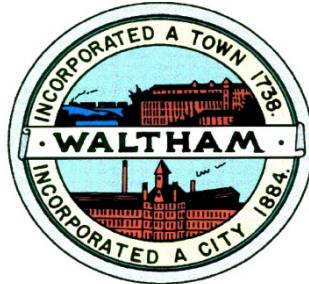


# The City of Waltham



**Invites**

**Interested Parties**

**To propose the best offer and or bid**

**For the service or product herewith described:**

**HVAC DESIGN, Waltham Community Cultural Center**

(510 Moody Street, Waltham MA 02451)

**The bid opening will be held: 10:00 AM Friday June 10, 2016**

**Site Inspection and Briefing: 1:00 PM Friday June 3, 2016**

(Meet at 510 Moody Street Waltham)

**Last Day for Written Questions: 12 Noon Friday June 6, 2016**

Via E-Mail Only to [Jpedulla@city.waltham.ma.us](mailto:Jpedulla@city.waltham.ma.us)

Phone: 781-314-3244, Fax: 781-314-3245

# **Table of Contents:**

- **Invitation to Bid**
- **Agreement**
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- **General Conditions**
- **Specifications**
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- **Bid Price**

# **Invitation to Bid**

**The City of Waltham**  
**Purchasing Department**

REQUEST FOR PROPOSAL(RFP)

Under the rules of M.G.L. Chapter 30b, the Chief Procurement Officer of the City of Waltham Purchasing Department hereby requests sealed bids for:

**HVAC Design, Waltham Community Cultural Center**

[\(510 Moody Street, Waltham MA 02451\)](#)

Price Proposals will be received at the office of the Purchasing Agent, City Hall, 610 Main Street, Waltham MA 02452, until:

**10:00 AM Friday June 10, 2016**

**Site Inspection and Briefing: 1:00 PM Friday June 3, 2016**

(Meet at 510 Moody Street, Waltham)

**Last Day for Written Questions: 12 Noon Monday June 6, 2016**

Via E-Mail Only to [Jpedulla@city.waltham.ma.us](mailto:Jpedulla@city.waltham.ma.us)

At which time and place the bids will be publicly opened and read.

Specifications and information available on line by visiting the Waltham Purchasing Department web site at [www.city.waltham.ma.us/open-bids](http://www.city.waltham.ma.us/open-bids)

**BIDS MUST BE SIGNED AND ENCLOSED IN A SEALED ENVELOPE AND MARKED BID FOR:  
HVAC DESIGN**

**This is a two envelope proposal: one is the technical; the second envelope is the price proposal, marked as such.**

If the Bidder is a corporation, state your correct corporate name and State of incorporation. If Bidder is a partnership, state names and addresses of partners. If Bidder is a trust or other legal entity, state correct names and addresses of trustees or names and address of those legally authorized to bid and enter into contracts.

**EXCEPTION OR ALTERNATES TO SPECIFICATIONS, TERMS OF SALE, AND DISCOUNTS AVAILABLE, MUST BE INCLUDED IN THE BID PRIOR TO OPENING DATE.**

**AGREEMENT**

**CITY OF WALTHAM**

**ARTICLE 1.** This agreement, made this \_\_\_\_\_ day of \_\_\_\_\_, 2016 by and between the CITY OF WALTHAM, party of the first part, hereinafter called the CITY, by its MAYOR, and

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hereinafter called the CONTRACTOR.

**ARTICLE 2.** Witnesseth, that the parties to this agreement, each in consideration of the agreement on the part of the others herein contained, do hereby agree, the CITY OF WALTHAM for itself, and said contractor for his heirs, executors, administrators and assigns as follows:

To furnish all equipment, machinery, tools and labor, to furnish and deliver all materials required to be furnished (except as otherwise specified) and deliver in and about the project and to do and perform all work in strict conformity with the provisions of this Contract and of the Notice to Bidders, bid, Project Manual, and Drawings hereto annexed. The said Notice to Bidders, bid, Project Manual, and Drawings are hereby made a part of this contract as fully and to the same effect as if the same had been set forth at length and incorporated in the contracts.

**ARTICLE 3.** In consideration of the foregoing premises the CITY agrees to pay and the CONTRACTOR agrees to receive as full compensation for everything furnished and done by the CONTRACTOR under this contract, including all work required by not included in the items herein mentioned, and also for all loss or damage arising out of the nature of the work aforesaid, or from the action of the elements, or from any unforeseen obstruction or difficulty encountered in the prosecution of the work, and for all expenses incurred by or in consequence of the suspension or discontinuance of the work specified, and for well and faithfully completing the work, and the whole thereof, as herein provided, such prices as are set forth in the accompanying bid.

**Date for final completion of the design is 90 Days (45 days for the 50% design and 45 additional days for the remaining 50% design) from the date of the Notice-to-Proceed (NTP)**

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

**CITY OF WALTHAM, MASSACHUSETTS**

**FOR THE CITY**

\_\_\_\_\_  
Jeannette A. McCarthy, MAYOR,  
City of Waltham  
Date: \_\_\_\_\_

\_\_\_\_\_  
John B. Cervone, City Solicitor  
Date: \_\_\_\_\_

APPROVED AS TO FORM ONLY

\_\_\_\_\_  
Catherine Cagle, Planning Director  
Date: \_\_\_\_\_

\_\_\_\_\_  
Joseph Pedulla, Purchasing Agent  
Date: \_\_\_\_\_

\_\_\_\_\_  
Paul Centofanti, Auditor  
Date: \_\_\_\_\_

I CERTIFY THAT SUFFICIENT FUNDS  
ARE AVAILABLE FOR THIS CONTRACT

**FOR THE COMPANY**

\_\_\_\_\_  
CONTRACTOR (Signature),  
Date: \_\_\_\_\_

Company \_\_\_\_\_  
Address \_\_\_\_\_

# Instructions

## INSTRUCTIONS FOR BIDDERS

1. 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.

2. 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.

3. 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.

4. 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.

5. PRICE IS ALL FIXED AND INCLUSIVE. (Two Envelope Solicitation)

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.

6. PRICE DISCREPANCY (if applicable)

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

7. EXCEPTIONS

No Exceptions will be acceptable to the City. The City's intent is to purchase precisely what is specified in the document.

8. BID DEPOSITS (if applicable)

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.



9. 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.

10. 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.

11. AWARD CRITERIA.

Qualified and responsive proposals will be evaluated based on the criteria established in other sections of this document. This is a two envelope proposal and evaluated on the combined value of the technical proposal and price.

12. DISCOUNTS.

Discounts for prompt payments will be considered when making awards.

13. TAX EXEMPT.

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

14. SAMPLES (if applicable).

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.

5. 15. 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.

16. 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.

17. 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.

18. 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.

19. 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.

20. 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.

21. 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.

22. DELIVERIES (if applicable):

a) The Contractor shall pay all freight and delivery charges. The Waltham Purchasing Department 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.

23. LABELING. (if applicable):

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.

24. GUARANTEES (if applicable):

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.

25. SINGLE VENDOR.

The Waltham Purchasing Department desires to award a single contract based on the Grand Total Price. However, where applicable, the City reserves the right to make multiple awards on a unit price basis if, in the opinion of the Waltham Purchasing Department, it is in the best interest of the Waltham Purchasing Department.

26. 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.

27. 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.

28. TIE BREAK

In the event of a tie where both vendors were responsive and responsible the vendors with a tie agree to a coin toss to determine the winner. The Coin toss will be executed in the presence of both vendors and a witness from the Purchasing Office. The coin will be flipped by the Chief Procurement Officer in the presence of the two bidders. A written record of the process you used, including the results and the names of those participating. The low bidders shall sign an agreement stating that they will abide by the results of the tie breaker. As an alternative, you may allow for a "second round" between the tied vendors

# **GENERAL CONDITIONS**

## **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. CONTRACT DURATION.**

This contract is for the completion of the 70 days design period plus the construction administration period.

7. INSURANCE

A. WORKMAN’S COMPENSATION: The Contractor shall provide 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. Contractors shall provide insurance on a primary basis and the contractor’s policy shall be exhausted before resorting to other policies. The contractor’s policy is the primary one not the contributory.

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
Professional Liability	\$2,000,000 Each Occurrence

C. AUTOMOBILE (VEHICLE) LIABILITY

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

D. UMBRELLA POLICY

General liability	\$1,000,000
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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 insurances under the contract, excluding Automobile and Workers Compensation coverage”*.

**Failure by the contractor to provide a current and updated insurance policy, during the entire duration of the contract, may result in additional legal liability.** 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

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. MATERIALS (if applicable)

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.

10. 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.

11. CONTRACT OBLIGATIONS

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

12. 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.

15. 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.



16. 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.

17 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.

18 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.

19. 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.

20. ACTIVE REPARATION CLAIMS

Does your company or any of its Principals have an active reparation Claim with the City. A claim is any demand by a contract for the payment of disputed invoices, payment penalties, labor disputes, interest, etc. YES \_\_\_\_\_, NO\_\_\_\_\_ (circle or check applicable).

If YES Please explain the nature of the claim, date of the claim and City Department

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(Add an additional page if necessary)

21. THE CITY OF WALTHAM EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION POLICY

The City of Waltham is committed to a policy of equal employment opportunity and to a program of affirmative action in order to fulfill that policy. The City will accordingly recruit and hire into all positions the most qualified persons in light of job-related requirements, and applicants and employees shall be treated in employment matters without regard to unlawful criteria including race, color, religion, ancestry, national origin, sex, sexual orientation, disability, age, positive HIV-related blood test results, status as a disabled or Vietnam Era Veteran, genetic information, or gender identity or expression, as these terms are defined under applicable law, or any other factor or characteristic protected by law.

In addition, The City of Waltham recognizes that discriminatory harassment and sexual harassment are forms of unlawful discrimination, and it is, therefore, the policy of the City of Waltham that discriminatory harassment and sexual harassment will not be tolerated. The City of Waltham also prohibits unlawful harassment on the basis of other characteristics protected by law.

Further, employees and applicants will not be subjected to harassment or retaliation because they have engaged in or may engage in the following: filing a complaint or assisting or participating in an investigation regarding alleged discrimination or harassment as prohibited in the policy statement above; filing a complaint or assisting or participating in an investigation, compliance evaluation, or any other activity related to the administration of the Vietnam Era Veterans' Readjustment Assistance Act of 1974 ("VEVRAA"), Section 503 of the Rehabilitation Act of 1973 ("Rehabilitation Act"), or the Affirmative Action provisions of federal, state or local

law; opposing any act or practice made unlawful by VEVRAA requiring equal employment opportunities for individuals with disabilities, disabled veterans, or veterans of the Vietnam Era; or exercising any rights under VEVRAA or the Rehabilitation Act.

Sources: Titles VI and VII of the Civil Rights Act of 1964; the Immigration Reform and Control Act of 1986; Title IX of the Education Amendments of 1972; the Equal Pay Act of 1963; the Age Discrimination in Employment Act of 1967; the Age Discrimination Act of 1975; Sections 503 and 504 of the Rehabilitation Act of 1973; the Americans with Disabilities Act of 1990; Section 402 of the Vietnam-Era Veterans Readjustment Assistance Act of 1974; Executive Order 11246 as amended; The Genetic Information Nondiscrimination Act of 2008 and such other federal, state and local non-discrimination laws as may apply.

# Specifications

## OVERVIEW

The City of Waltham Purchasing Department is soliciting the services of a qualified individual or firm to provide mechanical engineering design services for an energy efficient air conditioning system at the South Community Cultural Center, a City owned building located at 510 Moody Street, Waltham MA 02451.

The City applied and received funds from the United States Government under the provisions of Title I of the Housing and Community Development Act of 1974, as amended, Public Law 93-383; and Catalog of Federal Domestic Assistance Number 14.218; the City wishes to engage the Contractor to assist the City in utilizing such funds to carry out the purposes and responsibilities associated therewith in connection with the City's Community Development Program.

Interested individuals or firms should submit a proposal related to the scope of services requested here within. **In a separate sealed envelope** the respondent shall provide a **"not-to-exceed" price** for the services requested.

At minimum all proposers must:

- Possess a professional license to practice engineering in the Commonwealth of Massachusetts
- Have experience in the last 5 years contracting with a municipality

## BUILDING USE & BACKGROUND

The South Community Cultural Center is a historic brick exterior building which was once the South Middle School. The building was renovated in 2010 by the City and turned into a Community Center. The building houses the Waltham Recreation Department and multiple non-profit entities. The building has a large auditorium, gymnasium, small bowling alley and various other small activity rooms.

The building is heated with gas and does not currently have an air conditioning system. The total roof area of the building is 35,770 SF, which was replaced in 2016 with a Sika Sarnafil roofing system. There are no roof top mounted mechanical units on the building, only intake hoods. The project manual and construction drawings for the roof replacement is attached to this RFQ for reference, along with the original building blue prints which were not changed during the transformation from school to community center.

## EXISTING HVAC & ELECTRICAL CONDITIONS

The building has two separate heating systems one servicing the newer 1975 addition (rear portion of the building) which is heated by two gas fired forced hot water system while the original portion of the building that is heated by two gas fired steam boilers. Both boiler systems were converted from oil to natural gas fired in the mid-to late 2000's.

The original building (front portion of the building) retained its original steam distribution system with cast iron steam radiators throughout with classroom unit ventilators. In addition the cafeteria, part of the 1975 expansion is serviced by a dedicated ceiling mounted steam heating & ventilation (H&V) unit and ductwork distribution; 50% fresh air from a ducted roof mounted intake hood.

The 1975 addition has a forced hot water distribution system with fin tube radiators throughout with classroom unit ventilators providing both the heating and ventilation. The gym has two dedicated underside of roof H&V units with 50% fresh air and four exhaust fans that allow for 100% ventilation.

The building automatic temperature controls is a pneumatic system with a central thermostat located on the 2nd floor setting the steam pressure for the original portion of the building. The 1975 addition has individual space thermostats that maintain its individual temperature.

The electrical (power) utility service was upgraded as part of the 1975 work and from the street complete with pad mounted (at grade) transformer. A main, electrical room with a main switchboard and distribution panel boards. See drawing for E-6 for additional information. This service also was cross connected into the original portion of the building.

The service size is 1600amps (120/208-3ph) power that based upon electrical utility bills furnished by the city indicates sufficient capacity to support its expansion for the proposed HVAC systems.

## **REQUESTED SOLUTION**

Because of the existing layout and construction of the building it is proposed to add air conditioning by adding or replacing systems for the various portions and floors of the building. The system will be a combination of rooftop units where practicable and split units that will provide a central outdoor unit connected to multiple indoor room cooling devices. This will allow an incremental approach depending on available funds as well as not impacting the existing structure in a major way.

**Phase 1** - The first component provides air conditioning to the First Floor Administration Area by an outside condensing unit and remote indoor heating and cooling units in each room. Each room will have its own thermostat that controls the temperature through a central system controller. This step will require a new electrical distribution panel that will serve as the power supply for this step and all the steps that follow.

**Phase 2**– The second increment would be the air conditioning of the Gymnasium which would be accomplished by replacing the existing ceiling unit ventilator by a gas fired roof top unit that would distribute chilled and heated air through the existing ductwork system.

**Phase 3** – For the Auditorium the condenser that was installed in Step 1 will be used to supply interior cooling units within the space. A dedicated roof top energy recovery unit will be provided with heating and cooling to make-up ventilation air. The central system controller provided under Step 1 will be used for this system.

**Phase 4** – At the “Skate and Scoot” a similar gas fired rooftop unit as for the gymnasium will be provided. Existing ductwork will be reused if possible.

**Phase 5** – A central outdoor condensing unit and interior cooling and heating units are proposed for the Bowling Alley similar to the Auditorium system. The central system controller provided under Step 1 will be used for this system. Space ventilation will be provided by a dedicated rooftop energy recovery unit.

**Phase 6** – Ground Floor Classrooms will have a central outdoor condensing unit and multiple indoor units in each classroom. A central controller will provide for this Step and following Steps. Ventilation will be provided by opening windows.

**Phase 7** – First Floor Classrooms will the central outdoor condensing unit from Step 6 and multiple indoor units in each classroom. The central controller from Step 6 will provide for this Step and following Steps. Ventilation will be provided by opening windows.

**Phase 8** – Second Floor Classrooms will have a central outdoor condensing unit from Step 6 and multiple indoor units in each classroom. A central controller from Step 6 will provide for this Step. Ventilation will be provided by opening windows.

## **SCOPE OF SERVICES**

Required services to be provided by the firm and/or individual **beginning July 1, 2016 through January 1, 2017** include:

- 1) Assess and evaluate the existing heating system and make the most energy efficient and cost effective recommendation for cooling, as well as any electrical upgrades necessary to handle the new system;
- 2) Present to the Purchasing Department three sets of 50% and 95% construction design drawings and construction cost estimates for the entire project.
- 3) The construction cost estimates must be provided to the Purchasing Department in the format of a phased construction implementation schedule. The anticipated funding availability for construction is \$250,000 per year, with the first priority identified as the 1<sup>st</sup> floor and construction beginning in July 2017. One construction contract will be awarded for all phases.
- 4) Upon the approval by the City of Waltham of the 95% Design and Cost Estimate, the designer shall proceed with 100% Design Development, Construction Documents, inclusive of technical specifications and drawings;

### **PHASE 1 CONSTRUCTION – SCOPE OF SERVICES (Estimated March 1, 2017 – October 1, 2017)**

- 5) Provide four (4) hard copies and one electronic copy of the phase bid documents and assist the City during the bidding processes, including participation in pre-bid meeting and preparation of any addenda, answering technical questions, attend bid opening meeting, check references and make recommendation for award to the City's Chief Procurement Officer. Technical bidding specifications are to be provided to the Purchasing Department formatted in Calibri font size 11. Technical drawings shall be provided in pdf format
- 6) Provide construction administration, hold construction meetings, prepare meeting minutes, progress reports, and monitor construction progress relative to scheduling;
  - Construction phases two through eight will include a construction administration rate set firmly not to exceed 5% of the winning construction bid.
- 7) Provide no less than three site visits to per month during the phase to monitor progress. Perform field observation and provide technical assistance as needed to direct the Contractor on any changes and clarifications;
- 8) Respond to Contractor Requests for Information.
- 9) Review Contractor Change Order Requests and make recommendations for acceptance or rejection to the City
- 10) Review and certify Contractor's pay applications;
- 11) Provide shop drawings/submittal review, field clarifications and as-built/record drawing;
- 12) Provide three sets of as-built drawings.

## QUALIFICATION SUBMISSION FORMAT

Submittals shall be organized in a manner requested in the RFQ. Submissions shall contain all pertinent information requested and will be evaluated based on adherence to the following:

### 1. General Requirements (10pts)

- Cover letter
- Firm name, address, and telephone number
- Point of contact: name and telephone number
- Proof of Licensure in the Commonwealth of Massachusetts
- Compliance forms

### 2. Qualifications (20 pts)

- Company overview
- Resumes for proposed project manager and staff

### 3. Experience (20 pts)

- Provide information documenting relevant experience from public sector projects within the past five years. Relevant experience shall include the following as a minimum:
  - Client and client's point of contact information
  - Firm's role in project
  - Design fee and construction cost amounts
  - Project staff and their role

### 4. Project Approach (15 pts)

- Summary of suggested approach and methodology shall include:
  - Clearly defined scope of work
  - Proposed distribution of tasks among team members
  - Organizational chart, including all team members
  - Provide project timeline including major tasks and/or milestones

### 5. Separate Sealed Envelope with "not-to-exceed" price identified (35 pts)

- **Do not include a quote for phases 2 - 8.** Construction Administration (CA) rate for phases 2-8 is set firmly at 5% of the winning construction bid.



# **Compliance**

**(Required Documents.)**

## Compliance

The compliance documents in this section must be completed, signed and returned **with your bid package.**

### Purchasing Department

City of Waltham  
610 Main Street  
Waltham, MA 02452

Failure to submit the completed documents will cause the disqualification of the proposal.

### Section Index

	Check when Complete
• Non-collusion form and Tax Compliance form.....	_____
• Corporation Identification Form.....	_____
• Certificate of Vote Authorization.....	_____
• Certificate of Insurance (showing all limits of WC &GL).....	_____
• Three (3) References.....	_____
• Debarment Certificate .....	_____
• Right-to-know Law.....	_____

Your Company's Name: \_\_\_\_\_

Service or Product Bid \_\_\_\_\_

**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.

**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 \_\_\_\_\_

**PROVIDE THREE (3) SERVICE APPROPRIATE REFERENCES**

1. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

2. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

3. Company Name:

Address:

Contact Name:

Phone #

Type of service/product provided to this Company:

Dollar value of service provided to this Company:

**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.**

**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 \_\_\_\_\_



# **BID PRICE FORM**

**(Follows)**

**BID PRICE FORM**

**2 ENVELOPE - BID. PLACE THIS COMPLETED FORM IN A SEPARATE SEALED ENVELOPE**

**HVAC DESIGN,  
Waltham Community Cultural Center  
510 Moody Street Waltham, MA 02451**

**My Company proposes the following all inclusive, fixed and not-to-exceed price to provide the services described within this bid document.**

**Price** \$ \_\_\_\_\_  
*Not including Construction Administration (CA) for phases 2-8*

**My company recognizes receipt of addenda # \_\_\_\_\_.**

---

**Company Name:** \_\_\_\_\_

**Authorized Signature:** \_\_\_\_\_

**Print Name:** \_\_\_\_\_

**E-Mail Address:** \_\_\_\_\_

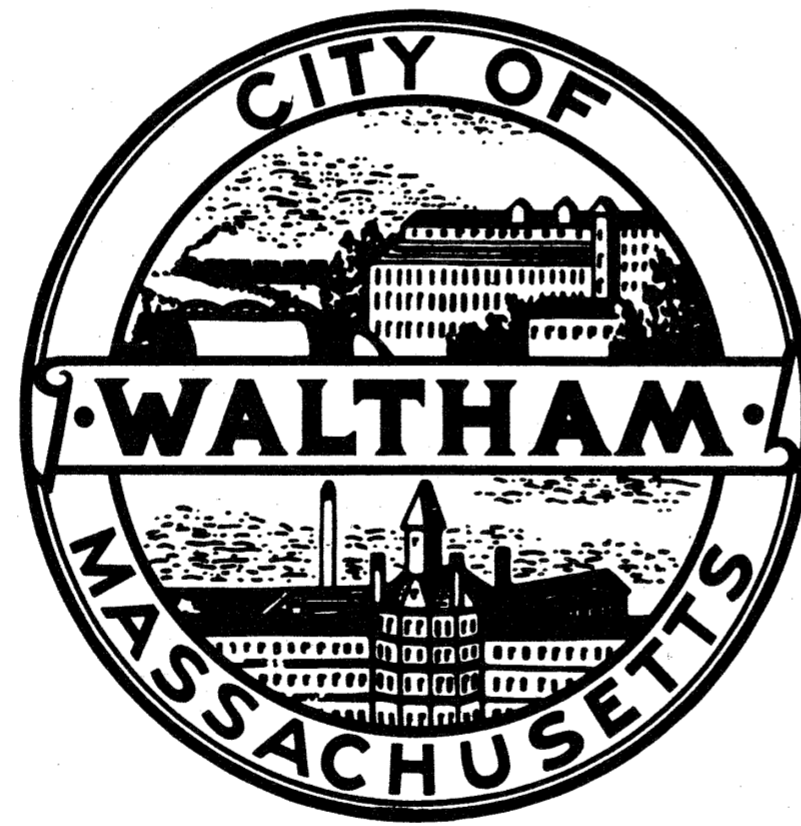
**Date:** \_\_\_\_\_

**ADDITIONS AND RENOVATIONS TO SCHOOLS**

# **SOUTH JUNIOR HIGH SCHOOL**

510 MOODY STREET

**WALTHAM, MASSACHUSETTS**



**KEYES ASSOCIATES  
ARCHITECTS/ENGINEERS/PLANNERS  
WALTHAM, MASSACHUSETTS**

**MAYOR**

HON. ARTHUR J. CLARK

**CITY COUNCIL**

CARL J. CINCOTTA  
JOHN B. DELANEY  
THOMAS J. DEVANE  
WILLIAM W. DURKEE  
PAUL W. GIUNTA  
JOSEPH D. GOODE  
ROBERT E. GRAVES  
HENRY M. HOOVER, JR.  
MALCOM KASPARIAN, JR.  
HAGOP N. KOUTOUJIAN  
ANTHONY M. MANDILE  
DONALD J. MANNING  
JOHN F. SNEDEKER  
THEODORE W. SUMNER  
PETER G. TROMBLEY

**SCHOOL COMMITTEE**

**CHAIRMAN**

HON. ARTHUR J. CLARK, MAYOR

**VICE CHAIRMAN**

DR. ALBERT F. PERNA  
RICHARD J. MONAHAN  
JOSEPH P. PAVONE  
PAUL F. POMEROY  
FREDERICK H. WALTER  
GERTRUDE M. WEBB

**SUPERINTENDENT OF SCHOOLS**

DR. FREDERICK J. STOKLEY

**DEPUTY SUPERINTENDENT OF SCHOOLS**

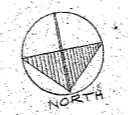
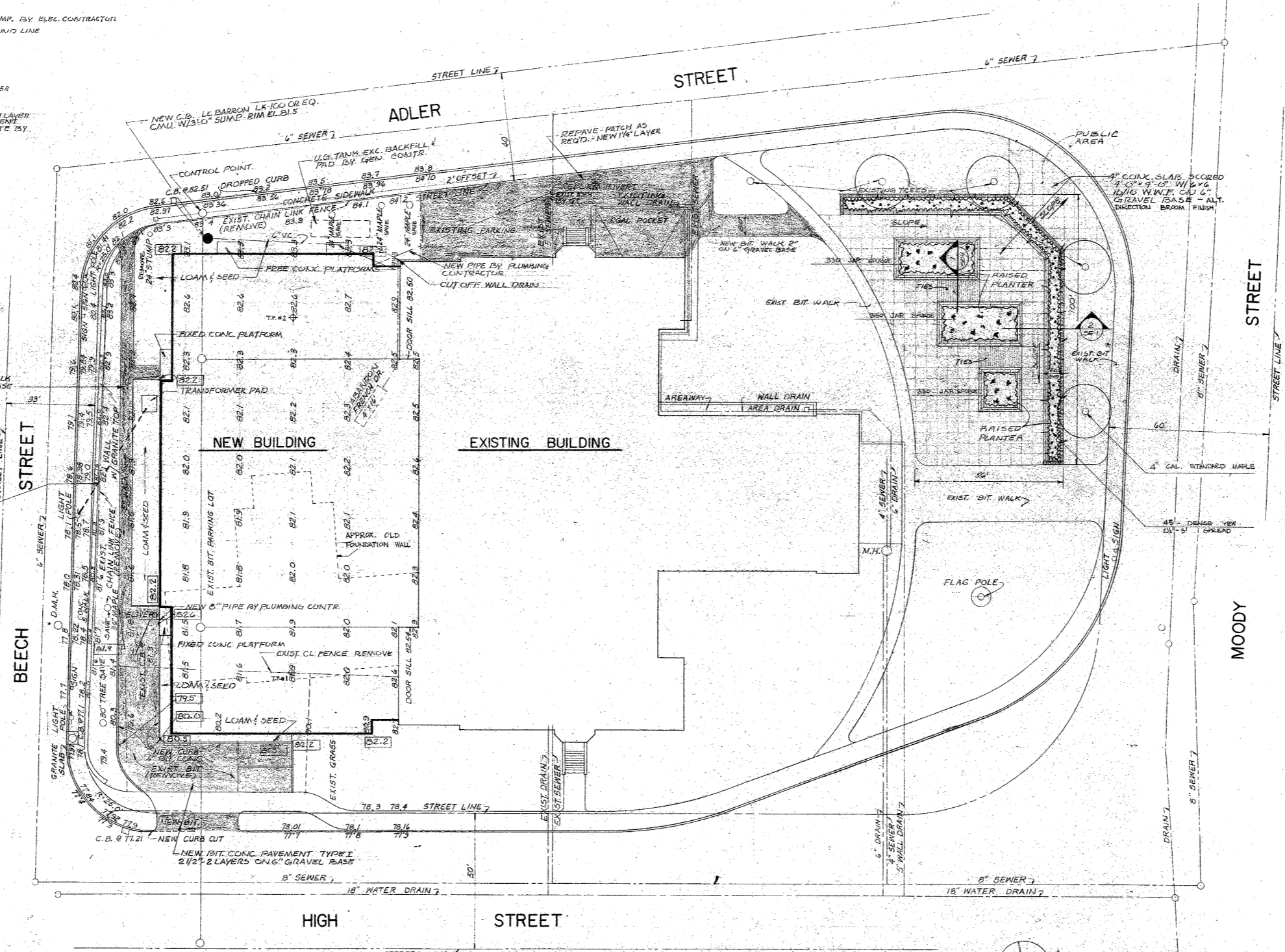
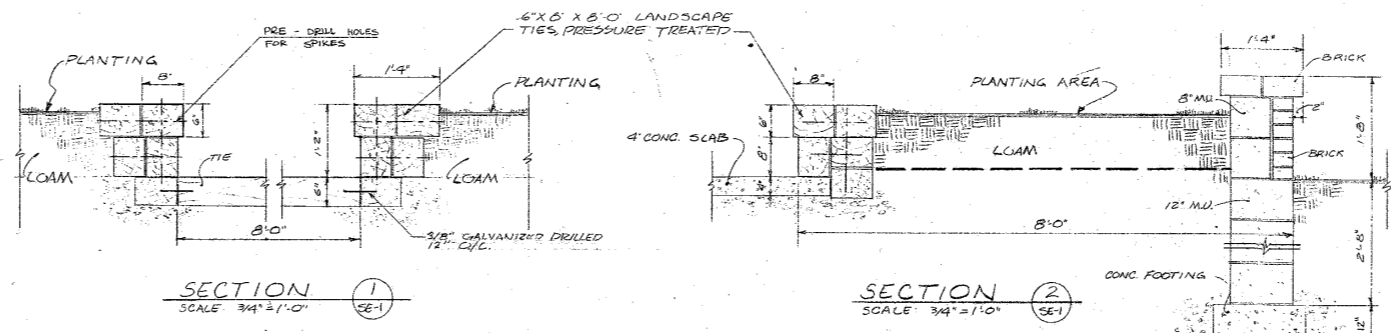
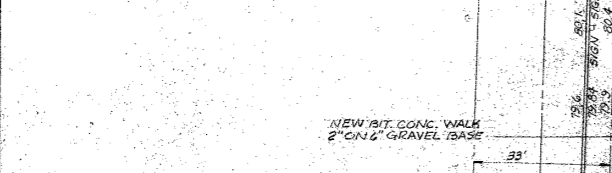
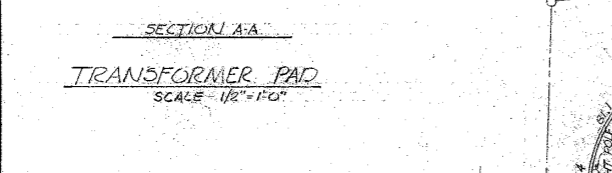
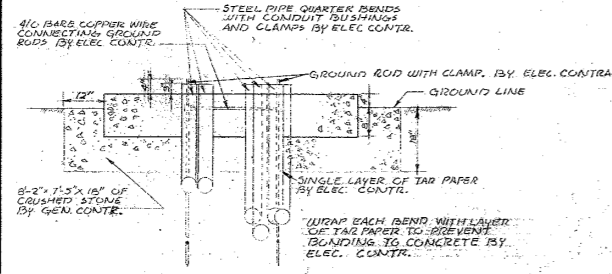
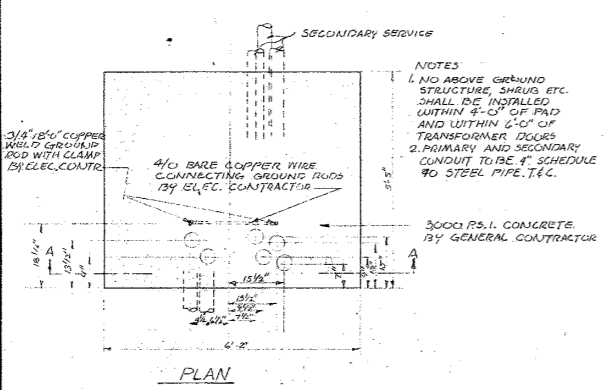
JOHN J. DADDONA

**ASSISTANT SUPERINTENDENTS OF SCHOOLS**

JAMES J. CANNON  
JOSEPH D. LoPRESTI

**PRINCIPAL**

EDWARD P. CHIASSON



- NOTES:
1. PRUNE & TRIM TREES AS REQUIRED.
  2. EXIT WALL SHALL BE REPLACED AS DIRECTED.
  3. EXISTING GRADE [82.2] FINISH GRADE.
  4. REMOVED EXISTING CHAIN FENCE TO BE STORED AS DIRECTED.

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**KEYES**  
Keyes Associates - Architects/Engineers/Planners

Providence  
Rhode Island  
Waltham  
Massachusetts  
Wethersfield  
Connecticut  
Nashua  
New Hampshire

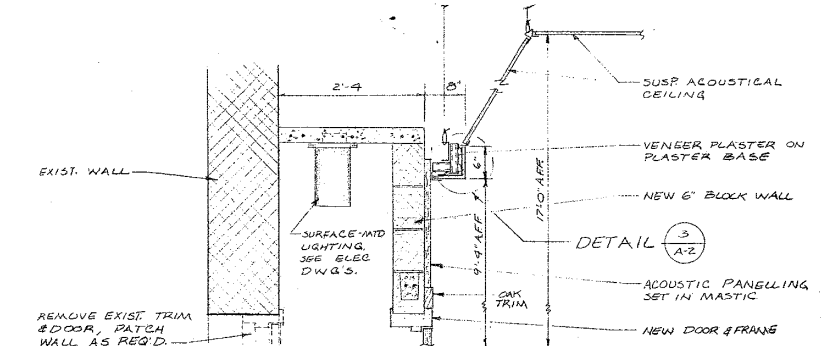
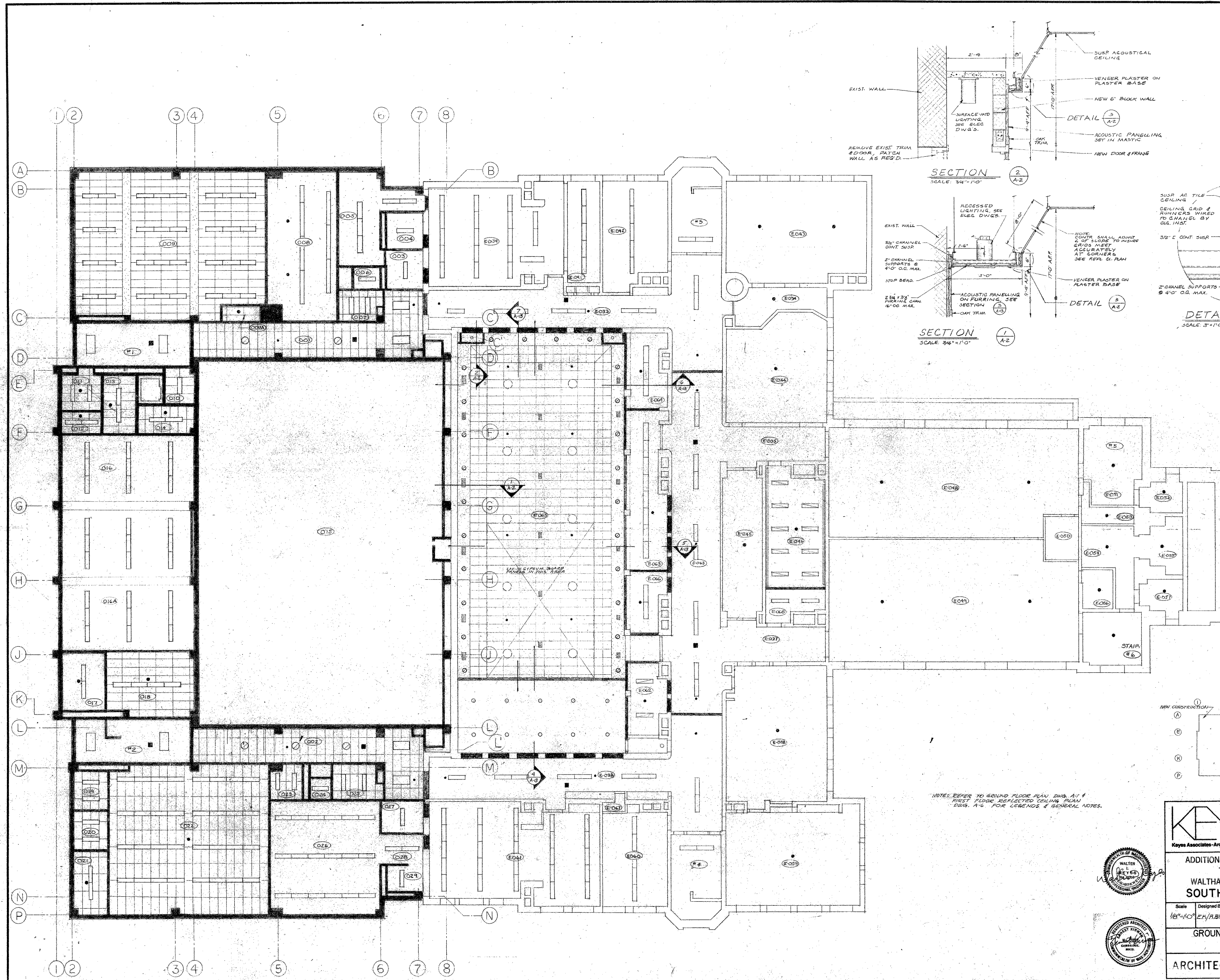
ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

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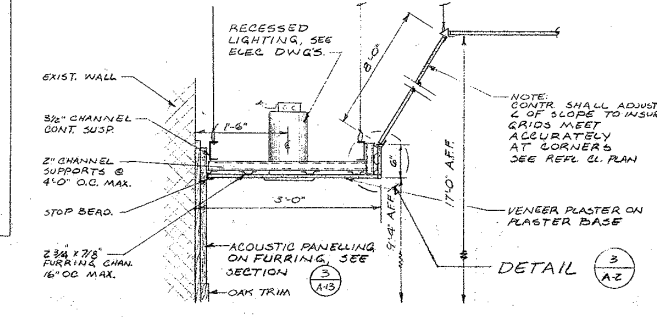
SITE PLAN

SITE SE-1

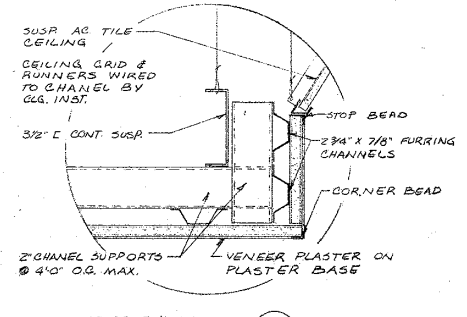




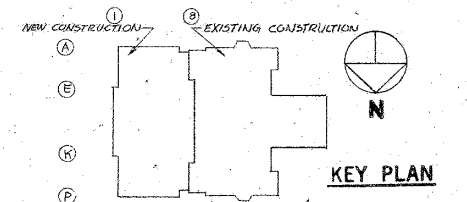
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SCALE: 3/4"=1'-0"



SECTION 3  
SCALE: 3/4"=1'-0"



DETAIL 3  
SCALE: 3"=1'-0"



NOTES: REFER TO GROUND FLOOR PLAN DWG. A-1 & FIRST FLOOR REFLECTED CEILING PLAN DWG. A-4 FOR LEGENDS & GENERAL NOTES.

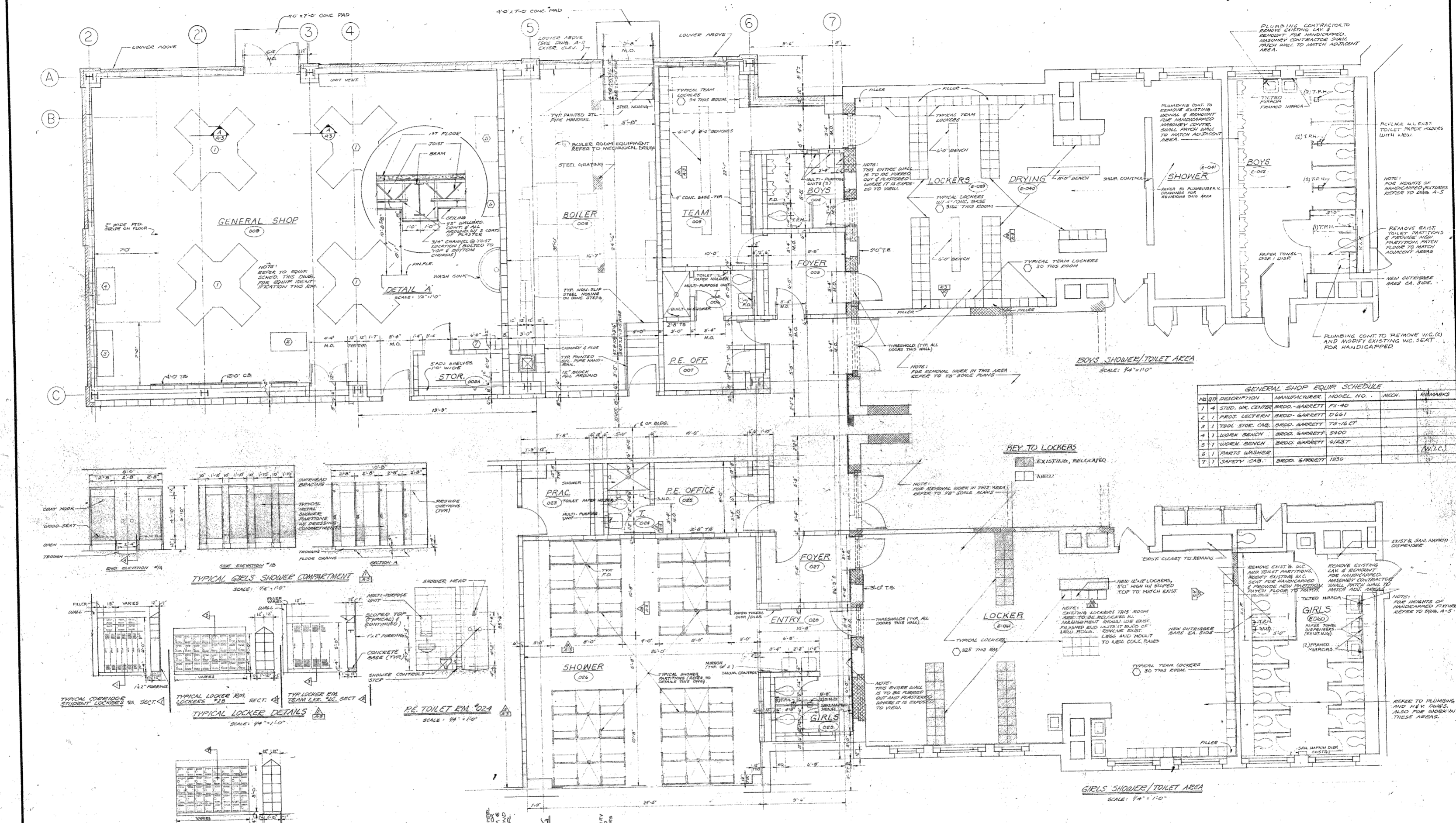
**KEYES**  
Providence  
Rhode Island  
Waltham  
Massachusetts  
Wethersfield  
Connecticut  
Nashua  
New Hampshire  
Keyes Associates - Architects/Engineers/Planners

ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
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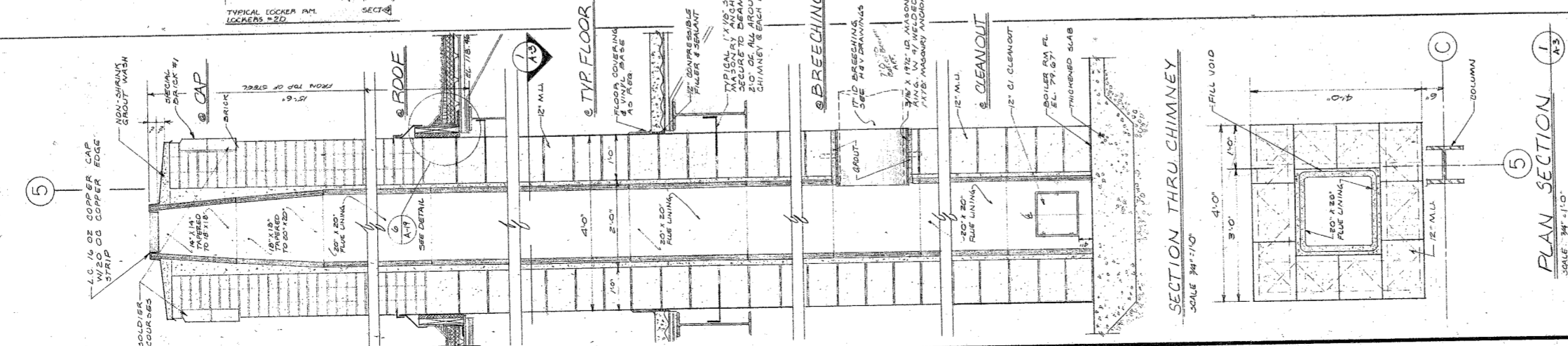
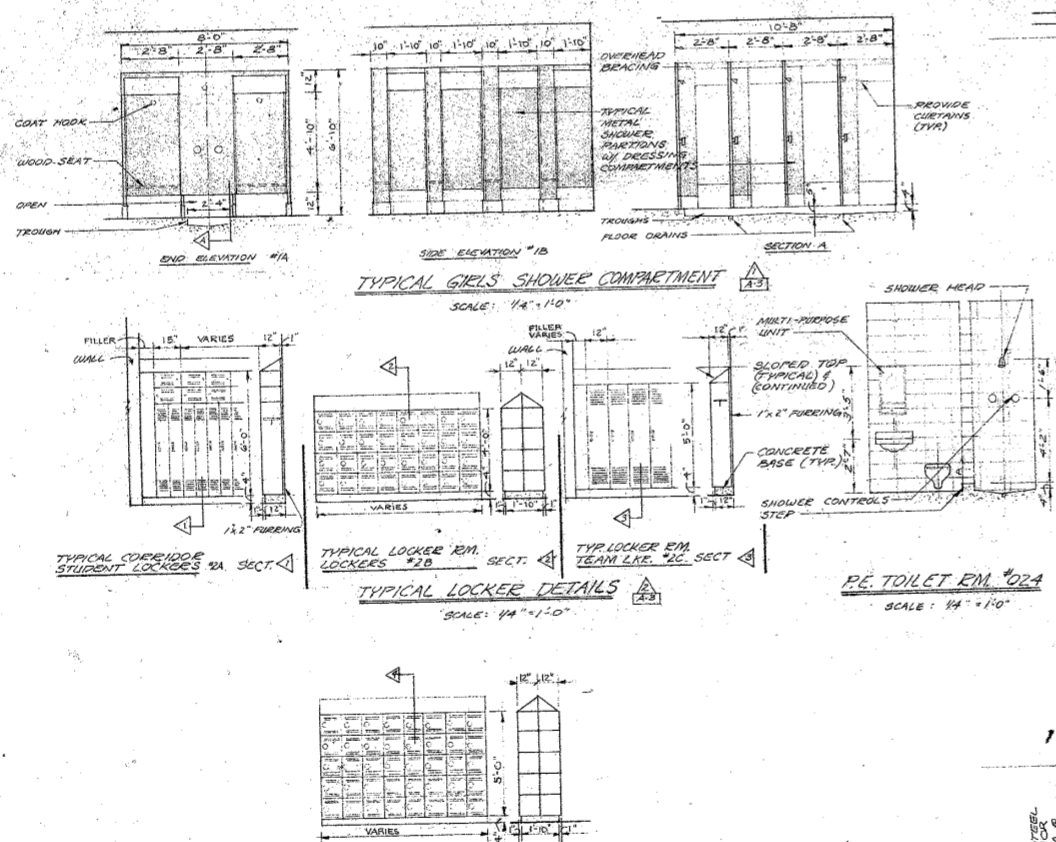
GROUND FLOOR REFLECTED  
CEILING PLAN  
ARCHITECTURAL **A-2**





**GENERAL SHOP EQUIP. SCHEDULE**

NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	MECH.	REMARKS
1	STUD. BK. CENTER	BEDD. GARRETT	FX-40		
2	PROJ. LECTERN	BEDD. GARRETT	D-661		
3	TYP. STOR. CAB.	BEDD. GARRETT	TS-16 CT		
4	LOCKER BENCH	BEDD. GARRETT	2400		
5	WALKER BENCH	BEDD. GARRETT	6/237		(N.I.C.)
6	PARTS WASHING				
7	SAFETY CAB.	BEDD. GARRETT	1930		



**KEY PLAN**

**KEYES**  
 Keyes Associates - Architects/Engineers/Planners

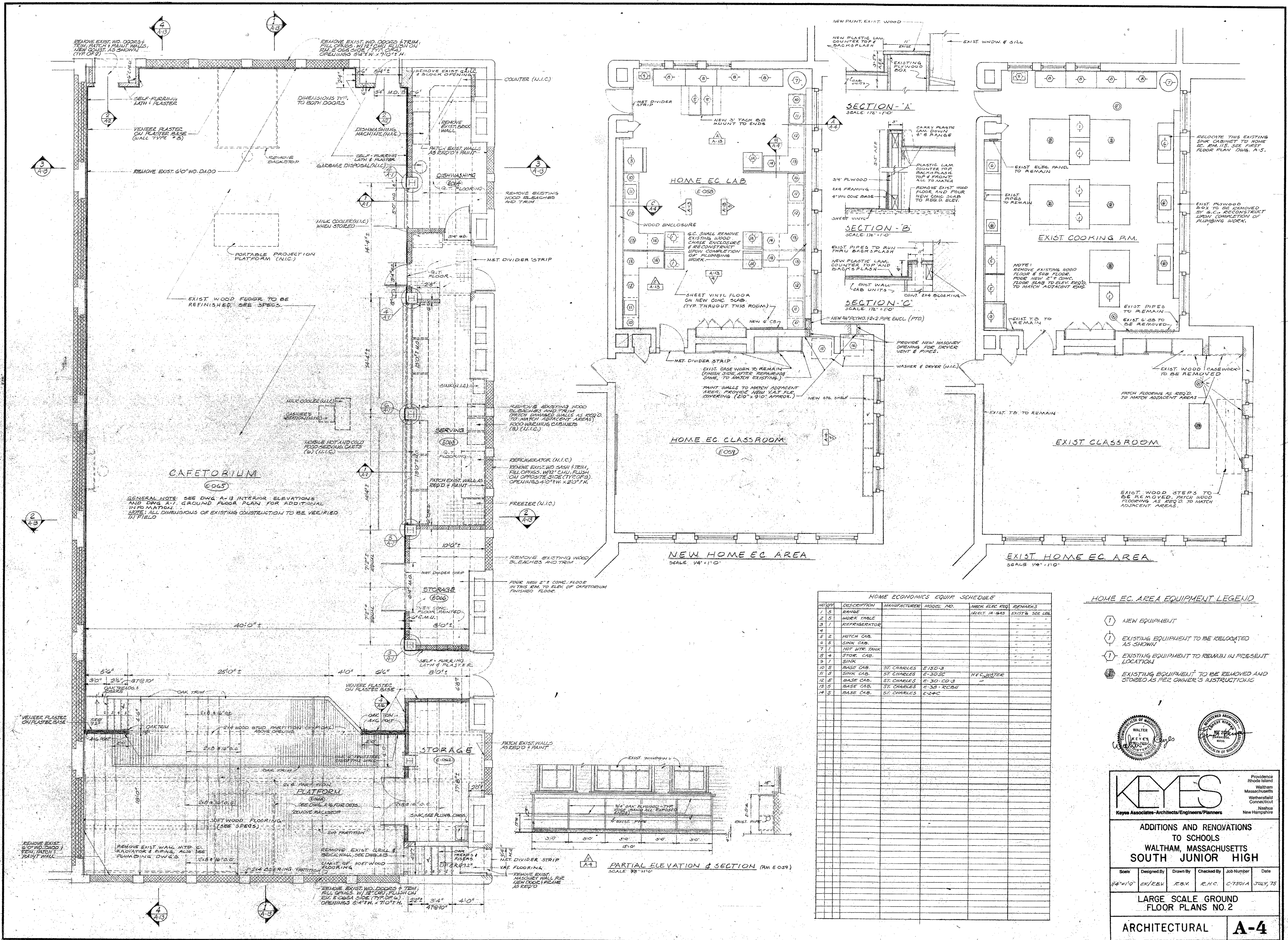
Providence  
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Waltham  
Massachusetts  
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Nashua  
New Hampshire

**ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/4" = 1'-0"	W.P.O./E.K./J.B.V.	D.W.	J.H.C.	CTS101A	JULY 75

**LARGE SCALE GROUND  
 FLOOR PLAN NO. 1**

**ARCHITECTURAL A-3**



**GENERAL NOTE:** SEE DWG A-B INTERIOR ELEVATIONS AND DWG A-1 GROUND FLOOR PLAN FOR ADDITIONAL INFORMATION. NOTE: ALL DIMENSIONS OF EXISTING CONSTRUCTION TO BE VERIFIED IN FIELD.

**HOME ECONOMICS EQUIP. SCHEDULE**

NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	MECH. EQ. REQ.	REMARKS
1	RANGE				EXIST. SEE LEG.
2	UNDER TABLE REFRIGERATOR				
3	HATCH CAB.				
4	SINK CAB.				
5	HOT WTR. PAN.				
6	STOVE CAB.				
7	SINK				
8	BASE CAB.	ST. CHARLES	E-150-B		
9	SINK CAB.	ST. CHARLES	E-150-B		W.F. WATER
10	BASE CAB.	ST. CHARLES	E-30-00-B		
11	BASE CAB.	ST. CHARLES	E-30-RC0-B		
12	BASE CAB.	ST. CHARLES	E-24-C		

**HOME EC. AREA EQUIPMENT LEGEND**

- ① NEW EQUIPMENT
- ② EXISTING EQUIPMENT TO BE RELOCATED AS SHOWN
- ③ EXISTING EQUIPMENT TO REMAIN IN PRESENT LOCATION
- ④ EXISTING EQUIPMENT TO BE REMOVED AND STORED AS PER OWNER'S INSTRUCTIONS



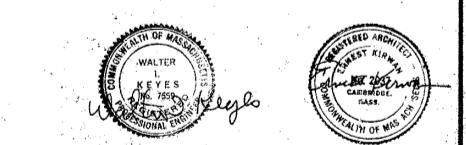
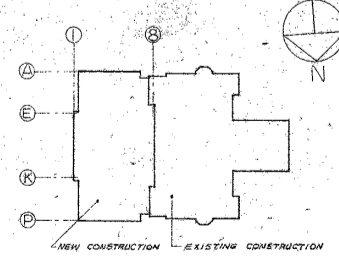
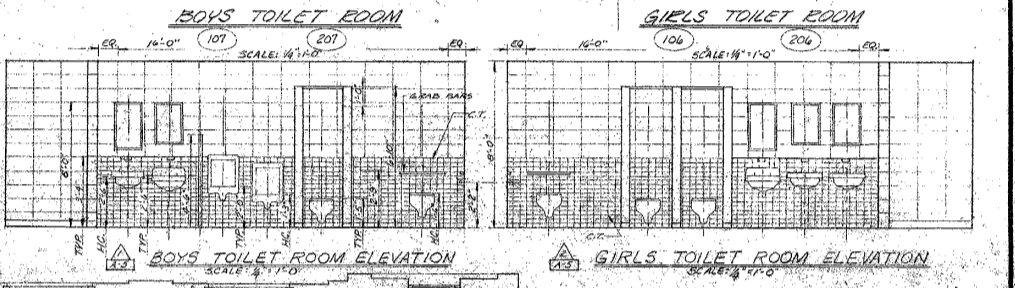
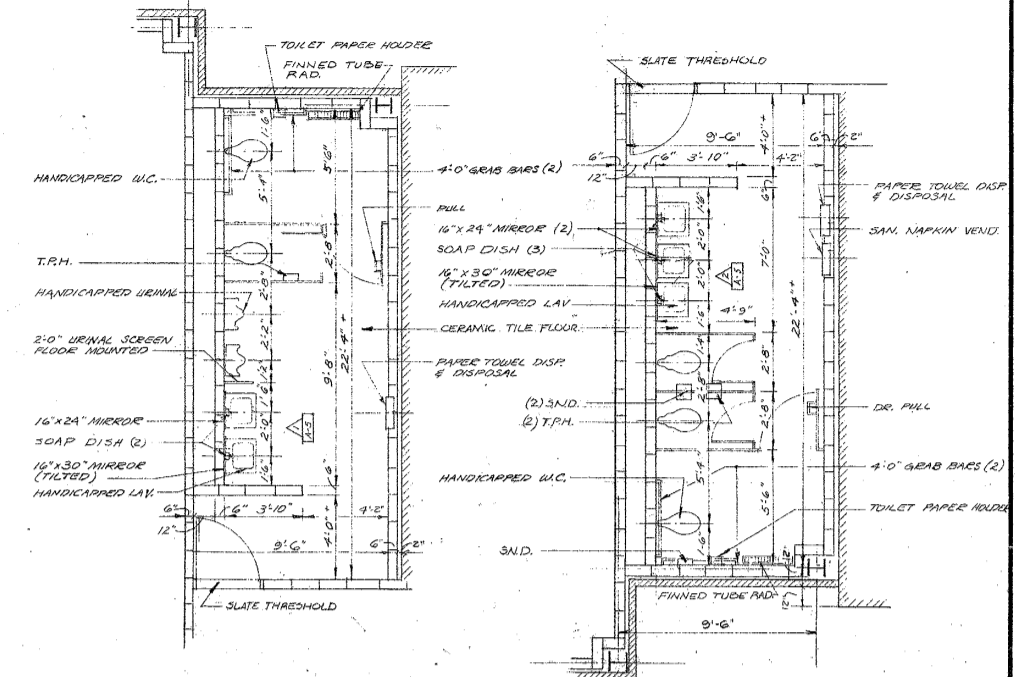
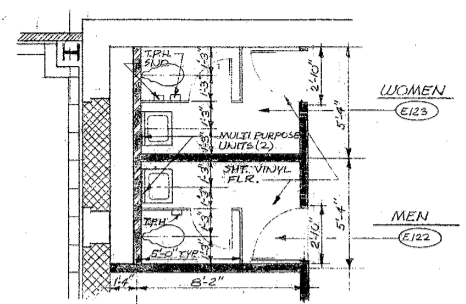
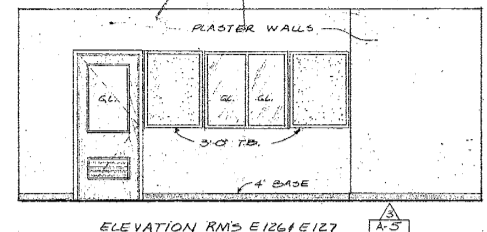
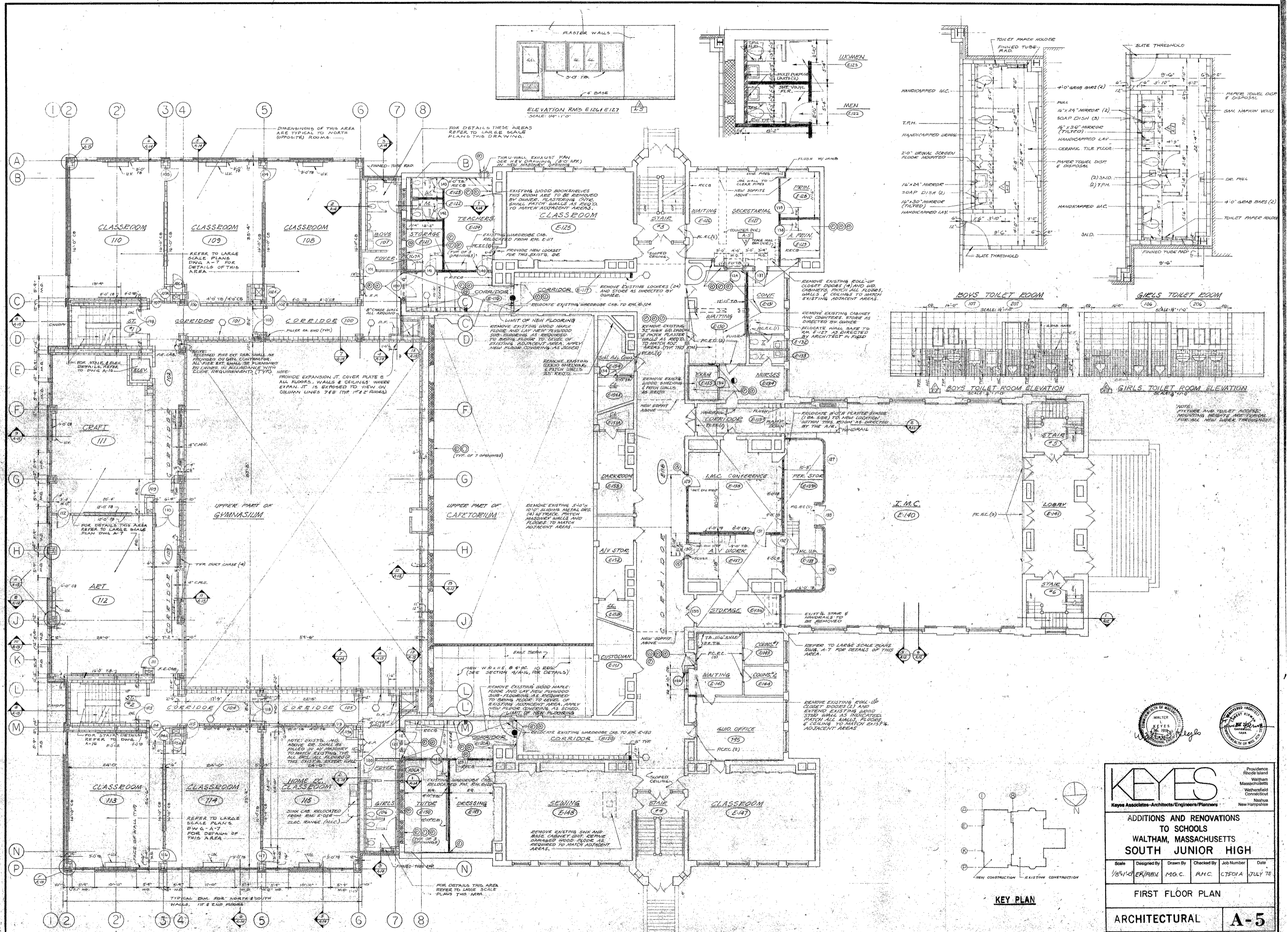
**KEYES**  
Keyes Associates - Architects/Engineers/Planners

**ADDITIONS AND RENOVATIONS TO SCHOOLS**  
WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale: 1/4" = 1'-0"  
Designed By: EK/EBV  
Drawn By: K.O.V.  
Checked By: E.H.C.  
Job Number: C-7501A  
Date: JULY, 75

**LARGE SCALE GROUND FLOOR PLANS NO. 2**  
ARCHITECTURAL **A-4**





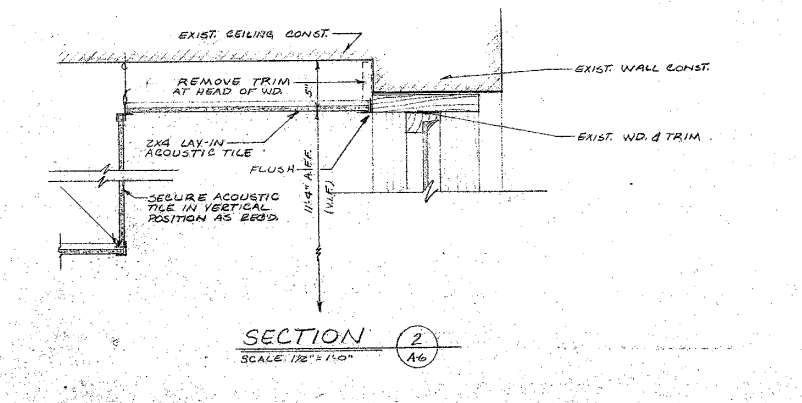
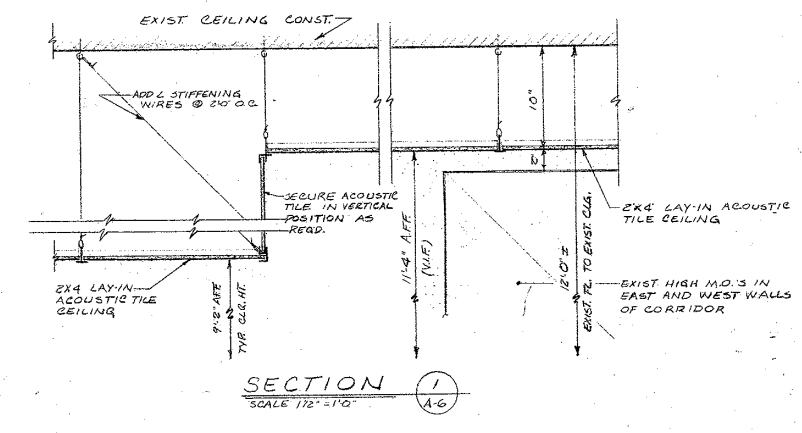
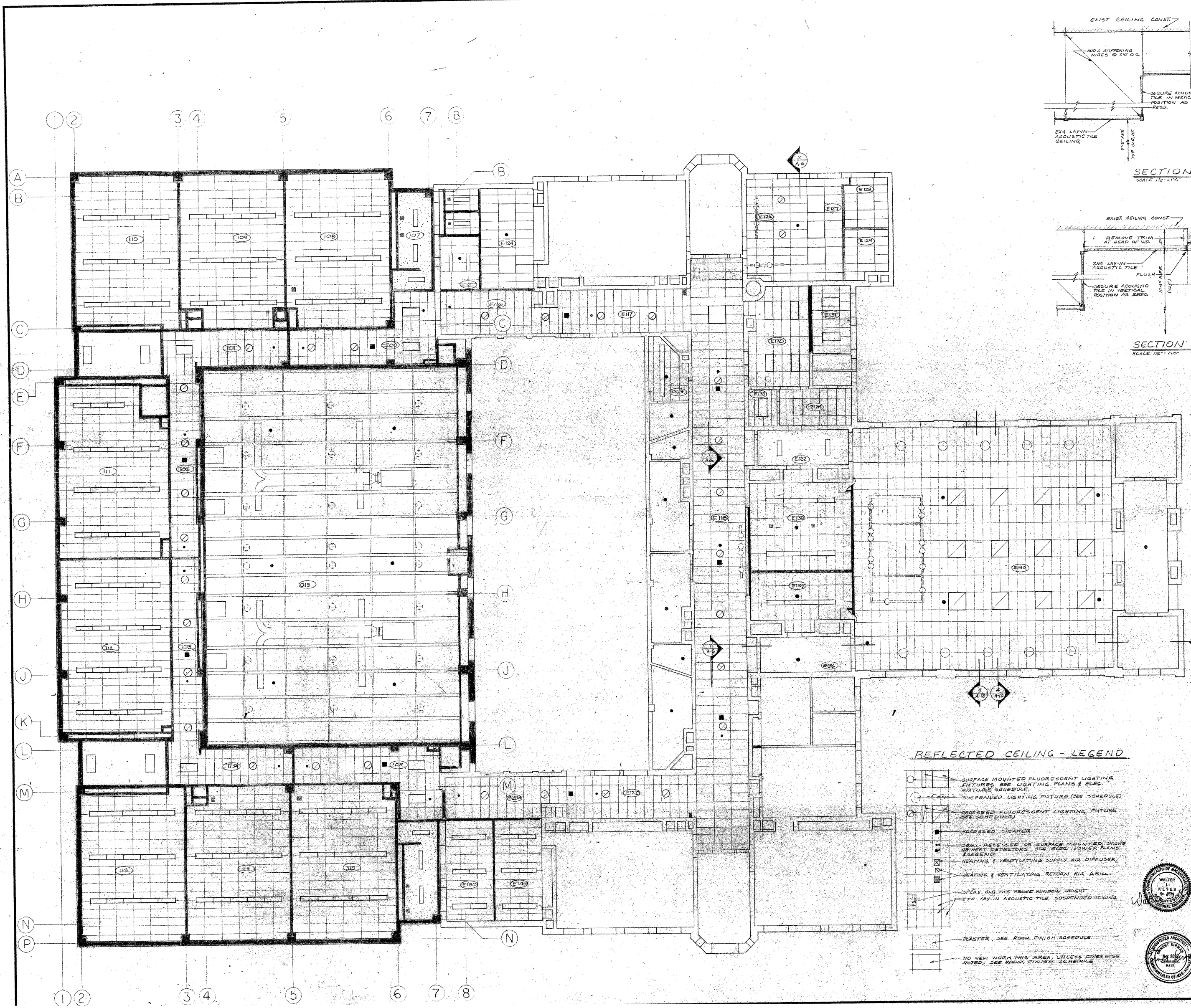
**KEYES**  
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 Connecticut  
 Nashua  
 New Hampshire

**ADDITIONS AND RENOVATIONS TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	ER/PMB	M.G.C.	R.H.C.	C7501A	JULY 78

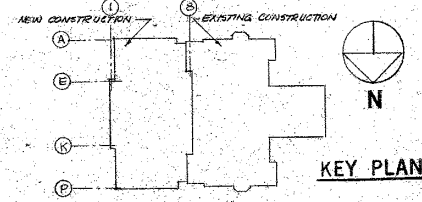
FIRST FLOOR PLAN

ARCHITECTURAL **A-5**



**REFLECTED CEILING - LEGEND**

- SURFACE MOUNTED FLUORESCENT LIGHTING FIXTURES SEE LIGHTING PLANS & ELEC. FIXTURE SCHEDULE.
- SUSPENDED LIGHTING FIXTURE (SEE SCHEDULE)
- RECESSED FLUORESCENT LIGHTING FIXTURE (SEE SCHEDULE)
- RECESSED SPEAKER
- SEAL-RECESSED OR SURFACE MOUNTED SMOKE OR HEAT DETECTORS SEE SCHEDULE FOR SCHEDULE
- HEATING & VENTILATING SUPPLY AIR DIFFUSER
- HEATING & VENTILATING RETURN AIR GRILL
- SPRAY ON TILE ABOVE WINDOW HEIGHT
- 2x6 LAY-IN ACOUSTIC TILE SUSPENDED CEILING
- PLASTER - SEE ROOM FINISH SCHEDULE
- NO NEW WORK THIS AREA, UNLESS OTHERWISE NOTED, SEE ROOM FINISH SCHEDULE



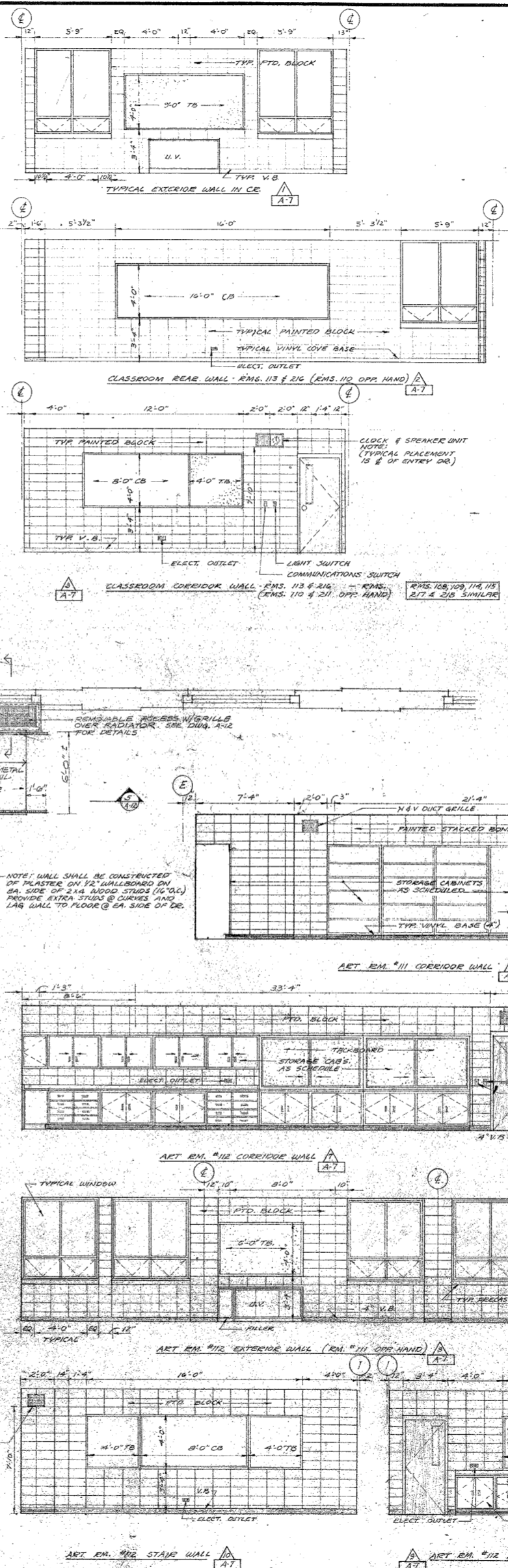
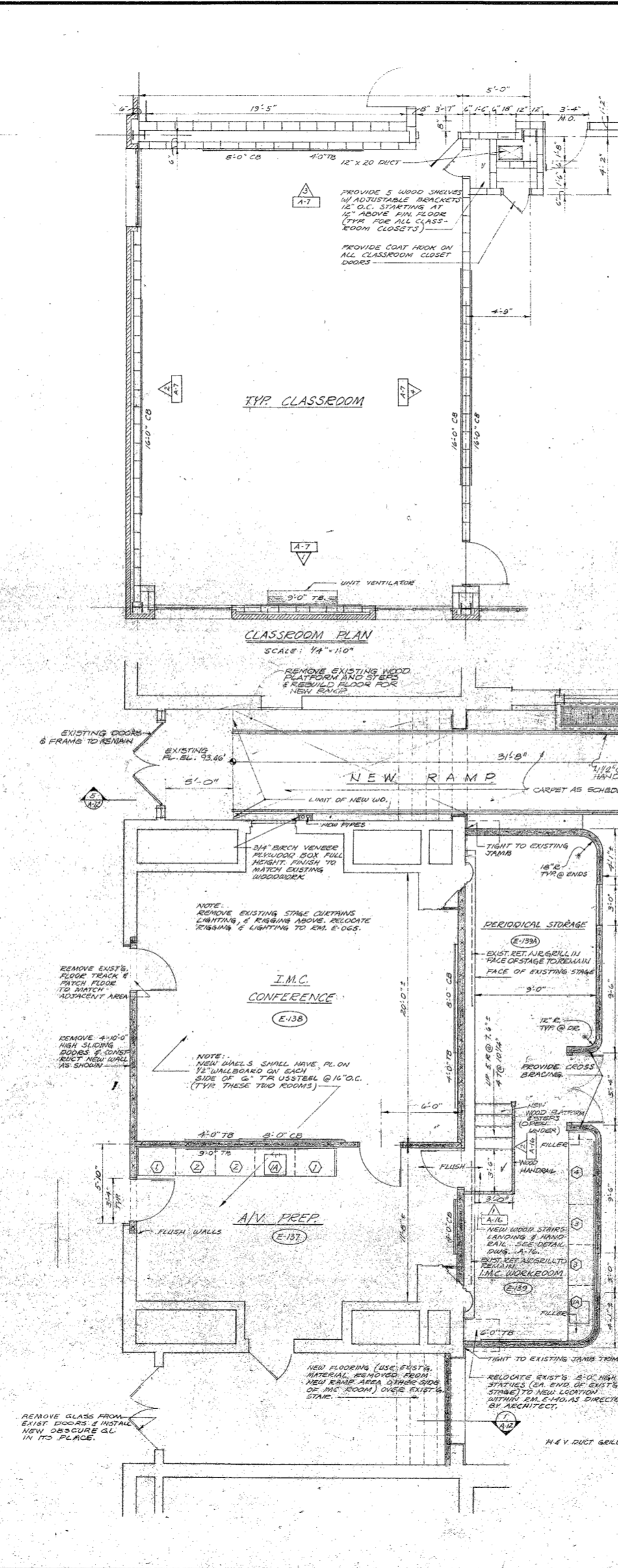
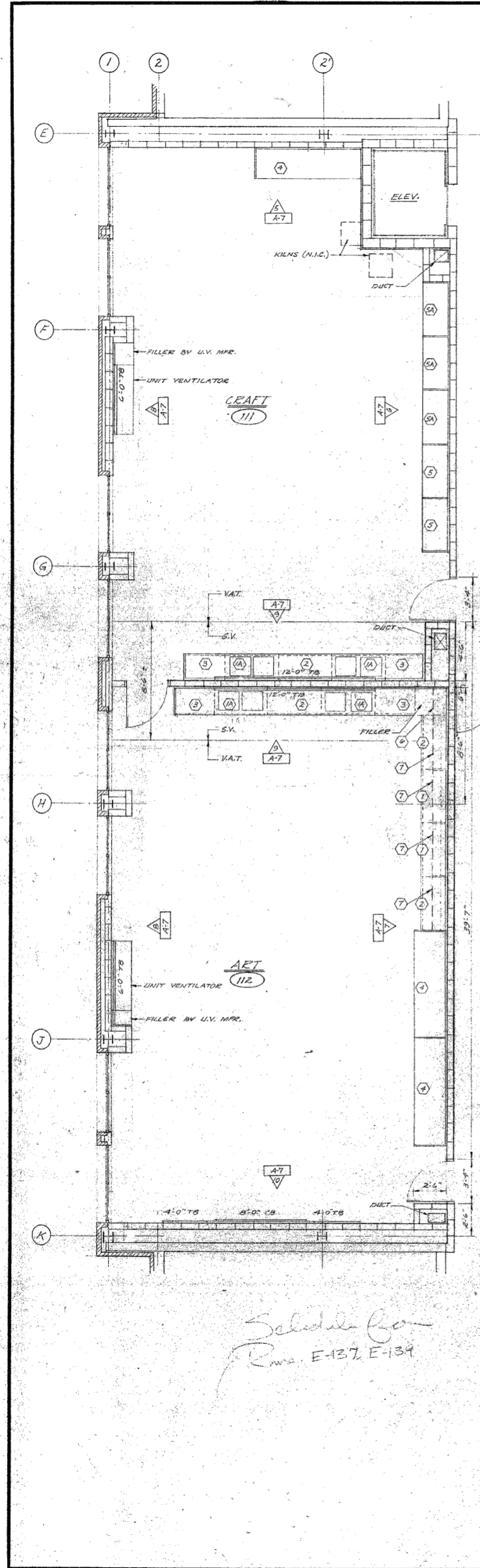
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**ADDITIONS AND RENOVATIONS TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH**

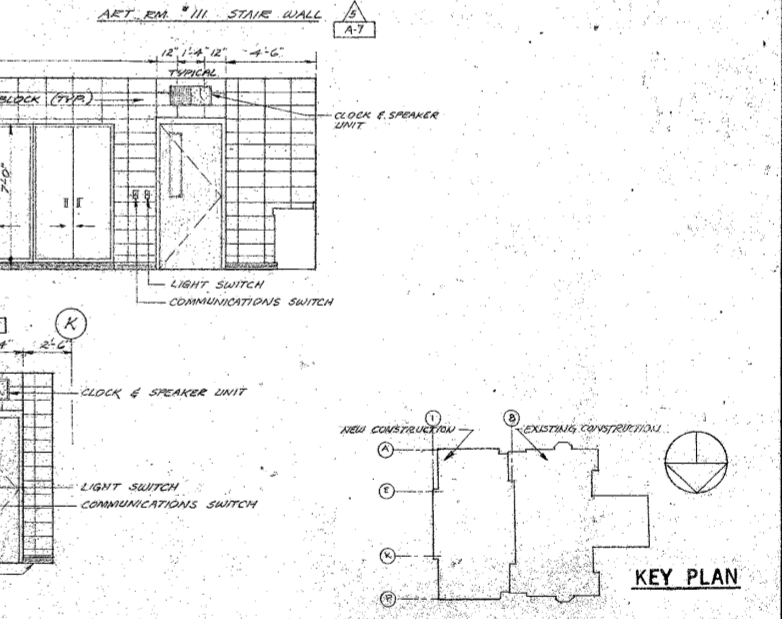
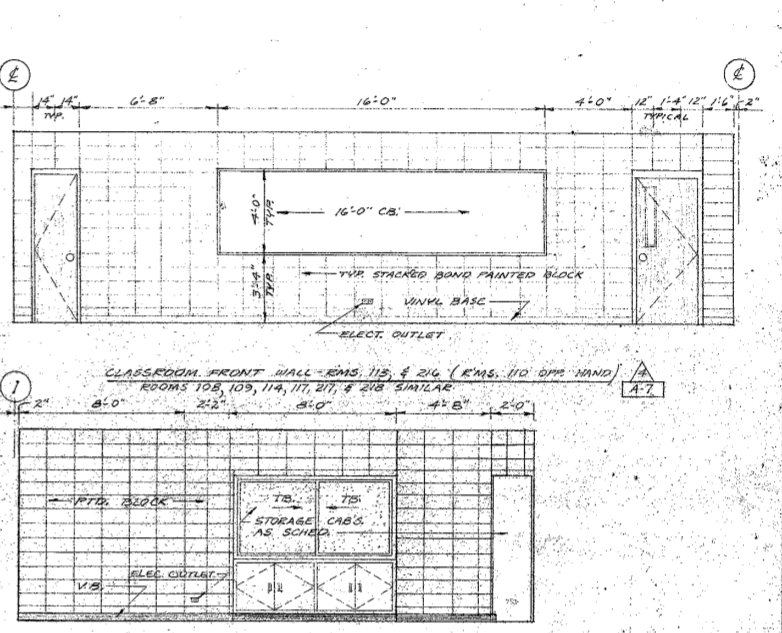
Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	EM/RSV	G.H/DW	R.H.C.	C7801A	JULY 75

**FIRST FLOOR REFLECTED CEILING PLAN**

ARCHITECTURAL **A-6**



EQUIPMENT SCHEDULE						
NO.	QTY	DESCRIPTION	MANUFACT.	MODEL NO.	MECH.	REMARKS
1	2	CUPBOARD	CONCO	1555K		FULLY LOCKING
1A	2	SINK CUPBOARD		3525	H.W., C.W. DRAIN	
2	4	DRIVERS		3554		FULLY LOCKING
3	2	CUPBOARD		3554		
4	1	CUPBOARD		4724		



Schedule for  
Rm. E-137, E-139

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Division  
Production  
Waltham  
Massachusetts  
Westfield  
Concord  
New Hampshire

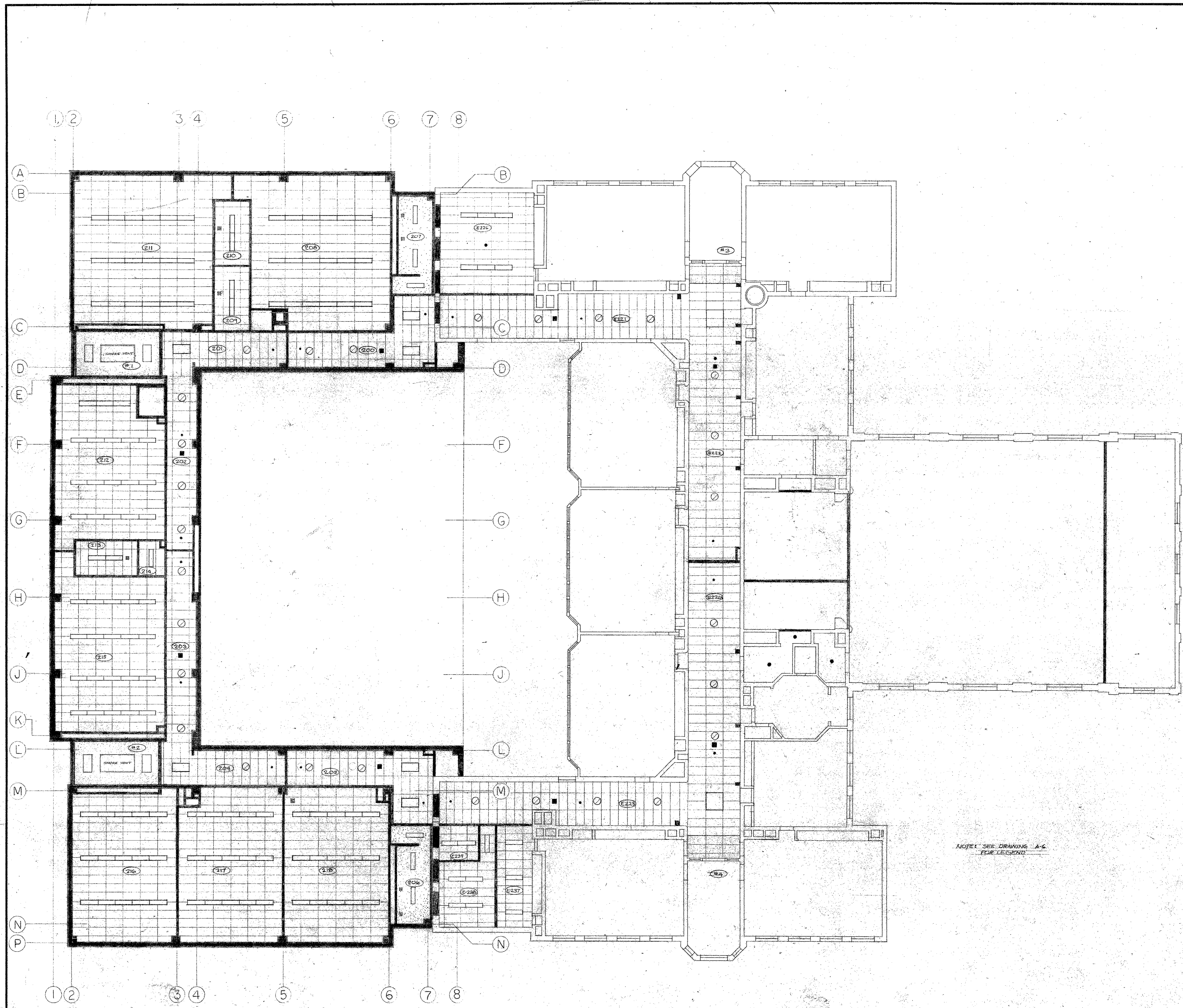
ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

Scale: 1/8" = 1'-0"    Drawn By: STAFF    Checked By: PHC    Job Number: 07021A    Date: JULY 78

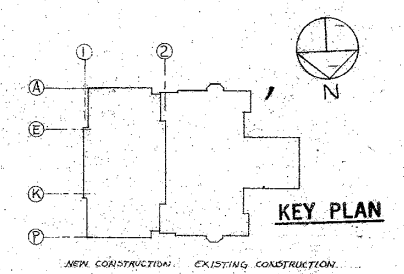
LARGE SCALE FIRST FLOOR PLANS  
AND ELEVATIONS

ARCHITECTURAL    A-7





NOTES: SEE DRAWING A-6 FOR LEGEND



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 Providence  
 Waltham  
 Massachusetts  
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 Nashua  
 New Hampshire

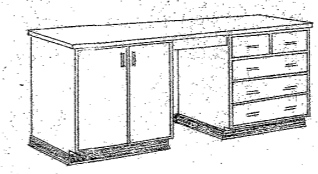
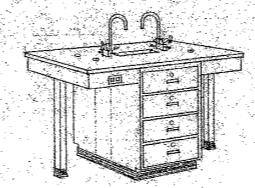
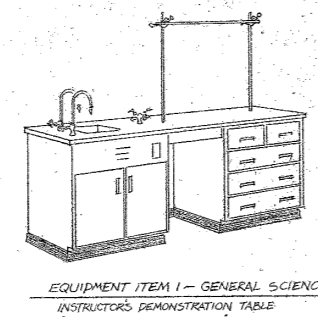
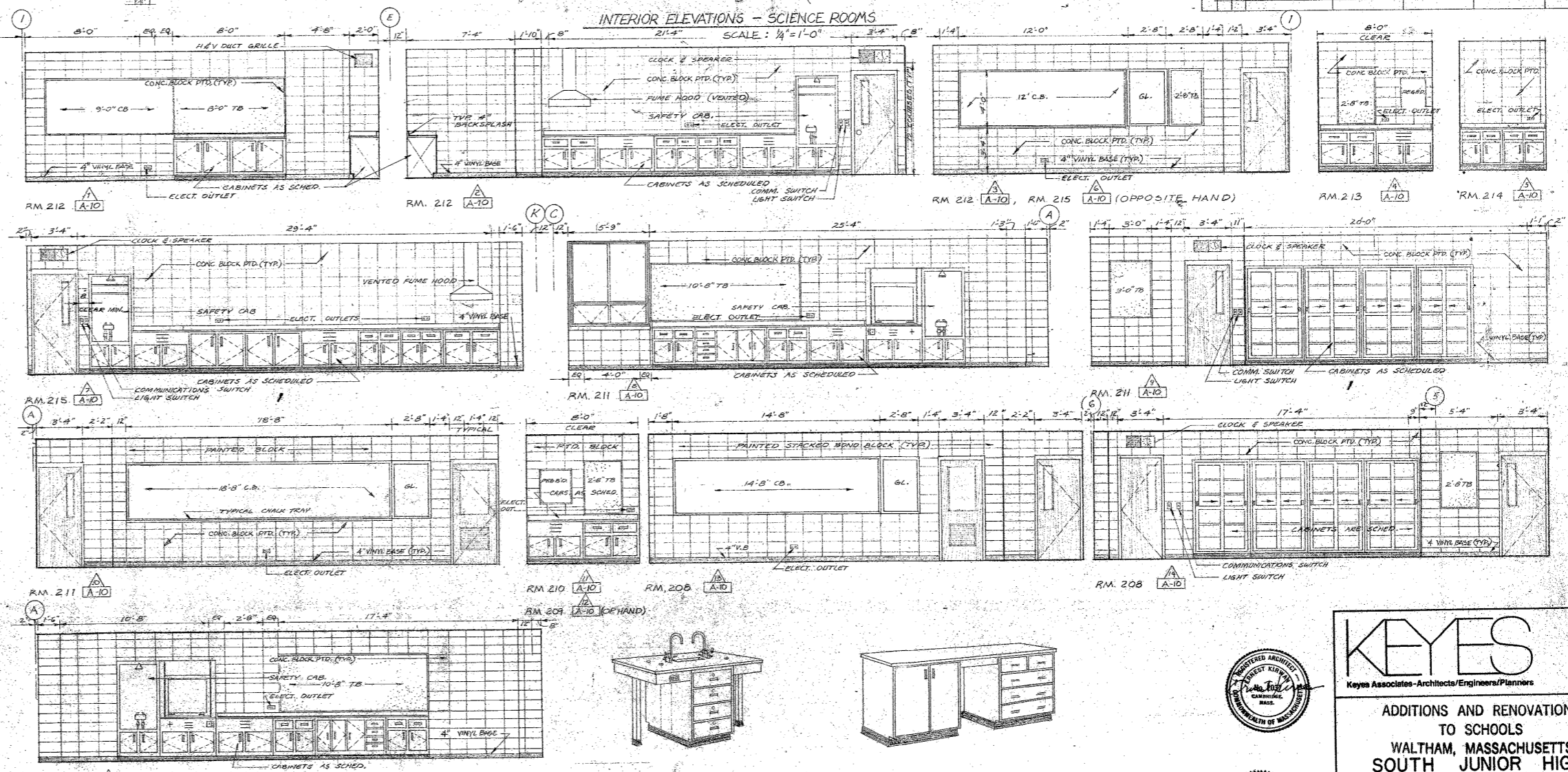
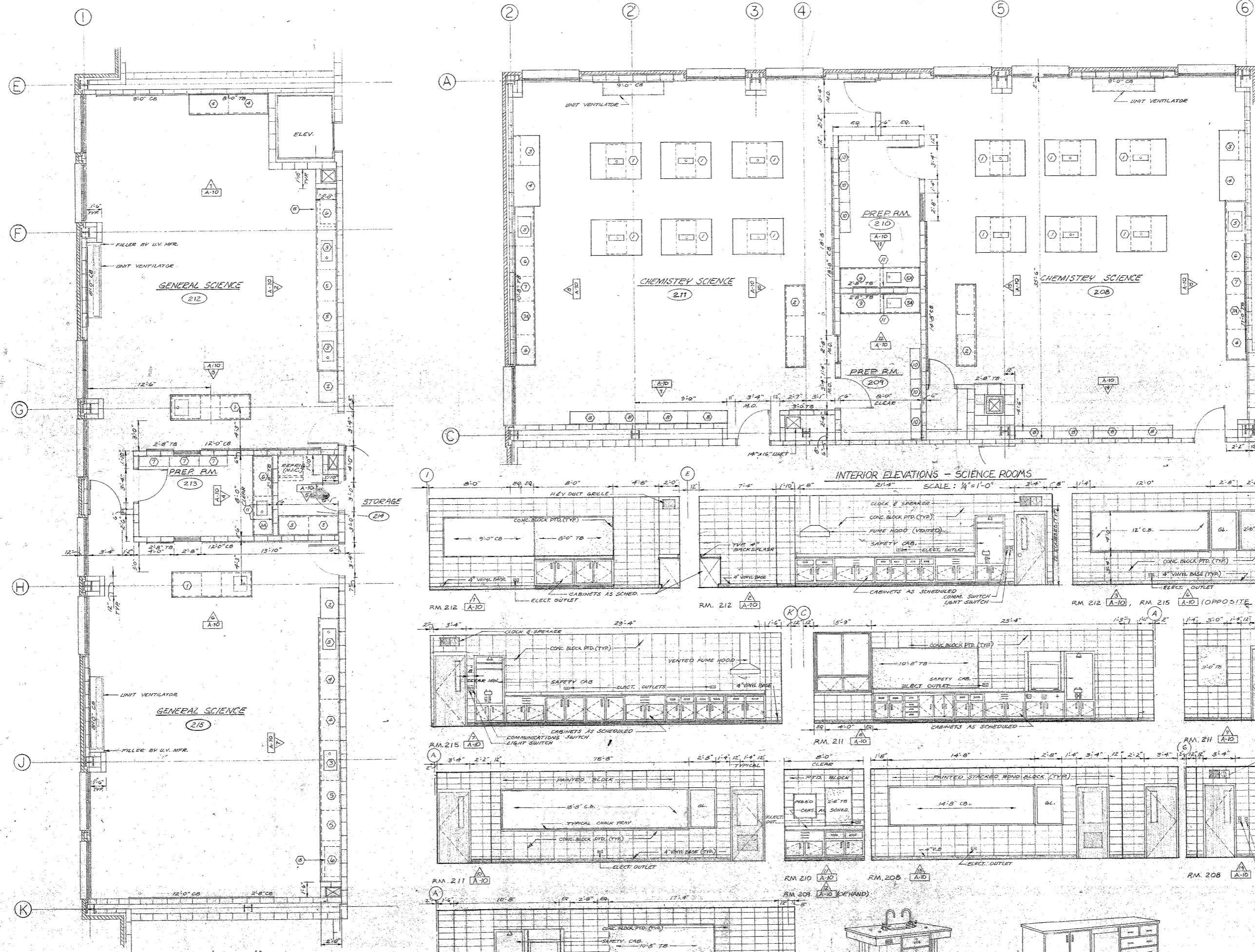
**ADDITIONS AND RENOVATIONS TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	E.B./P.B.K.	G.H./D.W.	P.H.C.	EJ501	JULY 75

**SECOND FLOOR REFLECTED  
 CEILING PLAN**

ARCHITECTURAL **A-9**

SCIENCE ROOM PLANS  
SCALE: 1/4"=1'-0"



CHEMISTRY SCIENCE EQUIPMENT SCHEDULE					
RM NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	MGR. ELEC.	REMARKS
1	STC LAB TABLE	KEWAWINNEE	KTF-320-Q3	6.6' CW	
2	INSTR. TABLE	KEWAWINNEE	KTF-X200R		
3	SAFETY CAB.	KEWAWINNEE	KTF-711	CW	
4	FUME HOOD	KEWAWINNEE	KTF-523	6.6' CW	
5	SINK UNIT	CONCO	4723	11.6' CW	
6	SINK UNIT	CONCO	4723	6.6' CW	
7	BASE CAB'S	CONCO	3524		
8	BASE CAB'S	CONCO	2425		
9	STORAGE CAB'S	CONCO	3147TS		
10	BASE CAB'S	CONCO	4723		
11	NPL SHELF UNITS	WILSON	600-12		
12	BASE CAB'S	CONCO	3546		
13	PREPBOARD	CONCO	32		

GENERAL SCIENCE EQUIPMENT SCHEDULE					
RM NO.	DESCRIPTION	MANUFACTURER	MODEL NO.	MGR. ELEC.	REMARKS
1	INSTR. DEMONSTR. TABLE	KEWAWINNEE	KTF-100R	6.6' CW	
2	SAFETY CAB.	KEWAWINNEE	KTF-711	CW	
3	SINK UNIT	CONCO	4723	11.6' CW	
4	SINK UNIT	CONCO	4723	6.6' CW	
5	BASE CAB'S	CONCO	4710		
6	BASE CAB'S	CONCO	3524		
7	BASE CAB'S	CONCO	4723		
8	NPL SHELF UNITS	WILSON	600-12		
9	EXHAUST HOOD				SEE HVAC CNG.

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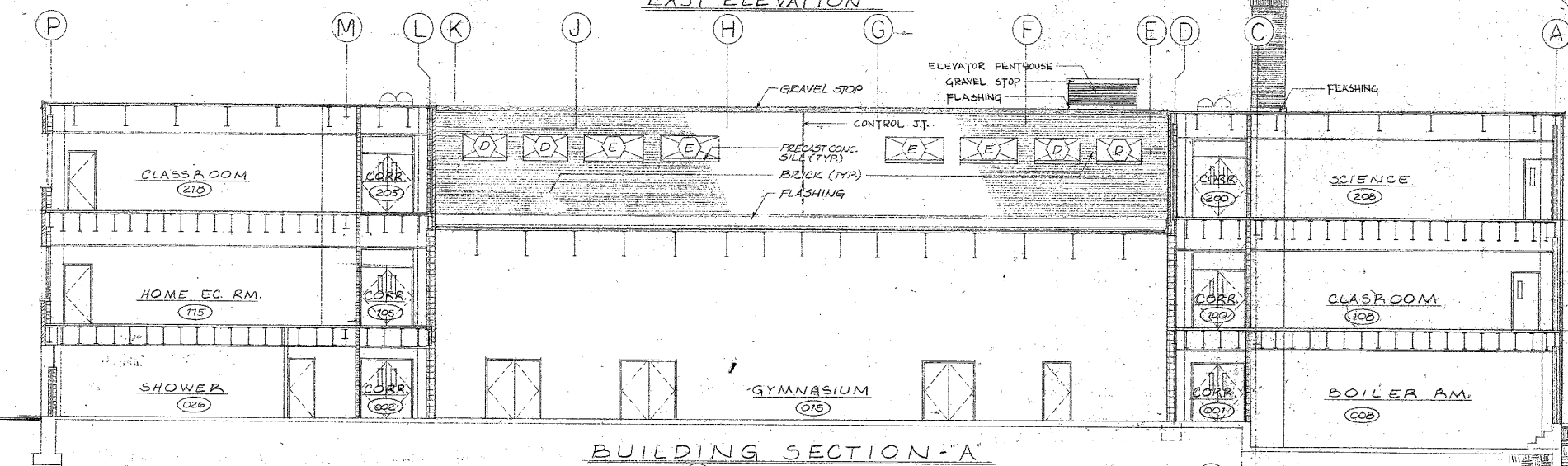
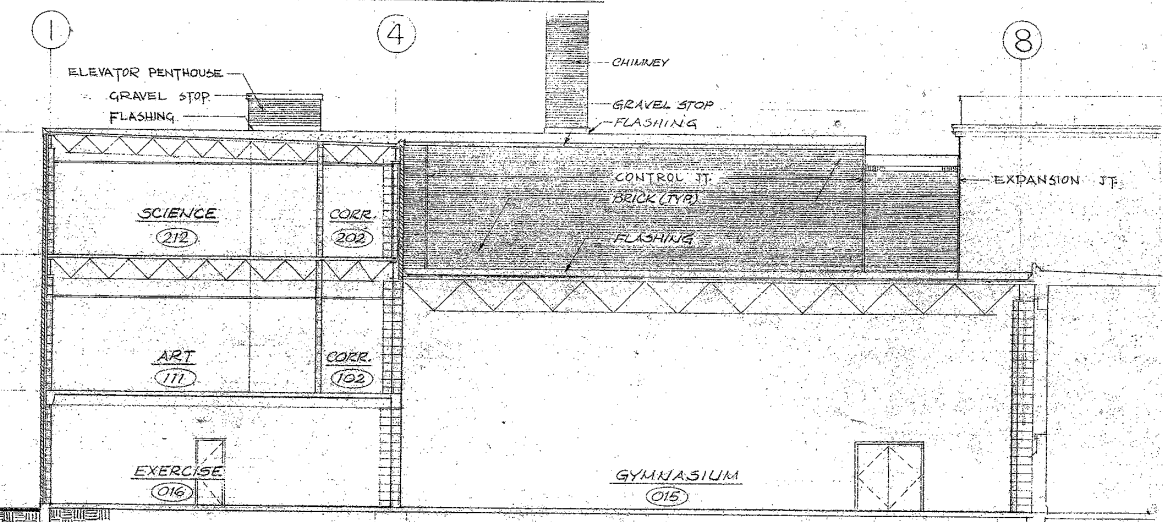
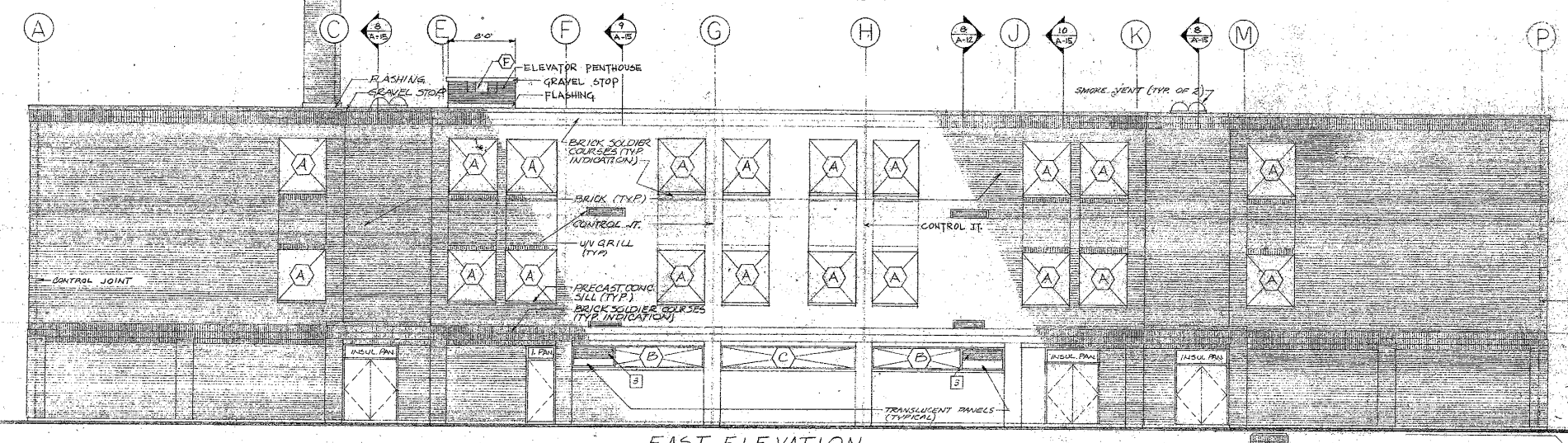
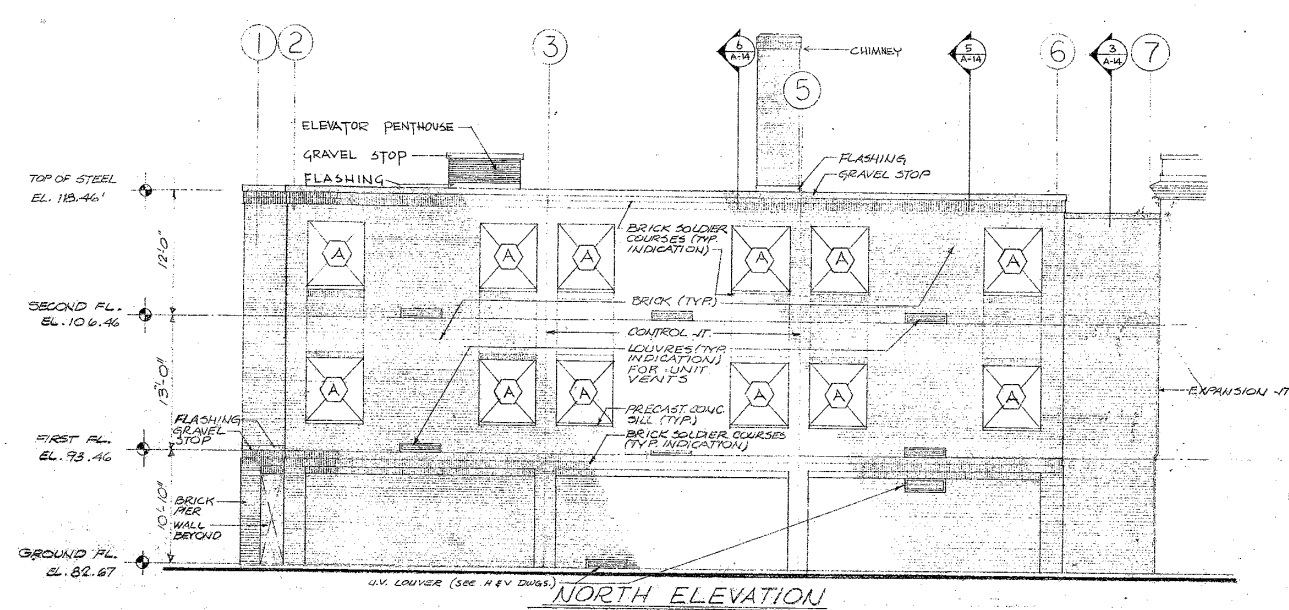
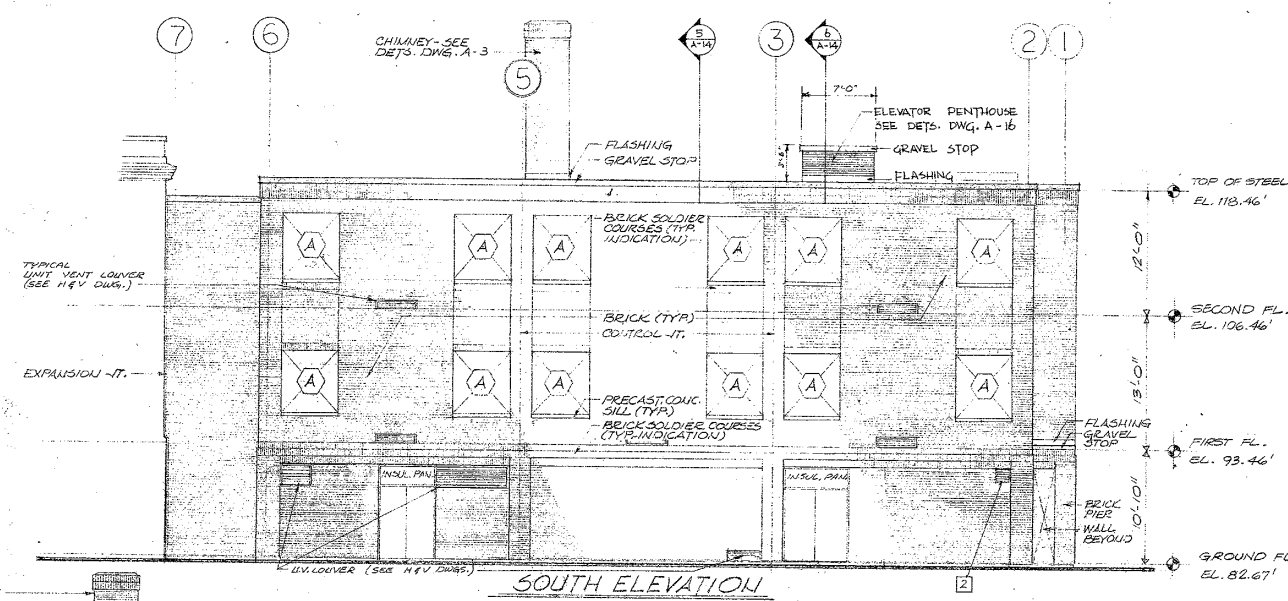
ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/4"=1'-0"	EA/RBY	RM	RHC	C75CA	JULY, 1935

LARGE SCALE SECOND FLOOR  
PLANS & ELEVATIONS

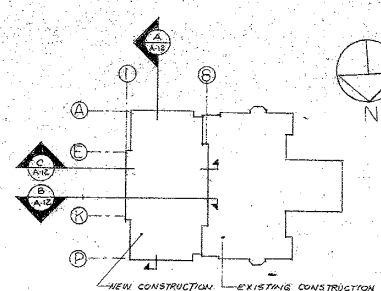
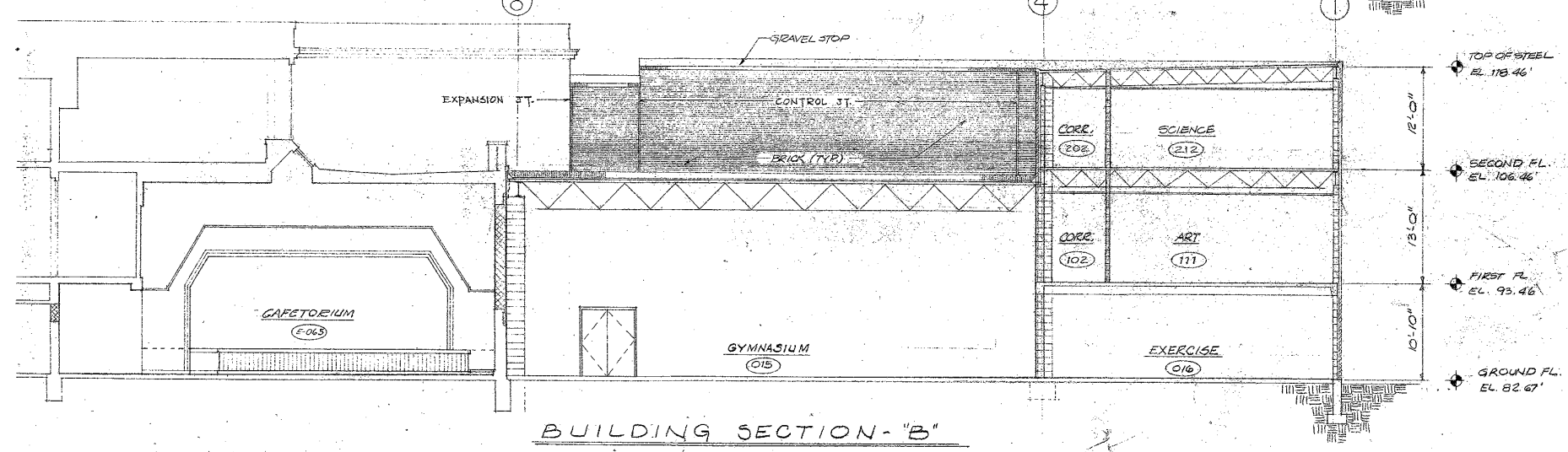
ARCHITECTURAL **A-10**





LOUVER SCHEDULE						
MODEL NO.	ANEX	NO. WIDTH	NO. HEIGHT	TYPE & QUANTITY IN OPENING	REMARKS	DETAILS
4271	2	6'-3"	1'-6 3/8"	FIXED (1) MILLION TYPE	LOCATION - BOILER RM. PROVIDE SILL & INTERIOR BIRD SCREENING	(2) (3) (4) (5)
6 MODEL 218X	2	10'-3/8"	15"	FIXED (1) HINGED	LOCATION - GENERAL SHOP PROVIDE SILL & INTERIOR BIRD SCREENING	(6) (7) (8) (9)
4271	3	4'-8"	18"	FIXED (2) A.C. TYPE	LOCATION - BOYS & GIRLS EXERCISE RM. PROVIDE SILL & SCREEN TO ORNATE W/ FRAMES, LIGHT PANEL MFR.	(10) (11) (12)

NOTES:  
 1. MODEL NUMBERS GIVEN ARE AS MANUFACTURED BY "CONSTRUCTION SPECIALTIES INC." OR EQUAL. (LOOK TO BE SELECTED BY A/E.)  
 2. ALL LOUVERS SHALL BE ELECTROSTATICALLY PAINTED.  
 3. ALL LOUVERS SHALL BE PROVIDED W/ INTERIOR MOUNTED ALUM. BIRD SCREENING.

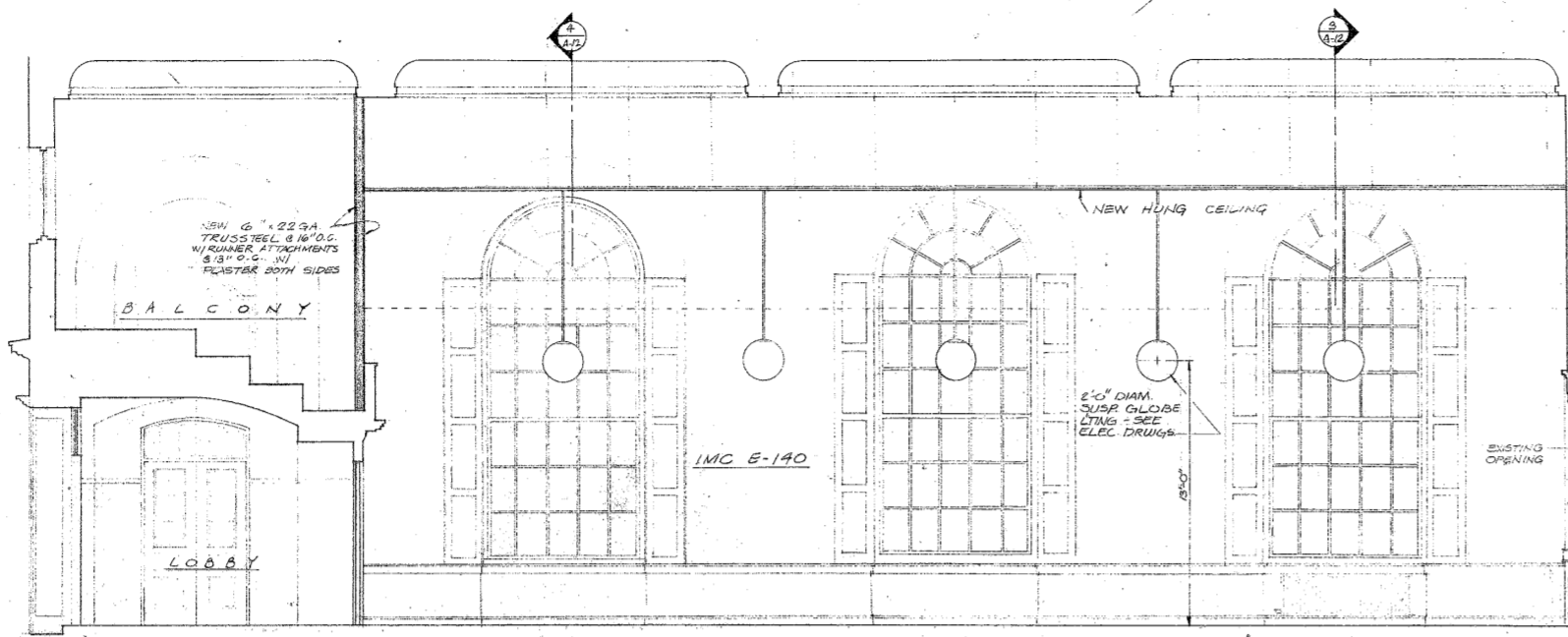


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**ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH**

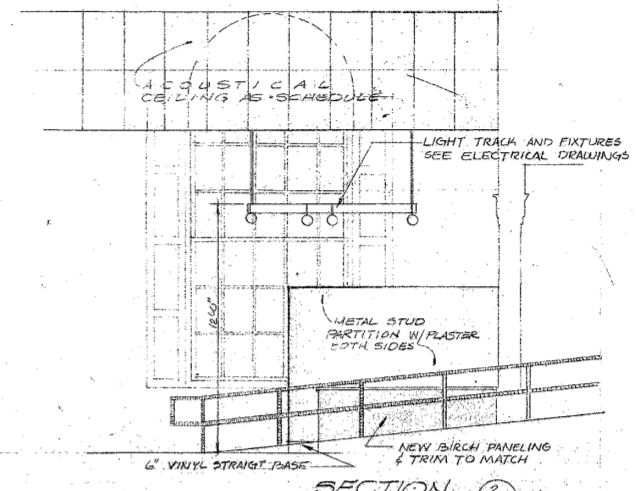
Scale: 1/8" = 1'-0" Designed By: E.H./R.M. Drawn By: REV. J.D. Checked By: P.H.C. Job Number: CTS101A Date: JULY 75

EXTERIOR ELEVATIONS  
**ARCHITECTURAL A-11**

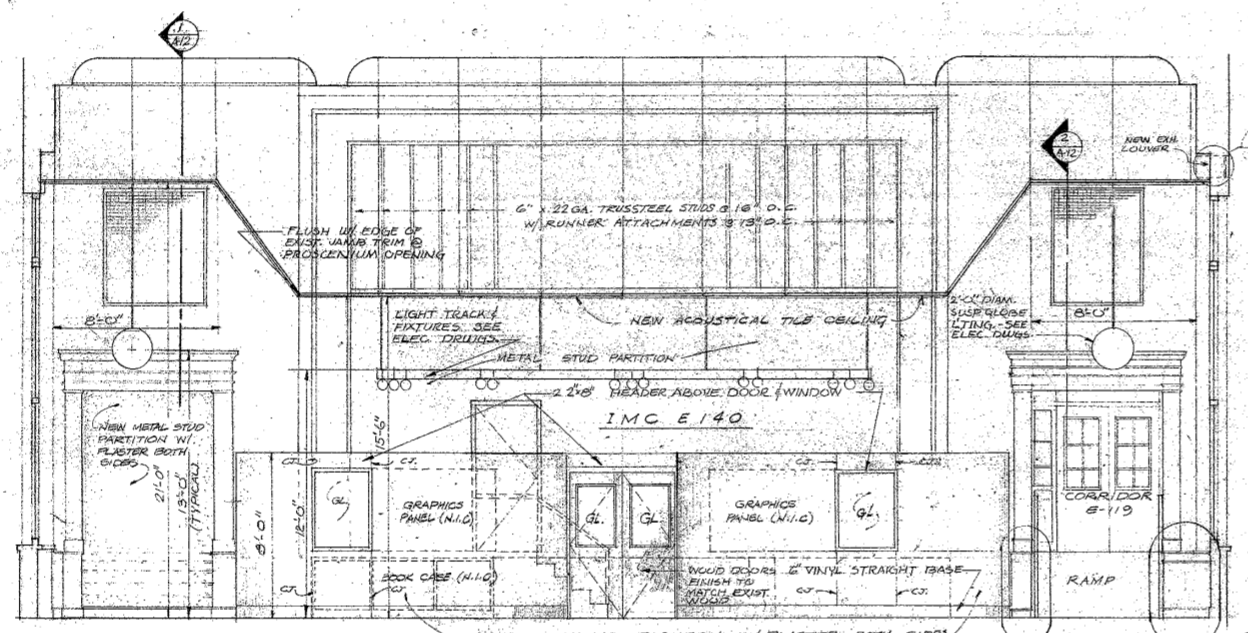


NOTE: EXISTING PLASTER WALLS IN ROOMS E-136 AND E-140 TO BE PAINTED AS SPECIFIED. EXISTING WOOD PANELED WALLS, WAINSCOTTING, AND TRIM IN ROOMS E-119, E-132, E-133, E-134, E-139, E-139A, AND E-140 WILL NOT REQUIRE NEW FINISH WORK EXCEPT WHERE DISTURBED BY NEW CONSTRUCTION, IN WHICH CASE THEY ARE TO BE FINISHED TO MATCH ORIGINAL. CONTRACTOR TO VERIFY (IN FIELD) EXACT SCOPE OF WORK REQUIRED.

