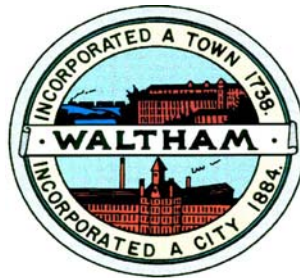


PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

The City of Waltham



**Invites
Interested Parties
To propose the best offer and or bid
For the service or product herewith described:**

PHASE III RENOVATIONS OF THE FORMER BANKS SCHOOL ELDERLY HOUSING CONDOMINIUMS

Bid Opening for General Contractors: Monday October 1 2012 at 10:00 AM

**Bid Opening for Sub Bids: Monday September 24, 2012 at
10:00 AM**

**Pre Bid meeting and Inspection Date: Wednesday September 19, 2012 at
10 AM**

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 FORMER BANKS SCHOOL
 WALTHAM, MA

**PHASE III RENOVATIONS TO THE
 BANKS SCHOOL
 WALTHAM, MASSACHUSETTS**

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CITY OF WALTHAM
MASSACHUSETTS**

NOTICE TO BIDDERS, INCLUDING SUB-BIDDERS

**PHASE III RENOVATIONS OF THE FORMER BANKS SCHOOL
ELDERLY HOUSING CONDOMINIUMS
WALTHAM, MASSACHUSETTS**

The City of Waltham, Massachusetts invites sealed bids from Contractors for the Phase III Renovation of the former Banks School into Elderly Housing Condominiums, Waltham, Massachusetts. The work includes Interior renovations of former classrooms into residential units including finishes and new kitchens and baths. Work also includes but is not limited to: interior walls and finishes, kitchen cabinets and both vanities, toilet accessories, fire protection, plumbing, HVAC, and electrical.

PLANS, SPECIFICATIONS and other Contract Documents may be obtained by visiting the city's web site at www.city.waltham.ma.us/open-bids or by e-mail request to Jpedulla@city.waltham.am.us Beginning **September 7, 2012 after 4 pm**. Documents will **not** be mailed.

Sealed **SUB-BIDS** for categories of "Painting", "Fire Protection Sprinkler Systems", "Plumbing", "HVAC", "Electrical", "Glass and Glazing", "Resilient Floors" and "Miscellaneous Metals" will be accepted at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 **until 10 AM on September 24, 2012**, at which place and time they shall be publicly opened, read aloud and recorded for presentation to the Awarding Authority.

Sealed **GENERAL BIDS** for this project will be accepted from eligible bidders at the Purchasing Department, Waltham City Hall, 610 Main Street, Waltham, MA 02452 **until 10:00 AM on October 1, 2012**, at which place and time they shall be publicly opened, read aloud and recorded for presentation to the Awarding Authority.

A **PRE-BID CONFERENCE** will be held for all interested parties at **10:00 AM on September 19, 2012** at the site at the Banks School Building, 948 Main Street, Waltham, MA. Attendance at this pre-bid conference is strongly recommended for parties submitting a bid. It will be the only opportunity to visit the site prior to the bid opening.

ONE AWARD TWO BIDS. While the City is issuing two separate bids: one for phase two and one for phase 3, contractors are expected to respond with one price for both projects (17 Unit Build out). The City will make one award to the proposal that is responsive and responsible with the lowest COMBINED price for both projects. Thus, **you will NOT find, in this packet t 00300 Form for General Bid and 00310 Form for Sub Bid. You will find these forms in the Phase II bid packet. The price you bid there is for both Phase II and Phase III.** Each general bid, and each filed sub-bid shall be accompanied by a bid deposit in the form of a bid bond, certified check, or a treasurer's or cashier's check issued by a responsible bank or trust

**NOTICE TO BIDDERS, INCLUDING SUB-BIDDERS
00050 - 1**

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

company, payable to the City of Waltham in the amount of five percent (5%) of the value of the bid. Bid deposits will be dealt with as provided in Massachusetts General Laws, Chapter 149, Section 44B.

To be given consideration, all general bids and all filed sub-bids must be accompanied by a copy of the Bidder's Certificate of Eligibility (DCPO Form CQ7) and an Update Statement (DCPO Form CQ3). The General Bidder must be certified eligible in the General Building category and the filed sub-bidders must be certified in their respective categories.

Bids shall be made on the basis of the Minimum Wage Rates as determined by the Commissioner of Labor and Industries, Pursuant to the Provisions of Chapter 149, Sections 26 to 27D inclusive of Massachusetts General Laws, a copy of which can be obtained from the City web site at www.city.waltham.ma.us/open-bids or via e mail request at jpedulla@city.waltham.ma.us. The prevailing Wage Schedule is made part, as reference, of the Contract. Bidders' selection procedures and contract award shall be in conformity with applicable statutes of the Commonwealth of Massachusetts.

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

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

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

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

CITY OF WALTHAM

J Pedulla, Purchasing Agent
Purchasing Department
City Hall, 610 Main Street
Waltham, MA 02452

END OF SECTION

NOTICE TO BIDDERS, INCLUDING SUB-BIDDERS
00050 - 2

SECTION 00100 - INSTRUCTION TO BIDDERS

PART 1 - GENERAL

SECTION 00100 - INSTRUCTION TO BIDDERS

1.011 ASBESTOS

Asbestos abatement will be undertaken by the City, at its expense, prior to construction. Therefore, the Asbestos Division 02000 Section 02080 in the bid specifications is deleted

1.012 OCCUPANCY

The main building will not be occupied during construction. Only the gymnasium will be used for periodic elections by the City Clerk's Office.

1.013 BASE BID

The base bid shall consist of the construction of seventeen (17) units on the first and second floors.

PHASE II
Second Floor

10 units

9 1-bedroom units
(7 – similar to 3rd floor)
(2 in new building)

1 2-bedroom unit
(Unit 209)

PHASE III
First Floor

7 units

5 1-bedroom units

2 2-bedroom units
(Units 101, 103)

Much of the bathroom demo work was done in Phase I.

No work to be performed in Mechanical Room (Room 213), Boiler Room (Room 113) and Fan Room (Room 115).

No work to be performed in the Common Room (Room 221) on the second floor.

The base bid will also include:

Third Floor

- Reinforcing the ceiling below Unit 303 (Unit 203)

PHASE III RENOVATIONS TO THE
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- Finishing the bedroom (floor, walls) in Unit 303
- Painting of the walls and carpeting the floor in the fire escape area on third floor (Vestibule No. 5, Room 312)
- Scraping and painting of walls and ceiling and carpeting floor in Room 318
- Window in Room 303 not included in Phase I to be included in base bid
- Picture panels in hallways not included in Phase I need 5/8" sheet rock for fire proofing

Second Floor

- Reinforcing, if necessary, the ceiling below Unit 203 (Unit 101)
- Painting of the walls and carpeting the floor in the fire escape area on second floor (Vestibule No. 4, Room 219)
- Demolishing old toilet area (Room 226) for future storage

First Floor

- Demolishing old toilet area (Room 133) for future storage

General

- Fire escape upgrades: sand and scrape the entire fire escape, add new balusters to meet the code, prime and paint, add new stairs at the bottom of the fire escape and any other place were needed, install roof to meet the code, lower exterior step installed to code, install roof to code, lower exterior step installed to code.
- Stairwells, guards and rails per code
- Tiles to entry ways of each unit not included in Phase I plans are to be included in bid prices in Phases II and III
- Certified as-built unit plans for all 17 units in a form suitable for recording in the Registry of Deeds
- Two toilets in gym area (Rooms 107B and 107C), and change wall so units 104, 105 and 106 have direct access to the lobby
- Old toilet area demolished for storage area (Room 133)
- Any plumbing pipes or fixtures that needed to be removed are the responsibility of the plumber.
- Any electrical panels that might need to be moved are the responsibility of the electrician.
- All electrical, old and new must be brought up to code.
- Any light fixtures that have to be lowered are the responsibility of the electrician.
- All chalk boards must have 1/4" Lauan plywood painted and repaired where necessary.
- All floors must be addressed – this includes the bathroom floors.
- All vent work must be addressed.
- Any loose wires that have to be hung up or remounted are the responsibility of the electrician.
- Picture panels in hallways not included in Phase I need 5/8" sheet rock for fire proofing
- Keyed electrical switches in hallways switched over to regular switch devices
- Fitting and installation of the washers and dryers according to code that were problematic in Phase I need to be addressed in Phases II and III.

INSTRUCTION TO BIDDERS
00100 - 2

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

- Installation of the individual unit interior entry release buttons associated with the outside automatic doors is the responsibility of the electrician.

1.014 BID ALTERNATE #1

Creation of 24 individual storage areas to be deeded to condo owners per the **attached sketches (Attachment A)**.

Bidder to present a specific plan and cost for:

- Painting
- Carpeting
- Panel dividers (not to the ceiling) where necessary to create space and doors/locks

For Rooms:

118 (1)	116 (1)
123A (1)	114B (3)
123 (2)	114A (2)
125 (1)	133 (1)
127A (1)	214 (2)
127B (1)	226 (1)
127 (4)	318 (1) – (Painting already included in base bid)
116A (2)	

1.01 SCHEDULE OF DATES

- A. Deadline for Advertisement for Bids: Central Register – Sept. 4, 2012, 4:00 P.M.
- B. Advertisement appears in Central Register, Plans and Specifications ready for Bidders at the Offices of the Waltham Purchasing Agent **after 8:30 P.M. on Sept. 12, 2012.**
- C. Pre-bid walkthrough on **Sept. 19, 2012 at 10:00 A.M** at the Banks School, 948 Main Street, Waltham, MA.
- D. Questions and requests for interpretations may be submitted in writing by the Filed Sub-Bidders to the Architect up to and including: **Sept. 20, 2012, 4:00 P.M.**, and by General Bidders up to and including: **Sept. 25, 2012, 4:00 P.M.**
- E. Addenda will be issued with interpretations as determined by the City.

INSTRUCTION TO BIDDERS
00100 - 3

- F. File Sub-Bids Deadline: **10:00 A.M. on September 24, 2012**, in the Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, Attn: J. Pedulla, Purchasing Agent, where the bids will be publicly opened and read.
- G. General Bids Deadline: **10:00 A.M. on October 1, 2012**, in the Purchasing Department, City Hall, 610 Main Street, Waltham, MA 02452, Attn: J. Pedulla, Purchasing Agent, where the bids will be publicly open and read.

1.02 BIDDING PROCEDURE

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

1.03 WITHDRAWAL OF BIDS

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

1.04 INTERPRETATION OF CONTRACT DOCUMENTS

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

1.05 EXAMINATION OF SITE AND CONTRACT DOCUMENTS

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

1.06 BID SECURITY

- A. The General Contractor's bid must be accompanied by bid security in the amount of five percent (5%) of the bid.
- B. At the option of the bidder, the security may be bid bond, certified, treasurer's or cashier's check issued by a responsible bank or trust company. No other type of bid security is acceptable.

Bid Bonds shall be issued by a Surety Company qualified to do business under the laws of the Commonwealth of Massachusetts.

- C. Certified, Treasurer's or Cashier's check shall be made payable to the City of Waltham, Massachusetts.
- D. The bid security shall secure the execution of the Contract and the furnishing of a Performance and Payment Bond by the successful General Bidder.
- E. Should any General Bidder to whom an award is made fail to enter into a contract therefore within five (5) days, Saturdays, Sundays and Legal Holidays, excluded, after notice of award has been mailed to him or fail within such time to furnish a Performance Bond and also a Labor and Materials or Payment Bond as required, the amount so received from such General Bidder through his Bid Bond, Certified, Treasurer's or Cashier's check as bid deposit shall become the property of the City of Waltham, Massachusetts as liquidated damages; provided that the amount of the bid deposit, which becomes the property of the City of Waltham, Massachusetts, shall not in any event exceed the difference between his bid price and the bid price of the next lowest responsible and eligible bidder; and provided further that, in case of death, disability, bona fide clerical error or mechanical error of a substantial nature, or other unforeseen circumstances affecting the General Bidder, his deposit shall be returned to him.

1.07 BID FORM

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

1.08 SUBMISSION OF BIDS AND BID SECURITIES

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

(Firm Name): _____
General Bid and Bid Security for:
Phase II Renovations to the
Banks School

1.09 AWARD OF CONTRACT

- A. The Contract shall be awarded to the lowest responsible and eligible General Bidder on the basis of competitive bids in accordance with the procedure set forth in the provision of Section 44B-44L inclusive, as amended or inserted, of Chapter 149 of the General Laws of the Commonwealth of Massachusetts.
- B. If the bidder selected as the General Contractor fails to perform his agreement to execute a contract in accordance with the terms of his General Bid, and furnish a Performance Bond and also a Labor and Materials or Payment Bond, as stated in his General Bid in accordance with Section 44F, an award shall be made to the next lowest responsible and eligible bidder.
- C. The words “lowest responsible and eligible bidder” shall be the bidder whose name is the lowest of those bidders possessing the skill, ability and integrity necessary for the faithful performance of the work and who shall certify that he is able to furnish labor that can work in harmony with all other elements of labor employed, or to be employed, on the work. Essential information in regard to

such qualifications shall be submitted in such form as the Awarding Authority may require.

- D. Action on the award will be taken within thirty (30) days, Saturdays, Sundays and Legal Holidays excluded after the opening of the bids.

1.10 SECURITY FOR FAITHFUL PERFORMANCE

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

1.11 EQUAL OPPORTUNITY

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

1.12 PRE-BID WALK-THRU

- A. A pre-bid conference will be held at the site on **Sept. 19, 2012, at 10:00 A.M.** at the Banks School, 948 Main Street, Waltham, MA. Interested parties are encouraged to attend given that this will be the only time the building is open prior to the submission of bids. Further, prior to the bid opening, potential bidders may not go onto the site any time other than the aforementioned pre-bid conference.

1.13 SITE VISITS

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

1.14 CONTRACT DOCUMENTS

- A. Contract documents are available on line at www.city.waltham.ma.us/open-bids .

1.15 EQUALITY

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

1.16 TAX FREE NUMBER

- A. The City of Waltham has a tax-free number.

1.17 SCHEDULE

- A. The work of the Contract shall be Substantially Complete in 180 calendar days after the date of commencement. Running Concurrently with phase 3

1.18 LATE FEES

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

1.19 WEEKLY JOB MEETINGS

- A. There will be a weekly job meeting at the site on the same agreed-upon day and time. Time will be provided to discuss and view the progress of the work and to answer questions. The Contractor’s job Superintendent and Project Manager shall attend each meeting. The City reserves the right to have job meetings conducted on site or at a city location to be named.

1.20 PROJECT SUPERINTENDENT

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

1.21 AWARD

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

1.22 MINIMUM WAGE SCHEDULE

- A. Bids shall be made on the basis of the Minimum Wage Schedule, as determined by the Commissioner of Labor and Industries, pursuant to the provision of Chapter 149, Section 26 to 27D inclusive, of the Massachusetts General Laws.

1.23 CONFLICT OF INTEREST

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

1.24 PROCEED ORDERS

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

1.25 STAGING

- A. The General Contractor shall provide all the vertical access (which includes staging, vertical lifts, etc.) for the work of the Contract for the General Bidder and his/her non Filed Sub-bid subcontractor. **Exception:** ALL File Sub-Bidders shall provide ALL their own staging, vertical access, and hoisting necessary to perform their own work.

1.26 COMPLIANCE WITH MASSACHUSETTS GENERAL LAWS

- A. Before a contract may be executed by the City, the successful Bidder will be required, in accordance with the provisions of M.G.L. Chapter 62C, Section 49A, to execute and file with the City the following certificate:
- B. Pursuant to Massachusetts General Laws, Chapter 62C, Section 49A, I certify under the penalty of perjury that I, to the best of my knowledge and belief have filed all state tax returns and paid all the state taxes required under law.

1.27 CONSTRUCTION BARRICADES

- A. The General Contractor shall provide all barricades to enclose the work area to prevent unauthorized access to the site.
 - 1. The barricades shall provide enough room for all construction activities to be performed while separated from pedestrians, students, and staff on site.

2. Safety is the sole responsibility of the Contractor and any barricades necessary to protect the work and the public shall be provided.
3. Provide entrance tunnel protection.

1.28 INSURANCE

- A. The contractor shall purchase and maintain, at his expense all insurance required by the Contract. Documents and all insurance required by the applicable laws of Massachusetts, including but not limited to, General Laws, Chapter 146, in connection with all hoisting equipment.
- B. The Contractor shall purchase and maintain such insurance as will protect him from claims under workmen's compensation acts and from claims for damages because of bodily injury, including death and all property damage including, without limitation, damage to buildings and adjoining the site of construction which might arise from and during operations under this contract, whether such operations be by himself or by any subcontractor or anyone directly or indirectly employed by either of them including:

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

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

2. Comprehensive General Liability Insurance

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

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

3. Comprehensive All Risk Motor Vehicle Liability Insurance

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

Covering all Contractor's equipment with a provision for Waiver of Subrogation against the Owner.
5. Excess Liability Insurance in Umbrella Form with combined Bodily Injury and Property Damage Limit of \$ 1,000,000.
6. City of Waltham. shall be listed as a NAMED Additional Insured with a Waiver of Subrogation on the insurance policy for this project.

1.29 SITE ACCESS

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

1.30 CONSTRUCTION TRAILER

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

1.31 BUILDING PERMIT FEES

- A. Building permit fees will be waived for this project. However all permits must be obtained from the appropriate City Department

1.32 COMPLETE BID FORMS

- A. Please Note: Each bidder must fill in all the blanks on all the bid forms, even if the information is "zero dollars" or "not applicable". Also, please acknowledge all Addenda even if they do not pertain to your trade.

2.00 FUNDS APPROPRIATION and LOAN AUTHORIZATION.

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

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

- A 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.

3.1 RETAINAGE.

The retainage applied to this project is 5% for Materials and 5% for Labor

Signature of Individual or Corporate Name

By:

(Signature of Corporate Officer if applicable)

Title: _____

Social Security Number or Federal Identification Number: _____

END OF SECTION

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

SECTION 00300

FORM FOR GENERAL BID

**FORMER BANKS SCHOOL PHASE III RENOVATIONS ELDERLY HOUSING
CONDOMINIUMS, WALTHAM, MASSACHUSETTS**

General Bid Opening Date: 10:00 am, October 1, 2012

J. Pedulla, Purchasing Agent
City of Waltham
610 Main Street
Waltham, MA 02452

A. Basic Price

**REPORT YOUR BID PRICE FOR THE WORK IN PHASE III IN THE FORM FOR
GENERAL BID FOUND IN THE PHASE II PACKET**

**FORM FOR GENERAL BID
00300 - 1**

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

SECTION 00310 - FORM FOR SUB-BID

INSERT TRADE NAME

**FORMER BANKS SCHOOL PHASE III RENOVATIONS
ELDERLY HOUSING CONDOMINIUMS
WALTHAM, MASSACHUSETTS**

Sub-Bid Opening Date: 10 am, September 24, 2012

**REPORT YOUR BID PRICE FOR THE WORK IN PHASE III IN THE FORM FOR SUB
BID FOUND IN THE PHASE II PACKET**

**PREVAILING WAGE RATES
00320 - 1**

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

SECTION 00320 - PREVAILING WAGE RATE

A. Prevailing Wage Schedule can be found in the City Web site at
www.city.waltham.ma.us/open-bids Under the Phase II & III Renovation to the Former Banks
School

PREVAILING WAGE RATES
00320 - 2

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

CONTRACT DOCUMENTS

COMPLIANCE FORMS

(PLEASE COMPLETE AND SUBMIT THESE FORMS WITH YOUR RESPONSE)

NON-COLLUSION FORM AND TAX COMPLIANCE FORM

CERTIFICATE OF NON-COLLUSION

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

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

(Name of business)

TAX COMPLIANCE CERTIFICATION

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

_____, _____
Signature of person submitting bid or proposal Date

Name of business

NOTE

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

CERTIFICATE OF VOTE OF AUTHORIZATION

Date:

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

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

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

SIGNED:

(Corporate Seal)

Clerk of the Corporation:

Print Name: _____

COMMONWEALTH OF MASSACHUSETTS

County of _____

Date
:

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

Notary Public;

My Commission expires: _____

CORPORATION IDENTIFICATION

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

If a Corporation:

Incorporated in what state _____

President _____

Treasurer _____

Secretary _____

Federal ID Number _____

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

Yes _____, No _____

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

If a Partnership: (Name all partners)

Name of partner _____

Residence _____

Name of partner _____

Residence _____

If an Individual:

Name _____

Residence _____

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

Name of Firm _____

Name of Individual _____

Business Address _____

Residence _____

Date _____

Name of Bidder _____

By _____

Signature _____

Title _____

–

Business Address _____ (POST OFFICE BOX NUMBER NOT ACCEPTABLE)

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

**WEEKLY PAYROLL RECORDS REPORT
& STATEMENT OF COMPLIANCE**

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

STATEMENT OF COMPLIANCE

_____, 201__

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

I do hereby state that I pay or supervise the payment of the persons employed by

_____ On _____
the _____
(Contractor, subcontractor or public body) (Building or project)

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

Signature _____, Title _____

Print _____, Date _____

WEEKLY PAYROLL REPORT FORM

Company Name: _____
 Prime Contractor
 Project Name: _____
 Subcontractor
 Awarding Auth.: _____
 List Prime Contractor: _____
 Work Week Ending: _____
 Employer Signature: _____
 Final Report
 Print Name & Title: _____

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

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

RIGHT TO KNOW LAW

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

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

Signature

Date

Print Name

NOTE

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

DEBARMENT CERTIFICATION

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

Company Name _____

Address _____

City _____, **State** _____, **Zip Code**

Phone Number (____) _____

E-Mail Address

Signed by Authorized Company Representative: _____

_____ **Print name. Date** _____

10 HOURS OSHA TRAINING CONFIRMATION

Chapter 306 of the Acts of 2004

CONSTRUCTION PROJECTS

AN ACT RELATIVE TO THE HEALTH AND SAFETY ON PUBLIC

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

Company Name: _____

Address: _____

Signature: _____

Title:

Print _____ **Name**

Date _____

See following Chapter 306 of the Acts of 2004

NOTE

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



AIA[®] Document G704[™] – 2000

Certificate of Substantial Completion

PROJECT: _____ PROJECT NUMBER: _____ / _____ OWNER:
 (Name and address): _____ CONTRACT FOR: General Construction ARCHITECT:
 CONTRACT DATE: _____ CONTRACTOR:
 TO OWNER: _____ TO CONTRACTOR: _____ FIELD:
 (Name and address): _____ (Name and address): _____ OTHER:

PROJECT OR PORTION OF THE PROJECT DESIGNATED FOR PARTIAL OCCUPANCY OR USE SHALL INCLUDE:

The Work performed under this Contract has been reviewed and found, to the Architect's best knowledge, information and belief, to be substantially complete. Substantial Completion is the stage in the progress of the Work when the Work or designated portion is sufficiently complete in accordance with the Contract Documents so that the Owner can occupy or utilize the Work for its intended use. The date of Substantial Completion of the Project or portion designated above is the date of issuance established by this Certificate, which is also the date of commencement of applicable warranties required by the Contract Documents, except as stated below:

Warranty **Date of Commencement**

 ARCHITECT BY DATE OF ISSUANCE

A list of items to be completed or corrected is attached hereto. The failure to include any items on such list does not alter the responsibility of the Contractor to complete all Work in accordance with the Contract Documents. Unless otherwise agreed to in writing, the date of commencement of warranties for items on the attached list will be the date of issuance of the final Certificate of Payment or the date of final payment.

Cost estimate of Work that is incomplete or defective: \$ 0.00

The Contractor will complete or correct the Work on the list of items attached hereto within Zero (0) days from the above date of Substantial Completion.

 CONTRACTOR BY DATE

The Owner accepts the Work or designated portion as substantially complete and will assume full possession at _____ (time) on _____ (date).

 OWNER BY DATE

The responsibilities of the Owner and Contractor for security, maintenance, heat, utilities, damage to the Work and insurance shall be as follows:

(Note: Owner's and Contractor's legal and insurance counsel should determine and review insurance requirements and coverage.)

Application and Certificate for Payment

TO OWNER:	PROJECT:	APPLICATION NO: 001	Distribution to:
		PERIOD TO:	OWNER: <input type="checkbox"/>
FROM CONTRACTOR:	VIA ARCHITECT:	CONTRACT FOR: General Construction	ARCHITECT: <input type="checkbox"/>
		CONTRACT DATE:	CONTRACTOR: <input type="checkbox"/>
		PROJECT NOS: / /	FIELD: <input type="checkbox"/>
			OTHER: <input type="checkbox"/>

CONTRACTOR'S APPLICATION FOR PAYMENT

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

1. ORIGINAL CONTRACT SUM	\$	0.00
2. Net change by Change Orders	\$	0.00
3. CONTRACT SUM TO DATE (Line 1 ± 2)	\$	0.00
4. TOTAL COMPLETED & STORED TO DATE (Column G on G703)	\$	0.00
5. RETAINAGE:		
a. 0 % of Completed Work (Column D + E on G703)	\$	0.00
b. 0 % of Stored Material (Column F on G703)	\$	0.00
Total Retainage (Lines 5a + 5b or Total in Column I of G703)	\$	0.00
6. TOTAL EARNED LESS RETAINAGE	\$	0.00
(Line 4 Less Line 5 Total)		
7. LESS PREVIOUS CERTIFICATES FOR PAYMENT	\$	0.00
(Line 6 from prior Certificate)		
8. CURRENT PAYMENT DUE	\$	0.00
9. BALANCE TO FINISH, INCLUDING RETAINAGE		
(Line 3 less Line 6)	\$	0.00

CHANGE ORDER SUMMARY	ADDITIONS	DEDUCTIONS
Total changes approved in previous months by Owner	\$ 0.00	\$ 0.00
Total approved this Month	\$ 0.00	\$ 0.00
TOTALS	\$ 0.00	\$ 0.00
NET CHANGES by Change Order	\$	0.00

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

CONTRACTOR:

By: _____ Date: _____

State of: _____

County of: _____

Subscribed and sworn to before
me this day of

Notary Public:

My Commission expires: _____

ARCHITECT'S CERTIFICATE FOR PAYMENT

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

AMOUNT CERTIFIED \$ 0.00

(Attach explanation if amount certified differs from the amount applied. Initial all figures on this Application and on the Continuation Sheet that are changed to conform with the amount certified.)

ARCHITECT:

By: _____ Date: _____

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



AIA[®] Document G703[™] – 1992

Continuation Sheet

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

APPLICATION NO: 001

APPLICATION DATE:

PERIOD TO:

ARCHITECT'S PROJECT NO:

A ITEM NO.	B DESCRIPTION OF WORK	C SCHEDULED VALUE	D WORK COMPLETED		F MATERIALS PRESENTLY STORED (NOT IN D OR E)	G		H BALANCE TO FINISH (C - G)	I RETAINAGE (IF VARIABLE RATE)
			FROM PREVIOUS APPLICATION (D + E)	THIS PERIOD		TOTAL COMPLETED AND STORED TO DATE (D+E+F)	% (G ÷ C)		
	GRAND TOTAL	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	0.00 %	\$ 0.00	\$ 0.00

AIA Document G703[™] – 1992. Copyright © 1963, 1965, 1966, 1967, 1970, 1978, 1983 and 1992 by The American Institute of Architects. All rights reserved. WARNING: This AIA[®] Document is protected by U.S. Copyright Law and International Treaties. Unauthorized reproduction or distribution of this AIA[®] Document, or any portion of it, may result in severe civil and criminal penalties, and will be prosecuted to the maximum extent possible under the law. This document was produced by AIA software at 15:16:42 on 05/05/2009 under Order No.1000365945_1 which expires on 7/30/2009, and is not for resale.

(4144838199)

SECTION 00655 CHANGE ORDERS.

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

SECTION 00700 - 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 period of 180 DAYS

7. INSURANCE

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

B. COMPREHENSIVE GENERAL LIABILITY

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

C. AUTOMOBILE (VEHICLE) LIABILITY

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

D. UMBRELLA POLICY

General liability	\$2,000,000
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

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

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

8. LABOR AND MATERIALS BOND

The Contractor agrees to execute and deliver to the City, a Labor and Materials or Payment Bond equal to 100% of the contract value. This contract shall not be in force until said bond has been delivered and accepted by the City. Bond to be issued by a company licensed by the Commonwealth of Massachusetts.

A LETTER FROM A SURETY COMPANY CERTIFYING THAT THE CONTRACTOR IS QUALIFIED AND CAPABLE OF OBTAINING THE ABOVE BONDS MUST BE INCLUDED WITH HIS/HERS BID.

9. 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.

10. PREVAILING WAGES

The Contractor is required to pay the prevailing wages as determined under the provisions of Chapter 149, Sections 26 and 27D of the Massachusetts General Laws, including the submission of weekly payrolls to the awarding authority.

11. MATERIALS

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

12. 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.

13. CONTRACT OBLIGATIONS

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

14. 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. 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.

SECTION 00851 - DRAWING LIST

- 1.01 DRAWINGS
- 1.02 ATTACHMENT A

GENERAL

- G0-01 COVER SHEET
- G0-02 PARTITION FIRE RATING DIAGRAMS

DEMOLITION

- D1-01 FIRST FLOOR DEMOLITION PLAN

SITE

- L1-01 SITE PLAN

ARCHITECTURAL

- A1-01 FIRST FLOOR PLAN
- A1-02 SECOND FLOOR PLAN
- A1-03 THIRD FLOOR PLAN
- A1-04 ROOF PLAN
- A1-05 FIRST FLOOR REFLECTED CEILING PLAN
- A1-06 UNITS 100 & 102 REFLECTED CEILING AND FLOOR PLANS
- A1-07 UNIT 101 REFLECTED CEILING AND FLOOR PLANS
- A1-08 UNIT 103 REFLECTED CEILING AND FLOOR PLANS
- A1-09 UNITS 104 & 105 REFLECTED CEILING AND FLOOR PLANS
- A1-10 UNIT 106 REFLECTED CEILING AND FLOOR PLANS
- A2-01 BUILDING ELEVATIONS
- A2-02 BUILDING ELEVATIONS
- A3-01 STAIRWELL #3 FIRST FLOOR PLANS AND SECTION
- A5-01 FINISH SCHEDULE, PARTITION TYPES AND DETAILS
- A5-02 TYPICAL UNIT ENTRY DETAIL PLAN AND SECTIONS
- A5-03 TYPICAL DETAILS
- A5-04 TYPICAL ROOF DETAILS
- A6-01 WINDOW SCHEDULE, ELEVATIONS AND DETAILS
- A7-01 DOOR SCHEDULE AND DETAILS

STRUCTURAL

- S1-01 FIRST FLOOR STRUCTURAL PLAN
- S2-01 GENERAL NOTES AND DETAILS

FIRE PROTECTION

- FP0.1 LEGEND, NOTES AND DETAILS
- FPD1.1 FIRST FLOOR DEMOLITION PLAN
- FP1.1 FIRST FLOOR PLAN

DRAWING LIST
00851 - 1

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

PLUMBING

- P0.1 PLUMBING LEGEND, NOTES & DETAILS
- P0.2 PLUMBING RISER DIAGRAMS
- PD1.1 FIRST FLOOR PLUMBING DEMOLITION PLAN
- P1.1V UNDERSLAB PIPING PLAN
- P1.1G FIRST FLOOR GAS PIPING PLAN
- P1.1 FIRST FLOOR PLUMBING PLAN

MECHANICAL

- MD1.1 HVAC FIRST FLOOR DEMOLITION PLAN
- M1.1 HVAC FIRST FLOOR PLAN
- M1.2 HVAC ROOF PLAN
- M2.1 HVAC DETAILS AND SCHEDULES
- VS.1 VIBRATION AND SEISMIC DETAILS
- VS.2 VIBRATION AND SEISMIC DETAILS

ELECTRICAL

- E0.1 ELECTRICAL SYMBOL LIST
- E0.2 ELECTRICAL SITE DETAILS AND SCHEDULE
- ED1.1 FIRST FLOOR DEMOLITION PLAN
- E1.1 FIRST FLOOR ELECTRICAL PLAN
- E1.2 TYPICAL UNIT ELECTRICAL PLAN
- E1.3 ELECTRICAL FIRST FLOOR PLAN-TYPICAL UNIT
- E1.4 ELECTRICAL ROOF PLAN
- E3.0 ONE-LINE POWER RISER DIAGRAM
- E3.1 SCHEDULES AND DETAILS
- E3.2 FIRE ALARM RISER AND DETAILS
- E3.3 SCHEDULES AND DETAILS

END OF SECTION

DRAWING LIST
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

TECHNICAL SPECIFICATIONS

DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01010

SUMMARY OF WORK

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. In general, the work includes but is not limited to:
 - 1. Phase III of converting existing, former Banks School into condominiums. Entire building is planned to be converted. Phase I is complete (third floor), Phase II is under construction or complete (second floor). Only the first floor is being constructed into living units under this contract. When Phase III is complete the entire building will have been converted into condominiums.
Note: A limited amount of work is being performed in the gymnasium. The gym is being leased to the City by the Condo Association and must remain secure from the residents.
 - 2. Existing first floor classroom spaces shall be modified by adding new partitions to define bedrooms, bathrooms, and closets. Install new kitchen and bathroom cabinets and countertops. Install all new plumbing, electrical, mechanical equipment/ductwork, and fire protection. At the

**SUMMARY OF WORK
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gymnasium, install new toilet rooms. At the center spaces create storage rooms for the tenants.

3. Finish all walls and trim with paint. Refinish all wood floors to remain, install ceramic tile floors in bathrooms, and carpet and vinyl tile flooring in the public spaces.
 4. Modify interior common spaces to accept new fire protection, electrical, fire alarm, exit signs, emergency lighting, and lighting where noted.
 5. Make existing spaces secure by locking doors where noted.
 6. Remove hazardous materials throughout the scope of work.
 7. Provide all demolition shown on the plans and as necessary to accomplish all the work of the contract. Please note that all the glass and glazing, painting, plumbing, HVAC, and electrical demolition shall be performed by the respective glass and glazing, painting, plumbing, HVAC, and electrical File Sub-bidders. All other demolition is by the General Bidder.
- B. Supply all shoring and protection necessary to protect the building area, building systems, parking areas, and occupants.
- C. The Contractor is hereby notified that the second and third floor of the building as well as the egress stairs and first floor common area will be occupied during construction. The first floor units will be unoccupied. The Contractor shall take all precautions and install all protections to safeguard the lives of residents and visitors to the building. All means and methods are the responsibility of the Contractor. The Contractor is solely responsible for safety on the job site.

1.03 INTENT OF THE PROJECT MANUAL

- A. Whenever “Furnish”, “Install”, or “Provide” is used in the Contract Documents, it shall mean to erect, install, connect, make operative, and supply all labor and materials, including miscellaneous fittings and accessories necessary to complete the installation of the specified item.
- B. All the work of the project is “related” in some fashion either by direct contract, sequencing, or coordination. It is the Contractor’s responsibility to perform all the work and coordinate all the various trades and types of “related” work in order to meet the schedule and quality standards of the Project.
- C. Means and methods of construction as well as compliance with OSHA and all other safety laws and regulations is the exclusive responsibility of the Contractor, his Subcontractors, suppliers, consultants, and servants. The Architect does not have control of the job site.

SUMMARY OF WORK 01010 - 2

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

1.04 ERRORS, OMISSIONS, AND CONFLICTS IN THE PROJECT MANUAL

- A. In the case of conflicts in the Drawings and the Specifications noticed by the Contractor, THE CITY shall be notified immediately in writing of such errors and/or omissions. In no case shall the Contractor proceed without written authorization from THE CITY.

1.05 UNFORESEEN FIELD CONDITIONS

- A. In the case of unforeseen field conditions, the Contractor shall notify the Owner immediately in writing of such conditions. In no case shall the Contractor proceed without written authorization from THE CITY. If such unforeseen conditions result in additional expense, the Contractor shall not proceed without the written approval of the Owner.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

SUMMARY OF WORK
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01040

SPECIAL PROJECT PROCEDURES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 BIDDERS EXAMINATION AND INSPECTION OF EXISTING BUILDING AND SITE

- A. All bidders must inspect the existing site and make their own assessment of the work required to achieve the complete, finished conditions specified in the Contract Documents.
- B. Failure to adequately inspect the site and/or correctly assess existing conditions shall not be cause for additional payment.
- C. Every Contractor will be bound by the scope of work of the Contract Documents and shall make the inspections necessary to assure that the bid price includes the complete scope.

1.03 HOURS OF WORK

- A. Work may commence at 7:00 A.M. and continue until 4:30 P.M., Monday through Friday.

SPECIAL PROJECT PROCEDURES
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- B. The Contractor shall be completely and fully responsible for the security and safety of the job site at all times.

1.04 CONTRACTOR USE OF THE BUILDINGS, ACCESSIBILITY AND SCHEDULES FOR WORK

- A. The work of the Contractor and all Subcontractors shall be performed during the hours of operation as specified herein and in and around areas of the building and site used while occupied by the Owner and the public. The Contractor shall execute the Work with the least possible disturbance to the use and continuous functioning of the site and building. The Contractor and each Subcontractor take all necessary measures to assure the safety of the staff, visitors, and the general public. The General Contractor is solely responsible for safety on the job site including securing and making safe all construction areas during construction hours as well as during non-construction hours.
- B. Schedule of Work and Site Use
 1. The Contractor shall schedule the work of this Contract so as to perform and complete the Work of the Contract according to the following schedule. The Contractor shall within seven (7) days of the Notice of Contract Award, submit a schedule to the Owner and Architect for review.
 2. Between the time period of the general bid due date and Construction Commencement, the Contractor shall take all necessary measures to complete the Work of this Contract. It is expected that the Contractor utilize the time period between the bid date and construction start date to schedule and coordinate the work and work sequence, prepare shop drawings and submittals for approval and order materials. The Owner shall issue a Notice to Proceed. If the work is not complete by the completion date, the Contractor will be subject to liquidated damages.
 3. The Contractor shall be responsible for providing any and all measures and/or temporary construction required to control the transmission of dust, particles, and fumes from construction activities.
 4. The Contractor shall be responsible on a daily basis for informing the designated Owner's representative of all persons on-site that day associated with the Work. The Contractor shall establish a daily reporting system of all activities which is acceptable to the Owner.
 5. The Construction schedule shall indicate the dates for start and completion of each work item or task required with all milestones using a Bar Chart subject to approval by the Architect.

6. The Awarding Authority's review of the project construction schedule shall not extend to the accuracy or other matters dealt with in the schedule, including but not limited to whether work is omitted, whether duration of activity is reasonable, the level of labor, materials or equipment, the Contractor's means, methods, techniques, procedures or sequence of construction, or whether the sequence and timing for work remaining are practical. The accuracy, correctness of all work, sequencing, schedules shall remain the sole responsibility of the Contractor. Neither the Awarding Authority's review of a schedule nor a statement of resubmittal not required shall relieve the Contractor for the responsibility for complying with the contract schedule, adhering to sequences of work, or from completing any omitted work with the Contract Time.
7. The Contractor shall provide, erect and maintain barricades with any required egress, access doors, lighting, ventilation, guard rails and all other appurtenances required to protect the general public, visitors, staff, and workers while construction is in progress. Safety is the sole responsibility of the Contractor on the job site.

1.05 HOUSEKEEPING AND PROTECTION OF EXISTING CONDITIONS

- A. Maintain the premises in a safe, orderly condition at all times. Protect construction, furnishings, equipment and other items.
- B. Property Protection: The General Contractor shall take all measures necessary to protect the Owner's property.
- C. Security: The General Contractor shall take every possible precaution to maintain the security of the buildings and site. The Contractor shall cooperate with the Owner fully and follow the Owner's directions as issued. The Contractor shall control and restrict access to areas of work to prevent injury to persons and property.
- D. The Contractor shall properly cover, protect and maintain floor and finished surfaces to prevent damage. Replace protective coverings which become wet, torn or ineffective.
- E. Roof and Finished Surfaces Protection:
 1. The Contractor shall restrict traffic on roofs and finished surfaces to that required to perform the work of this Contract and permit traffic only required to properly complete the Work.
 2. Effectively protect surfaces to prevent damages to existing substrates, new finishes, and to finished roofing work. Provide temporary walkways and work platforms as needed.

SPECIAL PROJECT PROCEDURES

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3. Load distribution: The Contractor and any Subcontractor shall not load or permit any part of the structure to be loaded in any manner that will damage the existing structure or endanger the safety of persons or property. Such loads shall include live and dead loads and all moving, vibratory, temporary and impact loads.

F. Correction by the Contractor

1. At no additional cost to the Owner, the General Contractor shall immediately correct all deficiencies, including damages to the building, site and site surfaces, damages to furnishings, damages to equipment or systems, damage to adjacent properties, and all other damage caused by the General Contractor or its Subcontractors during the execution of the Work of this Contract. Any and all damages resulting from inadequate, insufficient or defective temporary protections installed by the Contractor during the work of this Contract, shall be corrected by the General Contractor at no additional cost to the Owner.

1.06 REQUIREMENTS RELATED TO BUILDING USERS' FURNISHINGS,
EQUIPMENT AND OTHER ITEMS

- A. The General Contractor is responsible for protecting all furnishings, equipment and items from damage (including construction generated dust) during the entire construction period.
- B. The General Contractor shall be responsible for moving and re-setting up all furniture, fixed and movable equipment, file and storage cabinets, recreation equipment, boxes, and all other items to accomplish the work of both the General Contractor and the Subcontractors in its entirety.

1.07 DUST, DIRT, AND FUME CONTROL

- A. The Contractor shall take all necessary precautions and provide all necessary temporary construction to effectively contain dust, dirt and fumes within the areas of work and within the work limits. Temporary construction shall be provided to effectively prevent dust and dirt from entering areas of the buildings or adjacent buildings, satisfying all City, State and Federal laws, codes, and requirements.

1.08 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 building and Project site clean and free of debris, leaving all work in a clean condition and satisfactory to the Official.

SPECIAL PROJECT PROCEDURES

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- B. Immediately after unpacking, the Contractor shall collect and remove from the building and Project site all packing materials, case lumber, excelsior, wrapping and other rubbish.
- C. Rubbish removal shall occur so that trash and debris are contained in closed and secured waste containers.

1.09 SITE DRAINAGE AND PUMPING

- A. The Contractor shall be responsible at all times for proper and sufficient site drainage and shall maintain such drainage during the life of the Contract in a manner acceptable to the Owner and so as not to adversely affect the adjacent areas or adjacent properties.
- B. The Contractor shall provide and maintain all pumps, suction and discharge lines, and power in sufficient number and capacity to keep all excavations, pits, trenches, foundations and the entire property area free from accumulation of water from any source whatsoever at all times and under way and all circumstances and contingencies that may arise.

1.10 SNOW AND ICE REMOVAL

- A. The Contractor shall promptly remove all snow and ice which may impede the work, damage the finishes or materials, be detrimental to all/any crafts or trade, or impede trucking, delivery or moving of materials at the site, or prevent adequate drainage of the site or adjoining areas.

1.11 WINTER CONSTRUCTION

- A. The Contractor shall provide protection against damage to materials and work installed in freezing weather, including all special heat and coverings needed to prevent damage by the elements and to complete the work. The ground surface, under footings, under pipe lines, under masonry, under concrete, and other work subject to damage shall be protected against freezing or ice formations.
- B. Refer to SECTION 01500--TEMPORARY FACILITIES, for additional requirements applicable to winter construction.

1.12 BROKEN GLASS

- A. The Contractor shall be held responsible at all times prior to Substantial Completion of the Work, or occupancy by the City, 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 Official, the Contractor shall

replace at no increase in Contract Price or Contract Time, all such glass broken, missing, or damaged prior to Substantial Completion.

1.13 CLEANING AND POLISHING

- A. The Contractor shall at all times keep the building and Project site free from accumulation of waste materials or rubbish.
- B. Immediately prior to final inspection, the entire 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 shall be left broom clean.
 - 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 Selection of the Specifications.
 - 3. All glass affected by the work shall be washed and polished on both sides.
 - 4. All metals, hardware, fixtures, and equipment shall be left in undamaged, bright, polished condition.
 - 5. Plenums, duct spaces and furred spaces shall be protected at all times from fumes, particles and other air-borne construction effects. These building spaces shall be left clean of debris and decayable materials.
 - 6. Equipment and building systems located in areas of construction shall be cleaned and tested and made perfectly operational to the satisfaction of the Owner prior to Substantial Completion or partial Substantial Completion of that area of work.
- C. In cleaning items having manufacturer's finish, or items previously finished by a Subcontractor, care shall be taken not to damage such finish. In cleaning glass and finish surfaces, care shall be taken not to use cleaning agents which may stain or damage any finish materials. Any damage to finishes caused by cleaning operations shall be corrected and repaired by the Contractor at no increase in Contract Price.

1.14 OR-EQUAL

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

- A. Where materials, equipment, apparatus, or other products are specified by Manufacturer, brand name, type or catalog number, such designation is to establish standards or performance, quality, type and style.
- B. If the General or Subcontractor wishes to use materials or equipment other than these specifically designated herein, as being equal to those so specifically designated, he shall submit the proposed substitution before purchasing and/or fabrication in accordance with the requirement of the General Conditions for approval.
- C. It is the responsibility of the Contractor to submit all back-up material and data needed to prove that the proposed product is an “or-equal”. The Architect will not review an alternative product without proper documentation. Alternative products and assemblies will be rejected immediately without proper documentation.
- D. The schedule of the project is not subject to the availability of products submitted as “or approved equal” or the review needed to certify an “or approved equal” product.

1.15 PERMITS AND POLICE DETAILS

- A. The Contractor is responsible for procuring and paying for all applicable permits and police details throughout the entire project.

1.16 COORDINATION

- A. The Contractor shall coordinate locations of all items to be installed with the Architect. If an item is not dimensioned, for height or location, contact the Architect for the installation information. Installation of items without the proper dimensional information may result in reinstallation at no additional charge by the Contractor.

1.17 EXISTING BUILDING

- A. The Contractor is hereby notified that the second and third floor of the building as well as the egress stairs and first floor common area will be occupied during construction. The first floor units will be unoccupied. The Contractor shall take all precautions and install all protections to safeguard the lives of residents and visitors to the building. All means and methods are the responsibility of the Contractor. The Contractor is solely responsible for safety on the job site.
- B. The Contractor shall erect physical dust barriers around the work to eliminate construction dust into the building. There will be a pre-construction walk-thru in advance of the Contractor mobilization to verify the existing conditions of the building, specifically regarding dust. The Contractor shall be completely

SPECIAL PROJECT PROCEDURES

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responsible for all cleaning costs associated with any and all dust generated in the building by the construction, which will be deducted via change order.

1.18 GENERAL NOTES

- A. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS. IN CASE OF CONFLICT, THE ARCHITECT SHALL BE NOTIFIED AND SHALL RESOLVE THE CONFLICT.
- B. IN ANY CASE OF CONFLICT BETWEEN THE DRAWINGS AND THE PROJECT SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.
- C. THE CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT PRIOR REVIEW BY THE ARCHITECT.
- D. WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
- E. ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND LOCAL LAWS AND REGULATIONS.
- F. GENERAL CONTRACTOR SHALL COORDINATE LOCATIONS OF OPENINGS, PITS, BOXES, SUMPS, TRENCHES, SLEEVES, DEPRESSIONS, GROOVES, AND CHAMFERS, WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES.
- G. NO PROVISIONS HAVE BEEN MADE FOR CONDITIONS OCCURRING DURING CONSTRUCTION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE PROPER AND ADEQUATE PROVISIONS FOR STABILITY OF, AND ALL STRESSES TO THE STRUCTURE DUE TO ANY CAUSE DURING CONSTRUCTION.
- H. CONTRACTOR SHALL NOT SCALE DRAWINGS. CONTRACTOR SHALL REQUEST ALL DIMENSIONS OR INFORMATION REQUIRED TO PERFORM THE WORK FROM THE ARCHITECT. WORK COMPLETED BY THE CONTRACTOR WITHOUT DIMENSIONS OR INFORMATION SHALL BE DONE AT THEIR OWN RISK AND, IF DEEMED INCORRECT BY THE ARCHITECT, SHALL BE REMOVED AND REINSTALLED TO THE SPECIFICATIONS OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
- I. CODES: THE PROJECT IS BASED ON THE REQUIREMENTS OF THE MASSACHUSETTS STATE BUILDING CODE - SEVENTH EDITION

SPECIAL PROJECT PROCEDURES

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

- J. THE PLANS WERE COMPILED FROM VARIOUS SOURCES. THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING CONDITIONS AND DIMENSIONS.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SPECIAL PROJECT PROCEDURES
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01050

CONDUCT OF THE WORK

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 PROJECT MANAGEMENT

- A. The Contractor is hereby notified that the second and third floor of the building as well as the egress stairs and first floor common area will be occupied during construction. The first floor units will be unoccupied. The Contractor shall take all precautions and install all protections to safeguard the lives of residents and visitors to the building. All means and methods are the responsibility of the Contractor. The Contractor is solely responsible for safety on the job site.
- B. The work must be completed in a continuous uninterrupted operation. The Contractor must use sufficient personnel and adequate equipment to complete all the necessary work requirements within a minimum period of time.
- C. Unless specifically authorized by the Owner, in writing, the work must be conducted between the hours of 7:00 a.m. and 4:30 p.m. on Monday through Friday. No work is to be done on holidays or Sundays unless approved by the Owner in advance.
- D. The Contractor is responsible for the security and stability of partially completed

CONDUCT OF WORK
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work until the project is accepted by the Owner.

1.03 SHUTDOWN OF SERVICES

- A. If site utility services to the neighborhood are cut by the Contractor, he shall supply all labor, materials or whatever may be required to supply said temporary utility services at no extra cost to the neighborhood and in accordance with the state and local regulations on health and safety, working around the clock, until they are reinstated. The Contractor shall also repair the damaged utility immediately at no cost to the owner.

1.04 COORDINATION

- A. The Contractor shall submit for approval to the Owner a detailed operational plan showing the sequence of operations prior to commencement of any work at the site. Any changes to this operational plan must be approved by the Owner.
- B. The Contractor must retain on the Work during its progress a competent full time representative, satisfactory to the Owner. This representative shall not be changed, except with the consent of the Owner. The representative shall be in full charge of the work and all instructions given to this person by the Architect shall be binding.
- C. The Contractor must supply to the Owner the home telephone number of a responsible person who may be contacted during non-work-hours for emergencies on the Project.

1.05 OWNER'S COOPERATION

- A. The Owner shall assist the Contractor to perform the Work in accordance with the approved operational plan.
- B. The Contractor shall provide:
 - 1. Notification to the Owner two (2) weeks before any work is scheduled at the site/building.
 - 2. Notification to the Owner in writing forty-eight (48) hours before work is scheduled in any particular area.
 - 3. An updated schedule monthly with the application for payment. Payments will not be authorized until the updated schedule is received and approved.

END OF SECTION

CONDUCT OF WORK
01050 - 2

DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01090

DEFINITIONS & STANDARDS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 DELIVERY AND STORAGE

- A. Materials shall be delivered in their original, unopened containers, clearly labeled with manufacturer's name, brand name, and such identifying numbers as are appropriate.
 - 1. All materials shall be stored flat, or in the case of rolls, standing on end, elevated from the roof or deck, and protected with waterproof covers as necessary to keep the materials dry and protected from sunlight and moisture, and ventilated to prevent excessive temperature.
 - 2. Adhesives, sealants, and mastics shall be stored between 60 and 80 degrees F. Should they be exposed to lower temperatures, restore to room temperatures for 3-5 days prior to use.
 - 3. Flammable materials shall be stored in a cool, dry area away from sparks and open flames.

DEFINITIONS & STANDARDS
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4. Damaged or deteriorated materials shall not be used and shall be removed from the job site.
5. All cardboard containers shall be stored in dry areas or on pallets.
6. Provide security for all materials and equipment.
7. Protect all material and equipment from damage.

1.03 JOB CONDITIONS

- A. Do not deliver to site or install any material or system that has not been approved. Materials installed without approval may be required to be removed.
- B. Remove only as much existing roofing as can be replaced and made weathertight each day, including all flashing work.
- C. Materials which have a temperature other than the application temperature of the manufacturer shall not be applied.
- D. All surfaces to receive the new materials shall be thoroughly dry. Should surface moisture such as dew exist, the Contractor shall provide the necessary equipment to dry the surface prior to application.
- E. All materials shall be installed according to manufacturer's specifications and shall be compatible with the adjacent materials used.

1.04 DIMENSIONS AND QUANTITIES

- A. All dimensions and quantities shall be determined or verified by the Contractor. The Plans and Details have been compiled from various sources and may not reflect the actual condition at the moment of construction. The Contractor is cautioned to take all precautions and make all investigations necessary to install the proposed work. The Owner will not consider unfamiliarity with the job conditions as a basis for additional compensation.

1.05 MINIMUM REQUIREMENTS

- A. It is the intent of these contract documents to, in some cases, exceed the minimum requirements of the manufacturer. The new work shall be bid and installed as detailed.

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PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

DEFINITIONS & STANDARDS
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01300

SUBMITTALS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.
- E. Consult the individual sections of the specifications for the specific submittals required under those sections and for further details and descriptions of the requirements.

1.02 GENERAL PROCEDURES FOR SUBMITTALS

- A. Timeliness - The Contractor shall transmit each submittal to the Architect sufficiently in advance of performing related Work or other applicable activities so that the installation is not delayed by processing times, including disapproval and resubmittal (if required), coordination with other submittals, testing, purchasing, fabrication, delivery, and similar sequenced activities. No extension of time will be authorized because of the Contractor's failure to transmit submittals to the Architect in advance of the Work.
- B. Sequence - The Contractor shall transmit each submittal in a sequence which will not result in the Architect's approval having to be later modified or rescinded by reason of subsequent submittals which should have been processed earlier or concurrently for coordination.

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- C. Contractor's Review and Approval - Only submittals received from and bearing the stamp of approval of the Contractor will be considered for review by the Architect. Submittals shall be accompanied by a transmittal notice stating name of Project, date of submittal, "To", "From" (Contractor, Subcontractor, Installer, Manufacturer, Supplier), Specification Section, or Drawing No. to which the submittal refers, purpose (first submittal, resubmittal), description, remarks, distribution record, and signature of transmitter.
- D. Architect's Action - The Architect will review the Contractor's submittals and return them with one of the following actions recorded thereon by appropriate markings:
 - 1. Final Unrestricted Release: Where marked "Approved" the Work covered by the submittal may proceed provided it complies with the requirements of the Contract Documents.
 - 2. Final-But-Restricted Release: When marked "Approved as Noted" the Work may proceed provided it complies with the Architect's notations or corrections on the submittal and complies with the requirements of the Contract Documents. Acceptance of the Work will depend on these compliances.
 - 3. Returned for Resubmittal: When marked "Revise and Resubmit" or "Disapproved" the Work covered by the submittal (such as purchasing, fabrication, delivery, or other activity) should not proceed. The submittal should be revised or a new submittal resubmitted without delay (no limit to number of resubmissions), in accordance with the Architect's notations stating the reasons for returning the submittal.
- E. Processing - All costs for printing, preparing, packaging, submitting, resubmitting, and mailing, or delivering submittals required by this contract shall be included in the Contract Sum.

1.03 OR EQUALS

- A. Definition - Whenever a specification section names one or more brands for a given item, and the Contractor wishes to submit, for consideration, another brand, the submission shall be considered an "or-equal" or a "material substitution". For the purposes of this Contract, the terms "or-equal" and "material substitution" shall be considered synonymous.
- B. In no case may an item be furnished on the Work other than the item named or described, unless the Architect, with the Administrator's written concurrence, shall consider the item equal to the item so named or described, as provided by M.G.L. c.30 § 39M.
- C. The equality of items offered as "equal" to items named or described shall be

SUBMITTALS
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proved to the satisfaction of the Architect, including all research and full documentation, at the expense of the Contractor submitting the substitution.

- D. The Architect and/or the Department may require that full size samples of both the specified and proposed products be submitted for review and evaluation. The Contractor shall bear full cost for providing, delivering, and disposal of all such samples.
- E. The Contractor shall assume full responsibility for the performance of any item submitted as an "Or-Equal" and assume the costs of any changes in any Work which may be caused by such substitution.
- F. Or Equal Approval Process - On the transmittal, or on a separate sheet attached to the submission, the Contractor shall direct attention to any deviations, including minor limitations and variations, from the Contract Documents.
 - 1. The Contractor shall submit to the Architect for consideration of any or-equal substitution a written point-by-point comparison containing the name and full particulars of the proposed product and the product named or described in the Contract Documents.
 - 2. Such submittal shall in no event be made later than 120 calendar days prior to the incorporation of the item into the Work. In any case in which the time period specified in the Contract Documents from the Notice to Proceed to Substantial Completion is less than 120 days, this requirement can be waived by the Architect.
 - 3. Upon receipt of a written request for approval of an or-equal substitution, the Architect shall investigate whether the proposed item shall be considered equal to the item named or described in the Contract Documents. Upon conclusion of the investigation, the Architect shall promptly advise the Contractor that the item is, or is not, considered acceptable as on Or-Equal substitution. Such written notice must have the concurrence of the Administrator.

1.04 SUBMISSION OF SHOP DRAWINGS

- A. Shop Drawings shall be complete, giving all information necessary or requested in the individual section of the specifications. They shall also show all adjoining Work and details of connection thereto, including flashing, waterproofing, and all utilities.
- B. Shop Drawings shall be for whole systems. Partial submissions will not be accepted.

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- C. The Architect reserves the right to review and approve shop drawings only after approval of related product data and samples.
- D. Shop drawings shall be properly identified and contain the name of the project, name of the firm submitting the shop drawings, shop drawing number, date of shop drawings and revisions, Contractor's stamp of approval, and sufficient spaces near the title block for the Architect's stamp.
- E. The Contractor shall submit to the Architect one legible, reproducible transparency and two black line prints of each shop drawing. Transparency and prints shall be mailed or delivered in roll form. Each submittal shall be accompanied by a transmittal notice.
- F. When the transparency is returned by the Architect with the stamp "Revise and Resubmit" or "Disapproved", the Contractor shall correct the original drawing or prepare a new drawing and resubmit a transparency and two prints thereof to the Architect for approval. This procedure shall be repeated until the Architect's approval is obtained.
- G. When the transparency is returned by the Architect with the stamp "Approved" or "Approved as Corrected", the Contractor shall provide and distribute the prints for all Contractor and Subcontractors use, and in addition submit, within 10 calendar days after approval, 4 prints to the Architect.
- H. The Contractor shall maintain one full set of approved shop drawings at the site.
- I. Photo copies of the bid documents are not acceptable as shop drawings.

1.05 SUBMISSION OF PRODUCT DATA

- A. The Contractor shall submit 7 copies of Product Data to the Architect. All such data shall be specific and identification of material or equipment submitted shall be clearly marked in ink. Data of general nature will not be accepted.
- B. Product Data shall be accompanied by a transmittal notice. The Contractor's stamp of approval shall appear on the printed information itself, in a location which will not impair legibility.
- C. Product Data returned by the Architect as "Disapproved" shall be resubmitted in 7 copies until the Architects approval is obtained.
- D. When the Product Data are acceptable, the Architect will stamp them "Approved" or "Approved as Corrected", retain 3 copies, and return 4 copies to the Contractor. The Contractor shall provide and distribute additional copies as may be required to complete the Work.

