches high and shall extend six inches beyond the edge of equipment base unless indicated otherwise on drawings.
 2. Coordinate concrete bases: Concrete bases indicated on Architectural or Structural drawings are specified in other Divisions. Concrete bases not on Architectural or Structural drawings are requirements of this Division.
- F. Seismic Anchorage:
1. Seismic anchorage of electrical equipment shall be in accordance with Division 01 Section "Lateral Force Procedures". See 031500 – Concrete Accessories for approved anchors.
- G. Demolition and Removal:
1. Refer to construction documents for demolition and removal details.
 2. LBNL EH&S approval shall be obtained prior to disposal of electrical equipment and materials.
 3. Disconnected wiring shall be removed from raceway systems, panels, enclosures pull boxes, junction boxes etc. irrespective of whether the removal is specified in the construction documents or not. The empty raceway systems shall be tagged spare on both ends of each termination.

END OF SECTION 26 00 00

SECTION 31 00 00 EARTHWORK

PART 1 - GENERAL

1.1 SUMMARY

A. Related Documents:

1. Drawings and general provisions of the Contract, Including general and Supplementary Conditions and Division 1 Specification of Division 1 Specifications sections, apply to this section.
2. Review these documents for coordination with additional requirements and information that apply to work under this Section.

B. Section Includes the provision and installation of components described:

1. Providing Earthwork with a limited Project Scope.
 - a. The project scope is limited to the building exterior with only support interior components. Reference drawings.
 - b. The project scope includes individual components that will be fully utilized in future phases of the project, namely, Site Work, Cardinal Cottage, Trapelo Road, Waltham MA and Interior Remodeling and Restoration, Cardinal Cottage, Trapelo Road, Waltham MA.
 - c. The earthwork subcontractor is instructed to verify all existing site dimensions in field.

C. Section Includes:

1. The Earthwork Contractor shall furnish services, skilled and common labor, and apparatus and materials required for the complete installation as shown and within the intent of the drawings and these Specifications.
2. Work includes, but not limited to, the following and shall be completed in accordance with the project construction drawings and specifications:
 - a. Trenching and the installation of subterranean pipes that drain the roof downspouts to the back slope of the driveway are required on the south side of the building, see drawings.
 - 1) The subterranean pipes are to be an assembly of schedule 80 PVC pipe.
 - 2) A clean out will be included in each pipe assembly.
 - 3) The pipe assembly will be set below frost depth.
 - 4) The pipe assembly will be pitched toward the south at one quarter of an inch per foot.
 - 5) Where the pipe is day-lighted on the south side of the driveway a bed of 1-1/2" aggregate is to be placed on top of a geotextile mat that is approximately 2ft. in width and 5ft. in length.
 - 6) Where the pipe is day-lighted on the south side of the driveway is to be marked.
 - 7) The backfill of the trench is to be compacted and the asphalt is to be applied repairing the driveway to pre-construction conditions.

- 8) Where the downspout leader passes through the handicap access ramp a larger diameter plastic sleeve is to be used to pass the downspout leader through the ramp foundation.
- 9) Trees indicated on the plan are to be removed and the stumps ground down to 12" below surrounding grade. Where the new concrete stair is located at the front entrance the stump grinding will be deeper.
- 10) The existing stone walls are to remain in place and as is.
- 11) Removal of ground debris within ten feet of the building, pine needles, low lying shrubbery, decays leaves. Leave top soil.
- 12) After work is completed, reseed with grass.

D. Related Sections:

1. Division 01
2. Division 06
3. Division 07
4. Division 33

1.2 REFERENCES

A. General:

1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
3. Refer to Division 01
4. Definitions
 - a. Project limits: The fenced in area described in the contract document.
 - b. Bedding: Ground Support in which the pipe is laid
 - c. Compaction: Tamping by hand or machine to achieve required density in soils.
 - d. Excavation: Area or material removed to provide a suitable base for improvement.
 - e. Fill: The material placed above the original or natural ground line.
 - f. Service Connection: Any connection from the main line utility or storm drain to a property line for the proposed for providing service to an individual property.
 - g. Trench: Any excavation for a utility of drainage system
 - h. Non-Frost Susceptible Material: Non organic soil containing less than three percent (3%) by weight of grains smaller than .02 mm obtained from minus three inch (-3") material.
 - i. Unsuitable or Unstable Material: The subgrade material may consist of any material which is, in the opinion of the Project Manager to be inadequate for the use in the proposed construction.
 - j. Fill dirt: Dirt without rocks.

1.3 Submittals

- B. Submit under Division 01
- C. Shop Drawings: The Earthwork Contractor shall submit for approval Shop Drawings prepared in accordance with Division 01 showing the downspout leader pipe assembly.

1.4 QUALITY ASSURANCE

- D. Inspections: Refer to Division 01 Earthwork Contractor to pull his or her own permits and have his or her own work inspected by city inspectional services if required.
- E. Quality Control: Refer to Division 01
- F. Materials and Equipment: Refer to Division 01
- G. If the Drawings or Specifications may not appear clear or definite, the Earthwork Contractor shall request the Project Manager through 'Request for Information' (RFI) process for an interpretation and decision of same, and shall have such questions decided before proceeding with the Work.
- H. Earthwork Contractor to avoid having open trenches for extended periods of time. Coordinate with other contractors and utility providers. Trenches left open overnight are to be clearly marked. Trenches that have been left to be affected by weather are to be retrenched
- I. Protection of Equipment:
 - 1. Care shall be exercised during construction to avoid damage or disfigurement. Equipment shall be protected from dust and moisture prior to and during construction.
 - 2. Failure of the Earthwork Contractor to protect the equipment as outlined herein shall be grounds for rejection of the equipment and its installation.
- J. Qualifications and License Requirements:
 - 1. Earthwork Contractor performing excavation work shall have an active licensing.
- K. Approval of Materials:
 - 1. Refer to Division 01
 - 2. A complete list of materials and equipment proposed shall be submitted to the Project Manager for approval.
 - 3. Approval by the Architect-Engineer of substituted equipment is requirements.

1.5 EXISTING CONDITIONS

- A. The Earthwork Contractor is instructed to call "Dig Safe" before any excavation takes place. The Earthwork Contractor shall examine the site and become familiar with the conditions that may affect the work covered by this division of the Specifications in order to obtain a conclusive bid. Failure to do so shall not lessen the subcontractor's responsibility or entitle him to additional compensation for work not included in the bid.
- B. The Earthwork Contractor shall list separately in the bid quote exceptions taken from the construction documents and specifications. If none are specified in the bid quote, it shall be

understood that the prime, sub or sub-sub contractor shall comply with the requirements of the construction documents and specifications in their entirety.

- C. With regard to Contaminated Materials the owner is not aware of any contaminated materials within the project limits.
- D. Existing stone walls are to remain in place and as is.

1.6 COORDINATION

- A. REFER TO DIVISION 01
- B. Work with the other trades to coordinate the new trench installation, when the trenches are open, when the piping is put into place, when the inspections are to take place and when to back-fill the trenches.

1.7 MAINTENANCE

- A. Maintenance and Operating Instructions:
 - 1. See Division 01
 - 3. The contractor shall be responsible for time delays due to equipment failure.

1.8 WARRANTY

- A. Refer to Division 01

1.9 GENERAL

- A. In addition to material and equipment specified, the Subcontractor shall also provide incidental materials required that effect the completion of the installation. Such Incidental materials include but are not limited to the schedule 80 PVC pipe, fittings clean outs, reducer and glue needed for the downspout leaders. The geotextile fabric for the day-lighted end of the downspout leader, aggregates, sand and fill dirt. Materials and equipment shall be uniform throughout the installation. Equipment of the same type shall be of the same manufacturer. Materials and equipment shall be new.

2 EXECUTION

2.1 TESTS

- A. In the event that additional information is needed it is important to upon completion of the subterranean pipe installation work, perform a test and provide a test report.
- B. The Project Manager, Architect or Owner reserves the right to require the Subcontractor to perform tests until a positive result is achieved.

2.2 GENERAL INSTALLATION METHODS

- A. Install a plastic sleeve of a larger diameter than that used for downspout leader through the proposed concrete handicap access ramp foundation.
- B. If Unsuitable or Unstable Material is found in the excavation process alert the Project Manager, Architect and or Owner. Do not use yard debris for backfill.
- C. The characteristics of the excavation consist of an trench dug 8" deeper than the finished depth of the pipe.
 1. The bottom of the trench install and compact 6" of $\frac{3}{4}$ " angular aggregate, crushed limestone.
 2. On top of the compacted aggregate create a bed of 2" of sand for each the down spout leader assemble consisting of a chemically welded together Into a complete assembly ready for back fill. Each leader is to be tested and leaks repaired prior to backfill.
 3. Cover the pipe completely with sand and then backfill with fill dirt in 12" lifts and compact between lifts.
- D. Allow for 12" of total compacted fill to repair the driveway. The compacted fill is to consist of:
 1. 4" of $\frac{3}{4}$ " angular aggregate, crushed limestone.
 2. 2" of sand
 3. 6" of asphalt
- E. Where downspout meets the downspout leader, mortar is to be used to fill in around the downspout pipe.

END OF SECTION 31 00 00

SECTION 33 00 00 UTILITES

PART 1 - GENERAL

1.1 SUMMARY

- A. Related Documents:
 - 1. Drawings and general provisions of the Contract, Including general and Supplementary Conditions and Division 1 Specification of Division 1 Specifications sections, apply to this section.
 - 2. Review these documents for coordination with additional requirements and information that apply to work under this Section.
- B. Section Includes the provision and installation of components described:
 - 1. Providing Utilities with a limited Project Scope.
 - a. The project scope is limited to the building exterior with only support interior components. Reference drawings.
 - b. The project scope includes individual components that will be fully utilized in future phases of the project, namely, Site Work, Cardinal Cottage, Trapelo Road, Waltham MA and Interior Remodeling and Restoration, Cardinal Cottage, Trapelo Road, Waltham MA.
- C. Section Includes:
 - 1. The Utility Provider shall furnish services, skilled and common labor, and apparatus and materials required for the complete installation as shown and within the intent of the drawings and these Specifications.
 - 2. Work includes, but not limited to, the following and shall be completed in accordance with the project construction drawings and specifications:
 - a. The new electrical service will include the installation of new electrical conductors off of pole and to the house. Eversource, Massimiliano Leto, 781-441-3453, masshomeservicesinc@gmail.com
 - 1) The electrical service will take into account the requirements spelled out in the Information and Requirements for Electrical Service booklet for electricians and Architects produced by NSTAR electric in 2009.
 - 2) new electrical service is to accommodate (2) 200 amp electrical services (208/120 -1ph)
- D. Related Sections:
 - 1. Division 01 all section
 - 2. Division 06 Section 06 01 47 "Rough Carpentry Repairs and Framing", Section 06 16 10 "Wood Sheathing", Section 06 46 10 "Exterior Wood Trim and Molding"
 - 3. Division 07 Section 07 31 30 "Foam Gap Insulation"
 - 4. Division 26 - Electrical

1.2 REFERENCES

- A. General:
 - 1. The following documents form part of the Specifications to the extent stated. Where differences exist between codes and standards, the one affording the greatest protection shall apply.
 - 2. Unless otherwise noted, the referenced standard edition is the current one at the time of commencement of the Work.
 - 3. Refer to Division 01
- B. All work to be in compliance with National Electrical Code and NFPA72.

1.3 Submittals

- A. Submit under Division 01
- B. Shop Drawings: The Subcontractor shall submit for approval Shop Drawings prepared in accordance with Division 01
- C. Proof of inspection.

1.4 QUALITY ASSURANCE

- A. Inspections: Refer to Division 01 Utility Contractor to pull his or her own permits and have his or her own work inspected by city inspectional services.
- B. Quality Control: Refer to Division 01
- C. Materials and Equipment: Refer to Division 01
- D. If the Drawings or Specifications may not appear clear or definite, the Subcontractor shall request the Project Manager, Architect or Owner through 'Request for Information' (RFI) process for an interpretation and decision of same, and shall have such questions decided before proceeding with the Work.
- E. Manufacturer's Directions: Follow manufacturer's directions covering points not shown on the drawings or specified herein. Manufacturer's directions do not take precedence over drawings and Specifications. Where these are in conflict with the Drawings and Specifications, notify the Project Manager for clarification before installing the work.
- F. Protection of Equipment:
 - 1. Care shall be exercised during construction to avoid damage or disfigurement. Equipment shall be protected from dust and moisture prior to and during construction.
 - 2. Failure of the Subcontractor to protect the equipment as outlined herein shall be grounds for rejection of the equipment and its installation.
- G. Qualifications and License Requirements:
 - 1. Prime, Sub, or Sub-Sub contractor performing electrical construction work on the project shall have active licensing.
 - 2. Subcontractor performing utility construction work shall provide details of the project experience addresses and references with names and phone numbers.

3. Certified utility construction contractors shall have evidence of certification in their possession at all times. Non-certified personnel shall perform electrical work under the continuous supervision of a certified electrician.

H. Approval of Materials:

1. Refer to Division 01
2. A complete list of materials and equipment proposed shall be submitted to the Project Manager, Architect or Owner for approval. The list shall include for each item: the manufacturer, the manufacturer's catalog number, type or class, the rating, capacity, size, etc.
3. The Subcontractor shall submit a brochure containing catalog cuts or drawings and data for, but not limited to, the following items:
4. Before installation of the equipment, the Subcontractor shall submit for approval detailed construction drawings for each item of fabricated equipment required for the electrical installation. Drawings shall be to scale and fully dimensioned and shall provide sufficient detail to clearly indicate the arrangement of equipment and its components.
5. Installation of approved substituted equipment is the Subcontractor's responsibility, and changes required to work included under other divisions for installations of approved substituted equipment must be made to the satisfaction of the Architect-Engineer and without change in contract price. Approval by the Architect-Engineer of substituted equipment and/or dimension drawings does not waive these requirements.

1.5 EXISTING CONDITIONS

- A. The Subcontractor shall examine the site and become familiar with conditions that may affect the work covered by this division of the Specifications in order to obtain a conclusive bid. Failure to do so shall not lessen the subcontractor's responsibility or entitle him to additional compensation for work not included in the bid.
- B. The utility prime, sub or sub-sub contractor shall list separately in the bid quote exceptions taken from the construction documents and specifications. If none are specified in the bid quote, it shall be understood that the prime, sub or sub-sub contractor shall comply with the requirements of the construction documents and specifications in their entirety.

1.6 COORDINATION

- A. REFER TO DIVISION 01

1.7 MAINTENANCE

- A. Maintenance and Operating Instructions:
 1. See Division 01
 2. At time of occupancy, arrange for manufacturer's representatives to instruct

building, operating and maintenance personnel in the use of equipment requiring operating and maintenance. Arrange for personnel to be instructed at one time. Pay the costs for such service.

3. Maintenance and operating instructions and training for CONTRACTOR'S equipment will be provided by the equipment vendor. The Subcontractor shall be responsible for other equipment.

1.8 WARRANTY

- A. Refer to Division 01

1.9 GENERAL

- A. In addition to material and equipment specified, the Subcontractor shall also provide incidental materials required to effect a complete installation. Such incidental materials include solders, tapes, caulking, mastics, gaskets and similar items that are approved for the purpose.
- B. Materials and equipment shall be uniform throughout the installation. Equipment of the same type shall be of the same manufacturer. Materials and equipment shall be new. Materials and equipment for which tests have been established by the Underwriter's Laboratories, Inc. shall have been approved by that body, or an equivalent testing firm (see Paragraph 1.4.C), and shall bear its label of approval.

2.0 EXECUTION

2.1 TESTS

- A. Upon completion of the utility construction work, perform tests and provide test reports as specified in this and other sections.
- B. The Project Manager, Architect or Owner reserves the right to require the Subcontractor to perform tests to confirm a positive result.
- C. The Project Manager reserves the right to require that the Subcontractor perform and repeat tests that are deemed necessary to confirm a positive result. The Subcontractor shall correct unsatisfactory portion of his work that is revealed by the tests or that may be due to progressive deterioration during this period, unless the item in question was a direct specification.

2.2 GENERAL INSTALLATION METHODS

- A. Reference Division – 6 Carpentry, cutting, patching, and core drilling:
 1. Provide carpentry, cutting, patching, and core drilling required for installation of material and equipment specified in the scope of work.
 2. Do not cut, core, or drill structural members without consent of the Project Manager.
- B. Waterproof Construction:
 1. Maintain waterproof integrity of penetrations of materials intended to be waterproof. Provide flashings at exterior roof penetrations. Caulk penetrations of foundation walls and floors watertight. Provide membrane clamps at penetrations of waterproof membranes.

2. Provide waterproof NEMA 3R enclosures for equipment or devices mounted outside or otherwise exposed to the weather.
3. Employ the use of Sleeves, Conduit Stubs, and Slab Penetrations

END OF SECTION 33 00 00

COORDINATION

Provide coordination to door schedule with the door schedule contractor.
 Establish location for:
 a. On-site storage
 b. Dumpster for construction debris

EXTERIOR MATERIALS REMOVAL

Follow up After Removing Existing Materials:

The objective is to provide protection to the parts of the house that have value after the existing building cladding is removed.

Cladding = the existing siding and roofing that is on the building.

After the cladding is removed:

- Inspect existing substrate material, remove and replace existing defective materials
- Remove existing nails that stick up, make surface flat.
- Cover the substrate and protect from weather
- Don't leave substrate material exposed overnight
- Don't remove more cladding than can be effectively covered with the materials and man-power immediately available to cover it.

After the window sashes are removed and the surface finish is removed from the window boxes:

- Board up the opening
- Some blocking may be required to properly secure the board up
- Make the board up and the blocking easy to remove

TREATMENT OF SELECTIVE BUILDING COMPONENTS

Detailed building component removal

The objective is to take down components of the interior environment, remove the paint finishes and make the selected components available for re-finishing and reinstallation when the client decides to remodel the building interiors.

The selected interior building components include but are not limited to:

- First floor front room, window trim, sills and stops
- First floor front room, doors*, door trim and wall base
- First and second floor fireplace surrounds***
- Stair foyer, stair and second floor landing, window trim, sills and stops
- Stair foyer, stair and second floor landing, door*, door trim and wall base
- First and second floor bathroom and dining room built in cabinet doors* and door trim
- Selected interior doors*, door jambs and head (See door schedule, SHT. A1.1)
- Interior window trim, sills, stools and stops

These building components are to be carefully removed to receive special treatment.

Specifically,

The first floor front room window trim is to be numbered in clockwise order and numerically identified back to the opening where they were removed from.

The first floor front room door trim and wall base is to be numbered in clockwise order and numerically identified back to the opening and the walls where they were removed from.

The stair foyer and second floor landing window trim is to be numbered in clockwise order and numerically identified back to the opening where they were removed from.

The stair foyer and second floor landing door trim and wall base is to be numbered in clockwise order and numerically identified back to the opening and the walls where they were removed from.

The first and second floor bathroom and dining room built in cabinet doors are to be numerically identified back to the location where they were removed from.

The interior doors, door jambs and head are to be numerically identified back to the opening where they were removed from. (See door schedule, SHT. A1.1)

These interior building components are to have all of the paint chemically removed and brought back to the building and placed in close proximity to where they were removed from to be later re-installed as part of the upcoming interior remodeling.

* = the glass in the door is to be numerically identified back to the opening where it was removed from. Hardware on doors and door trim is to be removed, saved and numerically identified back to the door it was removed from.

** = door components may be broken or badly damaged. All available pieces of the door are to be kept together and go through the same treatment as the whole pieces of the door.

*** = fireplace surround mirrors may be broken or badly damaged. Replace with new to match existing.

Other selected interior building components to receive special treatment include:

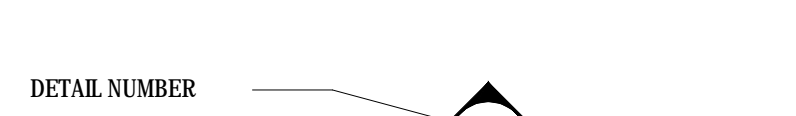
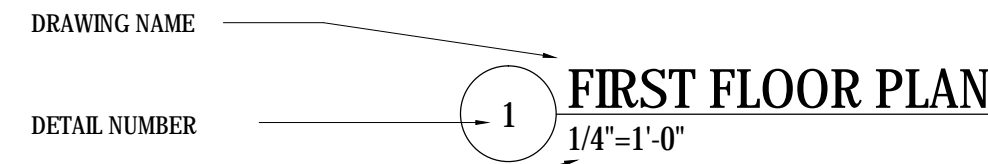
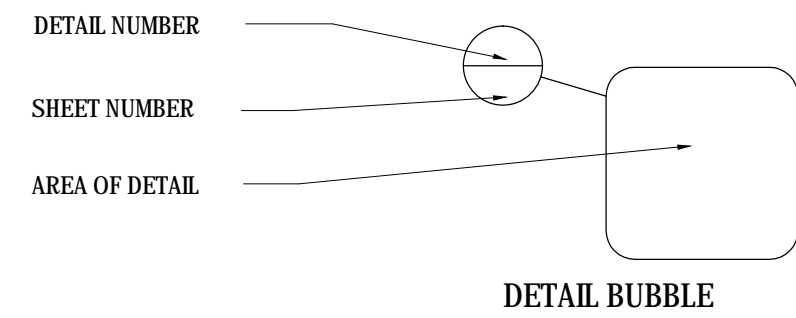
- Painted window stools.
- Painted window stops on jambs and at head

Specifically:

These building components are to be numbered in clockwise order and numerically identified back to the opening where they were removed from.

These interior building components are to have all of the paint chemically removed and brought back to the building and placed in close proximity to where they were removed from to be later altered and re-installed as part of the sash replacement process.

GRAPHIC STANDARDS



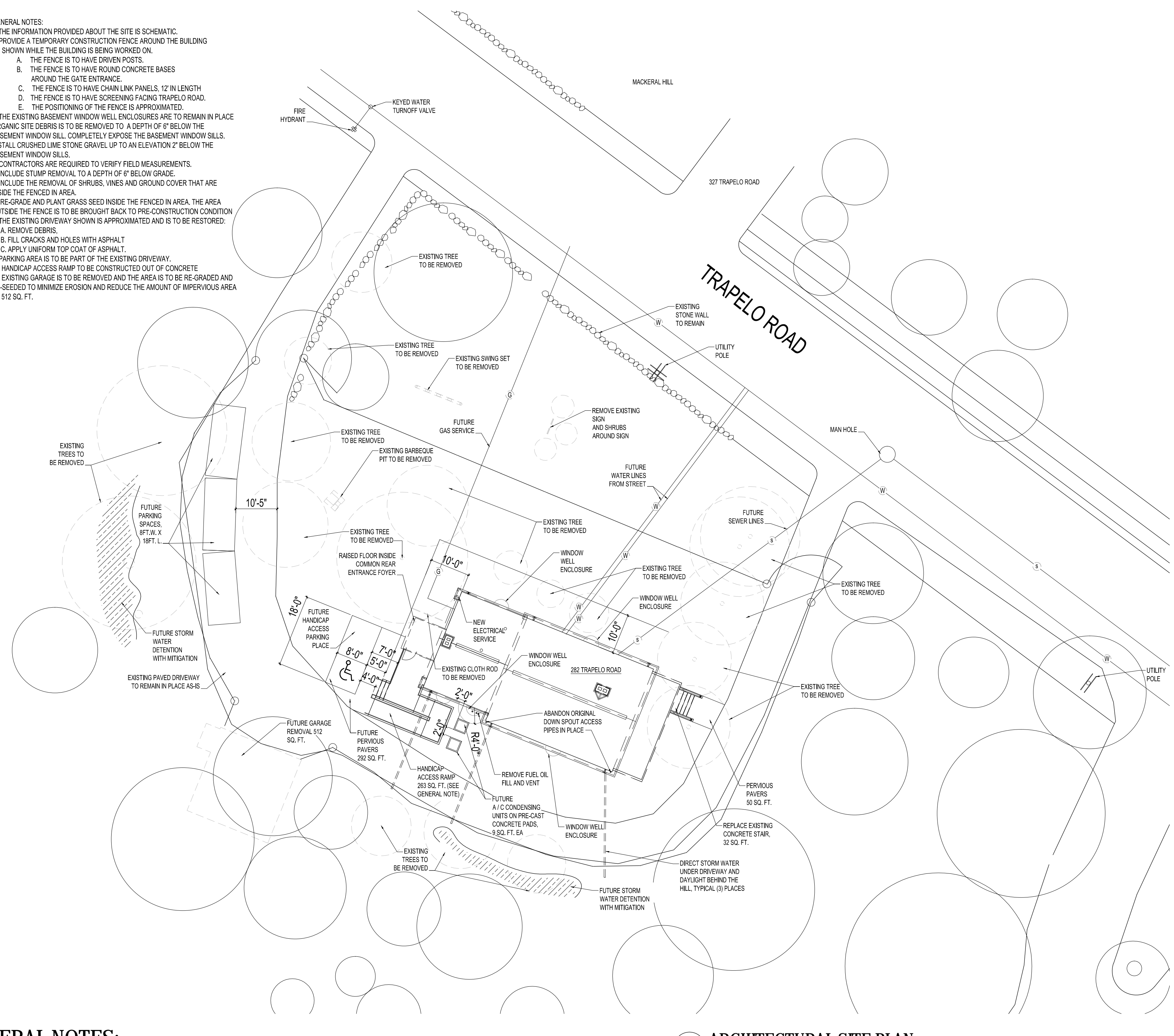
STRUCTURAL SILL REPLACEMENT

Procedure for removing and replacing a building perimeter sill

- Contractor is instructed to make themselves aware of their basement based surroundings.
- Visually inspect and understand the framed assembly as a structural mechanism and determine how the loads are distributed.
- Consult with the Owner, Architect and Engineer to compose a plan for equalizing the forces acting upon the perimeter sill.
- It is recommended that the perimeter sill replacement procedure be executed before the finished cladding materials, the trim and siding, are installed on the outside.
- With the Cardinal Cottage being a balloon framed building both floor framing members and the wall studs are resting on the perimeter sill. For this reason temporary supports for both need to be designed and executed.
- With regard to the floor framing support members:
 - Use house jacks to accomplish the support and incremental upward movement needed to take out a section of perimeter sill.
 - The perimeter sill at the cardinal cottage is a nominal 8x8 wood beam.
 - The sections to be removed should be not more than 10 ft. in each direction leading into a corner.
 - In the event that the corner is to be replaced then it is suggested that both perimeter sills leading into the corner be replaced together.
 - The house jacks are to be separated from the first floor framing on top and the concrete floor using LVL's on the flat, no less than 9'-1/4" in width and 1-3/4" in thickness.
 - The most effective jack would be one that is like a column and able to lift incrementally and independently.
 - Multiple jacks, no less than (3) in each direction, are to be used to accomplish a lift to remove an 8ft. section of perimeter sill.
 - The column type jacks are to be kept plumb at all times.
- With regard to the wall framing support members:
 - Use house jacks to accomplish the support and incremental upward movement needed to take out a section of perimeter sill.
 - Screw an LVL to a section of wall studs.
 - Place a LVL on the ground under that which is attached to the studs.
 - Devis a safe and effective method of applying upward movement of the wall.
- Sistering existing floor framing members will be required:
 - LVL material is to be used to sister floor framing where the floor framing is split, checked or rotted.
 - The sistered structural material is to be applied to both sides of the defective framing and attached using carriage bolts with lock washers.
 - Where entire floor framing members are rotted replacement pieces are to be installed using like material, 4 x 6, 4 x 8. LVL's can also be used.
 - Physical connections, joist hangers, are to be used when adding new floor framing materials.
- Apply the pressure needed to support and lift the section of the building and separating the framing from the defective perimeter sill.
- The cut of the perimeter sill is to be made through sound material, straight and plumb.
- The perimeter sill replacement member is to be attached to the existing, sound perimeter sill material using a lap joint with carriage bolts and timber screws elsewhere.
- To the highest degree possible, restore the connection of the wall studs and floor framing while lowering the floor and wall framing back into position.
- Where sufficient bearing is in question add physical connectors in the form of brackets, straps and hangers.
- Before removing the jack system completely make sure that all loads are being addressed and supported.
- Remove and set aside the LVL and jack parts as to prevent a tripping hazard.