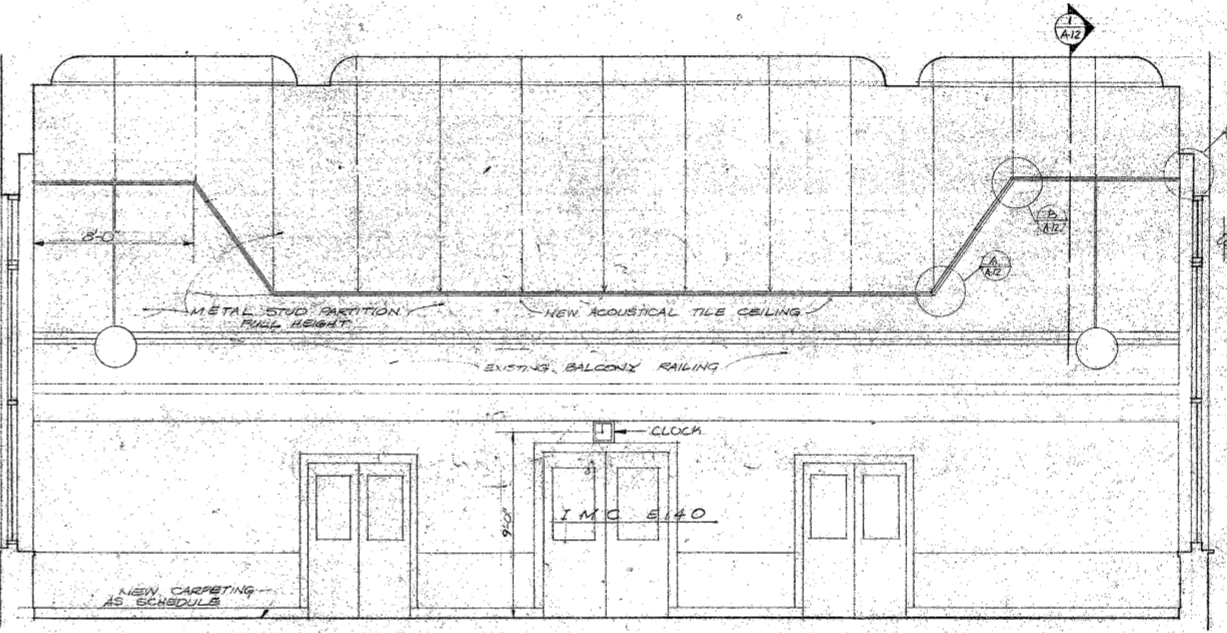
SECTION 1  
1/4" = 1'-0"



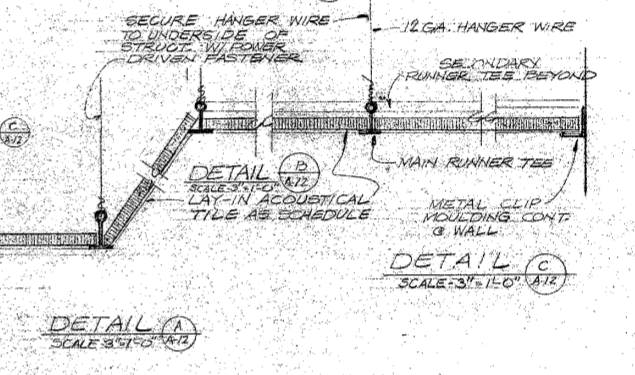
SECTION 2  
1/4" = 1'-0"



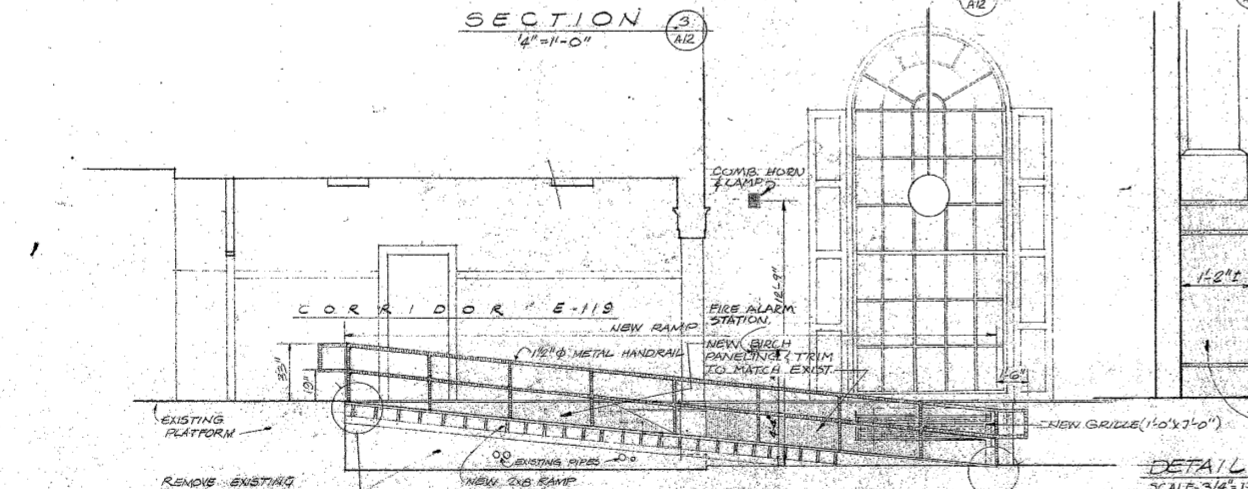
SECTION 3  
1/8" = 1'-0"



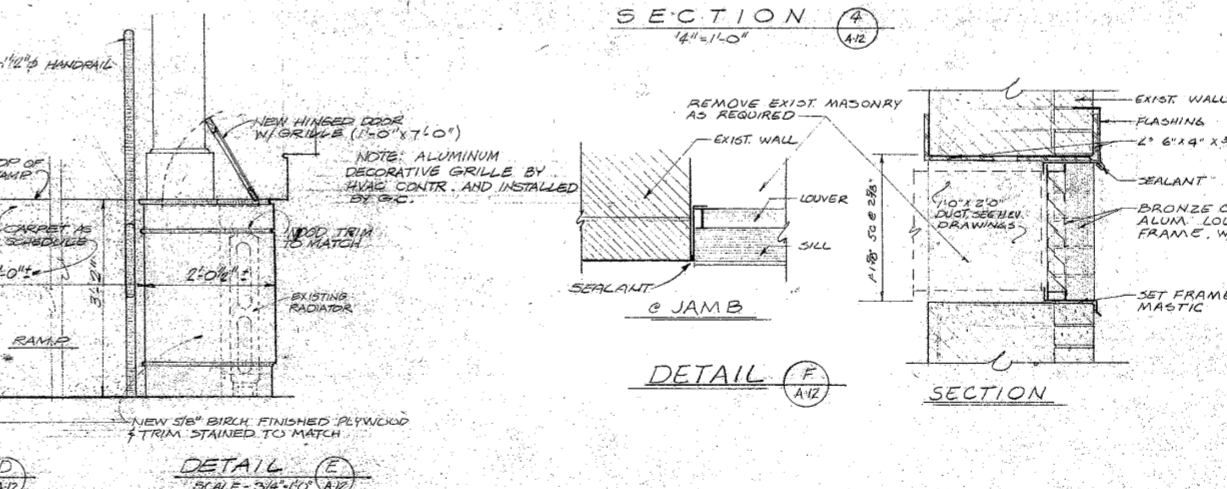
SECTION 4  
1/8" = 1'-0"



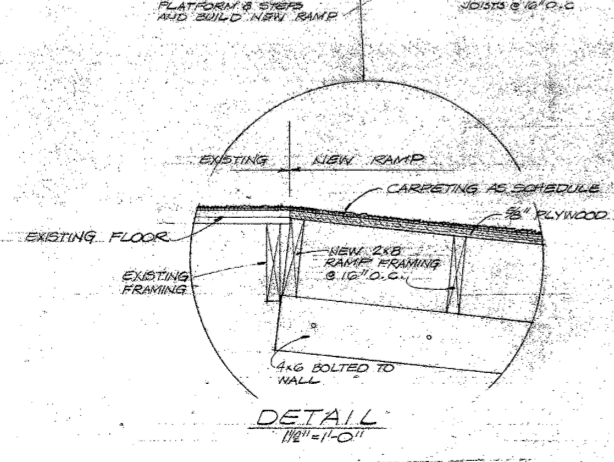
DETAIL A  
SCALE: 3/4" = 1'-0"



SECTION 5  
SCALE: 1/4" = 1'-0"



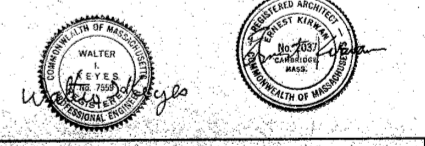
SECTION 6  
1/8" = 1'-0"



DETAIL B  
1/8" = 1'-0"



FULL SIZE DETAIL



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Massachusetts  
Wethersfield  
Connecticut  
Nashua  
New Hampshire

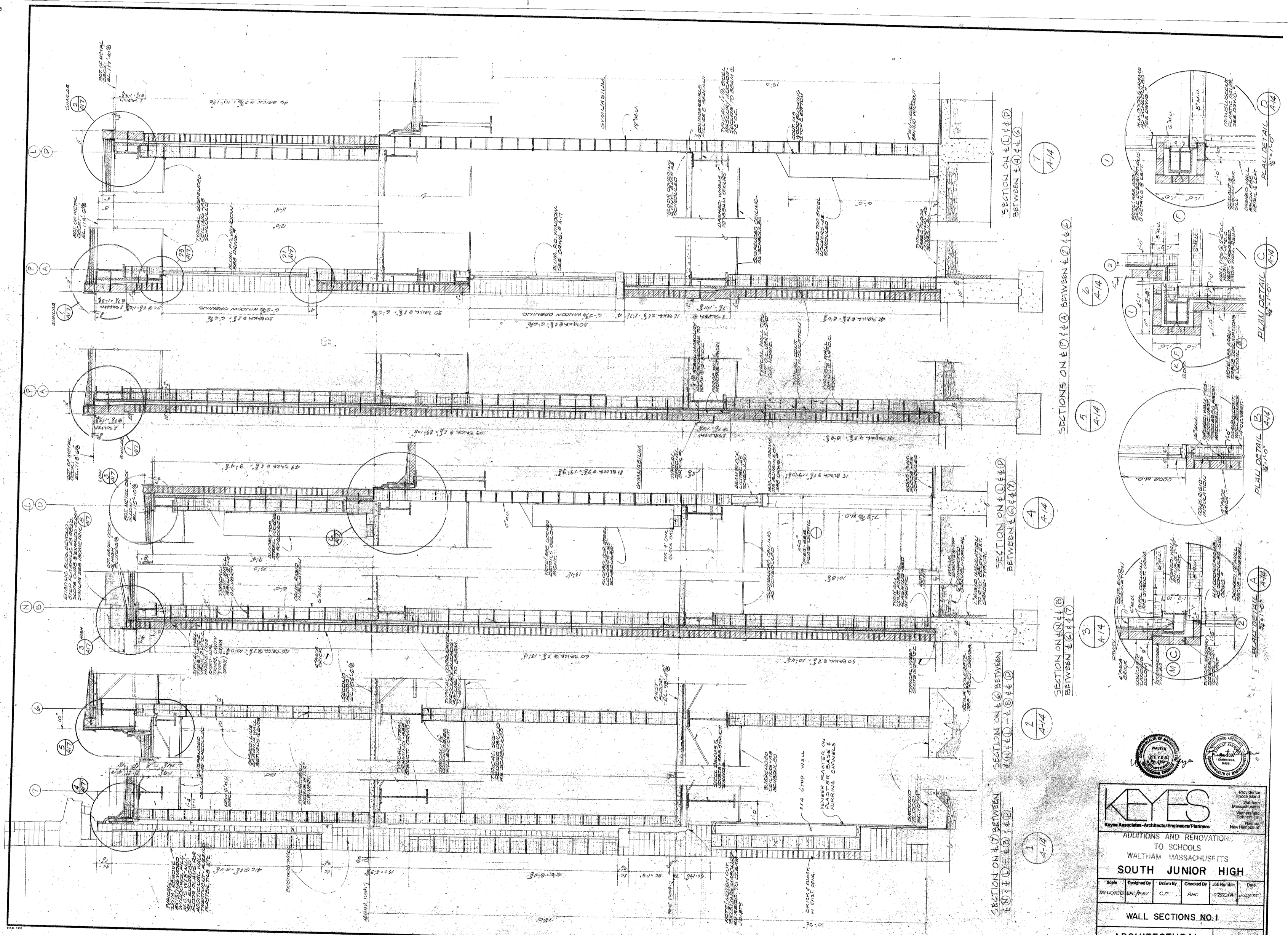
**ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	EK/RAV	JDM	AHC	CTFD/A	JULY 10'

I.M.C. ELEVATIONS & DETAILS  
**ARCHITECTURAL A-12**







**KEYS**  
Keyes Associates - Architects/Engineers/Planners

PROVIDENCE  
WALTHAM  
MASSACHUSETTS  
NEW HAVEN  
CONNECTICUT  
NEW YORK  
NEW JERSEY

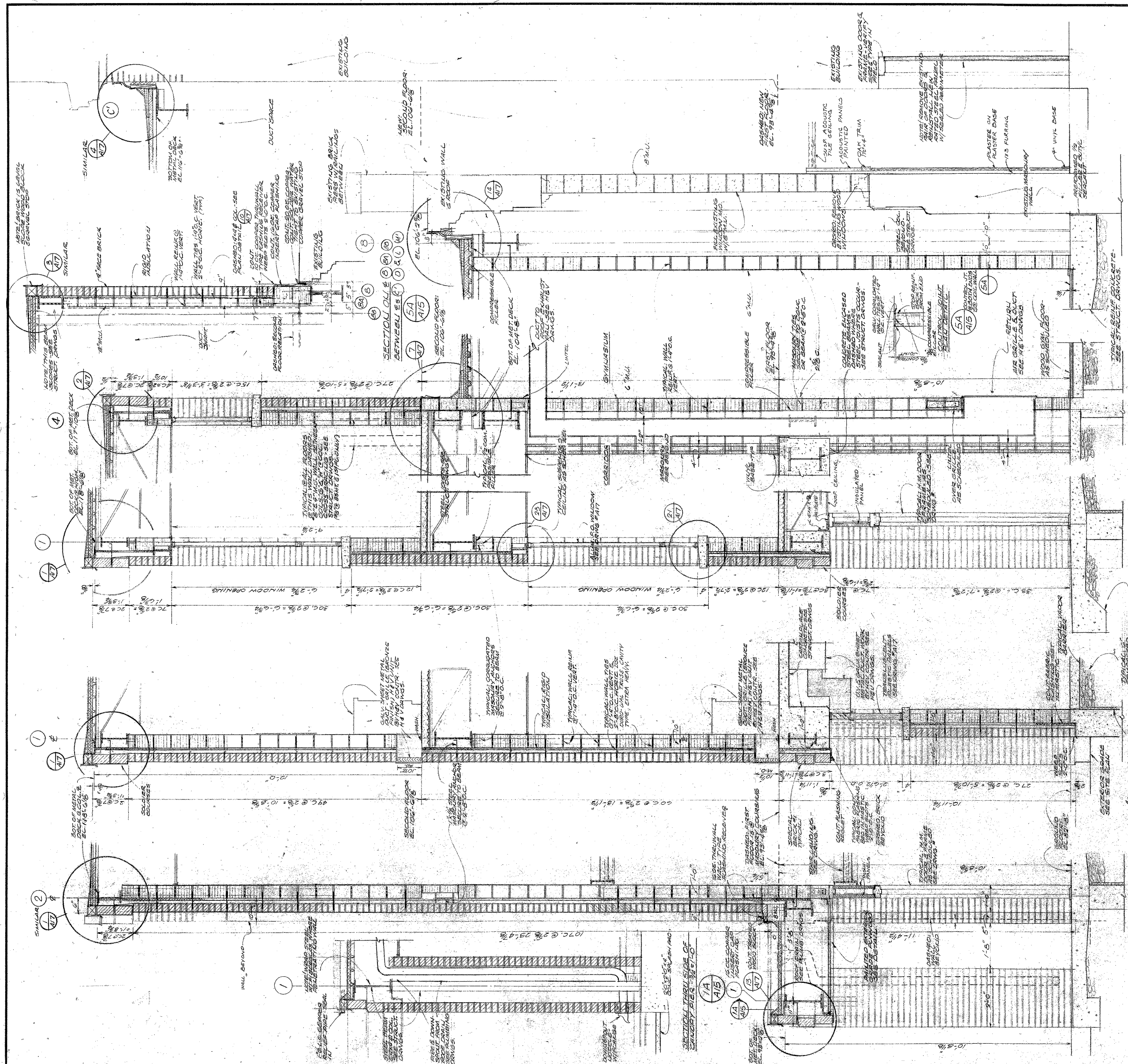
ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
RELAYED	EA, PAW	C.P.	AHC	47520A	JULY '72

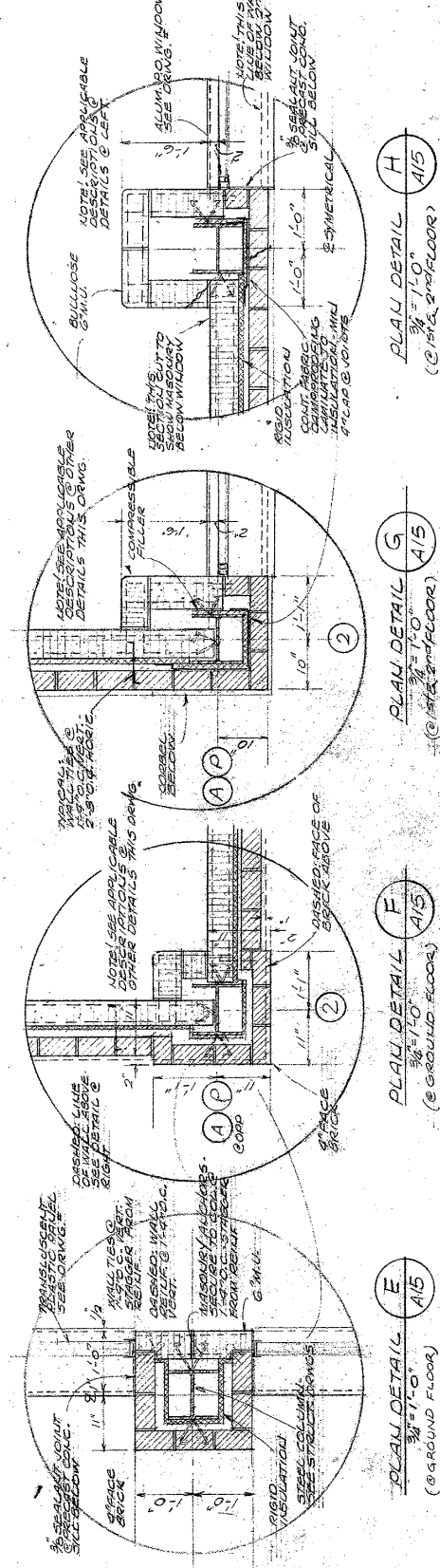
WALL SECTIONS NO. 1

ARCHITECTURAL **A-14**





SECTION 02 BETWEEN 05 (C) & 05 (D) A15  
 SECTION 03 BETWEEN 05 (D) & 05 (E) A15  
 SECTION 04 BETWEEN 05 (E) & 05 (F) A15  
 SECTION 05 BETWEEN 05 (F) & 05 (G) A15  
 SECTION 06 BETWEEN 05 (G) & 05 (H) A15  
 SECTION 07 BETWEEN 05 (H) & 05 (I) A15  
 SECTION 08 BETWEEN 05 (I) & 05 (J) A15  
 SECTION 09 BETWEEN 05 (J) & 05 (K) A15  
 SECTION 10 BETWEEN 05 (K) & 05 (L) A15  
 SECTION 11 BETWEEN 05 (L) & 05 (M) A15  
 SECTION 12 BETWEEN 05 (M) & 05 (N) A15  
 SECTION 13 BETWEEN 05 (N) & 05 (O) A15



**KEYES**  
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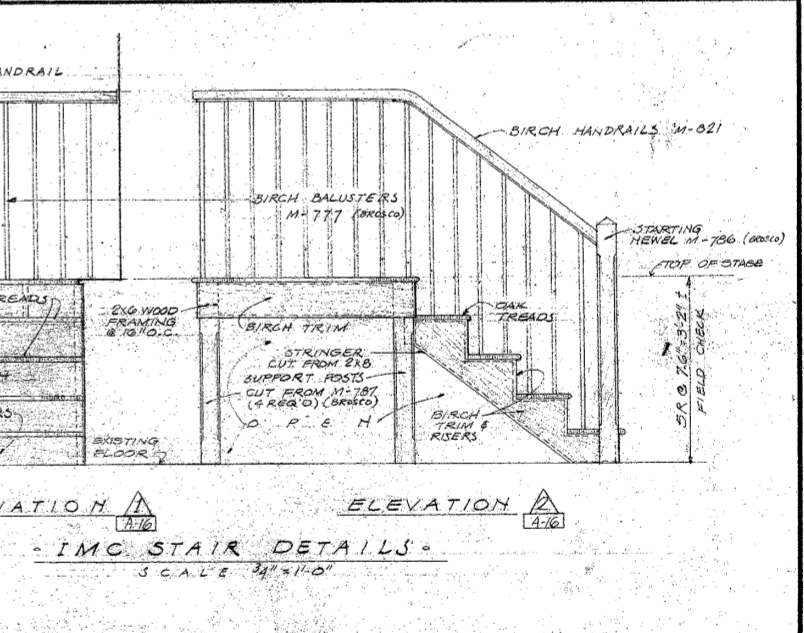
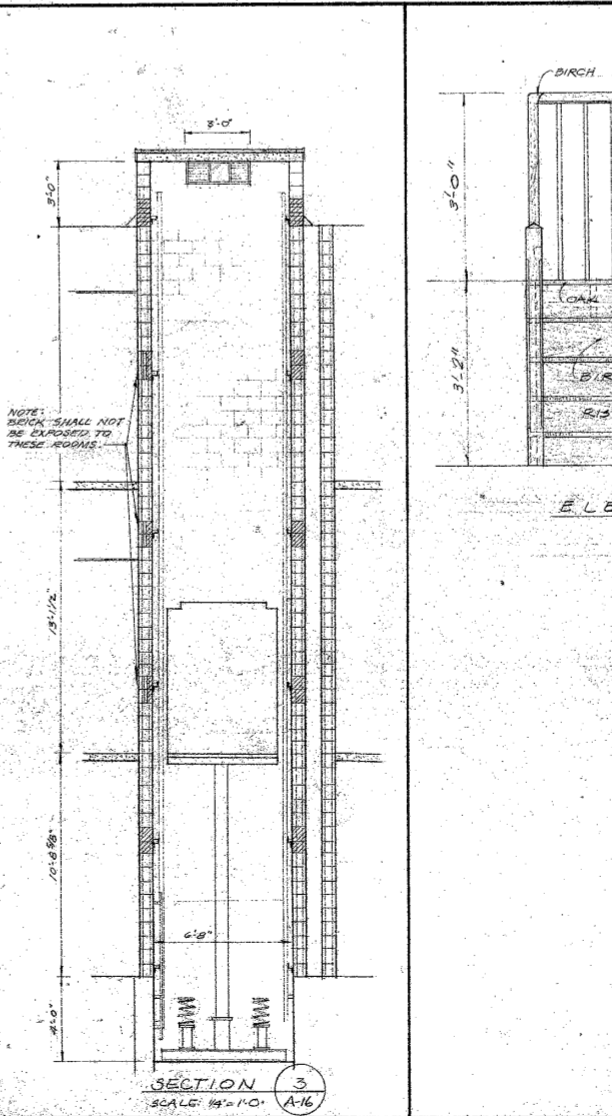
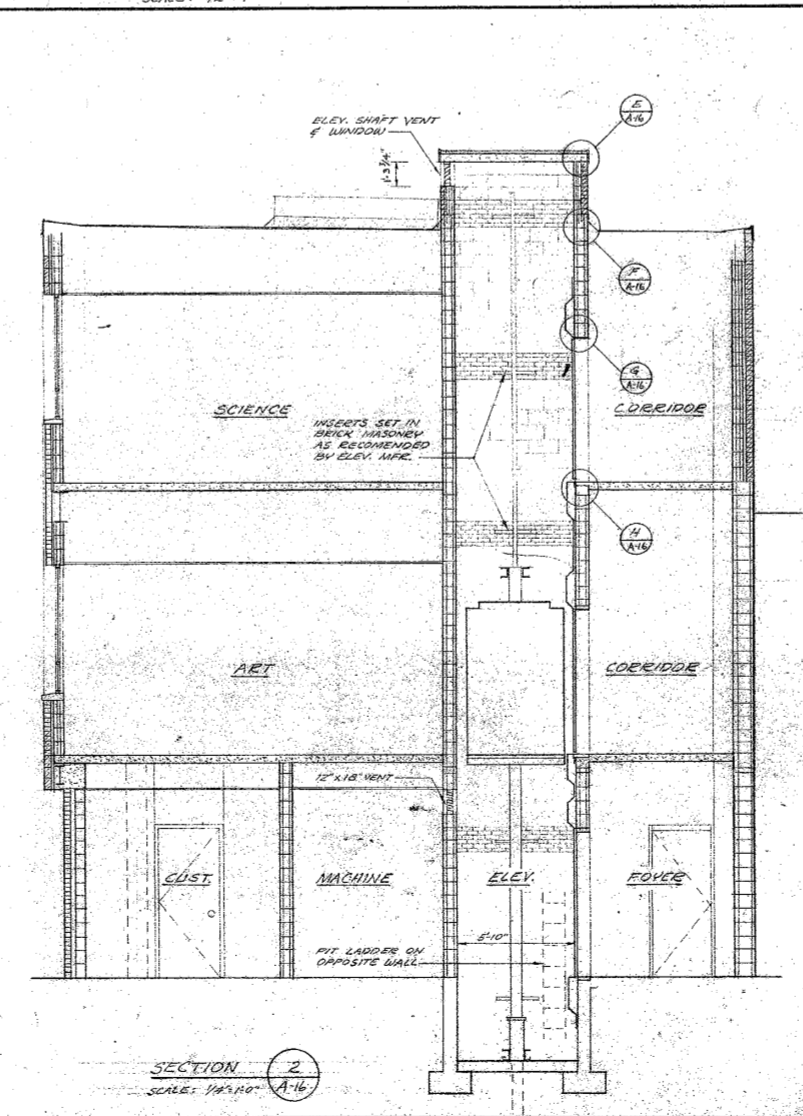
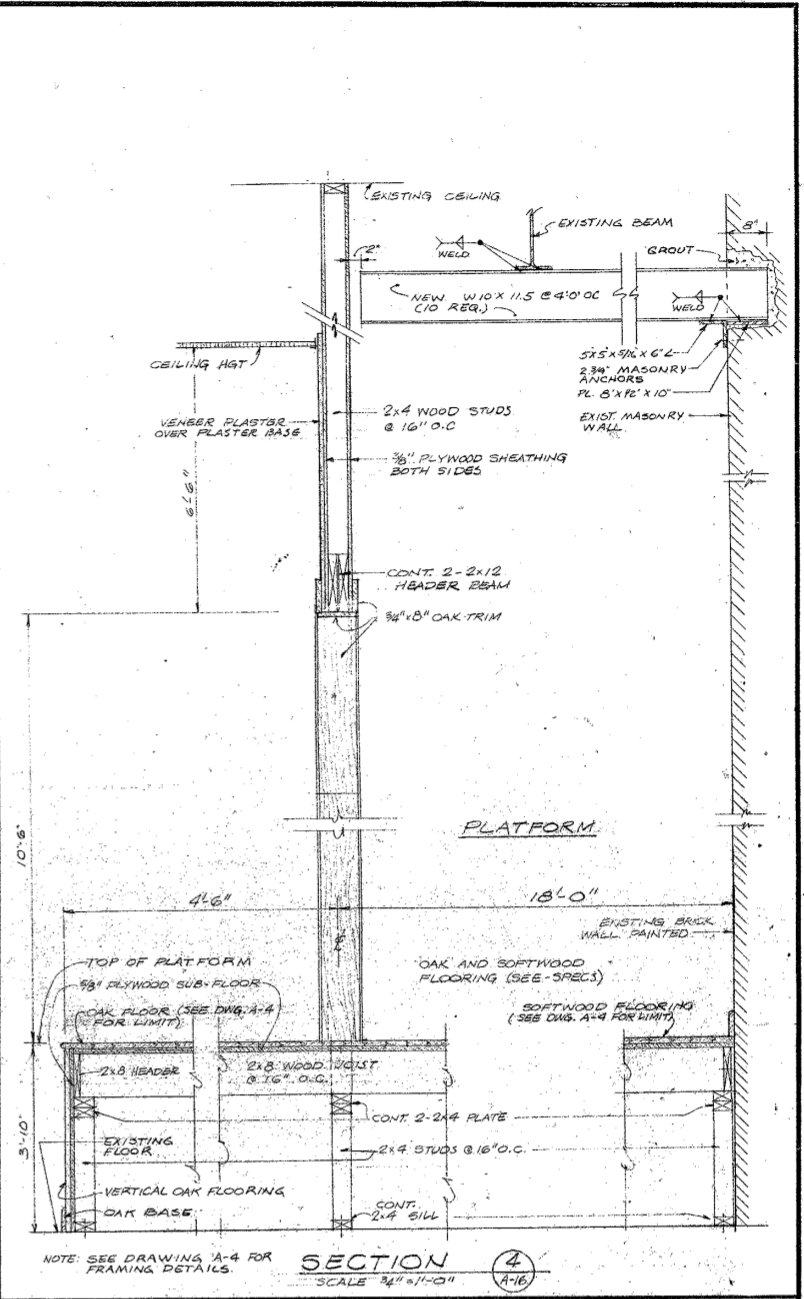
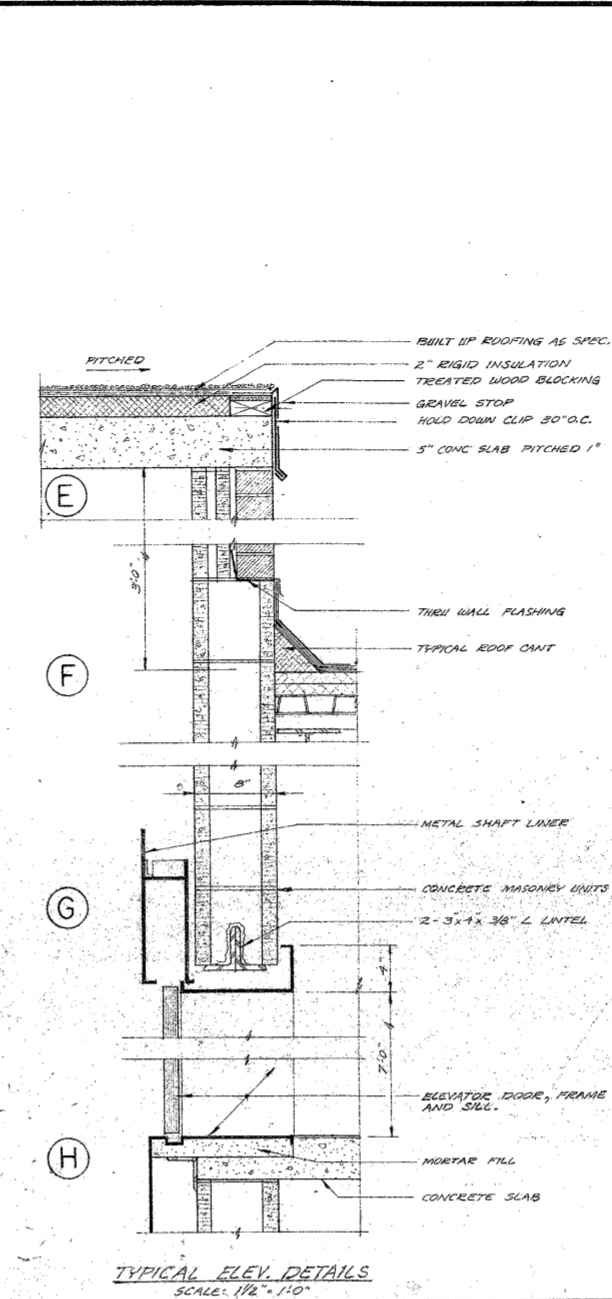
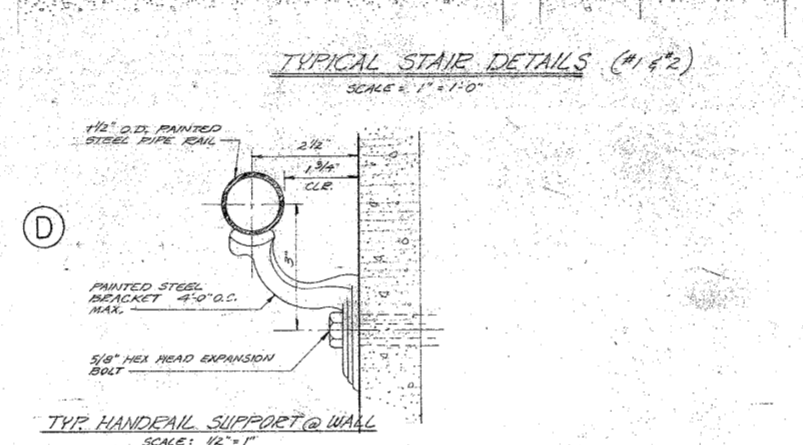
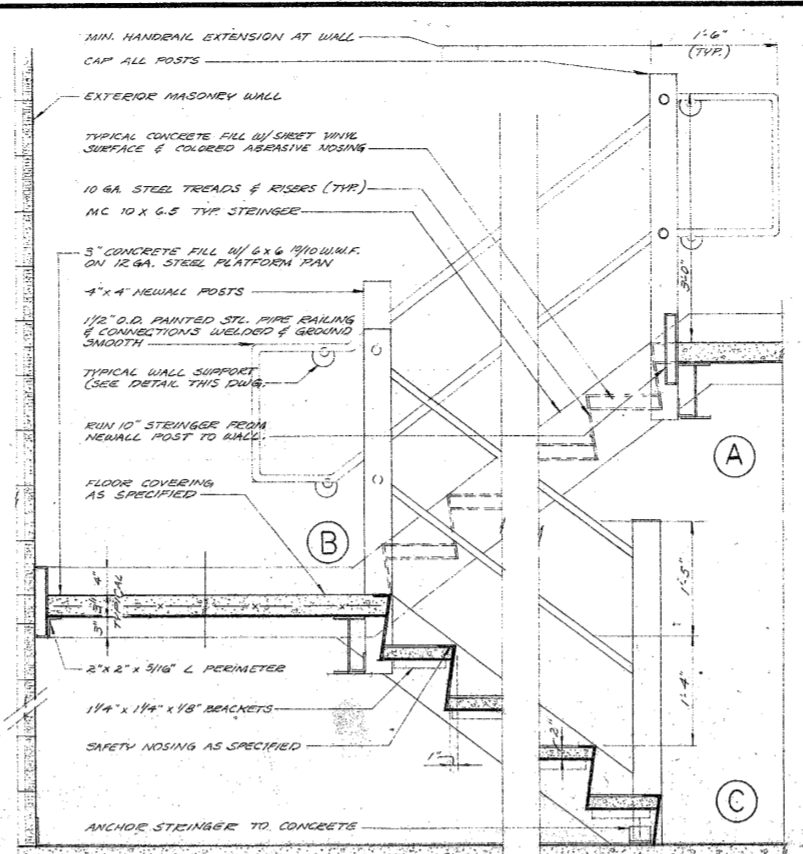
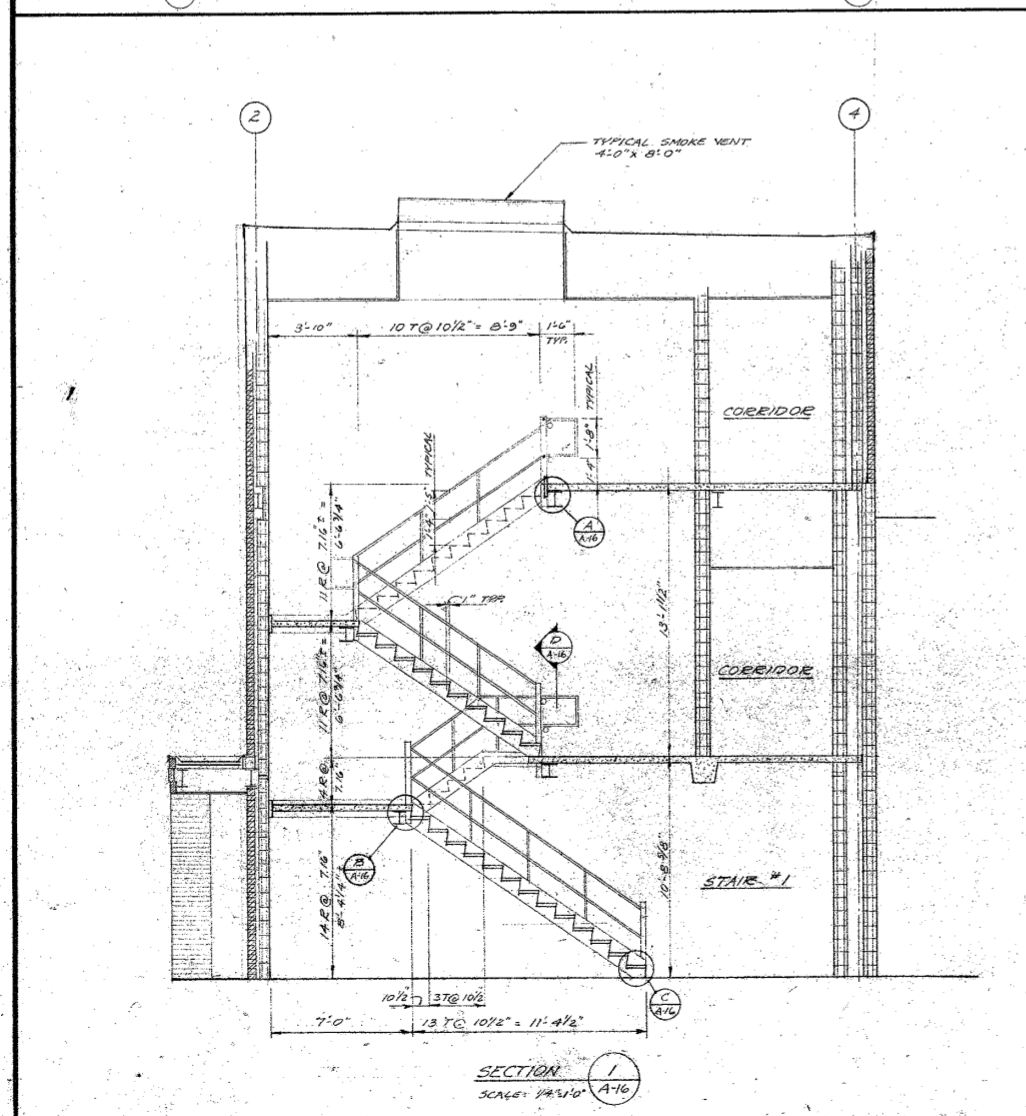
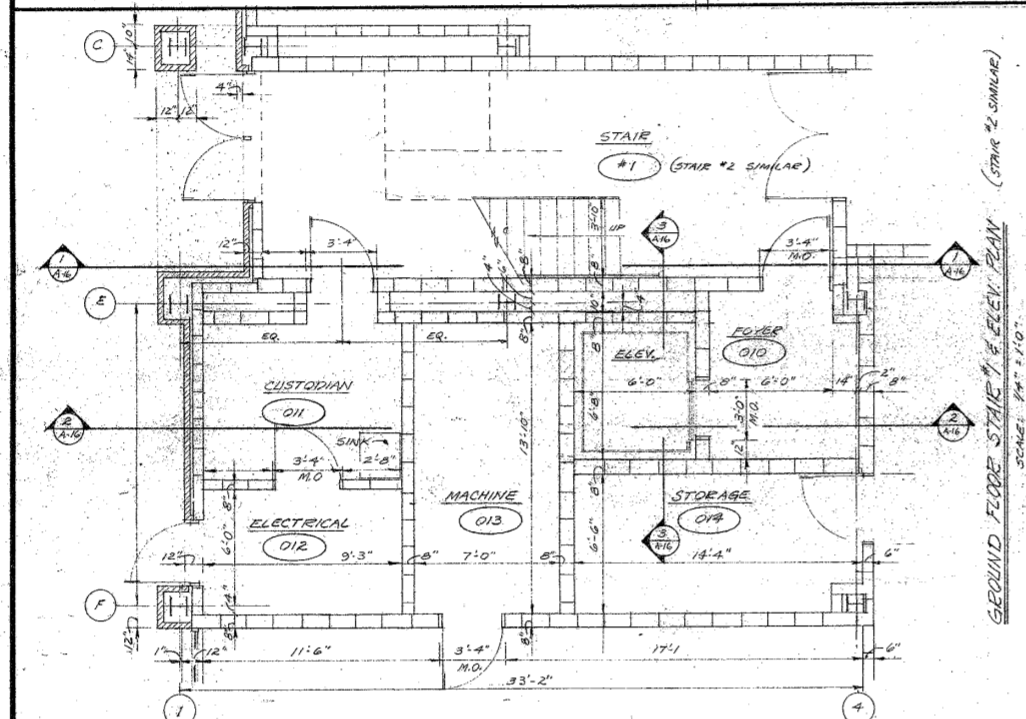
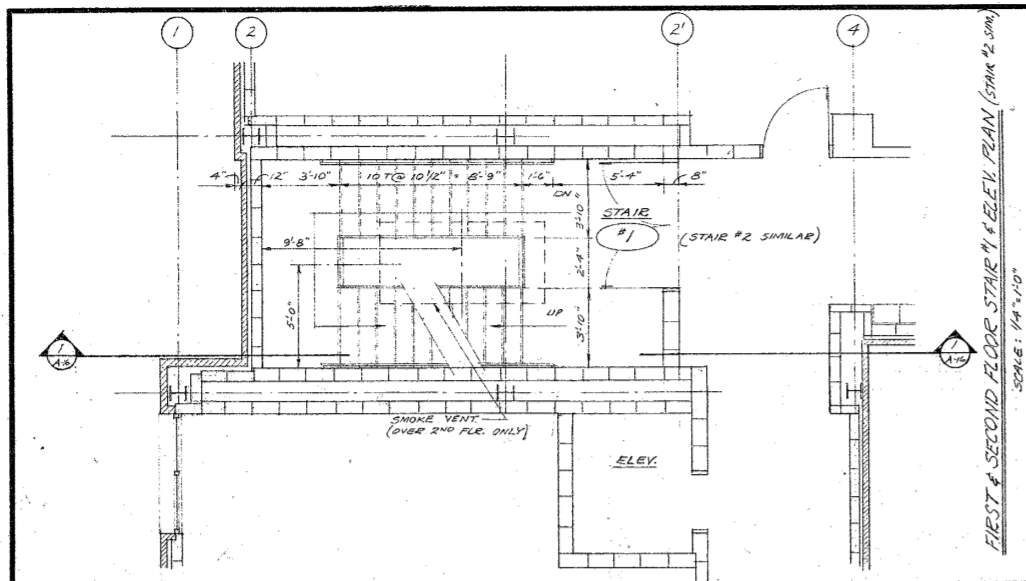
Providence  
 Rhode Island  
 Waltham  
 Massachusetts  
 Wethersfield  
 Connecticut  
 Nashua  
 New Hampshire

**ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	EA/RBV	C.P.	A.H.C.	C7501A	JULY 78

**WALL SECTIONS - NO. 2**

ARCHITECTURAL **A-15**



**KEYES**  
 Providence  
 Rhode Island  
 Waltham  
 Massachusetts  
 Waterbury  
 Connecticut  
 Nashua  
 New Hampshire

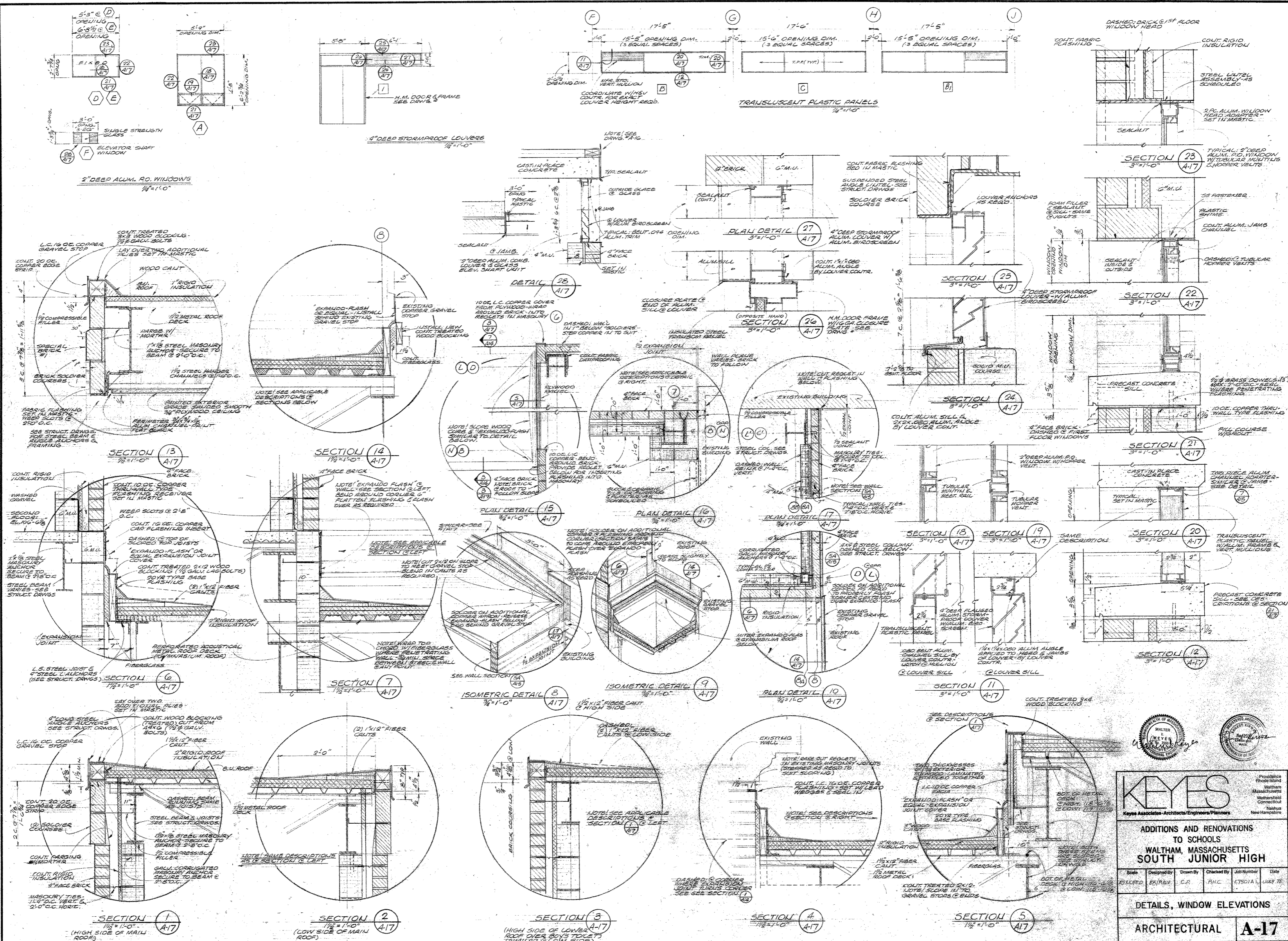
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**ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	EAH/RSV	FIG.C.	A.H.C.	C75D/A	JULY 75

**ELEVATOR & STAIR PLANS & DETAILS**

**ARCHITECTURAL A-16**



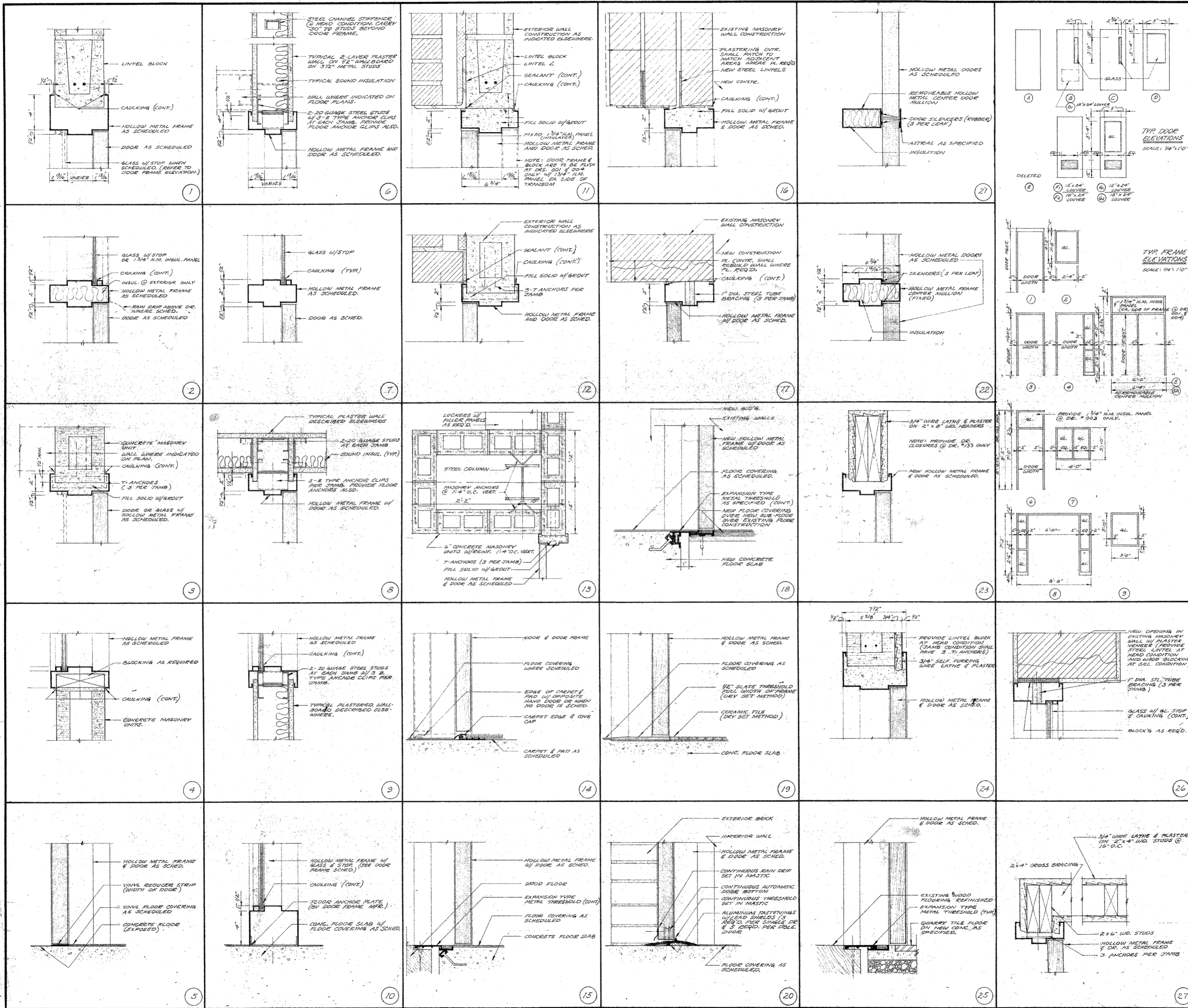
**KEYES**  
Architects/Engineers/Planners

**ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH**

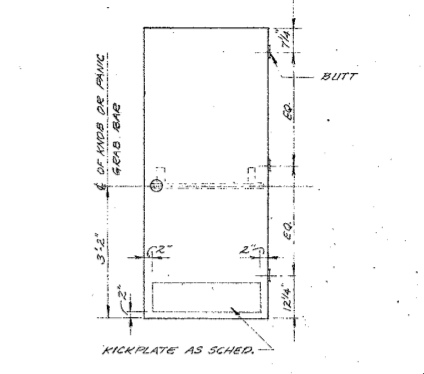
Scale	Designed By	Drawn By	Checked By	ASH Number	Date
AS SHOWN	EA/PAW	C.P.	P.H.C.	ETS/DA	JUNE 78

**DETAILS, WINDOW ELEVATIONS**  
**ARCHITECTURAL A-17**

Provided by:  
Rhode Island  
Western  
Massachusetts  
Connecticut  
New Hampshire

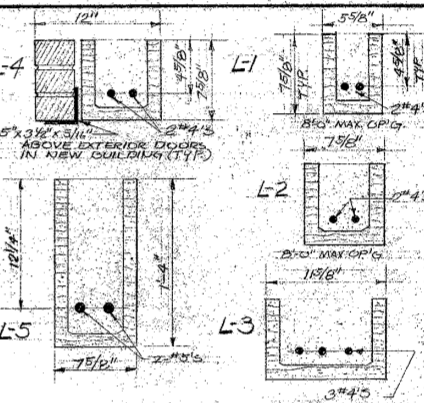


TYPICAL HARDWARE INSTALLATION DATA  
SCALE: 1/2" = 1'-0"



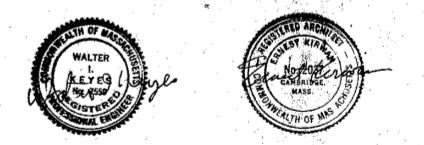
GENERAL NOTES

1. ALL GLASS IN DOORS AND FRAMES IS TO BE 1/4" THICK UNLESS OTHERWISE NOTED.
2. ALL JOINTS AT MASONRY WALLS ARE TO HAVE 3/8" DIA. ANCHORS, 3" PER JOINT, CONC. AND 2" G'S VERT.
3. PROVIDE CLOSER RE-ADJUSTMENT WHERE CLOSERS ARE SPECIFIED.
4. ALL GLASS IN CLASS 8 DOORS SHALL NOT EXCEED 100 SQ. IN.
5. THE FREE AREA OF 15" X 24" OR LARGER SHALL BE 85 SQ. IN. AND THE FREE AREA OF 18" X 24" OR LARGER SHALL BE 120 SQ. IN. MINIMUMS.



NOTES:  
 1. PROVIDE LINTELS OVER ALL MASONRY OPENINGS AS SHOWN OR SCHEDULED ON THIS SHEET.  
 2. FOR ALL UNUSUAL OPENINGS IN NEW EXTERIOR 12" WALL WHERE LINTELS ARE NOT SHOWN, LINTELS SHALL BE PROVIDED IN ACCORDANCE WITH CHINA MAN. SPEC.  
 STEEL WIRE SIZES:  
 2" DIA. STEEL TUBE BRACING (3 PER JOINT)  
 3/4" DIA. STEEL TUBE BRACING (3 PER JOINT)  
 3/8" DIA. STEEL TUBE BRACING (3 PER JOINT)  
 1/2" DIA. STEEL TUBE BRACING (3 PER JOINT)  
 1/4" DIA. STEEL TUBE BRACING (3 PER JOINT)

LINTEL SCHEDULE

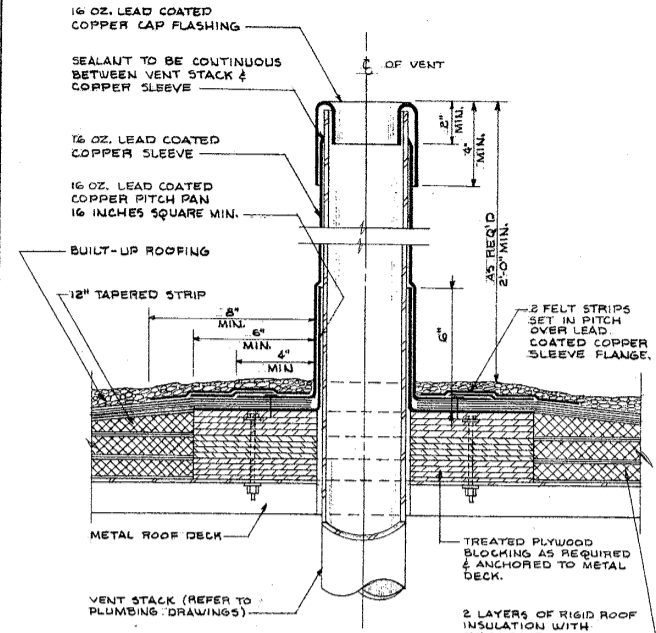
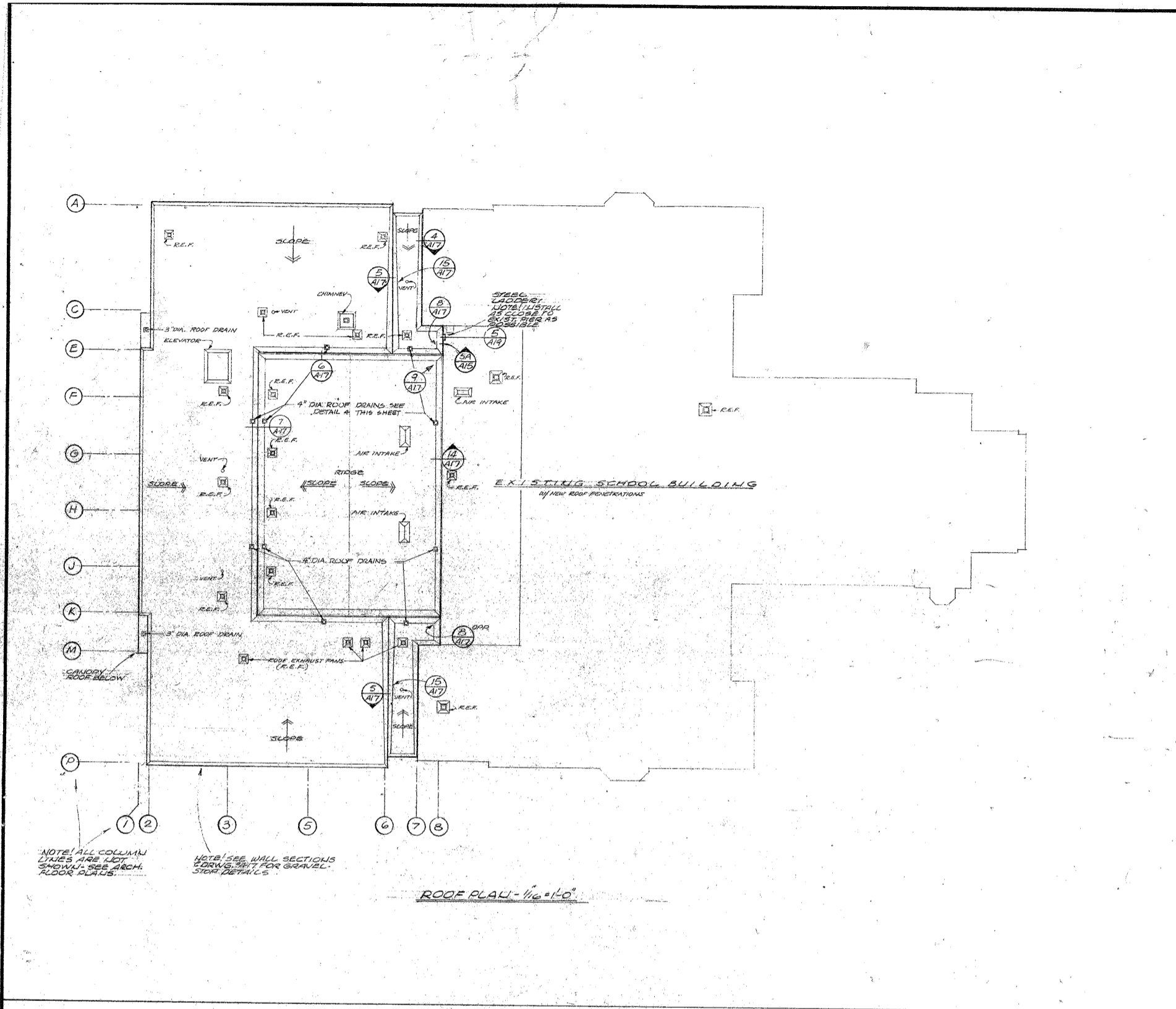


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 Waltham  
 Massachusetts  
 Waterbury  
 Connecticut  
 Nashua  
 New Hampshire

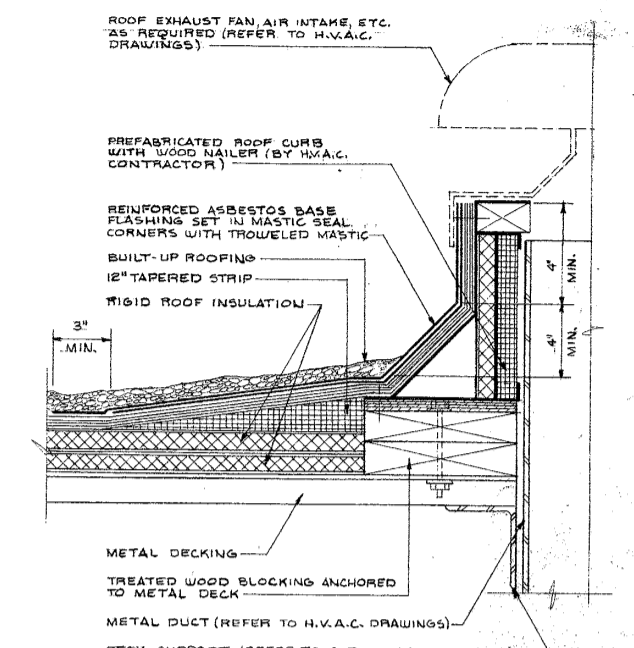
ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	EP/PBY	M.G.C.	P.H.C.	CT501A	JULY 75

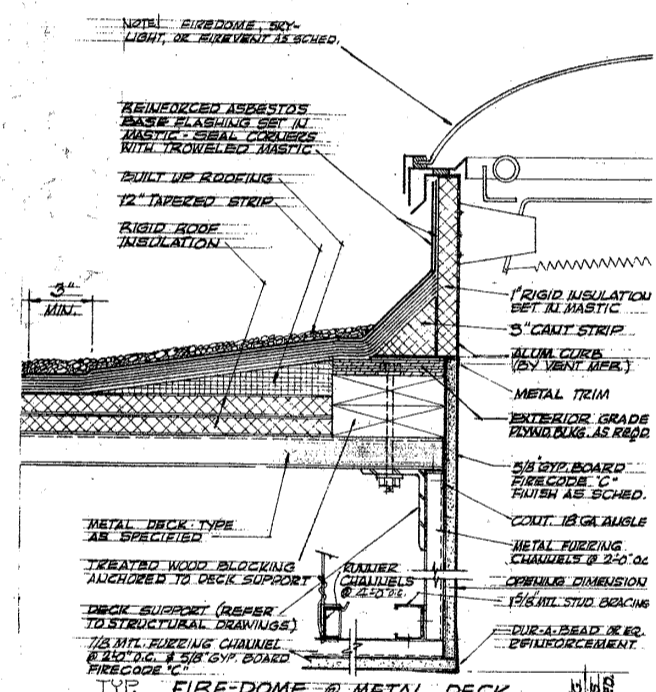
TYPICAL DOOR DETAILS  
 ARCHITECTURAL A-18



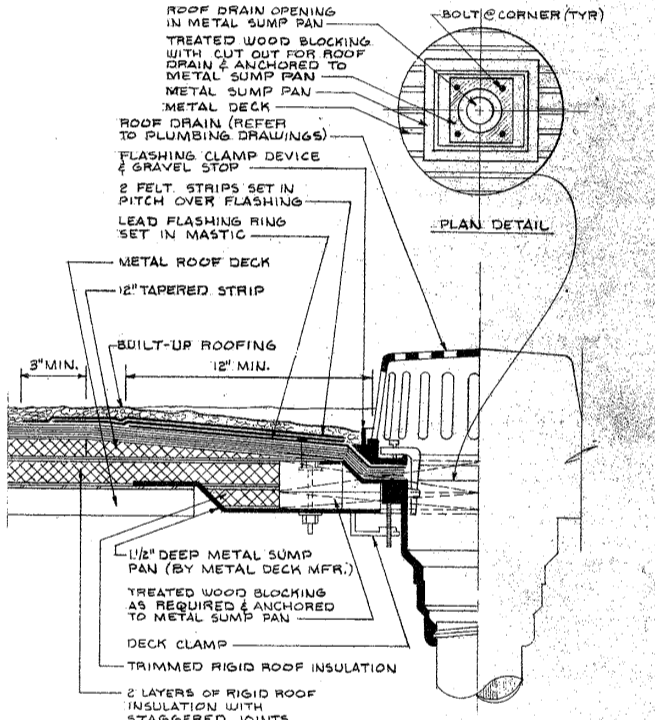
TYP. ROOF VENT @ METAL DECK  
SCALE: 3"=1'-0"



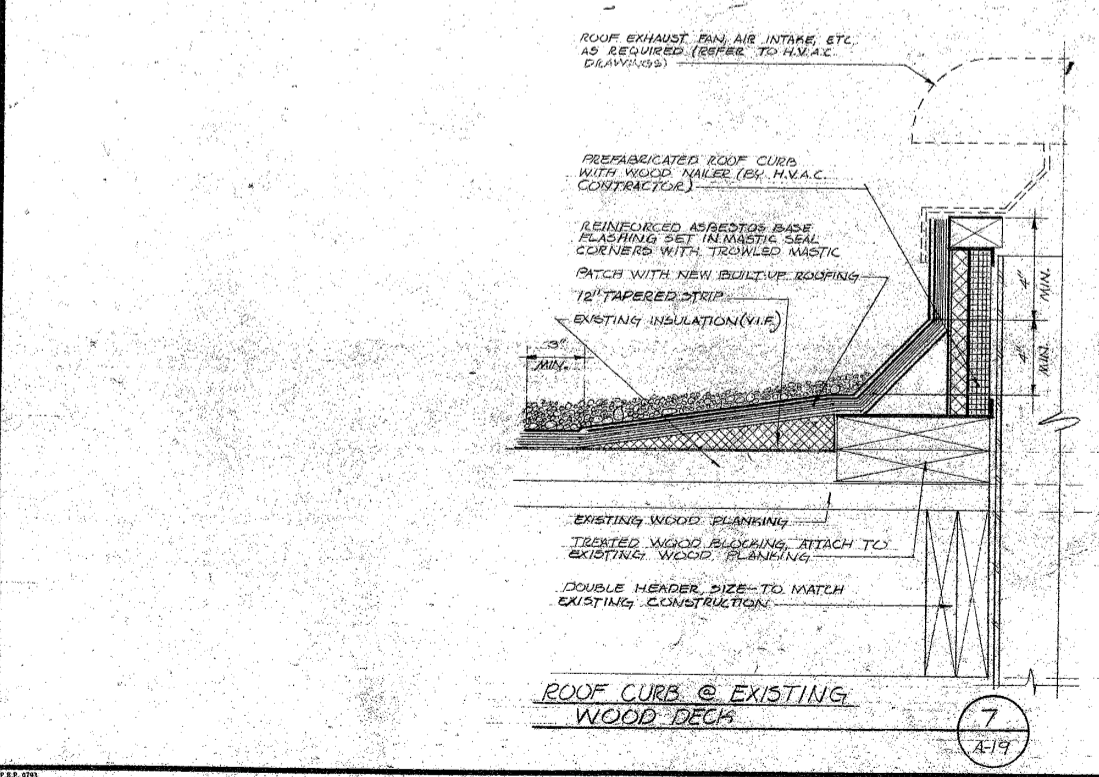
TYP. ROOF CURB @ METAL DECK  
SCALE: 3"=1'-0"



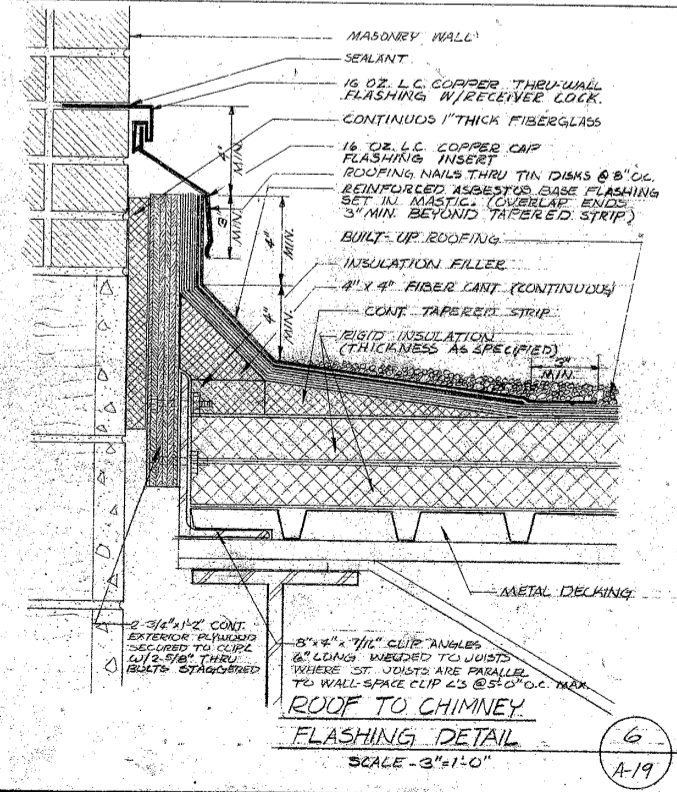
TYP. FIRE-DOME @ METAL DECK  
SCALE: 3"=1'-0"



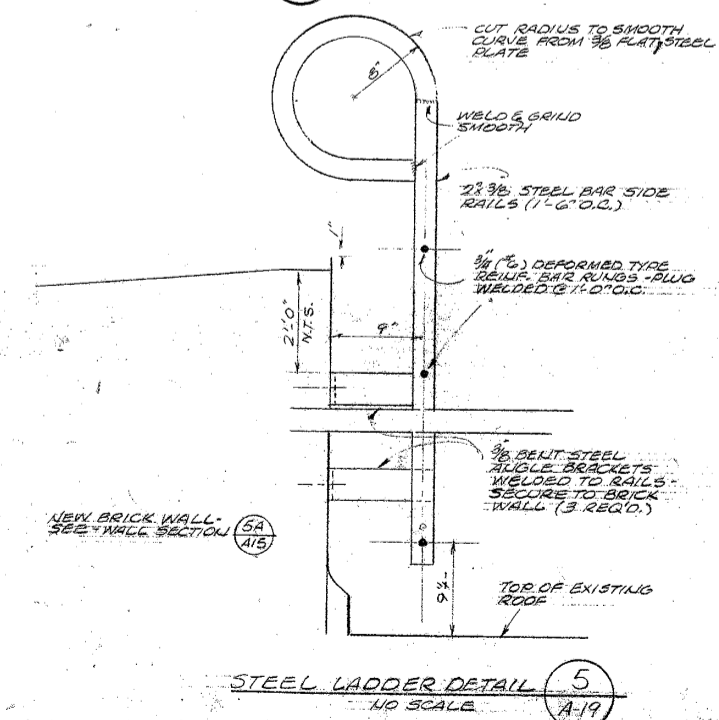
TYP. ROOF DRAIN @ METAL DECK  
SCALE: 3"=1'-0"



ROOF CURB @ EXISTING WOOD DECK  
SCALE: 3"=1'-0"



ROOF TO CHIMNEY FLASHING DETAIL  
SCALE: 3"=1'-0"



STEEL LADDER DETAIL  
NO SCALE

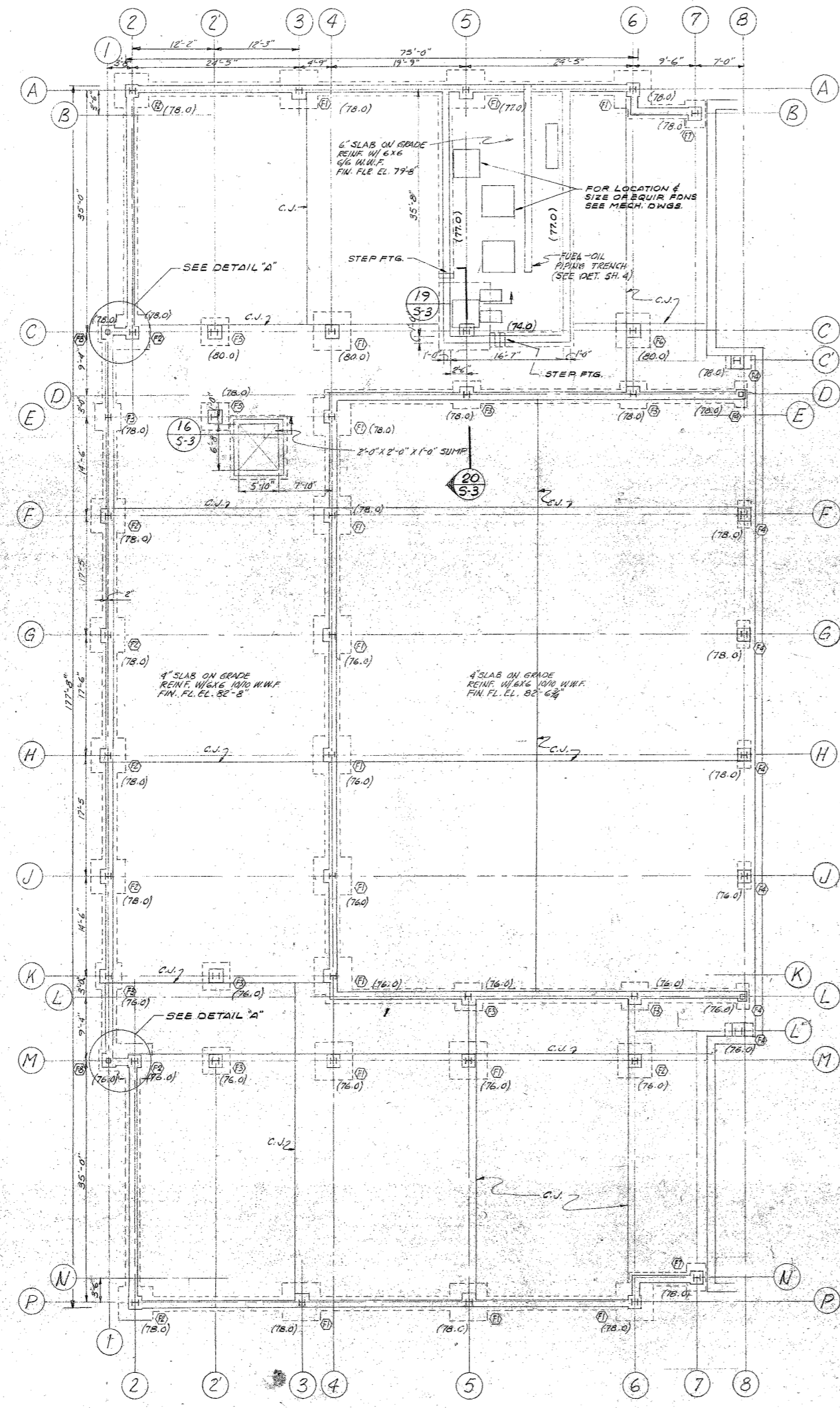


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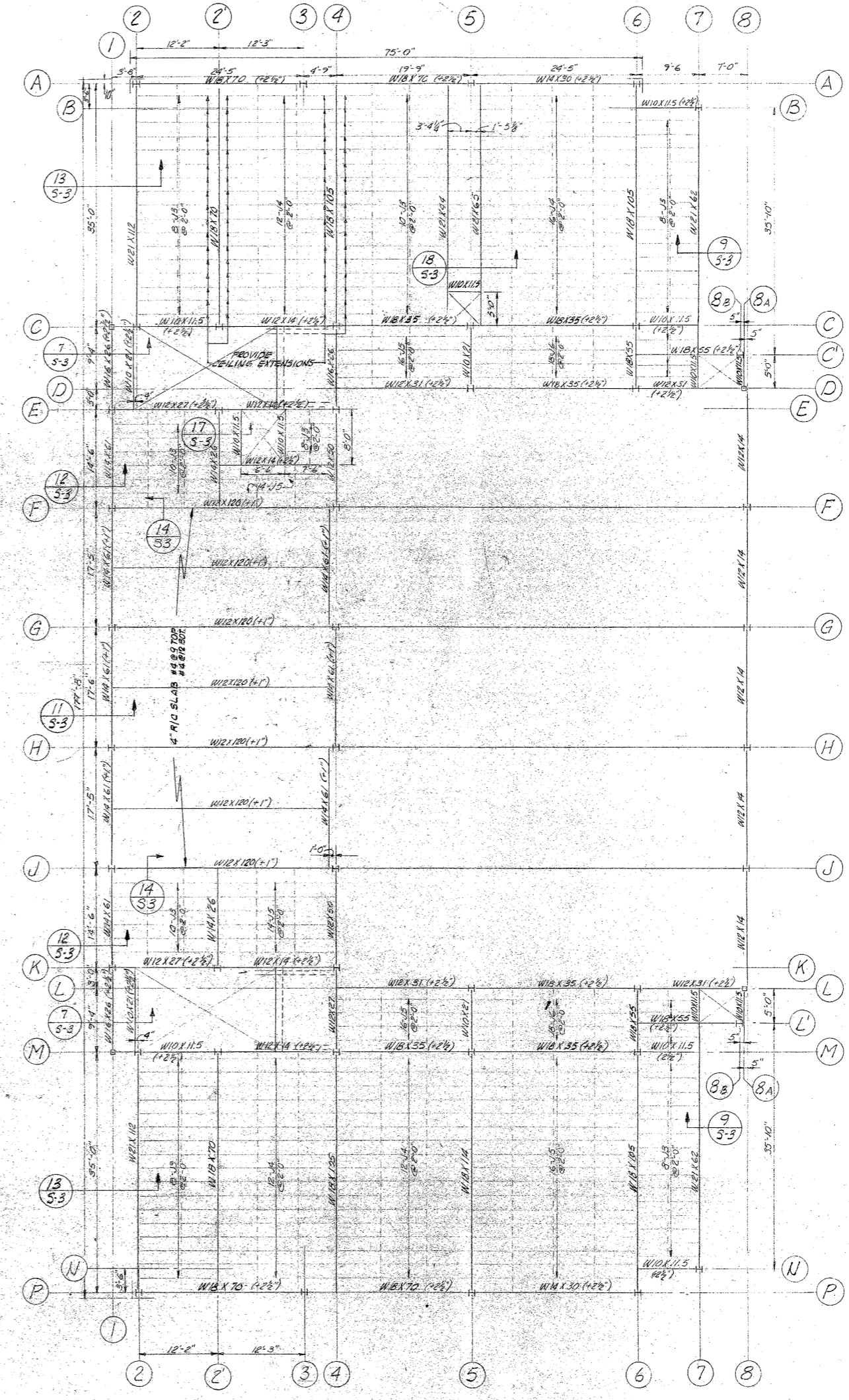
ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	EN/RBV	CP/JGH	RHC	L7501A	JULY 78

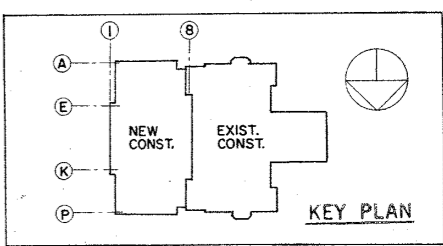
ROOF PLAN & DETAILS  
ARCHITECTURAL **A-19**



FOUNDATION PLAN



TOP OF STEEL EL. 92'-11 3/8" (UNLESS NOTED ±)  
FIRST FLOOR PLAN



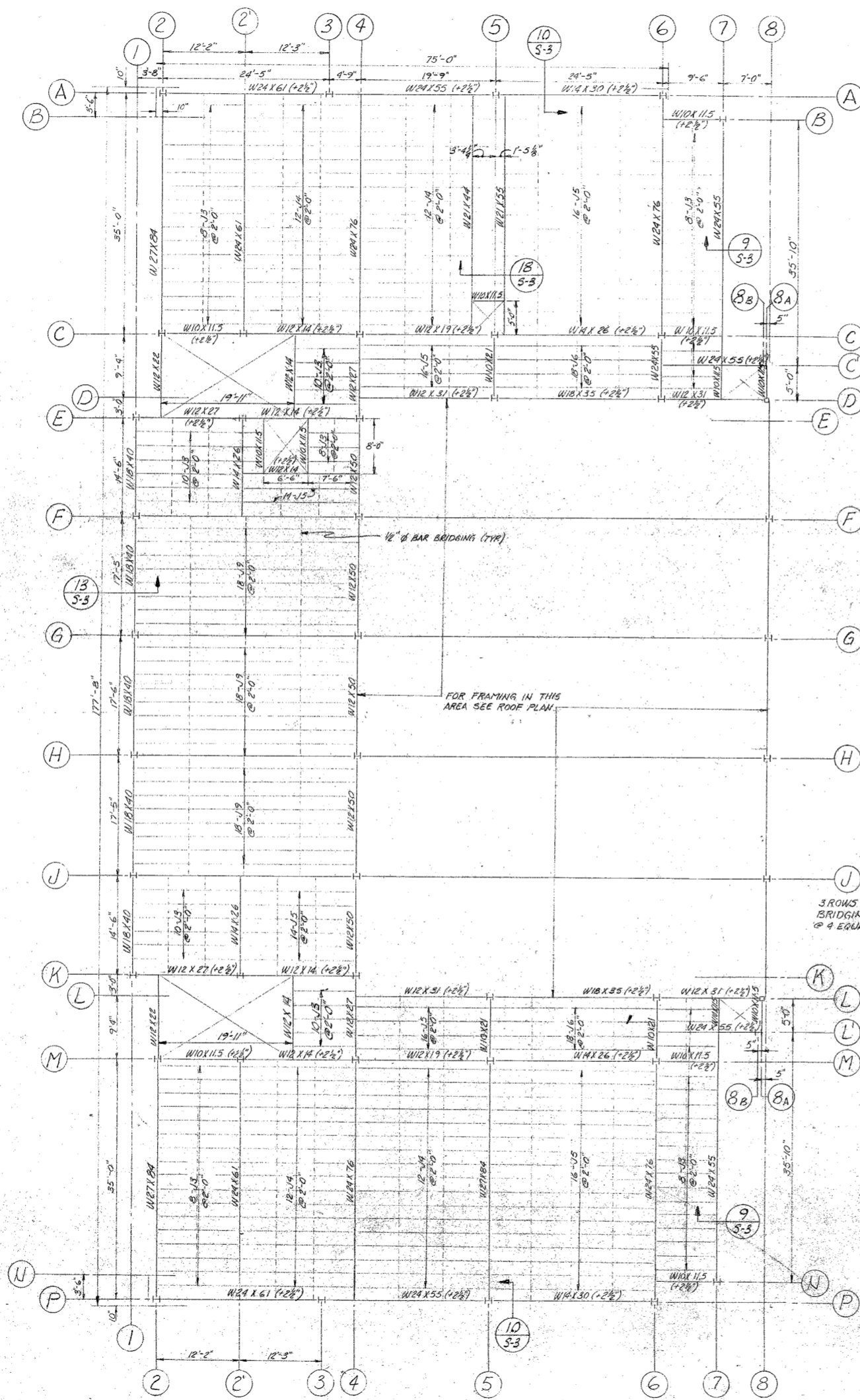
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ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

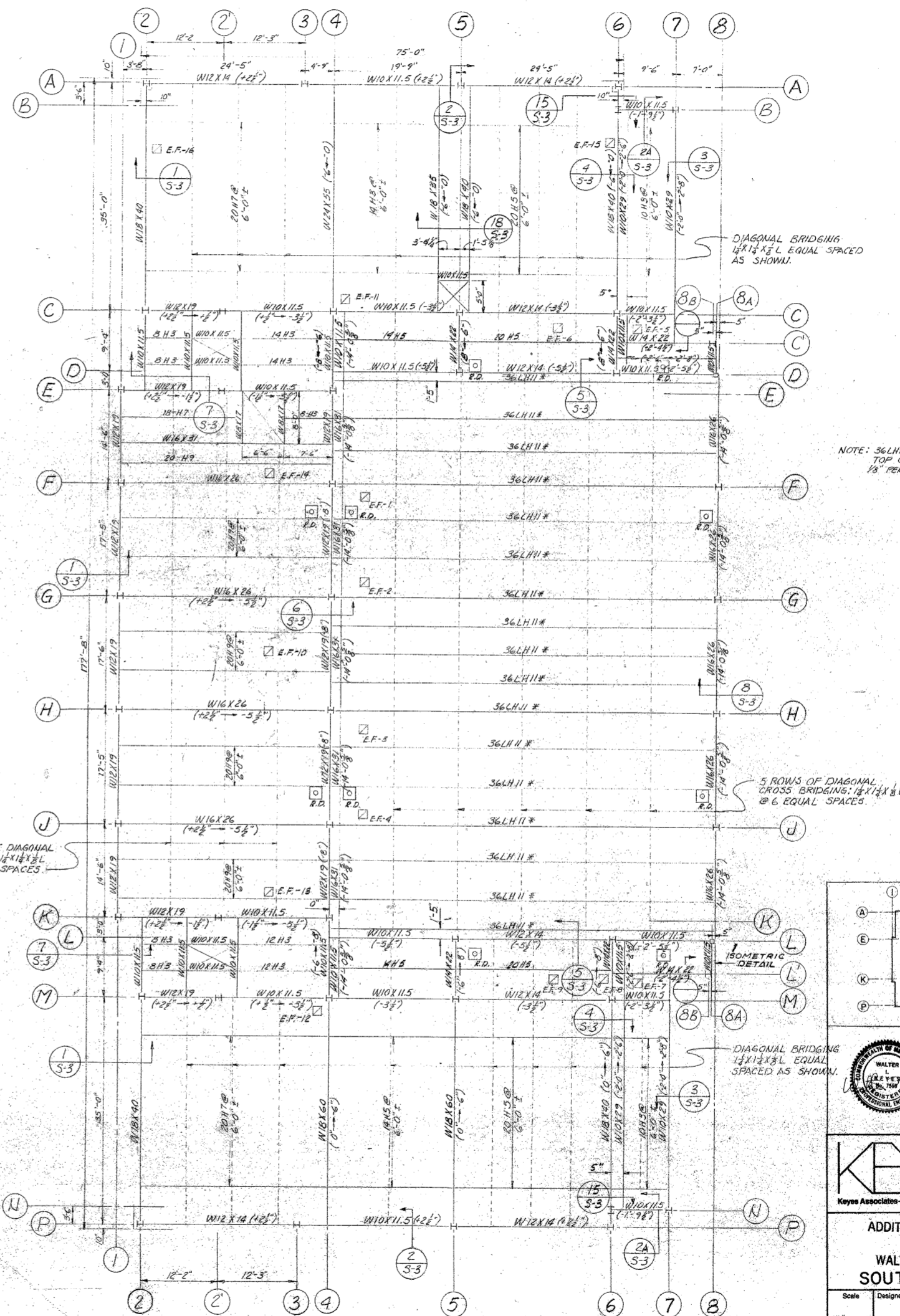
Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	E.L.B.	D.A.B.	E.L.B.	CT50VA	JULY-75

FDN. & FIRST FLR. FRAMING PLAN  
**STRUCTURAL S-1**



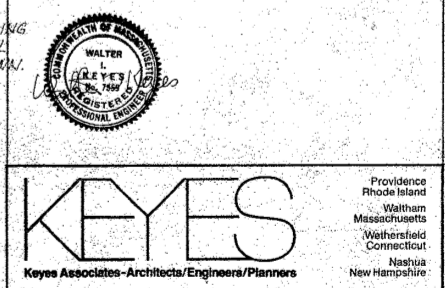
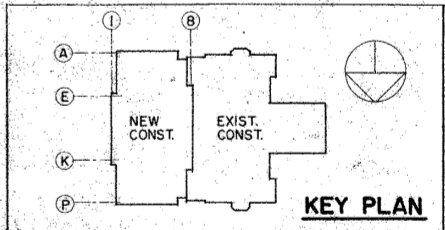


TOP OF STEEL EL. 106'-1/8" (UNLESS NOTED ±)  
SECOND FLOOR PLAN  
SCALE: 1/8" = 1'-0"



TOP OF STEEL EL. 118'-3/8" (UNLESS NOTED ±)  
ROOF PLAN  
SCALE: 1/8" = 1'-0"

NOTE: 36LH11 # DENOTES JOISTS WITH TOP CHORD PITCHED @ WAYS, 1/8" PER FT.



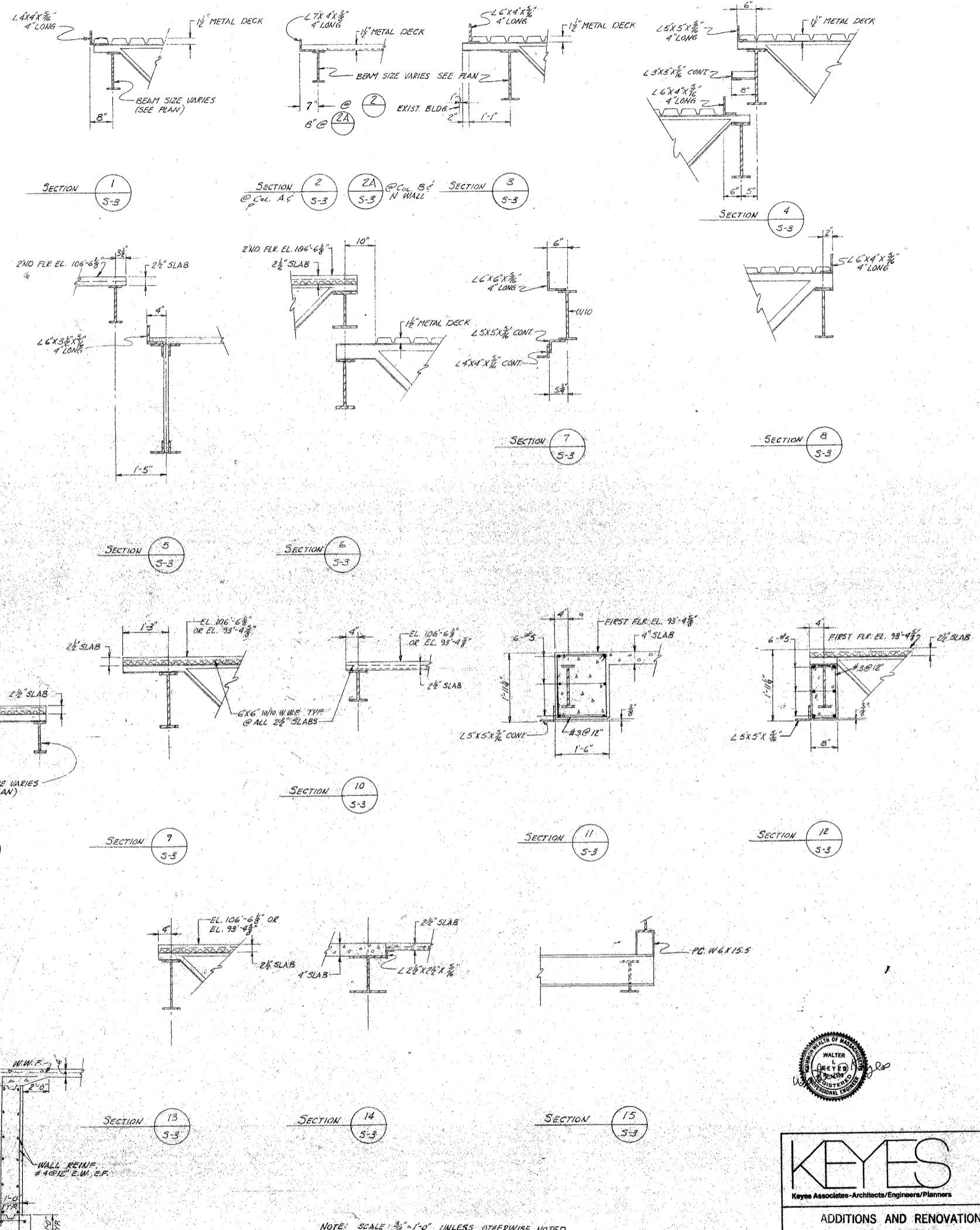
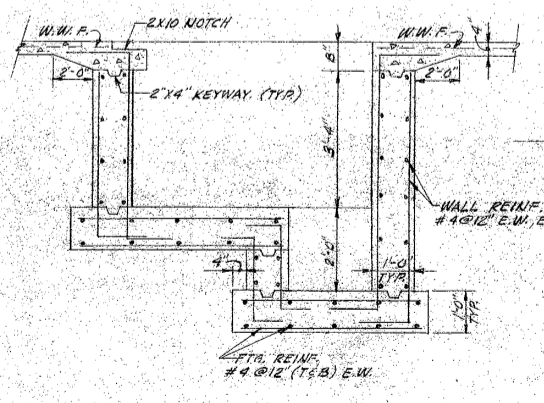
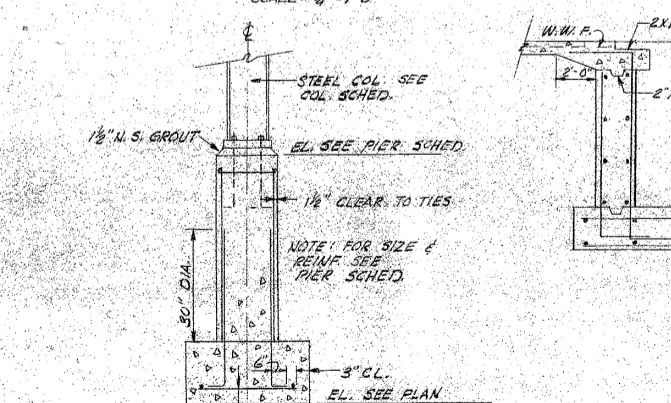
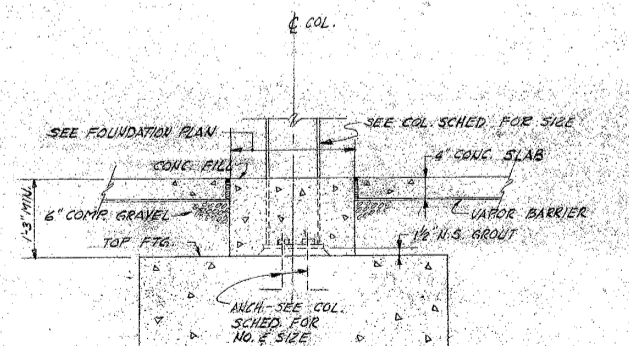
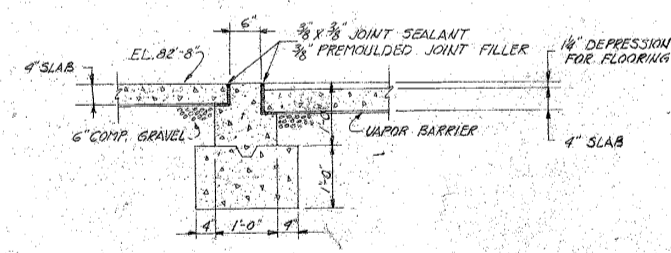
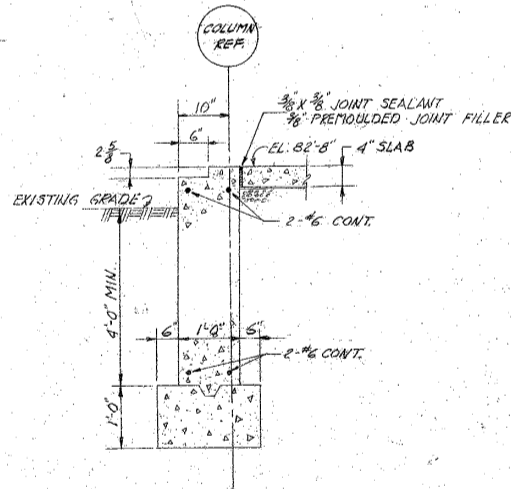
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WALTHAM MASSACHUSETTS				
WESTFIELD CONNECTICUT				
NASHUA NEW HAMPSHIRE				
ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH				
Scale	Designed By	Drawn By	Checked By	Job Number
1/8" = 1'-0"	ELB	D.A.B.	ELB	07001A
Date				
JULY 78				
SECOND FLR. & ROOF FRAMING PLAN				
STRUCTURAL				S-2

COLUMN SCHEDULE

	F1, G4, H4, J4, C4, M4, E4, N4	F2, A1, J1, A3, P3, P2, M3, E1, N3, H3	D5, D6, L3, L6, K2, M2, C1, F2	C6, H6	M1, C1	A5, C5	F8, G8, H8, J8	D8A, L8A	C8B, L8B
ROOF EL. (VARIES)									
2ND FLR EL. 106'-6 1/8"									
1ST FLR EL. 93'-4 1/8"									
GROUND FLR EL.									
BOTT. BASE R. EL.	81'-9 1/2"	81'-9 1/2"	81'-9 1/2"	81'-9 1/2"	81'-9 1/2"	78'-7 1/2"			
BASE R. SIZE BXTIC	14 1/2" X 11'-4"	15 1/2" X 11'-8"	12 1/2" X 10'	15 1/2" X 11'-5"	15 1/2" X 11'-5"	15 1/2" X 11'-5"	15 1/2" X 11'-5"	15 1/2" X 11'-5"	15 1/2" X 11'-5"
ANCHOR BOLTS	2-3/8"	2-3/8"	2-3/8"	2-3/8"	2-3/8"	2-3/8"	2-3/8"	2-3/8"	2-3/8"

FOOTING & PIER SCHEDULE

	F1	F2	F3	F4	F5	F6	F7	F8
SIZE	5'-0" X 2'-0"	3'-0" X 3'-0"	4'-0" X 4'-0"	4'-0" X 4'-0"	4'-0" X 4'-0"	5'-0" X 4'-0"	4'-0" X 4'-0"	3'-0" X 2'-0"
REINFORCING	7-#8 EW	8-#6 EW	8-#6 EW	8-#6 EW	8-#6 EW	8-#6 EW	8-#6 EW	8-#6 EW
DOWELS	8-#8	8-#8	8-#8				8-#8	8-#8
PIER & PILASTER								
SIZE	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"	2'-0" X 2'-0"
TOP EL.	81'-7"	81'-7"	81'-7"	81'-7"	81'-7"	81'-7"	81'-7"	81'-7"
VERT. REINF.	8-#8	8-#8	8-#8	8-#8	8-#8	8-#8	8-#8	8-#8
TIES	#3 @ 18"	#3 @ 18"	#3 @ 18"	#3 @ 18"	#3 @ 18"	#3 @ 18"	#3 @ 18"	#3 @ 18"
REMARKS								



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Nashua New Hampshire

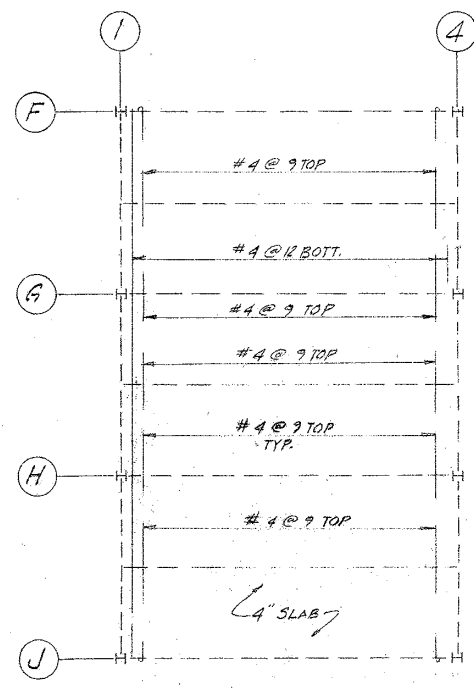
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ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

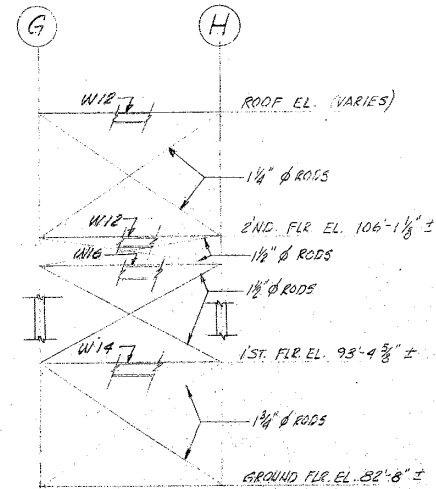
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AS NOTED	E.L.B.	D.A.B.	E.L.B.	C7501A	JULY-75

SCHEDULES & MISC. DETAILS

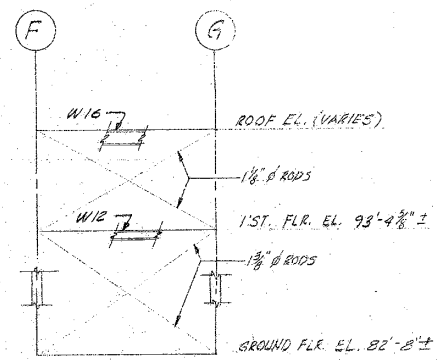
STRUCTURAL **S-3**



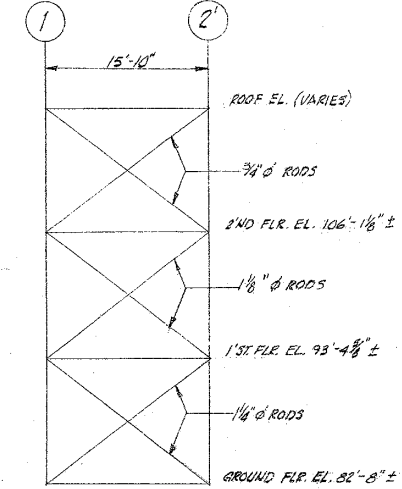
SLAB PLAN @ EL. 93'-4 3/8"  
SCALE: 1/8"=1'-0"



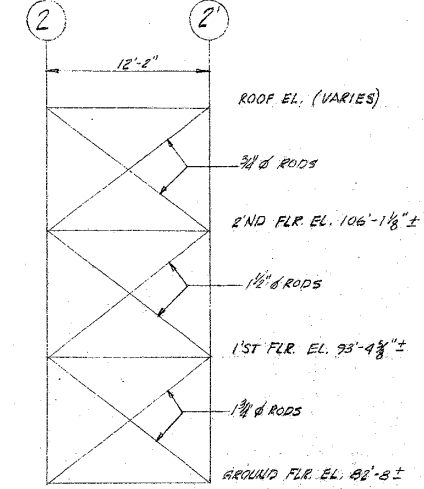
SECTION @ LINE 4  
SCALE: 1/8"=1'-0"



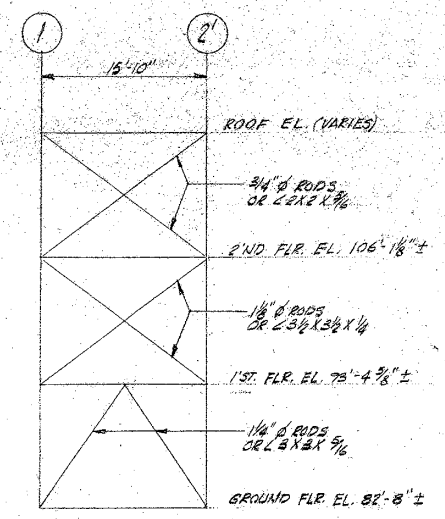
SECTION @ LINE E  
SCALE: 1/8"=1'-0"



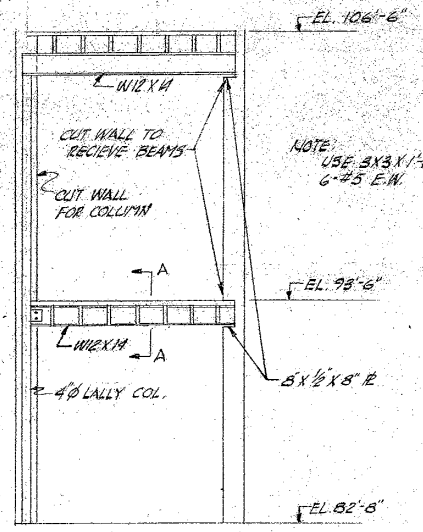
SECTION @ LINE K  
SCALE: 1/8"=1'-0"



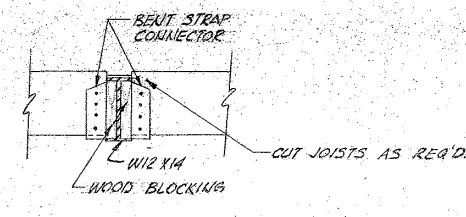
SECTION @ LINE C & M  
SCALE: 1/8"=1'-0"



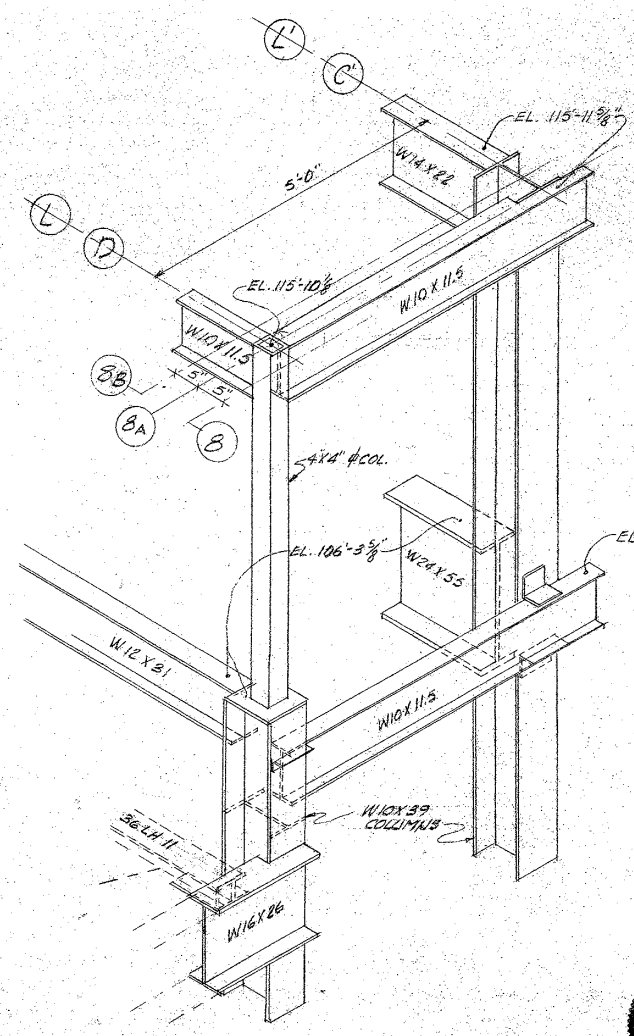
SECTION @ LINE E  
SCALE: 1/8"=1'-0"



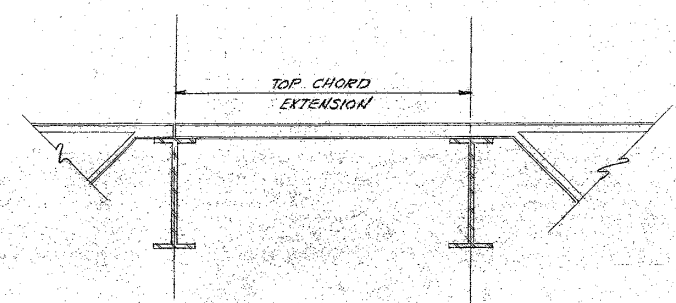
SECTION THRU EXISTING CORRIDOR  
SCALE: 1/4"=1'-0"



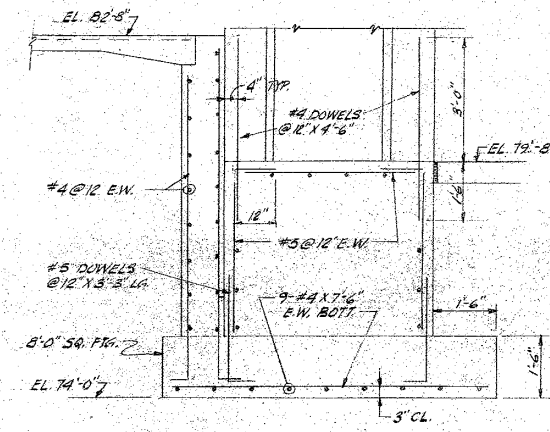
SECTION A-A  
SCALE: 1/4"=1'-0"



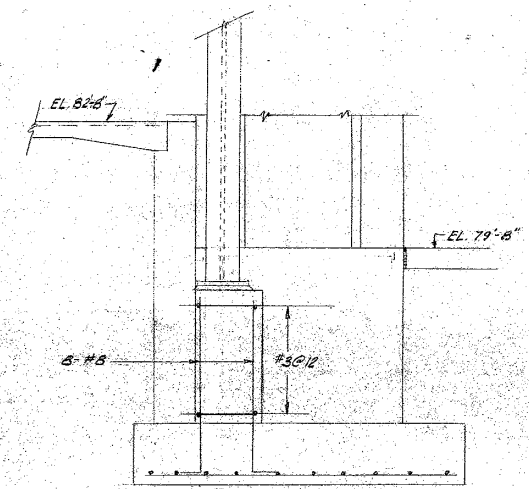
ISOMETRIC DETAIL  
NOT TO SCALE



SECTION 18  
SCALE: 1/4"=1'-0"



SECTION 19  
SCALE: 1/4"=1'-0"



SECTION 20  
SCALE: 1/4"=1'-0"



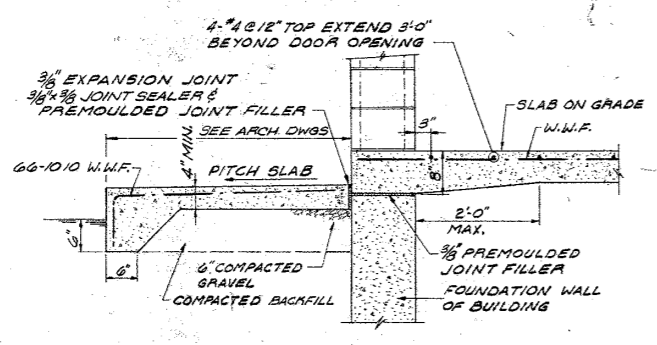
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ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

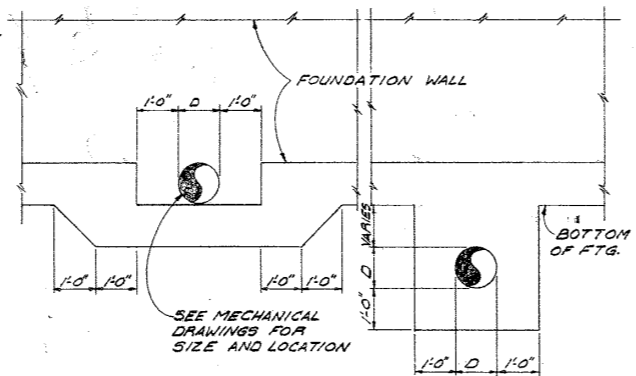
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AS NOTED	E.L.B.	D.A.B.	E.L.B.	C7201A	JULY-75

MISC. DETAILS

STRUCTURAL **S-4**

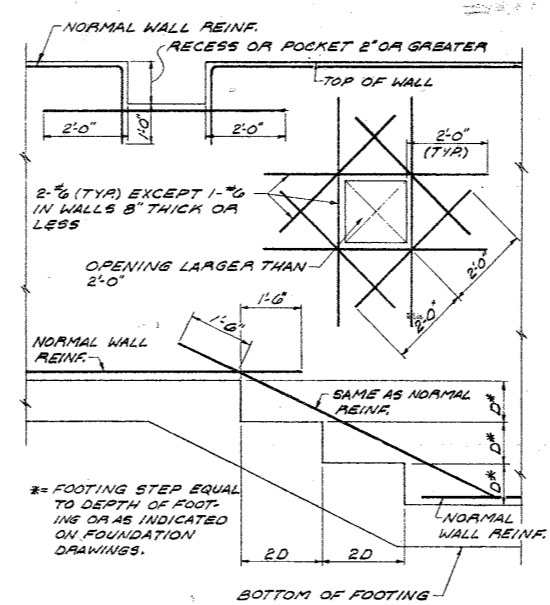


**FREE PLATFORM DETAIL**  
SCALE: 3/4" = 1'-0"

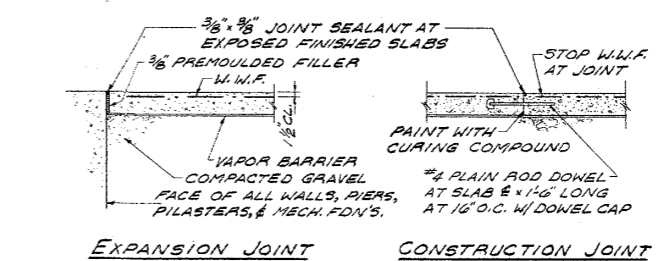


**CONDITION I**      **CONDITION II**

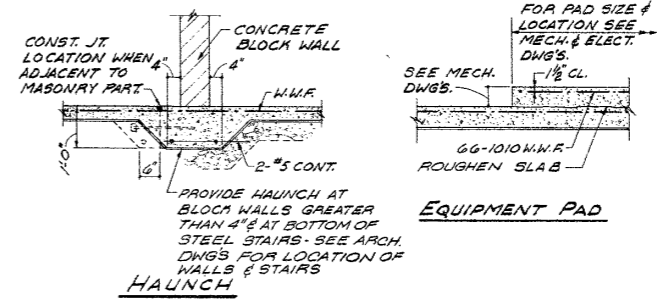
**PIPES THRU FOUNDATION**  
SCALE: 1/2" = 1'-0"



**FOUNDATION DETAILS**  
SCALE: 1/2" = 1'-0"

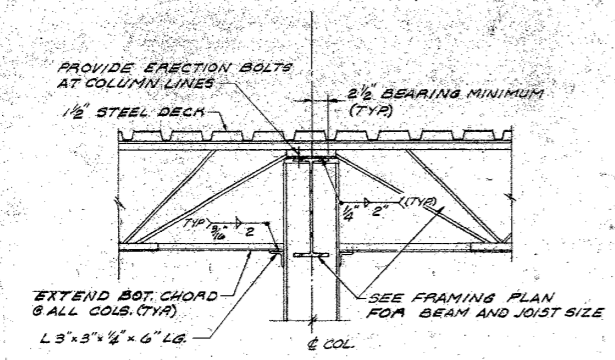


**EXPANSION JOINT**      **CONSTRUCTION JOINT**

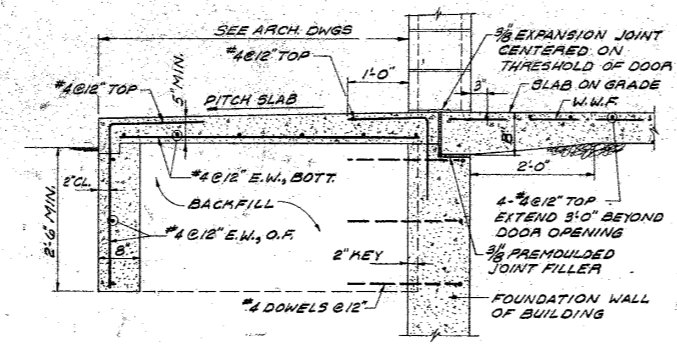


**EQUIPMENT PAD**

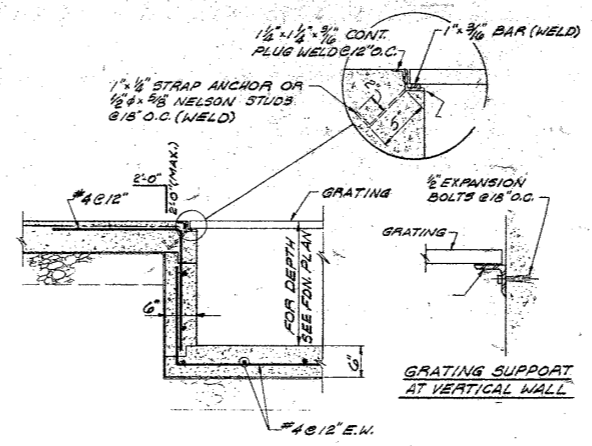
**SLAB ON GRADE DETAILS**  
SCALE: 1/2" = 1'-0"



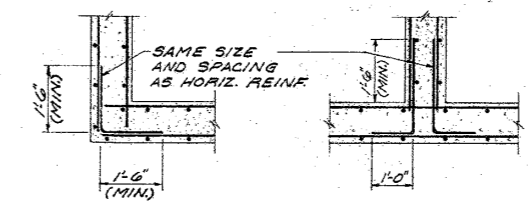
**JOIST FRAMING DETAIL**  
SCALE: 3/4" = 1'-0"



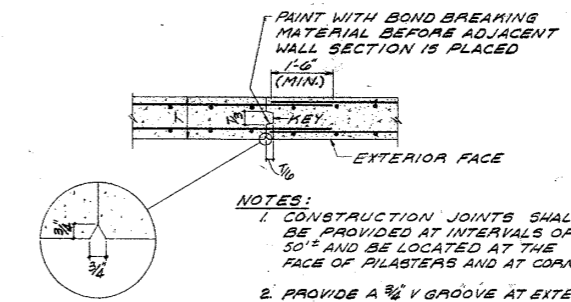
**FIXED PLATFORM DETAIL**  
SCALE: 3/4" = 1'-0"



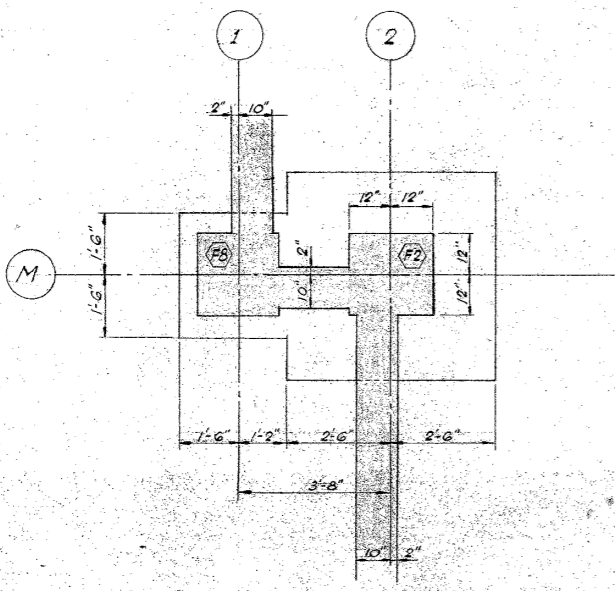
**TRENCH WITH GRATING**  
SCALE: 3/4" = 1'-0"



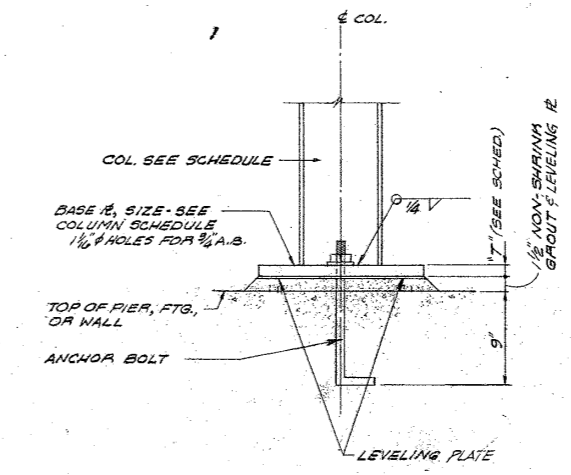
**CONC. WALL CORNER DETAILS**



**CONC. WALL CONST. JOINT**  
SCALE: 1/2" = 1'-0"



**DETAIL 'A'**  
SCALE: 1/2" = 1'-0"



**COLUMN BASE R DETAIL**  
SCALE: 1/2" = 1'-0"

- GENERAL NOTES**
- STRUCTURAL STEEL SHALL BE A.S.T.M. A36 STEEL.
  - CONNECTIONS SHALL BE BOLTED USING 3/4" A-307 BOLTS.
  - WELDING SHALL BE CLASS E-70 SERIES ELECTRODES.
  - BEAM CONNECTIONS SHALL HAVE A STRENGTH EQUAL TO THE SECTION PROVIDED BY THE UNIFORM LOAD CAPACITY FOR THE GIVEN SHAPE, SPAN, AND STEEL SPECIFIED, EXCEPT AS DETAILED OR AS INDICATED ON THE FRAMING PLANS.
  - SHOP PAINTING OF INTERIOR STRUCTURAL STEEL SHALL CONFORM TO SSPC-PA 1 STRUCTURAL STEEL EXPOSED TO THE WEATHER SHALL CONFORM TO SSPC-16.
  - NO MECHANICAL, ELECTRICAL, PIPING, EQUIPMENT, OR PLASTER CEILING SHALL BE HUNG FROM METAL ROOF DECK WITHOUT PRIOR APPROVAL OF THE ENGINEER.
  - GENERAL CONTRACTOR SHALL RELOCATE BRACING & BRACING ETC. TO CLEAR DUCTWORK AS APPROVED BY THE ENGINEER.

- STEEL DECK**
- ROOF: 1/8" GALVANIZED 20 GA. 18" ROOF DECK AS MANUFACTURED BY BOMMAN BUILDING PRODUCTS OR AN APPROVED EQUAL.
  - OVER GYM PROVIDE TYPE 15 1/2" ACOUSTICAL DECK 18 GA. BY BOMMAN OR APPROVED EQUAL.
  - IF A MECHANICAL OR ELECTRICAL OPENING CUTS MORE THAN ONE RIB OF THE METAL ROOF DECK PROVIDE AN ANGLE FRAME.
  - FLOOR: 2" STANDARD GALVANIZED CORRUGATED OR EQUAL W/ 2" CONC. REINF. WITH # 6 x 6 x 10 W.W.F.

- CONCRETE**
- CONCRETE SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,000 P.S.I. IN 28 DAYS.
  - CONCRETE IS DESIGNED IN ACCORDANCE WITH THE A.C.I. BUILDING CODE (ACI 318-65).
  - PROVIDE AIR-ENTRAINED CONCRETE FOR ALL EXPOSED CONCRETE.

- REINFORCING STEEL**
- REINFORCING STEEL SHALL BE GRADE 60 NEW BULLET STEEL CONFORMING TO A.S.T.M. A615.
  - DESIGN STRESSES ARE 64,000 P.S.I. FOR TENSION & 100,000 P.S.I. FOR COMPRESSION.

- FOUNDATIONS**
- FOUNDATIONS ARE DESIGNED FOR A BEARING VALUE OF 6,000 P.S.F. FOR EARTH.
  - ELEVATIONS INDICATED ON THE PLANS THUS (000.00) ARE TO THE BOTTOM OF FOOTING.

**DESIGN LOAD**

	FLOOR	CORRIDORS
CLASSROOMS		
LIVE LOAD	40 P.S.F.	50 P.S.F.
MECH.	10 P.S.F.	25 P.S.F.
CEILING	4 P.S.F.	4 P.S.F.
DEAD	33 P.S.F.	35 P.S.F.
ROOF		
LIVE LOAD	30 P.S.F.	
MECH.	20 P.S.F.	
CEILING	5 P.S.F.	
STRUCT.	4 P.S.F.	

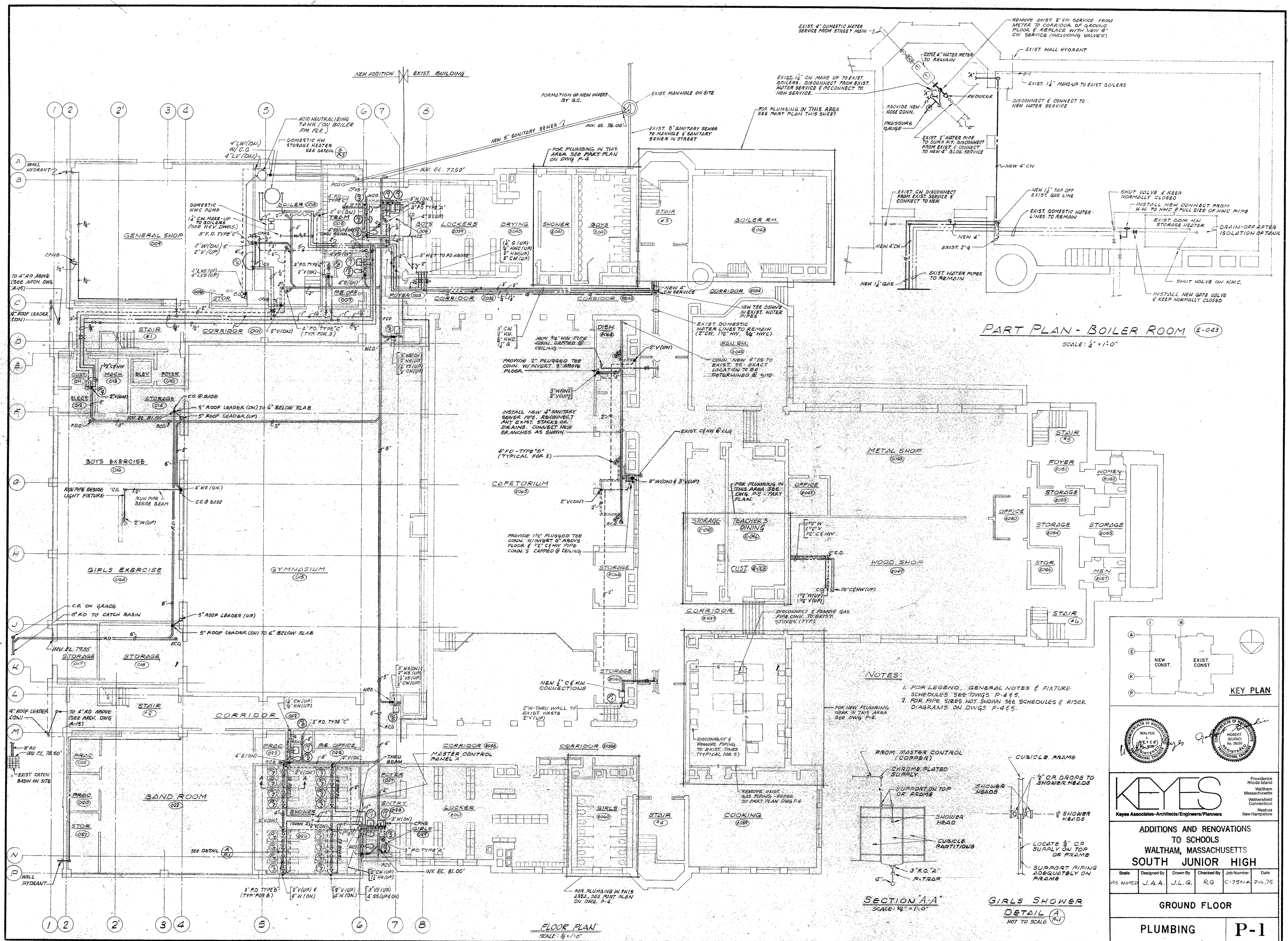


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Providence  
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Massachusetts  
Waltham  
Connecticut  
Nashua  
New Hampshire

**ADDITIONS AND RENOVATIONS TO SCHOOLS**  
**WALTHAM, MASSACHUSETTS**  
**SOUTH JUNIOR HIGH**

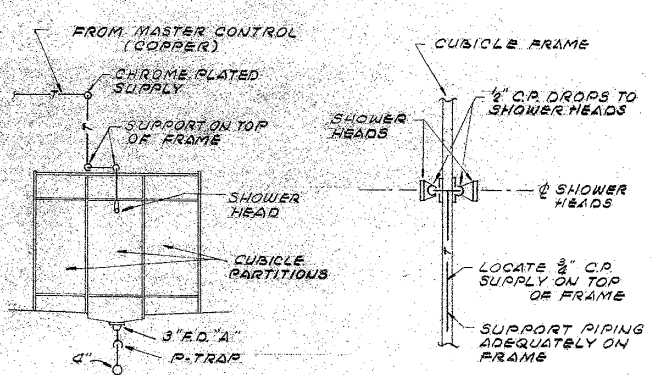
Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	E.L.B.	D.A.B.	E.L.B.	C7501 A	JULY-73

**TYPICAL DETAILS**  
**STRUCTURAL S-5**

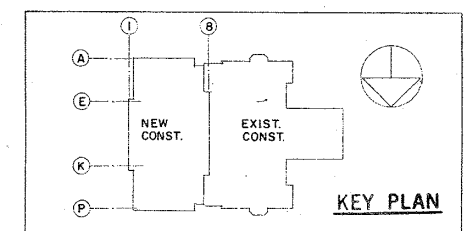


**PART PLAN - BOILER ROOM (E-043)**  
SCALE: 1/4" = 1'-0"

**NOTES:**  
 1. FOR LEGEND, GENERAL NOTES & FIXTURE SCHEDULES SEE DWGS P-4 & 5.  
 2. FOR PIPE SIZES NOT SHOWN SEE SCHEDULES & RISER DIAGRAMS ON DWGS P-4 & 5.



**SECTION A-A**  
SCALE: 1/2" = 1'-0"  
**GIRLS SHOWER DETAIL (A)**  
NOT TO SCALE

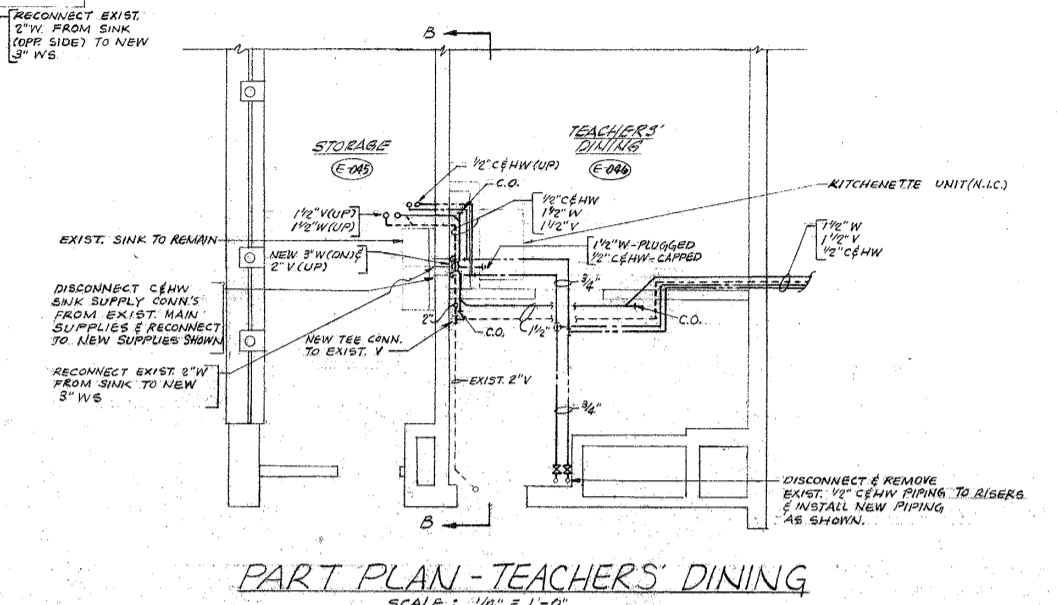
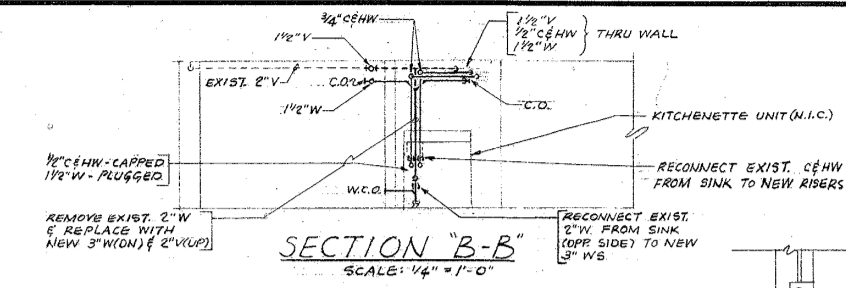
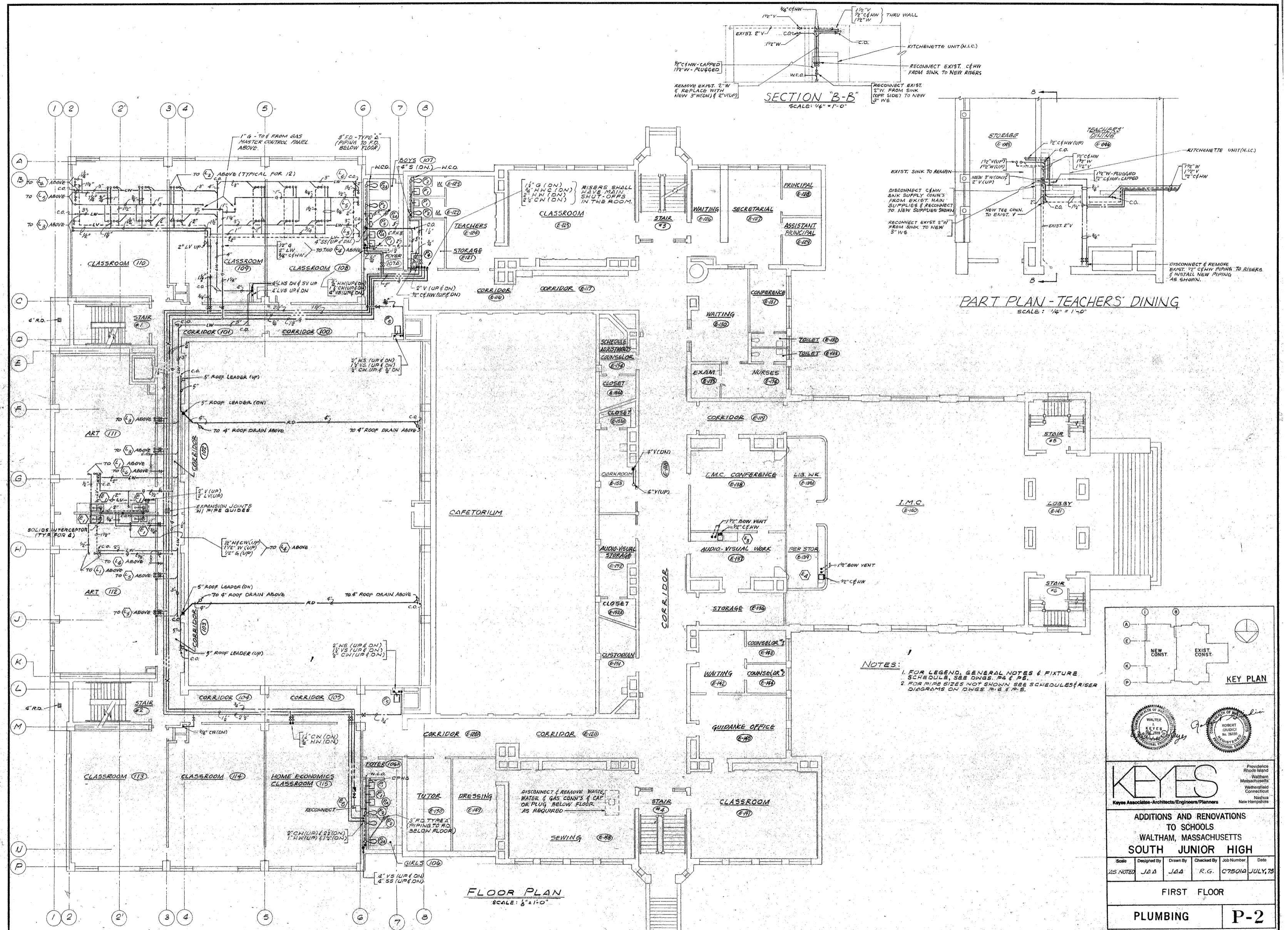


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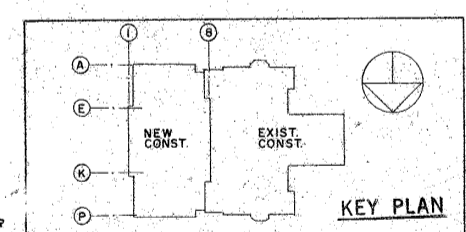
**ADDITIONS AND RENOVATIONS TO SCHOOLS**  
**WALTHAM, MASSACHUSETTS**  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	J.A.A.	J.L.G.	R.G.	C-7501A	3-1-75

**GROUND FLOOR**  
**PLUMBING P-1**

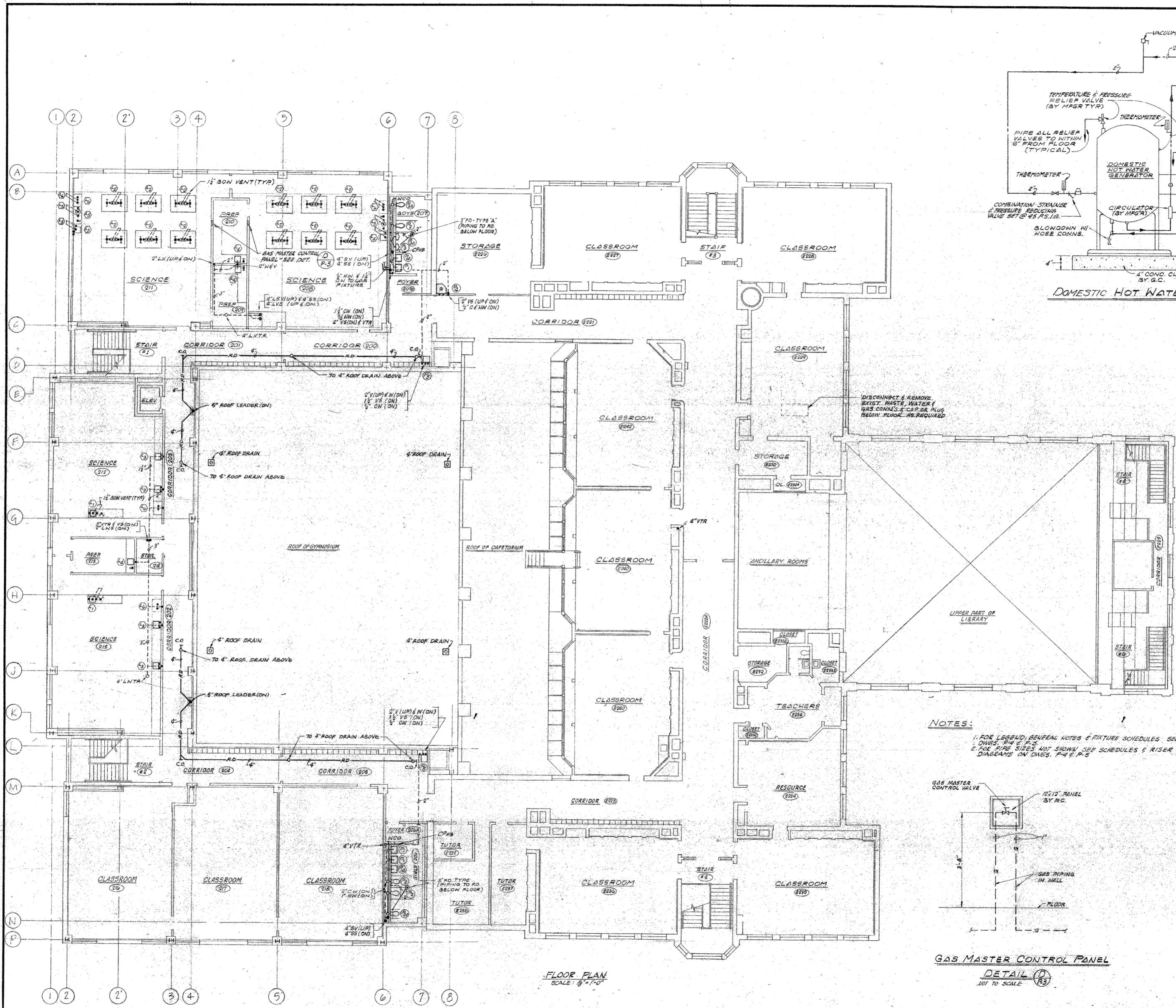


**NOTES:**  
 1. FOR LEGEND, GENERAL NOTES & FIXTURE SCHEDULES, SEE DWGS. P4 & P5.  
 2. FOR PIPE SIZES NOT SHOWN SEE SCHEDULES & RISER DIAGRAMS ON DWGS. P6 & P7.

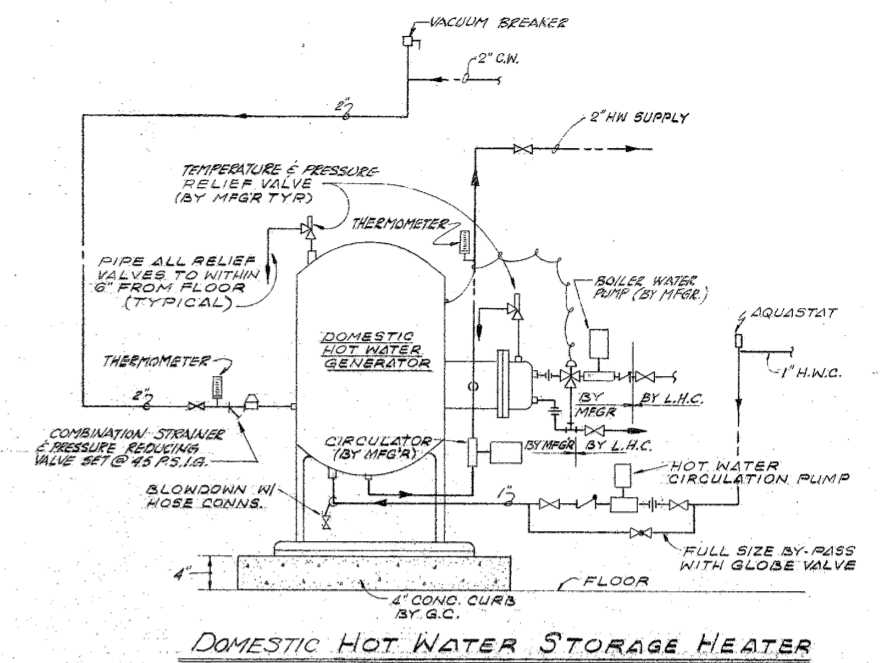


Professional Engineer Seal for Robert G. Gandy, No. 9125, State of Massachusetts.  
 Professional Engineer Seal for Walter J. Keyes, No. 9125, State of Massachusetts.  
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ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH					
Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	J.A.A.	J.A.A.	R.G.	C7501A	JULY, 75
FIRST FLOOR					
PLUMBING				P-2	

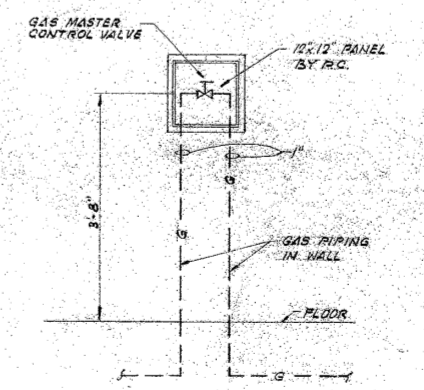


FLOOR PLAN  
SCALE: 1/8"=1'-0"

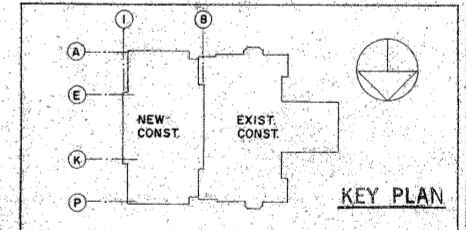


DETAIL (B)  
NOT TO SCALE

NOTES:  
1. FOR LEGEND, GENERAL NOTES & FIXTURE SCHEDULES SEE DWGS. P-4 & P-5.  
2. FOR PIPE SIZES NOT SHOWN SEE SCHEDULES & RISER DIAGRAMS ON DWGS. P-4 & P-5.



DETAIL (D)  
NOT TO SCALE

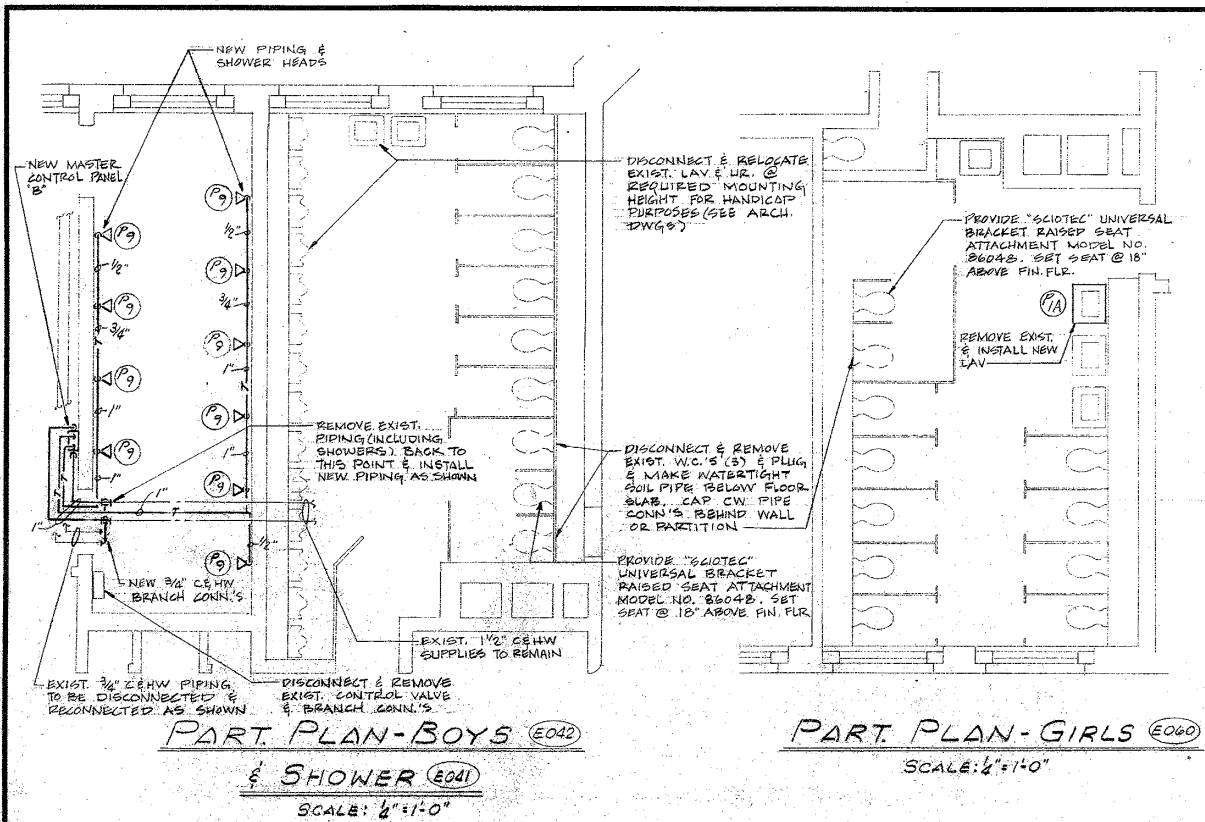


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ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

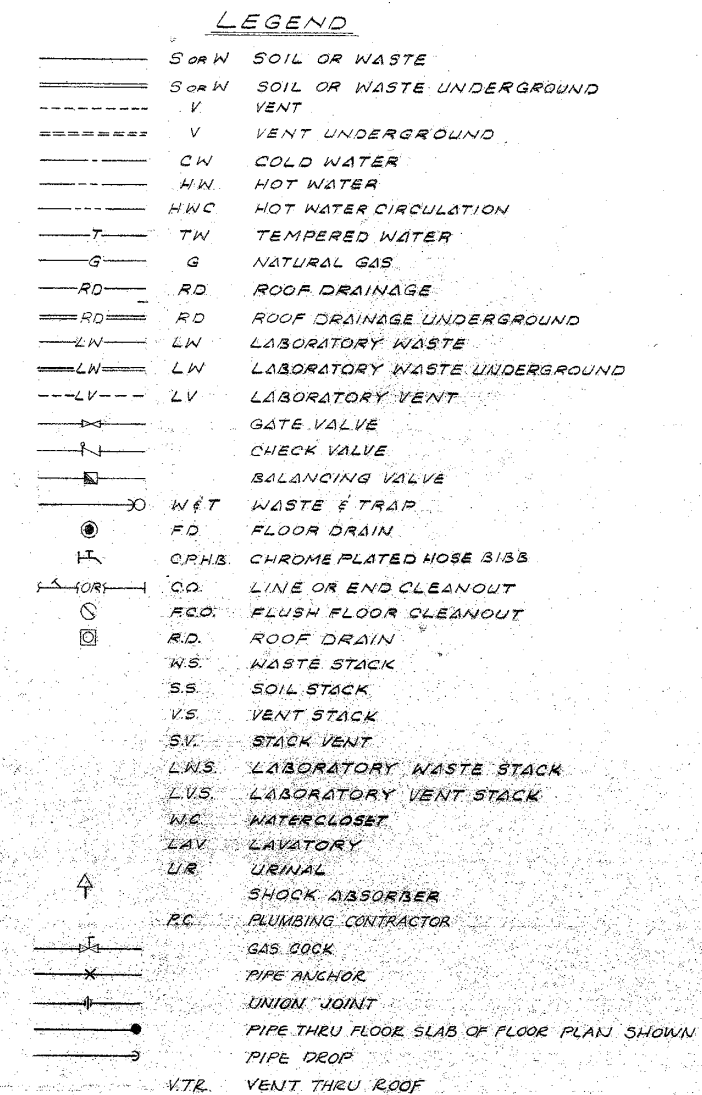
Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	J.A.A.	J.L.G.	R.G.	C7501A	JULY, 75

SECOND FLOOR  
PLUMBING P-3



### PLUMBING FIXTURE SCHEDULE

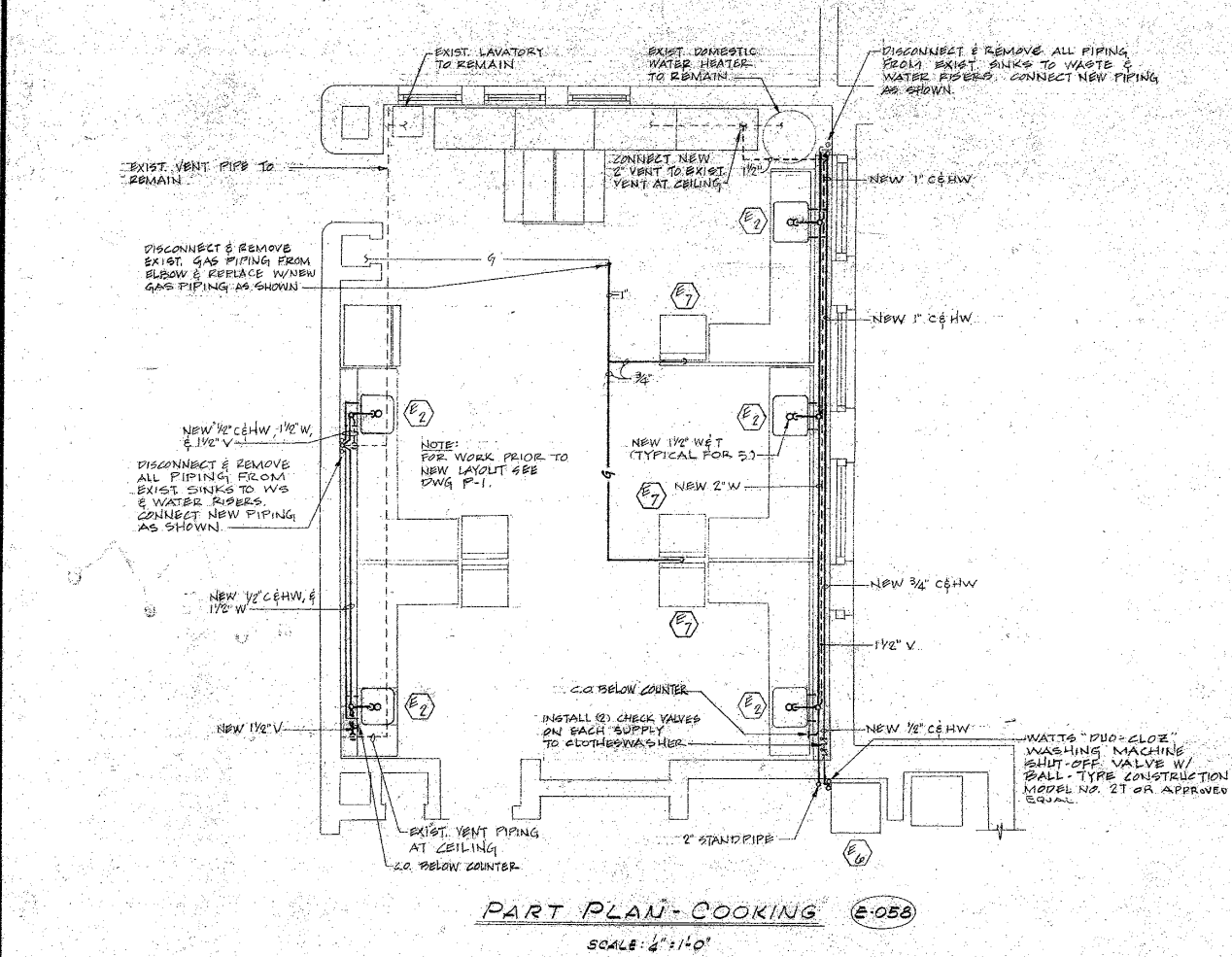
SYMBOL	DESCRIPTION	N	V	CN	HW	REMARKS
(P1)	LAVATORY	1 1/2"	1 1/2"	1/2"	1/2"	
(P1A)	LAVATORY	1 1/2"	1 1/2"	1/2"	1/2"	HANDICAP
(P2)	WATERCLOSET (R.V.)	4"	2"	1"	-	
(P2A)	WATERCLOSET (R.V.)	4"	2"	1"	-	HANDICAP
(P3)	URINAL	2"	2"	3/4"	-	
(P3A)	URINAL	2"	2"	3/4"	-	HANDICAP
(P4)	SERVICE RECEPTOR	3"	2"	1/2"	1/2"	
(P5)	DRINKING FOUNTAIN	1 1/2"	1 1/2"	1/2"	-	HANDICAP
(P6)	SEMI-CIRCULAR WASHBASIN	2"	1 1/2"	3/4"	3/4"	
(P7)	GIRLS' INDIVIDUAL CUBICLES	-	-	-	1/2"	TEMPERED (MASTER CONTROL)
(P8)	PHYS. ED. INSTRUCTOR'S SHOWER	5"	8"	2"	1/2"	
(P9)	BOYS' GANG SHOWER	-	-	-	1/2"	TEMPERED (MASTER CONTROL)



### LABORATORY EQUIPMENT FIXTURE SCHEDULE

EQUIPMENT BY G.C. (PIPING, TRAPS & COIN BY R.C.)