SUBMITTALS
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- E. The Contractor shall maintain one full set of approved, original Product Data at the site.
- F. Provide product data for all items to be installed whether or not noted in the specification section.

1.06 SUBMISSION OF SAMPLES

- A. Unless otherwise specified in the individual section, the Contractor shall submit two specimens of each sample.
- B. Samples shall be of adequate size to permit proper evaluation of materials. Where variations in color or in other characteristics are to be expected, samples shall show the maximum range of variation. Materials exceeding the variation of approved samples will not be approved on the Work.
- C. Samples of items of interior finishes shall be submitted all at once to permit a coordinated selection of colors and finishes.
- D. Samples which can be conveniently mailed shall be sent directly to the Architect, accompanied by a transmittal notice. All transmittals shall be stamped with the Contractor's approval stamp of the material submitted.
- E. All other samples shall be delivered at the field office of the Project Representative with sample identification tag attached and properly filled in. Transmittal notice of samples so delivered with the Contractor's stamp of approval shall be mailed to the Architect.
- F. If a sample is rejected by the Architect, a new sample shall be resubmitted in the manner specified hereinabove. This procedure shall be repeated until the sample is approved by the Architect.
- G. Samples will not be returned unless return is requested at the time of submission. The right is reserved to require submission of samples whether or not particular mention is made in the specifications, at no additional cost to the Owner.
- H. Samples shall not be installed as part of the work.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION – NOT USED

END OF SECTION

SUBMITTALS
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01400

QUALITY CONTROL

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 INSPECTION AND TESTING

- A. An independent inspector and/or testing laboratory may be engaged and paid for by the Owner to perform the inspection and testing of the new work.
- B. The Contractor shall cooperate with the inspector and/or testing laboratory, furnish materials and labor as may be required and provide for convenient access to all parts of the work for purposes of inspection and testing.
- C. The Contractor shall accept as final the results of all such inspection and testing.
- D. The inspector shall have the authority to delay the commencement of work, or to stop the work at any time, for any reason which he deems necessary.
- E. The inspector and/or testing laboratory reserves the right to require the Contractor to perform removal of materials installed by the Contractor.
- F. Bear all costs for tests where materials or systems have been found unacceptable and all costs for replacement required due to such unacceptability.

QUALITY CONTROL
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

- G. If any replacement work is required, such work will also be subject to the terms of this SPECIFICATION.

PART 2 - PRODUCTS - NOT USED

PART 3 - EXECUTION - NOT USED

END OF SECTION

QUALITY CONTROL
01400 - 2

DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01500

TEMPORARY FACILITIES

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 GENERAL

- A. The Contractor shall be responsible for providing and maintaining all temporary facilities until Substantial Completion. Removal of such prior to Substantial Completion must be with the concurrence of the Architect. The Contractor bears full responsibility for reproviding any facility removed prior to Substantial Completion.
- B. Removal of all temporary facilities shall be a condition precedent to Substantial Completion unless directed otherwise by the Architect or specifically noted in the specifications.
- C. The Contractor must comply with all safety laws and regulations of the Commonwealth of Massachusetts, the United States Government, and local government agencies applicable to Work under this contract. The Contractor's attention is directed to the Commonwealth of Massachusetts, Department of Labor and Industries Regulation 454 CMR.
- D. Safety is the sole responsibility of the Contractor on the job site. Contractor is notified that the building will be occupied during construction. The Architect does not have control of the job site in any way.

TEMPORARY FACILITIES
01500 - 1

1.03 FIELD OFFICES

- A. Space within the building will be available for meetings during the work.
- B. No space will be available within the building for Contractor offices or storage of tools or equipment. The Contractor shall provide a secure storage container for all tools, equipment, and storage.

1.04 TEMPORARY TELEPHONES

- A. The Contractor shall provide a separate service for the use of the Contractor's authorized personnel, Subcontractors, the Owner, and the Architect in the Field Office.
- B. The Contractor shall pay for the installation and removal of the foregoing temporary telephones and for all calls and charges in connection therewith.

1.05 TEMPORARY TOILETS

- A. Portable, temporary toilets will be provided by the Contractor and shall be located as directed by the owner.
- B. The Contractor:
 - 1. Assumes full responsibility for the use of the temporary toilets
 - 2. Pays all costs for operation, maintenance and cleaning.
- C. Under no circumstances will the Contractor's personnel be allowed to use the toilets and sinks in the building.

1.06 TEMPORARY CONSTRUCTION FENCE

- A. The Contractor shall be responsible for providing and maintaining temporary fencing and barricades around the construction as may be necessary to assure the safety of all persons authorized or unauthorized. Such protective measures shall also be located and constructed as required by local, state, and federal ordinances, laws, codes, or regulations.

1.07 TEMPORARY STRUCTURES AND MATERIAL HANDLING

- A. The Contractor shall provide such secure storage sheds, temporary buildings, or trailers as required for the performance of the Contract.
- B. Materials shall be handled, stored, installed, cleaned, and protected in accordance

TEMPORARY FACILITIES
01500 - 2

with the best practice in the industry and, except where otherwise specified in the Contract Documents, in accordance with manufacturer's specifications and directions.

- C. The Contractor must obtain the permission of the Owner for the placement of any storage facilities on site, and the Owner assumes no responsibility for articles stored.

1.08 TEMPORARY STAGING, STAIRS, CHUTES

- A. Except as otherwise specified, the General Contractor shall furnish, install, maintain in safe condition, and remove all scaffolds, staging, and planking over 8 ft. in height, required for the use of all trades for proper execution of the Work, except as noted.
Exception: All Filed Sub-Bidders shall provide their own staging, stairs, hoisting, and chutes to perform all their own work.
- B. The Contractor shall furnish, install, maintain in safe condition, and remove all temporary ramps, stairs, ladders, and similar items as required for the use of all trades for the proper execution of the Work.
- C. If the project is new construction permanent stairs shall be erected as soon as possible, for which the Contractor shall provide temporary protective treads, risers, handrails, and shaft protection.
- D. The Contractor shall furnish, install, maintain, and remove covered chutes from the work area. Such shall be in convenient locations and permit disposal of rubbish directly into trucks or disposal units.
- E. Debris shall not be allowed to fall freely from upper levels of the building. Materials shall not be thrown or dropped from open windows or the roof.

1.09 HOISTING FACILITIES

- A. Except as otherwise specified, the Contractor shall provide, operate, and remove material hoists, cranes, and other hoisting as required for the performance of the Work by all trades. All such hoisting service shall be without cost to the Subcontractors. EXCEPTION: The Sub-Bidders shall provide all their own hoisting to perform all their own work.

1.10 TEMPORARY WATER

- A. The Contractor may make use of the available water supply at the site for construction purposes, provided the permission of the Owner is obtained beforehand and only as long as the water is not used wastefully.

TEMPORARY FACILITIES **01500 - 3**

- B. The Contractor shall provide all necessary piping and hoses to utilize the available sources of water.
- C. The Contractor shall provide an adequate supply of cool drinking water with individual drinking cups for personnel on the job.

1.11 TEMPORARY ELECTRICITY

- A. The Contractor may make use of the electricity available at the site, metered and paid for by the Owner, provided that the Contractor shall supply proper adapters and extension cords.
 - 1. Where heavy duty electric equipment drawing current in excess of 15 amperes is involved, the Contractor shall provide temporary service to supply the power.
 - 2. The temporary electric service shall include, but not be limited to labor, materials, and equipment necessary to supply temporary power of adequate capacity for the project.
 - 3. Transformers and meters, when required by the power company, will be furnished by the power company and the Contractor shall pay the costs therefore.
- B. Temporary electrical Work shall be performed under the direct supervision of at least one master electrician, who will be present on the project at all times when such work is being performed.
- C. The Contractor shall furnish, install, and maintain lamps in operating condition. The Contractor, and each Subcontractor, shall furnish their own extension cords and additional lamps as may be required for their work. Temporary work of a special nature, not otherwise specified hereunder, shall be provided, maintained, and paid for the trade requiring same.
- D. All lamps installed in permanent lighting fixtures and used as temporary lights during the construction period shall be removed and replaced shortly before Substantial Completion by the set of lamps required to be provided under the Electrical section of the specifications.
- E. All temporary work shall be provided in conformity with the National Electric Code, State laws, and requirements of the power company. Particular attention is called to Commonwealth of Massachusetts, Department of Labor and Industries Regulation, 454 CMR.

1.12 WEATHER PROTECTION

TEMPORARY FACILITIES
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- A. The Contractor shall provide temporary enclosures and heat to permit work to be carried on during the months of November through March in compliance with MGL c.149 §44G (d). Without limitation this includes such items as excavation, pile driving, steel erection, erection of certain exterior wall panels, masonry, sealants, waterproofing, sheet metal work, roofing, and similar operations.
- B. "Weather Protection" means the temporary protection of that Work adversely affected by moisture, wind, and cold by covering, enclosing, and/or heating. This protection shall provide adequate working areas during the months of November through March as determined by the Owner and consistent with the construction schedule to permit the continuous progress of all Work necessary to maintain an orderly and efficient sequence of construction operations. The Contractor shall furnish and install "Weather Protection" material and be responsible for all costs, including heating required to maintain a minimum of 40 degrees F. at the working surface. This provision does not supersede any specific requirements for methods of construction, curing of materials, or the applicable conditions set forth in the Contract Documents with added regard to performance obligations of the Contractor.
- C. Within 30 calendar days after award of the Contract, the Contractor shall submit in writing, to the Architect for approval, three (3) copies of the proposed methods for "Weather Protection".
- D. The Contractor shall assume the entire responsibility for weather protection during construction (until Substantial Completion), and shall be liable for any damage to any Work caused by failure to supply proper weather protection and proper ventilation.
- E. Work damaged by frost shall be removed and replaced by and at the Contractor's expense and as directed by the Architect.
- F. It is to be specifically understood that the Contractor shall do no work under any conditions deemed unsuitable by the Contractor to the execution of the Work. This provision shall not constitute any waiver, release, or lessening of the Contractor's obligation to bring the Work to Substantial Completion within the period of time set forth in the Contract Documents.

1.13 ACCESS

- A. The Contractor will be permitted FULL access to the unoccupied spaces on the first floor of the building during construction operations and as directed by the owner. Access to occupied living units on the third floor will be by **advanced appointment only** and shall be coordinated with the Owner a minimum of 48 hours in advance. The Contractor is responsible for the protection and cleaning of the occupied property during contract work.

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01500 - 5

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

- B. The Contractor shall allow for the minimal interruption of access and entry to the building with special concerns for maintaining life safety access and egress.

1.14 DEBRIS

- A. The Contractor will be responsible for the removal of all construction debris from the job site.
- B. The Contractor will be allowed to locate a dumpster or rubbish truck on site. All debris shall be chuted or deposited in the dumpster in closed containers.
- C. Material removed from the existing building and not to be re-used shall be treated as required in SELECTIVE DEMOLITION. Debris resulting from the new work shall be stored in containers provided by the Contractor and legally disposed of.

END OF SECTION

TEMPORARY FACILITIES
01500 - 6

DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01510

PROTECTION

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 PROTECTION OF PERSONS & PROPERTIES

- A. The Contractor is hereby notified that the second and third floor of the building as well as the egress stairs and first floor common area will be occupied during construction. The first floor units will be unoccupied. The Contractor shall take all precautions and install all protections to safeguard the lives of residents and visitors to the building. All means and methods are the responsibility of the Contractor. The Contractor is solely responsible for safety on the job site. The architect does not have control of the job site, or means and methods, in any way.
- B. Any damage to buildings, roads, (public and private), concrete walks, bituminous concrete areas, fences, rails, lawn areas, trees, shrubbery, poles, underground utilities, etc. shall be made good by and at the Contractor's own expense, all to the satisfaction of the Owner.
- C. The Contractor shall patch, repair and/or replace all adjacent materials and surfaces damaged after the installation of new work to the complete satisfaction and at no expense to the Owner. All repair and replacement work shall match the existing in kind and appearance.

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1.03 TEMPORARY PROTECTION

- A. The Contractor shall:
1. Protect excavations, trenches, buildings, and materials at all times from rain water, ground water, backing-up, or leakage of sewers, drains, or other piping, or from water damage of any origin. Provide all pumps, piping, coverings, and other materials and equipment as required by job conditions to accomplish this requirement.
 2. In addition to the weather protection during the months of November to March specified elsewhere, provide temporary watertight enclosures for openings in exterior walls and in roof decks when and as required to protect the Work from damage by inclement weather. Temporary enclosures shall be provided with adequate means of ventilation to prevent accumulation of moisture in the buildings.
 3. Provide temporary wood doors for exterior entrances and elsewhere when required. Permanent door enclosures shall not be used as temporary enclosures.
 4. Protect sills, jambs, and heads of openings through which materials are handled.
 5. Protect decks and slabs to receive work by other trades from any soiling which will prevent proper adhesion of subsequent Work. Decks and slabs shall be left clean and free of blemishes at the time other trades begin the application of their work.
 6. Protect concrete slabs to remain exposed and finished floors against mechanical damage, plaster droppings, oil, grease, paint, or other material which will stain the floor finish. Install and maintain adequate strips of building paper or other protection on finished floors in rooms where future Work will be done by other trades.
 7. Protect all surfaces to receive work by other trades from any soiling which will prevent proper execution of subsequent work
 8. Protect other areas, furniture, and private property of the resident and the Owner. Any areas damaged by the Contractor shall be restored to the original condition or compensated at the Contractor's expense.
- B. Finished surfaces shall not be subjected to traffic nor shall they be used for storage of materials. Where some activity must take place in order to carry out the Work, adequate protection must be provided.

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- C. After the installation of the Work by any Subcontractor is completed, the Contractor shall be responsible for its protection and for repairing, replacing, or cleaning any such Work which has been damaged by other trades or by any other cause, so that all Work is in first class condition at the time of Substantial Completion.

1.04 ACCESS

- A. The Contractor shall, at all times, leave an unobstructed way along walks and roadways, and shall maintain barriers and lights for the protection of all persons and property in all locations where materials are stored or work is in progress.

1.05 SECURITY

- A. The Contractor shall be responsible for providing all security precautions necessary to protect the Contractor's and Owner's interests.
- B. Where excavation is involved, the Contractor shall be responsible for providing continuous watchmen service as necessary, to insure adequate protection of the general public.

1.06 NOISE AND DUST CONTROL

- A. The Contractor shall take special measures to protect the residents, neighbors, and general public from noise, dust, and other disturbances by:
 - 1. Keeping common pedestrian and vehicular circulation areas clean and unobstructed;
 - 2. Insulating work area from occupied portions as far as possible; and
 - 3. Sealing dust and fumes from contaminating occupied spaces.

1.07 FIRE PROTECTION

- A. The Contractor shall take necessary precautions to insure against fire during construction. The Contractor shall be responsible to insure that the area within contract limits is kept orderly and clean and that combustible rubbish and construction debris is promptly removed from the site.
- B. Installation of equipment suitable for fire protection shall be done as soon as possible after commencement of the Work. The Contractor's attention is directed to the requirements of the Commonwealth of Massachusetts, Department of Labor and Workforce Development Regulation 454 CMR.

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1.08 WIND PROTECTION

- A. Should high wind warnings be issued by the U.S. Weather Bureau, the Contractor shall take every precaution to minimize danger to persons, to the Work, and to the adjacent property.

1.09 WEATHER PROTECTION

- A. The Contractor shall provide Weather Protection as required by Specification Section 01500 Temporary Facilities and any other specific requirements of the Contract Documents.

END OF SECTION

PROTECTION
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01520

CLEANING UP

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.
- E. Consult the individual sections of the specifications for cleaning of Work installed under those sections.

1.02 CLEANING DURING CONSTRUCTION

- A. Conduct cleaning and disposal operations to comply with local ordinances and anti-pollution laws.
 - 1. Do not burn or bury rubbish and waste materials on the site.
 - 2. Do not dispose of volatile wastes such as mineral spirits, oil, or paint thinner in storm or sanitary drains.
 - 3. Do not dispose of wastes into streams or waterways.
- B. Wet down dry materials and rubbish to lay dust and prevent blowing dust.
- C. Do not allow materials and rubbish to drop free or be thrown from upper floors, but remove by use of a material hoist or rubbish chutes.

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- D. Maintain the Site free from accumulations of waste, debris, and rubbish.
- E. Provide on-site containers for collection of waste materials and rubbish.
- F. At the end of each day, remove and legally dispose waste materials and rubbish from site.
- G. Disposal of materials shall be in compliance with all applicable laws, ordinances, codes, and by-laws.

1.03 FINAL CLEANING

- A. Prior to submitting a request to the Architect to certify Substantial Completion of the Work, the Contractor shall inspect all interior and exterior spaces 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, interior and exterior, 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 interior and exterior 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 and existing glass and plastic glazing (if any) throughout the building(s), on both sides. Clean plastic glazing in accordance with the manufacturer's directions. This cleaning shall be completed by qualified window cleaners at the expense of the Contractor just prior to acceptance of the Work.

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PHASE III RENOVATIONS TO THE
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- J. Wash and polish all mirrors.
- K. Repair, patch, and touch up marred surfaces to the specified finish, to match adjacent surfaces.
- L. Polish glossy surfaces to a clear shine.
- M. Do the final cleaning of resilient floors and wood floors as specified under the respective sections of the Specifications.
- N. Leave all architectural metals, hardware, and fixtures in undamaged, polished conditions.
- O. Leave pipe and duct spaces, plenums, furred spaces and the like clean of debris and decayable materials.
- P. 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 that may stain adjoining finish surfaces. Any damage to finishes caused by cleaning operations shall be repaired at the Contractor's expense.
- Q. Broom clean exposed concrete surfaces and paved surfaces. Rake clean other surfaces of grounds.
- R. Ventilating systems - Replace filters and clean ducts, blowers, and coils if units were operated during construction.
- S. Owner's responsibility for cleaning commences at Substantial Completion.

END OF SECTION

CLEANING UP
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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01700

PROJECT CLOSEOUT

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.
- E. Consult the individual sections of the specifications for specific items required under those sections.

1.02 OCCUPANCY PERMIT

- A. The Contractor shall coordinate the efforts of all Subcontractors and obtain the Occupancy Permit from the local Building Department. The Contractor shall pay any and all Building Department fees associated with the Occupancy Permit. Fees are not waived.

1.03 PARTIAL COMPLETION

- A. At the completion of Work the Contractor may notify the Architect that the Work is Partially Complete. The Architect, or a designee, shall conduct a review of the Work. If the building is actively occupied this review shall occur within 24 hours of any written request. The Architect shall prepare a punch list, setting forth in accurate detail any items and additional items that are not acceptable or incomplete. The Contractor shall coordinate all Subcontractors to achieve prompt completion of the punch list.

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- B. Prior to requesting Partial Completion the Contractor shall make a thorough inspection of the Work. During this inspection the Contractor shall prepare a comprehensive list of all items remaining to be completed or corrected. This list shall include all remaining Contractor and Subcontractor items to be provided under the Contract Documents.
- C. The Contractor shall not be relieved of the responsibility to provide Contract items left off the Architect's punch list.
- D. If the Architect determines that the Work is not Partially Complete, the Architect shall inform the Contractor of those items that must be completed before the Architect will prepare the punch list. Upon completion of those items, the Contractor shall again request the Architect to prepare a punch list.
- E. If the Contractor fails to request a review that Contractor will be responsible for the condition of the Work even if the building is occupied.
- F. The date of Substantial Completion for the entire contract and the start of all associated warranties shall not occur until all work is complete.
- G. The Architect shall prepare the Certificate of Substantial Completion in accordance with Article 9.6 of the General Conditions after the work is complete.
- H. Partial Payment of retainage shall not be made until at least 65 days after the effective date of the Certificate of Substantial Completion.

1.04 RECORD DRAWINGS

- A. Consult the individual sections of the Specifications for the specific requirements of those sections. In cases of inconsistency the more stringent requirement, as directed by the Architect, shall be required.
- B. Prior to final payment and completion, the Contractor shall provide all marked up As Built Drawings required under other sections of the Specifications.

1.05 OPERATING AND MAINTENANCE INSTRUCTIONS

- A. Consult the individual sections of the specifications for the specific requirements for those sections and for further details and descriptions of the requirements
- B. Prior to final payment and completion the Contractor shall provide all Operating Manuals and Maintenance Instructions as required by the Contract Documents.
- C. OPERATING INSTRUCTIONS AND MANUALS

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1. Subcontractors, installers, and suppliers shall furnish to the Contractor two sets of operating and maintenance instructions of all mechanical, electrical, and manually operated equipment furnished and installed by them. Mechanical and electrical Subcontractors shall furnish instructions as specified in their respective sections.
2. The Contractor shall collect all of the above instructions, bind them into two complete sets, and submit them to the Architect who will deliver them to the Owner.
3. Submission of operating and maintenance instructions shall be a condition precedent to final payment.

D. INSTRUCTION OF OWNER'S PERSONNEL

1. Where specified in the individual sections of the specifications, the Contractor and Subcontractor shall instruct the Owner's personnel at the site, in the use and maintenance of equipment installed under the Contract.
2. Submission to the Architect of a certificate of compliance to this requirement, signed by the Contractor and the Owner's Representative, shall be a condition precedent to final payment.

1.06 FINAL COMPLETION

A. RELATED REQUIREMENTS

The Contractor's attention is directed to Article 9.7 of the General Conditions.

END OF SECTION

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DIVISION 01000

GENERAL REQUIREMENTS

SECTION 01720

SURVEYS AND RECORD DRAWINGS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 RECORD DRAWINGS

- A. Record Drawings shall consist of all the Contract Drawings.
- B. From the sets of drawings furnished by the Owner, the Contractor shall reserve one set for record purposes. From this set, the Contractor shall detach and furnish, at no charge to the Mechanical and Electrical Subcontractors the drawings of their portion of the Work for the same purpose.
- C. The Contractor and the above Subcontractors shall keep their marked up As Built set on the site at all times and note on it in colored ink or pencil, neatly and accurately, at the end of each working day, the exact location of their work as actually installed. This shall include the location and dimensions of underground and concealed Work, and any architectural, mechanical, or electrical variations from the Contract Drawings. All changes, including those issued by Addendum, Change Order, or instructions by the Architect shall be recorded. Marked up As Built drawings shall be prepared for the entire project and include all Work, including but not limited to:

SURVEYS AND RECORD DRAWINGS
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1. The location of all underground utilities and appurtenances referenced to permanent surface improvements, both horizontally and vertically at ten (10) foot intervals and at all changes of direction.
 2. The location of all internal utilities and appurtenances, concealed by finish materials, including but not limited to valves, coils, dampers, vents, cleanouts, strainers, pipes, junction boxes, turning vanes, variable and constant volume boxes, ducts, traps, and maintenance devices.
 - a. The location of these items shall be shown by offsets to structure and drawing grid lines.
 - b. The tolerance for the actual location of these items on the marked up As Built Drawings shall be plus or minus two (2) inches.
 - c. Each item shall be referenced by showing a tag number, areas served, and function on the marked up As Built drawing
- D. The Architect may periodically inspect the marked up As Built drawings at the site. The proper and current maintenance of the information required on these drawings shall be a condition precedent to approval of the monthly applications for payment.
- E. At Substantial Completion the Contractor shall submit the complete set of marked up As-Built drawings to the Architect. The Contractor shall check all marked up As-Built drawings prepared by Subcontractors and certify in writing on the title sheet of the drawings that they are complete and correct, prior to submission to the Architect.
- F. The Architect shall review the marked up As Built drawings and verify by letter to the Owner that the Work is complete. The Architect shall incorporate all changes onto to original drawings.
- G. The Contractor may make a written request for copies of the completed Record Drawings. The Contractor shall reimburse the Owner directly for the cost of printing of any requested Record Drawings.
- H. Submission of accurate marked up As Built drawings and their approval by the Architect shall be a condition precedent to final payment.

END OF SECTION

DIVISION 02000

EXISTING CONDITIONS

SECTION 02070

SELECTIVE DEMOLITION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Selective Demolition Work required to complete the Work of the Contract including all the Selective Demolition Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Selective Demolition Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Selective Demolition Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Selective Demolition Work includes, but is not limited to:
 - 1. In general, the Contractor shall supply all material, equipment, temporary protection, tools and appliances necessary for the proper removal of selected construction materials for the completion of the Work required in

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- the Specifications, in accordance with good construction, and required by the materials manufacturer.
2. Supply all shoring and protection necessary to protect the occupants, building area, building systems, and landscape areas. All means and methods are the responsibility of the Contractor. The Contractor is solely responsible for safety on the job site.
 3. Extent of demolition as described on the drawings and in conjunction with all the new Work shown on the drawings. The Contractor is responsible for all demolition, disposal, and cleanup associated with the Work, whether or not shown on the plans or described herein required to complete the Work.
 4. All demolition not included in the File Sub-bidder's scope shall be performed by the General Bidder. General Bidder shall fully review all the File Sub-bid requirements to determine their scope.
 5. The Filed Sub-Bidders shall own the removal and disposal (including dumpsters) of any and all materials, finishes, systems and equipment in order to perform the work of the Filed Sub-Bid.
 6. Remove all hazardous materials noted in the spec to accomplish work in accordance with all local, state, and federal codes and regulations in advance of the work. Coordinate with all sub-contractors and File Sub-Bidders.
 7. Carefully sawcut and remove concrete slabs and associated fill in order to accomplish the work.
 8. Carefully sawcut and remove portions of the existing masonry to accomplish the work.
 9. Carefully remove all interior framing, walls, plaster, flooring, finishes, doors and frames, transoms, millwork, toilet partitions, chalkboards, tack boards, interior trim, wall mounted movie screens, pencil sharpeners, hand sanitizers, flags and poles, pull down window shades, vent grilles, and accessories noted and needed to accomplish the work.
 10. Glass and Glazing File Sub-Bidder, at the windows in the old portion of the building, shall carefully remove all the existing Lexan, gaskets, and balances in the outer window and install 1/4" thick glass, gaskets, and balances. (Note: There are 2 double hung windows in each opening. Only the outer window requires new glass and gaskets.) All operable windows in the old portion of the building shall receive new balances and

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all tracks shall be lubricated. At the windows in the new portion of the building, all tracks shall be lubricated.

11. Remove all existing vinyl composition tile (VCT) in all areas to receive new flooring except the first floor corridors which will remain in place.
12. Remove existing key cores at all doors to remain in the scope area for new master keying.
13. At removal of masonry for unit entrances, also remove existing plaster on metal lath and wood framing/blocking.
14. Carefully remove portions of existing fire protection system in order to accomplish the work by the Fire Protection File Sub-bidder.
15. Carefully remove portions of the existing plumbing system in order to accomplish the work by the Plumbing File Sub-bidder.
16. Carefully remove portions of existing heating and ventilation system in order to accomplish the work by the HVAC File Sub-bidder.
17. Carefully remove portions of existing electrical system in order to accomplish the work by the Electrical File Sub-bidder.

1.03 RELATED WORK

- A. The following items of related Work are specified and included in other Sections of the Specifications:
 1. Section 02200, Excavation and Backfill

1.04 QUALITY ASSURANCE

- A. Supervision:
 1. Engage and assign supervision of shoring and bracing Work to qualified personnel.
- B. Regulations:
 1. Comply with local codes and ordinances of governing authorities having jurisdiction.

1.05 SUBMITTALS

- A. Schedule:

SELECTIVE DEMOLITION 02070 - 3

1. Submit schedule indicating proposed methods and sequence of operations for Selective Demolition.
2. Include coordination for shut-off, capping, and continuation of utility services in scope area.

1.06 JOB CONDITIONS

A. Condition of Structures:

1. Owner assumes no responsibility for actual condition of items or structures to be demolished.
2. Conditions existing at time of commencement of Contract will be maintained by Owner insofar as practicable.

B. Protections:

1. Provide temporary barricades and other forms of protection to protect Owner's personnel and general public from injury due to selective demolition Work. Safety is the sole responsibility of the Contractor.
2. Provide protective measures to provide free and safe passage of Owner's personnel and general public to and from area of selective demolition.
3. Erect temporary covered passageways as required by authorities having jurisdiction.
4. Take measures to protect against windblown dust, obtain Owner's approval of means used for dust control.
5. Provide interior and exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structure or element to be demolished, and adjacent facilities or Work to remain.
6. Protect from damage existing finish Work that is to remain in place and becomes exposed during demolition operations.
7. Protect adjacent materials and finishes with suitable coverings when necessary including, but not limited to, automobiles in parking lot adjacent to building which will remain in use during Work to be performed.
8. Remove protections at completion of Work.

- ##### C. Damages: Promptly repair damages caused to building or property, including cars, by demolition Work at no cost to Owner.

SELECTIVE DEMOLITION 02070 - 4

D. Traffic:

1. Conduct Selective Demolition operations and debris removal in a manner to ensure minimum interference with roads, streets, walks, and other adjacent occupied or used facilities.
2. Do not close, block, or otherwise obstruct streets, walks, parking lot, or other occupied or used facilities without written permission from the authorities having jurisdiction.
3. Provide alternate routes around closed or obstructed traffic ways if required by governing regulations.

E. Utility services:

1. Maintain existing utilities, keep in service, and protect against damage during demolition operations.
2. Do not interrupt existing utilities service occupied or used facilities, except when authorized in writing by authorities having jurisdiction. Provide 48 hours notice if service must be interrupted.
3. Provide temporary services during interruptions to existing utilities, as acceptable to governing authorities.

F. Environmental Controls:

1. Comply with governing regulations pertaining to environmental protection.
2. Do not use water when it may create hazardous or objectionable conditions such as ice, flooding, and pollution.

PART 2 – PRODUCTS – NOT USED

PART 3 – EXECUTION

3.01 INSPECTION

- A. Before start of Selective Demolition Work, inspect areas in which Work will be performed.

3.02 PREPARATION

A. Structure Safety:

1. Provide exterior shoring, bracing, or support to prevent movement, settlement, or collapse of structures to be demolished and adjacent facilities to remain.
2. Cease operations and notify the Owner's Representative immediately if safety of structure appears to be endangered.
3. Take precautions to support structure until determination is made for continuing operations.

B. Shoring and Bracing

1. If shoring and bracing is required, locate the system to clear permanent construction and to permit the completion of the Work.
2. Provide shoring and bracing system adequately anchored and braced to resist natural forces.
3. No shoring and bracing system shall remain at the completion of the Work.

3.03 DEMOLITION

A. General:

1. Perform Demolition Work in a systematic manner.
2. Use such methods as required to complete Work indicated on Drawings in accordance with Demolition Schedule and governing regulations.
3. If unanticipated mechanical, electrical, or structural elements which conflict with intended function or design are encountered, investigate and measure both nature and extent of the conflict with Consultant.

B. Disposal of Demolished Materials:

1. Remove debris, rubbish, and other materials resulting from demolition operations from site.
2. Transport and legally dispose of materials off site.
3. If hazardous materials are encountered during demolition operations, comply with applicable regulations, laws, and ordinances concerning

SELECTIVE DEMOLITION

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removal, handling, and protection against exposure or environmental pollution. Present receipts from certified waste disposal firms confirming hazardous waste disposal.

4. Burning of removed materials is not permitted on project site.

3.04 CLEANING AND REPAIR

- A. On completion of demolition Work, remove tools, equipment, and demolished materials from site. Remove debris on a daily basis.
- B. Remove protection and leave areas broom clean.
- C. Repair demolition performed in excess of that required.
- D. Repair adjacent construction or surfaces soiled or damaged by selective demolition Work.

END OF SECTION

DIVISION 02000

SUBSURFACE INVESTIGATION & DEMOLITION

SECTION 02080

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 01000 - 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 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 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 Division of Occupational Safety (DOS), 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 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 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.

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- 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 Owner has retained ATC Associates Inc. as the Environmental Consultant for the purpose of Project Management during Asbestos Abatement.
- H. For the purpose of this Section, "*Consultant*" shall refer to ATC Associates Inc., who will act as designated, authorized representatives of the Owner for the purpose of inspecting, monitoring, and testing.

1.02 SUMMARY OF WORK

- A. The following is the Scope of Work, at a minimum, required to be performed associated with the renovation of the former Nathaniel Banks Elementary School, 948 Main Street, Waltham, MA under the base bid. Additional work may also be performed if approved by Owner according to the Unit Prices, as described in this Section and elsewhere in this Specification.
- B. All Asbestos Abatement work under this Section shall be performed by a contractor holding a current Massachusetts DOS Asbestos Abatement Contractor's license. Contractor shall furnish all labor, worker training, materials, equipment, and services for the complete and proper removal and disposal of asbestos-containing materials.
 - 1. Removal and disposal of all specified asbestos-containing materials (ACM) and specified non-ACM materials as identified herein. This shall include all asbestos-containing pipe/pipe fitting insulation, floor tile and associated black mastic, sheet flooring and associated mastic, black-coated sinks, internal boiler components, and specified non-ACM where necessary to access asbestos, such as non-asbestos containing flooring. Removal of asbestos-containing flooring materials will include all floor tiles and associated mastic, any asbestos-contaminated flooring paper, contaminated plywood sub-floor, leveling compound, and contaminated hardwood floors.
 - 2. Work area preparations, including pre-cleaning, installation of critical barriers and polyethylene sheeting, construction of decontamination facilities, work area enclosures, sealing, isolation, and other activities as directed by the Owner or Consultant.

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3. Installation and operation of HEPA filtration units sufficient to achieve a minimum of four air changes per hour in each containment, and according to the provisions as set forth in this Section.
4. Protection on non-ACM materials and equipment inside of work areas with two layers of polyethylene sheeting.
5. Removal and proper disposal of all asbestos-containing pipe/pipe fitting insulation. Removal will be completed in accordance with Section 3.02 of this Section. The Glove Bag Removal Method, as specified in Section 3.03, may be used at the direction of the Consultant.
6. Removal and proper disposal of all asbestos-containing pipe/pipe fitting insulation in the crawl space. Removal to include a minimum of 3” of soil/dirt, all contaminated fiberglass insulation and all debris throughout the crawl space in accordance with Section 3.02 of this Section.
7. Removal and disposal of all asbestos-containing floor tile, sheet flooring and associated mastic, as specified in accordance with Section 3.02. Alternative methods, such as that specified in Section 3.04, may be used at the direction of the Consultant. Removal and disposal of all non-asbestos-containing materials (e.g., carpeting) to access the floor tile, including but not limited to all existing plywood sub floor. [Refer to Section 1.13 for additional considerations]. Removal of all asbestos-containing and asbestos-contaminated flooring materials will also include all layers of floor tiles, sheet flooring and associated mastic, flooring paper, leveling compound, and all hardwood floors (noted to be removed or to perform the work) until all asbestos-containing and asbestos-contaminated materials have been removed.
8. Removal of asbestos-containing coated sinks and internal boiler components. All work performed shall be as required by the Section 3.02.
9. Furnishing of all labor, materials, equipment, and services required for all work included under the provisions of this Section.
10. Compliance with all applicable federal, state, and local regulations, as well as all provisions set forth within this Section, and facility requirements.
11. Decontamination and clean up following removal activities in each designated work area. Clean up to include all visible debris from all surfaces present in the work areas.
12. 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.

PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

13. Provide temporary electrical wiring and services as required for asbestos removal according to the Provisions as set forth in this Section.
 14. 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.
- C. Base Bid: The following is the approximate location and quantities of asbestos-containing materials to be removed, under the Base Bid, in accordance with the provisions set forth in this Section:

FORMER NATHANIEL BANKS ELEMENTARY SCHOOL WALTHAM, MA		
Location	Asbestos-Containing Material	Estimated Quantity
First Floor	Pipe Insulation	1,795 ln ft
	Pipe fitting insulation on fiberglass line	44 each
	12"x 12" tan floor tile and associated black mastic	1,500 sq ft
	Pebble style sheet flooring and associated black mastic	300 sq ft
	9"x 9" green floor tile	100 sq ft
Second Floor	Pipe fitting insulation on fiberglass line	4 each
	12"x 12" tan floor tile and associated black mastic	100 sq ft
	12"x 12" tan/brown streak floor tile	100 sq ft
	9"x 9" green floor tile	100 sq ft
	Pipe Insulation (assumed concealed inside walls)	100 sq ft
Third Floor	12"x 12" tan floor tile and associated black mastic	800 sq ft
	12"x 12" tan/multicolor fleck floor tile	450 sq ft

1.03 SEQUENCE OF WORK

- A. The following is a typical sequence of work that 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. Contractor shall post all required signage.
 2. Contractor shall secure area from unauthorized access.
 3. Owner/Contractor will remove all movable objects from the work area.
 4. Contractor shall pre-clean the work area and cover all immovable objects and objects not removed from the work area with two (2) layers of six (6)-

**ASBESTOS ABATEMENT
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mil polyethylene sheeting, sealed airtight with duct tape. Contractor shall install critical barriers at all points of access required by regulations.

5. Contractor shall seal all rooms that do not contain ACM with two layers of six-mil polyethylene sheeting sealed airtight with duct tape.
6. Contractor shall install HEPA filtration units sufficient to achieve a minimum of four (4) air changes per hour. All units shall exhaust to the outside of the building through windows.
7. Contractor shall prepare the specified Work Area for total isolation, VAT and mastic removal, glove bag removal, internal boiler component removal and coated sink removal as described in this Section. Preparation shall include two (2) layers of six (6)-mil polyethylene sheeting, sealed with duct tape, on all floors (if applicable) and non impervious surfaces, including all interior walls.
8. Contractor shall construct decontamination unit, and any other construction needed to complete the work area to the satisfaction of Consultant.
9. Consultant shall inspect and approve all work area preparations before permitting Contractor to begin removal work.
10. Contractor shall construct demising barriers according to the Provisions as set forth in this Section, as deemed necessary and at the direction of the Consultant, if ceiling and wall voids are accessed during abatement activities.
11. Contractor shall remove and dispose all asbestos-containing materials as required by these Sections.
12. Contractor shall decontaminate and clean up each work area upon completion of removal. Clean up shall include the removal of all loose and peeling paint from various surfaces throughout the work area and all paint chips/debris. Clean up of the work area will include the removal of all visible dust and debris from all surfaces in the work area.
13. Consultant shall perform a final visual inspection to assure that no visible debris exist in the work area, including loose and peeling paint or paint chips. Contractor shall re-clean the work areas as needed until they pass a visual inspection by Consultant.
14. Contractor shall encapsulate all surfaces in the work area from which ACM was removed.

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15. Consultant will perform final air clearance testing in each work area. Satisfactory results are required before containment may be removed.
16. Contractor shall remove all work area barriers, equipment, polyethylene sheeting, etc. and clean any areas to the satisfaction of Consultant and Owner.

1.04 RELATED WORK SPECIFIED ELSEWHERE

- A. Related work specified elsewhere: Examine all Drawings and all other Sections of the Specification for requirements of related sections affecting the work of this Section, including but not limited to:
 1. 02070 – Selective Demolition.
 2. 02081 – Other Hazardous Material Abatement Protocol.
 3. 02090 – Lead Paint Considerations
- B. The work of this section shall be performed as stated herein. In performing the work of this Section, the Contractor shall refer to other Divisions for additional procedures. The Contractor is responsible for the coordination of the work of this section with other related work.

1.05 ESTIMATES

- A. Section 1.02 represents a brief description of the estimated quantities of asbestos and 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.
- B. The quantities and location of ACM and the extent of work included in this section are only best estimates, which are limited by the physical constraints imposed by occupancy of the buildings. Accordingly, minor variations of plus or minus 15% of the estimated quantities of ACM within the limits of containment for each abatement stage are considered as having no impact on the price of this contract. 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. Additional or reduced abatement work beyond the variations stated will be a basis for adjustment of the contract price according to the Unit Price schedule as set forth in this Specification.

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1.06 COORDINATION AND PHASING OF WORK

- A. Contractor 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 Contractor shall ensure compliance with all requirements.
- B. Contractors work schedule must be coordinated with, and acceptable to the General Contractor and approved by the Owner. Contractor shall work continuously and diligently in each work area on the days and during the hours indicated on their work schedule
- C. Contractor shall cooperate fully with other Contractors at the facility.
- D. Contractor 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.

1.07 SUBMITTALS

A. Pre-Construction Meeting

The 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 Contractor 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-Job 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-JOB SUBMITTALS

The Contractor is required to provide one copy of the following Pre-Job Submittals at the Pre-construction Conference:

1. Copies of all notifications, permits, applications, personnel licenses and like documents required by Federal, State, or local regulations obtained or submitted in proper fashion,
2. List of employees to be used on this project.
3. 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,
4. Record of successful respiratory fit test performed by a Competent person (as defined by OSHA) within the previous 6 months, as required elsewhere in the documents for each employee to be used on this project,
5. Certificate of Insurance,
6. Proposed respiratory program for employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used,
7. Written description of all procedures, methods, or equipment to be utilized by the Contractor that differ from the Contract Sections, including manufacturers Sections on any equipment not specified for use by the Contract Sections,
8. Proposed electrical safeguards to be implemented, including but not limited to location of transformers, GFCI outlets, lighting, etc., necessary to safely perform the job, including a description of an electrical hazards safety plan for common practices in the work area,
9. A list of all equipment to be used on site, by make and model, including negative pressure equipment, HEPA vacuums, Water Atomizing Devices, etc.,
10. Chain of Command of responsibility at work site including supervisors, foreman, and competent person, their names, resumes and certificates of training,
11. 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,

12. Contractor's testing lab, AIHA PAT proficiency, and Certification in the State where work site is located,
13. Schedule of values breaking down the work in sufficient detail so as to serve as the basis for payment, with disposal costs listed as a separate item.

C. Post-Construction Submittals

The Contractor 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.

1.08 REFERENCE STANDARDS, REGULATIONS AND CODES

A. All work shall be performed strictly according to the Sections contained herein and with the regulations cited in this Article. The Contractor undertaking asbestos abatement work and persons in their employ shall comply with and be bound to requirements of the following Federal, State, and Local standards, regulations and codes. These standards and codes shall be by reference made part of this Section and shall be complied with. Whenever regulations are conflicting, the more stringent regulation will prevail.

1. US Department of Labor; Occupational Safety and Health Act of 1970. (Particular attention is drawn to the Asbestos Regulations: CFR Title 29, Part 1910, Sec. 1910.1001 and Part 1926, Sec. 1926.1101, and the Respirator Regulations; CFR Title 29, Part 1910, Sec. 1910.134 and the Hazard Communication Program, CFR Title 29, Part 1910.1200).
2. US Environmental Protection Agency, CFR, Title 40, Part 61, Subparts A and M, National Emission Standards for Hazardous Air Pollutants;

Asbestos NESHAP Revision; Final Rule, Dated Tuesday, November 20, 1990.

3. US Environmental Protection Agency; TSCA Title II, Asbestos Hazard and Emergency Response Act (AHERA), 40 CFR Part 763 Subpart E - "Asbestos-Containing Materials in Schools" and also 40 CFR, Part 763, Subpart G - "Worker Protection Rule".
 4. US Department of Transportation regulations, 49 CFR Parts 172 and 173.
 5. All Commonwealth of Massachusetts laws, regulations and standards, including the regulations 453 CMR 6.00 "The Removal, Containment or Encapsulation of Asbestos" and 310 CMR 7.15 "Asbestos", 18.00 and 19.00 and MGL Chapter 21E.
 6. Other Federal, State and local statutes, ordinances, regulations, or rules pertaining to this Section and the work described herein, including the storage, transportation and disposal of asbestos.
- B. All regulations by these and other governing agencies in their most recent version are applicable. These Sections refer to many requirements found in these references, but in no way intend to cite or reiterate all provisions therein or elsewhere. It is the contractor's responsibility to know, understand, and abide by all such regulations and common practices. Other provisions contained in these references may from time to time during the execution of this contract be enforced by the Owner at his own discretion.

1.09 REGULATORY SUBMITTALS

- A. The Contractor 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.
- B. The Contractor shall notify the following agencies in appropriate manner and place of impending work, and shall provide evidence of notifications at the pre-construction conference:
 1. U.S. Environmental Protection Agency,
J. F. Kennedy Federal Building
Boston, Massachusetts 02203
(10 working days in advance)
 2. Massachusetts Department of Environmental Protection
Division of Air and Hazardous Materials

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(10 working days in advance)
Send Notification to:
Commonwealth of Massachusetts
Asbestos Program
P.O. Box 120087
Boston, Massachusetts 02112-0087

3. Massachusetts Division of Occupational Safety
Asbestos Control Unit
(10 working days in advance)
4. Waltham Fire Department, Waltham Public Health Commission
Environmental Health Office, and other state or city agencies as required
by law or ordinance.

1.10 PROJECT CONDITIONS

- 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, including full face piece powered air-purifying respirators, to the Consultants, who are licensed and certified, to visit the Work Areas to maintain and adjust building services.
- 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 Contractor'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 Contractor is responsible for providing alternative sources, the cost of which is to be included in bid price. The use of the Facility's 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,

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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 on this contract. These sheets shall be made available to the Consultant for review.
- H. No storage of waste will be permitted onsite. All ACM shall be removed off-site at the end of each shift except that limited storage space may be provided by the Owner at the facility. Contractor will supply any additional temporary storage as needed. All materials and equipment are to be kept in orderly fashion in designated areas, free and clear of halls and doorways, and in conformance with all regulations, codes, and in consideration of building usage.

1.11 RESPIRATORS AND PROTECTIVE CLOTHING

- A. Personal protection, in the form of disposable Tyvek suits, and NIOSH approved respirators, are required for mechanics, contractor supervision, Consultant and visitors at the work site during the set-up, removal, and cleaning operations. Contractor shall provide all this protective equipment for workers, Consultant, and authorized personnel to access this work site.
- B. Each worker shall be supplied with a minimum of two complete disposable uniforms everyday. Removal workers shall not be limited to two uniforms, and the Contractor will be required to supply additional uniforms as is necessary. Under no circumstances will anyone entering the removal area be allowed to reuse a contaminated uniform.
- C. Work clothes shall consist of disposable full body suits, head covers, gloves, footwear, and eye protection.
- D. The Contractor shall supply workers and supervisory personnel with NIOSH approved protective respirators and HEPA/filters. Appropriate respirator selection shall be determined by the daily personnel samples being taken and strictly follow the guidelines set forth in the OSHA respiratory program 29 CFR 1910.134 and the Massachusetts DOS Regulations 453 CMR 6.00. The respirators shall be sanitized and maintained according to the manufacturer's Sections. Appropriate respirators shall be selected using the information provided in OSHA Title 29 CFR Part 1910.1926 Final Rules. This determination has been made for this project. PAPR's shall be supplied by the contractor for all personnel associated with this work. Disposable respirators shall not be considered acceptable in any circumstance. The Contractor will maintain on site

a sufficient supply of disposable HEPA/filters to allow workers and supervisory personnel to change contaminated filters at least three (3) times daily. The Contractor is solely responsible for means and methods used and for compliance with applicable regulations.

- E. Respirators shall be individually assigned to removal workers for their exclusive use. All respiratory protection shall be provided to workers in accordance with the written submitted respiratory protection program, which includes all items in OSHA 29 CFR 1910.134 (b) (1-11). A copy of this program shall be kept at the work-site, and shall be posted in the Clean Room of the Decontamination Unit.
- F. Workers must perform negative and positive pressure fit tests each time a respirator is put on, whenever the respirator design so permits. Powered air purifying respirators shall be tested for adequate flow as specified by the manufacturer.
- G. Workers shall be given a qualitative fit test in accordance with procedures detailed in the OSHA Lead Standard (29 CFR 1910.1025, Appendix D, Qualitative Fit Test Protocols) for all respirators to be used on this abatement project. An appropriately administered quantitative fit test may be substituted for the qualitative fit test.
- H. Upon leaving the active work area, pre-filters shall be discarded, cartridges removed, and respirators cleaned in disinfectant solution and clean water rinse. Clean respirators shall be stored in plastic bags when not in use. The contractor shall inspect respirators daily for broken, missing, or damaged parts.
- I. Contractor shall provide daily personal sampling to check personal exposure levels for the purpose of establishing respiratory protection needs. Samples shall be taken for the duration of the work shift or for eight hours, whichever is less. Personal samples need not be taken every day after the first day if working conditions remain invariant, but must be taken every time there is a change in the removal operation, either in terms of the location or the type of work. Sampling will be to determine eight-hour Time-Weighted-Averages (TWA). The contractor is responsible for personal sampling as outlined in OSHA Standard 1926.1001.
- J. Sampling personnel shall be proficient in the taking of air samples under NIOSH 7400, and must be supervised by an individual who has completed the training course NIOSH 582 or equivalent.
- K. Air sampling results shall be available at the job site in written form no more than twenty-four (24) hours after the completion of a sampling cycle. The document shall list each sample's result, sampling time and date, person monitored, flow rate, sample duration, microscope field area, number of fibers per fields counted, cassette size and analysts name and company. Air sample analysis results will be reported in fibers per cubic centimeter.

1.12 WATER AND ELECTRICAL SERVICE

- A. The Contractor shall provide temporary connections to existing building utilities and provide temporary facilities as required and necessary to carry out the work.
- B. The Contractor shall provide temporary connections to building water service and provide all lines necessary for distribution of water.
- C. Comply with applicable NEMA, NECA and UL standards and governing regulations for materials and layout of temporary electrical service. All power connections and panel work is to be performed by a licensed electrician.
- D. The Contractor shall provide temporary service connections from power sources as required. All existing power service to the work area will be isolated and shut down for the duration of the project. Contractor shall provide service (sub-panel) with a minimum of 100 amp, two-pole circuit breaker or fused disconnect. Sub-panel and disconnect shall be sized and equipped to accommodate all electrical equipment required for completion. Contractor's electricians will make all necessary connections to main power system.
- E. Provide I.D. warning signs at power outlets that are other than 110-120 volt power. Provide polarized outlets for plug-in type outlets, to prevent insertion of 110-120 volt plugs into higher voltage outlets.
- F. Provide all receptacle outlets equipped with ground fault circuit interrupters (GFCI) and reset button for plug-in connection of equipment.
- G. The Contractor must supply temporary lighting for all lighting requirements within contained areas. All existing lighting shall be isolated and shut down.

1.13 SPECIAL CONSIDERATIONS

- A. Final Air Clearance Tests
 - 1. All final air tests will be performed in accordance with Massachusetts Division of Occupational Safety (DOS) regulations at 453 CMR 6.00, this Section, and other applicable Rulings (i.e., AHERA). The first set of final clearance air tests for each removal area will be paid for by Owner. In the event that these air tests do not pass the clearance criteria, any subsequent air tests that need to be performed shall be paid for by Contractor. All additional sampling costs will be automatically deducted from the contract price until the areas in question pass the final air clearance criteria of less than 0.010 fibers per cubic centimeter for PCM clearance testing or an average of 70 structures per square millimeter for TEM clearance testing.

B. Exceptions to Work Area Preparation Requirements

1. In accordance with 453 CMR 6.14 (2) (a) (7), it will not be required to cover impervious surfaces of walls or floors with two (2) layers of polyethylene sheeting. Examples of such surfaces that may be considered to be impervious include concrete floors without any cracks or fissures and glazed walls, i.e., painted brick walls. (Note: Wooden surfaces and surfaces constructed of stone/cement are not considered impervious). If Contractor wishes to utilize this exception, Contractor shall be required to state on their DOS notification forms that they do not intend to use two (2) layer of polyethylene sheeting for these particular surfaces. If the DOS does not permit this exception, Contractor shall be required to use two (2) layers of polyethylene sheeting in full accordance with the work area preparation requirements of this Section, and will not be entitled to any additional monies of payment.

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. Sealer: All surfaces from which asbestos-containing materials have been removed shall be sealed with a colored-asbestos sealer, mixed and applied in accordance with manufacturer's instructions. The proposed brand and product shall be submitted to the Consultant for approval.
- D. 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
- E. Encapsulant: a bridging encapsulant such as Childer's Product Co., Chilcare CP215 bridging encasement/encapsulant; Barrier Systems Inc., Slaytex Asbestos Encasement System; CRSI/ISP Guardian Bridging encapsulant; IPC Serpiflex

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shield encapsulant; or equivalent shall be used. The proposed brand and product shall be submitted to the Consultant for approval.

- F. Plaster impregnated glass-fiber cloth.
- G. Mastic Remover - Sentinel 747, or approved equal.

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 Contractor 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 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, pipes, duct work, insulation, light fixtures, public address speakers, sprinklers, and heat and smoke sensors. Contractor shall provide protection of these items and materials as part of the work area preparation. Where asbestos abatement activity causes damage, the Contractor 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 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 Contractor shall construct and maintain suitable critical barriers within the building to separate work areas from 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 hallways, doorways, grille openings, or other open entrances to the 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 Contractor 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 Contractor 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 ACM LOCATION PREPARATION AND REMOVAL

A. Preparation

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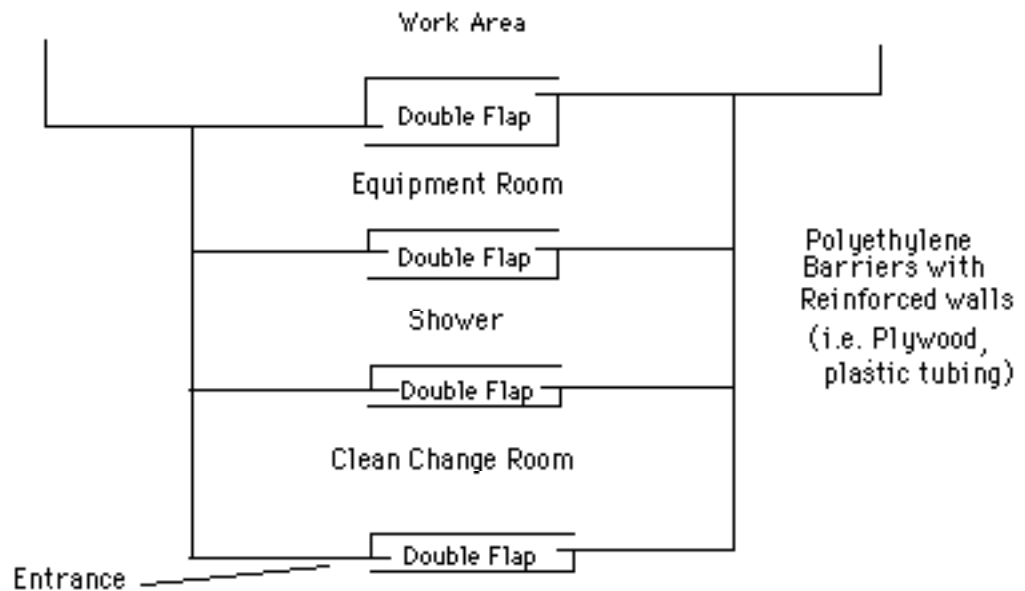
1. Primary Barriers: Prior to construction of the asbestos removal area, all primary barriers shall be sealed with a minimum of one layer of six (6) mil plastic sheeting and duct tape. Primary barriers consist of all windows, vents, closed and locked doors, and openings to adjacent spaces from the work area. HVAC systems shall be sealed, where applicable, as described previously with two layers of 6 mil polyethylene sheeting.
2. Critical Barriers: Critical barriers consist of the boundaries of the work area including floors, walls, and any constructed barrier to restrict public access to the work area. Floors, if applicable, shall be sealed with a minimum of two layers of six (6) mil polyethylene sheeting. There shall be a minimum overlap of two feet (24") at the floor seams and the sheeting will run a minimum of two feet (24") up the walls.
3. The containment walls shall be constructed using a minimum of two layers of six mil. polyethylene sheeting after sealing the floors. This shall be done using a minimum of one layer of six mil. polyethylene sheeting. Overlaps between the walls and floors shall be interwoven.
4. The first floor layer shall be taped up the wall a minimum of two feet (24"). The first wall layer shall be sealed to the floor layer at the corner of the floor and wall. The second floor layer shall be sealed to the first wall layer at a minimum of a two foot (24") overlap. The second wall layer shall cover all overlaps and be sealed to the floor.
5. The enclosure shall be constructed so as to allow the removal of interior layers of plastic without damaging the exterior layer. The exterior layer shall stay intact for the duration of the project and be designated the critical barrier.

B. Decontamination Unit and Procedures

1. It is the Contractor's responsibility to provide decontamination chambers 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 6 mil polyethylene sheeting acting as an airlock. This shall be designed to minimize fiber migration and air flow 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. A Decontamination Unit will be required for each separate containment area, if work is to be divided into sections.

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 Contractor 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 contractor shall provide space in the clean room for the worker's personal clothing. This may be in the form of hangers or lockers.

TYPICAL DECONTAMINATION UNIT



5. The above decontamination enclosure is called a "three-stage" decontamination enclosure and shall be the type constructed and used for this project in specified areas. A "two stage" unit resembles the "three-stage" unit in construction detail, but it is built without a shower section.

C. HEPA Filtration: Adequate negative pressure shall be provided within the enclosure as specified below.

1. After the work area is totally isolated, and prior to commencement of work, the Consultant will perform a visual inspection of the work area. This will consist of checking the integrity of barriers including smoke testing the containment if deemed necessary by Consultant. This does not in any way relieve the Contractor's responsibilities to ensure the isolation of the work area. The volume of air within the contained work area shall be changed a minimum of four (4) times per hour. A pressure differential reading of 0.02 inches of water shall be maintained in the negative pressure work area relative to adjacent areas. Equipment used for producing a negative pressure work area shall have a filtering device that is at least 99.97% efficient at a 0.3 micron pore size. Filters meeting these standards are referred to as High Efficiency Particulate Air (HEPA) filters.
2. The HEPA filtration units shall be equipped with the following:
 - a. Magnehelic gauge to monitor the unit's air pressure difference across the filters and be able to interpret magnehelic reading to cubic feet per minute (CPM).

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- b. An affixed label, clearly marked and conspicuous, showing the most recent installation date and hour reading of the primary internal HEPA
 - c. A clock to record the unit's operation time.
 - d. Automatic shut off for filter failure or absence.
 - e. Audible alarm for unit shutdown.
 - f. Amber flashing warning light for filter loading.
 - g. The unit must be equipped with a safety system which prevents it from being operated with the HEPA filter in an improper orientation.
 - h. All flexible ducting, vent tubing, adapter plates and other equipment used for the passage of filtered air shall be undamaged, uncontaminated, and free of air leaks at all points.
- 3. Pre-filters shall be changed frequently during the removal.
 - 4. Air movement will flow uninterrupted from outside the work area through the Decontamination Unit into the work area. There shall be no other openings for air to enter the containment unless approved by the Consultant in writing.
 - 5. HEPA filtration units shall be placed as far as possible from the air intake to the containment to prevent short-cycling of fresh air.
 - 6. This containment, along with the decontamination chamber, shall constitute the critical containment of the work area from the surrounding areas. All openings to this critical containment are to be sealed except where air must enter the work-site due to the use of exhaust equipment. Unless approved by the Owner, air shall enter the critical containment only through the Decontamination Unit.
 - 7. 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 for review before they can be used for work on this project.