GENERAL NOTES:

- THE INFORMATION PROVIDED ABOUT THE SITE IS SCHEMATIC.
- PROVIDE A TEMPORARY CONSTRUCTION FENCE AROUND THE BUILDING AS SHOWN WHILE THE BUILDING IS BEING WORKED ON.
 - THE FENCE IS TO HAVE DRIVEN POSTS.
 - THE FENCE IS TO HAVE ROUND CONCRETE BASES AROUND THE GATE ENTRANCE.
 - THE FENCE IS TO HAVE CHAIN LINK PANELS, 12" IN LENGTH.
 - THE FENCE IS TO HAVE SCREENING FACING TRAPELO ROAD.
 - THE POSITIONING OF THE FENCE IS APPROXIMATED.
- THE EXISTING BASEMENT WINDOW WELL ENCLOSURES ARE TO REMAIN IN PLACE ORGANIC SITE DEBRIS IS TO BE REMOVED TO A DEPTH OF 6" BELOW THE BASEMENT WINDOW SILL, COMPLETELY EXPOSE THE BASEMENT WINDOW SILLS. INSTALL CRUSHED LIME STONE GRAVEL UP TO AN ELEVATION 2" BELOW THE BASEMENT WINDOW SILLS.
- CONTRACTORS ARE REQUIRED TO VERIFY FIELD MEASUREMENTS.
- INCLUDE STUMP REMOVAL TO A DEPTH OF 6" BELOW GRADE.
- INCLUDE THE REMOVAL OF SHRUBS, VINES AND GROUND COVER THAT ARE INSIDE THE FENCED IN AREA.
- RE-GRADE AND PLANT GRASS SEED INSIDE THE FENCED IN AREA, THE AREA OUTSIDE THE FENCE IS TO BE BROUGHT BACK TO PRE-CONSTRUCTION CONDITION
- THE EXISTING DRIVEWAY SHOWN IS APPROXIMATED AND IS TO BE RESTORED.
 - REMOVE DEBRIS.
 - FILL CRACKS AND HOLES WITH ASPHALT
 - APPLY UNIFORM TOP COAT OF ASPHALT.
- PARKING AREA IS TO BE PART OF THE EXISTING DRIVEWAY.
- HANDICAP ACCESS RAMP TO BE CONSTRUCTED OUT OF CONCRETE
- EXISTING GARAGE IS TO BE REMOVED AND THE AREA IS TO BE RE-GRADED AND RE-SEED TO MINIMIZE EROSION AND REDUCE THE AMOUNT OF IMPERVIOUS AREA BY 512 SQ. FT.



GENERAL NOTES: REFERENCE PROJECT MANUAL AND SPECIFICATIONS

- All work shall conform to the 2009 International Residential Building Code.
- All licenses, permits, and inspections necessary to the performance, completion, and approval of the work shall be secured and paid for by the contractor/owner.
- These general notes shall conform equally to all prime and subcontractors. The word "Contractor" as used herein shall apply equally to the work of all trades.
- It is the responsibility of the Contractor to visit the site, verify the existing conditions, become thoroughly familiar with the scope of the work, and report all discrepancies between the drawings and actual conditions to the Architect.
- After uncovering existing construction, inspect conditions and immediately report to the Architect unsatisfactory or questionable circumstances that may affect the work.
- These drawings are intended to be read in conjunction with the schedules, product data, and consultants drawings. Contractor shall correlate work between drawings and these other information sources. Report all discrepancies to the Architect and await resolution before proceeding with any work affected by such discrepancies.
- All lines, symbols, notes, poche and other graphic devices contained in the contract documents carry design intent. The Contractor shall pay specific attention to all dimensioned or implied plan and section spatial relationships and shall verify all alignments and symmetries before commencing work.
- Dimensions marked "VF" are to be checked for accuracy by the Contractor as work progresses. All discrepancies are to be brought to the attention of the Architect before proceeding.
- The Contractor shall not scale the drawings. Only provided dimensions are to be used for all aspects of the work. Dimensions at new Work are given to face of stud and/or to centerline of structural members, unless noted otherwise. Dimensions given from existing walls are to face of existing finish, unless noted otherwise.
- It is the responsibility of the Contractor to confirm all rough openings for windows, doors, cabinets and other materials and equipment prior to ordering.
- It is the Contractor's responsibility to protect from damage any building and site areas unaffected by this work.
- Contractor shall clean the work periodically to keep the Work and adjacent areas free from accumulation of waste materials, rubbish and debris resulting from construction operations.
- The Contractor shall coordinate the work of all subcontractors, including those under separate contract with the owner.
- Before excavation, underground utilities are to be located through "Dig Safe" and/or the Utility Company.
- Follow the Secretary of Interior's Standards for Rehabilitation of Historic Properties.
- Work to be in compliance with DCAMM: Division of Capital Management and Maintenance
- Work is being administered by The City of Waltham Municipal Affordable Trust Fund and the City of Waltham Housing Division.

DRAWING LIST:

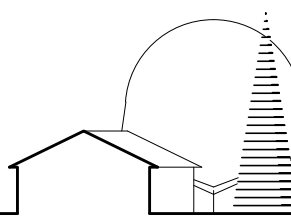
- A0.1 INFORMATION SHEET
- A0.2 WINDOW AND DOOR SCHEDULE
- A1.0 BASEMENT & FIRST FLOOR PLANS
- A1.1 SELECTIVE DEMOLITION INFORMATION
- A1.2 ROOF PLAN
- A2.1 NORTH & EAST ELEVATIONS
- A2.2 WEST & SOUTH ELEVATIONS
- A4.1 SECTIONS AND DETAILS
- A4.2 SECTIONS AND DETAILS
- A4.3 SECTIONS AND DETAILS
- A4.4 SECTION
- A4.5 SECTIONS AND DETAILS

LEGEND OF SYMBOLS & ABBREVIATIONS:

- = CENTERLINE
- = ABOVE FINISHED FLOOR
- = NOT TO SCALE
- = SQUARE FT.
- = AIR CONDITIONING
- +/- = PLUS OR MINUS WITHIN AN INCH
- VIF = VERIFY IN FIELD
- FIC = FLOOR AND CEILING AREA
- S— = SEWER LINE
- ELEV. = ELEVATION
- O.C. = ON CENTER
- FLR. = FLOOR
- STL. = STEEL
- MOD. = MODULUS OF ELASTICITY
- REF. = REFERENCE
- W = WALL AREA

1 ARCHITECTURAL SITE PLAN
N.T.S.

ALEX. KNOX, AIA
COLLABORATIVE DESIGN ARCHITECT
NEEDHAM, MA 02492



PROJECT: MULTI-FAMILY REMODEL
CARDINAL COTTAGE
TRAPELO RD
WALTHAM, MA

TITLE: INFORMATION SHEET
ARCHITECTURAL SITE PLAN

OWNER/CLIENT: CITY OF WALTHAM PLANNING DEPT.
ROBERT WATERS, HOUSING SUPERVISOR
119 SCHOOL ST., TOP FLR.
WALTHAM, MA 02451

ARCHITECT OF RECORD: ALEX KNOX, AIA
COLLABORATIVE DESIGN ARCHITECT
80 OAK STREET, NEEDHAM, MA 02492
617-306-3474

CONSULTANT: SABBAGH ASSOCIATES
STRUCTURAL ENGINEERING CONSULTANTS
451 MAIN STREET, STONEHAM, MA 02180
781-279-2223

1. WALTHAM HISTORIC COMMISSION 10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION 12-5-2017
3. FOR BID 2-1-2018

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DATE: 2-1-2018

SCALE: AS NOTED

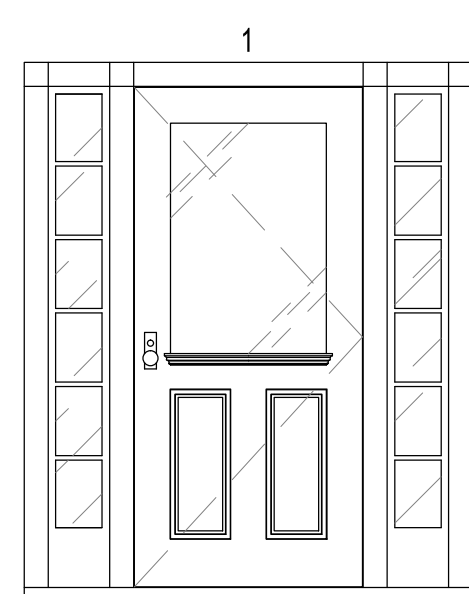
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DRAWING: A0.1

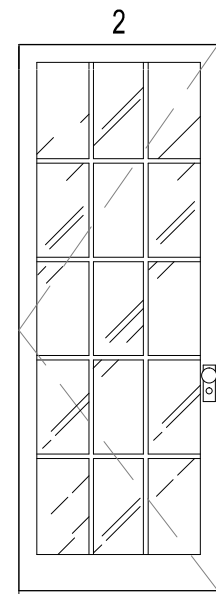
WINDOW SCHEDULE

FLOOR	ROOM	TAG	WINDOW TYPE	CALIBRATED OPENING SIZE (W x H) V.I.F.	HARDWARE	INTERIOR TRIM	EXTERIOR TRIM	REMARKS	SASH COLOR
BASEMENT	BASEMENT	Q	TYPE #1	29" X 13.375"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE RECONDITION EXISTING METAL SCREEN AND RE-INSTALL	#4
BASEMENT	BASEMENT	R*	TYPE #3	29" X 13.375"	BY TYPE (SEE BELOW)	WINDOW REQUIRES RE-CONSTRUCTION MATCH EXISTING. (SEE GENERAL NOTES)	DETAILS: 4/A0.2, 5/A0.2, 6/A0.2		#4
BASEMENT	BASEMENT	S	TYPE #3	29" X 13.375"	BY TYPE (SEE BELOW)	WINDOW REQUIRES RE-CONSTRUCTION MATCH EXISTING. (SEE GENERAL NOTES)	DETAILS: 4/A0.2, 5/A0.2, 6/A0.2		#4
BASEMENT	BASEMENT	PP	TYPE #3	29" X 13.375"	BY TYPE (SEE BELOW)	WINDOW REQUIRES RE-CONSTRUCTION MATCH EXISTING. (SEE GENERAL NOTES)	DETAILS: 4/A0.2, 5/A0.2, 6/A0.2		#4
BASEMENT	BASEMENT	GG	TYPE #2	29" X 13.375"	BY TYPE (SEE BELOW)	WINDOW REQUIRES RE-CONSTRUCTION MATCH EXISTING. (SEE GENERAL NOTES)	DETAILS: 4/A0.2, 5/A0.2, 6/A0.2		#4
FIRST	KITCHEN	A	TYPE #1	31.5" X 57.125"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	KITCHEN	B	TYPE #1	30.25" X 56.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	BATHROOM	C	TYPE #1	30.5" X 56.5"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	DINING	H*	TYPE #1	30.375" X 55.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	DINING	I	TYPE #1	30.375" X 55.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	BEDROOM 1	OO	TYPE #1	33.75" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	BEDROOM 1	NN	TYPE #1	33.75" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	BEDROOM 2	FF	TYPE #1	33.5" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	BEDROOM 2	EE	TYPE #1	33.5" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
FIRST	LIVING ROOM	MM**	TYPE #1	33.5" X 60.75"	BY TYPE (SEE BELOW)	SEE GENERAL NOTES	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	RESTORATION OF INTERIOR TRIM	#4
FIRST	LIVING ROOM	LL**	TYPE #1	33.75" X 60.875"	BY TYPE (SEE BELOW)	SEE GENERAL NOTES	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	RESTORATION OF INTERIOR TRIM	#4
FIRST	FRONT ENTRANCE FOYER	DD	TYPE #1	33.5" X 60.375"	BY TYPE (SEE BELOW)	SEE GENERAL NOTES	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	RESTORATION OF INTERIOR TRIM	#4
FIRST	REAR ENTRANCE FOYER	O	TYPE #1	34" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	REAR ENTRANCE FOYER	P	TYPE #1	33.825" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	REAR ENTRANCE FOYER	M	TYPE #1	34" X 60.75"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	REAR ENTRANCE FOYER	N	TYPE #1	34" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
FIRST	REAR ENTRANCE FOYER	L	TYPE #1	33.875" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
SECOND	KITCHEN	F	TYPE #1	33.5" X 49.125"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	KITCHEN	D	TYPE #1	30.5" X 44.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	BATHROOM	G	TYPE #1	33.5" X 49.125"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
SECOND	DINING	J	TYPE #1	30.625" X 56.5"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2	NO SHUTTERS OR SHUTTER HARDWARE	#4
SECOND	DINING	K	TYPE #1	30.875" X 56.375"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	BEDROOM 1	HH	TYPE #1	33.75" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	BEDROOM 1	II	TYPE #1	33.625" X 60.625"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	BEDROOM 2	CC	TYPE #1	33.625" X 60.75"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	LIVING ROOM	JJ	TYPE #1	33.75" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	LIVING ROOM	KK	TYPE #1	33.625" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	LIVING ROOM	X	TYPE #1	33.5" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	LIVING ROOM	Y	TYPE #1	33.625" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	COMMON STORAGE	Z	TYPE #1	33.625" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	COMMON STORAGE	AA	TYPE #1	33.5" X 60.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	FRONT ENTRANCE FOYER	BB	TYPE #1	33.75" X 60.75"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
SECOND	REAR ENTRANCE FOYER	E	TYPE #1	34.5" X 45.375"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
ATTIC	FRONT ATTIC	V	TYPE #1	30.75" X 56.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
ATTIC	FRONT ATTIC	W	TYPE #1	30.75" X 56.875"	BY TYPE (SEE BELOW)	STOOL, MODIFIED INTERIOR STOPS @ JAMB AND HEAD	DETAILS: 1/A0.2, 2/A0.2, 3/A0.2		#4
ATTIC	BACK ATTIC	T	TYPE #3	20.5" X 24.375"	BY TYPE (SEE BELOW)	NONE	DETAILS: 7/A0.2, 8/A0.2, 9/A0.2	RE-USE EXISTING HARDWARE. NO SHUTTERS OR SHUTTER HARDWARE	#4
ATTIC	BACK ATTIC	U	TYPE #3	20.5" X 24.375"	BY TYPE (SEE BELOW)	NONE	DETAILS: 7/A0.2, 8/A0.2, 9/A0.2	RE-USE EXISTING HARDWARE. NO SHUTTERS OR SHUTTER HARDWARE	#4

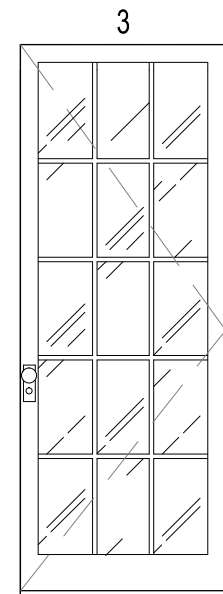
VERIFY CALIBRATED OPENING SIZES WITH SASH REPLACEMENT CONTRACTOR



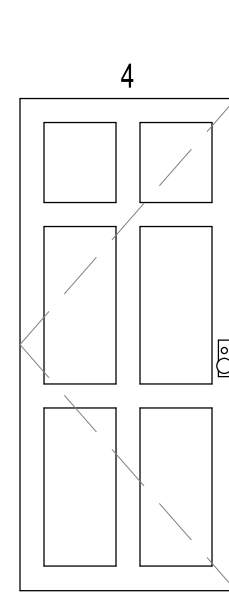
EXTERIOR FRONT ENTRANCE DOOR



EXISTING FRENCH FRONT ENTRANCE LEFT



EXISTING FRENCH FRONT ENTRANCE RIGHT

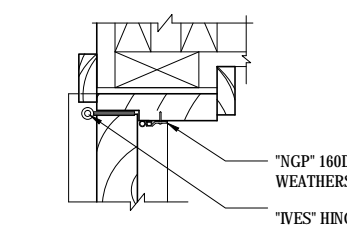


NEW REAR ENTRANCE DOOR

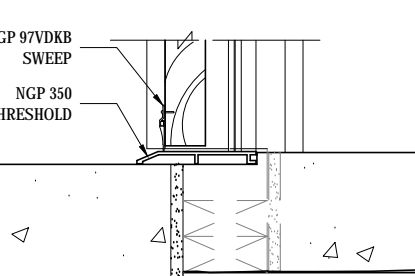
DOOR SCHEDULE

FLOOR	ROOM	TAG	DOOR SIZE:	ROUGH OPENING SIZE (W x H)	MODEL #:	HARDWARE:	REMARKS
FIRST	FRONT FOYER	1**	EXISTING	39.25" X 83.375"		EXISTING TO BE REUSED (SEE GENERAL NOTES)	SEE GENERAL NOTES REGARDING RECONDITIONING
FIRST	LIVING ROOM	2**	EXISTING	32.625" X 88.25"		EXISTING TO BE REUSED (SEE GENERAL NOTES)	SEE GENERAL NOTES REGARDING RECONDITIONING
FIRST	LIVING ROOM	3**	EXISTING	32.625" X 88.25"		EXISTING TO BE REUSED (SEE GENERAL NOTES)	SEE GENERAL NOTES REGARDING RECONDITIONING
FIRST	BACK FOYER	4		36" X 80"	BROSCO, F-2130 OR EQUAL	DOOR SET #1: REF. A0.2/10, A0.2/11, A0.2/12	CLASSIC CRAFT CANVAS COLLECTION

12 HEAD DETAIL 1-1/2"=1'-0"



11 JAMB DETAIL 1-1/2"=1'-0"



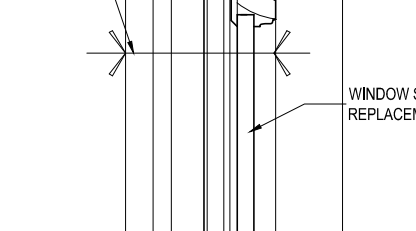
10 SILL DETAIL 1-1/2"=1'-0"



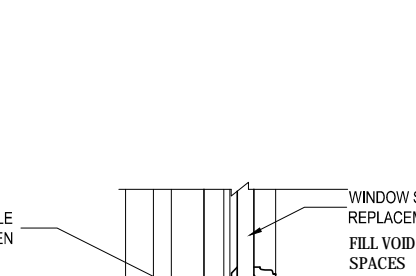
OUT SWING DOOR

DOOR HARDWARE SET #1:
 1. (3) HINGES - 35 SS BB4545 NRP, 630 FINISH
 2. (1) EXIT DEVICE - 6200R 3FT., 630 FINISH
 3. (1) EXIT TRIM - 65H 09 PHL, 626 FINISH
 4. (1) CLOSER - 7100BC PA EDA STSD, 689 FINISH
 5. (1) KICK PLATE - 980 0828 8" X 34" BV CS, 630 FINISH
 6. (1) WEATHERSTRIP - 160SDKB 36" X 80", DKB FINISH
 7. (1) SWEEP - 97VD KB 36", DKB FINISH
 8. (1) THRESHOLD - 350 36", ALUM. FINISH

9 HEAD DETAIL 1-1/2"=1'-0"



8 JAMB DETAIL 1-1/2"=1'-0"



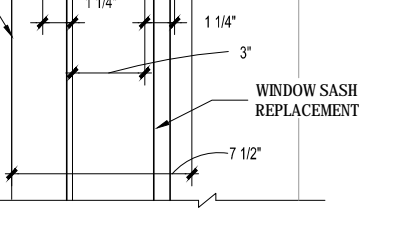
7 SILL DETAIL 1-1/2"=1'-0"



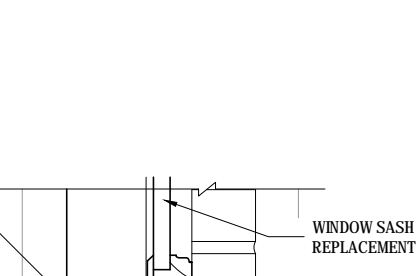
IN SWING WINDOW TYPE #3

CASEMENT WINDOW HARDWARE:
 WINDOW SASH: COLOR #4
 WINDOW BOX AND TRIM: COLOR #2
 WINDOW HINGE: RE-USING OR REPLACE WITH NEW TO MATCH EXISTING.
 BASEMENT BUTTERFLY SHAPED WINDOW KEEPER.

6 HEAD DETAIL 1-1/2"=1'-0"



5 JAMB DETAIL 1-1/2"=1'-0"



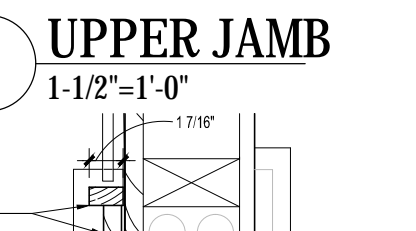
4 SILL DETAIL 1-1/2"=1'-0"



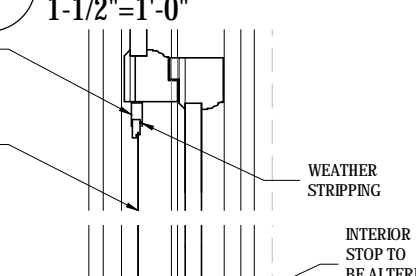
BASEMENT WINDOW TYPE #2

BASEMENT WINDOW HARDWARE:
 WINDOW SASH: COLOR #4
 WINDOW BOX AND TRIM: COLOR #2
 WINDOW HINGE: RE-USING OR REPLACE WITH NEW TO MATCH EXISTING.
 BUTTERFLY SHAPED WINDOW KEEPER.