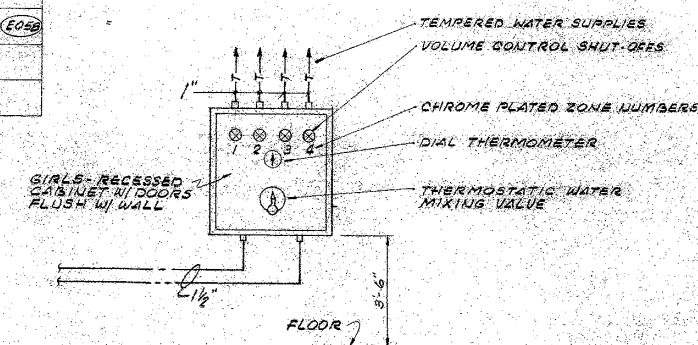
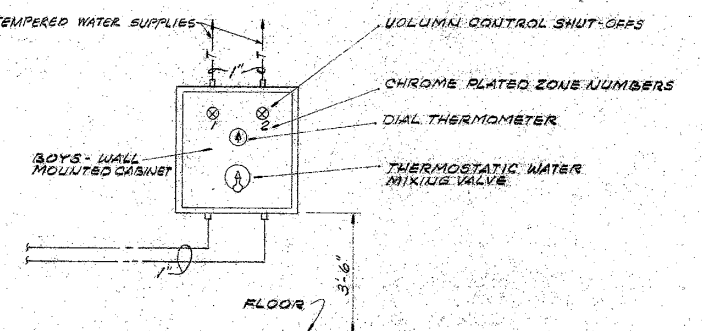
SYMBOL	DESCRIPTION	N	V	CN	HW	G	REMARKS
(E1)	INSTRUCTOR'S DEMO TABLE	1 1/2"	1 1/2"	1/2"	1/2"	-	CN, DOUBLE GAS
(E2)	STUDENT'S LAB TABLE	1 1/2"	1 1/2"	1/2"	1/2"	-	(2) COMB. FIX. W/ CN, 2 DOUBLE GAS
(E3)	LAB SLOP SINK	1 1/2"	1 1/2"	1/2"	1/2"	-	CN, HW
(E4)	PREP. RM LAB SINK	1 1/2"	1 1/2"	1/2"	1/2"	1/2"	CN, HW & SINGLE GAS
(E5)	FUME HOOD	1 1/2"	1 1/2"	1/2"	-	1/2"	CN, SINGLE GAS
(E6)	SAFETY CABINET	1 1/2"	1 1/2"	1/2"	-	-	EMERGENCY SHOWER & EYE WASH



### EQUIPMENT FIXTURE SCHEDULE

EQUIPMENT BY G.C. (PIPING, TRAPS & COIN BY R.C.)

SYMBOL	DESCRIPTION	N	V	CN	HW	G	REMARKS
(E1)	SS SINK (DOUBLE)	1 1/2"	-	1/2"	1/2"	-	ART ROOMS
(E2)	SS SINK (SINGLE)	1 1/2"	1 1/2"	1/2"	1/2"	-	COOKING (E-058)
(E3)	SS SINK (SINGLE)	1 1/2"	1 1/2"	1/2"	1/2"	-	AUDIO-VISUAL WORK ROOM
(E4)	SS SINK (SINGLE)	1 1/2"	1 1/2"	1/2"	1/2"	-	LIBRARY WORK ROOM
(E5)	EXIST SINK	1 1/2"	1 1/2"	1/2"	1/2"	-	RELOCATED FROM COOKING (E-058)
(E6)	CLOTHES WASHER	2"	-	1 1/2"	1/2"	-	COOKING (E-058)
(E7)	EXIST GAS RANGE	-	-	-	1/2"	-	RELOCATED



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ADDITIONS AND RENOVATIONS TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	JAA	J.L.G.	R.G.	C7501A	JUL 75

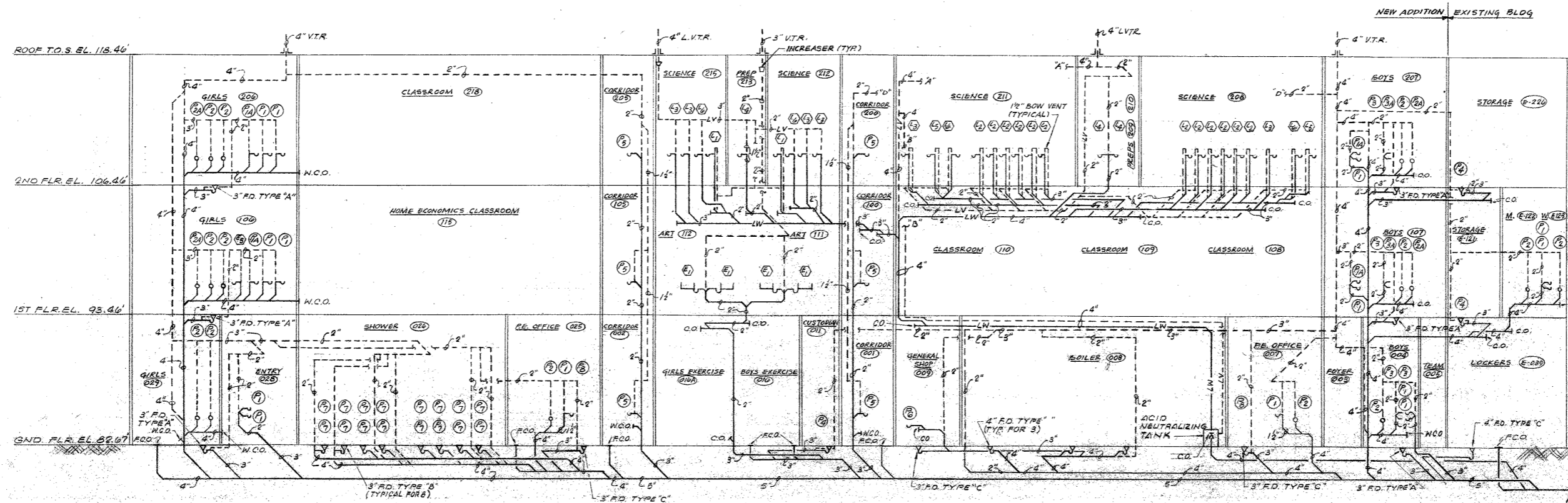
DETAILS & SCHEDULES

PLUMBING P-4

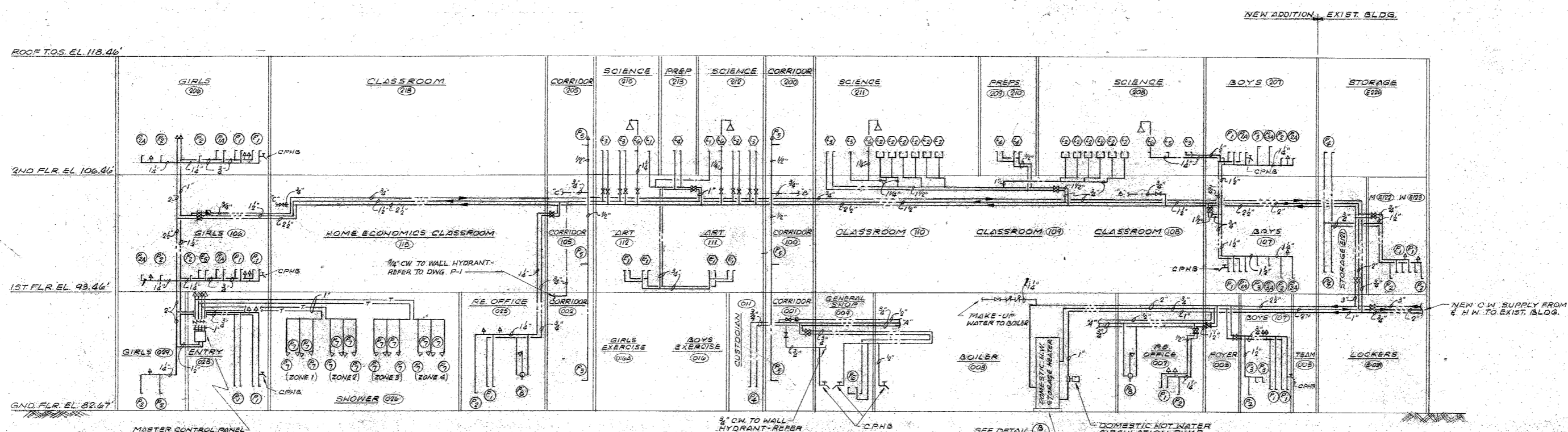


**GENERAL NOTES**

1. ALL PIPING SHOWN DIAGRAMMATICALLY ONLY, UNLESS OTHERWISE NOTED. EXACT LOCATIONS SHALL BE DETERMINED AFTER CAREFUL CO-ORDINATION WITH HEATING, VENTILATION AND ELECTRICAL SERVICES.
2. LOCATE ALL PIPING AS HIGH AS POSSIBLE UNLESS OTHERWISE NOTED.
3. INSULATE ALL NEW HOT & COLD WATER PIPING.
4. THE EXACT LOCATION OF ALL EXISTING PIPING MUST BE DETERMINED IN FIELD BY THE PLUMBING CONTRACTOR.
5. ALL HORIZONTAL ROOF DRAINAGE ABOVE GROUND SHALL BE INSULATED.
6. FOR EXACT LOCATION OF PLUMBING FIXTURES AND MOUNTING HEIGHTS REFER TO ARCHITECTURAL DRAWINGS.
7. GENERAL CONTRACTOR SHALL PROVIDE REMOVABLE CEILING PANELS AT LOCATIONS WHERE ACCESS IS REQUIRED.
8. LOCATE A CHROME PLATED HOSE BIBB IN ALL MEN TOILET ROOMS WITH FLOOR DRAINS.
9. EXACT SIZE AND LOCATION OF CONCRETE PADS FOR EQUIPMENT TO BE DETERMINED BY EQUIPMENT PURCHASER.
10. ALL VENTS THRU ROOF SHALL BE MINIMUM 4'-0" FROM BLDG. OUTSIDE WALL.
11. ALL PIPING AT LAB EQUIPMENT BY PLUMBING CONTRACTOR; FIXTURES ON EQUIPMENT SHALL BE FURNISHED BY LAB EQUIPMENT CONTRACTOR & INSTALLED BY PLUMBING CONTRACTOR.
12. SHUT OFF VALVES SHALL BE INSTALLED IN ALL RISERS TO LAB EQUIPMENT.
13. ALL GAS PIPING TO HAVE 6" DIRT POCKET AT BOTTOM OF RISERS.
14. FOR EQUIPMENT ARRANGEMENT IN SCIENCE AREAS, COOKING ROOM, ART ROOM ETC. REFER TO ARCHITECTURAL DWGS.
15. ALL GAS BRANCH TAKE-OFFS TO BE TAKEN OFF THE TOP OF THE MAIN.
16. EXACT LOCATION OF ALL FIXTURES ON LAB EQUIPMENT TO BE DETERMINED BY MANUFACTURER'S SHOP DRAWINGS OR BY OWNER.
17. THE LOCATION OF FLOOR DRAINS IN BOILER ROOM SHALL BE DETERMINED BY EQUIPMENT PURCHASER.
18. LOCATE ALL CLEANOUTS IN ACCESSIBLE AREAS.
19. LOCATE CLEANOUTS AT THE BASE OF ALL ROOF LEADERS & SANITARY SOIL & WASTE STACKS.
20. FOR EXACT LOCATION OF ALL ROOF DRAINS SEE ARCHITECTURAL DRAWINGS.
21. FOR MOUNTING HEIGHTS OF HANDICAPPED FIXTURES SEE ARCH. DRAWINGS.
22. ALL EXPOSED PIPING (WATER & WASTE) BENEATH A HANDICAP LAVATORY SHALL BE INSULATED.



**SANITARY RISER DIAGRAM**  
NOT TO SCALE



**DOMESTIC WATER RISER DIAGRAM**  
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**ADDITIONS AND RENOVATIONS TO SCHOOLS**  
**WALTHAM, MASSACHUSETTS**  
**SOUTH JUNIOR HIGH**

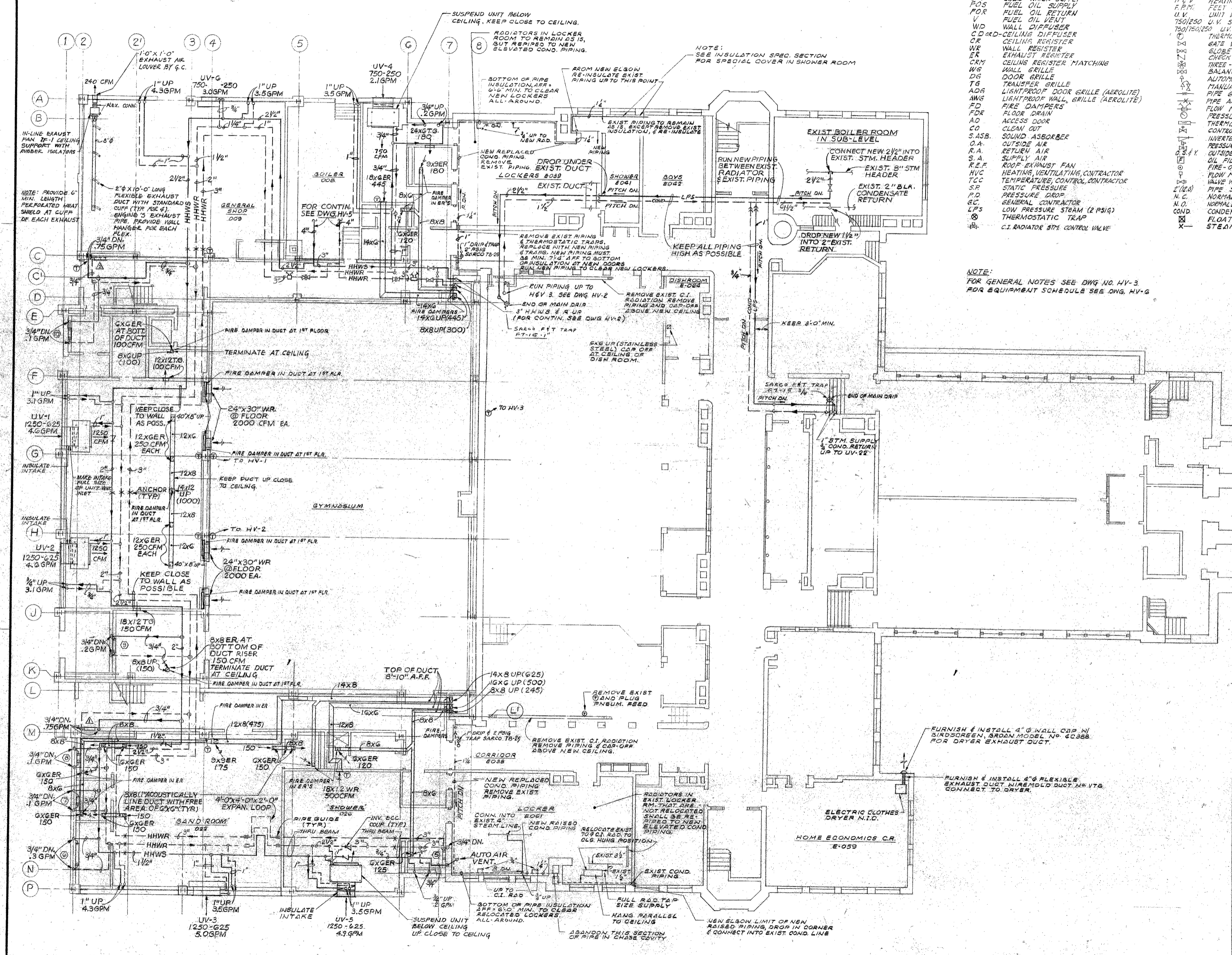
Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	J.A.A.	J.A.A.	R.G.	C7301A	JUL 75

**RISER DIAGRAMS**

<b>PLUMBING</b>	<b>P-5</b>
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**LEGEND**

- HHWS - HEATING HOT WATER SUPPLY
  - HHWR - HEATING HOT WATER RETURN
  - CW - COLD WATER SUPPLY
  - FOS - FUEL OIL SUPPLY
  - FOR - FUEL OIL RETURN
  - V - FUEL OIL VENT
  - WD - WALL DIFFUSER
  - CD - CEILING DIFFUSER
  - CR - CEILING REGISTER
li>
  - WR - WALL REGISTER
  - ER - EXHAUST REGISTER
  - CR - CEILING REGISTER MATCHING
  - WG - WALL GRILLE
  - DG - DOOR GRILLE
  - TG - TRANSFER GRILLE
  - ADR - LIGHTPROOF DOOR GRILLE (AEROLITE)
  - AWG - LIGHTPROOF WALL GRILLE (AEROLITE)
  - FD - FIRE DAMPERS
  - FDR - FLOOR DRAIN
  - AD - ACCESS DOOR
  - CO - CLEAN OUT
  - S.A.S. - SOUND ASORBBER
  - O.A. - OUTSIDE AIR
  - R.A. - RETURN AIR
  - S.A. - SUPPLY AIR
  - R.E.F. - ROOF EXHAUST FAN
  - H.V.C. - HEATING, VENTILATING, CONTRACTOR
  - T.C.C. - TEMPERATURE CONTROL CONTRACTOR
  - S.P. - STATIC PRESSURE
  - P.S. - PRESSURE DROP
  - G.C. - GENERAL CONTRACTOR
  - L.P.S. - LOW PRESSURE STEAM (2 P.S.I.)
  - TR - THERMOSTATIC TRAP
  - C.I. - RADIATOR STEAM CONTROL VALVE
- A.F.F. - ABOVE FINISH FLOOR
  - L.H.C. - LIMIT OF HEATING CONTRACT
  - H.E.V. - HEATING & VENTILATING UNIT
  - F.P.M. - FEET PER MINUTE
  - U.V. - UNIT VENTILATOR
  - 150/250 - U.V. SUPPLY AIR/MIN. O.A.
  - 150/150/250 - U.V. SUPPLY AIR/MAX. O.A./MIN. O.A.
  - TH - THERMOSTAT
  - GV - GATE VALVE
  - SV - STOP VALVE
  - CV - CHECK VALVE
  - 3WV - THREE-WAY VALVE
  - ACV - AUTOMATIC AIR VENT
  - MAV - MANUAL AIR VENT
  - PG - PIPE GUIDE
  - PA - PIPE ANCHOR
  - FME - FLOW MEASURING ELEMENT
  - PG - PRESSURE GAUGE
  - TM - THERMOMETER
  - CV - CONTROL VALVE
  - IEC - INVERTED ELECTRIC COUPLING
  - PRV - PRESSURE RELIEF VALVE
  - OSF - OUTSIDE SCREW & YONE
  - OF - OIL FILTER
  - FEM - FLOW METER (ELECTRIC)
  - FM - FLOW METER
  - WV - VALVE W/ HOSE BIBS CONN.
  - 2" (20) - PIPE SIZE (RPM FLOW)
  - N.C. - NORMALLY CLOSED
  - N.O. - NORMALLY OPEN
  - COND - CONDENSATE
  - FT & T - FLOAT & THERMOSTATIC TRAP
  - ST - STEAM OR COND. RISER



**KEY PLAN**

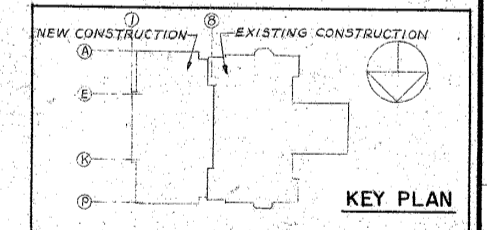
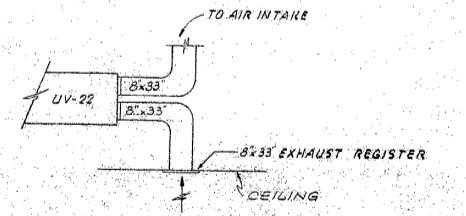
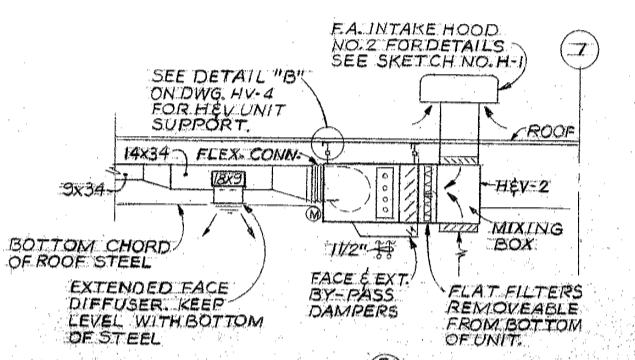
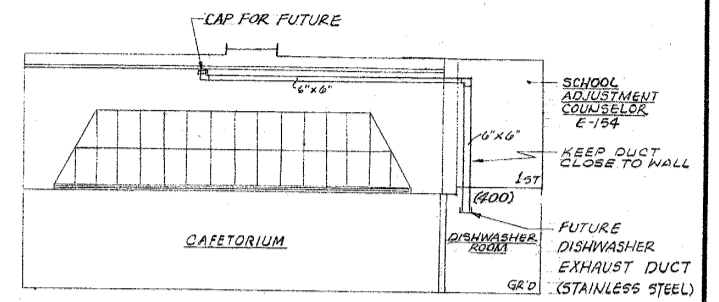
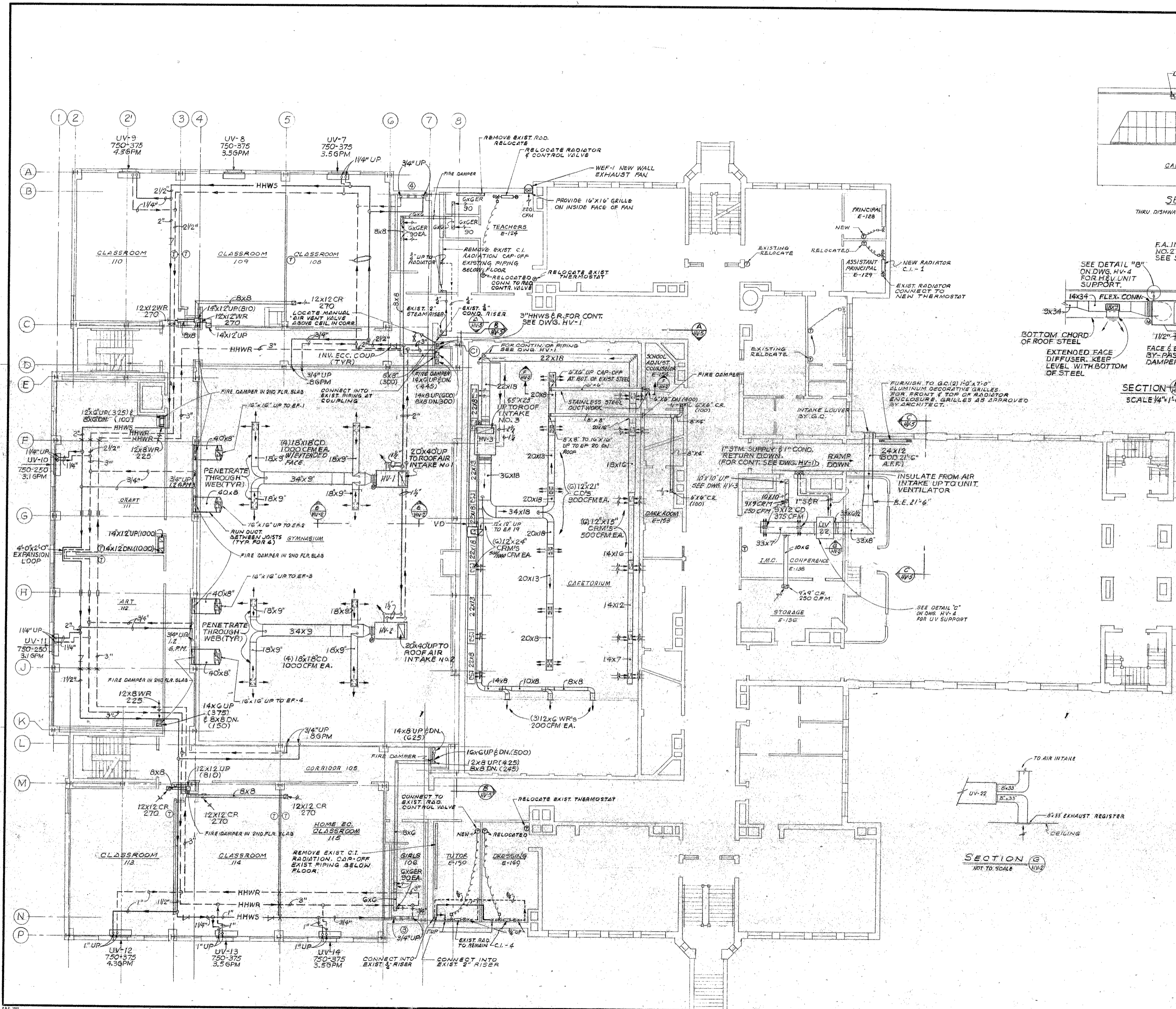
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Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	R.G.	C.A.	R.G.	C7501A	Jul, 75

**GROUND FLOOR PLAN**

**HEAT & VENT. HV-1**

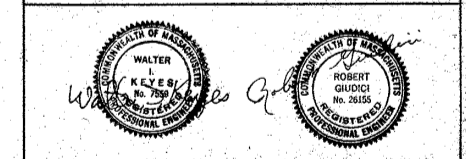
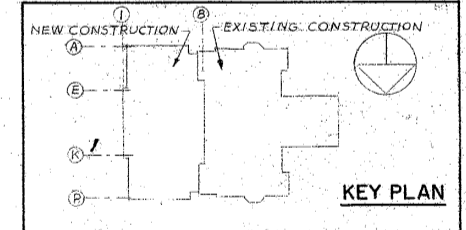
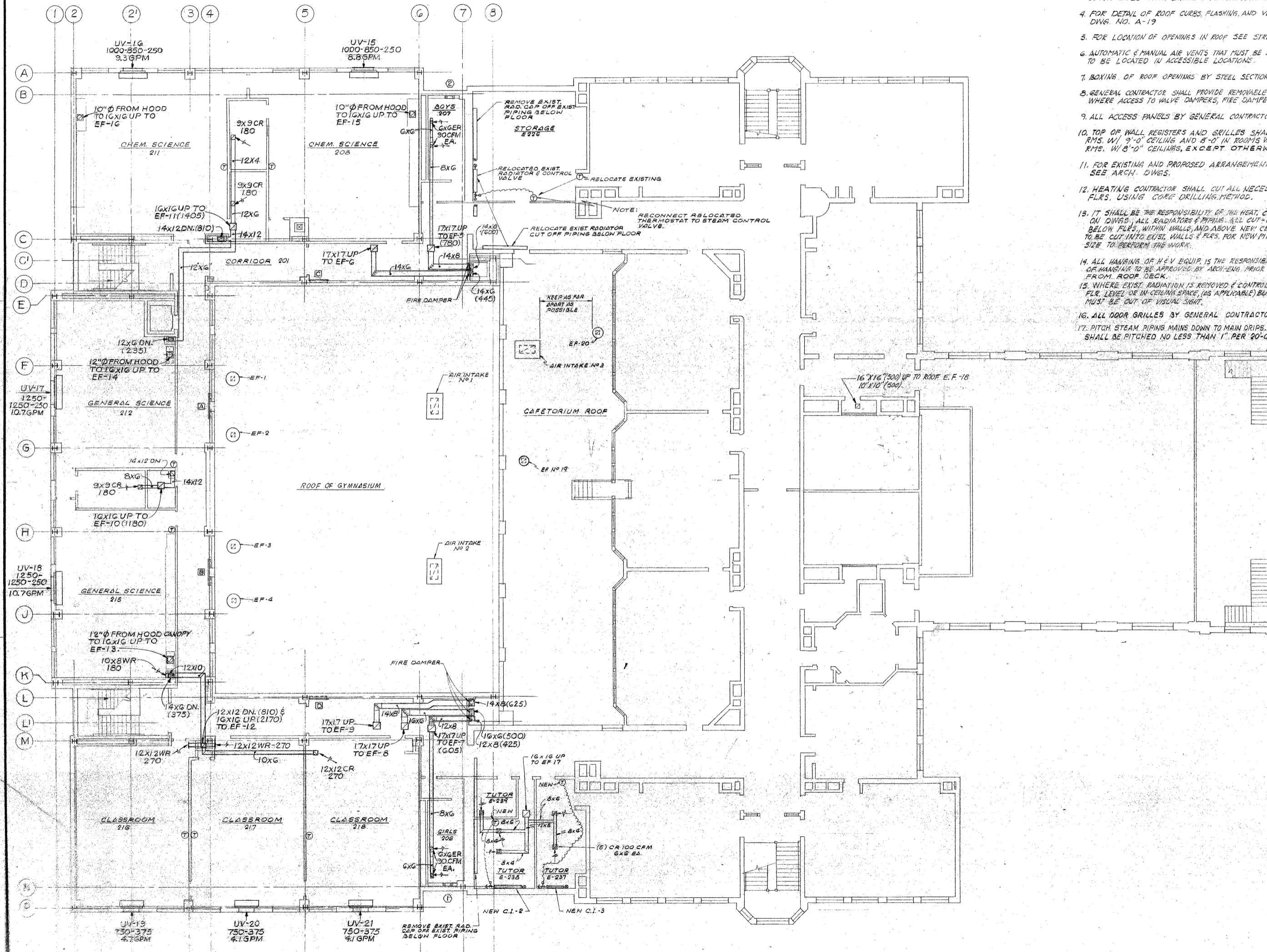


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<b>ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH</b>					
Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	R.G.	C.A.	R.G.	C7501A	JUL, 75
FIRST FLOOR PLAN					
HEAT. & VENT.					<b>HV-2</b>

GENERAL NOTES

1. ALL PIPING & DUCTWORK, UNLESS DIMENSIONED, SHOWN DIAGRAMMATICALLY ONLY. EXACT LOCATION SHALL BE DETERMINED IN THE FIELD AFTER CLOSE COORDINATION WITH OTHER TRADES.
2. FOR TYPICAL PIPING & CONNECTIONS AT EQUIPMENT SEE DETAILS, DIAGRAMS, AND SKETCHES AS INDICATED.
3. EXACT LOCATIONS OF ALL CEILING DIFFUSERS, REGISTERS AND GRILLES TO BE COORDINATED WITH LIGHTING FIXTURES. REFER TO REFLECTED CEILING PLANS.
4. FOR DETAIL OF ROOF CURBS, FLASHING, AND VENT THRU ROOF SEE ARCH. DWG. NO. A-19
5. FOR LOCATION OF OPENINGS IN ROOF SEE STRUCTURAL DWG. NO. S-4.
6. AUTOMATIC & MANUAL AIR VENTS THAT MUST BE SERVICED AND INSPECTED ARE TO BE LOCATED IN ACCESSIBLE LOCATIONS.
7. BOXING OF ROOF OPENINGS BY STEEL SECTIONS
8. GENERAL CONTRACTOR SHALL PROVIDE REMOVABLE CEILING PANELS AT LOCATIONS WHERE ACCESS TO VALVE DAMPERS FIRE DAMPERS ETC. ARE REQUIRED.
9. ALL ACCESS PANELS BY GENERAL CONTRACTOR.
10. TOP OF WALL REGISTERS AND GRILLES SHALL BE 8'-6" ABOVE FLOOR IN RMS. W/ 9'-0" CEILING AND 5'-0" IN ROOMS W/ 8'-6" CEILING AND 7'-6" IN RMS. W/ 8'-0" CEILINGS, EXCEPT OTHERWISE NOTED.
11. FOR EXISTING AND PROPOSED ARRANGEMENT OF WALLS AND PARTITIONS. SEE ARCH. DWGS.
12. HEATING CONTRACTOR SHALL CUT ALL NECESSARY HOLES THRU WALLS & FLRS. USING CORE DRILLING METHOD.
13. IT SHALL BE THE RESPONSIBILITY OF THE HEAT CONTR. TO REMOVE WHERE INDIC. ON DWGS. ALL RADIATORS & PIPING. ALL CUT-OFF PIPING SHALL BE CAPPED BELOW FLRS. WITHIN WALLS AND ABOVE NEW CEILINGS. THE SIZE OF OPENINGS TO BE CUT INTO EXIST. WALLS & FLRS. FOR NEW PIPING, SHALL BE KEPT TO A MIN. SIZE TO PERFORM THE WORK.
14. ALL HANDING OF H.E.V. EQUIP. IS THE RESPONSIBILITY OF THE H.E.V. CONTR. METHOD OF HANDLING TO BE APPROVED BY ARCH-ENG. PRIOR TO INSTALLATION. NO HANDLING FROM ROOF DECK.
15. WHERE EXIST. RADIATION IS REMOVED & CONTROLLED BY PNEUMATIC PIPING BELOW FLR. LEVEL OR IN CEILING SPACE (AS APPLICABLE) BUT IN ANY CASE, PLUGGED PIPING MUST BE OUT OF VISUAL SIGHT.
16. ALL DOOR GRILLES BY GENERAL CONTRACTOR.
17. PITCH STEAM PIPING MAINS DOWN TO MAIN DRIPS. STEAM AND CONDENSATE PIPING SHALL BE PITCHED NO LESS THAN 1" PER 20'-0"

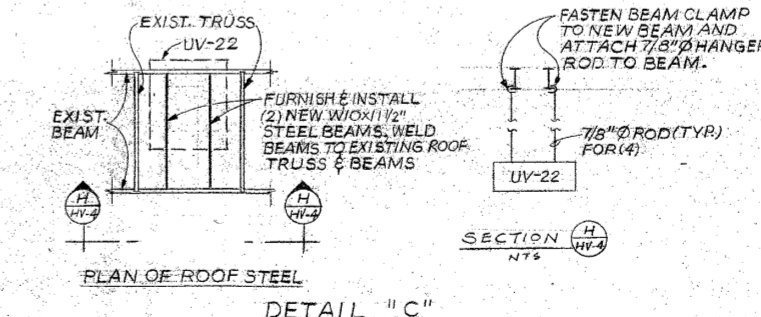
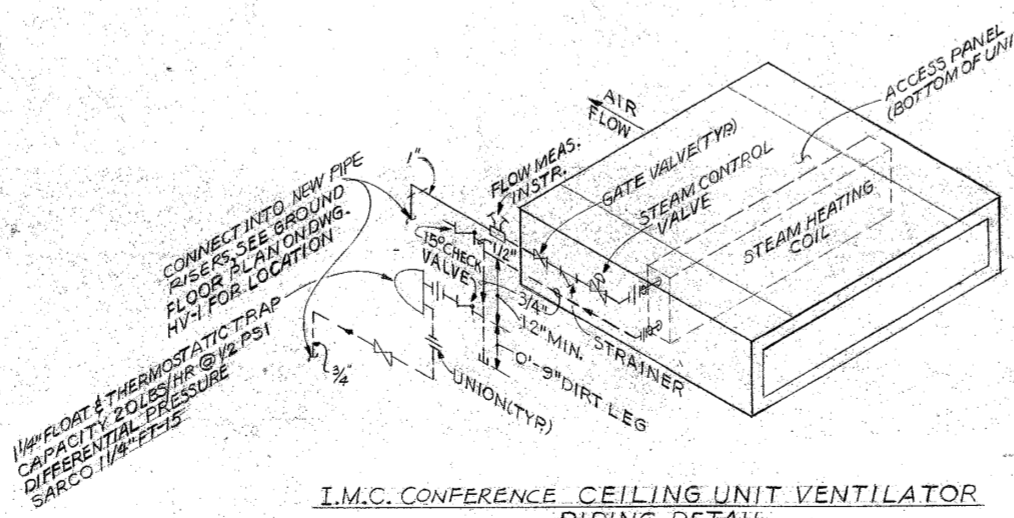
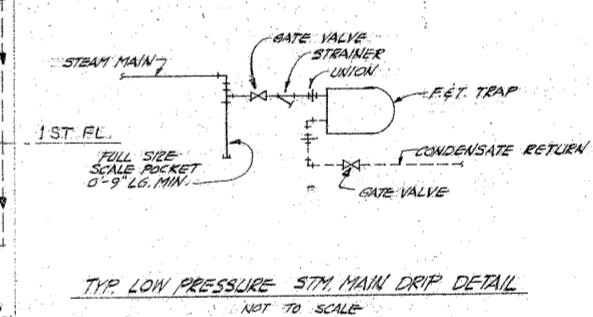
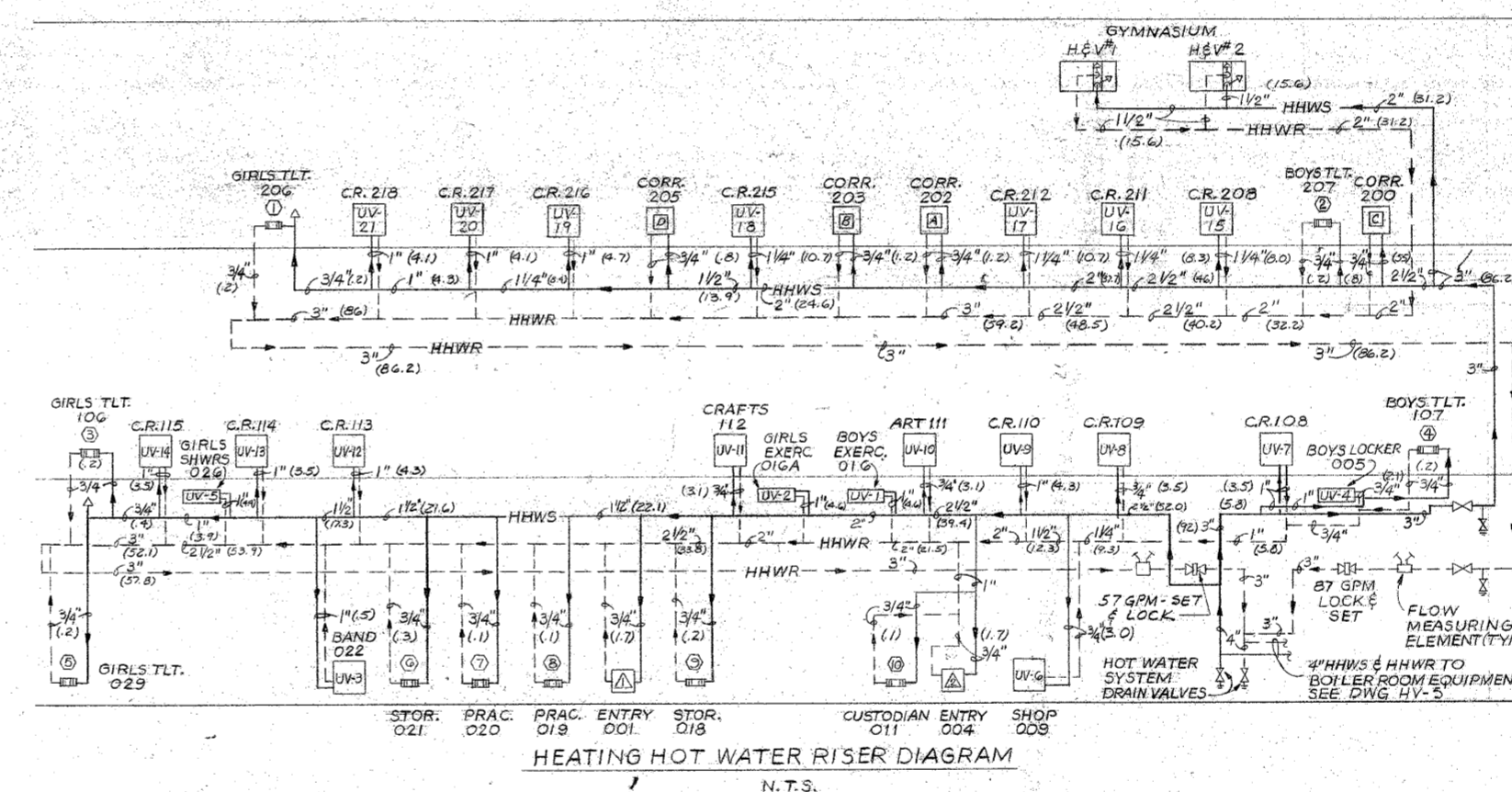
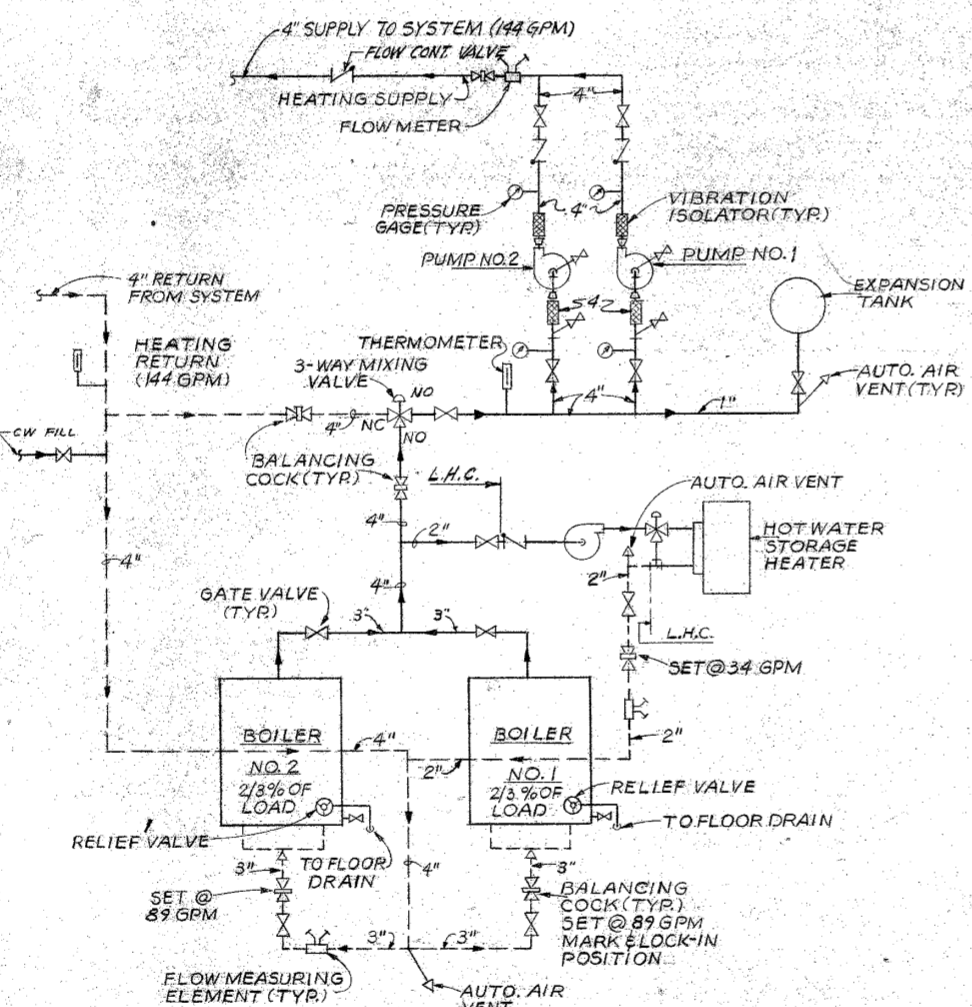
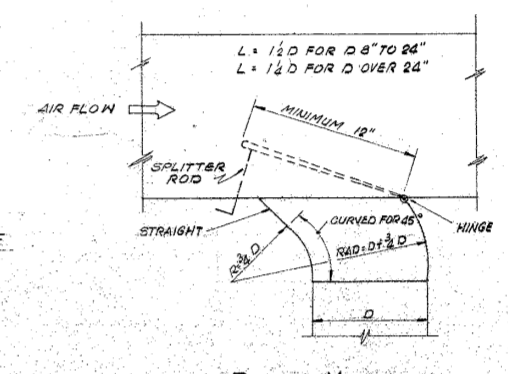
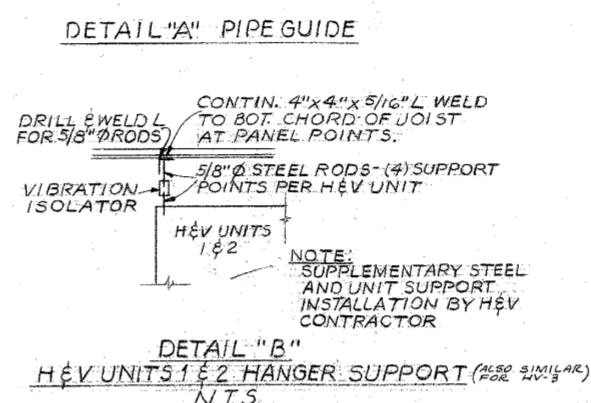
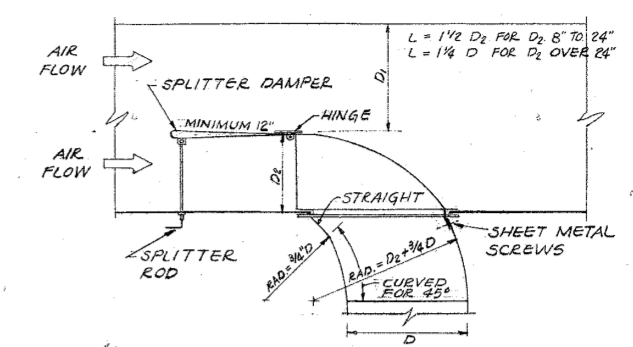
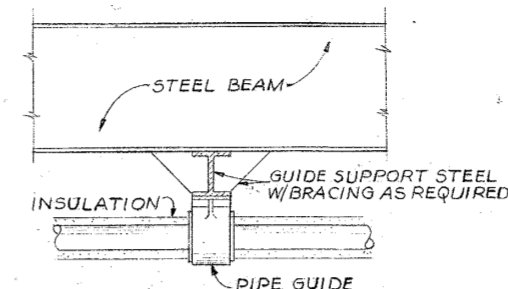
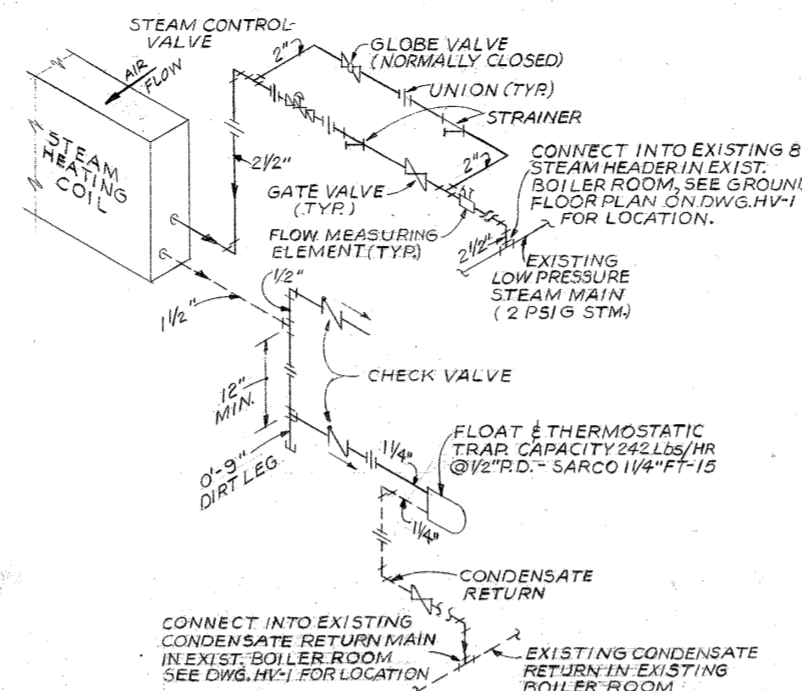
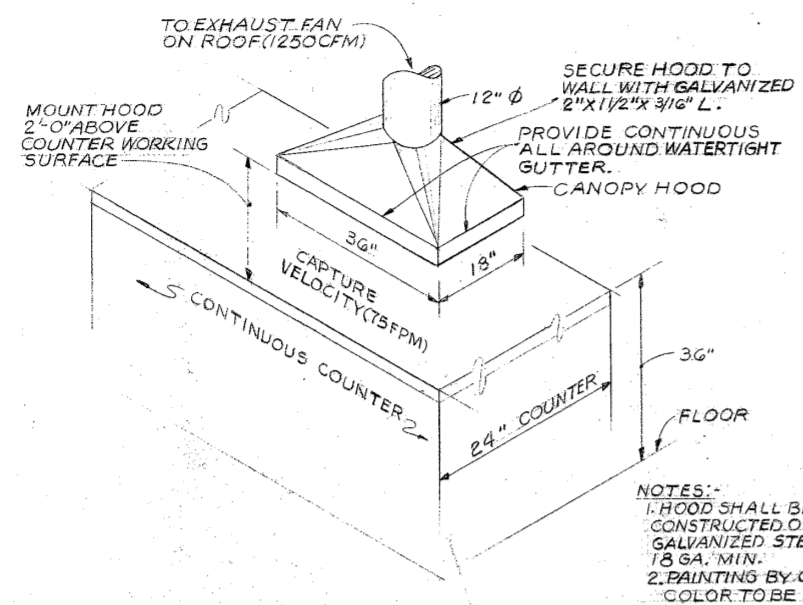


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ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	R.G.	C.A.	R.G.	C7501A	JUL 75

SECOND FLOOR PLAN  
 HEAT. & VENT. **HV-3**

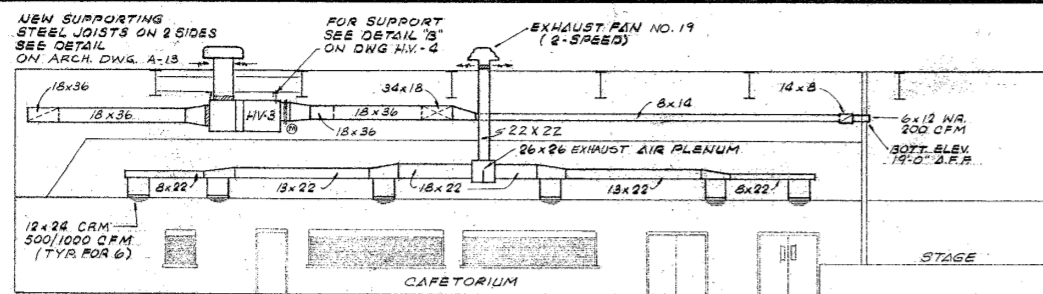


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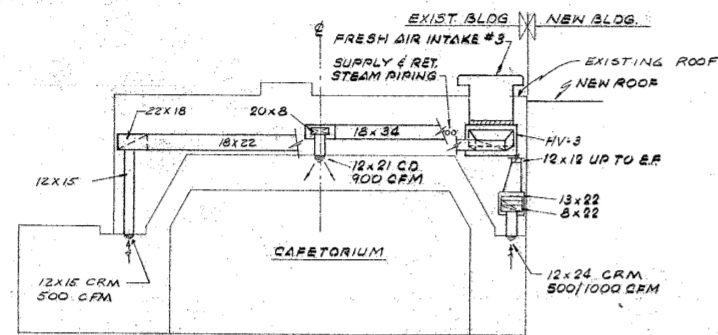
ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	R.G.	C.A.	R.G.	C7501A	7/4/75

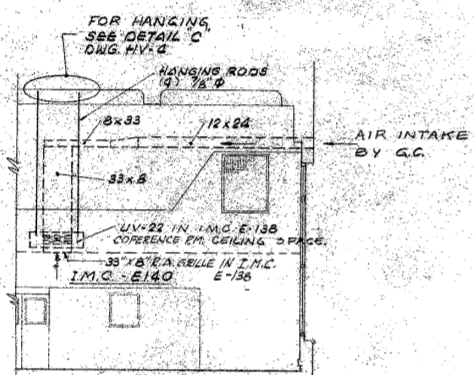
**DIAGRAMS AND DETAILS**  
**HEAT. & VENT. HV-4**



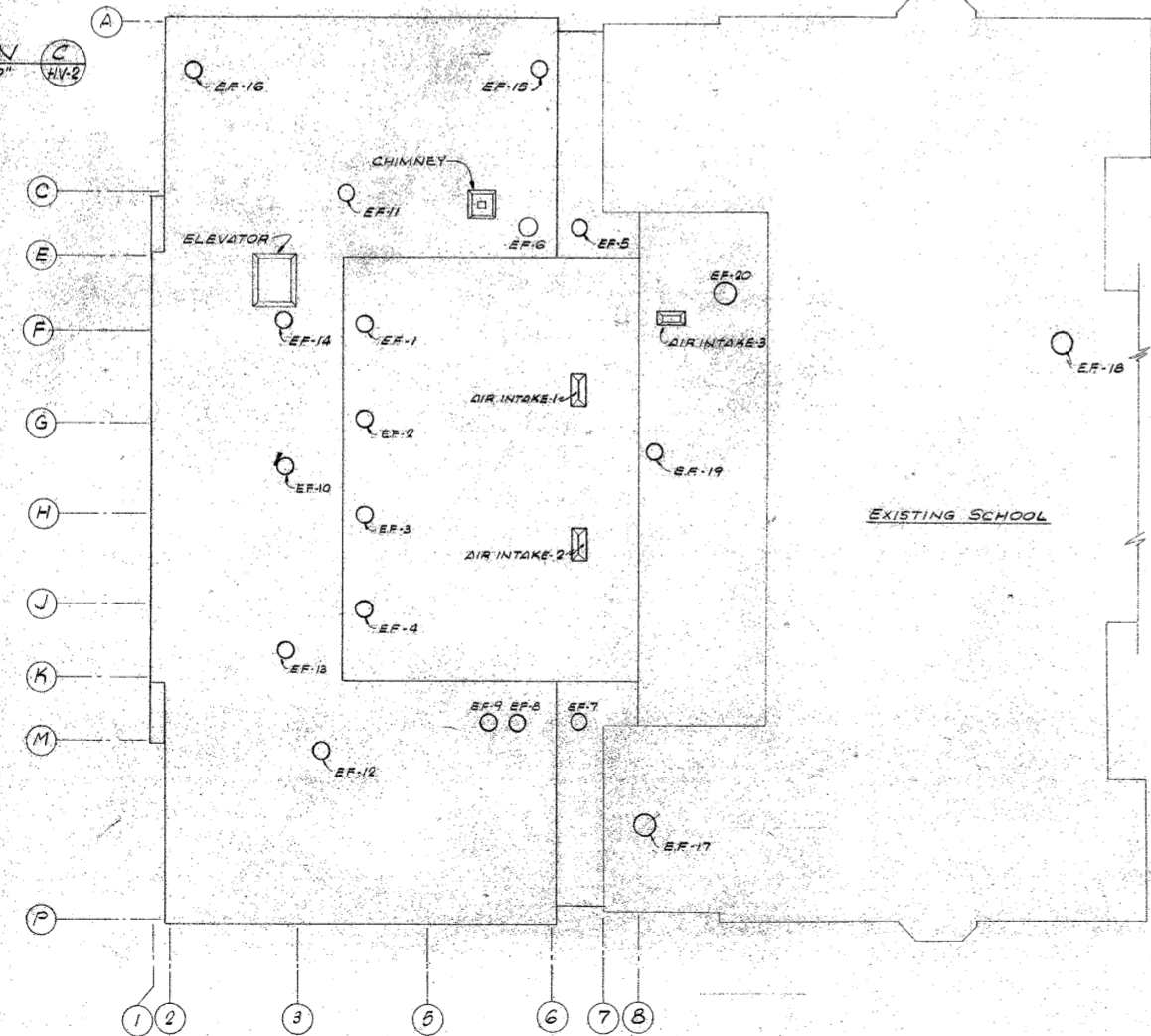
SECTION B  
SCALE: 1/2" = 1'-0"



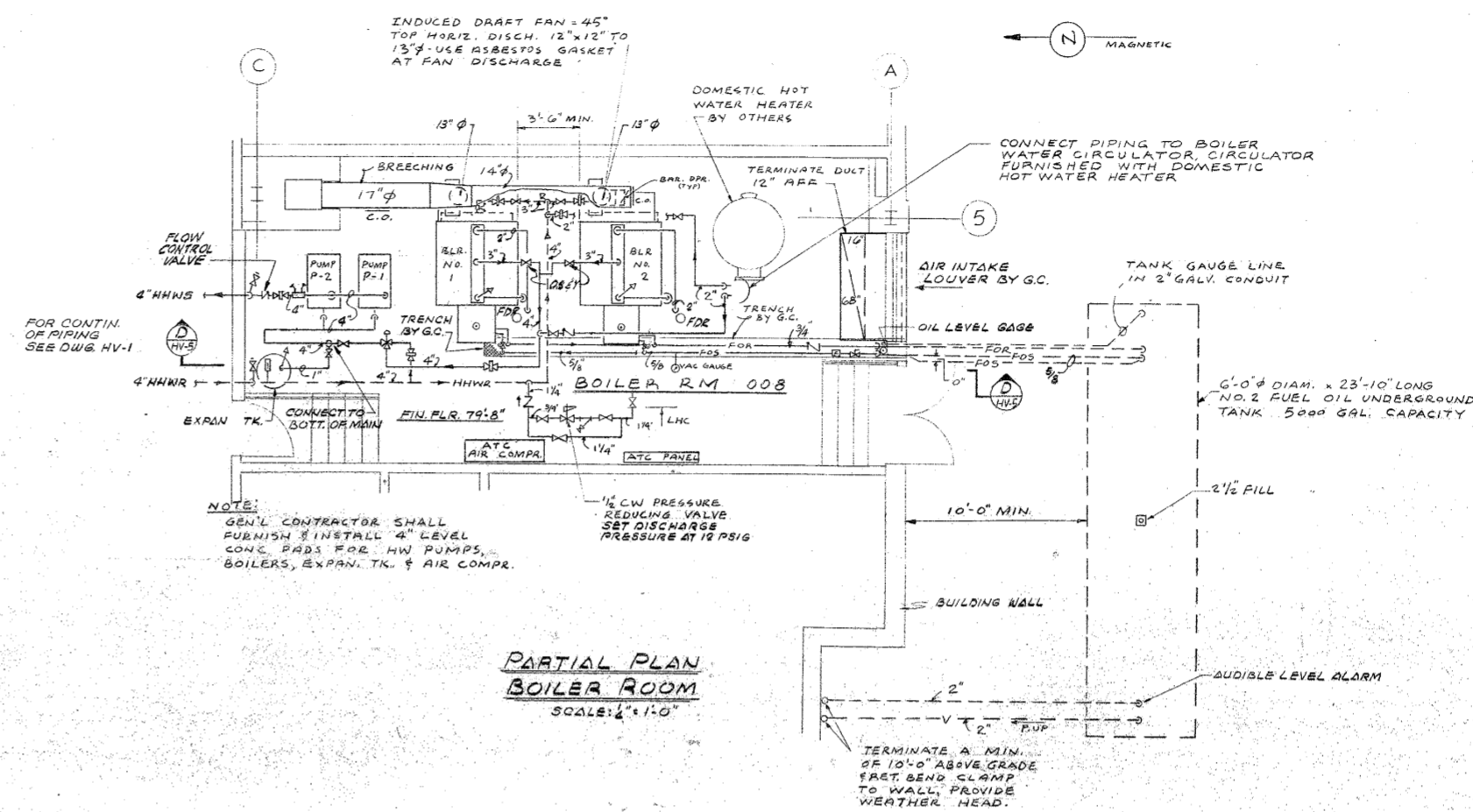
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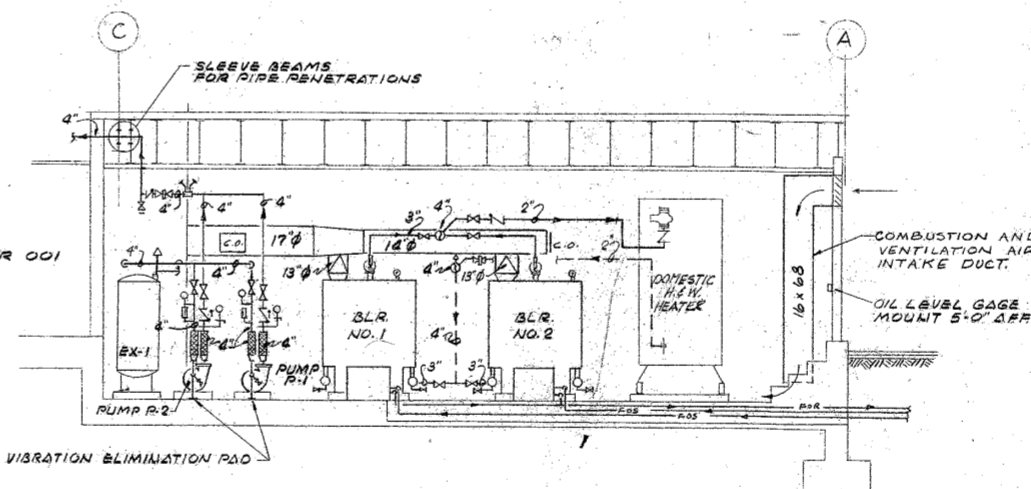
SECTION C  
SCALE: 1/2" = 1'-0"



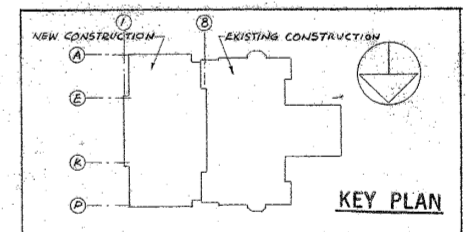
ROOF PLAN  
NOT TO SCALE



PARTIAL PLAN BOILER ROOM  
SCALE: 1/2" = 1'-0"



SECTION D  
SCALE: 1/2" = 1'-0"



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ADDITIONS AND RENOVATIONS  
TO SCHOOLS  
WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
AS NOTED	R.G.	R.G.	R.G.	C-7501A	JULY, 75

BOILER ROOM  
HEAT & VENT. **HV-5**

### HEATING & VENTILATING UNITS (HOT WATER)

UNIT NO.	LOCATION	MFR. NO.	TOTAL CFM	O.A. CFM		HEATING COIL DATA		FACE AND EXTERNAL BYPASS DAMPERS		MOTOR DATA		REMARKS			
				OC	UNOC	ENT. AIR	LVS. AIR	ENT. AIR	LVS. AIR	ENT. AIR	LVS. AIR		HP	V	PH
HV-1	GYM	T-8	4,000	0	0	58.0	155	41.0°F	77.0°F	1.1	YES	3	208	3	60
HV-2	GYM	T-8	4,000	0	0	58.0	155	41.0°F	77.0°F	1.1	YES	3	208	3	60

BASIS OF SELECTION: TRANE TORQUEVENT DRAW-THRU UNITS. HW. COIL = TYPE WC 1-ROW HEATING COIL (NO TURBULATORS)  
 HOT WATER CONDITIONS: 200°F ENT & 180°F LWT.  
 NOTE: AIR FILTERS SHALL BE 2" THICK FLAT TYPE AND BE REMOVABLE FROM BOTTOM OF UNIT.  
 (4) FILTERS 16X20" EACH.

### HEATING & VENTILATING UNITS (STEAM)

UNIT NO.	LOCATION	MFR. NO.	TOTAL CFM	O.A. CFM		HEATING COIL DATA		HEATING TOTAL		MOTOR DATA		REMARKS					
				OC	UNOC	ENT. AIR	LVS. AIR	EDR	W	HP	V		PH	CY			
HV-3	CAFETERIA	T-12	3,000	0	0	54.5	145	41.0°F	77.0°F	2.42	.14	372	1 1/4	3	208	3	60

BASIS OF SELECTION: TRANE TORQUEVENT DRAW-THRU UNITS 2.0 R/S L/E ENT. STEAM - COIL TYPE = NS SERIES 34  
 PROVIDE UNIT WITH COMBINATION MIXING-FILTER BOX COMBINATION FILTERS OF MEDIUM CAPACITY V-BANK (4) 20" X 25" X 2"

### CABINET UNIT HEATERS (HEATING HOT WATER)

UNIT NO.	LOCATION	MFR. NO.	RECESS	CFM	ENT. AIR	LVS. AIR	ENT. AIR	LVS. AIR	ENT. AIR	LVS. AIR	REMARKS
▲	ENT. WAY 001	03	INVERTED F. RECESS	170	1.7	1.7	1.7	1.7	1.7	1.7	INTEGRAL ELEC. THERMOSTAT
▲	ENT. WAY 003	03	INVERTED F. RECESS	170	1.7	1.7	1.7	1.7	1.7	1.7	INTEGRAL ELEC. THERMOSTAT

BASIS OF SELECTION: TRANE FORCED-FLO HEATER MODEL NO. U-46-A0-03  
 CONDITIONS: 200°F ENT & 180°F LWT.

### CONVECTER SCHEDULE (HOT WATER)

UNIT NO.	LOCATION	MODEL	TYPE	M.B.H.	G.P.M.	APPROXIMATE SIZE			RECESS
						LENGTH	HEIGHT	DEPTH	
A	CORR. 202	5K	SEMI-RECESS	12.4	1.2	62	36	6	3 1/2"
B	CORR. 203	5K	SEMI-RECESS	12.4	1.2	62	36	6	3 1/2"
C	CORR. 200	8K	F. RECESS	8.9	.8	44	36	6	5 9/16"
D	CORR. 208	8K	F. RECESS	8.9	.8	44	36	6	5 9/16"

BASIS OF SELECTION: TRANE  
 CONDITIONS: 190°F AVERAGE BWT. AND 66°F B.A.T.

### FIN TUBE RADIATION SCHEDULE

UNIT NO.	MFR. MODEL	LINEAR FEET	NO. ROWS	TOTAL M.B.H.	MAX. ENCL. HEIGHT	G.P.M.	ROOM SERVED	REMARKS
①	S-144	2'-0"	1	2.2	14	.2	GIRLS TOILET 106	
②	S-144	2'-0"	1	2.2	14	.2	BOYS TOILET 207	
③	S-144	2'-0"	1	2.2	14	.2	GIRLS TOILET 106	
④	S-144	2'-0"	1	2.2	14	.2	BOYS TOILET 207	
⑤	S-144	2'-0"	1	2.2	14	.2	GIRLS TOILET 023	
⑥	S-183	5'-0"	1	3.4	14	.3	STORAGE 061	
⑦	S-153	2'-0"	1	1.9	14	.1	PRACTICE	
⑧	S-153	2'-0"	1	1.9	14	.1	PRACTICE	
⑨	S-153	3'-0"	1	2.0	14	.2	STORAGE 018	
⑩	S-153	2'-6"	1	1.7	14	.1	CUSTODIAN	

BASIS OF SELECTION: STERLING VERSALINE  
 CONDITIONS: 200°F ENT & 180°F LWT.

### HEATING HOT WATER PUMP SCHEDULE

UNIT NO.	LOCATION	MFR. MODEL	G.P.M.	T.D.H. FT.	MOTOR DATA	PUMP TYPE	HP	SERVICE
P-1	BOILER ROOM	1067-33	14.4	4.4	3,028	5.00	1750	HEATING HOT WATER
P-2	BOILER ROOM	1067-33	14.4	4.4	3,028	5.00	1750	HEATING HOT WATER

BASIS OF SELECTION: BELL & GOSSETT 15/0 UNIVERSAL TYPE

### EXPANSION TANK SCHEDULE (PRESSURIZED DIAPHRAGM TYPE)

UNIT NO.	LOCATION	MFR. MODEL	SERVICE	TANK NO.	FILL PRESS. P.S.I.G.	OPER. PRESS. P.S.I.G.	RELIEF PRESS. P.S.I.G.	REMARKS
EX-1	BOILER ROOM	MAX-ROOM	HEATING	110	12	22	30	VERTICAL TANK

BASIS: AMTROL INC. ASME STAMPED UNIT

### UNIT VENTILATORS (HEATING HOT WATER)

UNIT NO.	MFR. MODEL	MFR. TYPE	CFM S.A.	CFM VENT AIR	CFM NO. EXH.	MAX. MBH	MAX. G.P.M.	MOTOR DATA	INTAKE LOUVER	REMARKS
UV-1	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-2	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-3	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-4	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-5	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-6	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-7	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-8	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-9	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-10	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-11	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-12	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-13	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-14	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-15	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-16	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-17	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-18	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-19	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-20	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM
UV-21	5000	36	1250	625	NONE	46.0	4.6	1/2 HP	1.00	BOYS EXERCISE OR GYM

BASIS OF SELECTION: AAF HERTZMAN NELSON DAMPER CONTROLLED HOT WATER UNIT VENTILATORS - 200°F ENT & 180°F LWT.

NOTES: 1. ADJUST UV-15 & 16 FOR 850 CFM AIR FLOW DURING MAXIMUM FLOW CONDITIONS.  
 2. UV-5 SHALL HAVE "SHIMMING ROOL CONSTRUCTION."

### UNIT VENTILATORS (STEAM)

UNIT NO.	MFR. MODEL	MFR. TYPE	CFM S.A.	CFM VENT AIR	CFM NO. EXH.	MAX. MBH	MAX. G.P.M.	MOTOR DATA	INTAKE LOUVER	REMARKS
UV-22	3010	36	750	250	625	2	1/2 HP	1.00	OTHERS	PROVIDE RETURN AIR SILL FOR MOUNTING IN CEILING FOR CONDENSATE DRAINAGE

BASIS OF SELECTION: AAF HERTZMAN NELSON - VALVE CONTROLLED.

### CAST IRON RADIATORS

UNIT NO.	ROOM LOCATION	NO. OF SECTIONS	TUBES	HEIGHT A.F.F.	EDR
CI-1	E-129	18	4	25"	36
CI-2	E-233	30	4	25"	60
CI-3	E-237	28	4	25"	36
CI-4	E-149	12	4	25"	24

BASIS: CRANE THIN TUBE RADIATION FLOOR MODEL, COMPACT TYPE "N" 240 BTU/SQ. FT./HOUR.

### CENTRIFUGAL EXHAUST FANS - ROOF MOUNTED

UNIT NO.	SERVICE	MFR. MODEL	C.F.M.	APPROX. FPM	S.F.W. RPM	MOTOR DATA	APPROX. SIZES	REMARKS
EF-1	GYM	C8-18	2000	260	2935	1/2	1/4 1/8 1 60	4.5
2	GYM	C8-18	2000	260	2935	1/2	1/4 1/8 1 60	4.5
3	GYM	C8-18	2000	260	2935	1/2	1/4 1/8 1 60	4.5
4	GYM	C8-18	2000	260	2935	1/2	1/4 1/8 1 60	4.5
5	BOYS TOILET	C8-18	750	180	3068	1/2	1/4 1/8 1 60	4.6
6	BOYS TOILET	C8-18	448	775	3040	1/2	1/4 1/8 1 60	4.6
7	GIRLS TOILET	C8-18	605	710	2740	1/2	1/4 1/8 1 60	4.7
8	GIRLS TOILET	C8-18	600	800	3070	1/2	1/4 1/8 1 60	4.7
9	CLASSRM	C8-18	625	850	3300	1/2	1/4 1/8 1 60	4.8
10	BOYS EXERCISE OR GYM	C8-18	1180	928	3618	1/2	1/4 1/8 1 60	6.6
11	CR'S	C8-18	1405	1305	5130	1/2	1/4 1/8 1 60	10.5
12	CR'S	C8-18	2170	1220	5290	1/2	1/4 1/8 1 60	11.0
13	CLASSRM	C8-18	1250	760	2900	1/2	1/4 1/8 1 60	4.4
14	CLASSRM	C8-18	1850	760	2900	1/2	1/4 1/8 1 60	4.4
15	CLASSRM	C8-18	850	1010	3985	1/2	1/4 1/8 1 60	7.2
16	CLASSRM	C8-18	850	1010	3985	1/2	1/4 1/8 1 60	7.2
17	CLASSRM	C8-18	800	675	2655	1/2	1/4 1/8 1 60	4.0
18	CLASSRM	C8-18	800	675	2655	1/2	1/4 1/8 1 60	4.0
19	CAFET	L8-24	3000	480	4940	1/2	1/4 1/8 1 60	11.3
20	CAFET	L8-24	310	480	1805	1/2	1/4 1/8 1 60	2.1

BASIS OF SELECTION: PENN DOMEX V-BELT DRIVE WITH 12" HIGH ALUMINUM PREFABRICATED SOUND CURBS, BIRDSCREENS & GRAVITY TYPE DAMPERS.

### EXHAUST FANS (THRU WALL)

UNIT NO.	LOCATION	MFR. MODEL	INSTALL UNIT SIZE	CFM	MOTOR DATA	DRIVE	REMARKS
WEF-1	RM-8124	CWP 67	WALL	220	1/2 HP	1 60	DIRECT W/AUTOMATIC SHUTTERS

BASIS OF SELECTION: I.L.G.

### IN-LINE EXHAUST FAN

UNIT NO.	SERVICE	MFR. MODEL	CFM	S.F.W. H.O.	RPM	DRIVE	SUPPORT	MOTOR DATA	REMARKS
IF-1	GEN. SHOP	R-018	240	1/4	1500	BELT	CEILING	1/2 HP	WITH FAN BELT GUARD & DOWN WALL DUCT CONN. & BUSHINGS & SUSTAIN.

BASIS: LOREN COOK CENTRIFUGAL IN-LINE FAN

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### ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH

Scale	Designed By	Drawn By	Checked By	Job Number	Date
NONE	R.G.	D.B.	R.G.	C7501A	JUL 75

SCHEDULES

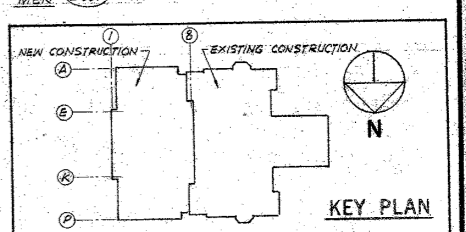
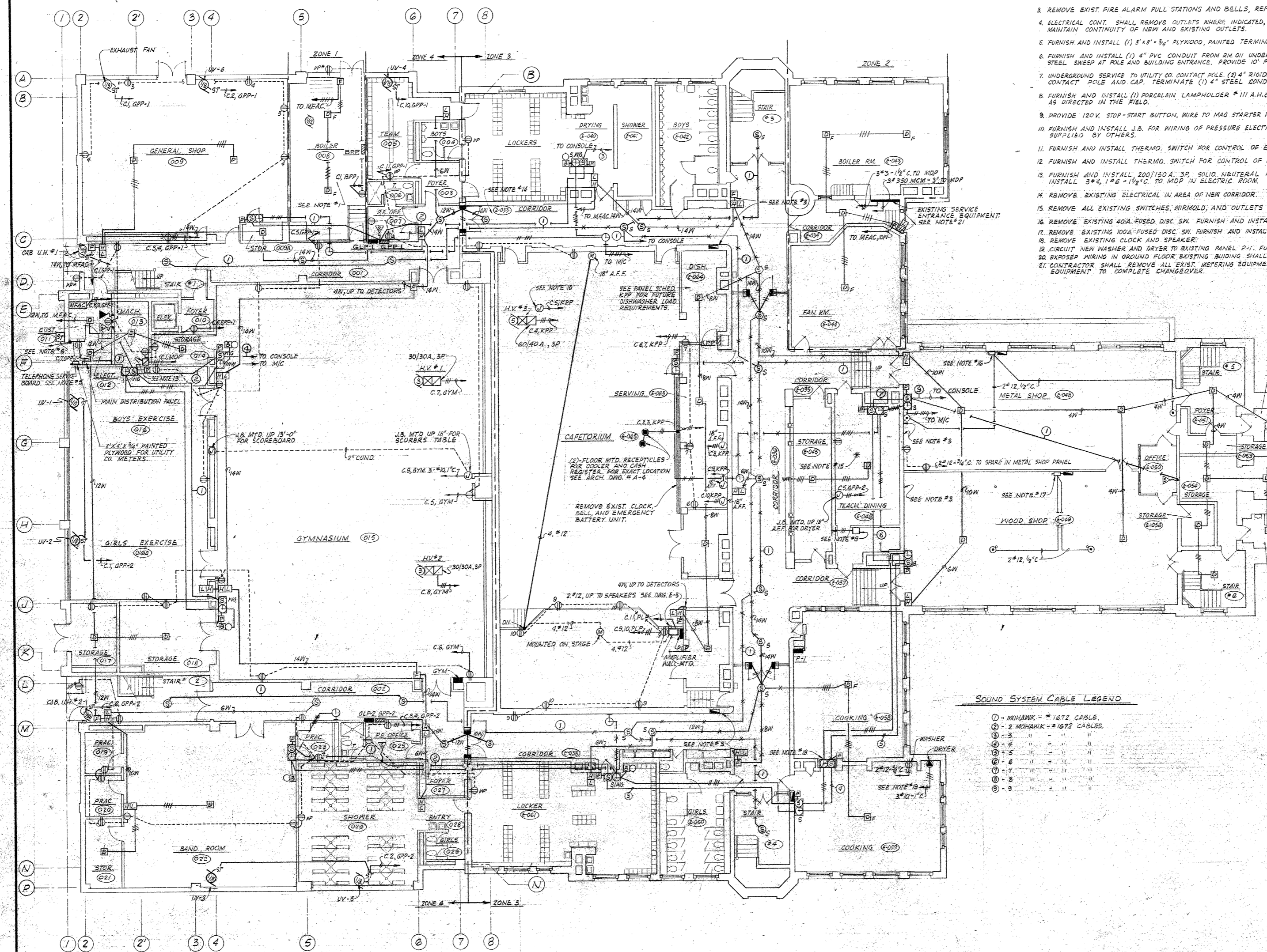
## HEAT. & VENT. HV-6





GENERAL POWER NOTES

- ELECTRICAL CONTRACTOR SHALL INSTALL AND CONNECT (3) FIRE-O-MATIC DETECTORS, FURNISHED BY H.V. CONTRACTOR. FOR EXACT LOCATION SEE DWG. # H.V.-5, BOILER RM #008.
- ELECTRICAL CONTRACTOR MAY USE NON-METALIC SHEATHED CABLE WHEREVER PERMITTED BY LOCAL AUTHORITY, UNLESS OTHERWISE NOTED.
- REMOVE EXIST. FIRE ALARM PULL STATIONS AND BELLS, REPLACE WITH STAINLESS STEEL PLATE.
- ELECTRICAL CONT. SHALL REMOVE OUTLETS WHERE INDICATED, EXTEND CIRCUITING SO AS TO MAINTAIN CONTINUITY OF NEW AND EXISTING OUTLETS.
- FURNISH AND INSTALL (1) 5'x8'x3/4" PLYWOOD, PAINTED TERMINAL BOARD, FOR TELEPHONE CO.
- FURNISH AND INSTALL (1) 4" PVC CONDUIT FROM RM. 011 UNDERGROUND TO CONTACT POLE. PROVIDE STEEL SWEEP AT POLE AND BUILDING ENTRANCE. PROVIDE 10' ROPE RISER.
- UNDERGROUND SERVICE TO UTILITY CO. CONTACT POLE. (2) 4" RIGID STEEL CONDUITS SWEEP UP 10' ON CONTACT POLE AND CAP. TERMINATE (1) 4" STEEL CONDUIT AT BASE OF POLE.
- FURNISH AND INSTALL (1) PORCELAIN LAMPHOLDER # III A.H.C.H. WITH SWITCH IN ELEVATOR PIT AS DIRECTED IN THE FIELD.
- PROVIDE 120V. STOP-START BUTTON, WIRE TO MAG STARTER HW #3 - 5#12-3/16" C.
- FURNISH AND INSTALL J.B. FOR WIRING OF PRESSURE ELECTRIC SWITCH, THERMOSTAT, AS SUPPLIED BY OTHERS.
- FURNISH AND INSTALL THERMO. SWITCH FOR CONTROL OF EF-17.
- FURNISH AND INSTALL THERMO. SWITCH FOR CONTROL OF EF-18.
- FURNISH AND INSTALL 200/150A. 3P. SOLID NEUTRAL FUSED DISCONNECT FOR ELEVATOR, INSTALL 3#4, 1#6-1/2" C. TO MDP IN ELECTRIC ROOM.
- REMOVE EXISTING ELECTRICAL IN AREA OF NEW CORRIDOR.
- REMOVE ALL EXISTING SWITCHES, WIRING, AND OUTLETS ROOM E-046.
- REMOVE EXISTING 40A. FUSED DISC. SW. FURNISH AND INSTALL 40A. 3P. SHUNT TRIP CIR. BKR. IN NEMA 1 ENCLOSURE.
- REMOVE EXISTING 100A. FUSED DISC. SW. FURNISH AND INSTALL 100A. 3P. SHUNT TRIP CIR. BKR. IN NEMA 1 ENCLOSURE.
- REMOVE EXISTING CLOCK AND SPEAKER.
- CIRCUIT NEW WASHER AND DRYER TO EXISTING PANEL P-1. FURNISH AND INSTALL NEW 2-30A. CIR. BKR.
- EXPOSED WIRING IN GROUND FLOOR EXISTING BUILDING SHALL BE IN RIGID STEEL CONDUIT.
- CONTRACTOR SHALL REMOVE ALL EXIST. METERING EQUIPMENT, FURNISH AND INSTALL ALL NECESSARY EQUIPMENT TO COMPLETE CHANGEOVER.



SOUND SYSTEM CABLE LEGEND

①	MOHAWK - # 1672 CABLE.
②	MOHAWK - # 1072 CABLES.
③	"
④	"
⑤	"
⑥	"
⑦	"
⑧	"
⑨	"

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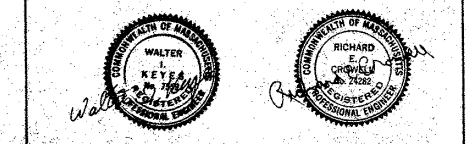
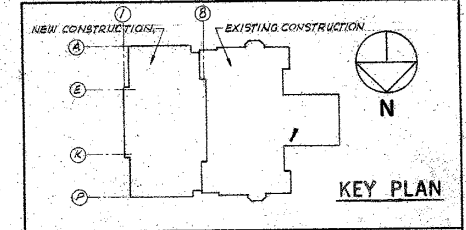
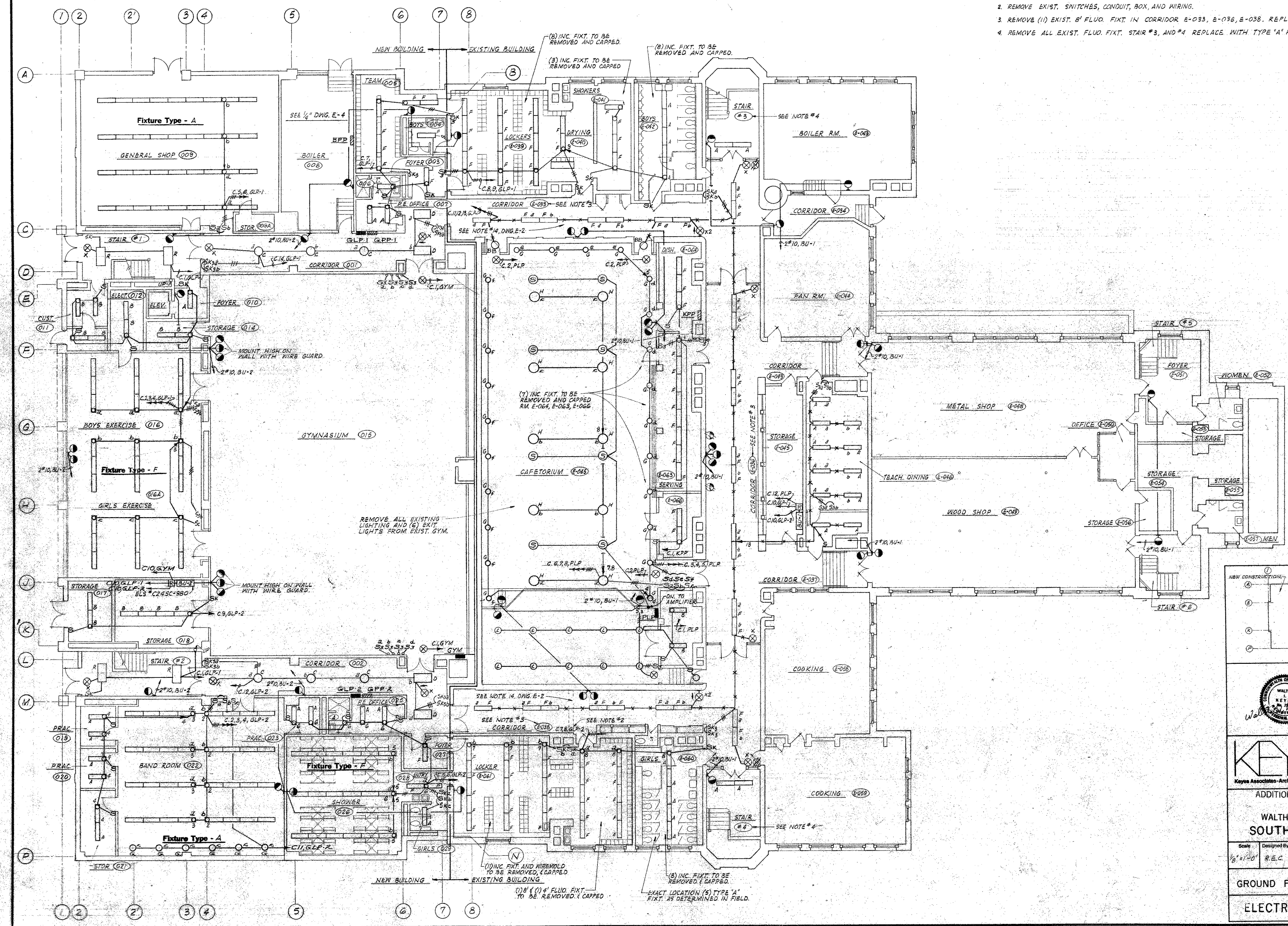
ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	R.E.C.	L.E.S.	R.E.C.	C-7501A	JULY, 1975

GROUND FLOOR POWER PLAN  
**ELECTRICAL E-2**

**GENERAL LIGHTING NOTES**

1. ELECTRICAL CONTRACTOR SHALL INSTALL ALL LIGHTING FIXTURES INCORPORATED WITH A NEW CEILING AS SHOWN BY ARCHITECTURAL REFLECTED CEILING PLANS, WHERE NO NEW CEILINGS ARE INDICATED LIGHTING FIXTURES SHALL BE INSTALLED AS SHOWN ON ELECTRICAL DRAWINGS, OR AS DIRECTED IN FIELD.
2. REMOVE EXIST. SWITCHES, CONDUIT, BOX, AND WIRING.
3. REMOVE (1) EXIST. 8' FLUO. FIXT. IN CORRIDOR E-033, E-036, E-038. REPLACE WITH TYPE 'F' FIXTURE.
4. REMOVE ALL EXIST. FLUO. FIXT. STAIR #3, AND #4. REPLACE WITH TYPE 'A' FIXT'S.

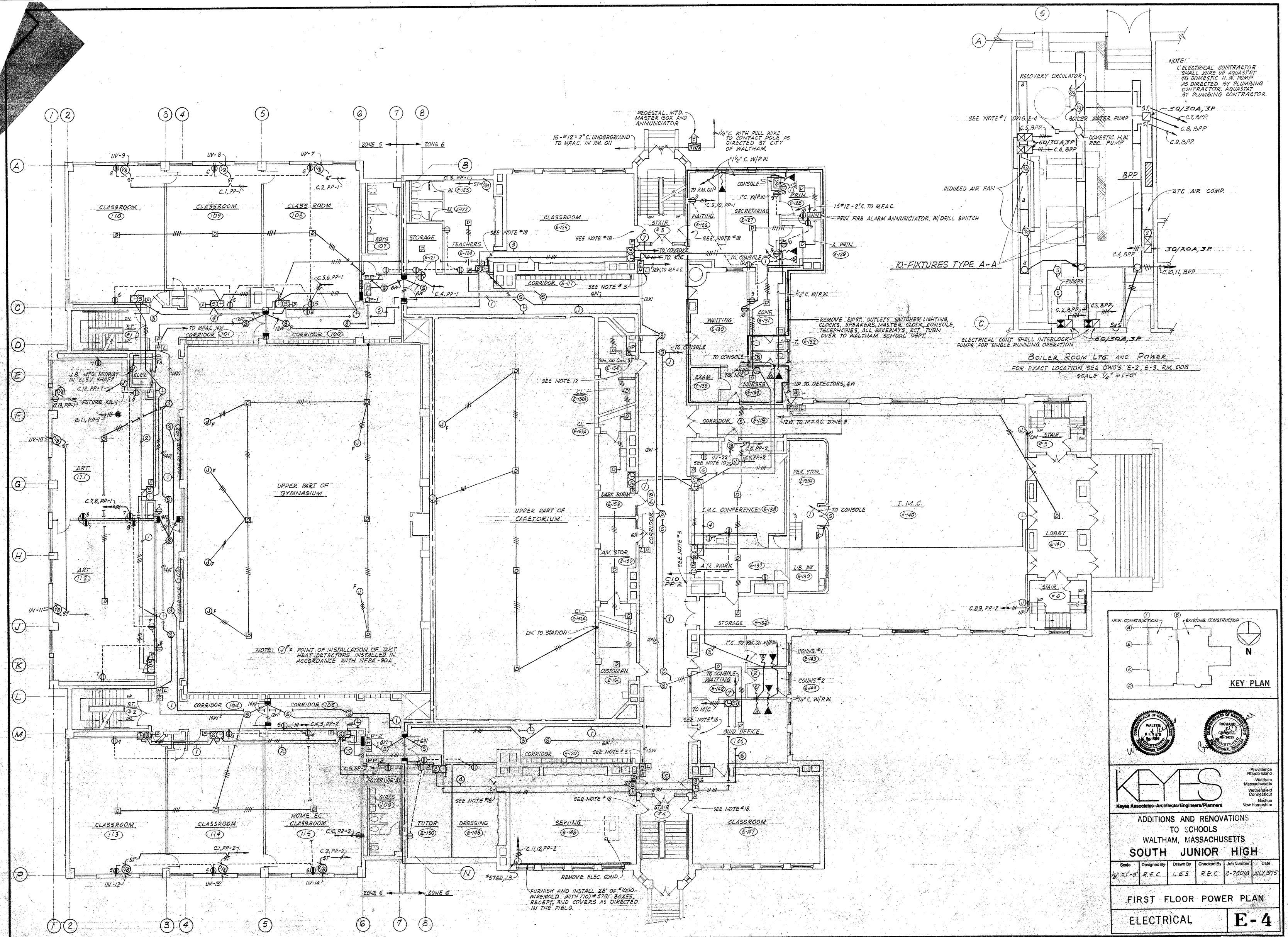


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 Nashua New Hampshire

**ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8" = 1'-0"	R.E.C.	L.E.S.	R.E.C.	C-7501A	JULY, 1975

**GROUND FLOOR LIGHTING PLAN**  
**ELECTRICAL E-3**



NEW CONSTRUCTION

EXISTING CONSTRUCTION

KEY PLAN

PROVIDENCE RICE BRAND

WALTHAM MASSACHUSETTS

WETHERFIELD CONNECTICUT

MAHARIS NEW HAMPSHIRE

**KEYES**

Keyes Associates-Architects/Engineers/Planners

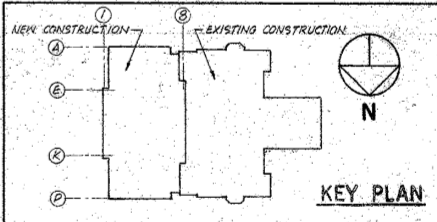
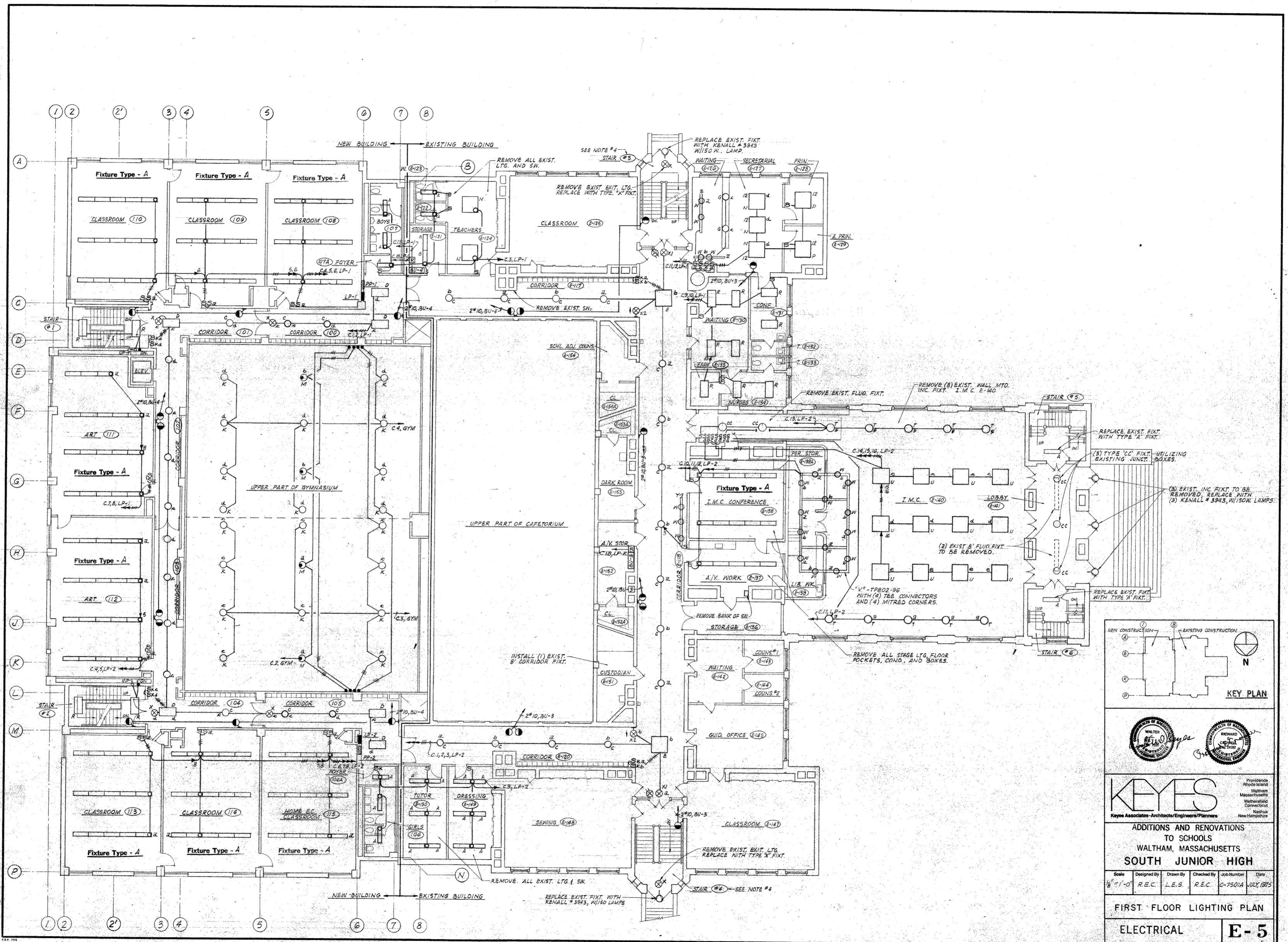
ADDITIONS AND RENOVATIONS TO SCHOOLS WALTHAM, MASSACHUSETTS

**SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8" = 1'-0"	R.E.C.	L.E.S.	R.E.C.	G-7501A	JULY, 1975

FIRST FLOOR POWER PLAN

ELECTRICAL **E-4**

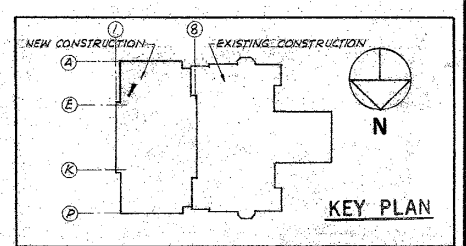
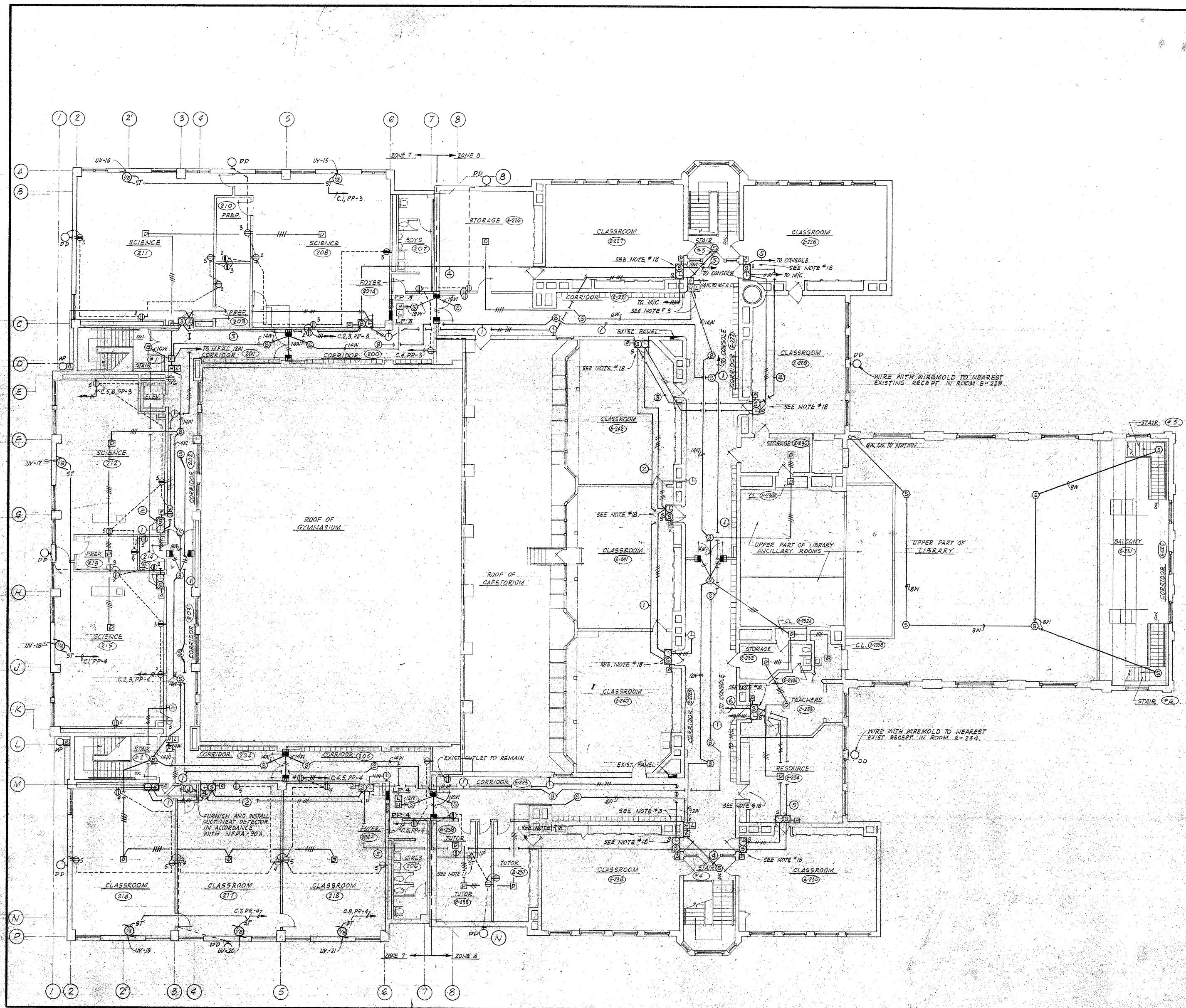


**KEYES**  
 Keyes Associates-Architects/Engineers/Planners  
 Providence  
 Waltham  
 Massachusetts  
 Waltham  
 Connecticut  
 Nashua  
 New Hampshire

**ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8" = 1'-0"	R.E.C.	L.E.S.	R.E.C.	G-7501A	JULY 1975

**FIRST FLOOR LIGHTING PLAN  
 ELECTRICAL E-5**



**KEYES**  
 Keyes Associates - Architects/Engineers/Planners  
 Providence  
 Rhode Island  
 Waltham  
 Massachusetts  
 Wethersfield  
 Connecticut  
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 New Hampshire

**ADDITIONS AND RENOVATIONS  
 TO SCHOOLS  
 WALTHAM, MASSACHUSETTS  
 SOUTH JUNIOR HIGH**

Scale	Designed By	Drawn By	Checked By	Job Number	Date
1/8"=1'-0"	R.E.C.	L.E.S.	R.E.C.	C-7501A	JULY, 1975

**SECOND FLOOR POWER PLAN**  
**ELECTRICAL E-6**





# ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER

510 MOODY STREET  
WALTHAM, MA 02453

CITY OF WALTHAM  
Jeannette McCarthy, Mayor

**Architect**

CSS Architects Inc.  
107 Audubon Road  
Bldg. 2, Suite 300  
Wakefield, MA 01880  
T: 781-245-8400  
F: 781-245-9372  
www.cssarchitects.com



**Destructive Testing Consultants**

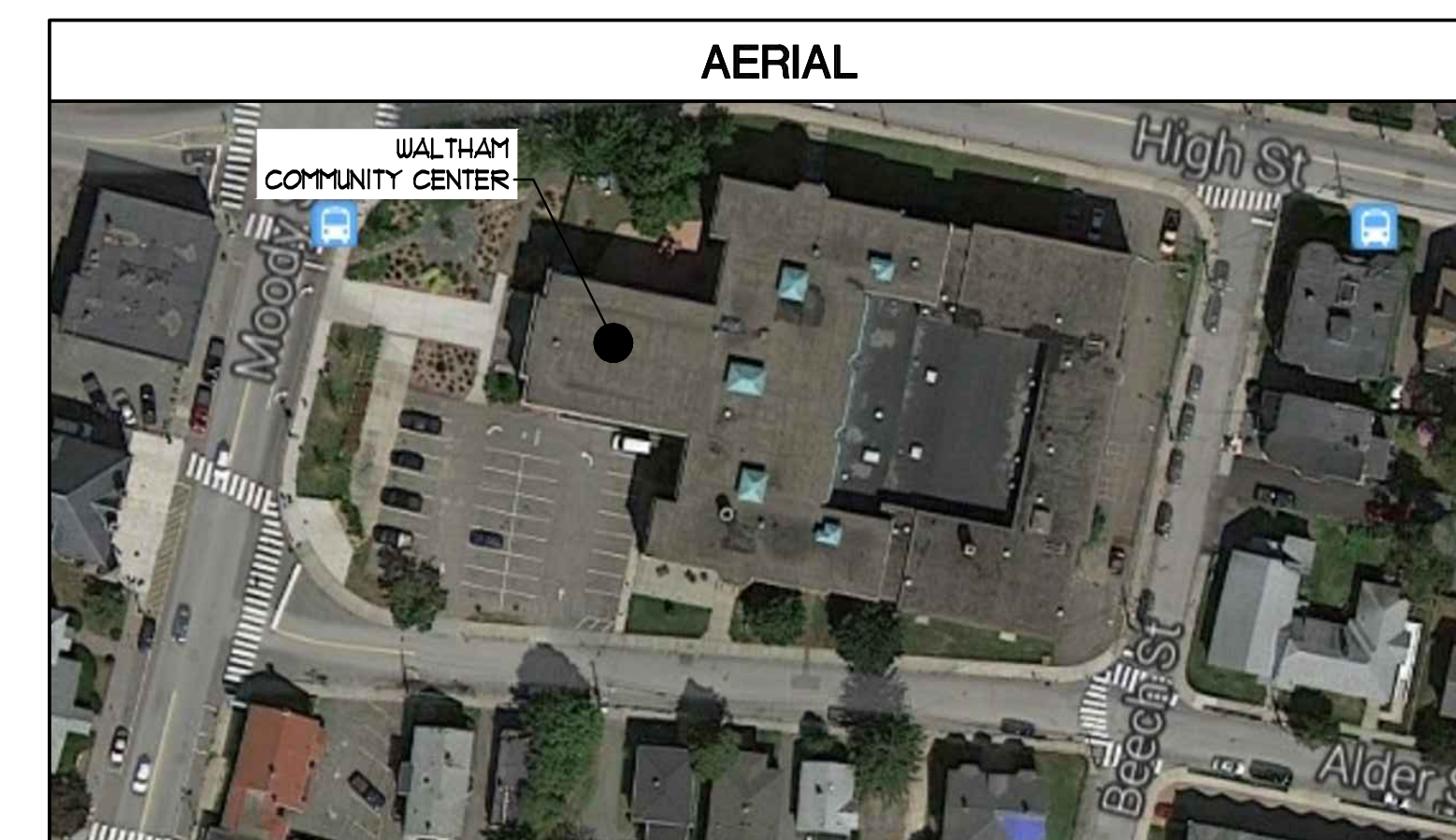
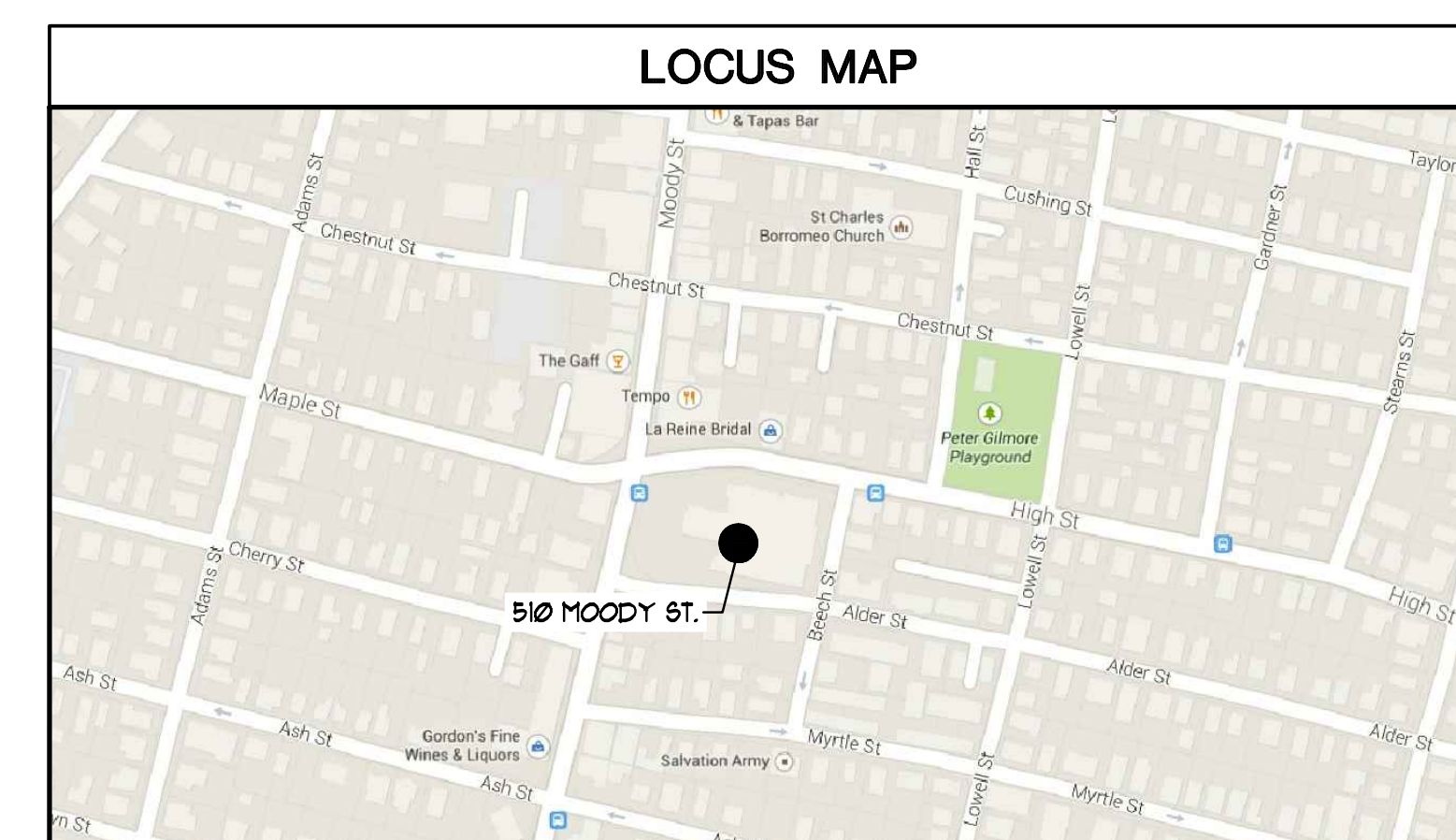
Building Enclosure Associates, LLC  
31 Fifth Street  
Boston, MA 02129  
T: 617-520-9555

**Environmental Consultant**

Cardno ATC  
600 West Cummings Park  
Suite 5450  
Woburn, MA 01801  
T: 781-932-9400  
F: 781-932-6211  
www.cardnoatc.com

**Cost Estimator**

PM&C  
59 South Street  
Hingham, MA 02043  
T: 781-740-8007



ABBREVIATIONS			
⊙	AT	MTL	METAL
&	AND	NO.	NUMBER
ALUM.	ALUMINUM	N.T.S.	NOT TO SCALE
BD.	BOARD	O.C.	ON CENTER
BLK'G.	BLOCKING	P.F.	PRE FINISHED
CONC.	CONCRETE	P.T.	PRESSURE-PRESERVATIVE TREATED
CONT.	CONTINUOUS	PTD.	PAINTED
DW'G.	DRAWING	PWD.	PLYWOOD
EQUIP.	EQUIPMENT	REQD.	REQUIRED
ELECT.	ELECTRICAL	R.U.	ROOF TOP UNIT
EXIST.	EXISTING	S.S.	STAINLESS STEEL
EXT.	EXTERIOR	STL	STEEL
G.C.	GENERAL CONTRACTOR	SPEC'S	SPECIFICATIONS
GALV.	GALVANIZED	TERM.	TERMINATION
INSUL.	INSULATION	TYP.	TYPICAL
MANUF.	MANUFACTURER	U.O.N.	UNLESS OTHERWISE NOTED
MECH.	MECHANICAL	WD.	WOOD

LIST OF DRAWINGS	
T10	- TITLE SHEET
AD11	- DEMOLITION ROOF PLAN
AD21	- DEMOLITION ROOF DETAILS
AD22	- DEMOLITION ROOF DETAILS
A11	- NEW CONSTRUCTION ROOF PLAN
A12	- NEW CONSTRUCTION SECTION/ELEVATIONS
A21	- NEW CONSTRUCTION ROOF DETAILS
A22	- NEW CONSTRUCTION ROOF DETAILS
P10	- PLUMBING LEGEND, NOTES, SCHEDULE AND DETAILS
P11	- PLUMBING ROOF PLAN

Bid Set  
February 4, 2015

ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER  
WALTHAM, MASSACHUSETTS



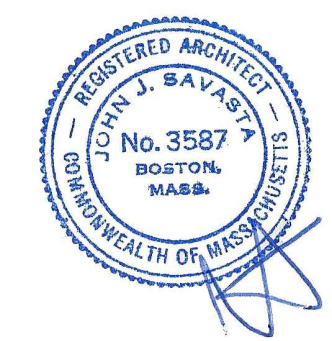
**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

**CSS ARCHITECTS INC.**  
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Wakefield, MA 01880  
css@cssarchitects.com



Title:

**DEMOLITION ROOF PLAN AND TYPES**

Scale: AS NOTED

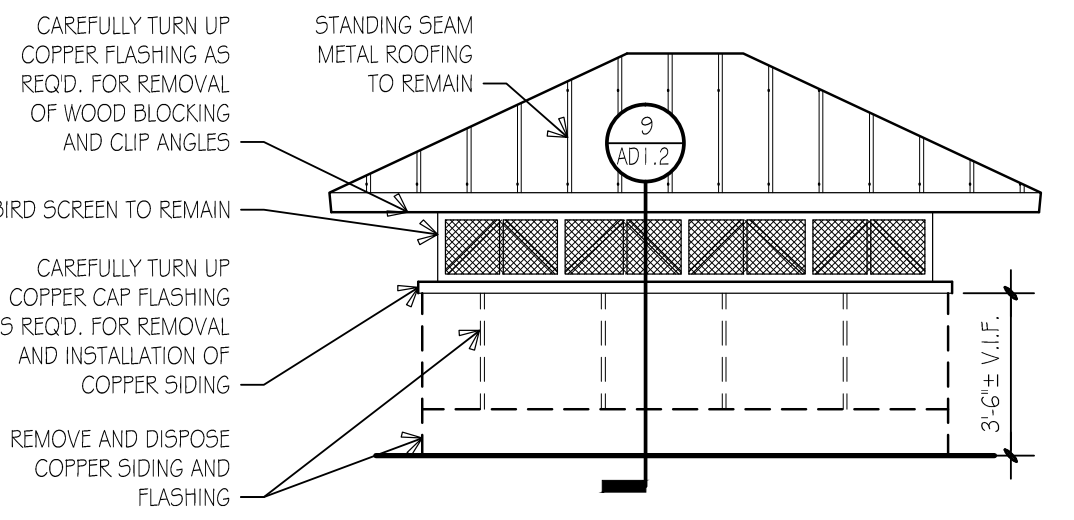
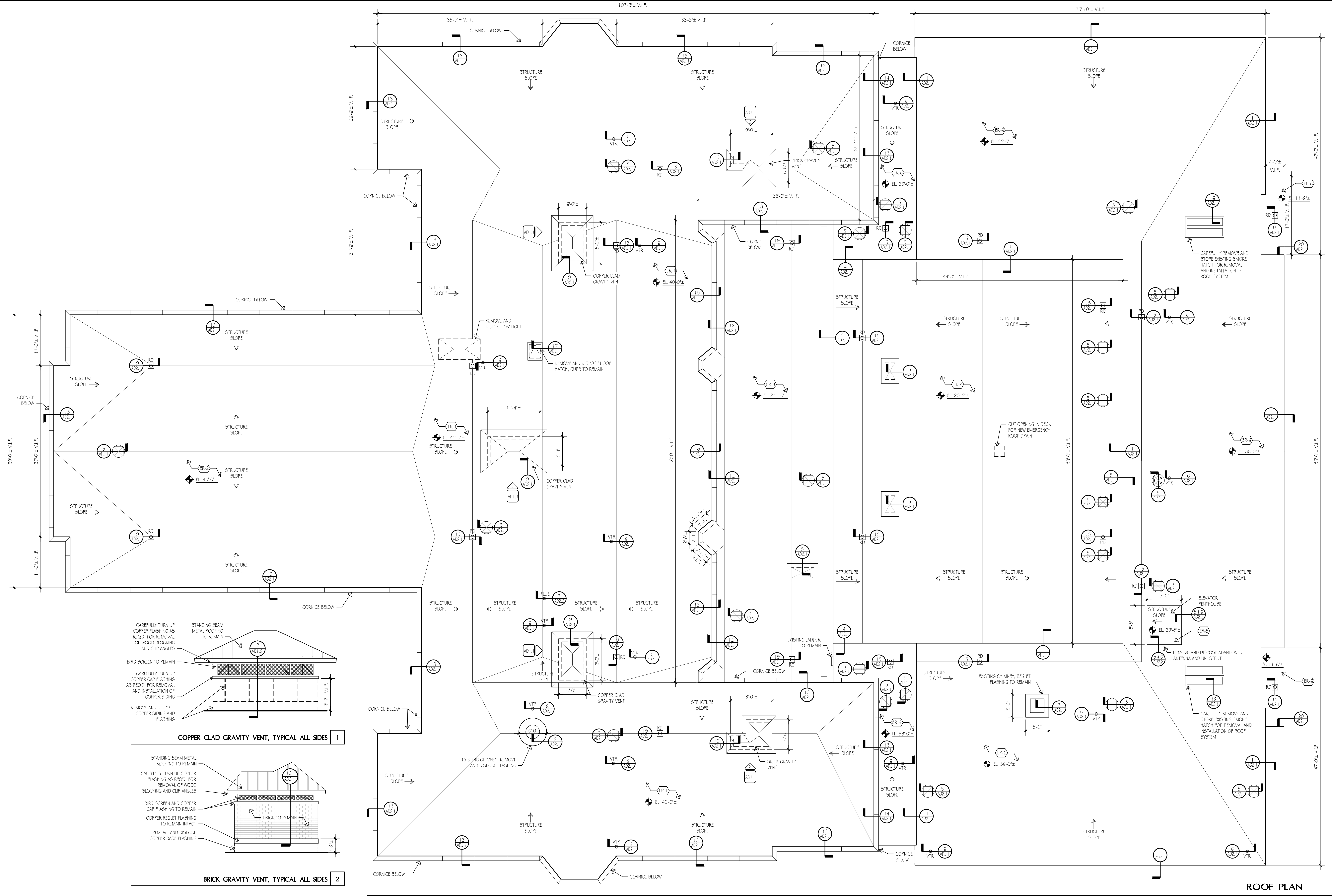
Date: 4 FEB. 2015

Drawn: LM/JET

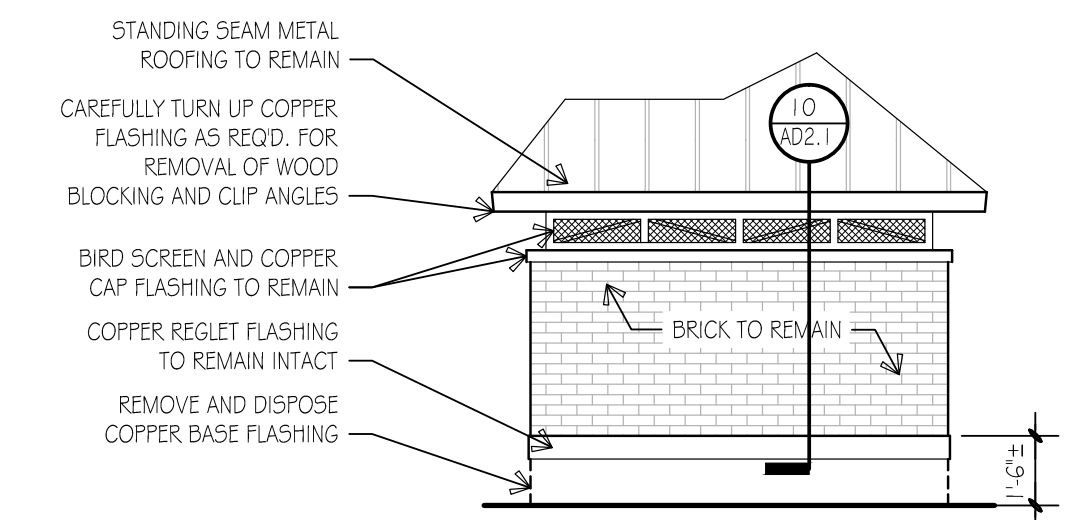
Checked: JET/CTC

Project No: 1138

**AD1.1**

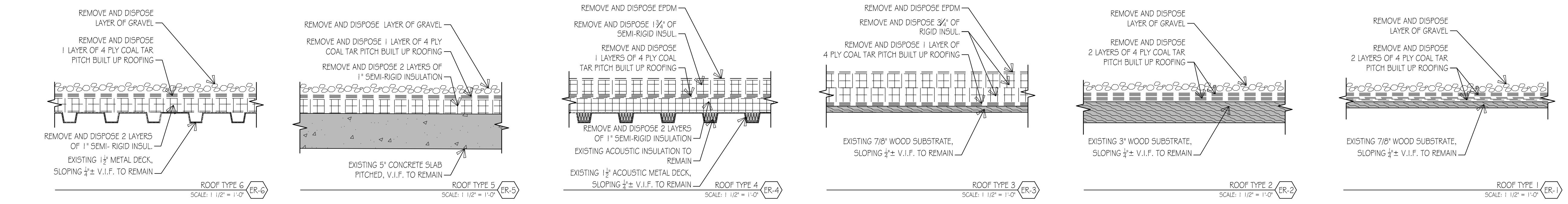


**COPPER CLAD GRAVITY VENT, TYPICAL ALL SIDES 1**



**BRICK GRAVITY VENT, TYPICAL ALL SIDES 2**

**EXISTING ROOF SYSTEM TYPES**

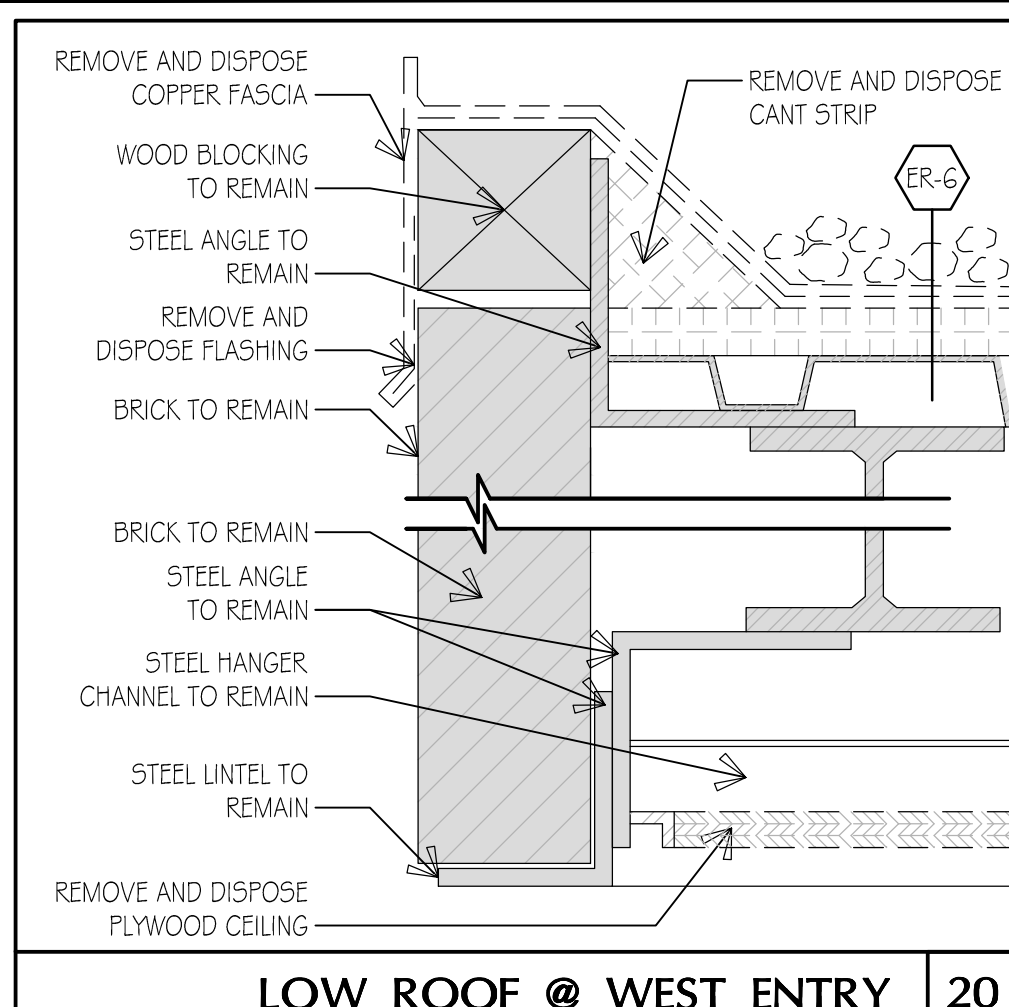


**DEMOLITION LEGEND**

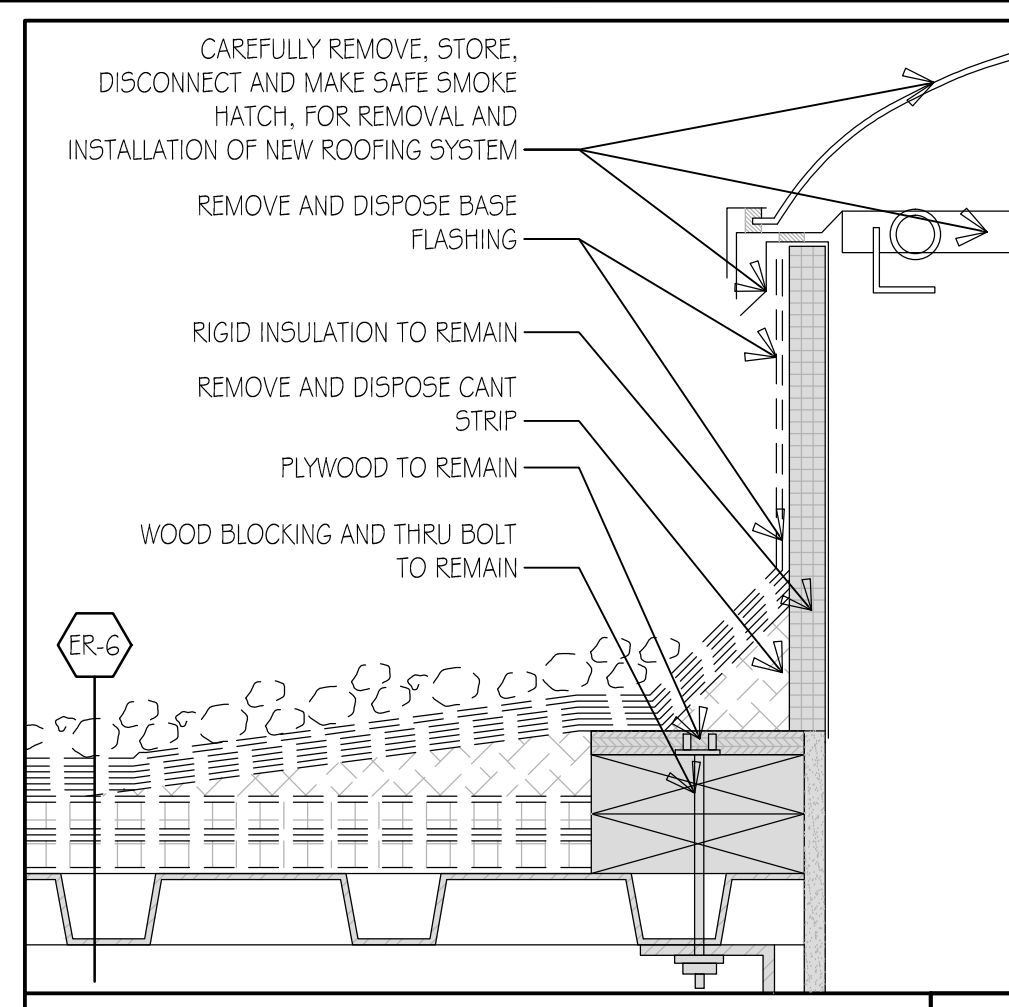
- REMOVE AND DISPOSE ROOF DRAIN WITH STRAINER. SEE DETAIL 15A02.1 AND 15A02.2
- EXISTING VENT PIPE. REMOVE AND DISPOSE FLASHING. SEE DETAIL 6A02.1
- REMOVE AND STORE EXHAUST GRAVITY FANS. REMOVE AND DISPOSE FLASHING. SEE DETAIL 5A02.1
- STRUCTURE SLOPE. APPROXIMATE DIRECTION OF EXISTING ROOF SLOPE. CONTRACTOR TO V.I.F.
- EXISTING ROOF SYSTEM TYPE
- APPROXIMATE HEIGHT OF ROOF ABOVE GRADE
- THICKNESS OF INSULATION

**ROOF PLAN**  
SCALE: 1/8" = 1'-0"

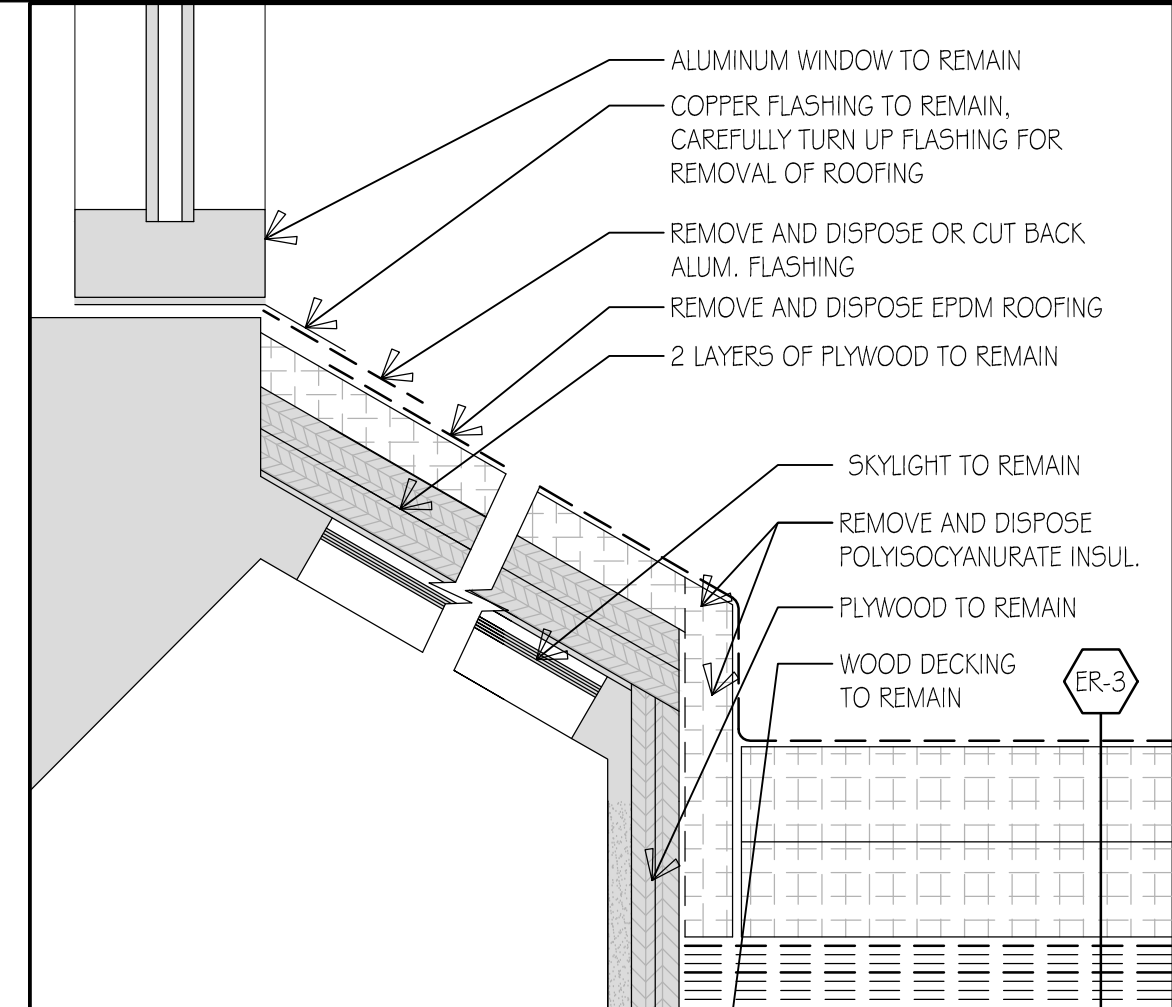
SCALE: 1 1/2" = 1'-0"