D. ACM Removal

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1. Asbestos removal will not begin until the Consultant has given authorization to proceed. This authorization will be given after the removal area has passed a visual inspection by the Consultant based on the criteria presented herein.
2. All asbestos-containing material must be soaked with amended water before removal. The material shall be sufficiently saturated to reduce fiber release so that the airborne fiber concentration does not exceed the established OSHA Permissible Exposure Limits, (PEL's). The amended water shall not be applied in amounts that will cause leakage or runoff of contaminated water from the removal area. Dry removal will not be permitted during this project.
3. Asbestos-containing material shall be carefully removed and placed immediately into bags. Bags must be filled with water to the point where all asbestos is adequately wetted as defined by Federal Regulations 40 CFR 61 Subpart M. Asbestos will not be permitted to let fall or sit on the ground before being bagged.
4. Fine cleaning of residual asbestos-containing material shall consist of carefully scraping or brushing the material from surfaces. The recommended method for brushing a substrate after gross removal has taken place is to use a nylon brush. Wetting of the substrate shall also occur while this brushing is performed, since the chance of airborne fiber generation during fine cleaning still exists.
5. Water Atomizing Devices, commonly termed "mistlers," shall be utilized by the contractor during asbestos removal and fine cleaning phases to provide further dust control protection in the work area. The mistlers shall be supplied with amended water and in operation continuously during these phases.
6. Asbestos waste must be double bagged before it is removed from the contained area. The inner bag will be HEPA vacuumed and showered before being placed in the outer bag. Vacuuming must take place in the Equipment Room of the Decontamination Unit. Washing must take place in the Shower Room of the Decontamination Unit. Bags will normally be removed at the end of each working day and transported from the job site.
7. Any materials considered contaminated by the Owner or the Owner's representative that cannot be double bagged shall be wetted and containerized in disposal drums. Oversized contaminated materials (e.g., plywood subfloor, hardwood floors) shall be wrapped airtight in two layers of 6 mil polyethylene sheeting.

8. All bags, containers or wrapped materials transported out of the work area shall be labeled with preprinted labels required by Federal EPA, OSHA and the Department of Transportation regulations. Any carts used to transport asbestos waste to the on-site holding dumpster should be HEPA vacuumed and wet wiped each day, and may be inspected by the Owner or Consultant every day.
9. Carts that are not made of an impermeable material shall be lined with a minimum of one layer of 6 mil polyethylene sheeting to be removed after each shift and disposed of as contaminated waste. The transport route and the transport of waste out of the work area shall be coordinated with the on site Owner's representative.
10. The work area shall be cleaned of residual asbestos debris on a daily basis. The Decontamination Unit floor (top layer) shall be picked up and replaced on a daily basis, if required by Consultant.
11. Air testing will be performed continuously outside the enclosed area. If fiber concentrations exceed 0.010 fibers/cc or background levels, work shall stop and the Contractor shall perform clean up activities in the affected areas and check the integrity of the critical barriers. Clean up activities shall include but not be limited to wet wiping and vacuuming surfaces with a HEPA equipped vacuum. Work may continue only after the source of contamination is identified, corrected and proper cleaning activities are implemented. Air testing will be performed by the Consultant on site in the affected areas. If the results of these air tests are not below 0.010 fibers/cc, the Contractor shall perform a thorough decontamination of the affected areas.
12. After brushing and scraping, surfaces shall be free of visible debris and fibers. A final wipe-down of the substrate with wet, lint-free rags shall take place in order to ensure proper cleaning. All surfaces including floors, walls, and ceilings shall also be HEPA vacuumed clean. All visible asbestos-containing material is to be removed by the Contractor before encapsulation procedures are allowed to begin. The Consultant will perform an inspection of the work area prior to giving approval to begin encapsulation of work area. Removal substrate must be clean and bare, and the entire work area must be free and clear of any suspect material for the contractor to pass this visual inspection and begin encapsulation.
13. Where insulated substrates penetrate walls or other demising structures, remove asbestos through to the opposite side of the demising structure. After the removal of the asbestos materials at the demising structures, any resulting spaces or breeches shall be foamed or sealed airtight.

E. Removal of Critical Barriers

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

F. Encapsulation Procedures

1. The polyethylene barriers shall be cleaned of gross contamination before a lock-down sealant can be applied to the substrate. After the substrate has been cleaned and all polyethylene barriers of the work area are cleaned of all visible debris, the Contractor shall request a visual inspection of the work area by the Consultant. Prior to the inspection of the work area, the Contractor shall remove the inside layer of the work area polyethylene sheeting, after cleaning, and dispose of it as contaminated waste. The work area will still have all primary barriers intact and one layer of polyethylene sheeting over floor, walls, and permanent structures within the work area during the inspection.
2. Workers performing lock-down must wear disposable protective clothing and respirators suitable for asbestos. The encapsulation process shall not be treated any differently from the removal process in this respect.
3. The lock-down material shall be applied with a low pressure (less than 500 p.s.i.), airless spray-type mechanism.
4. All surfaces in the work area will be encapsulated. A minimum of one coat of lock-down encapsulant will be applied to prevent the generation of airborne residual fibers. The lock-down encapsulant will be applied to both the substrate and the polyethylene sheeting serving as the containment barrier. During the encapsulation process, the Contractor shall decrease the negative pressure of the work area by shutting down some of the air filtration devices in the work area. If the lock-down material is being applied to irregular, grooved, or corrugated surfaces, it shall be administered from the opposing side, or at a right angle to the

direction of the previous application. The encapsulant shall be left to dry before the commencement of final air testing. After final air clearance and inspection criteria have been met, the Contractor shall begin final take-down procedures.

3.03 GLOVE BAG REMOVAL METHOD

- A. Removal of asbestos containing pipe and pipe fitting insulation shall be in accordance with the following procedure:
1. Glove bags may be used as a method of asbestos removal as an alternative to total isolation removal or in conjunction with total isolation removal in areas identified in the scope of work for pipe insulation removal, but only if the area will be unoccupied during all Phases of abatement. Several restrictions, which apply to the use of glove bags for asbestos removal purposes, may be found at OSHA Regulations 29 CFR 1926.1101.
 2. Contractor shall set up a containment barrier around the immediate area of glove bag removal. This containment is to consist of two layers of six (6)-mil polyethylene sheeting walls and a two layer six-mil polyethylene sheeting floor forming a fully enclosed "cocoon"-like work area enclosure.
 3. As an alternative to the "cocoon" enclosure described above, Contractor is permitted to erect a containment enclosure where all openings, windows, vents, and doors in the work area are sealed with two layers of six-mil polyethylene sheeting and duct tape. In addition, walls adjacent to the piping, floor surfaces below the piping, and any object in the work area shall be covered with two layers of six-mil polyethylene sheeting.
 4. In either case, the containment area surrounding the glove bag area shall be under adequate negative pressure to achieve a minimum of four air changes per hour. Criteria for filtering and exhausting the work area shall be the same as in the total isolation method for removal.
 5. Pipes and fittings where glove bags are to be used must be no warmer than 150°F, as the glove bag material may melt or stick to the pipes.
 6. All workers must wear full protective suits and respirators during all Phases of glove bag work, including preparation, removal, clean up, and encapsulation.
 7. Preparation of the area will include a minimum double-stage decontamination unit at the entrance to the contained area, equipped with a HEPA vacuum for personal decontamination, in accordance with OSHA 1926.1101, Appendix G. Glove bags will be placed on pipes or fittings

and securely taped with tools enclosed. Bags will not have any holes, which might allow air to escape during removal. Bags will be checked with smoke tubes provided by Contractor. A HEPA vacuum will be inserted through the appropriate hole in the bag along with the nozzle for the water sprayer containing amended water. When such preparations are completed, approval of the Consultant will be obtained for each glove bag work area before removal begins.

8. It is recommended that removal be performed by two-person teams. One will support the vacuum and assist with wetting the material in the bag while the other does the actual cutting of the material. Once the material is removed and the pipes are clean and bare, the material in the bag will be thoroughly wetted down and forced to the bottom of the bag. All air in the bag will be vacuumed out, and the bottom portion of the bag where all the asbestos must be will be twisted around before separating the bag from the pipe. Bags will then be immediately placed in another labeled bag for disposal purposes. Glove bags are not permitted to be left in the work area for any length of time after the removal.
9. All surfaces in the glove bag area will then be wet-wiped and HEPA-vacuumed. Clean up shall include all loose and peeling paint and paint chips/debris from the glove bag work area. Polyethylene sheeting used to protect the immediate area will be discarded as asbestos waste. Enclosure barriers will be left up until results of clearance air samples (if taken) are acceptable. Contractor will encapsulate the pipes and fittings for Consultant inspection.
10. Lock-down must be done with a pre-approved encapsulant, after the pipe is essentially dry. Workers performing lock-down must wear disposable protective clothing and suitable respirators. The lock-down material shall be applied with a low pressure (less than 500 psi), airless, spray-type mechanism or be hand-applied. A minimum of one coat of lock-down encapsulant will be applied. The lock-down encapsulant will be applied to both the substrate and the polyethylene sheeting, if in place. If the lock-down material is being applied to irregular, grooved, or corrugated surfaces, it should be administered from the opposing side, or at a right angle to the direction of the previous application.
11. Personal samples, containment area samples taken during glove bag operations, and/or final clearance air samples must not exceed 0.010 fibers/cc or above background levels. If this occurs, the area inside the containment must be thoroughly cleaned and encapsulated. Clearance air samples will then be taken with acceptance criteria of 0.010 f/cc required before the enclosure can be dismantled.

12. Glove bag work areas will be post-tested in the same manner and with the same acceptance criteria as specified for total isolation removal, i.e., 0.010 f/cc.

3.04 VAT/FLOOR COVERING AND ASSOCIATED MASTIC REMOVAL METHOD

- A. Removal of vinyl asbestos floor tiles (VAT)/floor covering and associated asbestos-containing mastic, including removal of any asbestos-contaminated materials, including, but not limited to, additional layers of floor tiles and mastic, flooring paper, contaminated plywood sub-floor, leveling compound, and contaminated hardwood floors shall be in accordance with all applicable regulations including Part II, Department of Labor – Occupational Safety and Health Administration, 29 CFR Parts 1910, et. al., dated Wednesday, August 10, 1994. At a minimum, the following work practices shall apply:
 1. Workers shall wear protective clothing and half-mask, dual-cartridge, HEPA-filtered respirator, at a minimum.
 2. The work area shall be isolated as required by regulations and to the satisfaction of the Consultant. As a minimum, critical barriers, a negative pressure system, and a personal decontamination facility shall be erected in accordance with Section 3.02 of this Section. All areas where VAT/floor covering and mastic are to be removed shall be sealed off by the use of polyethylene sheeting on all openings and HEPA filtered negative pressure shall be established in each work area sufficient to achieve four air changes per hour.
 3. VAT/floor covering and mastic shall be wet prior to removal and during removal.
 4. Each tile shall be removed as a complete unit, with no breakage, wherever possible. Contractor shall remove any carpeting prior to removal of asbestos-containing flooring materials. It is the intention of the asbestos abatement scope of work to remove all layers of ACM flooring materials as well as any asbestos-contaminated materials down to the base substrate.
 5. The exposed floor will be cleaned with a HEPA vacuum cleaner and wet-scraped. Repeat the process until the floor area is clean and smooth.
 6. Grinding of mastic is not permitted unless work is being performed under the 'Total Isolation Method'.
 7. Any chemicals to be used for removal of the mastic must be approved by the Consultant, Owner and General Contractor prior to being used.

8. Dispose of VAT/floor covering/mastic in a DEP-approved landfill, that legally accepts this type of waste.

3.05 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 zone 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 Contractor) shall be left in the Dirty Room of the Decontamination Unit until the completion of work in that area.
 4. All persons leaving the removal area must shower before leaving the containment.
 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.

3.06 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 Contractor shall provide proof that disposal sites for the waste materials have current and valid permits to dump asbestos waste at the time of the pre-construction meeting.
- C. Receipts shall be obtained by the Contractor 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. Labels must be conspicuous and legible and contain the following warning:

**CONTAINS ASBESTOS FIBERS
AVOID CREATING DUST
CANCER AND LUNG DISEASE HAZARD**

- E. The Contractor shall be responsible for all necessary precautions to prevent pollution by spilling during the performance of services and shall assume full responsibility for all Contractor-caused spills, which shall be cleaned up at the Contractor's expense.
- F. Temporary storage of asbestos waste on-site must be approved by the Owner.

3.07 HOUSEKEEPING

- A. Throughout the work period, the Contractor 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 days use.
 - 4. The Contractor shall retain all stored items in an orderly arrangement allowing maximum access, not impeding traffic, and providing the required protection materials.
 - 5. The Contractor shall not allow the accumulation of scrap, debris, waste material, and other items not required for completion of the work.

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6. The Contractor shall provide adequate storage for all items awaiting removal from the job site, observing all requirements for fire protection and protection of the ecology.
7. Daily, and more often if necessary, the Contractor shall inspect the work areas and adjoining spaces, and pick up all scrap, debris, and waste material. Remove all such items to the place designated for their storage.
8. The Contractor shall maintain the site in a neat and orderly condition at all times.

3.08 AIR MONITORING

- A. Background (pre-testing) air and appropriate dust samples may be taken to represent conditions before the Contractor starts masking and sealing operations.
- B. During removal, area samples will be collected by the Consultant (Owner's Representative) outside major openings in the containment: in the clean room, at other critical points outside the work areas, just outside the clean room, inside the contained work sites, and at HEPA exhaust locations. Contractor shall be responsible for all OSHA personal sampling.
- C. Final clearance air samples will be collected inside the contained removal work area after all visual inspection criteria is met and the area is free and clear of any suspect material and debris. The insulation substrate, if any, must be clean and bare. The work area should be clear of any debris including loose and peeling paint from various surfaces and paint chips/debris from inside the work area.
 1. Air will be agitated by means of a small leaf blower prior to the test, and kept agitated by means of a small electric fan. The results of all samples must be less than 0.010 fibers per cubic centimeter (f/cc) for PCM analysis or less than an average of 70 structures per square millimeter for TEM analysis to be in compliance with clearance criteria as described in this Section, Massachusetts Division of Occupational Safety regulations. The first set of final clearance air tests for each removal area will be paid by the Owner. In the event that these air tests do not pass the clearance criteria, any subsequent air tests that need to be performed shall be paid for by the Contractor. If the Contractor fails to meet the criterion, the Contractor will be required to re-clean the designated work site and then the Consultant (Owner's Representative) to repeat the final air clearance testing. Cleaning and testing will be repeated until the specified criterion is met.

3.09 WORK REVIEW

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- A. Consultant will review Contractor's work practices prior to the start of and during all asbestos related work and will report any Section violations to the Contractor. If the Contractor 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 Contractor Site Supervisor has given approval. Outside containment airborne fiber concentrations must not exceed 0.010 fibers/cc or pre-abatement levels, whichever is greater. If concentrations exceed this level, then work must be stopped, conditions reviewed as to the probable cause, and then corrected. A description of procedures regarding fiber concentrations greater than 0.010 fibers/cc outside the containment can be found above.
- B. Consultant will keep a daily log of Contractor's work practices and will make these daily logs a part of the final project documents.
- C. In addition to various daily inspections of containment 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 Contractor and performed by Consultant, to the satisfaction of the Consultant, and be signed off by the Consultant, before work is to continue on to the next task in the phase. Failure on the part of the Contractor to obtain sign-off before proceeding is regarded as a serious violation of the contract and unacceptable.

END OF SECTION

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DIVISION 02000

EXISTING CONDITIONS

SECTION 02081 OTHER HAZARDOUS MATERIAL ABATEMENT PROTOCOL

PART 1 - GENERAL

1.01 DESCRIPTION - GENERAL

- A. This Section specifies all labor, materials, tools and equipment necessary for the transportation and disposal of oil and hazardous materials (OHM) described in this section and located on all floors and areas within and on the exterior of the former Banks School building at 948 Main Street, Waltham, Massachusetts (“the Site”) that is scheduled for renovation.
- B. The winning bidder of this Project ("Contractor") shall be responsible for the characterization, handling, transportation and disposal/reuse/recycling of OHM, including, but not limited to, containerized materials, specified under this contract.
- C. This Section does not cover the removal or disposal of asbestos-containing materials, lead-based paint, or above-ground storage tanks (ASTs). The removal and disposal of these materials shall be conducted in accordance with the Asbestos Remediation Protocol, Lead Paint Remediation Protocol, and AST Removal Protocol, respectively.
- D. The Contractor is responsible, subject to review by the Owner and Consultant, or Owner's or Consultant's subcontractor, to completely characterize the OHM in accordance with disposal facility requirements and all applicable laws and regulations and to dispose of the materials in a safe and legal manner.
- E. The Contractor is encouraged to recycle/reuse materials where appropriate in lieu of disposal if the material is of acceptable physical quality and chemical quality, and the Contractor can identify a facility willing and permitted to accept the material.
- F. The Contractor shall conduct all work in accordance with a Health and Safety Plan (HASP) developed by the Contractor in accordance with Occupational Safety and Health Administration (OSHA) regulations and any other applicable federal, state, or local regulations.

1.02 DESCRIPTION - DETAILED

- A. Work covered by this Section consists of furnishing all labor, equipment, materials, and services to remove and dispose of potential OHM, with the exception of asbestos-containing materials, lead-based paint, and ASTs, encountered during renovation of the Site building. All floors and areas of the Site building, including the exterior, are covered by this Section.

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- B. A preliminary inspection of the Site, conducted in August 2010, revealed the presence of:
1. Fluorescent light ballasts.
 2. Fluorescent light bulbs.
 3. High-intensity discharge (HID) bulbs.
 4. Potential mercury switches/thermometers.
 5. Refrigerators and drinking water fountains containing refrigerant.
 6. Motors containing lubricating oils.
 7. Fire extinguishers.
 8. Microwave ovens and other white goods.
 9. Televisions/computer monitors.
 10. Computers/printers/scanners and other electronic goods.
 11. Cleaning products, maintenance chemicals, and paint, in <1-gallon, 1-gallon, and 5-gallon containers.
 12. Rechargeable batteries.
 13. Hydraulic oil reservoir (N.I.C.)

Note that this list of items does not include asbestos-containing materials, lead-based paint, or ASTs. The items (above) identified in the preliminary inspection include those listed in the report entitled Limited Hazardous Materials Inspection, Former Nathaniel Banks Elementary School, 948 Main Street, Waltham, Massachusetts, dated September 1, 2010 (the "Survey Report"). The summary list of the Survey Report is attached to this Bid specification.

- C. As noted, additional materials may be present at the facility in areas inaccessible during the preliminary inspection, or that were moved into, out of, or within the Site building since the time of the preliminary inspection. It shall be the Contractor's responsibility to identify all OHM (except asbestos, lead-based paint, and ASTs) to their satisfaction in the Site building for purposes of determining project costs, prior to submittal of a bid.

1.03 DEFINITIONS

- A. Oil or Hazardous Materials (OHM)

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1. Material defined as OHM in accordance with 310 CMR 40.0000 and 310 CMR 30.00.
- B. RCRA/State-Regulated Hazardous Waste
1. OHM defined as a RCRA characteristic or listed hazardous waste in accordance with 40 CFR 261; and/or
 2. OHM defined as a hazardous waste in accordance with 310 CMR 30.00 and/or 310 CMR 30.100 et seq.
- C. TSCA Regulated Waste
1. OHM which exceeds the TSCA criteria for PCBs as defined in 40 CFR 761 Subpart D.
- D. RCRA/TSCA Regulated Waste
1. OHM which meets the requirements as both a RCRA hazardous waste and a TSCA regulated waste as defined above.

1.04 QUALITY ASSURANCE

- A. General: The Contractor shall conform to all applicable requirements, ordinances, codes, regulations, policies and/or laws, including but not limited to those of:
1. The Department of Environmental Protection (DEP) of the Commonwealth of Massachusetts.
 2. The General Laws of the Commonwealth of Massachusetts (MGL).
 3. The U.S. Environmental Protection Agency (USEPA).
 4. The Occupational Safety and Health Administration (OSHA) with special emphasis on 1926.65/1910.120 Hazardous Waste Operations and Emergency Response.
 5. The local Fire Department regulations.
 6. The U.S. Department of Transportation (DOT).
- B. Manifests/Bills of Lading
1. A uniform hazardous waste manifest, bill of lading, or other applicable documentation is required for the removal from the premises, and disposal, of all items included in this Section. The Contractor shall obtain and prepare all such documents. The Contractor shall provide the Owner and the Consultant with a copy of the manifest(s), bills of lading, and any

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other shipping documents at least 5 business days prior to transport of the material from the Site. **The disposal manifests, bills of lading and any other shipping documents will be reviewed and authorized, and signed by the Owner.**

2. Each manifest, bill of lading, as well as all other documentation required herein, shall be clearly and distinctly marked with the contract number and removal and disposal order number as applicable. If blocks are not provided, the contract and removal and disposal order information shall be placed in the upper right hand corner of each document.
3. Each manifest, bill of lading, or other applicable documentation, shall note the truck registration number, state of registration, name of driver, and date of removal of material from the Site.
4. The cost of preparation and processing of the manifests, bills of lading, and other applicable documents shall be included in the bid amount.

C. Inspection:

1. All services shall be subject to inspection by the Owner or its authorized representatives. The Owner shall have the right, but not the duty, to inspect and obtain copies of all written licenses, training records, permits, and approvals issued by any entity or agency to the Contractor or its subcontractors which are applicable to the performance of services under this contract; to inspect and test, at its own expense, transportation vehicles or vessels, containers, and disposal facilities provided by the Contractor; and to inspect the handling, loading, transportation, storage and disposal operations conducted by the Contractor in the performance of this contract.
2. The Owner and/or Consultant shall have the right to inspect and obtain duplicates of all samples collected by the Contractor. If requested by the Owner or the Consultant, the Contractor shall collect and supply these samples to the Consultant for analyses by a laboratory selected by the Owner and/or Consultant.
3. The Owner and its representative shall be afforded free access to any facility used by the Contractor in performing services under this contract.
4. The Contractor is solely and exclusively responsible for the quality of all services performed under this contract. The Owner's right to conduct inspections at Contractor's facilities does not relieve the Contractor of this responsibility. Neither the Owner's, nor their authorized representatives', failure to make such inspection, nor failure to discover nonconforming services, will impose any liability on the Owner or their authorized

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representatives, nor shall it prejudice the rights of the Owner thereafter to reject services, and shall not relieve the Contractor of its obligation to perform work strictly in accordance with the contract and applicable local, state and federal regulations.

5. The Contractor, in its agreement with subcontractors, shall ensure that the inspection rights described herein are afforded to the Owner by each subcontractor performing services under this contract.
6. If any of the services do not conform to contract requirements, the Owner will require the Contractor to perform the services again at no additional cost to the Owner. When the defects in services cannot be corrected by re-performance, the Owner may (1) require the Contractor to take necessary action to ensure that future performance conforms to contract requirements, and (2) reduce the contract price to reflect the reduced value of the services performed.

1.05 SUBMITTALS

The Contractor shall provide the following submittals:

- A. The Contractor shall be responsible for obtaining any necessary licenses and permits and for complying with any applicable federal, state and local laws, codes, policies and regulations in connection with the performance of this work. The Contractor shall provide a copy of all such permits and licenses to the Consultant at least 3 business days prior to the start of work on this contract. Applicable permits pertaining to disposal facilities to be utilized shall also be provided at this time.
- B. The Contractor shall submit to the Consultant all analytical results including chain of custody records within 5 business days of receipt and at a minimum 3 business days prior to off-Site transportation and disposal of the items included in this Section. In addition, the Contractor shall submit to the Consultant summary tables of all analytical results and identify how the material shall be classified for disposal.
- C. The Contractor shall submit to the Consultant, for Owner review, approval, and signature, completed copies of all waste profiles, applications and questionnaires, prior to forwarding them to the party requiring these documents.
- D. The Contractor shall submit to the Consultant for approval a Work Plan including all pertinent information relating to the removal and transportation of OHM from the Site, within 15 business days after issuance of the Notice to Proceed and at least 3 business days prior to the start of Work. The Work Plan, at a minimum, shall include:

1. The name(s), address(es), and contact information of Subcontractors retained for Work of this Section.
 2. A detailed description of Work activities and progress schedule for each phase of the Work associated with the removal, transportation, and disposal of OHM.
 3. A statement of compliance, and evidence of said compliance, with applicable federal, state, regional, and local regulations covering such work.
 4. Name(s), address(es), and contact(s) of hazardous materials transporter(s) that the Contractor plans to use to transport OHM from the Site to a TSD facility, including EPA identification number (where applicable) and proof of permit, license, or authorization to transport OHM in all affected states.
 5. Name(s), address(es), and contact(s) of TSD facility(s) that the Contractor plans to use to accept OHM from the Site, including nature of storage/disposal of OHM, and documentation that the facility(s) will accept the designated materials from the Site.
 6. List(s) matching each TSD facility with the OHM it will accept from the Site, including, but not limited to, those items identified in Paragraph 1.02B.
- E. The Contractor shall complete any manifests, bills of lading or other documents required to transport and dispose of the items identified in this Section. The Contractor shall submit the completed forms to the Consultant for Owner review and signature. After confirmation that the transport/disposal documents have been properly completed, the Owner will sign and date the forms as generator. The Contractor shall not transport or dispose of any materials until authorized by the Owner. Completed copies of all manifests, bills of lading and other applicable documents and certified scale weight receipts or certified liquid quantity measurements, as applicable, must be furnished to the Owner as attachments to all invoices. The Contractor shall also be responsible for processing and distributing, as necessary, the completed manifests, bills of lading or other applicable documentation, as required by local, state and federal regulations.
- F. The Contractor shall prepare and submit, to the Owner, a report that summarizes and documents the removal and disposal of all OHM which left the Site. The report shall be a prerequisite for payment. At a minimum the report shall include the name of each disposal facility, a summary of materials disposed of at each facility, and a copy of the manifest, bill of lading, and/or other applicable documentation for each load.

1.06 WASTE AUDIT

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- A. A preliminary inspection was conducted in August 2010 to identify OHM in the Site building addressed in this Section. The results of this inspection indicated various materials within and on the exterior of the Site building which at a minimum need to be removed and disposed of as part of this contract. The summary list of the Survey Report is attached to this Bid specification. The Contractor shall be aware that other materials might be required to be removed and disposed in order to complete the obligations of this contract.
- B. The Contractor is responsible for determining if such information is valuable in completing the work. The Contractor is responsible for field verifying the presence or absence of the materials outlined in the Survey Report summary list prior to bidding on this project. No basis for claim shall result from the Contractor's failure to completely identify and/or characterize any OHM/hazardous waste.
- C. The Contractor shall be responsible for all labor and costs associated with OHM characterization, sampling and analysis.

1.07 REGULATORY REQUIREMENTS

- A. The Work of this Section shall be performed in accordance with all applicable federal, state, and local regulations, laws, codes, and ordinances governing the removal, handling, transportation, and disposal of materials managed under this contract.
- B. The Contractor shall obtain all federal, state and local permits required for the removal, handling, transport and disposal of materials managed under this contract. The Contractor shall adhere to all permit requirements.
 - 1. The Contractor shall document that the disposal facilities proposed have all certifications and permits as required by federal, state and local regulatory agencies to receive and dispose of the material managed under this contract.
- C. The following regulations are cited for the information and guidance of the Contractor. The list below is not all-inclusive; the Contractor shall be responsible for a thorough knowledge and full implementation of all requirements for removal, transportation, and disposal of the OHM found in the Site buildings.

State: Code of Massachusetts Regulations (CMR)

- 1. Hazardous Waste Regulations, 310 CMR 30.000 – Massachusetts Department of Environmental Protection (MADEP)
- 2. Requirements Governing Waste Oil and Used Oil Fuel, 310 CMR 30.259 – MADEP

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3. Universal Waste Management Standards, 310 CMR 30.1000 – MADEP
4. Solid Waste Management Facility Regulations, 310 CMR 19.000 – MADEP
5. Site Assignment Regulations for Solid Waste Facilities, 310 CMR 16.00 – MADEP
6. Origin and/or Hazardous Constituents, DEP Policy No. HW-93-01
7. Rubbish Handling Regulations, 527 CMR 34.00 - Massachusetts Department of Fire Services (MADFS)
8. Transportation of Flammable and Combustible Liquids, 527 CMR 8.00 – MADFS
9. Dust, Odor, Construction, and Demolition Standards, 310 CMR 7.09 – MADEP
10. Noise Standards, 310 CMR 7.10 – MADEP
11. Waste Disposal Ban Regulation, 310 CMR 19.017 – MADEP

Federal: Code of Federal Regulations (CFR)

1. Hazardous Waste Management Regulations, 40 CFR 260-267 - U.S. Environmental Protection Agency (USEPA)
2. Universal Waste Management Standards, 40 CFR 273 – USEPA
3. Standards for the Management of Specific Hazardous Wastes, 40 CFR 266, USEPA
4. Hazardous Waste Operations and Emergency Response Standard, 29 CFR 1910.120 - U.S. Occupational Safety and Health Administration (OSHA)
5. Polychlorinated Biphenyls (PCBs) Manufacturing, Processing, Distribution in Commerce, And Use Prohibition, 40 CFR 761 – USEPA
6. Hazardous Materials Regulations Relating to Transportation, 49 CFR 171-180 – U.S. Department of Transportation (U.S. DOT)
7. Recycling and Emissions Reduction of Refrigerants, 40 CFR 82 - Subpart F – USEPA
8. Management of Used Oil Standards, 40 CFR 279 – USEPA

PART 2 – PRODUCTS

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2.01 GENERAL

- A. The Contractor shall provide all personnel with personal protective equipment (PPE), protective clothing, and monitoring equipment consistent with the levels of protection required for each type of work. The Contractor is responsible for determining the required level of PPE for any work associated with this contract.
- B. The Contractor shall provide granular absorbent such as Speedy-Dry or approved equal, and any other emergency spill response equipment as may be necessary to complete the work outlined in this specification.
- C. The Contractor shall provide all drums, overpack drums, storage containers, recovery cylinders, packing materials, and related products and materials required for collecting, storing, and transporting OHM in compliance with Massachusetts Department of Environmental Protection (DEP), U.S. EPA, and U.S. Department of Transportation (DOT) requirements. All drums shall meet the requirements of DOT 49 CFR 173.
- D. The Contractor shall provide all monitoring devices, equipment, and containers necessary to collect, sample, drain, evacuate, flush, handle, secure, remove, transport, and dispose of all OHM at the Site.
- E. The Contractor shall provide all materials, products, and equipment necessary to bulk, shred, sort, flush, dilute, or otherwise prepare OHM for disposal at approved facilities.
- F. The Contractor shall provide all materials for temporary containment areas including but not limited to berms, containment pads, impervious barriers, and absorbent materials.

PART 3 – EXECUTION

3.01 GENERAL

- A. The Contractor shall prepare a summary of analytical data as part of the document package. The applicable transportation and disposal documents shall be prepared by the Contractor and submitted to Owner and Consultant at least three business days prior to planned shipment of the materials. The Contractor should note that the applicable documents may be subject to applicable local, state and federal agency review and approval. The Consultant or designated representative shall review all manifests, bills of lading, and other applicable documentation on behalf of the Owner. **The Owner will be the generator and will sign all manifests, bills of lading, and other applicable documentation as required.**
- B. Utilization of a hazardous waste manifest shall require the use of a licensed hazardous material transporter in conformance with the Massachusetts Hazardous Material Regulations as required by 310 CMR 30.000. A Licensed Site

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Professional Opinion (310 CMR 40.0000) is not required when using a hazardous waste manifest when transporting contaminated materials.

- C. All Work shall be performed in a manner as to prevent any spills and leaks.
- D. In the event that Work is being conducted in the vicinity of floor drains or openings in the floor, berms or other barriers shall be constructed to prevent the release of OHM to the sanitary sewer system or subsurface at the Site.
- E. The Contractor shall ensure that all required permits are obtained and in place including those required of any subcontractor, prepare all manifests and certifications, and deliver all copies of completed manifests and final certifications and certification of destruction to the Consultant in the form of one complete disposal document.

3.02 CHARACTERIZATION OF WASTES

- A. The Contractor shall be responsible for all labor and costs associated with waste characterization, sampling and analysis, where necessary for particular waste streams.
- B. The Contractor is responsible to ensure that materials are characterized to meet disposal facility requirements.
- C. The Contractor shall be required to submit a copy of all analytical results to the Consultant within 5 business days of receipt and at least 3 business days prior to transportation off-Site of OHM.
- D. If requested by the Owner or the Consultant, the Contractor shall, at the time of sample collection, provide duplicate samples for analysis by a laboratory selected by the Owner.
- E. In the event that there are discrepancies between the Contractor's and Owner's lab, the Contractor shall have their lab check and verify their results and provide all laboratory analytical backup.
- F. If the Contractor and the Owner cannot agree on the correct laboratory analytical results, the Contractor shall collect and resubmit samples to its lab for analysis at no additional cost to the Owner.
- G. Sampling of material shall be done by the Contractor at sufficient and adequately distributed locations so that the concentrations of the chemical constituents are adequately characterized.

3.03 MATERIAL-SPECIFIC PROCEDURES

- A. BALLAST REMOVAL

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1. All light fixture ballasts and capacitors shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. Prior to removal of any ballasts, the Contractor shall uncover and inspect the label on the ballasts. All ballasts designated as "No PCBs" shall be marked with green paint. All other ballasts and capacitors, unless it can be proven that they were manufactured after 1998, shall be assumed to contain PCBs and shall be marked with red paint. Similar color-coding shall be used for the receiving drums.
3. Removal shall be performed using approved methods and tools that will minimize damage to the fluorescent lamp and ensure a quick, neat removal with the ballast or capacitor intact and undamaged.
4. Once removed, the ballasts and capacitors shall be placed in red or green color-coded 55-gallon drums.
5. Once filled, the 55-gallon drums shall be closed and properly labeled for transport and disposal.

**B. FLUORESCENT AND HIGH INTENSITY DISCHARGE (HID) BULB
REMOVAL**

1. All fluorescent and HID light bulbs shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. Removal shall be performed using approved methods and tools that will minimize damage to the fluorescent and HID lamps and leave the bulbs intact and undamaged.
3. Contractor shall remove all fluorescent light bulbs and/or high intensity discharge (HID) lamps, intact, prior to renovation/demolition activities, and dispose of all light bulbs as mercury or lead waste in accordance with all applicable state and federal regulations.
4. Once removed, the fluorescent and HID light bulbs shall be placed in appropriate containers for transport to a disposal facility.
5. Once filled, the appropriate containers shall be closed and properly labeled for transport and disposal.

C. REFRIGERANT

1. Items containing refrigerant include, but are not limited to, refrigerators and drinking water fountains.
2. Unless contents are clearly labeled, perform analytical testing to identify

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the refrigerant, as necessary.

3. Discharge gases into appropriate DOT approved container vessels, and label for transport and disposal. Decontaminate all systems as necessary by means of steam cleaning, triple rinsing with a cleaning fluid, or both, to remove all residual contamination. Collect and drum all decontamination fluids into approved containers. Label containers for transport and disposal.
4. All activities associated with the removal and reclamation of refrigerant gases shall be in accordance with Section 608 of the federal Clean Air Acts Amendment of 1991.

D. MACHINERY FLUIDS

1. Drain and collect liquids from all equipment containing lubricating oils, hydraulic oils, or other types of fluids. This equipment includes, but is not limited to, motors, air compressors, fans, pumps and lifts.
2. Once removed, the machinery fluids shall be placed in appropriate containers for transport to a disposal facility.
3. Once filled, the appropriate containers shall be closed and properly labeled for transport and disposal.
4. Decontaminate all systems as necessary by means of steam cleaning, triple rinsing with a cleaning fluid, or both, to remove all residual contamination. Collect and drum all decontamination fluids into approved containers. Label containers for transport and disposal.
5. Label decontamination drum/container for transport and disposal.

E. CONTAINERIZED FLUIDS/MATERIALS

1. All containerized fluids/materials such as paint, cleaning fluids, janitorial supplies, and building maintenance chemicals shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. The containerized fluids/materials shall be properly lab-packed in 55-gallon drums or other appropriate containers. The containerized fluids/materials shall be properly characterized and segregated according to chemical type to prevent adverse reactions between chemicals if a spill/release were to occur within the drum.
3. Once filled, the 55-gallon drums/containers shall be closed and properly labeled for transport and disposal.

F. MERCURY THERMOSTATS, THERMOMETERS, AND SWITCHES

1. All mercury thermostats and switches, if any are identified at the Site building, shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. Contractor shall remove all mercury thermostats and switches intact, prior to renovation/demolition activities, and dispose of all mercury thermostats and switches as mercury waste in accordance with all applicable state and federal regulations
3. Removal shall be performed using approved methods and tools that will minimize damage to the thermostat or other fixture of which it is a part and leave the mercury switch intact and undamaged.
4. Once removed, the mercury switches shall be properly containerized.
5. Once filled, the appropriate containers shall be closed and properly labeled for transport and disposal.

G. FIRE EXTINGUISHERS

1. All fire extinguishers shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. Contractor shall remove all fire extinguishers intact, prior to renovation/demolition activities, and dispose of all fire extinguishers in accordance with all applicable state and federal regulations.
3. Once removed, the fire extinguishers shall be properly containerized or secured, as necessary.
4. Once filled, the appropriate containers (if applicable) shall be closed and properly labeled for transport and disposal.

H. ELECTRICAL WHITEGOODS

1. All electrical whitegoods, including but not limited to computers, printers, computer monitors, and televisions shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
2. Removal shall be performed using approved methods and tools that will minimize damage to the equipment.
3. Once removed, the equipment shall be properly containerized or secured, as necessary.

4. Once filled, the appropriate containers (if applicable) shall be closed and properly labeled for transport and disposal.

I. RECHARGEABLE BATTERIES

1. All rechargeable and automotive batteries shall be removed intact prior to renovation/demolition activities using appropriate techniques and personal protection gear as detailed in the submittals.
2. Once removed, the rechargeable and automotive batteries shall be properly containerized or secured, as necessary.
3. Once filled, the appropriate containers (if applicable) shall be closed and properly labeled for transport and disposal in accordance with all applicable state and federal regulations.

J. OTHER MISCELLANEOUS OHM

1. Any other miscellaneous OHM in the Site building shall be properly identified and characterized. These miscellaneous materials may include items listed in Section 1.02 of this bid specification, or otherwise located within or on the exterior of the Site building.
2. Other miscellaneous OHM shall be removed using appropriate techniques and personal protection gear as detailed in the submittals.
3. Removal of other miscellaneous OHM shall be performed using approved methods and tools that will minimize damage to the fixture of which it is a part.
4. Once removed, the other miscellaneous OHM shall be properly containerized or secured, as necessary.
5. Once filled, the appropriate containers (if applicable) shall be closed and properly labeled for transport and disposal.

3.04 STORAGE OF MATERIALS

- A. Once removed, materials shall be stored on-Site for no more than 30 calendar days. At the conclusion of each day's work, drums or other containers containing OHM shall be stored in a designated secure location until they are removed for transport and disposal.

3.05 WASTE PROFILES AND MANIFESTS/BILLS OF LADING

- A. The EPA RCRA ID No. for the Site will be provided to the Contractor by the Owner prior to the start of project activities.

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- B. The Contractor shall be responsible for preparing and submitting to the Consultant for review all waste profile applications and questionnaires, and coordination with disposal facilities and all federal and state Environmental Agencies, as applicable. The Contractor shall provide the Consultant with completed copies of all waste profile applications and questionnaires for review at least 5 business days prior to transportation off-Site. The Contractor shall not transport any material off-Site until the submitted paperwork is authorized by the Owner.
- C. The Contractor shall be responsible for preparing all OHM manifests, bills of lading and any other applicable paperwork with all applicable analytical backup, notification, and control forms. The Contractor shall be responsible for coordination with the disposal facilities.
- D. The Contractor shall provide certified tare and gross weight slips or certified liquid volume measurements for each load received at the designated facility, which shall be attached to each completed manifest and/or bill of lading. The completed manifest and/or bill of lading, with supporting documentation, shall be submitted to the Owner or Consultant.
- E. **The Owner will be designated as generator and will sign all manifests and waste profile applications or questionnaires.** The Contractor's Licensed Site Professional is responsible for stamping and signing all Massachusetts Bills of Lading, if any.
- F. The Contractor shall furnish all generator copies of the OHM manifests to the Owner. The Contractor shall submit copies to the applicable local, state and federal authorities, as required by regulations.
- G. The Contractor shall submit to the Owner and the Consultant, prior to receiving progress payment, documentation certifying that all materials were transported to, accepted, and disposed of, at the selected disposal facility. The Consultant or Owner's representative shall review all manifests, bills of lading, and other applicable documentation on behalf of the Owner. The documentation shall include, at a minimum, the following:
 - 1. Documentation shall be provided for each load from the Site to the disposal facility, including all manifests and any other transfer documentation as applicable.
 - 2. Certified tare and gross weight slips and/or certified liquid quantity measurements for each load, as applicable.

3.06 TRANSPORT OF CONTAMINATED MATERIAL

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- A. The Contractor shall not be permitted to transport contaminated materials off-Site until all disposal or recycling facility documentation has been received, reviewed, and accepted by the Owner.
- B. The Contractor shall transport contaminated materials from the Site to the disposal or recycling facility in accordance with all DOT, USEPA, OSHA, and MADEP regulations and any other applicable regulations.
- C. The Transporter(s) shall be licensed in all states affected by transport.
- D. The Contractor shall coordinate the schedule for truck arrivals and departures at the disposal Site to meet the approved schedule.
- E. The Contractor shall not deliver waste to any facility other than the disposal facility(ies) listed on the shipping manifest, bills of lading, and/or other applicable approved documentation.
- F. The Contractor shall be responsible for inspecting the access routes for road conditions, overhead clearance, and weight restrictions, and shall provide traffic control when needed.
- G. The Contractor shall provide to the Consultant copies of all weight slips (both tare and gross) and certified liquid quantity measurements, for every load disposed of at the accepted disposal facility. The Owner shall only make progress payments upon receipt of this documentation.

3.07 OFF-SITE DISPOSAL

- A. The Contractor shall be responsible for the disposal of contaminated materials at licensed disposal/recycling facilities in accordance with all federal, state and local regulations, laws, codes, policies or requirements.
- B. The Contractor shall identify within 15 business days of receiving the Notice to Proceed and at least 5 business days prior to the transportation of any items off-Site, the storage, disposal, and recovery facility(ies) which they intend to use for this project, along with a list matching the items to be disposed with the selected facility.
- C. The Contractor shall be responsible for acceptance of the specific material at an approved treatment, disposal, or recovery facility, for ensuring that the facility is properly permitted to accept the stated material, and that the facility provides the stated treatment and/or disposal services.
- D. All hazardous wastes, as defined, shall be disposed of at a RCRA or RCRA/TSCA permitted facility as appropriate.

- E. The Owner reserves the right to contact and visit the disposal facilities and regulatory agencies to verify their agreement to accept the stated material and to verify any other information provided. This does not in any way relieve the Contractor of any responsibilities under this contract.
- F. In the event that the identified and approved facility(ies) ceases to accept the stated materials or the facility(ies) ceases operations, it is the Contractor's responsibility to locate an alternate approved and permitted facility(ies) for accepting materials. No additional compensation shall be provided to the Contractor for having to utilize alternative facilities. The Contractor is responsible for making the necessary arrangements to utilize alternative facility(ies), and the alternate facility(ies) must be approved by the Owner in the same manner and with the same requirements as for the original facility(ies).
- G. All materials collected under this contract must be segregated and kept physically separate from any other items until the disposal facility is reached. The items must be so marked, so that they are readily identified as part of this contract throughout this period. In addition, the Contractor must ensure that there is a clear audit trail for all items until final treatment/disposal is accomplished.
- H. The Contractor shall coordinate the disposal of work-generated waste materials which may be contaminated. These waste materials include, but are not limited to, decontamination rinse water, disposable PPE, and miscellaneous disposable support equipment. Disposal of Contractor-generated waste shall be done at no additional cost to the Owner.
- I. Mere acceptance of a waste at a properly permitted treatment, storage, or disposal facility (TSDF) does not meet the definition of final treatment/disposal under this contract. It is the Contractor's responsibility to obtain all necessary documentation to prove that the final treatment/disposal of all items has been accomplished. This documentation shall be attached to the certificate of disposal and submitted with, or prior to, the payment requests.
- J. Treatment of waste on the Owner's premises is not permitted. Treatment is defined as any process that meets the definition of treatment as set forth in applicable federal (including 40 CFR 260.10), state and local laws, codes, policies and regulations.

3.08 SPILL RESPONSIBILITY

- A. The Contractor is solely responsible for any and all spills or leaks during the performance of work under this contract, which occur as a result of or are contributed to by the actions of its agents, employees or subcontractors. The Contractor agrees to clean up such spills or leaks to the satisfaction of the Owner or its representative, and in a manner that complies with applicable federal, state

and local laws, codes, policies and regulations. The spill cleanup shall be at no cost to the Owner or its representatives.

- B. As required, the Contractor shall notify all applicable local, state and federal authorities immediately if the transport vehicle is involved in an accident and a reportable quantity of OHM is released or suspected to have been released.
- C. The Contractor shall report all such spills or leaks, regardless of their quantity, to the Owner immediately upon discovery. A written follow-up report shall be submitted to the Owner as soon as possible, but not later than 24 hours after the initial telephone report. The written report shall be in narrative form and, at a minimum, include the following:
 - 1. Description of item spilled (including identity, quantity, manifest number, etc.).
 - 2. Exact time and location of spill, including a description of the area involved.
 - 3. Containment procedures initiated.
 - 4. Description of cleanup procedures employed or to be employed at the Site, including location of disposal of spill residues, and corrective measures to prevent recurrences.

3.09 DECONTAMINATION PROCEDURES

- A. General: The Contractor shall furnish labor, materials, tools, and equipment for decontamination of all personnel, equipment and supplies that enter the contaminated work area or are exposed to contaminated material. The Contractor shall provide equipment, decontamination pads, etc. necessary for the decontamination of equipment and personnel.
- B. Methods: The decontamination procedure shall follow the requirements of 29 CFR 1926.65/1910.120 as described in the Contractor's Health and Safety Plan.
- C. Personnel Decontamination: The Contractor shall provide and maintain a decontamination area which is to be located in the contamination reduction zone. The Contractor shall coordinate the location of the decontamination area with the Consultant. Decontamination of personnel and equipment is required after performance of activities in the exclusion zone. The personnel decontamination area may be in the form of a mobile trailer or field station. Personnel decontamination shall, at a minimum, consist of: decontamination before breaks and each time workers exit the exclusion zone, and at the completion of each work day to prevent worker exposure and the spread of contaminants off-Site.

1. Routine Decontamination: Routine decontamination shall follow the guidelines of 29 CFR 1926.65/1910.120.
 2. Emergency Decontamination: Should a worker be splashed with contaminants, the worker shall be immediately escorted to the field decontamination station and decontaminated in accordance with Contractor's health and safety plan. Site eye wash and shower stations shall be made available and operable.
- D. Equipment:
1. All equipment shall be provided to the work Site free of contamination. The Owner and/or Consultant retain express authority to prohibit from the Site any equipment that in their opinion has not been thoroughly decontaminated prior to arriving at the project location. Any decontamination of the Contractor's equipment prior to arrival at the Site shall be at the expense of the Contractor. The Contractor is prohibited from decontaminating equipment on the project Site that is not thoroughly decontaminated upon arrival.
 2. All equipment involved in Exclusion Zone activities shall be decontaminated and the effectiveness of the decontamination shall be determined each time it is removed from the Exclusion Zone. Equipment decontamination shall be performed in conformance with the requirements of 29 CFR 1926.65/1910.120 as described in the Contractor's Health and Safety Plan.
 3. The Contractor shall decontaminate all equipment that comes in contact with contaminated material, either directly or indirectly, after completion of work at one location and prior to beginning work at another location, as necessary or if so directed by the Owner or the Consultant.
- E. Rinse water used for decontamination which contains chemicals used during decontamination or which contains hazardous chemicals from the equipment which was decontaminated shall be collected, characterized, handled and disposed of, by the Contractor, at no additional cost to the Owner.
- F. Payment for the removal and disposal/discharge of decontamination wastewater shall be included under the Contractor's base bid and shall not be paid for separately under any unit price item.
- G. The Contractor is responsible for any sampling and characterization as required by local, state, federal or facility requirements.
- H. If appropriate, the Contractor shall coordinate discharges with the Massachusetts Water Resources Authority (MWRA).

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- I. The Contractor shall provide, maintain, and pay for any permits or monitoring necessary for the disposal/discharge of decontamination wastewaters.
- J. If on-Site treatment of decontamination wastewaters is proposed, the Contractor shall provide a licensed Treatment Plant Operator as required by local, state, federal, or facility requirements.
- K. The Contractor shall be responsible for all costs such as penalties and fines related to materials transported and/or disposed of in a manner not consistent with governing laws and regulations.

END OF SECTION

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DIVISION 02000

SUBSURFACE INVESTIGATION & DEMOLITION

SECTION 02090

LEAD PAINT CONSIDERATIONS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Attention is directed to the Contract including General Conditions, Modifications to the General Conditions, and all Sections within Division 01000 General Requirements that are hereby made a part of this Section.
- B. In addition to the requirements specified herein, refer to all Contract Documents for complete description of work required to be performed under this Section.
- C. Examine all Drawings and all other Sections of the Specifications for requirements of related sections affecting the work of this Section. A lead determination at the site indicates that various surfaces and building components are considered to be coated with lead containing paint.
- D. The work of this Section shall be performed as stated herein. In performing the work of this section, the General Contractor shall refer to other Sections for additional procedures. The General Contractor is responsible for the coordination of the work of this Section with related work. No delays in completion of the work shall be claimed for lack of coordination.
- E. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds
- F. The General Contractor shall comply with all applicable federal, state, and local guidelines and regulations regarding all work involving the presence of lead-containing paint.
- G. The work of this Section references work of the Renovation Section. Additionally, requirements of the General Contractor regarding coordination and related work are identified in this Section and shall be considered the responsibility of the General Contractor.
- H. Use of roads at the site and all access to the site shall be as required by the Owner, and where described elsewhere in the Specification.

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- I. For the purpose of this Section, the following definitions apply:

"Site" shall refer to the former Nathaniel Banks Elementary School in Waltham, Massachusetts.

"Engineer" shall refer to a licensed professional

"Consultant" shall refer to ATC Associates Inc., who will act as designated authorized representatives of the Owner for the purpose of inspecting, monitoring, and testing.

1.02 DESCRIPTION OF WORK

- A. The work of this Section specifies minimum requirements for the disturbance, removal, containment, and disposal of lead-containing paint and associated waste generated as a result of renovation activities as outlined in the Specifications.
- B. The procedures described herein apply to all renovation/construction work where a worker may be occupationally exposed to lead as well as to the disposal of the demolition debris. The General Contractor shall assume that any painted surface not tested, as included in this Section, shall be assumed to contain lead paint and it shall be the General Contractor's responsibility to protect workers performing under this Contract. This may require additional testing by the General Contractor to verify lead content.
- C. The General Contractor shall assume full responsibility and liability for the compliance with all applicable federal, state and local regulations pertaining to work practices, hauling and disposal of hazardous waste, hauling and recycling of all metal components coated with lead-containing paint, protection of workers and visitors to the site, and persons occupying areas adjacent to the site. The General Contractor shall hold the Owner, Architect, and Engineer harmless for failure to comply with any applicable work, hauling, disposal, safety, health or regulation on the part of himself, his workers or his sub contractors.
- D. The General Contractor is required to ensure the protection of workers performing any related renovation/demolition work that will affect surfaces coated with lead-containing paint as well as protecting the public and the environment from exposure to lead dust.
- E. Note: The Lead Paint Considerations specifications are intended for the proper handling and disposal of lead-containing materials, as outlined in this section. Complete de-leadings is not required for this project.
- F. Codes and Standards
1. All work shall conform to the standards set by applicable federal, state and local laws, regulations, ordinances, and guidelines in such form in which

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they exist at the time of the work on the contract and as may be required by subsequent regulations.

2. In addition to any detailed requirements of the Specification, the General Contractor shall at his own cost and expense comply with all laws, ordinances, rules and regulations of federal, state, regional and local authorities regarding handling and storing of lead waste material.
3. The following references are cited as applicable standard and regulations as amended:

a. Code of Federal Regulations (CFR) Publications:

29 CFR 1910 – General Industry

29 CFR 1926.55 – Gases, Vapors, Fumes, Dusts and Mists

29 CFR 1926.57 – Ventilation

29 CFR 1926.62 – Lead in Construction

29 CFR 1926.200 – Signs, Signals and Barricades

29 CFR 1926.354 – Welding, Cutting and Heating in Way of
Preservative Coatings

29 CFR Subpart T – Demolition

40 CFR 50 – National Primary and Secondary Ambient
Air Quality Standards for Lead

40 CFR 61 Subpart A – General Provisions

40 CFR 61.152 – Standard for Waste Manufacturing,
Demolition, Renovation, Spraying, and
Fabricating Operations.

40 CFR 241 – Guidelines for the Land Disposal of Solid
Wastes

40 CFR 257 – Criteria for Classification of Solid Waste

40 CFR 261 and 262 – Waste Disposal Facilities and Practices

b. Massachusetts Regulations:

454 CMR 22.11 – Safety Procedures for renovation

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454 CMR 23.00 – Occupational Lead Exposure

4. All regulations by the above and other governing agencies in their most current version are applicable throughout this project. Where there is a conflict between this Specification and the cited federal, state, or local regulations, the more restrictive or stringent requirements shall prevail.
5. THIS SECTION REFERS TO MANY REQUIREMENTS FOUND IN THESE REFERENCES, BUT IN NO WAY IS IT INTENDED TO CITE OR REITERATE ALL PROVISIONS THEREIN OR ELSEWHERE. IT IS THE GENERAL ONTRACTOR'S RESPONSIBILITY TO KNOW, UNDERSTAND, AND ABIDE BY ALL SUCH REGULATIONS AND COMMON PRACTICES.

1.03 RELATED WORK SPECIFIED ELSEWHERE

- A. The work of this Section shall be performed as stated herein. In performing the work of this Section, the General Contractor shall refer to other Divisions for additional procedures. The General Contractor is responsible for the coordination of the work of this Section with other related work.
- B. Portions of the work herein require direct coordination with the work of the above noted Related Sections.

1.04 DEFINITIONS

- A. The following definitions apply to the performance of the work of this project.
 1. Action Level: An airborne concentration of lead above 30-micrograms/cubic meter (μ/m^3) as a time-weighted average (TWA) for more than 30 days per year.
 2. Area Monitoring: Sampling of lead concentrations within the work area and outside the work area, which is representative of the airborne concentrations of lead.
 3. Clean Room: An uncontaminated change room directly adjacent to the work area having facilities for storage of employees' personal clothing and uncontaminated work clothes, materials and equipment provided when the airborne exposure to lead is above the PEL.
 4. Engineer: Authorized representatives who are under contract with the Owner to perform Engineering or Consulting services.
 5. General Contractor: The term General Contractor refers to the General Contractor and its Sub General Contractors.

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6. Decontamination Area: A contained area adjacent to or connected to the work area and consisting of an equipment room, shower area, and clean room which is used for decontamination of workers, materials and equipment.
7. HEPA Filter Equipment: High efficiency particulate air (HEPA) filtered vacuuming or exhaust ventilation equipment with a UL 586 filter system. Filters shall be of 99.97 percent efficiency for retaining 0.3-micrometer diameter particles.
8. Lead Containing Paint: Paint, varnish, or stain that contains lead in excess of 0.0 mg/cm² or 0.0% lead by weight.
9. Lead Permissible Exposure Limit (PEL): 50 micrograms per cubic meter (µg/m³) of air, based upon an 8-hour time weighted average.
10. Sample Location: Area or place where an air sample is collected.
11. Time Weighted Average (TWA): The TWA is an 8-hour time weighted average for the test of the concentration of lead for worker exposure.
12. Wet Cleaning: The process of removing lead contamination from building surfaces, equipment and other objects by using cloths, mops, or other cleaning tools which have been dampened with water, and by afterwards disposing of these cleaning tools as lead contaminated wastes.
13. Work Area: A controlled-access work area which has plastic sheeting or other containment barriers erected to separate the trades.

1.05 SUBMITTALS

A. Notifications

1. Provide in proper and timely fashion, all necessary notifications to relevant Federal, State, and local authorities and obtain and comply with provisions of all permits or applications required by the work specified, as well as make all required submittals required under those auspices. General Contractor shall indemnify Owner, Engineer and Consultant from, and pay for all claims resulting from failure to adhere to these provisions. Costs for all permits, applications, and the like are to be assumed by General Contractor.

- B. Prior to commencing any work under this Section, the Contractor shall submit the following items to the Engineer for review in accordance with the Submittals Section and the following. No Work under this Section may commence until the Engineer has accepted all required submittals.

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1. Copies of all notifications, permits, applications, licenses and like documents required by federal, state, or local regulations and this specification obtained or submitted in proper fashion,
 2. Copies of written medical opinions for each employee who may be occupationally exposed to lead as required by 29 CFR 1926.62 (j)(3)(v),
 3. Employer's Lead Compliance Program as required by 29 CFR 1926.62, including proposed worker training, respiratory protection program and medical monitoring for all employees throughout all phases of the job, including make, model and NIOSH approval numbers of respirators to be used; worker orientation plan; written description of all proposed procedures, methods, or equipment to be utilized, including those that may differ from the Contract Specifications. In all instances, the General Contractor must comply with all applicable federal, state and local regulations.
 4. Proposed number and type (i.e., hazardous waste or non-hazardous waste, open top, front loading, etc.) of dumpsters for waste, proposed location(s),
 5. A list of all equipment to be used on site, by make and model,
 6. Chain of Command of responsibility at work site including supervisors and competent person, their names, resumes and phone numbers,
 7. List of total number of supervisors and workers intended to be assigned to the project, including name and lead awareness qualifications,
 8. Material Safety Data Sheets on potentially hazardous materials to be used on the project,
 9. Waste Disposal Plan which describes the waste stream and the disposal means (i.e. landfill, recycle, etc.) and includes the name, address, and ID number of the proposed hazardous waste hauler, waste transfer route, and proposed disposal reclamation or treatment facility,
 10. Name and address of the proposed construction debris site,
 11. Name and address of the proposed metal component construction debris recycling site, including letter stating such site accepts such waste,
 12. Construction schedule including sequence of critical work.
- C. Submit the following to the Owner/Engineer as a Post-Construction submittal package:
1. Copies of waste manifests and receipts acknowledging disposal and

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recycling of all lead waste material from the project, showing delivery date, quantity, and appropriate signature of landfill's authorized representative.