3 HEAD DETAIL 1-1/2"=1'-0"



2 UPPER JAMB 1-1/2"=1'-0"



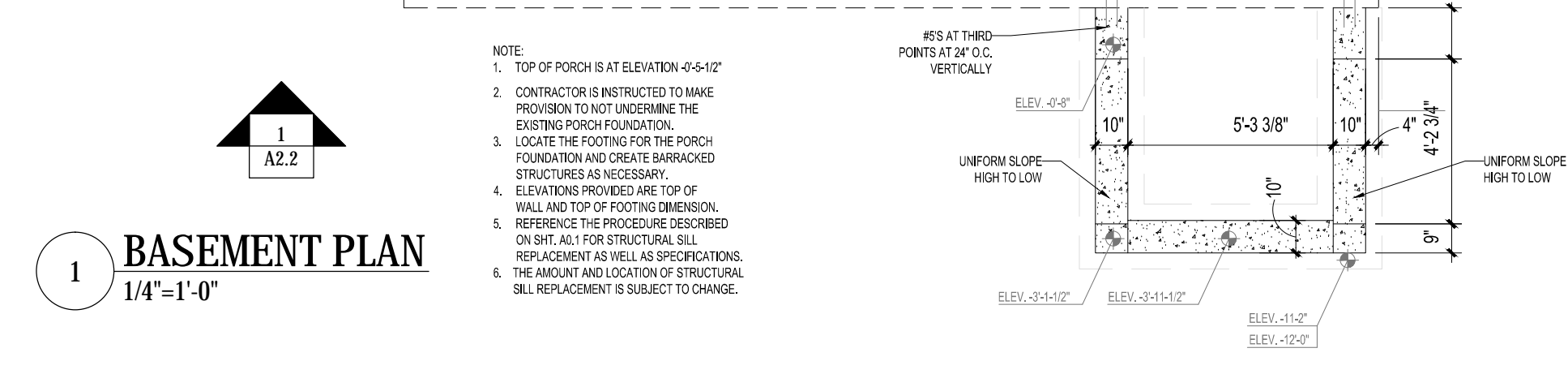
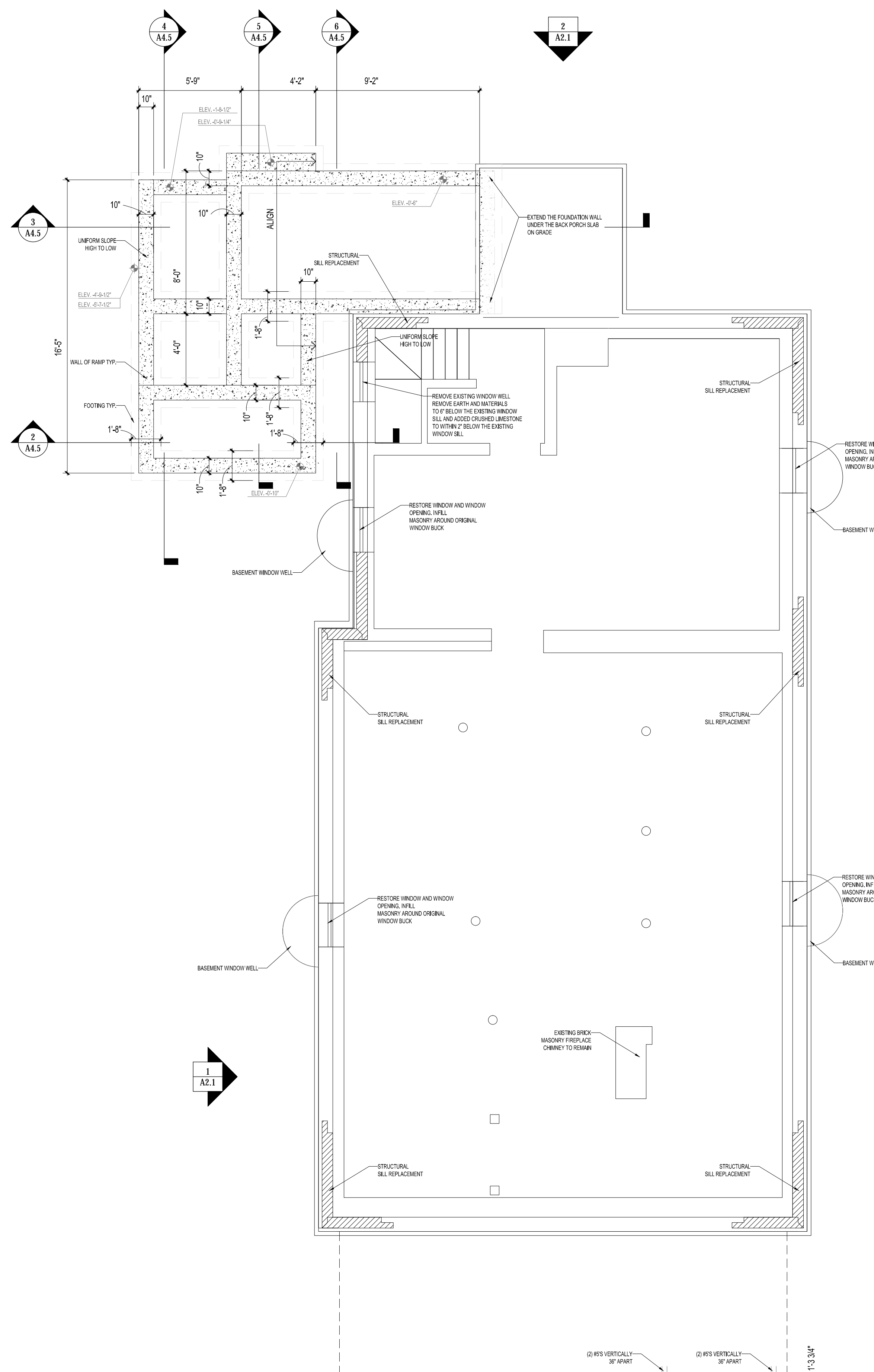
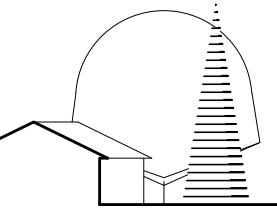
1 SILL DETAIL 1-1/2"=1'-0"



DOUBLE HUNG WINDOW TYPE #1

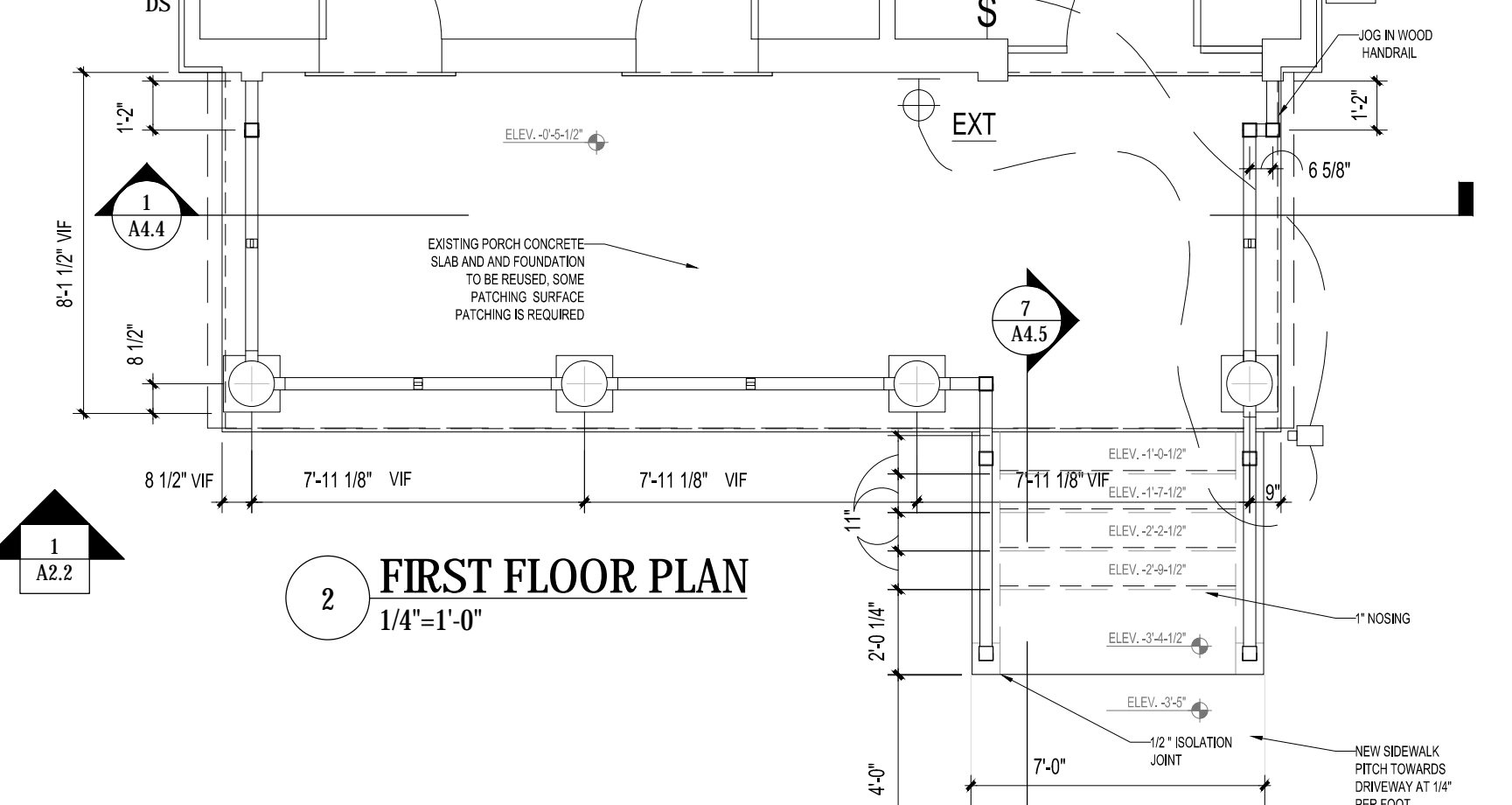
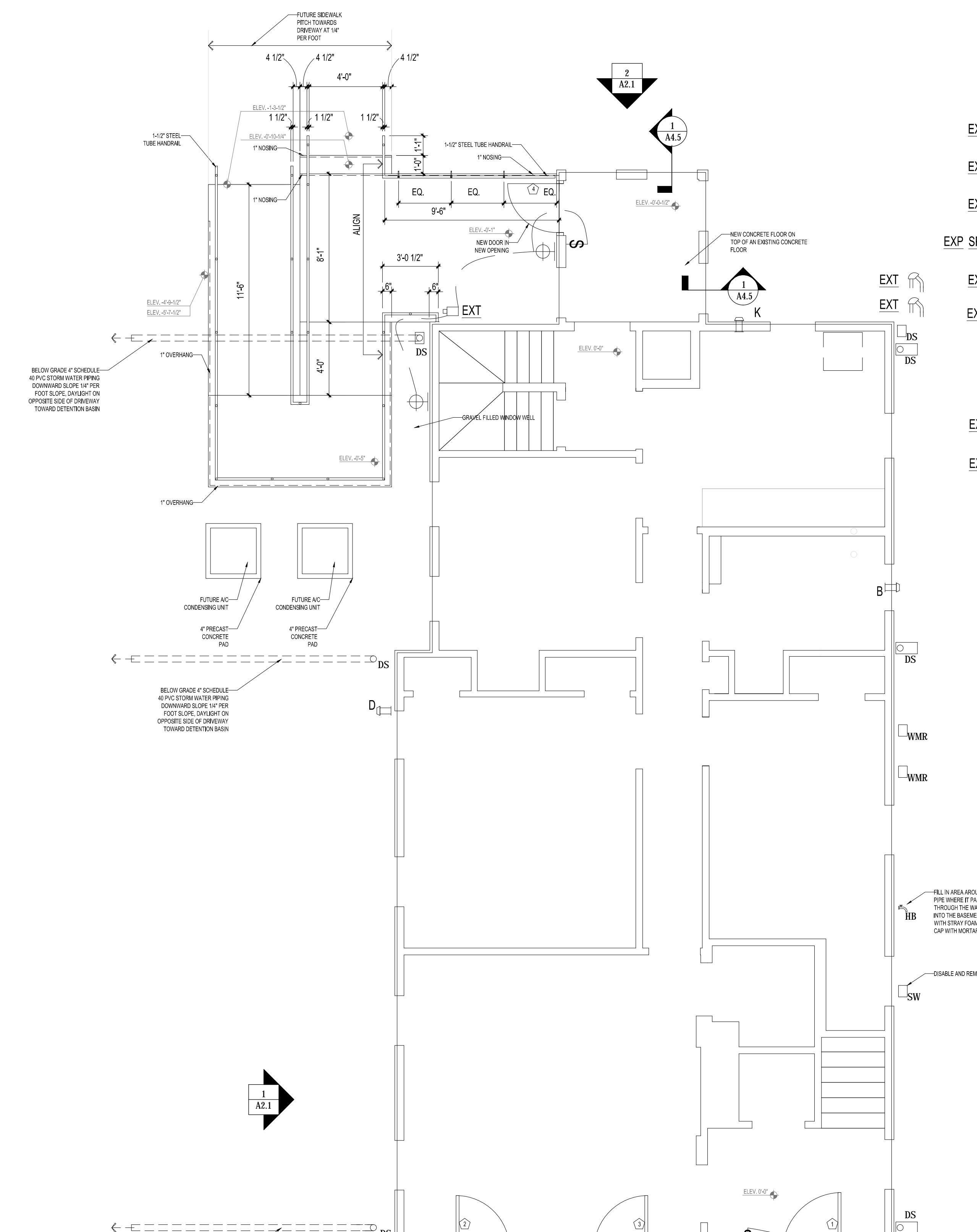
DOUBLE HUNG WINDOW WINDOW SASHES: COLOR #4
 WINDOW BOX AND TRIM: COLOR #2
 WINDOW SHUTTERS: COLOR #4
 EACH WINDOW IS TO BE FIELD MEASURES FOR THE PROPER FIT.
 SHUTTER HARDWARE: SILL LATCH, NEW ENGLAND STYLE HINGE AND PINTLE, SPRING LATCH OR SHUTTER KEEPER, BACK CATCH HOLD DOWN SURFACE MOUNTED WINDOW HARDWARE: WINDOW SASH CATCH, CLASSIC HOOK SASH LIFTS
 INTERNALLY MOUNTED WINDOW HARDWARE: CONSTANT FORCE BALANCE: MORTISED INTO LOWER SASH, 1" ABOVE THE BOTTOM RAIL.

PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	SCHEDULES AND DETAILS
OWNER/CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-306-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-279-2223
DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
REVISION:	A0.2



1 BASEMENT PLAN
1/4"=1'-0"

NOTE:
1. TOP OF PORCH IS AT ELEVATION -0.542'
2. CONTRACTOR IS INSTRUCTED TO MAKE PROVISION TO NOT UNDERMINE THE EXISTING PORCH FOUNDATION.
3. LOCATE THE FOOTING FOR THE PORCH FOUNDATION AND CREATE BARRICADED STRUCTURES AS NECESSARY.
4. ELEVATIONS PROVIDED ARE TOP OF WALL AND TOP OF FOOTING DIMENSION. REFERENCE THE PROCEDURE DESCRIBED ON SHEET 101 FOR STRUCTURAL SILL REPLACEMENT AS WELL AS SPECIFICATIONS.
5. THE AMOUNT AND LOCATION OF STRUCTURAL SILL REPLACEMENT IS SUBJECT TO CHANGE.



2 FIRST FLOOR PLAN
1/4"=1'-0"

- SYMBOL LABEL:**
- EXT ○ = CONCEALED LIGHT FIXTURE
 - EXT \$ = SINGLE POLE LIGHT SWITCH
 - EXT ⊕ = DUPLEX RECEPTACLE
 - EXP SPL ⊕ = ELECTRICAL FOR A/C CONDENSATE UNIT
 - EXT ⊕ = SCONCE LIGHT FIXTURE
 - EXT ⊕ = ELECTRICAL SERVICE OFF OF POLE
 - DS ⊕ = DOWN SPOUT WITH SPLASH BLOCKS
 - DS ⊕ = DOWN SPOUT WITH CONNECTION TO PREFORMED DRYWELL
 - EXT ⊕ = MOTION DETECTOR LIGHT
 - EXT ⊕ = FIRE ALARM ENUNCIATOR
 - K ⊕ = KITCHEN EXHAUST FAN WALL CAP
 - B ⊕ = BATHROOM EXHAUST FAN WALL CAP
 - D ⊕ = DRYER EXHAUST VENT WALL CAP
 - ⊕ = BUILDING ELECTRIC METER
 - DS ⊕ = DOWNSPOUT INTO SPASH BLOCK AT GRADE
 - SW ⊕ = EXISTING SITE WIRING TO BE REMOVED
 - HB ⊕ = HOSE BIB
 - ⊕ = GAS COMPANY PROVIDED METER
 - ⊕ = HEATING INTAKE AND EXHAUST
 - WMR ⊕ = REMOTE WATER METER READER

PROJECT: MULTI-FAMILY REMODEL
CARDINAL COTTAGE
TRAPELO RD
WALTHAM, MA

TITLE: BASEMENT / FIRST FLOOR
PLAN VIEW

OWNER/CLIENT: CITY OF WALTHAM PLANNING DEPT.
ROBERT WATERS, HOUSING SUPERVISOR
119 SCHOOL ST., TOP FLR.
WALTHAM, MA 02451

ARCHITECT OF RECORD: ALEX KNOX, AIA
COLLABORATIVE DESIGN ARCHITECT
80 OAK STREET, NEEDHAM, MA 02492
617-306-3474

CONSULTANT: SABBAGH ASSOCIATES
STRUCTURAL ENGINEERING CONSULTANTS
451 MAIN STREET, STONEHAM, MA 02180
781-278-2223

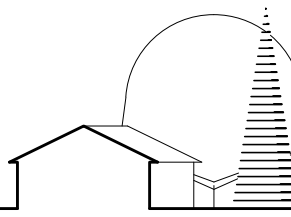
1. WALTHAM HISTORIC COMMISSION	10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION	12-5-2017
1. FOR BID	2-1-2018

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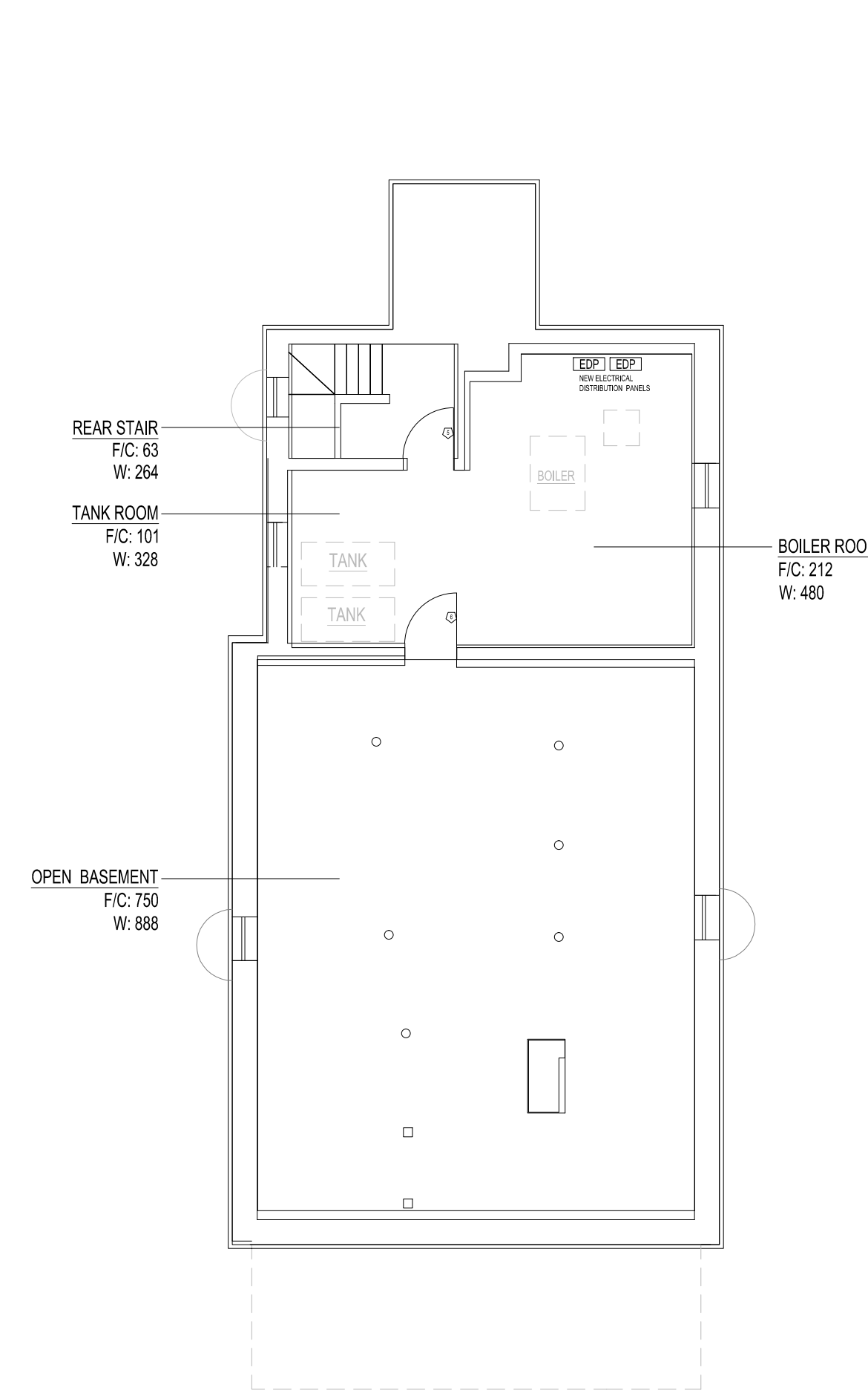
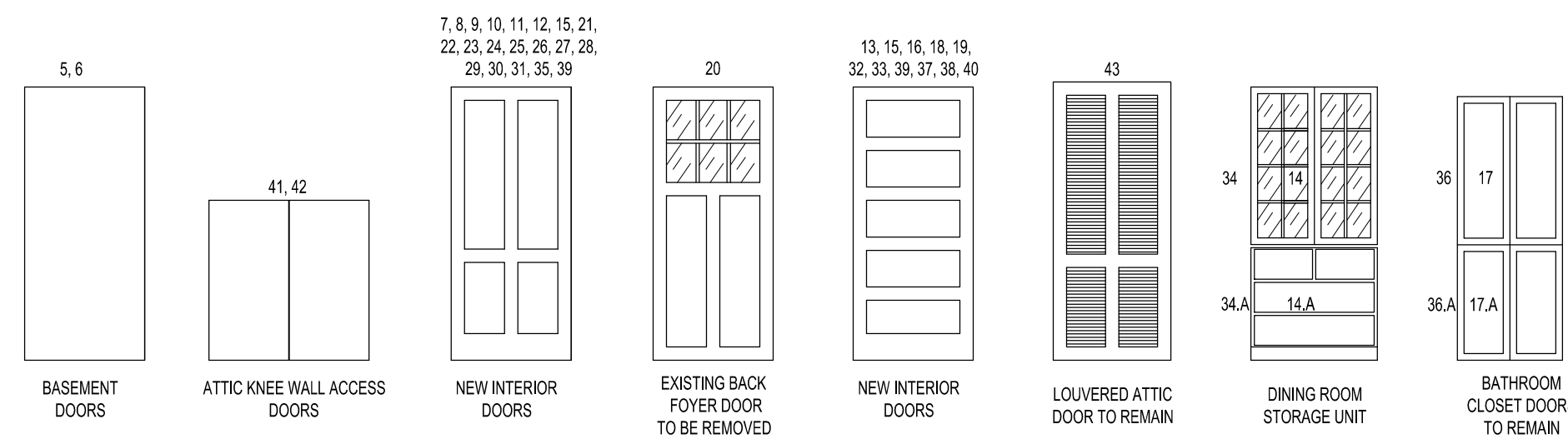
DATE: 2-1-2018
SCALE: 1/4" = 1'-0"