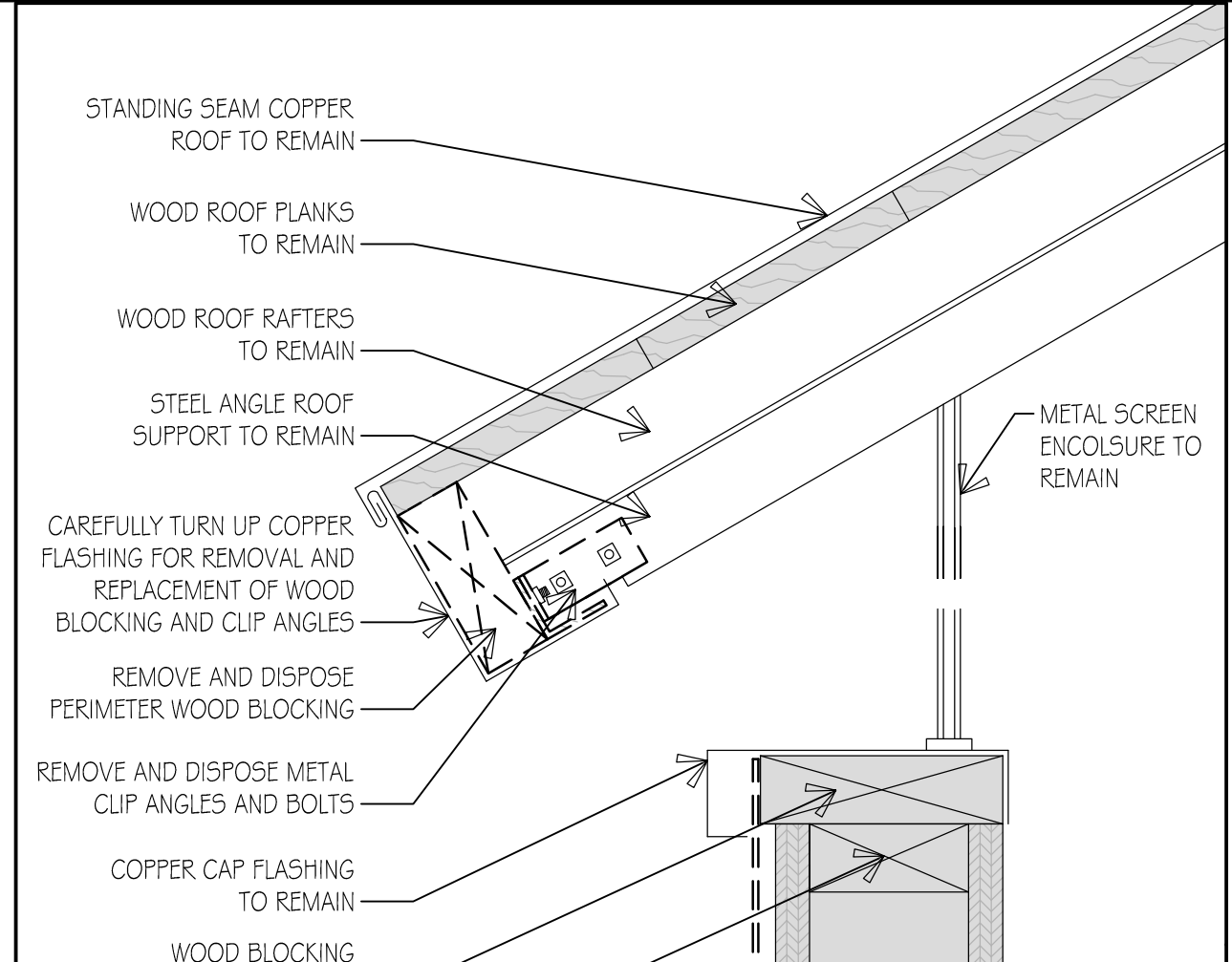
LOW ROOF @ WEST ENTRY 20



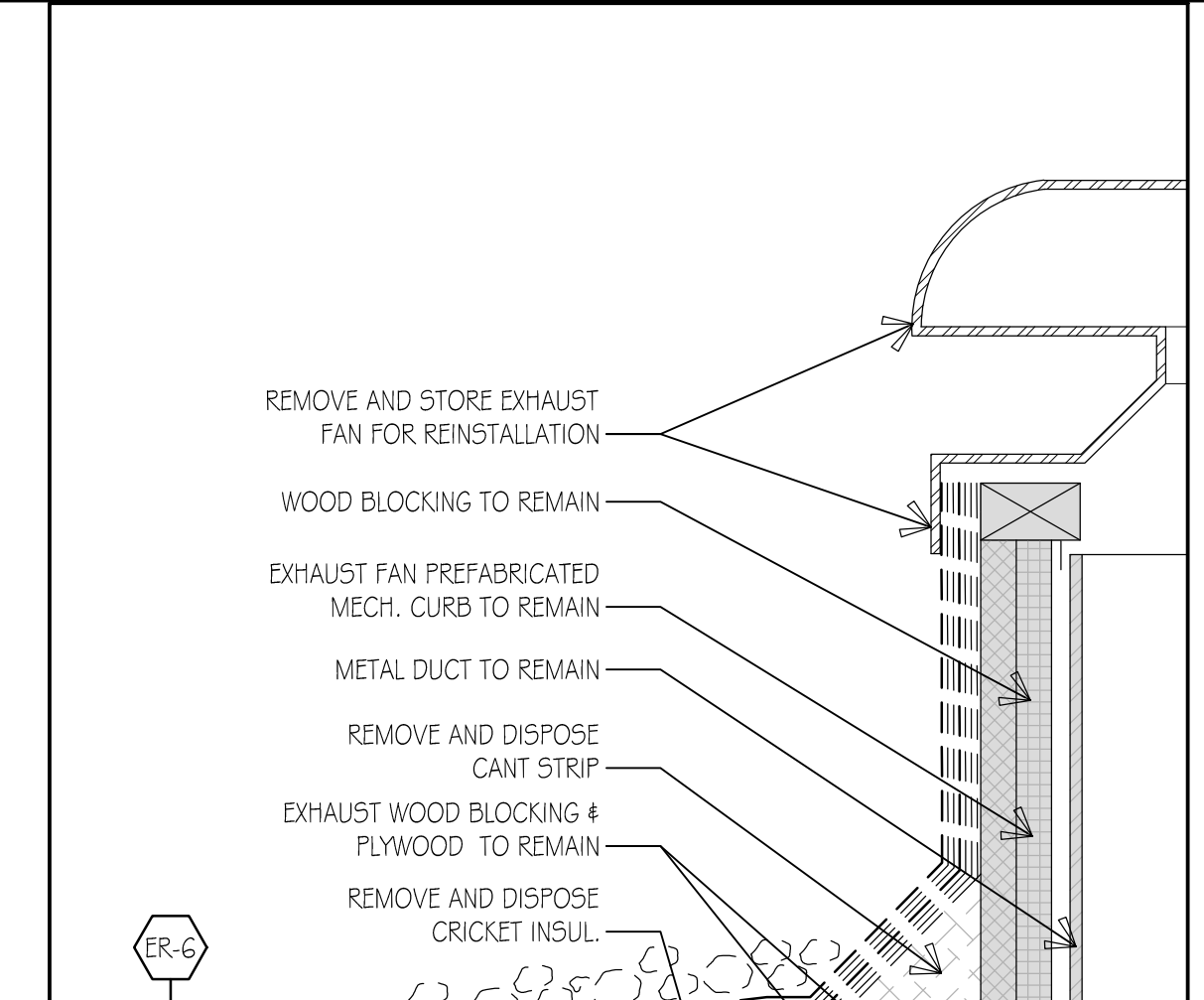
FLASHING @ SMOKE HATCH 16



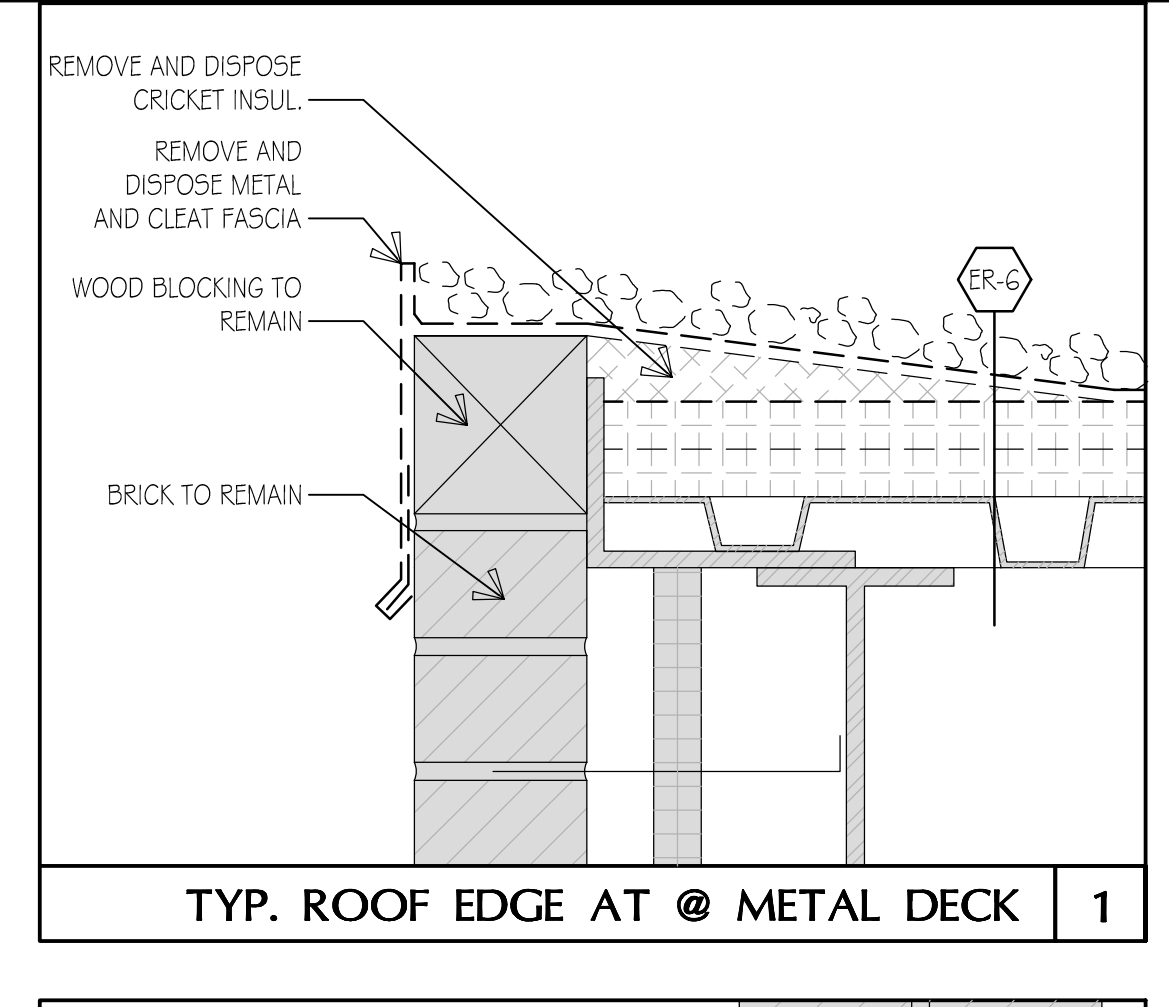
COVERED SKYLIGHT @ LOW ROOF 12



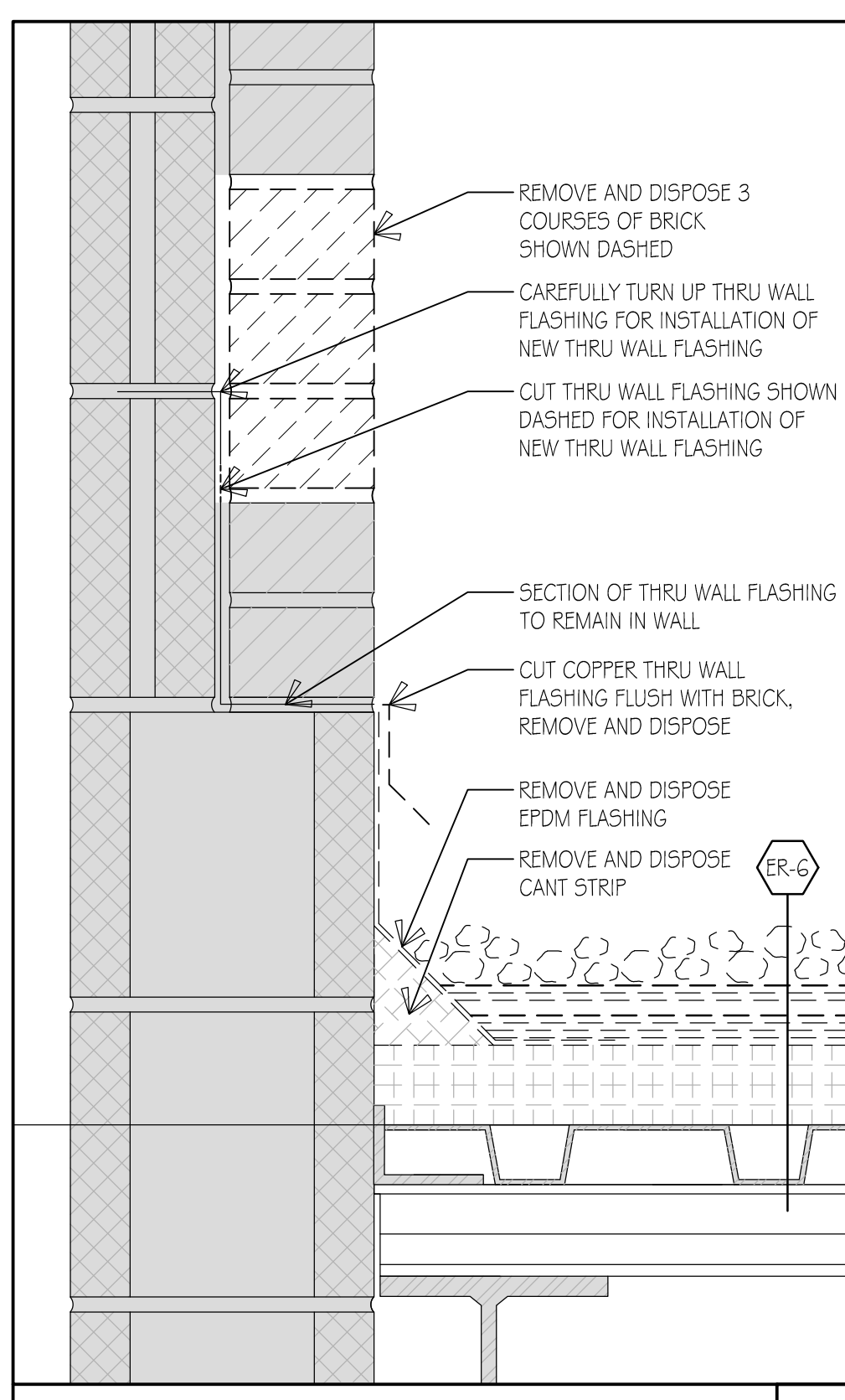
COPPER CLAD ENCLOSED GRAVITY VENT 9



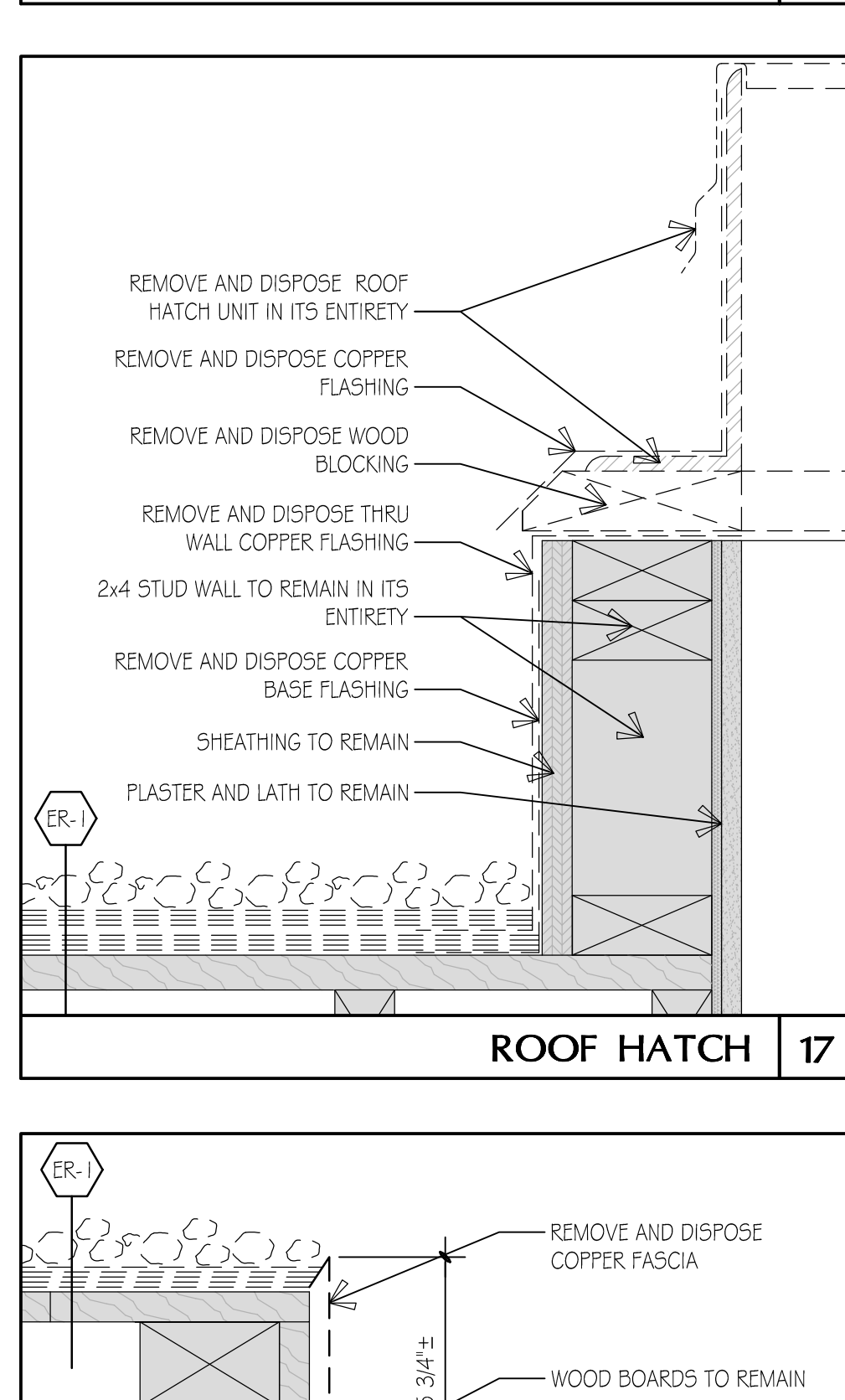
EXHAUST FAN CURB FLASHING 5



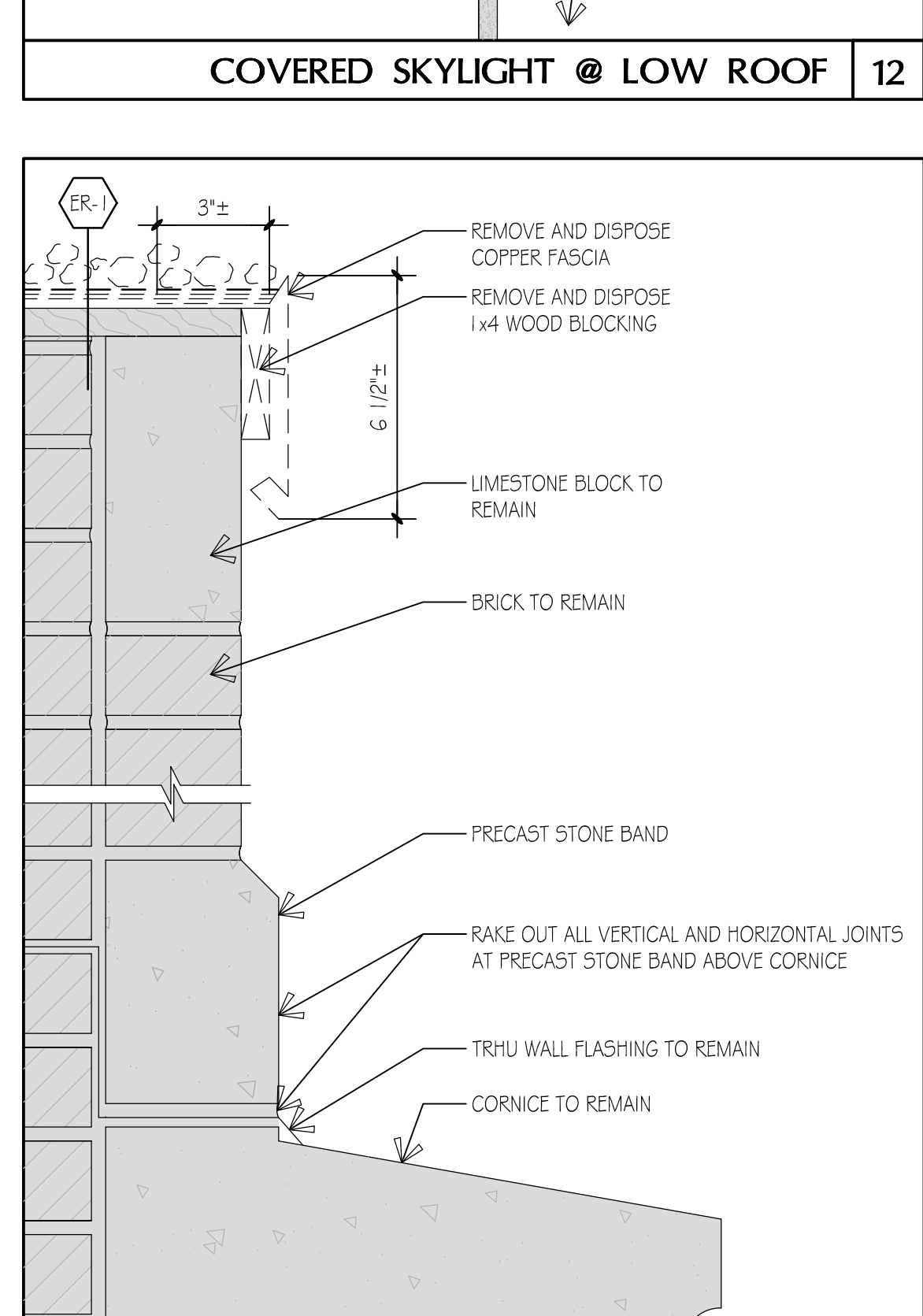
TYP. ROOF EDGE AT @ METAL DECK 1



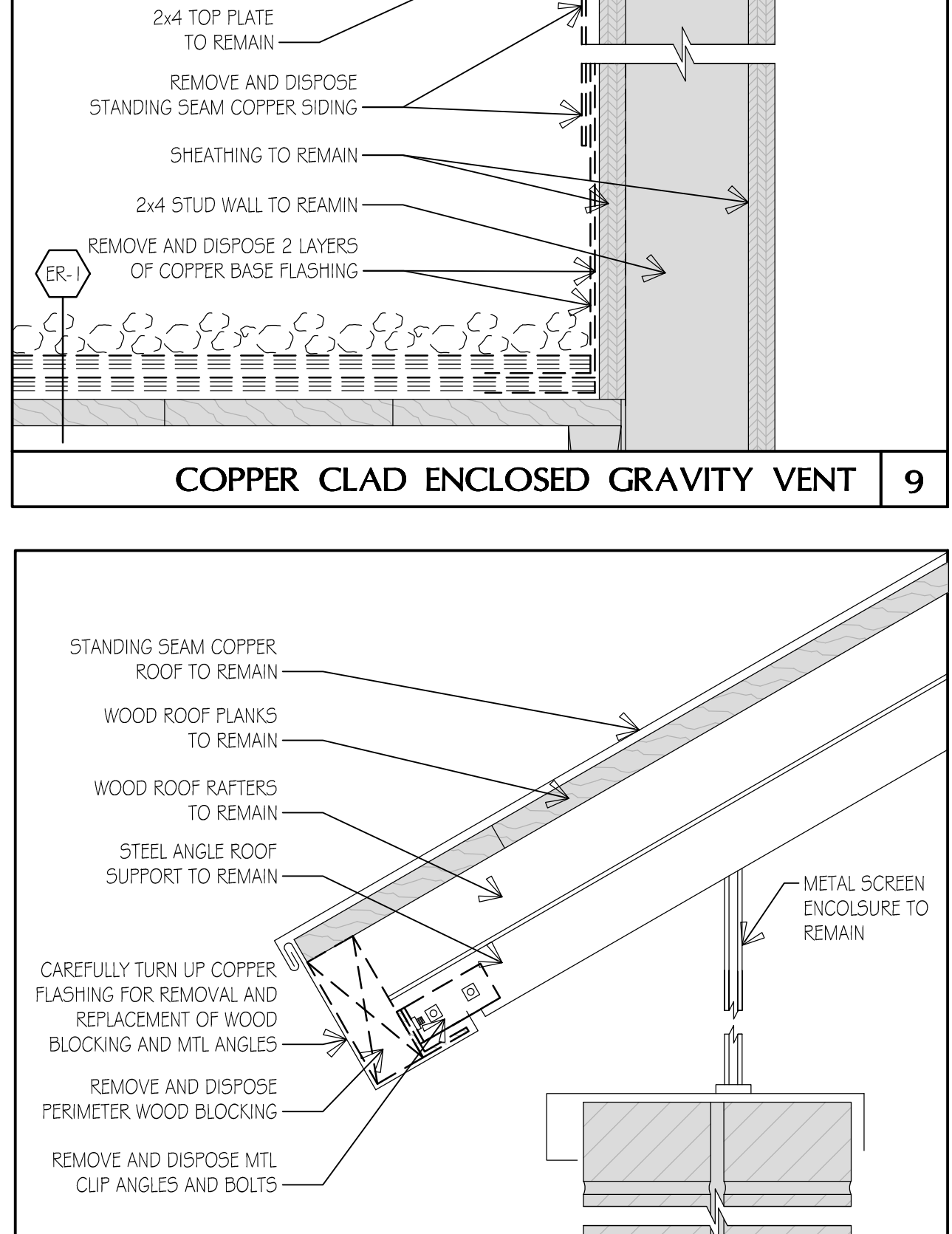
THRUWALL FLASHING AT ELEVATOR PENTHOUSE 21



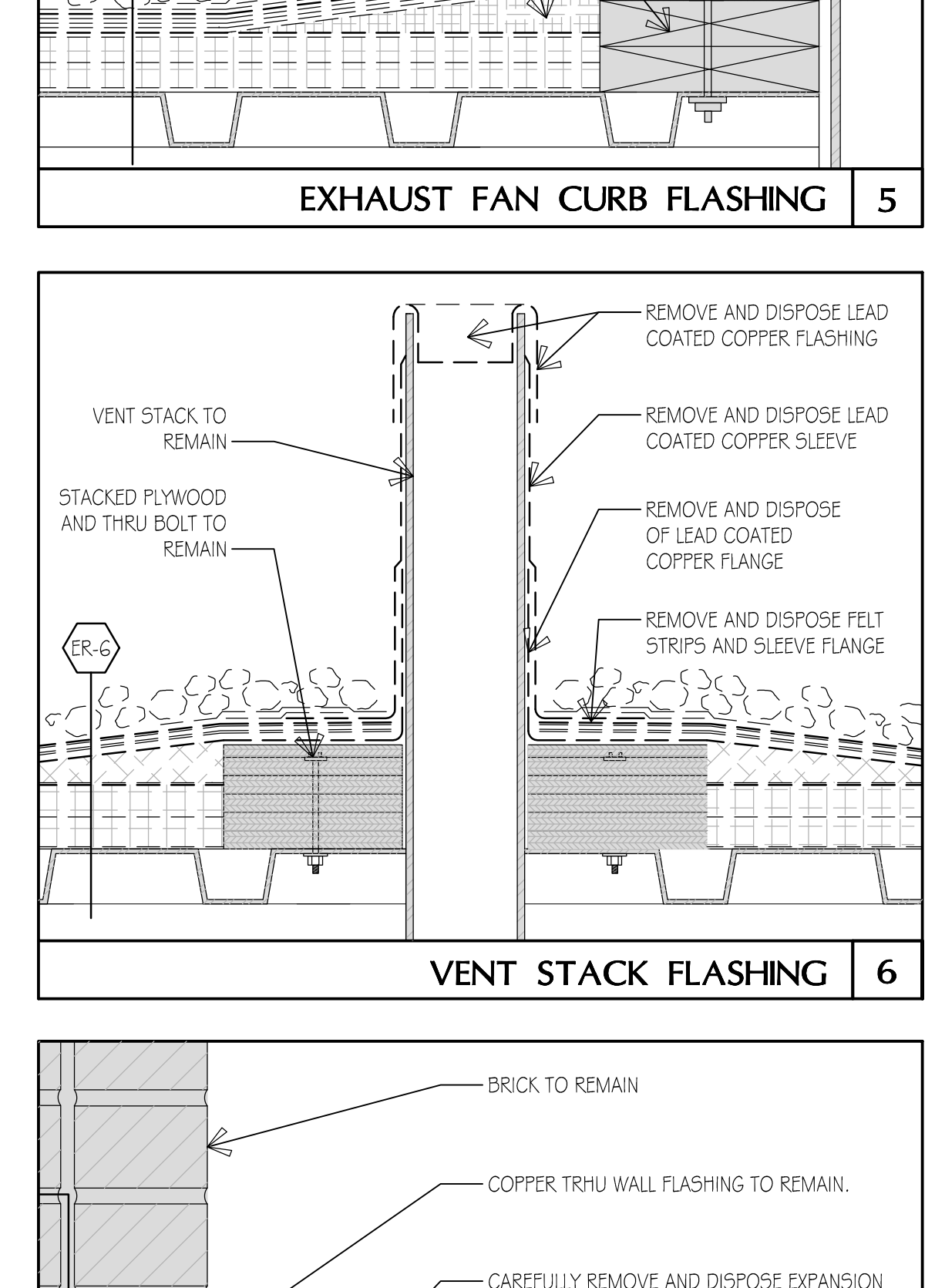
ROOF HATCH 17



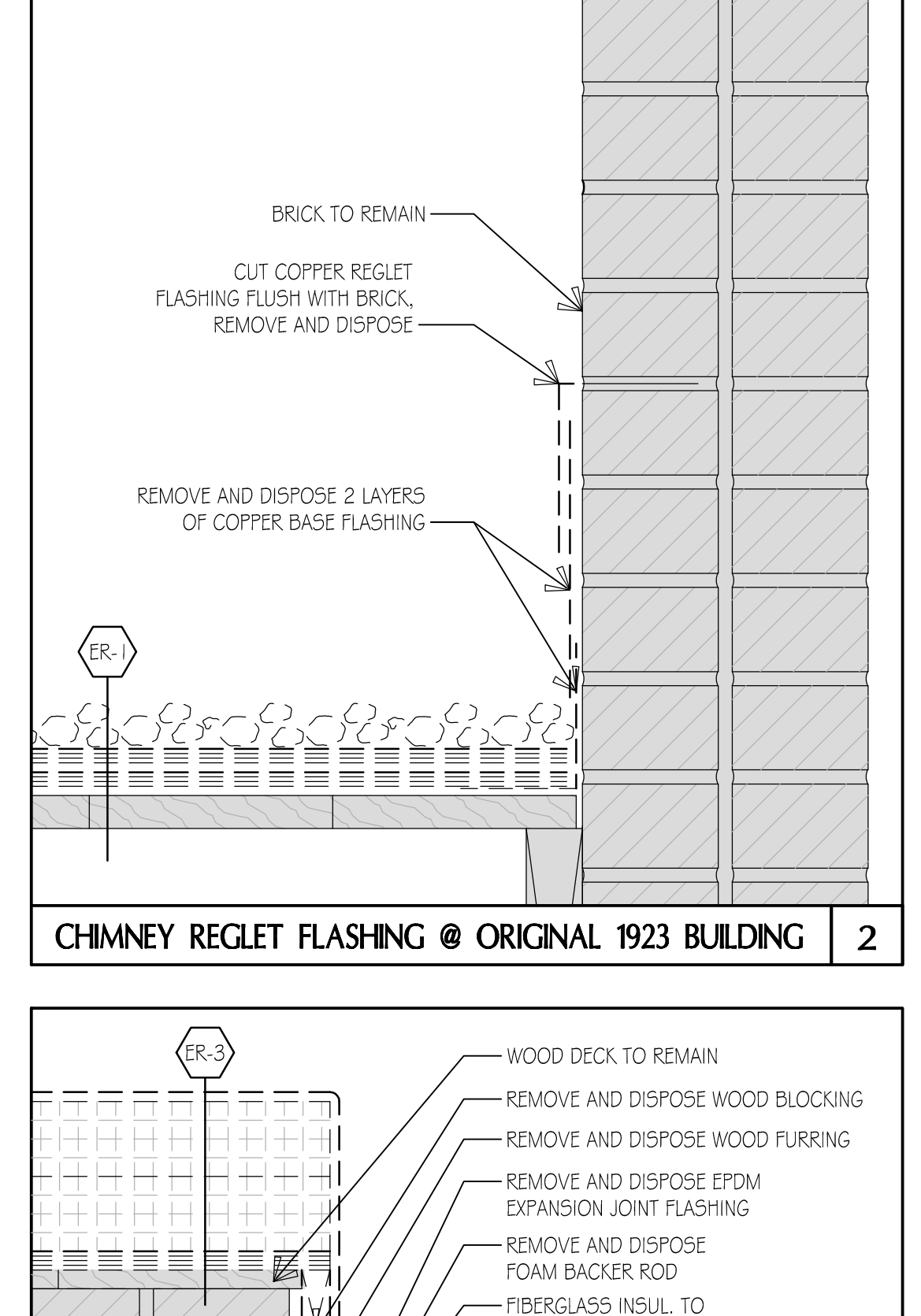
TYPICAL ROOF EDGE @ 1923 BUILDING 13



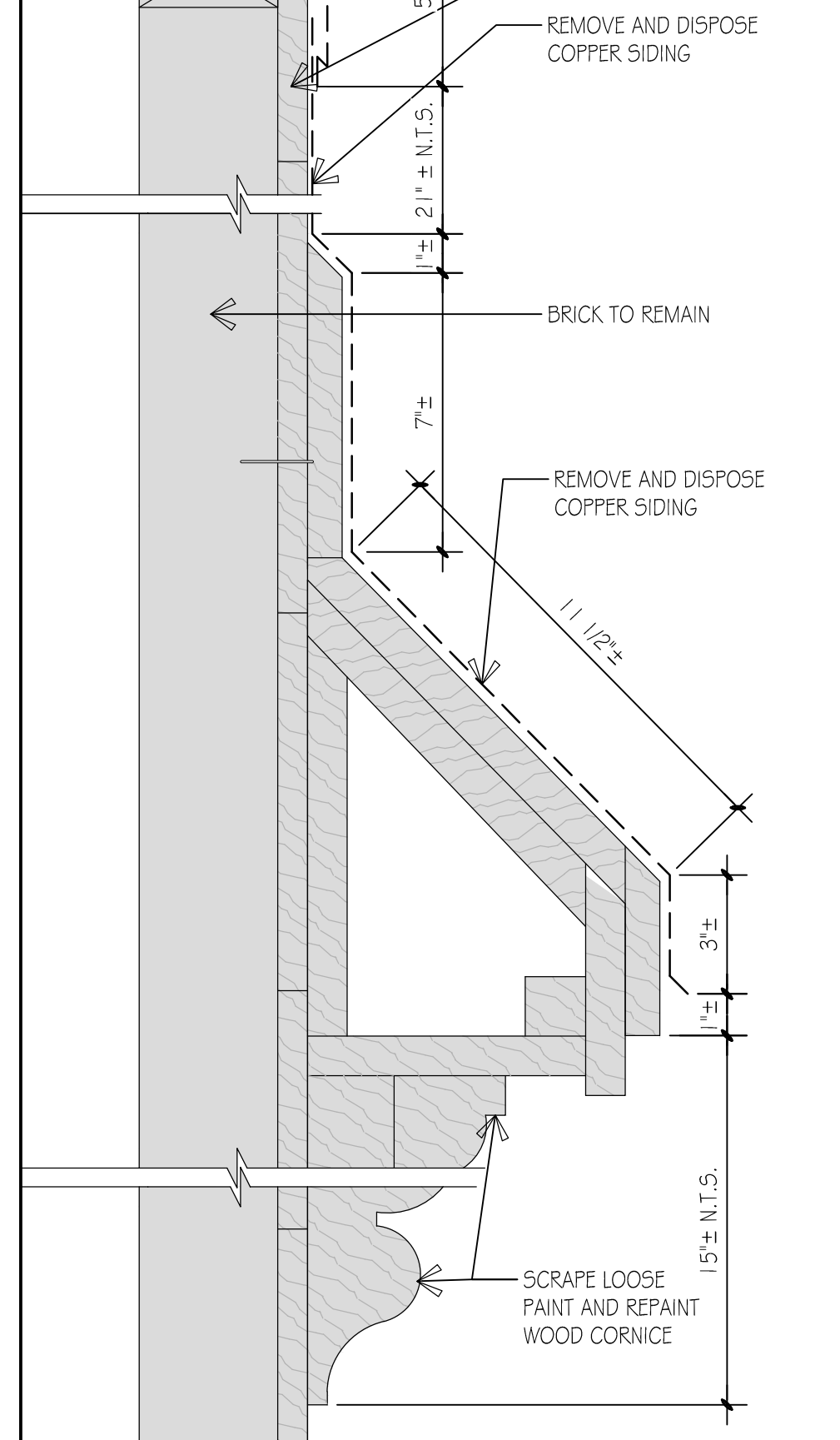
BRICK GRAVITY VENT FLASHING 10



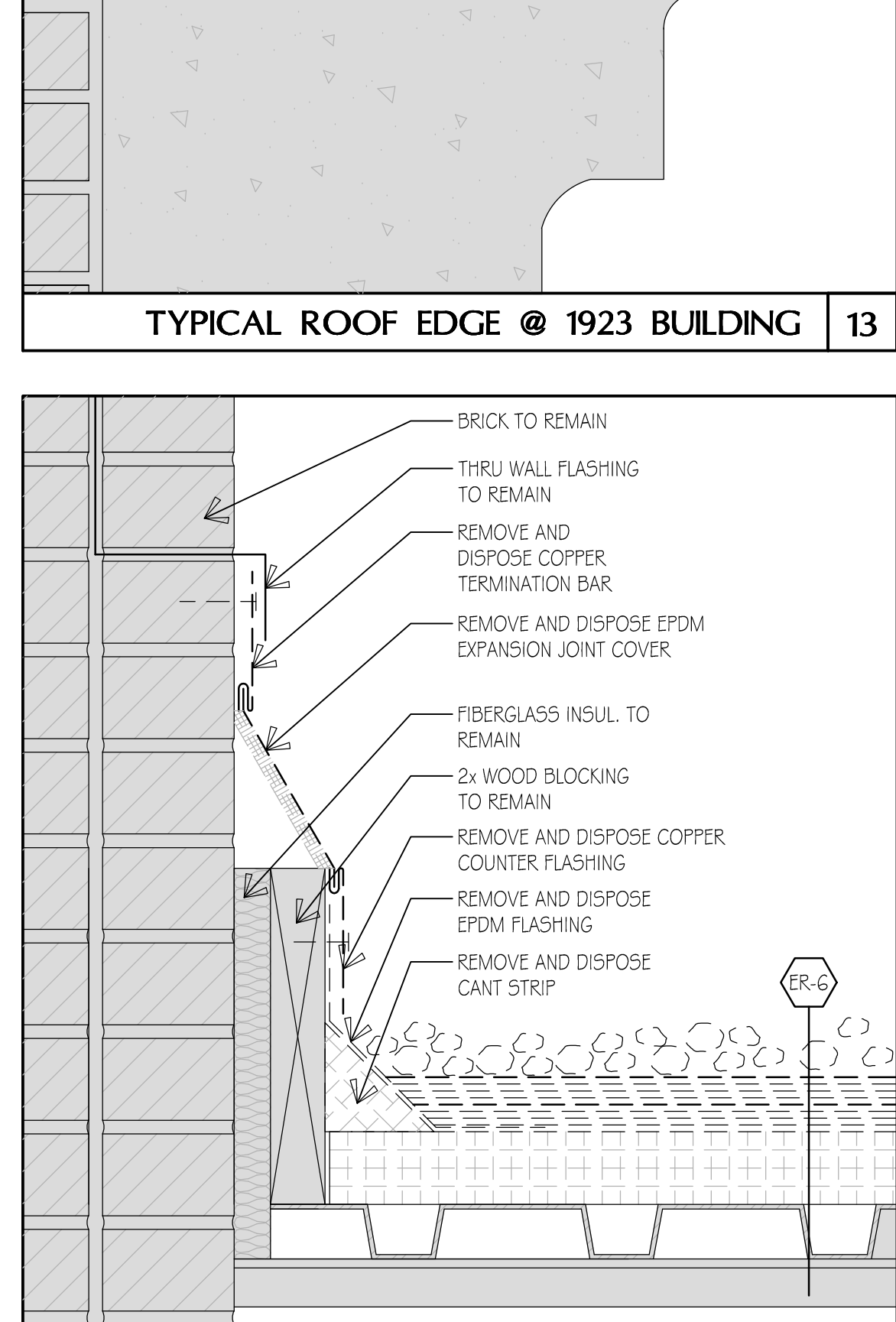
VENT STACK FLASHING 6



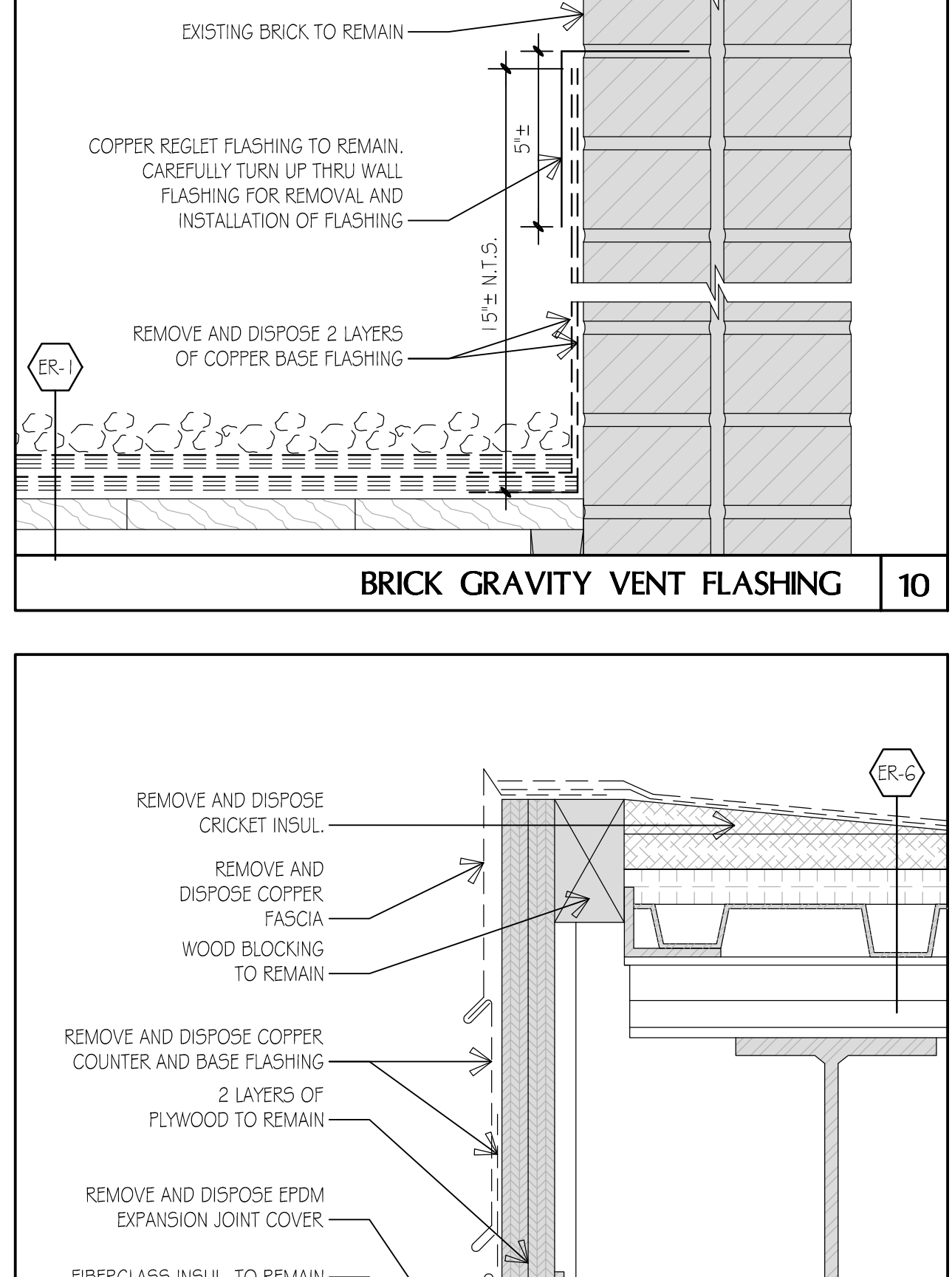
CHIMNEY REGLET FLASHING @ ORIGINAL 1923 BUILDING 2



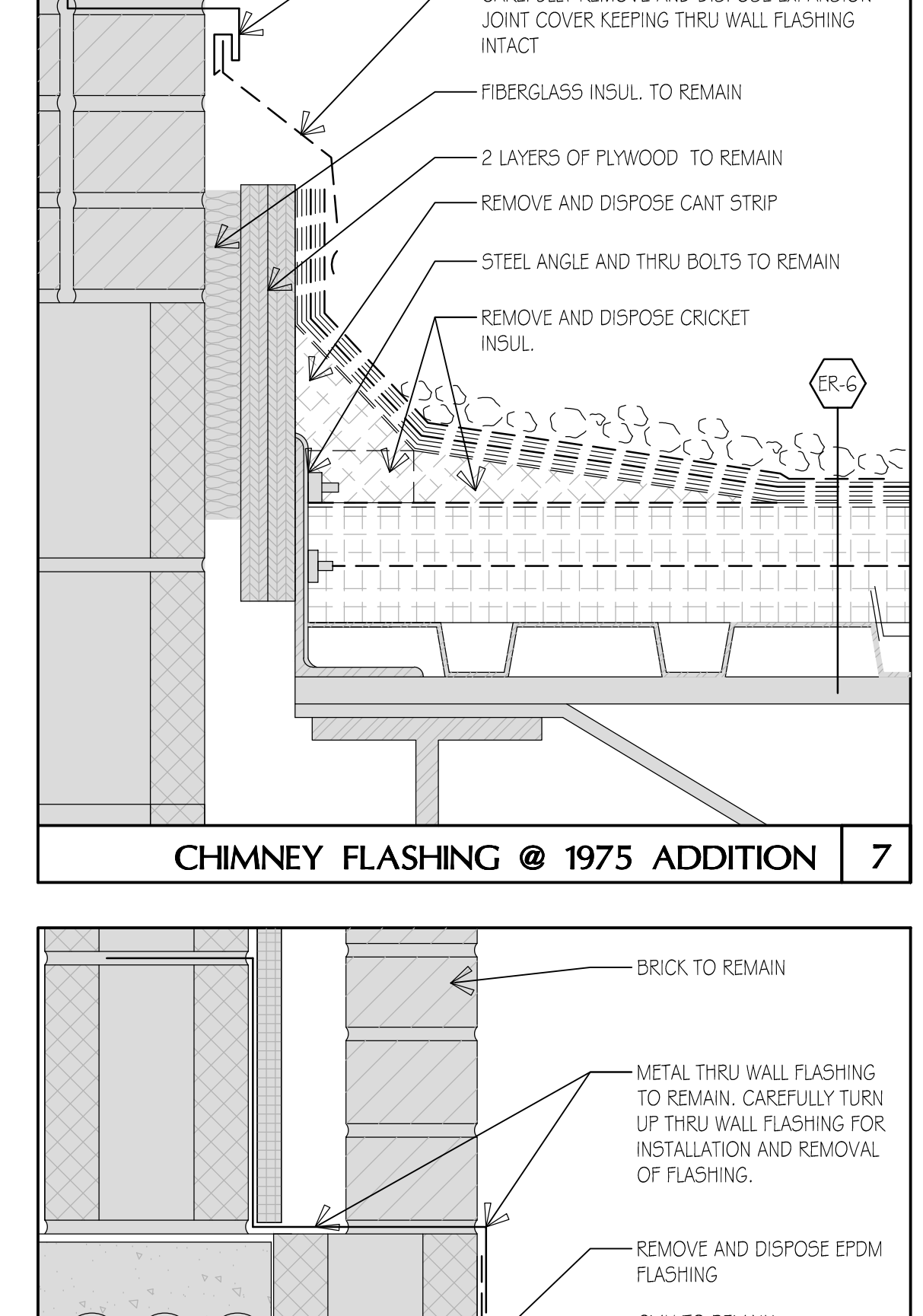
ROOF EDGE @ COPPER FASCIA 18



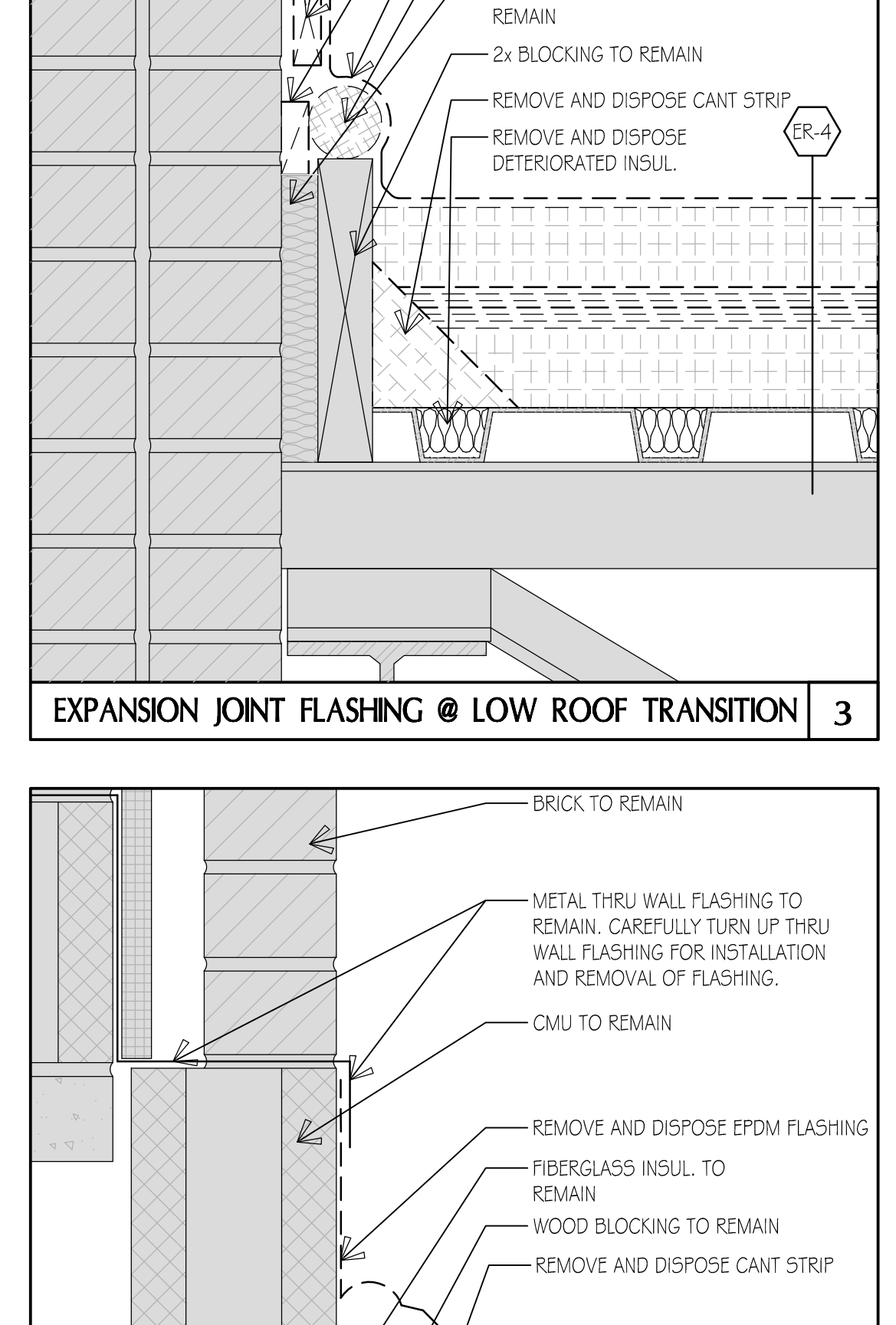
EXPANSION JOINT @ ORIGINAL 1923 BUILDING 14



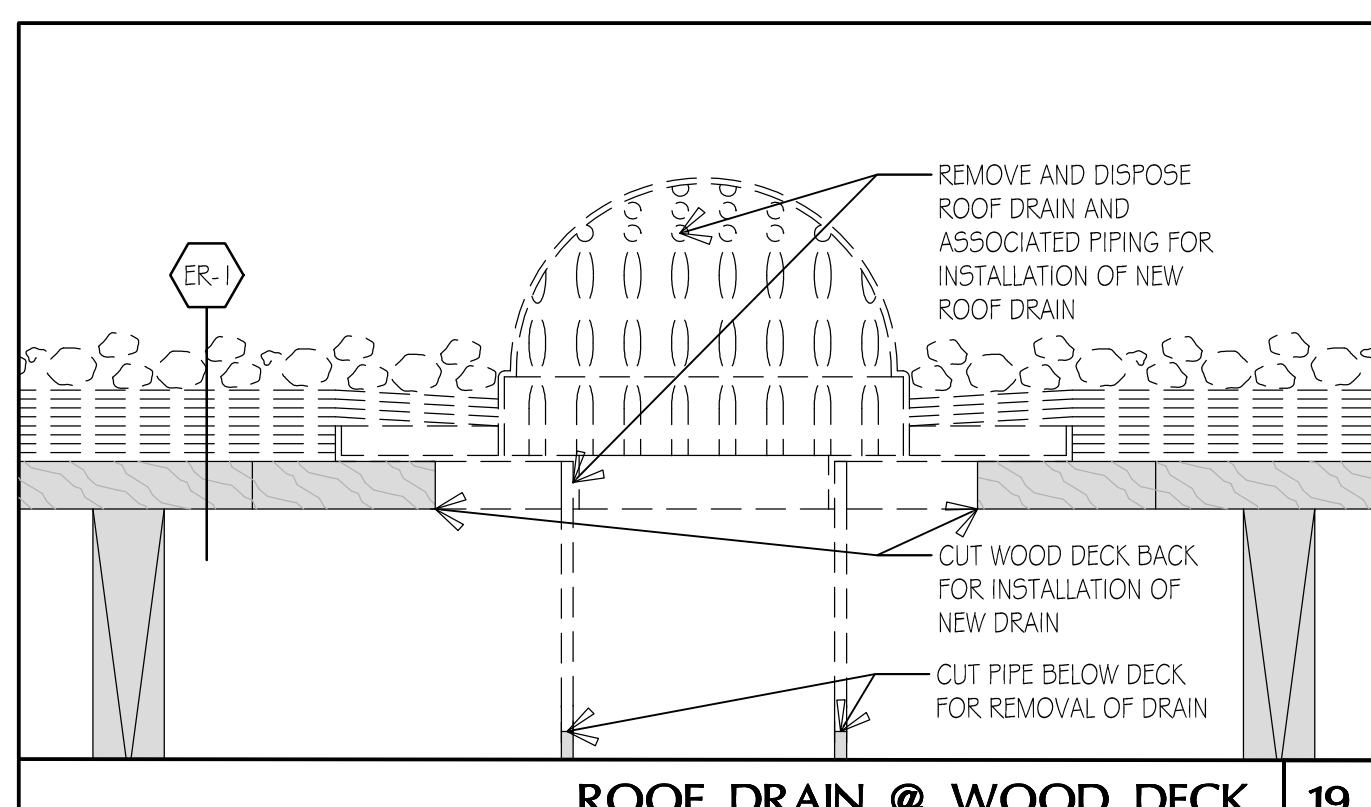
EXPANSION JOINT @ 1975 ADDITION 11



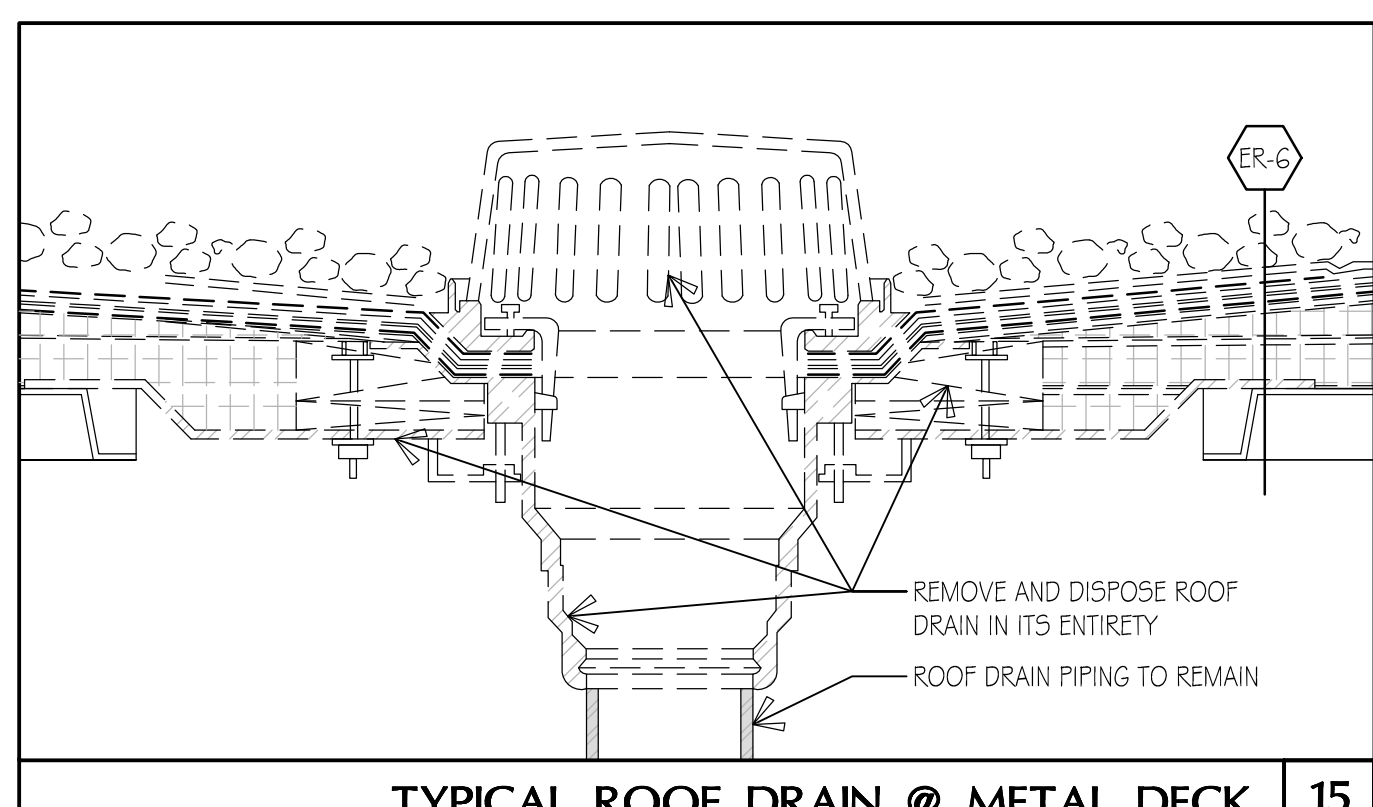
CHIMNEY FLASHING @ 1975 ADDITION 7



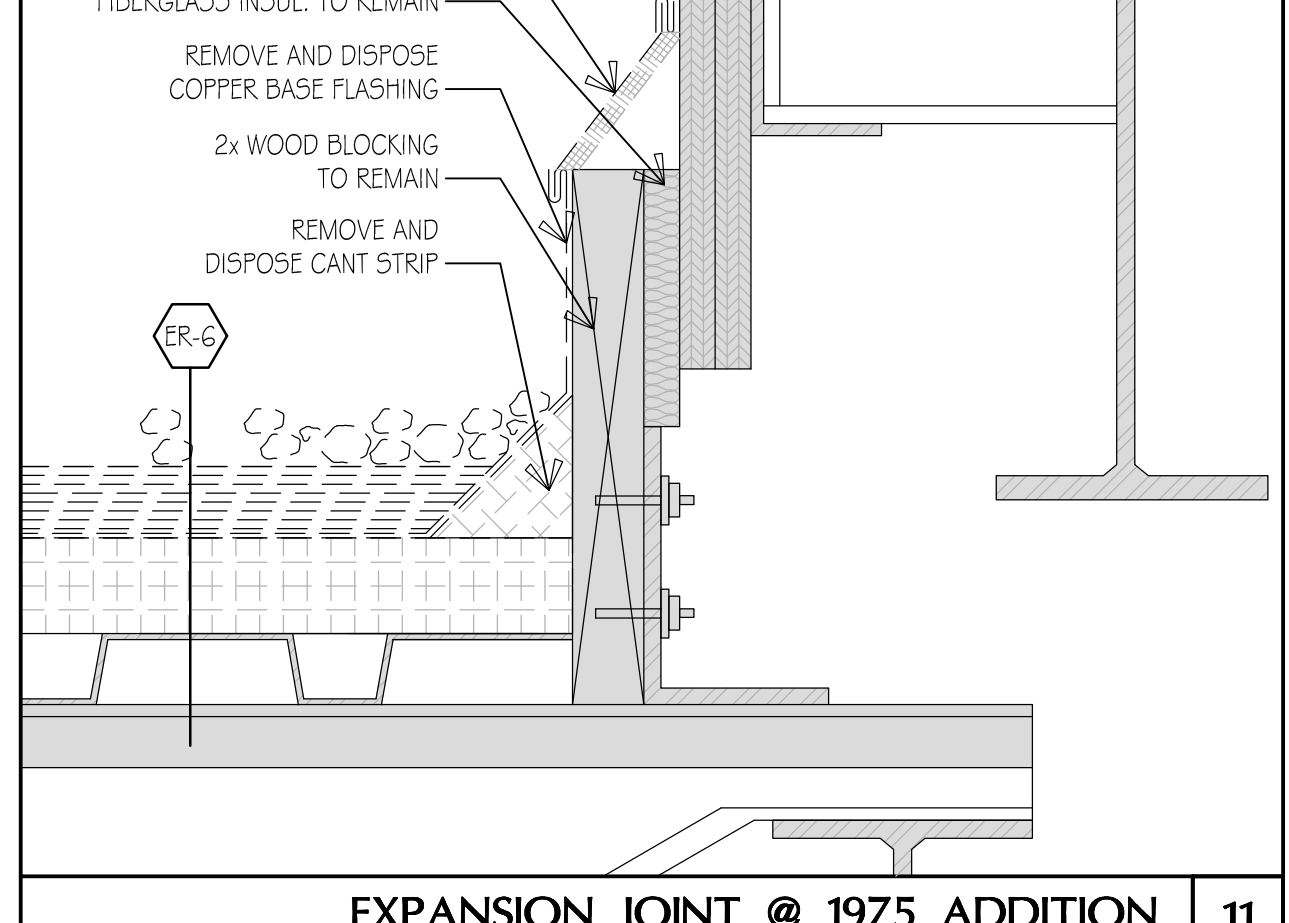
EXPANSION JOINT FLASHING @ LOW ROOF TRANSITION 3



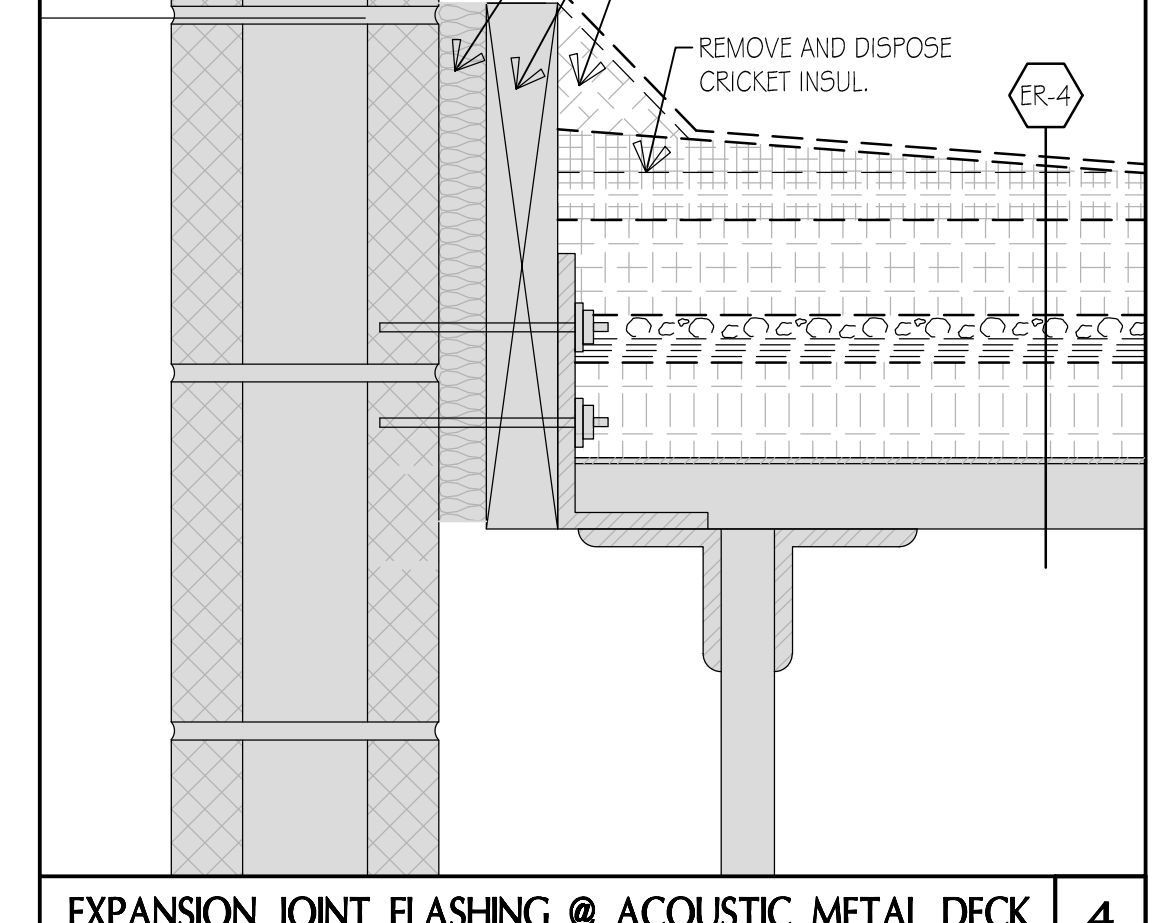
ROOF DRAIN @ WOOD DECK 19



TYPICAL ROOF DRAIN @ METAL DECK 15



THRU WALL FLASHING @ ACOUSTIC METAL DECK 8



EXPANSION JOINT FLASHING @ ACOUSTIC METAL DECK 4

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

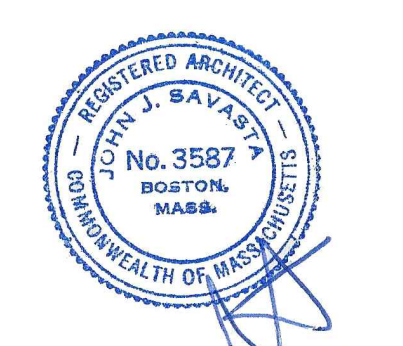
510 MOODY STREET  
WALTHAM, MA 02453

Revisions

No.	Date	Description	By

CSS ARCHITECTS INC.

107 Audubon Road  
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Waltham, MA 01980  
css@cssarchitects.com



Title:

DEMOLITION ROOF DETAILS

Scale: 3/4"=1'-0"

Date: 4 FEB. 2015

Drawn: LM

Checked: JET/CTC

Project No: 1138

AD2.1

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

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WALTHAM, MA 02453

Revisions

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css@cssarchitects.com



Title:

DEMOLITION ROOF DETAILS

Scale: 3/4"=1'-0"

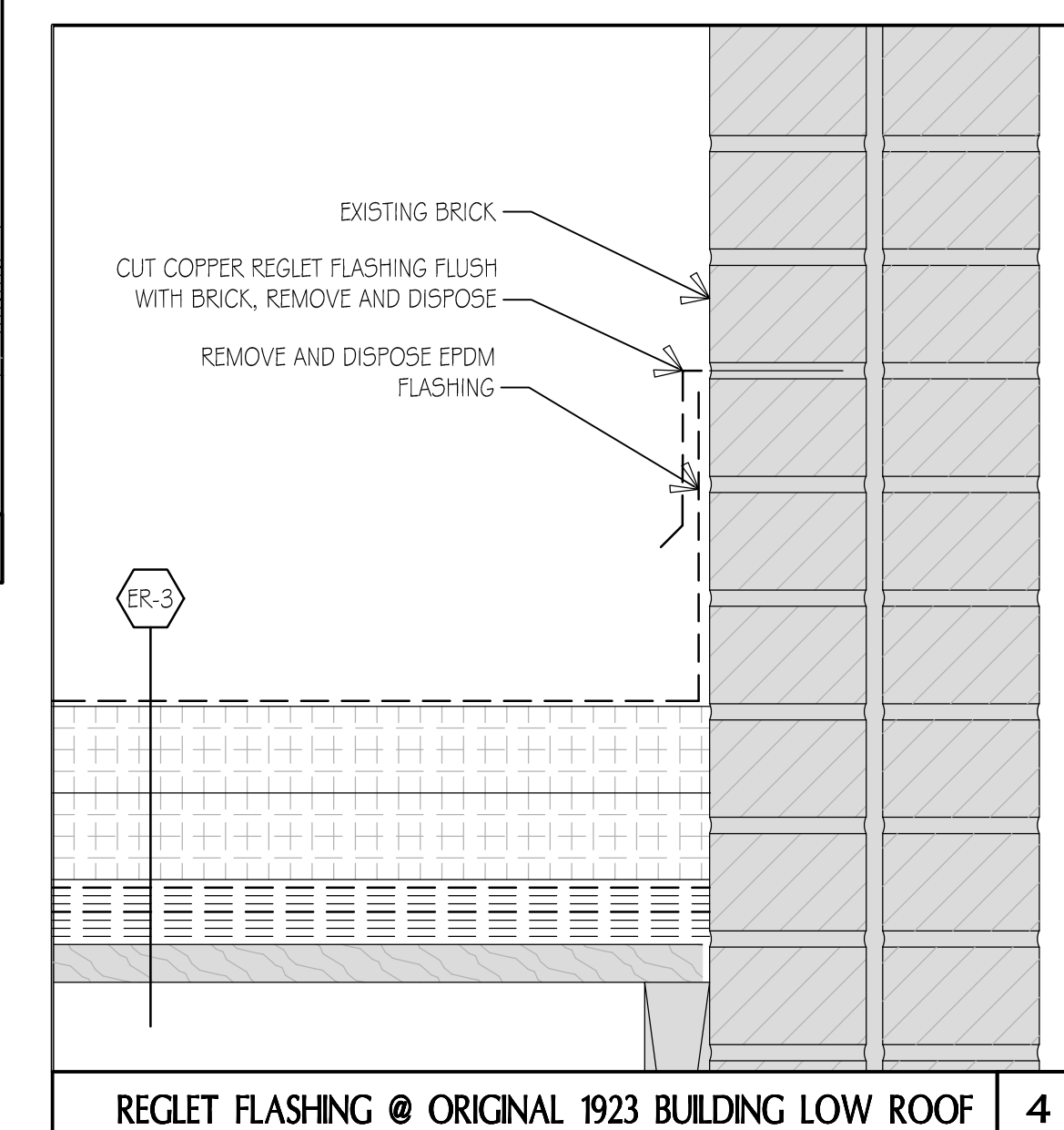
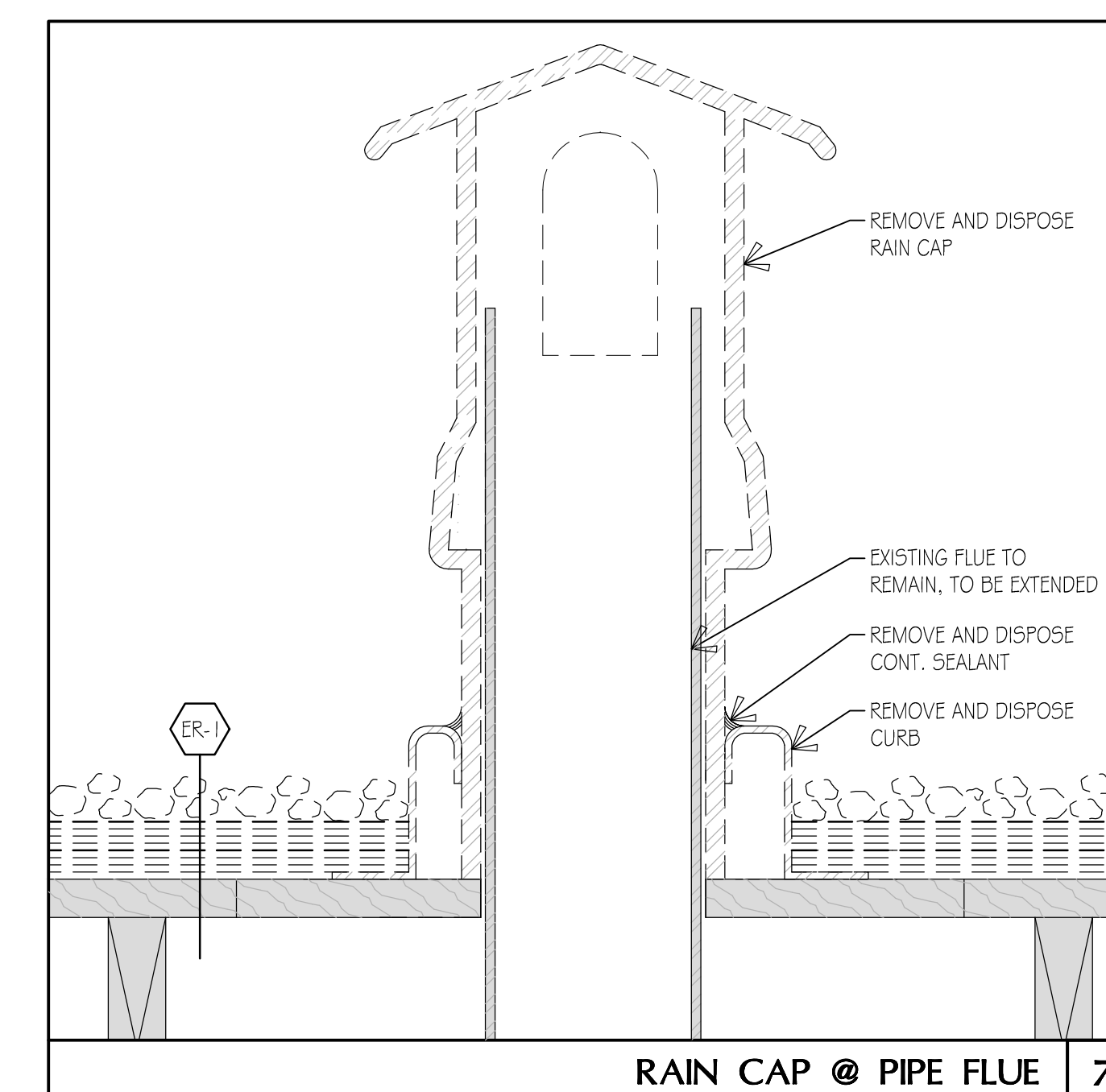
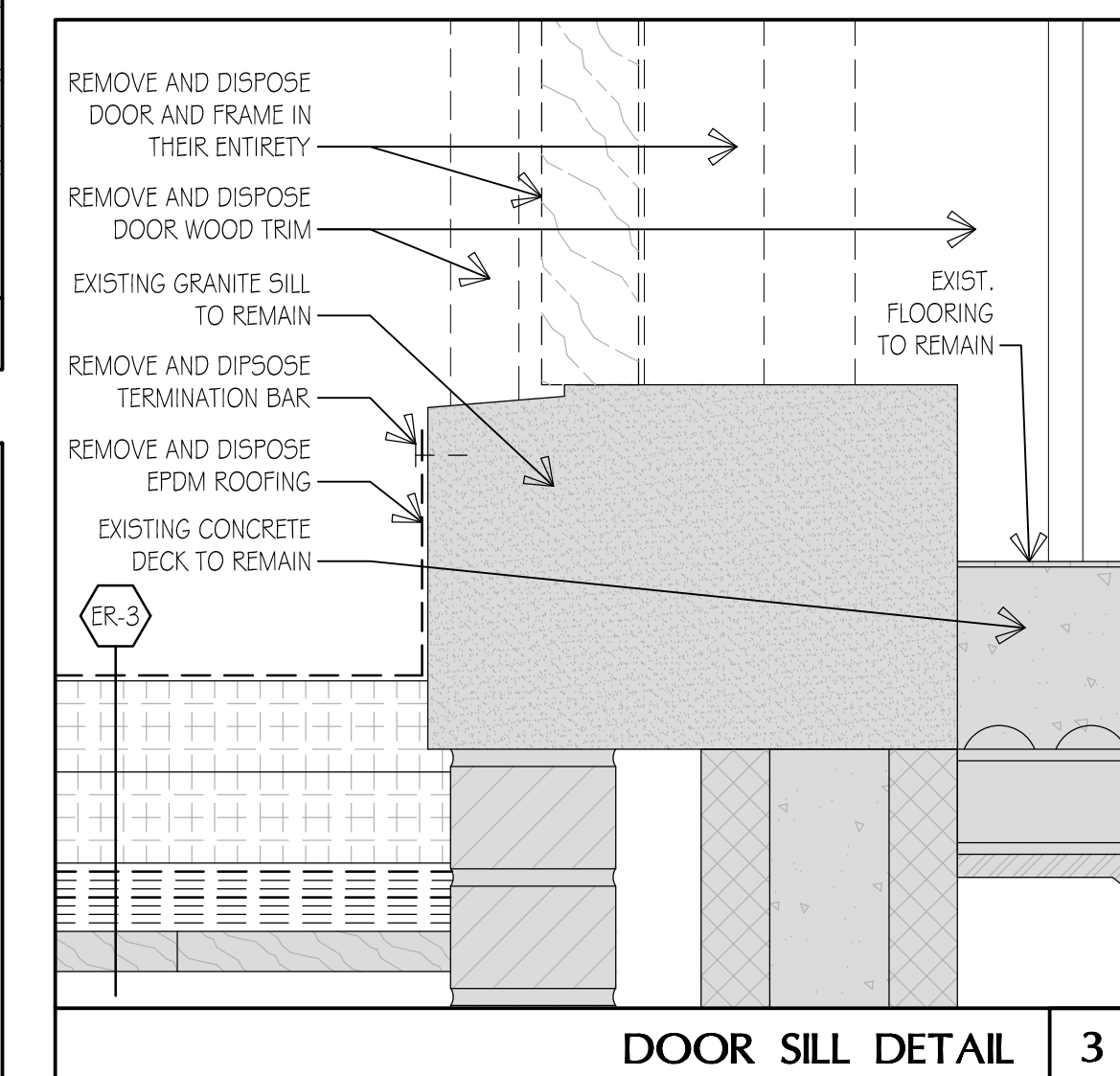
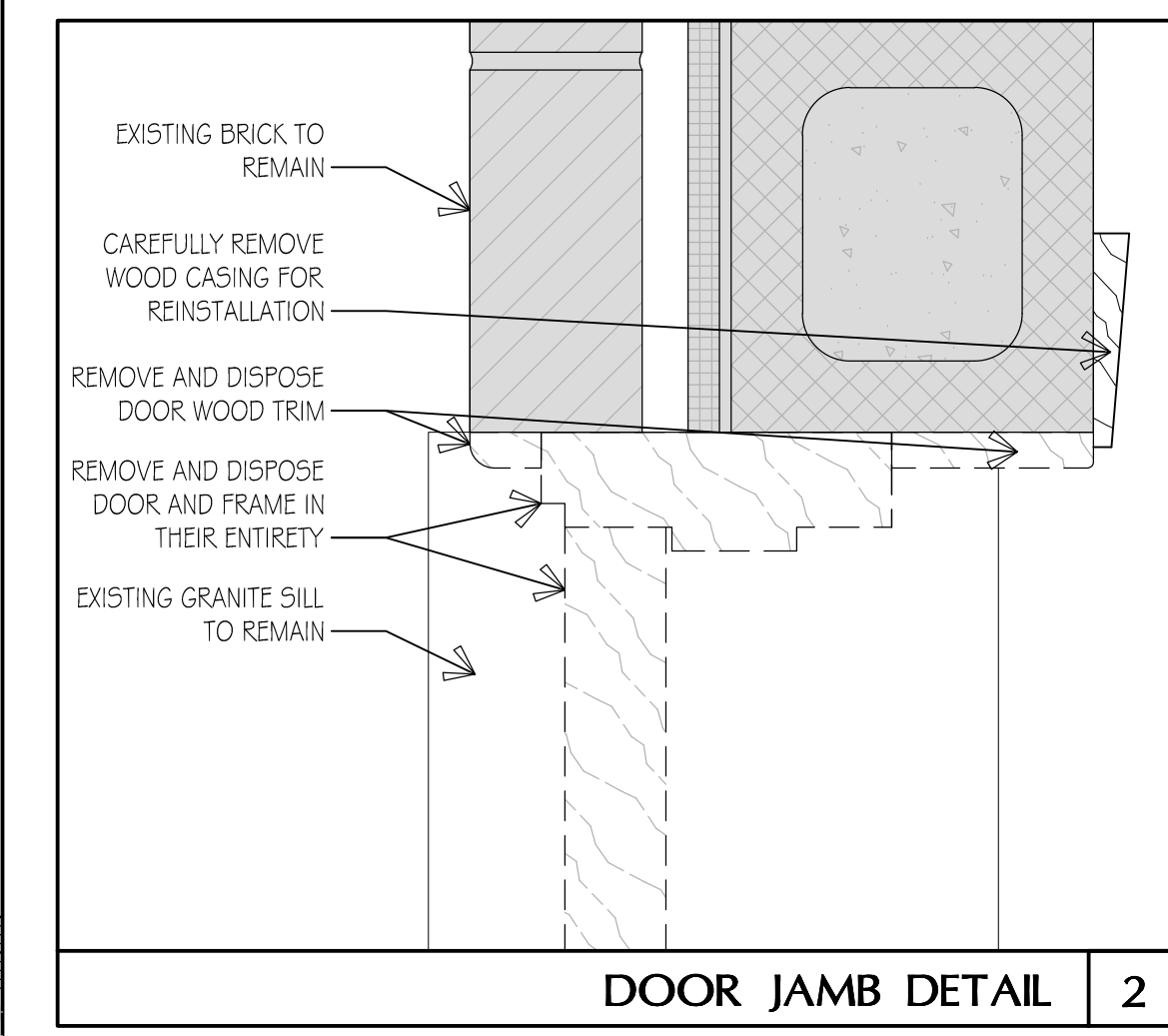
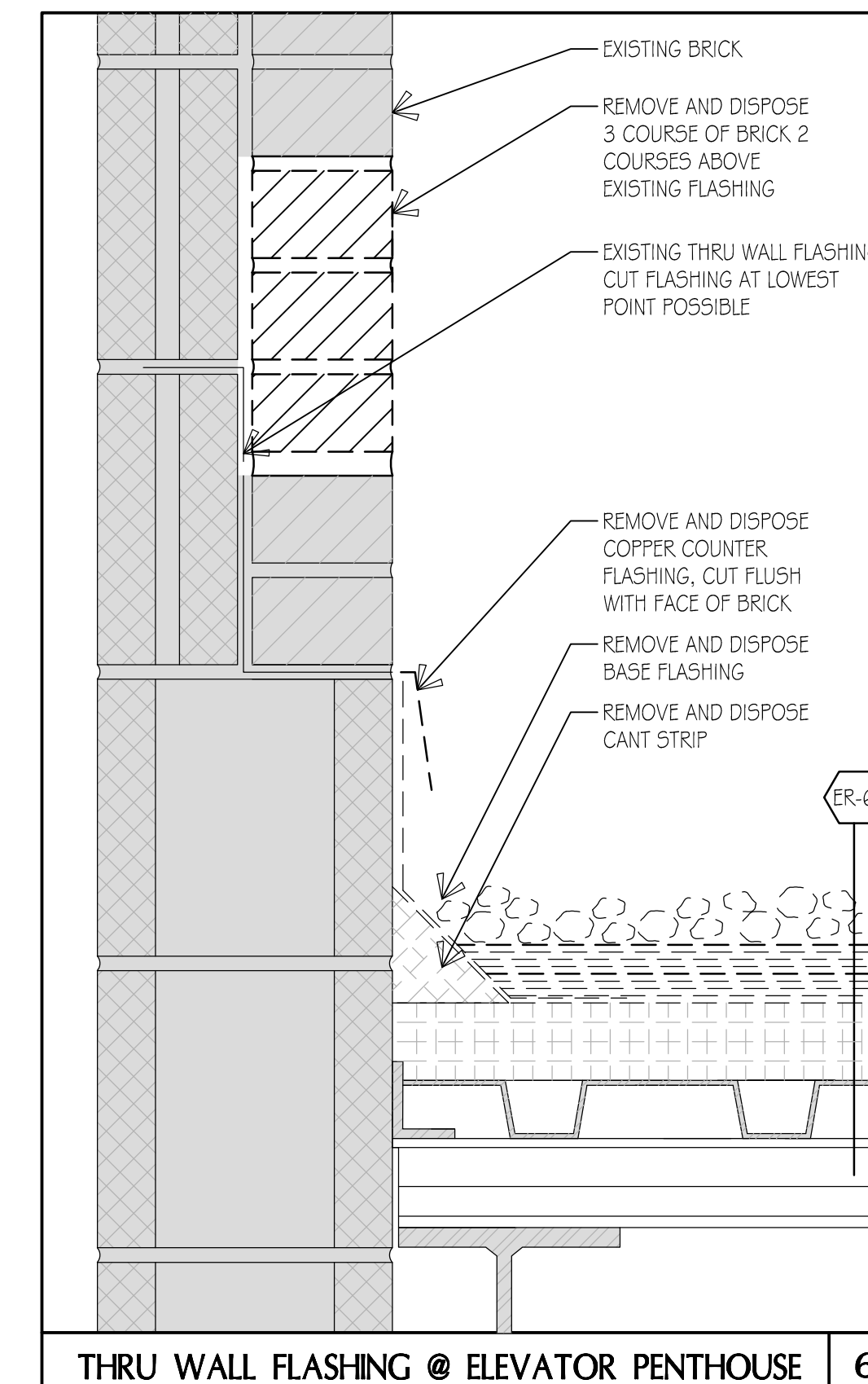
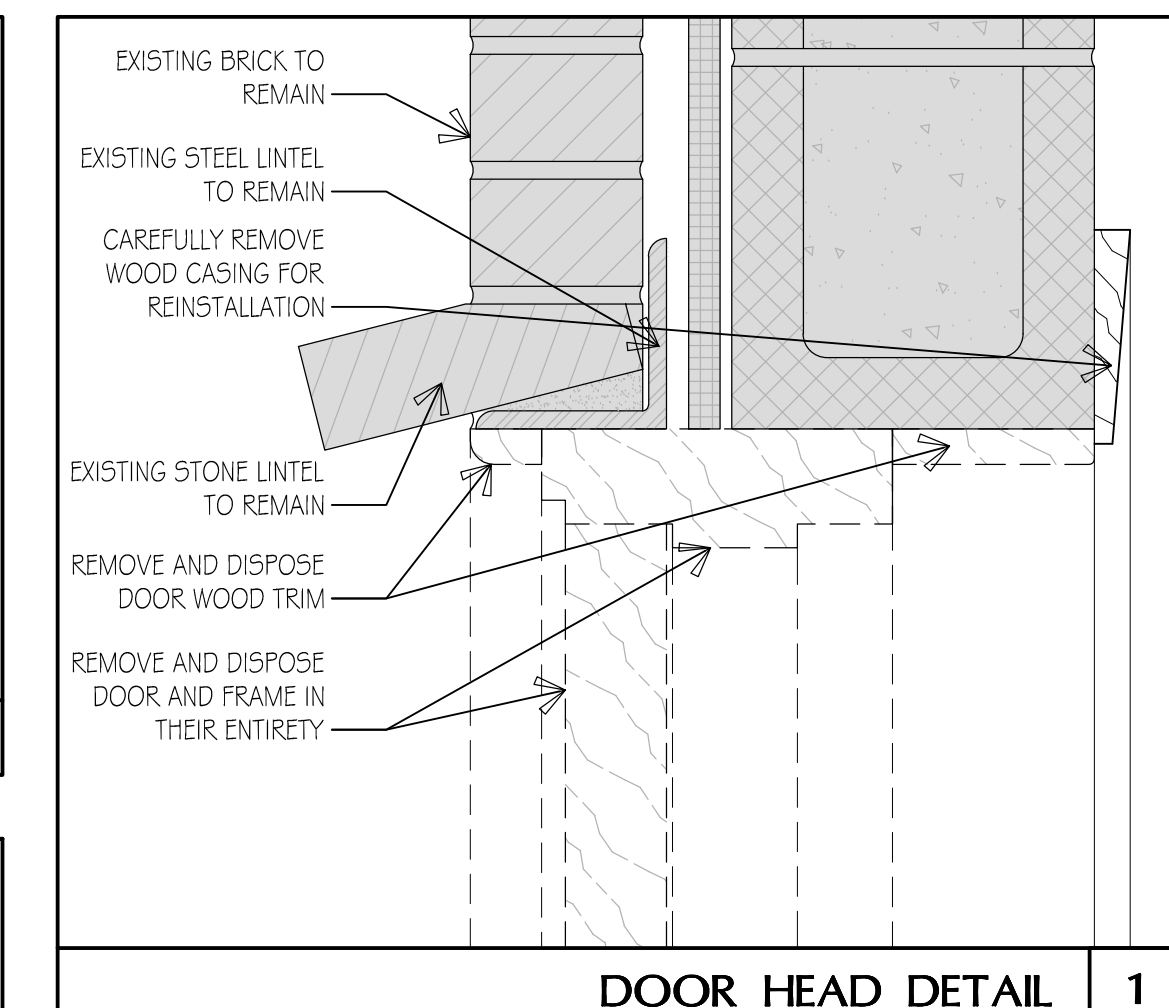
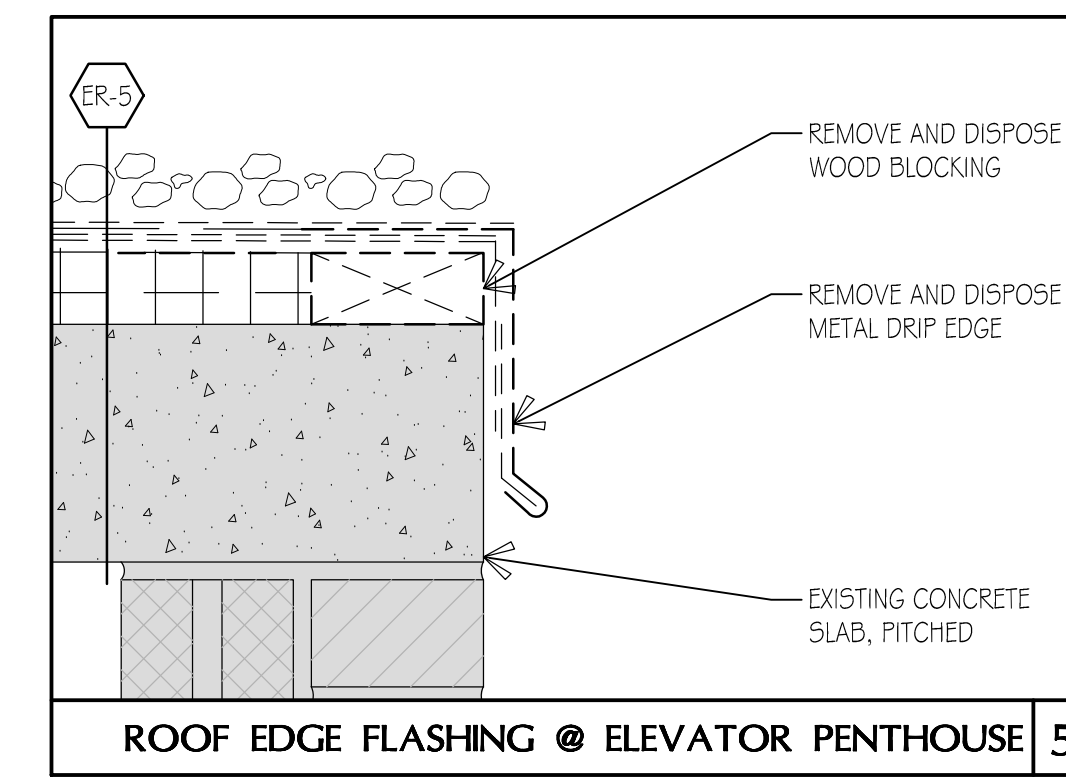
Date: 4 FEB. 2015

Drawn: LM

Checked: JET/CTC

Project No: 1138

**AD2.2**



**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

**CSS ARCHITECTS INC.**  
107 Audubon Road  
Suite 300  
Wakefield, MA 01880  
css@cssarchitects.com



Title:

**NEW CONSTRUCTION ROOF PLAN**

Scale: AS NOTED

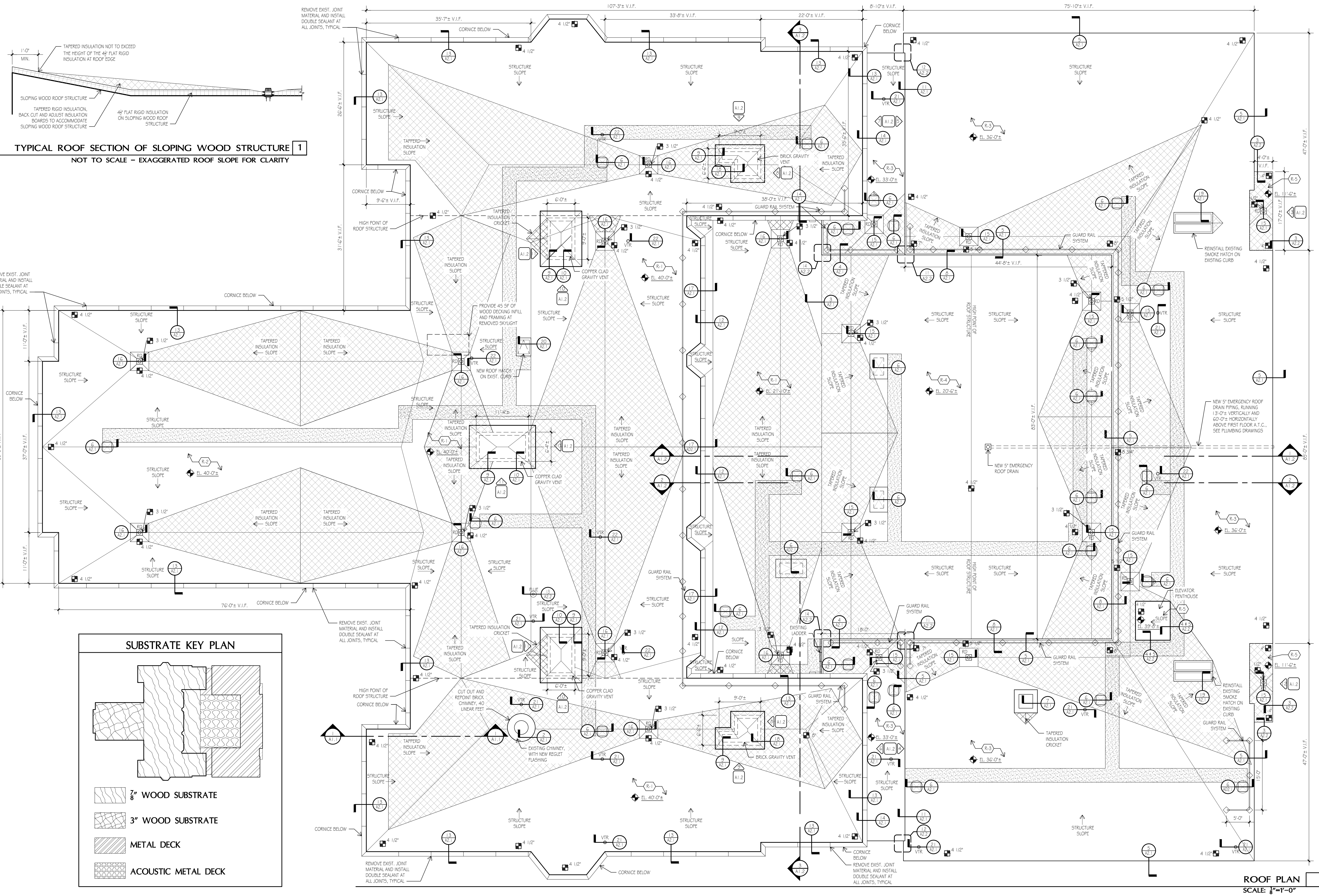
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Drawn: JET

Checked: JET/CTC

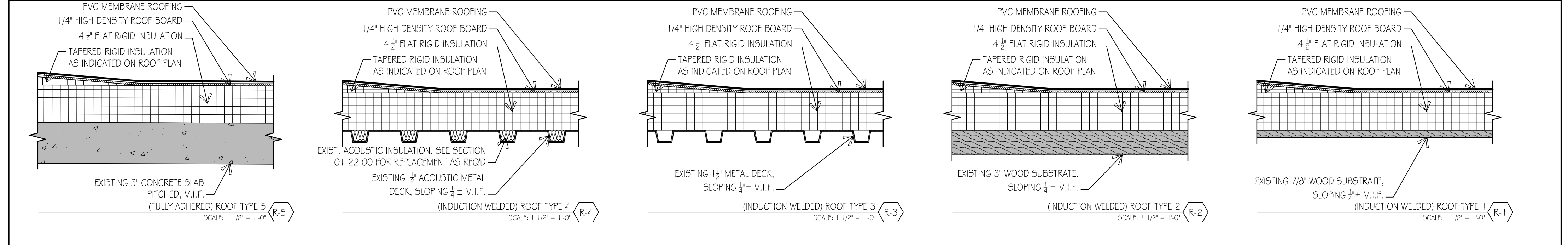
Project No: 1138

**A1.1**

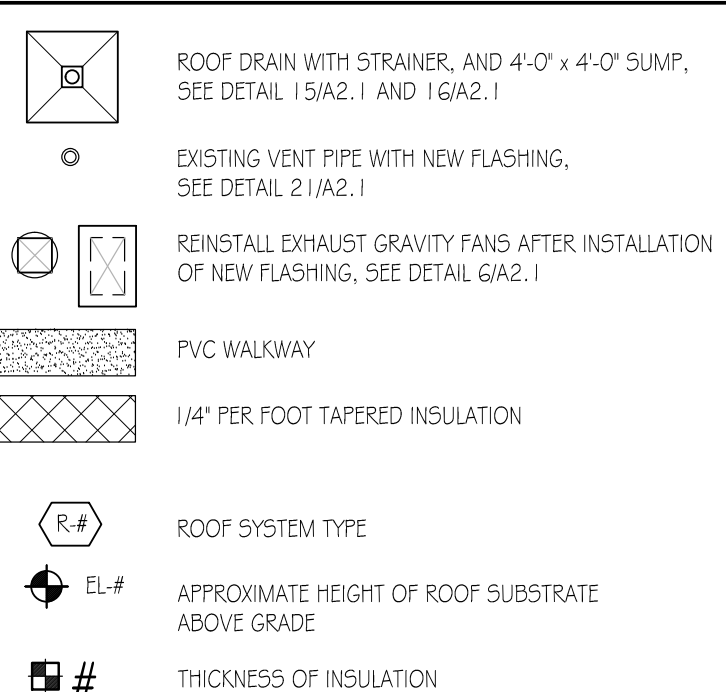


**ROOF PLAN**  
SCALE: 1/8" = 1'-0"

**ROOF SYSTEM TYPES**



**NEW CONSTRUCTION LEGEND**



**GENERAL NOTES**

- CONTRACTOR TO VERIFY ALL DIMENSIONS IN FIELD PRIOR TO COMMENCEMENT OF WORK.
- ALL ITEMS AND MATERIALS ARE TO BE NEW UNLESS INDICATED AS EXISTING.
- CONTRACTOR TO PERFORM FULL TEST ON EACH ROOF SYSTEM TYPE PRIOR TO INSTALLING ROOFING MATERIAL.
- ALL CRICKETS TO BE SLOPED A MINIMUM OF 1/8" PER FOOT.
- ALL EXISTING ELEVATION HEIGHTS ARE APPROXIMATE.
- REFER TO SECTION 01 24 00 FOR TEST CUT DESCRIPTIONS.
- FOR TEMP. REMOVAL OF GRAVITY FAN REFER TO ARCHITECTURAL DRAWING AND SPECIFICATIONS.
- REFER TO UNIT PRICES SECTION 01 22 00 FOR REMOVAL AND REPLACEMENT OF DETERIORATED MATERIALS.
- CONTRACTOR TO CLEAN ROOF DRAIN PIPING FOR A DISTANCE OF 20'-0" AFTER NEW ROOF MEMBRANE IS IN PLACE AND PRIOR TO PROJECT CLOSEOUT.
- CONTRACTOR TO PERFORM WATER FLOW TESTS ON ALL ROOF DRAINS PRIOR TO REMOVAL OF EXISTING ROOF MEMBRANE TO CONFIRM POSITIVE DRAINAGE.
- CONTRACTOR TO CONFIRM HEIGHT OF ALL WOOD BLOCKING TO ACCOMMODATE THE HEIGHT OF ROOF INSULATION.

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

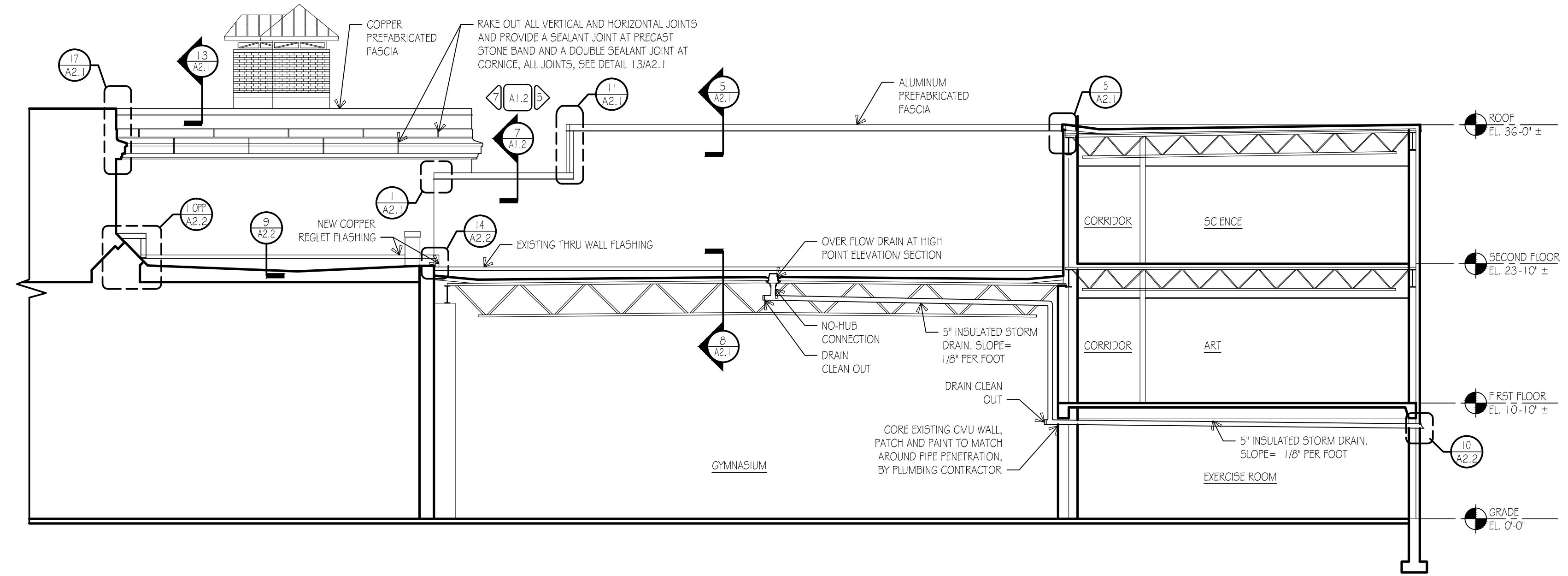
510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

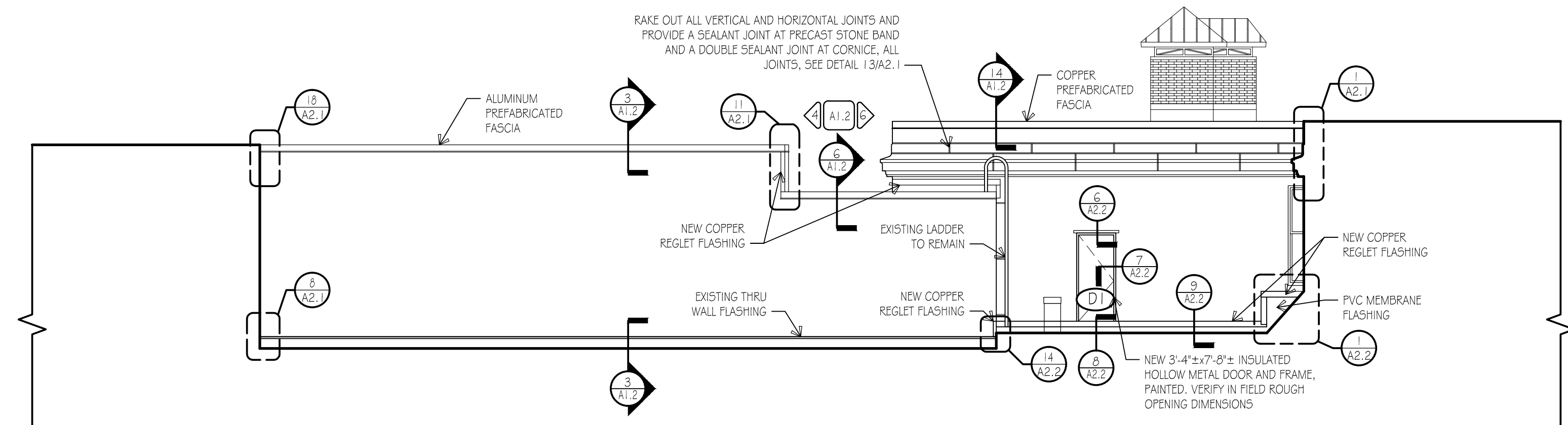
CSS ARCHITECTS INC.

107 Audubon Road  
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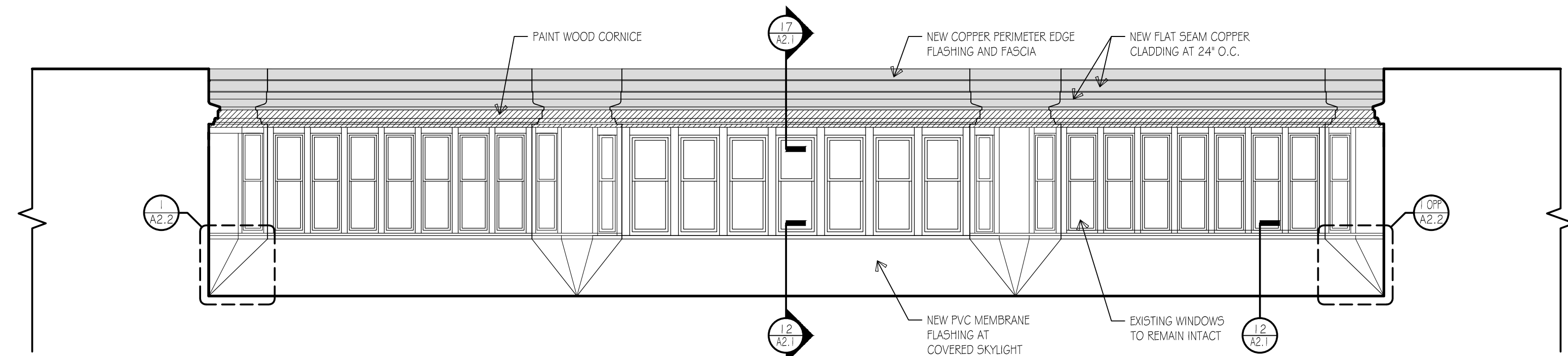
**SECTION/ELEVATION 1**

SCALE: 3/8"=1'-0"



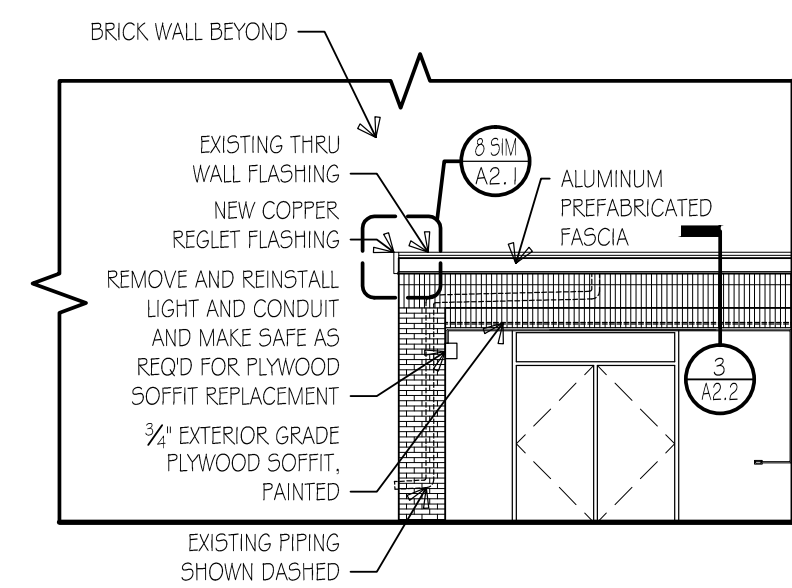
**SECTION/ELEVATION 2**

SCALE: 3/8"=1'-0"

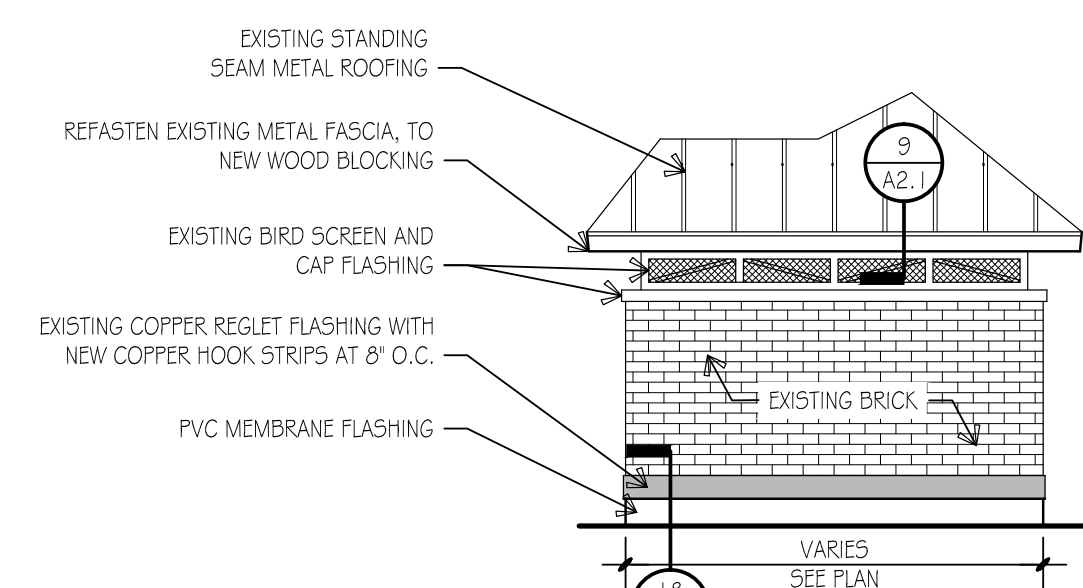


**SECTION/ELEVATION 3**

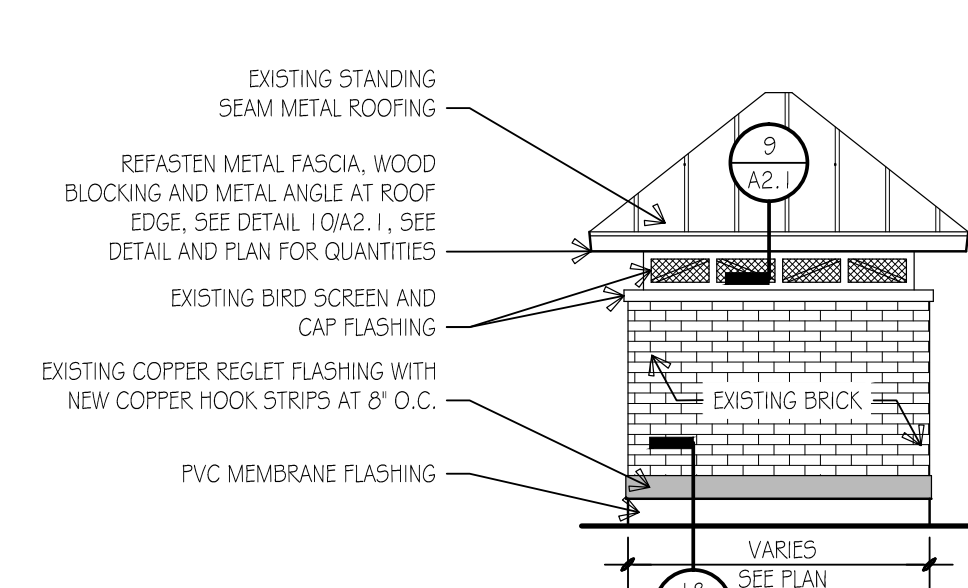
SCALE: 3/8"=1'-0"



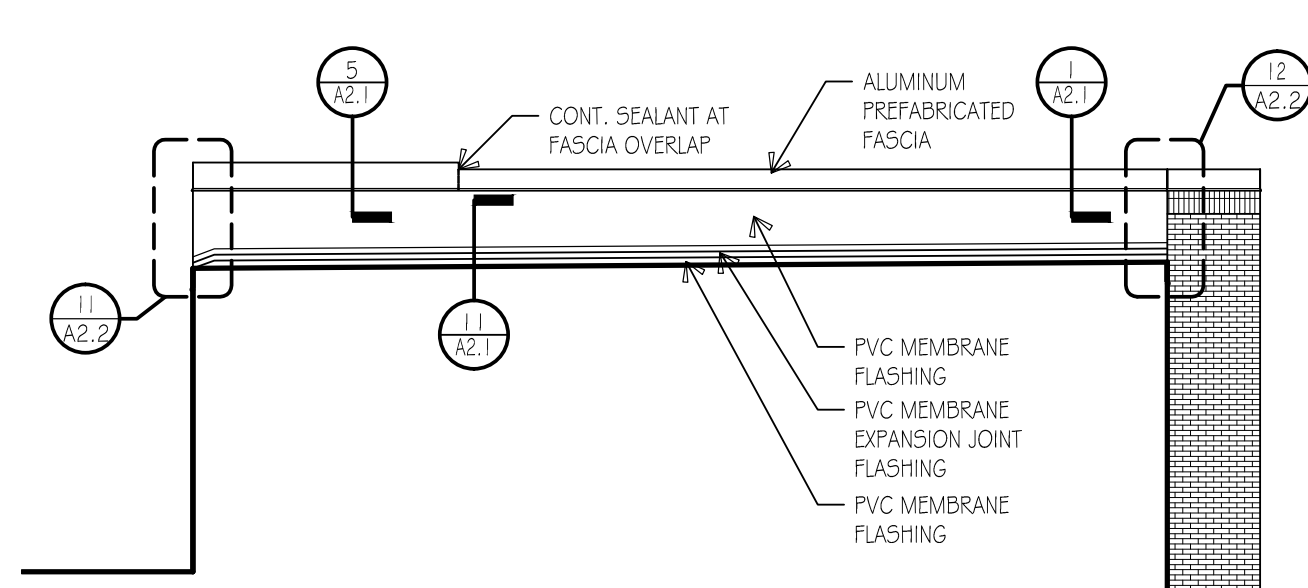
**ELEVATION 12**  
**OPPOSITE HAND 13**  
SCALE: 3/8"=1'-0"



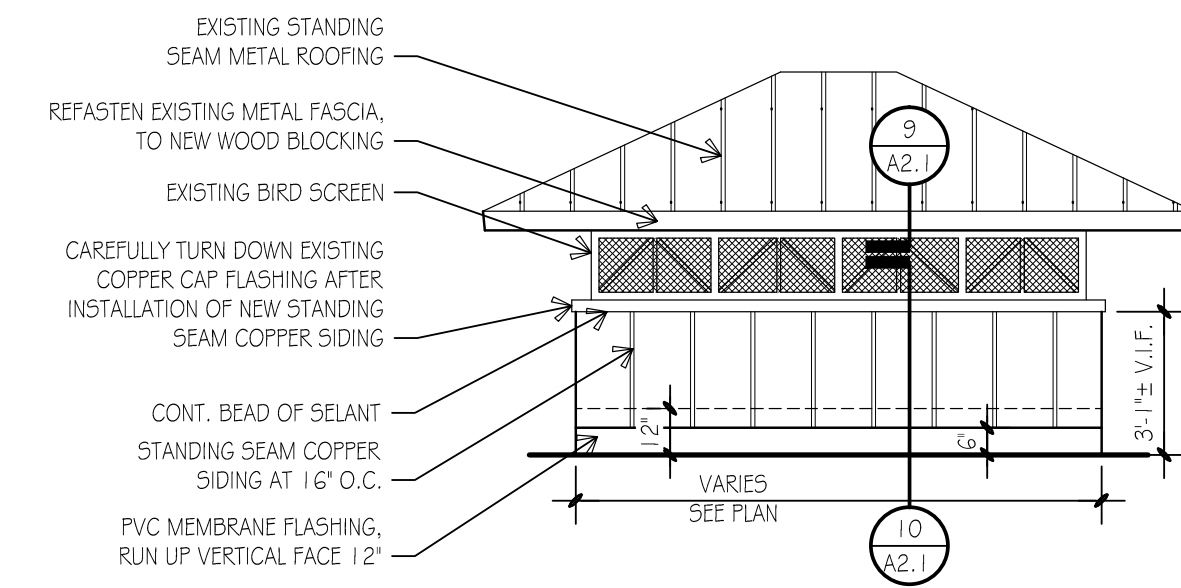
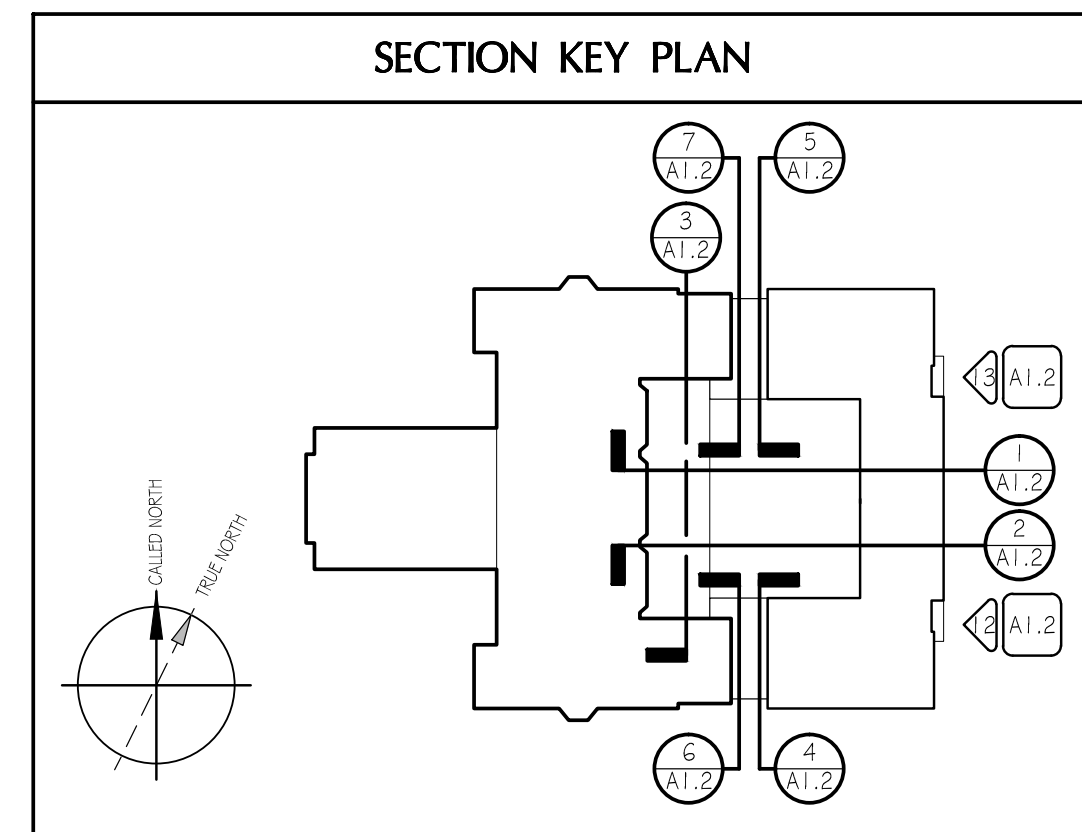
**BRICK GRAVITY VENT, NORTH AND SOUTH SIDES 9**  
SCALE: 3/8"=1'-0"



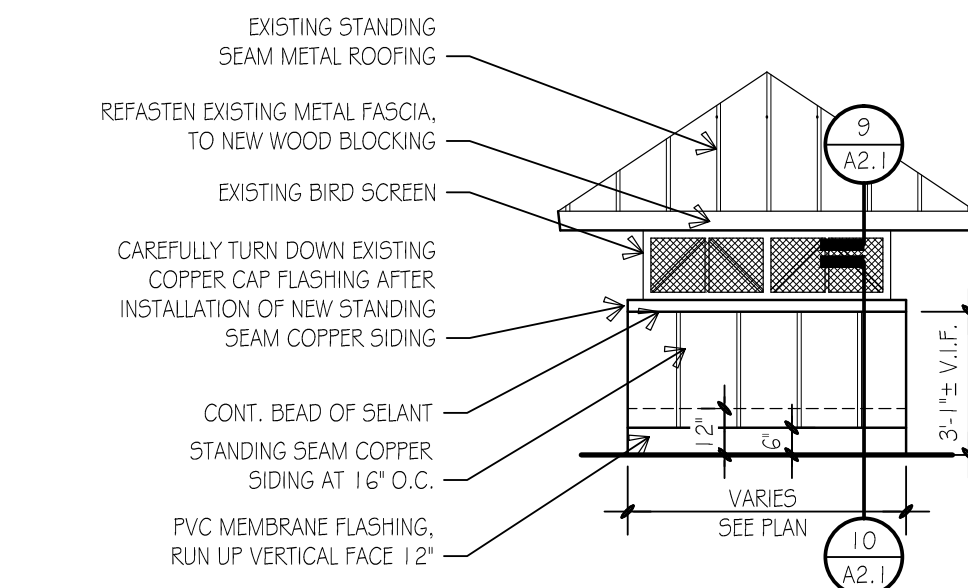
**BRICK GRAVITY VENT, EAST AND WEST SIDES 8**  
SCALE: 3/8"=1'-0"



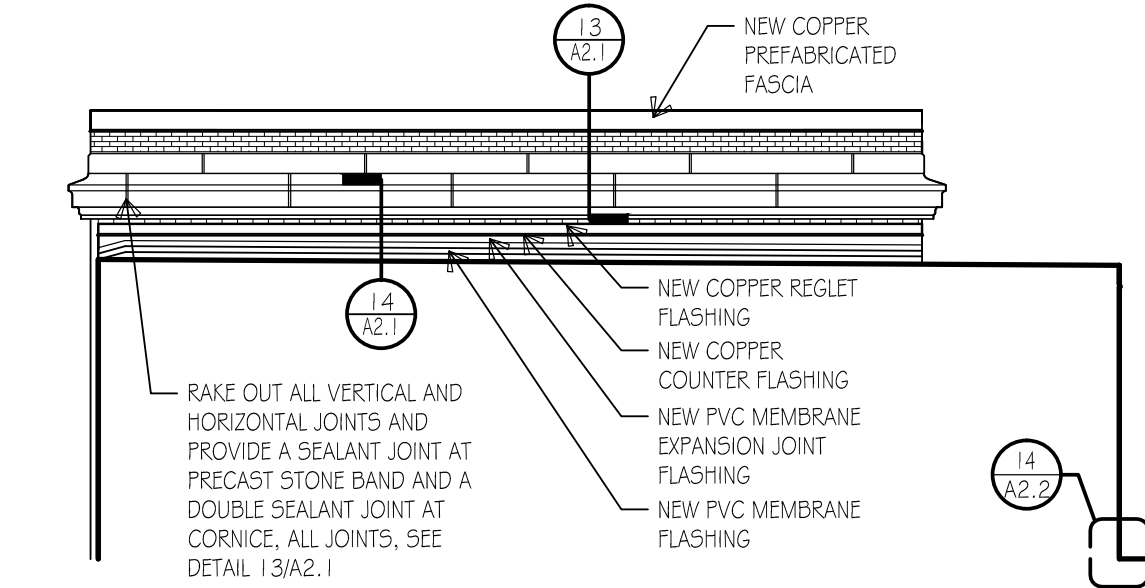
**SECTION/ELEVATION 4**  
**OPPOSITE HAND 5**  
SCALE: 3/8"=1'-0"



**COPPER CLAD GRAVITY VENT, NORTH AND SOUTH SIDES 11**  
SCALE: 3/8"=1'-0"



**COPPER CLAD GRAVITY VENT, EAST AND WEST SIDES 10**  
SCALE: 3/8"=1'-0"



**SECTION/ELEVATION 6**  
**OPPOSITE HAND 7**  
SCALE: 3/8"=1'-0"

Title:

**NEW CONSTRUCTION SECTION/ELEVATIONS**

Scale: AS NOTED

Date: 4 FEB. 2015

Drawn: JET

Checked: JET/CTC

Project No: 1138

**A1.2**

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

CSS ARCHITECTS INC.