2. A notarized copy of the daily list of workers and site entry-exit logbook,
3. All personnel monitoring results,
4. All TCLP testing results.

1.06 GENERAL WORK PROCEDURES

- A. Work shall be carried out in sequential phases. Inspection and approval of each phase by the Architect shall be sought and gained before proceeding to the next phase and in accordance with the schedule agreed upon by Owner and General Contractor at the Pre-Construction meeting as amended. This shall include demolition requirements for work area clearance and work area release prior to general construction work. As a Contract requirement, any reasonable delay caused by this requirement will not constitute a basis for claim against the Owner/Engineer. General Contractor must coordinate the work of this section with the work of the General Contractor and all other trades.
- B. At no time will Owner permit storage of debris generated from renovation/demolition activities to be stored inside buildings at the site, and any storage of materials shall be subject to Owner's approval. Assure security of debris at all times.
- C. The working hours for this project will be determined in the Pre-Construction meeting.

1.07 SPECIAL CONSIDERATIONS

- A. Testing References
 1. Limited testing for lead paint has been performed on representative interior and exterior painted surfaces that are anticipated to be impacted by building renovations. The lead paint testing was performed via X-Ray Fluorescence (XRF) Analysis, using an RMD Lead Paint Analyzer.
 2. The Occupational Safety and Health Administration (OSHA) requires employers to determine the airborne concentration of lead in dust in order to determine the employee's exposure hazard while impacting these coated surfaces and requires that the General Contractors and their employees adhere to the OSHA Lead-in-Construction standard found at 29 CFR 1926.62.

- B. The General Contractor shall follow the requirements of this Section regarding component removal, demolition/renovation, worker exposure and protection, work area cleaning, and waste disposal.
- C. Work Affected: In general, the following activities are minimum requirements of this Section and affect the demolition/renovation performed on the painted components:
 - 1. No torch cutting, mechanical sanding or stripping or abrasive methods of paint removal shall occur.
 - 2. No demolition or renovation activities shall occur which increase the workers' exposure above the Action Level of $30 \mu\text{g}/\text{m}^3$. General Contractor shall fully comply with the OSHA lead standard at 29 CFR 1926.62.
 - 3. Workers shall be informed of the components to be impacted during renovation or demolition that have been identified as containing lead.
 - 4. Worker protection, at a minimum, shall comply with the OSHA Lead Standard 29 CFR 1926.62. Worker Right to Know and Health and Safety Standards of 1926.62 shall also apply to the work of this section.
 - 5. Separation of Trades: Unprotected, untrained workers or trades shall not perform any related work within the same vicinity as work involving components identified with lead.
 - 6. Clean-up Activities: The General Contractor shall maintain work zones free of accumulated debris and paint chips of demolition involving lead.

1.08 REPORT OF FINDINGS

- A. Table 1 identifies various components identified as containing lead in excess of $0.0 \text{ mg}/\text{cm}^2$ at the former Nathaniel Banks Elementary School located in Waltham, Massachusetts. The table was derived from a lead paint determination at the Subject Site. This inspection included the testing of representative painted surfaces and is not intended to be a comprehensive identification of all painted surfaces.
- B. The Occupational Safety and Health Administration (OSHA) requires employers to determine the airborne concentration of lead in dust in order to determine the employee's exposure hazard while impacting these coated surfaces and requires that the General Contractors and their employees adhere to the OSHA Lead-in-Construction standard found at 29 CFR 1926.62.

Table 1: Summary of XRF Findings

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
First Floor				
Offices	Wall	Gypsum	White	0.0
	Wall	Wood Panel	White	0.0
	Chair Rail	Wood	White	0.0
	Baseboard	Wood	White	-0.0
	Door	Wood	White	-0.0
	Door Frame	Metal	White	0.0
	Ceiling	Plaster	White	0.0
Boiler Room & Fan Room	Wall	Brick	White	0.7
	Stair Components	Metal	Black	0.3
	Stair Handrail	Metal	Black	0.4
	Egress Door	Metal	Brown	-0.1
	Egress Door Frame	Metal	Brown	-0.2
	Vertical Beam Lintel	Metal	Brown	1.1
	Small Support Pole	Metal	Brown	0.0
	Large Support Pole	Metal	Brown	0.4

**LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm²)
	Fan Room Double Door	Metal (Suspect Lead Shield)	Brown	4.1
	Fan Room Double Door Frame	Metal	Blue	-0.1
Hot water Heater Room	Door	Metal (Suspect Lead shield)	White	1.0
	Door Frame	Wood	White	-0.2
	Door Frame	Metal	White	0.3
	Wall	Cinder Block	White	-0.1
	Wall	Brick	White	-0.1
	Floor	Concrete	Gray	-0.0
	Ceiling	Plaster	White	-0.0
Kindergarten-Room#10	Entry Door	Wood	Stain	0.0
	Entry Door Frame	Wood	Stain	-0.0
	Wall	Brick	White	5.8
	Window Frame	Wood	Stain	-0.0
	Closet Door	Wood	Stain	-0.1
	Closet Door Frame	Wood	Stain	-0.1
	Floor	Wood	Stain	-0.0

**LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Closet Wall	Brick	Off-White	1.4
	Closet Wall	Brick	Tan	1.7
	Closet Wall	Brick	Green	0.0
Boy's Bathroom	Wall	Cinderblock	White	-0.0
	Wall	Plaster	White	0.3
	Wall	Brick	White	0.9
	Wall	Glazed Tile	Tan	3.8
Kindergarten-Room#11	Entry Door	Wood	Stain	0.0
	Entry Door Frame	Wood	Stain	0.4
	Wall	Plaster	White	4.4
	Fireplace Trim	Wood	Stain	-0.1
	Fireplace Trim	Brick	Red	0.2
	Closet Door	Wood	Blue	-0.1
Girl's Bathroom	Wall	Plaster	White	-0.1
	Wall	Ceramic Tile	Tan	-0.2
	Radiator	Metal	White	0.8
	Partition	Metal	Blue	0.0
Coat Room	Wall	Plaster	Blue	3.7
	Wall	Plywood	Yellow	-0.1
	Door	Wood	Stain	-0.2

**LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Door Frame	Wood	Yellow	-0.2
Foyer	Double Door	Wood	Stain	-0.0
	Double Door Frame	Wood	Stain	0.0
	Chair Rail	Wood	Stain	0.0
	Wall	Plaster	White	3.0
	Floor	Concrete	Gray	-0.2
<i>Kindergarten-Room#12 Same Components, Substrates & Colors as Kindergarten Rooms #10 & #11.</i>				
Alcove	Wall	Plaster	Yellow	5.2
	Egress Double Door	Metal	Black	-0.2
	Egress Double Door Frame	Wood	Stain	0.2
	Radiator	Metal	Silver	1.1
Kindergarten-Room #13	Wall	Plaster	White	4.0
	Wall	Glazed Block	Brown	-0.0
	Closet Door	Wood	Stain	0.0
	Closet Door Frame	Wood	Stain	-0.1
	Closet Door Floor	Wood	Stain	-0.1
	Closet Ceiling	Plaster	White	-0.1

**LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
Resource Room-Room #14	Wall	Plaster	Yellow	5.3
	Egress Stairs	Wood	Stain	-0.0
	Closet Slider Door	Wood	Stain	0.0
	Closet Wall	Plaster	Gray	-0.0
	Closet Ceiling	Plaster	Gray	-0.1
	Closet Wall	Wood Panel	Stain	-0.0
Common Bathroom	Door	Metal	Blue	-0.0
	Door Frame	Metal	Gray	0.0
	Ceiling	Plaster	White	0.7
	Wall	Cinder Block	White	0.2
	Wall	Brick	White	1.3
	Radiator	Metal	White	0.2
	Partition	Metal	Gray	0.0
	Floor	Concrete	Gray	0.4
Stair Case No.2	Egress Double Door	Metal	Black	-0.0
	Egress Double Door Frame	Metal	Black	-0.1
	Egress double Door Lintel	Metal	White	0.0
	Stair Stringer	Metal	Black	-0.0

**LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Stair Newel Post	Metal	Black	-0.1
	Stair Railing	Metal	Black	-0.0
	Wall	Cinder Block	White	-0.0
Room #16	Entry Door	Wood	Stain	-0.2
	Entry Door Frame	Metal	Gray	0.0
	Ceiling Beam	Metal	Red	-0.1
	Wall	Cinder Block	White	-0.1
	Door	Metal	Blue	-0.0
	Door Frame	Metal	Gray	-0.1
<i>Rooms #17 & #18 Same Components, Substrates & Colors as Room #16</i>				
Girl's Bathroom	Wall	Cinder Block	White	0.0
	Wall	Ceramic Tile	Yellow	4.5
	Floor	Ceramic Tile	Tan	0.2
	Partition	Metal	Tan	-0.0
Boy's Bathroom	Wall	Cinder Block	Off-White	-0.2
	Wall	Ceramic Tile	Gray	-0.2

LEAD PAINT CONSIDERATIONS
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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm²)
	Floor	Ceramic Tile	Gray	-0.1
Gymnasium	Entry Double Door	Metal	Blue	-0.1
	Entry Double Door Frame	Metal	Black	0.0
	Wall	Cinder Block	White	0.3
	Serving Room Wall	Cinder Block	White	0.3
	Serving Room Floor	Glazed Tile	Brown	0.0
Stair Case No.1	Egress Double Door	Metal	Green	-0.0
	Egress Double Door Frame	Metal	Black	-0.0
	Stair Stringer	Metal	Black	0.0
	Stair Newel Post	Metal	Black	-0.0
	Stair Railing	Metal	Black	-0.0
	Hall double Door	Metal	Blue	-0.1
New Addition Hallway	Wall	Cinder Block	White	0.2
	Double Door	Metal	White	0.2
	Double Door Frame	Metal	White	0.7

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm²)
	Elevator Door	Metal	Yellow	-0.1
	Elevator Door Frame	Metal	Yellow	0.2
	Double Door	Metal	Blue	-0.1
	Double Door Frame	Metal	Black	0.4
	Door	Metal	Blue	-0.2
	Door Frame	Metal	Black	0.6
Original Hallway	Wall	Brick	White	0.0
	Wall	Gypsum	White	0.0
	Door Frame	Metal	White	1.5
	Boiler Room Door	Metal (Suspect Lead Shield)	White	4.3
	Boiler Room Door Frame	Metal (Suspect Lead Shield)	White	1.1
	Hot Water Room Door	Metal (Suspect Lead Shield)	White	0.5
	Hot Water Room Door Frame	Metal (Suspect Lead Shield)	White	0.9

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm²)
	Fan Room Double Door	Metal (Suspect Lead Shield)	White	4.1
	Fan Room Double Door Frame	Metal (Suspect Lead Shield)	White	1.3
	Double Door	Wood	Stain	-0.1
	Double Door Frame	Wood	Stain	-0.0
	Wall	Plaster	White	-0.0
	Door	Metal	White	0.2
	Door Frame	Metal	Black	-0.1
	Double Door	Metal	Orange	-0.0
	Double Door Frame	Metal	Black	0.5
Second Floor				
Room #20	Upper Wall	Plaster	White	0.7
	Lower Wall	Plaster	White	5.0
	Floor	Wood	Stain	-0.1
	Window Sill	Wood	Stain	-0.1
	Window Casing	Wood	Stain	0.0
	Radiator	Metal	White	0.5
	Closet Door	Wood	Stain	-0.0

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Closet Door Frame	Wood	Stain	0.0
	Closet Wall	Wood Slat	Stain	-0.0
	Closet Floor	Wood Plank	Stain	0.0
Room #21	Wall	Plaster	Orange	0.6
	Wall	Plaster	Yellow	0.5
	Wall	Plaster	White	1.3
Room #22	Upper Wall	Plaster	White	-0.0
	Lower Wall	Plaster	Yellow	3.1
	Radiator	Metal	White	-0.0
	Closet Wall	Plaster	Orange	-0.0
	Closet Ceiling	Plaster	Orange	-0.2
Boy's Bathroom	Upper Wall	Plaster	White	0.6
	Lower Wall	Plaster	White	1.8
	Wall	Ceramic Tile	Tan	2.6
	Wall Trim	Ceramic Tile	Black	7.5
	Floor	Glazed Block	Brown	-0.2
	Radiator	Metal	Off-White	-0.1
	Window Sill	Wood	Stain	0.3
	Window Casing	Wood	Stain	0.3

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Partition	Metal	Tan	0.0
Janitor's Closet	Wall	Plaster	White	2.3
	Ceiling	Plaster	Green	0.0
Media Center Room	Wall	Plaster	White	-0.0
	Wall	Gypsum	White	-0.2
	Entry Double Door	Metal	Green	-0.1
	Entry Double Door Frame	Metal	Black	-0.1
	Chair Rail	Wood	Green	>9.9
	Baseboard	Wood	Green	>9.9
	Wall Door	Wood	Green	>9.9
	Wall Door	Wood	Pink	>9.9
	Wall Trim	Wood	Green	>9.9
	Stage Stairs	Wood	Green	0.0
	Stage Column	Wood	Green	>9.9
	Stage Wall Panel	Metal (Suspect Lead Shield)	Green	5.7
	Stage Right Door	Wood	Green	>9.9
Stage Right Door Frame	Wood	Green	>9.9	

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Stage Right Wall	Plaster	Tan	4.6
	Stage Right Baseboard	Wood	Gray	-0.2
	Rear Egress Stair Riser	Wood	Green	>9.9
	Rear Egress Stair Baseboard	Wood	Green	>9.9
	Rear Egress Wall	Plaster	Green	3.2
	Rear Egress Double Door Frame	Wood	Green	>9.9
	Rear Egress Double Door	Wood	Stain	0.2
	Rear Egress Double Door Frame	Wood	Stain	0.3
Exit Hallway	Wall	Plaster	White	4.1
	Egress Double Door	Metal	Brown	-0.1
	Egress Double Door Frame	Metal	Black	-0.0
	Bathroom Wall	Plaster	Yellow	0.8
	Bathroom Floor	Glazed Block	Brown	0.0
<i>Counselor's Office Same Components, Substrates & Colors as Room #20</i>				

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

Location	Component	Substrate	Color	XRF RESULT (mg/cm²)
Storage Room	Wall	Plaster	Blue	0.4
	Radiator	Metal	Silver	0.6
Girl's Bathroom	Upper Wall	Plaster	White	0.6
	Lower Wall	Plaster	White	5.5
	Partition	Metal	Yellow	-0.1
	Outside Partition	Metal	White	-0.0
<i>Room #24 Same Components, Substrates & Colors as Rooms #20, #21 & #22</i>				
Room #25	Upper Wall	Plaster	White	0.3
	Lower Wall	Plaster	Tan	4.6
	Closet Wall	Plaster	Yellow	-0.1
	Closet Ceiling	Plaster	Yellow	0.0
	Vertical Pipe	Metal	White	0.3
<i>Room #26 Same Components, Substrates & Colors as Rooms #20, #21 & #22</i>				
Room #27	Wall	Cinder Block	White	0.3
	Wall	Cinder Block	Yellow	0.3
	Radiator Cover	Metal	White	-0.0
	Door	Wood	Stain	-0.0
	Door Frame	Metal	Black	-0.0
<i>Room #28 & #29 Same Components, Substrates & Colors as Rooms #27</i>				

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
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Location	Component	Substrate	Color	XRF RESULT (mg/cm ²)
Boy's Bathroom	Wall	Cinder Block	Off-White	0.0
	Wall	Ceramic Tile	Gray	-0.0
	Baseboard	Ceramic Tile	Gray	0.0
	Floor	Ceramic Tile	Gray	-0.2
	Partition	Metal	Tan	-0.1
Girl's Bathroom	Wall	Cinder Block	Off-White	0.0
	Wall	Ceramic Tile	Yellow	4.0
	Floor	Ceramic Tile	Tan	-0.2
<i>Common Bathroom Same Components, Substrates & Colors as Boy's Bathroom</i>				
Teacher's Room	Wall	Cinder Block	Orange	-0.0
	Wall	Cinder Block	Off-White	-0.0
	Wall	Cinder Block	Yellow	0.0
	Radiator Cover	Metal	Tan	0.2
<i>Storage & Science Offices Same Components, Substrates & Colors as Teacher's Room</i>				
New Addition Hallway	Handrail	Metal	Black	0.0
	Stair Riser	Metal	Black	-0.0

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
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Location	Component	Substrate	Color	XRF RESULT (mg/cm2)
	Door	Metal	Orange	0.0
	Door Frame	Metal	Black	0.0
	Door	Metal	Blue	-0.1
	Wall	Cinder Block	White	-0.0
Original Hallway	Double Door	Metal	Orange	0.0
	Double Door Frame	Metal	Black	-0.0
	Wall	Plaster	White	4.2
	Guard Rail	Metal	White	0.2
	Classroom Door	Wood	Stain	-0.0
	Classroom Door Frame	Wood	Stain	-0.0
	Baseboard	Wood	Stain	0.0
Third Floor				
Original Building Section <i>Same Components, Substrates & Colors as 1st & 2nd Floor Original Sections</i>				
Exterior				
Front Side	Left Double Door	Metal	Blue	-0.1
	Left Double Door Frame	Metal	Gray	-0.2

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
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Location	Component	Substrate	Color	XRF RESULT (mg/cm ²)
	Left Double Door Lintel	Metal	Gray	-0.0
	Sidewalk Guard Rail	Wood	Green	0.0
	Center Guard Rail	Metal	Brown	0.3
Right Side	Benches	Metal	Brown	-0.2
	Double Door	Metal	Gray	-0.0
	Double Door Frame	Metal	Gray	-0.2
	Fire Escape Supports	Metal	Black	>9.9
	Fire Escape Stair Stringer	Metal	Black	>9.9
	Fire Escape Stair Railing	Metal	Black	7.2
Rear Side	Left Double Door	Metal	Brown	0.0
	Left Double Door Frame	Metal	Brown	0.3
	Middle Four Doors	Metal	Green	-0.1
	Middle Four Doors Frame	Metal	Gray	-0.2
	Cafeteria Double Door	Metal	Green	-0.1

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Location	Component	Substrate	Color	XRF RESULT (mg/cm ²)
	Cafeteria Double Door Frame	Metal	Gray	-0.1
	Cafeteria Double Door Lintel	Metal	Gray	0.6

1.09 FEES, PERMITS & LICENSES

- A. The General Contractor shall pay all licensing fees, royalties, and other costs necessary for the use of any copyrighted or patented product, design, invention, or process in the performance of the work specified in this section. The General Contractor shall be solely responsible for costs, damages, or losses resulting from any infringement of these patent rights or copyrights. The General Contractor shall hold the Owner/Engineer from any costs, damages, and losses resulting from any infringement of these patent rights or copyrights. If the Specification requests the use of any product, design, invention, or process that requires a licensing, patent or royalty fee for use in the performance of the job, the General Contractor shall be responsible for the fee or royalty fee and shall disclose the existence of such rights.

- B. The General Contractor shall be responsible for costs for all licensing requirements, where applicable and notification requirements and all other fees related to the General Contractor's ability to perform the work in this Section.

- C. Secure all necessary permits for work under this Section, including hauling, removal, and disposal, fire, and materials usage, or any other permits required to perform the specified work.

1.10 CLEAN-UP

- A. Maintain the work site in a neat and orderly manner at all times, so as not to interrupt or infringe upon the work of other trades.

- B. Comply with all requirements for release of work areas as described in the project specification.

- C. It is the prerogative of the Owner/Engineer to inspect whenever deemed necessary and the General Contractor is responsible for meeting and correcting any deficiencies discovered which do not meet the current applicable regulations and requirements of these specifications.

1.11 COORDINATION

- A. Extend full cooperation to Owner in all matters involving the use of Owner's facilities. At no time shall General Contractor cause or allow to be caused conditions which may cause risk or hazard to the general public or conditions that might impair safe use of the facility. The use of the facility's electricity, water or like utilities by the General Contractor shall be as specified in Division 1.
- B. Coordinate the work of this section with that of all other trades. Phasing and scheduling of this project shall be subject to the approval of the Owner/Engineer. The work of this Section shall be scheduled and performed so as not to impede the progress of the project as a whole. Work shall not proceed in any area without the express consent of the Engineer.
- C. Unless specifically authorized by the Owner/Engineer, the work of this project shall be conducted in accordance with the working hours agreed upon in the Pre-Construction Meeting.
- D. Inspections: The Engineer may perform visual inspections during the work of this section, as described below. General Contractor shall not proceed with work until General Contractor has received the Owners/Engineer's approval at the stages identified below:
 - 1. Post Inspection: At the completion of work and final clean up, prior to clearance or removal of any critical barriers and decontamination unit from the work area.
 - 2. Waste Removal Inspection: Prior to removal of hazardous waste from the site, Owner and Architect will inspect the quantity and type.

1.12 EMERGENCY PRECAUTIONS

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

1.13 DISPOSAL OF WASTE MATERIAL

- A. General

1. The General Contractor shall comply with the Resource Conservation and Recovery ACT (RCRA) and with all applicable state and local regulations.
2. The General Contractor shall be responsible for disposing of all metallic waste and components determined to be coated with Lead-Based paint (LBP) by separating and recycling.
3. The General Contractor shall be responsible for disposing of all non-metallic waste determined by Toxicity Characteristic Leachate Procedure (TCLP) to be hazardous. The General Contractor shall be responsible for testing representative building components prior to demolition of building structures and selective waste streams post demolition work.
4. The General Contractor shall comply with all EPA regulations.

PART 2 – PRODUCTS

2.01 GENERAL REQUIREMENTS

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

2.02 MATERIALS

All materials and equipment proposed to be used on this project shall be subject to the acceptance of the Owner/Engineer. The required materials shall include, but not necessarily limited to the following:

- A. Fire retardant polyethylene sheeting, minimum thickness of six (6)-mil.
- B. Plastic bags, minimum thickness of six (6)-mil.
- C. Duct Tape, up to 3 inch width
- D. Lead Warning Signs, as required by Section 3.02, the MA DOS Regulations, and OSHA Hazard Communication requirements.

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- E. Flexible duct for ventilation units (if required)
- F. Spray adhesive, fire retardant
- G. Personal Protective Equipment, NIOSH approved respirators
- H. Ventilation units with HEPA filtration and exhaust fans.
- I. HEPA vacuums
- J. Tri-sodium Phosphate (TSP) and product data
- K. Cloth tarpaulin

2.03 TOOLS AND EQUIPMENT

- A. Transportation Equipment: Transportation equipment, as required, shall be suitable for loading, temporary storage, transporting, and unloading waste without exposure to persons or property. All over-the-road transportation equipment must carry the appropriate hazardous waste transport licenses and insurance.
- B. Vacuum Equipment: All vacuum equipment utilized in the work area shall utilize HEPA filtration systems.
- C. Water Sprayer: The water sprayer shall be an airless or other low-pressure sprayer for water application.
- D. Other Tools and Equipment: The General Contractor shall provide other suitable tools including but not limited to: rounded edge shovels, rakes, brooms, and carts.
- E. The General Contractor shall provide ground fault circuit interrupters (GFCI) to protect all electrical cord and connections.
- F. Approved lighting equipment for use in the work area.
- G. Scaffolding: Scaffolding, as required to accomplish specified work, shall meet all applicable federal, state and local safety regulations and used in accordance with manufacturer's specifications.

PART 3 – EXECUTION

3.01 SCHEDULING

- A. The General Contractor shall coordinate all scheduling with the Owner/Engineer. A schedule of work shall be submitted to the Owner/Engineer, prior to contract performance.

3.02 UTILITIES

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

3.03 IDENTIFICATION OF HAZARDS

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

3.04 BARRIERS AND ISOLATION AREAS

- A. Containment controls (including critical barriers, protective coverings, HEPA-filtered ventilation and decontamination facilities) may be required for renovation/demolition work. The degree of containment shall be appropriate for the anticipated levels of airborne lead dust. The lower the level of airborne lead, the lesser the requirements necessary to control lead emissions at the job site.
- B. Work Area Isolation (unless exempted according to Paragraph A)
 - 1. The General Contractor shall isolate work areas for the duration of work by completely sealing off all openings in the work area. Isolation sealing shall be accomplished by constructing critical barriers where necessary around the work area perimeter. The work area shall be sealed airtight to the greatest extent possible.
 - 2. Provide temporary power and lighting (with ground fault circuit interrupt protection) to the work areas, and ensure safe Installation of temporary power sources and equipment per applicable electrical code requirements, and OSHA requirements for temporary lighting in the environment normal to renovation/demolition areas.
- C. Equipment and Services: The General Contractor shall provide portable lighting, staging and scaffolding, utility hook-ups, portable fire extinguishers, first aid equipment, and all other equipment or items for the safe and efficient performance of Work.
- D. Decontamination Facility:
 - 1. The General Contractor shall erect one or more Decontamination Facilities (if applicable) to serve each work area. The facility will consist of series of two or more connected chambers including, at a minimum, a clean room and a shower/wash room, separated by an air lock. Unless otherwise

specified, the shower/wash room shall be contiguous to the work area. Non-contiguous, remote, three-chamber decontamination facilities may be substituted with the Engineer's prior written approval. Three-chamber decontamination facilities shall include an equipment room to be used for removal and temporary storage of contaminated worker clothing, equipment, and other items leaving the work area, prior to decontamination in the shower/wash room of the decontamination facility.

2. In all cases, non-emergency access between contaminated and uncontaminated rooms or areas shall only be through the Decontamination Facility/Wash Room.
3. Ensure that barriers and linings are effectively sealed and taped at all times, and that the Shower/Wash Room floor is completely watertight. Repair damaged barriers, and remedy defects immediately upon discovery. Visually inspect enclosures at the beginning of each work period.

E. All lead in renovation/demolition work areas shall remain isolated from all other trades on the project and remain inaccessible to the public. General Contractor shall monitor the access to the renovation/demolition work areas. The below listed items are required to control the generation of lead-containing dust during renovation/demolition activities if worker exposure is above the PEL. The General Contractor is ultimately responsible for cleaning all generated dust and paint debris from renovation/demolition operations and must maintain work areas free from lead dust generated from renovation/demolition activities.

1. Signs shall be posted at all approaches to the work area warning that work involving lead is being conducted in the vicinity. Signs shall be in bold lettering not smaller than two inches tall.
2. Barriers shall not be removed until the work areas are thoroughly cleaned and approved by the Engineer.

3.05 APPROVALS AND INSPECTIONS

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

3.06 PERSONAL SAMPLING – GENERAL CONTRACTOR

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

3.07 WORK PROCEDURES

- A. The General Contractor shall initiate, and continue, sufficient engineering and work practice controls, as described in the General Contractor's Lead Compliance Program, to reduce and maintain worker exposures to lead at or below the Action Level.
- B. The following work practices are specifically required by these specifications:
 - 1. All persons except those directly involved in the work shall be excluded from the work area. Physical barriers shall be used, where necessary, to limit access to the work area for the duration of the renovation activities. (Warning signs may need to be posted in accordance with applicable regulations.)
 - 2. Provide hand washing facilities and assure that all workers thoroughly wash their hands and face upon exiting the work area. Workers shall pay careful attention to cleanse the hands and face when decontaminating (Provide

hygiene facilities, including shower, as required based on initial assessment and continued monitoring.)

3. Thoroughly wet the areas to be impacted and mist the air to reduce the potential for creating airborne lead and dust.
4. All equipment used by the workers inside the work area shall be either left in the work area or thoroughly decontaminated before being removed from the area. Extra work clothing (in addition to the disposable suits supplied by the General Contractor) shall be left in the clean area until the completion of work in that area. The clean area shall be cleaned of all visible debris and disposable materials daily.
5. Under no circumstances shall workers or supervisory personnel eat, drink, smoke, chew gum, or chew tobacco in the work area; to do so shall be grounds for the Engineer to stop all work operations. Only in the case of life threatening emergency shall workers or supervisory personnel be allowed to remove their protective respirators, if applicable, while in the work area.

3.08 RENOVATION/DEMOLITION PROCEDURES

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

3.09 STORAGE OF WASTE

- A. Use of waste and recycling containers on site shall be controlled under the following requirements:

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1. Location of waste and recycling containers on site shall be coordinated with the General Contractor, subject to Owner's/Engineer's approval.
2. Waste containers shall be lined with two layers of six-mil polyethylene sheeting, be solid, enclosed containers, locked and sealed at all times. This requirement applies to waste classified as hazardous based on TCLP testing.
3. General Contractor shall comply with all federal, state, and local regulations and ordinances regarding lead waste and recyclable storage.

END OF SECTION

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DIVISION 02000

SUBSURFACE INVESTIGATION & DEMOLITION

SECTION 02200

EXCAVATION AND BACKFILL

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Excavation and Backfill work required to complete the work of the contract including all the Excavation and Backfill work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Excavation and Backfill work with all the other trades for the project. Provide all demolition and disposal work to complete the Excavation and Backfill work. Patch to match all adjacent surfaces that are disturbed left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Excavation and Backfill work includes, but is not limited to:
 - 1. Protection of all roads, sidewalks and existing utilities to remain. It is the Contractor's responsibility to call Dig Safe in the area of excavation.

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2. Excavation to indicated bearing level as approved by the Architect for all, foundations, utility lines, slabs and pavements, and other improvements. Legal disposal off-site of all unsuitable excavated materials and on-site stockpiling of all suitable excavated material.
 3. Excavation and off-site disposal of all unsuitable materials encountered below indicated subgrade elevation required for placement of compacted granular fill, common fill, utilities, and other improvements.
 4. Supply and placement of all backfill materials required to complete and work of this Section, including backfilling to indicated bearing elevations for footings foundations, paving and slabs.
 5. Dewatering.
- B. Provide all excavation and backfill to perform the work of the contract whether or not indicated including but not limited to the following locations:
1. Carefully cut concrete slabs and excavate and backfill for underground utilities within the building.
 2. Excavate and backfill on site for underground utility installation.

1.03 STANDARDS AND CODES

- A. The work shall conform to the codes and standards of the following agencies as further cited herein:
1. ASTM: Specifications of the American Society for Testing and Materials.
 2. AASHTO: American Association of State Highway and Transportation Officials.
 3. ACI: American Concrete Institute
 4. Code: Massachusetts State Building Code.

1.04 QUALITY ASSURANCE

- A. Comply with all rules, regulations, laws and ordinances of the Commonwealth of Massachusetts, and of all other authorities having jurisdiction. All labor, materials, equipment, and services necessary to make work comply with such requirements shall be provided without additional cost to Owner.
- B. Field Monitoring and Testing
1. The Owner will retain the services of a Geotechnical Engineer or testing agency to test, observe and document the Contractor's earthwork activities

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to determine the work is completed in accordance with the Project Specifications and perform such other duties as are herein described throughout these Specifications.

2. All fill materials and their placement will be subject to quality control testing. The Contractor will bear the cost of any tests which are needed to correct previously unacceptable work. Test results and lab recommendations will be available to the Contractor.
3. Approvals given by the Architect or by the testing agencies shall not relieve the Contractor of his/her responsibility for performing the work in accordance with the Contract Documents.

1.05 SUBMITTALS

- A. The Contractor shall submit the information specified herein to the Architect for review. Unless otherwise specified, submittals shall be made not less than one week before the start of work.
- B. Personnel qualifications, including name, license identification, qualification, and other identification of person(s) responsible for field survey.

1.06 JOB CONDITIONS

- A. Site and Subsurface Conditions
 1. Bidders should assume adequate soil conditions. Report unsuitable conditions or materials to the Architect.

1.07 LINES AND GRADES

- A. Lay out all lines and grade work in accordance with Drawings and Specifications not presently established at the site. Maintain all established bounds and benchmarks and replace as directed any which are destroyed or disturbed.
- B. The words "finished grades" as used herein shall mean the required final grade elevations indicated on the Drawings. Spot elevations shall govern over proposed contours. Where not otherwise indicated, project site areas outside of the buildings shall be given uniform slopes between points for which finished grades are indicated or between such points and existing established grades.
- C. The word "subgrade" as used herein, means the required surface of subsoil, borrow fill, or compacted fill. This surface is immediately beneath site improvements, specially dimensioned fill, paving, topsoil or other surfacing material.

PART 2 – PRODUCTS

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2.01 MATERIALS

Earth materials used as fill shall be as designated below:

- A. Gravel Base: Gravel base shall be sandy gravel or gravely sand, free of organic material, loam, snow, ice, frozen soil, and other objectionable materials and well graded within the following limits:

U.S. Standard

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
3"	100
#4	40-75
#40	8-28
#200	0-8

- B. Compacted Granular Fill: Granular Fill shall be sandy gravel or gravely sand, free of organic material, loam, snow, ice, frozen soil, and other objectionable material and well-graded within the following limits:

U.S. Standard

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
6"	100
#4	30-85
#40	10-50
#200	0-8

- C. Crushed Stone: Shall consist of clean, hard, durable natural rock, free of organic matter, rock dust, and other contaminants and conforming to ASTM specification C-33, Table 2, Size 57, 1 in. to #4 sieve size or conforming to Massachusetts DPW specification of M2.01.3.
- D. Common Fill: Common Fill shall consist of well graded mineral soil substantially free of organic materials, loam, wood, trash, and other objectionable material which may be compressible or which cannot be compacted properly. Common Fill shall be unfrozen and shall not contain snow, ice, or frozen materials. Common Fill shall not contain stones larger than six (6) inches in largest dimension and shall have physical properties such that it can be readily spread

and compacted. Common Fill shall conform to Massachusetts DPW specification for Ordinary Borrow, M1.01.0.

- E. Pipe Bedding Material: Bedding Material under and around utilities shall be natural mineral sand meeting Massachusetts DPW specification M1.04.1, or ASTM specification C-33, Fine Aggregate.
- F. Dense Graded Crushed Stone: Uniformly pre-mixed composition of coarse aggregates of crushed stone or gravel and fine aggregates of natural sand or stone screenings, meeting Massachusetts DPW specification M2.01.7, and well graded within the following limits:

U.S. Standard

<u>Sieve Size</u>	<u>Percent Finer by Weight</u>
2"	100
1-1/2"	70-100
3/4"	50-80
#4	30-55
#50	8-24
#200	3-10

PART 3 – EXECUTION

3.01 CLEARING AND PROTECTION

- A. Outside the building area where walkways, roadways, or parking areas are located and within the building area and the lateral limits to be occupied by compacted granular fill, remove all trees, brush and other vegetation and all tree stumps and root systems.
- B. Locate existing underground utilities in the areas of work. If utilities are to remain in place, provide adequate means of protecting during excavation operations.
- C. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult the utility Owner immediately for directions. Cooperate with Owner and public and private service companies in keeping their respective services and facilities in operation. Repair damaged utilities to the satisfaction of the utility Owner.

3.02 EXCAVATION

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A. General

1. Excavation consists of the removal and disposal or stockpiling of soil materials encountered when establishing the required limits and grade elevations.
2. Conform to the elevations and dimensions shown on the drawings, extending a sufficient distance from pile caps and foundations to permit placing and removal of concrete formwork, installation of services, other construction, and for monitoring.
3. The slab-on-grade floor slab shall bear on a minimum 18 inch thick layer of compacted granular fill as specified herein.
4. All material encountered during excavation shall be classified as general excavation. No additional payment shall be made for removal of materials encountered in the excavation including concrete slabs, foundation walls etc. The excavation operations shall be conducted in a manner to insure the most efficient reuse of excavated materials where suitable. Suitable materials shall be used or stockpiled for later use in backfill and subgrade preparation.
5. All surplus excavated material not used to fulfill requirements of the Contract shall become the property of the Contractor and shall be removed from the site and legally disposed of.
6. When excavations have reached the prescribed depths, the Architect shall be notified to observe the conditions. Contractor will receive notification to proceed if bearing conditions meet the design requirements.
7. If unsuitable bearing materials are encountered at the required subgrade elevations, carry excavations deeper and replace the excavated material with compacted granular fill, as directed by the Architect.
8. Authorized removal of unsuitable material and its replacement as directed will be paid on the basis of contract conditions relative to changes in the work.

B. Earth Excavation

1. Excavate earth utilizing appropriate equipment in sufficient quantity and sizes to expeditiously perform the excavation required to facilitate construction of the structures, utilities, pavements, and other site improvements to the lines and grades specified and/or indicated on the Drawings.
2. Prevent disturbance to soil subgrades

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3. If any part of the excavation is carried, through error, beyond the depth and dimensions indicated on the drawings or specified herein, the Contractor shall, at his own expense, furnish and install compacted granular fill as directed by the Architect, without additional cost to the Owner.
4. Sloped sides of excavations must be stable slopes that comply with codes and ordinances having jurisdiction.

D. Trench and Pit Excavation

1. Excavate trenches to the geometry lines and grades indicated on the drawings for the particular item to be installed.
2. Perform excavation operations in trenches in general conformations with "OSHA Standards and Interpretations, Subparagraph P - Excavation, Trenching and Shoring."
3. Prepare the bottom of the trench excavation to receive bedding material and pipes in accordance with respective specifications for utilities to be placed in the trenches. In the absence of subgrade preparation requirements in the respective specification sections for utilities, Section 3.05, herein applies.
4. Excavate all rock and other hard materials, if encountered, to at least six inches below the pipe at all points. Refill such space and all other cuts below grade with compacted granular fill.
5. Excavation for manholes, catch basins, drain, inlets, and other related structures shall be as necessary but with 12 inch minimum clearance on all sides.

3.03 TEMPORARY EXCAVATION SUPPORT

- A. It is the responsibility of the Contractor to provide protection to provide safe and stable excavations at all times during construction until the permanent structures, shown on the Drawings, have been constructed, achieve adequate strength, and are accepted by the Engineer as being complete.
- B. Temporary excavation support elements shall be designed by a registered professional engineer, employed by or retained by the Contractor. Designs shall conform to the requirements of the State of Massachusetts, Basic Building Code and good engineering practice.

3.04 DEWATERING

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- A. Provide, maintain, and operate pumps and related equipment, including standby equipment, of sufficient capacity to keep excavation free of all water at all times and under any and all contingencies that may arise until the structures attain their full strength.
- B. Maintain groundwater in the bearing strata at a safe level at all times by methods which prevent loss of fines or other disturbance to these strata. If the methods employed have not been adequate and the bearing value of the soil has been reduced, removed disturbed soil as directed and replace with compacted granular fill or concrete at no expense to the Owner.

3.05 SUBGRADE PREPARATION AND PROTECTION

- A. General
 - 1. Complete the excavations to the specified or indicated limits and required depths, plus any additional depth required to accommodate drainage layers, pipe, etc. for Contractor-designed temporary dewatering system(s).
 - 2. Remove any additional materials below subgrade levels which are unsuitable, as directed by the Architect.
 - 3. Fill all holes and low points, which will not otherwise be removed in the course of the Work, to the indicated subgrade level.
- B. Proofrolling Subgrades
 - 1. The Contractor shall proofroll all subgrades prior to proceeding with work in the vicinity.
 - 2. Proofrolling shall consist of at least two (2) complete coverages over the designated area(s) with approved heavy compaction equipment or a fully loaded 10-wheel dump truck.
 - 3. Soft spots detected by the Owner's Geotechnical Engineer or testing agency shall be removed and replaced with compacted granular fill upon confirmation by the Architect.
- C. Cold Weather Protection
 - 1. Protect frost susceptible excavation subgrades against freezing when the atmospheric temperature is less than 35 degrees F. Should protection fail, remove frozen materials and replace with concrete or compacted granular fill, as directed, at no cost to the Owner.

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3.06 PLACEMENT AND COMPACTION OF MATERIALS

A. General

1. All fill materials shall be placed "in-the-dry" on subgrades acceptable to the Architect. The Contractor shall dewater excavated areas as required to perform the work, and in such a manner as to preserve the undisturbed state of the subgrade material. The Contractor shall drain away ponded areas as required to perform the placement of fill "in-the-dry".
2. During compaction operations incidental compaction due to traffic by construction equipment, other than used specifically in compaction operations, will not be credited toward the required minimum coverages specified.
3. Bulldozers, trucks, and other mechanical contrivances used in placement of fill materials are expressly prohibited from approaching within 8 feet of backfilled building walls.
4. Placement of all specified fill materials shall be systematically conducted in the specified uniform layer thickness which is measured in all cases prior to compaction.
5. Compaction of fill materials shall be conducted by a minimum of four (4) complete coverages with acceptable compaction equipment to a specified density which is expressed as a percentage of maximum dry density as determined by ASTM D1557.

B. Backfill excavations as promptly as Work permits, but not until completion of the following:

1. Acceptance by the Architect of construction below finish grade including, where applicable, dampproofing, waterproofing, and perimeter insulation, if any.
2. Completion of quality control testing, approval, and recording locations of underground utilities.
3. Removal of concrete formwork.
4. Removal of temporary earth support elements as specified herein and backfilling of voids with materials acceptable to the Architect.
5. Removal of trash and debris.
6. Permanent or temporary horizontal bracing is in place on horizontally supported walls.

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C. Compaction Equipment

1. In all cases, the character, efficiency and acceptability of the Contractor's compaction equipment shall be subject to the approval of the Architect based on observed or documented field performance.
2. Compaction in confined areas (against walls, piers, and in trenches) shall be conducted with acceptable equipment such as hand-guided vibratory compactors or mechanical tampers. Appropriately sized vibrator rollers should be used for walkways and paved areas.
3. Compaction by puddling or jetting is prohibited.
4. Exercise care in the placement of backfill against wall and directly in contact with waterproofed structures such that stones contained in the backfill do not damage waterproofing.
5. Repair any damage to waterproofing which occurs during placement and compaction operations at no additional cost to Owner.
6. Control groundwater by ditches, sumps, or sloped surfaces to permit collection and removal efficiently and with minimal disturbance to materials being placed.
7. Fill materials of the various types specified shall generally be placed and compacted within the limits and to the thickness indicated on the Drawings unless otherwise specified.
8. Do not place fill material on surfaces that are muddy, frozen, or contain frost or ice.
9. Place fill materials evenly adjacent to structures to required elevations. Take care to prevent wedging action of backfill against structures by carrying the material uniformly around the structure to approximately the same elevation in each lift.
10. Prior to placing fill materials complete the specified ground surface and subgrade preparation for materials encountered at ground surface and at subgrade levels.
11. Fill shall not be placed when the atmospheric temperature is less than 30 degrees, unless prior approval is given by the Architect. In addition, during freezing weather, the following shall apply:
 - a. A layer of fill shall not be left in an uncompacted state at the close of a day's operations. Prior to terminating operations or the day, the final layer of fill, after compaction, shall be rolled with a

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smooth-wheeled roller to eliminate ridges of soil left by tractors, trucks, and compaction equipment.

- b. A layer of compacted fill shall not be placed on snow, ice, or soil that was permitted to freeze prior to compaction. Removal of these unsatisfactory materials will be required as directed by the Architect.

- 12. Where piping is laid in filled areas, place the fill before any pipe is placed, and compact as specified to a depth of not less than two feet above the proposed flow line of the pipe. A trench shall then be excavated to the required grade, of sufficient width to permit thorough tamping of the fill under the bells and around the pipe.

D. Moisture Control

- 1. The amount of moisture in any one layer of fill material shall be as uniform as practicable throughout. The upper limit of water content in materials shall be that which will permit handling, spreading and will permit proper compaction and shall not exceed a value of three (3) percentage points on the wet side of optimum water content as determined by ASTM D1557. The lower limit of water content shall not be less than two (2) percentage points below optimum water content. Material which is too wet, shall be spread and permitted to dry, assisted by mechanical agitation, if necessary, until the water content is reduced to a value within the specified limits.
- 2. Each layer of material which is too dry shall be sprinkled with water, and the water worked into the material by mechanical methods until a uniform distribution of moisture shall be accurately controlled in amount so that free water will not appear on the surface during, or subsequent to, compaction. Should excess water be applied to any part of material, such that materials are too wet to obtain the specified compaction, the compaction operations and all work on that section of placed material shall be suspended until the water content of the material is reduced to a value within the specified limits.

E. Granular Fill and Gravel Base Course

- 1. Place in layers not to exceed nine inches when utilizing heavy compaction equipment and in six inch layers when utilizing light, hand-operated compaction equipment.
- 2. Compact to at least 95 percent of maximum dry density.

F. Common Fill

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1. Place in layers not to exceed twelve inches.
2. Compact to at least 92 percent of maximum dry density.

3.07 GRADING

A. General

1. Perform all rough and finish grading required to attain the elevations shown on the Drawings.

B. Grading Tolerances

Upon completion of required backfilling, compacting, and grading, the grade surface conform to the following requirements and tolerances:

1. General: Uniformly grade areas within limits of grading under this Section, including adjacent transition areas. Smooth finish surfaces within specified tolerances, compact with uniform levels or slopes between points where elevations are shown, or between such points and existing grades.
2. Grading outside Building Lines: Finish surfaces free from irregular surface changes, and as follows:
 - a. Lawn and Planting Areas - Finish areas to receive topsoil to within not more than 0.10 foot above or below the required subgrade elevations.
3. Grading Surface of Fill under Pavements, Walks, and Slabs-on-Grade (both within and outside of Building): Grade smooth and even, free of voids, compact as specified, and to the required elevation. Provide final grades within a tolerance of 1/2 inch when tested with a 10 foot straight edge.

C. Treatment after Completion of Grading

1. After grading is completed and the Architect has finished inspection, permit no further excavating, filling, or grading except with the approval of and inspection by the Architect.
2. Use of all means necessary to prevent erosion of freshly graded areas during construction and until such time as permanent drainage and erosion control measures have been installed.

END OF SECTION

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DIVISION 02000

SUBSURFACE INVESTIGATION & DEMOLITION

SECTION 02901

LANDSCAPING REPAIR

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Landscaping Repair Work required to complete the work of the contract including all the Landscaping Repair Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Landscaping Repair Work with all the other trades for the project. Provide all demolition and disposal work to complete the Landscaping Repair Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Landscaping Repair Work includes, but is not limited to, replacing and planting of trees, shrubs and grass, including mulching, staking and related planting procedures of landscaping items only if damaged during construction.
 - 1. Preparation of final sub-grades in planted areas.
 - 2. Furnishing topsoil at areas to be planted.

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3. Planting mixes
4. Protection, maintenance and guarantee of plant materials.
5. Existing tree protection and care
6. Samples of materials.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other Sections of the Specifications:
 1. Section 02070, Selective Demolition

1.04 QUALITY ASSURANCE

- A. Comply with "Standardized Plant Names" as adopted by the latest edition of the American Joint Committee of Horticultural Nomenclature. Names of varieties not listed conform generally with names accepted by the nursery trade. Provide stock true to botanical name and legibly tagged.
- B. Comply with sizing and grading standards of the latest edition of "American Standard for Nursery Stock". A plant shall be dimensioned as it stands in its natural position.
- C. All plants shall be nursery grown under climatic conditions similar to those in the locality of the project for a minimum of 2 years.

1.05 SAMPLES

- A. Submit the following samples in accordance with the requirements of GENERAL CONDITIONS and SUPPLEMENTAL GENERAL CONDITIONS.
 1. Mulch
 2. Anchors
 3. Wire
 4. Hose
 5. Turnbuckles and cable clamps
 6. Wrapping
 7. Topsoil

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- B. Provide samples for testing as required by Architect.

PART 2 – PRODUCTS

2.01 TOPSOIL

- A. Topsoil shall be a fertile, friable natural topsoil not excessively acid or alkaline and free of toxic substances harmful to plant growth. Topsoil shall be without admixture of subsoil and free from clay lumps, stumps, roots, debris, stones, or other similar substances 2" or more in diameter.

It shall be obtained from a well-drained arable site with a history of good plant growth. Submit sample for approval by the Landscape Architect.

2.02 SLUDGE FERTILIZER

- A. Sludge fertilizer shall be an organic activated, granular, heat dried sludge and shall contain the following minimum percentages by weight: 6% Nitrogen, 4% Phosphoric Acid, and other nutritious basic elements. The sludge fertilizer shall be delivered as specified in standard size bags, showing weight analysis and name of processor and shall be stored in a weatherproof storage place.

2.03 COMPOSTED COW MANURE

- A. Manure shall be a derivative of cattle manure which has undergone a period of composting rendering it into a crumbly, odor free, weed free material containing beneficial natural soil bacteria. It shall be free of harmful chemicals and other injurious substances. Manure shall be free of refuse of any kind and shall not contain more than 25% of straw, shavings, leaves, or other material. Manure shall not be more than 2 years nor less than 9 months old.
- B. A composition of peat moss or peat humus to which has been added dehydrated manure such as bovung in the proportion of 100 pounds of dehydrated manure per cubic yard of peat, may be substituted for manure as specified above.

2.04 BONE MEAL

- A. Bone meal shall be commercial raw bone meal, finely ground, having a minimum analysis of 4% nitrogen and 20% phosphoric acid.

2.05 WATER

- A. Water will be furnished by Owner on the site. Hose and other watering equipment shall be furnished by Contractor.

2.06 PLANT MATERIALS

- A. Contractor shall replace in kind and plant all plants or lawn damaged or killed during construction. No substitutions will be permitted. All plants shall be nursery grown unless specifically authorized to be collected.
- B. Plant shall be in accordance with the USA Standard for Nursery Stock of the American Association of Nurserymen.
- C. All plants shall be typical of their species or variety and shall have a normal habit of growth and be legibly tagged with the proper name. All plants shall have been grown under climatic conditions similar to those in the locality of the site of the project under construction, or have been acclimated to such conditions for at least 2 years. Trees shall have straight trunks and all abrasions and cuts shall be completely culled over.
- D. The root system of each shall be well provided with fibrous roots. All parts shall be sound, healthy, and vigorous, well branched and densely foliated when in leaf. They shall be free of disease, insect pests, eggs or larvae.
- E. All plants must be moved with the root systems as solid units with balls of earth firmly wrapped with burlap. The diameter and depth of the balls of earth must be sufficient to encompass the fibrous root feeding system necessary for the healthy development of the plant. No plant shall be accepted when the ball of earth surrounding its roots has been badly cracked or broken preparatory to or during the process of planting or after the burlap, staves, ropes or platform required in connection with its transplanting have been removed. The plants and balls shall remain intact during all operations. All plants shall be freshly dug. No plants from cold storage or previously heeled-in will be accepted. All plants that cannot be planted at once must be heeled-in by setting in the ground and covering the balls with soil and then watering.
- F. The height of the trees (measure from the crown of the roots to the tip of the top branch) shall be not less than that of the tree being replaced. The branching height for shade trees next to walks shall be 7'. This may be obtained by pruning after delivery if this does not ruin the shape or form of the trees or cause unsightly scars. All cuts shall be shellacked. The trunk of each tree shall be a single trunk growing from a single unmutilated crown of roots. No part of the trunk shall be conspicuously crooked as compared with normal trees of the same variety. The trunk shall be free from sunscald, frost cracks, or wounds resulting from abrasions, fire or other causes. No pruning wounds shall be present having a diameter exceeding 2" and such wounds must show vigorous bark on all edges. No trees which have had their headers cut will be accepted.
- G. Shrubs shall meet the requirements for spread of height of the shrub being replaced. The measurements for height are to be taken from the ground level to

the average height of the shrub and not to the longest branch. The thickness of each shrub shall correspond to the trade classification No. 1.

Single stemmed or thin plants will not be accepted. The side branches must be generous, well-twiggged, and the plant as a whole well branched to the ground. The plants must be in a moist vigorous condition, free from dead wood, bruises or other root or branch injuries.

2.07 MULCH

- A. Mulch material shall be softwood hemlock bark shredded into fibrous pliable slices generally not exceeding 1/2" in width.

Mulch shall be 98% organic matter with the pH range 3.5 to 4.5. Moisture content of packaged material shall not exceed 35%. Submit sample.

2.08 STAKING MATERIALS

- A. Stakes for supporting trees shall be of sound wood, uniform in size, free of knots and holes. They shall be nominal 2" x 4" and 10' long for support staking, 3' long for guy wire anchor stakes. Stakes shall be stained dark brown.
- B. Wire for tree bracing and guying shall be pliable No. 12 gauge galvanized steel.
- C. Hose for covering wire shall be new or used 2 ply reinforced rubber garden hose not less than 1/2" inside diameter.
- D. Wrapping material shall be first quality, heavy waterproof crepe paper manufactured for this purpose, or first quality burlap not less than 4" nor more than 6" wide of suitable strength and manufactured for this purpose.

2.09 SEED

- A. Seed mixture shall be fresh, clean, new crop seed. Grass shall be of the previous year's crop and in no case shall the weed seed content exceed 0.25% by weight. The seed shall be furnished and delivered in the proportion specified below in new, clean, sealed and properly labeled containers. All seed shall comply with State and Federal seed laws. Submit manufacturer's Certificates of Compliance. Seed that has become wet, moldy or otherwise damaged shall not be acceptable. Chewings fescue, hard fescue, tall fescue and rygrass shall contain *Acromonium* endophytes. Seed containing endophyte must be kept cool and dry at all times; do not stockpile in the sun.

- 1. Seed Mixture Composition (not to be used on terraces)

	Proportion	Germination	Purity
<u>Common Name</u>	<u>By Weight</u>	<u>Minimum</u>	<u>Minimum</u>

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Creeping Red Fescue	50%	85%	95%
Kentucky Bluegrass	40%	85%	90%
Perennial Rye	10%	90%	90%

- a. Bluegrass and ryegrass varieties shall be within the top 50 percent and 25 percent respectively, of varieties tested in National Turfgrass Evaluation Program, or currently recommended as low maintenance varieties by University of Massachusetts or the University of Rhode Island.
- b. Seeding rate for the General Lawn Seed Mix shall be 6 pounds per 1,000 square feet.

PART 3 - EXECUTION

3.01 METHODS

- A. Personnel: The planting and lawn construction shall be performed by personnel familiar with the accepted procedure of planting and under the constant supervision of a qualified planting foreman.
- B. Planting Seasons:
 1. Deciduous plants shall be planted only when dormant, that is, before leaves appear in the spring and subsequent to their loss in the fall, unless otherwise directed by the Architect.
 2. Evergreen plants may be planted in the spring until new growth appears and any time between September 15 and November 30.
 3. If the building completion date prohibits in-season planting, the Contractor shall complete his work within the project date and prepare himself for out-of-season planting, including wiltproofing and extra watering.

Plant guarantee periods remain as stated below. No frozen ground planting.
- C. Lawn Replacement
 1. Remove all areas of dead lawn including root system. The Architect shall be the sole authority as to the extent of lawn replacement areas.
 2. Contractor to provide a minimum of 6" of new loam in all areas of lawn replacement. Peat moss shall be mixed into existing hard and/or clay type soil. Architect shall determine the need for and amounts of peat moss required.

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3. New grass shall be sod of rye grass, blue grass or a combination of both.
4. Apply starter fertilizer to all areas of newly planted grass.
5. Maintain constant moist soil conditions, a minimum of thirty days.

D. Planting of Trees, Shrubs, and Vines:

1. Unless otherwise directed by the Architect, the indication of a plant to be replaced is to be interpreted as including the digging of a hole, furnishing a plant of the specified size, the work of planting and mulching, and guying, staking and wrapping where called for.
2. One or more stockpiles of approved backfill mixture shall be maintained at all times during the planting operations. The backfill mixture shall consist of 50% topsoil and 50% specified composted cow manure by volume, thoroughly mixed together. The following shall be added to each area of tree replacement:

5 lbs. of sludge fertilizer

5 lbs. of bone meal

5 lbs. of cottonseed meal

The following shall be added to each area of lawn replacement:

1 lb. sludge fertilizer

1 lb. bone meal

1 lb. cottonseed meal

3. Locations for all plants shall be staked on the ground and must be approved by the Architect before any excavation is made. Adjustments in locations and outlines shall be made as directed. In the event that areas for planting are prepared and backfilled with Backfill Mixture to grade prior to commencement of lawn operations, they shall be so marked that when the work of planting proceeds, they can be readily located.

In case underground obstructions such as ledge or utilities are encountered, locations shall be changed under the direction of the Architect without extra charge.

4. Holes for trees shall be at least 2' greater in diameter than the spread of the root systems and at least 6" deeper than root ball. Holes for shrubs and vines shall be at least 12" greater in diameter than the spread of the root system and at least 18" deep.

5. Specified backfill mixture shall be spread and incorporated with loam in all areas of tree or lawn replacement and as directed by the Architect.
6. Planting: All plant roots and earthballs must be kept damp and thoroughly protected from sun and/or drying winds at all times from the beginning until the final operation, during transportation, and on the ground until the final operation of planting. The plants shall be planted in the center of the holes and at the same depth as they previously grew. They shall be plumbed and turned as directed. Specified Mixture shall be backfilled in layers of not more than 9" and each layer watered sufficiently to settle before the next layer is put in place. Backfill Mixture shall be tamped under edges of balled plants. Enough Backfill Material shall be used to bring the surfaces to finish grade when settled.
 - a. A saucer shall be provided around each plant.
 - b. Plants must be flooded with water twice within the first 24 hours of time of planting.
 - c. Wrapping: The trunks of all shade trees shall be wrapped spirally from the ground to the height of the second branches or as directed. Wrap brown cord 3" on center spirally to hold paper neatly in place.
 - d. Provide a 3" layer (after settlement) of bark mulch over the surface of each saucer and over the entire area of shrub beds.
 - e. Stake all trees.

E. PLANTING COORDINATION:

1. Replacement plantings must match existing for type and caliber of trees and size of shrubs.
2. The Contractor shall be responsible for selection and tagging at nurseries stocking the specified materials.
3. Contractor shall inform Architect when planting will commence, anticipated delivery date of material and have made and provided for the staking of all plants and plant bed.
4. Failure to notify the Architect in advance, in order to arrange proper scheduling may result in loss of time or removal of any plant or plants not installed as specified or directed.

3.02 PRUNING

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- A. Each tree and shrub shall be pruned in accordance with American Nurserymen Association Standards to preserve the natural character of the plant.
- B. All dead wood or suckers and all broken or badly bruised branches shall be removed. In addition, 1/3 of the wood may be removed by thinning out to balance root loss due to transplanting providing the natural character and form of the tree is preserved. Never cut a leader.
- C. Pruning shall be done with clean, sharp tools.
- D. Cuts over 1" in diameter shall be painted with an approved asphaltic tree paint. Paint shall cover all exposed living tissue.

3.03 MAINTENANCE

- A. Maintenance shall begin immediately after each plant is planted. Plants shall be watered, mulched, weeded, pruned, sprayed, fertilized, cultivated and otherwise maintained and protected for a minimum of 30 days until provisional acceptance. Settled plants shall be reset to proper grade and position, planting saucer restored and dead material removed. Stakes and wire shall be tightened and repaired.

Defective work shall be corrected as soon as possible after it becomes apparent and weather and season permit.

- B. Upon completion of planting and prior to provisional acceptance, remove from the site excess soil and debris, and repair all damage resulting from planting operations.
- C. Protection: Planting areas and plants shall be protected against trespassing and damage of any kind. This shall include the provision and installation of approved temporary fencing if necessary. If any plants become damaged or injured by vandalism or neglect of others prior to provisional acceptance, the Contractor shall treat or replace them at his own expense.