DRAWN: AJK

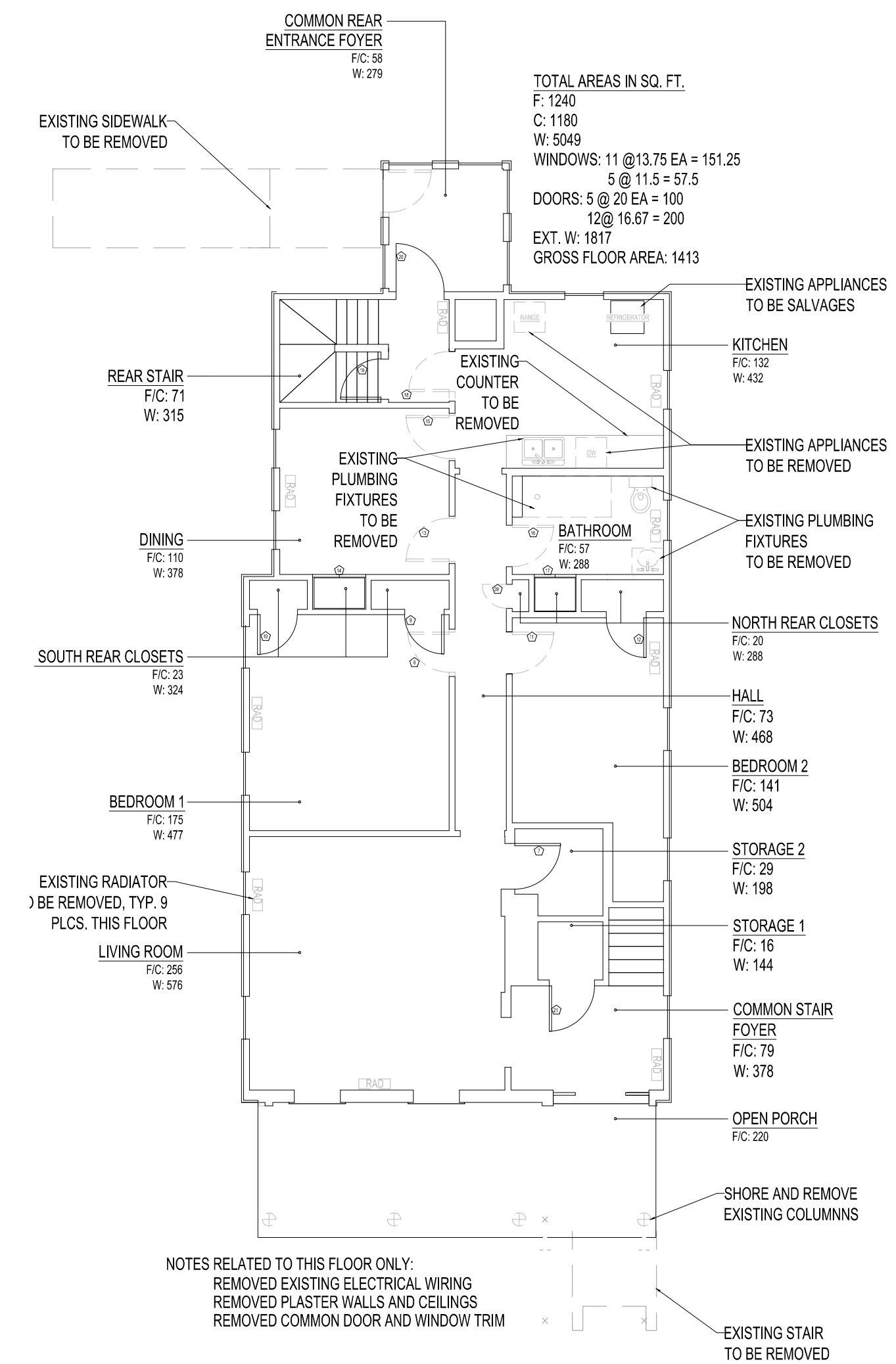
REVISION: **A1.0**



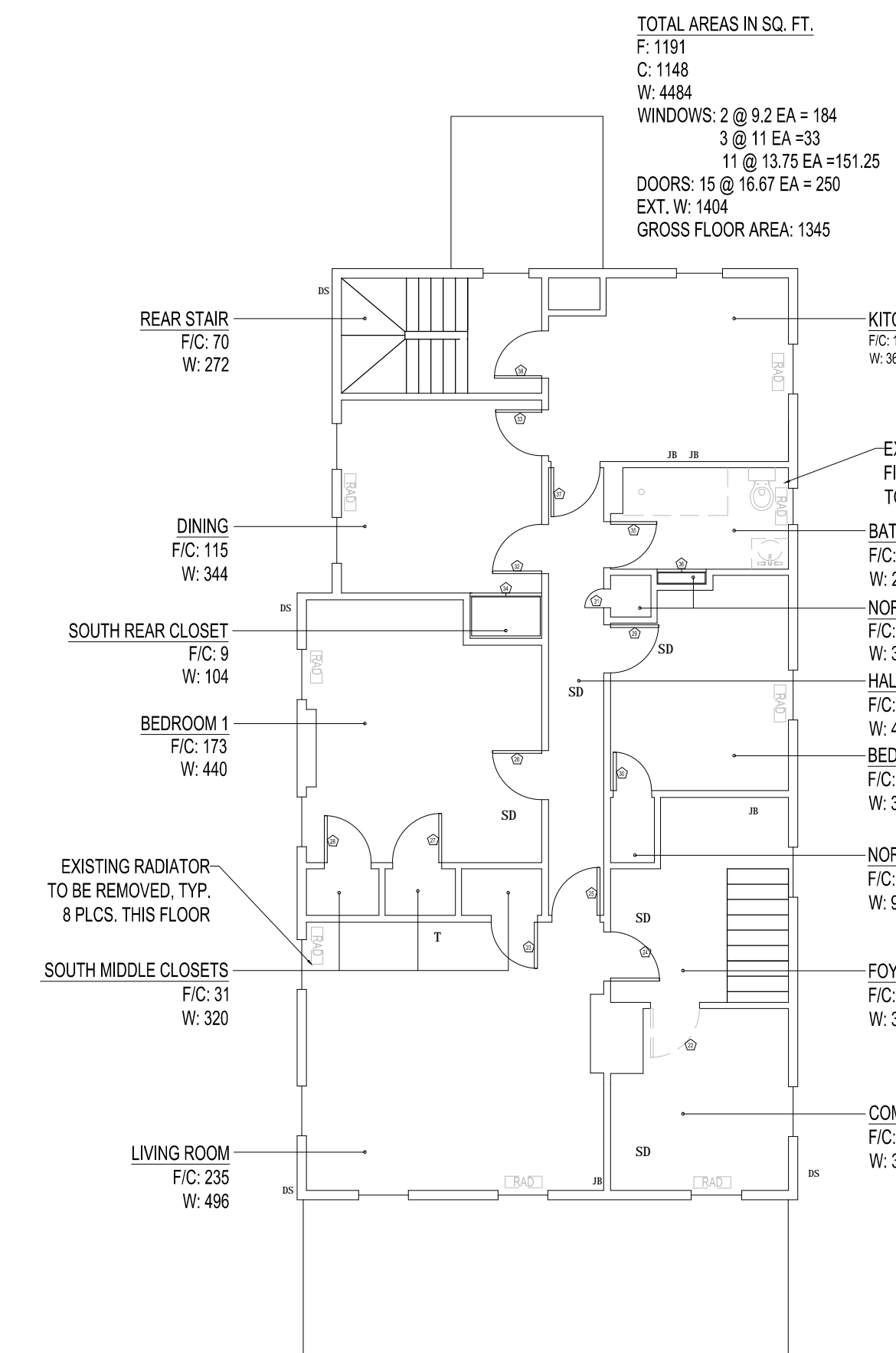
DOOR SCHEDULE							
FLOOR	ROOM	TAG	DOOR SIZE:	ROUGH OPENING SIZE (W x H)	ACTION TO BE TAKEN:	HARDWARE:	REMARKS:
BASEMENT	REAR STAIR	5	35.75" X 77.75"	35.75" X 77.75"	TO REMAIN IN PLACE AND AS IS	TO REMAIN IN PLACE AND AS IS	
BASEMENT	TANK ROOM	6	35.5" X 79"	35.5" X 79"	TO REMAIN IN PLACE AND AS IS	TO REMAIN IN PLACE AND AS IS	
FIRST	LIVING ROOM CLOSET	7	32.75" X 80"	32.75" X 80"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
FIRST	BEDROOM 1	8			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	BEDROOM 1 CLOSET	9	29.875" X 77.875"	29.875" X 77.875"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
FIRST	BEDROOM 2	10	29.875" X 77.875"	29.875" X 77.875"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
FIRST	BEDROOM 2 CLOSET	11			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	DINING ROOM	12	30.25" X 77"	30.25" X 77"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
FIRST	DINING ROOM	13			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	DINING ROOM UPPER CABINET	14	16.875" X 47.25"	16.875" X 47.25"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	SALVAGE STORAGE BOXES
FIRST	DINING ROOM LOWER CABINET	14.A	19.0625" X 47.25" +/-	19.0625" X 47.25" +/-	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	RECONSTRUCTION REQUIRED
FIRST	DINING ROOM	15			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	BATHROOM	16			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	BATHROOM UPPER CABINET	17	15.5" X 44.5"	15.5" X 44.5"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	SALVAGE STORAGE BOXES
FIRST	BATHROOM LOWER CABINET	17.A	13.75" X 34.625" +/-	13.75" X 34.625" +/-	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	RECONSTRUCTION REQUIRED
FIRST	KITCHEN	18			DISCARD DOOR AND DOOR FRAME	DISCARD	
FIRST	REAR STAIRS	19	31.625" X 80"	31.625" X 80"	TO REMAIN IN PLACE AND AS IS	TO REMAIN IN PLACE AND AS IS	
FIRST	BACK FOYER	20	36.25" X 82.25"	36.25" X 82.25"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
FIRST	FOYER CLOSET	21	32.5" X 79.5"	32.5" X 79.5"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	COMMON STORAGE	22	38.25" X 82.25"	38.25" X 82.25"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	LIVING ROOM CLOSET	23	30" X 79"	30" X 79"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	FOYER	24	38.25" X 82.25"	38.25" X 82.25"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	HALLWAY	25	32" X 79"	32" X 79"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BEDROOM 1 CLOSET	26	31.875" X 78.375"	31.875" X 78.375"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BEDROOM 1 CLOSET	27	32" X 78.875"	32" X 78.875"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BEDROOM 1	28	29.625" X 71.75"	29.625" X 71.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BEDROOM 2	29	32" X 79"	32" X 79"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BEDROOM 2	30	29.625" X 71.75"	29.625" X 71.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	HALLWAY CLOSET	31	24" X 77.125"	24" X 77.125"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	DINING ROOM	32	32" X 79.75"	32" X 79.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	DINING ROOM	33	29.875" X 79.75"	29.875" X 79.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	DINING ROOM UPPER CABINET	34	16" X 47.375"	16" X 47.375"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	SALVAGE STORAGE BOXES
SECOND	DINING ROOM LOWER CABINET	34.A	16" X 47.375" +/-	16" X 47.375" +/-	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	RECONSTRUCTION REQUIRED
SECOND	BATHROOM	35	31.875" X 79.75"	31.875" X 79.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	BATHROOM UPPER CABINET	36	16.25" X 44.75"	16.25" X 44.75"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	SALVAGE STORAGE BOXES
SECOND	BATHROOM LOWER CABINET	36.A	16.25" X 34" +/-	16.25" X 34" +/-	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	RECONSTRUCTION REQUIRED
SECOND	HALLWAY	37	31.375" X 80"	31.375" X 80"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
SECOND	KITCHEN	38	31.75" X 79.5"	31.75" X 79.5"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
NOT USED	NOT USED	39			NOT USED	NOT USED	
ATTIC	STAIRS	40	29.875" X 76.5"	29.875" X 76.5"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
ATTIC	ATTIC	41	37.5" X 53"	37.5" X 53"	REMOVE PAINT ON DOOR AND DOOR FRAME	RECONDITION AND REUSE	
ATTIC	ATTIC	42	37.5" X 53"	37.5" X 53"	TO REMAIN IN PLACE AND AS IS	TO REMAIN IN PLACE AND AS IS	
ATTIC	ATTIC	43	35.25" X 83.5"	35.25" X 83.5"	TO REMAIN IN PLACE AND AS IS	TO REMAIN IN PLACE AND AS IS	



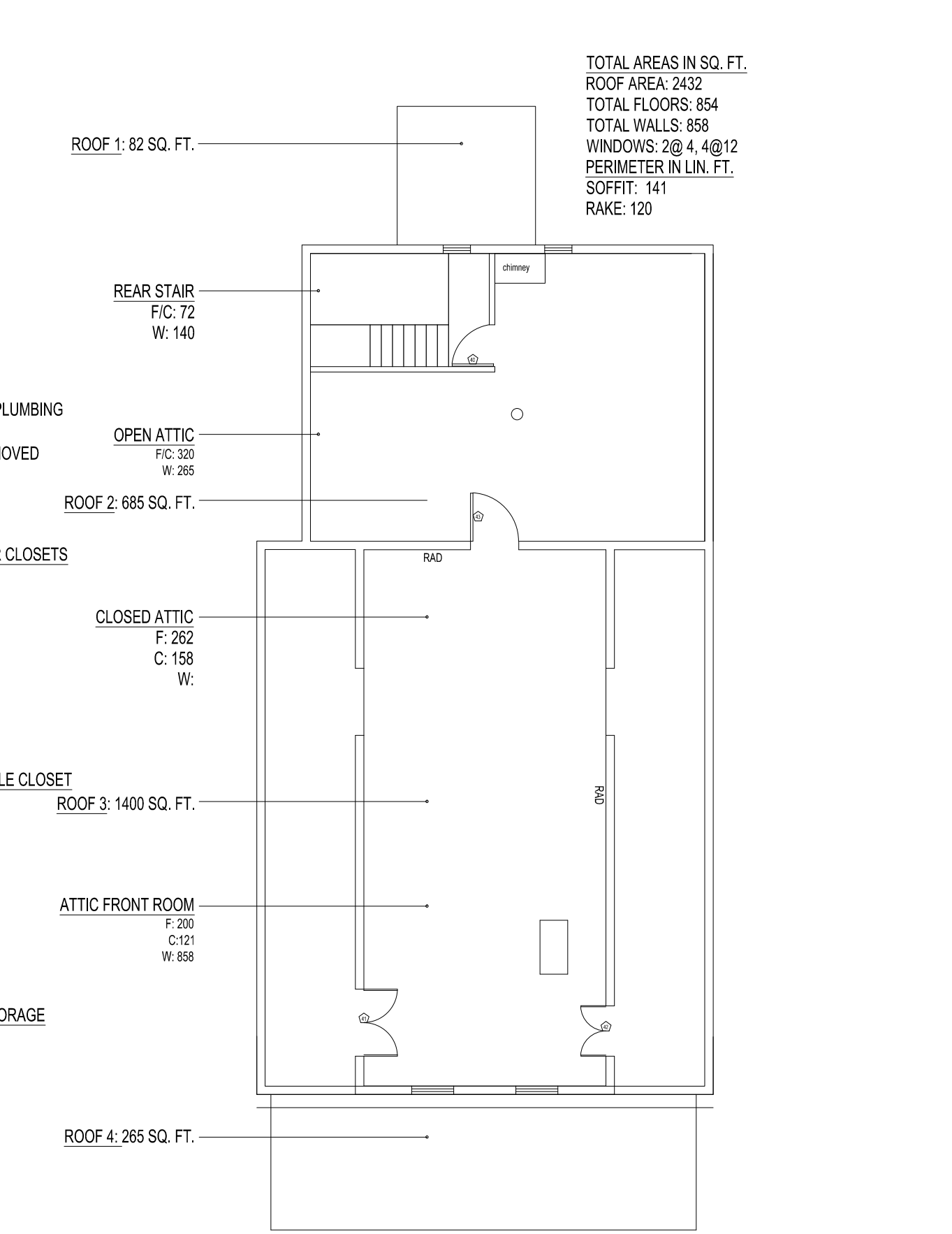
1 BASEMENT FLOOR PLAN
1/8"=1'-0" EXISTING



2 FIRST FLOOR PLAN
1/8"=1'-0" EXISTING



3 SECOND FLOOR PLAN
1/8"=1'-0" EXISTING



4 ATTIC FLOOR PLAN
1/8"=1'-0" EXISTING

TOTAL AREAS IN SQ. FT.
F: 1191
C: 1148
W: 4484
WINDOWS: 2 @ 9.2 EA = 184
3 @ 11 EA = 33
11 @ 13.75 EA = 151.25
DOORS: 15 @ 16.67 EA = 250
EXT. W: 1404
GROSS FLOOR AREA: 1345

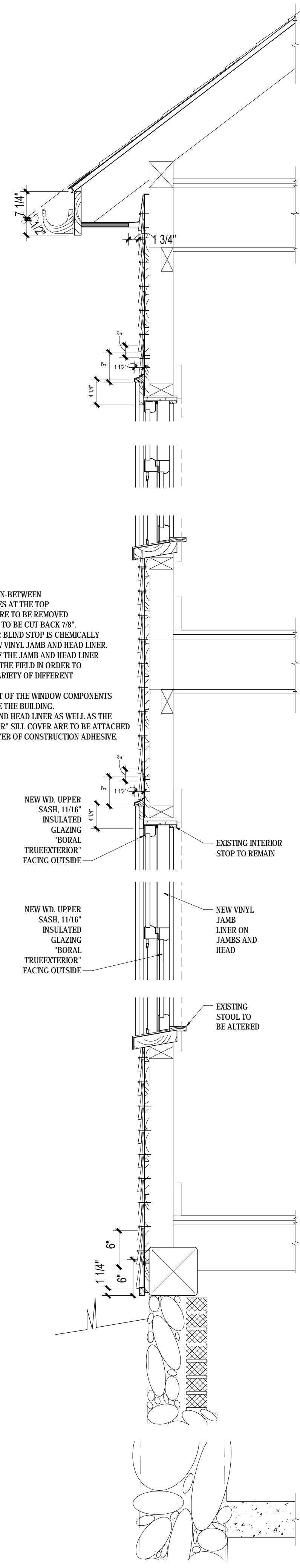
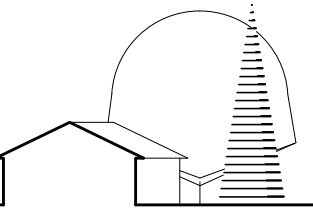
TOTAL AREAS IN SQ. FT.
ROOF AREA: 2432
TOTAL FLOORS: 854
TOTAL WALLS: 868
WINDOWS: 2 @ 4, 4 @ 12
PERIMETER IN LIN. FT.
SOFFIT: 141
RAKE: 120

NOTES RELATED TO THIS FLOOR ONLY:
REMOVED EXISTING ELECTRICAL WIRING

NOTES RELATED TO THIS FLOOR ONLY:
REMOVED EXISTING ELECTRICAL WIRING
REMOVED PLASTER WALLS AND CEILINGS
REMOVED COMMON DOOR AND WINDOW TRIM

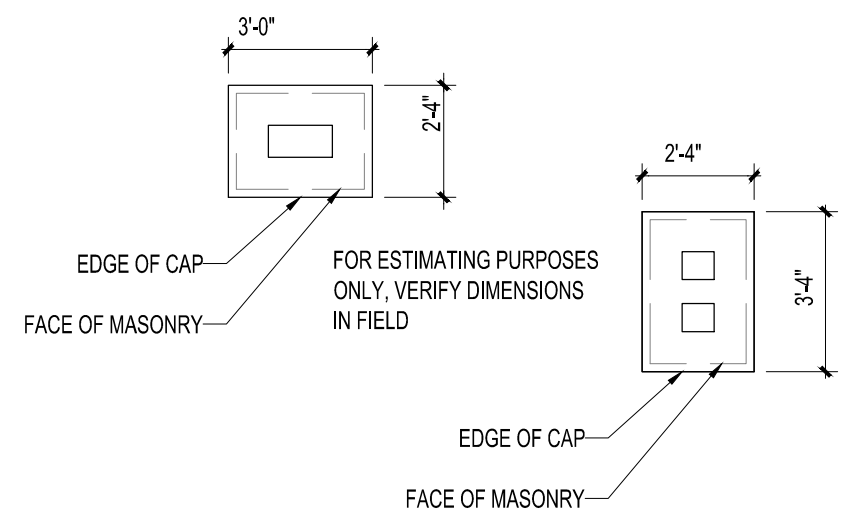
PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	EXISTING DOOR INFORMATION SELECTIVE DEMOLITION SALVAGE INFORMATION
OWNER/CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX. KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-306-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-279-2223
1. WALTHAM HISTORIC COMMISSION	10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION	12-5-2017
3. FOR BID	2-1-2018
COPYRIGHT	2017-2018
DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
CHECKED:	AJK
DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
CHECKED:	AJK
DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
CHECKED:	AJK

A1.1

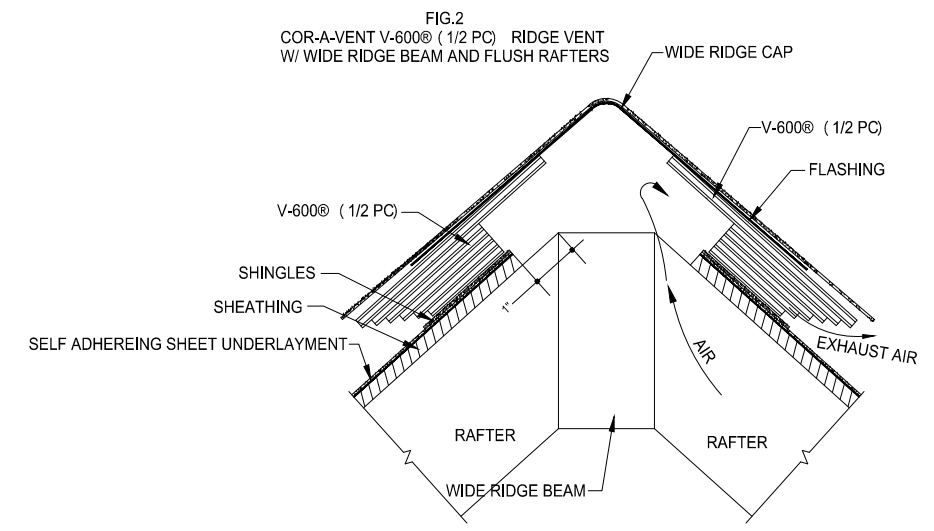


GENERAL NOTE:
1. THE BLEND STOPS IN BETWEEN THE ORIGINAL SASHES AT THE TOP AND ON THE SIDES ARE TO BE REMOVED
2. THE STOOL NEEDS TO BE CUT BACK 7/8"
3. THE NEW INTERIOR BLEND STOP IS CHEMICALLY WELDED TO THE NEW VINYL JAMB AND HEAD LINER
4. THE THICKNESS OF THE JAMB AND HEAD LINER CAN BE MODIFIED IN THE FIELD IN ORDER TO ACCOMMODATE A VARIETY OF DIFFERENT CONDITIONS
5. THE REPLACEMENT OF THE WINDOW COMPONENTS IS DONE FROM INSIDE THE BUILDING
6. THE VINYL JAMB AND HEAD LINER AS WELL AS THE "BORAL TREE EXTERIOR" SILL COVER ARE TO BE ATTACHED WITH A UNIFORM LAYER OF CONSTRUCTION ADHESIVE

5 WALL SECTION
1"=1'-0"



6 CHIMNEY CAPS
1/4"=1'-0"

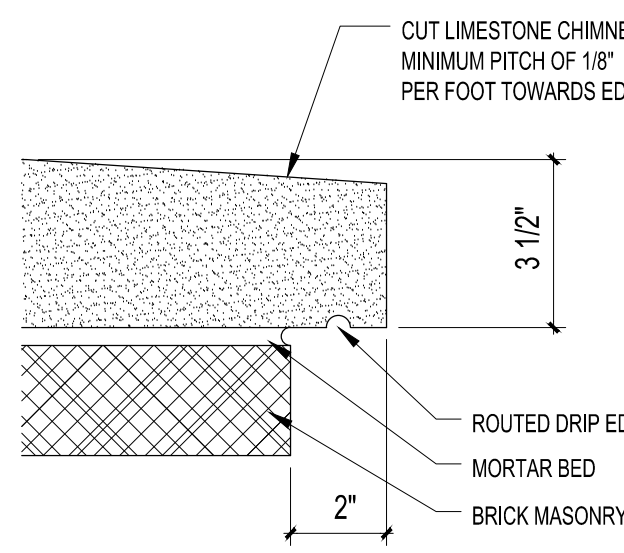


2 RIDGE VENT DETAIL
3"=1'-0"



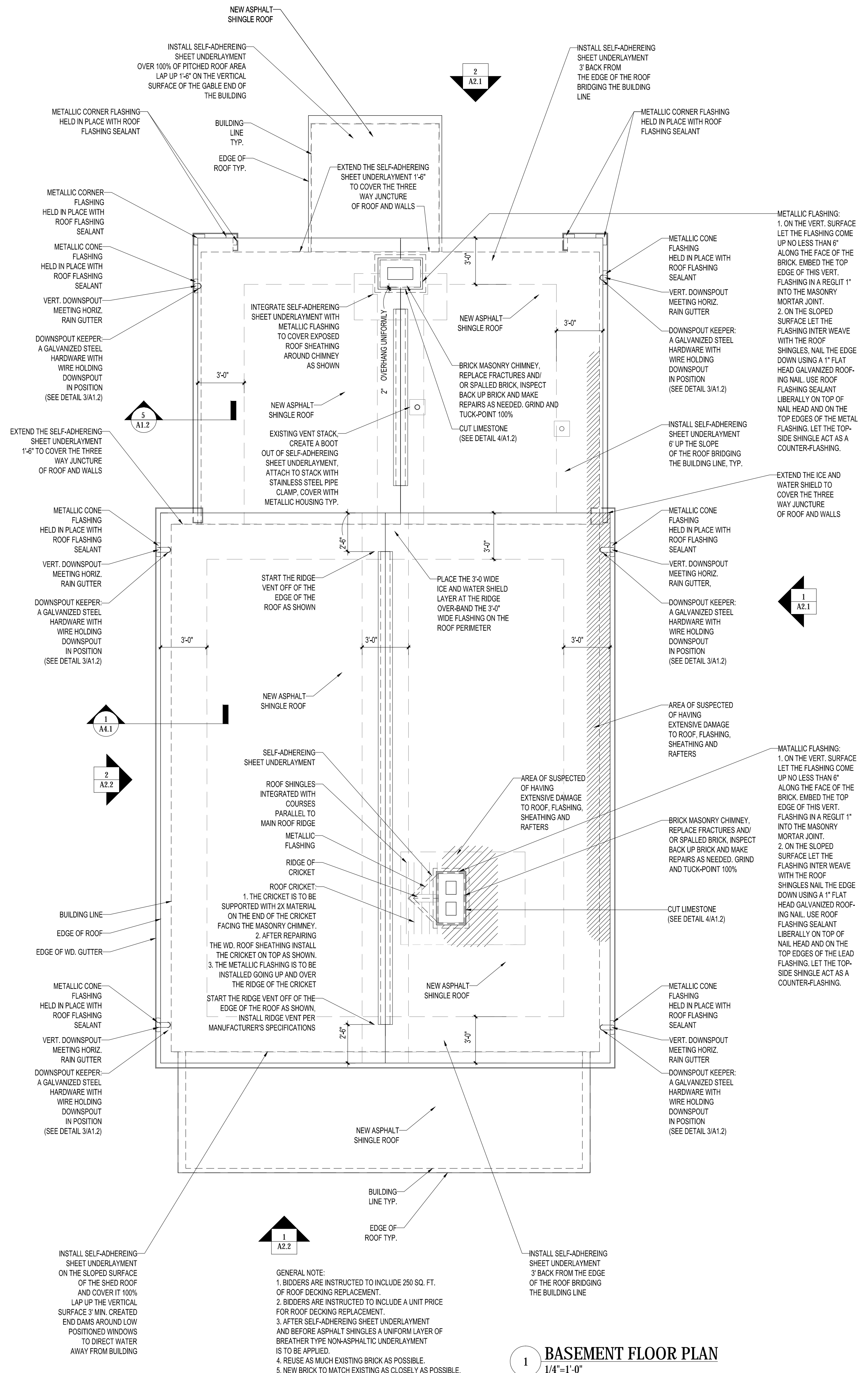
COORDINATE WITH DOWNSPOUT SELECTION
N.T.S.

3 DOWNSPOUT KEEPER DETAIL
N.T.S.



4 CHIMNEY CAP EDGE DETAIL
3"=1'-0"

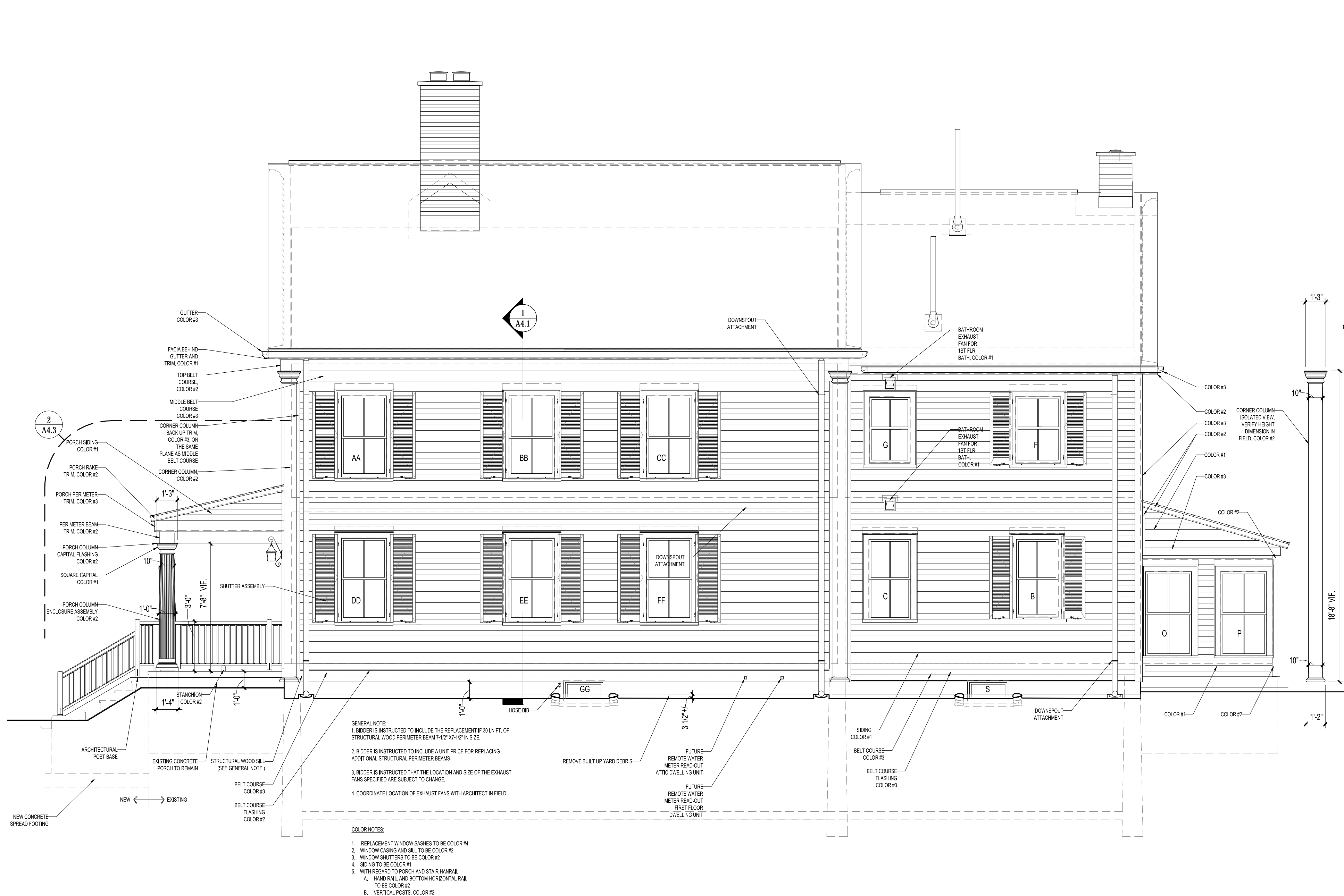
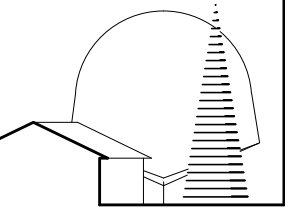
NOTES REGARDING OTHER CHIMNEY COMPONENTS:
1. INSPECT CHIMNEY LINER FOR VISIBLE CRACKS
2. REPLACE SPARK ARRESTER / BIRD SCREEN WITH NEW TO MATCH EXISTING.