107 Audubon Road  
Building 2, Suite 300  
Waltham, MA 01980  
css@cssarchitects.com



Title:

**NEW CONSTRUCTION DETAILS**

Scale: 3/4"=1'-0"

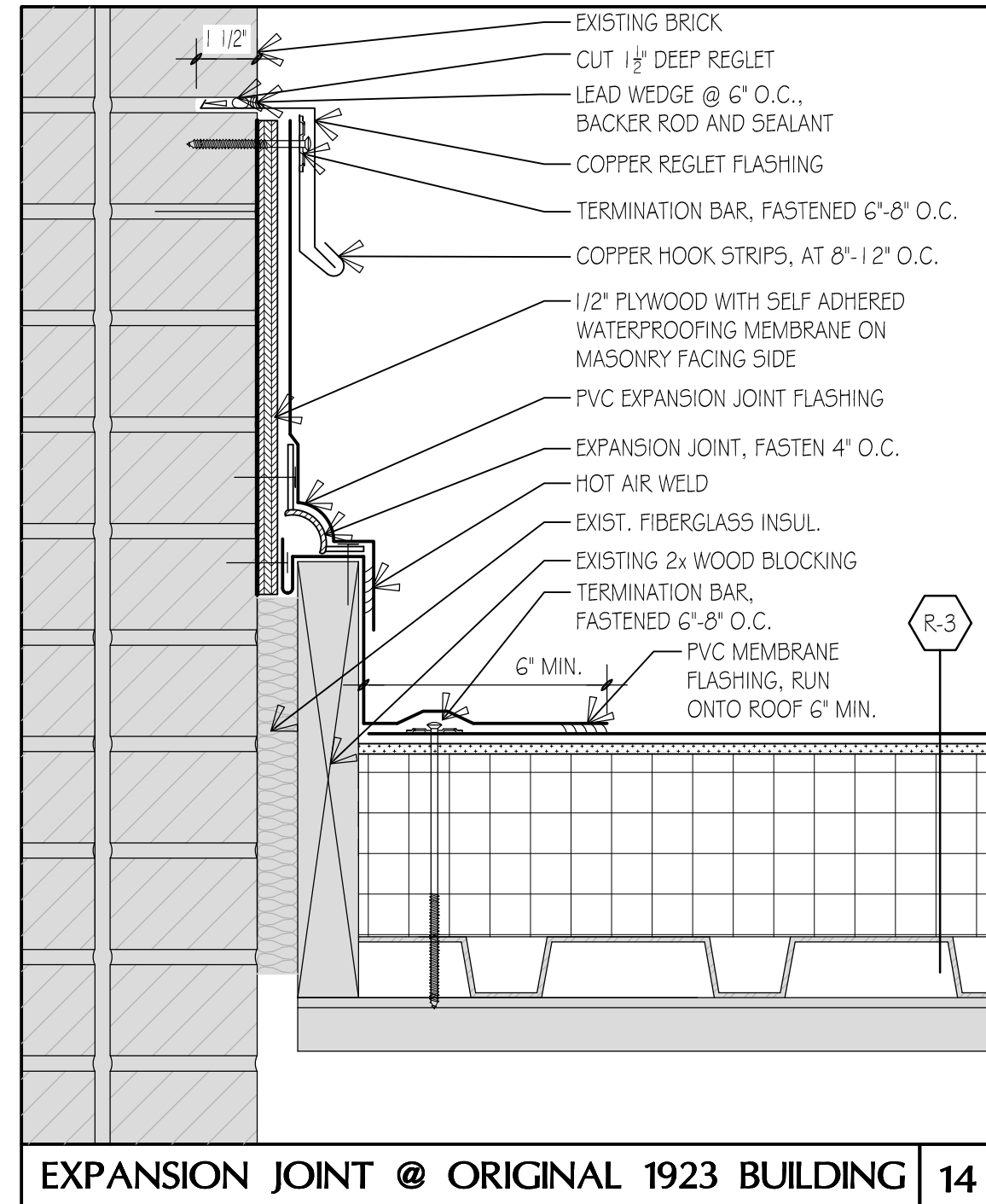
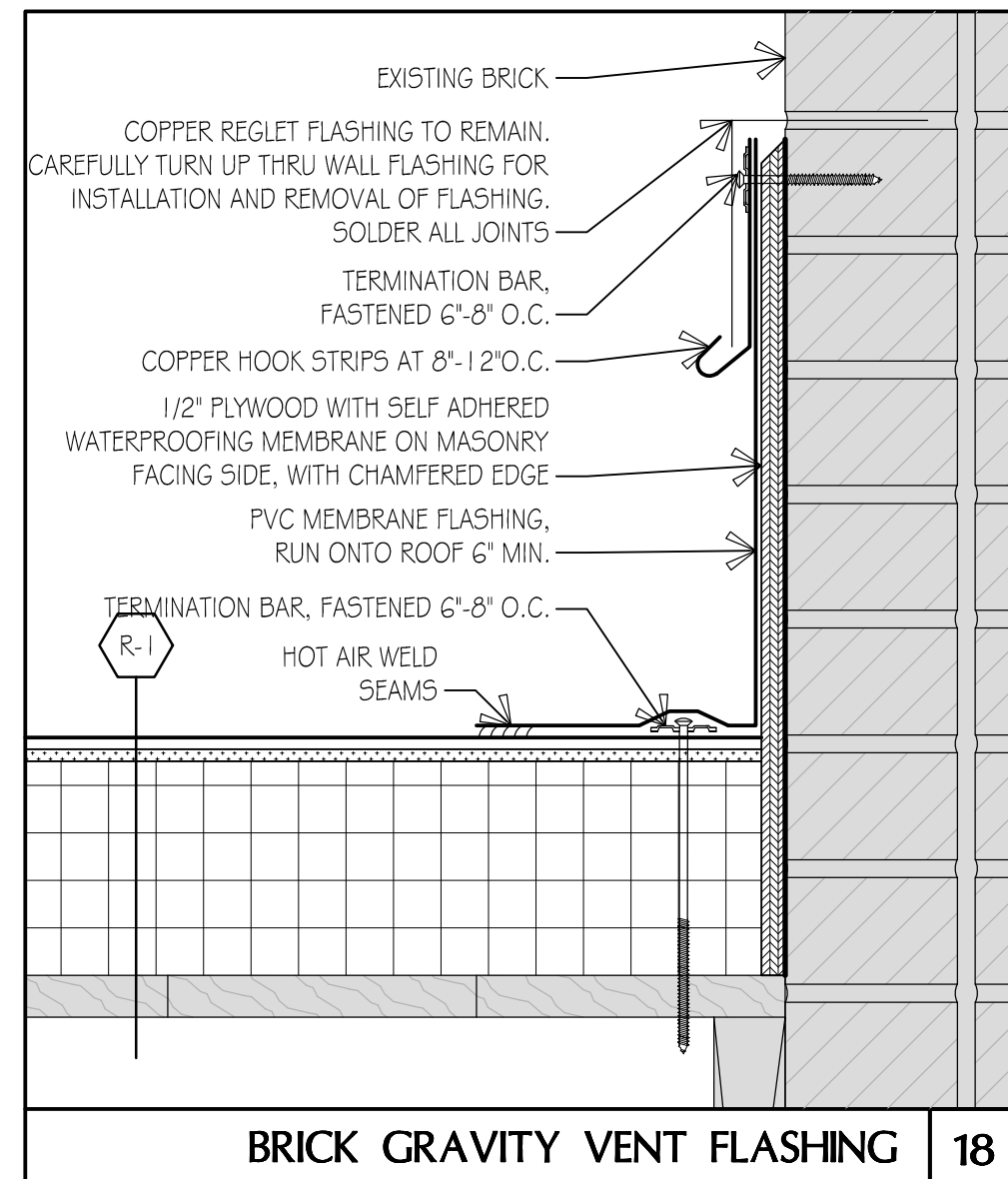
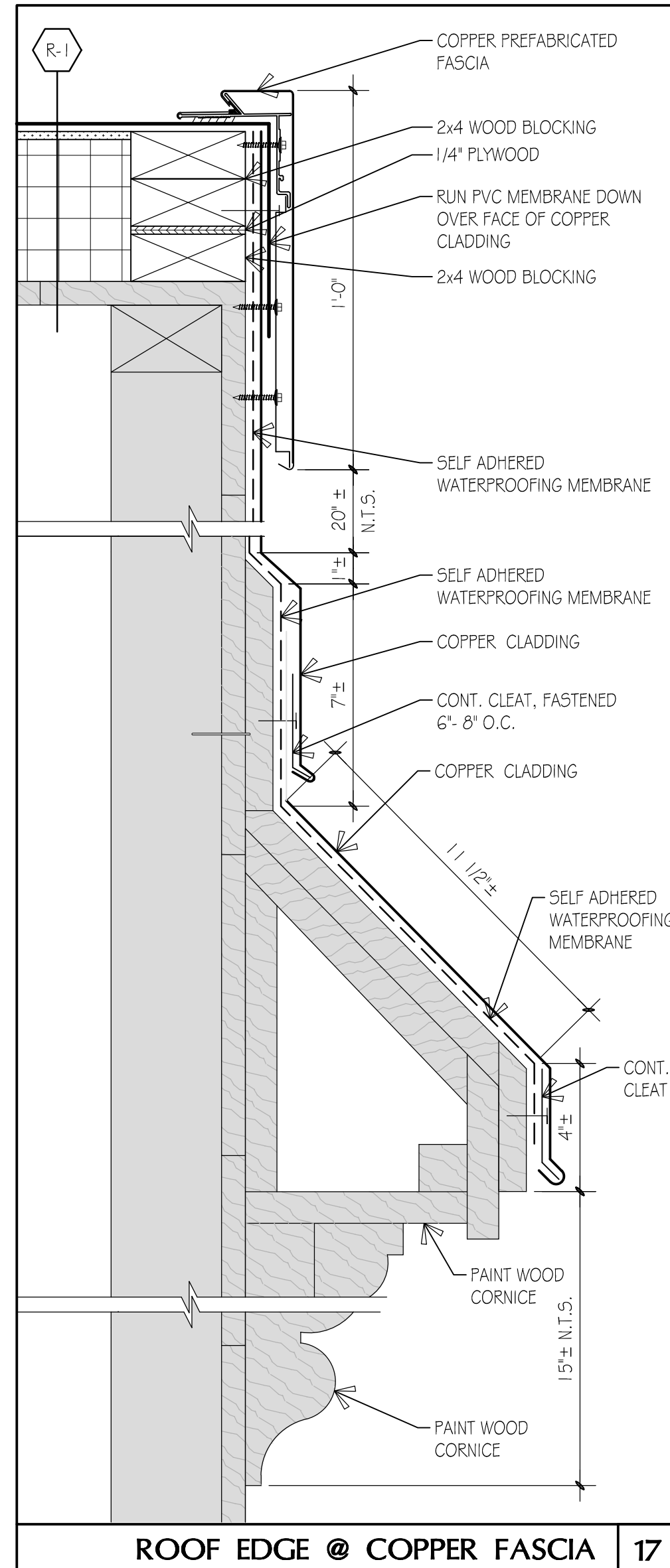
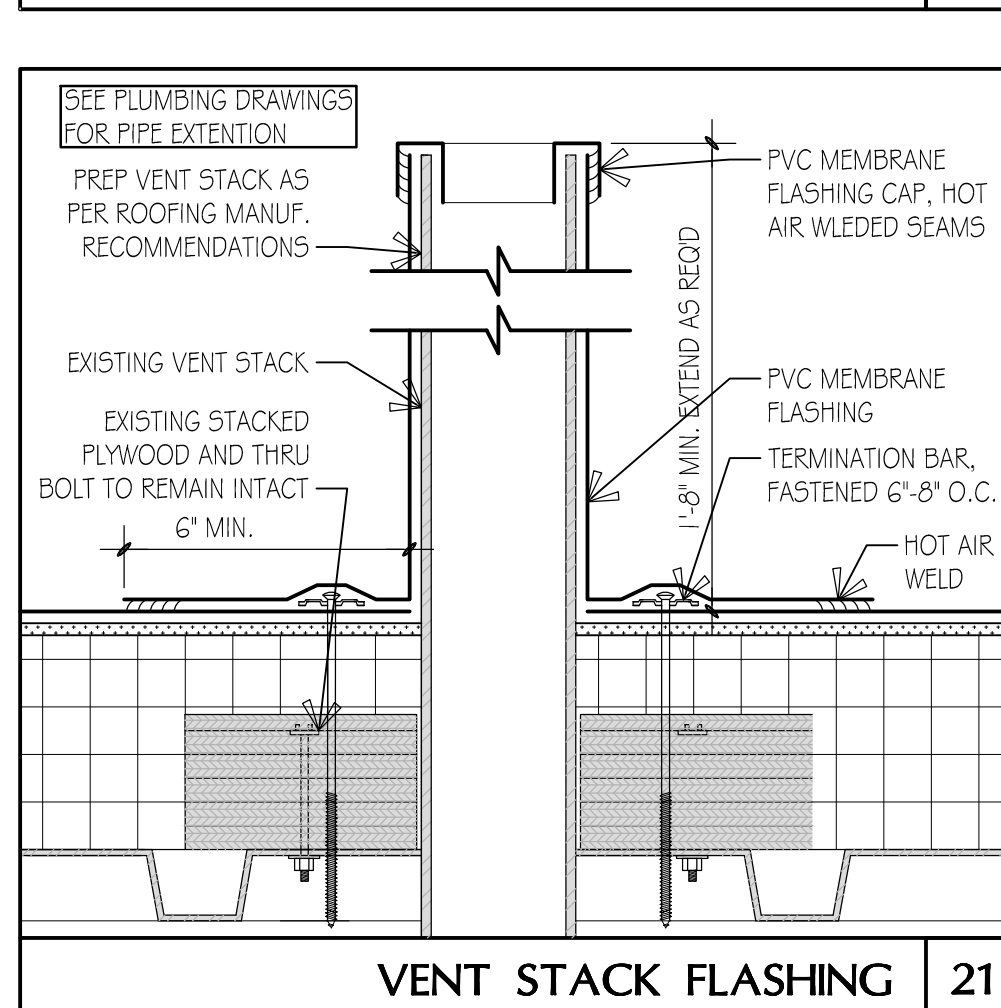
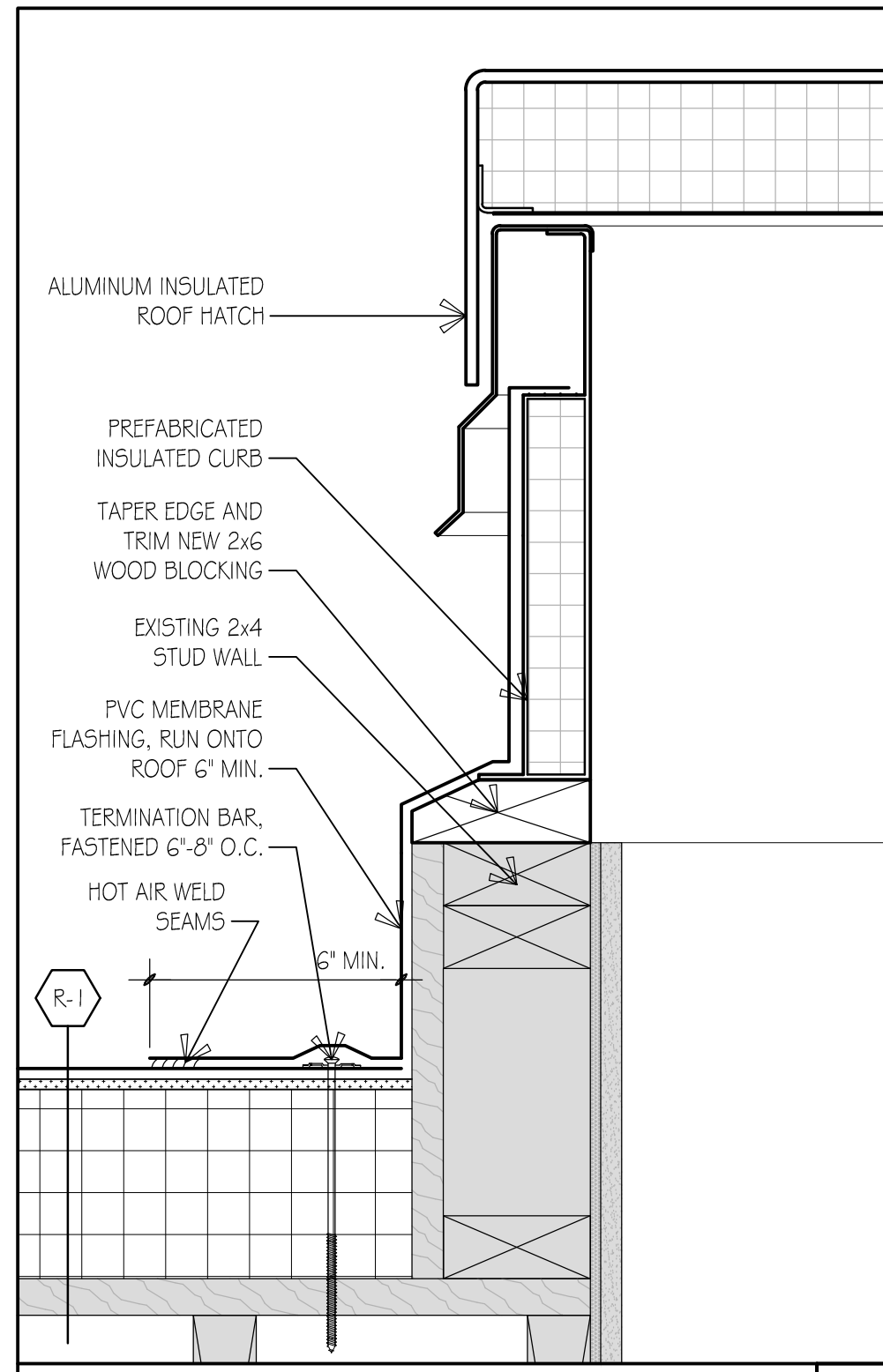
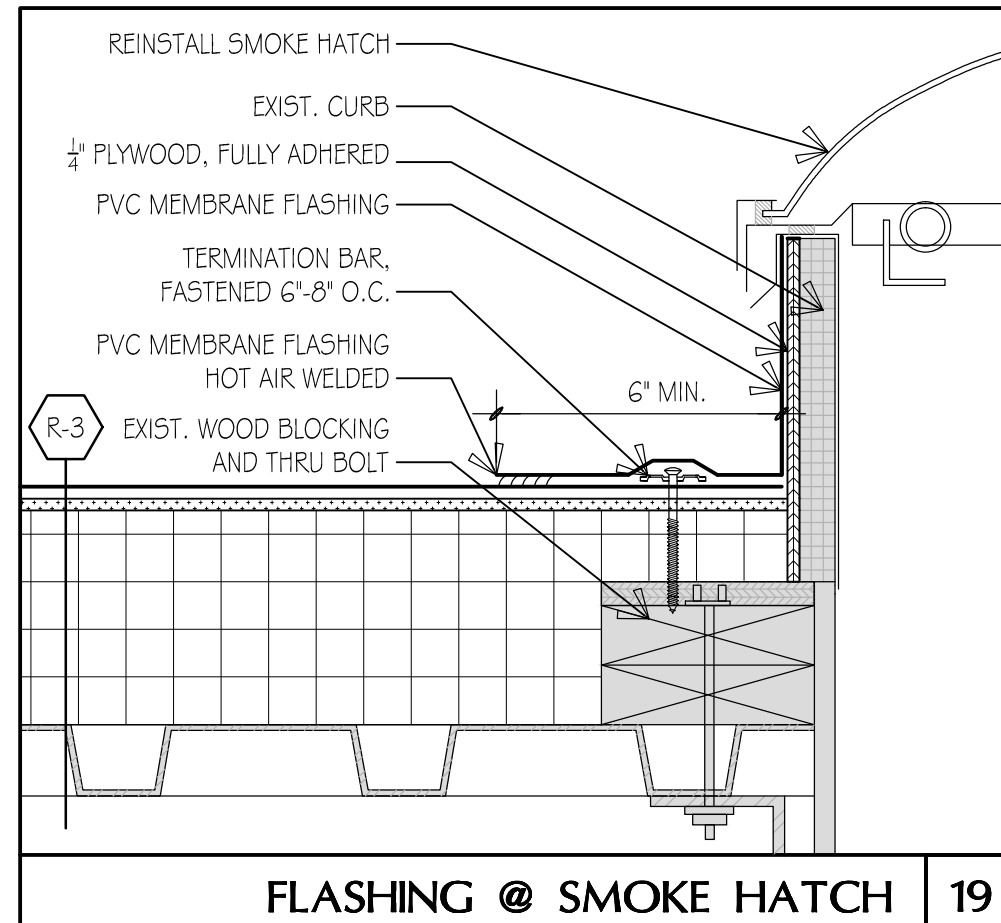
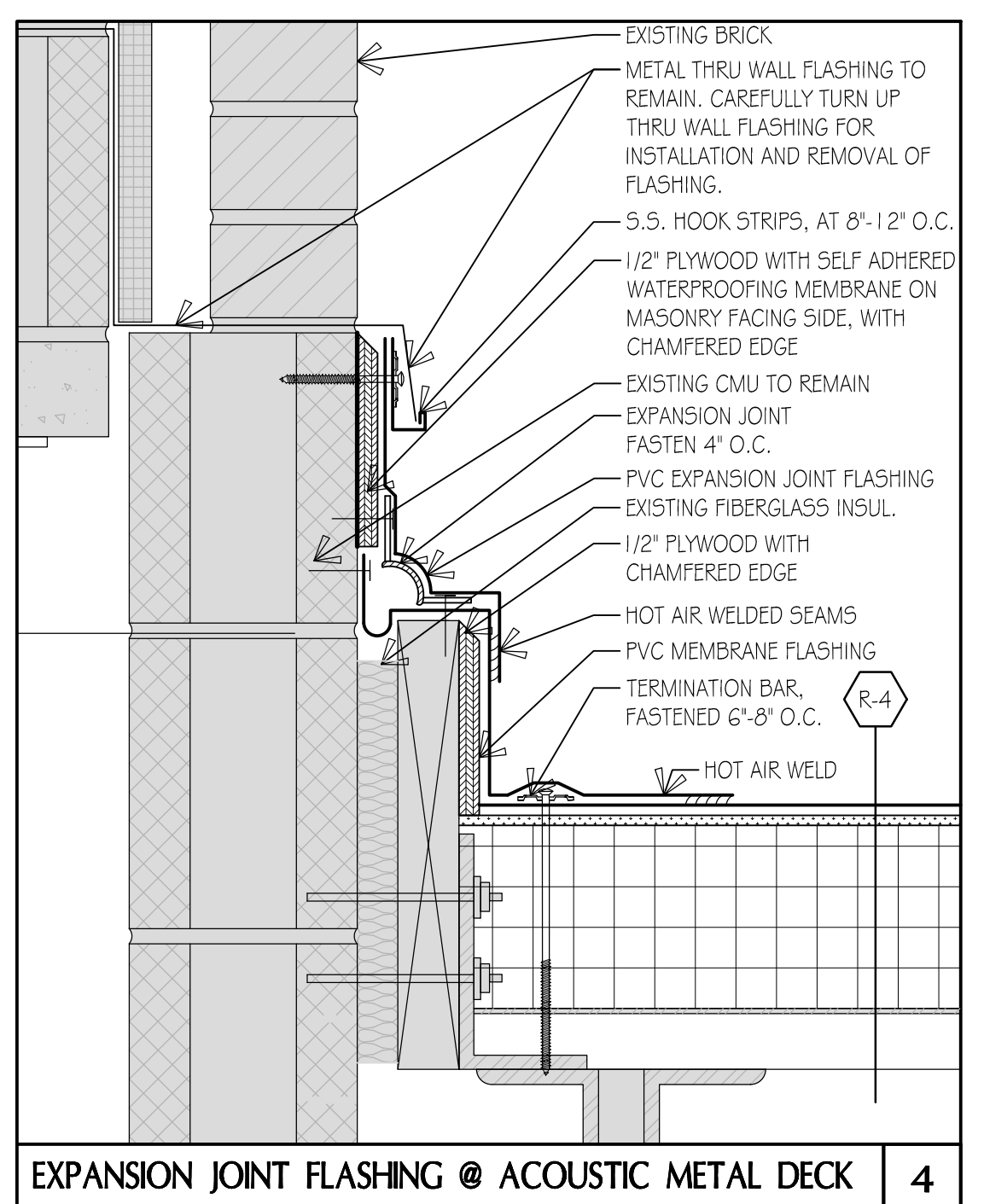
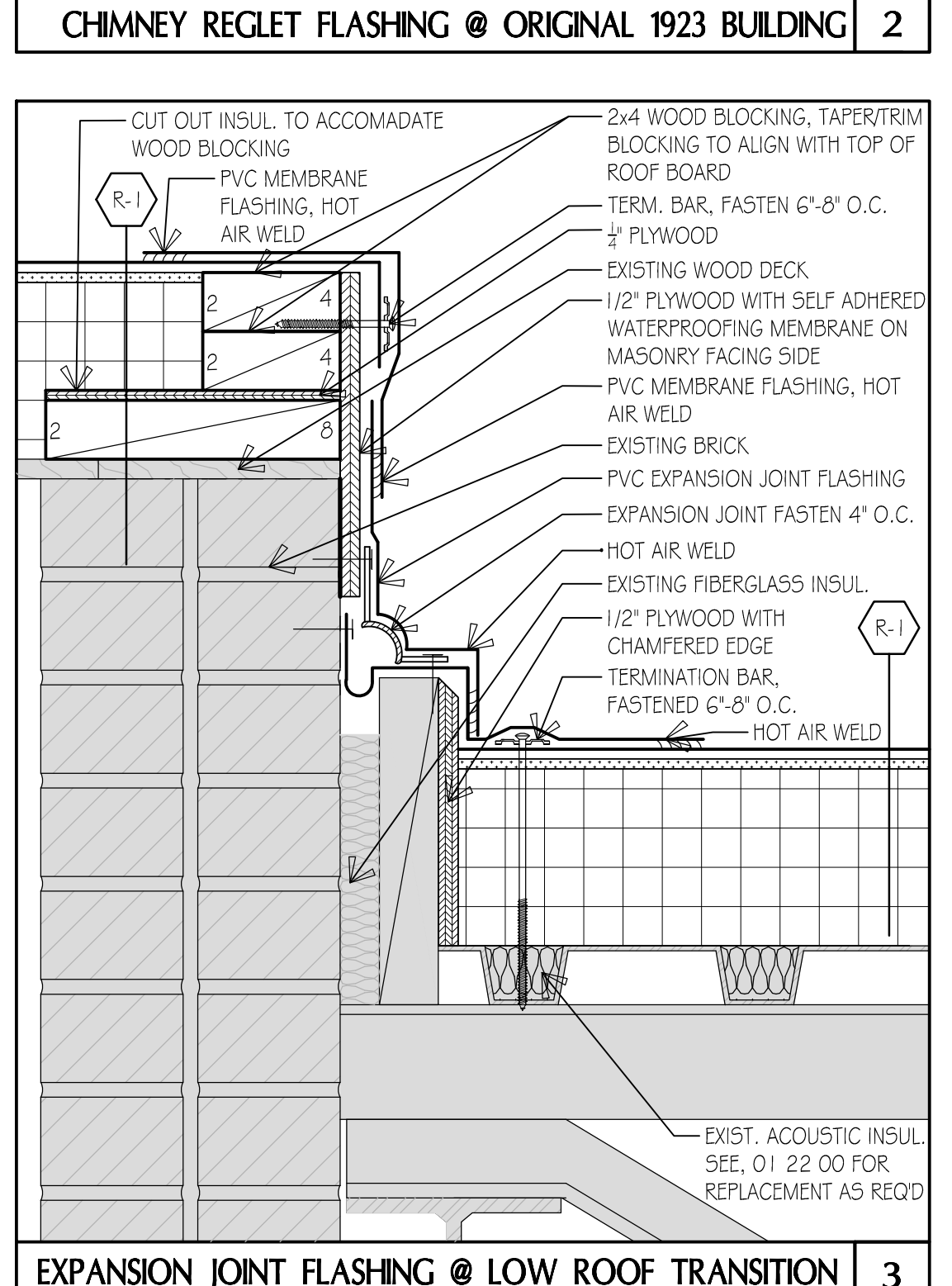
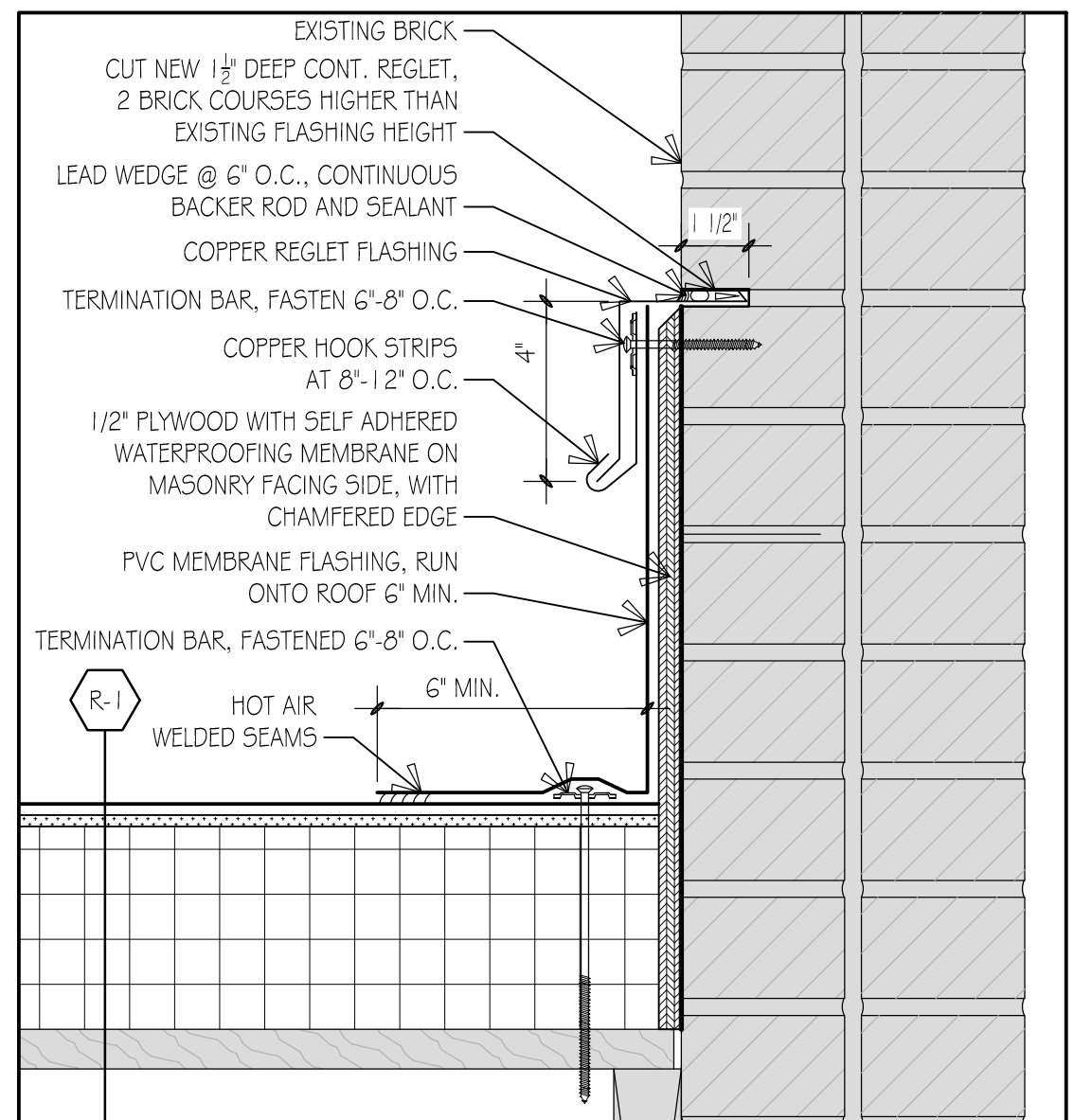
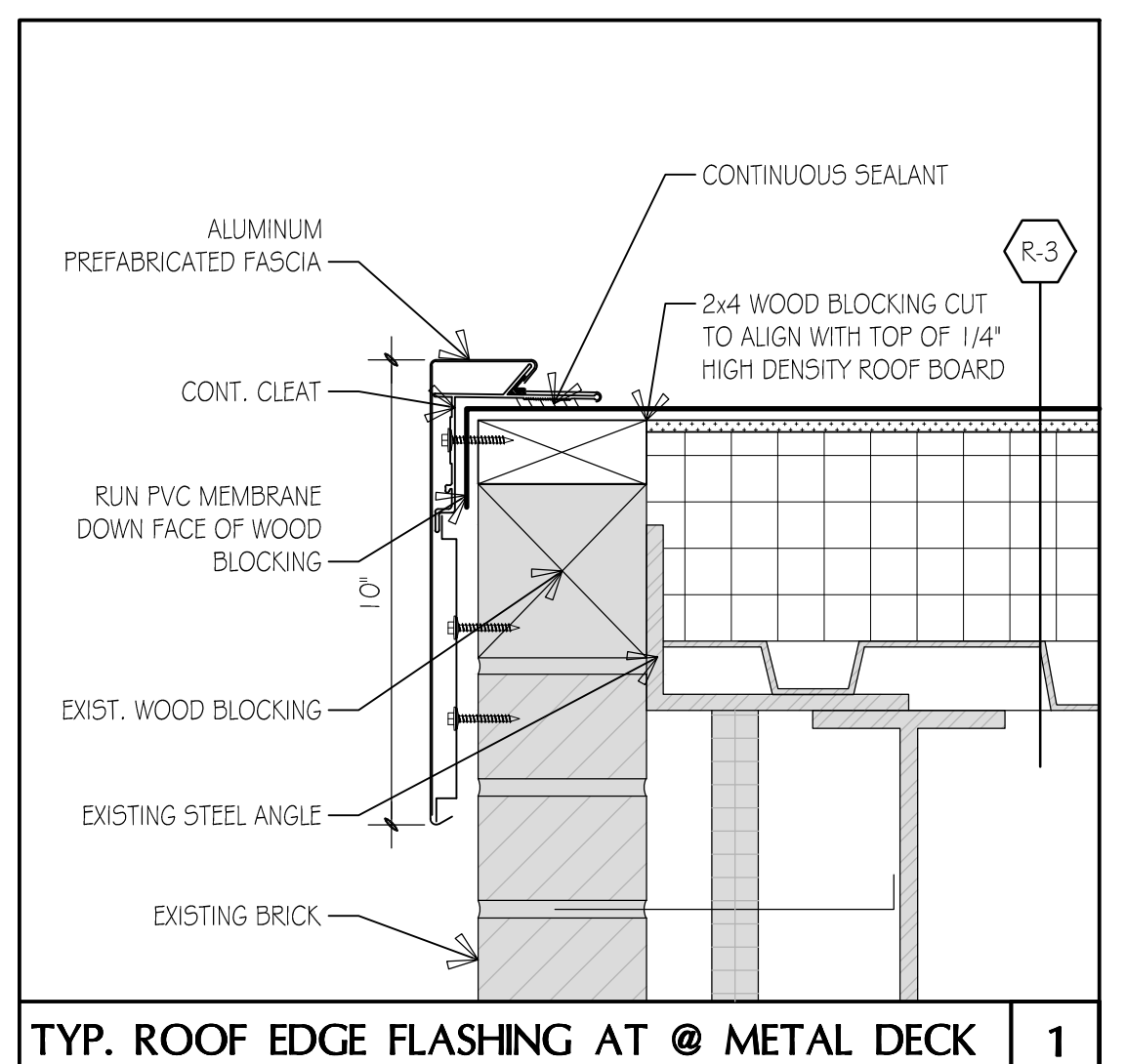
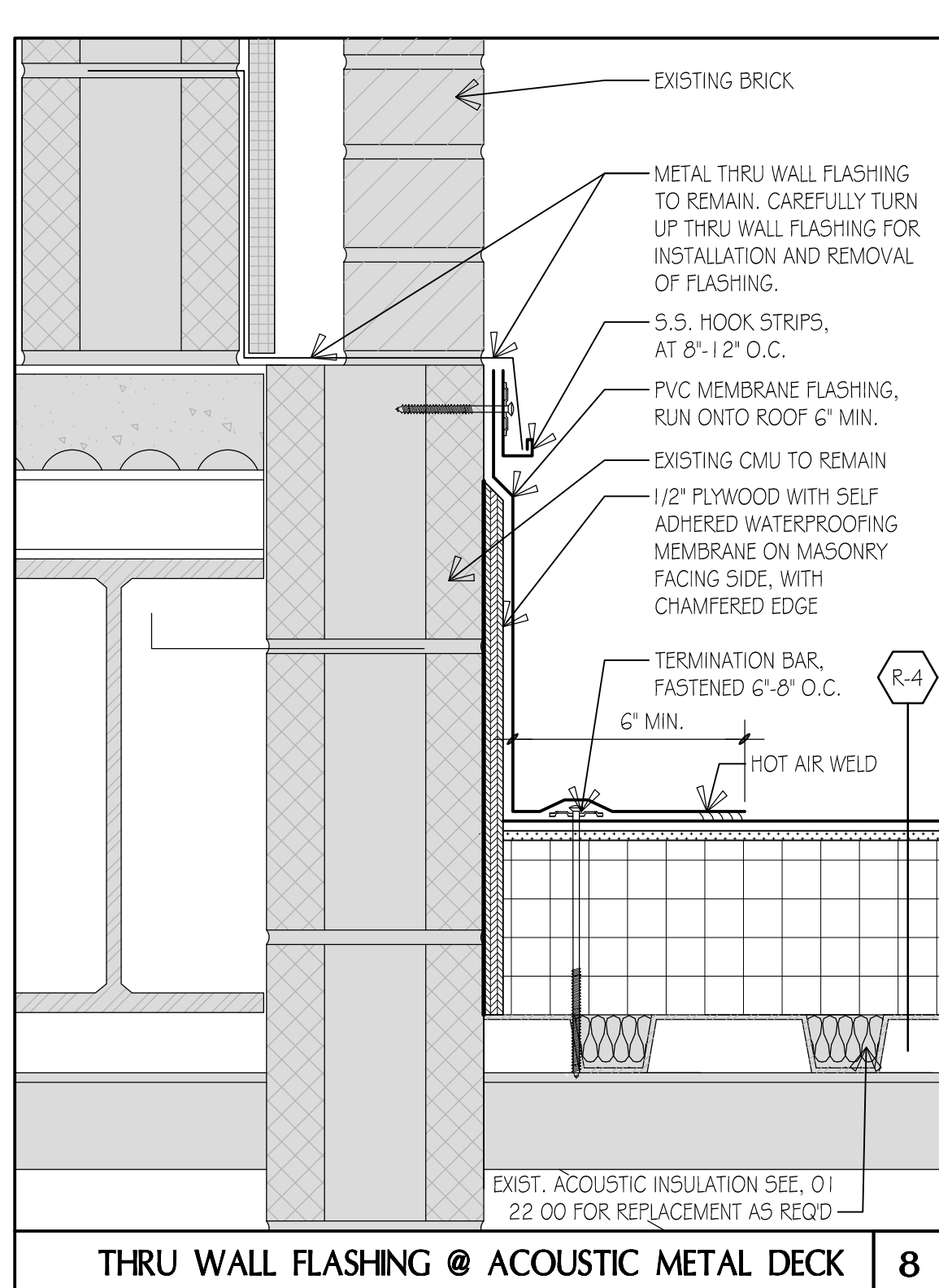
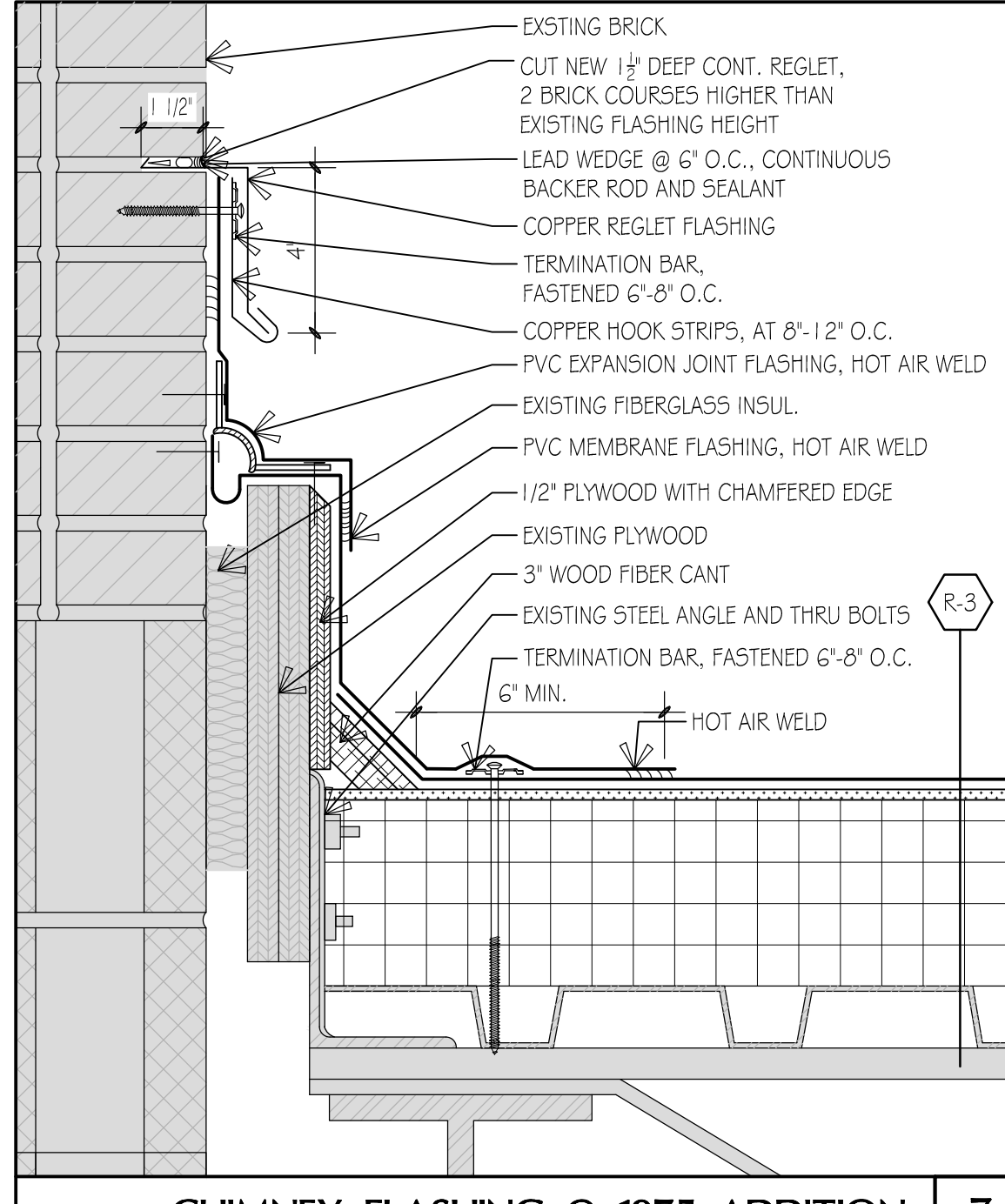
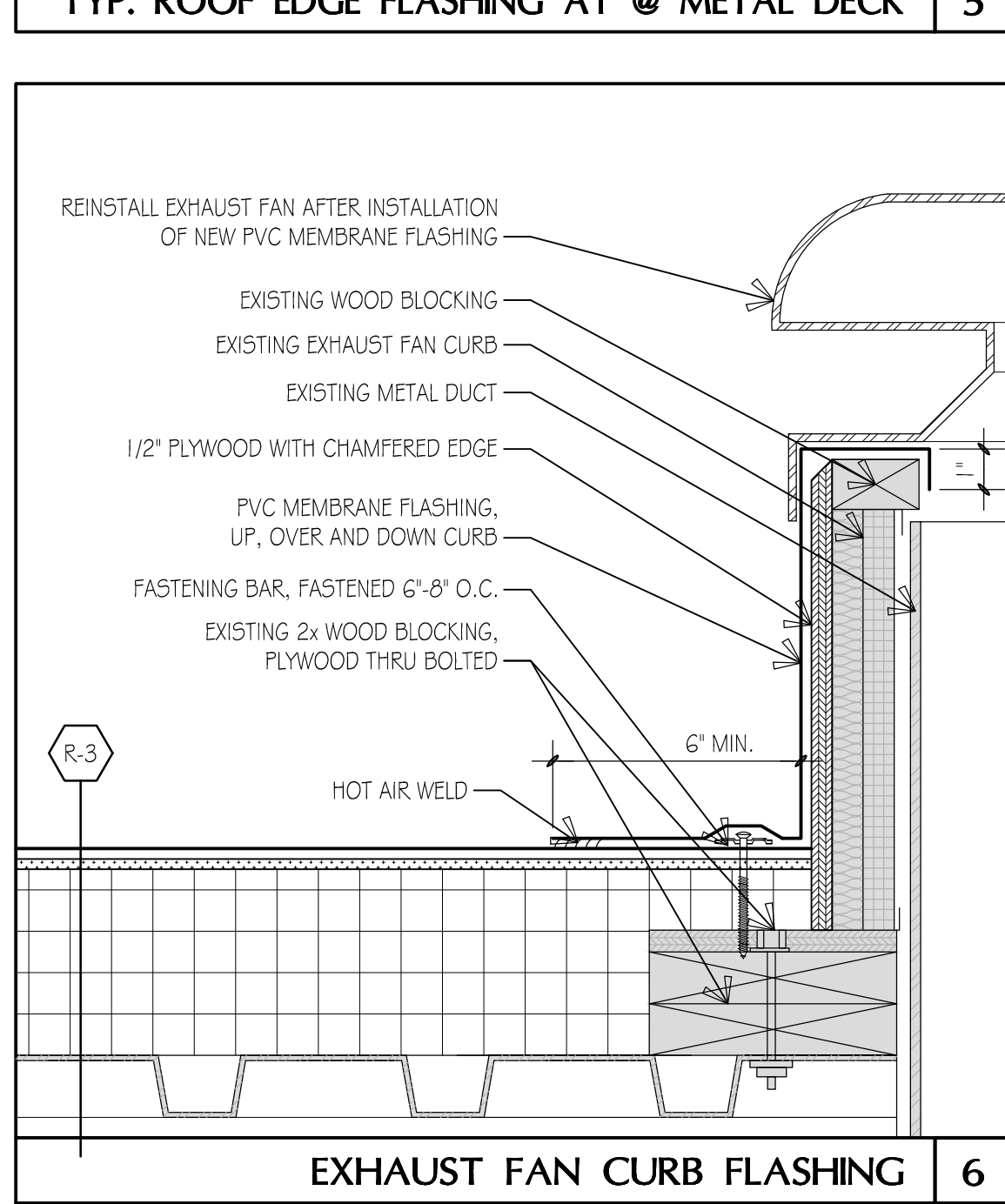
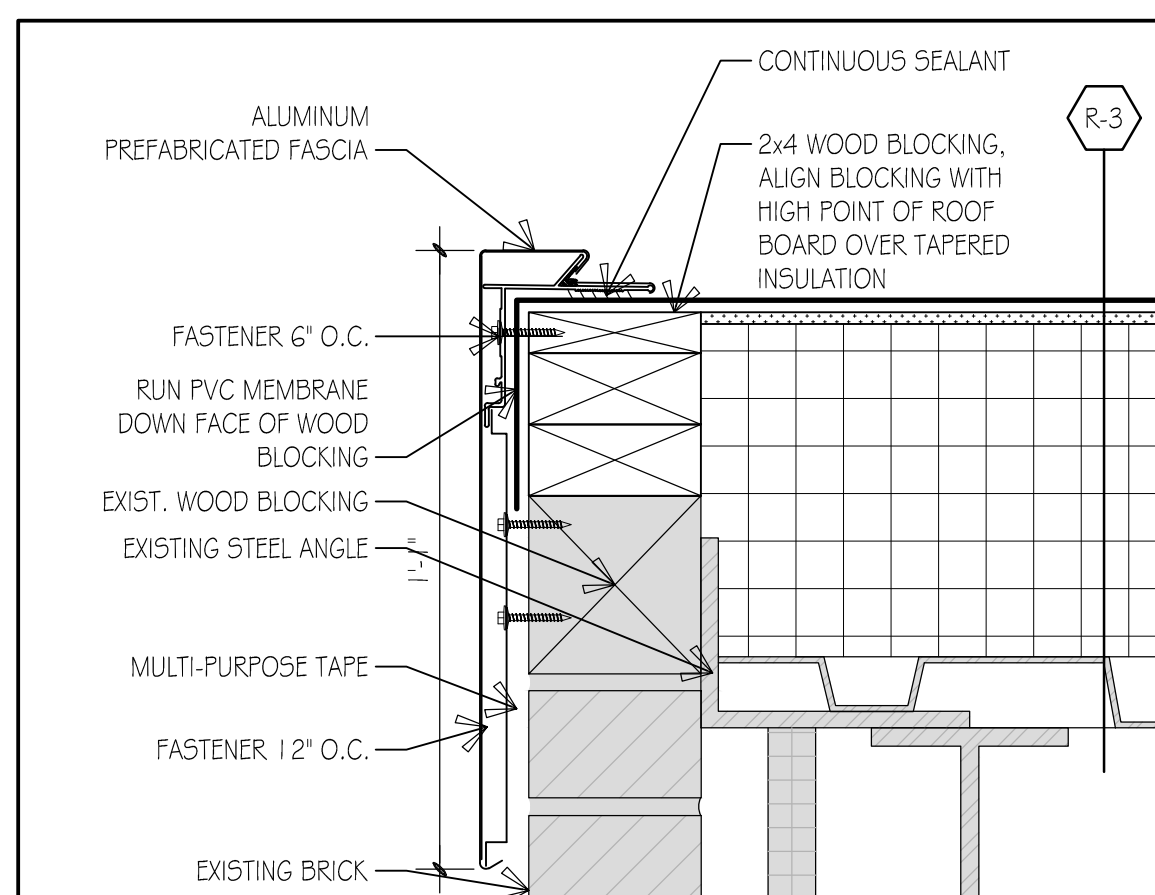
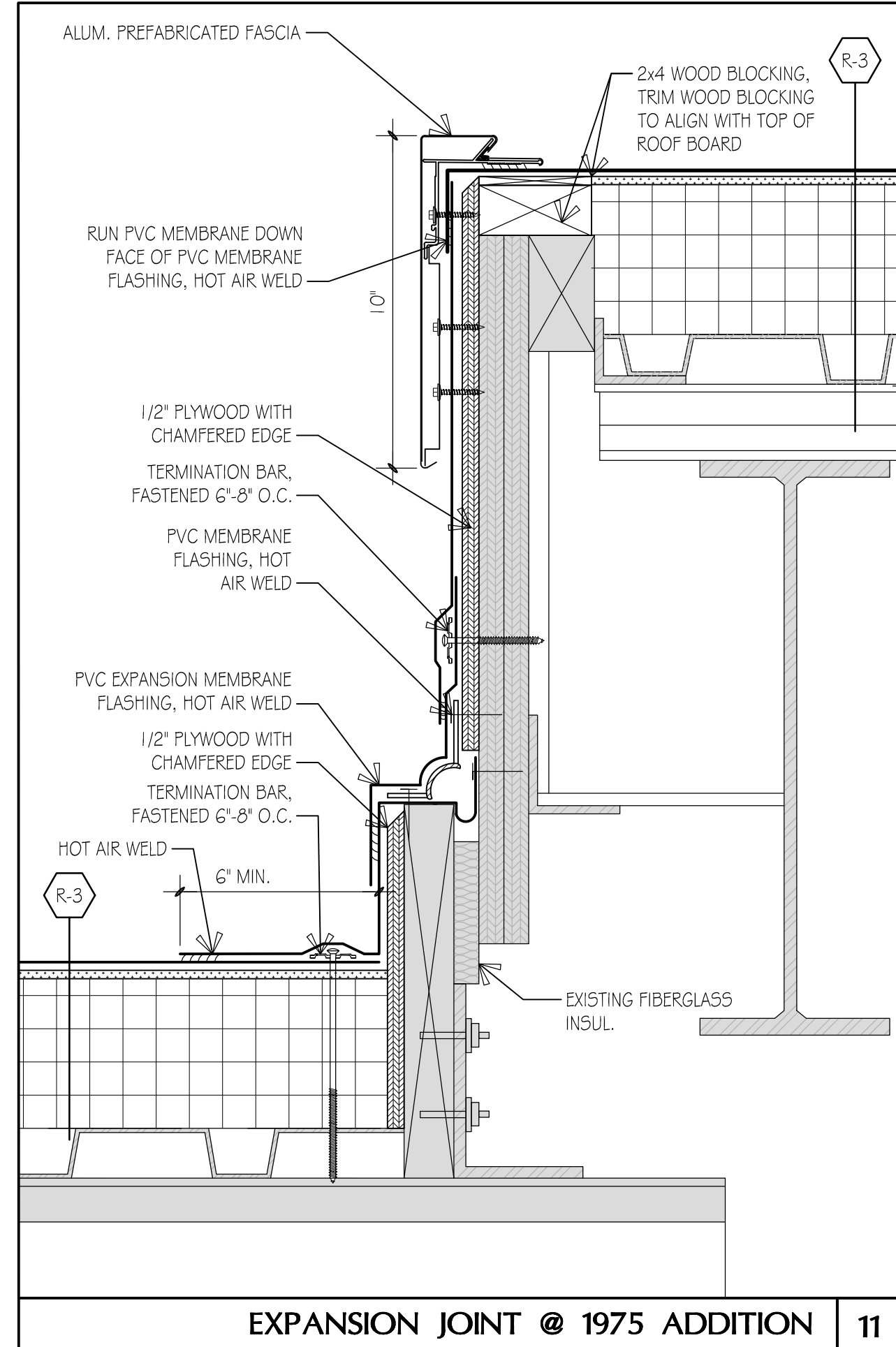
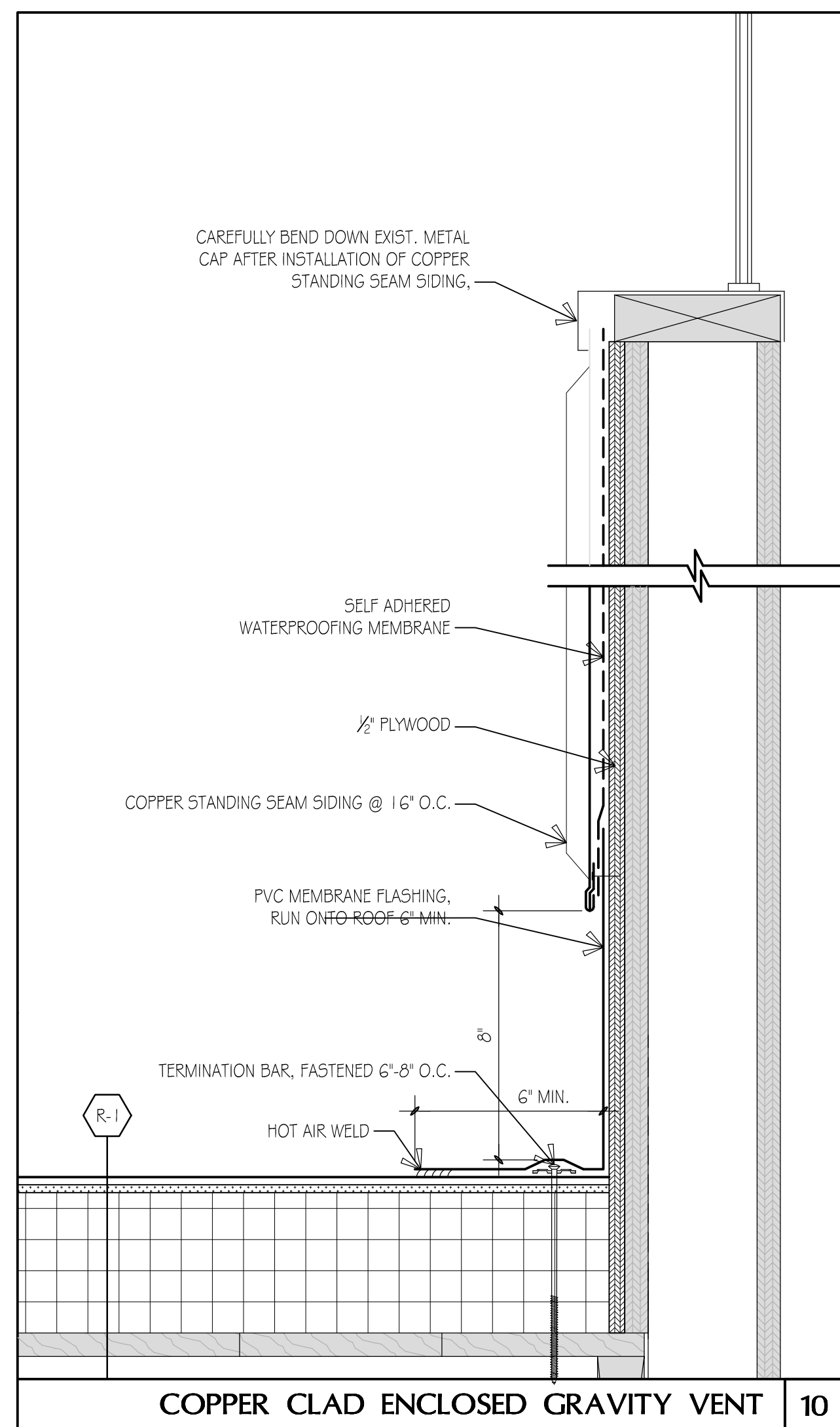
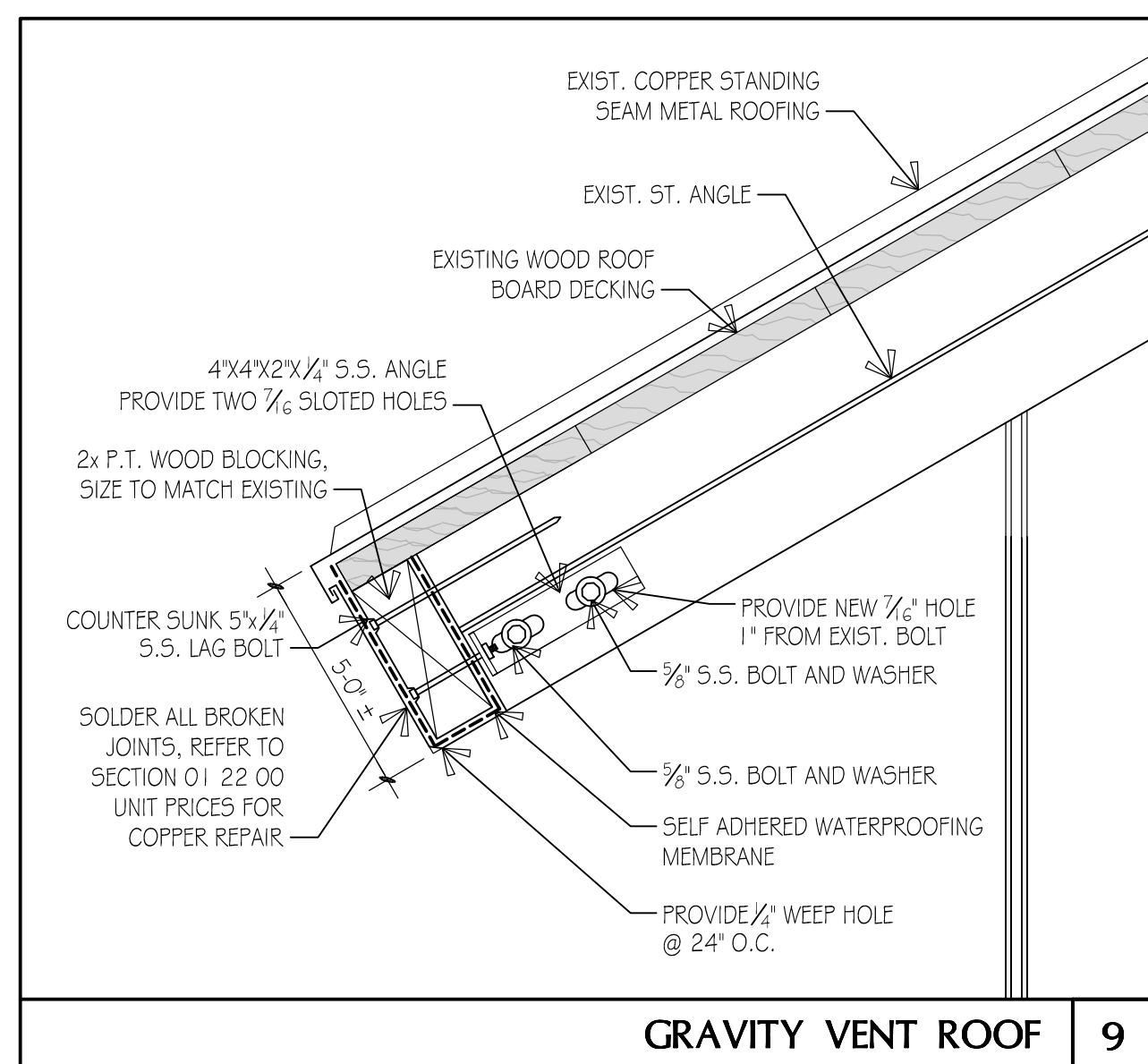
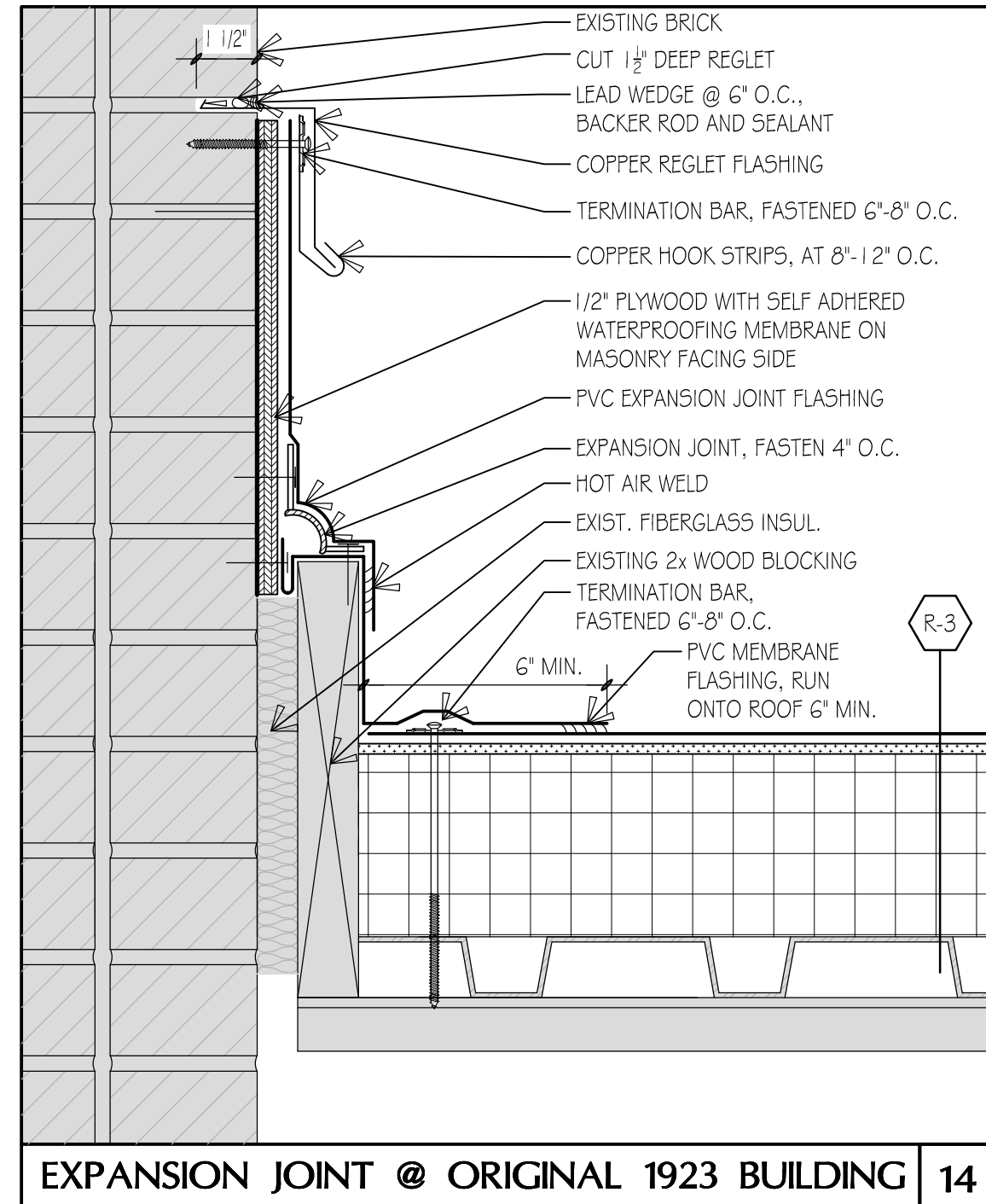
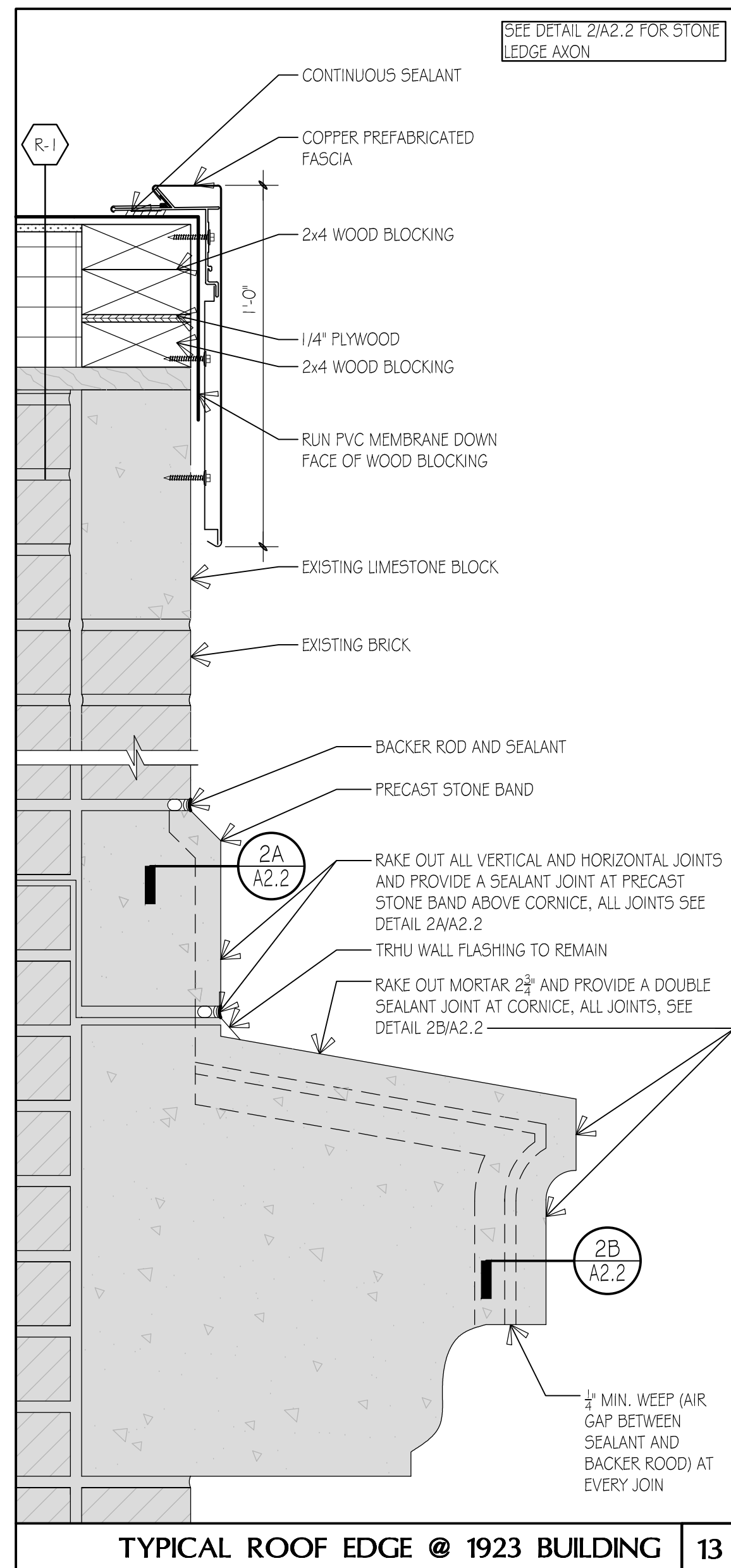
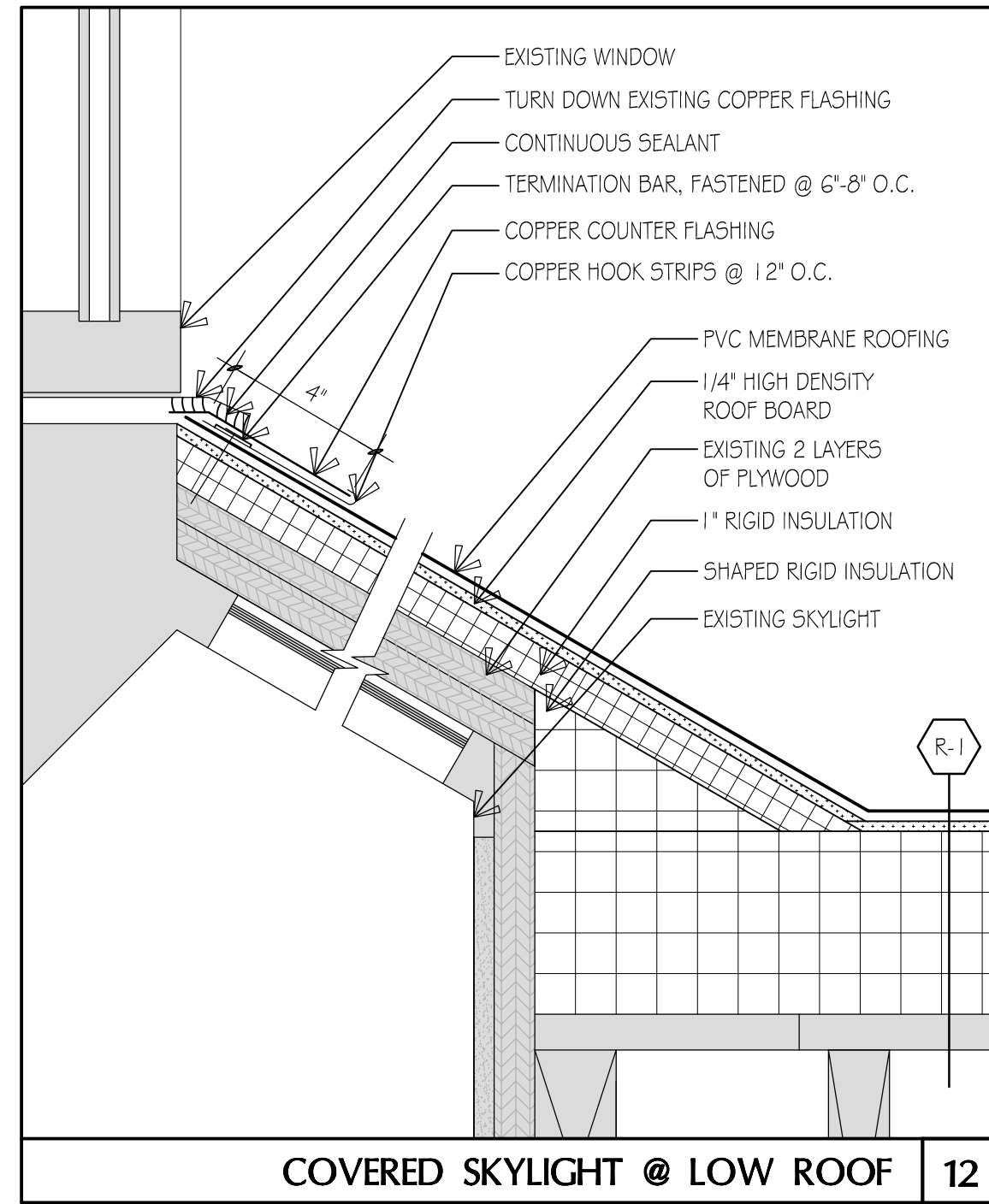
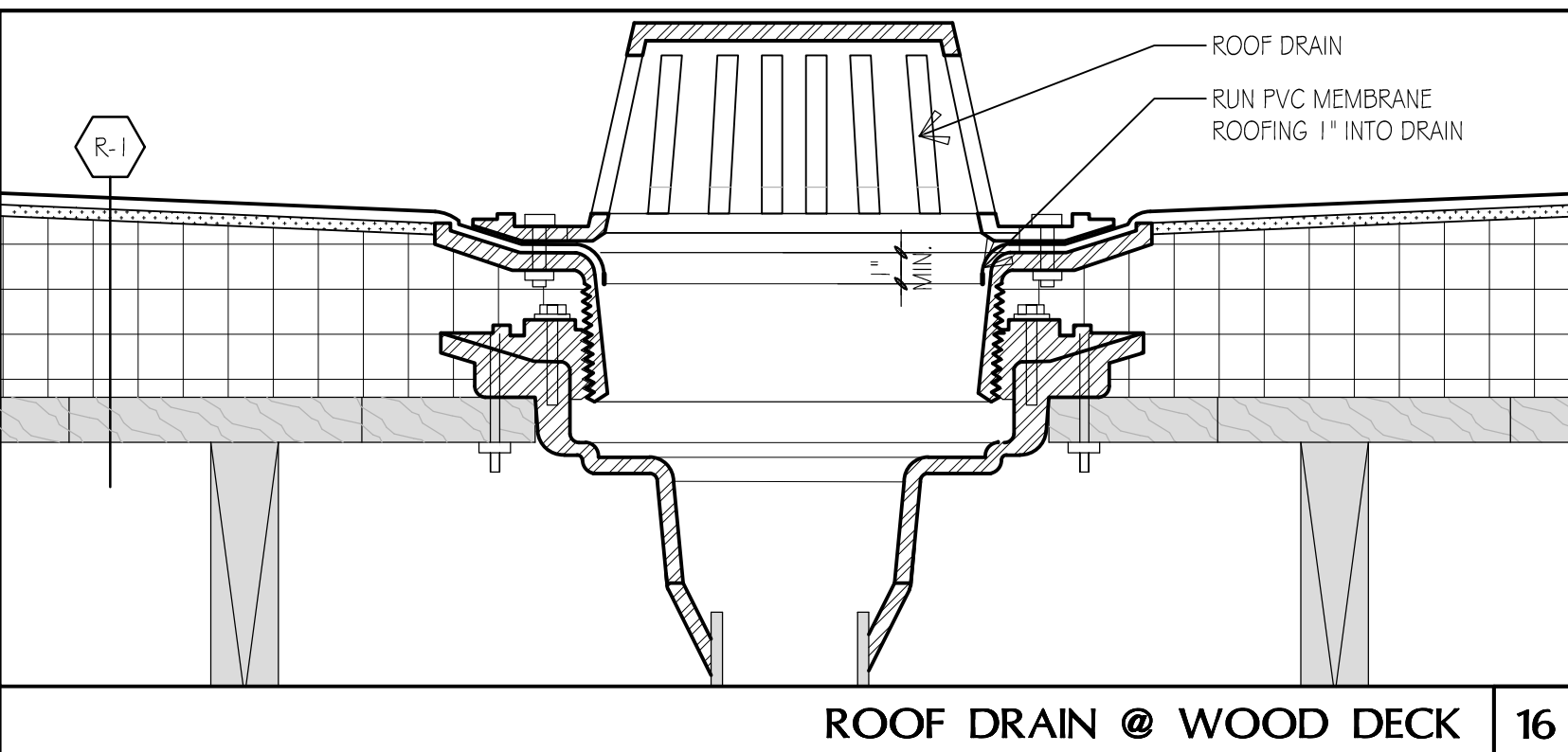
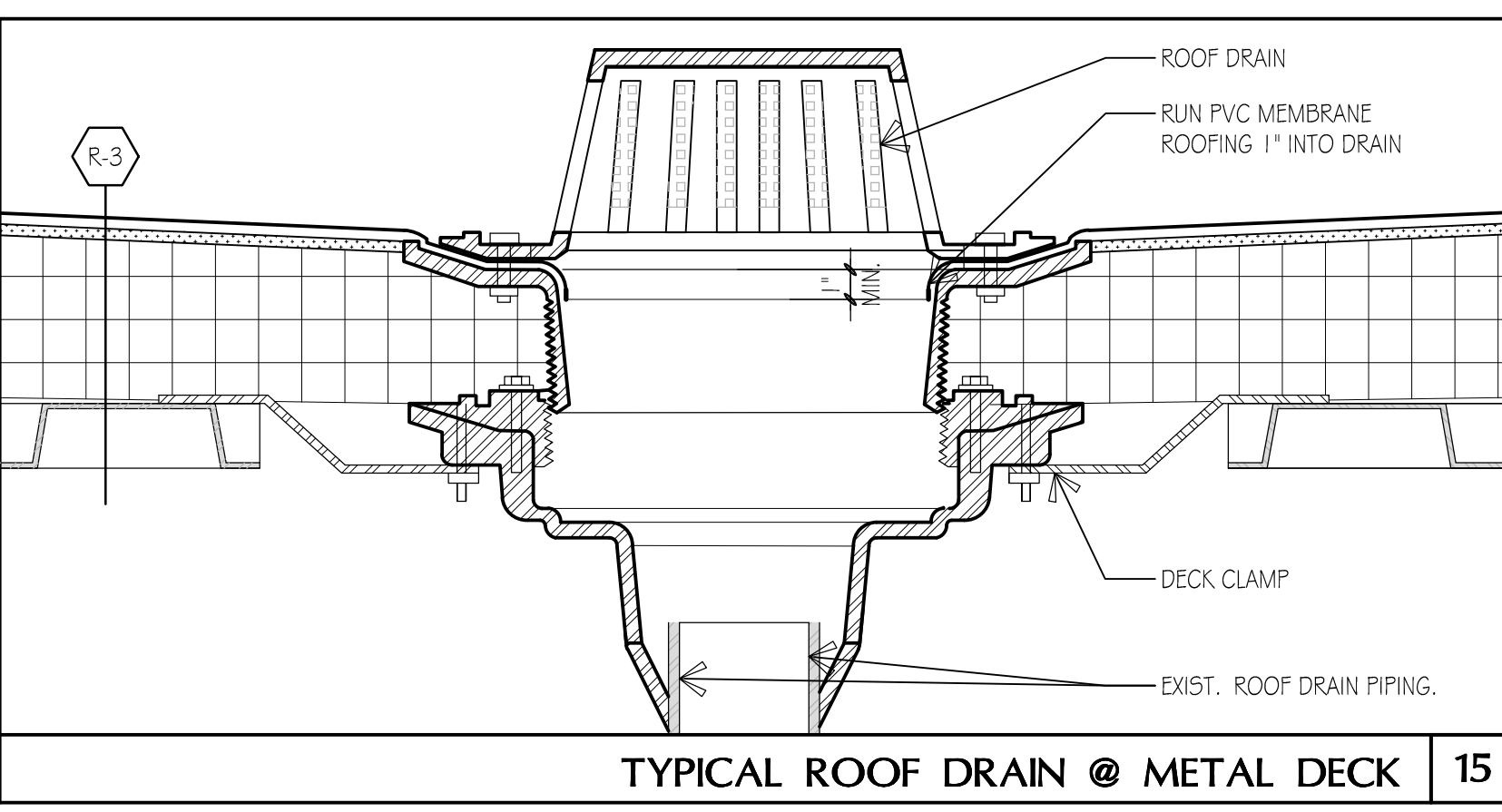
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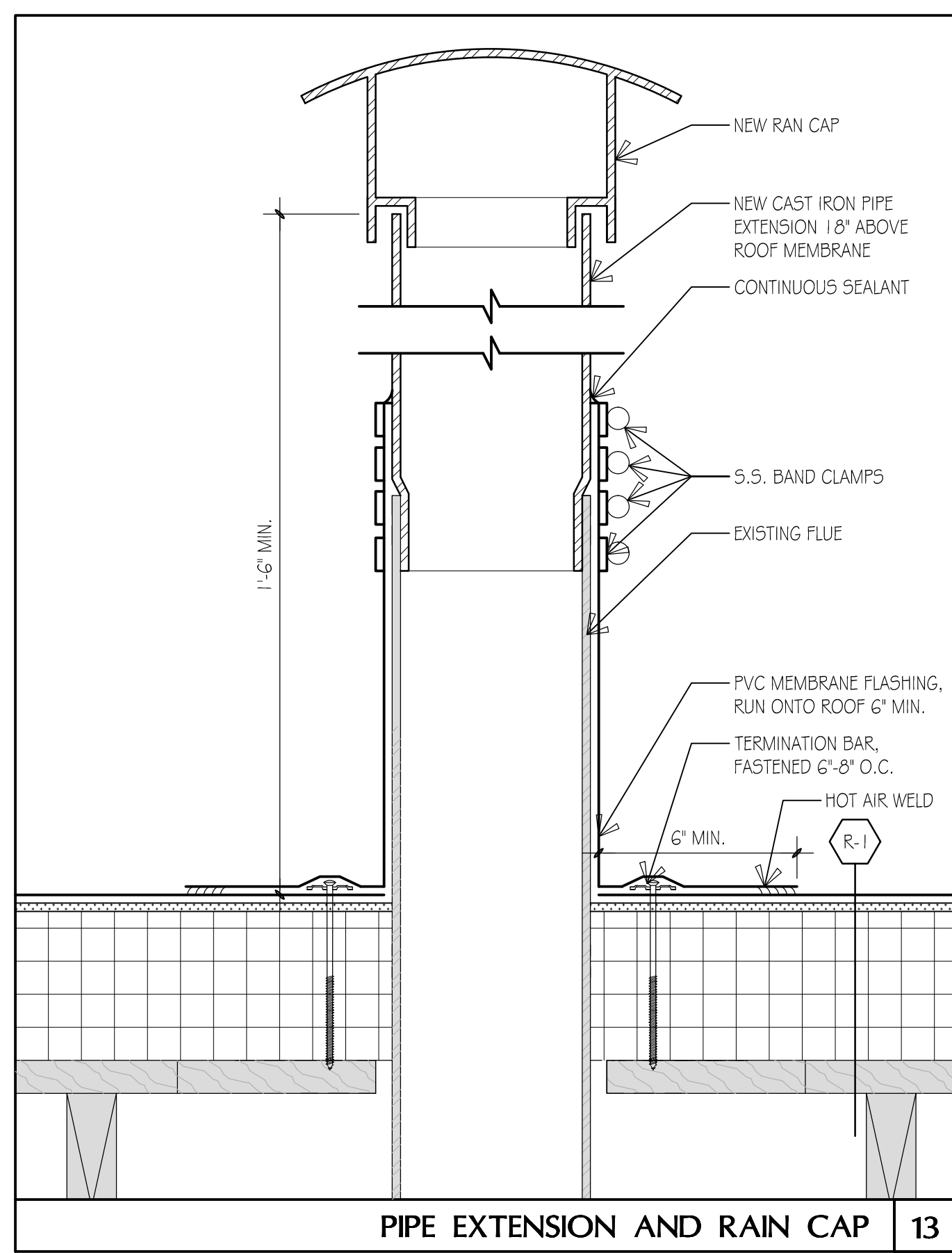
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Checked: JET/CTC

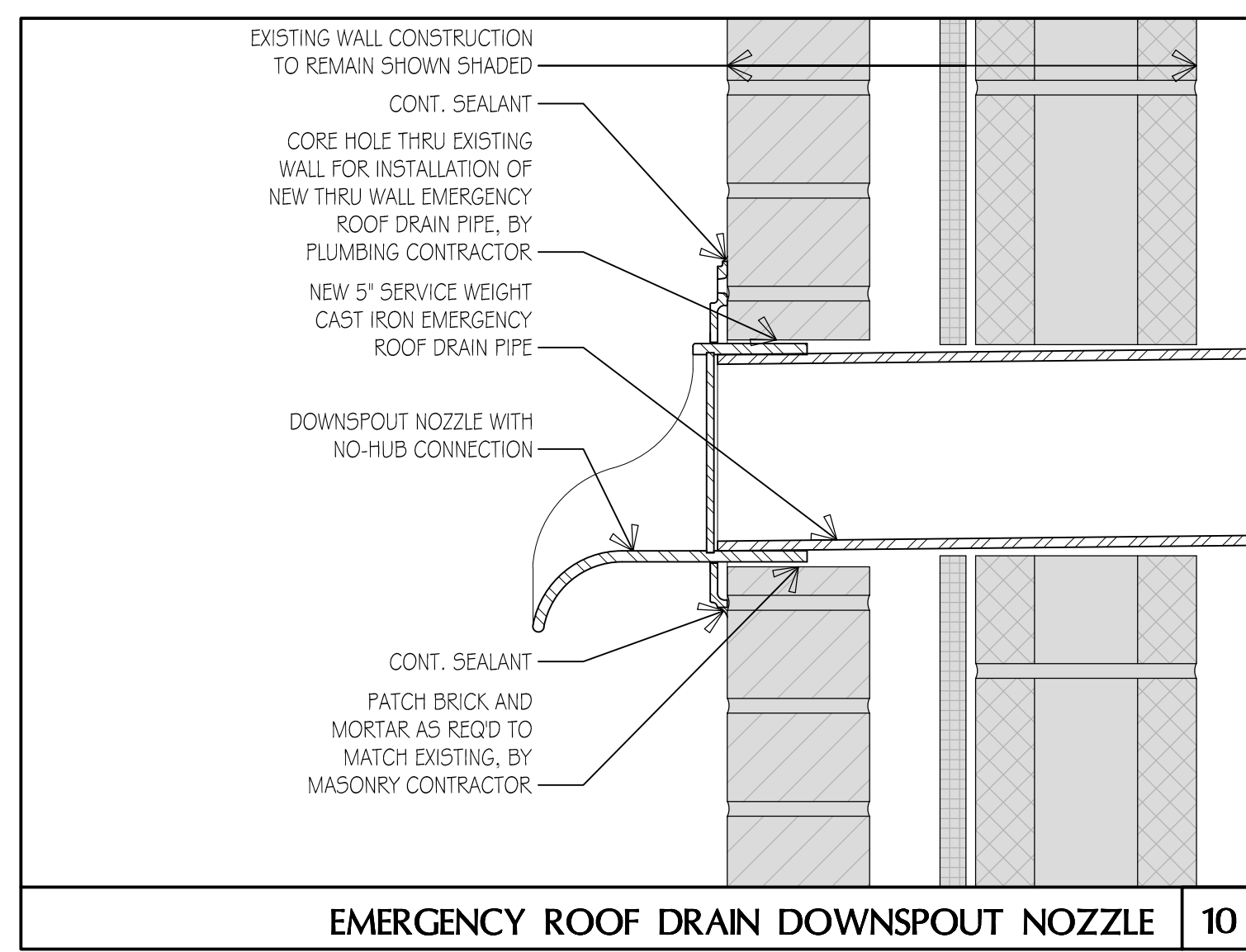
Project No: 1138

**A2.1**

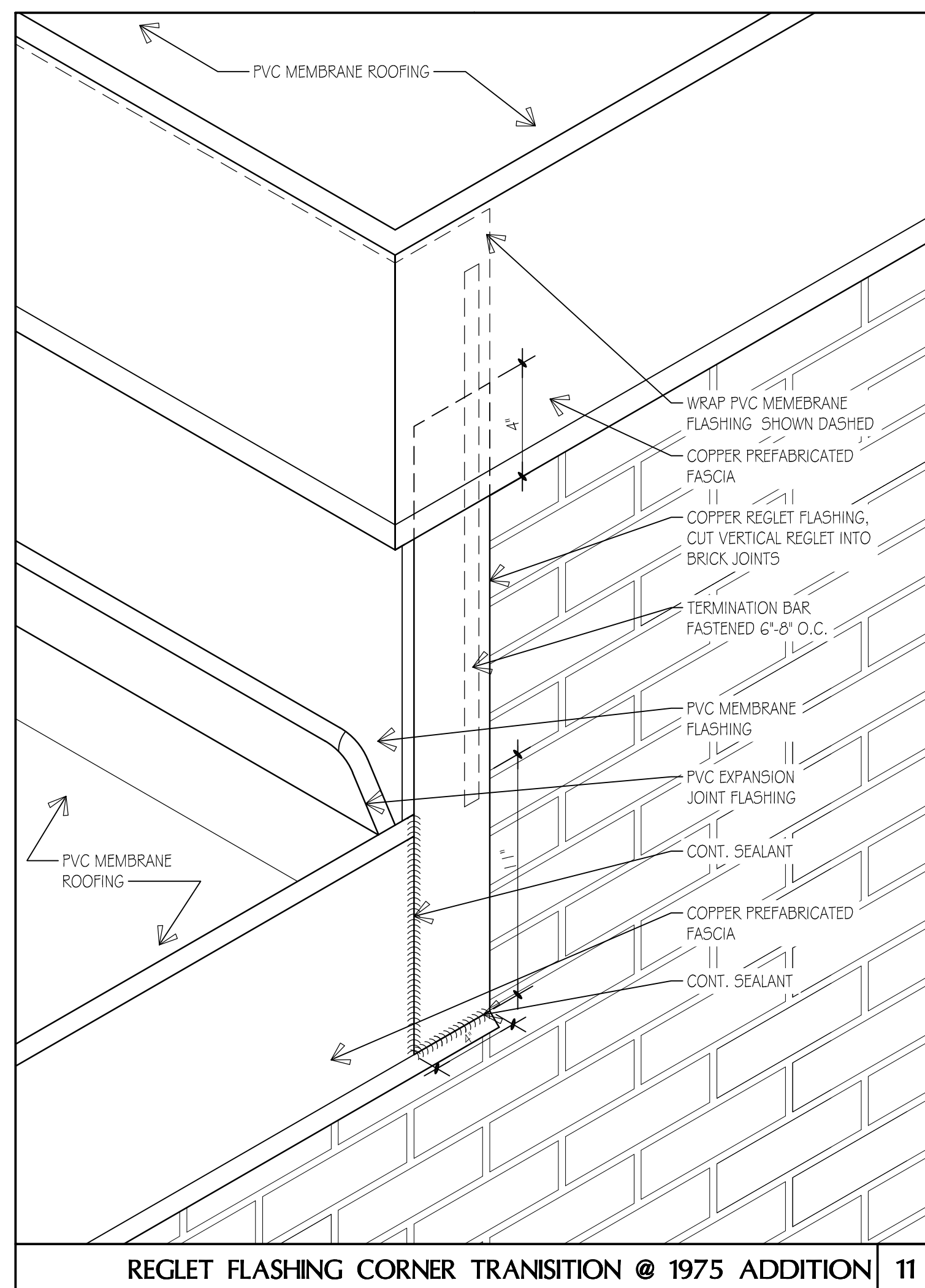




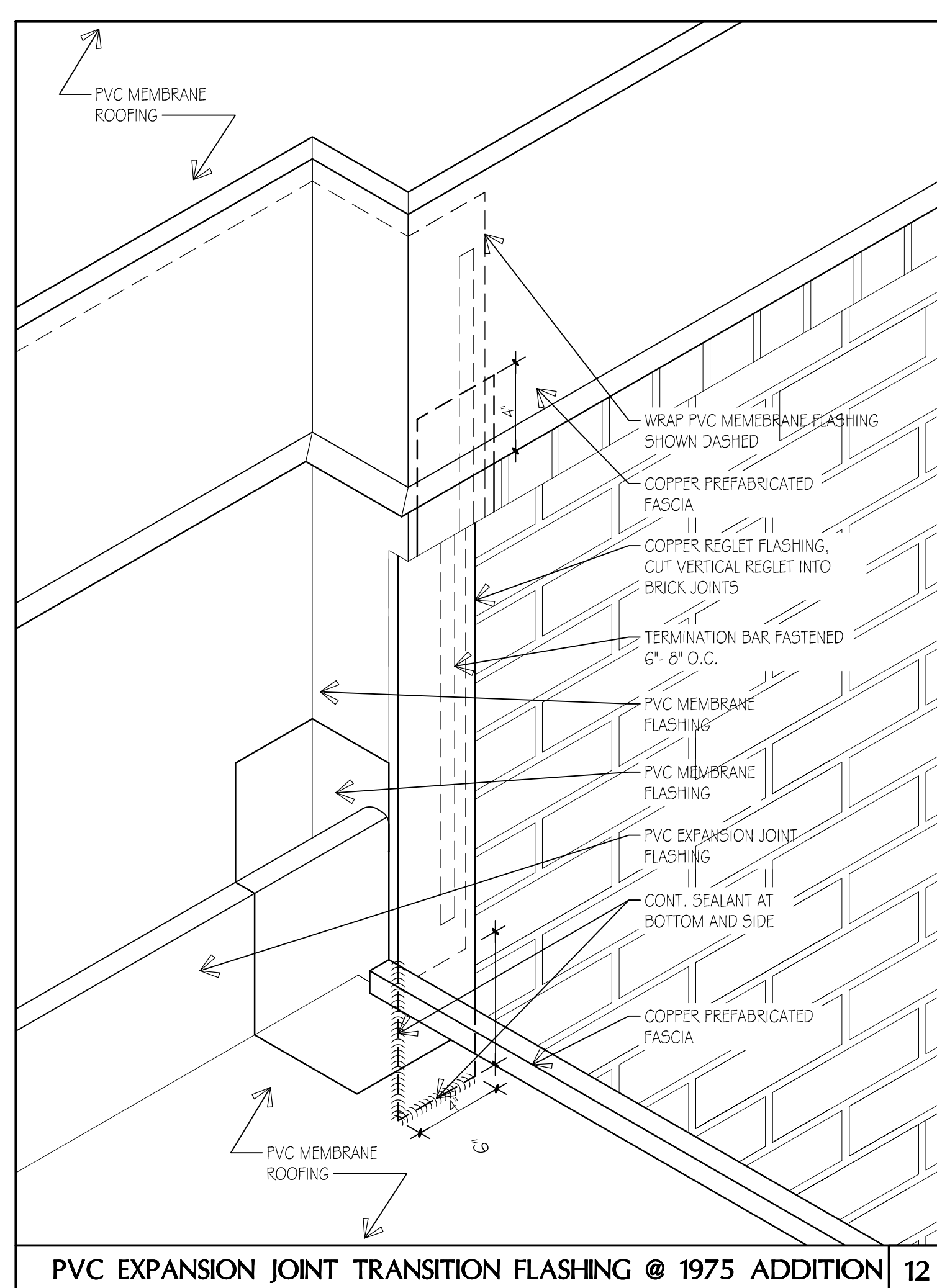
PIPE EXTENSION AND RAIN CAP 13



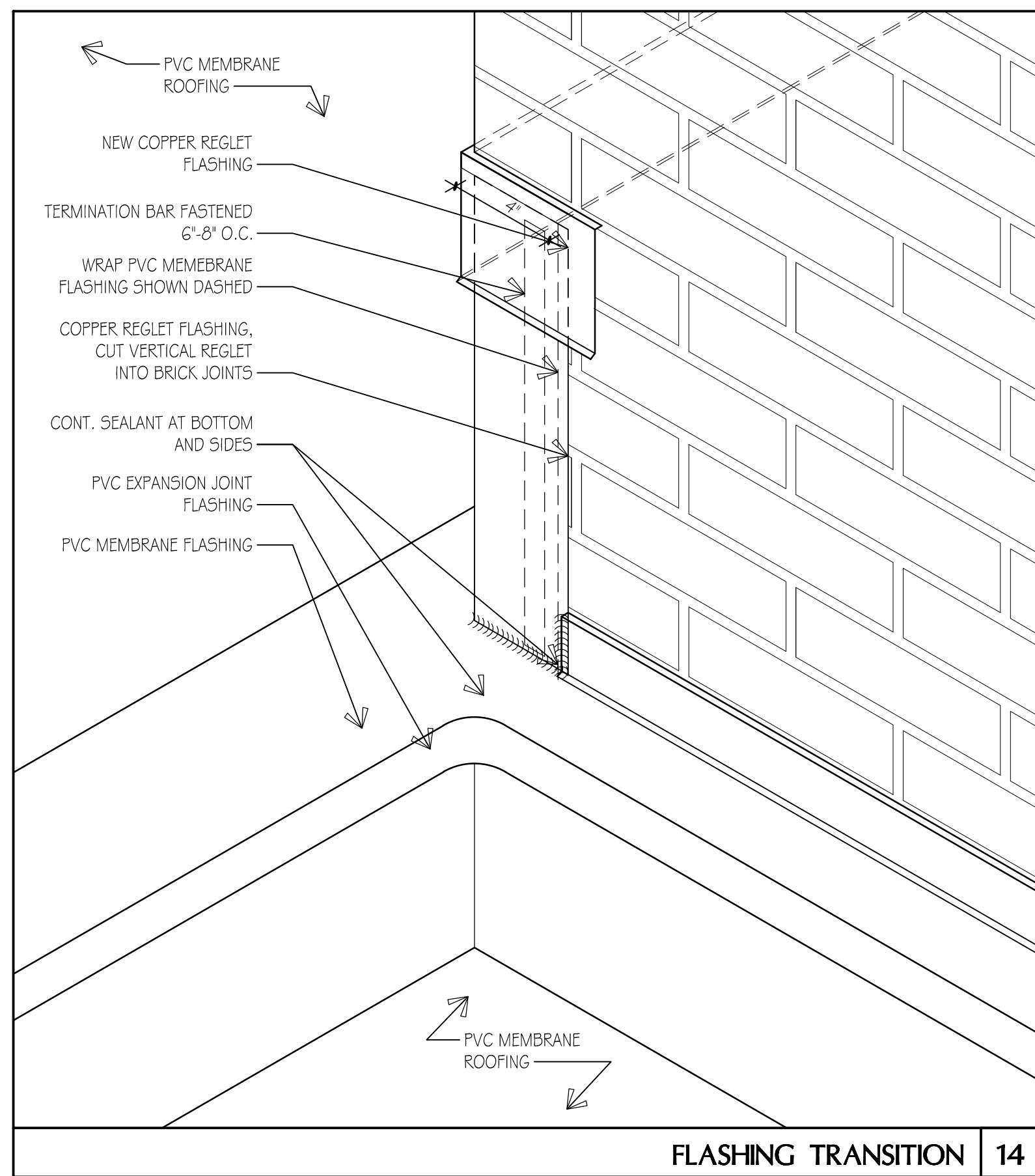
EMERGENCY ROOF DRAIN DOWNSPOUT NOZZLE 10



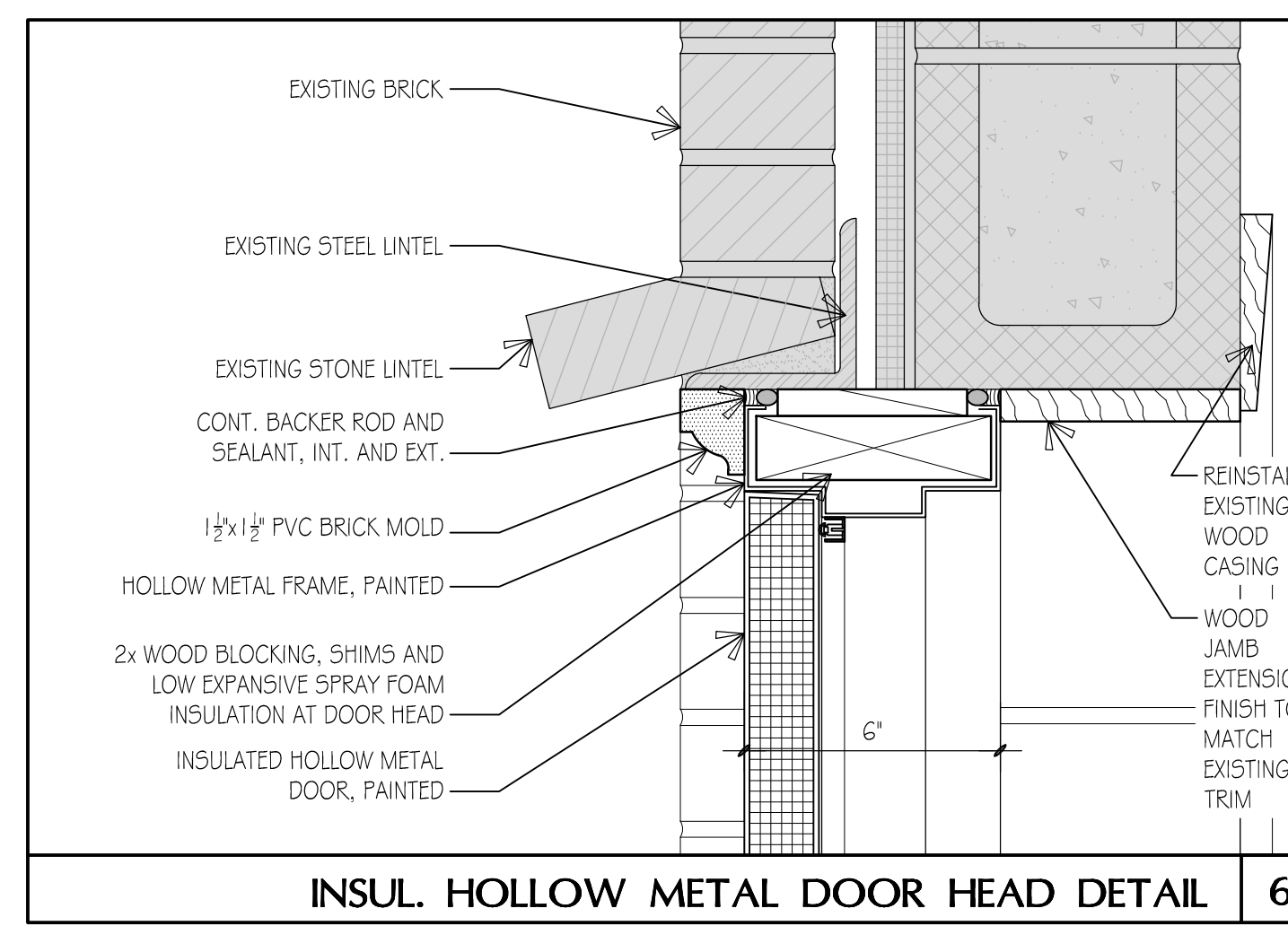
REGLET FLASHING CORNER TRANSITION @ 1975 ADDITION 11



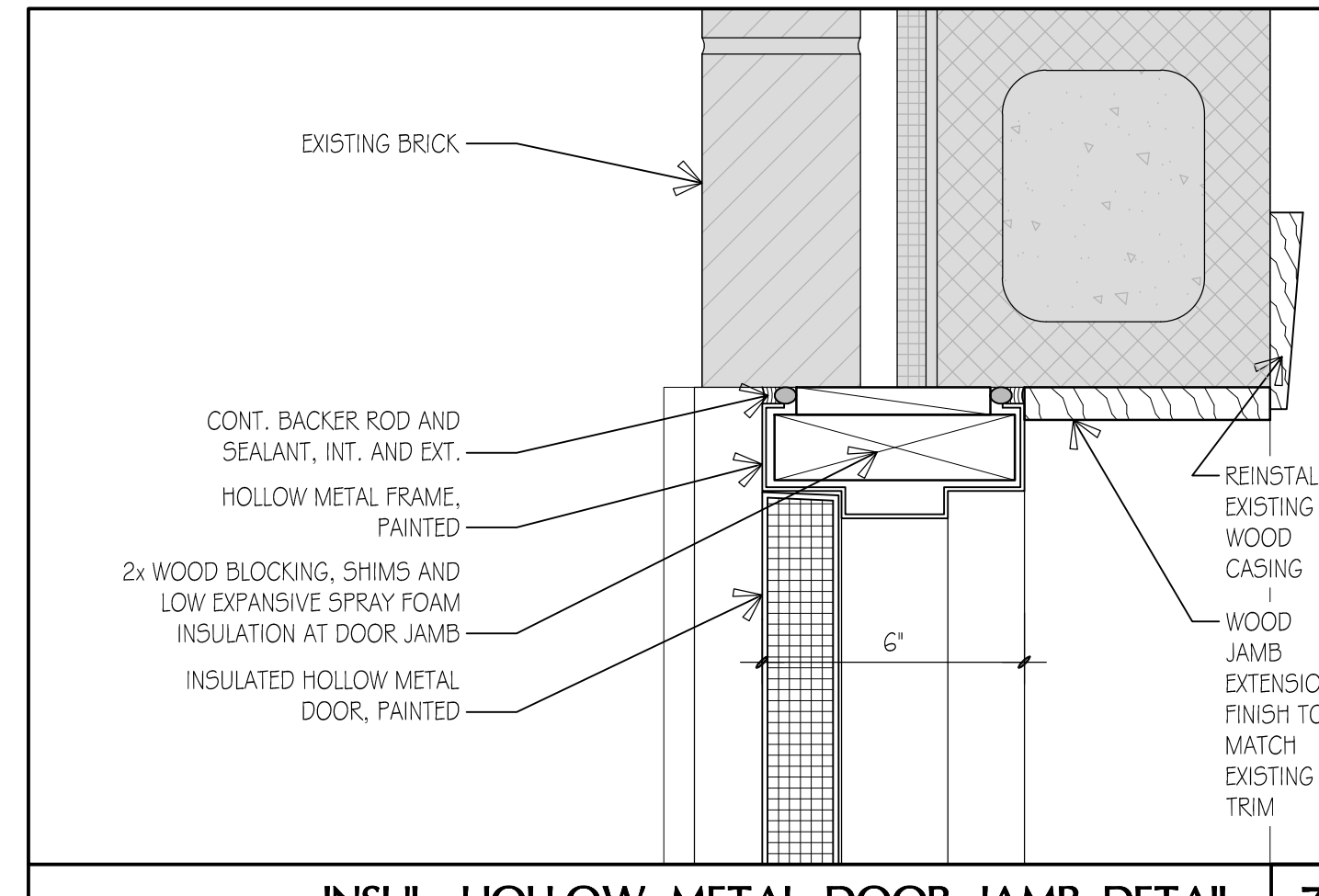
PVC EXPANSION JOINT TRANSITION FLASHING @ 1975 ADDITION 12



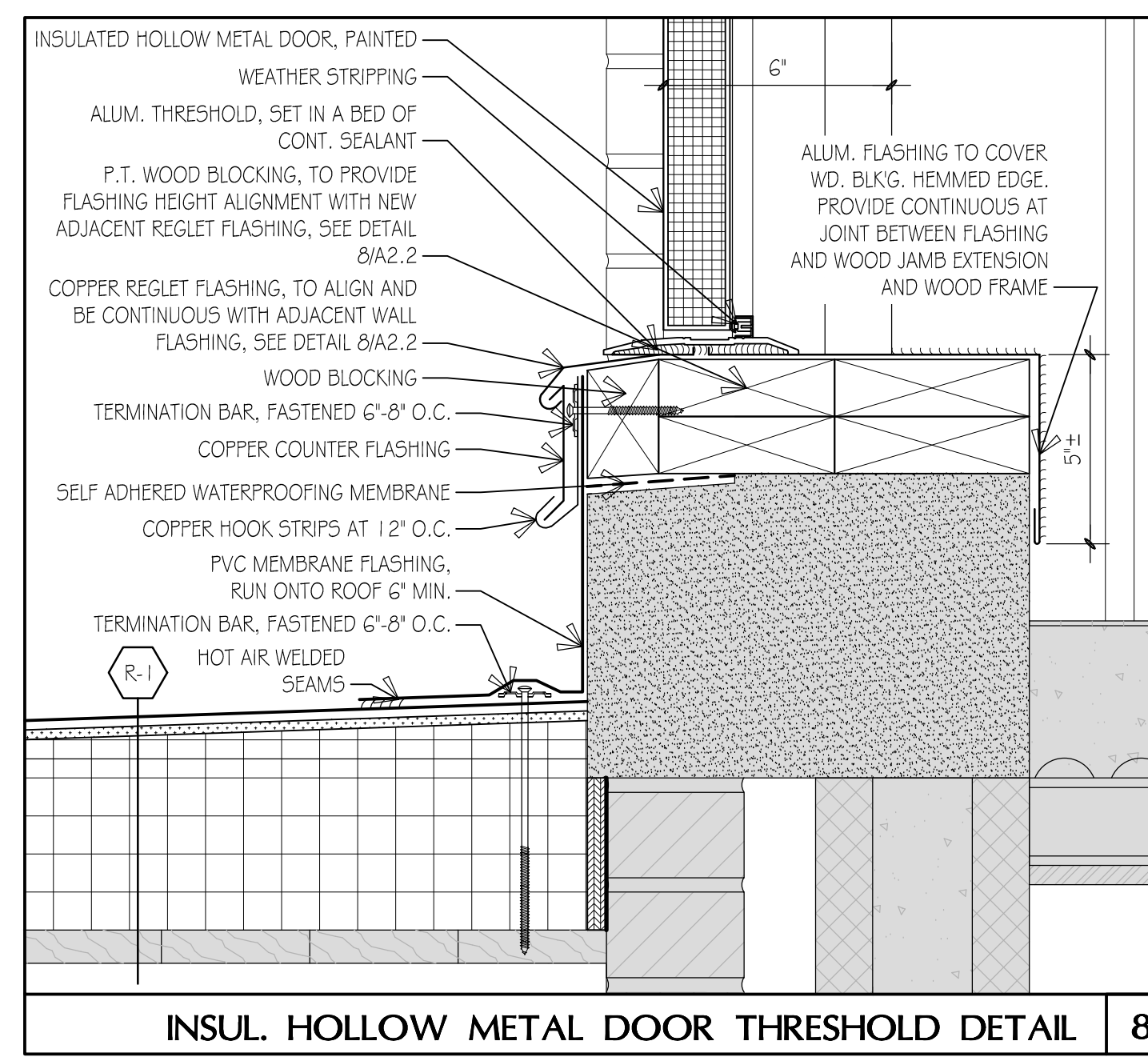
FLASHING TRANSITION 14



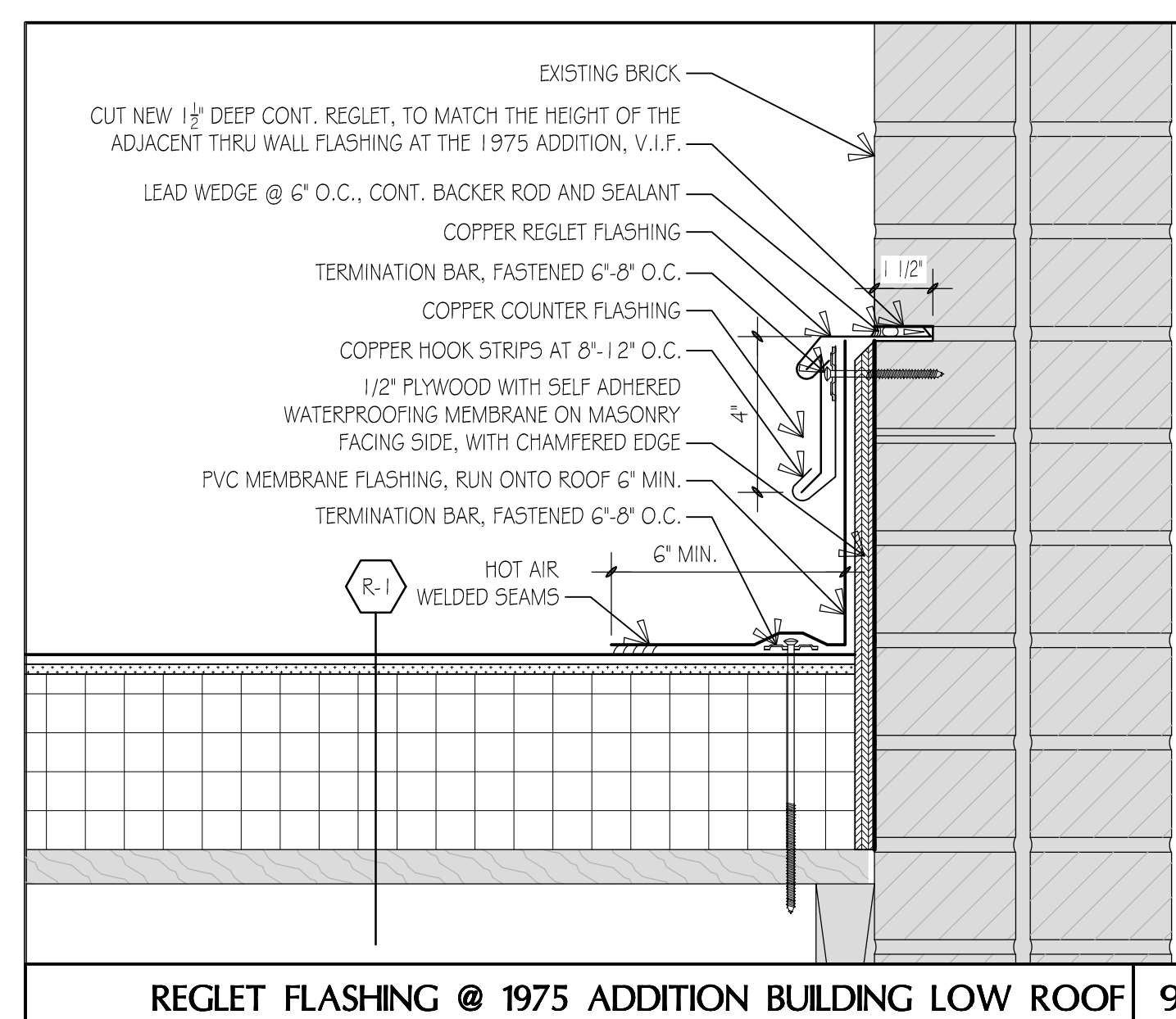
INSUL. HOLLOW METAL DOOR HEAD DETAIL 6



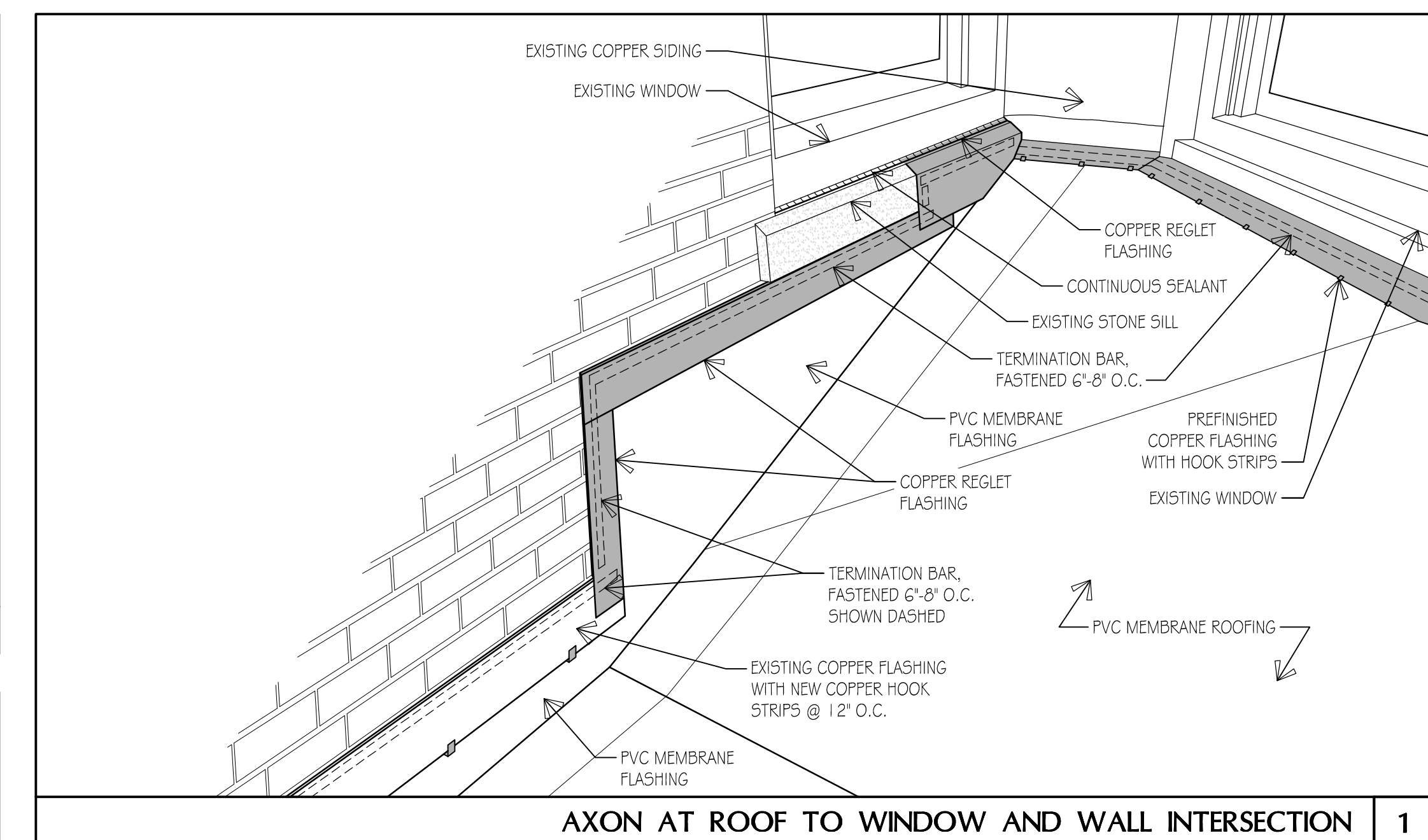
INSUL. HOLLOW METAL DOOR JAMB DETAIL 7



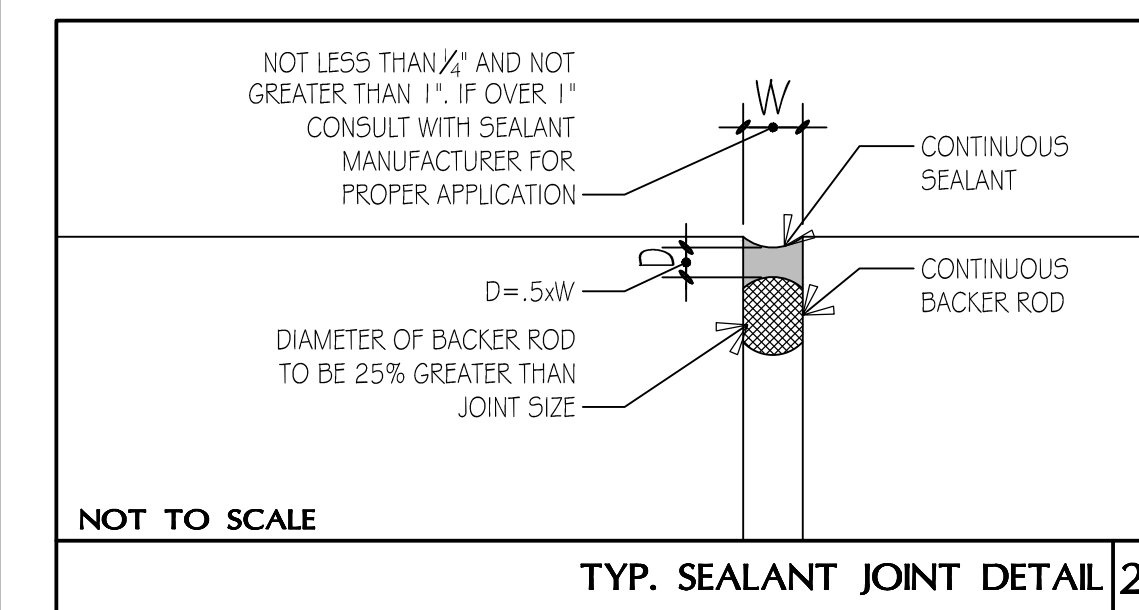
INSUL. HOLLOW METAL DOOR THRESHOLD DETAIL 8



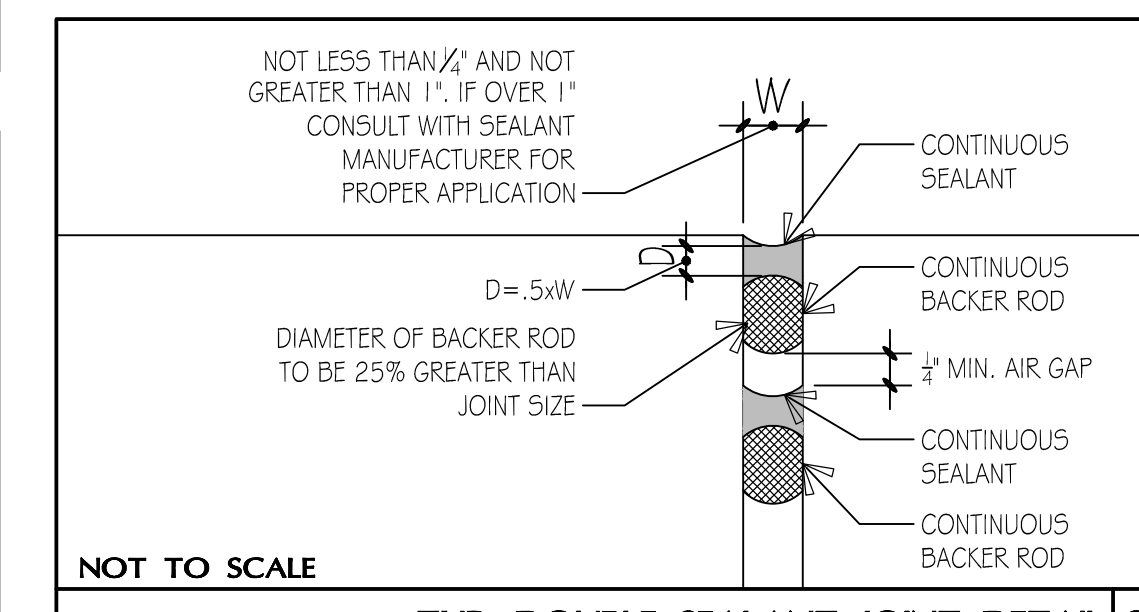
REGLET FLASHING @ 1975 ADDITION BUILDING LOW ROOF 9



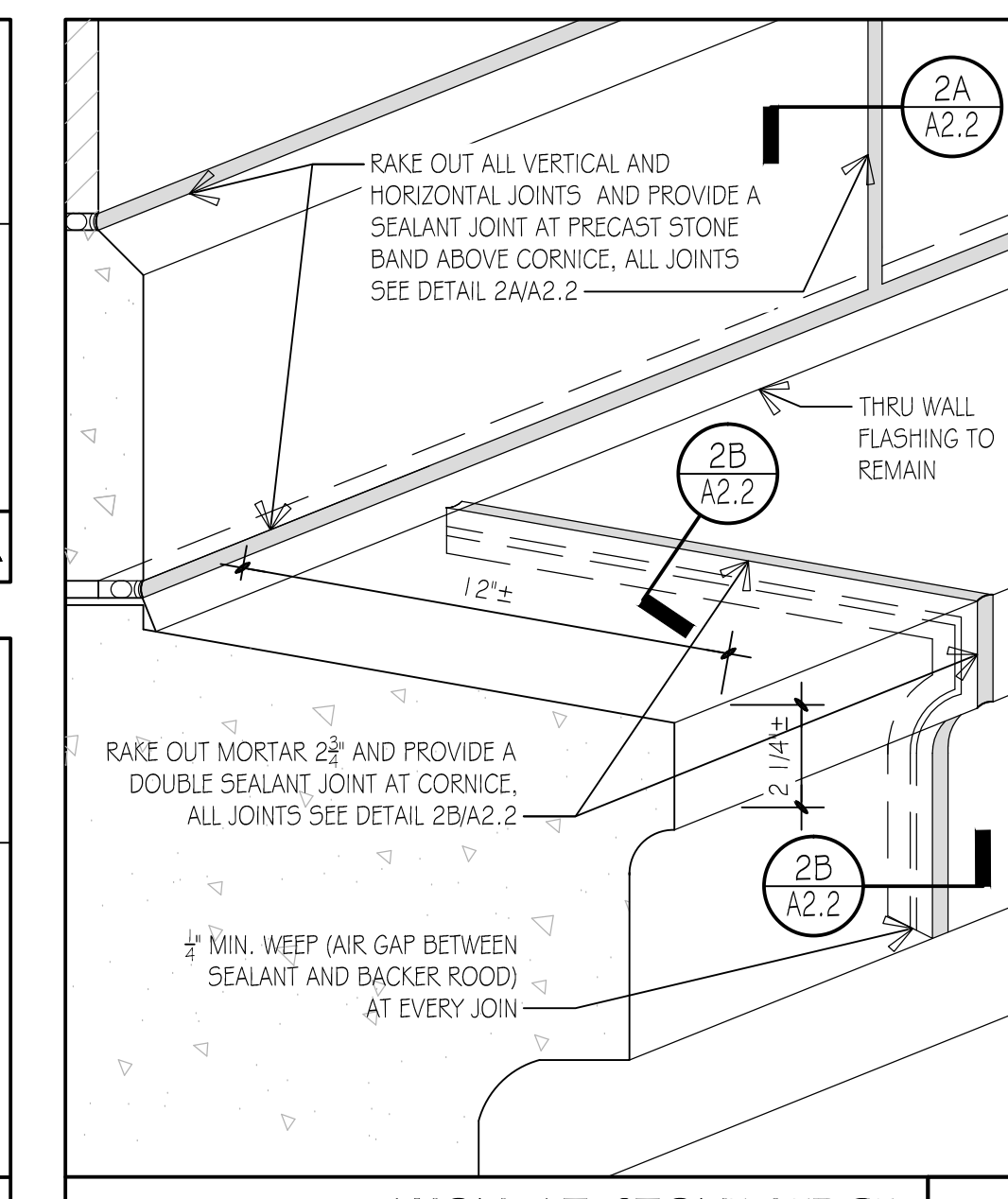
AXON AT ROOF TO WINDOW AND WALL INTERSECTION 1



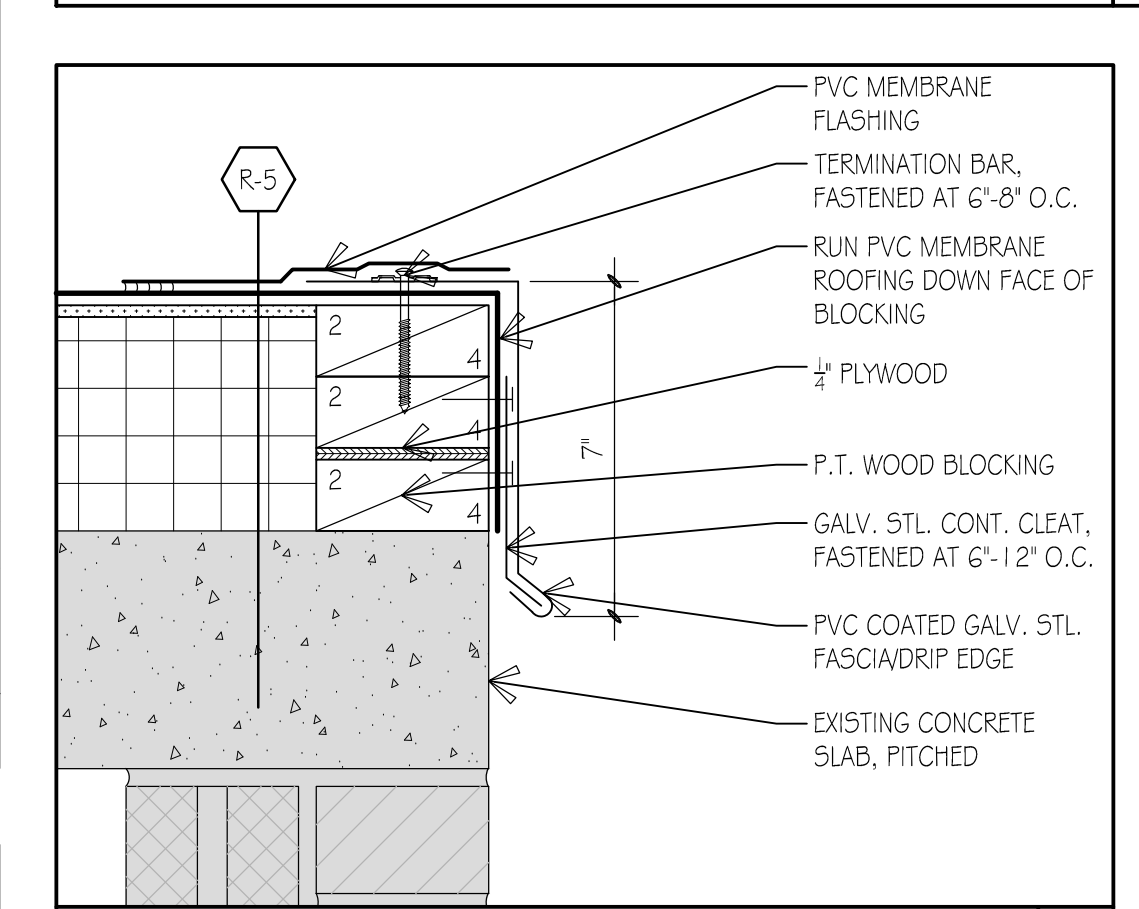
TYP. SEALANT JOINT DETAIL 2A



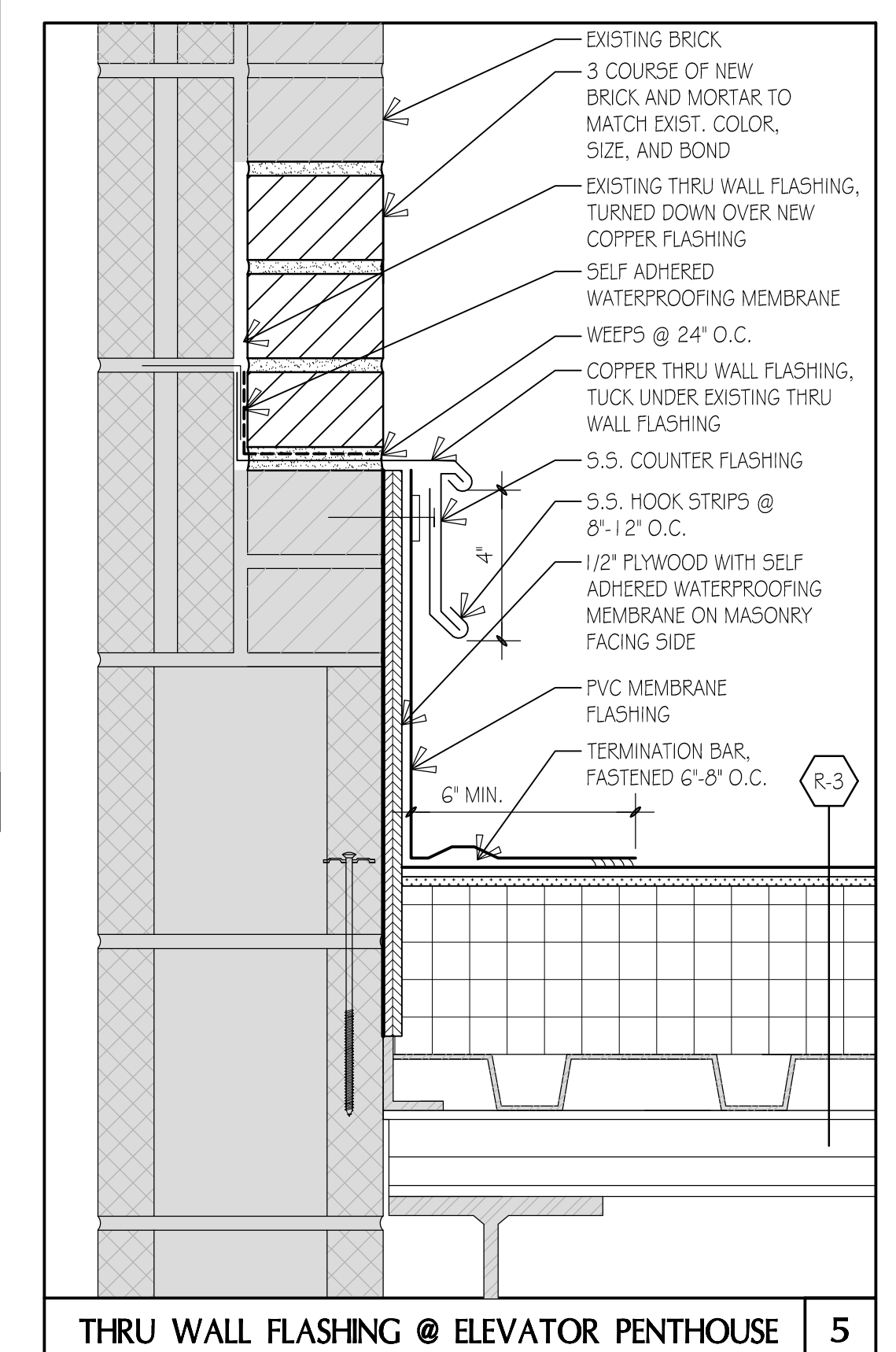
TYP. DOUBLE SEALANT JOINT DETAIL 2B



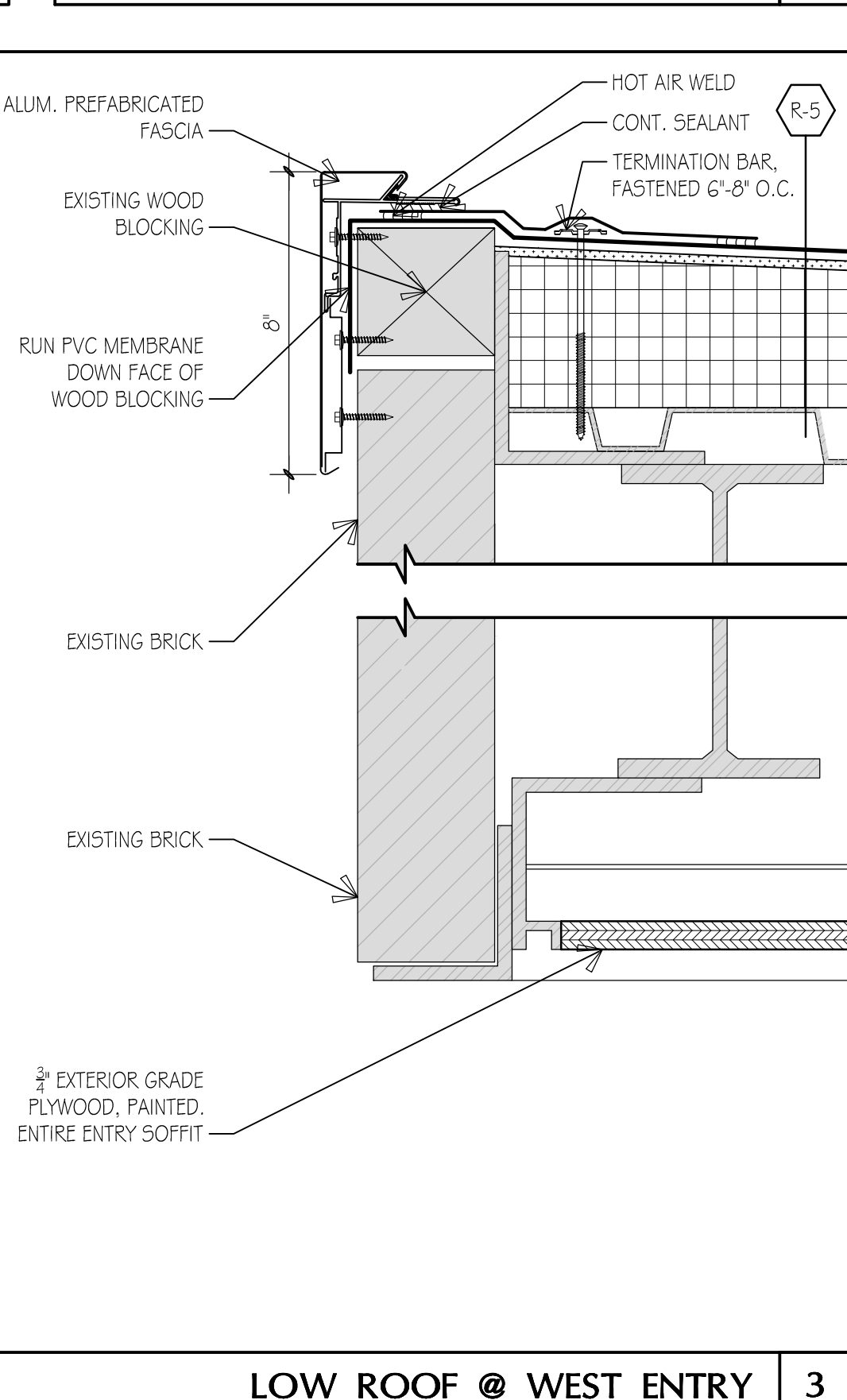
AXON AT STONE LEDGE 2



ROOF EDGE FLASHING @ ELEVATOR PENTHOUSE 4



THRU WALL FLASHING @ ELEVATOR PENTHOUSE 5



LOW ROOF @ WEST ENTRY 3

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

**CSS ARCHITECTS INC.**  
107 Audubon Road  
Building 2, Suite 300  
Waltham, MA 01980  
css@cssarchitects.com



Title:

**NEW CONSTRUCTION DETAILS**

Scale: 3/4"=1'-0"

Date: 4 FEB. 2015

Drawn: NSL / JET

Checked: JET/CTC

Project No: 1138

**A2.2**

**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

Revisions

No.	Date	Description	By

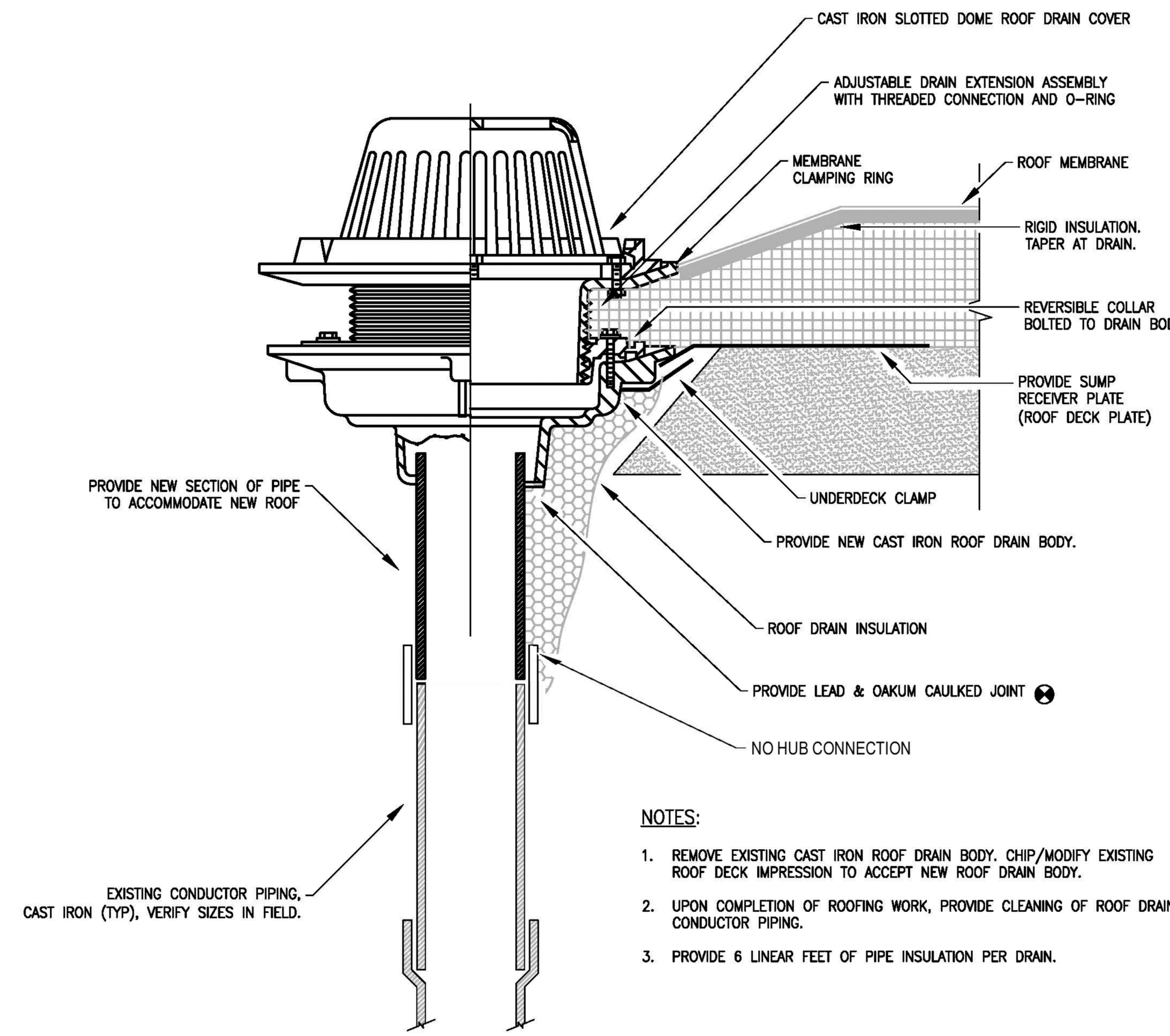
CSS ARCHITECTS INC.  
107 Audubon Road  
Building 2, Suite 300  
Wakefield, MA 01880  
css@cssarchitects.com



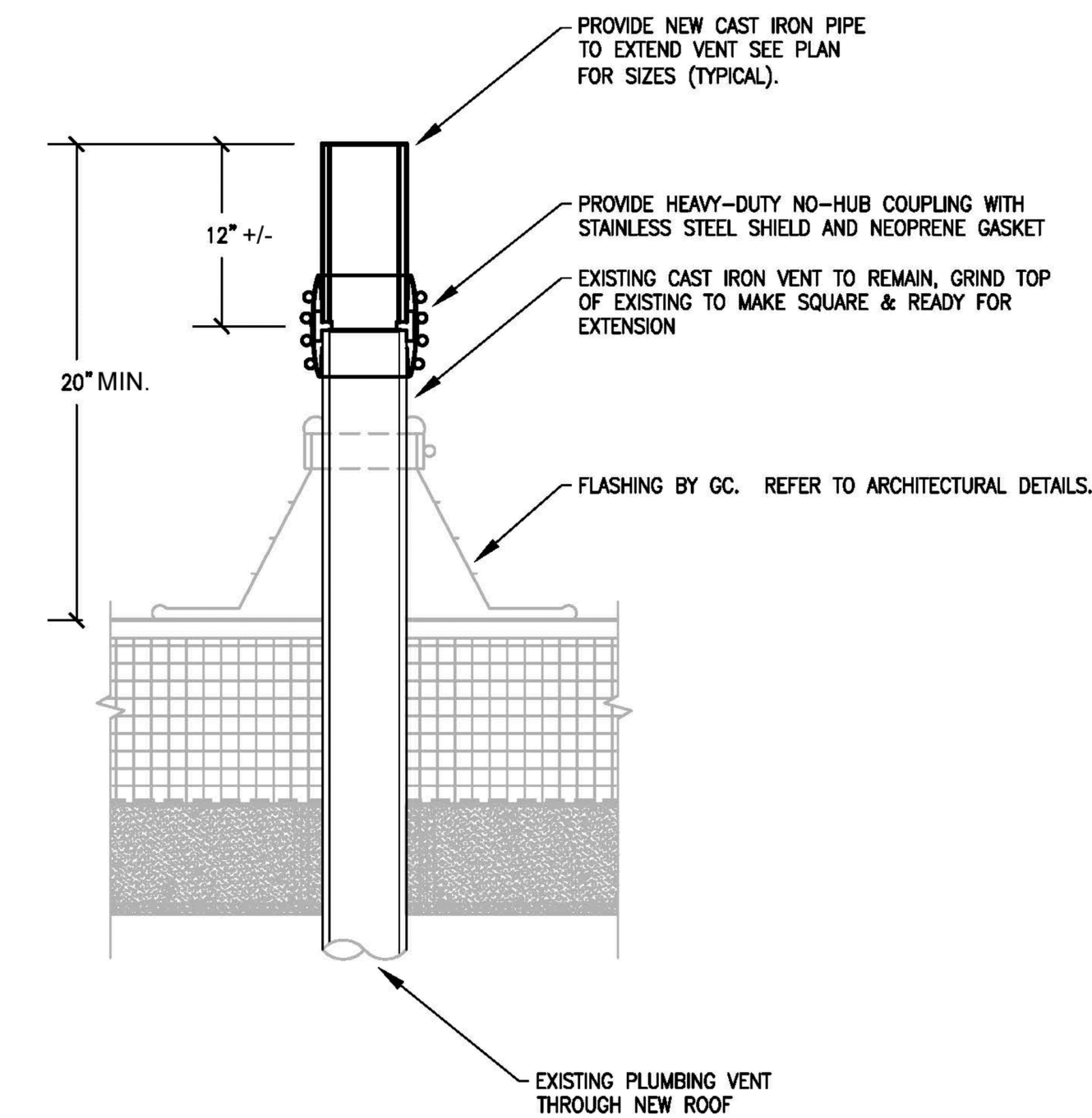
PLUMBING FIXTURE SCHEDULE [1] [2]					
DWG ID	FIXTURE	MANUFACTURER	MODEL NUMBER	REMARKS	DRAIN
RD-1	REPLACEMENT ROOF DRAIN	J.R. SMITH	1015-OD-RDP	DUCO CAST IRON BODY, ADJUSTABLE EXTENSION SLEEVE, CAST IRON DOME, WITH ROOF DECK PLATE	4"
RD-2	EMERGENCY ROOF DRAIN	J.R. SMITH	1015-OD-RDP	DUCO CAST IRON BODY, ADJUSTABLE EXTENSION SLEEVE, CAST IRON DOME, WITH ROOF DECK PLATE	5"
DN-1	DOWNSPOUT NOZZLE	J.R. SMITH	1770	CAST BRONZE NOZZLE AND FLANGE	5"

[1] VERIFY MEASUREMENTS IN FIELD BEFORE ORDERING  
[2] PROVIDE ADAPTER TO CONNECT TO NEW PIPING

PLUMBING LEGEND		
ABBREVIATIONS		
AHU	AIR HANDLING UNIT	NEW WORK (BOLD LINE)
BFP	BACKFLOW PREVENTER	EXISTING WORK (LIGHT OR SHADED LINE)
BWV	BACKWATER VALVE	EQUIPMENT TAG (SEE SCHEDULE) DOES NOT REQUIRE ELECTRICAL
CMU	CONCRETE MASONRY UNIT	EQUIPMENT TAG (SEE SCHEDULE) REQUIRES ELECTRICAL POWER
CO	CLEAN OUT	PUMP/CIRCULATOR
COND.	CONDENSATE	FLOOR DRAINS
CW	COLD WATER	AREA DRAINS
DDC	DIRECT DIGITAL CONTROL	ROOF DRAIN
DHW	DOMESTIC HOT WATER	END CLEAN OUT
DHWR	DOMESTIC HOT WATER RETURN	FLOOR CLEAN OUT; PROVIDE BRASS COVER AT ALL FINISHED LOCATIONS
ETR	EXISTING TO REMAIN	VACUUM BREAKER
EC	ELECTRICAL CONTRACTOR	QUARTER-TURN HOSE BIBB WITH CAP AND CHAIN
FD	FLOOR DRAIN	AIR VENT (REBUILDABLE TYPE)
FP	FIREPLACE	BALL VALVE WITH HOSE THREAD, BRASS CAP AND CHAIN
FPC	FIRE PROTECTION CONTRACTOR	RELIEF VALVE
GC	GENERAL CONTRACTOR (CONSTRUCTION MANAGER)	PITCH DIRECTION
ID	INDIRECT WASTE	EMERGENCY DRENCH SHOWER & EYE WASH COMBO
MC	MECHANICAL CONTRACTOR (FILED SUB-BID HVAC CONTRACTOR)	PEX MANIFOLD (PC TO DETERMINE NUMBER OF BRANCHES)
NIC	NOT IN CONTRACT	CONCENTRIC BOILER VENT
NPW	NON-POTABLE WATER	WASTE PIPE HEAT RECOVERY UNIT
OSD	OVERFLOW STORM DRAIN	WATER METER
PC	PLUMBING CONTRACTOR	GAS METER
PRV	PRESSURE REDUCING VALVE	STORM DRAIN PIPING
RD	ROOF DRAIN	CONDENSATE DRAIN PIPING
RPZ	REDUCED PRESSURE ZONE BACKFLOW PREVENTER	LOW PRESSURE GAS PIPING
SD	STORM DRAIN	ELEVATED PRESSURE GAS PIPING
TYP	TYPICAL	GAS VENT LINE
V	VENT	COLD WATER PIPING
VTR	VENT THROUGH ROOF	DOMESTIC HOT WATER PIPING
W	SANITARY WASTE	DOMESTIC HOT WATER RECIRCULATION PIPING
P-1	PLUMBING FIXTURE TAG (SEE SCHEDULE)	COMBUSTION AIR LINE
TS	TEMPERATURE SENSOR	COMBUSTION VENT LINE
A	AQUASTAT	VENT LINE
		BURIED VENT LINE
		WASTE PIPING
		BURIED WASTE PIPING
		DROP, PIPE DOWN
		RISER, PIPE UP
		PIPE DOWN FROM TWO SIDES
		BALL VALVE W/ DRAIN
		BALL VALVE
		BALANCING/ISOLATION VALVE
		PRESSURE REDUCING VALVE
		SPRING CHECK VALVE
		REDUCED PRESSURE ZONE (RPZ) BACKFLOW PREVENTER
		THERMOSTATIC 3-WAY VALVE
		UNION
		FLANGE
		GAS SHUT OFF VALVE
		BACKWATER VALVE
		STRAINER WITH BALL VALVE W/ 3/4" HOSE CONNECTION, BRASS CAP AND CHAIN



1 ROOF DRAIN WITH ADJUSTABLE EXTENSION (RD-1 REPLACEMENT ROOF DRAIN)  
SCALE: NTS



2 VENT EXTENSION DETAIL, TYP.  
SCALE: NTS

GENERAL PLUMBING NOTES

- GENERAL CONDITIONS & SPECIFICATIONS: THE GENERAL CONDITIONS, AND SPECIFICATIONS ARE PART OF THIS WORK. IT IS THE PLUMBING CONTRACTOR'S RESPONSIBILITY TO OBTAIN AND BE FAMILIAR WITH THESE CONDITIONS & SPECIFICATIONS.
- CODES AND ORDINANCES: INSTALLATION OF THE SYSTEMS SHALL CONFORM TO THE REQUIREMENTS OF THE NATIONAL FIRE PROTECTION ASSOCIATION, NATIONAL MECHANICAL CODE, AND ALL APPLICABLE FEDERAL, STATE, AND LOCAL LAWS, CODES AND ORDINANCES.
- REQUIREMENTS: OBTAIN AND PAY FOR ALL REQUIRED PERMITS, LICENSES AND CERTIFICATES.
- DESIGN: EQUIPMENT AND ACCESSORIES NOT SPECIFICALLY DESCRIBED OR IDENTIFIED BY MANUFACTURER'S CATALOG NUMBERS SHALL BE DESIGNED IN CONFORMITY WITH ASME, ASPE, AGA, UL OR OTHER APPLICABLE TECHNICAL STANDARDS, SUITABLE FOR MAXIMUM REQUIRED WORKING PRESSURE AND SHALL HAVE NEAT AND FINISHED APPEARANCE.
- INSTALLATION: ERECT EQUIPMENT IN NEAT AND WORKMANLIKE MANNER. INSTALL SO THAT CONNECTING AND DISCONNECTING OF PIPES, EQUIPMENT AND ACCESSORIES CAN BE MADE READILY AND SO THAT ALL PARTS ARE EASILY ACCESSIBLE FOR INSPECTION, OPERATION, MAINTENANCE AND REPAIR. ALL EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE MANUFACTURER AND THE BEST STANDARD PRACTICE FOR THIS TYPE OF WORK.
- STANDARD PRACTICE: IT IS NOT INTENDED THAT THE DRAWINGS SHALL SHOW EVERY FITTING, CONNECTION, OR APPLIANCE. THIS CONTRACTOR SHALL FURNISH ALL MATERIAL AND LABOR NECESSARY TO PROVIDE COMPLETE AND OPERATIONAL SYSTEMS IN ACCORDANCE WITH THE BEST STANDARD PRACTICE OF THE TRADE.
- EQUIPMENT LOCATION: THE P.C. SHALL VERIFY THE LOCATIONS AND MOUNTING HEIGHTS OF ALL EQUIPMENT AND MATERIALS, AND THE EXACT ROUTING OF ALL PIPES, WITH THE OWNER'S REPRESENTATIVE IN THE FIELD, PRIOR TO COMMENCING ANY WORK. ANY CONFLICTS WITH LOCATIONS, OR PROBLEMS ENCOUNTERED WITH ROUTING, SHALL BE PROMPTLY BROUGHT TO THE ATTENTION OF THE ARCHITECT FOR RESOLUTION. COORDINATE ELECTRICAL CHARACTERISTICS FOR ALL EQUIPMENT WITH E.C. BEFORE ORDERING EQUIPMENT. COORDINATE WITH M.C. FOR CW FEEDS, CONDENSATE, DHW, ETC.
- MATERIALS: ALL MATERIALS, FIXTURES AND EQUIPMENT SHALL BE NEW WITHOUT IMPERFECTIONS AND SHALL BE DELIVERED, ERECTED, CONNECTED AND FINISHED IN EVERY DETAIL. WHEREVER POSSIBLE, ALL TRIM, ACCESSORIES AND PARTS SHALL BE OF THE SAME MANUFACTURER AS THE RELATED EQUIPMENT AND FIXTURES.
- PLUMBING: ALL PLUMBING SHALL BE INSTALLED IN ACCORDANCE WITH COMMONWEALTH OF MASSACHUSETTS FUEL GAS AND PLUMBING CODE, 248 CMR, & NFPA 54.
- ELECTRICAL: ALL ELECTRICAL SHALL BE INSTALLED IN ACCORDANCE WITH THE NATIONAL ELECTRIC CODE AND ALL LOCAL REQUIREMENTS.
- GENERAL COORDINATION: EXAMINE ALL DRAWINGS AND OTHER SECTIONS OF THE SPECIFICATIONS FOR REQUIREMENTS WHICH AFFECT THE WORK OF THIS SECTION. COORDINATE WORK WITH THAT OF OTHER TRADES AFFECTING, OR AFFECTED BY, WORK OF THIS SECTION. COOPERATE WITH OTHER TRADES TO ENSURE THE STEADY PROGRESS OF THE WORK.
- PROTECTION OF EQUIPMENT AND MATERIALS: RESPONSIBILITY FOR CARE AND PROTECTION OF ALL MATERIALS AND WORK RESTS WITH THIS CONTRACTOR AT ALL TIMES UNTIL IT HAS BEEN APPROVED.
- GUARANTEE: ALL NEW COMPONENTS OF THE INSTALLATION SHALL BE GUARANTEED IN WRITING BY THIS CONTRACTOR TO BE FREE FROM DEFECTS OF MANUFACTURE AND INSTALLATION FOR A PERIOD OF ONE YEAR FROM THE DATE OF WRITTEN ACCEPTANCE OF THE ENTIRE BUILDING BY THE ENGINEER. ANY DEFECTS FOUND SHALL BE REPAIRED BY THE PLUMBING CONTRACTOR AT THEIR OWN EXPENSE.
- NOTIFICATION: THE P.C. SHALL NOTIFY THE ENGINEER UPON: (1) COMPLETION OF ALL ROUGH PIPING, BEFORE CLOSURE OF ANY TRENCHES, OPEN WALL CAVITIES OR CHASES. (2) UPON "SUBSTANTIAL COMPLETION" OF ALL SYSTEMS INCLUDING OPERATIONAL SYSTEMS AND FINISH WORK. AFTER "SUBSTANTIAL COMPLETION" THE ARCHITECT WILL PREPARE A PUNCH LIST OF ITEMS TO BE CORRECTED. THE P.C. SHALL CORRECT ANY DEFICIENCIES FOUND PROMPTLY, AT THEIR OWN EXPENSE.
- FINAL COMPLETION: THE WORK SHALL NOT BE CONSIDERED COMPLETE UNTIL THE PUNCH LIST IS COMPLETED TO THE SATISFACTION OF THE ENGINEER AND ALL FINAL INSPECTIONS HAVE BEEN COMPLETED.
- THE REQUIREMENTS OF THE STRETCH CODE HAVE BEEN ADOPTED BY THE LOCAL AUTHORITY, APPENDIX 115 AA, 780CMR. ALL WORK PERFORMED MUST CONFORM TO THESE REQUIREMENTS.