3.04 ACCEPTANCE AND GUARANTEE

- A. After the 30-day maintenance period, the Contractor shall request from the Architect an inspection to determine whether the plant material is acceptable. If the plant materials and workmanship are acceptable, written notice shall be given by the Architect to the Contractor stating that the guarantee period begins from the date of inspection.
- B. If a substantial number of plants are sickly or dead at the time of inspection, acceptance will not be granted, and the Contractor's responsibility for maintenance of all plants shall be extended until replacements are made. Replacements shall conform in all respects to specifications for new plants and shall be planted in the same manner.

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- C. Materials and Operations: All replacements shall be plants of the same kind and size specified on the plant list. They shall be furnished and planted as specified above. The cost shall be borne by the Contractor. Replacements resulting from the removal, loss or damage, due to occupancy of the project in any part, vandalism, or acts of neglect on the part of others, physical damage by animals, vehicles, etc., and losses due to curtailment of water by local authorities, will be approved and paid for by the Owner.
- D. Plants shall be guaranteed for a period of one year after inspection and shall be alive and in satisfactory growth at the end of the guarantee period.
- E. At the end of the guarantee period, inspection will be made again. Any plant required under this Contract that is dead or unsatisfactory shall be removed from the site. These shall be replaced during the normal planting season, until the plants live through one year.

END OF SECTION

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DIVISION 03000

CONCRETE

SECTION 03300

STRUCTURAL CONCRETE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Structural Concrete work required to complete the work of the contract including all the Structural Concrete work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Structural Concrete work with all the other trades for the project. Provide all demolition and disposal work to complete the Structural Concrete work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Structural Concrete work includes, but is not limited to:
 - 1. New concrete slabs and pads.
 - 2. Drilling and doweling with non-shrink grout into existing, adjacent, concrete sidewalks, curbs, walls, and stair.

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3. Installation of all steel reinforcing.
4. Where existing concrete slabs are cut and removed, fill with concrete over properly prepared base.

1.03 RELATED WORK

- A. The following items of related work are specified and included in other Sections of the Specifications:
 1. Excavation, backfilling, and rough grading.
 2. Carpentry, except formwork specified herein.
 3. Miscellaneous Metals.

1.04 REFERENCE STANDARDS

- A. The work shall conform to the codes and standards of the following agencies as further cited herein:
 1. ASTM: American Society for Testing Materials, 1916 Race Street, Philadelphia, PA, 19103, USA as published in "Compilation of ASTM Standards in Building Codes".
 2. ACI: American Concrete Institute, P.O. Box 19150, Redford Station, Detroit, MI 48219.
 3. CRSI: Concrete Reinforcing Steel Institute, 180 North LaSalle Street, Chicago, IL 60601.

1.05 SUBMITTALS

- A. Shop Drawings:
 1. Submit complete shop drawings in accordance with the GENERAL CONDITIONS for Consultant's approval. Show plans, elevations, details or job conditions, of all the new concrete work (base contract and any accepted Alternates) and their relationship to other work.
 2. Drawings shall consist of sections, plans and details clearly showing location, sizes and spacing of reinforcing that is shown on the working drawings. Include schedules and diagrams to indicate bends, sizes and lengths of reinforcing members. Indicate location of construction and control joints and show additional reinforcing required at these locations.

Schedule all accessories and chair bars required to hold slab or other reinforcing in place.

3. Shop drawings will be checked for general location, size, spacing and design details and returned either approved or marked for correction. Make revisions where required and resubmit. No work shall be fabricated for which shop drawings have not been approved.
4. Upon final approval of shop drawings, furnish all copies needed for erection and for use of other trades.
5. Contractor shall be responsible for furnishing and installing all materials called for in Contract Documents even though these materials may have been omitted from approved shop drawings.

B. Architectural Concrete Samples

1. Submit two samples approximately 12 inches by 2 inches thick to illustrate quality, color, and texture of surface finishes. Approved samples shall be retained at the site for use as a "Control Sample".

1.06 QUALITY ASSURANCE

- A. In addition to other standards listed below, concrete shall comply with ACI 301 "Specifications for Structural Concrete".
- B. All concrete work shall be performed to insure for the entire job homogeneous concrete having required strength, durability and weathering resistance, without planes of weakness, and other structural defects, and free of pronounced honeycombs, air pockets, voids, projections, offsets of plane, and other defacements on exposed surfaces.
- C. Manufacturer's statement attesting to compliance of each shipment of cement with standard specification shall be submitted to the Consultant upon request.

1.07 STORAGE AND HANDLING

- A. Handle and store cement to protect from air, ground or other moisture; to permit ready access for inspection; and to protect from contamination by foreign materials. Cement stored longest shall be used first. Caked or hardened cement shall not be used.
- B. Aggregate Protection: Protect aggregates from foreign materials, and store each separately until placed in mixer.

1.08 COORDINATION

STRUCTURAL CONCRETE
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- A. The work of this Section shall be coordinated with that of other trades affecting, or affected by, this work, as necessary to assure the steady progress of all work under the Contract.

1.09 GUARANTEE

- A. In addition to the specific guarantee requirements of the GENERAL CONDITIONS and SUPPLEMENTARY GENERAL CONDITIONS, the Contractor shall obtain in the Owner's name the standard written manufacturer's guarantees are offered in the manufacturer's published product data. All these guarantees shall be in addition to, and not in lieu of, other liabilities which the Contractor may have by law or other provisions of the Contract Documents.

PART 2 - PRODUCTS

2.01 CONCRETE MATERIALS

- A. Cement: Portland Cement Type II conforming to ASTM C150. Use only one brand and type throughout the project.
- B. Fine Aggregate: Natural sand consisting of clean, hard, durable uncoated particles conforming to ASTM C33. Organic content shall be determined according to ASTM C40, and supernatant liquid above test sample shall show color no darker than reference standard color solution prepared at same time. Grading for fine aggregate shall be uniform, and fineness modulus shall never vary more than 0.15 from that of sample used in design mixes.
- C. Coarse Aggregate: Crushed stone or gravel conforming to ASTM C33. Maximum size: 3/4 inch.
- D. Water: From approved source, potable, clean, and free from oils, salt, alkali, organic matter, and other deleterious material.
- E. Water-Reducing Agent: "WRDA" by W.R. Grace and Co., or equal conforming to ASTM C49 as approved by the Consultant. Water reducing agent shall be by same manufacturer as air entraining agent.
- F. Air Entraining Agent: "Darex" by W.R. Grace Company, or equal conforming to C260 as approved by the Consultant. Total air entrained shall be 5% of volume concrete.
- G. Architectural Concrete White Color Additive: As selected by the Architect.

2.02 CONCRETE MIX

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A. Concrete Mix Requirements:

<u>Compressive Strength</u>	<u>Max. Water to Cement Ratio</u>	<u>Min.Cement Factor</u>
3000 psi	6.0 gallons per sack	5.5 bags per yard
4000 psi	5.5 gallons	6.0 bags per yard

Submit proposed mix to Consultant for approval before use in work. See General Notes for detail requirements.

- B. Maximum size aggregate shall be 3/4 inches.
- C. Maximum slump shall be 4 inches.
- D. Comply with requirements of ACI 613 "Recommended Practice for Selecting Proportions for Concrete", and ASTM C94 for Ready Mixed Concrete.
- E. Exterior Exposed Concrete: Exterior concrete slabs and walls exposed to view and weather shall be air entrained, shall have a minimum compressive strength of 4000 PSI, and shall be uniform in color and finished appearance to the satisfaction of the Consultant.
- F. Admixtures causing accelerated setting of cement in concrete such as calcium chloride shall not be used.

2.03 FORMWORK

- A. Formwork shall be in accordance with ACI 347 "Recommended Practice for Concrete Formwork".
- B. Formwork materials shall be exterior "Plyform" Class 1, B-B not less than 3/4 inches thick.
- C. Forms for Concealed Concrete Work: Forms for all work shall be of sound plywood or other material capable of providing finished surfaces conforming to the intent stated above. Joints shall be sufficiently tight to prevent leakage and shall be flush in the plane of the surface. Place ties in adequate quantity to prevent springing of forms, in locations which will be concealed from view in the finished work and will not interfere with other work under this Section or other Sections.
- D. Footing Forms: Forms for footings may be of common lumber or of forms as specified herein for concealed walls, but shall be so erected as to provide full

bearing on undisturbed soil, parallel sides, level top surfaces, and cross sections symmetrical with respect to the supported wall, and having dimensions not less than those indicated on the Drawings. No footings shall be placed until completed form installation has been approved by the Consultant and all footings shall have side forms unless prior approval is given to use earth as side forms.

- E. Forms for Architectural Concrete: Provide forms and form facing materials of metal, plastic, wood, other acceptable material that is non-reactive with concrete and will produce required finish surfaces. Forms will be constructed without the use of internal form ties.
- F. Form Coatings: All forms shall be oiled before reinforcing is placed with a non-staining oil or liquid form coating as approved by the Consultant.

2.04 REINFORCING STEEL

- A. Furnish, fabricate, and install in forms all concrete reinforcement and accessories required for the Work. Submit shop drawings for approval.
- B. All reinforcing steel shall conform to ASTM A615, Grade 60.
- C. Bar reinforcing shall be shop formed cold to dimensions indicated on drawings. Detailing, fabricating, and erecting reinforcing shall conform to ACI 315 "Manual of Standard Practice for Detailing Concrete Structures" and ACI 318 "Building Code Requirements for Reinforced Concrete".
- D. Reinforcement shall be free of paint, dirt, oil, and excessive rust and scale.
- E. Chairs, bolsters and the like shall be preformed and manufactured for the express use involved.

PART 3 - EXECUTION

3.01 PLACING REINFORCING STEEL

- A. Reinforcing shall be accurately placed as indicated on approved shop drawings and in accordance with CRSI 59 and ACI 318. Dowels shall be tied in place prior to placing concrete. Do not install reinforcing after concrete is placed by inserting into forms.
- B. All reinforcing shall be securely tied and supported to maintain proper spacing and cover during placing operations.
- C. Install anchor bolts, steel bearing plates, angles and other items furnished under other Sections for building into concrete.

- D. All slab reinforcing shall be positioned in place and fully supported on slab bolsters.

3.02 PLACING CONCRETE

- A. Contractor to provide dimensioned shop drawings indicated extents, locations and details of all construction, expansion and control joints as well as reinforcing. Placement shall not occur prior to Architect / Owner approval.
- B. Deposit concrete only after removal of all water, dirt, and foreign matter from forms, and after checking of forms, sleeves, inserts and reinforcing for proper location.
- C. Place concrete only by those methods and arrangements of equipment which comply with Parts V and VI of ACI 614 "Recommended Practice for Measuring, Mixing and Placing Concrete".
- D. Vibrate concrete during deposition with internal type, high frequency mechanical vibrator having a speed of not less than 7,000 rpm. Do not use vibrators to move concrete. Supplement all vibration by wooded spade muddling between reinforcing and forms and into corners.

3.03 FIELD QUALITY CONTROL

- A. The Consultant may select a qualified Testing Laboratory or Materials Engineer to make inspection tests during the course of work as specified herein and as otherwise considered necessary. Costs of all tests will be paid by the Owner and are not included in the Contract Sum.
- B. All measuring, mixing, placing and curing may be subject to inspection by the Laboratory and approval by the Consultant. However, such inspection and approval shall in no way relieve Contractor of his responsibility to fulfill the requirements of this Contract.
- C. Contractor shall cooperate in making tests and shall be responsible for notifying designated laboratory in sufficient time to allow taking of cylinders at time of pour.
- D. Where test show that concrete is below specified strength, Contractor shall remove all such concrete, as directed by the Consultant. Full cost of removal of low strength concrete and its replacement with concrete of proper specified strength shall be borne by the Contractor.

3.04 CURING AND PROTECTION

- A. Curing shall be started as soon as the concrete has hardened sufficiently to prevent surface damage.
- B. Surfaces shall be wet cured for at least five (5) days by use of blankets, or approved curing compound. Blankets shall be thoroughly soaked at all times during this period.
- C. In hot weather, all concreting shall be done in accordance with the recommendations of ACI 605 "Recommended Practice for Hot Weather Concreting".
- D. In cold weather, all concreting shall be done in accordance with the recommendations of ACI 306 "Recommended Practice for Cold Weather Concreting". Do not place concrete when outside air temperatures are below 40 degrees F without provisions for enclosing and heating as approved by the Consultant.

3.05 FINISHING OF CONCRETE SURFACES

- A. Intent of Architectural Concrete Finish
 - 1. For all concrete surfaces exposed to view and to the weather, it is the intent of this Specification to require forms, mixtures of concrete, and workmanship so that concrete surfaces, when exposed, will require no patching.
 - 2. All concrete concealed from view, or which will in the opinion of the Consultant be concealed from view at any time when appearance will be a consideration, shall be free from defects affecting structural capacity but may have minor surface deficiencies which may be patched in accordance with the Specifications.
 - 3. All concrete not conforming to these requirements will be condemned by the Consultant and shall be properly and promptly removed and replaced with new work to the satisfaction of the Consultant, at no additional cost to the Owner.
- B. At other concrete that may be patched, for honeycomb concrete, stone pockets or voids, the loose concrete and loose cement shall be removed to sound hard concrete. The surface area shall be thoroughly wetted immediately prior to repair. New cement paste shall be used to fill in voids to a hard smooth surface even with adjacent concrete. For larger defects, repairs will be as directed by the Consultant.

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- C. All sidewalks and plaza concrete finishes shall have tooled control joints in pattern indicated with broom finish. If not shown, provide joints 5'-0" o.c. each way, maximum. Broom direction shall alternate from section to section.

3.06 FORM REMOVAL

- A. Do not remove forms or shoring until concrete members have acquired sufficient strength to support their weight and subsequent construction loads without deflection or distress.
- B. Remove forms in manner to assure safety of structure.
- C. Retain forms in place for a minimum period as follows (assuming curing temperatures above 50 degrees F.)
 - 1. Sidewalks and footings 2 days
 - 2. Walls 5 days

END OF SECTION

DIVISION 04000

MASONRY

SECTION 04210

BRICK MASONRY

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the materials and equipment to be furnished complete in every respect, and that this Contractor shall provide all items needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Brick Masonry Work required to complete the Work of the Contract including all the Brick Masonry Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Brick Masonry Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Brick Masonry Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, and each Subcontractor for the entire project so that all the Work can be properly and completely performed.
- B. Work included: Provide labor materials and equipment necessary to complete the Work of this section, including but not limited to the following:
 - 1. Masonry work associated with installation of steel lintels at openings in the masonry. Provide patching.
 - 2. Patching existing masonry walls at new openings and at openings created for shoring.

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1.03 QUALITY ASSURANCE

- A. Obtain materials from approved individual sources in sufficient quantities to complete each portion of the Work.
- B. Brick masonry units shall be of uniform quality, texture and color or a uniform blend within the ranges accepted for these characteristics to match original.
- C. Mortar ingredients shall be of uniform quality, texture and color to match original.
- D. Referenced Standards: Conform to State and Local Governing laws, Massachusetts or State Building Code, and the following standards:
 - 1. Brick institute of America.
 - 2. Portland Cement Association.
 - 3. ASTM.

1.04 SUBMITTALS

- A. Product Data:
 - 1. Submit manufacturer's product data for each type of masonry unit, accessory, and other manufactured products, including certifications that each type complies with specified requirements.
- B. Samples: All samples shall be presented for approval by the Owner
 - 1. Brick:
 - a. Brick shall match original in quality, texture, color and size.
 - b. Provide brick samples.
 - 2. Mortar:
 - a. Mortar shall match original texture, color, joint size and finish.
 - b. Provide fully washed, cured, and dry mortar samples in a variety of colors for decision by the Architect. Provide samples in advance of the Work so as not to adversely affect the schedule.
 - c. No limit to number of samples.
 - d. The City shall be contacted prior to the samples being performed in order that the pointing procedures can be viewed; said procedures shall be representative of the pointing procedures for

the entire project, provided they are performed per this specification section and BIA standards.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Deliver masonry materials in undamaged condition.
- B. Storage and Handling:
 - 1. Store and handle brick masonry units and materials to prevent their deterioration or damage due to moisture, temperature changes, contaminants, corrosion or other causes.
 - 2. Limit moisture absorption of brick masonry units and cement lime, etc., during delivery and until time of installation to the maximum percentage specified for brick for the average annual relative humidity as reported by the U.S. Weather Bureau Station nearest project site.
 - 3. Store cementitious materials off the ground, under weathertight covers or indoors, and kept clean and dry.
 - 4. Store aggregates where grading and other required characteristics can be maintained.
 - 5. Store masonry accessories including metal items to prevent deterioration by corrosion and accumulation of dirt.

1.06 PROJECT/SITE CONDITIONS

- A. Protection of Work:
 - 1. During erection, cover top of masonry element with waterproof sheeting at end of each day's Work.
 - 2. Cover partially completed structures when Work is not in progress.
 - 3. Extend cover min. 24 in. down both sides and hold cover securely in place.
 - 4. Do not apply loads for min. 3 days after building masonry walls.
- B. Staining:
 - 1. Prevent grout, mortar or soil from staining the face of masonry to be left exposed.
 - 2. Remove immediately grout or mortar in contact with such masonry.

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3. Protect base of walls from rain-splashed mud and mortar splatter by means of covering spread on ground and over wall surface.
 4. Protect sills, ledges, and projections from droppings of mortar.
- C. Cold Weather:
1. No Masonry Work will be performed in temperatures lower than 40 degrees F and no material will be allowed to freeze within 48 hours of installation.
 2. Provide temporary heat and winter protection at all new masonry to maintain temperature above 40 degrees F until cured.
 3. Mortar admixtures are not allowed on this project.

PART 2 – PRODUCTS

2.01 MATERIALS

A. Brick

1. New brick shall match original brick in color, size and texture. Contractor shall provide brick and provide samples to match each building.
2. Brick shall be hard burned, water struck, clay brick conforming to ASTM C216, Grade SW, Type FBS, except that compressive strength shall not be less than 6,000 psi (individual) nor 8,000 psi (average of five) nor shall water absorption exceed 10% (individual) or 8% (average of five) when subjected to 5-hour boiling test, all in accordance with testing procedures defined in ASTM C67.

B. Masonry Mortar

1. Mortar: Shall conform to ASTM C270, Type N, consisting of one (1) part Portland Cement (ASTM C150, Type 1, and meeting efflorescence requirements below), 1/2 to 1-1/4 parts hydrated lime (ASTM C207, Type S), and sand (ASTM C144) in quantity of not less than 2-1/2 nor more than 3 times the sum of the quantities of cement and lime, by volume.
2. New mortar at new brickwork and at all repointing locations shall match the original mortar in color, texture, aggregate and finish.
3. Tooled joint shall match original including depth of joint, shape of joint as well as amount of aggregate exposed.
4. Water shall be potable and free of injurious contaminants.

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5. No admixtures of any type will be permitted.
6. Mixing:
 - a. Combine and thoroughly mix cementitious, water, and aggregates in a mechanical batch mixer.
- C. Wall Ties for Replacement Work shall be two-part, stainless steel adjustable ties by Rhoman Haas, or approved equal.
- D. Through-Wall Flashing Materials
 1. New through-wall flashing pans shall be 28 ga. stainless steel [16oz. zinc coated copper] with [solder joints [lap joints bedded in non-hardening butyl sealant, Tremco - Curtainwall Sealant, Firestone - Water Block, Carlisle - Water Cutoff, or approved equal.]
 2. New Self Adhering through-wall flashing membrane within the wall masonry shall be PermaBarrier by W R Grace, Blue-Skin by Henry Company, or approved equal.
- E. Woven inserts for weephole slots shall be as manufactured by CavClear or Mortar Net, or approved equal, color to match mortar and filling opening to restrict insect access.
- F. Cleaning Agent: Detergent, solvent cleaner, non-acid solution type: as manufactured by Prosoco, Sure Klean, or equal.

PART 3 - EXECUTION

3.01 MASONRY CONSTRUCTION, GENERAL

- A. Masonry Work shall be done by skilled workmen, fully instructed as to the requirements of this specification, and adequately supervised during the Work.
- B. Cold Weather Masonry:
 1. Do no Masonry Work when outdoor temperatures are less than 40° F unless provisions are made to adequately protect the masonry materials and finished Work from frost by heating materials, enclosing the Work, and heating the enclosed spaces.
 2. Antifreeze admixtures will not be allowed in the mortar. No frozen Work shall be built upon. No masonry unit having a film of frost on its surface shall be laid in the Work. Any completed Work found to be affected by frost shall be taken down and rebuilt.

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- C. Lay masonry plumb; true to line; with level courses; straight, clean, uniform joints; dry surfaces; and straight, plumb corners. Maintain vertical alignment of joints as required to match original bond patterns. Align horizontal joints with tops of openings, as indicated. Lay units in solid partitions in manner to provide same evenness of surface on each side.
- D. Adjust each masonry unit in final position while mortar is still soft and plastic. Remove any unit disturbed after mortar has stiffened and re-lay with fresh mortar.
- E. Provide all chases, slots, and recesses as required to accommodate the Work of other trades. Close only after such Work has been installed tested, and approved. As the Work progresses, set all anchors, bolts sleeves, frames, lintels, and all other items of the various trades required to be built-into the masonry. No cutting and patching of completed Masonry Work will be permitted except as approved by THE CITY.
- F. Do not use installed masonry Work to support or in any way receive scaffolding or other temporary supports.
- G. Provide complete protection against breakage, staining and weather damage to masonry. Masonry, when not roofed over, shall be positively protected with non-staining waterproof coverings, properly weighted, at night, during showers, and whenever masons are not working on the structure.
- H. Maintain masonry clean as the Work progresses. Exercise extreme care at exposed Work to prevent smearing or staining with mortar. Wash mortar stains immediately from exposed surfaces. At completion of Work cut out and repoint all holes and defective joints, leaving the entire Work free of blemishes.

3.02 BRICK MASONRY WORK

- A. Brick shall be studied for permeability before laying. Hard impervious brick shall be laid dry to assure maximum bonding. Bricks with high rate of suction (in excess of 0.025 oz. per sq. in. per min. under ASTM C67) shall be laid moist, but free of surface moisture, to permit proper moisture retention in the mortar.
- B. Brick Work shall be executed in patterns to match the original in horizontal and vertical dimension. Construct brick Work to conform to approved sample panel.
 - 1. Build in or install all special brick types and coursing called for on Drawings, such as sills, courses, decorative patterns and stone accents etc., all as indicated to match original.
- C. Shove bricks into place (do not lay) in full mortar beds, with vertical and horizontal joints completely filled when laid. Do not slush. Strike exposed joints flush with face of brick, then finish to match original. Exercise extreme care to prevent mortar from falling into cavities and from bridging across to the new

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internal vent spaces. Provide temporary wood or metal strips in the cavities, raised as the Work is carried up, or other suitable method to prevent clogged vent holes.

- D. When mortar at exposed joints has become partially set, and will make a thumbprint under pressure without displacement of mortar, the joints shall be tooled to match original.

3.03 POINTING

- A. Sawcut all joints to be pointed to a minimum depth of $\frac{3}{4}$ ".
- B. New mortar shall match the existing masonry mortar. Point a sample area, 2' x 2' for approval. No Work shall commence without approval of sample by the Owner shall be on site to observe the pointing procedures. Said procedures shall be representative of the procedures used throughout the project provided they are performed per this specification section and BIA standards.
- C. Pointing:
1. During the tooling of joints, enlarge any voids or holes and completely fill with mortar prior to pointing.
 2. Mortar shall be applied in $\frac{3}{8}$ " lifts maximum. Additional lifts shall be applied only when the previous lift is "thumbprint" hard.
 3. The use of mortar bags and/or mortar guns is prohibited. Use of such equipment will result in rejection of the work.
 4. Point up all joints including corners, openings, and adjacent Work to provide a neat, uniform appearance, prepared for application of sealants.
 5. The following BIA Technical Standards shall be included as part of this specification section: Technical Notes 8B; Technical Notes 46. Should there be a discrepancy between this specification and the BIA Technical Notes, the more stringent of the two shall apply.

3.04 THROUGH WALL FLASHING

- A. Installation
1. Install Stainless steel pan out to the face of the brick. If above roofing flashing – Install a two piece metal flashing with a removable counter-flashing.
 2. Overlap the pan section a minimum of 3" and bed the lap in non-hardening butyl sealant. [or solder]

3. Overlay the metal flashing with a continuous self adhering membrane flashing tucked up behind the existing PVC membrane flashing. The PVC is very brittle so the demolition and handling of it must be careful to limit cracking so it is available to counter flash the new pan. Seal all membrane flashing joints and make a watertight seal. Roll joints with a hand roller
3. Pocket all ends of the flashing materials and make continuous at each location on the wall.
4. Provide open head joint weep slots filled with woven fabric weep hole filler inserts to form full head joints at 24" on center.

3.05 ADJUSTING AND CLEANING

A. Damaged or Defective Masonry:

1. Remove and replace masonry units which are loose, chipped, broken, stained, or otherwise damaged or, if units do not match adjoining units as intended.
2. Provide new units to match adjoining units and install in fresh mortar pointed to eliminate evidence of replacement.

B. Final Cleaning

1. General:
 - a. After mortar is thoroughly set and cured, clean masonry.
 - b. Remove large mortar particles by hand with wooden paddles and nonmetallic scrape hoes or chisels.
 - c. Test cleaning methods on sample wall panel; leave 1/2 panel unclean for comparison purposes.
 - d. Obtain approval of THE CITY for sample cleaning before proceeding with cleaning of masonry.
 - e. Protect adjacent stone and non-masonry surfaces from contact with cleaner by covering them with liquid strippable masking agent, polyethylene film, or waterproof masking.
2. Clean masonry to comply with masonry manufacturer's directions and BIA Technical Standards requirements.

END OF SECTION

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DIVISION 04000

MASONRY

SECTION 04230

REINFORCED UNIT MASONRY

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Reinforced Unit Masonry work required to complete the work of the contract including all the Reinforced Unit Masonry work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Reinforced Unit Masonry work with all the other trades for the project. Provide all demolition and disposal work to complete the Reinforced Unit Masonry work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Reinforced Unit Masonry work includes, but is not limited to:
 - 1. The work of this Section consists of the installation of all reinforced concrete masonry units at locations shown on the plans.
 - 2. Patch masonry at new openings.

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3. Patch existing CMU walls where existing electrical, mechanical, or plumbing at boxes, pipes, penetrations, etc. have been removed. Carry 65 individual locations throughout the building interior 8" x 8" and finish joints for painting.

1.03 RELATED WORK UNDER OTHER SECTIONS

- A. The following items of related work are specified and included in other sections of the Specifications:

1.04 SUBMITTALS

- A. Shop drawings: Submit complete shop drawings of this section to Architect for approval. Shop drawings shall include reinforcement, splices and wall thickness.

1.05 DELIVERY AND STORAGE

- A. Deliver reinforcing to the site, bundled, tagged and marked. Store reinforcing off the ground, and keep covered. Immediately before placing, clean from reinforcing loose rust, dirt or other coatings which will reduce the bond.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Reinforcing Bars shall be of size shown and to conform to ASTM A615, Grade 60.
- B. Grout Materials
 1. Portland Cement shall conform to ASTM C150, Type I.
 2. Fine Aggregate shall be clean, washed, well-graded sand conforming to ASTM C404.
- C. Mortar
 1. Mortar shall comply with ASTM C270, BIA Technical Note 8 and 8A. Use Type S mortar, nominal compressive strength 1800-to-2500 psi, consisting of 1 part Portland cement, 1/4-to-1/2 part lime, sand 2-1/4 to 3 times volume of cement and lime combined. Do not use masonry cement.
 2. Cement shall be American Portland cement conforming to ASTM C150, Type I.
 - a. For exterior masonry, the cement shall fulfill the further requirements that it shall exhibit no efflorescence when cast into

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the form of 2 in. by 7 in. slabs comprising the cement under test, Ottawa plastic mortar sand and distilled water (in proportions of 1:2 by weight, with water added to produce 100 percent flow) and subjected to a 7-day "wick test" in general conformity with the methods described in ASTM C67.

3. Lime shall be plastic hydrate conforming to ASTM C207, Type S (only).
4. Sand shall be clean, washed, and uniformly well graded masonry sand conforming to the requirements of ASTM C144 with the further requirement that the fineness modulus shall be maintained at 2.25 plus/minus 0.10. Sand shall be from a single source meeting these requirements and as approved by the Architect after laboratory test. Source of supply shall not be changed during the course of job without written consent of the Architect.
5. Water shall be potable and free of injurious contaminants.
 - a. The method of measuring materials shall be such that the specified proportions of the materials can be controlled and accurately maintained.
 - (1) No factory prepared masonry cement shall be used.
 - b. All cementitious materials and aggregate shall be mixed with the proper amount of water to produce a workable consistency. Hand mixing shall not be used.
 - c. Mortar shall be used and placed in final position within 2-1/2 hours after mixing. Mortar which has stiffened because of evaporation within the 2-1/2 hour period may be retempered once (only) to restore its workability.

D. CONCRETE MASONRY UNITS

1. Concrete masonry units (CMU) shall be moisture controlled, normal weight concrete units conforming to Grade N, Type 1 of ASTM C90 for Hollow Load-Bearing Concrete Masonry Units with a minimum compressive strength of 1,000 psi. Aggregate shall conform to ASTM C33.
 - a. All units shall be plain faced.

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E. ACCESSORIES

1. Joint Reinforcements

- a. Provide joint reinforcement in all CMU masonry construction.
- b. Joint reinforcements shall be manufactured from cold drawn steel wire conforming to ASTM A82 and shall consist of two deformed longitudinal rods welded at 16 in. intervals in the same plane to a continuous diagonal cross rod forming a truss design. Longitudinal and cross rods shall be No. 9 gauge. Width of reinforcement shall be 1-1/2 in. to 2 in. less than thickness of wall or wythe as applicable. Standard Truss by Dur-O-Wall; Block Truss AA600 by AA Wire Products; Regular Truss Ty by Ty-Wall; Truss Type by Wire Bond or equal.
- c. Reinforcement for exterior walls shall be hot-dip galvanized after fabrication with 1.5 oz. zinc coating complying with ASTM A153, Class B2. Reinforcement for interior walls and partitions may be uncoated steel.
- d. Prefabricated or job fabricated corner and tee sections shall be used to form continuous reinforcement around corners, and for anchoring abutting walls and partitions.

PART 3 - EXECUTION

3.01 CMU MASONRY

- A. Lay masonry units in running bond, with vertical joints in each course centered on units in courses above and below. Do not wet masonry units.
- B. Maintain vertical continuity of cells as all cells are to be reinforced and grouted. Cells shall provide a cavity at least 2-1/2 in. by 3 in. in size at exterior walls.
- C. Admixtures and Antifreeze Compounds shall not be used.

3.02 GROUT MIX

- A. Use methods which will ensure that specified proportions are controlled and accurately maintained. Measure aggregate material in a damp, loose condition.
- B. Grout shall conform to ASTM C476. Use "Fine Grout". Proportion by volume, one part by volume of Portland cement, 0 to 1/10 part by volume of Hydrated Lime and 2-1/4 to 3 times the sum of the volume of cementitious materials of fine aggregate measured in a damp, loose condition.

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- C. Mix grout to have a slump of 10 in. plus/minus 1 in.
- D. Average compression strength at 28 days shall be 2500 psi.

3.03 PLACING REINFORCING

- A. Do not bend or cut off dowels protruding from concrete foundation wall or slab; break masonry unit web if conflict with dowel occurs at reinforced cavities.
- B. Position reinforcing accurately using the sizes and spacing of bars shown on drawings.
- C. Maintain 1 in. minimum clearance on all sides of reinforcing bars. Support and secure bars against displacement during grouting.
- D. Bars shall be a minimum of 4'-0" long and shall be lapped a minimum of 2'-0" at splices.

3.04 PLACING GROUT

- A. Build masonry walls to a height not exceeding 4'-0". Insert steel reinforcing in proper cavities. Pour grout in cavities which contain reinforcing. Fill cavities to a level which will allow for a 2'-0" lap when next bar is inserted. Repeat operation by laying masonry units in 4 ft. lifts.
- B. Do not pour grout until mortar on masonry wall has cured 24 hours.
- C. Move the grout from the mixer to the point of deposit as fast as practical. Discard grout not placed within 1-1/2 hours after water is first added to the batch. Use placing methods which prevent segregation of the mix.
- D. Thoroughly puddle each pour to insure complete filling of the grout space.
 - 1. Grout shall be placed by practical means. Grout may be poured in place, pressure-grouted by gravity, or pumped. Use of pneumatic pressure or dry-packed grouting requires approval of Architect.
 - 2. Grout shall be poured from one side only, so as to flow across to open side to avoid air entrapment. Rod or vibrate grout during placing.
- E. Finishing Unconfined Grout
 - 1. After grout has acquired its initial set and will not sag, all unconfined, exposed edges shall be cut off, leaving sloping "shoulders". Entire exposed area shall then be painted within 24 hours with vapor-proof paint or plastered with a Portland cement-sand mortar.

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F. CURING

1. Moist cure with continuously wet burlap or by equivalent approved method, for not less than 72 hours at temperature of not less than 50 degrees F. Provide heated enclosure when temperature of ambient air or of concrete or steel plate is below 50 degrees F.

END OF SECTION

REINFORCED UNIT MASONRY
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DIVISION 05000

METALS

SECTION 05400

COLD-FORMED METAL FRAMING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the materials and equipment to be furnished complete in every respect, and that this Contractor shall provide all items needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Cold Formed Metal Framing Work required to complete the Work of the Contract including all the Cold Formed Metal Framing Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Cold Formed Metal Framing Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Cold Formed Metal Framing Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, and each Subcontractor for the entire project so that all the Work can be properly and completely performed.
- B. Work included: Provide labor materials and equipment necessary to complete the Work of this Section, including but not limited to the following:
 - 1. Fabrication and installation of cold formed framing units required to form
 - a. Interior walls, ceilings, and soffits.

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- b. Other interior construction noted on the plans to receive cold-formed metal framing.

1.03 QUALITY ASSURANCE

- A. Component Design: Compute structural properties of cold formed framing members in accordance with American Iron and Steel Institute (AISI) “Specification for the Design of Cold-Formed Steel Structural Members,” Latest Edition.
- B. Welding: Use qualified welders and comply with American Welding Society (AWS) d1.3 “Structural Welding Code - Sheet Steel”.
- C. Inspection: The Owner reserves the right to engage the services of a qualified “Special Inspector” during installation of cold-formed metal framing components to confirm that installation complies with Contract Documents and final shop drawings.
- D. Component Installation: In-place components will be inspected to confirm compliance with size, gauge and spacing requirements as well as bridging and cross brace requirements specified in the Contract Documents and in final shop drawings.
- E. Attachments: Welds and mechanical fasteners will be visually inspected to confirm that Project requirements for spacing and size are met. Verify that attachment of cold formed framing is in conformance with details shown in the Contract Documents or reviewed shop drawings. Attachments will be periodically inspected for tightness.

1.04 SUBMITTALS

- A. Product Data: Submit copies of manufacturer’s product information and installation instruction for each item of framing and accessories including fasteners. Distribute one (1) additional copy of installation instructions to the installer.
- B. Shop Drawings: Submit shop drawings (1 sepia, 3 prints) for all necessary components and installations of cold formed framing.
 - 1. Include placing drawings for all framing members and all prefabricated components showing size and gauge designations, number, type, location and spacing. Indicate strapping, bracing, splices, bridging, stiffeners, accessories, connections, and details required for proper installation. Reproduced copies of structural Construction Drawings are not acceptable.

2. The Contractor shall engage the services of a professional engineer registered in the State of Massachusetts to prepare complete shop drawings and structural design computations of all Work of this Section, and such Drawings shall bear the engineer's professional seal. Note: Manufacturer's shop drawings stamped by the engineer are acceptable in lieu of those actually prepared by the engineer.
 3. The Structural design computations shall provide a complete structural analysis of all typical and special conditions of construction, and shall certify conformance to the governing laws and building code.
- C. Certifications: Submit to Architect a statement from manufacturer certifying that materials and sections provided comply with the minimum requirements specified in the Contract Documents. Include certificates of compliance for mechanical fasteners.
1. Provide certification that welders employed in the Work of this project have satisfactorily passed AWS qualification tests within the previous 12 months.

1.05 DELIVERY AND STORAGE

- A. Protect metal framing units from rusting and damage. Deliver to the project site in manufacturer's unopened containers or bundles fully identified with name, brand, type, and grade. Store off the ground in a dry ventilated space or protect with suitable waterproof coverings.

PART 2 – PRODUCTS

2.01 METAL FRAMING

- A. System Components: With each type of metal framing required provide manufacturer's standard steel runners (tracks), blocking, bridging, clip angles, reinforcements, and accessories as recommended by manufacturer for the applications indicated, as needed to provide a complete metal framing system.
- B. Materials and Finishes: No framing shall be less than 20 gauge unless expressly approved. All cold-formed metal framing shall be galvanized.

For 18 gauge and lighter units fabricate metal framing components of commercial quality steel sheet with a minimum yield point of 33,000 psi, ASTM A653.

For 16 gauge and heavier units fabricate metal framing components of commercial quality sheet steel with a minimum yield point of 50,000 psi, ASTM A653.

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- C. Provide galvanized finish to all metal framing and accessories with ASTM A653 for minimum G 60 coating.
- D. “C” - Shaped studs: Manufacturer’s standard load-bearing steel studs of size, gauge, shape and properties indicated with 1.5” minimum flange and flange return lip.
- E. Base and Deflection Track: Gauge and size shall match studs, galvanized.
- F. Provide mechanical fasteners complying with the following specifications:
 - 1. Power driven fasteners shall be manufactured from modified AISI 1061 steel austempered to a hardness of 52-56 HRC and zinc plated in accordance with ASTM B633, SCI, Type III. Shear and tension values shall meet or exceed values listed in ICBO Report #2388. All fasteners to have .205 inch shank diameter unless otherwise indicated on Drawings.
 - 2. Expansion masonry anchors shall meet the description in Federal Specification FF-S-325 Group II, Type 4; Group VIII, Type 1 or approved equal. Anchors shall be zinc plated in accordance with ASTM B633 and shall have minimum shear and tension values listed in ICBO Report #2156 or Report #2895.
 - 3. Screw type fasteners shall be made from steel conforming to AISI 1019 or AISI 1022, case hardened and tempered. Screw type fasteners shall be treated with Stalgard Treatment, or equivalent, to prevent galvanic corrosion and shall have tension and shear values which meet or exceed the values listed for the Kwik-Pro self drilling screws, as manufactured by Hilti.
- G. Pressure-treated CDC plywood of thicknesses shown on the drawings.

2.02 FABRICATION

- A. General: Framing components may be prefabricated into panels prior to erection. Fabricate panels plumb, square, true to line and braced against racking with joints welded. Perform lifting of prefabricated panels in a manner to prevent damage or distortion to any members in the assembly.
- B. Fastenings: Attach similar components by welding. Attach dissimilar components by welding, bolting, or screw fasteners, as standard with the manufacturers.
- C. Wire tying of framing components is not permitted.

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PART 3 – EXECUTION

3.01 PREPARATION

- A. Pre-Installation Conference: Prior to the start of installation of metal framing Work, meet at the project site with the installers of other Work that interfaces with cold formed framing. Review areas of potential interference and conflicts, and coordinate layout and support provisions for interfacing Work.

3.02 INSTALLATION

- A. Manufacturer's Instructions: Install metal framing systems in accordance with manufacturer's printed or written instructions and recommendations, unless otherwise indicated.
- B. Runner Tracks: Install continuous tracks sized to match studs. Align tracks accurately to the layout at the base and tops of studs. Secure tracks as recommended by the stud manufacturer (unless otherwise noted on Drawings) for the type of construction involved, except do not exceed 24" o.c. spacing for nail or power-driven fasteners, or 16" o.c. for other types of attachment. Provide fasteners at corners and ends of tracks.
- C. Set studs plumb, except as needed for bracing.
- D. Where stud system abuts structure, including masonry walls, anchor ends of stiffeners to supporting structure.
- E. Install supplementary framing, blocking and bracing in the metal framing system wherever walls or partitions are indicated to support fixtures, equipment, services, casework, heavy trim and furnishing, and similar Work requiring attachment to the wall or partition. Where type of supplementary support is not otherwise indicated, comply with the stud manufacturer's recommendations and industry standards, taking into consideration the weight or loading resulting from the item supported.
- F. Installation of Wall Stud System:
 - 1. Secure studs to top and bottom runner tracks by either welding or screw fastening at both inside and outside flanges. Do not secure studs to directly to deflection track
 - 2. All walls to have horizontal stiffeners and bridging installed and properly attached by welding or screwing at each intersection before any studs are loaded.
 - 3. Provide fire or pressure-treated wood blocking as required for plumb, level installation.

- G. Installation of Joists: Install level and plumb, complete with bracing and reinforcing as indicated on Drawings. Provide not less than 1-1/2 inch end bearing. Reinforce ends with end clips, steel hangers, steel angle clips, steel stud section, or as otherwise recommended by joist manufacturer.
1. Where required, reinforce joists at interior supports with single short length of joist section located directly over interior support, snap-on shoe, 30 percent side-piece lapped reinforcement, or other method recommended by joist manufacturer.
 2. Secure joists to interior support systems to prevent lateral movement of bottom flange.
- H. Field Painting: Touch-up shop-applied protective coatings damaged during handling and installation. Use galvanizing repair paint for galvanized surfaces.

END OF SECTION

DIVISION 05000

METALS

SECTION 05500

MISCELLANEOUS METALS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Miscellaneous Metals work required to complete the work of the contract including all the Miscellaneous Metals work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Miscellaneous Metals work with all the other trades for the project. Provide all demolition and disposal work to complete the Miscellaneous Metals work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-Contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Miscellaneous Metals work includes, but is not limited to:
 - 1. Furnish and install all Misc. Metal shown on the plans.
 - 2. Provide WF steel lintels over entry door to the units. Provide all other channel, angle, etc. sections shown on the drawings.

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PHASE III RENOVATIONS TO THE
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3. Interior fabrications shall be prime painted and free of rust and scale in the shop.
4. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems and/or equipment that is required to be removed in order to perform the work of the Filed Sub Bid, including disposal.

1.03 SUBMITTALS

- A. Submit complete shop drawings in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
- B. Do not commence fabrication of any work or begin installation until approval has been obtained from the Consultant.

1.04 STANDARDS AND CODES

- A. The following Specifications, Standards and Codes of current issue form a part of this Specification.
- B. American Society for Testing and Materials: A36, A48, A53, A123, A143, A149, A153, A246.
- C. American Iron and Steel Institute, applicable standards.
- D. American Institute for Steel Construction (AISC): Code of Standard Practice for Steel Buildings and Bridges: Specifications for the Design, Fabrication and Erection of Structural Steel for Buildings.
- E. Federal Specs: QQ-1-652A, Iron Gray Castings; QQ-S741a, Steel Plates, Shapes and Bars, Carbon, Structural: WW-P521 Malleable Iron.
- F. American Welding Society Code: Standard Code for Arc and Gas Welding in Building Construction.
- G. National Association of Architectural Metal Manufacturers, applicable publications.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. All metals shall be free from defects impairing strength, durability or appearance and shall be of best commercial quality for each intended purpose.

MISCELLANEOUS METALS
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PHASE III RENOVATIONS TO THE
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- B. Fastenings which are exposed shall be of same material, color and finish as the metal to which they are applied, unless otherwise shown on the Drawings, or specified. All items employed with galvanized iron and steel shall be hot-dipped color galvanized ferrous metal. All fastenings shall be of heavy gauge as customarily used in the trades to safely support the required loads.
- C. Steel shapes shall conform to the requirements of ASTM A36 for Structural Steel. Steel pipe shall conform to ASTM A53.
- D. Filler Metal for Welding: Welding electrodes for manual shielded metal arc welding shall conform to ASTM A233-58T, E60 or E70 Series. Bare electrodes and granular flux used in the submerged arc process shall conform to AISC Specifications.
- E. Details and specifications of accessory items for which standard products are available are representative guides to requirements for such items. Standard products generally meeting such requirements will be accepted if details of construction and installation are approved by the Consultant.

2.02 WELDING

- A. Welding shall be continuous. Tack welding will not be permitted for finished work. All exposed welds shall be clean and ground smooth.
- B. Where structural joints are made by welding, the details of all joints, the techniques of welding employed, the appearance and quality of welds made, and the methods used to correct defective work shall conform to AISC and AWS Codes.
- C. Welds shall be made only by certified welders who have previously been qualified by tests as prescribed in AWS Standard Qualification Procedure for the type of work required.
- D. The use of a gas cutting torch in the field for correcting fabrication errors will be permitted on structural framing members only when the prior written approval of the Consultant has been obtained for each specific condition.

PART 3 - EXECUTION

3.01 WORKMANSHIP

- A. All work shall be executed by experienced mechanics and shall conform to details, be clean and straight with sharply defined profiles. Unless otherwise particularly noted, finished surfaces shall have smooth finish.
- B. Shearing and punching shall be done cleanly so as not to deform or mar adjacent surface.

MISCELLANEOUS METALS **05500 - 3**

PHASE III RENOVATIONS TO THE
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- C. Shop connections shall be welded and field connections bolted unless otherwise indicated. Bolts shall be turned up tight and threads deformed to prevent loosening.
- D. Castings shall be sound and free from warp, holes and other defects that impair strength and appearance. Exposed surfaces shall have a smooth finish with sharp well-defined lines and arises. Machined joints shall be milled to a close fit. Provide all necessary lugs, brackets and similar items so that work can be assembled and installed in a neat substantial manner.
- E. Flanges shall be concealed where practicable. Thickness of metal and details of assembly and support shall be such as to provide ample strength and stiffness.
- F. Provide holes and connections as required to accommodate work of other trades and for site assembly of metal work. Holes shall be drilled or punched and reamed in the shop. Show sizes and locations of all such holes on the shop drawings.
- G. Joints and connections exposed to weather shall be formed to exclude water.
- H. All materials and workmanship under this Section shall be subject to inspection in the mill, shop or field by the Consultant, or by qualified inspectors retained by the Owner. Inspection shall be without expense to the Owner. However, such inspection, wherever conducted, shall not relieve Contractor of his responsibility to furnish materials and workmanship in accordance with Contract requirements.

3.02 INSTALLATION

- A. Take all required measurements at the building site. Check measurements, compare dimensions and other data with various trades installed adjoining work to assure proper coordination.
- B. Conform to AISC Code for all drilling and fitting, cutting, welding, bolting and riveting required to erect, install and fit metal work to adjoining work. Furnish all screws, bolts, anchors, etc., required to attach metal work securely to adjoining work.
- C. Do not cut or alter members in the field without Consultant's approval. Do not enlarge unfair holes by burning and forcing, but correct by reaming.
- D. Be responsible for the correct location of miscellaneous metal work, including anchor bolts and base plates, and angles. Take particular care to maintain steel shapes, etc., plumb and level during the construction.

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PHASE III RENOVATIONS TO THE
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- E. All work shall be accurately set to established lines and elevations and rigidly fastened in place with suitable attachments to the construction of the building.
- F. Furnish, fabricate, install and anchor all light iron, miscellaneous metal work as indicated on the Drawings and as specified herein. Install all supports and anchors for miscellaneous metal work.
- G. Furnish all required anchors, anchor bolts, fastenings, etc., for attachment of work of all trades to concrete and masonry, except where otherwise specified or obviously included under other Sections of the Specifications.
- H. Clean up site of all debris, tools and materials daily.

3.03 PROTECTION

- A. The Contractor is responsible for protecting the finish of the railings after coating during storage, delivery and installation.
- B. Touch-up scrapes, scratches and any other mar in the finish after installation as per the specification.
- C. If Consultant determines that the paint finish has been damaged by the Contractor, beyond repair by touch-up, the entire railing section shall be removed and taken back to the shop and re-finished as per the specification and at no additional cost to the Owner.

END OF SECTION

MISCELLANEOUS METALS
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DIVISION 06000

WOOD AND PLASTICS

SECTION 06100

ROUGH CARPENTRY

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Rough Carpentry work required to complete the work of the contract including all the Rough Carpentry work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Rough Carpentry work with all the other trades for the project. Provide all demolition and disposal work to complete the Rough Carpentry work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Rough Carpentry work includes, but is not limited to:
 - 1. All General Contractor's temporary work, including barricades, tarpaulins, protective covers, dust barriers, scaffolding, and entrances.
 - 2. Installation of materials supplied under other specification sections, including but not limited to: Blocking, electrical backer boards.

ROUGH CARPENTRY
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PHASE III RENOVATIONS TO THE
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3. Wood framing and blocking shown on the plans and required to complete the work.

1.03 QUALITY ASSURANCE

- A. Softwood Lumber Standards: Provide lumber to comply with PS 20 "American Softwood Lumber Standard" and with applicable grading rules of inspection agencies certified by American Lumber Standards Committee's Board of Review.
- B. Plywood Standards: Provide plywood to comply with PSI-74 "US Product Standard for Construction and Industrial Plywood" for plywood panels and, for products not manufactured under PSI provisions, with American Plywood Association (APA) "Performance Standard and Policies for Structural Use Panels" and with ANSI A199.1.
- C. Grade Stamps: Each piece of lumber and plywood delivered to job site shall have factory-market grade stamp of inspection agency evidencing compliance with grading rule requirements and identifying grading agency, grade, species and moisture content at time of surfacing, and mill.
- D. Preservation treated lumber shall be marked according to AWPB Quality Mark Requirements, complying with AWPB LP-2.

1.04 PRODUCT HANDLING

- A. Delivery and Storage: Keep materials under cover and dry. Protect against exposure to weather and contact with damp or wet surfaces. Stack lumber and plywood. Provide for air circulation within and around stacks and under temporary coverings.

1.05 JOB CONDITIONING

- A. Time delivery and installations of carpentry work to avoid delaying other trades whose work is dependent on or affected by the carpentry work and to comply with protection and storage requirements.
- B. Contractor must examine the substrates and supporting structures and the conditions under which the carpentry work is to be installed, and notify the Owner in writing of conditions until unsatisfactory conditions have been corrected in a manner acceptable to the installer.
- C. Coordinate location of furring, nailers, blocking, grounds, and similar supports so that attached work will comply with design requirements.

1.06 SUBMITTALS

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PHASE III RENOVATIONS TO THE
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- A. Within thirty (30) days after Notice to Proceed, submit complete materials data and Shop Drawings in full compliance with Section 01 31 00.
- B. Submit a complete list of all materials and products required to complete the work of this Section.
- C. Submit full Product Data of all manufactured or proprietary items, and certification of compliance with these requirements for all items to be furnished exactly as specified.
- D. Submit Shop Drawings of all items to be fabricated off or on site as requested by the Consultant or required for proper coordination of the work. Shop Drawings may include detailed framing plans and elevation, bracing or connection details, sheathing layouts, schedules or diagrams of openings, and other information.

PART 2 – PRODUCTS

2.01 LUMBER, GENERAL

- A. General Quality: Lumber shall be of new, sound stock, straight, or consistent size, free of stains, and mildew, and be surfaced on four sides. Lumber which will be incorporated into the finished work shall have a moisture content of not more than 19%.
- B. Nominal sizes are indicated, except as shown by detailed dimensions. Provide dressed or worked and dressed lumber as applicable manufactured to the actual sizes as required by PS20 or to actual sizes and patterns as shown, unless otherwise indicated.
- C. Lumber lengths: Lumber shall be furnished in longest particle lengths with respect to each intended use, and single length pieces shall be used whenever possible.

2.02 LUMBER, MATERIAL

- A. Dimensional: "Concealed" Lumber
 - 1. Temporary Framing: Provide "Standard" grade lumber, any species.
 - 2. Concealed Boards, Blocking: Provide Southern Pine No. 2 or any species graded construction boards per WCLIB or WWPA rules. Concealed boards shall have maximum moisture content of 19%.
 - 3. Plywood: Provide marine grade plywood panels in thickness indicated on the drawings or, if not otherwise indicated provide 3/4" thickness.

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
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4. Preservative- treated Lumber shall be impregnated under pressure with water-borne preservative to comply with AWPA-U1. All treated wood shall be kiln-dried to a maximum moisture content of 19%. All field cuts shall be treated with compatible preservative materials.
- B. Fasteners and Anchorages: Provide size, type material and finish as indicated and as recommended by applicable standards and the Massachusetts building Code. Where carpentry work is exposed to weather, or exterior surfaces are in contact with the ground, provide fasteners and anchorages with hot-dip zinc coating.

2.03 ROUGH HARDWARE

- A. Fabricated hardware items shall be by Teco, Simpson, Heckman, or Silver as approved by the Consultant. In exterior areas or where in contact with concrete, rough hardware shall be hot-dip galvanized. In other areas electrogalvanizing will be acceptable. Select products for size of members joined or supported and to develop the full strength of the members.

PART 3 – EXECUTION

3.01 INSTALLATION

- A. Coordination: Fit carpentry work to other work; scribe, and cope for accurate fit. Correlate location of furring, nailers, blocking, grounds and similar supports to allow attachment of other work.
- B. Defects: Discard lumber or other material with defects which might impair the quality of work.
- C. General Execution: Construct all carpentry work called for in the Drawings or reasonably inferable therefrom. Set carpentry work to required levels and lines, with members plumb, level and true to line and cut and fitted. Shim as required using concealed shims. Securely attach carpentry work to substrate by anchoring and fastening as shown and as required by recognized standards. Where nailing or power driving into concrete or masonry, take care to avoid puncturing conduits, pipes, ducts, etc. embedded in such work.

3.02 LAYING OUT WORK

- A. The Contractor shall be responsible for establishing lines and levels in accordance with the conditions of the Contract and general requirements.
- B. Lay out all work in accordance with the Contract Documents, approved Shop Drawings, and completed portions of the work. Report all discrepancies to the Consultant promptly for correction and adjustment. In the event of failure to do so, be responsible for correction of any errors.

ROUGH CARPENTRY
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3.03 MISCELLANEOUS BLOCKING AND CARPENTRY

- A. Furring, blocking, and backing shall be furnished and installed where required for reception of wall board, formation of architectural features, concealment of pipes, conduits, ducts, attachment for supports for toilet room accessories, building specialties, and other fixtures. Contractor shall consult with the trades concerned and set furring and blocking they require.
- B. Dressed wood grounds shall be furnished and installed as indicated or as required for securing trim or other finish. Set grounds rigid, true, and in perfect alignment. Nail grounds to wood members, and secure to concrete or masonry with nailing blocks or plugs, or expansion type anchors. Provide wood stripping where indicated or required for the attachment of finish materials to wood, concrete, masonry, or other surfaces.

3.04 INTENT AND WORKMANSHIP

- A. It is not the intent of this Section to hereinafter define the types, sizes, or installation methods for each item of work. Methods of installation, joinery, sizes, spacing of nailers and furring strips, and other information pertaining to the lumber, plywood, and other items of required work, shall be installed in accordance with the details on the Drawings for the specified areas involved.
- B. Work that is to be finished or painted shall be free from defects or blemishes on surfaces exposed to view that will show after the finish coat of paint is applied. Any material which is in any way defective and not up to specifications for quality and grade for its intended use, or otherwise not in proper condition, shall be rejected.

END OF SECTION

DIVISION 06000

WOOD AND PLASTICS

SECTION 06200

FINISH CARPENTRY

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Finish Carpentry Work required to complete the Work of the Contract including all the Finish Carpentry Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Finish Carpentry Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Finish Carpentry Work. Patch to match all adjacent surfaces that are disturbed left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Finish Carpentry Work includes, but is not limited to:
 - 1. Install all finish carpentry, cabinets, and window, door and wall trim and chair rails indicated on the plans.
 - 2. Modify existing decorative "classroom" trim to accommodate the new work, whether or not indicated on the plans.

FINISH CARPENTRY
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PHASE III RENOVATIONS TO THE
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3. Install crown molding to match the existing crown molding at the top of all new walls to match existing.
4. Install wood baseboard to match existing at all new walls to be installed.
5. Furnish and install all kitchen appliances. See 3.03.
6. Patch existing wood flooring with material to match existing. Provide 50 square feet at small individual locations throughout the scope area.
7. Sand, prepare, and refinish all existing wood flooring to remain in the first floor units.

1.03 RELATED WORK

- A. The following items of related Work are specified and included in other Sections of the Specifications:

1.04 SHOP DRAWINGS

- A. Submit complete shop drawings in accordance with provisions of the GENERAL CONDITIONS.
- B. Shop drawings shall include:
 1. Submit shop drawings on all items of architectural woodwork.
 2. Product data, shop drawings, and samples for kitchen cabinets.
 3. Submit manufacturer's descriptive literature of specialty items not manufactured by the architectural woodworker, as requested by the Architect.

1.05 SAMPLES

- A. Submit the following samples in accordance with provisions of the GENERAL CONDITIONS:
 1. Submit samples of each wood specie which is to receive transparent finish at job site, as requested by the Architect.
 2. Submit finished samples of each finish to be applied at the factory.
 3. Submit finished samples of plastic laminate countertops.

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PHASE III RENOVATIONS TO THE
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1.06 FIELD DIMENSIONS

- A. The woodwork manufacturer is responsible for details and dimensions not controlled by job conditions and shall show on his shop drawings all required field measurements beyond his control. General Contractor and woodwork manufacturer shall cooperate to establish and maintain these field dimensions.
- B. Verify dimensions by field measurement. Measure for countertops after base cabinets are installed.

1.07 PRODUCT HANDLING

- A. The woodwork manufacturer and the Contractor shall be jointly responsible to make certain that woodwork is not delivered until the building and storage areas are sufficiently dry so that the woodwork will not be damaged by excessive changes in moisture content.

1.08 QUALITY ASSURANCE

- A. Standards:
 - 1. 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 defined in the latest edition of the AWI "Quality Standards."
 - 2. Any item not given a specific quality grade shall be Custom grade as defined in the latest edition of the AWI Quality Standards.
 - 3. Competence: The approved 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 furnish all of the woodwork.
 - 4. Comply with KCMA A161.1 for Kitchen Cabinets.
 - 5. Comply with KCMA A161.2 for Plastic Laminate Countertops.

PART 2 – PRODUCTS

2.01 STANDING AND RUNNING TRIM

Includes all exterior and interior casings, stops, stools, door jambs, jamb liners, board type paneling, chair rails, cornice, fascias, valances, etc. It shall be specified if plant assembled miters or openings are required.

FINISH CARPENTRY
06200 - 3

PHASE III RENOVATIONS TO THE
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- A. Interior for Opaque Finish.
 - 1. AWI Quality Grade: Custom Grade.
 - 2. Solid Wood: Poplar.