1 BASEMENT FLOOR PLAN
1/4"=1'-0"

GENERAL NOTE:
1. BIDDERS ARE INSTRUCTED TO INCLUDE 250 SQ. FT. OF ROOF DECKING REPLACEMENT.
2. BIDDERS ARE INSTRUCTED TO INCLUDE A UNIT PRICE FOR ROOF DECKING REPLACEMENT.
3. AFTER SELF-ADHERING SHEET UNDERLAYMENT AND BEFORE ASPHALT SHINGLES A UNIFORM LAYER OF BREATHER TYPE NON-ASPHALTIC UNDERLAYMENT IS TO BE APPLIED.
4. REUSE AS MUCH EXISTING BRICK AS POSSIBLE.
5. NEW BRICK TO MATCH EXISTING AS CLOSELY AS POSSIBLE.

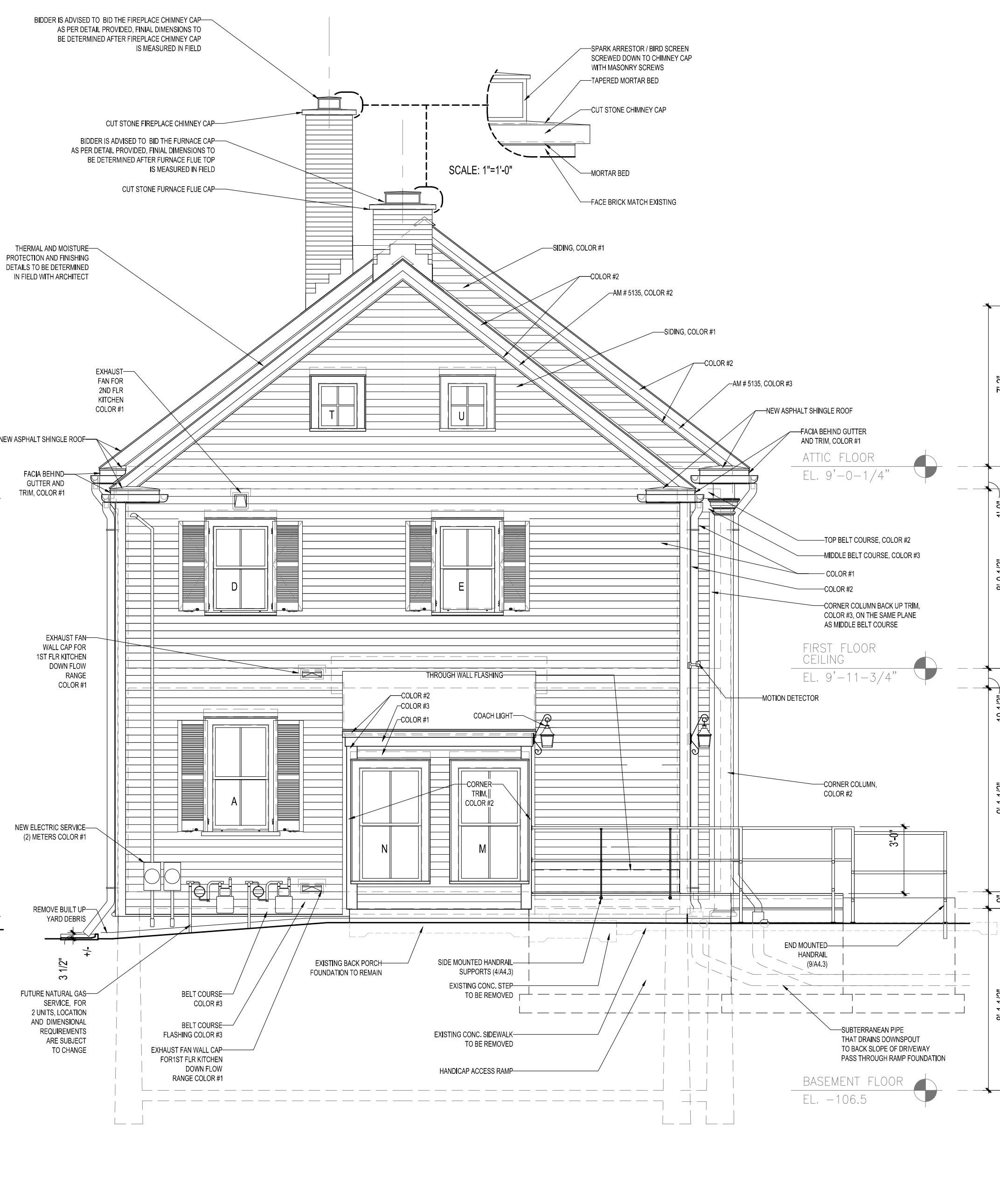
PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	ROOF PLAN GENERAL NOTES
OWNER / CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-306-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-279-2223
1. WALTHAM HISTORIC COMMISSION	10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION	12-5-2017
3. FOR BID	2-1-2018
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DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
REVISION:	A1.2



GENERAL NOTE:
1. BIDDER IS INSTRUCTED TO INCLUDE THE REPLACEMENT OF 30 LN.FT. OF STRUCTURAL WOOD PERMETER BEAM 4"x6" @ 20' ON CENTER.
2. BIDDER IS INSTRUCTED TO INCLUDE A UNIT PRICE FOR REPLACING ADDITIONAL STRUCTURAL PERMETER BEAMS.
3. BIDDER IS INSTRUCTED THAT THE LOCATION AND SIZE OF THE EXHAUST FANS SPECIFIED ARE SUBJECT TO CHANGE.
4. COORDINATE LOCATION OF EXHAUST FANS WITH ARCHITECT IN FIELD.

COLOR NOTES:
1. REPLACEMENT WINDOW SASHES TO BE COLOR #4
2. WINDOW CASING AND SILL TO BE COLOR #2
3. WINDOW SHUTTERS TO BE COLOR #2
4. SIDING TO BE COLOR #1
5. WITH REGARD TO PORCH AND STAIR HANDRAIL:
A. HAND RAIL AND BOTTOM HORIZONTAL RAIL TO BE COLOR #2
B. VERTICAL POSTS, COLOR #2
C. VERTICAL PICKETS, COLOR #1

1 NORTH ELEVATIONS
1/4"=1'-0"

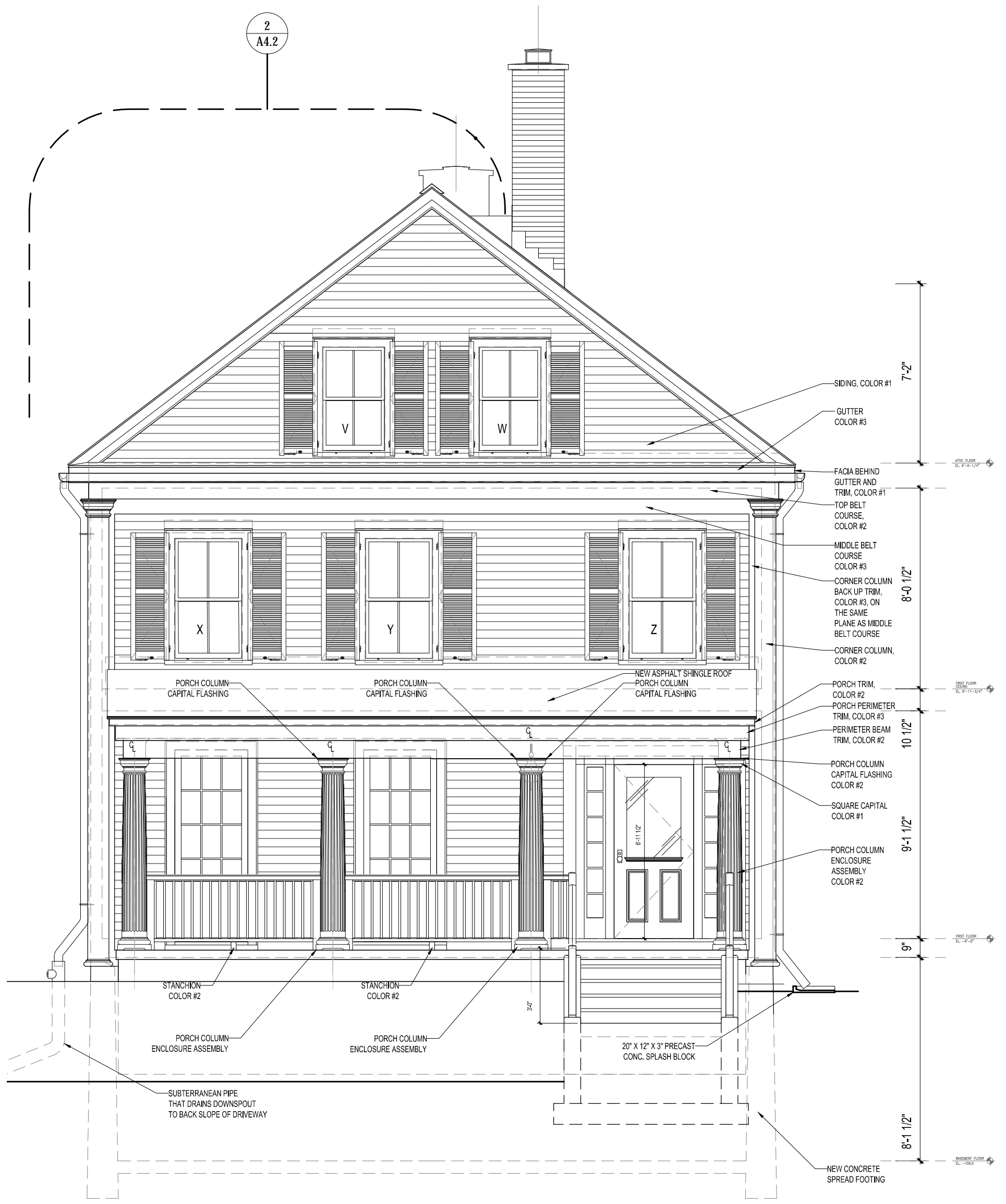
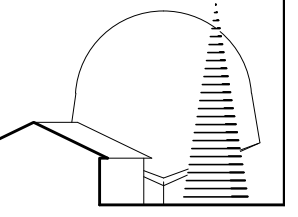


GENERAL NOTE:
1. BIDDER IS ADVISED TO BID THE FIREPLACE CHIMNEY CAP AS PER DETAIL PROVIDED. FINAL DIMENSIONS TO BE DETERMINED AFTER FIREPLACE CHIMNEY CAP IS MEASURED IN FIELD.
2. BIDDER IS ADVISED TO BID THE FURNACE CAP AS PER DETAIL PROVIDED. FINAL DIMENSIONS TO BE DETERMINED AFTER FURNACE FLUE TOP IS MEASURED IN FIELD.
3. BIDDER IS ADVISED TO BID THE FURNACE CAP AS PER DETAIL PROVIDED. FINAL DIMENSIONS TO BE DETERMINED AFTER FURNACE FLUE TOP IS MEASURED IN FIELD.

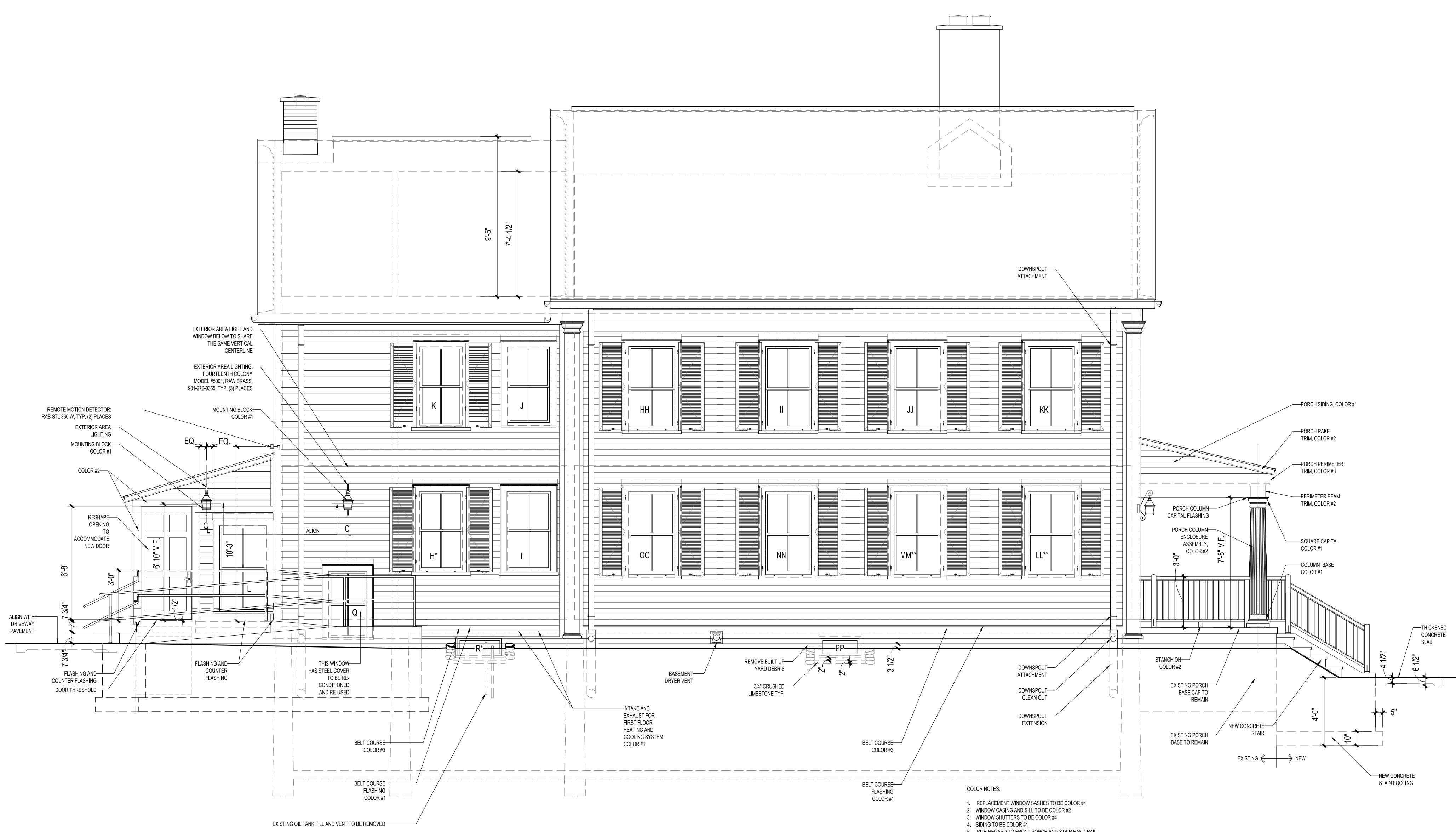
COLOR NOTES:
1. REPLACEMENT WINDOW SASHES TO BE COLOR #4
2. WINDOW CASING AND SILL TO BE COLOR #2
3. WINDOW SHUTTERS TO BE COLOR #2
4. SIDING TO BE COLOR #1
5. WITH REGARD TO PORCH AND STAIR HANDRAIL:
A. HAND RAIL AND BOTTOM HORIZONTAL RAIL TO BE COLOR #2
B. VERTICAL POSTS, COLOR #2
C. VERTICAL PICKETS, COLOR #1

2 EAST ELEVATION
1/4"=1'-0"

PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	EXTERIOR ELEVATIONS
OWNER/CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-306-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-279-2223
1. WALTHAM HISTORIC COMMISSION	10-16-2017
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DATE:	2-1-2018
SCALE:	1/4" = 1'-0"
DRAWN:	AJK
DRAWING	A2.1



1 WEST ELEVATIONS
 1/4"=1'-0"



2 SOUTH ELEVATION
 1/4"=1'-0"

- COLOR NOTES:
1. REPLACEMENT WINDOW SHAKES TO BE COLOR H4
 2. WINDOW CASING AND SILL TO BE COLOR K2
 3. WINDOW SHUTTERS TO BE COLOR M
 4. SIDING TO BE COLOR R1
 5. WITH REGARD TO FRONT PORCH AND STAIR HAND RAIL:
 - A. TOP HORIZONTAL HAND RAIL AND BOTTOM HORIZONTAL RAIL TO BE COLOR K2
 - B. VERTICAL PICKETS, COLOR K2
 - C. VERTICAL PICKETS, COLOR H1

PROJECT: MULTI-FAMILY REMODEL
 CARDINAL COTTAGE
 TRAPELO RD
 WALTHAM, MA

TITLE: EXTERIOR ELEVATIONS

OWNER/CLIENT: CITY OF WALTHAM PLANNING DEPT.
 ROBERT WATERS, HOUSING SUPERVISOR
 119 SCHOOL ST., TOP FLR.
 WALTHAM, MA 02451

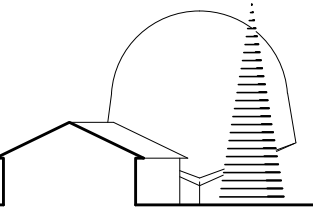
ARCHITECT OF RECORD: ALEX KNOX, AIA
 COLLABORATIVE DESIGN ARCHITECT
 80 OAK STREET, NEEDHAM, MA 02492
 617-306-3474

CONSULTANT: SABBAGH ASSOCIATES
 STRUCTURAL ENGINEERING CONSULTANTS
 451 MAIN STREET, STONEHAM, MA 02180
 781-275-2223

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3. FOR BID	2-1-2018

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DATE:	2-1-2018
SCALE:	1/4" = 1'-0"
DRAWN:	AJK
DRAWING:	A2.2



PROJECT: MULTI-FAMILY REMODEL
CARDINAL COTTAGE
TRAPELO RD
WALTHAM, MA

TITLE: EXTERIOR DETAILS

OWNER/CLIENT: CITY OF WALTHAM PLANNING DEPT.
ROBERT WATERS, HOUSING SUPERVISOR
119 SCHOOL ST., TOP FLR.
WALTHAM, MA 02451

ARCHITECT OF RECORD: ALEX KNOX, AIA
COLLABORATIVE DESIGN ARCHITECT
80 OAK STREET, NEEDHAM, MA 02492
617-306-3474

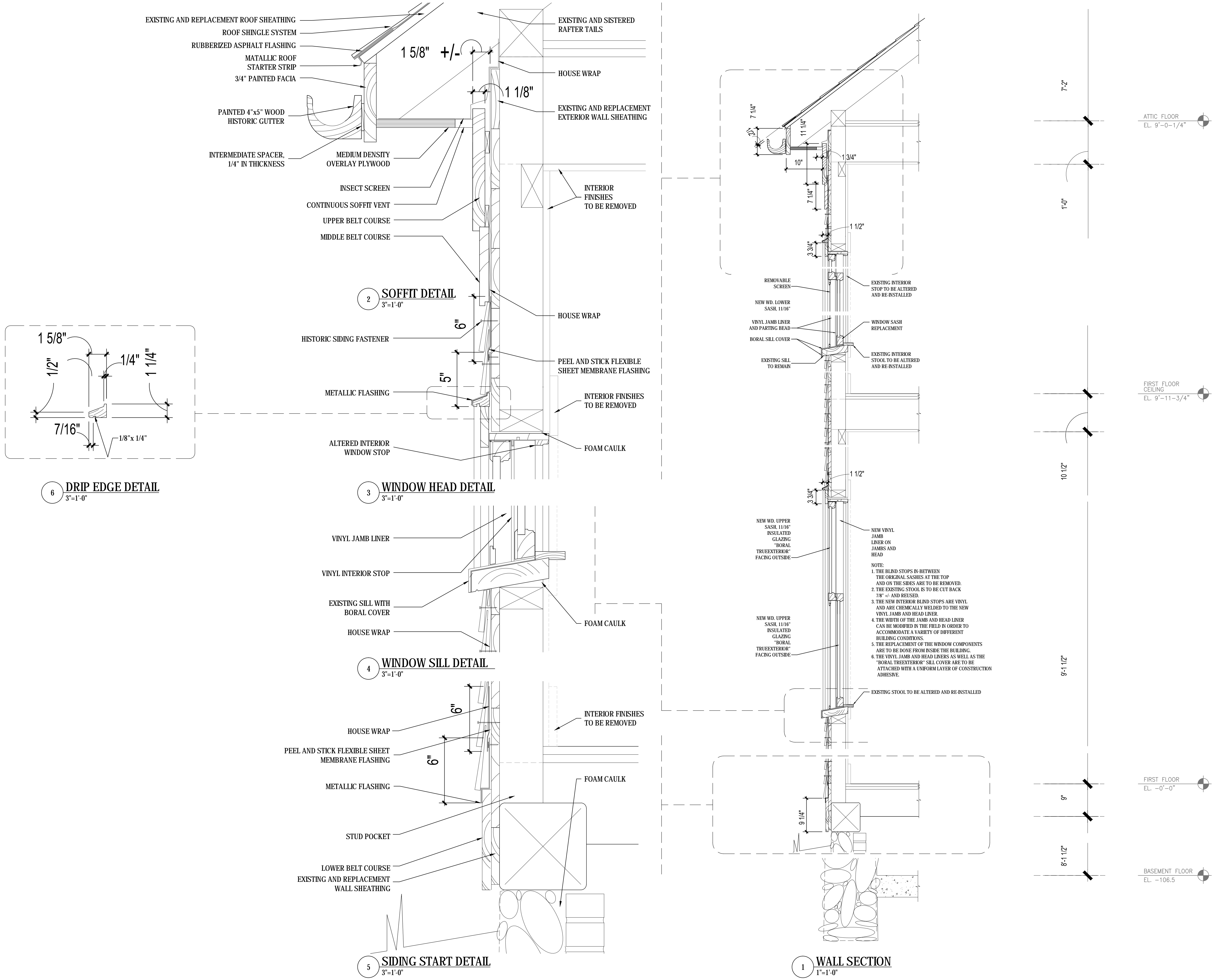
CONSULTANT: SABBAGH ASSOCIATES
STRUCTURAL ENGINEERING CONSULTANTS
451 MAIN STREET, STONEHAM, MA 02180
781-279-2223

1. WALTHAM HISTORIC COMMISSION	10-16-2017
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3. FOR BID	2-1-2018

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DATE: 2-1-2018
SCALE: AS NOTED
DRAWN: AJK

DRAWING: **A4.1**

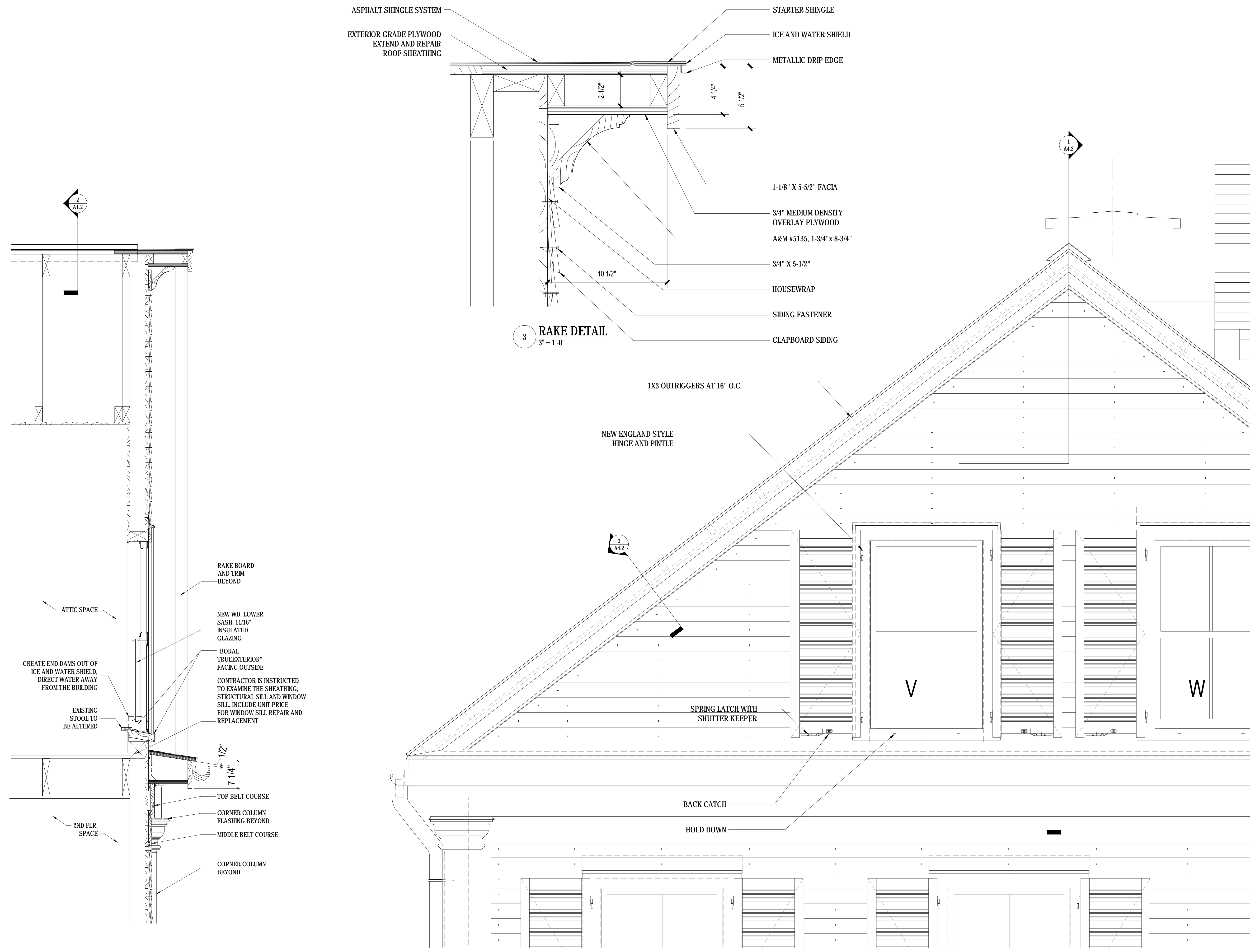
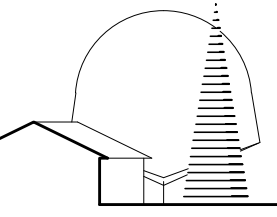


ATTIC FLOOR
CEILING
EL. 9'-0-1/4"

FIRST FLOOR
CEILING
EL. 9'-11-3/4"

FIRST FLOOR
EL. -0'-0"

BASEMENT FLOOR
EL. -106.5



ASPHALT SHINGLE SYSTEM
 EXTERIOR GRADE PLYWOOD
 EXTEND AND REPAIR
 ROOF SHEATHING

STARTER SHINGLE
 ICE AND WATER SHIELD
 METALLIC DRIP EDGE

2-1/2"
 4-1/4"
 5-1/2"

1-1/8" X 5-5/2" FACIA
 3/4" MEDIUM DENSITY
 OVERLAY PLYWOOD
 A&M #5135, 1-3/4" X 8-3/4"
 3/4" X 5-1/2"
 HOUSEWRAP
 SIDING FASTENER
 CLAPBOARD SIDING

10 1/2"

3 RAKE DETAIL
 3" = 1'-0"

2 A1.2

ATTIC SPACE

CREATE END DAMS OUT OF
 ICE AND WATER SHIELD.
 DIRECT WATER AWAY
 FROM THE BUILDING

EXISTING
 STOOL TO
 BE ALTERED

RAKE BOARD
 AND TRIM
 BEYOND

NEW WD. LOWER
 SASH, 1 1/16"
 INSULATED
 GLAZING

"BORAL
 TRUE EXTERIOR"
 FACING OUTSIDE

CONTRACTOR IS INSTRUCTED
 TO EXAMINE THE SHEATHING,
 STRUCTURAL SILL AND WINDOW
 SILL. INCLUDE UNIT PRICE
 FOR WINDOW SILL REPAIR AND
 REPLACEMENT

1/2"
 7 1/4"

TOP BELT COURSE
 CORNER COLUMN
 FLASHING BEYOND
 MIDDLE BELT COURSE
 CORNER COLUMN
 BEYOND

2ND FLR.
 SPACE

1X3 OUTRIGGERS AT 16" O.C.