Title:

PLUMBING LEGEND,  
NOTES, SCHEDULE  
AND DETAILS

Scale: AS NOTED

Date: 4 FEB. 2015

Drawn: NSL

Checked: JET/CTC

Project No: 1138

P1.0



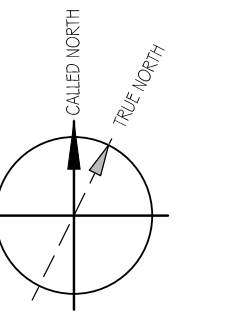
**ROOF REPLACEMENT AT THE WALTHAM COMMUNITY CENTER**

510 MOODY STREET  
WALTHAM, MA 02453

**Revisions**

No.	Date	Description	By

**CSS ARCHITECTS INC.**  
 107 Audubon Road  
 Building 2, Suite 300  
 Wakefield, MA 01880  
 css@cssarchitects.com



**ROOF PLUMBING PLAN**  
SCALE: 1/4"=1'-0"

- PLUMBING NOTES:**
- SEE SPECIFICATIONS AND DETAILS FOR FURTHER REQUIREMENTS.
  - INSTALL EQUIPMENT AND SYSTEMS PER CODE AND PER MANUFACTURER'S INSTRUCTIONS.
  - THIS PROJECT MUST CONFORM TO THE REQUIREMENTS OF THE STRETCH CODE: 780 CMR 1204A.
  - ALL DIMENSIONS AND LOCATIONS ARE APPROXIMATE. CONTRACTOR TO INSPECT AND VERIFY ALL INFORMATION IN FIELD AND INFORM THE ENGINEERS OF ANY DISCREPANCIES IN WRITING IMMEDIATELY.
  - PIPING MAY BE SHOWN DISPLACED FOR CLARITY.
  - INSTALL ALL PIPING ON WARM SIDE OF INSULATION.
  - INSULATE ALL NEW STORM DRAIN PIPING.
  - PC TO PROVIDE ALL REQUIRED FITTING AND CONNECTIONS TO CONNECT WITH EXISTING STORM DRAIN PIPING.
  - ALL VENT PIPING SHALL BE CAST IRON.

Title:

**PLUMBING ROOF PLAN**

Scale: AS NOTED

Date: 4 FEB. 2015

Drawn: NSL

Checked: JET/CTC

Project No: 1138

**P1.1**

# PROJECT MANUAL

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## WALTHAM COMMUNITY CENTER ROOF REPLACEMENT

510 MOODY STREET  
WALTHAM, MASSACHUSETTS

Prepared for:  
City of Waltham, MA

MAYOR  
Jeannette A. McCarthy

---

### Architect

CSS Architects Inc.  
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Fax: 781-245-9372  
E-mail: [css@cssarchitects.com](mailto:css@cssarchitects.com)



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**Bid Set**  
**04 February 2015**



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**Waltham Community Center  
Roof Replacement**

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**Section 01 01 00  
SUMMARY OF WORK**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 WORK UNDER THIS CONTRACT - GENERAL**

- A. Work covered by this contract consists of renovations and alterations to the Project described in this paragraph 1.02 including the following major work:
- B. The scope of work, without limiting the generality thereof, includes all labor, materials, equipment and services required to perform the work described fully in the Drawings and Specifications and includes, but is not limited to the following work:
  - 1. Selective Demolition
  - 2. Prior to commencement of ordering materials and any roof replacement work, the Contractor shall perform test cuts in locations to be determined in quantities as necessary to verify location and condition of substrates/structural decks.
  - 3. Removal of existing roofing, flashing and accessory materials and replacement as shown on the Drawings.
  - 4. Removal of existing and installation of new roof access hatches as shown on the Drawings.
  - 5. Removal and re-installation of existing smoke hatches as shown on the drawings.
  - 6. Disconnection, temporary relocation and reconnection of existing mechanical rooftop equipment as shown on the Drawings in conjunction with the roof replacement work.
  - 7. Temporary relocation of existing antenna and cable lines (all existing disconnected lines to be removed) on the roofs in conjunction with roof replacement.
  - 8. The restoration of the existing gravity vents as shown on the drawings.
  - 9. The removal of existing and installation of new metal wall cladding as shown on the drawings.
  - 10. Providing of guard rails as indicated on the drawings.
  - 11. Disconnecting and reconnecting of mechanical equipment as required as part of roofing replacement.
  - 12. Removal and replacement of existing roof drains and other related storm water piping as indicated on the Drawings in conjunction with the roof replacement work.
  - 13. Removal of existing Asbestos containing materials as per SECTION 02 82 00 – ASBESTOS ABATEMENT as related to the roof replacement work.
  - 14. Sealants and caulking as shown on the drawings work.
  - 15. Installation of new door and frame as shown on the drawings.
  - 16. Interior and Exterior painting as shown on the drawings
  - 17. Cost for all permits and drawing review fees.
- C. Unit Prices:
  - 1. Refer to SECTION 01 22 00 – UNIT PRICES for additional work.



- D. The work described by:
  - 1. These specifications as enumerated in the Table of Contents.
  - 2. Drawings numbered: T1.0, AD1.1, AD2.1, AD2.2, A1.1, A1.2, A2.1, A2.2 P1.0, P1.1
  - 3. Addenda issued during the bidding period which are hereby made a part of the Specifications.
- E. The distribution of work in these Specifications:
  - 1. It is intended to be described under the appropriate trade.
  - 2. May be redistributed, except as directed herein, provided no controversy will arise among the trades and progress will not be delayed.
- F. The committing of nuisances on the land of the Project and adjacent property shall be rigorously prohibited and adequate steps taken to prevent it.

**1.03 OWNER RIGHT TO PERFORM WORK AND TO AWARD SEPARATE CONTRACTS**

- A. The Owner reserves the right to perform work related to the Project with its own forces and to award separate contracts in connection with other portions of the Project or other work on the premises under these or similar Conditions of the Contract.

**1.04 EXISTING UTILITIES**

- A. Existing active utility lines on the site are to be verified with the City of Waltham. All work must be performed to prevent damage to existing lines. If damaged, be immediately repaired, inspected by the utility company, protected and maintained in use at no additional cost to the Owner.
- B. In the event that an active latent utility line is encountered immediately notify the utility company and the Architect of the exact location, size and type of utility line encountered. Such utility line, if damaged, shall be immediately repaired, inspected by the utility company, protected and maintained in use by the Contractor. If the Architect determines that such line be relocated, abandoned, cut and capped, or otherwise altered, the Contractor shall consult the utility company and perform required work. The Contract Price will be adjusted for the cost of any repairs, protection, maintenance and other work in accordance with the General Conditions.

**1.05 TEST AND INSPECTIONS**

- A. Where in the various SECTIONS of the Specifications, inspection and testing of materials, processes, and the like is called for, the selection of bureaus, laboratories, and/or agencies for such inspection and testing shall be subject to approval of the Architect.
- B. Should any material or work be found, after testing or inspection, to be defective or inferior, such material and/or work shall be removed and replaced with new sound materials and/or work as approved by the Architect.
- C. The Contractor shall make such tests and inspections of his workmanship and materials as may be required by the Building Code, state or municipal laws, or as called for under the various sections of the Specifications.

- D. All expense attached to such tests and inspections, unless otherwise specified under the various sections of the Specifications shall be borne by the Contractor, who shall furnish all labor, tools, instruments, water, temporary power and light, construction and equipment necessary for these tests and inspections. Refer to Section 01 40 00 - General Testing Requirements. Records of all tests and inspections shall be furnished to the Architect. The Contractor shall remove all temporary work, materials and equipment upon completion of tests and inspections.
- E. The Owner shall at any time perform independent testing of construction work the Owner feels necessary. The cost of the work shall be paid by the Owner. The testing performed by the Owner shall not relieve the Contractor of the testing requirements specified in this section of the Specifications.

#### **1.06 MATERIALS AND WORKMANSHIP**

- A. All materials required for the performance of this Contract shall be new and of best quality of kinds specified, all subject to the approval of the Architect. The use of old or second-hand materials is strictly forbidden except if called for in the Contract Documents. The Contractor shall, if required by the Architect, furnish satisfactory evidence as to the kind and quality of material and workmanship. Materials shall be used in accordance with the manufacturer's printed instructions unless otherwise specified. Upon request of the Architect to the Contractor, the manufacturer's representative shall go to the site and instruct the mechanics in the use of materials or shall supervise their use.
- B. For the execution of the work to be performed under this Contract and for the manufacturer or transportation of any of the materials or appliances to be used or installed, the Contractor shall employ only such labor throughout as will not interfere with the speedy and uninterrupted completion of the building. All work shall be done by mechanics skilled in their trade.
- C. All materials shall be ordered, manufactured, and delivered at such times and in such manner as will insure the speedy and uninterrupted progress of the work, the least obstruction to the premises; and such materials shall be so distributed as to cause no overloading at any point. If any material so stored obstructs the progress of any portion of the various parts of the work, they shall be moved from place to place or from the premises, as the Architect may direct, at the expense of the Contractor involved.
- D. Before making any shipment of materials to the building, the Contractor shall ascertain whether the building is in a condition to receive the shipment. Where this provision is neglected, and material is delivered to the building when the latter is not in condition to receive it, such materials shall be stored elsewhere at the expense of the Contractor involved.
- E. After signing of the Contract, the substitution will not be permitted of any materials or methods of construction, unless otherwise approved by the Architect.
  - 1. Should the specified materials or construction not be available through reasons beyond the control of the Contractor, the question shall be immediately referred to the Architect for decision before proceeding with the work.
- F. The Contractors shall carry on their work with the greatest reasonable rapidity, consistent with first-class workmanship, and without interfering with or delaying the work of others.

- G. Any materials delivered, or work performed, contrary to the CONTRACT DOCUMENTS and approved shop drawings, shall be removed by the Contractor at fault, at this own expense, and the same shall be replaced with other materials or work satisfactory to the Architect. The Contractor at fault shall also assume the cost of replacing the work which may be disturbed while making good the defective work.
- H. The Architect, however, reserves the right to allow such defective materials or workmanship to stand, in which case an amount equal to the difference in value between the work and material provided and that specified shall be deducted from the amount due or to become due under the Contract. If a suitable mutually agreed credit cannot be worked out defective material or workmanship shall be replaced.
- I. Any materials specified or work shown on the Drawings which the Contractor cannot guarantee against defects shall be called to the attention of the Architect in writing before installation in the building. Installation without such notice shall bind the Contractor to his full guarantee.

#### 1.07 TIMES FOR COMPLETION

- A. It is hereby understood and mutually agreed, by and between the General Contractor and the Owner, that the date of beginning and the times for completion, as specified in the Contract for the work to be done hereunder are ESSENTIAL CONDITIONS of this Contract, and it is further mutually understood and agreed that the work embraced in this Contract shall be commenced by the date specified therein.
- B. The General Contractor agrees that said work shall be prosecuted regularly, diligently, and uninterruptedly at such rate of progress as will insure full completion thereof within the time specified. It is expressly understood and agreed, by and between the General Contractor and the Owner, that the time for completion of the work described herein are reasonable times for the completion of the same, taking into consideration the average climatic range and usual industrial conditions prevailing in this locality.
- C. If the General Contractor should neglect, fail, or refuse to complete the work within the times specified in the Contract, or any proper extension thereof, granted by the Owner, then the General Contractor does hereby agree, as part consideration for the awarding of this Contract, to pay to the Owner the amount specified in the Contract, not as a penalty, but as liquidated damages for such breach of Contract as hereinafter set forth, for each and every calendar day that the General Contractor shall be in default after the time stipulated in the Contract for completion of the work. **The Liquidated Damages shall be as described in the CITY OF WALTHAM FORM OF GENERAL BID and INSTRUCTION TO BIDDERS**
- D. The said amounts are fixed and agreed upon by and between the General Contractor and the Owner because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages the owner would in such event sustain, and said amount is agreed to be in the amount of damages which the Owner would sustain and said amount shall be retained from time to time by the Owner from current periodical estimates.
- E. It is further agreed that time is of the essence of each and every portion of the Contract and of the CONTRACT DOCUMENTS wherein a definite and certain length of time is fixed for the performance of any act whatsoever; and where under the Contract an additional

time is allowed for the completion of any work, the new time limit is fixed by such extension shall be of the essence for this Contract. Provided, that the General Contractor shall not be charged with liquidated damages or any excess cost when the delay in completion of the work is due:

1. To any preference, priority, or allocation order duly issued by the Government;
  2. To unforeseeable causes beyond the control and without fault or negligence of the General Contractor, including but not restricted to, Acts of God, or of the public enemy, acts of the Owner, acts of another Contractor in the performance of a contract with the Owner, fires, floods, epidemics,, quarantine restrictions, strikes, freight embargoes, and unusual weather; and
  3. To any delay of Subcontractors or suppliers occasioned by any of the causes specified in subparagraphs 1. and 2. of this Paragraph. Provided, further, that the General Contractor shall, within ten days from the beginning of such delay, unless the Owner shall grant a further period of time prior to the date of final settlement of the Contract, notify the Owner, in writing, of the causes of the delay and to notify the General Contractor within a reasonable time of its decision in the matter.
- F. Each and every provision of the laws and clause required by law to be inserted in this Contract shall be deemed to be inserted herein and the Contract shall be read and enforced as though it were included herein, and if through mistake or otherwise any such provision is not inserted, or is not correctly inserted, then upon application of either party the Contract shall forthwith be physically amended to make such insertion or correction.
- G. **The Work shall commence at the time stated in the Notice to Proceed and shall be substantially completed within time specified in the CITY OF WALTHAM FORM FOR GENERAL BID and INSTRUCTION TO BIDDERS.**

#### 1.08 PRE-CONSTRUCTION CONFERENCE

- A. Within ten days of the contract execution and prior to the start of construction there will be a pre-construction meeting between the Contractors, representatives of the Owner/General Contractor and the Architect to discuss methods of construction and completion of the project.
- B. Representatives of the following shall be required to attend this conference:
1. Owner
  2. General Contractor
  3. Architect
  4. All Sub Contractors
  5. Agenda will include the following items:
  6. Tentative construction schedule.
  7. Critical work sequencing.
  8. Designation of responsible personnel.
  9. Submittal of shop drawings, project data and samples.

10. Processing applications for payment.
  11. Procedures for maintenance of record documents.
  12. Procedure for field changes, change estimates, change orders, etc.
  13. Use of premises.
  14. Location and maintenance of temporary storage buildings, etc.
  15. Major equipment deliveries and priorities.
  16. Site and building security procedures.
- C. Contractors shall make specified pre-construction submissions including the following, if not already submitted:
1. Certificate of Insurance.
  2. Performance and Payment Bonds.
  3. Construction Schedule.
  4. Schedule of Values.
  5. Schedule of Monthly Construction Payments.

#### **1.09 PROJECT MEETINGS**

- A. Project meeting shall be held on a bi-monthly basis subject to the discretion of the Owner's Architect. Project meeting shall be chaired by the Architect.
- B. Minutes of the meeting shall be prepared by the Architect or by his designated representative and shall be distributed in a timely manner to the Contractors, with copies to the Owner.
- C. As a prerequisite for monthly payments and control for completing the project on time, operating schedules and shop drawing schedules shall be prepared and maintained by the Contractor and shall be revised and updated (at a minimum) on a monthly basis. A copy shall be submitted to the Owner's Representative and Architect.
- D. In order to expedite construction progress on this project, the Contractor shall order all materials immediately after the approval of shop drawings and shall obtain a fixed date of delivery to the project site for all materials ordered which shall not impede or otherwise interfere with the construction progress.
- E. Scheduling shall be discussed with all concerned parties, and methods shall be presented by the Contractor which shall reflect construction completion not being deferred, at no additional expense to the Owner.
- F. Project meetings shall be chaired by the Architect. Agenda will include the following:
  1. Review approved minutes of previous meeting; insert corrections and comments.
  2. Review work progress since last meeting.
  3. Note field observations, problems, and decisions.
  4. Identify problems which impede planned progress.

5. Review off-site fabrication problems.
6. Develop corrective measures and procedures to return to planned schedule.
7. Revise construction schedule as indicated.
8. Plan progress during next work period.
9. Review submittal logs and schedules; expedite as required to maintain schedule.
10. Maintenance of quality and work standards.

#### **1.10 PERMITS, INSPECTION AND TESTING REQUIRED BY GOVERNING AUTHORITIES**

- A. If the Contract Documents, laws, ordinances, rules, regulations or orders of any public authority having jurisdiction require any portion of the work to be inspected, tested or approved, the Contractor shall give the Architect and such Authority timely notice of its readiness so the Architect may observe such inspection and testing.
- B. Prior to the start of construction, the Contractor shall complete application to the applicable Building Code enforcement authority for a Building Permit. Such Permit shall be displayed in a conspicuous location at the project site. All City imposed Building Permit Fees shall be waived by the City of Waltham

#### **1.11 SUPERVISION OF WORK**

- A. The Contractor shall be held directly responsible for the correct installation of all work performed under this Contract. He must make good repair, without expense to the Owner, of any part of the work which may become inoperative on account of leaving the work unprotected during the construction of the system or which may break or give out in any manner by reason of poor workmanship, defective materials, or lack of space to allow for expansion or contraction of the work during a period of one year from date of final acceptance of the work by the Owner.
- B. The Contractor shall furnish a competent Massachusetts licensed superintendent (regularly in his employ) satisfactory to the Owner and to the Architect, who shall supervise all work under this Contract, and who shall remain on duty at the site throughout the Contract period while work is in progress. Prior to commencing with the work and the Owner's approval of the Project Superintendent, the Contractor must furnish the Owner with a copy of the Superintendent's resume. The resume must list similar projects and locations, owners names and telephone numbers, Architects names and telephone numbers and three references with telephone numbers.

#### **1.12 RECORD DRAWINGS**

- A. During the progress of work, the Contractors shall keep on file at all times two (2) complete sets of black line prints of Contract Drawings and Specification, on one set of which shall be accurately and promptly noted, as the work progresses, all changes made, whether resulting from addenda; formal Change Order or other instructions issued by the Architect; to water distribution; storm drainage; sanitary sewerage; heating, ventilating and air conditioning; and electrical work, wherever the work was installed other than as shown on the Contract Drawings, or as described in the Specifications. As applicable show dimensions from building grid lines and elevations related to grade or building

structure. The Contractor shall be responsible for assuring that the various revisions are delineated by the specific trade involved.

- B. The second set shall be used to indicate the progress of the work installed by coloring in the various pipe lines, ducts, and apparatus as erected.
- C. Both sets of drawings will be reviewed at regular intervals by the Architect and will be taken into consideration when reviewing monthly Applications for Payment.
- D. At the completion of the work, the Contractors shall submit to the Architect for approval, the black line prints mentioned above. Two (2) copies of the Specifications will be annotated with revisions, and submitted to the Architect as above.
- E. Upon receipt of approval, the Contractors shall transfer the as-built information on the before-mentioned prints onto digital/CD media after which the annotated files shall be submitted to the Architect for transmittal to the Owner.

**1.13 INSURANCE REQUIREMENTS**

- A. Insurance carried by the Contractors shall be as per the Conditions of the Contract and as outlined below. If there is a conflict between stated requirements and statutory requirements, the higher amount of coverage shall prevail.
- B. Insurance Company must be "A" rated or better by the Best Rating System and licensed to do business in the Commonwealth of Massachusetts.
- C. Insurance coverage requirements are listed in the **CITY OF WALTHAM - OWNER-CONTRACTOR AGREEMENT**.
- D. The City of Waltham shall be named as additional named insured on all insurance.

**1.14 MUTUAL RESPONSIBILITY**

- A. The General Contractor shall afford the Owner and separate contractors reasonable opportunity for the introduction and storage of their materials and equipment and the execution of their work and shall connect and coordinate his Work with theirs as required by the Contract Documents.

**1.15 WAGE RATES**

- A. There shall be paid each laborer or mechanic of the General Contractor or Subcontractor engaged in work on the project under this Contract in the trades of occupations listed in SECTION 00 73 43 – PREVAILING WAGE AND LABOR RATES, not less than the hourly rate plus fringes as stated therein and list opposite the same, regardless of any contractual relationship which may be alleged to existing between the general Contractor or any Subcontractor and such laborers and mechanics.

**01 01 00 END OF SUMMARY OF WORK**

Section 01 13 00  
EXISTING CONDITIONS

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Before submitting a proposal, the Contractor shall be familiar with the conditions at the site, checking the requirements of the Plans and Specifications with the existing conditions.
- B. Before submitting a proposal, the Contractor shall review the following documents prepared by the Owner's Consultants for their effects on project scope:
  - 1. Appendix A – Report on Roof Test Cuts
  - 2. Appendix B – Asbestos Containing Materials Inspection
- C. No claim for extra compensation or extension of time will be allowed on account of the Contractor's failure to estimate properly the quantities, locations, and measurements of all items required to complete the work which could be discerned from visiting the site.
- D. The Contractor shall report any discrepancies to the Architect and request an interpretation.

**END OF EXISTING CONDITIONS**





**Waltham Community Center  
Roof Replacement**

**APPENDIX A  
Report on Roof Test Cuts**



October 9, 2014

Kaja Martin-Savasta  
CSS Architects Inc.  
107 Audubon Road,  
Building 2, Suite 300  
Wakefield, MA 01880

RE: Report on Evaluation of Roofing  
Waltham Community Center  
510 Moody Street, Waltham, MA  
File No. 31528

Dear Kaja:

Thank you for retaining Building Enclosure Associates, LLC (BEA) for consulting services related to above referenced project.

We have completed the following scope of work in accordance with our proposal dated September 12, 2014 and accepted by CSS Architects, Inc. on September 26, 2014:

**SCOPE OF WORK:**

**A – Test Cuts and Documentation**

This phase of the project consisted of retaining a roofing contractor to make and restore test cuts at locations indicated by CSS on plans for the Community Center located in Waltham, MA.

**B – Reporting**

This phase included preparing a report on findings including providing recommendations for the roof replacement and any masonry or flashing work or alterations necessary in association with the roof replacement project.

**Project Scope Exclusions:**

The following tasks were excluded from the project scope:

- Code review/Energy analysis roof replacement;
- Evaluation of roof diaphragm;
- Replacement of deteriorated roofing materials if discovered;
- Testing or repair of pre-existing roof leakage issues;
- Structural evaluation of deteriorated areas;

- Identification and/or testing of materials to detect presence of asbestos, lead, PCB's and other like materials;
- Testing of various exterior elements to verify sources of leakage.

### **Summary of Findings**

The following is a summary of findings of the project intended primarily to provide an overview of the roof condition based on test cuts made.

#### Project Description

The Waltham Community Center located in Waltham, Massachusetts is a two story masonry building housing meeting spaces, a gymnasium, as well as other recreational and various community use spaces. The building is home of the old Waltham South Junior High School, comprising an original masonry building and an addition. It was reported by Building Maintenance personnel that the building has been experiencing water leakage in many locations for an extended period of time.

BEA arrived on site on September 29, 2014 to observe and document exploratory test cuts made in the roofs to verify existing as-built conditions at select locations identified by CSS. SRC Roofing, Inc. of Quincy, MA was retained by BEA to perform and restore areas of exploratory demolition.

A total of ten (10) test cuts were made and included four (4) field of roof locations, one (1) edge of roof location, two (2) cuts at expansion joints, one (1) test cut at the base of a covered skylight, one (1) test cut at the base of a masonry wall and one (1) test cut at the base of a masonry gravity vent assembly.

#### Roofing Assembly

There are several different existing roofing assemblies on the various parts of the building. The roof on the Original building is a tar and gravel roof.

The test cuts showed the roof assembly to consist of the following components:

##### Original Building:

- ¾" wood deck, sloped;
- Paper fastened to deck;
- 1" to 1-1/2" thick tar & gravel

Addition:

- Metal deck, potentially sloped;
- 2" semi-rigid insulation;
- 1/2" to 1" thick tar & gravel.

Courtyard Roof:

- Acoustic Metal deck with insulation between flutes, potentially sloped;
- 2" semi-rigid insulation;
- 1/2" to 1" thick tar & gravel;
- 1-3/4" polyisocyanurate insulation;
- 60 mil EPDM

The roof structures appear to be sloped. The roof drains on the original building, showed copper drain inserts with cast iron strainers. At the Addition and Courtyard Roof Areas, plastic drain strainers were noted.

A one-piece copper fascia with a gravel stop runs along the perimeter of the roof, and provides a closure around to the underside of the wood fascia at the roof edge on the original building.

An extruded copper fascia exists below the roof edge metal at the head of the windows on the Courtyard Elevation, while brick masonry is present on other areas.

There are a total of 5 structures housing large gravity vents. The vent structures have copper standing seam roofs. The walls on 3 of the 5 vent structures appear to be wood framed and are clad with copper, while the others consist of brick masonry with copper skirt flashings. The majority of the wood roof framing that was exposed at these vents appeared to be deteriorated, with some pieces exposed or laying on the roof below. The curb for the roof access hatch appears to be wood framed, has copper skirt flashing.

A one-piece galvanized roof edge with a drip edge exists on all sides of the roof at the Addition. The curbs for the Mechanical units and other curbs are flashed with a tar like substance. There have been numerous interior leaks from the Addition roof and many previous repairs have been performed. The repairs have included adding additional amounts of tar which has, at some locations, spilled over the roof edge and onto the masonry wall and roof below.

The EPDM Courtyard roof was installed over a tar and gravel roof. This roofing assembly is terminated with a termination bar and throughwall flashing at the base of the masonry wall of the addition. This roof extends up and over what was once a balcony and also covers a previous skylight structure at the base of the second floor of the original building. At the transition of the former balcony to the lower courtyard roof, the insulation board extends to

the edge of this transition, and no wood blocking was provided.

The skylight structure has been covered with two layers of plywood and metal flashing is present at the base of the skylight. The roof membrane terminates below the window sill located at the peak of the skylight and is covered with a two-piece metal flashing that is secured through the roofing membrane. The fasteners installed in this flashing have been sealed.

At the transitions between the Original Building and the Addition roofs, a prefabricated (Expand-o-flash) flashing is installed along the base of the masonry wall at the lower Addition roof. The expansion joint consists of copper flange with an EPDM expansion gasket secured to the masonry wall and to blocking that exists on the roof below. A foam backer rod and insulation is provided along the expansion joint. A galvanized reglet flashing is installed in the existing masonry wall and laps over the top of the copper flashing at the expansion joint. The reglet flashing was observed to be disengaged from the wall in some areas and was not protecting the top of the expansion joint. The EPDM membrane was cracked and dry.

The following issues of concern, beyond the scope of this project, were noted with the existing masonry walls:

1. Horizontal, vertical and step cracking was noted at the brick chimney on the Original Building. The cracks appear to have been previously repaired by pointing in select areas, however, the cracking appears to be continuing.

It is recommended that the deteriorated masonry be evaluated to determine if the execution of the roof replacement work will require any remedial work to the masonry.

Representative photographs are presented in Appendix A to this report. A Roof Plan and Test Cut Logs and As-Built detail are presented in Appendix B and C respectively to this report.

## **Recommendations**

The following is a summary of recommendations for the scope of roof replacement work based upon observations made during the exploratory work performed,

### Roofing Assembly

- Remove all existing roof assemblies down to the existing wood or metal deck;
- Repair, as necessary, deteriorated areas of decking prior to installation of the new roofing assembly;
- Review and supplement as necessary existing framing over the original balcony and

skylight;

- Install a new insulated single ply thermoplastic roofing assembly, either TPO or PVC with vapor retarder on deck;
- Provide insulation as required to meet applicable Energy Code Requirements;
- Review existing drainage conditions and consider incorporating tapered insulation and/or crickets to promote drainage of water to the existing roof drains;
- Replace existing roof drain bodies and provide new cast iron drain assemblies;
- Install new flashings at masonry walls and equipment curbs to accommodate new finish height of roof surface.
- Replace existing expansion joints.

#### Wall Assembly

- Make repairs as necessary to deteriorated masonry areas to facilitate roofing and flashing installation.

At this juncture it is noted that this report is based upon a limited review of the visible and apparent condition of various accessible building elements on the date of this study. Although care has been taken in the performance of the study, no representation regarding latent or concealed defects which may exist and no warranty or guarantee is expressed or implied. The report is made only in the best exercise of our ability and judgment and not intended to be a contracting document.

Conclusions in this report are based on normal working life of various building components. Predictions of life expectancy and the balance of useful life are necessarily based on industry and/or statistical comparisons. Actual conditions can alter the useful life of any item and make it impossible to state precisely when each item will require replacement and/or repair.

We trust that this report meets your requirements. Please call if you have any questions.

Yours very truly,  
Building Enclosure Associates, LLC



Digitally Signed by Michael Velji  
Michael Velji  
Principal In Charge

Report on Evaluation of Roofing  
Waltham Community Center  
Waltham, MA  
October 9, 2014  
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**APPENDIX A**  
Representative Photographs





**Photograph No. 1**

General View of Roof at  
Original Building



**Photograph No. 2**

General View of Original  
Building and Courtyard Roof

Note roof extends over former  
balcony and skylight.



**Photograph No. 3**

General View of Courtyard  
Roof Below



**Photograph No. 4**

General View of Roof at  
Addition.



**Photograph No. 5**

Typical test cut at Original Building Roof.

Note paper separator between roof and wood deck.



**Photograph No. 6**

Typical test cut at Addition Roof.

Note 2 layers of insulation, tar and gravel installed on metal deck.



**Photograph No. 7**

Typical test cut at Courtyard Roof.

Cut made into EPDM roof, first layer of roofing.



**Photograph No. 8**

Typical test cut at Courtyard Roof.

Note EPDM and insulation installed over tar and gravel roof on acoustic metal deck.



**Photograph No. 9**

Typical copper roof edge at roof of Original Building.

Note copper extending over wood fascia, providing closure at underside of fascia.



**Photograph No. 10**

Typical view along roof edge at head of windows on Courtyard Elevation.

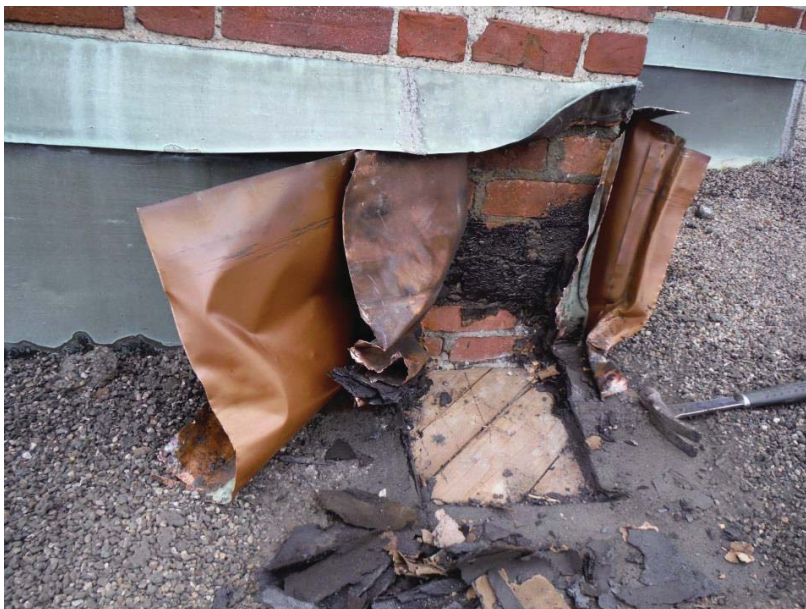
Copper roof edge and fascia below.



**Photograph No. 11**

Typical gravity vent at Original Building.

Note vents constructed of masonry and clad in copper.



**Photograph No. 12**

Typical test cut performed at base of gravity vent.

Note 2 layers of copper skirt flashing, wood deck and tar & gravel roof.



**Photograph No. 13**

Roof Access Hatch at Original Building.

Note copper skirt flashing.



**Photograph No. 14**

Typical mechanical curb at Addition



**Photograph No. 15**

Typical expansion joint from Original Building to Addition.

Note galvanized reglet flashing along top of expansion joint, not fully secured into masonry.



**Photograph No. 16**

Typical test cut at expansion joint from Original Building to Addition.

Note copper and EPDM expansion joint assembly, insulation and blocking within joint.





**Photograph No. 17**

Typical roof drain at Original Building.

Note copper insert secured to deck



**Photograph No. 18**

Typical roof drain at Addition.

Note broken plastic drain strainer.



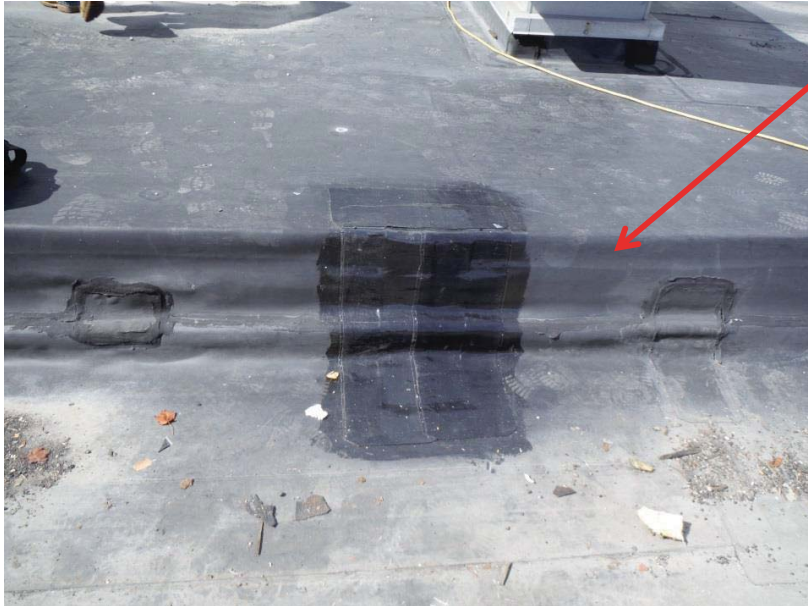
**Photograph No. 19**

Typical Stamp on EPDM membrane



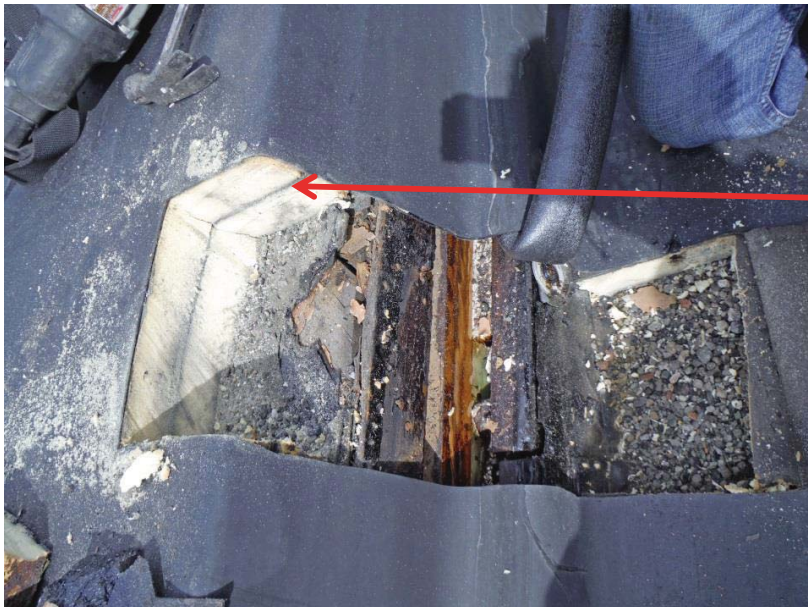
**Photograph No. 20**

Typical view of covered skylight at Courtyard Roof.



**Photograph No. 21**

Typical view along expansion joint at Courtyard Roof.



**Photograph No. 22**

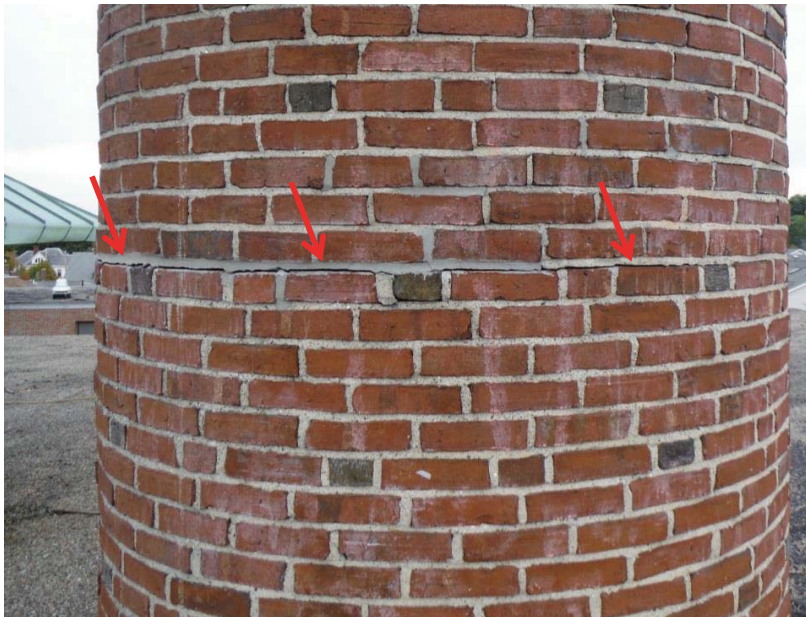
Typical test cut performed along expansion joint at Courtyard Roof.

Note no wood blocking provided at transition of upper to lower portion of roof.



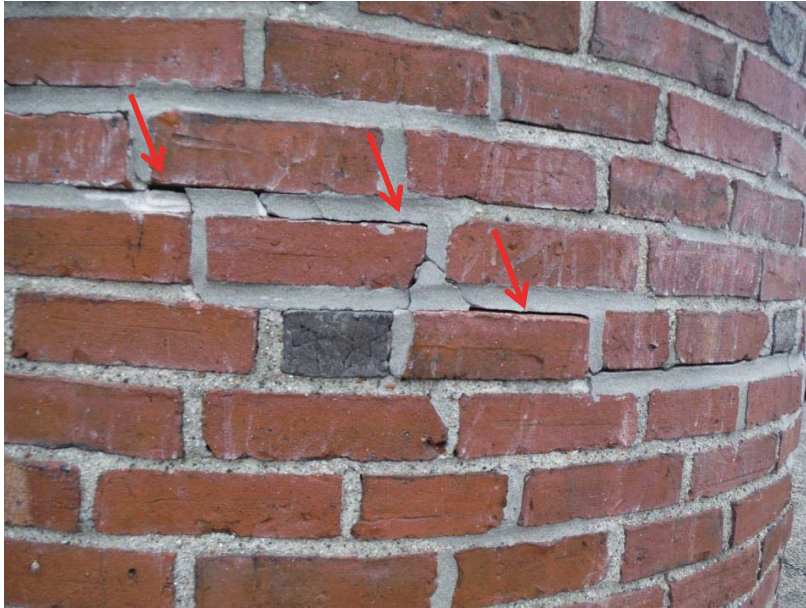
**Photograph No. 23**

Typical termination of roofing membrane at Courtyard Roof at base of Addition masonry wall.



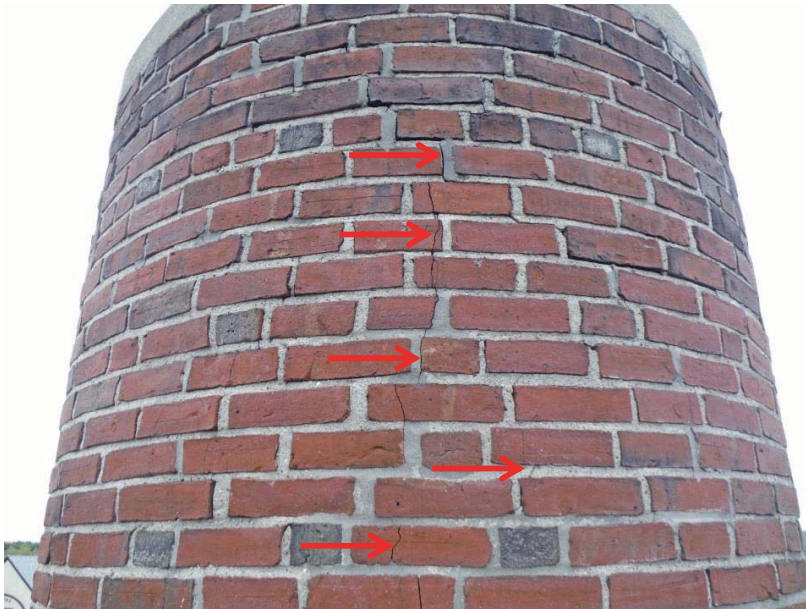
**Photograph No. 24**

Typical horizontal cracking of masonry at chimney



**Photograph No. 25**

Typical step cracking of masonry at chimney

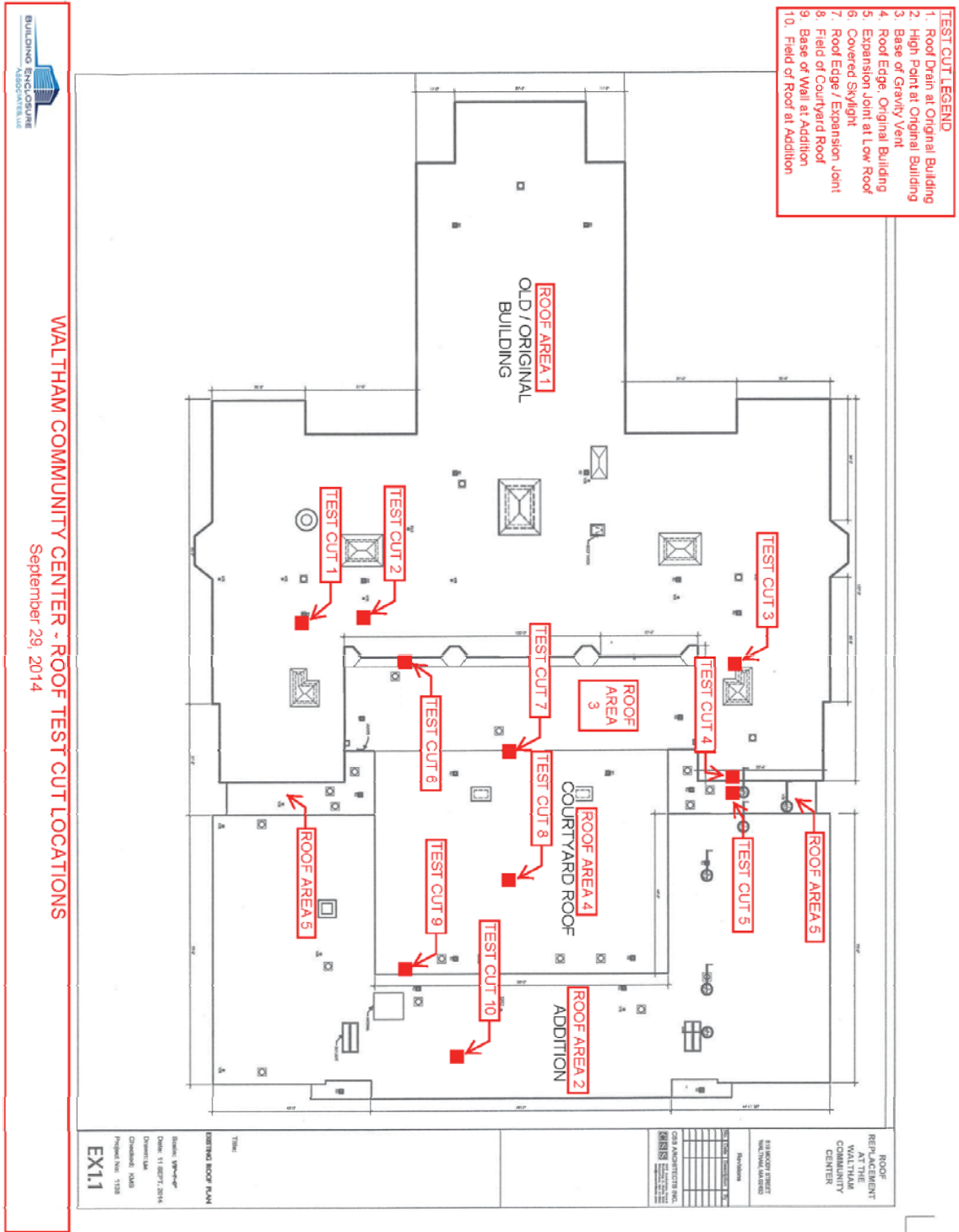


**Photograph No. 26**

Typical vertical cracking of masonry at chimney



Report on Evaluation of Roofing  
Waltham Community Center  
Waltham, MA  
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**APPENDIX B**  
Roof Plan and Roof Test Cut Logs



**TEST CUT DATA FORM**



<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>1</b>	
<b>Building Location</b>	Roof Drain at Original Building	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1-1/2"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	None	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	Separation layer fastened to deck	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	3/4" Wood	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Cast Iron Drain strainer with Copper drain inserts with approximately 9" flange.	





**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>2</b>	
<b>Building Location</b>	High Point at Original Building	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1/2"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	None	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	Separation layer fastened to deck	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	3/4" Wood	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Wood deck appears sloped to form cricket	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>3</b>	
<b>Building Location</b>	Base of Gravity Vent, Original Building	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1-1/2"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	None	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	Separation layer fastened to deck	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	3/4" Wood	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	2 layers of copper skirt flashing 18" in height at base of masonry, flashing laps onto deck approx. 5 1/2". Copper counterflashing over top of skirt flashing.	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>4</b>	
<b>Building Location</b>	Roof Edge of Original Building	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1-1/2"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	None	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	Separation layer fastened to deck	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	3/4" Wood	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Copper roof edge terminated on deck, wraps 1"x4" blocking at roof edge. Copper flashing approx. 5" in height.	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>5</b>	
<b>Building Location</b>	Expansion Joint at Low Roof	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1/2"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	Semi-Rigid / 2"	
<b>Condition of Insulation</b>	Fair	
<b>Vapor Barrier Type / Thickness</b>	None	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	Metal	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Galv. reglet flashing over top of copper and EPDM expansion joint. 1" insulation at base of masonry behind 2"x10" blocking, fiber cant with tar & gravel roof on top of 2 layers of 1" insulation.	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>6</b>	
<b>Building Location</b>	Covered Skylight, Courtyard Roof	
<b>Roof Membrane Type / Thickness</b>	EPDM / 60 mil	
<b>Condition of Roof Membrane</b>	Fair	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	Polyiso / 2 layers of 1-1/2"	
<b>Condition of Insulation</b>	Good	
<b>Vapor Barrier Type / Thickness</b>	None	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	Metal	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Existing skylight covered with 2 layers of 3/4" plywood, 1-1/2" polyisocyanurate insulation. EPDM adhered to insulation. 1" insulation btwn. Skylight and roof.	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>7</b>	
<b>Building Location</b>	Roof Edge / expansion joint at Courtyard Roof	
<b>Roof Membrane Type / Thickness</b>	EPDM / 60 mil, tar & gravel below	
<b>Condition of Roof Membrane</b>	Fair	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	Polyiso / 3.25" total in 2 layers @ old roof, 2 layers 1" at courtyard roof	
<b>Condition of Insulation</b>	Good	
<b>Type of Roof Deck</b>	3/4" Wood @ old roof, metal @ courtyard roof	
<b>Condition of Roof Deck</b>	Good	
<b>Composition of Old Roof</b>	Wood deck with tar & gravel, 3.25" polyiso, 60 mil EPDM.	
<b>Composition of Courtyard Roof</b>	Acoustic metal deck with insulation in flutes, 2 layers of 1" polyiso, tar & gravel, 1-3/4" polyiso and 60 mil EPDM membrane. 4" fiber cant and foam backer rod at expansion joint. Note: no blocking at roof edge.	



**TEST CUT DATA FORM**

<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>8</b>	
<b>Building Location</b>	Field of Lower Courtyard Roof	
<b>Roof Membrane Type / Thickness</b>	EPDM / 60 mil, tar & gravel below	
<b>Condition of Roof Membrane</b>	Fair	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	1-3/4" Polyiso above tar & gravel, 2" semi-rigid below tar & gravel	
<b>Condition of Insulation</b>	Good	
<b>Vapor Barrier Type / Thickness</b>	None	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	Metal	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>	Acoustic metal deck with insulation in flutes, 2" semi-rigid insulation, tar & gravel with 1-3/4" polyiso insulation and 60 mil EPDM.	

**TEST CUT DATA FORM**



<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

<b>Test Cut No.</b>	<b>9</b>	
<b>Building Location</b>	Base of Wall at Addition	
<b>Roof Membrane Type / Thickness</b>	EPDM / 60 mil	
<b>Condition of Roof Membrane</b>	Fair	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	None	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	None	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	NA	
<b>Condition of Roof Deck</b>	-	
<b>Remarks:</b>	CMU back-up wall with tar carried up base of wall, 60 mil EPDM on top of tar, terminated with termination bar at base of brick.	



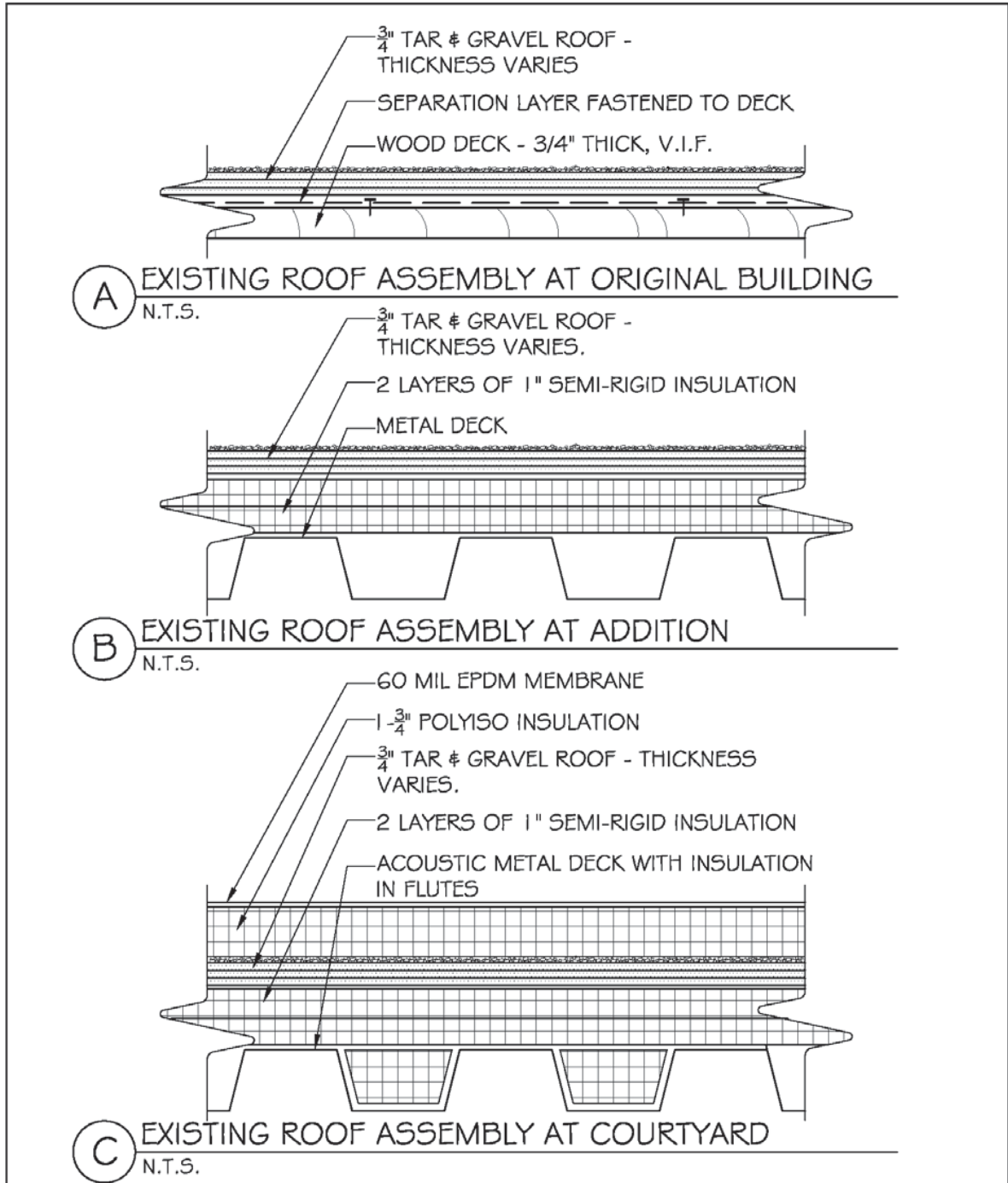
**TEST CUT DATA FORM**

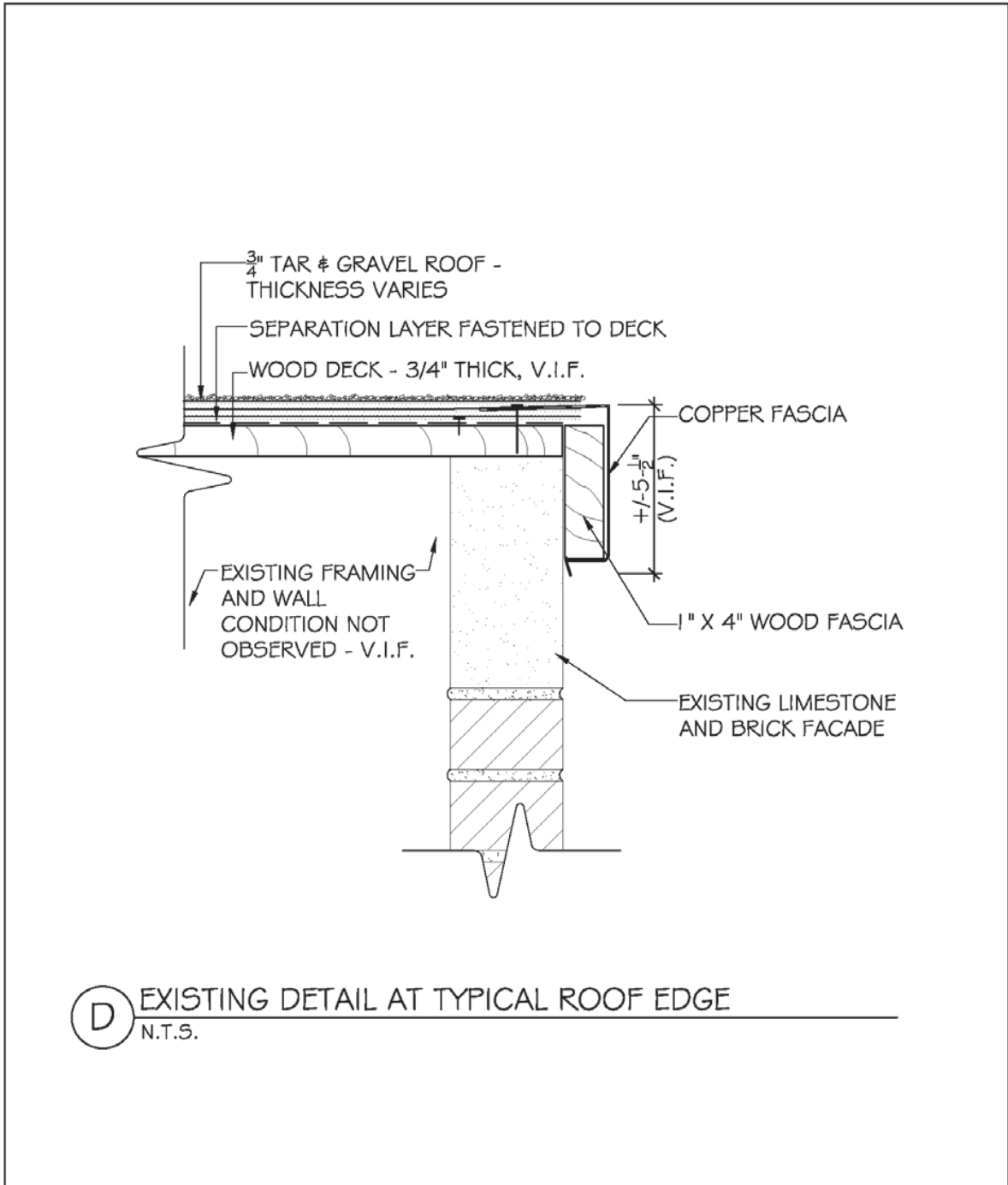
<b>Project Name</b>	Waltham Community Center		
<b>Project Address</b>	510 Moody Street, Waltham, MA		
<b>Project Number</b>	31529	<b>Date Performed:</b>	September 29, 2014

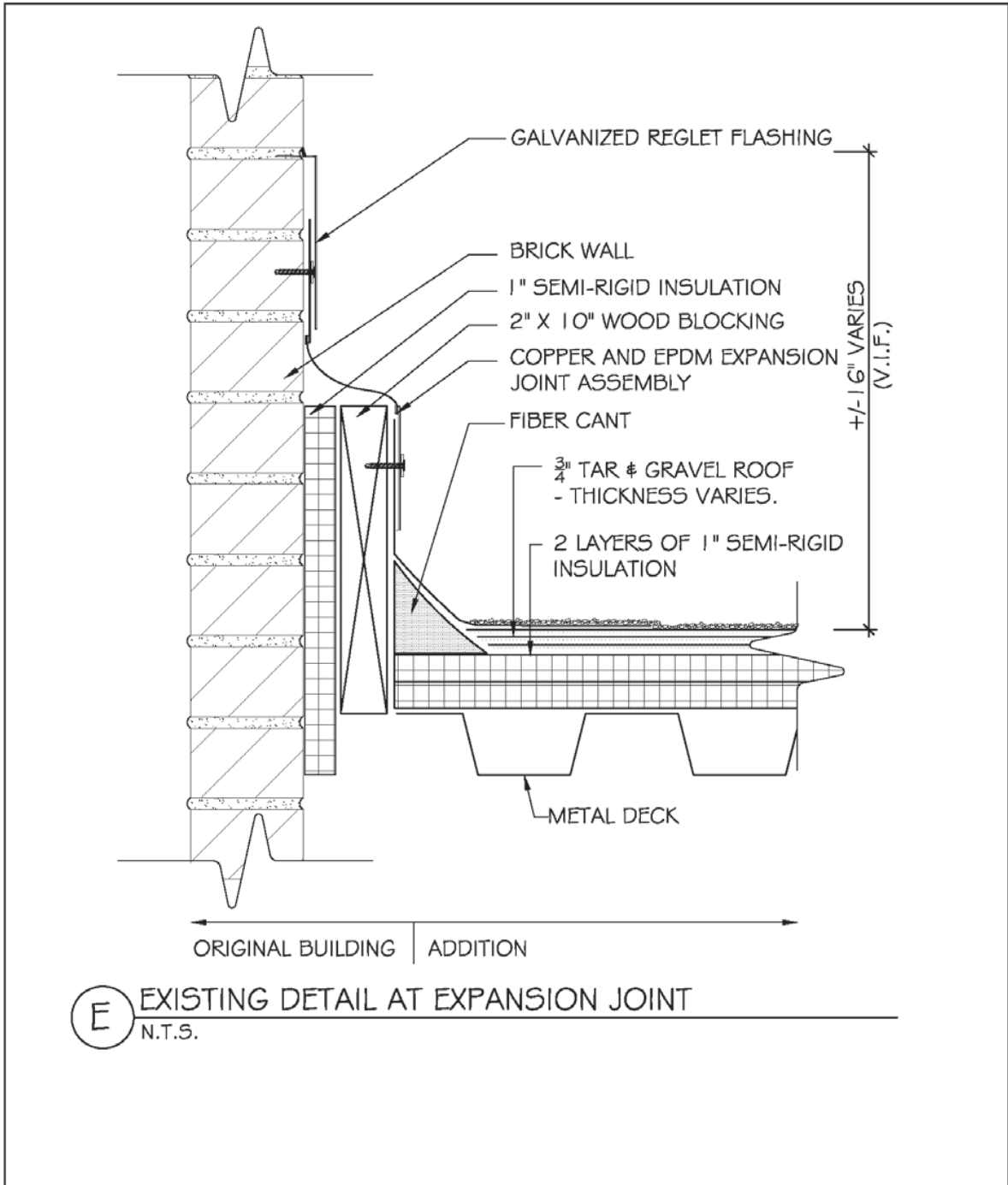
<b>Test Cut No.</b>	<b>10</b>	
<b>Building Location</b>	Field of Roof at Addition	
<b>Roof Membrane Type / Thickness</b>	Tar & Gravel / 1/2" to 1"	
<b>Condition of Roof Membrane</b>	Poor	
<b>Coverboard Type / Thickness</b>	None	
<b>Condition of Coverboard</b>	-	
<b>Insulation Type / Thickness</b>	Semi-Rigid / 2 layers of 1"	
<b>Condition of Insulation</b>	-	
<b>Vapor Barrier Type / Thickness</b>	None	
<b>Condition &amp; Continuity of Vapor Barrier</b>	-	
<b>Type of Roof Deck</b>	Metal	
<b>Condition of Roof Deck</b>	Good	
<b>Remarks:</b>		

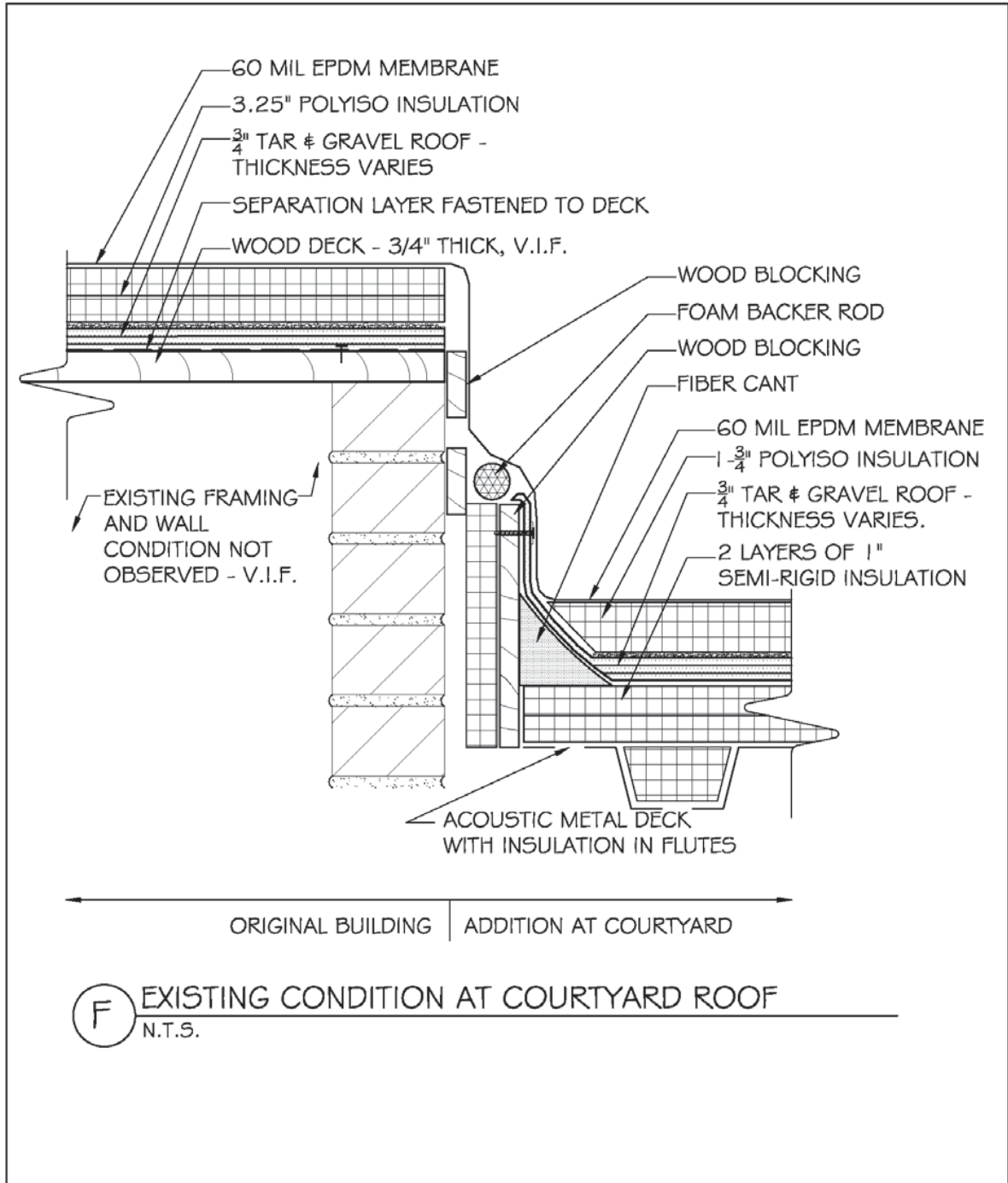
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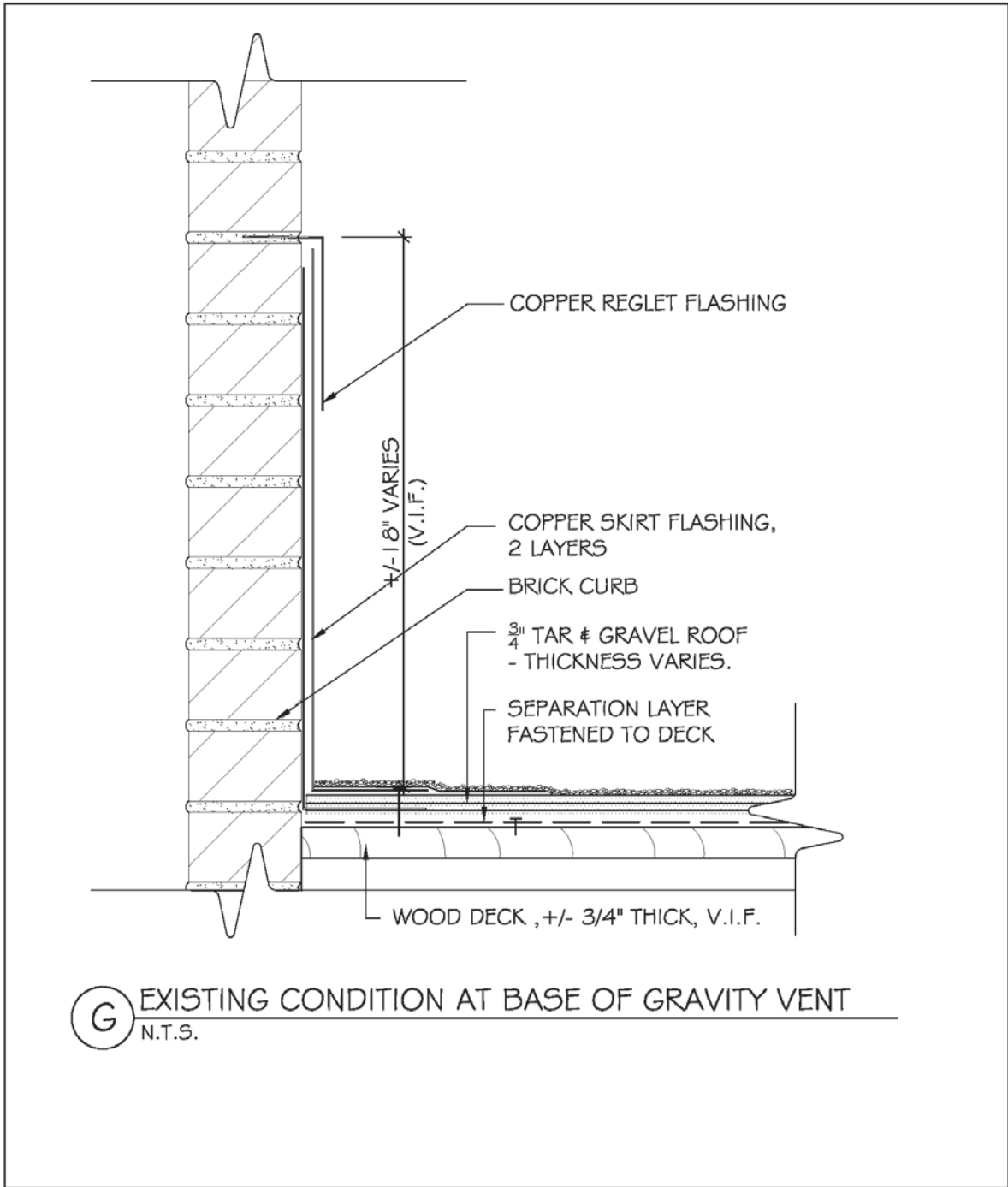
**APPENDIX C**  
As Built Details











**Waltham Community Center  
Roof Replacement**

**APPENDIX B  
Asbestos Containing Materials Inspection**





ASBESTOS-CONTAINING MATERIALS INSPECTION  
WALTHAM COMMUNITY CENTER ROOF  
510 MOODY STREET  
WALTHAM, MASSACHUSETTS

PREPARED FOR:

CSS ARCHITECTS, INC.  
107 AUDUBON ROAD  
BUILDING 2, SUITE 300  
WAKEFIELD, MASSACHUSETTS 01880

PREPARED BY:

CARDNO ATC  
600 WEST CUMMINGS PARK, SUITE 5450  
WOBURN, MASSACHUSETTS 01801

ATC PROJECT 060.03187.0056

OCTOBER 8, 2014

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APPENDIX A: ASBESTOS BULK SAMPLE ANALYSIS RESULTS BY PLM

## **1.0 EXECUTIVE SUMMARY**

Cardno ATC of Woburn, Massachusetts was retained by CSS Architects, Inc. to perform asbestos bulk sampling of roofing materials (ACM) at the Waltham Community Center located in Waltham, Massachusetts. The work was performed in accordance with ATC proposal 060-2014-0701.

Cardno ATC's scope of work included a representative survey of the exterior roofing areas. Please note Cardno ATC's scope of work was limited to roofing areas only and did not perform an inspection of any other areas.

### **1.1 Asbestos**

Section 2.0 discusses the asbestos-containing materials (ACM) survey and sampling methodology. This survey involved a visual inspection, bulk sampling and inventory of suspect ACMs, including locating and quantifying the identified ACM.

The asbestos survey was performed by a Commonwealth of Massachusetts Department of Labor Standards (DLS) certified Asbestos Inspector, Mr. Michael Tiernan (AI-073158) on September 29, 2014. A total of fifty-six (56) samples of suspect ACM were collected, with forty-four (44) analyzed to determine the asbestos content. The Cardno ATC inspector performed both the visual inspection and bulk sampling in the building according to methods outlined in the U.S. Environmental Protection Agency (EPA) guidance document titled, "Guidance for Controlling Asbestos-Containing Materials in Buildings" (EPA 560/5-85-024). Asbestos Identification Laboratory Polarized Light Microscopy (PLM) bulk sample results are included in Appendix A.

The estimated cost to remove the identified ACM is **\$18,930.00**.

**Limitations**

*Our professional services have been performed, our findings obtained and our recommendations prepared in accordance with customary principles and practices in the field of environmental science and engineering. This statement is in lieu of other statements either expressed or implied. This report does not warrant against future operations or conditions, nor does it warrant against operations or conditions present of a type or at a location not investigated.*

*Environmental evaluations are limited in the sense that conclusions and recommendations are developed and information obtained from limited research and secondary sources. Except as set forth in this report, Cardno ATC has made no independent investigations as to the accuracy or completeness of the information derived from the secondary sources and personal interviews and has presumed that such information was accurate and complete.*

*This report is intended for the sole use of CSS Architects, Inc. The scope of services performed in execution of this evaluation may not be appropriate to satisfy the needs of other users, and use or re-use of this document or the findings, conclusions, or recommendations, is at risk of said user.*

**CERTIFICATION OF RESULTS**

This report has been prepared for the exclusive use of CSS Architects, Inc. Photocopying of this document by parties other than those designated by the Client, or use of this document for purposes other than it is intended, is prohibited.

Respectfully submitted 8<sup>th</sup> day of October, 2014.

Sincerely,

**CARDNO ATC**

---

Michael Tiernan  
Project Manager



---

David Mitchell  
Senior Project Manager

## 2.0 ASBESTOS-CONTAINING MATERIALS SURVEY

### 2.1 Sampling Methodology

The survey was performed by a Massachusetts Department of Labor Standards (DLS) certified Asbestos Inspector. Bulk samples, representing individual homogenous areas of suspect materials, were collected in a randomly distributed manner, in accordance with those methods outlined below.

Building materials exist in the form of thermal systems insulation (TSI), surfacing materials, and miscellaneous materials.

The following generally illustrates the sampling strategy employed by Cardno ATC where feasible:

- (b) Thermal systems insulation.
  - (1) In a randomly distributed manner, collect at a minimum, three (3) bulk samples of thermal systems insulation material, representative of each homogeneous area, and not assumed to be ACM.
  - (2) Collect, at a minimum, one (1) bulk sample of patched thermal systems insulation, representative of each homogenous area, and not assumed to be ACM, providing the section of patch was less than 6 linear or square feet.
  - (3) Collect, at a minimum, three (3) representative bulk samples of each insulated mechanical system not assumed to be ACM, including, but not limited to cementitious material used on pipe fittings such as tees, elbows, or valves. Representative sampling was conducted in a manner sufficient as to identify whether each homogenous area is either asbestos or non-asbestos containing.
  - (4) Bulk samples are not required to be collected from any homogeneous area where the accredited asbestos inspector has determined that the thermal systems insulation is a non-suspect material (i.e., fiberglass, foam, glass, rubber, or any other non-ACM).
- (a) Surfacing materials - In a randomly distributed manner, collect bulk samples of surfacing materials, representative of each homogeneous area, and not assumed to be ACM.
  - (1) Collect at least three bulk samples from each homogeneous area that is less than or equal to 1,000 ft<sup>2</sup>.
  - (2) Collect at least five bulk samples from each homogeneous area that is greater than 1,000 ft<sup>2</sup>, but less than or equal to 5,000 ft<sup>2</sup>.
  - (3) Collect at least seven bulk samples from each homogeneous area that is greater than 5,000 ft<sup>2</sup>.
- (c) Miscellaneous materials - Collect, at a minimum, two (2) representative bulk sample of each miscellaneous material not assumed to be ACM, including, but not limited to

ceiling tiles, floor tiles, associated floor tile mastic, roofing materials, waterproofing, etc. Representative sampling was conducted in a manner sufficient as to identify whether each homogenous area is either asbestos or non-asbestos containing.

## 2.2 Asbestos-Containing Materials and Summary of Findings

Cardno ATC conducted a representative asbestos survey of the exterior roofing areas. Cardno ATC did not perform any exploratory demolition to access potentially hidden ACM or perform an inspection of the interior of the building. Cardno ATC did not disassemble any mechanical equipment or electrical gear that may have suspect ACM internal components. Additional ACMs may be present in areas not inspected.

The following table lists the suspect materials that were sampled, sampling locations, estimated quantities (if applicable) and their analytical results.

**Table 1: Bulk Sample Results by Polarized Light Microscopy  
Waltham Community Center  
Waltham, Massachusetts**

Sample ID	Material	Location (s) Sampled	Estimated Quantity	Analytical Results
01A 01B	Built-up Roofing	Roof 1, Location 8	N/A	NAD
02A 02B	Built-up Roofing	Roof 2, Location 9	N/A	NAD
03A 03B	Built-up Roofing	Roof 3, Location 4	N/A	NAD
04A 04B	Built-up Roofing	Roof 4, Location 5	N/A	NAD
05A 05B	Black Coating on Roof Hatch	Roof 1, Access Hatch	N/A	NAD
06A 06B	Black Coating on Copper Flashings	Roof 1, Access Hatch Roof 1, Round Brick Chimney	N/A	NAD
07A 07B	Black Stack Coating	Roof 1	N/A	NAD
08A 08B	Caulking around Metal Hatch/Door	Roof 1 on large Gravity Vent	12 LF (2 doors)	20% Chrysotile
09A 09B	Black Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	20% Chrysotile
10A 10B	Grey Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	20% Chrysotile
11A 11B	Black Coating on Round Hood Flashing	Roof 1	110 SF (13 hoods)	10% Chrysotile
12A 12B	Chimney Flashing	Roof 1 "Gravity Vent"	N/A	NAD
13A 13B	Skylight Window Glazing	Roof 1 Skylight	N/A	NAD

Sample ID	Material	Location (s) Sampled	Estimated Quantity	Analytical Results
14A 14B	Roof Edge Flashing	Roof 1, Location 6A	900 SF	5% Chrysotile
15A 15B	Exterior Window Caulking	Roof 2 Penthouse	N/A	NAD
16A 16B	Grey Flashing and Roof Patch	Roof 2 Skylight Roof 2, Round Hood	80 SF	20% Chrysotile
17A 17B	Roof Flashing	Roof 3 and Roof 4 junction/seam (Location 4)	150 SF	2% Chrysotile
18A 18B	Screwhead Sealant	Roof 3 Window Wall	N/A	NAD
19A 19B	Rubber Roof Seam Sealant	Roof 4 Roof 3	N/A	NAD
20A 20B	Grey/Black Flashing Sealant	Roof 3 on abandoned railing pilaster and above door	50 SF	20% Chrysotile
21A 21B	Interior Door Glazing	Roof 3	1 door	2% Chrysotile
22A 22B	Exterior Door Glazing	Roof 3	1 door	5% Chrysotile
23A 23B	Exterior Door Caulking	Roof 3	1 door	5% Chrysotile
24A 24B	Black Mastic on CMU	Roof 4, behind rubber flashing	N/A	NAD
25A 25B	Black Mastic on Roof Insulation Board	Roof 4, Location 5	N/A	NAD
26A 26B	White Caulking on top of silver flashing	Roof 5, Location 6	N/A	NAD
27A 27B	Capstone Crack Sealant/Filler	Roof 5 Parapet Wall	400 LF	2% Chrysotile
28A 28B	Roof Flashing	Roof 5 Parapet Wall, Location 6	50 SF	5% Chrysotile

Note: An asbestos-containing material (ACM) is defined by the U.S. Environmental Protection Agency (EPA) as any material or product containing more than one percent asbestos by weight, or one percent or greater according to the Massachusetts Department of Environmental Protection. Please refer to the attached drawing for sampling locations.

**Table 2: Cost Estimates for Removal of Identified Asbestos-Containing Materials  
Waltham Community Center  
Waltham, Massachusetts**

<b>Material</b>	<b>Location (s)</b>	<b>Estimated Quantity</b>	<b>Unit Cost</b>	<b>Total</b>
Caulking around Metal Hatch/Door	Roof 1 on large Gravity Vent	12 LF (2 doors)	\$15/LF	\$180
Black Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	\$10/SF	\$1,000
Grey Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	\$10/SF	\$1,000
Black Coating on Round Hood Flashing	Roof 1	110 SF (13 hoods)	\$10/SF	\$1,100
Roof Edge Flashing	Roof 1, Location 6A	900 SF	\$10/SF	\$9,000
Grey Flashing and Roof Patch	Roof 2 Skylight Roof 2, Round Hoods	80 SF	\$10/SF	\$800
Roof Flashing	Roof 3 and Roof 4 junction/seam (Location 4)	150 SF	\$10/SF	\$1,500
Grey/Black Flashing Sealant	Roof 3 on abandoned railing pilaster and above door	50 SF	\$10/SF	\$500
Interior Door Glazing	Roof 3	1 door	\$150/Door	\$150
Exterior Door Glazing	Roof 3	1 door	N/A	N/A
Exterior Door Caulking	Roof 3	1 door	N/A	N/A
Capstone Crack Sealant/Filler	Roof 5 Parapet Wall	400 LF	\$8/LF	\$3,200
Roof Flashing	Roof 5 Parapet Wall, Location 6	50 SF	\$10/SF	\$500
<b>Estimated Cost for Removal of all Above Identified Asbestos-Containing Materials</b>				<b>\$18,930.00</b>



### **2.3 Analytical Method**

Bulk samples of suspect roofing materials were analyzed by Asbestos Identification Laboratory of Woburn, Massachusetts (AIL) using the EPA approved polarized light microscopy with dispersion staining (PLM/DS) method using the visual estimation technique for asbestos quantification. AIL is fully accredited for bulk sample analysis under the National Voluntary Laboratory Accreditation Program (NVLAP) administered by the National Institute of Standards and Technology and is also licensed by the Massachusetts DLS (License #AA000208). Bulk samples were analyzed for asbestos content using EPA Method 600/R-93/116. The visual estimation technique was used to quantify asbestos concentrations.

### **2.4 Consideration for Hidden Materials**

Cardno ATC performed the inspection in exterior roofing areas of the building that were reasonably accessible at the time of the survey. Cardno ATC did not perform any exploratory demolition to access potentially hidden ACM or perform an inspection of interior areas, or disassemble any mechanical equipment or electrical gear that may have suspect ACM internal components.

Cardno ATC recommends that if a suspect material has not been positively identified, but is similar in mode of occurrence or physical properties as other ACM, it should be considered asbestos-containing. Any suspect materials uncovered during future renovation/demolition activities, not readily identified as non-asbestos, should be assumed to be asbestos-containing, unless future bulk sampling reveals otherwise.

### **2.5 Recommendations**

Cardno ATC understands that a roof replacement is planned for the building. All identified ACM that will be impacted by the planned renovation/demolition project should be properly removed and disposed of by a licensed Asbestos Contractor prior to any disturbance.

Cardno ATC recommends that this survey report include all bulk sample results and attached lab reports to be provided to all demolition contractors that will be performing any work in the areas inspected that would impact and/or disturb any of the building materials noted in this report. Cardno ATC also recommends that such contractors comply with all federal, state, and local regulations regarding abatement, demolition and disposal of the building materials noted in this report.

ATC also recommends the following as part of the abatement process:

1. Although the asbestos contractor is required to follow the requirements outlined in federal, state, and local regulations regarding asbestos during any abatement project. Cardno ATC recommends the development of a project specification and the use of project oversight to ensure compliance with all applicable regulations as well as to protect the interest of the client for all abatement work performed at the site. The project specification shall reference the regulations pertinent to each project, including those work procedures that shall be followed by asbestos abatement personnel.

2. As part of each abatement contractors bidding process, a unit price schedule for the abatement of asbestos-containing materials should be established. The unit price schedule should include costs for those materials identified within this report, as well as those materials that may potentially be uncovered during renovation/demolition activities. Also, included there should be unit prices for the removal of asbestos-containing materials (i.e. floor tile, window caulking/glazing, pipe insulation, etc.), as well as those non-asbestos-containing materials which may be asbestos contaminated (i.e. sheetrock, joint compound, mastic, etc.).
3. Project oversight will provide CSS Architects, Inc. with on-site technical expertise during all phases of the abatement work. Project oversight provides a constant management of the abatement project to ensure that all identified asbestos-containing materials be removed in accordance with applicable regulations and to prevent any asbestos fiber release. Tasks performed during project oversight should include periodic work area inspections to ensure that procedures employed by the abatement contractor are acceptable, and air monitoring be performed around each work area to detect any elevated asbestos fiber levels.

## **APPENDIX A**

### **ASBESTOS BULK SAMPLE ANALYSIS RESULTS BY PLM**



## Asbestos Identification Laboratory

165 New Boston St., Ste 271  
Woburn, MA 01801  
781-932-9600

Web: [www.asbestosidentificationlab.com](http://www.asbestosidentificationlab.com)  
Email: [mikemanning@asbestosidentificationlab.com](mailto:mikemanning@asbestosidentificationlab.com)

Batch: 2066



October 02, 2014

Mike Tiernan  
Cardno ATC, Woburn  
600 West Cummings Park  
Suite 5500  
Woburn, MA 01801

**Project Number:**

**Project Name:** Waltham Recreation Center

**Date Sampled:** 2014-09-29

**Work Received:** 2014-09-30

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

Dear Mike Tiernan,

Asbestos Identification Laboratory has completed the analysis of the samples from your office for the above referenced project

The information and analysis contained in this report have been generated using the EPA /600/R-93/116 Method for the Determination of Asbestos in Bulk Building Materials. Materials or products that contain more than 1% of any kind or combination of asbestos are considered an asbestos containing building material as determined by the EPA. This Polarized Light Microscope (PLM) technique may be performed either by visual estimation or point counting. Point counting provides a determination of the area percentage of asbestos in a sample. If the asbestos is estimated to be less than 10% by visual estimation of friable material, the determination may be repeated using the point counting technique. The results of the point counting supersede visual PLM results. Results in this report only relate to the items tested. This report may not be used by the customer to claim product endorsement by NVLAP or any other U.S. Government Agency.

Laboratory results represent the analysis of samples as submitted by the customer. Information regarding sample location, description, area, volume, etc., was provided by the customer. Asbestos Identification Laboratory is not responsible for sample collection activities or analytical method limitations. Unless notified in writing to return samples, Asbestos Identification Laboratory discards customer samples after 30 days. This report shall not be reproduced, except in full, without the written consent of Asbestos Identification Laboratory.

- NVLAP Lab Code: 200919-0
- Massachusetts Certification License: AA000208
- State of Connecticut, Department of Public Health Approved Environmental Laboratory Registration Number: PH-0142
- State of Maine, Department of Environmental Protection Asbestos Analytical Laboratory License Number: LB-0078(Bulk) LA-0087(Air)
- State of Rhode Island and Providence Plantations Department of Health Certification: AAL-121

Thank you Mike Tiernan for your business.

Michael Manning  
Owner/Director

Waltham Community Center  
Roof Replacement

October 02, 2014

Mike Tiernan  
Cardno ATC, Woburn  
600 West Cummings Park  
Suite 5500  
Woburn, MA 01801

**Project Number:**  
**Project Name:** Waltham Recreation Center

**Date Sampled:** 2014-09-29  
**Work Received:** 2014-09-30

**Analysis Method:** BULK PLM ANALYSIS EPA/600/R-93/116

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
01A	Built-Up Roofing	Roof 1- Location 8	black	Cellulose Non-Fibrous	10 None Detected 90
21455					
01B	Built-Up Roofing	Roof 1- Location 8	black	Cellulose Non-Fibrous	10 None Detected 90
21456					
02A	Built-Up Roofing	Roof 2- Location 9	multi	Mineral Wool Cellulose Non-Fibrous	2 None Detected 10 88
21457					
02B	Built-Up Roofing	Roof 2- Location 9	multi	Mineral Wool Cellulose Non-Fibrous	5 None Detected 15 80
21458					
03A	Built-Up Roofing	Roof 2- Location 4	black	Cellulose Non-Fibrous	15 None Detected 85
21459					
03B	Built-Up Roofing	Roof 2- Location 4	black	Cellulose Non-Fibrous	15 None Detected 85
21460					
04A	Built-Up Roofing	Roof 4- Location 5	black	Mineral Wool Cellulose Non-Fibrous	2 None Detected 20 78
21461					
04B	Built-Up Roofing	Roof 4- Location 5	black	Mineral Wool Cellulose Non-Fibrous	2 None Detected 15 83
21462					
05A	Black Coating on Roof Hatch	Roof 1- Access Hatch	black	Fiberglass Non-Fibrous	30 None Detected 70
21463					
05B	Black Coating on Roof Hatch	Roof 1- Access Hatch	black	Fiberglass Non-Fibrous	30 None Detected 70
21464					
06A	Black Coating on Copper Flashings (Multiple)	Roof 1- Roof Hatch	black	Non-Fibrous	100 None Detected
21465					
06B	Black Coating on Copper Flashings (Multiple)	Roof 1- Round Brick Chimney	black	Non-Fibrous	100 None Detected
21466					
07A	Black Stack Coating	Roof 1	black	Non-Fibrous	100 None Detected
21467					

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Waltham Community Center  
Roof Replacement

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
07B	Black Stack Coating	Roof 1	black	Non-Fibrous	100 None Detected
21468					
08A	Caulking Around Metal Hatch/Door	Roof 1- On Large Gravity Vent (Chimney)	black	Non-Fibrous	80 <b>Detected Chrysotile</b> 20
21469					
08B	Caulking Around Metal Hatch/Door	Roof 1- On Large Gravity Vent (Chimney)	null		Not Analyzed
21470					
09A	Black Sealant on Copper Parapet	Roof 1- Facing Roof 3	black	Non-Fibrous	80 <b>Detected Chrysotile</b> 20
21471					
09B	Black Sealant on Copper Parapet	Roof 1- Facing Roof 3	null		Not Analyzed
21472					
10A	Grey Sealant on Copper Parapet	Roof 1- Above Tall Thin Windows	black	Non-Fibrous	80 <b>Detected Chrysotile</b> 20
21473					
10B	Grey Sealant on Copper Parapet	Roof 1- Above Tall Thin Windows	null		Not Analyzed
21474					
11A	Black Coating on Round Hood Flashing	Roof 1	black	Fiberglass Cellulose Non-Fibrous	10 <b>Detected Chrysotile</b> 10 2 78
21475					
11B	Black Coating on Round Hood Flashing	Roof 1	null		Not Analyzed
21476					
12A	Chimney Flashing	Roof 1- "Gravity Vent"	black	Cellulose Non-Fibrous	40 None Detected 60
21477					
12B	Chimney Flashing	Roof 1 Gravity Vent	black	Cellulose Non-Fibrous	40 None Detected 60
21478					
13A	Skylight Window Glazing	Roof 1	multi	Non-Fibrous	100 None Detected
21479					
13B	Skylight Window Glazing	Roof 1	multi	Non-Fibrous	100 None Detected
21480					
14A	Roof Edge Flashing	Roof 1- Location 6A	black	Cellulose Synthetic Non-Fibrous	15 <b>Detected Chrysotile</b> 5 5 75
21481					
14B	Roof Edge Flashing	Roof 1- Location 6A	null		Not Analyzed
21482					
15A	Ext. Window Caulking	Roof 2- Penthouse	gray	Fiberglass Non-Fibrous	2 None Detected 98
21483					
15B	Ext. Window Caulking	Roof 2- Penthouse	gray	Fiberglass Non-Fibrous	2 None Detected 98
21484					
16A	Gray Roof/Flashing Patch	Roof 2- Skylight	black	Cellulose Non-Fibrous	20 None Detected 80
21485					

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Waltham Community Center  
Roof Replacement

FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
16B	Gray Roof/Flashing Patch	Roof 2- Round Hood	black	Non-Fibrous	80 <b>Detected Chrysotile</b> 20
21486					
17A	Roof Flashing	Roof 3/4 Seam Loc. 4	black	Cellulose Non-Fibrous	15 <b>Detected Chrysotile</b> 83 2
21487					
17B	Roof Flashing	Roof 3-4 Seam	null		Not Analyzed
21488					
18A	Screwhead Sealant	Roof 3 Window Wall	black	Non-Fibrous	100 None Detected
21489					
18B	Screwhead Sealant	Roof 3 Window Wall	black	Non-Fibrous	100 None Detected
21490					
19A	Rubber Roof Seam Sealant	Roof 4	black	Non-Fibrous	100 None Detected
21491					
19B	Rubber Roof Seam Sealant	Roof 3	black	Non-Fibrous	100 None Detected
21492					
20A	Flashing Sealant on Rowling Pillaster	Roof 3 (Above Door)	black	Non-Fibrous	80 <b>Detected Chrysotile</b> 20
21493					
20B	Flashing Sealant on Rowling Pillaster	Roof 3 (Above Door)	null		Not Analyzed
21494					
21A	Interior Door Glazing	Roof 3	white	Non-Fibrous	98 <b>Detected Chrysotile</b> 2
21495					
21B	Interior Door Glazing	Roof 3	null		Not Analyzed
21496					
22A	Exterior Door Glazing	Roof 3	white	Non-Fibrous	95 <b>Detected Chrysotile</b> 5
21497					
22B	Exterior Door Glazing	Roof 3	null		Not Analyzed
21498					
23A	Exterior Door Caulk	Roof 3	tan	Non-Fibrous	95 <b>Detected Chrysotile</b> 5
21499					
23B	Exterior Door Caulk	Roof 3	null		Not Analyzed
21500					
24A	Black Mastic on CMU	Roof 4- Behind Rubber Flashing	black	Non-Fibrous	100 None Detected
21501					
24B	Black Mastic on 1' High	Roof 4- Behind Rubber Flashing	black	Non-Fibrous	100 None Detected
21502					
25A	Insulation Board Mastic	Roof 4	black	Non-Fibrous	100 None Detected
21503					

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FieldID	Material	Location	Color	Non-Asbestos %	Asbestos %
LabID					
25B	Insulation Board Mastic	Roof 4	black	Non-Fibrous 100	None Detected
21504					
26A	White Caulk on Top of Silver Flashing	Roof 5	white	Fiberglass 2 Non-Fibrous 98	None Detected
21505					
26B	White Caulk on Top of Silver Flashing	Roof 5	white	Fiberglass 2 Non-Fibrous 98	None Detected
21506					
27A	Capstone Crack Sealant	Roof 5- Loc. 6A	white	Non-Fibrous 98	Detected Chrysotile 2
21507					
27B	Capstone Crack Sealant	Roof 5	null		Not Analyzed
21508					
28A	Roof Flashing	Roof 5 Parapet	black	Cellulose 15 Synthetic < 1 Non-Fibrous 80	Detected Chrysotile 5
21509					
28B	Roof Flashing	Roof 5 Parapet	null		Not Analyzed
21510					
Thursday 02 October	<i>Michael Manning</i>	End of Report			Page 4 of 4
Analyzed by:		Batch: 2066			











Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celsius =	Stereo Scope				Asbestos Minerals	Optical Properties					Non-Asbestos Percentage (%)											
			% of Asbestos	Color	Homogeneity	Texture		Friable	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous		
73	10A	Material Gray Sealant on Copper Parapet 100sf Location Roof 1 - above tall thin Material " "	90	DK	Y	F	N	Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite	80	LD		F	L	N	1.03/1.03								80	
74	10B	Material " " Location " "						Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																
75	11A	Material Black Coating on Round Wood Flashing Location Roof 1 Material " "	10	BLN	F	N		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																
76	11B	Material " " Location Roof 1 Material Chimney Flashing Location Roof 1 - Gravity Vent "						Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																
77	12A	Material " " Location Roof 1 - Gravity Vent "	0	OKN	F	N		Chrysotile Amosite Crocidolite Tremolite Anthophyllite Actinolite																

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DUSA

DUSA



Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celsius =	Stereo Scope					Optical Properties							Non-Asbestos Percentage (%)								
			% of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous	
88	15A		06Y	N	F/R	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite															98	
88	15B		06Y	N	F/R	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																99
88	16A		0BK	Y	F/N	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite	20	W		+	L	N	1.553 1.552									80
98	16B		20BK	Y	F/N	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite	2	W		+	L	N	1.552 1.552									80
88	17A		0BK	N	F/N	N	Chrysotile Amosite Crocidolite Tremolite Anthrophyllite Actinolite																83





Lab ID# (Lab Use Only)	Field ID/ (Client Reference)	Temp in Celsius =	Stereo Scope					Optical Properties							Non-Asbestos Percentage (%)									
			% of Asbestos	Color	Homogeneity	Texture	Friable	Asbestos Minerals	Asbestos %	Morphology	Extinction	Sign of Elongation	Birefringence	Pleochroism	RI	Fiberglass	Mineral Wool	Cellulose	Hair	Synthetic	Other	Non-Fibrous		
93	204		Material Flashing Sealant on Railing Pillaster Location (above door) 25 SF	80	DK	Y	FK	N	Asbestos Minerals	20	W		+	LN									85	
94	205		Material Location "						Asbestos Minerals															DNA
95	21A		Material Interior Door Glazing Location Roof 3	0	DK	N	H	N	Asbestos Minerals															98
96	21B		Material Location "						Asbestos Minerals															DNA
97	22A		Material Exterior Door Glazing Location Roof 3	5	DK	N	H	N	Asbestos Minerals															95









**Section 01 22 00  
UNIT PRICES**

**PART 1 - GENERAL**

**1.01 GENERAL PROVISIONS**

- A. The Unit Prices set forth herein shall be used to determine any equitable adjustment of the Contract Price in connection with the changes or extra work performed under this Contract as directed by the Owner
- B. It is mutually understood and agreed that such Unit Prices include all items of costs, equipment, taxes and insurance of every kind, overhead, and profit for the Contractor and they shall be used uniformly, without modification for addition and deductions. Prices listed under ADDITIONS and DEDUCTIONS are the complete total price billed to and paid by the Owner therefore.
- C. Sufficient prior notice shall be given in accordance with the General Conditions so that proper measurements of materials removed or to be replaced may be taken. All quantities used in the determination of additions to or deductions from the Contract Price due to Unit Prices shall only be those that have been determined and approved by the Owner in advance.
  - 1. The unit price bid shall be taken to include all labor and materials necessary to make the item of work complete in place.
  - 2. In case of substitution of items shown on the Drawings or called for in the Contract Documents, the change to the Contract Price for both item deleted and the item added, if of the same class of work, shall be based on the addition column.

No.	ITEM	BASE BID QUANTITIES	ADDITIONS	DEDUCTIONS
1.	Remove existing deteriorated roof blocking and furnish and install new wood blocking to match new blocking as shown on the drawings in addition to quantities as shown on the drawings	200 b.f.	\$6.00/b.f.	\$4.50/b.f.
2.	Remove existing deteriorated wood plank decking, ER-2; 3" nominal thickness, and furnish and install new wood decking to match existing wood decking.	300 b.f.	\$7.00/b.f.	\$6.00/b.f.

**Waltham Community Center  
Roof Replacement**

3.	Remove existing deteriorated wood plank decking, 1" nominal thickness, ER-1 & ER-2-3 and furnish and install new wood decking to match existing wood decking.	300 b.f.	\$6.00/b.f.	\$4.50/b.f.
4.	Remove existing metal roof deck and furnish and install new metal roof deck to match existing metal roof deck.	100 sq.ft.	\$20.00/sq.ft	\$17.00/sq.ft.
5.	Remove existing deteriorate acoustical insulation in flutes of metal deck and install new acoustical insulation in flutes to match existing.	300 Lineal ft.	\$2.00 per lineal foot	\$1.70 per lineal foot
6.	Remove existing deteriorated wood plank wall sheathing, 1" nominal thickness, and furnish and install new ¾" CDX plywood wall sheathing.	100 sq.ft.	\$5.00/sq.ft.	\$4.25/b.f.
7.	Remove existing copper reglet flashing and replace with new 20 o.z. copper reglet flashing.	20 lineal ft.	\$35.00 per lineal foot	\$28.00 per lineal foot
8.	Remove existing metal reglet flashing and replace with new 24 ga. stainless steel reglet flashing.	20 lineal ft.	\$30.00 per lineal foot	\$24.00 per lineal foot

Note: Quantities shown above are **in addition to** the quantities as shown on the drawings.

**01 22 00 END OF UNIT PRICE**

Section 01 33 23  
SHOP DRAWINGS, PRODUCT DATA, AND SAMPLES

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 REQUIREMENTS**

- A. Shop Drawings, products data, samples and schedule of values.

**1.03 SHOP DRAWINGS, PRODUCTS DATA AND SAMPLES**

A. General:

- 1. Before any shop drawings, product data and samples are submitted; a schedule shall be prepared and submitted, identifying each drawing and a contractor's number affixed to each for control.
- 2. Review and submit, to the Architect, shop drawings, project data and samples required by Specification Section.
- 3. All shop drawings (11" x 17" and smaller), product data etc. submitted shall be three hole punched for inserting in three ring binders.

B. Shop Drawings:

- 1. Original drawings shall be prepared by General Contractor, Subcontractor, Supplier or Distributor, which illustrate some portion of the Work, showing fabrication, layout, setting or erection details.
  - a. Shop drawings shall be prepared by a qualified detailer.
  - b. Details shall be identified by reference to sheet and detail number indicated on Contract Drawings.
  - c. Maximum sheet size shall be 24 inch by 36 inch.
  - d. Reproduction for submittals shall be reproducible transparencies with the required number of opaque prints specified herein.

C. Product Data:

- 1. Manufacturers' standard schematic drawings.
- 2. Manufacturers' catalog sheets, brochures, diagrams, schedules, performance charts, illustrations and other standard descriptive data.
- 3. All product data submissions shall be three hole punched capable of being inserted into three ring binders.



**D. Samples:**

1. Four sets of office samples of sufficient size and quantity shall clearly illustrate:
  - a. Functional characteristics of product or material, with integrally related parts and attachment devices.
  - b. Range of color samples as requested in the Project Manual.
  - c. All samples shall be three hole punched for insertion into three ring binders.  
Binders not required.

**E. General Contractor's Responsibilities:**

1. Coordinate each submittal with requirements of Contract Documents.
2. The General Contractor's responsibility for errors and omissions in submittals is not relieved by the Architect's review and approval of submittals.
3. Notify the Architect in writing at time of submission, of deviations in submittals from requirements of Contract Documents or previous submissions.
4. Work that requires submittal shall not commence unless submittals with Architect's stamp and initials or signature indicating review and approval.
5. After Architect's review and approval, distribute copies.

**F. Submission Requirements:**

1. Make submittals promptly in accordance with approved schedules, and in such sequence as to cause no delay in the work.
2. Submit one reproducible transparency and six opaque prints of shop drawings.
3. Submit number of copies of Product data which the General Contractor requires for distribution, plus three copies which shall be retained by the Architect.
4. Submit number of samples specified in each Section of the Specifications or, if not specified, two samples.
5. All submittals shall be made in at least triplicate unless otherwise specified.
6. Forward submittals with transmittal letter which includes:
  - a. Contractor's submittal control number.
  - b. Date and revision dates.
  - c. Project title and number.
  - d. The name of:
    - i. Architect
    - ii. General Contractor
    - iii. Subcontractor
    - iv. Supplier

- v. Manufacturer
- vi. Separate detailer when pertinent
  - e. Identification of product or material including specification section name, number and product paragraph number.
  - f. Relation to adjacent structure or materials.
  - g. Field dimensions, clearly identified as such.
  - h. Applicable standards, such as ASTM number.
  - i. A blank space, five-inch by four-inch, for the Architect's stamp.
  - j. Identification of deviations from Contract Documents.
  - k. General Contractor's stamp, initialed or signed certifying review and approval of shop drawings and sample submittals prior to submission to the Architect.
- 7. Submittals which are received from sources other than through Contractor's office or which do not have Contractor "approval" marking will be returned "without action".
- G. Resubmission Requirements:
  - 1. Shop Drawings:
    - a. Revise drawings as required and resubmit as specified for previous submittal.
    - b. Indicate on drawings any changes which may have been made other than those requested by the Architect.
  - 2. Product Data and Samples: Submit new data and samples as required from previous submittal.
- H. Distribution of Submittals After Review and Approval:
  - 1. Distribute copies of shop drawings and product data that display the Architect's stamp to appropriate Subcontractors.
  - 2. Distribute Samples as directed by the Architect.

**END OF SHOP DRAWINGS, PRODUCT DATA AND SAMPLES**



Section 01 35 13  
SPECIAL PROJECT PROCEDURES

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SAFETY REGULATIONS**

- A. This Project is subject to compliance with Public Law 92-596 "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. The committing of nuisances on the site or adjacent property is prohibited.

**1.03 SAFETY PRECAUTIONS**

- A. The Contractor shall take all precautions to safeguard the health and well being of all workers and all others rightfully on the Project site who may be affected by work done under this Contract.
- B. All safety laws and regulations of the Commonwealth of Massachusetts applicable to work performed under this Contract shall be adhered to by the Contractor.

**1.04 LEGAL RELATIONS/RESPONSIBILITY TO PUBLIC**

- A. Laws to be Observed:
  - 1. The Contractor shall keep himself fully informed of all existing and future State and National and Local laws and ordinances and regulations in any manner affecting those engaged or employed in the Work, or the materials used or employed in the Work, or in any way affecting the conduct of the Work, and all such orders and judgments having any jurisdiction or authority over the same are made a part of this Contract. The Contractor shall have all Subcontractors, Suppliers, agents and employees observe and comply with, all such existing and future Laws, ordinances, regulations, orders and judgments.
  - 2. If the Contractor uses or stores toxic or hazardous substances he is subject to certain additional laws and regulations including but not limited to M.G.L. Chapter 111F, Section 2, (the "Right to Know" law) and regulations promulgated by the State Department of Public Health, the Department of Public Safety and those of the City of Newburyport Agencies.

**1.05 FIRE PROTECTION AND PREVENTION**

- A. The Contractor shall keep the building and Project site free of rubbish and debris at all times.
  - 1. The Contractor shall provide metal barrels located in appropriate areas into which all refuse and garbage shall be deposited. All barrels shall have tight fitting covers.

2. At the end of each work week, the Contractor shall thoroughly clean the Project site of all rubbish and debris of any nature and remove such from the premises.
3. Gasoline and other flammable liquids shall be stored in and dispensed from UL listed safety containers in conformance with the National Board of Fire Underwriters recommendations and the Commonwealth of Massachusetts Department of Public Safety requirements, and in no case within the confines of the permanent structures.
4. All tarpaulins used shall have UL approval and comply with Federal Specifications CCC-C746. Polyethylene shall not be used.

**1.06 RUBBISH REMOVAL**

- A. The Contractor shall remove all rubbish, waste, tools, equipment, and appurtenances caused by and used in the execution of the Work; but this shall in no way be construed to relieve the Contractor of his primary responsibility for maintaining the Project site clean and free of debris, leaving all work in a clean condition satisfactory of the Official.
- B. Immediately after unpacking, the Contractor shall collect and remove from the building and or the Project site all packing materials, case lumber, excelsior, wrapping and other rubbish.

**1.07 BROKEN GLASS**

- A. The Contractor shall be held responsible at all times prior to Substantial Completion of the Work, or occupancy by the Owner, whichever occurs first, for all broken or scratched glass, or glass which had been damaged as a result of the Work, or otherwise and, when so directed by the Owner, the Contractor shall replace at no increase in Contract Price or Contract Time, all such glass broken, missing or damaged prior to Substantial Completion.

**1.08 CLEANING AND POLISHING**

- A. The Contractor shall at all times keep the site free from accumulation of waste materials or rubbish.
- B. Immediately prior to final inspection, the entire work areas of the building and surrounding Project areas shall be thoroughly cleaned by the Contractor including, without limitation:
  1. All construction facilities, tools, equipment, surplus materials, debris and rubbish shall be removed from the Project site and the entire Work.
  2. All finished surfaces shall be left in perfect condition, free of stains, spots, marks, dirt, and other defects. The Contractor shall be responsible for the cleaning and polishing of the Work of all trades, whether or not cleaning by such trades is included in their respective Sections of the Specifications.
  3. All metals, hardware, fixtures, and equipment shall be left in undamaged, bright, polished condition.
- C. In cleaning, items having manufacturer's finish, or items previously finished by a Subcontractor, care shall be taken so as not to damage such finish. In cleaning glass and finish surfaces, care shall be taken not to use cleaning agents which may stain any finish materials. Any damage to finishes caused by operations shall be corrected and repaired by the Contractor at no increase in Contract Price.

**1.09 BIDDERS INSPECTION OF EXISTING PROJECT SITE**

- A. All bidders must inspect the existing conditions at the project site and make their own assessment of the work required to achieve all work to achieve a completed project specified in the Contract Documents in light of all existing conditions.
- B. Failure to adequately inspect the site, review all site investigation materials and or reports included in the Contract Documents and/or to incorrectly assess existing conditions at the project site shall not be cause for extra payment to achieve the work required under the contract.
- C. Every Contractor will be bound by the scope of work required by the Contract Documents and must make whatever inspections he deems necessary to assure that the bid price includes the complete scope.

**1.10 CONTRACTOR'S CONDUCT ON SITE**

- A. The Contractor and his personnel shall not interact with any of the facility users. The Contractor shall set up, in accordance with the Temporary Facilities, toilet facilities for all personnel involved in the project. No tradesperson, supplier, truck driver shall use the toilet facilities of the existing facility at any time during the completion of this work. Any person violating this provision of the contract will be removed from the site.

**END OF SPECIAL PROJECTS PROCEDURES**



Section 01 42 16  
DEFINITIONS

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 DEFINITIONS**

- A. General Explanation: A substantial amount of specifications language constitutes definition for terms found in other contract documents, including the drawings which must be recognized as diagrammatic in nature and not completely descriptive of requirements indicated thereon. Certain terms used in the contract documents are defined generally in the article. Definitions and explanations of this Section are not necessarily either complete or exclusive, but are general for the work to the extent not stated more explicitly on another provisions of the contract documents.
- B. General Requirements: The provisions or requirements of Division 1 - sections. General requirements apply to entire work of the Contract.
- C. Indicated: The term "Indicated" is a cross-reference to details, notes or schedules on the drawings, to other paragraphs or schedules in the specifications, and to similar means of recording requirements in the Contract Documents. Where terms such as "shown", "noted", "scheduled" and "specified" are used in lieu of "indicated", it is for purpose of helping the reader locate the cross-reference, and no limitation of location is intended except as specifically noted.
- D. Directed, Requested, etc.: Where not otherwise explained, terms such as "directed", "requested", "authorized" and "permitted" mean "directed by Architect", "requested by Architect", etc. However, no such implied meaning will be interpreted to extend the Architect's responsibility into Contractor's area of construction supervision and coordination.
- E. Approve: Where used in conjunction with the Designer's response to submittals, requests, applications, inquiries, reports and claims by Contractor, the meaning of term "approved" will be held to limitations of the Designer's responsibilities and duties as specified in General and Supplemental Conditions. In no case will "approval" by the Designer be interpreted as a release of Contractor from responsibilities to fulfill requirements of the contract documents.
- F. Project Site: The space available to Contractor for performance of the work, either exclusively or in conjunction with others performing other work as part of the project. The extent of project site is shown on the drawings, and may or may not be identical with description of the land upon which project is to be built.
- G. Furnish: Except as otherwise defined in greater detail, term "furnish" is used to mean supply and deliver to project site, ready for unloading, unpacking, assembly, installation, etc., as applicable in each instance.



- H. Install: Except as otherwise defined in greater detail, term “install” is used to described operations at project site including unloading, unpacking, assembly, erection, placing, anchoring, applying, working to dimension, finishing, curing, protecting, cleaning and similar operations, as applicable in each instance.
- I. Provide: Except as otherwise defined in greater detail, term “provide” means furnish and install, complete and ready for intended use, as applicable in each instance.
- J. Installer: The entity (person or firm) engaged by the Contractor or its subcontractor or sub-subcontractor for the performance of a particular unit of work at the project site, including installation, erection, application and similar required operations. It is a general requirement that such entities (Installers) be expert in operations they are engaged to perform.
- K. Testing Laboratory: An independent entity engaged to perform specific inspections or tests of the work, either at project site or elsewhere; and to report and interpret results of those inspections or tests.
- L. Designer: Where the word “Designer” is used hereinafter, it shall mean either “DESIGNER”, “Engineer” or “ARCHITECT”.

### **1.03 FORMAT AND SPECIFICATION EXPLANATIONS**

- A. Format Explanation: The format of principal portions of these specifications can be described as follows:
  - 1. Sections and Divisions: For convenience, basic unit of specification text is a “section”, each unit of which is named and numbered. These are organized into related families of sections, and various families or sections are organized into “divisions”, which are recognized as the industry-consensus (CSI format) on uniform organization and sequence of specifications. The section title is not intended to limit meaning or content of section, nor to be fully descriptive of requirements specified therein, nor to be an integral part of text.
  - 2. Subordination of Text: Portions of specification text are subordinated to other portions in the following manner (lowest level to highest):
    - a. Indented (from left margin) paragraphs and lines of text are subordinate to preceding text which is not indented, or which is indented by a lesser amount.
    - b. Paragraphs and lines of text are subordinate to subarticle titles, which are printed in upper-case lettering.
- B. Imperative Language: Used generally in specifications. Except as otherwise indicated, requirements expressed imperatively are to be performed by Contractor. For clarity of reading at certain locations, contrasting subjective language is used to describe responsibilities which must be fulfilled indirectly by Contractor, or when so noted, by others.
- C. Section Numbering: Used to facilitate cross references in contract documents. Sections are placed in numeric sequence; however, number sequence is not complete, and listing of sections in Table of Contents must be consulted to determine numbers and names of specification sections in the Contract Documents.

- D. Page Numbering: Numbering independently for each section; recorded in listing of sections in table of contents.
- E. Project Identification: Section Title and Page Number are shown at the bottom of each page to minimize possible confusion with other project specification sections.
- F. Specification Content: Because of methods by which this project specification has been produced, certain general characteristics of content, and conventions in use of language are explained as follows:
1. Specifying Methods: The techniques or methods of specifying to record requirements varies throughout text, and may include “generic-descriptive,” “compliance with standards”, “performance”, “proprietary,” or a combination of these. The method used for specifying one unit of work has no bearing on requirements for another unit of work.
  2. Overlapping and Conflicting Requirements: Where compliance with 2 or more industry standards or sets of requirements is specified, and overlapping of those different standards or requirements established different or conflicting minimums of levels of quality, most stringent requirement (which is generally recognized to be also mostly costly) is intended and will be enforced, unless specifically detailed language written into the contract documents (not by way of referencing to an industry standard) clearly indicated that a less-stringent requirement is to be fulfilled. Refer apparently-equal-but-different requirements, and uncertainties as to which level of quality is more stringent, to Designer for a decision before proceeding.
    - a. Contractor’s Options: Except for overlapping or conflicting requirements where more than one set of requirements are specified for a particular unit of work, option is intended to be Contractor’s regardless of whether specifically indicated as such.
- G. Minimum Quality/Quantity: In every instance, quality level or quantity shown or specified is intended as minimum for the work to be performed or provided. Except as other wise specifically indicated, actual work may either comply exactly with that minimum (within specified tolerances), or may exceed that minimum within reasonable limits. In complying with requirements, indicated numeric values are either minimums or maximums as noted or as appropriate for context of requirements. Refer instances of uncertainty to the Designer for decision before proceeding.
- H. Specialists’ Assignments: In certain instances, specifications text requires that specific work be assigned to specialists or expert entities, who must be engaged for performance of those units of work. These must be recognized as special requirements over which Contractor has no choice or option. These assignments must not be confused with normal application of regulations, union jurisdictions and similar conventions. Nevertheless, final responsibility for fulfillment of entire set of requirements remains with the Contractor.
- I. Abbreviations: The language of specifications and other contract documents is of the abbreviated type in certain instances, and implies words and meaning which will be appropriately interpreted. Actual word abbreviations of a self-explanatory nature have been included in the text. Specific abbreviations have been established, principally for lengthy technical terminology and primarily in conjunction with coordination of specification requirements with notations on drawings and schedules. Trade association names and titles of general standards are frequently abbreviated. Singular words will be

interpreted as plural and plural words will interpreted as singular where applicable and where full context of the contract documents so indicates

**1.04 DRAWING SYMBOLS**

- A. General: Except as otherwise indicated, graphic symbols used on drawings are those symbols recognized in the construction industry for purposes indicated. Where not otherwise noted, symbols are defined by "Architectural Graphic Standards," published by John Wiley & Sons, Inc. Seventh Edition.

**PART 2 - PRODUCTS** Not Used

**PART 3 - EXECUTION** Not Used

**END OF DEFINITIONS**

Section 01 42 19  
REFERENCE STANDARDS

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 INDUSTRY STANDARDS**

- A. General Applicability of Standards: Applicable standards of construction industry have the same force and effect (and are made a part of the contract documents by reference) as if copied directly into contract documents, or as if published copies were bound herewith.
  - 1. Reference Standards (referenced directly in contract documents or by governing regulations) have precedence over non-referenced standards which are recognized in industry for applicability to work.
  - 2. Non-referenced Standards recognized in the construction industry are hereby defined, except as otherwise limited in contract documents, to have direct applicability to the work, and will be so enforced for performance of the work.
- B. Publication Dates: Except as otherwise indicated, where compliance with an industry standard is required, comply with standard in effect as of date of contract documents.
- C. Copies of Standards: Provide where needed for proper performance of the work; obtain directly from publication sources.
- D. Abbreviations and Names: The following acronyms or abbreviations as referenced in contract documents are defined to mean the associated names. Both names and addresses are subject to change, and are believed to be, but are not assured to be, accurate and up-to-date as of the date of contract documents.

AAMA                      American Architectural Manufacturers Association  
1827 Walden Office Square - Suite 550  
Schaumburg, IL 60173-4268

AGA                        American Gas Association  
400 North Capitol Street NW  
Washington, D.C. 20001

AGC                        Associated General Contractors of America  
2300 Wilson Boulevard - Suite 400  
Arlington, VA 22201

AIA                         American Institute of Architects  
1735 New York Avenue, N.W.  
Washington, DC 20006-5292

ANSI	American National Standards Institute 1899 L Street NW - 11 <sup>th</sup> Floor Washington, D.C. 20036 (202) 293-8020
APA	American Plywood Association 7011 South 19 <sup>th</sup> Street Tacoma, WA 98466-5333
ASHRAE	American Society of Heating, Refrigeration and Air Conditioning Engineers 1791 Tullie Circle NE Atlanta, GA 30329 800-843-2763
ASME	American Society of Mechanical Engineers Two Park Avenue New York, NY 10016-5990 800-843-2763
ASTM	American Society for Testing and Materials 100 Barr Harbor Drive West Conshohocken, PA 19428-2959
AWPA	American Wood-Preservers' Association 100 Chase Park South – Suite 116 Birmingham, AL 35244-1851
FHA	Federal Housing Administration (US Dept. of HUD) 451-7th Street SW Washington, D.C. 20410
FM	Factory Mutual System 270 Central Avenue Johnston, RI 02919 401-275-3000
FS	Federal Specification General Service Administration Specifications and Consumer Information Distribution Section (WFSIS) Washington Navy Yard, Bldg. 197 Washington, DC 20407
GA	Gypsum Association 6525 Belcrest Road – Suite 480 Hyattsville, MD 20782

IEEE	Institute of Electrical & Electronics Engineers 445 Hoes Lane Piscataway, NJ 08854-4141
MBMA	Metal Building Manufacturers Association 1300 Sumner Avenue Cleveland, OH 44115-2851
MIL	Military Standardization Documents (US Department of Defense) Naval Publications and Forms Center 5801 Tabor Avenue Philadelphia, PA 19120
ML/SFA	Metal Lath/Steel Framing Association 800 Roosevelt Road – Bldg. C – Suite 312 Glen Ellyn, IL 60137
NAAMM	National Association of Architectural Metal Manufacturers 800 Roosevelt Road – Bldg. C – Suite 312 Glen Ellyn, IL 60137
NBS	National Bureau of Standards 100 Bureau Drive Gaithersburg, MD 20899
NEC	National Electric Code (by NFPA)
NECA	National Electric Contractors Association, Inc. 3 Bethesda Metro Bethesda, MD. 20814 (301) 657-3110
NEMA	National Electrical Manufacturers' Association 1300 North 17 <sup>th</sup> Street – Suite 1752 Roslyn, VA 22209 703-841-3200
NFPA	National Fire Protection Association 1 Batterymarch Park Quincy, MA 02169-7471 (617) 770-3000
NTMA	National Terrazzo and Mosaic Association P.O. Box 2605 Fredericksburg, TX 78024

OSHA	Occupational Safety and Health Administration (US Dept. of Labor) 200 Constitution Ave Washington, D.C. 20210
PCA	Portland Cement Association 5420 Old Orchard Road Skokie, IL 60077
NIST	National Institute of Standards and Technology 100 Bureau Drive – Stop 1052 Gaithersburg, MA 20899-1052
TCA	Tile Council of America, Inc. 100 Clemson Research Drive Anderson, SC. 29625
UFAS	Uniform Federal Accessibility Standards
UL	Underwriters' Laboratories, Inc. 2600 N.W. Lake Road Camas, WA 98607-8542 877-854-3577

**1.03 GOVERNING REGULATIONS AUTHORITIES**

A. General: The procedure followed by the Architect has been to contact governing authorities where necessary to obtain information needed for the purpose of preparing the contract documents; recognizing that such information may or may not be of significance in relation to the Contractor's responsibilities for performing the work. Contact governing authorities directly for necessary information and decisions having a bearing on the performance of the work.

**1.04 SUBMITTALS**

A. For the Owner's records, submit copies of permits, licenses, certifications, inspection reports, releases, jurisdiction settlements, notices, receipts for fee payments, judgments, and similar documents, correspondence and records established in conjunction with compliance with standards and regulations bearing upon performance of the work.

**PART 2 - PRODUCTS** Not Used

**PART 3 - EXECUTION** Not Used

**END OF REFERENCE STANDARDS**

Section 01 45 00  
QUALITY CONTROL

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 REQUIREMENTS**

- A. The work of this Section includes, but is not limited to, the following:
  - 1. General testing requirements and procedures.
  - 2. Responsibilities of the Contractor.
  - 3. Responsibilities of the Owner.

**1.03 REQUIRED TESTING**

- A. Testing: The Contractor shall employ independent testing agencies to perform field and lab tests. This testing will be paid for by the Contractor, unless otherwise specified or indicated. The contractor shall provide standard factory testing, certification of compliance with specified requirements, testing for fire performance, and other tests as specified or indicated. The Owner, may, at the Owner's option, elect to have their own testing agency perform specific tests.
- B. General Construction Tests: More detailed testing requirements are given in individual specification sections. The Owner shall retain the right to make any additional tests the Architect deems necessary or appropriate. The scope of tests required to be performed and paid for by the Contractor and Subcontractor shall include as a minimum the following:
  - 1. General Concrete Work: Concrete mix design testing.
  - 2. General Concrete Work: 3 concrete test cylinders per 50 c.y. or per day of pouring. Cylinders shall be tested at 7, 14 and 28 days.
  - 3. Metals: Strength , dimension, coating thickness, bolt torque, welding X-Ray or ultrasonic tests.
  - 4. Wood: Moisture content, treatment retention, strength, dimension.
  - 5. Sealants: Chemical Analysis, adhesive strength, compatibility with adjacent materials, elasticity.