PART 3 – EXECUTION

3.01 WORKMANSHIP AND INSTALLATION REQUIREMENTS

- A. Finished architectural woodwork shall be dressed and sanded, free from machine and tool marks, abrasions, raised grain, or other defects on surfaces exposed to view. Construction and workmanship of architectural woodwork items shall conform to, or exceed, the requirements for either Premium or Custom Grade as established under AWI Quality Standards.
- B. Joints shall be tight and so formed as to conceal shrinkage. Mortise and tenon joints shall be set in glue under pressure. Shop miters 4" or greater shall be glued and doweled or locked with metal spline. Miters less than 4" shall be glued and splined with the spline concealed.
- C. All exposed sides and ends of plywood shall be edged with solid strip of matching hardwood, at least 1/2" wide, and the full width of the plywood edge. Miter edge strips at corners.
- D. Architectural woodwork shall be properly framed, closely fitted, and accurately set to the required lines and levels and shall be rigidly secured in place.
- E. Install cabinets with no variations in flushness of adjoining surfaces by using concealed shims. Where casework abuts other finished Work, scribe and cut for accurate fit. Provide filler strips, scribe strips, and moldings in finish to match casework face.
- F. Install cabinets without distortion so doors and drawers fit openings properly and are aligned.
- G. Install level and plumb to a tolerance of 1/8 inch in 3 feet (3.2 mm in 2.4 m).
- H. Fasten each cabinet to adjacent unit and to structural members of wall construction. Fasten wall cabinets through back, near top and bottom, at ends and not less than 24 inches (600 mm) o.c.
- I. Fasten plastic-laminate countertops by screwing through corner blocks in base units into underside of countertop. Spline and glue joints in countertops and use concealed mechanical clamps.

FINISH CARPENTRY
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PHASE III RENOVATIONS TO THE
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- J. Fasten solid surface countertops by screwing through corner blocks in base units into underside of countertop. Align adjacent surfaces. Form seams 1/8 inch (3.2 mm) wide and adhere with manufacturer's recommended joints adhesive in color to match countertop. Dress joints smooth, remove surface scratches, and clean entire surface.

3.02 PAINTING AND FINISHING

- A. All painting and finishing shall be provided under SECTION 09900 - PAINTING, but it shall be the responsibility of the Contractor to see to it that all finished woodwork and doors be primed or sealed before installation as specified in SECTION 09900 - PAINTING. Paint or seal coats must be dry before items are installed.
- B. All finish Work shall be sandpapered and field joints shall be left in perfect condition for finishing under SECTION 09900 - PAINTING.

3.03 APPLIANCES

- A. Furnish and install the following appliances within each unit:
 - 1. Refrigerator: GE #GTH18IBX
 - 2. Electric Range: GE #JSS28DN
 - 3. Non-Venting Hood: GE #JN327H
 - 4. Stackable Washer/Dryer: GE #WSM2700/80H
 - 5. Dishwasher: GE #XX384M

3.04 WOOD FLOOR REPLACEMENT, SANDING & REFINISHING

- A. Replace Damaged Flooring – Replace damaged flooring and install new flooring at areas requiring patching (refer to quantities in Section 06200 above) prior to refinishing the wood floors.
 - 1. Replacement wood shall match existing wood species, color and plank dimensions.
 - 2. Measure the moisture content of the new and existing flooring to ensure that there is no more than a 2 percent difference in moisture content before replacing.
 - 3. Carefully remove existing damaged flooring with a circular saw or chisel. Carefully remove nails and avoid damage to adjoining boards.

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4. Measure the opening and cut replacement board to size.
 5. Carefully dry-fit the replacement board.
 6. Coat tongue and groove with adhesive and drive the tongue into place using a wood block and mallet.
 7. Use color wood putty to fill holes and joints.
- B. Sanding - Remove existing finish entirely from wood floors by sanding to a smooth, even and uniform finish without burns.
1. Sanding shall be dustless and performed by a qualified wood flooring professional.
 2. Perform final sanding at a time and manner to accept specified finish.
 3. Inspect the floor carefully for sanding errors and repair sander marks to the Owner and Architect's satisfaction.
 4. After sanding, sweep and vacuum floors clean.
 5. Do not walk on floors until specified finish is complete and dry.
- C. Product & Approvals - Provide 3 samples of finish for Owner and Architect approval. Apply 3 coats of the approved water-based polyurethane finish, semi-gloss, with integral stain.
- D. Execution – Application shall be performed by a qualified wood flooring professional.
1. Apply polyurethane at edges using a painting pad.
 2. Apply polyurethane at open areas using a synthetic-wool applicator.
 3. Maintain a “wet-edge” during application to prevent lap marks.

END OF SECTION

FINISH CARPENTRY
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DIVISION 06000

WOOD AND PLASTICS

SECTION 06410

PLASTIC LAMINATE COUNTERS

PART1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Plastic Laminate Counters work required to complete the work of the contract including all the Plastic Laminate Counters work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Plastic Laminate Counters work with all the other trades for the project. Provide all demolition and disposal work to complete the Plastic Laminate Counters work. Patch to match all adjacent surfaces that are disturbed left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Plastic Laminate Counters work includes, but is not limited to:
 - 1. Countertops in all kitchens and bathrooms.

PLASTIC LAMINATE COUNTERS
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1.03 SHOP DRAWINGS

- A. Submit complete shop drawings in accordance with the provisions of the GENERAL CONDITIONS.
- B. Shop drawings and cuts shall indicate Section of Specifications requiring equipment submitted.
- C. All colors and finishes shall be selected by Architect from the manufacturer's standard range of colors.

1.04 SAMPLES

- A. Submit the following samples in accordance with the provisions of the General Conditions:
 - 1. Plastic laminate
 - 2. Typical section of a post-formed countertop full scale 12" length.

1.05 GUARANTEES

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

1.06 REFERENCES

- A. ANSI A208.1 – Mat Formed Wood Particleboard.
- B. NEMA LD-3 – High Pressure Decorative Laminates.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials, unless otherwise specified, to be supplied and/or installed under this SECTION shall be installed in accordance with the manufacturer's recommendation.

PLASTIC LAMINATE COUNTERS
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2.02 COUNTER MATERIALS

- A. Counter to be post formed of plastic laminate over 3/4" particle board.
 - 1. Fabricate from particle board core with adhesive bonded plastic laminate face sheets and edging.
 - 2. Core: ANSI 208.1, Medium Density Series, wood particle board with 45 pounds minimum density.
 - 3. Face sheets and edges:
 - a. Material: NEMA LD-3, General Purpose Type plastic laminate, 1/16" thick by Formica, Wilson Art, Nevamar, or approved equal.
 - b. Color: selected by Architect from Manufacturer's standard range.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Coordinate requirements for surface mounted blocking on CMU walls to ensure proper support is provided for wall attachments.
- B. Verify that site conditions are ready to receive work and opening dimensions are as indicated on the shop drawings.
- C. Verify correct spacing of supports.

3.02 INSTALLATION

- A. Install counter secure, plumb, and level in accordance with manufacturer's instructions.
- B. Attach counters securely to blocking using anchor devices recommended by manufacturer.

3.03 ADJUSTING

- A. Replace significantly damaged, deeply scratched, or chipped counter.
- B. Apply sealant at entire counter perimeter.

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3.04 CLEANING

- A. Clean surfaces with liquid spray furniture or counter top polish. Do not use abrasives.

END OF SECTION

PLASTIC LAMINATE COUNTERS
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DIVISION 06000

WOOD

SECTION 06411

CABINETS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Cabinets required to complete the Work of the Contract including all the Cabinets shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Cabinets with all the other trades for the project. Provide all demolition and disposal Work to complete the Cabinets. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Cabinet Work includes, but is not limited to:
 - 1. Install base (standard 24" deep) and upper cabinets (standard 12" deep) at all new kitchen areas per plan.
 - 2. Install base vanity cabinets (standard 21" deep) in new bathrooms.

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PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
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1.03 RELATED WORK

- A. The following items of related Work are specified and included in other Sections of the Specifications:
 - 1. Section 06200 - FINISH CARPENTRY
 - 2. Section 09255 - GYPSUM BOARD ASSEMBLIES
 - 3. Section 09900- PAINTING

1.04 REFERENCES

- A. ANSI A161.1 – Performance and Construction Standard for Vanity Cabinets.

1.05 DESIGN / PERFORMANCE REQUIREMENTS

- A. Perform Work in accordance with ANSI A161.1.

1.06 SUBMITTALS

- A. Submit under provisions of Section 01300.
- B. Product Data: 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: Indicate casework locations, plans, elevations, rough-in and anchor placement dimensions and tolerances and clearances required.
- D. Selection Samples: For each finish product specified, two complete sets of color chips representing manufacturer's full range of available colors and patterns. Submit a complete cabinet sample.
- E. Verification Samples: For each finish product specified, two samples, minimum size 6 inches (150 mm) square, representing actual product, color and finish.
- F. Manufacturer's Certificates: Certify products meet or exceed specified requirements.

1.07 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section with minimum ten years documented experience.

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- B. Mock-Up: Provide a mock-up for evaluation of cabinet and counter top.

1.08 DELIVERY, STORAGE, AND HANDLING

- A. Store products indoors, under cover in manufacturer's unopened packaging until ready for installation.

1.09 PROJECT CONDITIONS

- A. Maintain environmental conditions (temperature, humidity, and ventilation) within limits recommended by manufacturer for optimum results. Do not install products under environmental conditions outside manufacturer's absolute limits.

PART 2 - PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturers: Grandview Products Co. Inc., which is located at: 1601 Superior Dr. P. O. Box 874 ; Parsons, KS 67357; Toll Free Tel: 800-247-9105; Tel: 620-421-6950; Homecrest Cabinetry, 1002 Eisenhower Dr. N., Goshen, IN, 46526, (574) 533-9571; Maple Craft USA, PO Box 26, Albion, PA, 16401, (800) 756-8077, or approved equal.
- B. All cabinets and components shall be solid maple.

2.02 MATERIALS AND CONSTRUCTION

- A. Face Frames: Mortise and tenon, glued and fastened. Horizontal rails 3/4 inch by 1-1/2 inch kiln dried hardwood. Vertical stiles 3/4 inch by 1-1/2 inch kiln dried hardwood. Center stiles 3/4 inch by 3 inches kiln dried hardwood.
- B. Cabinet Ends: Exposed ends 1/2 inch thick premium particle board. Wall cabinet ends rabbeted to receive tops, bottoms. Base cabinet ends rabbeted to receive floor and intermediate shelf.
- C. Cabinet Doors and Drawer Heads: Doors five piece hardwood frame door, type as specified. Drawer Heads type as specified.
- D. Drawer Construction: Box sides 7/16 inch thick medium density fiberboard printed woodgrain natural maple with lap joints glued and nailed. Bottoms 1/8 inch thick hardboard with printed woodgrain natural maple finish. Drawer header attached.
- E. Drawer Construction: Solid Oak drawer construction, solid 5/8 inch thick Oak drawer box with dovetail construction. Oak veneered bottom 1/4 inch thick, inlet on 4 sides. Clear finish. Drawer header attached.

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PHASE III RENOVATIONS TO THE
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- F. Drawer Construction: Five piece solid hardwood drawer matching drawer header. Five piece construction, 3/4 inch thick solid hardwood material with dovetail construction. Bottom 1/4 inch thick Oak veneered bottom, inset on four sides. Clear finish. Drawer header attached.
- G. Wall Cabinet and Base Cabinet Shelving: 5/8 inch thick premium particle board with front edge smooth, fully adjustable in wall and base cabinets. Due to plumbing considerations, no shelving provided in sink bases or vanities. Base shelf is half depth.
- H. Wall Cabinets Top and Bottom: Wall cabinets not less than 1/2 inch thick particle board. Let into sides and face frame. All joints glued and power nailed.
- I. Base Cabinet Floors: Base cabinet floor not less than 1/2 inch thick particle board let into sides and face frame. All joints glued and power nailed. Back of floor set on supporting member, glued and fastened.
- J. Hardware: To be ADA compliant.
- K. Concealed hinges, self closing.
- L. Drawer Slides, Side Mount: Epoxy coated captured glides with 75 pound capacity and lifetime warrantee.
- M. Cabinet Backs: All back are 1/8 inch thick standard hardboard.
- N. Finish: Oak.
- O. Conversion Varnish, hard durable non-yellowing finish with excellent chemical resistance.
- P. All exposed interior sides, shelving and wall cabinet bottoms shall be GrandLam clad except hang rail.
- Q. Cabinet housing oven must be equipped with full extension, heavy duty, resting shelf.

2.03 COMPONENT STYLE

- A Oak Style:
 - 1. "Entrée" by Granville Products or approved equal:
 - a. Door Type: Solid Oak with a traditional square recessed panel profile.
 - 1) Solid.

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PHASE III RENOVATIONS TO THE
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- b. Solid Oak drawer header.
- c. Solid Oak face frames.
- d. Profiled edge.
- e. Concealed hinges.

2.04 CABINETS

A. Kitchen Base Cabinets:

- 1. Double and Single Doors, see plan for dimension:
 - a. Width:
 - 1) Varies.
 - b. Depth:
 - 2) 22 inches.

B. Kitchen Upper Cabinets:

- 1. Double and single doors, see plan for dimensions.
 - a. Width:
 - 1) Varies.
 - b. Depth:
 - 2) 12 inches.

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

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achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

- A. Install in accordance with manufacturer's instructions.
- B. Use anchoring devices and fasteners to suit conditions and substrate materials encountered.
- C. Set cabinet work items plumb and square, securely anchored to building structure.
- D. Carefully scribe cabinet work abutting other components
- E. Adjust doors, drawers, hardware, fixtures, and other moving or operating parts to function smoothly.
- F. Clean casework, shelves, and hardware.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

DIVISION 07000

THERMAL AND MOISTURE PROTECTION

SECTION 07220

ROOF INSULATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Roof Insulation Work required to complete the work of the contract including all the Roof Insulation Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Roof Insulation Work with all the other trades for the project. Provide all demolition and disposal work to complete the Roof Insulation Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Roof Insulation Work includes but is not limited to:
 - 1. At all new roof penetrations, install flat and tapered polyisocyanurate insulation on the roof decks to match the existing height mechanically attached to the existing wood roof decks.
 - 2. All insulation shall have a compressive strength of 20psi.

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1.03 SUBMITTALS

- A. Submit complete shop drawings for insulation layout and thickness in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS. This contractor shall take sufficient probes and field measurements to determine the insulation requirements.
 - 1. Complete roof insulation Layout Plan indicating all the various insulation board types, thicknesses, and slopes.
- B. Submit the following samples in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 - 1. 12" x 12" insulation sample.
 - 2. Product literature for all materials in this section.
 - 3. Compressive strength test data.
- C. Do not commence fabrication of any work or begin installation until approval has been obtained from the Architect.

PART 2 – PRODUCTS

2.01 RIGID ROOFING INSULATION

- A. Insulation for use in a fully adhered roofing system shall be a Factory Mutual Class 1 fire rated, I-90 uplift approved polyisocyanurate board.
- B. Insulation shall meet all identified code/insurance requirements.
- C. Insulation shall be approved in writing by insulation manufacturer for intended use, and for use with the membrane manufacturer's materials as part of their Full System Warranty.
- D. Insulation shall be compatible with the roofing membrane having a compressive strength of 20psi.

2.02 MEMBRANE UNDERLAYMENT

- A. The installed insulation shall be overlaid with a layer of ½" thick DensDeck Prime fiberglass faced water resistant gypsum panels, by Georgia Pacific, fully adhered to the insulation with urethane foam adhesive, as underlayment for the membrane.

2.03 ADHESIVE FASTENING

- A. The following urethane foam adhesives are accepted for isocyanurate insulation, DensDeck and concrete deck construction:
 - 1. OlyBond500 Foam Insulation Adhesive, by OMG, Inc.
 - 2. Roofing membrane manufacturer's urethane foam adhesive product supplied with the roofing system.
- B. Adhesive Manufacturer's Warranty:
 - 1. Adhesive shall be Factory Mutual approved and meet the roofing manufacturer's requirements for the Full System Warranty.

2.04 GYPSUM UNDERLAYMENT

- A. Covering for insulation below the membrane shall be 1/2" thick water resistant gypsum panels with fiberglass facing, such as DensDeck by Georgia Pacific.

2.05 MECHANICAL FASTENERS

- A. Self tapping concrete screw fasteners, expansion anchors or drive pin fasteners for wood blocking into concrete:
 - 1. Fasteners and plates shall be Factory Mutual approved and meet F.M. Standard 4470 for corrosion resistance.
 - 2. Fastener manufacturer shall warranty the performance of the fastener and plates for the duration of the Roof manufacturer's warranty.
 - 3. Pullout tests shall be performed on site by the fastener manufacturer. The results of these tests plus a statement by the fastener manufacturer concerning the fasteners suitability for the intended job, and installation instructions shall be submitted to the roofing contractor and the Roof manufacturer prior to the job start.

PART 3 – EXECUTION

3.01 INSTALLATION GENERAL

- A. Follow Factory Mutual Class 1 fire rating, and the 1-90 wind uplift fastening pattern requirements.
- B. Insulation shall be installed on properly prepared and dry deck surfaces. Insulation boards shall be uniform and square with no open butt joints, broken corners, edges, or similar flaws.

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- C. Utilize tapered edge strips and fiberboard fillers at all drain locations. Step taper the surrounding insulation system down to the drain bowl locations. The minimum distance from the center of the drain bowl to the outer edge of the tapered drain sump shall be 24 inches.
- D. The minimum dimension on cut insulation boards shall be 12" with a minimum surface area of 2 square feet.
- E. The finished insulation system surface area shall be free from all asphalt and roof gravel contamination. Areas with asphalt or gravel contamination shall be removed and replaced.

3.02 SURFACE PREPARATION

- A. Prior to and during application all dirt, debris, and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods to ensure that surface to receive insulation is clean, smooth, and dry.

3.03 INSTALLATION OF INSULATION

- A. Insulation boards shall be installed in parallel courses with end joints staggered and adjacent boards butted together. Joints of alternate layers shall be staggered.
- B. Insulation joints shall be 1/4 inch or less in width. Joints wider than 1/4 inch shall be filled with the same insulation.
- C. Where field trimmed, insulation shall be fitted tightly around roof protrusions and terminations.
- D. No more insulation shall be applied than can be covered by the roofing membrane by the end of the day or the onset of inclement weather.
- E. Adhesive application where utilized shall be 100% coverage. Foam setup time is highly temperature sensitive. Accelerators shall be used when the air/ surface temperature is 40 or below.
- F. Insulation boards and the gypsum membrane underlayment shall be set into the fresh adhesive before the surface begins to skin over, and be stepped down to achieve full adhesion to the substrate before the adhesive sets.

END OF SECTION

ROOF INSULATION
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DIVISION 07000

THERMAL AND MOISTURE PROTECTION

SECTION 07221

BUILDING INSULATION

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Building Insulation work required to complete the work of the contract including all the Building Insulation work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Building Insulation work with all the other trades for the project. Provide all demolition and disposal work to complete the Building Insulation work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Building Insulation work includes, but is not limited to:
 - 1. Install fiberglass batt insulation and 6 mil poly vapor barrier at locations and in thicknesses indicated on the drawings.
 - 2. Install mineral fiber sound insulation at locations and in thickness indicated on the drawings.

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3. Blow insulation between units at demising partitions only, not in corridor or outside walls.

1.03 SUBMITTALS

- A. Submit complete shop drawings in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 1. Manufacturer's literature on each product including installation procedures.
- B. Submit the following samples in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 1. 2' x 16" insulation sample of each product.
 2. 2' x 2' 6 mil poly sample.
- C. Do not commence fabrication of any work or begin installation until approval has been obtained from the Engineer.

PART 2 – PRODUCTS

2.01 BATT OR BLANKET BUILDING INSULATION

- A. Provide resilient flexible fiberglass unfaced batts in thickness to fill entire wall cavity, Pink Insulation by Owens Corning or approved equal.
- B. Provide 6 mil polyethylene vapor barrier.
- C. Provide mineral fiber unfaced acoustical batts in thickness to fill entire wall cavity, by Johns Manville or approved equal.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. Prior to and during application all dirt, debris, and dust shall be removed from surfaces either by vacuuming, sweeping, blowing with compressed air and/or similar methods to ensure that surface to receive insulation is clean, smooth, and dry.

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3.02 INSTALLATION OF INSULATION

- A. Insulation shall be installed between metal studs by pressure fit. Fill all voids between pieces of insulation and at perimeters, corners, and joints with insulation to achieve a complete assembly.
- B. Cover entire surface of studs (warm side) with 6 mil poly. Lap all seams and tape. Tape around penetrations.

END OF SECTION

DIVISION 07000

THERMAL AND MOISTURE PROTECTION

SECTION 07520

EPDM SHEET ROOFING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the EPDM Sheet Roofing Work required to complete the Work of the Contract including all the EPDM Sheet Roofing Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the EPDM Sheet Roofing Work with all the other trades for the project. Provide all demolition and disposal Work to complete the EPDM Sheet Roofing Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, and each Subcontractor for the entire project so that all the Work can be properly and completely performed.
- B. EPDM Sheet Roofing Work includes but is not limited to all the Work shown on the plans and described below and shall include the removal and disposal of incidental existing roofing and flashing materials, and related items, required for the roofing Work as specified below and as indicated on the Drawings.
 - 1. At new penetrations in the roof, remove existing EPDM roofing membrane and fasteners to the deck to accommodate installation of the mechanical, electrical, or plumbing work.

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2. Install all flashing and counter flashing of aluminum. Provide all incidental skirt and metal flashings as shown on the drawings.
3. Install hardware fasteners, accessories as indicated on the plans or as required by the roofing manufacturer and to provide a complete watertight assembly.
4. Install pitch pockets, walk pads, pressure treated sleepers, pre-manufactured boot flashing, and self adhering EPDM flashing, and EPDM field sheet and flashing to accomplish the work.

1.03 SUBMITTALS

- A. Submit complete shop drawings in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 1. Product literature for all materials.
 2. Manufacturer's fastening pattern for insulation and membrane to meet 90 MPH wind speed warranty.
- B. Submit the following samples in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 1. Two (2) of each fastener for attachment of each condition.
 2. 12" x 12" insulation sample.
 3. EPDM roofing membrane, EPDM membrane flashing, pressure sensitive membrane flashing, termination bars, hardware, disks, and incidental items.
 4. 12 inch section of all metal flashing types, counter flashing, and parapet caps in their final material configuration and design configuration, including termination bars.
- C. Do not commence fabrication of any Work or begin installation until approval has been obtained from the Engineer.

1.04 QUALITY ASSURANCE

- A. Roofing and flashing shall be applied by a roofing applicator experienced, certified, licensed, franchised, or approved by the roofing materials manufacturer prior to bid, using experienced, skilled roofers. The Contractor shall submit, with their bid, written verification from the manufacturer that he/she is an authorized applicator and has a minimum five (5) years experience installing this system.

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- B. All roofing and flashing Work shall be applied in strict accordance with roofing manufacturer's written requirements and specifications applicable to roof conditions. There shall be no deviations made from this specification or the approved shop drawings without prior written approval by the Engineer.
- C. Upon completion of the installation, an inspection shall be made by a representative of the roofing manufacturer to ascertain that the roofing system has been installed according to the applicable manufacturer's specifications and details.

1.05 JOB CONDITIONS

- A. Do not use bitumen-based roof cement.
- B. Do not expose membrane or accessories to a constant temperature in excess of 180 degrees F.
- C. The Contractor is cautioned that certain EPDM membranes are incompatible with asphalt, coal tar and oil-based materials and cements. Creosote and penta-based materials are also incompatible. Such materials should not come in contact with EPDM membranes at any time. If such contacts occur, the material shall be cut out and discarded. The Contractor should consult the Roof manufacturer with respect to material compatibility, precautions, and recommendations.
- D. Cements and bonding adhesives contain petroleum distillates and are extremely flammable. Consult container labels and material safety data sheets for specific information. Safety is the sole responsibility of the Contractor on the job site.
- E. Splicing and bonding surfaces shall be clean and dry.
- F. Expose only enough cement and adhesive to be used within a four hour period.
- G. All surfaces to receive new insulation, membrane or flashings shall be thoroughly dry. Should surface moisture occur, the Contractor shall provide the necessary equipment to dry the surface prior to application.
- H. Only as much of the new roofing as can be made weathertight each day, including all flashing, and metal Work shall be installed.
- I. Each day's roofing Work shall be completed in accordance with the manufacturer's specifications, including flashings, adhesives, and seam sealing.

1.06 WARRANTY

- A. Manufacturer's Warranty:

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Upon project completion and final acceptance, the Contractor shall obtain and deliver the Roofing Material Manufacturer's twenty (20) year, 90 mile per hour wind speed, Full-System roofing Warranty. All components of the roofing system, including, but not limited to, fasteners, insulation components, base/metal flashings, and related detailing, are to be included within the full-system Warranty.

B. Roofing Contractor's Warranty:

The roofing Contractor shall supply the Owner with a minimum two-year Workmanship warranty. In the event any Work related to roofing, flashings, or metal Work is found to be defective or otherwise not in accordance with the Contract documents within two years of substantial completion, the roofing Contractor shall remove and replace at not cost to the Owner. The Contractor's warranty obligation shall run directly to the Owner, and a copy shall be sent to the Roof manufacturer.

C. Upon successful completion of the Work and receipt of final payment, the Roofing Manufacturer's Warranty shall be issued.

PART 2 – PRODUCTS

2.01 WOOD NAILERS

- A. Wood nailers, if required, shall be minimum #2 lumber "Wolmanized" or pressure treated for rot resistance with a salt-based preservative. No creosote or asphaltic type preservatives are allowed.
- B. In general all fasteners, anchors, nails, straps, shall be of zinc or cadmium plated steel, galvanized, or stainless steel. All fasteners and anchors shall have a minimum embedment of 1-1/4 inches and shall be approved for such use by the fastener manufacturer. Fasteners for attachment of metal to wood blocking shall be annular ring nails. All fasteners shall meet Factory Mutual Standard 4470 for corrosion resistance.

2.02 EPDM MEMBRANE AND MATERIALS

- A. Membrane: Shall be .060" thick "Black" unreinforced elastomeric membrane, Ethylene Propylene Diene Monomer sheet "EPDM" compound as manufactured by **CARLISLE or FIRESTONE only**. Single ply membrane shall comply with the following minimum physical properties:

<u>Property</u>	<u>Test Method</u>	<u>Specifications</u>
Thickness	ASTM-D-412	±10%
Tensile Strength Min. PSI	ASTM-D-412	1650

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Ultimate Elongation Min. %	ASTM-D-412	480
Tear Resistance Min. LBF/In	ASTM-D-624	200
Factory Seam Strength Min. Modified Membrane		
	ASTM-D-816	Rupture
Resistance to Heat Aging		
Properties after four weeks @ 240 degrees F.		
Tensile Str. Min. (PSI)	ASTM-D-412	1500
Elongation, Ult. Min. %	ASTM-D-412	225
Tear Resist. Min. LBF/In	ASTM-D-624	215
Linear Dim. Chng. Max. %	ASTM-D-1204	±2
Ozone Resistance	ASTM-D-1149	No Cracks
Brittle Temp. Max. deg. F.	ASTM-D-746	-0.04
Resistance to Water Absorption		
% change in mass	ASTM-D-471	4
Water Vapor Perm. (perm)	ASTM-E-96B	2.0
Resist. to Outdoor (Ultraviolet) Weathering		
Tens. Strength min. PSI	ASTM-D-412	1200
Elongation min. %	ASTM-D-412	225
C.	Membrane manufacturer's supplied Bonding Adhesive, Splice Cleaner, Splicing Cement, In-Seam Sealant, Primer, SecurTAPE, Cured EPDM Flashing, Pressure-Sensitive Flashing, uncured Elastroform Flashing®, Seam Fastening Plate, molded pipe flashing, lap sealant, water cut-off mastic, night seal, pourable sealer, and termination bar and securement systems (with the corresponding fasteners) are required for use with this roofing system.	

2.03 FASTENER ATTACHMENTS

- A. Mechanical fasteners shall be coated screw type fasteners of sufficient length to penetrate the deck by 1-1/4" and be supplied by the membrane manufacturer.

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- B. All attachments shall be installed to meet the wind uplift requirements for the FM I-90 installation requirements.

PART 3 – EXECUTION

3.01 INSPECTION OF SURFACES AND COORDINATION OF WORK

- A. Before the Work is begun, roof areas shall be carefully inspected and checked for all conditions affecting roofing applications and performance. Roofing Work shall not proceed until defects have been corrected. Commencement of Work shall constitute acceptance of the conditions of the surfaces to which the complete roofing system Work is to be applied and all defects in Work resulting from such accepted surfaces shall be corrected by the trade without additional expense to the Owner.
- B. Temporary waterstops shall be installed at the end of each day's Work, and shall be removed before proceeding with next day's Work. Waterstops shall be compatible with all materials and shall not emit dangerous or incompatible fumes.

3.02 PREPARATION OF EXISTING ROOFING AND MATERIALS

- A. Remove existing EPDM membrane and insulation. Remove all other items incidental thereto and make all conditions satisfactory for application of the new roofing system Work under this Contract.
- B. Any damaged or deteriorated metal decking areas shall be reported to the Engineer or Owner's representative immediately. Repair locations shall be determined by the Engineer or Owner's Representative in the field after removal of the roofing materials, and repaired on a unit cost basis.
- C. All material shall be removed from roof by way of chutes or lowered down to dumpsters. Absolutely no material shall be thrown or dropped or in any other way released from the roof.
- D. Dispose of all material in dumpsters. Location of dumpsters shall be as directed by the Owner.
- E. Remove no more roofing and flashing than can be replaced in its entirety by the new roofing and flashing systems in the same day's Work, including all related Work for this area, to maintain a watertight roof surface. Under no circumstances shall the Contractor subject the interior of the facility to water damage by failing to provide adequate protections in a weather emergency.
- F. Clean up all debris daily. Do not stockpile roof debris overnight.

3.03 SUBSTRATE PREPARATION

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- A. Surface shall be clean, smooth, free of nails, roof gravel, fins, sharp edges, loose and foreign material, oil, grease, and bitumen.
- B. When possible, Work shall begin at the lowest point of the roofing project area and proceed to the highest point. All seams shall be shingled with, or run perpendicular to the flow of water.

3.04 INSTALLATION OF ATTACHMENT SUBSTRATE & FASTENERS

- A. Remove the existing roofing materials to the deck where detailed. Remove all loose materials and debris leaving a clean smooth surface for the new systems.
- B. Insulation shall be laid with tightly butted joints no larger than 1/4", 12 minimum size pieces, and slivers to fill joints.
- C. Dens-Deck substrate shall be laid by mechanical fastening over the insulation with the joints butted tightly within 1/4".
- D. Fasteners to be driven perpendicular to the Work surface.
- E. Fasteners shall be installed as per manufacturer's recommendations and installation procedures to meet pull-out requirements.

3.05 TEMPORARY CUT-OFF

- A. **All flashings shall be installed concurrently with the roof membrane in order to maintain a watertight condition as the Work progresses.** When a break in the day's Work occurs in the central area of a roof, a temporary waterstop shall be constructed to provide a 100% watertight seal. When Work on the new system is suspended, the stagger of the insulation joints shall be maintained by installing partial fillers. The new membrane shall be carried into the waterstop. The waterstop shall be sealed to the deck and/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 roof cement of 6" girth. When Work resumes, the contaminated EPDM membrane shall be cut out. All sealant, contaminated membrane, insulation fillers, etc. shall be removed from the Work area and 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 Contractor 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 Contractor's expense.

3.06 EPDM MEMBRANE INSTALLATION

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- A. Placement
 - 1. The membrane shall be fully adhered to the gypsum panel substrate which shall be fully adhered or mechanically attached to the structural deck.
- B. Attachment
 - 1. The membrane is fully adhered with adhesive and is attached to the existing wood blocking using approved fasteners.
- C. Elastomeric sheet roofing shall be installed in strict accordance with manufacturer's standard roofing specifications.
- D. Position roofing membrane over substrate without stretching. Allow membrane to relax for approximately one hour. Sheets shall be smooth without wrinkles or buckles prior to splicing base flashing joints.
- E. Membrane Splicing with In-Seam Tape
 - 1. Apply In-Seam Primer to the splice area.
 - 2. Position In-Seam tape onto bottom membrane sheet with the edge of the release film along a line mark ½" out from the top sheet. Press tape onto sheet using hand pressure, overlapping tape roll ends a minimum of 1".
 - 3. Remove the release film and press top sheet onto tape using hand pressure. Roll the splice with a 2" wide steel roller.
 - 4. Install a 6" side section of Pressure-Sensitive Flashing over all field splice intersections and seal edges of flashing with Lap Sealant.
 - 5. The use of Lap Sealant with tape splices is optional except at cut edges of reinforce membrane and at tape overlaps.
- F. Perimeter flashing and flashing around roof drains and other penetrations, etc., shall be done with EPDM field sheet using longest pieces practicable. When interruption of field sheet is unavoidable splicing between flashing and main roof sheet shall be completed before bonding of flashing to the vertical surface. This splice shall be sealed at least 3" beyond the fasteners which attach roofing membrane to vertical surface. Apply bonding adhesive to both the membrane and the surface to which it is being bonded. After bonding adhesive has dried so that it does not string or stick to dry finger touch, roll the flashing into the adhesive. Take care to assure that the flashing is not bridging where there is any change in direction of flashing (e.g., where vertical surfaces meet roof deck).
- G. Install water cut-off mastic between membrane and substrates in accordance with manufacturer's written specifications and details.

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- H. Install termination bars as indicated on the Drawings in accordance with manufacturer's recommendations. Bars shall be continuous in long lengths as practical, secured in place using expansion screws and sleeves or mechanical fasteners spaced and secured to resist uplift in any direction of 75 plf of bar. Butt each bar and provide for expansion and Contraction. Apply lap sealant at top of exposed bars continuously.
- I. Voids and joints 1/4" wide and larger in surfaces where membrane for flashing is to be applied, shall be filled with backer rod and pourable sealant in order to eliminate all bridging.
- J. At the end of each day's Work, take care to ensure that water does not flow beneath any completed sections of roof by temporarily sealing loose edge of membrane with night sealer when weather is threatening. Allow no unfinished roof areas unprotected in wet weather or at night.
- K. Protect elastomeric roofing from damage of all kinds of hazards.

3.07 EPDM FLASHING INSTALLATION

A. Walls, Parapets, Mechanical Equipment Curbs:

Use the longest pieces of material which are practicable. Use cured EPDM membrane for all flashing wherever feasible. All flashings and terminations shall be done in accordance with the applicable manufacturer's detail. Tight conditions may require the use of uncured neoprene flashing. These locations shall be detailed in advance and submitted via shop drawing for approval.

1. When using uncured EPDM flashing at a vertical surface, complete the splice between the flashing and the main roof sheet before bonding flashing to the vertical surface. The splice shall extend at least 3 inches beyond the termination bar which attaches the membrane at the angle change.

Use of cured EPDM flashing is required at all locations not previously approved for flashing with uncured EPDM.

2. When using a continuation of roofing membrane as flashing, bond the membrane to the surface to be flashed without "pig ears".
 - a. Apply bonding adhesive evenly, without globs or puddles, with a 9 inch plastic core paint roller.
 - b. Apply bonding adhesive to both the flashing and the surface to which it is being bonded, at a rate covering approximately 60 square feet of finished surface per gallon.

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- c. After the bonding adhesive has dried to the point that it does not string or stick to a dry finger, roll the flashing onto the cemented surface. Care must be taken to ensure that the flashing does not bridge where there is a change of direction (e.g. where the parapet meets the roof deck).
- d. Fasten the top of the installed flashing, at least every 12 inches on center, under metal counter flashing or coping cap.
- e. Install uncured neoprene flashing as required to form a continuous membrane seal in each corner. This is a preapproved location for use of uncured material.

B. Penetrations:

1. General:

- a. Flash all penetrations (pipes, round supports, soil stacks, cold vents, etc.) passing through the membrane.
- b. The flashing seal must be made directly to the penetration passing through the membrane system.
- c. All existing flashing must be removed.

2. Pipes, round supports, etc:

- a. Flash pipes with pre-molded pipe flashings where installation is possible.
- b. **MOLDED PIPE FLASHING CANNOT BE CUT AND PATCHED; DECK FLANGES CANNOT BE OVERLAPPED.**
- c. **Where Molded Pipe Flashings cannot be installed, USE FIELD FABRICATED PIPE SEALS.**
- d. The deck membrane must be secured with a nailer around penetrations larger than 18 inches in diameter.

C. Surface Splice:

- 1. Correction of splices, tears, etc., may be accomplished by splicing a membrane section over the affected areas.
 - a. Select repair membrane which is the same material as that to be repaired.

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- b. Extend the repair membrane section at least 3 inches in every direction from the splice, tear, etc., to be corrected.
- c. To remove field dirt, clean the splice area with soap and water, rinse with clean water and dry.
- d. Follow splicing procedures shown in this specification.

NOTE: Surface splice at drain shall extend 6 inches onto horizontal surface of roof membrane.

D. Daily Seal:

Care should be exercised to ensure that water does not flow beneath any completed sections of the membrane system. Temporarily seal any loose membrane edge with night seal.

1. Mix the two components thoroughly according to the instructions on the label.
2. Apply the night seal at a rate of 100 lineal feet per gallon (on smooth surface), 12 inches back from the edge of the sheet onto the exposed substrate surface. If necessary, use a trowel to spread materials in order to achieve a complete seal.
3. After embedding the membrane in night seal, CHECK FOR CONTINUOUS CONTACT. Weight the edge, providing continuous pressure over the length of the cut-off.
4. When Work is resumed, pull sheet free before continuing installation.

3.08 WALKWAY INSTALLATION

Walkways shall be provided for roof areas subject to foot traffic as located on the drawings.

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A. Walkway Pad installation

1. Roofing membrane to receive walkway pad shall be clean and dry.
2. Chalk lines on deck sheet to indicate location of walkway pad.
3. Walkway pad shall be unrolled and positioned within chalk lines.
4. Adhere the perimeter of the walkway pad to the EPDM deck sheet with adhesive.
5. Spaces shall be left between sections of walk pad to allow for drainage of the roof without creating ponding water.

3.09 METAL FLASHINGS

- A. General: Fabricate and install flashing and other sheet metal Work in accordance with the general procedures specified in accordance with the publications entitled: "Copper and Common Sense".
- B. In all cases, use special care in installation procedures to ensure sufficient allowances for expansion and Contraction of each type metal.
- C. Generally, flashing and sheet metal Work shall be in lengths not exceeding 8' and free from longitudinal joints. Coat all flashing in contact with dissimilar metal with asphalt paint. Form expansion joints in running flashing Work by joining ends of sheets together with a 3" loose lock, filled with plastic cement, and install expansion joints every 24 feet in straight runs. No joints in the sheet metal shall be made closer than 4'-0" to any corner.
- D. Coping and Other Non-specified Flashing: Fabricate and install all items in accordance with the details and specified publication standards.
- E. Metal details, fabrication practices and installation methods shall conform to the applicable requirements of the following:
1. Factory Mutual Loss Prevention Data Sheet 1-49 (latest issue).
 2. Sheet Metal and Air Conditioning Contractors National Association (SMACCA), (latest issue).
- F. Complete all metal Work in conjunction with roofing and flashings so that a watertight condition exists daily.
- G. Metal shall be installed to provide adequate resistance to bending and allow for normal thermal expansion and Contraction.

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H. Metal joints shall be watertight.

3.10 COMPLETION

- A. Prior to demobilization from the site, the Work shall be reviewed by the Owner, Engineer and Contractor. All defects noted, non-compliance's with the specifications or the recommendations of the Roof manufacturer shall be itemized in a punch list. These items must be corrected immediately by the Contractor prior to demobilization to the satisfaction of the Owner, Engineer, and the Roof manufacturer.
- B. All warranties, as required in Part 1 of this Section shall be submitted for approval prior to final payment.
- C. Clean site of debris daily. At the end of the project remove all trash, debris, tools, and materials.

END OF SECTION

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DIVISION 07000

THERMAL AND MOISTURE PROTECTION

SECTION 07620

SHEET METAL FLASHING AND TRIM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Sheet Metal Flashing and Trim work required to complete the work of the contract including all the Sheet Metal Flashing and Trim work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Sheet Metal Flashing and Trim work with all the other trades for the project. Provide all demolition and disposal work to complete the Sheet Metal Flashing and Trim work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Sheet Metal Flashing and Trim work includes, but is not limited to:
 - 1. Edge metal at locations noted on the roofs.
 - 2. Through wall flashing, step flashing, pitch pockets, and vertical and horizontal terminations of roof membrane installations.

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PHASE III RENOVATIONS TO THE
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1.03 SUBMITTALS

- A. Submit complete shop drawings in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 - 1. Pitch pockets.
 - 2. Edge Metal.
 - 3. Parapet Cap Flashing.
 - 4. Scuppers.
- B. Submit the following samples in accordance with the provisions of SECTION 01300 - SUBMITTALS in GENERAL REQUIREMENTS.
 - 1. 12 inch by 12 inch section of all aluminum material and 12 inch long piece of flashing in each configuration listed in 1.02.A, above as a mock-up for approval.
 - 2. Two of each fastener.
- C. Do not commence fabrication of any work or begin installation until approval has been obtained from the Consultant.

PART 2 – PRODUCTS

2.01 SHEET METAL MATERIALS

- A. New 0.050" thick aluminum with dark bronze Kynar finish.
- B. Fasteners for Metal Work:
 - 1. Screws for aluminum: Stainless steel wood screws of sizes most appropriate for the function.
 - 2. Aluminum rivets 1/8" diameter.
- C. Where face fastening at existing counter flashing is approved, provide neoprene washers at each fastening to assure water tightness.

PART 3 – EXECUTION

3.01 INSTALLATION OF METAL FLASHINGS AND SHEET METAL

- A. General: Fabricate and install flashings and other sheet metal work in accordance with the general procedures specified in accordance with the publications entitled:

SHEET METAL FLASHING AND TRIM
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"Modern Application of Sheet Copper in Building Construction" and "Copper and Common Sense".

- B. In all cases, use special care in installation procedures to ensure sufficient allowances for expansion and contraction of each type metal.
- C. Use rivet connections of metal in preference to solder connections, except where visual appearance is a major factor. When solder joints are specified or necessitated, ensure that all surfaces are pre-tinned and that the proper flux is used.
- D. Verify all wood nailers and other surfaces to which fasteners will be installed and request correction of same from the General Contractor where surfaces would not otherwise properly receive the fastenings.
- E. Generally, flashings and sheet metal work shall be in lengths not exceeding 8' and free from longitudinal joints. Coat all flashing in contact with dissimilar metal with asphalt paint. Form expansion joints in running flashing work by joining ends of sheets together with a 3" loose lock, filled with plastic cement, and install expansion joints every 24 feet in straight runs. Submit sample for approval.
- F. Coping and Other Nonspecified Flashings: Fabricate and install all items in accordance with the details and specified publication standards.

END OF SECTION

SHEET METAL FLASHING AND TRIM
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DIVISION 07000

THERMAL AND MOISTURE PROTECTION

SECTION 07920

SEALANTS AND CAULKING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Sealants and Caulking work required to complete the work of the contract including all the Sealants and Caulking work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Sealants and Caulking work with all the other trades for the project. Provide all demolition and disposal work to complete the Sealants and Caulking work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Sealants and caulking work includes, but is not limited to:
 - 1. Provide a complete watertight installation as per good construction practice.
 - 2. Provide paintable acrylic sealant at the interior of each unit at the connection of all dissimilar materials included but not limited to door frames.

SEALANTS AND CAULKING
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PHASE III RENOVATIONS TO THE
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1.03 SUBMITTALS

- A. Product Literature: Submit 4 copies of product data sheets and the manufacturer's installation instructions.
- B. Color Samples: Copies of manufacturer's standard color charts shall be submitted. Cured samples of each chosen color shall be submitted for verification of actual color to be installed.

1.04 PRODUCT HANDLING

- A. Delivery shall be in manufacturer's original unopened container, clearly identifying each product specified, relating it to the product literature submitted.

1.05 GUARANTEES

- A. Exterior sealant shall be guaranteed by the manufacturer against cohesive and adhesive failure of the sealant and water penetration through the joints for TWENTY (20) years.

PART 2 – PRODUCTS

2.01 GENERAL

- A. Colors: Provide full range of manufacturer's color samples for Architect's review.

2.02 MATERIALS

- A. Exterior and Window Sealant: Medium modulus, neutral cure single component, non-sag, Silicone sealant - ASTM C-920-79/Type S/Class 25/Grade NS, such as 795 by Dow Corning, 864 by Pecora, or approved Equal.
- B. Interior Sealant: Paintable Acrylic sealant – Benjamin Moore's Crown and Trim Sealant 464, Tremco Acrylic Latex Sealant, or approved equal.
- C. Primer: A primer shall be used at all locations in accordance with the manufacturer's instructions, with all primers being installed prior to the installation of any backer rod or bond breaker tape. Manufacturer shall be consulted for all surfaces not specifically covered in submittal application instructions.
- D. Backer Rod: Shall be closed cell polyethylene or polyurethane as recommended by the sealant manufacturer for compatibility with sealant.
- E. Bond Breaker Tape: Any acceptable polyethylene or similar type bond breaker tape shall be used to prevent three (3) sided adhesion in locations where backer rod cannot be used.

SEALANTS AND CAULKING
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PART 3 – EXECUTION

3.01 JOINT SURFACE PREPARATION

- A. Remove all failed sealants and clean joint surfaces immediately before installation of sealant and caulking compounds. Remove dirt, insecure coatings, moisture and other substances which would interfere with the bond of sealant or caulking compounds.

3.02 INSTALLATION

- A. Where backer rod is required it shall be installed using only blunt instruments or rounded tools which will insure a uniform depth (+ or - 1/8") depth without puncturing the material. Backer rod shall be a minimum of 33% oversized for the joint to be sealed.
- B. Surrounding areas shall be protected to ensure that no sealant contaminates these surfaces.
- C. Sealant shall be installed in accordance with manufacturer's recommendations and instructions in order to insure proper width to depth ratio. Take all steps to prevent three (3) sided adhesion. Sealant depth shall be one half of joint width with a minimum depth of 1/4" and a maximum of 1/2" unless otherwise required by the manufacturer.
- D. Both temperature and dampness conditions may restrict application of these sealants. Comply with manufacturer's instructions.

END OF SECTION

DIVISION 08000

WINDOWS AND DOORS

SECTION 08110

METAL DOORS AND FRAMES

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Metal Doors and Frames work required to complete the work of the contract including all the Metal Doors and Frames work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Metal Doors and Frames work with all the other trades for the project. Provide all demolition and disposal work to complete the Metal Doors and Frames work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Metal Doors and Frames work includes, but is not limited to:
 - 1. All hollow metal doors and door frames as indicated on Drawings.
 - 2. All wall and floor anchors, clips, extensions, and other related items necessary to complete each assembly.

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- C. Provide and fabricate doors in accordance with SDI 100.

1.03 SHOP DRAWINGS

- A. Submit complete shop drawings in accordance with the provisions of the GENERAL CONDITIONS.
- B. Shop drawings shall include a complete door and frame schedule, elevations of door and frame profiles and gauges of metal, wall conditions of all anchorages, typical and special details of construction, methods of typical and special details of construction, methods of assembling sections, UL label certifications, hot-dipped galvanizing certification, shop prime materials, and all other necessary information.
- C. Provide details at 3" to 1' scale and dimensioned elevations at not less than 3/8" to 1' scale.

1.04 GUARANTEE

- A. Contractor shall warranty the door and frame for a period of two (2) years.

1.05 QUALITY ASSURANCE

- A. Except as otherwise indicated or specified herein, provide "standard" doors and frames complying with Steel Door Institute "Recommended Specifications: Standard Steel Doors and Frames" (SDI-100) and as herein specified.
- B. Single Source Responsibility: All hollow metal work shall be fabricated or supplied by one manufacturer.

1.06 REFERENCES

- A. ANSI/SDI 100-91 - Recommended Specifications for Standard Steel Doors & Frames; Steel Door Institute.
- B. SDI 105 - Recommended Erection Instructions for Steel frames.
- C. SDI 111 - Recommended Standard Details for Steel Doors & Frames.
- D. SDI 113 - Test Procedure and Acceptance Criteria for Acoustical Performance for Steel Door and Frame Assemblies.
- E. ASTM A 366/A 366M - Standard Specification for Steel, Sheet, Carbon, Cold-Rolled, Commercial Quality.
- F. ASTM A 568/A 568M - Standard Specification for Steel, Sheet, Carbon, and High-Strength, Low-Alloy, Hot-Rolled and Cold-Rolled, General Requirements For.

- G. ASTM A 569/A 569M - Standard Specification for Steel, Carbon (0.15 Maximum, Percent), Hot-Rolled Sheet and Strip Commercial Quality.
- H. ASTM A 591/A 591M - Standard Specification for Steel Sheet, Electrolytic Zinc-Coated, for Light Coating Mass Applications.
- I. ASTM A 653/A 653M - Standard Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process.
- J. ASTM A 924/A 924M - Standard Specification for General Requirements for Sheet Steel, Metallic-Coated by the Hot-Dip Process.
- K. NFPA 80 - Standard for Fire Doors and Windows.
- L. Building Materials Directory; Underwriters Laboratories Inc.
- M. Certification Listings; Warnock Hersey International Inc.

PART 2 - PRODUCTS

2.01 PRODUCTS

A. DOORS

- 1. Provide metal doors of types and styles as shown and scheduled in the Drawings.

B. FRAME

- 1. Provide metal frames of types and styles as shown and scheduled in the drawings, with the proper anchorages for each installation condition.

C. MANUFACTURERS

- 1. Subject to compliance with requirements, manufacturers offering products which may be incorporated in the work include, but are not limited to, the following, or approved equals:
 - a. Allied Steel Product, Inc.
 - b. Ceco Corp.
 - c. Steelcraft/Division of American Standard Co.

D. HARDWARE

- 1. Provide complete set of finish hardware rated for exterior exposure for all doors as per Section 08 71 00.

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- a. Lockset hardware, coordinate keying with City of Waltham standards. Provide construction core that is interchangeable with Waltham core.

2. All hardware shall be brushed chrome finish.

2.02 MATERIALS: Except as otherwise specified herein, door and frame materials shall comply with the following:

- A. Hot-Rolled Steel Sheets and Strip: Commercial quality carbon steel, pickled and oiled, complying with ASTM A569 and ASTM A568.
- B. Cold-Rolled Steel Sheets: Commercial quality carbon steel, complying with ASTM A366 and ASTM A568.
- C. Steel Plates, Shapes and Bars: ASTM A36.
- D. Steel Tubing: Cold-formed, ASTM A500; or hot-rolled, ASTM A501.
- E. Inserts, Bolts, and Fasteners: Manufacturer's standard units.

2.03 FABRICATION

- A. Faces of exterior doors and door frames shall be formed from 20 gauge cold rolled galvanized steel.
- B. Supports, anchors, and reinforcement shall be formed from 16 gauge galvanized steel.
- C. Fabricate frames with mitered and welded corners from 14 gauge galvanized steel.
- D. Fabricate doors and frames to be rigid, neat in appearance and free from defects, warp or buckle. Whenever practicable, fit and assemble units in manufacturer plant. Clearly identify work that cannot be permanently factory-assembled before shipment, to assure proper assembly at project site.
- E. In general, use materials of size and thickness indicated, or if not indicated, as required to produce strength and durability in finished product for use intended. Work to dimensions indicated using proven details, fabrication and support. Use type of materials indicated or specified for the various components of work. Continuously weld corners and seams, complying with AWS recommendations. At exposed connections, grind exposed welds smooth and flush to match and blend adjoining surfaces. Form exposed connections with hairline joints, flush and smooth, using concealed fasteners and stiffeners.
- F. Exposed Fasteners: Unless otherwise indicated, provide countersunk flat Philips

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heads for exposed screws and bolts.

2.04 FINISH HARDWARE PREPARATION

- A. Prepare doors and frames to receive both surface applied and mortised and concealed finish hardware in accordance with final Finish Hardware Schedule and templates provided by hardware supplier. Comply with applicable requirements of ANSI A115 series specifications for door and frame preparations for hardware.
- B. Reinforce doors and frames to receive surface applied hardware. Drilling and tapping for surface-applied finish hardware may be done at project site.
- C. Locate finish hardware as indicated on final shop drawings or, if not indicated, in accordance with "Recommended Locations for Builder's Hardware".
- D. In the case of new doors to be installed in existing frames, field measure and locate hardware to coincide with existing hardware locations in frames.
- E. Door Silencers: Drill stops on all interior door frames to receive 3 silencers on strike jambs of single swing frames and 2 silencers on heads of double swing frames.
- F. Plaster Guards: Provide minimum 26 gage steel plaster guards or mortar boxes, welded to frames, at back of finish hardware cutouts where mortar or other materials might obstruct hardware operations and to close off interior of openings.

2.05 GALVANIZING

- A. Fabricate all stile, trim, and reinforcing and other related items therefore, from zinc coated steel. This coating shall consist of zinc applied by a hot-dipped process on both sides of all base metals. Grind down all welds and fill all blemishes prior to galvanizing.
- B. Apply zinc in such a manner as to provide a ductile coating that is tightly adherent to base metal and which will conform to bend tests conducted in accordance with ASTM A525. Zinc coating shall not be less than 1.25 ounces per square foot of steel. Following fabrication of exterior frames, tough up all welds with liquid zinc.

2.06 SHOP PAINTING

- A. Cut, ground or welded areas and any other areas where the galvanized coating has been damaged shall be coated with "ZRC" or equal zinc-rich paint prior to prime painting.
- B. Clean, treat, and paint exposed surfaces of steel door and frame units. Clean steel surfaces of mill scale, rust, oil, grease, dirt, and other foreign materials before

METAL DOORS AND FRAMES

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application of paint. Apply shop coat of prime paint of even consistency to provide a uniformly finished surface ready to receive finish paint. Drips or sags shall be sanded smooth and re-primed.

2.07 PACKAGING

- A. Doors and transom panels shall be full wrapped in corrugated cardboard, single faced paper, 42 pound with a 26 pound liner medium "B" flute, protecting all surfaces of the door and panel. Flute shall run the full height of the door and panel.
- B. Wood strips, 3/8" x 2" commercial grade finished one side for marking, extending 1/2" beyond top and bottom of the door shall be applied to the edges of the door.
- C. The corrugated cardboard and wood strip shall be held firmly in place by three 3/8" x 0.018 steel bands on each door.
- D. Wood strips shall be marked clearly giving door type and door size.

2.08 COORDINATION

- A. Closely coordinate work with that of other trades.

2.09 STORAGE

- A. Be responsible for the proper storage and protection of this material. Should the priming coat be faulty or rust or scale appear, clean all exposed surfaces to bright metal and apply a suitable approved priming coat as hereinafter-specified before finish painting.

2.10 DOOR SCHEDULE

- A. See Plans.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. The installer shall verify that project conditions are suitable before beginning installation of frames.
 - 1. Verify that completed openings to receive frames are of correct size and thickness.
- B. Correct unsatisfactory condition before proceeding with installation.

3.02 INSTALLATION

- A. Install frames in accordance with SDI 105.
- B. Install doors plumb and in true alignment and fasten to achieve the maximum operational effectiveness and appearance of the unit. Maintain clearances specified in SDI 100 or NFPA 80.
- C. Fill welded frames in masonry construction with mortar as masonry is laid-up. Provide masonry anchorage devices at the rate of at least three per jamb.

3.03 ADJUST AND CLEAN

- A. Adjust doors for proper operation, free from binding or other defects.
- B. Clean and restore soiled surfaces. Remove scraps and debris, and leave site and a clean condition.

END OF SECTION

DIVISION 08000

DOORS AND WINDOWS

SECTION 08210

WOOD DOORS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Wood Doors work required to complete the work of the contract including all the Wood Doors work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Wood Doors work with all the other trades for the project. Provide all demolition and disposal work to complete the Wood Doors work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Wood Doors work includes, but is not limited to:
 - 1. Provide wood doors at all locations shown on the plans.
 - 2. Provide pre-hung solid mineral core molded panel doors where indicated as 'Masonite' on the Door Schedule.

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1.03 RELATED WORK

- A. The following related work is to be performed under the designated SECTIONS:
1. Section 06100, ROUGH CARPENTRY.
 2. Furnishing of finish hardware and templates: Section 08700, FINISH HARDWARE.
 3. Finish painting and/or transparent finishes for doors, panels, and related items not specified to be prefinished: Section 09900, PAINTING.

1.04 SHOP DRAWINGS

- A. Submit complete shop drawings in accordance with the provisions of the GENERAL CONDITIONS.
- B. Include a complete wood door and panel schedule showing locations and sizes of cut-outs in each door. In addition, include with the initial submission of shop drawings a certified statement that the doors proposed to be furnished meet or exceed the requirements specified hereunder.

1.05 SAMPLES

- A. Submit the following samples in accordance with the provisions of the GENERAL CONDITIONS:
1. Corner section of each specified type door and panel, showing core construction, methods of joinery, and type of veneer.
 2. After initial selection of colors by the Architect, samples of all selected colors applied to 12" x 12" pieces of plywood of the specified specie which will be indicative of the finish and colors to be expected on the doors and panels.

1.06 GUARANTEE

- A. The manufacturer shall submit directly to the General Contractor for transmittal to the Architect, 2 copies of the standard NWMA Guarantee covering all solid core doors and panels for the lifetime of the installation and hollow core doors and panels for two years after installation. Said guarantee shall be signed by the manufacturer and shall be submitted at the same time doors and panels are shipped.

1.07 REGULATORY AGENCIES

- A. The requirements of the following agencies shall apply to the work of this SECTION to the extent applicable:

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1. Underwriters Laboratories, Inc. (UL): Fire doors (120 IDO) for fire classification marking.
2. National Fire Protection Association (NFPA): "Standard Fire Doors and Windows, NFPA 80" for installation of fire rated doors.

1.08 QUALITY STANDARDS

- A. Construction of wood doors and panels shall be in accordance with the requirements of the Architectural Woodwork Institute Quality Standards, Section 1300, for grades specified hereunder, including applicable requirements of U. S. Commercial Standard CS171 as amended, and specific requirements set forth hereunder:
 1. Finishing of wood doors and panels shall be in accordance with the requirements of AWI Quality Standards, Section 1500.

1.09 STORAGE AND HANDLING

- A. Deliver material only when proper storage conditions can be ensured at the project site.
- B. Store materials only in areas which are free from great variations in temperature and humidity.
- C. Stack materials flat on 2" x 4" lumber, spaced 12" in from sides of doors and panels and long center lines thereof.
- D. Provide continuous plywood or corrugated cardboard over supporting lumber to protect surfaces of doors and panels before stacking same.
- E. When handling materials, lift doors and panels individually without dragging over other surfaces, to avoid damage.

PART 2 - PRODUCTS

2.01 DOORS, PANELS, AND RELATED ITEMS

- A. Refer to the Door Schedule and the Drawings for various door and panel types, sizes, cut-outs, and other characteristics of doors and panels.
 1. Interior UL Label solid core doors shall be AWI Custom Grade Type 1-1/2 F-1, stain grade, with birch veneer.
 2. All Interior unit doors indicated as 'Masonite' on the Door Schedule shall be 1-3/8" solid mineral core molded 6-panel doors with factory primed and painted white composite wood facing by *Masonite*, or approved equal. Doors shall be pre-hung, split jamb with applied 2-1/2 flat casing.