NEW ENGLAND STYLE
 HINGE AND PIVTLE

3 A4.2

V W

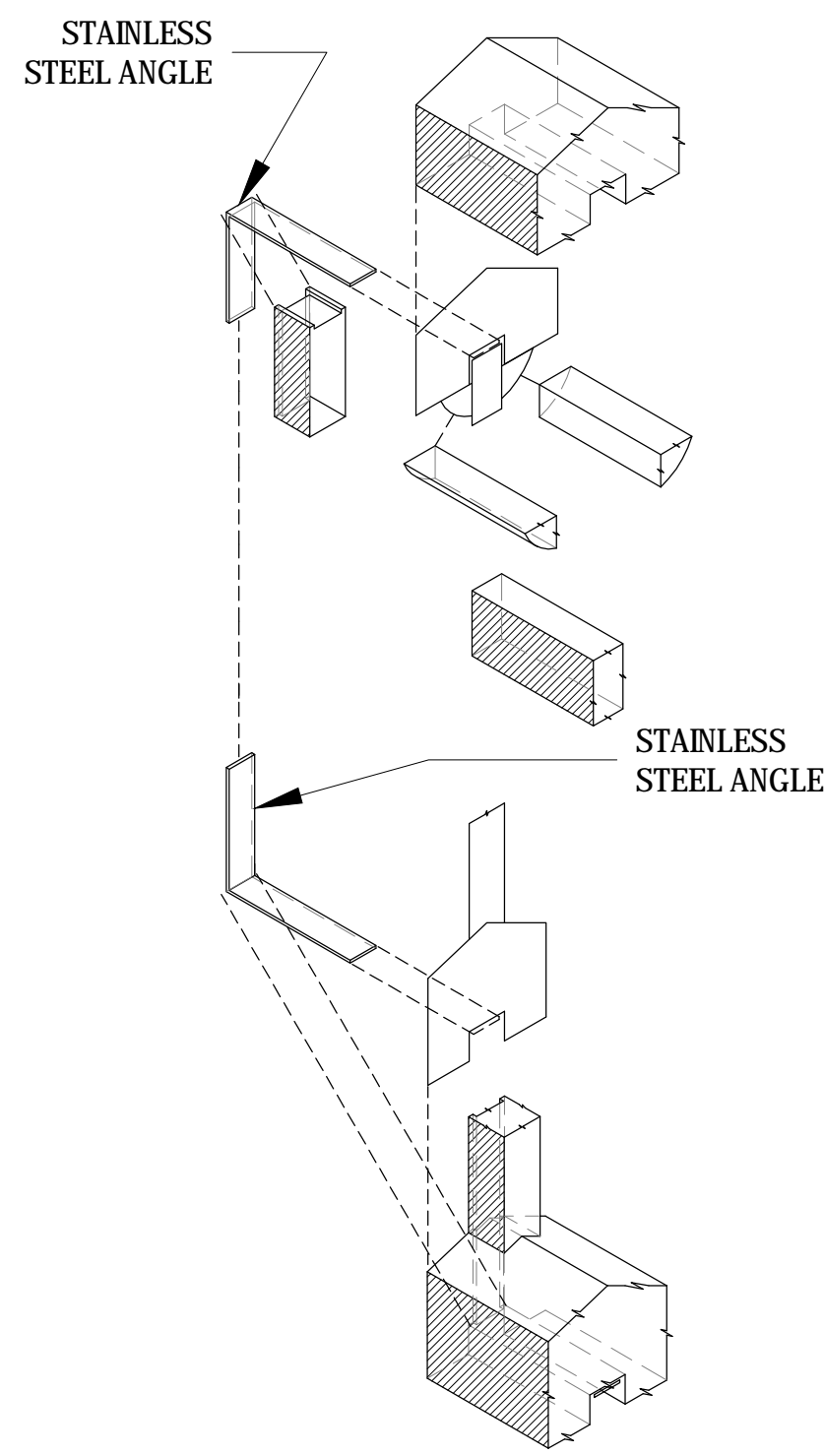
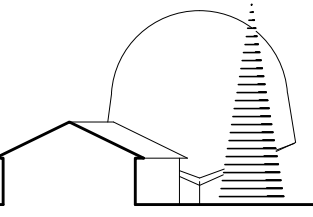
SPRING LATCH WITH
 SHUTTER KEEPER

BACK CATCH
 HOLD DOWN

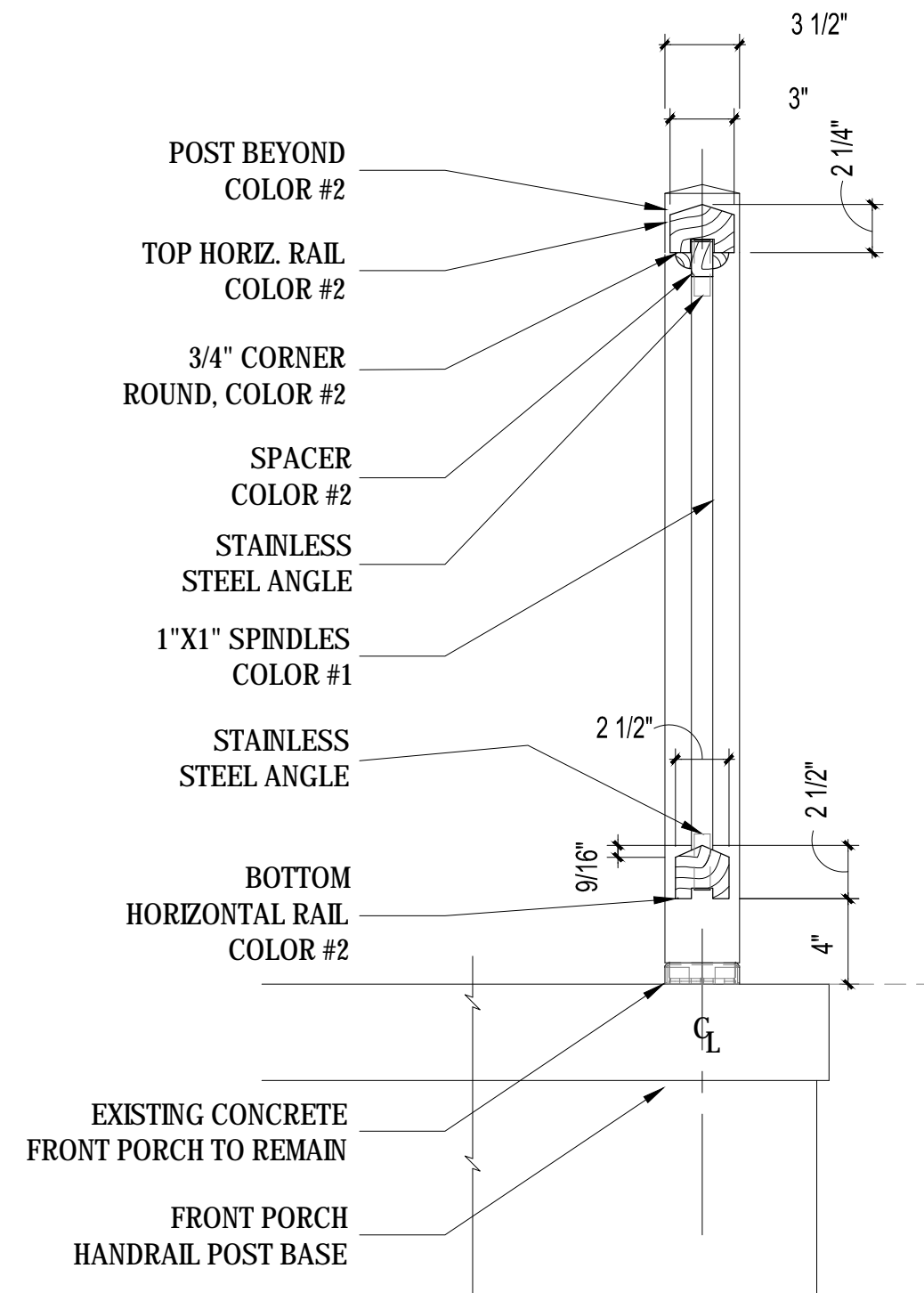
1 PARTIAL GABLE END SECTION
 1" = 1'-0"

2 GABLE END ELEVATION IN DETAIL
 1" = 1'-0"

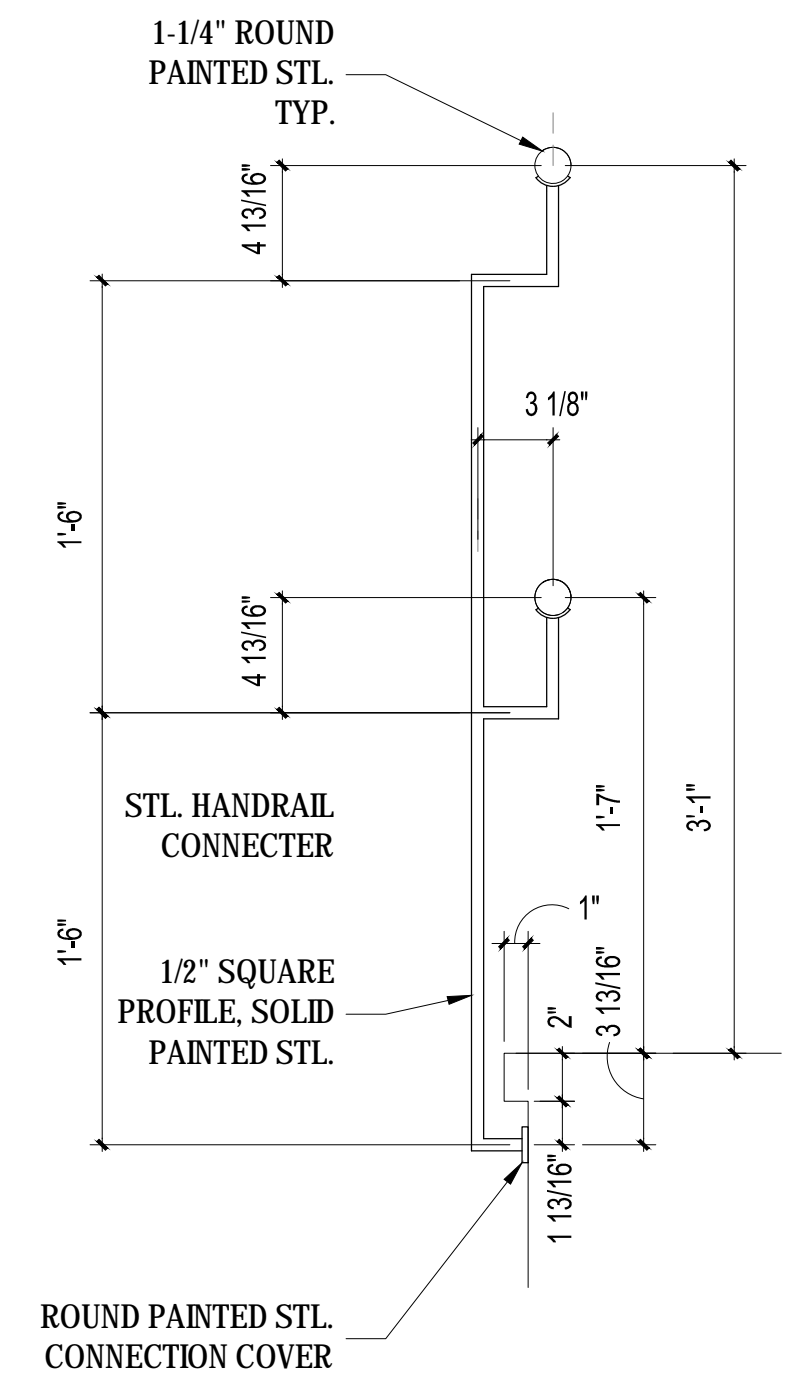
PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	EXTERIOR DETAILS
OWNER/CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-308-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-279-2223
1. WALTHAM HISTORIC COMMISSION	10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION	12-5-2017
3. FOR BID	2-1-2018
COPYRIGHT	2017-2018
DATE:	2-1-2018
SCALE:	AS NOTED
DRAWN:	AJK
DRAWING:	A4.2



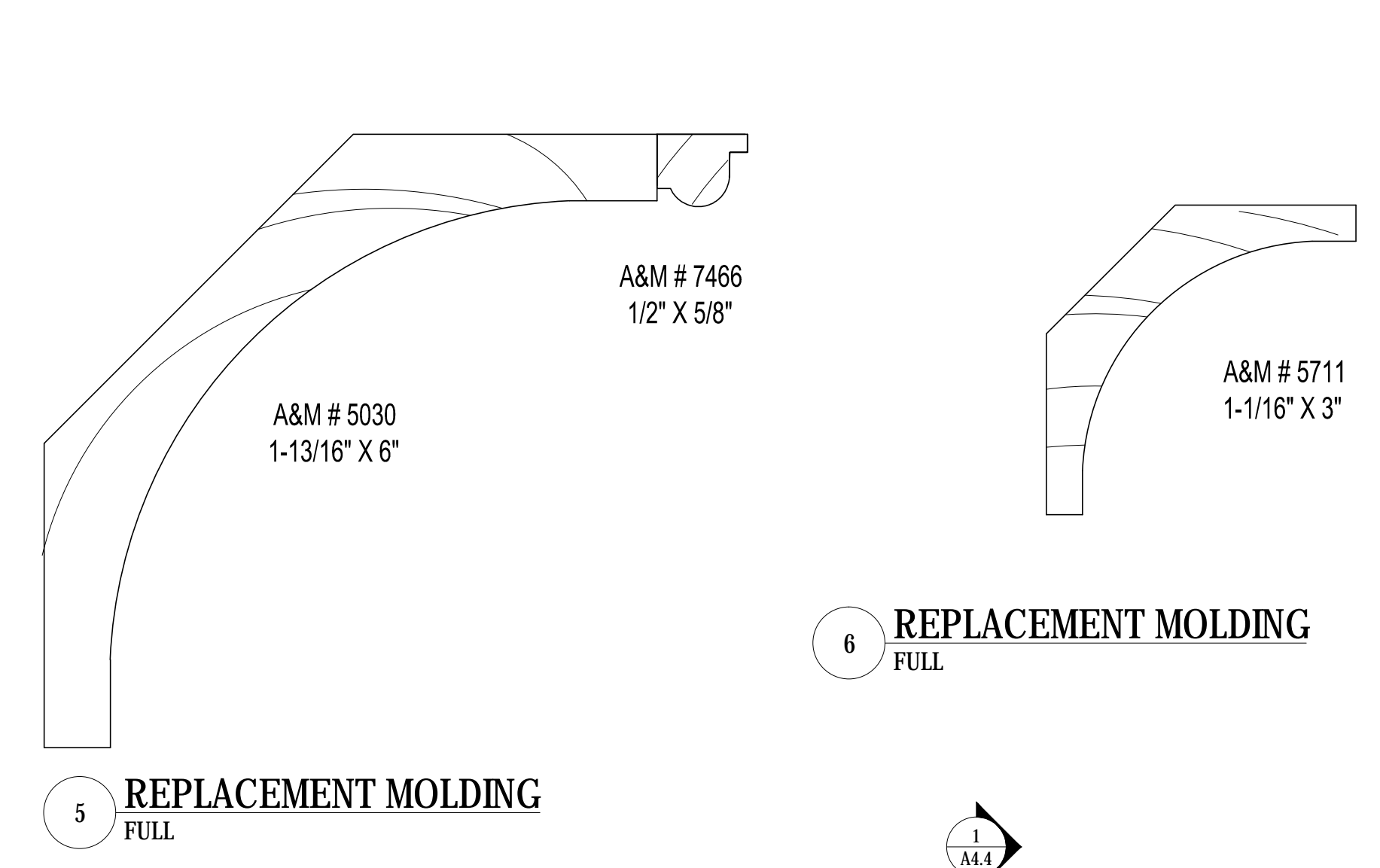
7 HANDRAIL ASSEMBLY DETAIL
N.T.S.