6. Waterproofing: Chemical analysis, in-place ponding, field leakage testing.
  7. Paints and Finishes: Chemical analysis, coating thickness.
- C. Metal Building Systems: See Section 13 34 19 Metal Building Systems – Paragraph 1.08 for specific test required during the erection of the metal building and its related components.
- D. Plumbing Tests: The following tests shall be performed and paid for by the Contractor and witnessed by the Owner’s on-site representative.
1. Sanitary Waste and Vent piping hydrostatic test.
  2. Hot and Cold Water supply piping hydrostatic pressure test.
  3. Compressed air distribution piping 150 psi pressure test.
  4. Disinfection test of plumbing.
- E. Heating Testing: The following tests shall be performed and paid for by the Contractor and witnessed by the Owner’s on site representative. All HVAC work shall be tested by an independent testing and balancing agency. Adjustments shall be made by the Contractor as directed by the Owner in order that the equipment performs as designed.
1. Firing and balancing of Oil Fired Furnace
  2. Firing of natural gas fired unit heaters
  3. Testing of Thermostatic controls.
- F. Electrical Power System Testing: The following tests shall be performed and paid for by the Contractor and witnessed by the Owner’s on-site representative.
1. Polarity tests.
  2. Operation of all circuits.
  3. Testing of all grounding.
- G. Electrical Lighting System Testing: The following tests shall be performed and paid for by the Contractor and witnessed by the Owner’s on-site representative.
1. Operation of every component of entire system.
- H. Fire Alarm System Testing: The following tests shall be performed and paid for by the Contractor and witnessed by the Owner’s on-site representative.
1. All smoke and heat detectors.

2. Demonstrate the proper operation of the fire alarm system as required by authorities having jurisdiction.

#### 1.04 TESTING PROCEDURES

- A. Contractor's Responsibilities: The Contractor shall fully cooperate with testing agencies and permit free access to all areas at all times. The Contractor shall permit taking samples at any time during construction, either before or after installation. Prior to Notice to Proceed with Construction, the Contractor shall submit a Testing Log of planned tests and scheduled test dates. Tests shall be numbered based on type of work, type of test and sequence. The Testing Log shall be maintained by the Contractor and updated weekly. The Contractor shall notify the Owner's on-site representative in writing at least fourteen calendar days prior to any work requiring testing.
- B. For all tests performed by the Contractor (or Contractor's testing agency) the Contractor shall distribute at least two (2) copies of test records to the Architect.
- C. Owner Responsibilities: The Owner may, at the Owner's option, have an independent testing agency perform the tests.

For any tests the Owner elects to perform, Owner will arrange testing and sampling and will have prepared test record forms. Upon receipt of test results, the Owner will distribute copies with test results as follows:

1. Contractor (2 copies)
2. Architect (2 copies)

- D. Follow-Up and Corrective Action: The Contractor and Owner will record all tests on the Testing Log to acknowledge test procedures and results. If follow-up or corrective action is needed, the Contractor shall submit to the Owner two written copies of proposed follow-up or corrective plans and obtain the Owner's written approval before proceeding.

**PART 2 - PRODUCTS**                      NOT USED

**PART 3 - EXECUTION**                      NOT USED

**END OF QUALITY CONTROL**



Section 01 50 00  
TEMPORARY FACILITIES AND CONTROLS

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SCOPE OF WORK**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Temporary Facilities and Services.
  - 2. Temporary Water.
  - 3. Temporary Electricity and Lighting.
  - 4. Temporary Telephone Service.
  - 5. Temporary Contractor Sanitary Facilities.
  - 6. Temporary Construction.
  - 7. Temporary Enclosures.
  - 8. Hoisting Equipment and Machinery.
  - 9. Staging and Scaffolding.
  - 10. Maintenance of Access.
  - 11. Protection of Work, Property and the Public.
  - 12. Noise Control.
  - 13. Water and Snow Control and Removal.
  - 14. Cleaning During Construction.
  - 15. Pollution Control.
  - 16. Project Identification.
  - 17. Temporary Offices.
  - 18. Temporary Signage
  - 19. Removal of all temporary facilities.

**1.03 RELATED WORK**

- A. Related Work: The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. SECTION 01 35 13 – Special Project procedures

2. Final cleaning: SECTION 01 77 00 – Close-Out Procedures

**1.04 TEMPORARY FACILITIES AND SERVICES**

- A. The General Contractor shall be responsible for arranging and providing temporary facilities and general services as specified herein and as otherwise required for proper and expeditious prosecution of Work. Except as otherwise specified in the Project Manual, the General Contractor shall pay cost for all temporary facilities and general services until date of Final Consolidated Completion of the Work established by the Architect and shall remove same at completion of the Work.
- B. Provide and maintain all temporary connections to existing utilities and services in locations acceptable to the Owner, Architect and local authorities having jurisdiction thereof. Make all installations in a manner subject to the acceptance of such authorities and the Architect. Remove temporary installations and connections when no longer required and restore the services and sources of supply to proper operating condition.
- C. Should a change in location of any temporary equipment be necessary in order for the Work to progress properly, the General Contractor shall remove and relocate such equipment as required without additional cost to the Owner.

**1.05 TEMPORARY WATER**

- A. The Contractor shall make use of available water supply at the Community Center for construction purposes, provided the permission of the Owner is obtained beforehand and only as long as the water is not used wastefully.
- B. The Contractor shall provide an adequate supply of cool drinking water with individual drinking cups for personnel on the job.

**1.06 TEMPORARY ELECTRICITY AND LIGHTING**

- A. The Contractor shall make arrangements with the Owner to secure temporary electrical power to the Contractor and his Sub-contractors sufficient to service the project during construction. The cost of providing temporary electrical during the duration of the project shall be paid for by the General Contractor at no additional cost to the Owner.

**1.07 TEMPORARY TELEPHONE SERVICE**

- A. The General Contractor shall provide one cellular telephone for the General Contractor's Superintendent.
- B. Each Subcontractor shall make his own arrangements for telephone service.

**1.08 TEMPORARY SANITARY FACILITIES**

- A. The General Contractor shall provide an adequate number of toilet facilities, with chemical type toilets and temporary lighting, rented from and serviced by an approved company, as necessary for all persons engaged on the work.
- B. The toilets shall be erected in location approved by the Architect, shall be maintained by the General Contractor in a clean orderly condition in compliance with local and State health requirements, and shall be removed at substantial completion of the Work.

### 1.09 TEMPORARY FIRE PROTECTION

- A. Provide and maintain adequate temporary fire protection in the form of fire extinguishers, or other effective means of extinguishing fire, ready for instant use, distributed around the project and in and about temporary inflammable structures during construction of the Work.
- B. Gasoline and other flammable liquids shall be stored in and dispensed from UL listed safety containers in conformance with National Board of Fire Underwriter's recommendations. Storage shall not be within structures.
- C. Make arrangements for periodic inspections by local fire protection authorities and insurance underwriter's inspectors. Cooperate with said authorities and promptly carry out their recommendations.
- D. Tarpaulins used during construction work shall be made of material which is resistant to fire, water and weather. Tarpaulins shall have UL approval and comply with S-CCC-D-746.
- E. Torch-cutting and welding operations performed by Subcontractors shall have approval of the General Contractor before such work is started and chemical extinguisher shall be available within sight and not over 10 ft. from location where such work is in progress. Fire watch permit will be required for any torch cutting or welding which will occur within the building.
- F. Do not light fires in or about premises.

### 1.10 TEMPORARY CONSTRUCTION

- A. The General Contractor shall furnish and maintain all temporary stairs, ladders, ramps, scaffolds, runways, chutes, etc. as required for the proper execution of the work, unless specifically noted to be provided for in other Sections.
- B. All such apparatus, equipment and construction shall meet all requirements of Federal, State and local laws applicable thereto.

### 1.11 HOISTING EQUIPMENT AND MACHINERY

- A. Unless otherwise specified, all hoisting equipment and machinery required for the proper and expeditious prosecution and progress of the Work shall be furnished, installed, operated and maintained in safe condition by the General Contractor for the use of all Subcontractors' material and/or equipment delivered to the designated hoisting area except that which is specifically required to be provided by the Subcontractors themselves and is so stated in each appropriately related Section of the Specifications. All cost for hoisting operating services shall be borne by the General Contractor unless specifically excepted in the Contract Documents.
- B. Hoisting equipment and machinery referred to above in sub-paragraph A. shall be understood to mean vertical conveyance equipment required for the conveyance of Workmen, materials and equipment not exceeding the normal weight capacity generally provided for construction projects of this magnitude. All trades shall provide their own equipment for conveyance of material and equipment in excess of the normal weight capacity of vertical conveyance equipment provided by General Contractor.

- C. Where hoisting equipment is being utilized, the Contractor shall have a “spotter” on grade verifying that the area is clear for operation and that no building occupants, city workers or the general public is in the area of operation for the full term of operation/movement of the equipment.

**1.12 STAGING AND SCAFFOLDING**

- A. Unless otherwise specified in the various trade Sections of the Specifications, the General Contractor shall furnish, erect and maintain in safe condition staging and scaffolding over eight feet in height for use by his forces and those of all Filed Bid Subcontractors, without charge, as needed by them for proper execution of their work during the construction of the structures in accordance with existing trade agreements. The use of this staging and scaffolding by the Filed Bid Subcontractors shall be coordinated with the General Contractor and performed in a timely manner in accordance with the approved Construction Progress Schedule. Filed Bid Subcontractors not performing their work within the established time period indicated for their work in the Construction Progress Schedule shall be responsible for providing staging and scaffolding required for performance of their work. Staging and scaffolding shall be of approved design, erected and removed by experienced stage builders having all accident prevention devices required by Federal, state and local laws. Where staging/scaffolding is utilized on the project, access to staging/scaffolding is to be secured at the end of each day/work shift to ensure no one will have access to roof areas from the staging/scaffolding.

**1.13 MAINTENANCE OF ACCESS**

- A. The General Contractor shall provide and maintain for the duration of the Contract, a means of access to, around and within the adjacent City of Waltham Community Center for both pedestrian and vehicular traffic. This means of access shall be constructed to sustain the weight of equipment customarily engaged for use in construction projects of this type and magnitude. The General Contractor, shall without additional compensation from the Owner, furnish labor and materials as may be required from time to time to maintain this means of access in an acceptable condition as determined by the Architect.

**1.14 PROTECTION OF WORK, PROPERTY AND THE PUBLIC**

- A. Construction barricades and protective facilities required for the protection of the public in accordance with local and state regulations. Furnish and install signs, lights, reflectors, and all such protection facilities as may be required.
- B. The General Contractor shall save the Owner harmless from all claims arising from the use of public streets, sidewalks, and adjoining premises for construction purposes.
- C. Keep all access roads and walks clear of debris, materials, construction plant and equipment during construction operations. Repair streets, drives, curbs, sidewalks, fences, poles and the like where disturbed in construction operations and leave them in as good condition after completion of the work as before operations started.
- D. The General Contractor shall be responsible for the maintenance of the construction barriers and traffic barriers in order to maintain traffic, over, through or around the work included in his contract with the maximum of safety and practical convenience to such traffic during the life of the contract, and weather or not work has been suspended

temporarily. He shall take all precautions for preventing injuries to persons or damage to property to or about the work.

- E. The work shall be carried on and barriers erected in such a manner as to provide safe passage at all times for public travel and with least obstruction to traffic. The General Contractor shall provide and maintain at his own expense in a safe and passable condition such temporary bypasses as created by the barriers as may be necessary to accommodate both pedestrian and vehicular traffic.
- F. The General Contractor shall maintain all legally required means of egress, and shall not erect barriers which interfere with, or obstruct such means of egress.
- G. Where the new construction coincides with the present traveled way, the General Contractor shall carry on his work so that travel will not be obstructed.
- H. Whenever gale or high winds are forecast, take proper measures to secure all loose material, equipment or other items which could blow about and be damaged or cause damage to other work. No such loose items shall be left unsecured at end of working day. Particular attention shall be taken with scaffolding and items placed or stored on roofs or within the structure prior to being enclosed.
- I. Take all required measures to protect the work at all times against fire, storm, theft, vandalism and other losses.
- J. The General Contractor shall be wholly responsible for patrolling and protecting the work under construction and the materials stored on the site; and shall reimburse the Owner for any losses, damages or injury not compensated by insurance, except those directly caused by the Owner, its agents or its employees.
- K. Breakage of Glass: The General Contractor shall be responsible for correcting all breakage of glass furnished under this Contract from any cause whatsoever, until the work is accepted by the Owner. All broken glass shall be promptly and properly replaced with identical materials. Unless the glass has been broken by the Owner's personnel or their representatives, the cost for replacement of glass shall be borne by the General Contractor.

#### **1.15 NOISE CONTROL**

- A. Develop and maintain a noise-abatement program, enforce strict discipline over all personnel to keep noise to a minimum.
- B. Execute construction work by methods and by use of equipment which will reduce excess noise.
- C. Employ construction methods and equipment which will produce the minimum amount of noise.
  - 1. Equip air compressors with silencers, and power equipment with mufflers.
  - 2. Handle vehicular traffic and scheduling to reduce noise.

#### **1.16 CLEANING DURING CONSTRUCTION**

- A. General:



1. Execute cleaning during process of the Work, as required by the CONDITIONS OF THE CONTRACT and as herein specified.
2. Maintain premises and public properties free from accumulations of waste, debris, and rubbish, caused by operations. At completion of Work, remove waste materials, rubbish, tools, equipment, machinery and surplus materials, and clean all sight-exposed surfaces; leave project clean and ready for occupancy.
3. Prohibit overloading of trucks to prevent spillage on access and haul routes.\
4. Refer to Sections of the Specifications for cleaning of specific products or work.

**B. Safety and Disposal Requirements:**

1. Standards: Maintain project in accordance with State Building Code and local ordinances.
2. Hazards Control:
  - a. Store volatile wastes in covered metal containers, and remove from premises.
  - b. Prevent accumulation of wastes which create hazardous conditions.
  - c. Provide adequate ventilation during use of volatile or noxious substances.
3. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
  - a. Do not burn rubbish and waste materials on project site.
  - b. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
  - c. Do not dispose of wastes into streams or waterways.

**C. During Construction:**

1. Execute the cleaning on a daily basis to ensure that the structures, the site, adjacent properties, storage and parking areas or along access roads and haul routes are maintained free from accumulations of waste materials and rubbish and windblown debris, resulting from construction operations.
2. Provide on-site containers for collection of waste materials, debris and rubbish.
3. Remove waste materials, debris and rubbish from the structures daily and from the site periodically but not less than weekly and dispose of off-site.
4. Handle materials in a controlled manner with as few handlings as possible. Do not drop or throw materials from heights.
5. Schedule cleaning operations so that dust and other contaminants resulting from cleaning process will not fall on wet, newly painted surfaces.

**1.17 POLLUTION CONTROL FOR CONTAMINATION CAUSED BY CONTRACTOR OPERATIONS**

- A. Provide methods, means and facilities required to prevent contamination of soil, water or atmosphere by the discharge of noxious substances from construction operations.

- B. Provide equipment and personnel, perform emergency measures required to contain any spillage, and to remove contaminated soils or liquids.
  - 1. Excavate and dispose of any contaminated earth off-site, and replace with suitable compacted fill and topsoil.
- C. If the release results in a reportable condition under the Massachusetts Contingency Plan (310 CMR 40.0000) or any other state or federal regulation, make the appropriate notifications and take the actions required to address the release.
- D. Take special measures to prevent harmful substances from entering public waters.
- E. Prevent disposal of wastes, effluents, chemicals, or other such substances adjacent to streams, or in sanitary or storm sewers.
- F. Provide systems for control of atmospheric pollutants.
  - 1. Prevent toxic concentrations of chemicals.
  - 2. Prevent harmful dispersal of pollutants (including dust) into the atmosphere.

**1.18 PROJECT IDENTIFICATION**

- A. No signs or advertisements will be allowed to be displayed on the premises without the approval of the Architect and the Owner.
- B. Provide such directional signs as are required, as determined by the Architect, to control construction traffic within the limits of the Contract.

**1.19 TEMPORARY SIGNAGE**

- A. The General Contractor shall provide a temporary signage in locations as designated on the Drawings of materials and in sizes as shown/detailed on the Drawings.
- B. In addition the Contractor shall provide mounting/display equipment as shown on the Drawings to adequately display the signage to employees and visitors to the site.

**1.20 WELDING AND CUTTING**

- A. Whether electric or gas welding or cutting work done above or within ten (10) feet of combustible material or above spaces that may be occupied by persons, interposed shield or incombustible material shall be used to protect against fire damage or injury due to sparks and hot metal.
- B. Tanks supplying gases for gas welding or cutting shall be placed at no greater distance from the work than is necessary for safety, securely fastened and maintained in an upright position where practicable. Such tanks, when stored for use, shall be remote from exposure to the rays of the sun or too high temperatures.
- C. Suitable fire extinguishing equipment shall be maintained near all welding and cutting operations. When operations cease for the noon hour or at the end of the day, the surroundings adjacent to welding and cutting operations shall be thoroughly wetted down.
- D. A workman equipped with suitable fire extinguishing equipment shall be stationed near welding and cutting operations to see that sparks do not lodge in floor cracks or pass through floor or wall openings or lodge in any combustible material. The workman shall

be kept at the source of work offering special hazards for 30 minutes after the job is completed to make sure that smoldering fires have not been started. The Contractor shall obtain and pay for any required permits for welding and cutting operations including a firewatch for work done within the building.

- E. A qualified electrician shall be in charge of installing an repairing electric or arc welding equipment. No electric welding equipment shall be connected into the Owner's electrical system.
- F. The Contractor shall coordinate with the Natick Fire Department for any firewatch personnel deemed necessary by the fire department at any point during the project at no cost to the Owner.

#### **1.21 TEMPORARY AND TRIAL USAGE**

- A. Temporary or trial usage by Owner of any mechanical device, machinery, apparatus, equipment, or any work or materials supplied under Contract, before final completion and written acceptance by the Architect shall not be construed as evidence of Architect's acceptance of same.
- B. The Owner reserves the privilege of such temporary or trial usage, for such reasonable time as required to properly test such items. Claims for damage, due to injury to, or breakage of, any parts of such work, when the determined cause is weakness or inaccuracy of structural parts, or by defective material or workmanship, will not be permitted.
- C. If the General Contractor so elects, he may, without additional cost to the Owner, place an approved person, or persons, to instruct and assist in such trial usage. Trials shall be made under the Architect's supervision.

#### **1.22 ACCIDENT PREVENTION**

- A. Comply with all recommendations and requirements for accident prevention of the Associated General Contractors of America and the American Standards Association Standard A10.2. The Field Superintendent of the General Contractor shall conduct regular and frequent inspections of the site for compliance with safety regulations, stating in writing to the Architect each month that he has done so. The Architect specifically reserves the right to direct and enforce compliance with safety regulations if conditions on the site do not comply.
- B. Neither the Owner nor the Architect shall be responsible for providing a safe working place for the General Contractor, Subcontractors or their employees or any individual responsible to them for the work.

#### **1.23 OVERLOADING**

- A. Materials and fabricated work shall not be stacked on, or be transported over, floor and roof construction that would stress any of said construction beyond the designed live loads.

**1.24 REMOVAL**

- A. Remove temporary materials, equipment, services, and temporary construction prior to Substantial Completion inspection.
- B. Clean and repair damage caused by installation or use of temporary facilities. Restore existing facilities used during construction to its original condition.

**PART 2 - PRODUCTS**    **Not Used**

**PART 3 - EXECUTION**    **Not Used**

**END OF TEMPORARY FACILITIES AND CONTROLS**



**SECTION 01 60 00  
MATERIAL AND EQUIPMENT**

**PART I - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Products.
- B. Material And Equipment Incorporated Into The Work.
- C. Manufacturer's Instructions.
- D. Transportation and Handling.
- E. Storage and Protection.
- F. Product Standards.
- G. Substitutions.
- H. Systems Demonstration.

**1.03 RELATED SECTIONS**

- A. SECTION 01 01 00 - SUMMARY OF WORK.
  - 1. Tax Exemption.
  - 2. Owner-Furnished Products.
- B. SECTION 01 42 00 – REFERENCE STANDARDS:
- C. SECTION 01 45 00 – QUALITY CONTROL
- D. SECTION 01 77 00 – CLOSEOUT PROCEDURES
  - 1. Operating and Maintenance Data.
  - 2. Warranties and Bonds.
  - 3. Spare Parts and Maintenance Materials.

**1.04 PRODUCTS**

- A. Products include material, equipment and systems

**1.05 MATERIAL AND EQUIPMENT INCORPORATED INTO THE WORK**

- A. Comply with Specifications and referenced standards as minimum requirements.
- B. Comply with size, make, type and quality specified, as shown on the Drawings, or as specifically approved in writing by the Architect.
- C. Manufactured and Fabricated Products:

1. Design, fabricate and assemble in accord with the best engineering and shop practices.
  2. Manufacture like parts of duplicate units to standard size and gauges, to be interchangeable.
  3. Two or more items of the same kind shall be identical, by the same manufacturer.
  4. Products shall be suitable for service conditions.
  5. Equipment capacities, sizes and dimensions shown or specified shall be adhered to unless variations are specifically approved in writing.
- D. Do not use material or equipment for any purpose other than that for which it is designated or specified.

**1.06 MANUFACTURERS' INSTRUCTIONS**

- A. When Contract Documents require that installation of work shall comply with manufacturers' printed instructions, obtain and distribute copies of such instructions to parties involved in the installation, including two copies to the Architect. Maintain one set of complete instructions at the job site during installation and until completion
- B. Handle, install, connect, clean, condition and adjust products in strict accord with such instructions and in conformity with specified requirements.
1. Should job conditions or specified requirements conflict with manufacturer's instructions, consult with Architect for further instructions.
  2. Do not proceed with work without clear instructions.
- C. Perform work in accord with manufacturer's instructions. Do not omit any preparatory step or installation procedure unless specifically modified or exempted by Contract Documents

**1.07 TRANSPORTATION AND HANDLING**

- A. Arrange deliveries of products in accordance with construction schedules, coordinate to avoid conflict with work and conditions at the site.
- B. Deliver products in undamaged condition, in manufacturer's original containers or packaging, with identifying labels intact and legible.
1. Immediately on delivery, inspect shipments to assure compliance with requirements of Contract Documents and approved submittals, and that products are properly protected and undamaged.
- C. Provide equipment and personnel to handle products by methods to prevent soiling or damage to products or packaging.

**1.08 STORAGE AND PROTECTION**

- A. Store products in accordance with manufacturers' instructions, with seals and labels intact and legible:
1. Store products subject to damage by the elements in weather tight enclosures.
  2. Maintain temperature and humidity within the ranges required by manufacturers' instructions.

**B. Exterior Storage:**

1. Store fabricated products above the ground, on blocking or skids. Prevent soiling or staining. Cover products which are subject to deterioration with impervious sheet coverings, provide adequate ventilation to avoid condensation.
  2. Store loose granular materials in a well-drained area on solid surfaces to prevent mixing with foreign matter
- C. Arrange storage in a manner to provide easy access for inspection. Make periodic inspections of stored products to assure that products are maintained under specified conditions, and free from damage or deterioration.
- D. Protection after installation: Provide substantial coverings as necessary to protect installed products from damage from traffic and subsequent construction operations. Remove when no longer needed.

**1.09 PRODUCT STANDARDS**

- A. Any product specified by reference to the number, symbol or title of a standard, such as Commercial Standard, a Federal Specification, an ASTM Standard, an ANSI Standard, a trade association standard, or other similar standard, shall comply with the requirements of the latest issue of such standard or revision thereof, including any amendment or supplement thereto, as listed in the latest official index in effect and issued not later than thirty days prior to date of Invitation to Bid.
- B. The standards referred to, except as modified in the Specifications, shall have full force and effect as though printed in the Specifications. The Architect will furnish, upon request, information as to how copies of the standards referred to may be obtained.
- C. All manufactured articles, materials, and equipment shall be applied, installed, connected, erected, used, cleaned and conditioned, in accordance with the manufacturer's printed instructions, unless otherwise specified.

**1.10 SUBSTITUTIONS**

- A. Substitutions of products shall comply with requirements of Chapter 30, Section 39M of the General Laws, and the additional requirements and procedures specified herein.
- B. The Contract Documents are intended to produce structures of consistent character and quality of design. All components of the structures visible items of mechanical and electrical equipment have been selected to have a coordinated design in relation to the overall appearance of the structures. The Architect will judge the design, functionality and appearance of proposed substitutes on their basis of their suitability in relation to the overall design of the work, as well as for their intrinsic merits. The Architect will not approve as equal to materials specified, proposed substitutes which, in his opinion, would be out of character, obtrusive, or otherwise inconsistent with the character or quality of design of the Work.

With respect to interior or exterior finishes or other materials or products which have been specified to obtain an artistic or aesthetic value or effect, the Architect may not approve as equal any proposed substitute which, in their sole opinion, would not produce the same artistic or aesthetic value or effect. In order to permit coordinated design or color and finishes the General Contractor shall, if required by the Architect, furnish the substituted material in



any color, finish, texture, or pattern which would have been available from the manufacturer originally, at no additional cost to the Owner.

- C. Specific reference in the Specifications to any product, material or process by name, make or catalogue number shall be interpreted as establishing a standard of quality. An item will be considered equal to the item so named or described if (1) it is at least equal in quality, durability, appearance, strength and design; (2) it will perform at least equally the function imposed by the general design for the Work; (3) it conforms substantially, even with deviations, to the detailed requirements for the item in the Specification. M.G.L. Chapter 30, Section 39M (b). The Architect shall be the sole judge of whether any proposed substitute product, material, process or method is equal to that specified according to this standard, and his decision shall be final and binding on the General Contractor and any Subcontractor or Sub-Subcontractor.
- D. If the General Contractor proposes to use a material which, while suitable for the intended use, deviates in any way from the detailed requirements of the Contract Documents, he 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.
- E. In requesting approval of deviations or substitutions, the General Contractor shall provide evidence leading to a reasonable certainty that the proposed substitution or deviation will provide a quality or result at least equal to that otherwise attainable. If, in the opinion of the Architect, the evidence presented by the General Contractor does not provide a sufficient basis for such reasonable certainty, the Architect may reject such substitution or deviation without further investigation.
- F. Any additional cost, loss or damage arising from the substitution of any material or any method for those originally specified shall be borne by the General 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 or the Architect.

**1.11 SYSTEMS DEMONSTRATION**

- A. Prior to final inspection, demonstrate operation of each system to Architect and Owner's personnel.
- B. Instruct Owner's personnel in operation, adjustment, and maintenance of equipment and systems, using the operation and maintenance data as the basis of instruction.

**PART II - PRODUCTS** Not Used

**PART III - EXECUTION** Not Used

**END OF MATERIAL AND EQUIPMENT**

**Section 01 73 29  
EXECUTION**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Coordination of elements of the Work.
- B. Coordination of contract close-out.

**1.03 RELATED SECTIONS**

- A. Section 01 01 00 – SUMMARY OF WORK:
  - 1. Pre-construction conferences.
  - 2. Coordination, Cooperation and Giving Information.
- B. Product options and substitutions: Section 01 60 00 – MATERIAL AND EQUIPMENT.
- C. Section 01 73 29 - CUTTING AND PATCHING.
- D. Close-out submittals: Section 01 77 00 – CLOSE-OUT PROCEDURES.

**1.04 DESCRIPTION**

- A. Coordinate scheduling, submittals, and work of the various Sections of Specifications to assure efficient and orderly sequence of installation of construction elements, with provisions for accommodating items to be installed later.
- B. Coordinate sequence of Work to accommodate Owner occupancy.

**1.05 MEETINGS**

- A. In addition to progress meetings specified in Section 01 01 00, hold coordination meetings and pre-installation conferences with personnel and Subcontractors to assure coordination of the Work.

**1.06 COORDINATION OF SUBMITTALS**

- A. Schedule and coordinate submittals specified in Section 01 33 23.
- B. Coordinate work of various Sections having interdependent responsibilities for installing, connecting to, and placing in service, such equipment.
- C. Coordinate requests for substitutions to assure compatibility of space, of operating elements, and effects on work of other Sections.

**1.07 COORDINATION OF ELEMENTS OF THE WORK**

- A. Before commencing any work, the General Contractor shall prepare a sequence of operations for all work under this Contract as stipulated in Section 01 33 23, and submit for approval by the Architect.

- B. Before commencing any work, the General Contractor shall consult with the Owner regarding the use of any facilities, including, but not limited to, loading docks, parking areas, storage areas, access gates and roadways etc. that may be required to prosecute the Work.
- C. If, in the judgment of the Architect, continued work under the sequence of operations may interfere with the operations of the Owner, at any time during the progress of the Work, the Architect may direct the General Contractor to accelerate, interrupt, or Cease work at particular points. The General Contractor shall make reasonable changes in the sequence of operations to accommodate these directions, at no additional cost to the Owner.
- D. The General Contractor shall be responsible for the proper fitting of all work and the coordination of the operations of all trades, Subcontractors or material and equipment engaged upon the Work. He shall be prepared to guarantee each of his Subcontractors the dimensions which they may require for the fitting of their work to all surrounding work and shall do or cause the Subcontractor to do all cutting, fitting, adjusting and patching necessary to make the several parts of the work come together properly and to fit the work to receive or be received by that of other contractors.
- E. The General Contractor shall give his personal supervision to the Work or have a competent superintendent on the Work at all times during the progress of the Work, with the authority to act for him, and provide an adequate staff for the proper coordination and expediting of his work.
- F. The General Contractor shall lay out his own work, and be responsible for all lines, elevations, and measurements of the structures, grading, paving and other work executed under the Contract. He shall exercise proper precaution to verify the dimensions shown on the Drawings before laying out the work and will be held responsible for any error resulting from his failure to exercise such precaution.
- G. The General Contractor shall be in charge of the entire Work and shall be responsible for the prompt coordination of all trades, including his own forces and Subcontractors, as well as the Owner's separate contractors if they are on the job during the General Contractor's operations, and become fully familiar with all work required under the Contract.
- H. Care shall be given to the proper scheduling, delivery, and installation of items to be built into rough construction which will affect the latter portions of the Work, such as anchors, pipe sleeves, inserts, conduit pipes, lugs, clips, brackets, braces, hangers, bolts, miscellaneous metal, and similar items. These items are not necessarily specified under the Trade Section under which they are to be installed. The General Contractor shall ascertain that all are properly installed in their correct locations at the proper time, so as to prevent cutting and patching of finished work.
- I. The General Contractor shall be fully responsible for coordination of General Construction work with that of his forces and all Subcontractors. He shall investigate, together with the Subcontractors involved, the routing of pipe, ductwork, and conduit with particular attention to interference of structural members, other pipes, ducts, and conduit cuts, head room conditions, door and window openings and swings, pipe chases, and similar features of the structures which may affect installation and proper functioning of such items.

- J. Changes in design locations which may be necessary in the routing of pipes and ducts, or in the location of any mechanical, electrical or other equipment, shall be anticipated and made prior to installation. Additional compensation will not be allowed for costs incurred as a result of the General Contractor's failure to anticipate the necessity for such changes.
- K. There shall be no change or variation in ceiling height, wall layout, shafts, chase, furring, or other dimensions shown on Drawings, without the specific written approval of the Architect.
- L. The General Contractor's responsibility for the coordination of all work under the Contract shall be complete and shall extend to all modifications in the Work, whether or not such modifications entail a change in the Contract Price. Where the Contract Documents allow an optional material or method of performing a portion of the Work, or where the General Contractor is ultimately allowed or directed to perform a part of the work using a substitute material or method, the General Contractor shall provide all other coordination and additional work that such changes necessitate, without any additional cost to the Owner.

**1.08 COORDINATION OF CONTRACT CLOSE-OUT**

- A. Coordinate completion and cleanup of work of separate Sections in preparation for Substantial Completion of portions of Work designated for Owner partial occupancy.
- B. After Owner occupancy of premises, coordinate access to site by various Sections for correction of defective work and work not in accordance with Contract Documents, to minimize disruption of Owner's activities.
- C. Assemble and coordinate close-out submittals specified in Section 01 70 00.

**PART 2 - PRODUCTS** Not Used

**PART 3 - EXECUTION** Not Used

**END OF EXECUTION**



Section 01 73 29  
CUTTING AND PATCHING

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Execute cutting, fitting, and patching, to complete Work, and to:
  - 1. Fit the several parts together, to integrate with other work.
  - 2. Uncover work to install ill-timed work.
  - 3. Remove and replace defective and non-conforming work.
  - 4. Provide openings in elements of work for mechanical, plumbing and electrical work.

**1.03 RELATED REQUIREMENTS**

- A. Section 01 35 13 – SPECIAL PROJECT PROCEDURES:
  - 1. Fire Protection and Prevention.
- B. Section 01 60 00 – MATERIAL AND EQUIPMENT:
  - 1. Substitution of materials.
- C. Individual Specifications Sections:
  - 1. Coring, cutting and patching incidental to work of the Section.
  - 2. Advance notification to other Sections of openings required in work of those Sections.
  - 3. Limitations on cutting structural members.

**1.04 SUBMITTALS**

- A. Submit written requests in advance in order not to affect the progress of the Work of cutting or alteration which affects:
  - 1. Structural integrity of any element of Project.
  - 2. Integrity of weather-exposed or moisture-resistant element.
  - 3. Efficiency, maintenance, or safety of any operational element.
- B. Include in request:
  - 1. Identification of Project.
  - 2. Location and description of affected work.
  - 3. Necessity for cutting or alteration.
  - 4. Description of proposed work, and products to be used.

5. Alternatives to cutting and patching.
6. Effect on work of Owner or separate contractors.
7. Written permission of affected separate contractors.
8. Date and time work will be executed.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Those required for original installation.
- B. For any change in materials, submit request for substitution.

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Except as otherwise specified in any particular Filed Sub-Bid Sections of the Specifications, the General Contractor shall do all cutting, fitting and patching of the work that may be required to make its several parts come together properly and fit it to receive and be received by work of other contractors shown upon, or reasonably implied by, the Drawings and Specifications.

### **3.02 INSPECTION**

- A. Inspect existing conditions, including elements subject to damage or movement during cutting and patching.
- B. After uncovering, inspect conditions affecting performance of work.
- C. Beginning of cutting or patching means acceptance of existing conditions.

### **3.03 PREPARATION**

- A. Provide supports to assure structural integrity of surroundings; devices and methods to protect other portions of Project from damage.
- B. Provide protection from elements for areas which may be exposed by uncovering work.

### **3.04 PERFORMANCE**

- A. Execute work by methods to avoid damage to other work, and which will provide proper surfaces to receive patching and finishing.
- B. Employ original installer to perform cutting and patching for weather-exposed and moisture-resistant elements, and sight-exposed surfaces.
- C. Cut rigid materials using masonry saw or core drill. Pneumatic tools are not allowed without prior approval.
- D. Restore work with new products in accordance with requirements of Contract Documents.
- E. Fit work airtight to pipes, sleeves, ducts, conduit, and other penetrations through surfaces.
- F. Refinish surfaces to match adjacent finishes. For continuous surfaces, refinish to nearest intersection; for an assembly, refinish entire unit.

## **END OF CUTTING AND PATCHING**

**Section 01 77 00  
CLOSEOUT PROCUDURES**

**PART I - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Close-out Procedures.
- B. Final Cleaning.
- C. Record Drawings.
- D. Maintenance Manuals and Instructions (Three-hole punched).
- E. Warranties and Bonds (Three-hole punched).
- F. Close-out Requirements.

**1.03 CLOSE-OUT PROCEDURES**

- A. Comply with procedures stated in CONDITIONS OF THE CONTRACT for issuance of Certificate of Consolidated Completion.
- B. When the General Contractor considers the Work has reached final completion, submit written certification that the Contract Documents have been reviewed, the Work has been inspected, and that the Work is complete in accordance with Contract Documents and ready for Architect's inspection.
- C. In addition to submittals required by the CONDITIONS OF THE CONTRACT, provide submittals required by governing authorities, and submit a final statement of accounting giving total adjusted Contract Sum, previous payments, and sum remaining due.
- D. Architect will issue a final Change Order, reflecting approved adjustments to Contract Sum not previously made by Change Order.

**1.04 FINAL CLEANING**

- A. prior to submitting a request to the Architect to certify Completion of the Work the Contractor shall inspect all work and verify that all waste materials, rubbish, tools, equipment, machinery, and surplus materials have been removed, and that all sight exposed surfaces are clean. Leave the Project clean and ready for occupancy.
- B. Unless otherwise specified under other sections of the Specifications, the Contractor shall perform final cleaning operations as herein specified prior to final inspection.
- C. Cleaning shall include all surfaces, which the Contractor has had access to, whether new or existing.
- D. Employ experienced workmen or professional cleaners for final cleaning.
- E. Use only cleaning materials recommended by the manufacturer of the surface to be cleaned.



- F. Use cleaning materials which will not create a hazard to health or property and which will not damage surfaces.
- G. All broken or defective glass caused by the Contractor's Work shall be replaced at the expense of the Contractor.
- H. Remove grease, mastic, adhesive, dust, dirt, stains, labels, fingerprints, and other foreign materials from sight-exposed surfaces. This includes cleaning of the Work of all finishing trades where needed, whether or not cleaning by such trades is included in their respective specifications.
- I. Clean and polish all new glass and plastic glazing (if any) throughout the building(s) soiled due to construction, on both sides. Clean plastic glazing with the manufacturer's directions.
- J. Leave all architectural metals, hardware, and fixtures in undamaged, polished conditions.
- K. In cleaning items with manufacturer's finish or items previously finished by a subcontractor, care shall be taken not to damage such manufacturer's or subcontractor's finish. In cleaning glass and finish surfaces, care shall be taken not to use detergents or other cleaning agents which may stain adjoining finish surfaces. Any damage to finishes caused by cleaning operations shall be repaired at the Contractor's expense.
- L. Owner's responsibility for cleaning commences at the time designated on the Certificate of Substantial Completion.

#### **1.05 RECORD DRAWINGS**

- A. Before work begins, the General Contractor shall, from the Architect's original Contract Drawings, have a set of reproducible copies of the entire Contract Drawings made on Mylar. The General Contractor shall furnish to the Plumbing, Heating, Ventilation and Air Conditioning, and Electrical Subcontractors the reproducible copies of the drawings which correspond to their respective portions of the Work
- B. During construction, the General Contractor, Plumbing, Heating, Ventilation, and Electrical Subcontractors shall keep accurate daily records of all major deviations from the works as shown on the Contract Drawings, and indicate actual installation with colored inks on a complete set of prints obtained and maintained at the job site for that specific purpose. Such sets shall be kept available at all times for use and inspection by the Architect and the Project Representative.
- C. The General Contractor shall transfer all information from the daily record prints to the reproducible tracings at least once every three months and submit three prints of each tracing to the Architect. When roughing-in of any particular area is completed, it shall be shown on the tracings and a copy submitted for Architect's review.
- D. Records shall be made and kept on separate prints and tracings for work shown on the Site Work, Structural, Architectural, Plumbing, Heating, Ventilation and Air Conditioning, and Electrical Drawings. Particular attention shall be given to noting locations, elevations, sizes, etc. of all concealed and buried utilities, ducts, and services, and especially including exterior utility and storm drainage lines.
- E. Before completion of the Work, and when directed by the Architect, the General Contractor and all indicated Subcontractors shall transcribe all previous information onto a set of reproducible prints (24" X 36" minimum size), make all final changes and corrections to same,

sign each Drawing as certification that the work was installed as shown, and deliver same to Architect. Drawings shall be signed by the General Contractor and the applicable Subcontractors. Acceptance by the Architect of the completed tracings shall be a prerequisite for final payment.

- F. Shop Drawings will not be acceptable as project Record Drawings.
- G. All Record Drawing work shall be performed by competent draftspersons. The Architect shall be the sole judge of the acceptability of project Record drawings.
- H. Record drawings for exterior utilities and other items below grade shall accurately locate the points where such items enter the building and property lines and shall locate all turns, offsets, and other changes in direction below grade, as well as all valves and other appurtenances. Such locations shall be made by dimensions to adjacent permanent bench marks or structures as approved by the Architect. Reliance on scale only or reference to any temporary or concealed construction will not be acceptable

#### **1.06 MAINTENANCE MANUALS AND INSTRUCTIONS**

- A. The General Contractor shall, upon Completion of the Work, submit drafts of maintenance schedules, maintenance manuals, and all approved Shop Drawings, presenting full details for care and maintenance of visible surfaces and all equipment furnished and installed under the Contract.
- B. Maintenance manuals shall consist of manufacturer's catalogue cuts with descriptive information, lubricating and maintenance instructions, parts list, usage instructions, names, addresses and telephone numbers where replacement parts and services can be quickly obtained, and all other information required for the Owner to use, maintain, and service the items properly.
- C. Upon Architect's approval of drafts, submit four corrected copies (three hole punched) properly bound in a logical and well arranged order, with index, for Owner's use.
- D. The General Contractor shall arrange for a reasonable amount of instruction for the Owner's employees, to insure proper operation of the equipment furnished. It is the intent of this paragraph to require the General Contractor and the applicable Subcontractors to furnish as much detailed instruction as is necessary to educate reasonably intelligent personnel in the proper use of the equipment. This instruction shall be provided by the manufacturer's representative for each item of equipment. In some cases, this may require several visits to the Project by those responsible for the instruction.

#### **1.07 WARRANTIES AND BONDS**

- A. General: Compile specific warranties and bonds, review to verify compliance with Contract Documents, and submit to Architect for his review and transmittal to the Owner. Warranties and Bonds are to be three hole punched for insertion into three ring binders.

#### **B. SUBMITTAL REQUIREMENTS**

- 1. Assemble three original signed copies of warranties, bonds and service and maintenance contracts, executed by Officers of each of the respective manufacturers, suppliers, and Subcontractors.

2. Table of Contents: Neatly typed, in orderly sequence. Provide complete information for each item.
  - a. Product or work item.
  - b. Firm, with name of principal, address and telephone No.
  - c. Scope.
  - d. Date of beginning of warranty, bond or service and maintenance contract will commence upon date of Substantial Completion as established by the Architect.
  - e. Duration of warranty, bond or service maintenance contract.
  - f. Provide information for Owner's personnel:
  - g. Proper procedure in case of failure.
  - h. Instances which might affect validity of warranty or bond.
  - i. General Contractor or Subcontractor, as applicable, name of responsible principal, address and telephone number.
- C. Form of Submittals: Prepare in three packets and in the following format:
  1. Size 8-1/2 in. by 11 in.; punch sheets for 3-ring binder. Fold larger sheets to fit into binders.
  2. Cover: Identify each packet with typed or printed title "WARRANTIES AND BONDS". List Title of Project and Name of General Contractor or Subcontractor.
  3. Binders: Commercial quality, three-ring, with durable and cleanable plastic covers.
- D. Time of Submittals:
  1. For equipment or component parts of equipment put into service during progress of construction, submit documents within ten days after inspection and acceptance. Otherwise, make submittal within ten days after acceptance, listing the date of acceptance as the start of the warranty period.
- E. Submittals Required: Submit warranties, bonds, service and maintenance contracts as specified in the respective Sections of the Specifications.

#### **1.08 CLOSE-OUT REQUIREMENTS**

- A. Punch List: When the Architect inspects the Work for Completion, he will prepare and issue to the General Contractor a "punch list" of items to be corrected before final payment will be made. Such punch list shall not be construed as all-inclusive of the work which the General Contractor will be required to perform before final payment.
- B. Final Inspection:
  1. The General Contractor shall submit written certification that:
    - a. Contract Documents have been reviewed.
    - b. Project has been inspected for compliance with Contract Documents.
    - c. Work has been completed in accordance with Contract Documents.
    - d. Equipment and systems have been tested in presence of Owner's Representative and are operational.

- e. Project is completed, and ready for final inspection.
2. Architect will begin final inspection within seven days after receipt of certification.
3. Should the Architect consider the Work is finally complete in accordance with requirements of Contract Documents, he shall request the General Contractor to make Project Close-out submittals.
4. Should the Architect consider that the Work is not finally completed:
  - a. He shall notify the General Contractor, in writing, stating reasons.
  - b. The General Contractor shall take immediate steps to remedy the stated deficiencies, and send second written notice to the Architect certifying that the Work is complete.
  - c. Architect will re-inspect the Work.
- C. Close-out Submittals:
  1. Project Record Documents.
  2. Operating and Maintenance Data (Three copies – Three hole punched in binders).
  3. Extended Guarantees and Warranties (Three copies – Three hole punched in binders).
  4. Spare Parts and Maintenance Materials.
- D. Instructions: Instruct Owner's personnel in the operation of all systems, mechanical, electrical and other equipment.
  1. Evidence of Payments, and Release of Liens:
    2. The General Contractor's Affidavit of Payment of Debt Claims, AIA G706.
    3. The General Contractor's Release of Liens, AIA G706A, with:
      - a. Consent of Surety to Final Payment: AIA G707.
      - b. General Contractor's release or waiver of liens.
      - c. Separate releases or waivers of liens for Subcontractors, suppliers and others with lien rights against property of the Owner, together with list of those parties.
  4. All submittals shall be duly executed before delivery to the Architect.
- E. Final Application and Certificate for Payment.
  1. The General Contractor shall submit final application in accordance with requirements of the CONDITIONS OF THE CONTRACT.
  2. Architect shall issue final certificate in accordance with provisions of CONDITIONS OF THE CONTRACT.
  3. NOTE: Prior to issuance of the Certificate for Final Payment by the Architect, all requirements contained in this Paragraph entitled "Close-out Requirements" and other requirements of the CONDITIONS OF THE CONTRACT shall be executed, received and approved by the Architect.
- F. Post-Construction Inspection:
  1. Prior to expiration of one year from Date of Substantial Completion, the Architect will make visual inspection of Project in company with the Owner and General Contractor to determine

whether correction of Work is required, in accordance with provisions of the CONDITIONS OF THE CONTRACT.

2. Architect will promptly notify the General Contractor, in writing, of any observed deficiencies.

**G. Commissioning (Project Closeout):**

1. Contractor shall provide a Final Commissioning Report. The report shall include an executive summary, list of participants and the role of each participant, brief building and systems descriptions, an overview of the scope of commissioning and testing, and a general description of testing and verification methods.

a. The report shall address the adequacy of the equipment, documentation and training, in satisfying the requirements of the Contract Documents in each of the following areas:

i. Material/system specifications and design intent

ii. Material /system installation

iii. System functional performance and efficiency

iv. Description of the verification method used and observations and conclusions from the testing

v. Non-compliance issues referenced to the specific functional test, inspection, and other records where the deficiency is documented

vi. Material /system operations and maintenance

vii. Record documentation

b. All outstanding non-compliance items shall be specifically listed in the report, and recommendations for improvement to equipment or operations, future actions, commissioning process changes, and other appropriate matters shall also be listed.

c. Appendices shall contain Issues Log, meeting minutes, progress reports, deficiency lists, site visit reports, findings, unresolved issues, communications, and all other relevant information.

d. Pre-functional checklists and functional performance tests and monitoring data and analyses shall be provided in a separate labeled binder.

**H. Commissioning (Post Commissioning):**

1. Contractor shall, through the Owner's Representative, plan, organize, schedule and coordinate required seasonal or deferred testing and deficiency corrections.

2. Contractor shall provide the final testing documentation for the commissioning record and operations and maintenance manuals.

**END OF CONTRACT CLOSE-OUT**

Section 02 41 19  
SELECTIVE DEMOLITION

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SCOPE OF WORK**

- A. Work included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Removal and disposal of existing roof systems (built-up asphalt roofing), copings, fascias, flashings, insulation and underlayments to substrate/roof deck as indicated on the Drawings.
  - 2. Remove and store for reinstallation existing roof top mechanical equipment including disconnection of electrical connections and disconnection of ductwork as indicated on the drawings.
  - 3. Removal and disposal of existing roof access hatches and/ or curbs as indicated on the drawings.
- B. Related Work: The following items of work are not included in this Section and will be performed under the designated Sections:
  - 1. Removal of existing roof drains as per SECTION 22 00 00 - PLUMBING

**1.03 SUBMITTALS**

- A. A demolition and removal plan for the building shall be submitted to the Architect for review, which describes the proposed sequence, methods, scaffolding, overhead protection and equipment for the demolition work and disposal of debris, including transporting demolished materials. The plan is to ensure uninterrupted operations of the Waltham Community Center. The plan shall describe the measures, which will be taken to prevent dust from becoming airborne as a result of the demolition and movement of debris.
- B. Submit a protection and safety plan describing how temporary hand railings, walkways, enclosures, etc. will be provided for safety of the occupants of and visitors to the Waltham Community Center.
- C. Do not proceed with Protection devices, Demolition and Removal until the Architect has given written acceptance of the plan.

**1.04 PROJECT CONDITIONS**

- A. Damages: Promptly repair damages caused to adjacent materials by demolition work.
- B. Flame Cutting is not permitted.

- C. Utility Services: Maintain existing utilities indicated to remain, keep in service, and protect against damage during demolition operations.
- D. Traffic: Conduct demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks and other adjacent occupied or used facilities.
  - 1. Do not close, block or otherwise obstruct streets, drives, walks or portions of the building without written permission from the City of Waltham.
- E. The contractor is responsible to tarp and protect all materials within the building which could be subject to exposure to dust from construction operations. Where dust has accumulated in the building or portions thereof from construction operations those portions of the building so affected shall be cleaned to “original condition” at the completion of the work. “Broom clean” will not be acceptable.
- F. The contractor shall be responsible to return all lawn and landscape areas to “original condition” at the completion of the work.

**1.05 PERMITS, TAXES AND LICENSES**

- A. Obtain and pay for all permits and licenses required by governing authorities to carry out the work of this Section.
- B. Pay all legally imposed fees and taxes on the work of this Section.

**PART 2 - MATERIALS**

**2.01 MATERIALS**

- A. Provide all sheathing, tarps, coverings, anchors, nails, screws, barricades, electrical items, and other materials as necessary to properly complete the work of this Section.

**PART 3 - EXECUTION**

**02 41 19 END OF SELECTIVE DEMOLITION**

Section 02 82 00  
ASBESTOS ABATEMENT

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. The General Provisions of the contract, including General and Supplementary conditions and applicable provisions of Division 1 - General Requirements, apply to the work specified within this Section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this Section.
- C. All provisions of this Section relating to the health and safety of workers and the general public, as well as protection of the environment are minimum standards. The General Contractor and the Asbestos Abatement Subcontractor, or other approved properly trained Roofing Contractor, are responsible for determining whether any additional and/or more stringent protective measures are required by any legal requirements or prudent conservative work practices, and implementing such measures if deemed necessary. Nothing in this Section shall be deemed to relieve the General Contractor and the Asbestos Abatement Subcontractor, or other approved properly trained Roofing Contractor, from any liability with respect to any such legal requirements or requirement of prudent conservative practice.
- D. All work-site preparations and practices will be conducted in accordance with all Federal, Massachusetts and appropriate City and other local regulations, standards and codes pertaining to worker health protection, protection of the public health and the environment, including current US Environmental Protection Agency (EPA), Department of Labor Occupational Safety and Health Administration (OSHA), US Department of Transportation (DOT), Massachusetts Department of Labor Standards (DLS), Massachusetts Department of Environmental Protection (DEP), local and all other Federal, Commonwealth of Massachusetts and local regulations pertaining to asbestos removal, its transportation and disposal.
- E. The Consultant will render certain technical services during the Work, including without limitation, the services described at 453 CMR. 6.07 (5) and 6.14 (5) and described within this Section. All services performed by such Representative shall be considered advisory to, and for the sole and exclusive benefit of the Owner. The Asbestos Abatement Subcontractor, or other approved properly trained Roofing Contractor, acknowledges that the Consultant is an independent contractor of the Owner and agrees that no act or omission by such Consultant, and no communication by said "Consultant", shall be deemed in any manner to alter or modify the terms of this Contract, or to waive any provision hereof, or to bind Owner, unless specifically agreed upon by Owner in a signed written instrument.



- F. Prior to use of any design, device, material, method of operation, or process covered by letters patent or copyright, the right for such use shall be secured by suitable legal agreement with the patentee or owner of the letters patent or copyright. No arrangement involving letters patent or copyright is acceptable, if subsequent payment for permanent use following completion of the work is required or implied. The contractor shall be responsible for any liability on the part of the Consultant, which may result from violations by the contractor.
- G. The Architect has retained Cardno ATC as the Environmental Consultant for the purpose of Project Management during Asbestos Abatement.
- H. For the purpose of this Section, "*Consultant*" shall refer to Cardno ATC, who will act as designated, authorized representatives of the Architect for the purpose of inspecting, monitoring, and testing.

**1.02 SUMMARY OF WORK**

- A. Summary of Work to be Completed

The following is the Scope of Work, at a minimum, required to be performed at the Waltham Community Center located at 510 Moody Street in Waltham, Massachusetts under the Base Bid. Additional work may also be performed if approved by the Owner according to the Unit Prices, as described in this Section and the Unit Prices Section.

All Asbestos Abatement work under this Section shall be performed by the General Contractor and the Asbestos Abatement Subcontractor holding a current Massachusetts Department of Labor Standards (DLS) Asbestos Abatement Contractor's license, or other approved properly trained Roofing Contractor. The Asbestos Abatement Subcontractor or other properly trained Roofing Contractor shall furnish all labor, worker training, materials, equipment, and services for the complete and proper removal and disposal of asbestos-containing materials.

- 1. In areas defined by paragraph 1.02 (b) removal and disposal of all specified asbestos-containing materials (ACM) and specified non-ACM materials as identified herein. This shall include if necessary removal and disposal of roofing materials (membrane), insulation board, gravel/stones, vapor barrier material or other non-ACM roofing material as needed to allow for the removal of all identified asbestos-containing materials.
- 2. Work area preparations, including pre-cleaning, installation of critical barriers and polyethylene sheeting, construction of decontamination

facilities, work area sealing, isolation, and other activities as directed by the Owner or Consultant.

3. Protection of non-ACM materials and equipment inside of work areas with two layers of polyethylene sheeting.
4. Removal and proper disposal of all asbestos-containing roof materials as identified in Paragraph 1.02(B). Removal will be completed in accordance with Section 3.3. Work practices of paragraph 3.3 may be used by non-licensed asbestos contractors provided that the properly trained Roofing Contractor strictly follows certain work practices are used as described in paragraph 3.3B.
5. Furnishing of all labor, materials, equipment, and services required for all work included under the provisions of this Section. Asbestos Abatement Subcontractor or properly trained Roofing Contractor is responsible for safely accessing and removing asbestos roofing materials and also providing any additional equipment necessary (e.g., ladders, scaffolds, lifts, safety/fall protection equipment) to perform abatement work.
6. Compliance with all applicable federal, state, and local regulations, as well as all provisions set forth within this Section, and facility requirements.
7. Decontamination and clean up following removal activities in each designated work area.
8. Performance of any other work or activities required by this Section, applicable regulations, or as necessary to perform a complete job to the satisfaction of the Owner and Consultant.
9. Provide temporary electrical services and other utilities as required and if needed for asbestos removal according to the provisions as set forth in this Section.
10. Removal and disposal of asbestos-containing materials, and specified non-ACM materials, uncovered during demolition/renovation and not included in the Base Bid scope of work, in accordance with the Unit Price schedule as set forth in this Specification and the Unit Prices Section.

**B. Scope of Work**

1. Base Bid: The following is the approximate location and quantities of asbestos-containing roofing materials. All quantities are to be removed, under the Base Bid, in accordance with the Unit Price Section and provisions set forth in this Section:

**Summary of Identified Asbestos-Containing Materials to be Removed  
Waltham Community Center  
510 Moody Street  
Waltham, Massachusetts**

<b>Material</b>	<b>Location(s)</b>	<b>Estimated Quantity</b>	<b>Result</b>
Caulking around Metal Hatch/Door	Roof 1 on large Gravity Vent	12 LF (2 doors)	20% Chrysotile
Black Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	20% Chrysotile
Grey Sealant on Copper Parapet	Roof 1 facing Roof 3 under roof edge	100 SF	20% Chrysotile
Black Coating on Round Hood Flashing	Roof 1	110 SF (13 hoods)	10% Chrysotile
Roof Edge Flashing	Roof 1, Location 4	900 SF	5% Chrysotile
Grey Flashing and Roof Patch	Roof 2 Skylight Roof 2, Round Hoods	80 SF	20% Chrysotile
Roof Flashing	Roof 3 and Roof 4 junction/seam (Location 7)	150 SF	2% Chrysotile
Grey/Black Flashing Sealant	Roof 3 on abandoned railing pilaster and above door	50 SF	20% Chrysotile
Interior Door Glazing	Roof 3	1 door	2% Chrysotile
Exterior Door Glazing	Roof 3	1 door	5% Chrysotile
Exterior Door Caulking	Roof 3	1 door	5% Chrysotile
Capstone Crack Sealant/Filler	Roof 5 Parapet Wall	400 LF	2% Chrysotile
Roof Flashing	Roof 5 Parapet Wall, Location 5	50 SF	5% Chrysotile

C. Provide Unit Pricing for the following:

Asbestos Abatement: Show on the Bid Form the cost or credit to the Owner, per location, to remove ACM more or less than included in the Base Bid.

D. Sequence of Work

The following is a typical sequence of work that the General Contractor and the Asbestos Abatement Subcontractor or other properly trained Roofing Contractor shall adhere to during the asbestos abatement project. Consultant may authorize deviations from this typical sequence based upon the specific conditions encountered during the project.

1. Asbestos Abatement Subcontractor shall post all required signage.
2. Asbestos Abatement Subcontractor shall secure area from unauthorized access.
3. Owner/General Contractor will remove all movable objects from the work area.
4. Asbestos Abatement Subcontractor shall cover all immovable objects and objects not removed from the work area with two (2) layers of six (6)-mil polyethylene sheeting, sealed airtight with duct tape. Asbestos Abatement Subcontractor shall install critical barriers at all points of access required by regulations.
5. Asbestos Abatement Subcontractor shall prepare the specified Work Area for roof removal as described in this Section.
6. Asbestos Abatement Subcontractor shall construct remote decontamination unit, and any other construction needed to complete the work area to the satisfaction of Consultant.
7. Consultant shall inspect and approve all work area preparations before permitting the Asbestos Abatement Subcontractor to begin removal work.
8. Asbestos Abatement Subcontractor shall remove and dispose all asbestos-containing roofing materials as required by this Section.
9. Asbestos Abatement Subcontractor shall decontaminate the work area upon completion of removal.
10. Consultant shall perform a final visual inspection to assure that no visible debris exist in the work area. The Asbestos Abatement Subcontractor shall re-clean the work area as needed until it passes a visual inspection by Consultant.
11. Asbestos Abatement Subcontractor shall remove all work area barriers, equipment, polyethylene sheeting, etc. and clean any areas to the satisfaction of Consultant and Owner.

E. Estimates

1. Section 1.2(B) represents a brief description of the estimated quantities of asbestos-containing materials to be removed. This data is provided for informational purposes only, and is based on the best information available at the time of specification preparation. Nothing in this section may be

interpreted as limiting the scope of work otherwise required by this contract and related documents.

2. The quantities and location of ACM and the extent of work included in this section are only best estimates. Accordingly, minor variations of plus or minus 15% of the estimated quantities of ACM are considered as having no impact on the price of this contract. Bidders shall confirm all quantities and items during the Pre-Bid walkthrough to the extent reasonably possible. Neither the Consultant nor the Owner will be responsible for errors or emissions and/or charges for extra work arising from any bidder's failure to become familiar with the existing conditions of the site, requirements of the work and the results to be produced. By submitting a bid, the Bidder further agrees that the descriptions contained herein and on the drawings (e.g., quantities, descriptions, locations, areas) are adequate and that the Bidder will produce the required results. Where additional asbestos abatement work is required beyond the above variations, the contract price will be adjusted according to the Unit Price schedule as set forth in this specification.

**F. Coordination and Phasing of Work**

1. Asbestos Abatement Subcontractor shall coordinate all work in this Section with all other work of this Project. Where additional regulatory requirements apply to the work in this Section, the Asbestos Abatement Subcontractor shall ensure compliance with all requirements.
2. Asbestos Abatement Subcontractor's work schedule must be coordinated with and acceptable to the General Contractor and approved by the Owner. The Asbestos Abatement Subcontractor shall work continuously and diligently in each work area on the days and during the hours indicated on their work schedule
3. Asbestos Abatement Subcontractor shall subdivide work areas and/or otherwise provide additional containments and mobilization where and when necessary to accomplish asbestos abatement in accordance with the project phasing, as determined by the General Contractor, and as specified by the Owner.

**1.03 SUBMITTALS**

**A. Pre-Construction Meeting**

The Asbestos Abatement Subcontractor or other approved properly trained Roofing Contractor shall meet with the Owner and the Consultant for a Pre-Construction meeting prior to commencing work on the project. The meeting shall be at the

facility or at the offices of the Owner, at a mutually convenient time and date. At the meeting, the Asbestos Abatement Subcontractor shall be represented by authorized representatives and the field supervisor who shall run the project on a daily basis, and who shall present evidence that all requirements for initiation of the work have been met. The minimum agenda for the meeting shall be:

1. Review of "Pre-Construction Submittals".
2. Channels of communication.
3. Construction schedule, including sequence of critical work.
4. Designation of responsible personnel.
5. Procedures for safety, security, quality control, housekeeping, and related matters.
6. Use of premises, facilities, and utilities.

**B. Pre-Construction Submittals**

Prior to commencing any work under this Section, the Asbestos Abatement Subcontractor or other approved properly trained Roofing Contractor shall submit the following items to the Consultant for review. No Work under this Section may commence until the Consultant has accepted all required submittals

1. Asbestos Abatement Plan: Prepare an Asbestos Abatement Plan describing engineering controls and removal procedures that the Asbestos Abatement Subcontractor will use to conduct the Work of this Section.
2. Copies of all notifications, permits, applications, contractor license, personnel licenses and like documents required by Federal, State, or local regulations obtained or submitted in proper fashion,
3. List of employees to be used on this project.
4. Copies of medical records as required by OSHA or a notarized statement by examining medical doctor that such examinations took place and when for each employee to be used on project.
5. Record of successful respiratory fit test performed by a competent person (as defined by OSHA) within the previous 12 months, as required elsewhere in the documents for each employee to be used on this project.
6. Certificate of Insurance.

7. A list of all equipment to be used on site, by make and model, including manufacturers Sections on any equipment not specified for use by the Contract Sections.
8. Chain of Command of responsibility at work site including supervisors, foreman, and competent person, their names, resumes and certificates of training.
9. Proposed Emergency plan and route of egress from work areas in case of fire or injury, including the name and phone number of nearest medical assistance center.
10. Asbestos Abatement Subcontractor's testing lab, AIHA PAT proficiency, and Certification in the State where work site is located.

**C. Post-Construction Submittals**

The Asbestos Abatement Subcontractor is required to submit the following to the Consultant within thirty days after completion of the project:

1. Manifests and waste receipts acknowledging disposal of all waste material from the project showing delivery date, quantity, and appropriate signature of landfill's authorized representative.
2. A copy of the entry-exit logbook required elsewhere in these Sections.
3. All personnel monitoring results as required by OSHA and elsewhere in these Sections.
4. Copy of licenses, medical, and fit tests of all workers and supervisors, who performed work on the project.
5. All notifications as required elsewhere in these Sections.

**D. Regulatory Submittals**

1. The Asbestos Abatement Subcontractor shall be responsible for securing all necessary permits for asbestos related work, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.
2. The Asbestos Abatement Subcontractor shall notify the following agencies in appropriate manner and place of impending work, and shall provide evidence of notifications at the pre-construction conference:

- a. U.S. Environmental Protection Agency,  
J. F. Kennedy Federal Building  
Boston, Massachusetts 02203  
(10 working days in advance)
- b. Massachusetts Department of Environmental Protection  
Division of Air and Hazardous Materials  
(10 working days in advance)  
Send Notification to:  
  
Commonwealth of Massachusetts  
Asbestos Program  
P.O. Box 120087  
Boston, Massachusetts 02112-0087
- c. Massachusetts Division of Occupational Safety  
Asbestos Control Unit  
(10 working days in advance)
- d. City of Waltham Fire Department, City of Waltham Public Health  
Commission Environmental Health office, and other state or city  
agencies as required by law or ordinance.

**1.04 QUALITY ASSURANCE**

- A. Take all measures and provide all material necessary for protecting fixed machinery, controls, instrumentation, equipment, and furniture from asbestos fiber, dust and debris and from water damage.
- B. Working space and space available for storing materials is restricted within the confines of the project and/or at locations to be designated by the Owner.
- C. Provide access and personal protective equipment to the Consultant that is licensed and certified, to enter the regulated work area.
- D. Schedule the use of existing utilities with the Owner. No utility service, fire protection system, or communication system may be interrupted without prior approval of the Owner.
- E. Water, electric power, lighting and other utilities, toilets, and other facilities, shall be provided by the Owner from existing sources where the Asbestos Abatement Subcontractor's use is not excessive and does not interfere with buildings normal use. Where existing utilities of the facility are not adequate or cannot be used, the Asbestos Abatement Subcontractor is responsible for providing alternative sources, the cost of which is to be included in bid price. The use of the existing building utilities shall be coordinated through the Owner.



- F. Post and affix caution signs and labels as required by OSHA regulation, 29.CFR.1926.1101 (k) (1). Post safety signs outside the work project as may be required by the Owner. Obtain two copies of 29.CFR.1910.1001, 29.CFR.1926.1101, m 40.CFR.61, Subpart M, and Commonwealth of Massachusetts Regulations 453 CMR 6.00 and 310 CMR 7.00, and post one copy at the job site and retain one copy on file.
- G. Post at the job site, or at the entrance to each independent Work Area, one copy of all Material Safety Data Sheets (MSDS's) of all chemicals and other substances to be used under this contract. These sheets shall be made available to the Consultant and Owner for review.
- H. No uncontainerized storage of waste will be permitted onsite. All ACM shall be removed from the roof by the end of each shift and must be properly containerized.

## **PART 2 - PRODUCTS**

### **2.01 ASBESTOS ABATEMENT SUPPLIES**

- A. Respirators: Respirators will be selected from those jointly approved by the National Institute for Occupational Safety and Health (NIOSH), US Department of Health and Human Services and the Mine Safety and Health Administration (MSHA), US Department of Labor.
- B. Surfactant (Amended Water): All water to be used for removal and wet wiping of asbestos-contaminated materials during clean-up operations shall be amended through the addition of a surfactant (a 50/50 mixture of polyoxyethylene ether and polyoxyethylene ester, or equivalent) mixed and supplied in accordance with manufacturer's instructions.
- C. Polyethylene Sheeting: All polyethylene sheeting used on the Project shall be fire resistant, and shall meet and be approved as called for in local, Fire Prevention Codes

## **PART 3 - EXECUTION**

### **3.01 GENERAL**

- A. Approvals and Inspection
  - 1. All temporary facilities, work procedures, equipment, materials, services, and agreements must strictly adhere to and meet these contract Sections 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 Asbestos Abatement Subcontractor is further subject to approval of the Owner.

2. 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 Sections must be made to the Owner and Consultant for review before they can be used for work on this project.

**B. Damage and Repairs to the Work Site**

1. Asbestos removal and disposal shall be performed without damage to the building, including, but not limited to, structural members, ceilings, walls, exterior masonry and windows. The Asbestos Abatement Subcontractor shall provide protection of these items and materials as part of the work area preparation. Where asbestos abatement activity causes damage, the Asbestos Abatement Subcontractor shall patch, repair, replace or otherwise restore it to its original condition at no additional cost to the Owner.

**C. HVAC Systems**

1. All duct work, heating units and HVAC equipment in the work area shall be wrapped in two layers of six-mil polyethylene prior to any other work taking place, or excluded from work area boundaries by airtight polyethylene sheeting.

**D. Barriers and Isolation Areas**

1. The Asbestos Abatement Subcontractor shall construct and maintain suitable critical barriers to separate asbestos abatement roof work areas from interior spaces occupied by the Owner. Critical barriers shall be of sufficient size and strength to prevent staff, residents, the public and others from entering the work areas. Critical barriers shall be constructed at all roof hatch access locations or other open entrances to the roof work area. Critical barriers shall be constructed with plywood and 2 x 4 lumber, reinforcing it, and placed in the locations specified and designated by the Owner's Representative. Any seams in the critical barriers shall be sealed airtight with caulking or an approved equal method. These barriers shall be removed by the Asbestos Abatement Subcontractor at the completion of construction work.

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 Federal Register, Volume 51, Number 119, June 20, 1986. 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. (k)(1)(ii). The signs will read as follows:

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

3. The signs shall be posted at the perimeters of asbestos removal, demolition or construction areas where the asbestos-containing material to be removed exists.
4. The Asbestos Abatement Subcontractor shall maintain all temporary and critical barriers, facilities and controls as long as needed for the safe and proper completion of the work. 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.
5. 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 PREPARATION AND DECONTAMINATION UNIT**

#### **A. Preparation**

1. The Asbestos Abatement Subcontractor shall prepare the roof work area by installing critical barriers and sealing any roof top openings near roof abatement areas. Critical barriers consist of the boundaries of the work area including roof hatches, roof level windows and any constructed barrier to restrict public access to the work area. HVAC systems shall be shutdown and sealed, where applicable, as described previously with two layers of 6 mil polyethylene sheeting.

#### **B. Decontamination Unit and Procedures**

**Waltham Community Center  
Roof Replacement**

1. It is the Asbestos Abatement Subcontractor's responsibility to provide a remote decontamination unit consisting of an Equipment Room, Shower, and Clean Room for personnel involved in asbestos removal. Each of the three rooms shall be of sufficient size to accommodate authorized personnel and related equipment. Each room shall be separate of other rooms by a double flap of six (6) mil. polyethylene sheeting acting as an airlock. This shall be designed to minimize fiber migration and airflow between the decontamination unit rooms. The rooms shall be framed with 2"x 4" lumber, masked, sealed and attached to the entry/exit ways of asbestos work areas. The three rooms together shall be referred to as the Decontamination Unit.
2. The Equipment Room shall serve as a transfer room and an intermediate area between the work area and any decontamination procedures to occur in the shower room. This room shall be vacuumed and washed whenever necessary in order to prevent asbestos dust and debris accumulations or when required by Consultant. The Equipment Room will also serve as an access area to the shower for personnel leaving the work area. Workers leaving the containment shall remove and dispose of disposable protective suits and wear only respirators into the Shower. At the end of each day, bags of asbestos waste and contaminated materials shall be removed after a thorough decontamination procedure as described in the contract Sections. Workers performing this operation will wear respirators and disposable full-body protective suits.
3. The Shower Room shall have a continuous supply of cold and hot water, and be suitably arranged for complete showering during decontamination. The Shower Room with curtained doorways will comprise an airlock between contaminated and clean areas. All materials being passed from the equipment room to the clean room must pass through the shower and be thoroughly decontaminated. The shower floor will not be allowed to sit at ground level, but must be elevated a minimum of six inches off of the floor with a suitable catch basin for drainage into a filtration system. The shower will be equipped with a sump pump and an in-line two stage filter. The first stage will efficiently filter fibers greater than twenty (20) microns in length and the second stage will filter bulk material and fibers greater than five (5) microns in length. Alternatively, shower water may be re-routed back into the work area to be bagged and disposed of as asbestos contaminated waste. The Asbestos Abatement Subcontractor shall provide disposable towels and soap in the shower area.
4. The Clean Room shall store asbestos worker's 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 Asbestos Abatement Subcontractor shall provide space in the clean room for the worker's personal clothing. This may be in the form of hangers or lockers.

**3.03 REMOVAL AND DISPOSAL OF CATEGORY I NON-FRIABLE ASBESTOS-CONTAINING ROOFING MATERIALS**

A. Because asphalt based roofing material is classified as non-friable material, regulations for the removal of roofing material are less stringent if certain procedures are followed. Category I non-friable asbestos-containing roofing materials shall be removed from the roof and disposed in accordance with all regulations of applicable federal, state and local authorities concerning roofing materials, including the Interpretive Rule for Roof Removal Operations under the Asbestos NESHAP (40 CFR 61, Appendix A to Subpart M). The Department of Environmental Protection (DEP) has a policy statement that addresses the requirements for handling Category I non-friable asbestos-containing roofing materials. If these provisions are followed, as outlined below, the roof removal does not have to be performed by a licensed Asbestos Abatement Contractor and can be performed by an approved properly trained Roofing Contractor. In addition, the following minimum work practices shall be adhered to:

1. Asbestos Abatement Subcontractor shall post all OSHA required signage.
2. Persons not involved in the removal shall be excluded from the roof areas.
3. Workers shall wear protective clothing and respirators.
4. All openings into building near the work area shall be sealed with polyethylene sheeting or other appropriate covering.
5. A minimum of a remote three-chambered worker decontamination enclosure system shall be provided on site in accordance with OSHA 29 CFR 1926.1101, Appendix G. Procedures for the utilization of this system shall be established which prevent contamination of areas outside the roof area.
6. Category I Non-friable ACM shall be removed in small sections and containerized when wet. At no time shall material be allowed to accumulate or become dry.
7. The roofing materials shall be wetted down with amended water and shall be maintained in damp condition throughout the demolition and disposal process. Mechanical methods of cutting are prohibited unless performed in accordance with this section (i.e., such as an RB roof cutter). An RB roof cutter means an engine-powered roof cutting machine with one or more rotating cutting blades the edges of which are blunt. (Equipment with blades

having sharp or tapered edges, and/or which does not use a rotating blade, is used for "slicing" rather than "cutting" the roofing material; such equipment is not included in the term "RB roof cutter").

8. Category I Non-friable ACM shall not be dropped or thrown to the floor/ground level. For roofs of heights greater than fifty (50) feet above the floor/ground, a dust-tight enclosed chute shall be constructed to transport removed Category I Non-friable ACM to containers on the floor/ground. Category I Non-friable ACM may be dropped to a raised scaffold or containerized at elevated levels for disposal.
  9. All Category I Non-friable ACM shall be adequately wetted before being placed into containers for disposal. Dispose of all non-friable, Category I asbestos-containing roof material and associated demolition debris in a landfill that legally accepts the material.
  10. A coating of encapsulating agent shall be applied to any porous surfaces that have been stripped of Category I Non-friable ACM to securely seal any residual fibers that may be present. The encapsulating agent should be chosen so as to be compatible with subsequent coverings.
  11. Clean-up procedures using HEPA vacuuming and wet cleaning techniques shall be performed following abatement in each area to ensure that all dust and roofing debris is removed.
  12. Personnel air monitoring of asbestos abatement workers, which demonstrates compliance with the provisions of OSHA 29 CFR 1926.1101 (f), may be used in lieu of clearance air sampling requirements.
- B. If the work involves using a RB roof cutter (or device that similarly damages roofing material) to cut Category 1 asbestos containing roofing material, the dust and debris resulting from the cutting roof should be collected as soon as possible after the cutting operation, and kept wet until collected and placed in leak-tight containers. Where the blade guard completely encloses the blade and extends down close to the roof surface and is equipped with a device for spraying a fine mist of water inside the blade guard, and the spraying device is in operation during the cutting, most of the dust and debris from cutting will be confined along the cut. The most efficient methods to collect the dust and debris from cutting are to immediately collect or vacuum up the damaged material where it lies along the cut using a HEPA- filtered vacuum cleaner that meets the requirements of 40 CFR 61.152 to clean up as much of the debris as possible, or to gently sweep up the bulk of the debris, and then use a filtered vacuum cleaner that meets the requirements of 40 CFR 61.152 to clean up as much of the remainder of the debris as possible.

### 3.04 DECONTAMINATION/WORK PROCEDURES

- A. In order to avoid possible exposure to dangerous levels of asbestos, and to prevent possible contamination of areas outside the demarcated work zone, work shall follow the guidelines listed below.
1. At no time shall a worker entering the containment area go further than the Clean Room of the Decontamination Unit without a respirator and protective clothing.
  2. Before leaving the work area, the worker shall remove all gross contamination and debris from the coveralls. In practice this is carried out by one worker assisting another.
  3. All equipment used by the workers inside the demarcated work area shall be either left in the Dirty Room of the Decontamination Unit or thoroughly decontaminated before being removed from the area. Extra work clothing (that in addition to the disposable garments supplied by the Asbestos Abatement Subcontractor) shall be left in the Dirty Room of the Decontamination Unit until the completion of work in that area.
  4. All persons leaving the work area must shower before leaving the regulated area.
  5. Under no circumstance shall workers or supervisory personnel be allowed to eat, drink, smoke, chew gum, or chew tobacco in the work area; to do so shall be grounds for the Consultant to stop all removal 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.
  6. As with additional clothing, all footwear shall be left inside the work area until the completion of the job, then cleaned or discarded.

### 3.05 PACKING AND DISPOSAL OF ASBESTOS WASTE

- A. Waste removal procedure shall be done in accordance with all regulations as set forth by the agencies having authority to regulate.
- B. The Asbestos Abatement Subcontractor shall provide proof that disposal sites for the waste materials have current and valid permits in order to dispose of non-friable asbestos waste at the time of the pre-construction meeting.

- C. Receipts shall be obtained by the Asbestos Abatement Subcontractor from the dumping site(s), and submitted to the Owner upon request for final payment.
- D. Warning labels having permanent, waterproof print and adhesive shall be affixed to all bags, trucks, drums (lids and sides), and other containers used to store and/or transport asbestos-containing material and must conform to the latest OSHA, EPA and DOT labeling requirements. Labels must be conspicuous and legible and contain the following warning:

CONTAINS ASBESTOS FIBERS  
AVOID CREATING DUST  
CANCER AND LUNG DISEASE HAZARD
- E. The Asbestos Abatement Subcontractor shall be responsible for all necessary precautions to prevent pollution by spilling during the performance of services and transportation and shall assume full responsibility for all Asbestos Abatement Subcontractor caused spills, which shall be cleaned up at the Asbestos Abatement Subcontractor's expense.
- F. Temporary storage of asbestos waste on-site must be approved by the Owner.
- G. All waste shall be thoroughly wetted when packaged for disposal. Acceptable packaging includes double bagged in 6 mil waste disposal bags, double wrapped in 6 mil polyethylene sheeting, and/or loaded into a lined dumpster with two 10 mil preformed liner and sealed air tight

**3.06 HOUSEKEEPING**

- A. Throughout the work period, the Asbestos Abatement Subcontractor shall maintain the building and site in a standard of cleanliness as specified throughout these Sections.
  - 1. Contaminated disposable clothing, respirator filters, and other debris shall be bagged and sealed at the end of each work day.
  - 2. All asbestos generated by either removal or repair, shall be bagged immediately and not allowed to be left exposed at the end of each work day.
  - 3. Respirators shall be thoroughly cleaned at the end of each work day and stored for the next day's use.
  - 4. The Asbestos Abatement Subcontractor shall retain all stored items in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection materials.



5. The Asbestos Abatement Subcontractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the work.
6. The Asbestos Abatement Subcontractor shall provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.
7. Daily, and more often if necessary, the Asbestos Abatement Subcontractor shall inspect the work areas and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
8. The Asbestos Abatement Subcontractor shall maintain the site in a neat and orderly condition at all times.

### **3.07 AIR MONITORING**

- A. During removal, area samples may be collected by the Consultant outside the roof work area, just outside the clean room, inside the regulated area and inside the building. The Asbestos Abatement Subcontractor shall be responsible for all OSHA personal sampling.

### **3.08 WORK REVIEW**

- A. Consultant will review the Asbestos Abatement Subcontractor's work practices prior to the start of and during all asbestos related work and will report any Section violations to the Asbestos Abatement Subcontractor. If the Asbestos Abatement Subcontractor fails to correct deficiencies in a timely manner, the Owner will be notified in writing, and work may be stopped. The Consultant will review the containment structure and negative air conditions before work begins and after the Asbestos Abatement Subcontractor Site Supervisor has given approval. Outside airborne fiber concentrations must not exceed 0.010 fibers/cc or pre-abatement levels, whichever is greater. If concentrations exceed this level, then work must be stopped, conditions reviewed as to the probable cause, and then corrected.
- B. Consultant will keep a daily log of the Asbestos Abatement Subcontractor's work practices and will make these daily logs a part of the final project documents.
- C. In addition to various daily inspections of engineering controls and work practices, Consultant will make three (3) mandatory inspections throughout the removal work. These inspections include: a pre-abatement visual inspection, a post-abatement visual inspection, and a post-teardown visual inspection.

- D. Each inspection must be requested by the Asbestos Abatement Subcontractor and performed by Consultant, to the satisfaction of the Consultant, and be signed off by the Consultant, before work is to continue on next task in the phase. Failure on the part of the Asbestos Abatement Subcontractor to obtain sign-off before proceeding is regarded as a serious violation of the contract and unacceptable.

END OF SECTION



Section 04 00 01  
MASONRY

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Division 00 and 01 are hereby made a part of this section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this section.

**1.02 SCOPE OF WORK**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, included but not limited to the following:
  - 1. Cutting of new reglet joints for the installation of flashing and counter flashing as indicated on the drawings.
  - 2. Repoint of existing brick work as indicated on the drawings.
  - 3. Removal an installation of new brick work in conjunction of installation of new flashings as shown on the drawings
  - 4. Coring and rebuilding of exterior brick walls for the installation of new overflow roof drains as indicated on the drawings.
  - 5. Furnishing and installing all temporary shoring, and bracing of all existing masonry as required to perform the work as indicated on the drawings.
- B. Related Work: The following items of work are not included in this Section and are specified under the designated Sections
  - 1. SECTION 01 50 00 – TEMPORARY FACILITIES
  - 2. SECTION 01 22 00 – UNIT PRICES
  - 3. SECTION 07 62 00 – SHEET METAL FLASHING AND TRIM
  - 4. SECTION 22 00 00 – PLUMBING

**1.03 REFERENCES**

- A. National standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable subject to their timely submission, review and acceptance by the Designer.
  - 1. ASTM A955/955M – Stainless Steel Bars for Concrete Reinforcement
  - 2. ASTM A 167 – Standard Specification for Stainless and Heat-Resistant Chromium-Nickle Steel Plate, Sheet and Strip; 1996
  - 3. ASTM C90 Standard Specification for Loadbearing Concrete Masonry Units
  - 4. ASTM C140 Standard Test Method for Sampling and Testing Concrete Masonry Units
  - 5. ASTM C150 Standard Specification for Portland Cement
  - 6. ASTM C270 Standard Specification for Mortar for Unit Masonry

7. ASTM C476 Standard Specification for Grout for Unit Masonry
8. ASTM C1019 Standard Test Method for Sampling and Testing Grout
9. ASTM C1314 Standard Test Method for Compressive Strength of Masonry Prisms
10. ASTM C1586 Standard Guide for Quality Assurance of Mortars

#### **1.04 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Product Literature: Submit manufacturer's printed literature indicating product information correlated to specified requirements.
- C. Certificates: Prior to delivery, submit certificates attesting compliance with the applicable specifications for grades, types, or classes of all masonry materials.
- D. Manufacturers recommended masonry cleaning agent and application procedure.
- E. Provide a 4 square foot sample of repointing for approval of re-pointing methods and resulting appearance and mortar color.

#### **1.05 QUALIFICATIONS**

- A. Installer: Company specializing in performing the work of this section with a minimum of five years documented experience in all aspects of the work of this Section.

#### **1.06 GUARANTEE/WARRANTY**

- A. Attention is directed to the provisions of the CONDITIONS OF THE CONTRACT regarding guarantees/warranties for the Work.
- B. Manufacturers shall provide their standard guarantees/warranties for work under this Section. However, such guarantees/warranties shall be in addition to and not in lieu of all other liabilities which the manufacturers, the Contractor and the Subcontractors may have by law or by other provisions of the Contract Documents.

#### **1.07 TESTING AND INSPECTION**

- A. Testing and inspection of mortar and mortar materials shall be performed by a Testing Laboratory selected and paid for by the Owner.
- B. Use no mortar materials in the work without prior testing and written approval of the Testing Laboratory and Designer. Submit materials to the Testing Laboratory at least three weeks, and preferably five weeks, in advance of proposed first use in the structure for subjection to the prescribed basic acceptance test and determination of basic mixtures.
- C. At the start of field operations, and periodically during the course of work, the laboratory may perform tests of mortar materials and mortar to assure compatibility with these Specifications and the originally approved samples. Number and frequency of tests shall be determined by the Designer.

#### **1.08 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Carefully handle all materials in transit and on the site so as to keep units whole, edges sharp and faces clean and undamaged.

- B. Protect masonry units of all types from wetting by rain or snow and keep covered when not in use.
- C. Deliver and store manufactured materials such as cement and lime in their original containers, plainly marked with product identification and manufacturer's name.
- D. Materials in broken containers or in packages showing water marks or other evidence of damage shall not be incorporated into the work and shall be removed from the site.

**1.09 ENVIRONMENTAL CONDITIONS AND PROTECTION**

- A. Perform no masonry work when the temperature is below 38 deg. F. unless provisions for heating and drying the materials and protecting the completed work comply with the "Recommended Practice for Cold Weather Masonry Construction" of the International Masonry Industry All-Weather Council and approved by the Designer.
- B. Do not build upon frozen work. Do not lay masonry units having a film of water or frost on their surfaces.
- C. Protect masonry construction from direct exposure to wind and sun when erected in an ambient air temperature of 99 deg. F. in the shade with relative humidity less than 50%.
- D. Protect masonry from rain and snow until the work is complete and the mortar has set. Protect with strong waterproof membrane well secured in place, or other suitable protective methods.

**PART 2 - PRODUCTS**

**2.01 Brick Masonry**

- A. Brick units exposed to view shall water struck brick, smooth faced, free of chips, cracks or other imperfections new brick shall match the existing brick to be replaced in size, color, texture and shape and shall meet the requirements of ASTM C 216, Grade SW, FBS for exterior use.
- B. Purchase all brick units from single manufacturer.
- C. Masonry units shall be sound and true to plane and line. They shall include all shapes and sizes as shown on the Drawings. No damaged units will be allowed to be used.

**2.02 MORTAR MATERIALS AND GROUT MATERIALS**

- A. Cement: American Portland Cement conforming to ASTM C150, Type I or II as selected by the Designer for color. For exterior masonry, the cement shall exhibit no efflorescence when cast into the form of 2 in. by 7 in. by 1/2 in. slabs and subjected to a 7-day "wick test" in general conformity with the methods described in ASTM C67.
- B. Water: Potable
- C. Sand: Well graded masonry sand conforming to ASTM C144.
- D. Lime: Plastic hydrated lime conforming to ASTM C207, Type "N" as manufactured by: Graymont Dolime Inc., USM Masonry Products, Old Castle Materials or approved equal.
- E. Mortar Pigments: Mortar Pigments: Natural and synthetic iron oxides and chromium oxides, compounded for use in mortar mixes. Use only pigments with a record of satisfactory performance in masonry mortar.

1. Available Products:
  - a. LanXess; Bayferrox Iron Oxide Pigments.
  - b. Davis Colors; True Tone Mortar Colors.
  - c. Solomon Grind-Chem Services, Inc.; SGS Mortar Colors
- F. Aggregate for Mortar: ASTM C 144. For mortar that is exposed to view, use washed aggregate consisting of well graded natural sand.
- G. Aggregate for Grout : ASTM C 404
- H. Mortar mix materials to produce mortar cubes having the compressive strength of 750 psi (5.2 Mpa) at 28 days when tested in accordance with Property Specification Table 2 or reference standard C270.
  1. Proportion specification for mortar:
    - a. Part by volume Portland Cement.
    - b. Part by volume Hydrated Lime.
    - c. Parts by volume sand, as measured damp.

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Verify that field conditions are acceptable and are ready to receive work.
- B. Verify items provided by others sections of work are properly sized and located.
- C. Verify that built-in items are in proper location and ready for roughing into masonry work.
- D. Beginning of installation means installer accepts existing conditions.

#### **3.02 MORTAR MIXING**

- A. Mortar: Comply with ASTM C270 and Massachusetts State Code 8th Edition:
  1. Use Type N mortar, as defined in 2.02 herein.
- B. Admixtures:
  1. Add coloring agents to mortar for brick masonry units exposed to view in the quantity and manner recommended by the manufacturer to match existing mortar.
- C. Mixing:
  1. Mortar shall be machine mixed. Cement and hydrated lime may be batched by the bag. Sand preferably shall be batched by weight, but subject to the approval of the Designer, may on certain small operations be batched by volume in suitably calibrated containers, provided proper allowance is made for weight per cubic foot, contained moisture, bulking and consolidation. Shovel measurement shall not be used.
  2. Workability or consistency of mortar on the board shall be sufficiently wet to be worked under the trowel. Water for tempering shall be available on the scaffold at all times. Mortar which has begun to "set" or is not used within two and one-half hours after initial mixing shall be discarded. Mortar which has stiffened due to evaporation within the two

and one-half hour period shall be retempered to restore its workability. Retempering the mortar at the mixer shall not be permitted.

### **3.03 MASONRY WORK IN GENERAL**

- A. All masonry work shall be performed by skilled workers under adequate supervision, and shall be laid true to lines and levels, with coursing indicated and with joints of uniform thickness, all surfaces true, and corners straight and plumb.
- B. Examine all Drawings as to requirements for the accommodation of work of other Subcontractors and provide all required recesses, chases, slots, cutouts and built-ins and other items occurring in the masonry work. Take every precaution to minimize future cutting and patching.
- C. No masonry work shall be performed in temperature below 38 deg.F and falling without the expressed approval of the Designer. Anti-freeze admixtures shall not be permitted. Any completed work found to be affected by freezing shall be taken down and rebuilt.
- D. Provide complete protection against breakage and weather damage to all masonry work. Masonry, when not roofed over, shall be positively protected at all times when Masons are not working on the walls. Tarpaulins shall be applied and properly weighted or nailed to assure their remaining in place to protect masonry from all possible hazards. All tarpaulins used shall have UL approval and comply with Federal Specifications CCC-C746. Polyethylene shall not be used.

### **3.04 MORTAR BEDDING AND JOINTING**

- A. Lay masonry units as follows:
  - 1. With head and bed joints fully imbedded in mortar. Both head and bed joints of equal joint spacing and of equal depth.
  - 2. Tool exposed joints slightly concave when thumbprint hard, using a jointer larger than joint thickness, unless otherwise indicated.
  - 3. Cut joints flush for masonry walls to receive plaster or other direct-applied finishes (other than paint), unless otherwise indicated.

### **3.05 COLD WEATHER REQUIREMENTS**

- A. There is to be no cold weather installation without prior approval of Designer. If approval given, comply with cold weather construction specifications in BIA Technical Note 1A and NCMA-TEK 16:
- B. Maintain masonry above 32 deg. F for 24 hours minimum using insulated blankets or headed enclosures. Construct windbreaks at wind velocities over 15 mph. Maintain mortar on board at 40 deg. F minimum, heating mixing water and sand as required.
- C. Sprinkle units with high rates of absorption with heated water. If standard instead of Type III high-early strength cement must be used, maintain installed masonry above freezing for 48 instead of 24 hours.
- D. Do no masonry work at temperatures below 38 deg. F and falling or 35 deg. F and rising, until Designer has approved cold weather construction procedures.



### 3.06 REPOINTING

#### A. EXAMINATION

1. Review locations to be repointed with Designer prior to removing existing mortar or applying new mortar.

#### B. REMOVE EXISTING MORTAR

1. Existing vertical and horizontal mortar joints are to be cut out by masons skilled in this work.
2. All joints shall be cut out back to sound, solid, back up material. Cutting out shall leave a clean, square face at the back of the joint to provide for maximum contact of pointing mortar with the existing masonry back up mortar. Shallow or feather edging will not be permitted.
3. Do not widen the existing masonry joints. Do not spall, chip or cut or saw into the edges of surrounding masonry in the process of mortar removal. Any damage to surrounding brick or other masonry elements resulting from mortar removal shall not be accepted. The Contractor shall replace brick or other masonry elements damaged during mortar removal with replacement units that match the original as determined by the Designer.
4. Brush joint faces and vacuum debris from joint to remove dirt and loose debris, working from top to bottom of wall.

#### C. MORTAR REMOVAL DEPTH

1. Existing mortar joints shall be cut out to a whichever depth is greatest:
  - a. 5/8 inch.
  - b. 2-1/2 times the width of the existing mortar joint.
  - c. Until bonded, cohesive existing mortar is encountered.

#### D. PREWETTING

1. Brush joint faces and flush out joints with water to remove dirt and loose debris, working from top to bottom of wall. Rinse brick and cast stone joints with water to remove dust and mortar particles. Thoroughly wet wall below to avoid soiling. Joint surfaces should be damp but free from standing water.
2. Prior wetting is necessary to achieve the proper absorption rate before masonry repair commences and is essential to good masonry practice. Presoak walls and joints with water as required by project and weather conditions. During hot or windy weather, wet walls and joints several times in advance of repointing. Re-wet walls and joints yet to be repointed if masonry dries out before repointing. Masonry units shall be damp but without standing water at the time of pointing.
3. Maintain hand mister bottles or a sprayer with clean, clear, potable water immediately available to masons at all times during the repointing process. A very low pressure spray hose with nozzle adjusted to a fine, low-volume mist may be used over large areas providing erosion of joints is prevented.
4. Exposed surface of masonry adjacent to joint shall be wet prior to repointing.

**E. INSTALLATION OF NEW MORTAR**

1. Joints shall be pointed in layers or "lifts" where the joints are deeper than 3/4 inch.
2. Joints greater than 3/4 inches deep shall be pointed with an initial lift to bring the joint depth to a uniform 3/4 inches deep.
3. Compact each layer at the time it is placed in the joint by applying firm pressure with the pointing tool.
4. Allow each lift to become thumbprint hard before applying the next lift.
5. Finish joints uniformly. Do not overwork. Leave the surface of the masonry clean.

**F. CLEANING**

1. Maintain clean surfaces on the face, sills, ledges, and projections of masonry on a daily basis.
2. With a trowel, strike off minor dabs of adherent mortar from face of masonry.
3. Remove minor mortar marks from masonry by misting with water and brushing with a small, stiff-bristle brush.

**G. CURING**

1. Keep mortar from drying out too quickly.
2. Mist walls with water as required by project and weather conditions to insure slow curing of the mortar.
3. Shield from direct sun and drying winds for the first 48 hours after installation.

**3.07 REPRESENTATIVE SAMPLE**

- A. Masons to prepare a 4 square foot sample of repointed masonry for each type of masonry to be repointed for review and approval by the Designer prior to proceeding with remainder of repointing work. This sample shall remain through the execution of the work for comparison to all subsequent repointing of masonry.

**END OF MASONRY**



**Section 05 50 00  
METAL FABRICATIONS**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B area hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this section.

**1.02 SECTION INCLUDES**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Repair to gravity vent canopy steel framing with stainless steel components and fasteners as indicated on the drawings.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and will be performed under the designated Sections:
  - 1. Section 01 50 00 – TEMPORARY FACILITIES AND CONTROLS:
    - a. Staging over eight feet in height.
  - 2. Section 06 10 00 – ROUGH CARPENTRY:
    - a. Bolts, anchors, and other fastening devices required to secure wood members to new galvanized steel framing.

**1.04 REFERENCE STANDARDS**

- A. American Institute of Steel construction (AISC)
  - 1. AISC Spec Design, Fabrication, and Erection of Structural Steel for Buildings
- B. American Society for Testing and Materials (ASTM)
  - 1. ASTM A36 Structural Steel
  - 2. ASTM A53 Pipe, Steel, Black and Hot-Dipped Zinc-Coated Welded and Seamless
  - 3. ASTM A123 Zinc (Hot-Dip-Galvanized) Coatings on Iron and Steel Products
  - 4. ASTM A153 Zinc Coating (Hot-Dip) on Iron and Steel Hardware
  - 5. ASTM A239 Test for Uniformity of Coating by the Preece Test (Copper Sulfate Dip) on Zinc-Coated (Galvanized) Iron or Steel Articles
  - 6. ASTM A307 Carbon Steel Externally and Internally Threaded Standard Fasteners
  - 7. ASTM A366 Steel, Carbon, Cold-Rolled Sheet, Commercial Quality
  - 8. ASTM A525 Steel Sheet, Zinc-Coated (Galvanized) by the Hot-Dip Process, General Requirements
  - 9. ASTM A569 Steel Carbon (0.15 Maximum Percent) Hot-Rolled Sheet and Strip, Commercial Quality 02/01/2010 05500-3

10. ASTM B221 Aluminum-Alloy Extruded Bars, Rods, Shapes and Tubes
  11. ASTM B308 Aluminum-Alloy Standard Structural Shapes, Rolled or Extruded
  12. Stainless steel plate: Type 304 Stainless – ASTM A480
- C. American Welding Society (AWS)
1. AWS Code Standard Code for Arc and Gas Welding in Building Construction

#### **1.05 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Shop Drawings:
1. Submit Shop Drawings for each item or assembly specified. Shop drawings shall accurately and clearly show in detail the construction, sizes, gauges, dimensions, method of assembly, supports, and all other pertinent data and information required for checking.
  2. Provide setting drawings and templates for the location of metal fabrication items that are to be embedded in or anchored to concrete or masonry or other dissimilar materials.

#### **1.06 QUALITY ASSURANCE**

- A. The Standards, Specifications, and Codes included in respective articles as well as the ones following shall apply:
1. American Hot-Dip Galvanizer's Association: Standard Specification.
  2. American Welding Society: Standard Code for Welding in Building Construction - as modified by the 1963 publication in 3.
  3. American Institute of Steel Construction: Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
- B. Welders' Qualifications: Welding shall be performed by certified welders qualified in accord with procedures specified in American Welding Society Standard in accordance with AWS D1.1 using procedures and materials and equipment of the type required for the work.

#### **1.07 GUARANTEE/WARRANTY**

- A. Attention is directed to the provisions of the CONDITIONS OF THE CONTRACT regarding guarantees/warranties for the Work.
- B. Manufacturers shall provide their standard guarantees/warranties for work under this Section. However, such guarantees/warranties shall be in addition to and not in lieu of all other liabilities which the manufacturers, the Contractor and the Subcontractors may have by law or by other provisions of the Contract Documents.

### **1.08 FIELD MEASUREMENTS**

- A. Verify at the site conditions affecting work of this Section, and obtain accurate dimensions covering all parts thereof for incorporation in shop drawings submitted before fabrication of the work.
- B. Verify dimensions before fabricating materials to ensure proper coordination.

### **1.09 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Store all metal fabrication items under cover and off the ground. Handle in such a manner so as to protect surfaces and to prevent distortion of, and any other type of damage to, fabricated pieces.
- B. Deliver metal work fully sealed and identified. Protect from damage from any source. Provide removable protection as required.

### **1.10 COORDINATION**

- A. Coordinate metal fabrication work with the work of other trades. Take all necessary field measurements before starting fabrication.
- B. Furnish to the applicable Subcontractors all metal fabrication items that are to be built into work of other trades, and furnish all necessary templates and information required by those trades to properly locate such items. Furnish items to be built-in in time so as to avoid later cutting and patching.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS**

- A. Metal Surfaces, General: For fabrication of metal fabrication work which will be exposed to view in the finished work, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
- B. Structural Steel Shapes: ASTM A36.
- C. Steel Plates for Bending or Cold Forming: ASTM A283, Grade C. Thickness shown for raised pattern safety plates is exclusive of projected pattern.
- D. Steel Tubing: ASTM A501; hot-formed, furnace butt welded or seamless process.
- E. Steel Bars and Bar Size Shapes: ASTM A675, Grade 65, or ASTM A36.
- F. Cold Rolled Carbon Steel Sheets: ASTM A366.
- G. Galvanized Carbon Steel Sheets: ASTM A526, galvanized in accordance with ASTM A525, Coating Designation G90.
- H. Steel Pipe: ASTM A53, Type E or S, Grade B, standard weight [Schedule 40], unless otherwise indicated or required to satisfy performance criteria.
- I. Anchors and Inserts: Provide anchors and inserts for attachment of ornamental items to masonry and concrete. Anchors and inserts shall be non-corrosive and compatible with contiguous metals.
- J. Welding Electrodes: Type and alloy recommended by the producer of the metal to be welded and as required for color match, strength and compatibility in the fabricated items.

- K. Zinc-Rich Paint: "ZIRP" by Duncan Galvanizing, "Z.R.C." by Sealube Company, or equal. Use for repairing abraded galvanized surfaces and for painting field welds.
- L. Stainless steel plate: Type 304 Stainless – ASTM A480

## **2.02 FABRICATION AND WORKMANSHIP**

- A. Include supplementary parts necessary to complete metal fabrication work though not definitely shown or specified.
- B. Verify measurements and dimensions at the job site and cooperate in the coordination and scheduling of the work of this Section with the work of related trades, with particular attention given to the installation of items embedded in concrete and masonry, so as not to delay job progress.
- C. Form exposed work true to line and level with accurate angles and surfaces and straight sharp edges. Ease exposed edges to a radius of approximately 1/32 in., unless otherwise shown. Form bent metal corners to smallest radius possible without causing grain separation or otherwise impairing work.
- D. Form exposed connections with hairline joints, flush and smooth; using concealed fasteners where possible. Exposed threaded portion of bolts and screws shall be cut off flush with adjacent metal. Cut, drill, punch and tap as required for the installation and attachment of other work to metal fabrication work.
- E. Form metal work built into concrete or masonry with its own anchorage, or provide suitable anchors, expansion shields, or other anchoring devices shown or required to provide support for intended use. Furnish such metal work in ample time for setting and securing in place.
- F. Make joints as strong and rigid as adjoining sections. Make welds continuous along entire line of contact, except where spot welding is indicated. Grind exposed welds flush and smooth to match and blend with adjoining surfaces. Where bolted or riveted connections are indicated, such connections may be welded.
- G. Make up threaded connections tight so that threads are entirely concealed. Shoulder and head, dowel and pin abutting bars. Provide bolt and screw heads flat and counter sunk in exposed work and elsewhere as required. Carefully machine, fit and secure removable members by means of Allen-head set screws of proper size and spacing.
- H. Preassemble items in shop to greatest extent possible to minimize field splicing and assembly. Following trial fit; disassemble units only as necessary for shipping and handling limitations. Clearly mark units for reassembly and coordinated installation. Provide alignment and splice plates for accurate field fit.

## **2.03 SLEEVES**

- A. Sleeves through masonry or concrete shall be standard weight wrought iron or galvanized steel, size to allow 1/4 in. between sleeves and pipe. Length of sleeves shall be 1/2 in. less than total thickness of wall or slab in order to provide for application of sealant.

## **2.05 GALVANIZING**

- B. Reference Standards: Hot-dip galvanizing for items of work specified in this Section shall conform to the following American Society for Testing and Materials Standard Specifications:

Metal Fabrications  
Section 05 50 00  
4 to 6

1. ASTM A153 - Specifications for Zinc Coating [Hot-Dip] on Iron and Steel Hardware [weight of coating to be not less than 1.25 oz. per sq. ft.]
2. NOTE: All items to be galvanized shall be galvanized after fabrications. All galvanizing steel shall be dipped in a 0.2 percent chromic acid solution.

C. Quality Assurance:

1. Mark all hot-dip galvanized material with a stamp indicating the appropriate ASTM Designation and the number of ounces per square foot of zinc coating, similar to the Duncan stamp.
2. The galvanizer shall, with the initial shipment of items to the project site, submit two notarized affidavits certifying compliance with referenced standards specified herein to the Quality Assurance Representative.

D. Items of Work Requiring Galvanizing:

1. All sleeves, bolts, nuts, and other hardware in conjunctions with galvanized items of work.
2. All other metal fabrications specifically noted on the Drawings to be galvanized.

**PART 3 - EXECUTION**

**3.01 ERECTION IN GENERAL**

- A. Take all measurements required at the building. Check measurements; compare dimensions and other data with various trades installing adjoining work to assure proper coordination.
- B. Carefully handle and stack all materials to prevent deformation and damage. Take care to prevent damage to the shop coat of paint and to prevent the accumulation of mud, dirt or other foreign matter on the metal work. Remove all such dirt prior to erection.
- C. Do all drilling and fitting, cutting, welding, bolting and riveting required to erect, install and fit metal work to adjoining work. Conform to AISC Code. Furnish all screws, bolts, anchors, etc. required to attach metal work securely to adjoining work.
- D. Do not cut or alter members in the field without the Architect's approval. Do not enlarge unfair holes by burning and forcing, but correct by reaming.
- E. Erect work square, plumb and true, accurately fitted, and with tight joints at intersections. Unless otherwise shown, weld all connections which will be exposed and grind smooth to the touch.
- F. After installation, touch up field cuts in galvanized work with two coats of the specified zinc-rich coating.
- G. Protect finished surfaces against damage during subsequent construction operations and remove such protection at time of substantial completion.
- H. Deliver items which are to be built into the work of other Sections in time so as not to delay the progress of the work.
- I. Align and adjust members forming a complete frame or structure before securely fastening by bolt and/or welding.



- J. Connections not noted for welding shall be bolted.
- K. Bolt holes shall be drilled or punched, not burned.

**END OF METAL FABRICATIONS**

Section 05 52 00  
PORTABLE RAILING SYSTEM

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Portable, free-standing guardrail system for:
  - 1. Roof Railings.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are Specified under the designated Sections:
  - 1. Section 07 51 00 POLYVINYL-CHLORIDE ROOFING

**1.04 REFERENCES**

- A. OSHA 29 CFR 1926.500-503.
- B. OSHA 29 CFR 1910.23.

**1.05 SUBMITTALS**

- A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. Manufacturer's data sheets on each product to be used, including:
  - 1. Preparation instructions and recommendations.
  - 2. Storage and handling requirements and recommendations.
  - 3. Installation methods.
- C. Shop Drawings: Complete details of entire railing layout, showing member sizes and part identification, fasteners, anchors, fittings and evidence of compliance with structural performance requirements.

**1.06 QUALITY ASSURANCE**

- A. Manufacturer Qualifications: Minimum of 15 years' experience manufacturing portable railing systems.
- B. Installer Qualifications: Multi- person crew capable of positioning base plates and installing portable railing systems according to manufacturer's instructions.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Store products in manufacturer's unopened packaging until ready for installation.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Garlock Safety Systems; 2601 Niagara Lane, Plymouth, MN; 877-791-4446
- B. CAI Safety Systems; 2161 Railroad Street, Corona, CA; 951-272-6999
- C. Fall Protection Systems; 224 N Highway 67, Florissant, MO 63031
- D. Or Approved Equal

### **2.02 DESIGN REQUIREMENTS**

- A. Structural Performance: Comply with requirements of applicable local, state, and federal codes.
- B. Structural performance of top rails and supports:
  - 1. Capable of withstanding a concentrated load of 200 pounds, applied to the top rail at any point and in any direction.
  - 2. Capable of withstanding a uniform load of 50 pounds per linear foot applied to the top rail horizontally with a simultaneous load of 100 pounds per linear foot applied vertically downward.
  - 3. Design need not provide for both concentrated and uniform loads to be applied concurrently.
- C. Structural performance of railing infill:
  - 1. Capable of withstanding a horizontal concentrated load of 200 pounds, applied to one foot square area at any point on the infill.
  - 2. Infill includes panels, intermediate rails, posts and other elements.
  - 3. Design need not provide for infill loads to be applied concurrently with top rail loading.

### **2.03 MATERIALS**

- A. Railing Sections.
  - 1. Rails: 1-5/8 inch O.D. by 0.065 inch wall HREW tubing.
  - 2. Height: 42 inches.
  - 3. Mid-rail: weld to posts at 21 inches below top rail.
  - 4. Finish: Epoxy powder coated.
    - a. Color: To be selected from Manufacturer's Standard Colors.
- B. Base Plates.
  - 1. Material: cast iron class 20B.
  - 2. Size: 1 foot 9-1/2 inches by 1 foot 9-1/2 inches.
  - 3. Carrying handles: built in with a center carrying hook for base transporter.
  - 4. Capacity: two railing sections and be able to accommodate adapter to support three or four intersecting rails on the same base.

5. Holes: Holes for permanent mounting and round holes for pins securing base to rail.
  6. Bottom of base must have a concave recess no less than 125 sq. inches to reduce rocking on uneven surfaces.
  7. Base plate must provide no less than 5 inches of leading edge substrate contact as concentrated load is applied to base.
  8. Finish: Epoxy powder coated.
    - a. Color: To be selected from Manufacturer's Standard Colors
  9. Four adhesive pads with directional non-skid resistant ridge pattern and minimum 28 sq. inches of substrate contact each: shall be adhered to the bottom of base plate to resist slippage on hard surfaces.
- C. Securing Pins.
1. Material: 1038H cold rolled steel.
  2. Lock: Klick-pin attached to chain to lock into pin shaft.
  3. Finish: Electroplate and zinc dichromate dipped

### **PART 3 - EXECUTION**

#### **3.01 EXAMINATION**

- A. Do not begin installation until substrates have been properly prepared.
- B. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

#### **3.02 PREPARATION**

- A. Clean surfaces thoroughly prior to installation.
- B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

#### **3.03 INSTALLATION**

- A. Install in accordance with manufacturer's instructions.
- B. Before installation, inspect all parts to insure no damaged parts are used.
- C. Railing must be secured to base with securing pins.

#### **3.04 PROTECTION**

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

### **END OF PORTABLE RAILING SYSTEM**



Section 06 10 00  
ROUGH CARPENTRY

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Division 00 and 01 are hereby made a part of this section.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work of this Section with that of all other trades affecting, or affected by, this Section. Cooperate with such trades to assure the steady progress of all work under the contract.

**1.02 SECTION INCLUDES**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. New wood blocking for installation of new roofing systems as indicated on the drawings.
  - 2. Replacement of deteriorated wood blocking to remain – See Section 01 22 00 UNIT PRICES.
  - 3. Provide ½” plywood substrate for installation of membrane flashing at walls.
  - 4. Repair of existing roof sheathing. – See Section 01 22 00 UNIT PRICES
  - 5. Repair of existing wall sheathing under copper cladding - See Section 01 22 00 Unit prices
  - 6. Repair of wood roof framing at gravity vents – See Section 01 22 00 UNIT PRICES
  - 7. Framing and sheathing of existing roof openings to be closed up as indicated on the drawings.
  - 8. Installation of self-adhered membrane flashing to isolate wood members from masonry surfaces as indicated on the drawings.
  - 9. Nails, bolts and fasteners for securing items of rough carpentry.
  - 10. All other rough carpentry items as required to complete the work of the Contract not otherwise specified to be furnished and installed under the other trade sections of the Specifications.
  - 11. Wood blocking, framing and plywood for temporary protection as required to complete the work of the contract.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are Specified under the designated Sections:
  - 1. Section 01 22 00 – Unit Prices
  - 2. Section 07 46 01 – Copper Wall Cladding
  - 3. Section 07 54 19 – Polyvinyl-Chloride Roofing
  - 4. Section 07 62 00 – Sheet Metal Flashing and Trim

**1.04 SUBMITTALS**

- A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. Affidavits: Submit affidavits from the supplier indicating the species, grade, and moisture content of framing lumber.

**1.05 GUARANTEE/WARRANTY**

- A. Attention is directed to the provisions of the GENERAL CONDITIONS regarding guarantees/warranties for the work.
- B. Manufacturers shall provide their standard guarantees/ warranties for work under this Section. However such guarantees/warranties shall be in addition to and not in lieu of all other liabilities which the manufacturers, the Contractor and the Subcontractors may have by law or by other provisions of the Contract Documents.

**1.06 REFERENCES**

- A. National standards referenced herein are included to establish recognized quality only. Equivalent quality and testing standards will be acceptable subject to their timely submission, review and acceptance by the Architect.

**1.07 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Keep rough carpentry work dry during delivery, storage and installation, and until finish is applied and building is enclosed. Provide for air circulation in stacks of lumber and plywood.

**PART 2 - PRODUCTS**

**2.01 GRADING REQUIREMENTS**

- A. Lumber Grading: Comply with "Simplified Practice Recommendations PS-20, American Softwood Lumber Standards" by U.S. Department of Commerce, and with the applicable lumbermen's association rules under which each species of lumber is produced.
- B. Plywood Grading: Comply with U.S. Products Standard PS-1.
- C. Grade Marking: Factory mark each piece of lumber and plywood with the official grade mark of the appropriate or authorized inspection service under whose rules the lumber is graded.
- D. Sizes and Patterns: Provide lumber which is dressed S4S and worked to such patterns as shown or specified. Dimensions on drawings designate the nominal undressed size of the item.

**2.02 MOISTURE CONTENT**

- A. Moisture content shall not exceed 15% for lumber and plywood.

**2.03 LUMBER**

- A. Lumber, 2 inch nominal thickness and less, shall conform to Grade #2 Southern Pine, Western Hemlock, Spruce-Pine-Fir or other species meeting the grade requirements.
- B. Lumber, greater than 2 inch nominal thickness, shall be Construction Grade Western Hemlock, Douglas Fir, Southern Pine, or other species meeting the grade requirements.

**2.04 PLYWOOD**

- A. Exterior plywood substrate shall be 1/2" or match existing thickness APA rated, Exposure 1, Structural 1, fir plywood C-D panels.

**2.05 PRESERVATIVE TREATMENT (PT)**

- A. Preservative shall meet AWPAC Standard U1 to the requirements of Use Category UC3A. All wood shall be accompanied upon delivery with a Certificate of Treatment from the Society of American Wood Preservers, certifying the kind of preservative and the net retention of the preservative in pounds per cubic foot.
- B. All wood shall be accompanied upon delivery with a Certificate of Treatment from the Society of American Wood Preservers, certifying the kind of preservative and the net retention of the preservative in pounds per cubic foot.
- C. Brush-coat surfaces of lumber sawed or cut after treatment with same preservative used at plant.
- D. Creosote products shall not be considered suitable for this project.
- E. Wood and plywood to be given preservative treatment:
  - 1. Wood nailers and blocking in conjunction with roofing and flashing.
  - 2. Wood nailers and blocking in contact with exterior or interior masonry, stone or concrete.

**2.06 FASTENING DEVICES**

- A. Except as otherwise specified, anchors and fasteners for securing wood items, unless noted otherwise, shall be as follows:
  - 1. Bolts:
    - a. Bolts, nuts, studs and rivets shall conform to Fed. Spec. FF-B-571a and FF-B-575, as applicable.
    - b. Expansion shields shall conform to Fed. Spec. FF-S-325. Shields shall be accurately recessed and, unless otherwise indicated, shall not be less than 2-1/2 inch into concrete or masonry. Devices of Groups IV, V, VI and VII shall not be used in sizes greater than 3/8 inch unless otherwise indicated.
    - c. Lag screws or lag bolts shall conform to Fed. Spec. FF-B-561b.
    - d. Toggle bolts shall conform to Fed. Spec. FF-S-588b
  - 2. Screws: Wood screws shall conform to Fed Spec. FF-S-111b.
  - 3. Nails: Nails shall conform to Fed. Spec. FF-N-105a. Nails for plywood secured to wood shall be ring or angular type. Nails for exterior use shall be hot dipped galvanized.
  - 4. Steel Plates and Shapes: ASTM A36, galvanized.
  - 5. Ground Anchorage: Wood plugs or nailing blocks are not acceptable for fastening grounds, furring, etc. to concrete or masonry. Hardened steel nails, expansion screws, toggle bolts, metal plugs, or metal inserts, as most appropriate for each type of masonry or concrete construction shall be used.
  - 6. Explosive Driven Fastenings: Fed. Spec. FF-P-395 or GGG-D-777. Explosive or power-driven fastenings may be used only when approved by the Architect.



7. All fasteners shall be sized and installed in a pattern and at a rate as recommended by the roofing manufacturer to meet all state and federal wind and uplift requirements.

#### **2.07 PRIMER**

- A. As recommended by the flexible self-adhered membrane flashing and wall membrane manufacturer.

#### **2.08 FLEXIBLE SELF-ADHERED MEMBRANE FLASHING**

- A. Provide cross laminated, butyl rubber based adhesive backed high density self adhering polyethylene membrane, 40 mils thick, 12" wide. Acceptable products include:
  1. W.R. Grace – "Vycor V40"
  2. Tamko "TW Flash-N-Wrap 40"
  3. Carlisle Syntec Inc. "CCW-705"
  4. or approved equal.

#### **2.09 SILICONE SEALANTS**

- A. Dow "790 Silicone Sealant"
- B. GE Silicones; SilPruf LM SCS2700.
- C. Tremco; Spectrem 1.
- D. Pecora Corporation; 864.

### **PART 3 - EXECUTION**

#### **3.01 PROTECTION**

- A. Do such work as is necessary to cover and protect all finishes and other work from damage during construction. Provide and maintain temporary substantial wood handrails around all openings through floors, and provide temporary traffic-supporting coverings for window openings until permanent items are installed thereover.

#### **3.02 TEMPORARY FACILITIES**

- A. Furnish, install, and maintain in weatherproof condition until permanent enclosure items are installed, substantial temporary enclosures of weatherproof construction for all openings in the exterior walls of the building, as required to provide proper installation conditions for all trades engaged in the work. Remove temporary enclosures only when permanent enclosures will be immediately installed thereafter.

#### **3.03 GENERAL INSTALLATION OF ROUGH CARPENTRY WORK**

- A. Closely coordinate the installation of the rough carpentry work with the work of other trades responsible for the installation of interfacing or overlaying materials, so as not to delay the work of the related trades.
- B. Erect all rough carpentry work plumb, level, and true with tight, close fitting joints, securely attached and braced to surrounding construction, all in a first class workmanlike manner. Counterbore for bolt heads, nuts, and washers where required to avoid interference with other materials. Bear complete responsibility for structural integrity, connections, and anchorage of all rough carpentry work.

- C. Use as long lengths as practicable for wood nailers, blockings, and curbs, to minimize number of joints, and attach the members with the types, and spacings, of fasteners specified herein.
- D. Install wood grounds and furring, as required for proper attachment of the work of other trades, in accordance with the requirements provided by the respective related trades.

**END OF ROUGH CARPENTRY**



**Section 06 20 00  
FINISH CARPENTRY**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Provide labor, materials and equipment necessary to complete the work of this Section, and without limiting the generality thereof includes:
  - 1. Interior running and standing wood trim in locations as designated on the Drawings.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. Section 08 11 13 - HOLLOW METAL DOORS AND FRAMES
    - a. Installation of Metal Door Frame
  - 2. Section 09 91 00 – PAINTING:
    - a. Finish field painting/finishing for finish carpentry.

**1.04 REFERENCE STANDARDS**

- A. ANSI A135.4 - American National Standard for Basic Hardboard; 2004.
- B. ASTM E 84 - Standard Test Method for Surface Burning Characteristics of Building Materials; 2010.
- C. AWI/AWMAC (QSI) - Architectural Woodwork Quality Standards Illustrated; Architectural Woodwork Institute and Architectural Woodwork Manufacturers Association of Canada; 2005, 8th Ed., Version 2.0.
- D. NHLA G-101 - Rules for the Measurement & Inspection of Hardwood & Cypress; National Hardwood Lumber Association; 2007.
- E. PS 1 - Structural Plywood; 2007.
- F. PS 20 - American Softwood Lumber Standard; National Institute of Standards and Technology (Department of Commerce); 2005.

**1.05 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Shop Drawings: Submit shop drawings of all interior wood casework, running finish and other millwork items. Shop drawings shall indicate the materials and species, arrangement, full size profiles of moldings, thickness, size of parts, construction, fastenings, blocking, clearances, assembly and erection details, applied finishes

and surfacing, built-in hardware, and necessary connections to work of other trades.

C. Samples:

1. Each type of trim specified, 6 in. lengths, of sufficient number to indicate the variation of color and grain.
2. Other materials upon request by the Architect.

D. Affidavits: Submit affidavits from the supplier indicating the species, grade, and moisture content of lumber and the grade, thickness and type of plywood supplied.

**1.06 GUARANTEE/WARRANTY**

A. Attention is directed to the provisions of the CONDITIONS OF THE CONTRACT regarding guarantees/warranties for the Work.

B. Manufacturers shall provide their standard guarantees/warranties for work under this Section. However, such guarantees/warranties shall be in addition to and not in lieu of all other liabilities which the manufacturers, the Contractor and the Subcontractors may have by law or by other provisions of the Contract Documents.

**1.07 INTENT**

A. It is not the intent of this Specification to define the types, sizes, or installation methods for each item of millwork. Methods of installation, joinery, sizes, types of finish, and other information pertaining to the casework, millwork and other items of required finish shall be installed in accordance with the detailing on the Drawings for the specific areas involved, unless other specified herein. Grades and types of finish shall be as specified under this Section.

**1.08 QUALITY ASSURANCE**

A. The "Quality Standards" of the Architectural Woodwork Institute shall apply and by reference are hereby made a part of this specification. Any reference to Premium, Custom or Economy in this specification shall be as defined in the latest edition of the AWI "Quality Standards".

B. Any item not given a specific quality grade shall be "Premium Grade" as defined in the latest edition of the AWI "Quality Standards".

C. Woodwork manufacturer must have a reputation for doing satisfactory work on time and shall have successfully completed comparable work. The Architect reserves the right to approve the woodwork manufacturer selected to finish all of the woodwork.

D. Lumber and plywood shall be identified by the official grade mark, except where grade mark will interfere with the natural finish. In such cases, the material shall be accompanied by a certificate of inspection issued by an acceptable lumber grading or inspection agency.

E. Nominal lumber dimensions shall conform to minimum established by the American Lumber Standard of the U.S. Department of Commerce.

**1.09 QUALIFICATIONS**

A. The work of this Section shall be provided by a firm having a minimum of 5 years experience on projects of similar size and quality to that specified and shown.

### 1.10 PRODUCT HANDLING

- A. Material must be kept dry at all times prior to installation. Avoid ground contact.
- B. Elevate the material a minimum of 6" off the ground of floor to allow for air circulation.

## **PART 2 - PRODUCTS**

### 2.01 MATERIALS

- A. General Lumber and Grading Requirements
  - 1. Standards: In addition to requirements shown and specified, comply with applicable provisions for grading and workmanship of AWI "Quality Standards".
  - 2. Surfaces and Patterns: Provide lumber surfaced 4 sides [S4S] and worked to profiles shown.
  - 3. Moisture Content: Kiln-dry lumber to the moisture content recommended by the AWI Section 100-G-3.
- B. Lumber: AWI Section 100 with the following requirements:
  - 1. Solid Hardwood: Flat sawn poplar S4S.
- C. Plywood:
  - 1. Hardwood Plywood: Maple Hardwood, Good 2 Sides (G2S), grade A-1, with 7-Ply Veneer Core, plain sliced veneer.
  - 2. Softwood Plywood for Concealed Areas: BD-INT-DFPA.
- D. Fasteners:
  - 1. Wood Screws: Fed. Spec. FF-S-111, type, size, material and finish as required for the condition of use.
  - 2. Nails: Fed. Spec. FF-N-105, type, size, material and finish as required for the condition of use.
  - 3. Anchors: Type, size, material and finish as required for the condition of use.
- E. Rough Hardware:
  - 1. Metal Surfaces, General: For fabrication of miscellaneous metal work which will be exposed to view in the finished work, use only materials which are smooth and free of surface blemishes including pitting, seam marks, roller marks, rolled trade names and roughness.
  - 2. Structural Steel Shapes: ASTM A36.
  - 3. Steel Tubing: ASTM A501, hot-formed, furnace butt welded or seamless process.
  - 4. Steel Bars and Bar Size Shapes: ASTM A675, Grade 65, or ASTM A36.
  - 5. Cold Finished Steel Bars: ASTM A108, grade as selected by fabricator.
  - 6. Cold Rolled Carbon Steel Sheets: ASTM A366.

7. Fasteners and Anchorage Devices: Nails, screws, steel clips and other attachment hardware shall be of the type and size to securely support and maintain the integrity of the millwork, casework and trim.

## **2.02 SEALANTS**

- A. Interior Sealant: Silicone base material conforming to Fed. Spec. TT-S-001543A, by any one of the following, or equal:
  1. "1702 Sanitary Sealant": General Electric Co.
  2. "785 Mildew-Resistant Silicone Sealant": Dow Corning Corp.

## **PART 3 - EXECUTION**

### **3.01 INSTALLATION**

- A. General:
  1. Installation of all woodwork specified in this SECTION 06 20 00 shall meet with the requirements set forth under Architectural Woodwork Quality Standard for "Premium Grade" and the additional requirements specified herein whichever is more stringent.
  2. Coordinate installation with the work of other trades to ensure exact fit and perfect alignment. Verify dimensions before proceeding and obtain measurements at job site for work required to be accurately fitted to other construction.
  3. Install work plumb, level, true and straight with no distortions. Provide shims as required. Level plywood underlayment to 1/8 inch in 10 feet.
  4. Cutting, trimming, fitting and matching of prefinished work will not be permitted.
  5. Where cutting is required, scribe to fit adjoining work so as not to damage finished surfaces.
  6. Securely fasten woodwork items to blocking with concealed fasteners only. Where surface nailing is required, countersink and fill flush with the woodwork so that the finished heads are undetectable.

**END OF FINISH CARPENTRY**

**Section 07 10 00**  
**WATERPROOFING, DAMPPROOFING, AND CAULKING**  
(Filed Sub-Bid Required)

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 FILED SUB-BIDS**

- A. Waterproofing, Dampproofing, and Caulking is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid.
- B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required by Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.
- C. Sub-Bids must be filed with the Awarding Authority in a sealed envelope, before the time stipulated, on the date stipulated in the Invitation for Bids.
- D. Specific information relating to the sub-bidders is set forth in the Contract Documents, under the heading "Notice to All Bidders, including Sub-Bidders" and the attention of sub-bidders is directed thereto.
- E. The work to be done under Waterproofing, Dampproofing and Caulking Section 07 10 00 is shown on Drawings numbered A1.1, A1.2, A2.1 and A2.2.

**1.03 SCOPE OF WORK**

- A. Work Included: Provide waterproofing, dampproofing and caulking as follows:
  - 1. Joint Sealing at new hollow metal door frame installation as indicated on the drawings.
  - 2. Joint sealing at all skyward facing and vertical joints of existing limestone cornice and adjacent masonry as indicated on the drawings.
  - 3. All other exterior sealing called for, or reasonably inferred from the Drawings and as required to provide weathertight conditions in exterior assemblies.
- B. Indoor Air Quality: Adhesives, sealants and related materials used in the Work shall have low or no VOCs (Volatile Organic Compounds) as acceptable to the Owner and the Architect.



**1.04 RELATED WORK**

A. The following items of work are not included in this Section and are specified under the designated Sections:

1. SECTION 07 54 19 – POLYVINYL-CHLORIDE ROOFING.
  - a. Installations of sealants related to roof membrane installation
2. SECTION 07 62 00 - SHEET METAL, FLASHING AND TRIM
  - a. Installation of sealant related to installation of metal flashing and trim
3. SECTION 08 11 13 - HOLLOW METAL DOORS AND FRAMES
  - a. installation of sealant in relation to setting of thresholds

**1.05 SUBMITTALS**

A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.

B. Joint Sealant Submittals:

1. Product Data: Submit manufacture’s printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each sealant material used. Provide certifications that sealant materials comply with specified requirements.
2. Initial Selection Samples: Submit samples manufacturer’s color charts showing complete range of colors, textures and finishes available for each material used.
3. Verification Samples: Submit actual representative sample of each sealant material that is to be exposed in the completed work. Show full color ranges and finish variations expected. Provide sealant samples having minimum size of 4 in. long.
4. Test Reports: Provide certified reports for all specified tests.

**1.06 QUALITY ASSURANCE**

A. Joint Sealers:

1. Compatibility: Provide sealant and sealant joint backing materials suitable for the use intended and compatible with the materials with which they will be in contact. Compatibility of sealant and accessories shall be verified by the sealant manufacturer.
2. Source: For each sealant material type required for the work of this section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of the primary materials.
3. Installer: A firm with a minimum of five years experience in type of work required by this Section and which is acceptable to the manufacturers of the primary materials.
4. Mock-ups: Prior to commencing the primary work of this Section, provide mock-ups at locations acceptable to Architect. Obtain Architect’s acceptance of visual

qualities. Protect and maintain accepted mock-ups throughout the remainder of the work of this section to serve as criteria for acceptance of the work.

### **1.07 WARRANTIES**

- A. Joint Sealers: Furnish joint sealant manufacturer's written single-source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five years from date of Substantial Completion of the Project.

### **1.08 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Joint Sealants:
  - 1. Materials under this Section shall be delivered to, and stored at, the job site in unbroken factory sealed containers with labels intact.

### **1.09 JOB CONDITIONS**

- A. Joint Sealants:
  - 1. Weather: Perform work of this Section only when existing or forecasted weather conditions are within the limits established by manufacturers of the materials and products used.
  - 2. Substrates: Proceed with work only when substrate construction and penetration work is complete.

### **1.10 PROTECTION**

- A. Protect the building and finish surfaces from damage, resulting from spillage, dripping and dropping of materials. Prevent materials from entering and clogging drains. Repair, restore or replace work which is soiled or damaged in connection with the performance of the work.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
- C. Colors of Exposed Joint Sealants: Custom colors as selected by Designer for joints exposed to view.

Waterproofing, Dampproofing, and Caulking  
Section 07 10 00

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## 2.02 JOINT SEALANTS

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Two-component chemically curing polyurethane and multi-component polyurethane:
  - 1. Available Products: Subject to compliance with requirements, products that may be incorporated into the Work include, but are not limited to, the following:
    - a. Chemnex; Sonneborn NP2.
    - b. Pecora Corporation; Dynatrol 11.
    - c. Tremco; Vulkem 227 or Dymetric.
  - 2. Extent of Use: Joints in exterior vertical and horizontal surfaces as indicated on the drawings.

## 2.03 MISCELLANEOUS SEALANT MATERIALS

- A. Primer: Provide primer recommended by sealant manufacturer for surfaces to be adhered to.
- B. Bond Breaker Tape: Provide polyethylene or other plastic tape recommended by sealant manufacturer to prevent three-sided adhesion.
- C. Sealant Back-Up Rod: Closed-cell, non-gassing, polyethylene rod. The diameter of the rod shall be approximately 25 percent in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.
  - 1. Basis of Design: Ethafoam by Dow Chemical Co.; or equal product as manufactured by Pecora, Sonneborne, or equal.
- D. Joint backing for general use at joints in horizontal surfaces shall consist of two rows of butyl rubber or neoprene foam rod in contact with one another, and each compressed to approximately 2/3 original width when in place.
- E. Provide miscellaneous materials of type that will not bleed through sealant, discolor surface, or produce other deleterious effects. Select size to provide compression to approximately 2/3 original width when in place. Provide backing material profile concave to the rear of the sealant, and equipped with a bond-breaking film.

## **PART 3 - EXECUTION**

### 3.01 CONDITION OF SURFACE

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances

detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

### **3.02 SEALANT INSTALLATION**

- A. The Installer shall examine substrates and conditions under which this work is to be performed and notify Contractor, in writing, of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning of sealant work means installer's acceptance of joint surfaces and conditions.
- B. Strictly comply with manufacturers' instructions and recommendations, except where more restrictive requirements are specified in this Section.
- C. Clean joint surfaces immediately before installation of sealants, primers, tapes and fillers. Remove substances which could interfere with bond. Etch or roughen joint surfaces to improve bond, as recommended by manufacturer. Surface which have been given protective coatings and those that contain oil or grease shall be thoroughly cleaned with xylol or MEK solvent, with due precautions taken to minimize hazards.
- D. Tape or mask adjoining surfaces to prevent spillage and migration problems.
- E. Prime surfaces as recommended by sealant manufacturer.
- F. Schedule work as long as possible after completion of concrete work and finish brick paving and granite work.
- G. Provide backer rods for all sealants except where specifically recommended against by sealant manufacturer.
- H. Prevent three-sided adhesion by use of bond breaker tapes or backer rods.
- I. Force sealant into joints to provide uniform, dense, continuous ribbons free from gaps and air pockets. Completely wet both joint surfaces equally on opposite sides.
- J. Except in hot weather, make sealant surface slightly concave. Install sealants so that compressed sealants do not protrude from joints. Dry tool sealants to form a smooth dense surface. At horizontal joints form a slight concave to prevent trapping water.
- K. Provide sealants to depths indicated, or if not indicated, follow manufacturer's recommendations.

### **3.03 EXTENT OF SEALANT WORK**

- A. General Extent: Seal joints indicated, and all interior and exterior joints, seams, and intersections between dissimilar materials. Exterior Sealing: Without limitation, the work of this Section includes the sealing of the following:
1. Masonry to masonry joints.
  2. Masonry to other exterior wall materials, including stone, metal and wood.
  3. Concrete to other exterior wall materials, including metal and masonry.
  4. Metal to metal joints.
  5. Joint fillers for all joints.

### **3.04 SEALANT CURING**

- A. Cure all sealants in strict compliance with manufacturers' instructions and recommendations to obtain highest quality surface and maximum adhesion. Make every effort to minimize accelerated aging effects and increase in modulus of elasticity.

### **3.05 CLEANING AND PROTECTION OF SEALANTS**

- A. Remove smears from adjacent surfaces immediately, as the work progresses. Exercise particular care to prevent smearing or staining of surrounding surfaces which will be exposed in the finished work, and repair any damage done to same as result of this work without additional cost to Owner.
- B. Remove and replace work that is damaged or deteriorated.
- C. Clean adjacent surfaces using materials and methods recommended by sealant manufacturer. Remove and replace work that cannot be successfully cleaned.
- D. Provide temporary protection to ensure work being without damage or deterioration at time of final acceptance. Remove protection before final acceptance.

### **3.06 CLEAN-UP**

- A. Upon completion of the system, clean all stains, remove all masking, protections, equipment, material, and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

### **3.07 TRASH AND DEBRIS REMOVAL**

- A. The General Contractor shall provide dumpsters for use by all subcontractors. During the course of the work at the end of each work day, subcontractors shall clean up trash and debris caused by their work, and deposit it in the dumpsters, or, at the subcontractor's option, haul it away and dispose of the trash legally. The subcontractor shall do a thorough cleaning of all their debris after scaffolding and staging has been removed from an area.

## **END OF WATERPROOFING, DAMPPROOFING AND CAULKING**

Section 07 46 01  
COPPER WALL CLADDING AND FLASHING

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SCOPE OF WORK**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, and without limiting the generality thereof includes:
  - 1. Standing seam copper wall cladding and flashings as indicated on the drawings.
  - 2. Flat seam copper wall cladding and flashings as indicated on the drawings.
  - 3. Self adhered weather and or isolation barrier.

**1.03 RELATED WORK**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. SECTION 06 10 00 – ROUGH CARPENTRY
  - 2. SECTION 07 92 00 – JOINT SEALANTS

**1.04 COORDINATION**

- A. Coordinate copper wall cladding with roofing and flashing work to provide a completely watertight wall cladding and roofing installation.

**1.05 PERFORMANCE REQUIREMENTS**

- A. Installation Requirements: Fabricator is responsible for installing system, including anchorage to substrate and necessary modifications to meet specified and drawn requirements and maintain visual design concepts in accordance with Contract Documents and following installation methods as stipulated in the "Copper in Architecture" handbook published by the Copper Development Association Inc. (CDA).
  - 1. Drawings are diagrammatic and are intended to establish basic dimension of units, sight lines, and profiles of units.
  - 2. Make modifications only to meet field conditions and to ensure fitting of system components.
  - 3. Obtain Architect's approval of modifications.
  - 4. Provide concealed fastening wherever possible.
  - 5. Attachment considerations: Account for site peculiarities and expansion and contraction movements so there is no possibility of loosening, weakening and fracturing connection between wall cladding and building structure or between components themselves.
  - 6. Obtain Architect's approval for connections to building elements at locations other than indicated in Drawings.