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2.02 FACTORY FINISHES

- A. Refer to the Drawings for doors and panels to be factory sealed, factory primed, or completely factory finished.
 - 1. Factory sealing for wood veneer doors and panels: One coat of solvent type polyvinyl clear sealer which will properly receive stain filler and transparent finish coats to be applied at the project.
 - 2. Factory finishing for wood veneer doors and panels designated on the Drawings to receive transparent finish: Manufacturer's standard finish system comprising, as a minimum, one coat of solvent type polyvinyl clear sealer, one coat of stain filler in tones as selected by the Architect, and two coats of clear semi-gloss.

2.03 FACTORY PREFITTING AND MACHINING

- A. Perform all prefitting and machining for wood doors at the factory prior to application of any finish thereon, in accordance with the following tolerances, using plane method for width trimming and saw method for height.
- B. Bevel Requirements:
 - 1. On lock and hinge edges of non-rated doors and meeting stile edges of pairs of doors: 1/8" in 2", maximum.
- C. Clearance Requirements:
 - 1. 1/8" at top.
 - 2. 1/8" at each side edge.
 - 3. 1/4" between bottom of door and top of threshold.
 - 4. 1/8" between meeting stiles for pairs of doors.
- D. Machining for hardware: Unless otherwise specified, perform all machining for hardware in accordance with Standard Procedures and Recommendations for Factory Machining Architectural Wood and Plastic Flush Doors for Hardware, published by NWMA, latest edition as of bid receipt date. Templates for all hardware will be issued by the finish hardware supplier. Holes for thru-bolts of closers will be drilled at the project.

2.04 SEALING AND FINISHING

- A. Perform factory sealing, factory priming, or prefinishing as applicable, only after all prefitting and machining has been completed.

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- B. Include all door and panel faces, edges of cut-outs, side edges, top and bottom edges, louvers, glazing beads, and moldings, using the manufacturer's standard procedures and at least the minimum number of applications specified herein before.

2.05 PACKAGING

- A. Carefully pack each door and panel individually, with no-staining, moistureproof coverings and spacers, prior to shipping in a manner which will protect the doors and panels, including the finish thereon, from damage in transit.

PART 3 – EXECUTION

3.01 INSTALLATION OF DOORS AND PANELS

- A. Doors and panels will be installed and touched-up under Section 06100, ROUGH CARPENTRY.

END OF SECTION

WOOD DOORS
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DIVISION 08000

WINDOWS AND DOORS

SECTION 08494

ROLLER SHADES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Roller Shades work required to complete the work of the contract including all the Roller Shades work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Roller Shades work with all the other trades for the project. Provide all demolition and disposal work to complete the Roller Shades work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Roller Shade work includes but is not limited to:
 - 1. Provide individual shades at all windows in the scope area and as indicated on the plans.
 - 2. Provide a single shade for each section of window.
 - 3. All shades shall be manually operated by chain and shall include valance

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and end caps to match shade cloth.

1.03 RELATED WORK

- A. Section 02070 – Selective Demolition.

1.04 REFERENCES

- A. ASTM G 21 – Standard Practice for Determining Resistance of Synthetic Polymeric Materials to Fungi.
- B. NFPA 70 – National Electrical Code.
- C. NFPA 701 – Fire Tests for Flame-Resistant Textiles and Films.

1.05 SUBMITTALS

- A. Submit complete shop drawings in accordance with the provisions of Section 00 70 00 – General Conditions. If the submittals and mock-up are not given to the Architect within 30 days of the contract award date, the Owner has the right to reject the roller shade Subcontractor. Any new Subcontractor must be acceptable to the Owner.
- B. Manufacturer's data sheets on each product to be used, including:
 - 1. Preparation instructions and recommendations.
 - 2. Styles, material descriptions, dimensions of individual components, profiles, features, finishes and operating instructions.
 - 3. Storage and handling requirements and recommendations.
 - 4. Mounting details and installation methods.
- C. Shop Drawings shall include: Plans, elevations, sections, product details, installation details, operational clearances, and relationship to adjacent work for each window.
 - 1. Prepare complete and detailed shop drawings of each window type.
 - 2. Window Treatment Schedule: For all roller shades, use same window designations as indicated on the Drawings and include opening sizes and key to typical mounting details.
- D. Samples
 - 1. Selection Samples: For each finish product specified, one set of shade cloth options and aluminum finish color samples representing

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manufacturer's full range of available colors and patterns.

2. Verification Samples: For each finish product specified, one complete set of shade components, unassembled, demonstrating compliance with specified requirements. Shadecloth sample and aluminum finish sample as selected. Mark face of material to indicate interior faces.
3. Provide one complete assembly as mock-up in the existing space which will represent an example of the exact product proposed for approval. Shadecloth shall have factory sealed edges.

1.06 QUALITY ASSURANCE

- A. Manufacturer Qualifications: Obtain roller shades through one source from a single manufacturer with a minimum of twenty years experience in manufacturing products comparable to those specified in this section.
- B. Installer Qualifications: Installer trained and certified by the manufacturer with a minimum of ten years experience in installing products comparable to those specified in this section.
- C. Fire-Test-Response Characteristics: Passes NFPA 701 small and large-scale vertical burn. Materials tested shall be identical to products proposed for use.
- D. Anti-Microbial Characteristics: 'No Growth' per ASTM G 21 results for fungi ATCC9642, ATCC 9644, ATCC9645.
- E. Mock-Up: Provide a complete mock-up of one roller shade assembly for evaluation of mounting, appearance and accessories.
 1. Locate mock-up in window designated by Architect.
 2. Do not proceed with remaining work until, mock-up is accepted by Architect.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver shades in factory-labeled packages, marked with manufacturer and product name, fire-test-response characteristics, and location of installation using same room designations indicated on Drawings and in the Window Treatment Schedule.

1.08 PROJECT CONDITIONS

- A. Environmental Limitations: Install roller shades after finish work including window demolition, installation, and painting is complete and ambient temperature and humidity conditions are maintained at the levels indicated for

Project when occupied for its intended use.

1.09 WARRANTY

- A. Roller Shade Hardware and Chain Warranty: Manufacturer's standard non-depreciating twenty-five year limited warranty.
- B. Standard Shadecloth: Manufacturer's standard twenty-five year warranty.
- C. Roller Shade Installation: One year from date of Substantial Completion, not including scaffolding, lifts or other means to reach inaccessible areas.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Acceptable Manufacturer: Mecho Shade Systems, Inc.; Hunter Douglas, Walker Specialties, or approved equal.

2.02 ROLLER SHADE TYPES

- A. Manually Operated Shades:
 - 1. Mounting: Surface mounted with fascia.
 - 2. Configuration: Single solar shadecloth.
 - 3. Solar Shadecloths:
 - a. Fabric: ThermoVeil 0900, 0-1 percent visually translucent extra dense linear-weave pattern.
 - b. Color: Selected from manufacturer's standard colors.

2.03 SHADE CLOTH

- A. Visually Transparent Shadecloth: single thickness non-raveling 0.030-inch (0.762 mm) thick vinyl fabric, woven from 0.018-inch (0.457 mm) diameter extruded vinyl yarn comprising of 21 percent polyester and 79 percent reinforced vinyl.

2.04 SHADE BAND

- A. Shade Bands: Construction of shade band includes the fabric, the hem weight, hem-pocket, shade roller tube, and the attachment of the shade band to the roller tube. Sewn hems and open hem pockets are not acceptable.
 - 1. Hem Pockets and Hem Weights: Fabric hem pocket with RF-welded seams (including welded ends) and concealed hem weights. Hem weights

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shall be of appropriate size and weight for shade band. Hem weight shall be continuous inside a sealed hem pocket. Hem pocket construction and hem weights shall be similar, for all shades within one room.

2. Shade Band and Shade Roller Attachment:

- a. Use extruded aluminum shade roller tube of a diameter and wall thickness required to support shade fabric without excessive deflection. Roller tubes less than 1.55 inch (39.37 mm) in diameter for manual shades, and less than 2.55 inches (64.77 mm) for motorize shades are not acceptable.
- b. Provide for positive mechanical engagement with drive / brake mechanism.
- c. Provide for positive mechanical attachment of shade band to roller tube; shade band shall be made removable / replaceable with a "snap-on" snap-off" spline mounting, without having to remove shade roller from shade brackets.
- d. Mounting spline shall not require use of adhesives, adhesive tapes, staples, and/or rivets.
- e. Any method of attaching shade band to roller tube that requires the use of: adhesive, adhesive tapes, staples, and/or rivets are not acceptable.

2.05 SHADE FABRICATION

- A. Fabricate units to completely fill existing openings from head to sill and jamb-to-jamb, unless specifically indicated otherwise.
- B. Fabricate shadecloth to hang flat without buckling or distortion. Fabricate with heat-sealed trimmed edges to hang straight without curling or raveling. Fabricate unguided shadecloth to roll true and straight without shifting sideways more than 1/8 inch (3.18 mm) in either direction per 8 feet (2438 mm) of shade height due to warp distortion or weave design. Fabricate hem as follows:
 1. Standard concealed hem bar.
 2. Exposed blackout hembar with light seal.
- C. Provide battens in standard shades as required to assure proper tracking and uniform rolling of the shadebands. Contractor shall be responsible for assuring the width-to-height (W:H) ratios shall not exceed manufacturer's standards or, in absence of such standards, shall be responsible for establishing appropriate standards to assure proper tracking and rolling of the shadecloth within specified

standards. Battens shall be roll-formed stainless steel or tempered steel, as required.

- D. For railroaded shadebands, provide seams in railroaded multi-width shadebands as required to meet size requirements and in accordance with seam alignment as acceptable to Architect. Seams shall be properly located. Furnish battens in place of plain seams when the width, height, or weight of the shade exceeds manufacturer's standards. In absence of such standards, assure proper use of seams or battens as required to, and assure the proper tracking of the railroaded multi-width shadebands.
- E. Provide battens for railroaded shades when width-to-height (W:H) ratios meet or exceed manufacturer's standards. In absence of manufacturer's standards, be responsible for proper use and placement of battens to assure proper tracking and roll of shadebands.

2.06 COMPONENTS

A. Access and Material Requirements:

- 1. Provide shade hardware allowing for the removal of shade roller tube from brackets without removing hardware from opening and without requiring end or center supports to be removed.
- 2. Provide shade hardware that allows for removal and re-mounting of the shade bands without having to remove the shade tube, drive or operating support brackets.
- 3. Use only engineered plastics for all plastic components of shade hardware. Styrene based plastics, and /or polyester, or reinforced polyester will not be acceptable.

B. Manual Operated Chain Drive Hardware and Brackets:

- 1. Provide for universal, regular and offset drive capacity, allowing drive chain to fall at front, rear or non-offset for all shade drive end brackets. Universal offset shall be adjustable for future change.
- 2. Provide hardware capable for installation of a removable fascia, for both regular and/or reverse roll, which shall be installed without exposed fastening devices of any kind.
- 3. Provide shade hardware system that allows for removable regular and/or reverse roll fascias to be mounted continuously across two or more shade bands without requiring exposed fasteners of any kind.
- 4. Provide shade hardware system that allows for operation of multiple shade

bands (multi-banded shades) by a single chain operator, subject to manufacturer's design criteria. Connectors shall be offset to assure alignment from the first to the last shade band.

5. Provide shade hardware system that allows multi-banded manually operated shades to be capable of smooth operation when the axis is offset a maximum of 6 degrees on each side of the plane perpendicular to the radial line of the curve, for a 12 degrees total offset.
6. Provide positive mechanical engagement of drive mechanism to shade roller tube. Friction fit connectors for drive mechanism connection to shade roller tube are not acceptable
7. Provide shade hardware constructed of minimum 1/8-inch (3.18 mm) thick plated steel or heavier as required to support 150 percent of the full weight of each shade.
8. The following Drive Bracket/Brake Assembly specification is based on Mecho Shade system:
 - a. Shade Drive Bracket model M5 shall be fully integrated with all Shade accessories, including, but not limited to: Snap Loc fascia, room darkening side/sill channels, center supports and connectors for multi-banded shades.
 - b. Drive sprocket and brake assembly shall rotate and be supported on a welded 3/8 inch (9.525 mm) steel pin.
 - c. The brake shall be an over-running clutch design which disengages to 90 percent during the raising and lowering of a shade. The brake shall withstand a pull force of 50 lbs. (22 kg) in the stopped position.
 - d. The braking mechanism shall be applied to an oil-impregnated hub on to which the brake system is mounted. The oil impregnated hub design includes an articulated brake assembly, which assures a smooth, non-jerky operation in raising and lowering the shades. The assembly shall be permanently lubricated. Products that require externally applied lubrication and or not permanently lubricated are not acceptable.
 - e. The entire assembly shall be fully mounted on the steel support bracket, and fully independent of the shade tube assembly, which may be removed and reinstalled without effecting the roller shade limit adjustments.
 - f. Drive Chain: #10 qualified stainless steel chain rated to 90 lb. (41

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kg) minimum breaking strength. Nickel plate chain shall not be accepted.

C. Fascia:

1. Continuous removable extruded aluminum fascia that attaches to shade mounting brackets without the use of adhesives, magnetic strips, or exposed fasteners.
2. Fascia shall be able to be installed across two or more shade bands in one piece.
3. Fascia shall fully conceal any part of the exposed brackets, shade roller and fabric on the tube.
4. Provide bracket/fascia end caps where mounting conditions expose any part of the outside of roller shade brackets.
5. Notching of the Fascia for manual chain shall not be acceptable.

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 roller shades level, plumb, square, and true according to manufacturer's written instructions, and located so shade band is not closer than 2 inches (50 mm) to interior face of glass. Allow proper clearances for window operation hardware.
- B. Adjust and balance roller shades to operate smoothly, easily, safely, and free from binding or malfunction throughout entire operational range.
- C. Clean roller shade surfaces after installation, according to manufacturer's written instructions.

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- D. Engage installer to train owner's maintenance personnel to adjust, operate and maintain roller shade systems.

3.04 PROTECTION

- A. Protect installed products until completion of project.
- B. Touch-up, repair or replace damaged products before Substantial Completion.

END OF SECTION

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DIVISION 08000

WINDOWS AND DOORS

SECTION 08700

FINISH HARDWARE

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Finish Hardware work required to complete the work of the contract including all the Finish Hardware work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Finish Hardware work with all the other trades for the project. Provide all demolition and disposal work to complete the Finish Hardware work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Finish Hardware work includes, but is not limited to:
 - 1. Provide all hardware for all new doors.
 - 2. Provide new lock cylinders at all existing doors to remain.
 - 3. Provide all new hardware noted for existing doors to remain.

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1.03 RELATED WORK SPECIFICIED ELSEWHERE

- A. Section 08110 – Metal Doors and Frames.
- B. Section 08210 – Wood Doors.

1.04 QUALITY ASSURANCE

- A. Manufacturer: Obtain each type of hardware from a single manufacturer, although several may be indicated as offering products complying with requirements.
- B. Supplier: A recognized architectural finish hardware supplier, with warehousing facilities, who has been furnishing hardware for a period of not less than 5 years, and who is, or who employs an experienced architectural hardware consultant who is available to the Owner, Architect, and Contractor, at reasonable times during the course of the work, for consultation about the project's hardware requirements. It is the Hardware Supplier's responsibility to accurately furnish the proper sizes, weights, quantities, and functions as scheduled, as required by these Specifications and as recommended by the hardware manufacturer's catalogue information.

1.05 SUBMITTALS

- A. Product Data: Submit manufacturer's technical product data for each item of hardware. Include whatever information may be necessary to show compliance with requirements. Include instructions for installation and for maintenance of operating parts and finish.
- B. Schedules: Submit preliminary schedule at earliest possible date after notice of award of Contract. Hardware schedule shall be carefully coordinated with the Contract Documents and with the requirements of doors, frames and related work to ensure proper size, thickness, hand, function and finish of hardware. The schedule shall list the manufacturer's numbers, sizes, and installation location for all hardware required to complete the work. Organize hardware schedule into hardware test, parallel to the sets specified herein, indicating complete designations of every item required for each door or opening. Explain all abbreviations, symbols, codes, etc. used in schedule.
- C. Templates: Furnish all necessary templates and approved schedules required to fabricate doors, frames, and thresholds in sufficient time so as not to impede the progress of the work.

1.06 PRODUCT HANDLING

- A. All hardware shall be individually protectively wrapped/ packaged by the supplier, and in the same package shall be all screws, bolts, and fastenings

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necessary for proper installation. Group sets of hardware for each door. All hardware packages shall be legibly labeled indicating manufacturer's number, sizes, and hardware schedule reference number.

1.07 STANDARDS

- A. ANSI/BHMA Designations: Hardware shall comply with the requirements of the following standards.

Hinges:	ANSI A156.1, BHMA 101
Locks and Lock Trim:	ANSI A156.2, BHMA 601
Mortise Locks and Latches:	ANSI A156.13, BHMA 621
Exit Devices:	ANSI A156.2, BHMA 701
Door Controls - Closers:	ANSI A156.1, BHMA 301
Architectural Door Trim	ANSI A156.2, BHMA 1001
Template Hinge Dimensions:	ANSI A156.1
Control-Overhead Holders:	ANSI A156.2, BHMA 311
Materials and Finishes:	ANSI A156.18, BHMA 1301

1.08 KEYS AND KEYING

- A. Keying: Supplier shall meet with Owner to finalize keying requirements and obtain final instructions in writing. In general, keying shall match the Owner's existing system. Furnish the following quantities of keys:

Three (3)	Grand Master Keys (if required)
Five (5)	Master Key/Set
Three (3)	Change Keys/lock of cylinder

- B. Keys: Permanently inscribe each key with number of lock that identifies cylinder manufacturer key symbol, and notation "DO NOT DUPLICATE".

PART 2 – PRODUCTS

2.01 DOOR HARDWARE

- A. General: Produce hardware units of basic metal and forming methods indicated, using manufacturer's standard metal alloy, composition, temper and hardness, but in no case of lesser quality than specified for applicable hardware units by applicable ANSI A156 series standards. Do not substitute other materials or forming methods for those indicated, except as otherwise specified.
1. Fasteners: Provide hardware manufactured to conform to published templates, generally prepared for machine screw installation. Do not provide hardware which has been prepared for self-tapping sheet metal screws, except as specifically indicated. Furnish screws for installations with each hardware item. Provide Phillips flat-head screws except as otherwise indicated. Finish of screws shall match hardware finish.
 2. Finish: In general, all hardware finish shall be either US 26D, Satin Chrome.
 3. Tools and Instructions for Maintenance: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of finish hardware.
 4. Hardware supplier shall size and had all hardware on his hardware schedule, subject to approval of the architect.
- B. Butt Hinges: Hinges shall be Stanley as scheduled, Hager, Lawrence, or approved equal. All hinges shall be non-corrosive, ball bearing type. Notwithstanding any as scheduled data to the contrary, hinges for installation in existing door frames shall be sized to fit existing mortises. Note that re-drilling and tapping of screw holes in existing frames, if required, is included under Section 06 10 00, Rough Carpentry.
1. Number of hinges per door: Provide 1 1/2 pair butts for each door.
 2. Tips: Flat buttons and matching plug, finished to match leaves.
 3. Pins: Hinge pins at all locking doors shall be non-removable type.
 4. Supplier shall show on his schedule the appropriate size of hinge for each opening, subject to approval by the architect.
- C. Locksets, Privacy sets, and paddles with deadbolts shall be mortise type, Schlage

Le Series Primus 06n-626 with steel cases and forged brass fronts that are adjustable from flat to beveled. Armored scalp plates and strikes to be wrought bronze and shall meet the requirements of ANSI for standard dimensions.

1. Manufacturer: Schlage.
 2. Provide interchangeable core cylinders for all locking devices.
 3. All handles shall be lever type.
- D. Closures shall be LCN model Quest 1520 Series. The Supplier's Hardware schedule shall show the degree of opening for all doors with closers.
1. Mounting: Exposed closers shall be mounted on the side of the opening least exposed to public view. Never mount closers on the corridor side of an opening.
 2. Floor stops shall be furnished where practical and where conditions allow. Floor stops shall be dome type, Glynn-Johnson #FB13 or #FB14 or as manufactured by Ives, Baldwin, or approved, equal.
 3. Overhead Stay: Where neither wall stops nor floor stops are applicable, an overhead stay must be furnished. Overhead stays shall be Corbin 775 Series, or as manufactured by Glynn-Johnson, Ives, or approved equal.
- E. Door push plates and pulls shall be manufactured by Brookline, Baldwin, Hiawatha, or approved equal.
- F. Protection Plates: Armor and kick plates, shall be 16 gauge brushed stainless steel, square edged. Height shall be as scheduled or required. Width shall be not more than 1 1/2" less than door width on stop side and not more than 1/2" less than door width on pull side. Mounting screws shall be countersunk. Plates shall as manufactured by Brookline, Baldwin, Hiawatha, or approved equal.
- G. Thresholds shall be manufacturer's standard, of profiles detailed in the Contract Drawings, manufactured by Pemko, Zero, Reese or approved equal, and shall have a vertical height of not more than 1/2" in order to comply with the regulations of the Massachusetts Architectural Access Board.
- H. Silencers: All interior metal door frames shall be provided with silencers, three for each single door and two for each pair of doors.
- I. Padlocks will be supplied by the Owner.
- J. Panic bars shall be by Von Duprin.

2.02 HARDWARE SETS:

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HW #1: Single Interior Unit Entry SC Wood Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Lockset, Schlage L9453J 06N x 626
- 1 Cylinder Core, Schlage 23-030 x 626
- 1 Closer, LCN 1260 series
- 1 Door Viewer, Hager 1756 x US26D
- 1 Set of smoke/fire/sound gasketing, Hager 864S N x [perimeter of opening]
- 3 Door Silencers, Hager 307D
- 1 Threshold, Hager 4773 x [width of opening]

HW #2: Single Pre-hung Residential Unit Bedroom, Bathroom Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Privacy Set, Schlage AL40S – SAT x 626
- 1 Wall or floor stop 236W or 243F x US32D/26D (provide as required)
- 1 Coat hook 9124 x US26D

HW #3: Single Unit Mechanical Closet Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Storeroom Lock, Schlage AL80PD – SAT x 626
- 3 Door Silencers, Hager 307 D
- 1 Set Door Gaskets, Hager 864SN x [perimeter of opening]

HW #4: Single Bi-fold Unit Closet Doors

- 1 Set Bi-fold Closet track & pivots for single unit
- 1 Dummy Trim, Schlage AL170 – SAT x 626

HW #5: Double Bi-fold Unit Closet Doors

- 1 Set Bi-fold Closet track & pivots for single unit
- 2 Dummy Trim, Schlage AL170 – SAT x 626

HW #6: Double Aluminum Exterior Entry Doors

- 2 Continuous Gear hinges, Hager/Roton 780-224HD x [full height] x US32D
- 2 Exterior Pulls, Kawneer CO-12 x US32D
- 2 Interior Push bars, Kawneer CP-II x US32D
- 2 Surface Door Closers, LCN 1520 SCUSH x US32D
- 2 Kick-plate, Hager 193S x 8" high x [2" less width of door] x US32D
- 1 Threshold, Hager 626S x 4" wide x [width of opening] x cast AL finish
- 2 Set of Meeting Stile weatherstripping, Hager 802SxBx mil x [height of door]
- 2 Door Sweeps at base of door, Hager 802SxBx MIL x [width of door]
- 1 Set of Weather-stripping, Hager 864SxNxCLR x [perimeter of opening]

HW #7: Double Entry Interior Vestibule Doors

- 1 Exit Device (Inactive leaf), Concealed Vertical Rod, Electric Latch Retraction, Von Duprin EL 9847 L 06 x [width of door] x US26D
- 1 Exit Device (Active leaf), Concealed Vertical Rod, Von Duprin 9847 L-DT 06 x [width of door] x US26D
- 1 Power Supply, Von Duprin PS 873-2

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- 1 Electric Geared Hinge, Hager/Roton 780-224HD x [full height of door] x E (number of required contacts) x US26D
- 2 Surface Door Closers, LCN 1520 SCUSH x US32D
- 1 Continuous Gear hinge, Hager/Roton 780-224HD x [full height] x US26D
- 2 Surface Door Closers, LCN 1520 SCUSH x US26D
- 2 Kick-plate, Hager 193S x 8" high x [2" less width of door] x US26D
- 1 Threshold, Hager 626S x 4" wide x [width of opening] x cast AL finish
- 2 Set of Meeting Stile weatherstripping, Hager 802SxBx mil x [height of door]
- 2 Door Sweeps at base of door, Hager 802SxBx MIL x [width of door]
- 1 Set of Weather-stripping, Hager 864SxNxCLR x [perimeter of opening]
- 3 Door Silencers, Hager 307 D

Operations Narrative: Doors are secured, entry by electric release from residential units or outside key. Refer to electrical.

HW #8: Single Bathroom Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Classroom deadlock, Schlage B663P x US26D
- 1 Closer, LCN 1260 series x US26D
- 1 Pull Plate, Hager, 103G, 4" x 16" x US26D
- 1 Push Plate, Hager 100T, 4" x 16" x US26D
- 2 Kickplate, Hager 1935 x 8" high x [2" less width of door] x US26D
- 3 Door Silencers, Hager 307 D

HW #9: Lobby Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Exit lock, Schlage AL25D x SAT x 626
- 1 Cylinder only deadlock, Schlage B664P x 626
- 1 Wallstop, Hager 236W x US26D
- 3 Door Silencers, Hager 307 D

HW #10: Double Exterior Doors

- 6 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 2 Closer, LCN 1260 series x US26D
- 1 Exit Device (Inactive leaf), surface-mounted Vertical Rod, Von Duprin 9827 L 06 x [width of door] x US26D
- 1 Exit Device (Active leaf), surface-mounted Vertical Rod, Von Duprin 9827 L 06 DT x [width of door] x US26D
- 2 Kick-plate, Hager 193S x 8" high x [2" less width of door] x US26D
- 1 Threshold, Hager 626S x 4" wide x [width of opening] x cast AL finish
- 2 Set of Meeting Stile weatherstripping, Hager 802SxBx mil x [height of door]
- 2 Door Sweeps at base of door, Hager 802SxBx MIL x [width of door]
- 1 Set of Weather-stripping, Hager 864SxNxCLR x [perimeter of opening]
- 3 Door Silencers, Hager 307 D

HW #11: Stair Passage Doors

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- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Closer, LCN 1260 series x US26D
- 1 Passage Latch, Schlage AL105 x US26D
- 1 Wallstop, Hager 236W x US26D
- 1 Kickplate, Hager 1935 x 8" high x [2" less width of door] x US26D
- 3 Door Silencers, Hager 307 D

HW #12: Single Electric Room Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Closer, LCN 1260 series x US26D
- 1 Storeroom Lock, Schlage AL80PD x SAT x US26D
- 1 Single Cylinder Deadlock, Schlage B660P x US26D
- 1 Wallstop, Hager 236W x US26D
- 3 Door Silencers, Hager 307 D

HW #13: Single Storage Room Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Closer, LCN 1260 series x US26D
- 1 Storeroom Lock, Schlage AL80PD x SAT x US26D
- 1 Single Cylinder Deadlock, Schlage B660P x US26D

HW #14: Stair / Corridor Doors

- 3 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 1 Closer, LCN 1260 series x US26D
- 1 Storeroom Lock, Schlage AL80PD x SAT x US26D
- 1 Wallstop, Hager 236W x US26D
- 3 Door Silencers, Hager 307 D

HW #15: Double Stair Doors

- 6 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 2 Closer, LCN 1260 series x US26D
- 1 Exit Device (Active & Inactive Leafs), surface-mounted Vertical Rod, Von Duprin 9827L-BE-F x US26D
- 2 Wallstop, Hager 236W x US26D
- 2 Kickplate, Hager 1935 x 8" high x [2" less width of door] x US26D
- 6 Door Silencers, Hager 307 D

HW #16: Double Storage Doors

- 6 Standard weight hinges, Hager BB1279 4.5 x 4.5 x US26D
- 2 Closer, LCN 1260 series x US26D
- 1 Storeroom Lock (Active Leaf), Schlage AL80PD x SAT x US26D
- 1 Automatic Flush Bolts (Inactive Leaf), Ives FB32P
- 6 Door Silencers, Hager 307 D

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PHASE III RENOVATIONS TO THE
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END OF SECTION

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DIVISION 08000

WINDOWS AND DOORS

SECTION 08800

GLASS AND GLAZING

**Filed Sub-Bid Required
Glass and Glazing**

PART 1 – GENERAL

1.00 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **Glass and Glazing** 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 08800 Glass and Glazing is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles

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incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Glass and Glazing work required to complete the work of the contract including all the Glass and Glazing work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all hardware, finishes, and accessories. Coordinate the Glass and Glazing work with all the other trades for the project. Provide all demolition and disposal work to complete the Glass and Glazing work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file Sub-Bidder for the entire project so that all the work can be properly and completely performed.
1. Glass and Glazing File Sub-Bidder, at the windows in the old portion of the building, shall carefully remove all the existing Lexan, gaskets, and balances in the outer window and install 1/4" thick glass, gaskets, and balances. (Note: There are 2 double hung windows in each opening. Only the outer window requires new glass and gaskets.) All operable windows in the old portion of the building shall receive new balances and all tracks shall be lubricated. At the windows in the new portion of the building, all tracks shall be lubricated.
 2. 1/4" wire glass at locations shown in rated doors.
 3. At all operable windows in scope area (old and new section), re-balance all sash and lubricate all tracks of every window.
 4. Note: Temporary protections at window openings are at the Glass and Glazing Filed Sub-Bidder's option. The existing windows consist of two individual double-hung windows. Either set of sash may be removed at any one time or both may be removed at the same time. If the Glass and Glazing Filed Sub-Bidder chooses to remove both sets at any time and is not going to reinstall them immediately, then they shall provide and install temporary protection. However, this is a means and methods issue. If necessary for means and methods, then temporary protections shall be included in the Glass and Glazing Filed Sub-Bidder's Bid.
 5. All work described in the typical window notes on the drawings shall be the work of the Glass and Glazing Filed Sub-bidders.
 6. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems and/or equipment that is required to be removed in order to perform the work of the Filed Sub Bid, including disposal.

1.03 QUALITY ASSURANCE

- A. The following published specifications are hereby made a part of this SECTION.
 - 1. Federal Specification DD-G-451: Quality characteristics, thickness and dimensional tolerances of flat glass products.
 - 2. ANSI Z97.1: Standard for safety glazing material of all types.
 - 3. Consumer Product Safety Commission Standard 16 CFR1201: Category I or Category II as applicable.
 - 4. All work shall be done according to the Manufacturer's recommendations.

1.04 SHOP DRAWINGS

- A. Submit complete shop drawings in accordance with the provisions of the GENERAL CONDITIONS.
- B. Shop drawings shall include product literature on all glazing.

1.05 SAMPLES

- A. Submit the following samples in accordance with the provisions of the GENERAL CONDITIONS:
 - 1. One sample of each glass, 12" x 12" bearing the name of the manufacturer, thickness and quality of glass.
 - 2. Samples of glazing materials and sealants along with manufacturer's written description and directions for installation, if requested by Engineer.
 - 3. Sealant compounds and all other miscellaneous items.

1.06 GUARANTEE

- A. Manufacturer shall provide his standard guarantees for work under this Section. However, such guarantees shall be in addition to and not in lieu of all other liabilities which the manufacturer and Contractor may have by law or by other provisions of the Contract Documents.
- B. Glass: Low Emissivity (Low E) coated glass shall be warranted from visual obstruction or fogging due to internal moisture for a period of twenty (20) years.

PART 2 – PRODUCTS

2.01 GENERAL MATERIAL REQUIREMENTS

- A. All materials shall be free of defects impairing strength, durability, and appearance. All compounds, sealants, setting blocks and tapes shall arrive at the job in unopened containers and shall be used in strict accordance with the manufacturer's recommendations. It shall be the responsibility of the glazing subcontractor to provide glazing materials which are compatible with the materials used for setting blocks and spacer shims, and also compatible with the materials to be glazed.

2.02 GLAZING UNITS

A. LOW EMISSIVITY [LOW-E] COATING

- 1. Replacement window glass units shall have a soft coat low-e coating. Provide clear, non-reflective transparent metallic coated glass. Provide glass having the following characteristics

Visible Light Transmittance: 70% minimum.

Solar Heat Gain Coefficient: 0.37 maximum.

Winter Nighttime U-Value: 0.30 Btu/hr/sf/°F max.

2.03 GLAZING MATERIALS

- A. Glazing materials for new replacement windows shall be supplied by the window manufacturer.
- B. Glazing gaskets for the storefront replacement glass shall be extruded EPDM rubber to replace the existing materials on both sides of the glass and shall match the existing to fit the existing extrusions. Corner butt joints shall be sealed with glazing sealant prior to setting the glass.
- C. Glazing Sealant: Shall be a one part Silicone sealant, Pecora 864, Dow Corning 795, or equal. Primer shall be as recommended by manufacturer. Color shall be as selected by Engineer.
- D. All glass shall be supported on silicone setting blocks 4"x1/4" minimum having a minimum durometer hardness of 70. All setting blocks shall be locked or sealed in place.

PART 3 – EXECUTION

3.01 INSTALLATION OF GLASS UNITS

- A. Glass shall be field installed.
- B. Where necessary due to size, glass shall be field glazed. Place setting blocks in sills and lock or seal setting blocks in place at the $\frac{1}{4}$ points of the glass.
- C. Install new glazing gaskets in full lengths and 4" longer than the frame to apply compression of the gasket as it is installed. Seal corner butt joints of the exterior gasket with glazing sealant
- D. Apply glazing materials and other materials in strict accordance with manufacturer's printed recommendations.
- E. Prior to reglazing the storefront frames, solvent clean all corners and any penetrations of the sills and seal with a bead of glazing sealant.
- F. Apply a bead of glazing sealant around the perimeter of all storefront units.
- G. Glass shall be set without springing with proper clearances at all edges. Edge clearance and tolerance shall be in accordance with recommendations of FGMA Glazing Manual, latest edition.

3.03 CLEAN-UP AND PROTECTION

- A. Clean up all debris resulting from this Work and clean off all marks and smudges, repair all damage, remove scratches and damaged materials and remove all debris from the job site. The Contractor shall be responsible for the protection of the windows, during the course of construction and shall also be responsible for cleaning all portions of the windows after the work is completed.
- B. The Contractor shall do all final cleaning of glass panes, leaving the glass and frames whole and free from rattle. The Contractor shall employ experienced workmen for the final cleaning of all work.
- C. Clean both sides of back piece of glass in each sash for both window assemblies. Therefore, there shall be four (4) sashes per window opening to be cleaned. Clean the frames inside and outside, as well.

3.07 CLEAN-UP

- A. The glazing Subcontractor shall remove all his shipping crates and waste material from the project.

END OF SECTION

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DIVISION 09000

FINISHES

SECTION 09240

FURRING, LATHING, AND PLASTERING

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Furring, Lathing, and Plastering Work required to complete the Work of the Contract including all the Furring, Lathing, and Plastering Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Furring, Lathing, and Plastering Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Furring, Lathing, and Plastering Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Furring, Lathing, and Plastering Work includes, but is not limited to:
 - 1. Patching: The General Bidder shall own ALL patching to existing walls, floors and ceilings that are disturbed by any of the demolition activities. All patching will be of same material as the existing adjacent and shall maintain fire ratings. In addition to patching of surfaces disturbed by the demolition activities and infill areas already noted in the Contract

FURRING, LATHING, AND PLASTERING

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Documents, there are additional areas that patching of existing surfaces will be necessary. The General Bidder shall carry the following *additional* quantities of patching to match existing adjacent, in small individual locations throughout the scope area at places directed by the Architect:

- a. 500 square feet of 1-1/4" thick plaster and metal lath wall.
- b. 250 square feet of 3/4" plaster and wood lath wall patching.
- c. 250 square feet of 1-1/4" plaster and metal lath ceiling.

1.03 RELATED WORK

- A. The following related work is to be performed under the designated Sections:
 1. Section 09900, Painting.

1.04 SAMPLES

- A. Submit the following samples in accordance with the provisions of the GENERAL CONDITIONS.
- B. Samples shall include all materials specified herein with specified plaster finish.
- C. Provide mock-up test area of minimum 4 square feet for approval of each color.

1.05 PROTECTION

- A. All adjacent wood, metal glass, flooring, and other finished work shall be protected during progress of plastering and any damage done shall be made good in every respect under this Section.
- B. All manufactured materials shall be delivered in the original packages or containers bearing the name of the manufacturer and the brand. Plaster materials shall be kept off the ground, under cover and dry until ready for use.
- C. When plaster is to be mixed the areas so used shall be covered by 2 layers of reinforced waterproof paper. Maintain this coverage until equipment and materials are removed.

1.06 COOPERATION

- A. Cooperate with other trades on the project and plan to work to advantage in the general progress of the work without causing delay or doing work when conditions are not suitable for satisfactory work. Keep fully informed at all times

as to the work of appurtenant trades and obtain all necessary information for the proper relation of the work to that of other trades.

1.07 INSPECTION

- A. Be responsible for the proper execution and performance of the work described herein. Inspect all surfaces and correct any conditions that may affect the work adversely. Commencement of work will be taken as unqualified approval of surfaces.

PART 2 – PRODUCTS

2.01 FURRING AND LATHING MATERIALS

- A. General: All furring and lathing materials for the project shall be of domestic manufacture and shall be the products of one manufacturer for any one system unless otherwise specified herein such as Gold Bond, U.S. Gypsum, Georgia-Pacific, or equal.
- B. Hanger Supports for concrete overhead shall be 1-1/2" x 1/8" x 6" galvanized steel bent straps. Straps to have 3/8" diameter hole not less than 3/8" from exposed end.
- C. Hangers shall be 1" x 1/8" galvanized steel.
- D. Hanger Bolts shall be 5/16" diameter, galvanized, of sufficient length, furnished complete with hex nut.
- E. Furring Channels shall be 3/4" channels weighing not less than 300 lbs. per 1,000 linear feet, and 1-1/2" channels weighing not less than 475 lbs. per 1,000 linear feet. All furring channels shall be galvanized.
- F. Tie Wire for securing furring channels together shall be 16 gauge monel or stainless wire.
- G. Tie Wire for securing metal lath shall be 18 gauge monel or stainless wire.
- H. Corner Beads shall be 26 gauge galvanized 3/16" radius nose bead with 1-1/2" wide expanded type flanges.
- I. Cornerites shall be 3" x 3" x 96" "sate-edge", 2.5 lb. flat expanded galvanized metal lath.
- J. Casings shall be 24 gauge galvanized steel similar to No. 16 expanded flange type, as manufactured by National Gypsum Company, U. S. Gypsum Company,

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Wheeling Steel Co., or equal. NOTE: Casings in conjunction with exterior stucco plaster shall be of solid zinc.

- K. Metal Lath for exterior and interior plaster shall be 3.4 lb. galvanized diamond mesh lath.
- L. Strip Lath shall be 12" x 24", "safe-edge", 2.5 lb. flat expanded galvanized metal lath.
- M. Expansion Joints within plaster surfaces shall be formed by galvanized steel No. 40 expansion joint, as manufactured by Wheeling Steel, U. S. Gypsum, National Gypsum, or equal. NOTE: Expansion joints in conjunction with exterior stucco plaster shall be of solid zinc.
- N. Gypsum Lath shall be perforated, 3/8" thick, 16" wide, 8'0" long.

2.02 PLASTERING MATERIALS

- A. Sand shall be clean sharp bank sand, well-graded, free from foreign matter, conforming to ASTM C35.
- B. Water shall be potable, clean, and free from deleterious amounts of oils, salts, alkali, organic matter, and other harmful materials.
- C. Portland Cement shall conform to ASTM C150, Type I.
- D. Gypsum Neat and Fibered Plaster shall conform to ASTM C28.
- E. Cement Plaster shall be white gypsum plaster for extra hard finish, conforming to ASTM C61.
- F. Perlite for use as plaster aggregate, conforming to ASTM C35.
- G. Lime shall be hydrated finishing lime, conforming to ASTM C206 for finish coats.
- H. Waterproofing: All exterior and interior plaster base coats shall have the addition of water reducing, plasticizing admixture "Omicron" by Master Builders, "Toxement 1W" by Toch Bros., "Hydrocide" by Sonneborn, or equal.

PART 3 – EXECUTION

3.01 FURRING ERECTION

- A. The strap (flat bar) hangers shall be secured to the structure in a manner approved by the Engineer.

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- B. Hangers both straight and splayed shall be furnished and installed in such a manner that all of the following requirements are met:
 - 1. No hanger shall support more than 12 sq. ft. of ceiling area.
 - 2. Each main runner shall be supported along its length at spaces not exceeding 4'.
 - 3. No splay hanger shall be installed at an angle of more than 30 degrees from the vertical (60 degrees from the horizontal).
- C. Main runner channels shall be bolted, as approved by the Engineer, to hangers. Main runners shall be spaced not further than 3' apart.
- D. Main runners shall not be let into nor come in contact with abutting walls. Main runners shall be located within 6" of the walls in order to properly support the cross runner channels.
- E. Cross furring channels shall be spaced not over 12" apart and shall be securely saddle tied to main runners with double strand of 16 gauge tie wire.
- F. Grillage system shall be modified and reinforced with such additional supports, runners and furring as the Engineer may deem necessary in order to properly provide for interruptions of, or openings in, the plaster work as may be caused by mechanical items, electrical items, expansion joints, control joints, changes of direction, changes of material, or other similar conditions. Such work shall be installed at no additional cost and shall be in accordance with the best practices of the trade as approved by the Engineer.

3.02 LATH INSTALLATION

- A. Metal lath shall be applied over metal studs and metal furring, except self-furring lath.
- B. All metal lath shall be applied with long dimension of the sheet across the supports. Lath shall be attached to supports at maximum 6" centers and in strict accordance with manufacturer's best recommended practice.
- C. Self-furring lath shall be installed as plaster base for fireproofing of columns and beams per UL #X402.
- D. Prior to installation of lath, check installation of all mechanical and electrical work to ensure that all concealed work is properly in place.

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- E. Furnish and install galvanized metal sleeves around all pipes passing through plaster work. Sleeves shall be so sized as to permit free expansion and movement of pipes.
- F. Secure all plaster rings and access panels furnished by other trades.
- G. Frame around all openings required for other trades and reinforce as necessary to make entire installation rigid and satisfactory to the Engineer.
- H. The ends of all lath shall be lapped not less than 1". If ends are made between supports they shall be adequately tied with 18 gauge tie wire. Sides of lath shall be lapped a minimum of 1/2".
- I. Expansion joints shall be installed in all exterior plastered soffits. Unless otherwise indicated on Drawings, such expansion joints shall be spaced 10' on center. All locations shall be verified with and approved by the Engineer before installation.
- J. Interior expansion joints, unless otherwise indicated on Drawings, shall be installed at a maximum spacing of 10' on center vertical on walls and in both directions on ceilings. NOTE: On masonry walls, expansion joints and control joints in plaster shall coincide one over the other.
- K. Where dissimilar materials are to serve as plaster base, such as concrete abutting masonry units or wire lath abutting concrete or masonry units, apply an 8" wide strip of wire at joints and secure to wire lath and wire ties and to concrete or masonry with 3/4" long hardened steel masonry nails.
- L. Casing beads shall be installed at all openings in plaster, at all places where plaster abuts another material, and elsewhere as detailed on the Drawings or as required by good practice.
- M. Install corner beads at all external angles and corner reinforcing at all internal angles where plaster runs through the angle.
- N. Provide additional corner reinforcement at corners of all openings in plastered surfaces.

3.03 INSTALLATION OF GYPSUM LATH

- A. General
 - 1. Install face side out with long dimension perpendicular to supports.
 - 2. Stagger end joints.

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3. Butt pieces of lath snugly together.
4. Cut lath to fit neatly and snugly at angles and around items penetrating lath.
5. Minimum clearance of fasteners from edges and ends of lath: 3/8".
6. Install lath on metal supports with clips, self-tapping screws or tie wire in accordance with recommendations of lath manufacturer.
7. Install lath on wood supports with screws at 12" o.c. Do not nail or staple gypsum lath to framing members at interior angles.

3.04 VENEER PLASTER BASE

A. Single Layer Plaster Base Erection:

1. Apply plaster base vertically or horizontally. Position all edges over stud flanges for vertical application; all ends over stud flanges for horizontal application. To maintain a true surface plane, arrange direction of application so leading edge of base is attached first to open end of stud flange. Use maximum practical lengths to minimize end joints. Fit ends and edges closely, but not forced together. Stagger joints on opposite sides of partition.
2. For vertical application of base, space screws 12" o.c. in field of base and 8" o.c. staggered along vertical abutting edges. For horizontal base application, space screws 12" o.c. in field and along abutting end joints.

B. Double Layer Plaster Base Erection:

1. For screw attachment, space screws 16" o.c. for both layers. Apply both layers of plaster base vertically with joints in face layer offset from base layer joints. For 5/8" base, use 1" screws for base layer and 1-5/8" screws for face layer. For 1/2" base, use 7/8" screws for base layer and 1-5/16" screws for face layer.
2. In double layer laminated construction attach base layer with 1" Type S screws spaced 8" o.c. at joint edges and 12" o.c. in field. Apply face layer vertically with joint compound taping or 90 spread on back side, joints staggered approximately 12" and fastened to base layer with 1-1/2" Type G screws. Drive screws approximately 2' from ends and 4' o.c. in field of panel, 1' from ends and 3' o.c. along a line 3" from vertical edges.

C. Ceiling Panel Installation:

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1. Apply plaster base of maximum practical length face down with long dimension at right angles to furring channels. Position end joints over channel web and stagger in adjacent rows.
2. Fit ends and edges closely, but not forced together. Fasten base to channels with 1" Type S screws spaced 12" o.c. in field of base and along abutting ends and edges.

D. Caged Beam Fireproofing:

1. Screw attach three layers of 5/8" "Imperial Firecode" plaster base to channel brackets installing vertical panels first, with bottom panels overlapping lower edges of vertical panels in each layer. Attach panels to channel brackets with 1" Type S screws 16" o.c. for base layer, 1-5/8" Type S screws 12" o.c. for middle layer and 2-1/4" Type S screws 8" o.c. for face layer. Install wire mesh over bottom middle layer panel, extend 1-1/2" up each side and fasten with 1-5/8" screws used to fasten panels.

3.05 PLASTER APPLICATION

A. Interior Basecoat Work

1. Check all grounds, screens, casing, corner beads, cornerites, and stripites for proper application.
2. Mechanical mixer shall be cleaned of all set or hardened material before new material is loaded. Add materials while mixer is turning. No more materials shall be mixed than can be applied in one hour.
3. Mixing of materials shall be in accordance with manufacturer's printed instructions, which are hereby made a part of this Specification.
4. Basecoat plasters shall be proportioned and mixed in such a manner as to provide a minimum compressive strength of 750 psi dry.
5. Basecoat plasters shall be machine mixed in mechanical mixers specifically designed for this purpose.
6. Mix proportions and method of mixing shall be submitted to the Engineer for approval prior to the start of the work.
7. Where plaster is to be applied directly to concrete or masonry units or brick, apply to these surfaces a liquid bonding agent brushed on in accordance with manufacturer's printed instructions.

8. Application of basecoat work shall be in two coats (scratch and brown) and the work shall be performed in a manner and left in condition suitable for the application of the third (finish) coat.
9. The scratch (first) coat shall be applied with sufficient material and pressure to form good full keys on the metal lath or masonry surface, and then shall be cross raked. The brown (second) coat shall be applied after the scratch coat has set hard and firm, shall be brought out to grounds, and shall be straightened to a true surface with rod and darby without the use of additional water. The brown coat shall be left rough to receive finish (third) coat.
10. Scratch coat of plaster shall be applied to masonry or wire lath where ceramic tiles are to be installed using the mud bed method.

B. Interior Plaster Finish Coats

1. After completion of basecoat work the interior plaster finish coat shall be applied in accordance with manufacturer's recommendations and these Specifications.
2. Keene's cement finish coat plasters shall be mixed in proportion by dry weight of three parts of gauging plaster to one part lime in accordance with the manufacturer's directions.
3. Regular gypsum finish coat plaster shall be mixed in proportion by dry weight on one part gauging plaster to two parts lime in accordance with manufacturer's recommendations.
4. Finish coats shall be thoroughly scratched in and immediately doubled back to fill out a smooth, dense surface for decoration free of surface blemishes and irregularities. Thickness shall be 1/16" to 1/8". Finish shall be troweled until the material sets.

C. Portland Cement Plaster:

1. Portland cement plaster shall be mixed for brown and scratch coats as hereinbefore specified.
2. Scratch coat shall be full 1/4" thick and shall be applied with sufficient force to form good keys. Cross scratch coat upon attaining its initial set. Keep damp with fog spray for 72 hours.
3. Apply brown coat only after scratch coat has set at least 24 hours. After application, the brown coat shall be lightly scratched, broomed, and kept moist with fog spray for 72 hours and thence allowed to dry out.

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4. Apply factory milled finish coat in accordance with manufacturer's recommendation only after brown coat has cured for 7 days. Just before application, wet brown coat again evenly with fog spray. Apply finish coat moist with fog spray for at least 2 days, thereafter protect against rapid drying until properly thoroughly cured. Exterior soffits shall have stippled finish; interiors shall have smooth finish. Make field sample for texture and color for approval of Engineer.
5. Total cement plaster thickness shall be 3/4".

3.06 INSTALLATION - GENERAL

- A. In general, work shall conform to USA Standard Specifications for Interior Lathing and Furring, USAS A42.4-1967 and USA Standard Specifications for Gypsum Plastering, USAS A42.1-1964.
- B. The Plastering Subcontractor shall inspect job conditions and related work and report for the General Contractor conditions affecting lath and plaster work. Commencement of work will constitute acceptance of conditions.
- C. The Plastering Subcontractor is referred to the mechanical drawings and the Specifications for plumbing, heating, ventilating and air conditioning, and electrical work.
- D. Work under this Section shall be properly coordinated with the work of other Sections. In no case shall work of other Sections which is to be concealed by the work of this Section be so concealed until it has been inspected.
- E. Make all changes and adjustments in lath and all other work under this Section as needed to accommodate the work of other Sections and other subcontractors.
- F. Surfaces that are to receive plaster shall be clean and free of defects. Plaster screens and/or spot grounds shall be provided to assure that base coats be straight and plumb and of specified thickness. The trade designation "West Screed" shall be acceptable in lieu of "Metal Base Screens".

3.07 PATCHING

- A. Point up around trim and other work. Cut out and patch defective and damaged plaster. Patching shall match existing plaster in texture, finish and joining with plaster previously applied and shall be finished flush and in line with plaster previously applied.
- B. If, in the opinion of the Engineer, the cutting and patching or the repair of damaged work is necessary as a result of improper performance on the part of

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another trade, then the furring, lathing and Plastering Subcontractor shall nonetheless perform the work but the costs thereof shall be paid by the trade whose actions had necessitated the work.

3.08 CLEANING

- A. Immediately upon completion of plastering in a specific area, remove the protective coating from metal doors and glazing frames.
- B. At completion of work, clean all plaster from beads, door frames, metal trim, etc., and leave work ready for decoration by others.
- C. Remove all rubbish from building site and leave floors broom clean daily. Remove tools and equipment from the building and site daily.

END OF SECTION

DIVISION 09000

FINISHES

SECTION 09255

GYPSUM BOARD ASSEMBLIES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Gypsum Board Assemblies work required to complete the work of the contract including all the Gypsum Board Assemblies work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Gypsum Board Assemblies work with all the other trades for the project. Provide all demolition and disposal work to complete the Gypsum Board Assemblies work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Gypsum Board Assemblies work includes, but is not limited to:
 - 1. Install gypsum wallboard (GWB) which shall be taped, spackled, and sanded at all board.

1.03 RELATED WORK

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- A. The following related work is to be performed under the designated SECTIONS:
 - 1. Section 05400, Cold Formed Metal Framing.
 - 2. Section 07920, Sealants and Caulking.

1.04 DEFINITIONS

- A. Gypsum Board Construction Terminology: Refer to ASTM C 11 and GA-505 for definitions of terms for gypsum board assemblies not defined in this Section or in other referenced standards.

1.05 SUBMITTALS

- A. General: Submit each item in this Article according to the Conditions of the Contract and Division 01000 Specification Sections.
- B. Product Data for each type of product specified.
- C. Shop Drawings showing locations, fabrication, and installation of control and expansion joints including plans, elevations, sections, details of components, and attachments to other units of Work.
- D. Product certificates signed by manufacturers of gypsum board assembly components certifying that their products comply with specified requirements.

1.06 QUALITY ASSURANCE

- A. Single-Source Responsibility for Steel Framing: Obtain steel framing members for gypsum board assemblies from a single manufacturer, unless otherwise indicated.
- B. Single-Source Responsibility for Panel Products: Obtain each type of gypsum board and other panel products from a single manufacturer.
- C. Single-Source Responsibility for Finishing Materials: Obtain finishing materials from either the same manufacturer that supplies gypsum board and other panel products or from a manufacturer acceptable to gypsum board manufacturer.

1.07 DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original packages, containers, or bundles bearing brand name and identification of manufacturer or supplier.
- B. Store materials inside under cover and keep them dry and protected against damage from weather, direct sunlight, surface contamination, corrosion, construction traffic, and other causes. Neatly stack gypsum panels flat to prevent sagging.

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1.08 PROJECT CONDITIONS

- A. Environmental Conditions, General: Establish and maintain environmental conditions for applying and finishing gypsum board to comply with ASTM C 840 requirements or gypsum board manufacturer's recommendations, whichever are more stringent.
- B. Room Temperatures: For non-adhesive attachment of gypsum board to framing, maintain not less than 40 deg F (4 deg C). For adhesive attachment and finishing of gypsum board, maintain not less than 50 deg F (10 deg C) for 48 hours before application and continuously after until dry. Do not exceed 95 deg F (35 deg C) when using temporary heat sources.
- C. Ventilation: Ventilate building spaces as required to dry joint treatment materials. Avoid drafts during hot, dry weather to prevent finishing materials from drying too rapidly.

PART 2 – PRODUCTS

2.01 MANUFACTURERS

- A. Available Manufacturers: Subject to compliance with requirements, manufacturers offering products that may be incorporated in the Work include, but are not limited to, the following:
 - 1. Steel Framing and Furring:
 - a. Clark Steel Framing, Inc.
 - b. Dale Industries, Inc.
 - c. Marino/Ware (formerly Marino Industries Corp.).
 - d. Unimast, Inc.
 - 2. Gypsum Board and Related Products:
 - a. Domtar Gypsum.
 - b. Georgia-Pacific Corp.
 - c. National Gypsum Co.; Gold Bond Building Products Division.
 - d. United States Gypsum Co.

2.02 STEEL FRAMING FOR WALLS AND PARTITIONS

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- A. Steel framing: Comply with requirements of Division 05000, Section 05400, Cold-Formed Metal Framing.

2.03 GYPSUM BOARD PRODUCTS

- A. General: Provide gypsum board of types indicated in maximum lengths available that will minimize end-to-end butt joints in each area indicated to receive gypsum board application.
 - 1. Widths: Provide gypsum board in widths of 48 inches (1219 mm).
- B. Gypsum Wallboard: ASTM C 36 and as follows:
 - 1. Thickness: ½ inch standard, in all areas outside baths.
 - 2. Thickness: 5/8 inch Type – X fire rated at all one and two hour rated partitions.

2.04 JOINT TREATMENT MATERIALS

- A. General: Provide joint treatment materials complying with ASTM C 475 and the recommendations of both the manufacturers of sheet products and of joint treatment materials for each application indicated.

2.05 INSULATION

- A. Provide 3½” fiberglass sound attenuation batt insulation at all stud partitions and at ceiling between floors. Insulation shall comply with ASTM C 665, Type I and ASTM E 136.

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine substrates to which gypsum board assemblies attach or abut, installed hollow metal frames, cast-in-anchors, and structural framing, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of assemblies specified in this Section. Do not proceed with installation until unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Ceiling Anchorages: Coordinate installation of ceiling suspension systems with installation of overhead structural assemblies to ensure that inserts and other provisions for anchorages to building structure have been installed to receive ceiling hangers that will develop their full strength and at spacing required to support ceilings.

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1. Furnish concrete inserts and other devices indicated to other trades for installation well in advance of time needed for coordination with other construction.

3.03 INSTALLING STEEL FRAMING, GENERAL

- A. Steel Framing Installation Standard: Install steel framing to comply with ASTM C 754 and with ASTM C 840 requirements that apply to framing installation.
- B. Install supplementary framing, blocking, and bracing at terminations in gypsum board assemblies to support fixtures, equipment services, heavy trim, grab bars, toilet accessories, furnishings, or similar construction. Comply with details indicated and with recommendations of gypsum board manufacturer or, if none available, with United States Gypsum Co.'s "Gypsum Construction Handbook."
- C. Isolate steel framing from building structure at locations indicated to prevent transfer of loading imposed by structural movement. Comply with details shown on Drawings.
 1. Where building structure abuts ceiling perimeter or penetrates ceiling.
 2. Where partition framing and wall furring abut structure, except at floor.
 - a. Provide slip- or cushioned-type joints as detailed to attain lateral support and avoid axial loading.
 - b. Install deflection track top runner to attain lateral support and avoid axial loading.
 - c. Install deflection and firestop track top runner at fire-resistance-rated assemblies where indicated.
 - 1) Attach jamb studs at openings to tracks using manufacturer's standard stud clip.
- D. Do not bridge building control and expansion joints with steel framing or furring members. Independently frame both sides of joints with framing or furring members as indicated.

3.04 INSTALLING STEEL FRAMING FOR WALLS AND PARTITIONS

- A. Install runners (tracks) at floors, ceilings, and structural walls and columns where gypsum board stud assemblies abut other construction.
 1. Where studs are installed directly against exterior walls, install asphalt felt strips or foam gaskets between studs and wall.

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- B. Installation Tolerances: Install each steel framing and furring member so that fastening surfaces do not vary more than 1/8 inch (3 mm) from the plane formed by the faces of adjacent framing.
- C. Extend partition framing full height to structural supports or substrates above suspended ceilings, except where partitions are indicated to terminate at suspended ceilings. Continue framing over frames for doors and openings and frame around ducts penetrating partitions above ceiling to provide support for gypsum board.
 - 1. Cut studs 1/2 inch (13 mm) short of full height to provide perimeter relief.
 - 2. For STC-rated and fire-resistance-rated partitions that extend to the underside of floor/roof slabs and decks or other continuous solid structural surfaces to obtain ratings, install framing around structural and other members extending below floor/roof slabs and decks, as needed, to support gypsum board closures needed to make partitions continuous from floor to underside of solid structure.
- D. Terminate partition framing at suspended ceilings where indicated.
- E. Install steel studs and furring in sizes and at spacings indicated.
- F. Install steel studs so flanges point in the same direction and leading edge or end of each gypsum board panel can be attached to open (unsupported) edges of stud flanges first.
- G. Frame door openings to comply with GA-219, and with applicable published recommendations of gypsum board manufacturer, unless otherwise indicated. Attach vertical studs at jambs with screws either directly to frames or to jamb anchor clips on door frames; install runner track section (for cripple studs) at head and secure to jamb studs.
 - 1. Install 2 studs at each jamb, unless otherwise indicated.
 - 2. Install cripple studs at head adjacent to each jamb stud, with a minimum 1/2-inch (12.7-mm) clearance from jamb stud to allow for installation of control joint.
 - 3. Extend jamb studs through suspended ceilings and attach to underside of floor or roof structure above.
- H. Frame openings other than door openings to comply with details indicated or, if none indicated, as required for door openings. Install framing below sills of openings to match framing required above door heads.