4 HANDRAIL DETAIL
1"=1'-0"

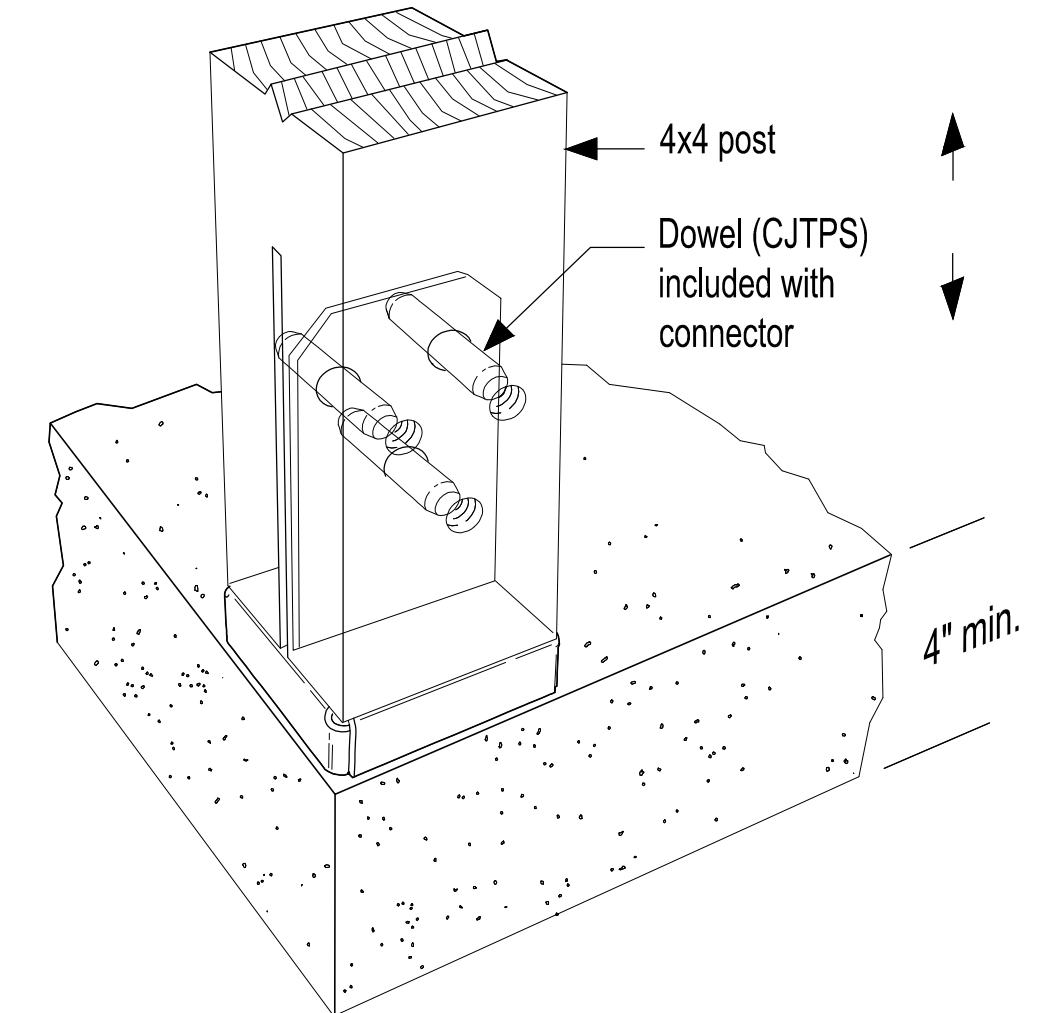


8 HANDRAIL DETAIL
1-1/2"=1'-0"

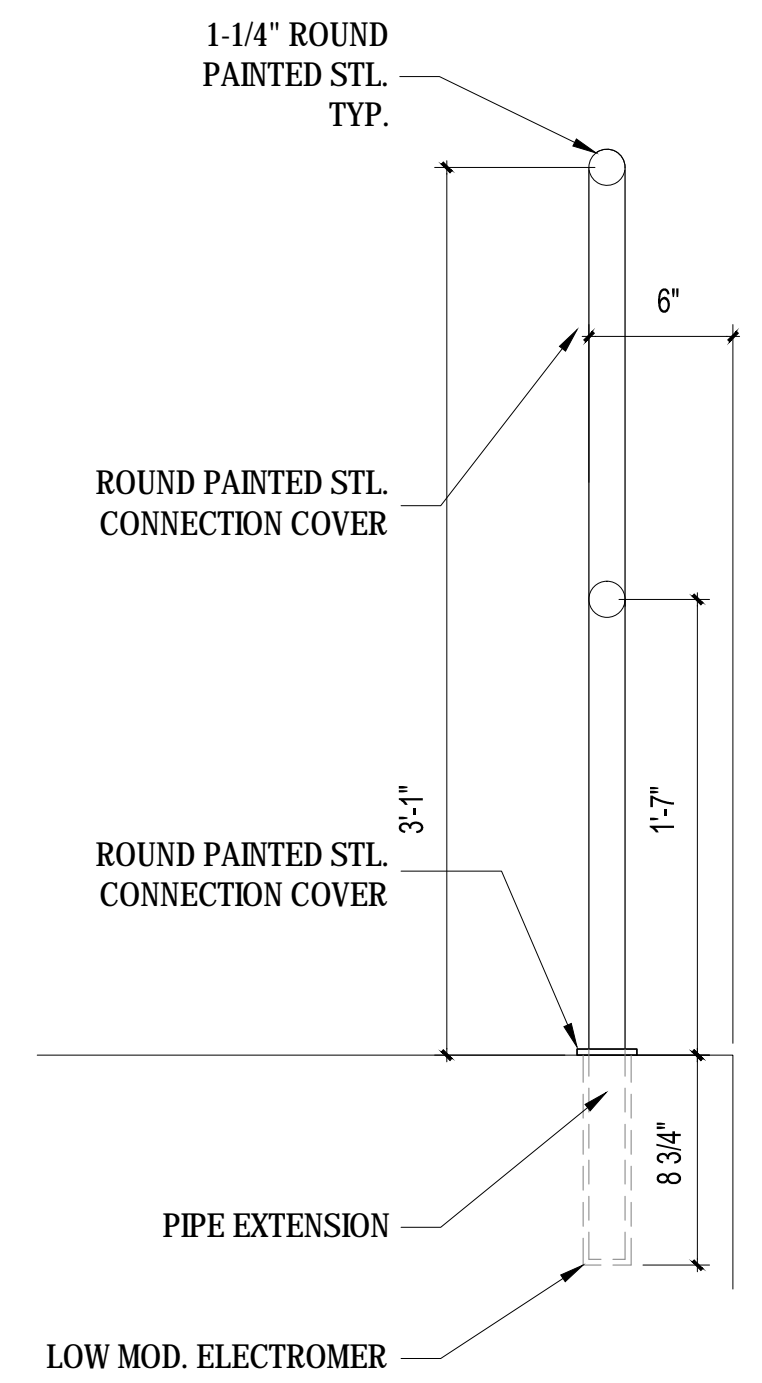


5 REPLACEMENT MOLDING
FULL

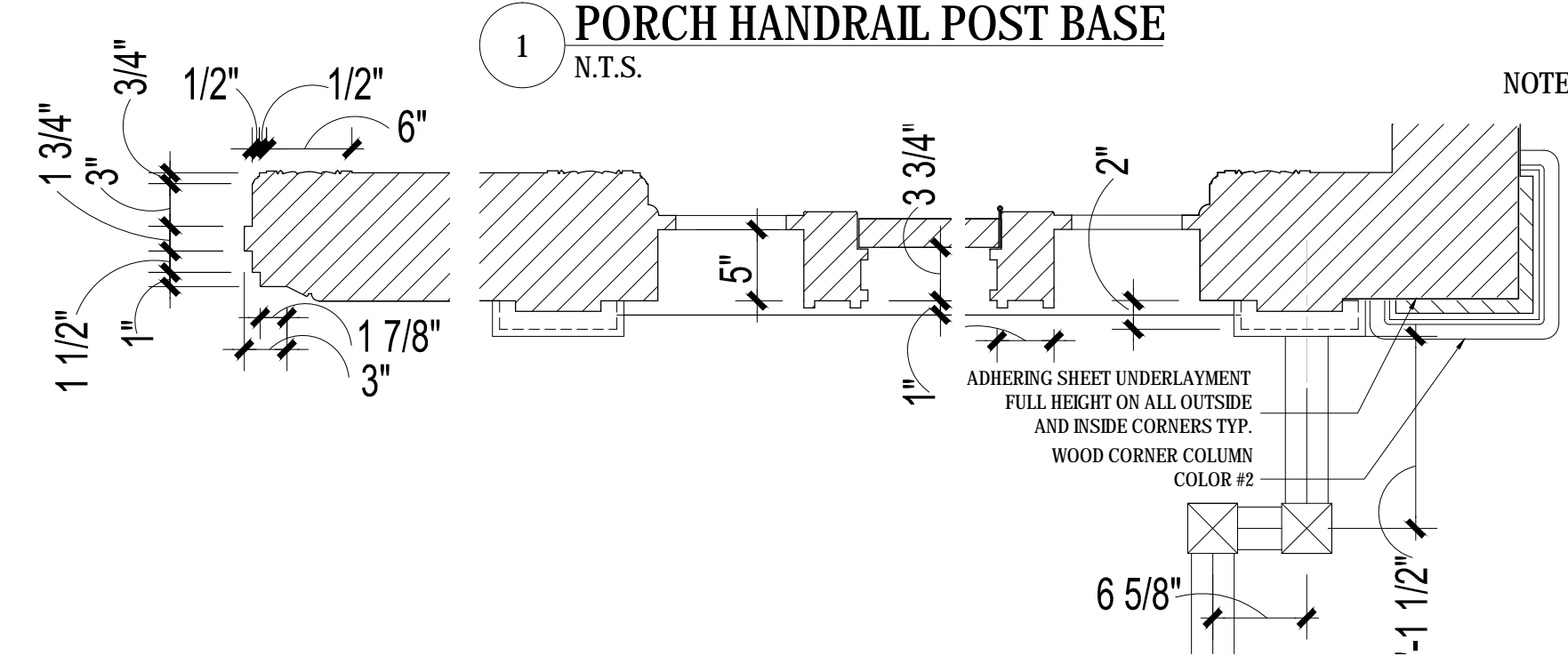
6 REPLACEMENT MOLDING
FULL



Typical CPT44Z Corner-Flush Edge Installation



9 STANCHION DETAIL
1"=1'-0"

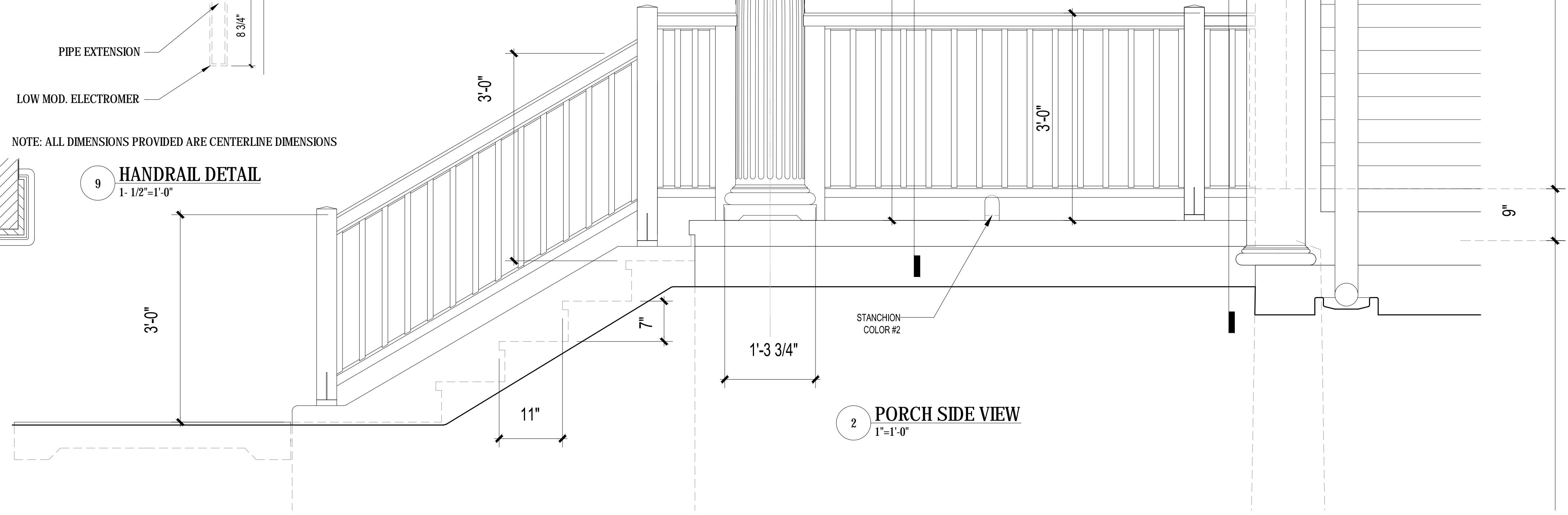


1 PORCH HANDRAIL POST BASE
N.T.S.

NOTE: ALL DIMENSIONS PROVIDED ARE CENTERLINE DIMENSIONS

9 HANDRAIL DETAIL
1-1/2"=1'-0"

3 PARIAL DOOR JAMB SECTION
1"=1'-0"



2 PORCH SIDE VIEW
1"=1'-0"

PROJECT: MULTI-FAMILY REMODEL
CARDINAL COTTAGE
TRAPELO RD
WALTHAM, MA

TITLE: EXTERIOR DETAILS

OWNER/CLIENT: CITY OF WALTHAM PLANNING DEPT.
ROBERT WATERS, HOUSING SUPERVISOR
118 SCHOOL ST., TOP FLR.
WALTHAM, MA 02451

ARCHITECT OF RECORD: ALEX KNOX, AIA
COLLABORATIVE DESIGN ARCHITECT
80 OAK STREET, NEEDHAM, MA 02492
617-306-3474

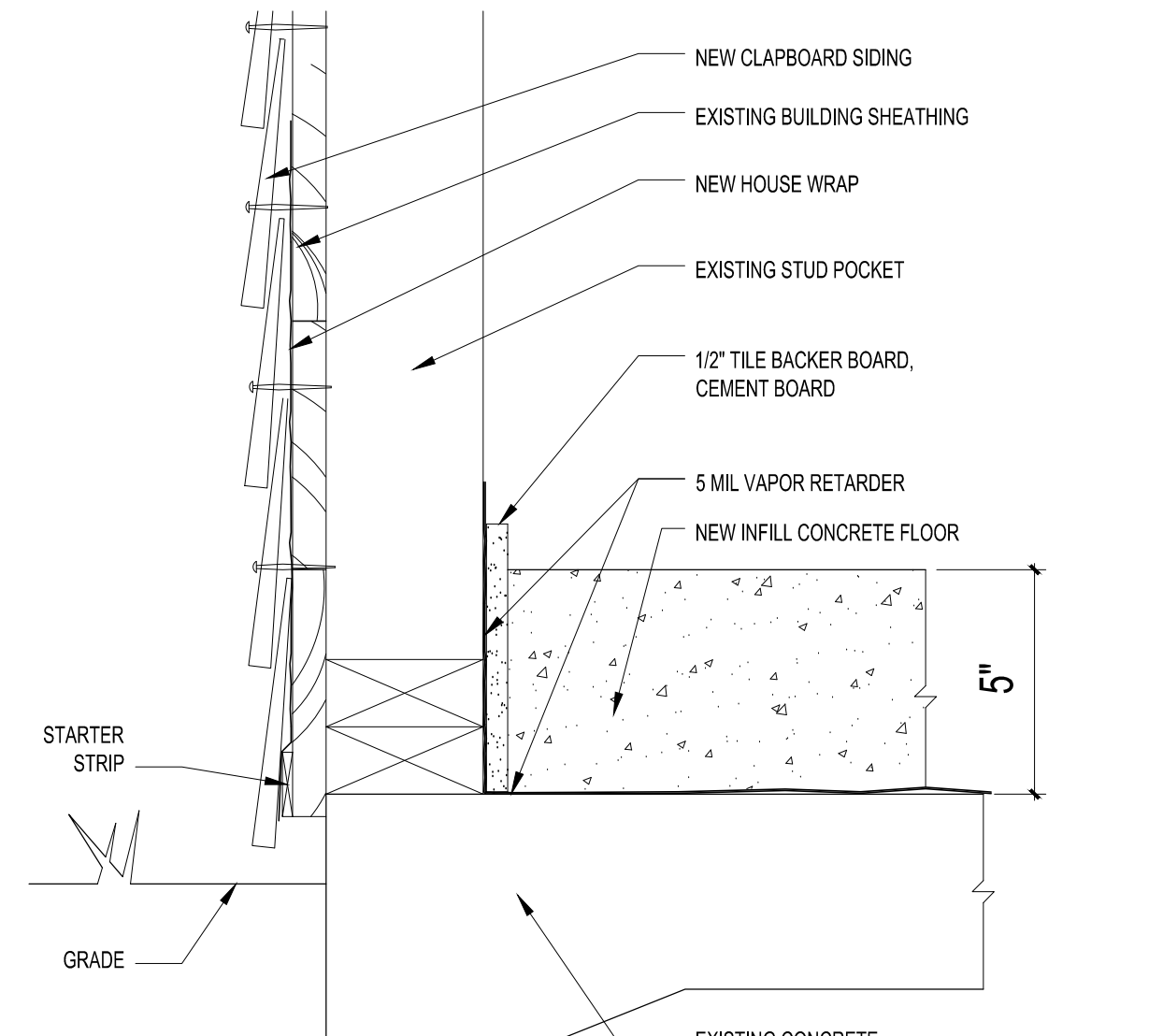
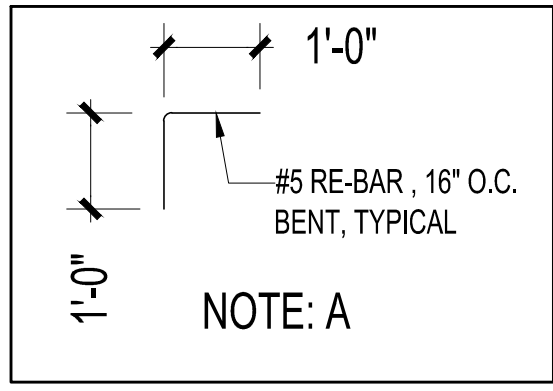
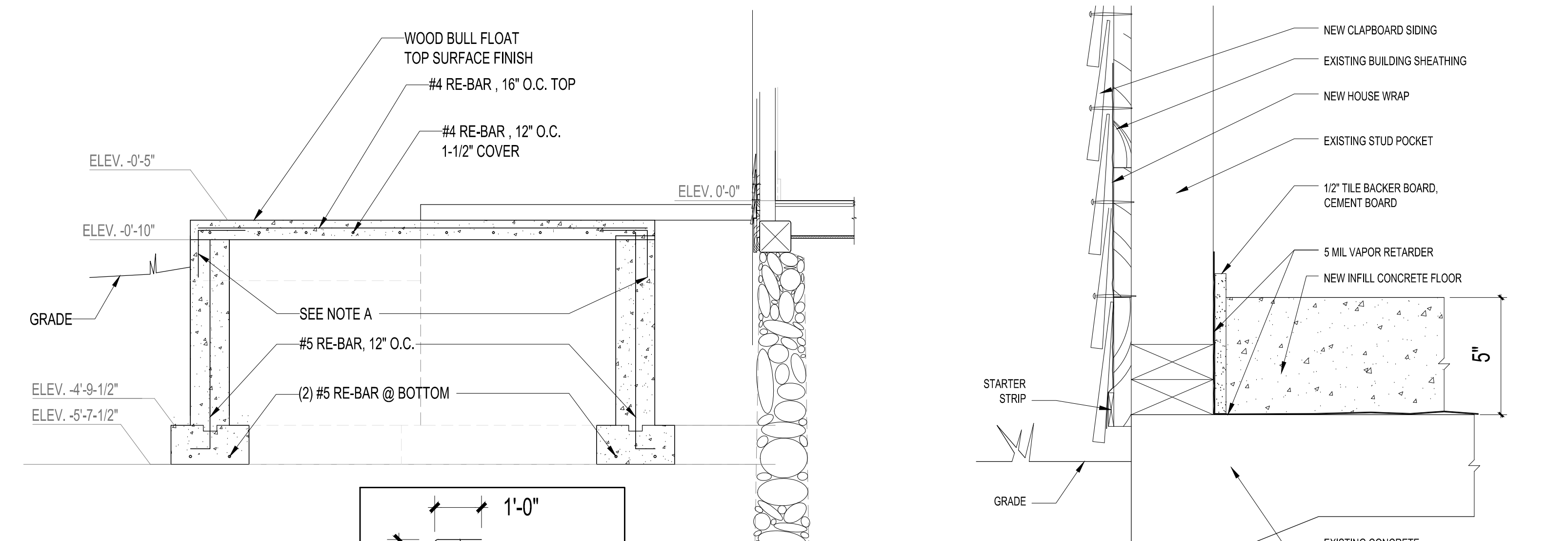
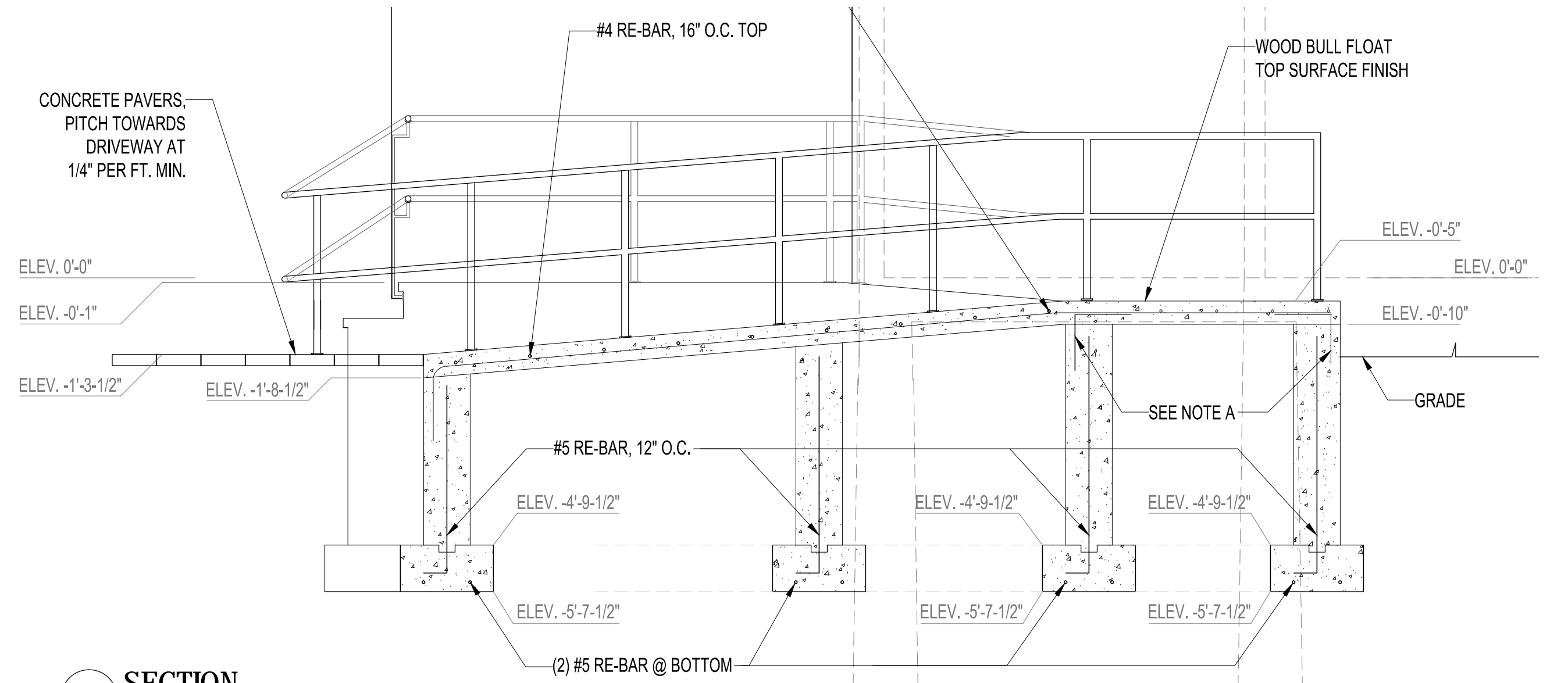
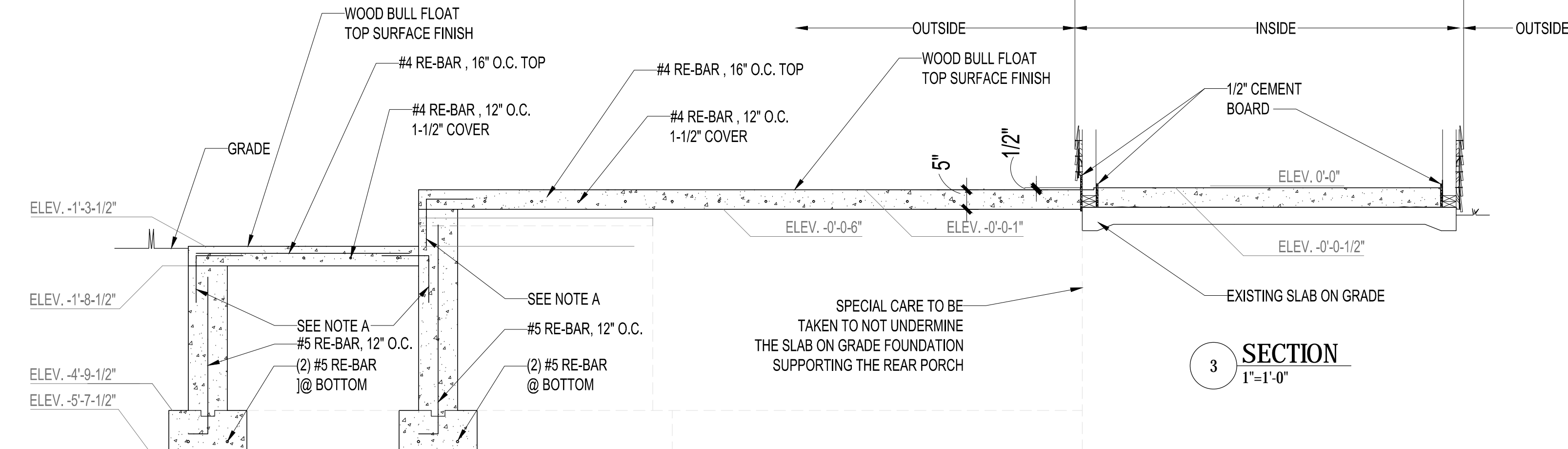
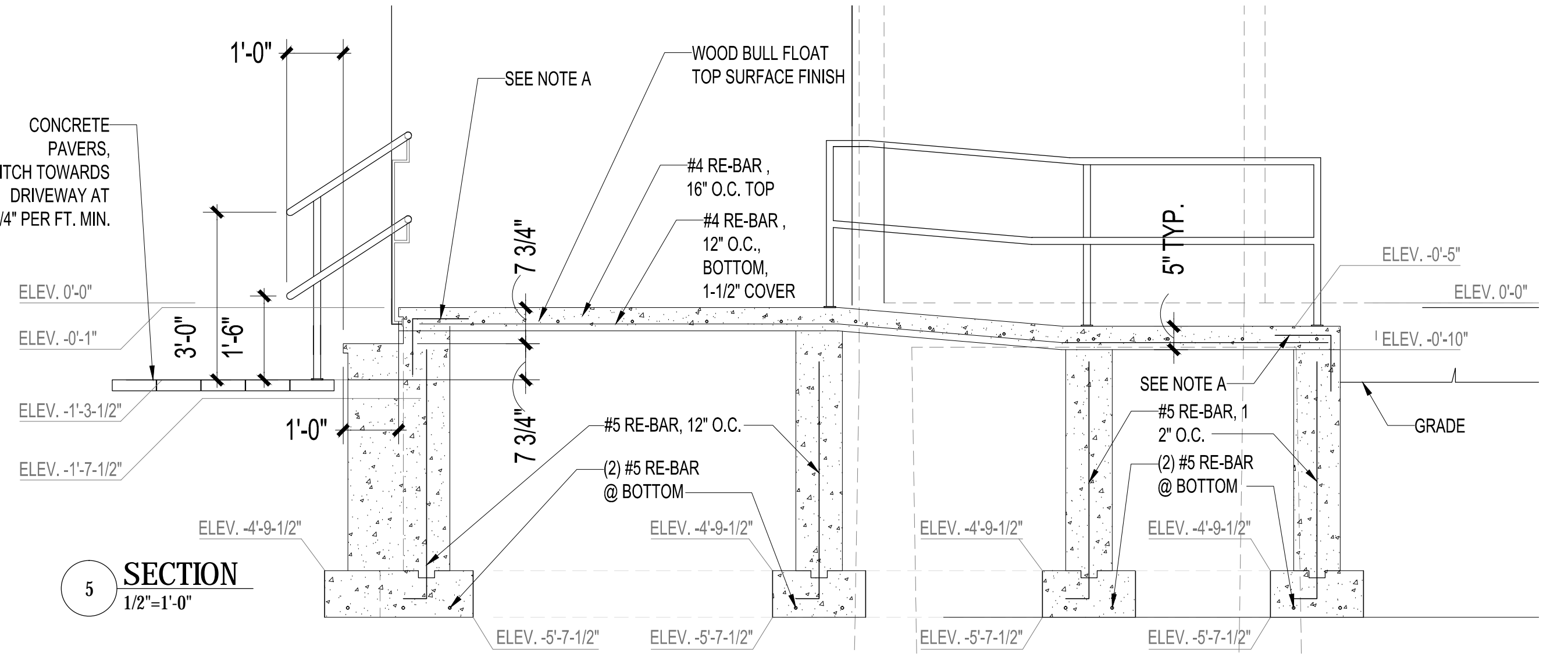
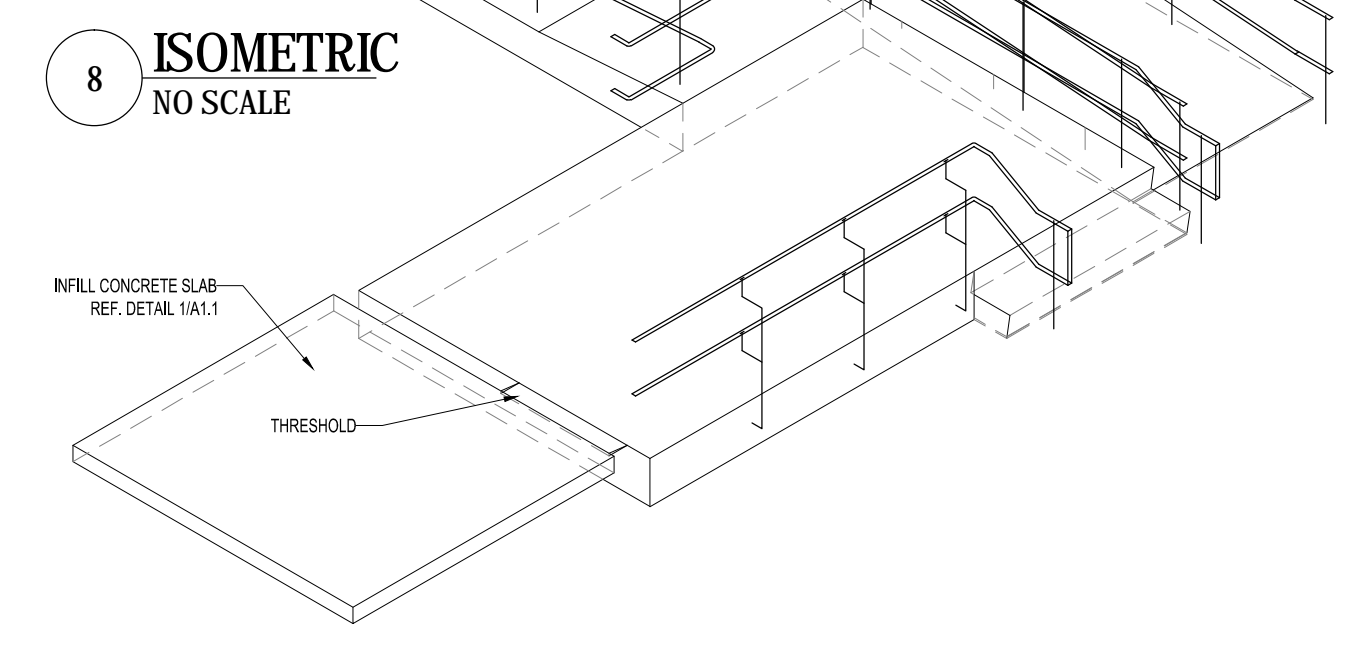
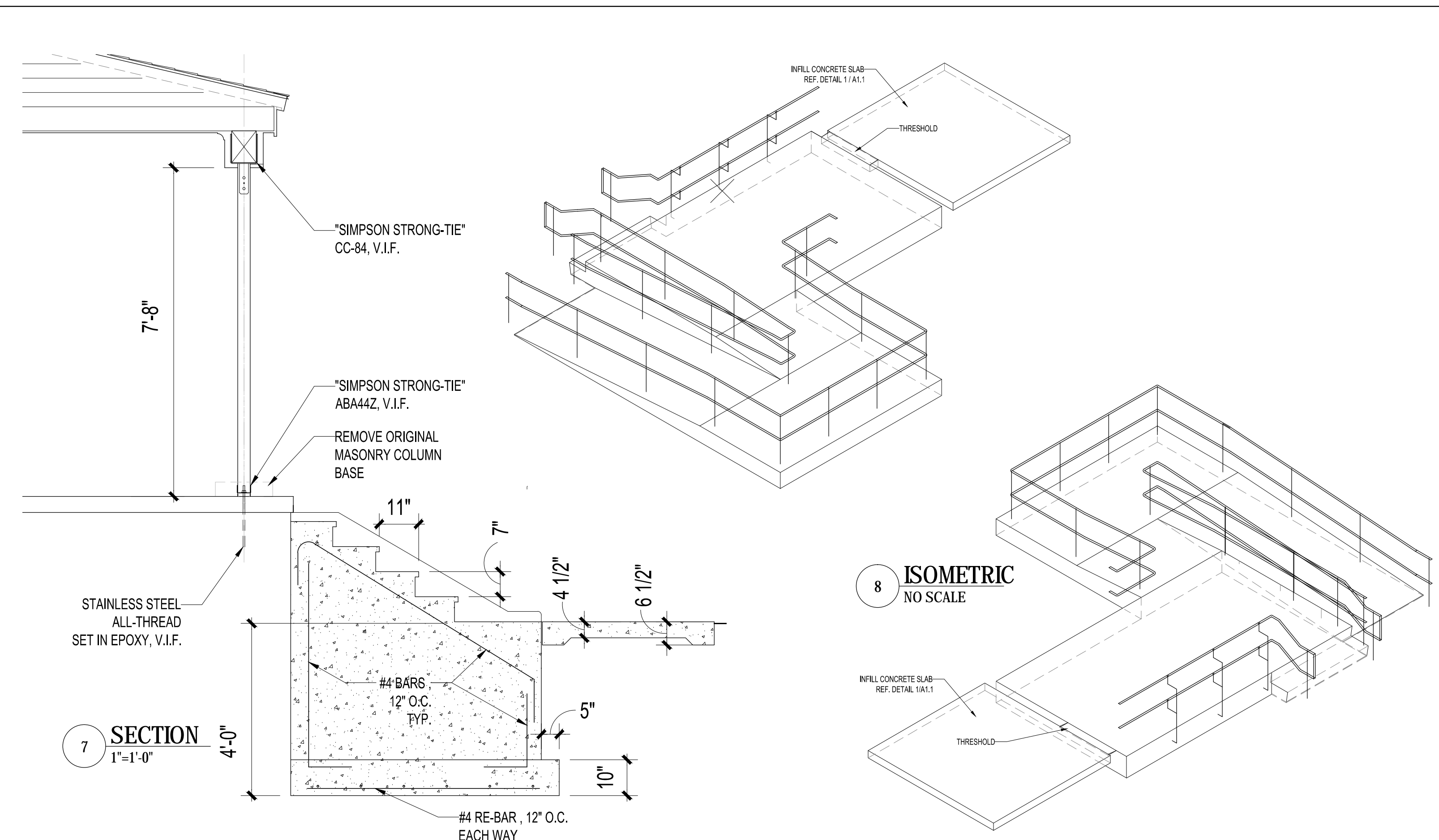
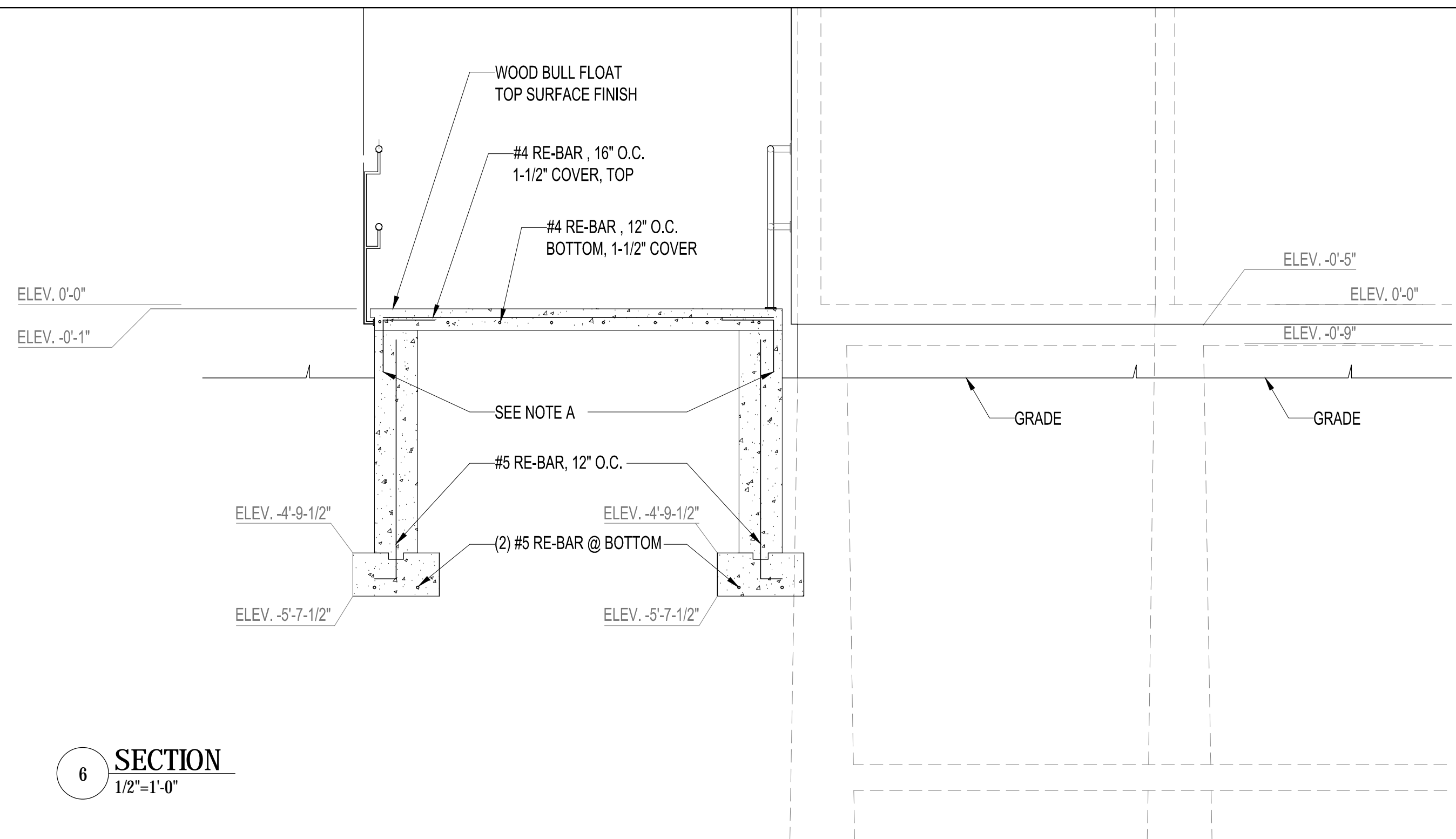
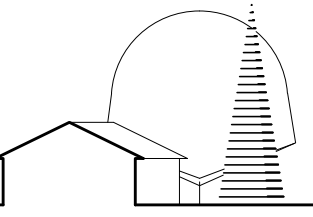
CONSULTANT: SABBAGH ASSOCIATES
STRUCTURAL ENGINEERING CONSULTANTS
451 MAIN STREET, STONEHAM, MA 02180
781-279-2223