7. Accommodate building structure deflections in system connections to structure.

**B. Performance Requirements:**

1. System shall accommodate movement of components without buckling, failure of joint seals, undue stress on fasteners, or other detrimental effects when subjected to seasonal temperature changes and live loads.
2. Design system capable of withstanding building code requirements for negative wind pressure.

**C. Interface With Adjacent Systems**

1. Integrate design and connections with adjacent construction.
2. Accommodate allowable tolerances and deflections for structural members in installation.

**1.06 SUBMITTALS**

- A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. Product data including copper manufacturer's specifications, installation instructions, and general recommendations for wall cladding applications. Include certification or other data substantiating that materials comply with requirements.
- C. Shop Drawings:
  1. Provide elevations showing seam layout and pattern.
  2. Show manner of forming, joining, and securing copper cladding to Project substrate.
  3. Show expansion joint details and waterproof connections to adjoining work and at obstructions and penetrations.
- D. Samples consisting of 6-inch (150 mm) or 12-inch (300 mm) square specimens of specified copper wall cladding material.
- E. Certificates: Fabricator's certification that products furnished for Project meets or exceeds specified requirements.

**1.07 CLOSEOUT SUBMITTALS**

- A. Provide maintenance data in Operations and Maintenance manual for maintaining copper panels.

**1.08 QUALITY ASSURANCE**

- A. Fabricator's Qualifications: Company specializing in copper sheet metal wall cladding work with five years experience in similar size and type of installations.
- B. Installer: A firm with five years of successful experience with installation of copper wall cladding of type and scope equivalent to Work of this Section.
- C. Industry Standard: Except as otherwise shown or specified, comply with applicable recommendations and details of the "Copper in Architecture" handbook published by the Copper Development Association Inc. (CDA). Conform to dimensions and profiles shown.

### **1.09 DELIVERY, STORAGE AND HANDLING**

- A. Packing, Shipping, Handling, and Unloading: Protect finish panel faces.
- B. Acceptance at Site: Examine each panel and accessory as delivered and confirm that finish is undamaged. Do not accept or install damaged panels.
- C. Storage and Protection:
  - 1. Stack pre-formed material to prevent twisting, bending, and abrasions.
  - 2. Provide ventilation.
  - 3. Prevent contact with materials which may cause discoloration or staining.

### **1.10 WARRANTY**

- A. Warrant installed system and components to be free from defects in material and workmanship for period of 2 years.
- B. Include coverage against leakage and damages to finishes.

## **PART 2 - PRODUCTS**

### **2.01 MANUFACTURERS**

- A. Manufacturers: Subject to compliance with requirements, provide materials by one of the following:
  - 1. Revere Copper Products, Inc
  - 2. Hussey Copper, Ltd
  - 3. Luvata, Inc

### **2.02 MATERIALS**

- A. Copper Wall Cladding Sheets: Cold-rolled copper sheet complying with ASTM B 370 temper H00, unless otherwise indicated, and as follows:
  - 1. Weight: 16 oz. per sq. ft. (0.0216-inch thick) (0.55 mm) unless otherwise indicated
- B. Miscellaneous Materials: Provide materials and types of fasteners, protective coatings, separators, sealants and accessory items as recommended by copper sheet manufacturer for copper wall cladding work, except as otherwise indicated.
- C. Accessories: Except as indicated as work of another specification Section, provide components required for a complete wall cladding system, including trim, copings, fascias, ridge closures, cleats, seam covers, battens, flashings, gutters, louvers, sealants, gaskets, vents, and closure strips. Match materials and finishes of wall cladding.
  - 1. Cleats:
    - a. Concealed for wall cladding to resist negative wind pressure. Fabricated from Stainless Steel: ASTM A167, Type 304 or Type 316, 20 gauge in sizes as indicated on the Drawings.
    - b. Fabricate cleats to allow thermal movement of copper wall cladding panels while preventing copper panel distortion due to negative wind pressure.
  - 2. Trim, Closure Pieces, and Accessories:



- a. Same material, thickness, and finish as adjacent copper wall cladding panels, formed to required profiles.
- b. Comply with standards conforming to recognized industry standard sheet metal practice.
3. Flashings: Formed copper sheet, minimum 16 oz. per sq. ft. (0.0216 inch thick) (0.55 mm) unless otherwise indicated; finished to match panels
4. Paper Slip Sheet: Minimum 4-lb. red rosin-sized building paper.
5. Nails for Wood Substrates: stainless steel, 0.109 inch minimum not less than 1 1/8-inch long barbed with large head.
6. Screws & Bolts: passivated stainless steel (300 Series) of sufficient size and length to sustain imposed stresses.
7. Neoprene (resilient) gasketed washers tested to be compatible with copper and exposed screw head color matched to adjacent panel where exposed. Use exposed fasteners only where absolutely necessary to attach trim.
8. Rivets: Pop Rivets: 1/8-inch (3-mm) to 3/16-inch (4.5-mm) diameter, with solid brass mandrels. Provide solid copper rivet (tinner's rivets) where structural integrity of seam is required.
9. METAL SEAM SEALANT
  - a. Provide metal seam sealant, specifically compounded to seal very thin joints in metal to metal joints and to match adjacent metal colors and finishes. Provide one of the following products, or equal:
    - i. Protective Treatments, Inc. PTI 200
    - ii. Tremco Seam Sealer.
    - iii. Approved equal by Pecora or Sonneborn.
  - b. Extent: Provide seam sealant for metal to metal joints in metal copper wall cladding.

## **2.03 FABRICATION**

- A. General Metal Fabrication: Shop-fabricate work to greatest extent possible. Comply with details shown and with recognized industry standards as shown in the "Copper in Architecture" handbook published by the Copper Development Association Inc. (CDA) and other recognized industry practices. Fabricate for waterproof and weather-resistant performance with expansion provisions for running work, sufficient to permanently prevent leakage, damage, or deterioration of the work. Form work to fit substrate. Comply with material manufacturer's instructions and recommendations for forming material. Form exposed copper work without excessive oil-canning, buckling, and tool marks, true to line and levels indicated, with exposed edges folded back to form hems.
  1. Fabricate to allow for adjustments in field for proper anchoring and joining.
  2. Form sections true to shape, accurate in size, square, free from distortion and defects.
  3. Cleats: Fabricate cleats and starter strips of same or thicker material as sheet, interlockable with sheet in accordance with CDA recommendations.

4. Standing Seam Panels

- a. Fabricate pans to interlock standing seam with center to center seam spacing as indicated on Drawings.
- b. Fabricate interlocking seams to heights and patterns indicated.
- c. Form interlocking seams with cleats folded into seam.
- d. Form overlapping and interlocking transverse joints

5. Flat Seam Panels

- a. Fabricate pans to interlock with center to center seam spacing as indicated on Drawings.
- b. Fabricate interlocking seams to heights and patterns indicated.
- c. Form interlocking seams with cleats folded into seam.
- d. Form overlapping and interlocking transverse joints

B. Expansion Provisions: Where lapped or bayonet-type expansion provisions in work cannot be used, or would not be sufficiently water/weatherproof, form expansion joints of intermeshing hooked flanges, not less than 1-inch (25-mm) deep, filled with sealant (concealed within joints).

C. Sealant Joints: Where movable, non-expansion-type joints are indicated or required for proper performance of work, form copper to provide for proper installation of elastomeric sealant, in compliance with CDA standards.

D. Separations: Provide for separation of copper from noncompatible metal or corrosive substrate by coating concealed surfaces at locations of contact, with bituminous coating or other permanent separation as recommended by manufacturer/fabricator

**2.04 FINISHES**

- A. Natural weathering mill finished copper. No applied finish

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. General: Examine conditions and proceed with work when substrates are ready.
- B. Confirm that substrate system is even, smooth, sound, clean, dry, and free from defects.
- C. Verify wall openings, pipes, sleeves, ducts, and vents through wall assembly are solidly set, and fastener strips located.

**3.02 PREPARATION**

- A. Clean surfaces to receive copper wall cladding. Substrate to be smooth and free of defects. Drive all projecting nails or other fasteners flush with substrate.
- B. Slip sheet on weather barrier under copper wall cladding to greatest extent possible unless otherwise recommended by manufacturer of sheet metal. Slip sheets must be installed over weather barrier. Minimize use of mechanical fasteners. Lap joints 2 inch minimum.

**3.03 INSTALLATION**

A. Manufacturer's Recommendations: Except as otherwise shown or specified, comply with recommendations and instructions of manufacturer of copper being fabricated and installed.

B. General:

1. Separate dissimilar metals by painting each metal surface in area of contact with a bituminous coating, by applying rubberized asphalt or butyl underlayment to each metal surface, or by other permanent separation as recommended by manufacturers of dissimilar metals.
2. Form and fabricate sheets, seams, strips, cleats, flashings, edge treatments, and other components of copper wall cladding to profiles, patterns, and drainage arrangements shown and as required for permanently leak proof construction. Provide for thermal expansion and contraction of the work, as indicated. Seal joints as shown and as required for leak proof construction. Shop-fabricate materials to greatest extent possible.
3. Fabricate and install work with lines and corners of exposed units true and accurate. Form exposed faces flat and free of buckles, excessive waves, and avoidable tool marks considering temper and reflectivity of metal. Provide uniform, neat seams. Except as otherwise shown, fold back sheet metal to form a hem on concealed side of exposed edges.
4. Conceal fasteners and expansion provisions where possible in exposed work, and locate so as to minimize possibility of leakage. Cover and seal fasteners and anchors as required for a tight installation.

C. Standing Seam and Flat Seam Cladding:

1. Standing Seam: Fold lower end of each pan under  $\frac{3}{4}$ -inch (19-mm). Slit fold one inch (25-mm) away from corner to form tab where pan turns up to make standing seam. Fold upper end of each pan over 2-inches (50-mm). Hook fold on lower end of upper pan into fold on upper end of underlying pan.
2. Standing Seam: Finish standing seams 1-inch (25-mm) [1  $\frac{1}{2}$ -inch (38-mm)] high. Bend up one side edge 1  $\frac{1}{2}$ -inch (38-mm) [ 2-inch (50-mm) ] and other 1  $\frac{3}{4}$ -inch (44-mm) [ 2  $\frac{1}{4}$ -inch (66-mm) ] . Make first fold  $\frac{3}{4}$ -inch (6-mm) wide single fold and second fold  $\frac{1}{2}$ -inch (13-mm) wide, providing locked portion of standing seam with 5 plies in thickness.
3. Apply pans beginning at bottom of wall.

D. Fastening:

1. Provide expansion and contraction movement capability as necessary.
2. Permanently shim and fasten panel system to substrate system at spacing required by panel manufacturer.
3. Align, level, and plumb, within specified tolerances.
4. Use concealed fasteners for flat panels; exposed fasteners may only be used on portions of applied trim if necessary.

5. Locate and space exposed fasteners in true vertical and horizontal alignment, unless indicated otherwise by Architect.
  6. Use proper tools to obtain controlled uniform compression for positive seal without rupture of resilient washer.
- E. Install accessories, flashings, closures, and related trim to provide complete watertight system.
- F. Coordinate installation of panels with adjacent construction to ensure watertight enclosure.
- G. Tolerances:
1. Maximum offset from true alignment between adjacent members butting or in line: 1/8-inch (3-mm).
  2. Maximum variation from plane or location indicated on Drawings: ¼-inch (6-mm).
- H. Field adjust and align using adjustments within fastening method.

### **3.04 CLEANING**

- A. Remove protective film (if any) from exposed surfaces of copper wall cladding promptly upon installation. Strip with care to avoid damage to finishes.
- B. Upon completion of each area of soldering, carefully remove flux and other residue from surfaces. Neutralize acid flux by washing with baking soda solution, and then flushing clean water rinse. Use special care to neutralize and clean crevices.
- C. Clean exposed metal surfaces of substances that would interfere with normal oxidation and weathering.

### **3.05 PROTECTION**

- A. Provide final protection in a manner acceptable to installer that ensures that copper wall cladding is without damage or deterioration at time of Substantial Completion.

## **END OF COPPER WALL CLADDING AND FLASHING**



Section 07 54 19  
POLYVINYL-CHLORIDE ROOFING

**PART 1 - GENERAL**

**1.01 GENERAL REQUIRMENTS**

- A. Part A and DIVISION 1 of PART B area hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this section.
- C. Coordinate work of this Section with that of all other trades affecting, or affected by, this Section. Cooperate with such trades to assure the steady progress of all work under the contract.

**1.02 SCOPE OF WORK**

- A. General:
  - 1. To install a complete polyvinyl-chloride roofing system including membrane, flashings and other components in locations as indicated on the Drawings.

**1.03 RELATED REQUIREMENTS**

- A. The following items are not included in this Section and will be performed under the designated Sections:
  - 1. Section 06 10 00 - ROUGH CARPENTRY for wood nailers, curbs, and blocking.
  - 2. Section 07 60 00 – FLASHING AND SHEET METAL for installation of flashings and trims integral with roofing system installation.
  - 3. Section 07 92 00 - JOINT SEALANTS For installations or sealants in conjunction with roof installation.
  - 4. Section 07 72 33 – ROOF HATCH For providing roof hatch to be installed by roofing contractor.
  - 5. Section 22 00 00 – Plumbing – For supplying of roof drains to be installed into roofing system by roofing contractor and to be piped by plumbing contractor.
- B. Upon successful completion of work provide 20 year roofing manufacturer’s full system warranty
- C. Upon successful completion of work provide 2 year roof applicator’s warranty.

**1.04 QUALITY ASSURANCE**

- A. This roofing system shall be applied only by a Roofing Applicator authorized by the Roofing Manufacturer.
- B. Upon completion of the installation and the delivery to Roofing Manufacturer by the Applicator of certification that all work has been done in strict accordance with the contract specifications and Roofing Manufacturer’s requirements, a Roofing manufacturer Technical Service Representative will review the installed roof system wherever a Standard or System warranty has been specified.

- C. There shall be no deviation made from the Project Specification or the approved shop drawings without prior written approval by the Owner, the Owner's Representative and the Roofing Manufacturer.
- D. All work pertaining to the installation of the polyvinyl-chloride roofing and related flashings shall only be completed by Applicator personnel trained and authorized by Roofing manufacturer in those procedures.

#### **1.05 SUBMITTALS**

- A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. The Contractor shall submit to the Architect the following:
  - 1. Samples of each primary component to be used in the roof system and the manufacturer's current literature for each component.
  - 2. Written approval by the insulation manufacturer for the use and performance of the product in the proposed system.
  - 3. Sample copy of Roofing Manufacturer's warranty.
  - 4. Sample copy of Applicator's warranty.
- C. Dimensioned shop drawings which shall include:
  - 1. Outline of roof with roof size and elevations shown.
  - 2. Details of flashing methods for penetrations.
  - 3. Insulation layout plan.
- D. Certifications by manufacturers of roofing and insulating materials that all materials supplied comply with all requirements of the identified ASTM and other industry standards or practices.
- E. Certification that the entire roof system specified meets all identified code and insurance requirements as required by the Specification.
- F. Material Safety Data Sheets (MSDS)

#### **1.06 CODE & PERFORMANCE REQUIREMENTS**

- A. The Applicator shall submit evidence that the proposed roof system meets the requirements of the local building code and has been tested and approved or listed by the following test organizations. These requirements are minimum standards and no roofing work shall commence without written documentation of the system's compliance, as required in the "Submittals" section of this specification.
- B. System shall be designed to meet a minimum wind design requirements for Waltham, MA as listed in the latest edition of the Massachusetts State Building Code.
- C. System shall be designed to meet the stretch energy requirements (Appendix AA) of the Eighth Edition of the Massachusetts State Building Code.

- D. Roofing System Design: Provide a membrane roofing system that is identical to systems that have been successfully tested by a qualified testing and inspection agency to resist uplift pressure calculated according to ASCE 7.
  - 1. Fire/Windstorm Classification: Class 1A-90.
  - 2. Hail resistance: SH.

**1.07 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. All products delivered to the job site shall be in the original unopened containers or wrappings bearing all seals and approvals.
- B. Handle all materials to prevent damage. Place all materials on pallets and fully protect from moisture.
- C. Membrane rolls shall be stored lying down on pallets and fully protected from the weather with clean canvas tarpaulins. Unvented polyethylene tarpaulins are not accepted due to the accumulation of moisture beneath the tarpaulin in certain weather conditions that may affect the ease of membrane weldability.
- D. As a general rule all adhesives shall be stored at temperatures between 40 degree F (5 degree C) and 80 degree F (27 degree C). Read instructions contained on adhesive canister for specific storage instructions.
- E. All flammable materials shall be stored in a cool, dry area away from sparks and open flames. Follow precautions outlined on containers or supplied by material manufacturer/supplier.
- F. All materials which are determined to be damaged by the Owner's Representative or the Roofing Manufacturer's Representative are to be removed from the job site and replaced at no cost to the Owner.

**1.08 JOB CONDITIONS**

- A. Roofing materials may be installed under certain adverse weather conditions but only after consultation with the Roofing Manufacturer, as installation time and system integrity may be affected.
- B. Only as much of the new roofing as can be made weather tight each day, including all flashing and detail work, shall be installed. All seams shall be heat welded before leaving the job site that day.
- C. All work shall be scheduled and executed without exposing the interior building areas to the effects of inclement weather. The existing building and its contents shall be protected against all risks.
- D. All surfaces to receive new insulation, membrane or flashings shall be dry. Should surface moisture occur, the Applicator shall provide the necessary equipment to dry the surface prior to application.
- E. All new and temporary construction, including equipment and accessories, shall be secured in such a manner as to preclude wind blow-off and subsequent roof or equipment damage.
- F. Uninterrupted water stops shall be installed at the end of each day's work and shall be completely removed before proceeding with the next day's work. Water stops shall not



emit dangerous or unsafe fumes and shall not remain in contact with the finished roof as the installation progresses. Contaminated membrane shall be replaced at no cost to the Owner.

- G. The Contractor is cautioned that certain membranes are incompatible with asphalt, coal tar, heavy oils, roofing cements, creosote and some preservative materials. Such materials shall not remain in contact with these membranes. The Contractor shall verify with the Roofing Manufacturer regarding compatibility, precautions and recommendations.
- H. Arrange work sequence to avoid use of newly constructed roofing as a walking surface or for equipment movement and storage. Where such access is absolutely required, the Contractor shall provide all necessary protection and barriers to segregate the work area and to prevent damage to adjacent areas. A substantial protection layer consisting of plywood over insulation board shall be provided for all new and existing roof areas that receive rooftop traffic during construction.
- I. Prior to and during application, all dirt, debris and dust shall be removed from surfaces by vacuuming, sweeping, blowing with compressed air or similar methods.
- J. The Contractor shall follow all safety regulations as required by OSHA and any other applicable authority having jurisdiction.
- K. All existing roofing, insulation, flashings and metal work removed during construction shall be immediately taken off site to a legal dumping area authorized to receive such materials. Hazardous materials, such as materials containing asbestos, are to be removed and disposed of in strict accordance with applicable City, State and Federal requirements.
- L. All new roofing waste material (i.e., scrap roof membrane, empty cans of adhesive) shall be immediately removed from the site by the Contractor and properly transported to a legal dumping area authorized to receive such material.
- M. The Contractor shall take precautions that storage and application of materials and equipment does not overload the roof deck or building structure.
- N. Flammable adhesives and deck primers shall not be stored and not be used in the vicinity of open flames, sparks and excessive heat.
- O. All rooftop contamination that is anticipated or that is occurring shall be reported to the Roofing Manufacturer to determine the corrective steps to be taken.
- P. The Contractor shall immediately stop work if any unusual or concealed condition is discovered and shall immediately notify Owner of such condition in writing for correction.
- Q. Site cleanup, including both interior and exterior building areas that have been affected by construction, shall be completed to the Owner's satisfaction.
- R. All landscaped areas damaged by construction activities shall be repaired at no cost to the Owner.
- S. The Contractor shall conduct fastener pullout tests in accordance with the latest version of the SPRI/ANSI Fastener Pullout Standard to verify condition of the deck/substrate and to confirm expected pullout values.
- T. The roofing membrane shall not be installed under the following conditions without consulting the Roofing Manufacturer's Technical Dept. for precautionary steps.

1. The roof assembly permits interior air to pressurize the membrane underside.
- U. Precautions shall be taken when using adhesives at or near rooftop vents or air intakes. Adhesive odors could enter the building. Coordinate the operation of vents and air intakes in such a manner as to avoid the intake of adhesive odor while ventilating the building. Keep lids on unused cans at all times.

**1.09 EXISTING CONDITIONS**

- A. Carefully examine all existing condition reports, specifications and drawings. No claims for extra costs will be allowed because of lack of full knowledge of the existing conditions and the requirements of the construction documents.

**1.10 WARRANTY**

- A. Provide roofing Contractor's warranty to cover all defects in workmanship and materials for a period of two (2) years from date of substantial completion of the project.
- B. Roofing System Warranty & Service-Contract
  1. The Roofing Materials Manufacturer shall provide a long-term full labor and materials warranty for the completely installed roofing system at this facility. It is the intent to require that the Roofing Materials Manufacturer have an established program for providing sole-source responsibility for the administration and servicing of this warranty.
  2. Upon project completion and final acceptance by the Owner, Contractor shall obtain and deliver the Roofing Material Manufacturer's Twenty (20) year Warranty on the complete roofing system.

**PART 2 - PRODUCTS**

**2.01 GENERAL**

- A. The components of the polyvinyl-chloride roofing system are to be products of one manufacturer to ensure a consistent end product installation.
- B. Manufacturer's: The specification herein is based on a SikaSarnafil polyvinyl-chloride roofing system. Systems of equal or greater performance criteria by the following manufacturers will be considered providing adequate verification is provided that they meet the performance criteria specified:
  1. Carlisle – Sure Flex PVC Membrane
  2. GAF Materials Corporation.
  3. Johns Manville, Inc.
  4. Or equal.

**2.02 MEMBRANE**

- A. Polyester reinforced membrane with a lacquer coating.
- B. Membrane shall conform to ASTM D4434 (latest version), "Standard for polyvinyl Chloride Sheet Roofing". Classification: Type II, Grade I.
  1. Thermoplastic membrane, 60 mil (1.5 mm), membrane

**Waltham Community Center  
Roof Replacement**

C. Color of Membrane:

1. Manufacturer's full range of colors.

D. Typical Physical Properties:

<u>Parameters</u>	<u>ASTM Test Method</u>	<u>ASTM D-4434 Spec. Requirement</u>	<u>Typical Physical Properties</u>
Reinforcing Material	-	-	Polyester
Overall Thickness(1), min., inches (mm)	D751	0.045 (1.14)	[0.06 inches]
Thickness Above Scrim	-	-	0.023 (avg.)
Tensile Strength, min., psi (MPa)	D751	200 (35.0)	230 (40.0)
Elongation at Break, min. (machine / transverse)	D751	15% / 15%	25% / 25%
Seam strength(2), min. (% of breaking strength)	D751	75	85
Retention of Properties After Heat Aging	D3045	-	-
Tensile Strength, min., (% of original)	D751	90	95
Elongation, min., (% of original)	D751	90	90
Tearing Resistance, min., lbf (N)	D1004	45 (200)	45.0 (200)
Low Temperature Bend, -40° F (-40° C)	D2136	Pass	Pass
Accelerated Weathering Test (florescent light, uv exposure)	G154	5,000 Hours	10,000 Hours
Cracking (7x magnification)	-	None	None
Discoloration (by observation)	-	Negligible	Negligible
Crazing (7x magnification)	-	None	None
Linear Dimensional Change	D1204	0.5 % max.	0.01%
Weight Change After Immersion in Water	D570	± 3.0% max.	2.5%
Static Puncture Resistance, 33 lbf (15 kg)	D5602	Pass	Pass
Dynamic Puncture Resistance, 7.3 ft-lbf (10 J)	D5635	Pass	Pass
Initial Solar Reflectance	E903	-	0.83

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<u>Parameters</u>	<u>ASTM Test Method</u>	<u>ASTM D-4434 Spec. Requirement</u>	<u>Typical Physical Properties</u>
Emissivity	E408, C1371, Other	-	0.90
Solar Reflective Index (SRI)	E1980	-	104
Recycled Content (5 & 10 ft. sheets only)	8 to 12% Pre-Consumer / Up to 1% Post Consumer.		

**2.03 FLASHING MATERIALS**

A. Wall/Curb Membrane Flashing

1. An asphalt resistant, polyester reinforced, membrane adhered to substrate using adhesive as recommended by the roofing system manufacturer.

B. Accessory Materials

1. Prefabricated outside and inside flashing corners made of 0.060 inch (60 mil/1.5 mm) thick membrane that are heat-welded to membrane or base flashings. Available in one size which accommodate both inside and outside corners. Can be cut into one inside or one outside corner.
2. Open Post Flashing: Prefabricated post flashing, 0.048 inch (48 mil/1.2 mm) thick, with an open seam used to flash obstructed rooftop conduits and pipes 1/2 to 1-1/4 inch (12.7-31.8 mm) in diameter. Available in 2 sizes; 1/2 to 3/4 inch (12.7-19 mm) and 3/4 to 1-1/4 inch (19-31.8 mm) diameter. Open Post Flashings are heat welded in place and terminated at the top of the penetration completing the pipe penetration detail.
3. Sealants: Sealant used at flashing terminations to be as recommended by roofing system manufacturer.
4. Adhesive: A solvent-based, low VOC, reactivating adhesive used to attach membrane to flashing substrate
5. Flashing Backer: A non-woven polyester or polypropylene mat cushion layer that is necessary behind Flashing Membrane when the flashing substrates are rough or incompatible with the flashing membrane.

**2.04 RIGID INSULATION**

A. Polyisocyanurate Insulation: Flat and Tapered

1. Closed-cell HCFC Free “Green” polyisocyanurate foam core manufactured using zero ozone depleting blowing agent and integrally laminated to coated glass facers: FM 1-90 wind uplift classification: compressive strength – 20 psi. Thickness shall be as shown on the Drawings. Maximum board size to be 4’ x 4’ for tapered and adhered board stock, 4’ x 8’ for flat mechanically fastened board stock.

**2.05 HIGH DENSITY ROOF BOARD**

A. 150 psi high density polyisocyanurate roof board with a coated glass facer.

1. Properties:

- a. Thickness: 1/4"
- b. Width: 4'
- c. Length: 8'
- d. Flexural Strength (ASTM D1037): 2000 psi
- e. Dimensional Stability (ASTM D 2126): <0.6%
- f. Permeance, perms (ASTM E 96): <1
- g. Water Absorption, % max (ASTM C 209): 2.6%
- h. Compression Strength (ASTM D1621): 150psi
- i. Surface Water Absorption (ASTM C 473): <1 gram
- j. Mold Resistance (ASTM D3273): Pass
- k. Flame Spread (ASTM E84): 25
- l. Smoke Density (ASTM E84): 185

## 2.06 ATTACHMENT COMPONENTS

### A. Induction Welding

#### 1. Induction Weld Plate:

- a. A high strength plate with a polymer coating used with various fasteners to attach insulation boards to the roof deck and as a substrate to induction weld the PVC membrane. Plate shall be 3 inch round, 22 gauge corrosion resistant steel plate.

#### 2. Fasteners:

- a. A #15, heavy-duty, corrosion-resistant fastener used with Induction weld plate to attach insulation to roof decks. #15 fastener has a shank diameter of approximately 0.21 inch (5.3 mm) and the thread diameter is approximately 0.26 inch (6.6 mm). The driving head has a diameter of approximately 0.435 inch (11 mm) with a #3 Phillips recess for positive engagement.

#### 3. Perimeter Bars:

- a. An FM approved, heavy duty, 14 gauge, galvanized, roll-formed steel bar used to attach membrane to roof decks. The formed steel is pre-punched with holes every 1 inch on center to allow various fastener spacing options, as required for warranty and uplift requirements.

### B. Insulation Board Adhesive

- 1. low odor, VOC compliant, single component, low-rise urethane foam used to attach insulation to approved compatible substrates. Application rate is as follows:
- 2. Coverage -Approximately 500 to 600 square feet (46.4 to 55.7 square m) per 3 gallons (11.3 L) unit. Rates are based on an application using a ribbon pattern, 1/2 to 3/4 inch (13 to 19 mm) wide beads, 12 inches (30 cm) on center per 4 x 4 feet (121.9 x 121.9 cm) insulation board. Coverage rates may vary over irregular surfaces.

### C. Membrane Adhesive

1. Solvent-based, low VOC, reactivating-type adhesive used to attach the membrane to the substrate, either horizontally or vertically. Application rate shall be by manufacturer's recommended rates, based upon substrate.

## **2.07 MISCELLANEOUS ACCESSORIES**

### **A. Aluminum Tape**

1. A 2 inch (50 mm) wide pressure-sensitive aluminum tape used as a separation layer between small areas of asphalt contamination and the membrane and as a bond-breaker under the coverstrip at joints.

### **B. Sealing Tape Strip**

1. Compressible foam with pressure-sensitive adhesive on one side. Used with metal flashings as a preventive measure against air and wind blown moisture entry.

### **C. Multi-Purpose Tape**

1. A high performance sealant tape used with metal flashings as a preventive measure against air and wind blown moisture entry.

## **2.08 SEALANTS**

- A. Sealant: As recommended by roofing system manufacturer (for termination details).

## **2.09 MISCELLANEOUS FASTENERS AND ANCHORS**

- A. All fasteners, anchors, nails, straps, bars, etc. shall be post-galvanized steel, aluminum or stainless steel. Mixing metal types and methods of contact shall be assembled in such a manner as to avoid galvanic corrosion. Fasteners for attachment of metal to masonry shall be expansion type fasteners with stainless steel pins. All masonry fasteners and anchors shall have a minimum embedment of 1-1/4 inch (32 mm) and shall be approved for such use by the fastener manufacturer. All miscellaneous wood fasteners and anchors used for flashings shall have a minimum embedment of 1 inch (25 mm) and shall be approved for such use by the fastener manufacturer.

## **PART 3 - EXECUTION**

### **3.01 PRE-CONSTRUCTION CONFERENCE**

- A. The Contractor, Owner's Representative, Architect and Manufacturer shall attend a pre-construction conference.
- B. The meeting shall discuss all aspects of the project including but not limited to:
  1. Safety
  2. Set up
  3. Construction schedule
  4. Acceptability of Substrates
  5. Contract conditions
  6. Coordination of the work

### 3.02 SUBSTRATE CONDITION

- A. Contractor shall be responsible for acceptance or provision of proper substrate to receive new roofing materials.
- B. Contractor shall verify that the work done under related sections meets the following conditions:
  - 1. Roof curbs, nailers, equipment supports, vents and other roof penetrations are properly secured and prepared to receive new roofing materials.
  - 2. All surfaces are smooth and free of dirt, debris and incompatible materials.
  - 3. All roof surfaces shall be free of water, ice and snow.

### 3.03 SUBSTRATE PREPARATION

- A. The roof deck and existing roof construction must be structurally sound to provide support for the new roof system. The Contractor shall load materials on the rooftop in such a manner as to eliminate risk of deck overload due to concentrated weight. Provide two (2) fastener pull tests on the existing roof deck. Verify the roof deck is secured to the structural framing according to local building code and in such a manner as to resist all anticipated wind loads in that location.
- B. Existing Roofing
  - 1. All existing roofing, base flashing, deteriorated wood blocking or deteriorated metal flashings shall be removed. Remove only that amount of roofing and flashing which can be made weather tight with new materials during a one-day period or before the onset of inclement weather.

### 3.04 SUBSTRATE INSPECTION

- A. A dry, clean and smooth substrate shall be prepared to receive the Sarnafil Polyvinyl-Chloride roof system.
- B. The Contractor shall inspect the substrate for defects such as excessive surface roughness, contamination, structural inadequacy, or any other condition that will adversely affect the quality of work.
- C. The substrate shall be clean, smooth, dry, free of flaws, sharp edges, loose and foreign material, oil and grease. Roofing shall not start until all defects have been corrected.
- D. All roof surfaces shall be free of water, ice and snow.
- E. Roofing System shall be applied over compatible and accepted substrates only.

### 3.05 WOOD NAILER INSTALLATION

- A. Install continuous wood nailers at the perimeter of the entire roof and around roof projections and penetrations as shown on the Drawings.
- B. Nailers shall be anchored to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons per lineal meter) in any direction. Individual nailer lengths shall not be less than 3 feet (0.9 meter) long. Nailer fastener spacing shall be at 12 inches (0.3 m) on center or 16 inches (0.4 m) on center if necessary to match the structural framing. Fasteners shall be staggered 1/3 the nailer width and installed within 6 inches (0.15 m) of each end. Two

fasteners shall be installed at ends of nailer lengths. Nailer attachment shall also meet the requirement of the current Factory Mutual Loss Prevention Data Sheet 1-49.

- C. Thickness shall be as required to match substrate and insulation height to allow a smooth transition.
- D. Any existing nailer woodwork which is to remain shall be firmly anchored in place to resist a minimum force of 300 pounds per lineal foot (4,500 Newtons per lineal meter) in any direction and shall be free of rot, excess moisture or deterioration. Only woodwork shown to be reused in Detail Drawings shall be left in place. All other nailer woodwork shall be removed.
- E. Stainless steel, corrosion resistant, fasteners are required when mechanically attaching any roofing product to wood nailers and wood products treated with ACQ (Alkaline Copper Quaternary). When ACQ treated wood is used on steel roof decks or with metal edge detailing, a separation layer must be placed between the metal and ACQ treated wood.

### **3.06 INSULATION INSTALLATION**

- A. Insulation shall be installed according to insulation manufacturer's instructions.
- B. Insulation shall be neatly cut to fit around penetrations and projections.
- C. Install tapered insulation in accordance with insulation manufacturer's shop drawings.
- D. Install tapered insulation around drains creating a drain sump.
- E. Do not install more insulation board than can be covered with roofing membrane by the end of the day or the onset of inclement weather.
- F. Use at least 2 layers of insulation when the total insulation thickness exceeds 2-1/2 inches. Stagger joints at least 12 inches between layers.
- G. Adhesive Attachment
  - 1. Apply adhesive using a gravity fed applicator or by hand with a dual component caulk gun over properly installed and prepared substrates in bands 12 inches (305 mm) on center. Bands are 1/4 to 1/2 inch (6 to 13 mm) wide before foaming. Adhesive will quickly, within 30 to 45 seconds at 60 to 80 degree F (15 to 27 degree C), transform from a liquid into a low rise foam. Immediately set insulation boards into wet adhesive. Do not allow the adhesive to skin over. Walk insulation boards into place to ensure full embedment. Only areas that can be made completely watertight in the same day's operations shall be coated.
  - 2. For multiple layers of insulation spray adhesive over the base layer once fully secured and follow procedures above for attachment of each insulation layer.
- H. Mechanical Attachment
  - 1. Insulation shall be mechanically fastened to the structural deck with approved fasteners and induction weld plates according to the insulation and roof membrane manufacturer's recommendations for fastening rates and patterns. The quantity and locations of the fasteners and plates shall also cause the insulation boards to rest evenly on the roof deck/substrate. Each insulation board shall be installed tightly against the adjacent boards on all sides.



2. Fasten the insulation using induction weld plates and fasteners in a 2 by 2 foot or 2 by 3 foot grid pattern according to the membrane manufacturer's and the wind design requirements. Fasteners must be tight enough that the induction weld plates do not turn, but not so tight as to deform the induction weld plates

### **3.07 OVERLAYMENT BOARD INSTALLATION**

#### **A. General Criteria:**

1. Boards shall be installed according to manufacturer's instructions.
2. Boards shall be neatly cut to fit around penetrations and projections.
3. Do not install more boards than can be covered with Sarnafil membrane by end of day or onset of inclement weather.
4. Boards shall be installed tightly against adjacent boards on all sides.
5. Boards shall evenly on insulation so that there are no significant and avoidable air spaces between boards and insulation.

### **3.08 INSTALLATION OF MEMBRANE – INDUCTION WELDING**

- A. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced. Sarnafil S327 membrane shall be attached with Sarnafasteners and Sarnadisc RhinoBond according to Sika Sarnafil's and wind uplift requirements per ASCE 7 or Factory Mutual.
- B. Sarnafil full width rolls shall be placed over the overlayment board. Membrane overlaps shall be shingled with the flow of water where possible. Seam overlaps may be placed over Sarnadisc RhinoBond plate. Welding of the plate will not be affected.
  1. Tack welding of the membrane for purposes of temporary restraint during installation is not permitted and may result in voiding of Sika Sarnafil warranty.
  2. Field, Perimeter and Corner Areas
    - a. Over the properly prepared, installed and attached substrate surface following either the 2 by 2 foot (0.6 by 0.6 m) or 2 by 3 foot (0.6 by 0.9 m) grid pattern, S327 full-width rolls are to be installed so as to properly shed water. SRefer to FM LPDS 1-29 for their requirements for perimeter and corner enhancements.
    - b. Around all perimeters, at the base of walls, drains, curbs, vent pipes, or any other roof penetrations, Sarnafasteners and Sarnadisc RhinoBond, Sarnadiscs or Sarnabars shall be installed according to perimeter rate of attachment. Fasteners shall be installed according to the manufacturer's instructions. Fasteners shall be installed using the fastener manufacturer's recommended torque-sensitive fastening tools with depth locators. If Sarnadisc RhinoBond is not used, the fasteners shall clamp the Sarnafil membrane tightly to the substrate.
    - c. Sarnafil membrane flashings shall extend 2-1/2 inches (63 mm) past Sarnadisc and be hot-air welded to the Sarnafil deck membrane.

#### **C. RHINOBOND INDUCTION WELDING**

1. Welding equipment shall be provided by or approved by Sika Sarnafil. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Sika Sarnafil Technical Service Representative prior to welding.
  - a. Induction Welding : Activate the weld between membrane and plate using approved portable induction device. The induction coil must be positioned over the center of the Sarnadisc RhinoBond, +/- 1 inch (25 mm) Portable induction device must elevate the temperature of the Sarnadisc RhinoBond from ambient to 400 – 500 degree F (204 – 260 degree C).
2. Quality Control of Induction Welding
  - a. The Applicator shall check all induction welds each day. Check welds by using an ordinary plunger centered over the welded plate and pull straight up. Correct welds shall have no separation between the plate and membrane.

### 3.09 INSTALLATION OF MEMBRANE – FULLY ADHERED

- A. General: The surface of the insulation or substrate shall be inspected prior to installation of the roof membrane. The substrate shall be clean, dry, free from debris and smooth with no surface roughness or contamination. Broken, delaminated, wet or damaged insulation boards shall be removed and replaced.
- B. Membrane Adhesive:
  1. Over the properly installed and prepared substrate surface, adhesive shall be applied using solvent-resistant 3/4 inch (19 mm) nap paint rollers. The adhesive shall be applied to the substrate at a rate according to roofing system manufacturer's requirements. No adhesive is applied to the back of the membrane. The adhesive shall be applied in smooth, even coats with no gaps, globs, puddles or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be coated with adhesive. The first layer of adhesive shall be allowed to dry completely prior to installing a second layer of adhesive and the membrane.
  2. The roof membrane is unrolled immediately into a second layer of wet adhesive. Adjacent to that first installed roll of membrane, another second layer of wet adhesive is applied and the second roll of membrane is immediately unrolled into it, overlapping the first roll by 3 inches (75 mm). This process is repeated throughout the roof area. Immediately after application into adhesive, each roll shall be pressed firmly in place with a minimum 100 lb. (45 kg) linoleum roller by frequent rolling in two directions.  
**Do not allow the second application of adhesive to dry at all!**
  3. Weld membrane cover strips at all seams that do not have a factory selvage edge.
  4. Notes:
    - a. The Contractor shall count the amount of pails of adhesive used per area per day to verify conformance to the specified adhesive rate.
    - b. No adhesive shall be applied in seam areas. All membrane shall be applied in the same manner.

### 3.10 HOT-AIR WELDING OF MEMBRANE SEAM OVERLAPS

- A. General

1. All seams shall be hot-air welded. Seam overlaps should be 3 inches (75 mm) wide when automatic machine-welding and 4 inches (100 mm) wide when hand-welding, except for certain details.
  2. Welding equipment shall be provided by or approved by roofing system manufacturer. All mechanics intending to use the equipment shall have successfully completed a training course provided by a Roofing System Manufacturer Technical Service Representative prior to welding.
  3. All membrane to be welded shall be clean and dry.
- B. Hand-Welding: Hand-welded seams shall be completed in two stages. Hot-air welding equipment shall be allowed to warm up for at least one minute prior to welding.
1. The back edge of the seam shall be welded with a narrow but continuous weld to prevent loss of hot air during the final welding.
  2. The nozzle shall be inserted into the seam at a 45 degree angle to the edge of the membrane. Once the proper welding temperature has been reached and the membrane begins to "flow", the hand roller is positioned perpendicular to the nozzle and rolled lightly. For straight seams, the 1-1/2 inch (40 mm) wide nozzle is recommended for use. For corners and compound connections, the 3/4 inch (20 mm) wide nozzle shall be used.
- C. Machine Welding
1. Machine welded seams are achieved by the use of roofing manufacturer's automatic welding equipment. When using this equipment, the roofing manufacturer's instructions shall be followed and local codes for electric supply, grounding and over current protection observed. Dedicated circuit house power or a dedicated portable generator is recommended. No other equipment shall be operated simultaneously off the generator.
  2. Metal tracks may be used over the deck membrane and under the machine welder to minimize or eliminate wrinkles.
- D. Quality Control of Welded Seams
1. The Applicator shall check all welded seams for continuity using a rounded screwdriver. Visible evidence that welding is proceeding correctly is smoke during the welding operation, shiny membrane surfaces, and an uninterrupted flow of dark gray material from the underside of the top membrane. On-site evaluation of welded seams shall be made daily by the Applicator at locations as directed by the roofing manufacturer's representative. One inch (25 mm) wide cross-section samples of welded seams shall be taken at least three times a day. Correct welds display failure from shearing of the membrane prior to separation of the weld. Each test cut shall be patched by the Applicator at no extra cost to the Owner.

### **3.11 MEMBRANE FLASHINGS**

- A. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Roofing Manufacturer. Approval shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing, the affected area shall be removed

and replaced at the Applicator's expense. Flashing shall be adhered to compatible, dry, smooth, and solvent-resistant surfaces. Use caution to ensure adhesive fumes are not drawn into the building.

**B. Adhesive for Membrane Flashings**

1. Over the properly installed and prepared flashing substrate, adhesive shall be applied according to instructions found on the Product Data Sheet. The adhesive shall be applied in smooth, even coats with no gaps, globs or similar inconsistencies. Only an area which can be completely covered in the same day's operations shall be flashed. The bonded sheet shall be pressed firmly in place with a hand roller.
2. No adhesive shall be applied in seam areas that are to be welded. All panels of membrane shall be applied in the same manner, overlapping the edges of the panels as required by welding techniques.

**C. Install flashings according to the manufacturer's recommendation and the Construction Drawings with approved fasteners into the structural deck at the base of parapets, walls and curbs.**

**D. The Roofing Manufacturer's requirements and recommendations and the specifications shall be followed. All material submittals shall have been accepted by roofing manufacturer prior to installation.**

**E. All flashings shall extend a minimum of 8 inches (0.2 m) above roofing level unless otherwise accepted by the Architect and/or the roofing manufacturer.**

**F. All flashing membranes shall be consistently adhered to substrates. All interior and exterior corners and miters shall be cut and hot-air welded into place. No bitumen shall be in contact with the roofing membrane.**

**G. Flashings shall be terminated according to Roofing Manufacturer's recommended details.**

**H. All flashings that exceed 30 inches (0.75 m) in height shall receive additional securement.**

**3.12 PERIMETER EDGE FLASHING**

**A. General:**

1. All flashings shall be installed concurrently with the roof membrane as the job progresses. No temporary flashings shall be allowed without the prior written approval of the Architect and Roofing Manufacturer. Acceptance shall only be for specific locations on specific dates. If any water is allowed to enter under the newly completed roofing due to incomplete flashings, the affected area shall be removed and replaced at the Applicator's expense.
2. Cut membrane at the roof perimeter edge. Weld one side of a membrane flashing strip along the perimeter edge to the top of the cut membrane. Position membrane flashing over roof edge and down outside face of wall covering the wood nailer(s) completely. Allow min. 1 inch of excess membrane to extend beyond the wood nailer(s). Hot-air weld all seams making sure there are no voids in welds.

**B. Metal flashings shall be formed and installed per the Detail Drawings.**

1. All metal flashings shall be fastened into solid wood nailers with two rows of post galvanized flat head annular ring nails, 4 inches (100 mm) on center staggered. Fasteners shall penetrate the nailer a minimum of 1 inch (25 mm).
  2. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and contraction.
- C. Adjacent sheets of metal base flashings/edge metal shall be spaced 1/4 inch (6 mm) apart. The joint shall be covered with 2 inch (50 mm) wide aluminum tape. A 4 inch minimum (100 mm) wide strip of flashing membrane shall be hot-air welded over the joint. Exercise caution at perimeter of roof.
- D. Airtight and continuous cleats are required behind perimeter edge flashing. Cleats are to be fastened 8 inches on center into the wood nailer.

### **3.13 TEMPORARY CUT-OFF**

- A. General: All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the work progresses. All temporary waterstops shall be constructed to provide a 100 percent watertight seal. The stagger of the insulation joints shall be made even by installing partial panels of insulation. The new membrane shall be carried into the waterstop. Waterstop shall be sealed to the deck or substrate so that water will not be allowed to travel under the new or existing roofing. The edge of the membrane shall be sealed in a continuous heavy application of sealant. When work resumes, the contaminated membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the work area and properly disposed of off site. None of these materials shall be used in the new work.
- B. If inclement weather occurs while a temporary waterstop is in place, the Applicator shall provide the labor necessary to monitor the situation to maintain a watertight condition.
- C. If any water is allowed to enter under the newly-completed roofing, the affected area shall be removed and replaced at the Applicator's expense.

### **3.14 COMPLETION**

- A. Prior to demobilization from the site, the work shall be reviewed by the Architect, Owner's Project Manager, Roofing Manufacturer's Representative and the Contractor. All defects noted and non-compliances with the Specifications or the recommendations of Roofing Manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Contractor to the satisfaction of the Architect, Owner's Project Manager and Roofing Manufacturer's Representative prior to demobilization.
- B. All Warranties referenced in this Specification shall have been submitted and have been accepted at time of contract award.

**END OF SECTION**

Section 07 62 00

**SHEET METAL, FLASHING AND TRIM**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIRMENTS**

- A. Include the General Conditions of the Contract and Division 1, General Requirements, as part of this Section.
- B. Examine all other Sections of the Specifications for requirements that affect work under this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work of this Section with that of all other trades affecting, or affected by, this Section. Cooperate with such trades to assure the steady progress of all work under the contract.

**1.02 DESCRIPTION OF WORK**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. Remove and dispose of metal base, reglet, counter, fascias, as indicated on the Drawings to be removed.
  - 2. Sheet metal flashing and trim for the following applications:
    - a. Formed roof/wall flashing
    - b. Copper reglet flashing and hook strips
    - c. Stainless steel counter flashing
    - d. Prefabricated copper roof fascia
    - e. Prefabricated PVC Coated Galvanized Steel roof fascia
    - f. Aluminum flashing and counter flashing as indicated on the drawings

**1.03 RELATED REQUIREMENTS**

- A. The following items are not included in this Section and will be performed under the designated Sections:
  - 1. Section 04 00 01 – Masonry
  - 2. Section 06 10 00 – Rough Carpentry
  - 3. Section 07 54 19 - Polyvinyl-Chloride Roofing
  - 4. Section 07 92 00 – Joint Sealants

**1.04 PERFORMANCE REQUIREMENTS**

- A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.
- B. Fabricate and install roof edge flashing and copings capable of resisting the following forces required by Code according to recommendations in FMG Loss Prevention Data Sheet 1-49.

- C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.
1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.
- D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

### 1.05 SUBMITTALS

- A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.
- B. Shop Drawings: Show layouts of sheet metal flashing and trim, including plans and elevations. Distinguish between shop and field-assembled work. Include the following:
1. Identify material, thickness, weight, and finish for each item and location in Project.
  2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
  3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
- C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:
1. Formed Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments for each type of metal flashing.
  2. Trim: 12 inches long. Include fasteners and other exposed accessories.
  3. Self-adhered membrane flashing: 12 inch by 12 inch sample.
  4. Accessories: Full-size Sample.

### 1.06 QUALITY ASSURANCE

- A. Formed Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.
- B. High performance roof edge shall be CERTIFIED by the manufacturer to comply with ANSI/SPRI Standard ES-1. Roof edge/gravelstop shall meet performance design criteria according to the following test standards:
1. ANSI/SPRI ES-1 Test Method RE-1 Test for Roof Edge Termination of Single-ply Roofing Membranes: The fascia system shall be tested to secure the membrane to minimum 100 lbs/ft in accord with the ANSI/SPRI ES-1 Test Method RE-1. Use the current edition of ANSI/SPRI ES-1 Wind Design Standard for Edge Systems Used with Low Slope Roofing Systems.

- C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.
  - 1. Meet with the Owner's Representative, Architect, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
  - 2. Review methods and procedures related to sheet metal flashing and trim.
  - 3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
  - 4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

#### **1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.
- B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.
- C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

#### **1.08 COORDINATION**

- A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leak proof, secure, and noncorrosive installation.

### **PART 2 - PRODUCTS**

#### **2.01 SHEET METALS**

- A. Copper: ASTM B101 20 oz. weight unless indicated otherwise on the drawings.
- B. Stainless-Steel Sheet: ASTM A 240/A 240M, Type 304, with No. 2D dull, cold rolled finish; 22 ga. minimum thickness unless indicated otherwise on the drawings.
- C. Galvanized Steel: 24 Gauge thickness unless indicated otherwise on the drawings.
- D. Aluminum: .050" thickness unless indicated otherwise on the drawings.

#### **2.02 ROOF EDGING**

- A. Roof Edging: A two-part assembly with a rigid extruded termination base plate, and a decorative snap-on fascia cover for single-ply roofs. The system shall have all concealed fasteners with no penetration on horizontal roof surface.
  - 1. Retainer base plate: Shall be .100 extruded aluminum with .187" x .375" slotted holes for fasteners @ 12" (305 mm) on center in 10'-0" (3048 mm) standard lengths.
    - a. Install with field-applied waterproof sealant by roofing membrane manufacturer.
    - b. 24 ga. galvanized steel or .050" aluminum extender cleat for face sizes above 6.75".
    - c. Custom sizes by use of a galvanized or aluminum extension cleat by request.
- B. Exterior fascia covers:



1. Copper 20oz.
  2. Aluminum .050"
  3. 24 gauge galvanized steel
  4. 24 gauge PVC-coated, heat-weldable galvanized steel.
  5. Covers to be in 10'-0" lengths for all sizes; concealed, matching 4" wide joint splice plates in matching material.
  6. Fasteners: Stainless steel hex head screw type provided by the manufacturer.
- C. Exterior fascia finishes for Aluminum and Galvanized Steel: Kynar-500 from manufacturer's standard colors, custom color Kynar-500.

### **2.03 MISCELLANEOUS MATERIALS**

- A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.
- B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.
1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
  2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
  3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.
  4. Solder for Stainless Steel: ASTM B 32, Grade Sn60, with acid flux of type recommended by stainless-steel sheet manufacturer.
  5. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, non-staining tape.
  6. Low Modulus Silicone Sealant: ASTM C 920, low modulus, high performance, one part, moisture curing silicone joint sealant; of Type S, Grade NS, Class 100/50, and Use Classifications required to seal joints in sheet metal flashing and trim and remain watertight.
  7. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

### **2.04 FABRICATION, GENERAL**

- A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.
- B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.
- C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.
- D. Sealed Joints: Form non-expansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.
- E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.
- G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.
  1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

## **2.05 SHEET METAL FABRICATIONS**

- A. Formed Sheet Metal Reglet and Counterflashing. Fabricate in minimum 96-inch-long, but not exceeding 10-foot- long sections.
  1. Reglet Flashing: Fabricate from material as indicated on the drawings
    - a. Copper: 20 oz.
    - b. Stainless Steel: 22 ga.
  2. Counterflashing: Fabricate from the following material as indicated on the drawings.
    - a. Copper: 20 oz.
    - b. Stainless Steel: 22 ga.
  3. Aluminum Flashing: Fabricate as indicated on the drawings
    - a. .050" minimum thickness
  4. Joint Style: All joints soldered for Copper and Stainless. All joints riveted and sealed for Aluminum.

## **2.06 FINISHES**

- A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.
- B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
- C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.
  - 1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
  - 2. Proceed with installation only after unsatisfactory conditions have been corrected.

### **3.02 INSTALLATION, GENERAL**

- A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.
  - 1. Torch cutting of sheet metal flashing and trim is not permitted.
- B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.
- C. Coat side of stainless-steel sheet metal flashing and trim with bituminous coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.

### **3.03 ROOF FLASHING INSTALLATION**

- A. General: Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal
- B. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners
- C. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Provide expansion joints as indicated on the Drawings with expansion joint covers. Where lapped or bayonet-type expansion provisions cannot be used or would not be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.
- D. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.
  - 1. Galvanized or Prepainted, Metallic-Coated Steel: Use stainless-steel fasteners.
  - 2. Copper: Use copper or stainless-steel fasteners.
  - 3. Stainless Steel: Use stainless-steel fasteners.
- E. Seal joints with elastomeric sealant as required for watertight construction.
- F. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.

- G. Prepare joints and apply sealants to comply with requirements in Section 07 92 00 - JOINT SEALANTS.
- H. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Prein edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.
- I. Stainless-Steel Soldering: Prein edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
- J. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

### **3.04 ROOF FLASHING INSTALLATION**

- A. General: Install sheet metal roof flashing and trim to comply with performance requirements, sheet metal manufacturer's written installation instructions,] and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.
- B. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.
- C. Secure in a waterproof manner by means of snap-in installation and sealant.

### **3.05 WALL FLASHING INSTALLATION**

- A. General: Install sheet metal wall flashing and self adhered membrane flashing/underlayment to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated on the Drawings. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

### **3.06 CLEANING AND PROTECTION**

- A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.
- B. Clean and neutralize flux materials. Clean off excess solder and sealants.
- C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.
- D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

**END OF SHEET METAL, FLASHING AND TRIM**

**Section 07 72 33  
ROOF HATCHES**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, and without limiting the generality thereof includes:
  - 1. Roof hatches installed on or in roofing system indicated on the Drawings and specified herein, including all related hardware and attachments. Does not include mechanical or structural items.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. Section 06 10 00 – ROUGH CARPENTRY:
    - a. Wood roof framing/blocking into which roof hatch to be installed.
  - 2. Section 07 54 19 – POLYVINYL-CHLORIDE ROOFING:
    - a. Roofing material into which roof hatch is to be installed.

**1.04 REFERENCE STANDARDS**

- A. American Society for Testing and Materials (ASTM), 100 Bar Harbor Drive, West Conshocken, PA 19428-2959; (610) 832-9585, fax (610) 832-9555
  - 1. ASTM A 36-93a: Standard Specification for Structural Steel

**1.05 SUBMITTALS**

- A. Submit under provisions of Section 01 33 00 – SUBMITTAL PROCEDURES.
- B. Shop Drawings: Indicate the configuration and dimensions of components, adjacent construction, required clearances and tolerances, and other affected Work.
  - 1. Hatch Units: Show types, elevations, thickness of metals and full profiles.
  - 2. Hardware: Show materials, finishes, locations of fasteners, types of fasteners, locations and types of operating hardware and details of installation.
  - 3. General: Show connections of units and hardware to other Work. Include schedules showing locations of each type and size of unit.
- C. Product Data: Manufacturer's technical data for each type of hatch assembly, including setting drawings, templates, finish requirements and details of anchorage devices

1. Include complete schedule, types, locations, construction details, finishes, latching of locking provisions and other pertinent data.
- D. Manufacturer's Installation Instructions: Indicate installation requirements and rough-in dimensions.
- E. Quality Control Submittals: Statement of qualifications.

**1.06 QUALITY ASSURANCE**

- A. Qualifications: Manufacturer and installer shall specialize in the manufacturing and installation of components specified in this Section with a minimum of five years documented experience.
- B. Single Source Responsibility: Obtain roof hatch units and frames for the entire project from one source and one single manufacturer.
- C. Regulatory Requirements: OSHA Compliance: Provide hatch safety railing system as required by OSHA Standard 1910.23 and 1910.27 and as specified herein.

**1.07 GUARANTEE/WARRANTY**

- A. Attention is directed to the provisions of the CONDITIONS OF THE CONTRACT regarding guarantees/warranties for the Work.
- B. Manufacturers shall provide a five year guarantee for work under this Section to be free from defects in materials and workmanship.
- C. The guarantee/warranty shall be in addition to and not in lieu of all other liabilities which the manufacturers, the Contractor and the Subcontractors may have by law or by other provisions of the Contract Documents.

**1.08 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver materials in manufacturer's original unopened and undamaged packages. Clearly identify manufacturer, brand name, contents, color, stock number, and order number on each package. Packages showing indications of damage that may affect condition of contents are not acceptable.
- B. Store in original packaging under protective cover and protect from damage. Stack containers in accordance with manufacturer's recommendations.
- C. Handle materials in such a manner as to prevent damage to products or finishes.

**PART 2 - PRODUCTS**

**2.01 APPROVED MANUFACTURERS**

- A. Roof hatches shall be Type S, single leaf preassembled hatch as manufactured by one of the following manufacturers, or equal:
  1. The Bilco Company
  2. Karp Associates, Inc.
  3. Babcock-Davis.

## 2.02 MANUFACTURED UNITS

### A. Aluminum Roof Hatches

1. Cover and Liner: 14 gauge type 304 stainless steel cover shall be reinforced to support minimum live load of 40 psf. with a maximum deflection of  $1/150^{\text{th}}$  of the span. Entire hatch shall be weathertight with fully welded corner joints on the cover and curb. Liner shall be 18 gauge aluminum.
2. Cover Insulation: shall be one inch rigid fiberboard insulation.
3. Curb: Curb shall be 12 inches in height and of 12 gauge type 304 stainless steel. The curb shall be formed with a 3-1/2" flange with 7/16" holes provided to secure to the roof deck. The curb shall be equipped with an integral metal cap-flashing of the same gauge and materials as the curb, fully welded at the corners. The flashing system shall include stamped tabs, 6: on center to be bent inward to hold a single ply membrane roofing securely in place.
4. Curb Insulation: Curb insulation shall be rigid, high density fiberboard one inch thickness on the outside of the curb.
5. Hinges: Type 316 stainless steel tamperproof hinge contained within the hatch as part of the spring assembly.
6. Latch: Type 316 stainless steel slam hatch with a turn handle and inside/outside padlock hasps.
7. Lifting Mechanism: The manufacturer shall provide compression spring operators enclosed in telescopic tubes to provide, smooth, easy, and controlled cover operation throughout the entire arc of opening and closing. The upper tube shall be the outer tube to prevent accumulation of moisture, grit, and debris inside the lower tube assembly. The lower tube shall interlock with a flanged support shoe welded to the curb assembly..
8. Hardware: Type 316 stainless steel hold open arm(s) with rubber handle that automatically locks the door when opened. Furnish hatches with interior padlock hasp and EPDM draft seal.
9. Size: As indicated on the Drawings.
10. Finish shall be mill finish aluminum.

## **PART 3 - EXECUTION**

### **3.01 EXAMINATION**

- A. Verification of Conditions: Examine areas and conditions under which the Work is to be performed and identify conditions detrimental to proper or timely completion.
- B. Verify that deck, curbs, roof membrane, base flashing and other items affecting the Work of this Section are in place and positioned correctly.
- C. Verify tolerances and correct improper conditions.
- D. Do not proceed until unsatisfactory conditions have been corrected.



**3.02 INSTALLATION**

- A. Install roof hatch and safety rail items and components per manufacturer's instructions.
- B. Coordinate installation of components of this Section with the installation of the roof membrane and base flashing.
- C. Coordinate installation of sealants and roofing cement with Work of this Section to ensure water tightness.
- D. Coordinate installation of flashing flanges into reglets.
- E. Separate metal from incompatible metal or corrosive substrates, including wood, by coating concealed surfaces, at locations of contact, with bituminous coating or providing other permanent separation.
- F. Flange Seals: Unless otherwise indicated, set flanges of accessory units in a thick bed of roofing cement to form a seal.

**3.03 ADJUSTING**

- A. Adjust movable parts for smooth operation.
- B. Operational Units: Test-operate units with operable components. Clean and lubricate joints and hardware. Adjust for proper operation.

**3.04 CLEANING**

- A. Clean exposed surfaces per the manufacturer's written instructions. Touch up damaged metal coatings.

**END OF ROOF HATCHES**

**Section 07 92 00  
JOINT SEALANTS**

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Division 00 and 01 are hereby made a part of this section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Work Included: Provide caulking as follows:
  - 1. Metal to metal joint sealant not expressly called to be installed by other sections.
  - 2. All other exterior sealing called for, or reasonably inferred from the Drawings and as required to provide weather tight conditions in exterior assemblies.
- B. Indoor Air Quality: Adhesives, sealants and related materials used in the Work shall have low or no VOCs (Volatile Organic Compounds) as acceptable to the Owner and the Architect.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. Section 07 10 00 - WATERPROOFING, DAMPPROOFING, AND CAULKING

**1.04 SUBMITTALS**

- A. General Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. Submittals:
  - 1. Product Data: Submit manufacture's printed product data, specifications, standard details, installation instructions, use limitations and recommendations for each material used. Provide certifications that all materials comply with specified requirements.
  - 2. Initial Selection Samples: Submit samples manufacturer's color charts showing complete range of colors, textures and finishes available for each material used.
  - 3. Verification Samples: Submit actual representative sample of each sealant material that is to be exposed in the completed work. Show full color ranges and finish variations expected. Provide sealant samples having minimum size of 4 in. long.
  - 4. Test Reports: Provide certified reports for all specified tests.

### 1.05 QUALITY ASSURANCE

#### A. Joint Sealers:

1. Compatibility: Provide sealant and sealant joint backing materials suitable for the use intended and compatible with the materials with which they will be in contact. Compatibility of sealant and accessories shall be verified by the sealant manufacturer.
2. Source: For each sealant material type required for the work of this section, provide primary materials which are the product of one manufacturer. Provide secondary or accessory materials which are acceptable to the manufacturers of the primary materials.
3. Installer: A firm with a minimum of five years experience in type of work required by this Section and which is acceptable to the manufacturers of the primary materials.
4. Mock-ups for testing: Prior to commencing the primary work of this Section, provide mock-ups at locations acceptable to Architect. Obtain Architect's acceptance of visual qualities and perform tests for adhesion in accordance with ASTM C1521 and provided test results to the Architect and the Owner for review and acceptance. If results are acceptable, protect and maintain accepted mock-ups throughout the remainder of the work of this section to serve as criteria for acceptance of the work.

### 1.06 WARRANTIES

- #### A. Joint Sealers:
- Furnish joint sealant manufacturer's written single-source performance warranty that joint sealant work will be free of defects related to workmanship or material deficiency for five years from date of Substantial Completion of the Project.

### 1.07 PRODUCT DELIVERY, STORAGE AND HANDLING

#### A. Joint Sealants:

1. Materials under this Section shall be delivered to, and stored at, the job site in unbroken factory sealed containers with labels intact.

### 1.08 JOB CONDITIONS

#### A. Joint Sealants:

1. Weather: Perform work of this Section only when existing or forecasted weather conditions are within the limits established by manufacturers of the materials and products used.
2. Substrates: Proceed with work only when substrate construction and penetration work is complete.

### 1.09 PROTECTION

- #### A. Protect the building and finish surfaces from damage, resulting from spillage, dripping and dropping of materials. Prevent materials from entering and clogging drains. Repair, restore or replace work which is soiled or damaged in connection with the performance of the work.

## **PART 2 - PRODUCTS**

### **2.01 MATERIALS, GENERAL**

- A. Compatibility: Provide joint sealants, backings, and other related materials that are compatible with one another and with joint substrates under conditions of service and application, as demonstrated by sealant manufacturer, based on testing and field experience.
- B. VOC Content of Interior Sealants: Provide sealants and sealant primers that comply with the following limits for VOC content when calculated according to 40 CFR 59, Subpart D (EPA Method 24):
  - 1. Sealants: 250 g/L.
  - 2. Sealant Primers for Nonporous Substrates: 250 g/L.
  - 3. Sealant Primers for Porous Substrates: 775 g/L.
    - a. Colors of Exposed Joint Sealants: Custom colors as selected by the Architect for joints exposed to view.

### **2.02 JOINT SEALANTS**

- A. Elastomeric Sealants: Comply with ASTM C 920 and other requirements indicated for each liquid-applied chemically curing sealant specified, including those referencing ASTM C 920 classifications for type, grade, class, and uses related to exposure and joint substrates.
- B. Stain-Test-Response Characteristics: Elastomeric sealants shall be nonstaining to porous substrates. Provide products that have undergone testing according to ASTM C 1248 and have not stained porous joint substrates indicated for Project.
- C. Two-component chemically curing polyurethane meeting Federal specifications TT-S-00227E, Type II, Class A and ASTM C—920, Type M, Grade NS, Class 50

### **2.03 SEALANT SCHEDULE**

- A. Polyurethane Sealant  
(Moisture-curing, single-component non-sag polyurethane sealant)
  - 1. Tremco Dymonic
  - 2. Pecora Dyna Trol 1-XL
  - 3. BASF MasterFlex-472 Plus
  - 4. or Approved Equal

### **2.04 MISCELLANEOUS SEALANT MATERIALS**

- A. Primer: Provide primer recommended by sealant manufacturer for surfaces to be adhered to.
- B. Bond Breaker Tape: Provide polyethylene or other plastic tape recommended by sealant manufacturer to prevent three-sided adhesion.
- C. Sealant Back-Up Rod: Closed-cell, non-gassing, polyethylene rod. The diameter of the rod shall be approximately 25 percent in excess of joint width. Surface skin of rod shall be continuous and unbroken and of sufficient thickness to preclude outgassing and formation of voids in the overlying sealant.
  - 1. Basis of Design: Ethafoam by Dow Chemical Co.; or equal product as manufactured by

Pecora, Sonneborne, or equal.

- D. Joint backing for general use at joints in horizontal surfaces shall consist of two rows of butyl rubber or neoprene foam rod in contact with one another, and each compressed to approximately 2/3 original width when in place.
- E. Provide miscellaneous materials of type that will not bleed through sealant, discolor surface, or produce other deleterious effects. Select size to provide compression to approximately 2/3 original width when in place. Provide backing material profile concave to the rear of the sealant, and equipped with a bond-breaking film.

### **PART 3 - EXECUTION**

#### **3.01 CONDITION OF SURFACE**

- A. The installer shall examine conditions of substrates and other conditions under which this work is to be performed and notify the contractor, in writing, of circumstances detrimental to the proper completion of the work. Do not proceed with work until unsatisfactory conditions are corrected.

#### **3.02 SEALANT INSTALLATION**

- A. The Installer shall examine substrates and conditions under which this work is to be performed and notify Contractor, in writing, of conditions detrimental to proper completion of work. Do not proceed with work until unsatisfactory conditions are corrected. Beginning of sealant work means installer's acceptance of joint surfaces and conditions.
- B. Strictly comply with manufacturers' instructions and recommendations, except where more restrictive requirements are specified in this Section.
- C. Clean joint surfaces immediately before installation of sealants, primers, tapes and fillers. Remove substances which could interfere with bond. Etch or roughen joint surfaces to improve bond, as recommended by manufacturer. Surface which have been given protective coatings and those that contain oil or grease shall be thoroughly cleaned with xylol or MEK solvent, with due precautions taken to minimize hazards.
- D. Unless otherwise indicated, use of sealants shall conform to the following: ASTM C 790 for latex sealants or ASTM C 962 for other sealants.
- E. Tape or mask adjoining surfaces to prevent spillage and migration problems.
- F. Prime surfaces as recommended by sealant manufacturer.
- G. Schedule work as long as possible after completion of concrete work
- H. Provide backer rods for liquid sealants except where specifically recommended against by sealant manufacturer.
- I. Prevent three-sided adhesion by use of bond breaker tapes or backer rods.
- J. Force sealant into joints to provide uniform, dense, continuous ribbons free from gaps and air pockets. Completely wet both joint surfaces equally on opposite sides.
- K. Except in hot weather, make sealant surface slightly concave. Install sealants so that compressed sealants do not protrude from joints. Dry tool sealants to form a smooth dense surface. At horizontal joints form a slight concave to prevent trapping water.

- L. Provide sealants to depths indicated, or if not indicated, follow manufacturer's recommendations.

**3.03 EXTENT OF SEALANT WORK**

- A. General Extent: Seal joints indicated, and all exterior joints, seams, and intersections between dissimilar materials. Provide elastomeric sealant installation with backer rod in all interior and exterior control joints.

**3.04 SEALANT CURING**

- A. Cure all sealants in strict compliance with manufacturers' instructions and recommendations to obtain highest quality surface and maximum adhesion. Make every effort to minimize accelerated aging effects and increase in modulus of elasticity.

**3.05 CLEANING AND PROTECTION OF SEALANTS**

- A. Remove smears from adjacent surfaces immediately, as the work progresses. Exercise particular care to prevent smearing or staining of surrounding surfaces which will be exposed in the finished work, and repair any damage done to same as result of this work without additional cost to Owner.
- B. Remove and replace work that is damaged or deteriorated.
- C. Clean adjacent surfaces using materials and methods recommended by sealant manufacturer. Remove and replace work that cannot be successfully cleaned.
- D. Provide temporary protection to ensure work being without damage or deterioration at time of final acceptance. Remove protection before final acceptance.

**3.06 WATERPROOFING APPLICATION**

- A. Application shall be in strict adherence to the manufacturer's written application procedures and recommendations.

**3.07 CLEAN-UP**

- A. Upon completion of the system, clean all stains, remove all masking, protections, equipment, material, and debris from the work and storage area, and leave those areas in an undamaged and acceptable condition.

**3.08 TRASH AND DEBRIS REMOVAL**

- A. The General Contractor shall provide dumpsters for use by all subcontractors. During the course of the work at the end of each work day, subcontractors shall clean up trash and debris caused by their work, and deposit it in the dumpsters, or, at the subcontractor's option, haul it away and dispose of the trash legally. The subcontractor shall do a thorough cleaning of all their debris after scaffolding and staging has been removed from an area.

**END OF JOINT SEALANTS**



Section 08 11 13  
HOLLOW METAL DOORS AND FRAMES

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Division 00 and 01 are hereby made a part of this section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SCOPE OF WORK**

- A. Furnish and install the following items:
  - 1. Hollow Metal Doors
  - 2. Pressed Metal Frames
- B. Install the following items to be provided by the designated sections:
  - 1. Section 08 71 00 – DOOR HARDWARE:
    - a. Door Hardware.

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
- B. Section 08 71 00 – DOOR HARDWARE:
  - 1. Templates for hardware reinforcing and templates for cut-outs in frames and furnishing and installing of all hardware.
- C. Section 07 92 00 JOINT SEALANTS
  - 1. Sealing between hollow metal frames and masonry
- D. Section 09 91 00 – PAINTING:
  - 1. Field painting of frames and doors

**1.04 SUBMITTALS**

- A. A. General: Refer to SECTION 00 70 00 – GENERAL CONDITIONS – 4.13 through 4.18 for submittal provisions and procedures.
  - 1. Product Data: Submit for each type of door and frame specified, including details of construction, materials, dimensions, hardware preparation, core, label compliance, sound ratings, profiles, and finishes.
  - 2. Door Schedule: Use same reference designations indicated on Drawings.

**1.05 QUALITY ASSURANCE**

- A. Reference Standards:
  - 1. Steel Door and Frame Standard: Comply with ANSI A250.8.



## 1.06 DELIVERY, STORAGE AND HANDLING

### A. Delivery:

1. Deliver doors and frames cardboard-wrapped or crated to provide protection during transit and job storage.
2. Inspect doors and frames on delivery for damage.
3. Minor damages may be repaired, provided refinished items are equal in all respects to new work and acceptable to Architect.
4. Remove and replace damaged items as directed.

### B. Storage:

1. Store doors and frames at building site under cover.
2. Place units on min. 4 in. high wood blocking.
3. Avoid use of non-vented plastic or canvas shelters that could create humidity chamber.
4. If cardboard wrapper on door becomes wet, remove carton immediately.
5. Provide 1/4 in. spaces between stacked doors to promote air circulation.

## **PART 2 - PRODUCTS**

### 2.01 ACCEPTABLE MANUFACTURERS

#### A. Steel Doors and Frames:

1. Benchmark Commercial Door Div. (General Products Co.),
2. Mesker Door Co., Pioneer Industries Inc.,
3. Republic Builders Products, Steelcraft Div. (Ingersoll- Rand).

### 2.02 MATERIALS

#### A. Steel:

1. Galvanized Steel Sheets: Zinc-coated carbon cold-rolled (per ASTM A366) steel, Commercial Quality, comply with ASTM A653, Type B, with A40 (ZF126) zinc-iron alloy (galvannealed) coating; stretcher-leveled standard for flatness.

#### B. Anchors and Fasteners:

1. Supports and Anchors: Fabricate of min. 18 ga. steel, galvanized where used with galvanized frames.
2. Inserts, Bolts and Fasteners: Manufacturer's standard units, except hot-dip galvanize items to be built into exterior walls, comply with ASTM A153, Class C or D, as applicable.

#### C. Shop-Applied Primer Paint:

1. Rust-inhibitive primer enamel or paint, either air-dried or baked, suitable as base for specified finish paints
2. Comply with ANSI A224.1, Test Procedure and Acceptance Criteria for Prime Painted Steel Surfaces for Steel Doors and Frames.

## 2.03 FABRICATION

### A. General:

1. Fabricate units to be rigid, neat in appearance and free from defects, warp, or buckle.
2. Wherever practicable, fit and assemble units in manufacturer's plant.
3. To assure proper assembly at Project site, clearly identify work that cannot be permanently factory-assembled before shipment.
4. Comply with ANSI/SDI-100 requirements.
5. Clearances:
  - a. Max. 1/8 in. at jambs and heads, except max. 1/4 in. between nonfire-rated pairs of doors.
  - b. Max. 3/4 in. at bottom.
6. Tolerances: Comply with SDI 117, Manufacturing Tolerances Standard Steel Doors and Frames.
7. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat or oval heads for exposed screws and bolts.

### B. Doors:

1. Provide metal doors of types and styles or grades and models indicated on Drawings or Schedules.
2. Face Thickness:
  - a. 0.042 in. (18 ga.).
3. Internal Construction:
  - a. Insulated: Manufacturer's standard foam.
4. Close top and bottom edges of exterior doors as integral part of door construction or by addition of min. 0.053 in. thick inverted steel channels.
5. Single-Acting, Door-Edge Profile: Beveled edge.

### C. Frames:

1. General:
  - a. Provide steel frames that comply with ANSI A250.8 and with details indicated for type and profile.
  - b. Conceal fastenings, unless otherwise indicated.
2. Frame Thickness - Steel Doors:
  - a. 0.053 in. (16 ga.)
3. Supports and Anchors:
  - a. Fabricated from min. 0.042 in. (18 ga.) thick, metallic-coated steel sheet.
4. Inserts, Bolts, and Fasteners:

a. Manufacturer's standard units

D. Thermal-Rated (Insulating) Assemblies:

1. As scheduled, provide doors that have been fabricated as thermal insulating door and frame assemblies and tested to comply with ASTM C236.
2. Unless otherwise indicated, provide thermal-rated assemblies with 0.24 Btu per hr. sq. ft. deg. F or better U-factor
3. Doors: 0.167 in. (7 ga.) steel plate hinge reinforcement, 0.093 in. (12 ga.) closer reinforcement, and 0.093 in. (12 ga.) lock front reinforcement.
4. Frames: 0.053 in. (16 ga.) knock-down.
5. Labeling: Underwriter's Laboratories (UL), Factory Mutual (FM), or Warnock Hersey.

E. Finish Hardware Preparation:

1. Prepare doors and frames to receive mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier.
2. Comply with applicable requirements of ANSI A115 Series Specifications for door and frame preparation for hardware.
3. Reinforce to receive surface-applied hardware
4. Drilling and tapping for surface-applied finish hardware may be done at Project site.
5. Locate finish hardware as shown on final shop drawings or, if not shown, in accordance with Recommended Locations for Builder's Hardware, published by Door and Hardware Institute.
6. Shop-Painting - Prime Finish: Manufacturer's standard, factory-applied coat of rust-inhibiting primer complying with ANSI A250.10 for acceptance criteria.

**2.04 SEALANT FOR THRESHOLDS**

A. Single Component Butyl Rubber Sealant for under exterior thresholds.

1. Tremco Butyl Sealant
2. Pecora BC 158
3. XtraBond 1500
4. or Approved Equal

**PART 3 - EXECUTION**

**3.01 INSTALLATION**

A. General: Install standard steel doors, frames, and accessories in accordance with final shop drawings, manufacturer's data, and as specified.

B. Placing Frames:

1. Comply with provisions of SDI-105, Recommended Erection Instructions for Steel Frames, unless otherwise indicated.

2. Set frames accurately in position, plumbed, aligned, and braced securely until permanent anchors are set.

**C. Door Installation:**

1. Fit hollow metal doors accurately in frames within clearances specified in ANSI A250.8 and shim as required to comply with SDI 122 and ANSI/DHI A115.1G.

**D. Hardware Installation:**

1. Install hinges
2. Install thresholds
3. Install weatherstripping
4. Install locksets and closers

**3.02 ADJUSTING AND CLEANING**

- A. Prime Coat Touchup: Immediately after erection, sand smooth any rusted or damaged areas of prime coat and apply compatible air-drying primer touchup.
- B. Final Adjustments: Check and readjust operating finish hardware items, leaving steel doors and frames undamaged and in complete and proper operating condition.

**END OF HOLLOW METAL DOORS AND FRAMES**



Section 08 71 00  
DOOR HARDWARE

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A and DIVISION 1 of PART B are hereby made a part of this SECTION.
- B. Examine conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Work to be furnished only: Furnish the following items for installation by the designated Sections:
  - 1. Section 08 11 13 – HOLLOW METAL DOORS AND FRAMES

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and will be performed under the designated Sections:
  - 1. Section 08 11 13 – HOLLOW METAL DOORS AND FRAMES

**1.04 REFERENCES**

- A. Applicable state and local building codes and standards.
- B. FIRE/LIFE SAFETY
  - 1. NFPA - National Fire Protection Association
    - a. NFPA 70 – National Electric Code
    - b. NFPA 80 - Standard for Fire Doors and Fire Windows
    - c. NFPA 101 - Life Safety Code
    - d. NFPA 105 - Smoke and Draft Control Door Assemblies
- C. UL - Underwriters Laboratories
  - 1. UL 10C - Positive Pressure Test of Fire Door Assemblies
  - 2. UL 1784 - Air Leakage Tests of Door Assemblies
  - 3. UL 305 - Panic Hardware
- D. Accessibility
  - 1. ADA - Americans with Disabilities Act
  - 2. ICC / ANSI A117.1 - Accessible and Usable Buildings and Facilities
- E. DHI - Door and Hardware Institute
  - 1. Sequence and Format for the Hardware Schedule
  - 2. Recommended Locations for Builders Hardware
- F. ANSI - American National Standards Institute

1. ANSI/BHMA A156.1 - A156.29, and ANSI A156.31 - Standards for Hardware and Specialties

#### **1.05 SUBMITTALS**

- A. General: Submit the following in accordance with Conditions of Contract and Division 1 requirements. Prior to submittal field verify existing doors and/or frames receiving new hardware and/or existing conditions receiving new openings. Verify new hardware is compatible with the existing door/frame preparation and/or existing conditions. Advise architect within the submittal package of incompatibility or issues.
- B. Catalog Cuts: Product data including manufacturers' technical product data for each item of door hardware, installation instructions, and maintenance of operating parts and finish, and other information necessary to show compliance with requirements.
- C. Final Hardware Schedule Content: Submit schedule with hardware sets in vertical format as illustrated by the Sequence of Format for the Hardware Schedule as published by the Door and Hardware Institute. Indicate complete designations of each item required for each door or opening, Include the following information:
  1. Door Index; include door number, heading number, and Architects hardware set number.
  2. Opening Lock Function Spreadsheet; list locking device and function for each opening.
  3. Type, style, function, size, and finish of each hardware item.
  4. Name and manufacturer of each item.
  5. Fastenings and other pertinent information.
  6. Location of each hardware set cross-referenced to indications on Drawings.
  7. Name of room/space on each side of door; door handing.
  8. Explanation of all abbreviations, symbols, and codes contained in schedule.
  9. Mounting locations for hardware, mounting type for door closers. Degree of door opening.
  10. Door and frame sizes and materials, hand, fire ratings, degree of opening, and location on floor plan.
  11. Name and phone number for the local manufacturer's representative for each product.
- D. Key Schedule: After a keying meeting between representatives of the Owner, Architect, hardware supplier, and, if requested, the representative for the lock manufacturer, provide a keying schedule, listing the levels of keying, as well as an explanation of the key system's function, the key symbols used, and the door numbers controlled. Utilize ANSI A156.28 "Recommended Practices for Keying Systems" as a guideline for nomenclature, definitions, and approach for selecting the optimal keying system.
- E. Samples: If requested by the Architect, submit production sample or sample installations as requested of each type of exposed hardware unit in the finish indicated, and tagged with a full description for coordination with the schedule.

1. Samples will be returned to the supplier in like-new condition. Units that are acceptable to the Architect may, after final check of operations, be incorporated into the Work, within limitations of key coordination requirements.
- F. Templates: After final approval of the hardware schedule, provide templates for doors, frames, and other work specified to be factory prepared for the installation of door hardware.
- G. Operations and Maintenance Data: Provide in accordance with Division 01 and include the following:
1. Complete information on care, maintenance, and adjustment; data on repair and replacement parts, and information on preservation of finishes.
  2. Catalog pages for each product.
  3. Name, address, and phone number of local representative for each manufacturer.
  4. Parts list for each product.
  5. Copy of final approved hardware schedule, edited to reflect "As installed."
  6. Copy of final keying schedule.
  7. One (1) complete set of special tools required for maintenance and adjustment of hardware, including changing of cylinders.
  8. Copy of warranties including appropriate reference numbers for manufacturers to identify the project.
- H. Certificates of Compliance: Upon request of Architect or Authority Having Jurisdiction certificates of compliance for fire-rated hardware and installation instructions shall be made available.

#### **1.06 QUALITY ASSURANCE**

- A. Substitutions: Products are to be those specified to ensure a uniform basis of acceptable materials. Requests for substitutions must be made in accordance with Division 01 requirements. If proposing a substitute product, submit product data for the proposed item with product data for the specified item and indicate basis for substitution and savings to be made. Provide sample if requested. Certain products have been selected for their unique characteristics and particular project suitability.
1. Items specified as "no substitute" shall be provided exactly as listed.
  2. Items listed with no substitute manufacturers listed have been requested by the Owner or Architect to match existing for continuity and/or future performance and maintenance standards or because there is no known equal product.
  3. If no other products are listed in a category, then "no substitute" is implied.
- B. Supplier Qualifications: A recognized architectural hardware supplier, with a minimum of 5 years' experience, and with warehousing facilities in the Project's vicinity, that has a record of successful in-service performance for supplying door hardware similar in quantity, type, and quality to that indicated for this Project and that provides a certified Architectural Hardware Consultant (AHC) available to the Owner, Architect, and Contractor, at reasonable times during the course of the Work for consultation.



- C. Single Source Responsibility: Obtain each type of hardware (latch and locksets, hinges, exit devices, closers, etc.) from a single manufacturer.
- D. Fire-Rated Openings: Provide door hardware for fire-rated openings that complies with NFPA Standard No. 80 and requirements of authorities having jurisdiction. Provide only items of door hardware that are listed and are identical to products tested by Underwriters Laboratories, Intertek Testing Services, or other testing and inspecting organizations acceptable to the authorities having jurisdiction for use on types and sizes of doors indicated in compliance with requirements of fire-rated door and door frame labels.

**1.07 DELIVERY, STORAGE, AND HANDLING**

- A. Tag each item or package separately with identification related to the final hardware schedule, and include installation instructions with each item or package.
- B. Each article of hardware shall be individually packaged in manufacturer's original packaging.
- C. Contractor will provide secure lock-up for door hardware delivered to the Project, but not yet installed. Control handling and installation of hardware items so that completion of Work will not be delayed by hardware losses both before and after installation.
- D. Items damaged in shipment shall be replaced promptly and with proper material and paid for by whoever did the damage or caused the damage to occur.
- E. Hardware shall be handled in a manner to avoid damage, marring, or scratching. Irregularities that occur to the hardware after it has been delivered to the Project shall be corrected, replaced, or repaired by the Contractor. Hardware shall be protected against malfunction due to paint, solvent, cleanser, or any chemical agent.
- F. No direct shipments will be allowed unless approved in writing by the Contractor.

**1.08 WARRANTY**

- A. Provide manufacturer's warranties as specified in Division 1 and as follows:
  - 1. Closers: Limited Lifetime.
  - 2. Locksets: Limited Lifetime.
  - 3. Butt Hinges: Lifetime warranty.
  - 4. Other hardware: 1 year.
- B. No liability is to be assumed where damage or faulty operation is due to improper installation, improper use, or abuse.
- C. Products judged to be defective during the warranty period shall be replaced or repaired in accordance with the manufacturer's warranty, at no additional cost to the Owner.

**1.09 MAINTENANCE**

- A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of door hardware.

**PART 2 - PRODUCTS**

**2.01 MANUFACTURERS**

- A. The following hardware schedule is based on products by Stanley,
- B. Approval of manufacturers other than those listed shall be in accordance with paragraph 1.5.A.
- C. Note that even though an acceptable substitute manufacturer may be listed, the product must provide all the functions and features of the specified product or it will not be approved.
- D. Hand of Door: Drawings show direction of slide, swing, or hand of each door leaf. Furnish each item of hardware for proper installation and operation of door movement as shown.
- E. Where the hardware specified is not adaptable to the finished shape or size of the members requiring hardware, furnish suitable types having the same operation and quality as the type specified, subject to the Architect's approval.

**2.02 MATERIALS**

**A. Fasteners**

- 1. Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation.
- 2. Furnish screws for installation with each hardware item. Finish exposed (exposed under any condition) screws to match hardware finish, or, if exposed in surfaces of other work, to match finish of this other work as closely as possible including "prepared for paint" surfaces to receive painted finish.
- 3. Provide concealed fasteners for hardware units that are exposed when door is closed except to the extent that no standard units of type specified are available with concealed fasteners. Do not use thru-bolts for installation where bolt head or nut on opposite face is exposed in other work unless their use is the only means of reinforcing the work adequately to fasten the hardware securely. Review door specification and advise Architect if thru-bolts are required.
- 4. Hardware shall be installed with the fasteners provided by the hardware manufacturer.

**B. Hinges**

- 1. Provide five-knuckle, concealed bearing hinges of type, material, and height as outlined in the following guide for this specification:
  - a. 1-3/4 inch thick doors, up to and including 36 inches wide:
    - 1) Exterior: heavy weight, bronze/stainless steel, 4-1/2 inches high
  - b. 1-3/4 inch thick doors over 36 inches wide:
    - 1) Exterior: heavy weight, bronze/stainless steel, 5 inches high
- 2. Provide three hinges per door leaf for doors 90 inches or less in height, and one additional hinge for each 30 inches of additional door height.

3. Hinge Pins: Except as otherwise indicated, provide hinge pins as follows:
  - a. Out-Swinging Exterior Doors: Non-removable pins
4. The width of hinges shall be 4-1/2 inches. Adjust hinge width as required for door, frame, and/or wall conditions to allow proper degree of opening.
5. Acceptable manufacturers and/or products: Hager Companies, St Louis, MO, Stanley, New Britain, CT, Yale, Berlin, CT or approved equal.

C. Cylindrical Locksets:

1. Provide mortise locks that comply with ANSI A156.2, Series 4000, BHMA Grade 1, are ULC listed, and appear in BHMA's "Directory of Certified Products".
2. Lock Throw: Comply with testing requirements for length of bolts to comply with labeled fire door requirements.
3. Backset: 2-3/4 inches (70 mm), unless otherwise indicated.
4. Lever design shall be ADA compliant; provide tactile levers as indicated on door schedule.
5. Acceptable manufacturers and/or products: Hager Companies, St Louis, MO, Stanley, New Britain, CT, Yale, Berlin, CT or approved equal.

D. Door Closers Extra Heavy Duty:

1. Provide door closers certified to ANSI/BHMA A156.4 Grade 1 requirements by a BHMA certified independent testing laboratory. Door closers shall have fully hydraulic, full rack and pinion action with a high strength cast iron cylinder. Cylinder body shall be 1-1/2 inch diameter.
2. Provide hydraulic fluid requiring no seasonal closer adjustment. Fluid shall be fireproof and shall pass the requirements of the UL10C "positive pressure" fire test.
3. Spring power shall be continuously adjustable over the full range of closer sizes, and allow for reduced opening force as required by accessibility codes and standards. Closers shall have separate adjustment for latch speed, general speed, delayed action, and backcheck.
4. Provide closers with heavy-duty forged forearms for parallel arm closers.
5. Provide closers with delayed action feature.
6. Closers shall not incorporate Pressure Relief Valve (PRV) technology.
7. Provide special templates, drop plates, mounting brackets, or adapters for arms as required for details, overhead stops, and other finish hardware items interfering with closer mounting.
8. Mount closers on room side of corridor doors, inside of exterior doors, and stair side of stairway doors from corridors. Closers shall not be visible in corridors, lobbies and other public spaces unless approved by Architect.
9. Acceptable manufacturers and/or products: Hager Companies, St Louis, MO, Stanley, New Britain, CT, Yale, Berlin, CT or approved equal.

E. Thresholds, Seals, Door Sweeps, Automatic Door Bottoms, and Gasketing

1. Provide thresholds, weatherstripping (including door sweeps, seals, astragals) and gasketing systems as specified and per architectural details. Match finish of other items as closely as possible. Size of thresholds shall be as follows:
  - a. Bumper Seal Thresholds – 1/2 inch high x 5 inches wide x door width
2. Provide door sweeps and seals only of type where resilient or flexible seal strip is easily replaceable and readily available.
3. Acceptable manufacturers and/or products: National Guard, Reese, Zero.

### **2.03 FINISHES**

- A. Finish of all hardware shall be US26D (BHMA 626/652) with the exceptions as follows:
  1. Butt Hinges at Exterior Doors and where specified: US32D (BHMA 630).
  2. Heavy Duty Exit Devices: US32D (BHMA 630).
  3. Standard Duty Exit Devices: 689
  4. Overhead Stops and Holders: US32D (BHMA 630).
  5. Door Closers: Aluminum Painted (BHMA 689).
  6. Weatherstripping: Clear Anodized Aluminum.
  7. Thresholds: Mill Finish Aluminum.

### **2.04 KEYING**

- A. Provide cylinder housings to accept permanent Best Cormax cores conforming to the following requirements:
  1. Provide construction cores with construction master keying for use during construction. The Owner or Owner's security agent shall install permanent keyed cores upon completion of the project. The temporary construction cores are to be returned to the hardware supplier.
  2. Permanent cores shall be furnished and keyed by the factory to the Owner.
  3. The hardware supplier, accompanied by a qualified factory representative for the manufacturer of the cores and cylinders, shall meet with Owner and Architect to review keying requirements and lock functions prior to ordering finish hardware.
  4. Provide keys as follows
    - a. Two keys per lock and/or cylinder.
    - b. Two construction core control keys
    - c. Six construction master keys for each type (Contractor is to provide one set of construction keys to Architect)
  5. Deliver all key from the factory or authorized distributor directly to the Owner in sealed containers, return receipt requested. Failure to comply with these requirements may be cause to require replacement of all or any part of the keying system that was compromised at no additional cost to the Owner.

**PART 3 - EXECUTION**

**3.01 EXAMINATION**

- A. Prior to installation of any hardware, examine all doors, frames, walls and related items for conditions that would prevent proper installation of finish hardware. Correct all defects prior to proceeding with installation.

**3.02 INSTALLATION**

- A. Coordination:
  - 1. Prior to installation of hardware, schedule and hold a meeting for the purpose of instructing installers on proper installation and adjustment of finish hardware. Representatives of locks, exit devices, closers, automatic operators, and electrified hardware shall conduct training; provide at least 10 days notice to representatives. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.
- B. Hardware will be installed by qualified tradesmen, skilled in the application of commercial grade hardware. For technical assistance if necessary, installers may contact the manufacturer's rep for the item in question, as listed in the hardware schedule.
- C. Mount hardware units at heights indicated in "Recommended Locations for Builders Hardware for Standard Steel Doors and Frames" by the Door and Hardware Institute.
- D. Install each hardware item in compliance with the manufacturer's instructions and recommendations, using only the fasteners provided by the manufacturer.
- E. Do not install surface mounted items until finishes have been completed on the substrate. Protect all installed hardware during painting.
- F. Set units level, plumb and true to line and location. Adjust and reinforce the attachment substrate as necessary for proper installation and operation.
- G. Operating parts shall move freely and smoothly without binding, sticking, or excessive clearance.

**3.03 ADJUSTING, CLEANING, AND DEMONSTRATING**

- A. Adjust and check each operating item of hardware and each door, to insure proper operation or function of every unit. Replace units which cannot be adjusted to operate freely and smoothly.
- B. Where door hardware is installed more than one month prior to acceptance or occupancy of a space or area, return to the installation during the week prior to acceptance or occupancy and make a final check and adjustment of all hardware items in such space or area. Clean operating items as necessary to restore proper function and finish of hardware and doors. Adjust door control devices to compensate for final operation of heating and ventilating equipment.
- C. Clean adjacent surfaces soiled by hardware installation.
- D. Instruct Owner's personnel in the proper adjustment, lubrication, and maintenance of door hardware and hardware finishes.

**3.04 FIELD QUALITY CONTROL**

- A. Prior to Substantial Completion, the installer, accompanied by representatives of the manufacturers of locks, exit devices, closer, and any electrified hardware, shall perform the following work:
1. Examine and re-adjust each item of door hardware as necessary to restore function of doors and hardware to comply with specified requirements.
  2. Consult with and instruct Owner’s personnel in recommended additions to the maintenance procedures.
  3. Replace hardware items that have deteriorated or failed due to faulty design, materials, or installation of hardware units.
  4. Prepare a written report of current and predictable problems of substantial nature in the performance of the hardware.
  5. At completion of project, a qualified factory representative for the manufacturers of locksets, closer, exit devices, and access control products shall arrange and hold a training session to instruct the Owner’s personnel on the proper maintenance, adjustment, and/or operation of their respective products. After training a letter of compliance, indicating when the training was held and who was in attendance, shall be sent to the Architect.

**3.05 PROTECTION**

- A. Provide for the proper protection of complete items of hardware until the Owner accepts the project as complete. Damaged or disfigured hardware shall be replaced or repaired by the responsible party.

**3.06 HARDWARE SCHEDULE**

- A. Provide hardware for each door to comply with requirements of Section “Finish Hardware,” hardware set numbers indicated in door schedule, and in the following schedule of hardware sets.
- B. Locksets, exit devices, and other hardware items are referenced in the Hardware Sets for series, type, and function. Refer to the preamble for special features, options, cylinders/keying, and other requirements.

C. Hardware Sets:

SET #1 – Door to Roof of Hallway

3	Hinges	CB199 4 1/2 X 4 1/2 NRP	US32D	ST
1	Door Closer	QDC117	689	SH
1	Door Sweep	C627 A x 36" (National Guard)	NA	
1	Gasket	706 E 1 x 36" 2 x 84" (National Guard)	NA	
1	Threshold	804 V x 36" (National Guard)	AL	NA

**END OF DOOR HARDWARE**



Section 09 91 00  
PAINTING

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Division 00 and 01 are hereby made a part of this section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this SECTION.

**1.02 SECTION INCLUDES**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, and without limiting the generality thereof includes:
  - 1. Examine the Specifications and Drawings of all trades and thoroughly be familiar with all provisions regarding painted work included therein.
  - 2. All priming and preparatory work of surfaces required to be painted, not otherwise primed or prepared under the work of other Sections.
  - 3. Touch up painting of existing painted surfaces, at interior walls, which have become damaged or otherwise abraded or removed during construction.
  - 4. Painting and or finishing of all new construction as called for on the Drawings including but not limited to exterior metal doors and frames, interior wood door trim, plywood soffits and trim, piping and other items as indicated on the Drawings.
  - 5. Protection of all City property and affected construction

**1.03 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are specified under the designated Sections:
  - 1. The protection of all surfaces not scheduled for painting.
  - 2. 06 20 00 – FINISH CARPENTRY
  - 3. Section 08 11 13 – HOLLOW METAL DOORS AND FRAMES.

**1.04 SUBMITTALS**

- A. General: Refer to SECTION 00 70 00 – GENERAL CONDITIONS – 4.13 through 4.18 for submittal provisions and procedures.
- B. Submit specifications and complete range of paint manufacturer's color chips for approval. Nonconformance to specifications and a limited range of color samples shall be considered sufficient reason for rejection of paint manufacturer. Architect shall select colors from any of the specified manufacturer's color chips including accent colors. Paint manufacturer shall match colors selected exactly with Architect approved color chips. Architect shall determine if match is acceptable. If match is unacceptable, the Painter shall use paint of manufacturer from whose color chip was selected. After approval of paint chips, the Painter shall apply test samples on all surfaces to be painted at the job



site. Sample areas shall match paint chips exactly. If match is unacceptable, paint shall not be used. Repeat this procedure until paint color on all surfaces is acceptable to the Architect.

- C. Detailed Painting Schedule: Submit a "Detailed Painting Schedule" for review by the Architect. Prepare this schedule on the basis of the surfaces, types of paint materials, number of coats required, and list of the brand name of the product of the manufacturer proposed for each use. In addition, provide a space for each coat of paint in each room or spaces specified to be painted. This Detailed Painting Schedule will also serve as a record of progress and kept up to date by a representative of the Architect. Each coat applied shall be inspected, approved and initialed by the Architect or his duly authorized representative, prior to the application of each succeeding coat; otherwise no credit for such coat will be given and the Painter shall, at no expense to the Owner, recoat the surface area in question.

#### **1.05 PRODUCT DELIVERY, STORAGE AND HANDLING**

- A. Deliver paint materials to the job site in original containers and packages, bearing the manufacturer's labels, indicating name, type and brand. Unless otherwise directed by the Architect, deliver paints ready-mixed. Order in advance in large enough quantities and in ample time to facilitate the work.
- B. Store materials and equipment in a designated storage space on the site. Keep storage space neat, clean and accessible at all times. Protect floors from paint spillage.

#### **1.06 ENVIRONMENTAL CONDITIONS**

- A. Do not paint when air is dust-laden or when weather and temperature conditions are unsuitable. Comply with manufacturer's recommendations when they are more stringent with respect to application temperatures.

#### **1.07 PROTECTION AND STORAGE**

- A. The Painter shall not use any plumbing fixture or pipe for the disposal of waste materials. He shall carry all required water to the mixing rooms and legally dump all waster materials in containers outside the building. Remove oily rags and other combustible materials from the site daily.
- B. Take necessary precautions to keep fire hazard to a minimum. Provide each storage area with a CO<sup>2</sup> or Dry Chemical Type Fire Extinguisher of adequate capacity.
- C. Furnish and lay drop cloths in all areas where painting is being done to protect tenant's personal property, floors and all other surfaces from damage during the work.
- D. Remove or protect such item as hardware, hardware accessories, and plates. lighting fixtures and similar items placed prior to painting. Reposition or remove protection upon completion of each space. Disconnect equipment adjacent to walls by workmen skilled in these trades to permit painting of wall surfaces; replace or reconnect after completion of painting.
- E. Maintain wrappings or other factory applied protection furnished with finish hardware or other items provided by other trades and installed in areas where painting is required, and if displaced or removed, replace for the duration of painting work.

- F. The Painter will be held strictly responsible for any and all damages resulting from his failure to observe these provisions.

## **PART 2 - PRODUCTS**

### **2.01 GENERAL**

- A. Deliver all materials to the site in original sealed containers, bearing the manufacturer's standard label, indicating type and color. Materials shall be delivered in sufficient quantity in advance of the time needed in order that work will not be delayed in any way.
- B. No claim by the Painter concerning the unsuitability of any material specified, nor his ability to produce first class work with same, will be entertained after Contract is signed.
- C. No material other than types specified or approved by the Architect may be delivered to the project site. All unapproved or unlabeled materials shall be removed from the project site immediately.
- D. No material shall be changed or thinned in any way except as indicated on the manufacturer's label.
- E. Before purchasing materials for the work, the Painter shall submit to the Architect a list of the products he proposes to use, and the list shall be satisfactory to the Architect and approved by him before commitment for materials is made.
- F. After approval of paint colors and materials, as part of project close-out, deliver to the Owner two unopened gallon cans of each finish paint or stain to be used.

### **2.02 MATERIALS**

- A. Paint Materials:
  - 1. To establish a standard of quality, the products of the various manufacturers are specified. Other manufacturers' products of equal quality will be considered by the Architect provided that the submitted products meet or exceed the specified quality. Where a question of quality occurs, the Contractor shall submit an affidavit from the material manufacturer stating the quality range of the product to be used, as compared to other top quality products made by that manufacturer. Architect shall have choice of selecting flat, satin, semi-gloss, or gloss finish.
  - 2. Tint prime and undercoats approximately to the shade of the final coat but with sufficient variation to distinguish them from the preceding coat.
- B. Unspecified Materials: All unspecified materials, shall be the "best grade" or "first line" of the specified manufacturers, and shall bear the labels and be approved by the Architect.

## **PART 3 - EXECUTION**

### **3.01 ACCEPTANCE OF THE SURFACES**

- A. Inspect all surfaces and assure that they are in proper condition to receive work to be performed under this Section. Any questions as to the proper performance of the various paint systems specified herein shall be brought to the Architect's attention no later than 15 calendar days prior to the date of commencing work, otherwise, the Painting Subcontractor shall assume the responsibility for providing the desired results.

- B. The commencement of work in any space by the Painting Subcontractor will be construed as acceptance of the surfaces as being satisfactory, any defects to his work resulting from such accepted surfaces shall be corrected by him at this own expense.
- C. If the existing surfaces cannot be put in proper condition to receive paint by customary cleaning methods, or sanding, furnish and install necessary bonding agents, and/or other preparation required to ensure proper application and performance of the painting and finishing materials, and include the cost for same in the base bid for the work of this Section.

### **3.02 PREPARATION**

- A. General:
  - 1. Prepare all surfaces to receive paint; thoroughly clean off grime, grease, dirt, loose material and other substances that may interfere with proper adhesion of paint. Paint dry surfaces only.
  - 2. Fill dents, cracks, hollow places, open joints and other irregularities with a filler suitable for the purpose and, after setting, sand to a smooth finish.
  - 3. Prime surfaces not more than eight hours after cleaning.
  - 4. Apply "Stain Kill" to surfaces suspect of bleeding through specified paint systems. Stain Kill material shall be "Bullseye" by Zinnser Co., "Stain-Seal" by Sterling Clark and Lerton, Malden, Massachusetts, Benjamin Moore Fresh Start 100% Acrylic Super Primer 046 or approved equal.
- B. Metals:
  - 1. General: Clean bare metal surfaces thoroughly of foreign matter such as mortar, plaster, grease, rust, scale and dirt before priming coat is applied. Where solder flux has been used clean surface with solvent.
  - 2. Where metal is corroded remove all corrosion by sand blasting or other approved methods down to bare metal.
  - 3. Shop Primed Ferrous Metal Surfaces: Remove grease and oil with a cleaner recommended for the purpose. Exercise care to prevent damage to shop coat
  - 4. Zinc Coated [Galvanized] Surfaces: Remove grease and oil with a cleaner recommended for the purpose.
- C. Previously Finished Wood Surfaces: Remove all chipping and blistering parts, remove all mildew, grease, stains, dirt and patch all minor cracks and holes with filler and sand smooth.
- D. Previously Finished Metal Surfaces: Remove grease, oil, dust and stains and sand smooth areas that have been damaged by scratches and touch up bare metal prior to applying finish coat.

### **3.03 APPLICATION**

- A. Mix materials thoroughly; strain if necessary before using. Do not adulterate ready-mixed materials except in accordance with manufacturer's printed instructions. If no printed instructions appear on the container, obtain this information in writing from the manufacturer.

- B. All work shall be performed by skilled mechanics under adequate supervision and in accordance with manufacturer's recommendations and/or as directed by the Architect. Mil thickness of each coat of paint to be not less than the manufacturer's recommendation for the particular type of paint used. Apply stain with a brush and then wipe off at the proper time to produce the desired effect.
- C. All spaces shall be protected before painting is started. Refer to "Project Conditions" Section 01 11 00 Summary of Work.
- D. All materials shall be applied under the same level of illumination as will be provided for the completed building space, evenly spread, and smoothly flowed on without sags, runs or holidays.
- E. Finishing materials shall be free from skins, lumps, and any foreign matter when used and shall be kept well stirred while being applied.
- F. Evenly brush or rollout each coat and allow to dry 24 hours before any subsequent coat is applied, unless otherwise recommended by the manufacturer and approved by the Architect. **SPRAY PAINTING WILL NOT BE ALLOWED UNLESS DONE OFF SITE.**
- G. Each coat shall be a different tint from that of the preceding coat. Finish coats shall be the exact shades and textures as selected by the Architect. The finished work shall be free from runs, sags, defective brushing and clogging lines or angles.

### **3.04 COATING SCHEDULE**

- A. Hollow Metal Doors and Metal frames and all other Ferrous Metal.
  - 1. First coat, for galvanized metal items only: Exterior galvanized metal primer product of the finish coat manufacturer.
  - 2. First coat, for non-galvanized bare metal surfaces only: Exterior zinc-rich primer product of the finish coat manufacturer.
  - 3. Second and Third coats both for galvanized and non-galvanized metal surfaces: Benjamin Moore Impervo Enamel, Pittsburgh PPG Quick Dry Enamel, Glidden Glid Guard Industrial Enamel, or approved equal.
- B. New Exterior Plywood and Existing Exterior Trim
  - 1. Painting Primer:
    - a. Benjamin Moore Fresh Start Moorwhite Penetrating Alkyd Primer 100 , Benjamin Moore Company, Inc. 101 Paragon Drive, Montvale, NJ 07645,
    - b. PPG Seal Grip Alkyd Primer, PPG Industries, One PPG Place, Pittsburg, PA 15272
    - c. Sherwin Williams All Surface Enamel Oil Primer, The Sherwin Williams Company, 101 West Prospect Ave, Cleveland, OH 44115
    - d. Or approved equal
  - 2. First Finish Coat:
    - a. Aura Waterborne Exterior Semi-Gloss Finish 632, Benjamin Moore Company, Inc. 101 Paragon Drive, Montvale, NJ 07645, or approved

- b. PPG Manor Hall Timeless Exterior Paint, PPG Industries, One PPG Place, Pittsburg, PA 15272
- c. Emerald Exterior Acrylic Latex Paint, The Sherwin Williams Company, 101 West Prospect Ave, Cleveland, OH 44115

3. Second Finish Coat:

- a. Aura Waterborne Exterior Semi-Gloss Finish 632, Benjamin Moore Company, Inc. 101 Paragon Drive, Montvale, NJ 07645, or approved
- b. PPG Manor Hall Timeless Exterior Paint, PPG Industries, One PPG Place, Pittsburg, PA 15272
- c. Emerald Exterior Acrylic Latex Paint, The Sherwin Williams Company, 101 West Prospect Ave, Cleveland, OH 44115

C. Previously Painted or Existing Wood Trim:

1. Primer:

- a. Fresh Start 100% Acrylic Primer by Benjamin Moore
- b. PrepRite ProBlocker Latex Primer Sealer by Sherwin Williams
- c. Interior Latex Primer/Sealer by Valspar
- d. Or Approved Equal

2. Second Coat

- a. Aura, Satin by Benjamin Moore
- b. Solo, Eggshell by Sherwin Williams
- c. Medallion, Satin by Valspar
- d. Or Approved Equal

3. Third Coat

- a. Aura, Satin by Benjamin Moore
- b. Solo, Eggshell by Sherwin Williams
- c. Medallion, Satin by Valspar

**END OF PAINTING**

**Section 22 00 00**  
**PLUMBING**  
(Filed Sub-Bid Required)

**PART 1 - GENERAL**

**1.01 GENERAL REQUIREMENTS**

- A. Part A DIVISION 1 of part B area hereby made part of this section.
- B. Examine all conditions as they exist at the project prior to submitting a bid for the work of this section.

**1.02 FILED SUB-BIDS**

- A. Plumbing is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid.
- B. All sub-bids shall be submitted on the Form for Sub-Bid furnished by the Awarding Authority, as required by Section 44F of Chapter 149 of the Massachusetts General Laws, as amended.
- C. Sub-Bids must be filed with the Awarding Authority in a sealed envelope, before the time stipulated, on the date stipulated in the Invitation for Bids.
- D. Specific information relating to the sub-bidders is set forth in the Contract Documents, under the heading "Notice to All Bidders, including Sub-Bidders" and the attention of sub-bidders is directed thereto.
- E. The work to be done under plumbing section is shown on Drawings numbered P0.1 & P1.1

**1.03 SECTION INCLUDES**

- A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
  - 1. All work of Section 22 00 00 – Plumbing
    - a. Pipe Materials
    - b. Plumbing Fixtures
    - c. Hangers, Anchors and Inserts
    - d. Pipe Hangers and Support
    - e. Insulation
    - f. Jointing Compounds
  - 2. Provide close-out procedures as per Section 01 77 00
  - 3. Provide warranty.
  - 4. Provide shop drawings and reproducible record drawings of actual installation. E. Provide required cutting and patching.
  - 5. Provide required cleaning and rubbish removal, for this trades related items, as directed by General Contractor.
  - 6. Provide seismic bracing on all applicable piping systems as required by state code.
  - 7. Provide field verification of all and coordination of all systems and the building structure.
  - 8. The work to be done under this section of the specifications shall include the furnishing, set-up and maintenance of all derricks, hoisting machinery, scaffold, staging and planking lower than eight feet. Hoisting is by GC as stipulated in Section 01 50 00

**1.04 ITEMS TO BE FURNISHED ONLY**

- A. Items to be Furnished Only: Furnish the following items for installation by the designated Sections:
  - 1. Roof Drains furnished by plumber, installed into roof by the roofing contractor, connected to storm drain piping by plumber.

**1.05 RELATED REQUIREMENTS**

- A. The following items of work are not included in this Section and are Specified under the

designated Sections:

1. Section 04 00 01 – Masonry
2. Section 07 54 19 – Polyvinyl-Chloride Roofing

#### **1.06 CUTTING AND PATCHING**

- A. With the exception of coring through exterior masonry walls provide all cutting and patching work required for installation of materials and equipment under this section of the specifications, in such a manner so as to leave the work complete and in a condition that matches existing corresponding area. All existing conditions that are damaged or cut during installation of the work of this section shall be patched by this contractor to the owners' satisfaction, and at no extra cost to the contract.
- B. All work shall be fully coordinated with all phases of construction, in order to minimize the requirements for cutting and patching.
- C. The contractor shall see that all such chases, openings, and sleeves are located accurately and are of the proper size and shape and shall consult with the Architect in reference to this work. In so doing, he shall confine the cutting to the smallest extent possible consistent with the work to be done. In no case shall piers or structural members be cut without the approval of the Engineer.
- D. Carefully fit around, close up, repair, patch around the work specified herein to the entire satisfaction of the Architect
- E. Fill and patch all openings or holes left in the existing structures by the removal of existing equipment by himself, his subcontractors or other filed subcontractors.
- F. All of this work shall be carefully done by workmen competent to do such work and with the proper and smallest tools applicable.
- G. Any cost caused by defective or ill-timed work shall be the plumbing contractors' responsibility therefore.

#### **1.07 SUBMITTALS**

- A. General: Refer to SECTION 01 33 23 – SHOP DRAWINGS, PRODUCT DATA and SAMPLES for submittal provisions and procedures.
- B. SHOP DRAWINGS
  1. Shop drawings shall be submitted in accordance with requirements set forth by the architect/owner.
  2. This contractor shall assume the associated cost of and entire responsibility for coordination with all the trades involved for any items of material or equipment substituted for those specified or shown. Such changes shall not be a matter for subsequent change order for extra work to the contract. This shall also apply to coordination and field verification of all conditions to which the work of this section will be installed.
  3. List of Shop Drawings:
    - a. Piping, Fittings and Accessories
    - b. Insulation
    - c. Roof and Overflow Drains
  4. Material List: Before purchasing materials for the work, submit to the Designer a complete list showing (1) the materials specified, and (2) the equivalent materials proposed for use, including description of product, if the Subcontractor desires to use

materials other than those specified.

- a. All materials shall be approved by the Designer before commitment for materials is made. Intention of using specified materials shall not relieve the Subcontractor from submitting the above list.
5. Product Data: Submit complete manufacturer's product description and technical information including:
  - a. Piping, fittings and accessories
  - b. Pipe Hangers and supports including supplementary steel and seismic restraint.
  - c. Insulation
  - d. Roof and Overflow Drains
6. Submit Material Safety Data Sheets (MSD) on each product with submittal.

#### **1.08 CODES, PERMITS AND FEES**

- A. Unless otherwise specified or indicated, materials, workmanship and equipment performance shall conform to the latest governing edition at the time of bid award of the following standards, codes, specifications, requirements, and regulations, but not limited to:
  1. All applicable NFPA standards.
  2. State Building Code 8th Edition
  3. American Society of Mechanical Engineers.
  4. American Society of Testing and Materials.
  5. American National Standards Institute.
  6. State and local Plumbing and Gas Codes.
  7. Underwriters' Laboratories, Inc.
  8. Occupational Safety and Health Administration.
  9. Water and Sewer Authority Regulations.
  10. Massachusetts D.E.P. Regulations
  11. Any other local codes or authorities having jurisdiction including any other standards specifically indicated in other paragraphs of this specification.
- B. Under this Section of the Specification, pay all fees, submit all necessary documents, obtain all permits, certificates and necessary approvals from authorities having jurisdiction. Prior to installation, provide copies of all permits, approvals and certificates to the Architect for his record. All costs for these requirements shall be borne under this section of the specification
- C. Where Drawings or Specifications and listed code requirements are in conflict, the more stringent requirement shall be followed.

#### **1.09 SURVEYS AND MEASUREMENTS**

- A. Under this section of the Specification, base all required measurements, both horizontal and vertical, from referenced points established by the General Contractor and be responsible for correctly laying out of the work required under this section of the specification.
- B. In the event of discrepancy between actual measurements and those indicated, notify the General Contractor in writing and do not proceed with the related work until instructions have been issued.

#### **1.10 COORDINATION**

- A. Work shall be performed in cooperation with other trades on the project and so



scheduled as to allow speedy and efficient completion of the project.

- B. Furnish to all other trades advance information on location and size of all concrete pads, frames, boxes, sleeves, and openings needed for the work under this section of the specifications, and also furnish layout information and shop drawings necessary to permit trades affected by the work under this section of the specifications to install their work properly coordinated and without delay.
- C. Protect all materials and work of other trades from damage that may be caused by the work required under this section of the specifications and be responsible for repairing any damages caused by such work without any additional cost to the Contract.

#### **1.11 FIREPROOFING**

- A. All clips, hangers, clamps, supports and other attachments to the fire rated structure required for work provided under this section of the specifications shall be installed to avoid any damage to the existing fireproofing.
- B. Pay the cost of all additional patching and repairing of fireproofing due to cutting or damage to the fireproofing by the installation of work provided under this section of the specifications.

#### **1.12 SLEEVES, INSERTS AND ANCHOR BOLTS**

- A. Coordinate with other trades the location of and maintaining in proper positions, sleeves, inserts and anchor bolts to be supplied and/or set in place under this section of the specifications. In the event of incorrectly located preset sleeves, inserts and anchor bolts, etc., all required cutting and patching of finished work shall be done under this section of the specifications.
- B. Unless otherwise specified herein, all pipes passing through rated floors, walls, ceilings or partitions shall be provided with sleeves as required by code. All sleeves through plenum walls shall be sealed air-tight.
- C. Field drilling (core drilling), when required, except through exterior masonry walls which shall be performed as part of the work of Section 04 00 01- Masonry, shall be performed under this section of the specifications, after receipt of approval by the Architect and the General Contractor.
- D. All pipes passing through rated floors, walls, or partitions shall be provided with sleeves as required by code and having an internal diameter with a minimum of one inch larger than the outside diameter of the pipe or insulation on covered lines.
- E. Sleeves through outside walls (if required) shall be Schedule 40 galvanized steel pipe with a 150 pound galvanized steel slip on welding flanges, welded at the center of the sleeve and shall be painted with one coat of bitumastic paint, inside and outside.
- F. Sleeves through masonry floors and interior masonry walls shall be Schedule 40, black, steel pipe. Sleeves through interior nonmasonry walls or partitions shall be 22 gauge galvanized sheet steel.
- G. The sleeves through outside walls and slab on grade (if required) shall be provided with pipe to wall penetration closures. Seals shall be mechanical type of interlocking rubber links shaped to fill space between pipe and sleeve. Links shall be assembled with bolts to form a belt around the pipe with pressure plate under each bolt head and nut. After seal assembly is positioned, tightening of bolts will provide watertight seal. This Contractor shall determine the required inside diameter of each individual sleeve before ordering, fabricating or installing. The inside diameter of each sleeve shall be sized as recommended by the manufacturer to fit the pipe and to assure a watertight joint.
- H. Sleeves through walls shall terminate flush with face of wall.

- I. Required fire resistance of floors and walls shall be maintained where penetrations occur. Fire stopping at sleeves shall be installed per manufacturer recommendations. Fire stopping material shall be UL listed for the service and fire rating. Provide asbestos-free firestopping material capable of maintaining an effective barrier against flame, gases, and temperature. Provide noncombustible firestopping that is nontoxic to human beings during installation or during fire conditions. Devices and equipment for firestopping service shall be UL FRD listed or FM P7825 approved for use with applicable construction, and penetrating items.
1. Fire Hazard Classification:
    - a. Material shall have a flame spread of 25 or less, a smoke developed rating of 50 or less when tested in accordance with UL 723 or UL listed and accepted.
    - b. Firestopping materials shall be UL FRD listed or FM P7825 approved for "F" and "T" ratings at least equal to fire-rating of fire wall or floor in which penetrated openings are to be protected, except that "F" and "T" ratings may be 3 hours for firestopping in through-penetrations of 4-hour fire rated wall or floor.
- J. Escutcheons shall be provided with a set screw to properly hold escutcheon in place and provided at all exposed floor and wall penetrations. Escutcheons on C.P. piping shall be chrome plated.

#### **1.13 SUPPLEMENTARY STEEL, CHANNELS AND SUPPORTS**

- A. Provide all supplementary steel, factory fabricated channels and supports required for proper installation, mounting and support of all equipment and systems provided under this section of the specification.

#### **1.14 TYPICAL DETAILS**

- A. Typical details where shown on the drawings shall apply to each and every item of the systems covered under this section of the specifications where such items are applicable. They are not reproduced in full on the drawings, which in many cases are diagrammatic only. Any other methods proposed to be provided under this Section of the Specifications shall have prior written approval from the Architect before installation.

#### **1.15 DEFINITIONS**

- A. As used in this section, the following terms are understood to have the following meanings:
1. The Contractor" or "Plumber" shall mean the Trade Contractor.
  2. Furnish" shall mean purchase and deliver to the project site, complete with every necessary appearance and support.
  3. Install" shall mean unload at the delivery point at the site and perform all work necessary to establish secure mounting, proper location and operation in the project.
  4. Provide" shall mean furnish and install.
  5. Work" shall mean all labor, materials, equipment, apparatus, controls, accessories, and all other items required for a proper and complete installation.
  6. Piping" shall mean, in addition to pipe or tubing, all fittings, flanges, unions, valves, strainers, drains, hangers and other accessories relative to such piping.
  7. Concealed" shall mean hidden from sight in chases, furred spaces, shafts, and embedded in construction or in crawl space.
  8. Exposed" shall mean not installed underground or concealed as defined above.
  9. Furnished by others" shall mean materials or equipment purchased and set in place under other sections of the general contract and connected to the systems covered by this section of the specifications by this trade contractor.

10. Coordinate" shall mean all work provided under this section of the specification shall be in compliance with work of other trades.

**1.16 DRAWINGS, SPECIFICATIONS AND COORDINATION**

- A. It is the intention of the Contract Documents to call for complete, finished work, fully tested and ready for continuous operation.
- B. Drawings are generally diagrammatic and are intended to convey scope of work and indicated general arrangements of equipment, piping, fixtures, etc.
- C. Location of items indicated that are not definitely fixed by dimensions are approximate only. Exact locations necessary to secure best conditions and results must be determined at the project and shall have the Architect's approval before being installed.
- D. Follow drawings in layout work, check drawings of, and coordinate with, other trades to verify special provisions, installation requirements and spaces in which work provided under this Section of the Specifications will be installed and maintain maximum headroom or space conditions at all points. Where headroom or space conditions appear inadequate, notify the Architect before proceeding.
- E. Attend regular coordination and job progress meetings as required by the General Contractor.
- F. Provide and maintain on site storage facilities.
- G. Maintain premises and public properties free from accumulations of waste, debris, and rubbish caused by plumbing construction work.
- H. Maintain a clean, dry, legible, and current record drawing.
- I. Where a conflict arises between a Code minimum Requirement and the contract drawings and specifications, the more stringent requirement shall take precedence and be followed.

**1.17 INSPECTION OF SITE CONDITIONS**

- A. Prior to submission of bid, this trade contractor shall visit the site and review the related construction documents to determine the conditions under which the work has to be performed. He shall report, in writing, to the Architect, any conditions which might adversely affect the Contractor's work.

**1.18 SUPERVISION**

- A. This trade contractor shall supply the services of an experienced and competent supervisor who shall be in charge of the contractor's work at the site.

**1.01 WARRANTIES**

- A. This trade contractor shall submit manufacturer's warranties for products as specified in this section. All warranties shall be submitted to the Architect prior to project close out.
- B. All materials, types of equipment and workmanship furnished under this section shall carry standard warranty against all defects in material and workmanship for a period of not less than one (1) year from date of acceptance by Owner, unless otherwise noted.

**PART 2 - PRODUCTS**

**2.01 PIPE, FITTINGS AND JOINTS**

- A. Piping and fittings shall conform to the latest ANSI, ASTM, and NFPA and AWWA Standards including latest amendments and shall be in conformance with state and local plumbing codes, material standards
- B. Each length of pipe, each pipe fitting, trap, materials and/or device used in the respective system shall have cast, stamped or indelibly marked on it, the maker's name or

mark, weight and quality of the product when such marking is required by the approved standard that applies.

## **2.02 ROOF DRAINS AND OVERFLOW DOWNSPOUT**

- A. Drains and Fittings shall be J.R. Smith, Zurn, Wade, or equal or as indicated on the drawings.

## **2.03 HANGERS AND SUPPORTS**

- A. Hangers shall be installed, as required, to meet code compliance as to location/spacing and Manufacturer's Standardization Society (MSS) Standard Practice Bulletins SP-58 & 69.
- B. Hanger material shall be compatible with piping materials with which it comes into contact.
- C. Hangers shall be installed, in addition to the above, at all changes of direction (horizontal and vertical), valves and equipment connections. Hangers shall be located so that their removal is not required to service, assemble or remove equipment.
- D. Horizontal runs may use band hangers up to 4" size. Piping larger than 4" shall be provided with clevis type.
- E. Vertical support shall be by means of riser clamps (anchors with split ring type allowable up to 2" size only) and adjustable pipe support with flange anchored to floor.
- F. Insulation protectors (shields) for horizontal piping shall be constructed of galvanized steel formed to a 180 degree arc and 12" long, 18 gauge for hangers 5" in size and smaller, 16 gauge for hangers larger than 5" in size.
- G. Exposed rods, clamps and hangers shall be electro-galvanized coated.
- H. Valve and piping supports, from the floor, shall be adjustable pipe support and complete with pipe standard and flange, anchored to floor.
- I. Supports shall be installed at each control valve, riser tee or elbow and where any unsupported section exceeds 4'-0" in length measured along piping centerline and within 4'-0" off floor.

## **2.04 PIPE COVERING**

- A. General: The pipe covering specified herein for piping system shall be provided in strict accordance with the manufacturer's printed instructions, the best practice of the trade and to the full intent of this specification.
  - 1. The sealers, tapes, adhesives and mastics used in conjunction with the installation of the pipe covering specified herein shall possess the maximum possible fire-safe qualities available and shall be of a type approved by Factory Mutual, Factory Insurance Association or National Fire Protection Association.
  - 2. Valves, fittings, flanges and accessories shall have the same thickness of pipe covering applied as the adjacent pipe. Pipe covering for these items shall be factory PVC molded type.
  - 3. Longitudinal seams and butt joint shall be sealed with a fire retardant, vapor barrier adhesive.
- B. All horizontal storm drain piping including roof drain bodies
  - 1. All storm drain shall be four pound density, fiberglass with factory applied white, fire

retardant, reinforced, vapor barrier jacket, 1" thick regardless of pipe size. Insulation shall be continuous through sleeves.

2. Ends of insulation at termination points shall be sealed to the pipe with a pre-molded PVC type fitting. Pipe fittings and valves shall be provided with pre-molded PVC covers with fiberglass inserts.
3. All drain piping, valves and fittings installed exposed to view and in the mechanical room, shall be provided with 20 mil. White PVC continuous covers in addition to the vapor barrier jacket. Fittings and seams shall be solvent welded.

C. Horizontal Storm Drain and Roof Drain Bodies

1. Same as listed above
2. Insulation at hangers shall be protected with sheet metal saddles. E. Sanitary and Vent piping
3. Insulation shall not be required on any sanitary or vent piping within the building

**PART 3 - EXECUTION**

**3.01 STORM DRAINAGE PIPING (Interior)**

- A. This Contractor shall be responsible for checking each pipe for alignment, centerline elevation and invert grade for installations.
- B. At times when work is not in progress, open ends of pipe and fittings shall be securely closed so that no trench water, earth or other substance will enter the pipe or fittings. Pipe laid through rock excavation shall rest on a six-inch layer of well- compacted sand.
- C. Branch connections to each drainage system shall be made with "Wye" and long turn "Tee Wye" fittings. Installation of short radius 1/4 bends, common offsets; double hub fittings and saddles will not be approved. Only fittings conforming to the Code shall be installed.
- D. The changes in direction of each drainage system shall be made with "Wye" branches and 1/8 bends. Provide long sweep bends at bottom of stacks with a vertical cleanout just above the floor at places where a "Wye" and 1/8 bends at bottom of stacks and end cleanouts cannot be installed.
- E. Cleanouts shall be provided in drainage piping at changes in directions, at foot of stacks or other required points so that all portions of the lines will be readily accessible for cleaning or rodding out.
- F. Cleanouts shall be of the same size as the pipe installed in up to four inches in diameter and not less than four inches in diameter for piping larger than four inches in diameter.
- G. The maximum horizontal distance between cleanouts; in piping four inches in diameter and smaller shall not be more than 50 feet apart; in piping five inches in diameter and larger shall not be more than 100 feet apart.

**3.02 TESTING**

- A. General:
  1. All labor, materials, instruments, devices and power required for testing shall be provided by this Contractor. The tests shall be performed in the presence and to the satisfaction of the Architect and such other parties, as may have legal jurisdiction. No piping in any location shall be closed up, furred in, or covered before testing.
  2. Where portions of piping systems to be covered or concealed before completion of the project, those portions shall be tested separately in the manner specified herein for the

respective entire system.

3. Any piping or equipment that has been left unprotected and subject to mechanical or other injury in the opinion of the Architect shall be retested in part or in whole as directed.
4. Caulking of screwed joints or holes in piping will not be acceptable.
5. This Contractor shall notify the Architect and any inspectors having jurisdiction, a minimum of 48 hours in advance of making any required tests so that arrangements may be made for their presence to witness his scheduled tests.

B. Specific:

1. Storm Drain Piping Systems:

- a. All new work shall be flow tested and shall be verified for no leaks. Any leaks or defects found in the new work shall be found and replaced.

**3.03 CLEANING AND ADJUSTING**

A. Cleaning and Adjusting

1. At the completion of the work, all parts of the installation shall be thoroughly cleaned.
  - a. All equipment, pipe, valves and fittings shall be cleaned of grease, metal cuttings and sludge which may have accumulated by operation of the system for testing.
  - b. Any stoppage or discoloration or other damage to parts of the building, its finish, or furnishings, due to this Contractor's failure to properly clean the piping system shall be repaired by this Contractor at no increase in Contract costs.
  - c. Roof drain strainers and shall be cleaned of all debris.
2. All items of equipment shall be thoroughly inspected and any items dented, scratched or otherwise damaged in any manner shall be replaced or repaired and painted to match the original finish. All items so repaired and refinished shall be brought to the attention of the Architect for inspection and approval.

**3.04 CERTIFICATES OF APPROVAL**

- A. Upon completion of the work, furnish to the Owner through the Architect, in duplicate, certificates of inspection and/or approval from state and local inspection authorities having jurisdiction indicating the installed systems compliance to their requirements.

**3.05 QUIET OPERATION**

- A. All work provided under this Section of the Specifications shall operate under conditions of load without sound or vibration, which is abnormally objectionable for such equipment in the opinion of the Architect. In case of moving machinery, sound or vibration noticeable outside of the room in which it is installed, or annoyingly noticeable inside its own room will be considered objectionable shall be corrected in an approved manner by this Contractor at no change in Contract amount

**3.06 PATCHING, REPLACEMENT AND MODIFICATION OF EXISTING WORK**

- A. After installation of pipe lines, the Contractor shall neatly patch, repair, and replace existing work (work installed prior to plumbing work) where damaged, removed or altered for pipe

line installation. This work shall be similar and equal in quality to the work removed or damaged, unless otherwise shown or specified. Such work shall include replacement of existing lines at points of connections to new lines, patching of masonry work, and wherever any such patching work is indicated on drawings or otherwise required.

### **3.07 GENERAL INSTALLATION REQUIREMENTS**

#### **A. Piping Installation**

1. Install piping approximately as shown on the drawings and as directed during installation by the General Contractor or the Architect
2. Piping shall be installed as straight and direct as possible forming right angles or parallel lines with building walls, other piping and neatly spaced.
3. The horizontal runs of piping, except where concealed in partitions, shall be installed as high as possible.
4. Piping or other apparatus shall not be installed in such a manner so as to interfere with the full swing of the doors and access to other equipment.
5. The arrangement, positions and connections of pipes, fixtures, drains, valves, and the like, indicated on the drawings shall be followed as closely as possible, but the right is reserved by the General Contractor or the Architect to change locations and elevations to accommodate the work, without additional compensation for such change.
6. It shall be possible to drain the water from all sections of each sprinkler cold, and hot water piping system. Pitch piping back to drain valves.
7. Screwed piping of brass or chrome plated brass shall be made up with special care to avoid marring or damaging pipe and fitting exterior and interior surfaces.
8. Small fittings shall be screwed up close to the shoulders of male threads. Lampwick, cord, wool, or any other similar material shall not be used to make up thread joints.
9. Screwed pipe and copper tubing shall be reamed smooth before installation.
10. All exposed piping in connection with fixtures and where exposed on finished walls or to view, shall be chrome plated. Where chrome plated piping is installed, cut and thread pipe so that no unplated pipe threads are visible when the work is completed.
11. Reducing fittings, unless otherwise approved in special cases, shall be provided in making reduction in size of pipe. Bushings will not be allowed unless specifically approved.
12. Remove and replace with new materials, any copper or brass piping (chrome plated or unplated) and valves showing visible tool marks.
13. Vertical risers shall be firmly supported by riser clamps, properly installed to relieve all weight from the fittings.
14. Any piece of pipe six inches or less in length shall be considered a nipple.
15. The pipe and fittings shall be manufactured in the United States of America and in accordance with the Commercial Standards, American National Standards Institute and American Society of Testing Materials.

**B. Hanger Installation**

1. All piping shall be supported from the building structure by means of approved hangers and supports, to maintain proper grading and pitching of lines, to prevent vibration and to secure piping in place, and shall be so arranged as to provide for expansion and contraction.
2. Maximum spacing of hangers on runs of pipe (vertical and horizontal) having no concentration of weight shall be as follows:

SCHEDULE			
MATERIAL	Steel	Copper	PVC
Pipe Size (Inches)	Hanger Spacing in Feet/Pipe		
.50	6	6	3
.75	8	6	3
1.00	10	6	3
1.25	10	10	3
1.50	10	10	3
2.00	10	10	4
2.50	10	10	4
3.00	10	10	4
3.50	10	10	4
4.00	10	10	4
5.00	10		4
6.00	10		4
8.00	10		

3. Maximum spacing of hangers on soil pipe shall be five feet or at each fitting on straight lengths to maximum of 10' and hangers shall be provided at either side of all changes in direction. Vertical Hanger rods to support piping from the structure or supplementary steel shall not exceed four feet in total length vertically, this Contractor shall provide factory fabricated channels and all associated accessories.
4. Friction clamps shall be installed at the base of the plumbing risers and at each floor (above or below floor slabs). Friction clamps installed above floor slabs shall not be supported from or rest on floor sleeves.
5. Provide hangers at a maximum distance of two feet from both sides of all changes in direction (horizontal and vertical), on both sides of concentrated loads (equipment) and at valves.
6. Hangers, in general, for all horizontal piping shall be A Band type hangers for piping up to 4" size and Clevis type for piping 5" and larger. These hangers shall be sized to fit the outside diameter of the pipe insulation protectors (sheet metal shields) specified herein. Gang type hangers may be used for supply piping up to 3" size where applicable and in conformance with manufacturer's recommendations
7. All vertical drops and runouts including insulated pipes shall be supported by split ring hangers with extension rods and wall plates or stamped type up to 2" size only.



8. Provide on all horizontal insulated lines, pipe covering protectors (shields) at each hanger. Each protector shall be sized to fit the outside diameter of the Pipe insulation
9. Lock nuts or retaining straps shall be provided with all beam clamps.
10. All supplementary steel including factory fabricated channels and associated accessories, including 12" long sheet metal shields, throughout both suspended and floor mounted shall be provided by this Contractor and shall be subject to the approval of the Architect.
11. Hangers shall not pierce the insulation on any insulated pipe except when prior approval is given.
12. Wire, tape or wood fastenings for shims or support of any pipe or tubing shall not be used.
13. Remove all rust from the ferrous hanger equipment (hangers, rods, and bolts).
14. Piping at all equipment and each control valve shall be supported to prevent strains or distortions in the connected equipment and control valves. Piping and equipment shall be supported to allow for removal of equipment, valves and accessories with a minimum of dismantling and without requiring additional support after these items are removed.
15. All piping shall be independently supported from the building structure and not from the piping, ductwork, conduit or ceiling suspension systems of other systems.
16. Installation of hangers which permit wide lateral motion of any pipe will not be acceptable.
17. All hangers in contact with uninsulated piping shall be compatible with piping material.

**END OF PLUMBING**