1. WALTHAM HISTORIC COMMISSION 10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION 12-5-2017
3. FOR BID 2-4-2018

COPYRIGHT 2017-2018

DATE: 2-1-2018
SCALE: AS NOTED
DRAWN: AJK

DRAWING: A4.3



PROJECT:	MULTI-FAMILY REMODEL CARDINAL COTTAGE TRAPELO RD WALTHAM, MA
TITLE:	CONCRETE SECTIONS AND DETAILS
OWNER/CLIENT:	CITY OF WALTHAM PLANNING DEPT. ROBERT WATERS, HOUSING SUPERVISOR 119 SCHOOL ST., TOP FLR. WALTHAM, MA 02451
ARCHITECT OF RECORD:	ALEX KNOX, AIA COLLABORATIVE DESIGN ARCHITECT 80 OAK STREET, NEEDHAM, MA 02492 617-306-3474
CONSULTANT:	SABBAGH ASSOCIATES STRUCTURAL ENGINEERING CONSULTANTS 451 MAIN STREET, STONEHAM, MA 02180 781-275-2223
1. WALTHAM HISTORIC COMMISSION	10-16-2017
2. MASSACHUSETTS HISTORIC COMMISSION	12-5-2017
3. FOR BID	2-1-2018
COPYRIGHT:	2017-2018
DATE:	2-1-2018
SCALE:	1/4" = 1'-0"
DRAWN:	AJK
DRAWING:	A4.5

REPORTS



The Commonwealth of Massachusetts
William Francis Galvin, Secretary of the Commonwealth
Massachusetts Historical Commission

December 19, 2017

Robert Waters
Housing Supervisor
City of Waltham
119 School Street
Waltham, MA 02452

RE: Cardinal Cottage Restoration, former Fernald Redevelopment Center, 282 Trapelo Road, Waltham, MA;
MHC# RC.63500

Dear Mr. Waters:

Staff of the Massachusetts Historical Commission (MHC) have reviewed the Project Notification Form that was submitted by Alex Knox, received at this office on November 27, 2017, for the project referenced above. The staff of the MHC have the following comments.

The proposed project consists of the rehabilitation of the Cardinal Cottage and the demolition of the concrete garage located next to the Cardinal Cottage.

The Cardinal Cottage (Building 53, WLT.377) is listed in the State and National Registers of Historic Places as a contributing element of the Walter E. Fernald State School Historic District. The Garage (Building 54, WLT.767) located next to the Cardinal Cottage is a non-contributing element of the Walter E. Fernald State School Historic District.

The proposed rehabilitation of the Cardinal Cottage fulfills Stipulation I of the Memorandum of Agreement among the Massachusetts Division of Capital Asset Management and Maintenance, The City of Waltham, and the Massachusetts Historical Commission (MOA), executed in 2014.

In regards to the garage located next to the Cardinal Cottage, please reference Stipulation IV (A) (5). Since this garage is a non-contributing element of the Walter E. Fernald it may be demolished or altered as an exempted activity.

These comments are offered to assist in compliance with M.G.L. Chapter 9, sections 26-27C (950 CMR 71.00) and the MOA. Please do not hesitate to contact Elizabeth Sherva of my staff if you have any questions.

Sincerely,

A handwritten signature in blue ink that reads "Brona Simon".

Brona Simon
State Historic Preservation Officer
Executive Director
Massachusetts Historical Commission

cc: Mayor Jeannette McCarthy, City of Waltham
Waltham Historical Commission

MEMORANDUM OF AGREEMENT
BETWEEN
THE MASSACHUSETTS DIVISION OF CAPITAL ASSET MANAGEMENT AND
MAINTENANCE, THE CITY OF WALTHAM,
AND THE MASSACHUSETTS HISTORICAL COMMISSION

WHEREAS, the legislature has authorized the Massachusetts Division of Capital Asset Management and Maintenance (DCAMM) to enter into a disposition process to dispose of the approximately 180+/-acre Walter E. Fernald Developmental Center Disposition Parcel (Parcel) located in the City of Waltham, MA (City) to the City; and

WHEREAS, the Parcel contains ninety-three (93) structures and landscape features constructed between the years of 1891 and ca.1990; and

WHEREAS, the City will have the right to develop the Parcel by and through private development for uses deemed appropriate by the City and subject to all federal, state and local permits and approvals; and

WHEREAS, the Parcel is listed in the State and National Registers of Historic Places as the Walter E. Fernald State School Historic District, a district listed as part of the Massachusetts State Hospitals and State Schools Multiple Property Listing; and

WHEREAS, the following buildings, structures and landscapes within the Parcel are listed as contributing resources in the District:

Building 1, Waverly Hall (1891); Building 2, North Building (1897); Building 3, Activity Center (1891); Building 4/5, Schoolhouse/Gymnasium (1891); Building 6, Chipman (1892); Building 7, North Nurses' Home (1904); Building 8, Waverly Hall Lawn (ca.1891); Building 9, East Nurses' Home (1906); Building 10, Manual Training (1904); Building 11, Warren Hall (1906); Building 12, South Nurses' Home (1907); Building 13, Thom Building (1952); Building 14, Power Plant (1921); Building 15, Main Garage (1932); Building 16, Storehouse (1891); Building 17, Cottage #17 (1925); Building 18, Cottage #18 (1925); Building 19, Cottage #19 (1925); Building 20, Cottage #20 (1925); Building #21, Southard Research Laboratory (1921); Building 22, Laundry (1928); Building 23, Lavers Hall (1914); Building 24, Maintenance (1930); Building 27, Engineer's Storage (ca.1930); Building 28, Barn Foundation (ca.1900); Building 29, Shed (ca.1920); Building 32, Tarbell Hall (1934); Building 33, West Building (1889 -1890); Building 34, Belmont House (1890); Building 35, Seguin Hall (1934); Building 36, MacDougall Hall (1898); Building 37, Dolan Hall (1906); Building 38, West Nurses' Home (1906); Building 39, Wheatly Hall (1933); Building 40, Food Service Building (1931); Building 41, Howe Hall (1931); Building 42, East Dowling Hall (1906); Building 43, Hillside Cottage (1904); Building 44, Hillside Cottage Garage (1912); Building 45, Baldwin Cottage (ca.1900); Building 46, Wallace Hall (1936); Building 47, Administration (1933); Building 49, Hospital/S.Bowne (1893-1907); Building 51, Trapelo Cottage (ca.1860); Building 53, Cardinal Cottage (ca.1850); Building 59, Cast Iron Fence (ca.1890); Building 90, Shed (ca.1920); Building 91, Activity Center Lawn (ca.1891); and

WHEREAS, the following buildings and structures within the Parcel are listed as non-contributing resources in the District or were not included in the National Register Nomination:

Building 25, Greenhouse (ca.1940); Building 26, Electric Substation (ca.1960); Building 30, Shed (ca.1970); Building 31, Garage (ca.1950); Building 48, Farrell Hall (1960); Building 50, Greene Unit (1953-54); Building 52, Trapelo Cottage Garage (1930); Building 54, Garage (1947); Building 55, Garage (ca.1950); Building 56, Garage (1930); Building 57, Garage (1955); Building 58, Electric Sub Station (ca.1960); Building 60, Kelley Hall (1969); Building 61, Activities Center (1980); Building 62, Withington Center (1979); Building 63, Eunice Shriver Center (1967); Building 64, Cottage #5 (1976); Building 65, Cottage #6 (1976); Building 66, Cottage #7 (1976);

Building 67, Cottage #8 (1976); Building 68, Cottage #9 (1976); Building 69, Cottage #10 (1976); Building 70, Cottage #11 (1976); Building 71, Cottage #12 (1976); Building 72, Cottage #13 (1976); Building 73, Cottage #3 (1976); Building 74, Cottage #4 (1976); Building 75, Brookside (1981); Building 76, Woodside (1981); Building 77, Site 5 (1980); Building 78, Open Pavilion (ca.1970); Building 79, Shed (ca.1970); Building 80, Shed (ca.1970); Building 81, Garage (ca.1930); Building 82, Shed (ca.1970); Building 83, Malone Park 1 (ca.1990); Building 84, Malone Park 2 (ca.1990); Building 85, Malone Park 3 (ca.1990); Building 86, Malone Park 4 (ca.1990); Building 87, Pool/Playground (ca.1960); Building 88, Chapel (1960); Building 89, Electric Sub Station (ca.1960); the Gazebo (ca. 1985); Shed (ca. 1974); Malone Park Comfort Station (ca. 1990); and

WHEREAS, the following contributing buildings and structures within the Parcel have been identified as in extremely poor condition making rehabilitation unlikely or are no longer extant:

Building 1, Waverly Hall (1891); Building 3, Activity Center (1891); Building 6, Chipman (1892); Building 17, Cottage #17 (1925); Building 18, Cottage #18 (1925); Building 29, Shed (c.1920) Building 33, West Building (1889-1890); Building 39, Wheatly Hall (1933); Building 42, East Dowling Hall (1906); Building 44, Hillside Cottage Garage (1912); Building 49, Infirmary/Stephen Bowne Hall (1893, 1901, 1907); Building 90; Shed (wood, c.1920); and

WHEREAS, the City may prepare and issue a Request for Proposals (RFP) for the sale or lease and redevelopment of the Parcel; and

WHEREAS, the transfer by disposition of the Parcel constitutes a project undertaken by a State agency pursuant to 950 CMR 71.03 and is a project for which DCAMM and the City have sought the comments of the Massachusetts Historical Commission (MHC) pursuant to M.G.L. Chapter 9, Section 26-27C, as amended by Chapter 254 of the Acts of 1985 (950 CMR 71.00); and

WHEREAS, MHC has determined that the proposed project will have an adverse effect on the historic property pursuant to 950 CMR 71.05(e) through the disposition of a State Register property; and

WHEREAS; no feasible or prudent alternative exists to eliminate the adverse effect of the proposed disposition; and

WHEREAS, MHC has determined to accept the adverse effect of the disposition of the Parcel in consideration of the mitigation alternatives described herein; and

WHEREAS, MHC, DCAMM and the City agree, and the Waltham Historical Commission (WHC) hereby concurs, that the project shall be undertaken and implemented in accordance with the following stipulations to mitigate the effect of the disposition of the Parcel in compliance with M.G.L. Chapter 9, Section 27C.

STIPULATIONS

DCAMM and the City shall ensure that the following measures are carried out in coordination with MHC and WHC, as set forth below:

I. Redevelopment of the Disposition Parcel

A. The City is encouraged to include historic preservation in any redevelopment process. Options for redevelopment of the Parcel which incorporate historic preservation should take into account the following principles of reuse planning:

1. Preservation of the character-defining features of the contributing buildings, structures and landscapes on the Parcel should be encouraged where feasible.

2. If it is determined that it is not feasible to preserve all of the character-defining features of the contributing buildings, structures and landscape features on the Parcel, the feasibility of preserving character-defining features of portions of the contributing buildings, structures and landscape features will be examined and encouraged where feasible.
3. Rehabilitation of contributing buildings, structures and landscape features on the Parcel should be consistent with recommended approaches in the Secretary of the Interior's Standards for Rehabilitation of Historic Properties, (hereinafter "Standards").
4. Rehabilitation of buildings identified as in extremely poor condition in this MOA will be encouraged, but demolition of the buildings may proceed provided each demolition complies with Stipulation V.

II. Marketing Plan and Request for Proposals

- A. Notwithstanding any provisions of this MOA, the City will have full marketing authority for the Parcel and will make all final marketing decisions. The City will consult with MHC and WHC on developing a marketing plan for the Parcel which shall include the following elements:
 1. An advertising plan and schedule for publicizing the availability of the RFP.
 2. An initial distribution list for notice of availability of the RFP which will include any contacts offered by MHC and WHC.
 3. A schedule for receiving and reviewing submissions in response to the RFP.
- B. The City will provide a draft marketing plan to MHC and WHC. MHC and the WHC will have fourteen (14) days to review and comment on the draft marketing plan. If MHC or WHC does not find the draft marketing plan acceptable, the City will make reasonable efforts exercised in good faith to accommodate the concerns of MHC and WHC and will submit a final marketing plan. Before implementation, MHC and WHC will have seven (7) days to review and comment on the portions of the final marketing plan which address issues of historic preservation. In the event MHC and WHC do not provide initial comments on the draft marketing plan within 14 days or comments on the final marketing plan within 7 days, the plan shall be deemed acceptable to MHC and WHC. It is understood that the content of the marketing plan shall not require approval of MHC or WHC.
- C. Concurrent with the development of a marketing plan, the City will prepare the RFP for this disposition of the Site. The City will consult with MHC and WHC on developing the RFP which shall include the following elements:
 1. An appendix to the RFP that includes the National Register Nomination form and the Historic Resources Existing Conditions Memorandum compiled by Epsilon Associates. The appendix should refer to the MHC and National Park Service websites for additional information on the State and Federal Historic Tax Credit programs.
 2. A photograph and parcel map of the Parcel.
 3. Reference to the points listed under I.A. of this MOA. The RFP as a whole will make a good faith effort to generate interest in the preservation of what MHC has defined as the historic character of the Parcel.
- D. The City will provide a confidential draft RFP to MHC and WHC. MHC and WHC will have fourteen (14) days to review and comment on those portions of the draft RFP which address issues of historic preservation. Before issuance of the final RFP, MHC and WHC will have seven (7) days to review and comment on the portions of the final RFP which address issues of historic preservation. In the event MHC and WHC do not provide initial comments on the draft RFP within 14 days or comments

on the final RFP within 7 days, the RFP shall be deemed acceptable to MHC and WHC. It is understood that the content of the RFP shall not require approval of MHC or WHC. It is further understood that MHC and WHC will not share any portion of the RFP with anyone prior to the time the RFP is made publicly available by the City.

- E. The marketing effort shall be continued for no less than three months from the date of the issuance of the RFP. Issuance shall occur when the notice of availability of the RFP is published in the Central Register.
- F. The City will schedule a Bidder's Conference for prospective developers to occur at the midpoint of the marketing effort during which MHC and WHC will have the opportunity to present information and to answer questions from prospective developers.
- G. Once proposals from developers are received by the City in response to the RFP, MHC and WHC shall be afforded the opportunity to comment on the proposals and to provide these comments in writing to the City prior to any interviews which the City may conduct with any of the developers. If, after a consultation period of no more than thirty (30) days with MHC and WHC regarding the applicability of the Standards to the proposals and taking into consideration MHC and WHC comments during any interviews which the City may conduct with any of the developers during the RFP marketing period, the City, in their sole determination, have received no proposals that are feasible and acceptable that provide for rehabilitation or new construction in conformance with the recommended approaches in the Standards, they will convey their conclusions to MHC and WHC.
 - 1. For all buildings, structures and landscape features for which there is no preservation proposal that is feasible and acceptable to the City, then the City or any new owners of any part of the Parcel or any other person may proceed, subject to any other applicable reviews and permits, with demolition of buildings and structures or rehabilitation or new construction that does not conform to the Standards following completion of photographic recordation and documentation as stipulated in Section V.

III. New Construction

- A. The City shall encourage new buildings and structures that are sympathetic or compatible to what MHC has determined to be character-defining attributes of the contributing buildings, structures and landscape features on the Parcel.
- B. If new construction is proposed on previously undisturbed land within the Disposition Parcel, the City shall consult with the MHC to determine if an archaeological survey is required prior to any ground disturbing activities are undertaken on the land.
- C. If construction or modifications to the landscape are proposed in the vicinity of the West Building, an archaeological survey must be conducted in the area identified in the National Register Nomination as "a small area...enclosed by a decorative wrought iron fence" to determine if an unmarked cemetery is present that should be avoided.

IV. Exempted Activities

- A. The following construction activities are unlikely to affect what MHC regards as the character-defining attributes of the Parcel and are exempted from further review by MHC, including comments in any environmental review process:
 - 1. Resurfacing, maintenance, repair or improvement of existing parking lots, roads and driveways.
 - 2. Repair, replacement or improvements to infrastructure, i.e. heating and electrical systems, sewer, water, ventilation systems or plumbing.

- 3. Maintenance work such as painting, repair or replacement of substantially in-kind architectural elements.
- 4. All interior work.
- 5. Demolition or alteration of non-contributing structures.
- 6. New construction on the Parcel within existing building sites that is consistent with the design guidelines set forth in Section III.

V. Photographic Recordation and Documentation

- A. Prior to demolition of any contributing building or structure, substantial new construction or other major change to any part of the Parcel, the City shall require that the buildings and structures on that part of the Parcel are documented by photographs and narratives in accordance with a "recordation plan" that satisfies all of the following:
 - 1. Provides for documentation of the historical processes that shaped the organization, design and history of the Fernald Developmental Center. (The nomination of the Fernald State School to the National Register by MHC is sufficient documentation.)
 - 2. Contains photographs and documentation of the character-defining attributes.
 - 3. Provides that copies of the resulting documentation are made available to WHC.

VI. Historic Rehabilitation Tax Credits

- A. Rehabilitation of buildings and landscape features that contribute to the National Register District may qualify for State and/or Federal tax credits. The City shall encourage any third party developer to consult with MHC and the National Park Service to determine if the buildings are eligible for tax credits and if the proposed work meets the Secretary of the Interior's Standards for Rehabilitation allowing for the award of tax credits.

VII. Modifications

Any party to this MOA may request that it be amended or modified whereupon the parties will consult in accordance with 950 CMR 71 to consider such amendment or modification.

Executed on this 18 day of December, 2014.

City of Waltham

By: Juanito G. McCaig
Title: MAYOR

Division of Capital Asset Management and Maintenance (DCAMM)

By: Carole J. Caruban
Title: Commissioner

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A
MASSACHUSETTS HISTORICAL COMMISSION
220 MORRISSEY BOULEVARD
BOSTON, MASS. 02125
617-727-8470, FAX: 617-727-5128

PROJECT NOTIFICATION FORM

Project Name: RESTORATION & REPAIR OF CARDINAL COTTAGE

Location / Address: 282 TRAPELO ROAD, PARCEL ID R036-008-0002

City / Town: WALTHAM

Project Proponent

Name: THE CITY OF WALTHAM MUNICIPAL AFFORDABLE TRUST FUND AND
THE CITY OF WALTHAM - ROBERT WATERS, HOUSING SUPERVISOR

Address: 119 SCHOOL STREET,

City/Town/Zip/Telephone: WALTHAM, MA 02452

Agency license or funding for the project (list all licenses, permits, approvals, grants or other entitlements being sought from state and federal agencies).

Agency Name

Type of License or funding (specify)

FUNDING THROUGH WALTHAM MUNICIPAL AFFORDABLE TRUST FUND

Project Description (narrative):

RESTORE AND REPAIR CARDINAL COTTAGE

Does the project include demolition? If so, specify nature of demolition and describe the building(s) which are proposed for demolition.

THE PROJECT INVOLVES THE REMOVAL OF A CONCRETE GARAGE THAT
HAS BEEN DETERMINED TO BE NON HISTORIC

Does the project include rehabilitation of any existing buildings? If so, specify nature of rehabilitation and describe the building(s) which are proposed for rehabilitation.

THE PROJECT INVOLVES THE RESTORATION AND REPAIR OF AN 1846
RESIDENTIAL BUILDING.

Does the project include new construction? If so, describe (attach plans and elevations if necessary).

WE ARE ADDING A HANDICAP ACCESS RAMP AND REPLACING
THE FRONT ENTRANCE STAIR.

950 CMR: OFFICE OF THE SECRETARY OF THE COMMONWEALTH

APPENDIX A (continued)

To the best of your knowledge, are any historic or archaeological properties known to exist within the project's area of potential impact? If so, specify. **THE PROJECT LOCATION IS WITHIN THE WALTER E. FERNALD DEVELOPMENTAL CENTER**

What is the total acreage of the project area?

Woodland _____	acres	Productive Resources:	
Wetland _____	acres	Agriculture _____	acres
Floodplain _____	acres	Forestry _____	acres
Open space <u>2.46</u>	acres	Mining/Extraction _____	acres
Developed <u>1413 SQ.FT.</u>	acres	Total Project Acreage <u>2.5</u>	acres

What is the acreage of the proposed new construction? 355 SQ.FT. acres **RAMP & STAIR**

What is the present land use of the project area? **HOUSE WITH DRIVEWAY AND GARAGE RESIDENTIAL, ABANDON**

Please attach a copy of the section of the USGS quadrangle map which clearly marks the project location.

114 LEXINGTON, COPY ATTACHED

This Project Notification Form has been submitted to the MHC in compliance with 950 CMR 71.00.

Signature of Person submitting this form: Alex J. Knox Date: 11.17.17
Name: ALEX J. KNOX, AIA
Address: 20 OAK ST.
City/Town/Zip: NEEDHAM, MA 02492
Telephone: 617-306-3474

REGULATORY AUTHORITY

950 CMR 71.00: M.G.L. c. 9, §§ 26-27C as amended by St. 1988, c. 254.



Mapped by the Geological Survey 1943
 Revised in 1949
 Red tint indicates areas in which only landmark buildings are shown

ROAD CLASSIFICATION
 HARD-SURFACE ALL WEATHER ROADS DRY WEATHER ROADS
 Heavy-duty ——— 4 LANE 16 LANE Improved dirt ———
 Medium-duty ——— 4 LANE 16 LANE Unimproved dirt ———
 Loose-surface, graded, or narrow hard-surface - - - -
 U. S. Route State Route

Mapped by the Geological Survey 1943
 Revised in 1949
 NEWTON (CITY HALL) 3.4 MI.
 12 MI. TO U.S. 1
 WATERTOWN (TOWN HALL) 1.3 MI.
 BOSTON COMMON 7.7 MI.

Scale $\frac{1}{31680}$
 1 500 0 500 1000 1500 2000
 1000 0 1000 2000 3000 4000 5000 6000 7000
 1 .5 0 1 Kilometers
 Contour interval 10 feet
 Datum is mean sea level

TRUE NORTH
 MAGNETIC NORTH
 APPROXIMATE MEAN DECLINATION, 1943