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- I. Install thermal insulation as follows:
 1. Erect insulation vertically and hold in place with Z-furring members spaced 24 inches (610 mm) o.c.
 2. Except at exterior corners, securely attach narrow flanges of furring members to wall with concrete stub nails, screws designed for masonry attachment, or powder-driven fasteners spaced 24 inches (600 mm) o.c.
 3. At exterior corners, attach wide flange of furring members to wall with short flange extending beyond corner; on adjacent wall surface, screw attach short flange of furring channel to web of attached channel. Start from this furring channel with standard width insulation panel and continue in regular manner. At interior corners, space second member no more than 12 inches (300 mm) from corner and cut insulation to fit.
 4. Until gypsum board is installed, hold insulation in place with 10-inch (250-mm) staples fabricated from 0.0625-inch (1.6-mm) diameter tie wire and inserted through slot in web of member.

- J. Install polyethylene vapor retarder where indicated to comply with the following requirements:
 1. Extend vapor retarder to extremities of areas to be protected from vapor transmission. Secure in place with mechanical fasteners or adhesives. Extend vapor retarder to cover miscellaneous voids in insulated substrates, including those filled with loose mineral-fiber insulation.
 2. Seal vertical joints in vapor retarders over framing by lapping not less than 2 wall studs. Fasten vapor retarders to framing at top, end, and bottom edges, at perimeter of wall openings, and at lap joints; space fasteners 16 inches (400 mm) o.c.
 3. Seal joints in vapor retarders caused by pipes, conduits, electrical boxes, and similar items penetrating vapor retarders with vapor retarder tape.
 4. Repair any tears or punctures in vapor retarder immediately before concealing it with the installation of gypsum board or other construction.

3.05 APPLYING AND FINISHING GYPSUM BOARD, GENERAL

- A. Gypsum Board Application and Finishing Standards: Install and finish gypsum panels to comply with ASTM C 840 and GA-216.
- B. Install ceiling board panels across framing to minimize the number of abutting end joints and to avoid abutting end joints in the central area of each ceiling. Stagger abutting end joints of adjacent panels not less than one framing member.

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- C. Install gypsum panels with face side out. Do not install imperfect, damaged, or damp panels. Butt panels together for a light contact at edges and ends with not more than 1/16 inch (1.5 mm) of open space between panels. Do not force into place.
- D. Locate both edge or end joints over supports, except in ceiling applications where intermediate supports or gypsum board back-blocking is provided behind end joints. Do not place tapered edges against cut edges or ends. Stagger vertical joints on opposite sides of partitions. Avoid joints other than control joints at corners of framed openings where possible.
- E. Attach gypsum panels to steel studs so leading edge or end of each panel is attached to open (unsupported) edges of stud flanges first.
- F. Attach gypsum panels to framing provided at openings and cutouts.
- G. Spot grout hollow metal door frames for solid-core wood doors, hollow metal doors, and doors over 32 inches (813 mm) wide. Apply spot grout at each jamb anchor clip and immediately insert gypsum panels into frames.
- H. Form control and expansion joints at locations indicated and as detailed, with space between edges of adjoining gypsum panels, as well as supporting framing behind gypsum panels.
- I. Cover both faces of steel stud partition framing with gypsum panels in concealed spaces (above ceilings, etc.), except in chases that are braced internally.
 - 1. Except where concealed application is indicated or required for sound, fire, air, or smoke ratings, coverage may be accomplished with scraps of not less than 8 sq. ft. (0.7 sq. m) in area.
 - 2. Fit gypsum panels around ducts, pipes, and conduits.
 - 3. Where partitions intersect open concrete coffers, concrete joists, and other structural members projecting below underside of floor/roof slabs and decks, cut gypsum panels to fit profile formed by coffers, joists, and other structural members; allow 1/4- to 3/8-inch- (6.4- to 9.5-mm-) wide joints to install sealant.
- J. Isolate perimeter of nonload-bearing gypsum board partitions at structural abutments, except floors, as detailed. Provide 1/4 inch to 1/2 inch (6.4 mm to 12.7 mm) wide spaces at these locations and trim edges with U-bead edge trim where edges of gypsum panels are exposed. Seal joints between edges and abutting structural surfaces with acoustical sealant.

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- K. Floating Construction: Where feasible, including where recommended by manufacturer, install gypsum panels over wood framing, with floating internal corner construction.
- L. Where STC-rated gypsum board assemblies are indicated, seal construction at perimeters, behind control and expansion joints, openings, and penetrations with a continuous bead of acoustical sealant including a bead at both faces of the partitions. Comply with ASTM C 919 and manufacturer's recommendations for location of edge trim and closing off sound-flanking paths around or through gypsum board assemblies, including sealing partitions above acoustical ceilings.
- M. Space fasteners in gypsum panels according to referenced gypsum board application and finishing standard and manufacturer's recommendations.
 - 1. Space screws a maximum of 12 inches (304.8 mm) o.c. for vertical applications.
- N. Space fasteners in panels that are tile substrates a maximum of 8 inches (203.2 mm) o.c.

3.06 GYPSUM BOARD APPLICATION METHODS

- A. Multilayer Application on Partitions/Walls: Apply gypsum board indicated for base layers and gypsum wallboard face layers vertically (parallel to framing) with joints of base layers located over stud or furring member and face-layer joints offset at least one stud or furring member with base-layer joints. Stagger joints on opposite sides of partitions.
 - 1. On Z-furring members, apply base layer vertically (parallel to framing) and face layer either vertically (parallel to framing) or horizontally (perpendicular to framing) with vertical joints offset at least one furring member. Locate edge joints of base layer over furring members.
- B. Single-Layer Fastening Methods: Apply gypsum panels to supports as follows:
 - 1. Fasten with screws.
 - 2. Fasten to wood supports with adhesive and supplementary nails or screws.

3.07 INSTALLING TRIM ACCESSORIES

- A. General: For trim accessories with back flanges, fasten to framing with the same fasteners used to fasten gypsum board. Otherwise, fasten trim accessories according to accessory manufacturer's directions for type, length, and spacing of fasteners.
- B. Install corner bead at external corners.

- C. Install edge trim where edge of gypsum panels would otherwise be exposed. Provide edge trim type with face flange formed to receive joint compound, except where other types are indicated.
 - 1. Install L-bead where edge trim can only be installed after gypsum panels are installed.
 - 2. Install U-bead where indicated.
- D. Install control joints at locations indicated.

3.08 FINISHING GYPSUM BOARD ASSEMBLIES

- A. General: Treat gypsum board joints, interior angles, flanges of corner bead, edge trim, control joints, penetrations, fastener heads, surface defects, and elsewhere as required to prepare gypsum board surfaces for decoration.
- B. Prefill open joints, rounded or beveled edges, and damaged areas using setting-type joint compound.
- C. Apply joint tape over gypsum board joints, except those with trim accessories having flanges not requiring tape.
- D. Apply joint tape over gypsum board joints and to flanges of trim accessories as recommended by trim accessory manufacturer.
- E. Levels of Gypsum Board Finish: Provide the following levels of gypsum board finish per GA-214.
- F. Use the following joint compound combination as applicable to the finish levels specified:
 - 1. Embedding and First Coat: Setting-type joint compound. Fill (Second) Coat: Setting-type joint compound. Finish (Third) Coat: Sandable, setting-type joint compound.

3.09 INSULATION

- A. Fiberglass sound attenuation batt insulation shall be installed loose by friction fit. Cut long enough to fill entire void between and at ends of studs. Fill any gaps and holes with small pieces of insulation. Do not crush. Carefully fit around light fixtures and junction boxes.

3.10 CLEANING AND PROTECTION

- A. Promptly remove any residual joint compound from adjacent surfaces.

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- B. Provide final protection and maintain conditions, in a manner acceptable to Installer, that ensure gypsum board assemblies are without damage or deterioration at the time of Substantial Completion.

END OF SECTION

GYPSUM BOARD ASSEMBLIES
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DIVISION 09000

FINISHES

SECTION 09300

CERAMIC TILE

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Ceramic Tile Flooring Work required to complete the Work of the Contract including all the Ceramic Tile Flooring Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Ceramic Tile Flooring Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Ceramic Tile Flooring Work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All Work of the Contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Ceramic Tile Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:
 - 1. Floor tile.
 - 2. Wall tile.

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3. Marble thresholds installed as part of tile installations.
 4. Waterproofing and crack-suppression membrane for thin-set tile installations.
 5. Surface preparation for tile and accessories.
 6. Provide and install 1/4" Luan underlayment at all new ceramic tile floors.
- C. Related Work: The following items are not included in this Section and will be performed under the designated Sections:
1. Section 03300 - Structural Concrete for monolithic slab finishes specified for tile substrates.
 2. Section 07920 – Sealants and Caulking for sealing of expansion, contraction, control, and isolation joints in tile surfaces.
 3. Section 09255 - Gypsum Board Assemblies for cementitious backer units.

1.03 PERFORMANCE REQUIREMENTS

- A. Static Coefficient of Friction: For tile installed on walkway surfaces, provide products with the following values as determined by testing identical products per ASTM C 1028:
1. Level Surfaces: Minimum 0.6.
 2. Step Treads: Minimum 0.6.
 3. Ramp Surfaces: Minimum 0.8.

1.04 SUBMITTALS

- A. Product Data: For each type of product indicated.
- B. Shop Drawings: Show locations of each type of tile and tile pattern. Show widths, details, and locations of expansion, contraction, control, and isolation joints in tile substrates and finished tile surfaces.
- C. Samples for Verification:
1. Assembled samples with grouted joints for each type and composition of tile and for each color and finish required, at least 12 inches square and mounted on rigid panel. Use grout of type and in color or colors approved for completed work.

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2. Full-size units of each type of trim and accessory for each color and finish required.
 3. Stone thresholds in 6-inch lengths.
 4. Metal edge strips in 6-inch lengths.
- D. Qualification Data: For Installer.
- E. Material Test Reports: For each tile-setting and -grouting product.

1.05 QUALITY ASSURANCE

- A. Source Limitations for Tile: Obtain all tile of same type and color or finish from one source or producer.
1. Obtain tile from same production run and of consistent quality in appearance and physical properties for each contiguous area.
- B. Source Limitations for Setting and Grouting Materials: Obtain ingredients of a uniform quality for each mortar, adhesive, and grout component from a single manufacturer and each aggregate from one source or producer.
- C. Source Limitations for Other Products: Obtain each of the following products specified in this Section through one source from a single manufacturer for each product:
1. Stone thresholds.
 2. Waterproofing.
 3. Joint sealants.
 4. Cementitious backer units.
 5. Metal edge strips.
- D. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01000.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. Deliver and store packaged materials in original containers with seals unbroken and labels intact until time of use. Comply with requirement in ANSI A137.1 for labeling sealed tile packages.

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- B. Store tile and cementitious materials on elevated platforms, under cover, and in a dry location.
- C. Store aggregates where grading and other required characteristics can be maintained and contamination avoided.
- D. Store liquid additives in unopened containers and protected from freezing.

1.07 PROJECT CONDITIONS

- A. Environmental Limitations: Do not install tile until construction in spaces is complete and ambient temperature and humidity conditions are maintained at the levels indicated in referenced standards and manufacturer's written instructions.

PART 2 - PRODUCTS

2.01 TILE SCHEDULE

- A. Floor Tile FT-4: Interior floor installation on waterproof and anti-fracture membrane on 1/4" Luan underlayment over existing wood floor; thin-set mortar; TCA F122 and ANSI A108.5.
 - 1. Tile Type: Unglazed ceramic mosaic tile as selected by Designer.
 - 2. Thin-Set Mortar: Latex-portland cement mortar.
 - 3. Grout: Polymer-modified unsanded grout.
 - 4. Joint Width: 1/16 inch.
- B. Wall Tile Installation WT-3: Interior wall and shower-receptor installation over cementitious backer units; thin-set mortar; TCA B415, TCA W244, and ANSI A108.5.
 - 1. Tile Type: Glazed ceramic tile as selected by Designer.
 - 2. Thin-Set Mortar: Latex-portland cement mortar.
 - 3. Grout: Polymer-modified unsanded grout.
 - 4. Joint Width: 1/16 inch.

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2.02 PRODUCTS, GENERAL

- A. ANSI Ceramic Tile Standard: Provide tile that complies with ANSI A137.1, "Specifications for Ceramic Tile," for types, compositions, and other characteristics indicated.
 - 1. Provide tile complying with Standard grade requirements, unless otherwise indicated.
 - 2. For facial dimensions of tile, comply with requirements relating to tile sizes specified in Part 1 "Definitions" Article.
- B. ANSI Standards for Tile Installation Materials: Provide materials complying with ANSI standards referenced in "Setting and Grouting Materials" Article.
- C. Factory Blending: For tile exhibiting color variations within ranges selected during Sample submittals, blend tile in factory and package so tile units taken from one package show same range in colors as those taken from other packages and match approved Samples.
- D. Mounting: For factory-mounted tile, provide back- or edge-mounted tile assemblies as standard with manufacturer, unless otherwise indicated.
- E. Tile Trim Units: Matching characteristics of adjoining flat tile and coordinated with sizes and coursing of adjoining flat tile where applicable. Provide shapes selected from manufacturer's standard shapes.
- F. Marble Thresholds: Uniform, fine- to medium-grained white stone with gray veining, ASTM C 503 with a minimum abrasion resistance of 10 per ASTM C 1353 or ASTM C 241 and with honed finish. Fabricate to sizes and profiles indicated or required to provide transition between adjacent floor finishes.
 - 1. Bevel edges at 1:2 slope, aligning lower edge of bevel with adjacent floor finish. Limit height of bevel to 1/2 inch or less, and finish bevel to match face of threshold.
- G. Fabric-Reinforced, Fluid-Applied Waterproofing and Crack Suppression Membrane: System consisting of liquid-latex rubber, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24), and fabric reinforcement.
 - 1. Custom Building Products; Trowel & Seal Waterproofing and Anti-Fracture Membrane.
 - 2. LATICRETE International Inc.; Laticrete 9235 Waterproof Membrane.

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3. MAPEI Corporation; PRP M19.
 4. Summitville Tiles, Inc.; S-9000.
- H. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.
- I. Water-Cleanable, Tile-Setting Epoxy Adhesive: ANSI A118.3, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- J. Organic Adhesive: ANSI A136.1, Type I, with a VOC content of 65 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- K. Standard Sanded Cement Grout for Joint Widths Wider Than 1/8 inch: ANSI A118.6, color as indicated.
- L. Standard Unsanded Cement Grout for Joints Widths 1/8 inch or smaller: ANSI A118.6, color as indicated.
- M. Tile Cleaner: A neutral cleaner capable of removing soil and residue without harming tile and grout surfaces, specifically approved for materials and installations indicated by tile and grout manufacturers.

2.03 ELASTOMERIC SEALANTS

- A. General: Provide manufacturer's standard chemically curing, elastomeric sealants of base polymer and characteristics indicated that comply with applicable requirements in Section 079200 - JOINT SEALANTS.
1. Use sealants that have a VOC content of 250 g/L or less when calculated according to 40 CFR 59, Subpart D (EPA Method 24).
- B. Colors: Provide colors of exposed sealants to match colors of grout in tile adjoining sealed joints, unless otherwise indicated.
- C. One-Part, Mildew-Resistant Silicone Sealant: ASTM C 920; Type S; Grade NS; Class 25; Uses NT, G, A, and, as applicable to nonporous joint substrates indicated, O; formulated with fungicide, intended for sealing interior ceramic tile joints and other nonporous substrates that are subject to in-service exposures of high humidity and extreme temperatures.
1. Available Products:
 - a. Dow Corning Corporation; Dow Corning 786.

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- b. GE Silicones; Sanitary 1700.
 - c. Pecora Corporation; Pecora 898 Sanitary Silicone Sealant.
 - d. Tremco, Inc.; Tremsil 600 White.
- D. Multipart, Pourable Urethane Sealant for Use T: ASTM C 920; Type M; Grade P; Class 25; Uses T, M, A, and, as applicable to joint substrates indicated, O.
- 1. Available Products:
 - a. Bostik; Chem-Calk 550.
 - b. Mameco International, Inc.; Vulkem 245.
 - c. Pecora Corporation; NR-200 Urexpan.
 - d. Tremco, Inc.; THC-900.

2.04 MIXING MORTARS AND GROUT

- A. Mix mortars and grouts to comply with referenced standards and mortar and grout manufacturers' written instructions.
- B. Add materials, water, and additives in accurate proportions.
- C. Obtain and use type of mixing equipment, mixer speeds, mixing containers, mixing time, and other procedures to produce mortars and grouts of uniform quality with optimum performance characteristics for installations indicated.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Examine substrates, areas, and conditions where tile will be installed, with Installer present, for compliance with requirements for installation tolerances and other conditions affecting performance of installed tile.
 - 1. Verify that substrates for setting tile are firm; dry; clean; free of oil, waxy films, and curing compounds; and within flatness tolerances required by referenced ANSI A108 Series of tile installation standards for installations indicated.

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2. Verify that installation of grounds, anchors, recessed frames, electrical and mechanical units of work, and similar items located in or behind tile has been completed before installing tile.
 3. Verify that joints and cracks in tile substrates are coordinated with tile joint locations; if not coordinated, adjust joint locations in consultation with Designer.
- B. Proceed with installation only after unsatisfactory conditions have been corrected.

3.02 PREPARATION

- A. Remove coatings, including curing compounds and other substances that contain soap, wax, oil, or silicone, that are incompatible with tile-setting materials.
- B. Provide concrete substrates for tile floors that comply with flatness tolerances specified in referenced ANSI A108 Series of tile installation standards.
1. Fill cracks, holes, and depressions with trowelable leveling and patching compound according to tile-setting material manufacturer's written instructions. Use product specifically recommended by tile-setting material manufacturer.
 2. Remove protrusions, bumps, and ridges by sanding or grinding.
 3. Blending: For tile exhibiting color variations within ranges selected during Sample submittals, verify that tile has been factory blended and packaged so tile units taken from one package show same range of colors as those taken from other packages and match approved Samples. If not factory blended, either return to manufacturer or blend tiles at Project site before installing.

3.03 INSTALLATION, GENERAL

- A. ANSI Tile Installation Standards: Comply with parts of ANSI A108 Series "Specifications for Installation of Ceramic Tile" that apply to types of setting and grouting materials and to methods indicated in ceramic tile installation schedules.
- B. TCA Installation Guidelines: TCA's "Handbook for Ceramic Tile Installation." Comply with TCA installation methods indicated in ceramic tile installation schedules.
- C. Extend tile work into recesses and under or behind equipment and fixtures to form complete covering without interruptions, unless otherwise indicated. Terminate work neatly at obstructions, edges, and corners without disrupting pattern or joint alignments.

- D. Accurately form intersections and returns. Perform cutting and drilling of tile without marring visible surfaces. Carefully grind cut edges of tile abutting trim, finish, or built-in items for straight aligned joints. Fit tile closely to electrical outlets, piping, fixtures, and other penetrations so plates, collars, or covers overlap tile.
- E. Jointing Pattern: Lay tile in grid pattern, unless otherwise indicated. Align joints when adjoining tiles on floor, base, walls, and trim are same size. Lay out tile work and center tile fields in both directions in each space or on each wall area. Adjust to minimize tile cutting. Provide uniform joint widths, unless otherwise indicated.
 - 1. For tile mounted in sheets, make joints between tile sheets same width as joints within tile sheets so joints between sheets are not apparent in finished work.
- F. Lay out tile wainscots to next full tile beyond dimensions indicated.
- G. Expansion Joints: Locate expansion joints and other sealant-filled joints, including control, contraction, and isolation joints, where indicated during installation of setting materials, mortar beds, and tile. Do not saw-cut joints after installing tiles.
 - 1. Locate joints in tile surfaces directly above joints in concrete substrates.
 - 2. Prepare joints and apply sealants to comply with requirements in Section 07920 – Sealants and Caulking.
- H. Grout tile to comply with requirements of the following tile installation standards:
 - 1. For ceramic tile grouts (sand-portland cement; dry-set, commercial portland cement; and latex-portland cement grouts), comply with ANSI A108.10.
 - 2. For chemical-resistant epoxy grouts, comply with ANSI A108.6.
- I. At showers, tubs, and where indicated, install cementitious backer units and treat joints to comply with ANSI A108.11 and manufacturer's written instructions for type of application indicated.

3.04 WATERPROOFING AND CRACK-SUPPRESSION MEMBRANE INSTALLATION

- A. Install waterproofing to comply with ANSI A108.13 and waterproofing manufacturer's written instructions to produce waterproof membrane of uniform thickness bonded securely to substrate.

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- B. Install crack-suppression membrane to comply with manufacturer's written instructions to produce membrane of uniform thickness bonded securely to substrate.
- C. Do not install tile over waterproofing until waterproofing has cured and been tested to determine that it is watertight.

3.05 FLOOR TILE INSTALLATION

- A. General: Install tile to comply with requirements in the Floor Tile Installation Schedule, including those referencing TCA installation methods and ANSI A108 Series of tile installation standards.
 - 1. For installations indicated below, follow procedures in ANSI A108 Series tile installation standards for providing 95 percent mortar coverage.
- B. Stone Thresholds: Install stone thresholds at locations indicated; set in same type of setting bed as abutting field tile, unless otherwise indicated.
 - 1. Set thresholds in latex-portland cement mortar for locations where mortar bed would otherwise be exposed above adjacent nontile floor finish.
- C. Metal Edge Strips: Install at locations indicated or where exposed edge of tile flooring meets carpet, wood, or other flooring that finishes flush with top of tile.

3.06 WALL TILE INSTALLATION

- A. Install types of tile designated for wall installations to comply with requirements in the Wall Tile Installation Schedule, including those referencing TCA installation methods and ANSI setting-bed standards.

3.07 CLEANING AND PROTECTING

- A. Cleaning: On completion of placement and grouting, clean all ceramic tile surfaces so they are free of foreign matter.
 - 1. Remove grout residue from tile as soon as possible.
 - 2. Clean grout smears and haze from tile according to tile and grout manufacturer's written instructions, but no sooner than 10 days after installation. Use only cleaners recommended by tile and grout manufacturers and only after determining that cleaners are safe to use by testing on samples of tile and other surfaces to be cleaned. Protect metal surfaces and plumbing fixtures from effects of cleaning. Flush surfaces with clean water before and after cleaning.

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3. Remove temporary protective coating by method recommended by coating manufacturer that is acceptable to tile and grout manufacturer. Trap and remove coating to prevent it from clogging drains.
- B. When recommended by tile manufacturer, apply coat of neutral protective cleaner to completed tile walls and floors. Protect installed tile work with kraft paper or other heavy covering during construction period to prevent staining, damage, and wear.
- C. Prohibit foot and wheel traffic from tiled floors for at least seven days after grouting is completed. After seven days, cover areas subject to construction traffic with heavy cardboard.
- D. Before final inspection, remove protective coverings and rinse neutral cleaner from tile surfaces.

END OF SECTION

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DIVISION 09000

FINISHES

SECTION 09500

ACOUSTICAL CEILINGS

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Acoustical Ceilings work required to complete the work of the contract including all the Acoustical Ceilings work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Acoustical Ceilings work with all the other trades for the project. Provide all demolition and disposal work to complete the Acoustical Ceilings work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Acoustical Ceilings work includes, but is not limited to:
 - 1. Furnish and install new 2' x 4' and 2' x 2' acoustical tile ceiling in exposed 'T' grid where indicated on the drawings. Install new tile in existing grid where indicated on the drawings.

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2. Cut and patch and/or adjust existing ceiling grid and tile to accommodate the installation of all new partitions, soffits, other elements penetrating the acoustical tile ceiling, and at areas adjacent to demolition, both sides.

1.03 RELATED WORK

- A. The following related work is to be performed under the designated SECTIONS:
 1. Section 05410, Cold Formed Metal Framing.
 2. Section 09255, Gypsum Board Assemblies.
 3. Section 09900, Painting.

1.04 STANDARDS

- A. Tolerances:
 1. Surfaces to receive acoustical treatment: Free from irregularities and level to within 1/4", 12'.
 2. Deflections:
 - a. Suspension system components, hangers, and fastening devices supporting light fixtures, ceiling grilles, and acoustical units: maximum deflection 1/360 of the span.
 - b. Deflection test: ASTM C635.
 3. Allowable tolerance of finished acoustical ceiling system: Level within 1/8", 12'.
 4. Accessibility percentage: Set forth access requirements.

1.05 SUBMITTALS

- A. Samples:
 1. Submit representative full size samples of each type of acoustical material to illustrate color and range of appearance.
 2. Submit one full size sample of each suspension system member, moldings, and hangers.
 3. Submit one sample of pad and pad spacers for metal pan and perforated board tiles.
- B. Shop Drawings:

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1. Layout indication.
 2. Insert and hanger spacing and fastening details.
 3. Splicing method for main and cross runners.
 4. Change in level details.
 5. Access door dimensions and locations.
 6. Acoustical unit support at ceiling fixture.
- C. Manufacturer's Literature: Submit for review of Architect/Engineer the manufacturer's recommendations for installation of suspension system.
- D. Certificates:
1. Furnish certification of fire endurance rating and flame spread index of fire rating organization.
 2. Furnish certification of materials and systems conforming to Specifications requirements.
- E. Maintenance Material:
1. Furnish extra materials equal to 10% of each type of acoustical material supplied.
 2. Furnish suspension system components in amount sufficient to install extra ceiling units.

1.06 PRODUCT DELIVERY, STORAGE, AND HANDLING

- A. Deliver materials in original unopened protective packaging, with manufacturer's labels indicating brand name, pattern, size, thickness, and fire rating as applicable, legible and intact.
- B. Store materials in original protective packaging to prevent soiling, physical damage, or wetting.
- C. Store cartons open at each end to stabilize moisture content and temperature.
- D. Do not begin installation until sufficient materials are received to complete a room.

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PART 2 – MATERIALS

2.01 MATERIALS

A. Suspension Systems:

1. System: Exposed Tee Grid, Prelude XL 15/16", by Armstrong or approved equal.
2. Main, cross and concealed members:
 - a. Web design: Exposed "T".
 - b. Cold-rolled steel, minimum thickness of 0.020" electrozinc coated and factor painted low sheen satin.
 - c. Exposed flange: 15/16" width.
3. Edge molding: Minimum 0.020" steel, angle shaped, with minimum flange width of 15/16".
4. Rough Suspension:
 - a. Hanger wire: Minimum 12 gauge, galvanized soft annealed, mild steel wire or hanger rod: 3/16" diameter.
 - b. Threaded rod for fixture support or hanger strap: 3/16" thick, 1" wide, zinc coated, flat steel strap for fixture support.

B. Acoustical Units

1. Type: Cirrus, Tegular, Fine Texture by Armstrong, or approved equal.
2. Class: A
3. Performance:
 - b. Sound transmission coefficient: ASTM E90.
 - c. Noise reduction coefficient: ASTM C423.
4. Light reflectance: ASTM C523.
5. Nominal Size: 2'-0" x 2'-0" x 3/4"
2'-0" x 4'-0" x 3/4"
6. Finish: Factory applied.

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7. Edge: Tegular.

PART 3 – EXECUTION

3.01 CONDITION OF SURFACES

- A. Examine surfaces scheduled to receive suspended or directly attached acoustical units for unevenness, irregularities, and dampness that would affect quality and execution of work.
- B. Mark access provisions as to size and location before beginning installation. Delete if access provisions are not included as a part of this work.
- C. Areas to which acoustical units will be cemented must be free of oils, form residue, or materials that will affect bond capabilities of adhesive.

3.02 INSTALLATION

- A. Suspension Systems: ASTM C636.
- B. Rough Suspension:
 1. Hangers:
 - a. Hanger: Wires as recommended by manufacturer.
 - b. Space Hanger: 4' (1.2 m) on center, each direction.
 - c. Install additional hangers at ends of each suspension member and at light fixtures 6" (150 mm) from vertical surfaces.
 - d. Do not splay wires more than 5" (127 mm) in a 4' (1.2 m) vertical drop.
 - e. Wrap wire a minimum of 3 times horizontally, turning ends upward.
 2. Saddle tie carrying channels to main structure for indirect hung suspension system or install carrying channels with leveling clips to main structure for indirect hung suspension system.
 3. Main and Cross Runners:
 - a. Space main runners at (Specify 1' to 5') at center, at right angle to carrying channel. Selection depends on size of acoustical units.
 - b. Level and square to adjacent walls, and wire clip to channels at all intersections.

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- c. Space cross runners at 2'-0" on center.
- 4. Wall Molding:
 - a. Install wall molding at intersection of suspended ceiling and vertical surfaces.
 - b. Miter corners where wall moldings intersect or install corner caps.
 - c. Attach to vertical surface with mechanical fasteners.
 - d. Install spring spacers at wall molding to hold acoustical unit snug on flange of wall molding.
- 5. Install splines in unsupported joints of acoustical tile, providing hairline joints in a smooth even plane.
- C. Acoustical Units:
 - 1. Install in level plane in straight line courses.
 - 2. Place materials to bear all around on suspension members.
 - 3. Minimum width of border tiles: One-half unit dimension.
 - 4. Install acoustical units surrounding recessed troffer lights with hold down clips to prevent movement or displacement of units.

3.03 CLEANING

- A. Clean soiled or discolored unit surfaces after installation.
- B. Touch up scratches, abrasions, voids, and other defects in painted surfaces. Remove and replace damaged or improperly installed units.

END OF SECTION

DIVISION 09000

FINISHES

SECTION 09650

RESILIENT FLOORS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Resilient Floors work required to complete the work of the contract including all the Resilient Floors work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Resilient Floors work with all the other trades for the project. Provide all demolition and disposal work to complete the Resilient Floors work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each filed sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Resilient Floor work includes, but is not limited to:
 - 1. Install 1' x 1' vinyl composition tiles, over ¼" Luan underlayment and 4" vinyl cove base at all locations indicated on the plans.
 - 2. Provide all vinyl transition strips between the vinyl tile and all existing floor finishes, and between the vinyl tile and other new floor finishes.

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3. In addition to the scope shown on the plans provide an additional 100 SF of patching of VCT at small individual locations throughout the scope area.

1.03 RELATED WORK

A. The following related work is to be performed under the designated SECTIONS:

1. Section 09900, Painting.
2. Section 09255, Gypsum Board Assemblies.

1.04 SAMPLES

A. Submit the following samples in accordance with the provisions of the GENERAL CONDITIONS:

1. Resilient Tiles: Two sets of tiles, treads, pattern and thickness specified and in all colors required. Match existing colors where installation occurs at existing tile.
2. Vinyl cove base: Two 1'-0" long sections of each color specified or required to match the existing in existing spaces.
3. Adhesives, Mastics, Crack Fillers, Primer Cleaners, Polishers, etc.
4. Leveling Compound Sample

1.05 EXAMINATION OF SURFACES

A. Examine all surfaces to receive resilient flooring to see that they are in proper condition to receive the work to be performed under this SECTION. Report to the Engineer in writing any surfaces that are not acceptable. Starting of work in any area shall constitute acceptance of such surface as being satisfactory, and any defects resulting from use of such accepted surface shall be corrected by resilient flooring subcontractor at no additional expense to the Owner.

PART 2 – PRODUCTS

2.01 TILE

A. Imperial Excelon vinyl composition tile as manufactured by Armstrong or approved equal.

2.02 VINYL COVE BASE

A. 4" vinyl cove base by Roppe or approved equal.

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2.03 ADHESIVES AND UNDERLAYMENTS

- A. Adhesives shall be type and brand recommended by manufacturer for each of the various conditions and flooring materials. Where manufacturer lists more than one recommended adhesive, the manufacturer's "preferred choice" shall be used.
- B. Mastic underlayments for use at wood floors shall be latex type recommended by flooring manufacturer.
- C. Crack filler shall be as recommended by flooring manufacturer such as: Armstrong "S-190", Flintkote "Crack Filler", or Kentile "Fast Kenpatch No. 13", or approved equal. Crack filler shall be installed under this Section.
- D. Primers for use for all the various conditions and materials shall be as recommended by manufacturer of each specific material for each specific application.
- E. Contractor shall provide exhaust ventilation in each room to exhaust adhesive fumes during installation to the satisfaction of the Owner and Engineer.
- F. Provide and install ¼" Luan underlayment at all new VCT.

2.04 MAINTENANCE SUPPLY

- A. Furnish to Owner additional standard cartons equal to 1% of each different color type and pattern of tile used on the project and from same manufacturing runs. At completion of work, deliver to site and place in storage areas designated by Official in properly labeled cartons, receipt of which shall be acknowledged in writing by authorized representative of Owner.

2.05 CLEANERS AND POLISHES

- A. Floor Cleaner: Shall be a commercial floor cleaner such as: Armstrong "C-410", Flintkote "Floor Cleaner", Hillyard's "Super Shine-All", or approved equal.
- B. Floor Polish: Shall be commercial floor finish such as: Armstrong "C-145", Flintkote "Floor Finish", or Hillyard's "Polykote", or approved equal.

2.06 LEVELING COMPOUND

- A. Trowelable Underlayments and Patching Compounds: Latex-modified, portland cement-based formulation provided or approved by manufacturer of tile-setting materials for installations indicated.

PART 3 – EXECUTION

3.01 DELIVERY AND STORAGE

- A. Deliver all materials to job in unopened containers with manufacturer's brand name clearly marked thereon.
- B. Store all materials to protect them from moisture and extremes of heat and cold.

3.02 PREPARATION OF SURFACES

- A. Fill all cracks in subsurfaces using approved crack filler in accordance with manufacturer's printed instructions. Clean subfloors of all remaining dirt and loose particles before application of flooring materials.

3.03 INSTALLATION

- A. Do not begin installation until work of other trades, including painting, has been substantially completed. Use only experienced workmen. Adhere strictly to printed instructions of manufacturer of the materials. Refer to Architect for decisions in case of conflicts.
- B. Room temperature in any area where tile is being installed shall be maintained at a temperature of not less than 68 degrees F. from 48 hours prior to commencement of the work to at least 48 hours after its completion. Refer to Section 01500, TEMPORARY FACILITIES, for information regarding temporary heating.
- C. Lay tile square to match existing patterns.
- D. Lay resilient flooring so as to insure full uniform contact with base material and to produce finished surfaces which are smooth, even, and in true planes, free of buckles, waves, and other imperfections. Store and use adhesives in accordance with manufacturer's printed instructions.
- E. Fit flooring neatly into breaks and recesses, against bases and thresholds, and around pipes, columns, and other projections. Cut, fit, and scribe borders after application of field tile.
- F. Replace damaged edge strips where resilient flooring materials terminate at points higher than continuous finished flooring.
- G. Clean off surplus adhesive from flooring and adjacent surfaces.
- H. Adjust tiles that have not been seated level with surrounding tiles in manner recommended by manufacturer.

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- I. Replace tile showing broken corners or fracture lines by warming tile, carefully removing and replacing with new tile of same type, color, pattern, and thickness, all at no extra expense to the Owner.
- J. All resilient flooring materials shall be carefully rolled after application to eliminate all buckles, air pockets, etc. Do not shorten manufacturer's required rolling time.

3.04 CLEANING, POLISHING, AND PROTECTION

- A. After installation, allow resilient materials to set overnight before initial cleaning. Clean resilient materials by damp mopping, followed as soon as dry with the application of a light coat of commercial buffable floor polish or specified type, strictly following manufacturer's printed instructions. Take care not to flood the surface. Except for initial cleaning and polishing, allow resilient materials to set without traffic for at least 5 days after installation.
- B. General Contractor will install protective covering over completed surfaces.
- C. Final waxing just prior to project acceptance will be done by General Contractor.

3.05 GUARANTEE

- A. All work, materials and labor performed under this SECTION shall be guaranteed in writing to the Owner by the Contractor and manufacturer for a period of one year, all in accordance with the requirements of PART A.

END OF SECTION

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DIVISION 09000

FINISHES

SECTION 09680

CARPET

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that the equipment to be furnished complete in every respect, and that this Contractor shall provide all equipment needed and usually furnished in connection with such systems to provide a complete installation. Equipment, materials, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Carpet Work required to complete the Work of the contract including all the Carpet Work shown on the plans, listed in the specification, and needed to install a complete assembly in every way. Coordinate the Carpet Work with all the other trades for the project. Provide all demolition and disposal Work to complete the Carpet Work. Patch to match all adjacent surfaces that are disturbed left exposed, or unfinished. All Work of the contract is related. It is the General Contractor's responsibility to review all the Work of each section, each Subcontractor, and each file sub-bidder for the entire project so that all the Work can be properly and completely performed.
- B. Carpet Work includes, but is not limited to:
 - 1. Install new carpet at locations shown on the plans. Provide broadloom on pad in the first floor corridor.
 - 2. Provide leveling compound in advance of carpet installation.

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1.03 RELATED WORK

- A. The following related work is to be performed under the designated SECTIONS:
 - 1. Section 09900 – Painting.

1.04 QUALITY ASSURANCE

- A. Installer Qualifications: Engage an experienced Installer who is certified by the Floor Covering Installation Board (FCIB) or who can demonstrate compliance with FCIB certification program requirements.
- B. Single-Source Responsibility: Obtain each type of carpet from one source and by a single manufacturer.
- C. Carpet Fire-Test-Response Characteristics: Provide carpet with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface Flammability: Passes CPSC-16-CFR, Part 1630.
 - 2. Flame Spread: 25 or less per ASTM-E-84.
 - 3. Smoke Developed: 450 or less per ASTM-E-84.
- D. Carpet Cushion Fire-Test-Response Characteristics: Provide carpet cushion with the following fire-test-response characteristics as determined by testing identical products per test method indicated below by UL or another testing and inspecting agency acceptable to authorities having jurisdiction. Identify carpet cushion with appropriate markings of applicable testing and inspecting agency.
 - 1. Surface Flammability: Passes CPSC-16-CFR, Part 1630.
 - 2. Flame Spread: 25 or less per ASTM-E-84.
 - 3. Smoke Developed: 450 or less per ASTM-E-84.
- E. Mockups: Prior to installing carpet, construct mockups for each type of carpet and installation method required to verify selections made under Sample submittals and to demonstrate aesthetic effects as well as qualities of materials and execution. Build mockups to comply with the following requirements, using materials indicated for final unit of Work.
 - 1. Locate mockups on-site in the location and of the size indicated or, if not indicated, as directed by Architect.

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2. Notify Architect one week in advance of the dates and times when mockups will be constructed.
3. Demonstrate the proposed range of aesthetic effects and Workmanship.
4. Obtain Architect's approval of mockups before start of final unit of Work.
5. Retain and maintain mockups during construction in an undisturbed condition as a standard for judging the completed Work.
 - a. Approved mockups in an undisturbed condition at the time of Substantial Completion may become part of the completed Work.

1.05 SUBMITTALS

- A. Submit the following samples in accordance with provisions of the GENERAL CONDITIONS.
- B. Product Data for each type of carpet material, and installation accessory specified. Submit manufacturer's printed data on physical characteristics, durability, fade resistance, and fire-test-response characteristics. Submit methods of installation for each type of substrate.
- C. Samples for initial selection in the form of manufacturer's color charts or Samples of materials showing the full range of colors, textures, and patterns available for each type of carpet indicated.
- D. Samples for verification of the following products, in manufacturer's standard sizes, showing the full range of color, texture, and pattern variations expected. Prepare Samples from the same material to be used for the Work. Label each sample with manufacturer's name, material type, color, pattern, and designation indicated on Drawings and carpet schedule. Submit the following:
 1. 12-inch (300 mm) square Samples of each type of carpet material required.
 2. 12-inch (300 mm) Samples of each type of exposed edge stripping and accessory item.
 3. 6-inch (150 mm) Samples of each type of carpet cushion.
- E. Schedule of carpet using same room designations indicated on Drawings.
- F. Maintenance data for carpet and cushion to include in the operation and maintenance manual specified in the GENERAL CONDITIONS. Include the following:

1. Methods for maintaining carpet and carpet cushion, including manufacturer's recommended frequency for maintaining carpet.
2. Precautions for cleaning materials and methods that could be detrimental to finishes and performance. Include cleaning and stain-removal products and procedures.

1.06 DELIVERY, STORAGE, AND HANDLING

- A. General: Comply with the Carpet and Rug Institute's CRI-104, Section 5: "Storage and Handling."
- B. Deliver materials to Project site in original factory wrappings and containers, labeled with identification of manufacturer, brand name, and lot number.
- C. Store materials on-site in original undamaged packages, inside well-ventilated area protected from weather, moisture, soilage, extreme temperatures, and humidity. Lay flat, with continuous blocking off ground.

1.07 PROJECT CONDITIONS

- A. Space Enclosure and Environmental Limitations: Do not install carpet until space is enclosed and weatherproof, wet-Work in space is completed and nominally dry, Work above ceilings is complete, and ambient temperature and humidity conditions are and will be continuously maintained at values near those indicated for final occupancy.
- B. Subfloor Moisture Conditions: Moisture emission rate of not more than 3 lb/1000 sq. ft./24 hours (14.6 kg/1000 sq. m/24 hours) when tested by calcium chloride moisture test in compliance with CRI-104, 6.2.1, with subfloor temperatures not less than 55 deg F (12.7 deg C).
- C. Subfloor Alkalinity Conditions: A pH range of 5 to 9 when subfloor is wetted with potable water and pHydriion paper is applied.

1.08 WARRANTY

- A. General Warranty: The special warranty specified in this Article shall not deprive the Owner of other rights the Owner may have under other provisions of the Contract Documents and shall be in addition to, and run concurrent with, other warranties made by the Contractor under requirements of the Contract Documents.
- B. Special Carpet Warranty: Submit a written warranty executed by carpet manufacturer and Installer agreeing to repair or replace carpet that does not meet requirements or that fails in materials or workmanship within the specified

warranty period. Failures include, but are not limited to, more than 10 percent loss of face fiber, edge raveling, snags, runs, and delamination.

C. Warranty Period:

1. Broadloom carpet: 10 years from date of Substantial Completion.
2. Modular carpet: Lifetime warranty.

1.09 EXTRA MATERIALS

A. Furnish extra materials described below that match products installed, are packaged with protective covering for storage, and are identified with labels clearly describing contents.

1. Carpet: Before installation begins, furnish quantity of full-width units equal to 5 percent of amount installed.

PART 2 – PRODUCTS

2.01 CARPET

A. Provide carpeting at all designated floor areas with at least the following minimum attributes and physical properties: (Note: CPT-2 shall be provided at all corridors in the scope areas and all other areas specified to receive carpet on the Finish Schedule not receiving CPT-1.)

- E. Seaming Cement: Hot-melt adhesive tape or similar product recommended by carpet manufacturer for taping seams and butting cut edges at backing to form secure seams and to prevent pile loss at seams.

2.03 RUBBER BASE

- A. Rubber base shall be straight, set-on-type, 1/8 inch thick, 4 inches high, with wrapped external corners and end stops.
- B. Colors of the base shall be manufacturer's standard colors and so selected by the Architect. Color of performed pieces shall exactly match color of adjacent straight pieces.
- C. Edge strips for carpet flooring shall be preformed moulded rubber for adhesive application and as manufactured by Roppe, Mercer of styles indicated on the Drawings or as approved equal, in colors to match base material.
- D. Adhesives for Rubber Base shall be waterproof, stabilized type as recommended by the manufacturer of resilient materials to be installed. Asphalt emulsions and other non-waterproof types of adhesives shall not be used.

<u>1. RUBBER WALL BASE</u>	<u>RB-1</u>	<u>JOHNSONITE</u>	<u>GENERAL AT CARPET LOCATIONS WITHOUT EXISTING WOOD BASEBOARD</u>
		<u>1/8" GAUGE</u>	
		<u>COLOR: TO BE SELECTED</u>	
		<u>4" STRAIGHT</u>	

PART 3 – EXECUTION

3.01 EXAMINATION

- A. Examine subfloors and conditions, with Installer present, for compliance with requirements for maximum moisture content, alkalinity range, installation tolerances, and other conditions affecting performance of carpet. Do not proceed with installation until unsatisfactory conditions have been corrected.
- B. Verify that subfloors and conditions are satisfactory for carpet installation and comply with requirements specified in this Section and those of the carpet manufacturer and carpet cushion manufacturer.

3.02 PREPARATION

- A. General: Comply with carpet manufacturer's installation recommendations to prepare substrates indicated to receive carpet installation.
- B. Level subfloor within 1/4 inch in 10 feet noncumulative, in all directions. Sand or grind protrusions, bumps, and ridges. Patch and repair cracks and rough areas. Fill depressions.
 - 1. Use leveling and patching compounds to fill cracks, holes, and depressions in subfloor as recommended by the carpet manufacturer and carpet cushion manufacturer.
- C. Remove subfloor coatings, including curing compounds, and other substances that are incompatible with adhesives and that contain soap, wax, oil, or silicone.
- D. Broom or vacuum clean subfloors to be covered with carpet. Following cleaning, examine subfloors for moisture, alkaline salts, carbonation, or dust.
- E. Concrete-Subfloor Preparation: Apply concrete-slab primer, according to manufacturer's directions, where recommended by the carpet manufacturer and carpet cushion manufacturer.
- F. Wood-Subfloor Preparation: Apply wood-floor sealer, according to manufacturer's directions, where recommended by the carpet manufacturer and carpet cushion manufacturer.
- G. Resilient-Flooring Substrate Preparation: Replace missing pieces of existing resilient flooring or patch to level. Cut out peaked seams and fill with latex underlayment as recommended by manufacturer. Repair depressions with material recommended by the carpet manufacturer and carpet cushion manufacturer.

3.03 INSTALLATION

- A. Direct Glue-Down Installation: Comply with CRI-104, Section 8: "Direct Glue-Down."
- B. Modular Installation: Comply with CRI-104, Section 14: "Carpet Modules."
- C. Comply with carpet manufacturer's recommendations for seam locations and direction of carpet; maintain uniformity of carpet direction and lay of pile. At doorways, center seams under door in closed position. Do not bridge building expansion joints with continuous carpet.

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- D. Cut and fit carpet to butt tightly to vertical surfaces, permanent fixtures, and built-in furniture including cabinets, pipes, outlets, edgings, thresholds, and nosings. Bind or seal cut edges as recommended by carpet manufacturer.
- E. Extend carpet into toe spaces, door reveals, closets, open-bottomed obstructions, removable flanges, alcoves, and similar openings.
- F. Install carpet cushion seams at 90 degree angle with carpet seams.

3.04 CLEANING

- A. Perform the following operations immediately after completing installation.
 - 1. Remove visible adhesive, seam sealer, and other surface blemishes using cleaner recommended by carpet manufacturer.
 - 2. Remove protruding yarns from carpet surface.
 - 3. Vacuum carpet using commercial machine with face-beater element.

3.05 PROTECTION

- A. General: Comply with CRI-104, Section 16: "Protection of Indoor Installation."
- B. Provide final protection and maintain conditions, in a manner acceptable to manufacturer and Installer that ensure carpet is without damage or deterioration at the time of Substantial Completion.

END OF SECTION

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DIVISION 09000

FINISHES

SECTION 09900

PAINTING

**Filed Sub-Bid Required
Painting**

PART 1 – GENERAL

1.00 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **Painting** 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 09900 Painting is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete

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installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Painting work required to complete the work of the contract including all the Painting work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Painting work with all the other trades for the project. Provide all demolition and disposal work to complete the Painting work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Painting work includes, but is not limited to:
1. Paint all new gypsum wallboard walls, crown moldings, and ceilings. Paint all existing plaster walls and ceilings.
 2. Paint all wood doors and trim.
 3. Paint all steel doors and frames.
 4. Prepare and paint existing walls at locations where utilities have been removed. See electrical, mechanical, plumbing, and fire protection drawings for additional information.
 5. At all existing wood trim, including chair rails, baseboards, door casings, window casings and sills, as well as all trim around chalk boards, closets, closet interiors, and doors to remain, prepare and apply three coats polyurethane with integral stain. Note: Sanding to bare wood is not required or intended. Preparation at all existing interior wood trim to remain shall be lightly sanded smooth for the proper application. Painter shall follow manufacturer's recommendations for the proper application of the specified finish.
 6. At all windows in the older portion of the building, paint wood infill panel at all fixed transoms over each double hung window.
 7. Paint all new baseboard, trim, and crown molding trim.
 8. Paint all other items indicated on the plans and all items that should receive a coating to protect it from the weather or from deterioration.

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9. Achieve full coverage on all items to be painted. Number of coats listed, below, is a minimum. Full coverage is achieved when the color below is no longer visible. Tint the first two coats slightly to be different in order to see coverage.
10. Filed Sub-Bid Demolition includes the demolition of any and all existing building materials, finishes, systems, and/or equipment that is required to be removed in order to perform the work of the Filed Sub-Bid, including disposal.
11. Lead paint testing has been performed, see Section 02090 which shall become part of this specification and a part of the Painting Filed Sub-Bidders work. Note: The Lead Paint Considerations specifications are intended for the proper handling and disposal of lead-containing materials, as outlined in this section. Complete de-leading is not required for this project.

1.03 SUBMITTALS

- A. Submit the following shop drawings in accordance with the provisions of SECTION 01300 - SUBMITTALS in the general requirements.
 1. Manufacturers literature on each product used.
- B. Submit the following samples in accordance with the provisions of SECTION 01300 - SUBMITTALS in the general requirements.
 1. 12" long section of metal fabrication with complete paint finish.

1.04 QUALITY ASSURANCE

- A. Provide at all times during the work of this Section adequate supervisory personnel who shall be thoroughly familiar with the type of construction involved and with the requirements of the Contract Documents pertinent to this Work. Provide adequate numbers of skilled craftsmen and other personnel to ensure the orderly and proper progress of the Work in accordance with the approved Progress Schedule.
- B. Comply with the Codes and Standards of the Steel Structures Painting Council.

PART 2 – PRODUCTS

2.01 PAINT

- A. All paints to be by Benjamin Moore, Pratt & Lambert, Sherwin Williams brand or approved equal. Specification is based on Sherwin Williams brand but may be by an approved equal.

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- B. Drywall:
 - 1. Primer for drywall surfaces to be PROMAR 200 Primer Latex.
 - 2. Finish two (2) coats for interior surfaces to be Pro-Industrial Catalyzed Waterbased Epoxy 2-component semi-gloss paint.
- C. Wood:
 - 1. Primer for wood surfaces to be Premium Interior Wall & Wood Primer.
 - 2. Finish two (2) coats for interior surfaces to be ProClassic Interior WaterBased Acrylic-Alkyd semi-gloss paint.
- D. Metal:
 - 1. Metal surfaces to be primed with Pro-Industrial PRO-CRYL Universal Acrylic Primer.
 - 2. Finish coats shall be Pro-Industrial Industrial Enamel 100.
- E. Masonry:
 - 1. Heavy-duty Epoxy Block-Filler.
 - 2. Finish coats shall be Pro-Industrial Catalyzed Waterbased Epoxy 2-component semi-gloss paint.
- F. Concrete:
 - 1. PROMAR 200 Primer Latex.
 - 2. Finish coats shall be Pro-Industrial Catalyzed Waterbased Epoxy 2-component semi-gloss paint.

PART 3 – EXECUTION

3.01 SURFACE PREPARATION

- A. Install all paint as per the manufacture's written recommendations.
- B. Unfinished New Wood and Drywall:
 - 1. Remove surface dirt and grit with a detergent solution followed by a thorough rinsing with clear water. Allow surface to dry completely before coating.
 - 2. Prime all bare wood and drywall.

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C. Painted Wood and Drywall Surfaces.

1. On existing finished surfaces to be repainted, remove all loose, blistered, or cracked finish to bare substrate.
2. To remove loose prior coatings use methods such as scraping, wire brushing. Where scraping or wire brushing rinse thoroughly.
3. Sand smooth or feather all rough edges.
4. Lightly sand or etch all glossy painted surfaces.
5. Where new work joins existing work, prepare existing surfaces to nearest break in the plane.
6. Wash surfaces with detergent and water or other solution as required to remove any accumulated dirt, oil, grease, or other foreign matter which would impair bond or bleed through new finishes.
7. After washing rinse with water and allow to dry thoroughly.
8. Prime all bare surfaces.

D. Metal Surfaces.

1. Power wire brush clean fire escape as per Steel Structures Painting Council SSPC-SP3.

3.02 APPLICATION TO WOOD, DRYWALL, AND MASONRY

- A. Apply paint by methods generally accepted by the trade to achieve approved results.
- B. Do not apply finishes on surfaces that are not sufficiently dry. Make sure each coat of finish is dry and hard before following coat is applied unless manufacturer's direction states otherwise.
- C. Prime all surfaces before installation by other trades.
- D. Brush on oil-based paints with a high quality natural bristle brush.
- E. Apply two finish coats.

3.03 APPLICATION TO METAL/CONCRETE FLOORS

- A. Apply paint as per manufacturer's recommendations and by methods generally accepted by the trade to achieve approved results. Full coverage will be achieved when the color of the coat of paint below is no longer visible.

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- B. All work shall be performed in the shop by qualified personnel under controlled conditions for dust, temperature and humidity. Provide sufficient lighting.
- C. Prime all prepared bare metal surfaces.
- D. Apply two finish coats.

3.04 PROTECTION

- A. The contractor is responsible for protecting the finish of the Railings after coating during storage, delivery and installation.
- B. Touch-up scrapes, scratches and any other mar in the finish as required after installation as per this specification.
- C. If Consultant determines that the paint finish has been damaged by the contractor, beyond repair by touch-up, the entire rail section shall be re-finished as per this specification and at no additional cost to the Owner.

END OF SECTION

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DIVISION 10000

SPECIALTIES

SECTION 10810

TOILET ACCESSORIES

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Toilet Accessories work required to complete the work of the contract including all the Toilet Accessories work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Toilet Accessories work with all the other trades for the project. Provide all demolition and disposal work to complete the Toilet Accessories work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each file sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Toilet Accessories work includes, but is not limited to:
 - 1. Toilet accessories listed herein.
 - 2. Rough-in frames furnished to other Sections.
 - 3. Attachment hardware.

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1.03 REFERENCES

- A. ASTM A167 - Stainless and Heat-Resisting Chromium-Nickel Steel Plate, Sheet, and Strip.
- B. ASTM A366 - Cold-Rolled Carbon Steel Sheets, Commercial Quality.

1.04 SUBMITTALS

- A. Submit manufacturer's product data under provisions of Section 01 31 00, Submittals.
- B. Data to illustrate each accessory at large scale and show installation method.
- C. Submit manufacturer's installation instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Pack accessories individually in a manner to protect accessory and its finish.

1.06 PROTECTION

- A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. See 3.03 - SCHEDULE OF ACCESSORIES

2.02 MATERIALS

- A. Sheet Steel: ASTM A366, cold rolled stretcher leveled; 125 oz/sq ft galvanized coating.
- B. Stainless Steel Sheet: ASTM A167, commercial grade, 22 gage.
- C. Stainless Steel Tubing: ASTM A269, commercial grade, seamless welded.
- D. Adhesive: Epoxy type contact cement.
- E. Fasteners, Screws, and Bolts: Stainless steel. Expansion Shields: Fiber, lead or rubber as recommended by accessory manufacturer for component and substrate.

2.03 FINISHES

- A. Plating: Satin finish.

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- B. Stainless Steel: No. 4 satin luster finish.
- C. Shop Primed Ferrous Metals: Pretreat and clean, spray apply one coat primer and bake.
- D. Enamel: Pretreat to clean condition, apply one coat primer and minimum two coats epoxy baked enamel.

2.04 FABRICATION

- A. Weld and grind smooth joints of fabricated components.
- B. Form exposed surfaces from one sheet of stock, free of joints.
- C. Provide steel anchor plates and anchor components for installation on building finishes.
- D. Form surfaces flat without distortion. Maintain flat surfaces without scratches or dents.
- E. Back paint components where contact is made with building finishes to prevent electrolysis.
- F. Shop assemble components and package complete with anchors and fittings.

PART 3 – EXECUTION

3.01 PREPARATION

- A. Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates and rough-in measurements as required.
- B. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of units.
- C. Verify with Architect exact location of accessories. All accessories shall be installed in accordance with the Massachusetts Access Board Regulations and the dimensional requirements of ADA.

3.02 INSTALLATION

- A. Install fixtures, accessories and items in accordance with manufacturer's instructions.
- B. Install true, plumb, and level, securely and rigidly anchored to substrate.
- C. Use tamper-proof fasteners.

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- D. Mount grab bars securely and test anchorage for proper strength. Grab bars must be capable of supporting a dead load of 250 lbs. at any point for a period of 5 minutes.

3.03 SCHEDULE OF ACCESSORIES

- A. 24" long towel bar, "Dottington" by Allied Brass, Inc.
- B. Toilet paper holder, "Dottington" by Allied Brass, Inc.
- C. Tumbler/tooth brush holder, "Dottington" by Allied Brass, Inc.
- D. Soap dish, "Dottington" by Allied Brass, Inc.
- E. Shower curtain, curtain rod bracket, "Dottington" by Allied Brass, Inc.
- F. Coat hook, "Dottington" by Allied Brass, Inc.
- G. Medicine cabinet, AFINA SD-1622-R-BSX-BS BASIX brushed silver cabinet by Mighty Knobs, 866-506-6000.

END OF SECTION

TOILET ACCESSORIES
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DIVISION 10000

SPECIALTIES

SECTION 10820

PORTABLE FIRE EXTINGUISHERS AND CABINETS

PART 1 – GENERAL

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect work of this Section whether or not such work is specifically mentioned in this Section.
- C. Coordinate work with that of all other trades affecting or affected by work of this Section. Cooperate with such trades to assure the steady progress of all work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Provide all the Fire Extinguisher and Cabinet work required to complete the work of the contract including all the Fire Extinguisher Cabinet work shown on the plans, listed in the specification, and needed to install a complete assembly in every way, with all reinforcing, pinning, and finishes. Coordinate the Fire Extinguisher Cabinet work with all the other trades for the project. Provide all demolition and disposal work to complete the Fire Extinguisher Cabinet work. Patch to match all adjacent surfaces that are disturbed, left exposed, or unfinished. All work of the contract is related. It is the General Contractor's responsibility to review all the work of each section, each sub-contractor, and each filed sub-bidder for the entire project so that all the work can be properly and completely performed.
- B. Fire Extinguisher and Cabinet work includes, but is not limited to:
 - 1. Portable Fire Extinguishers and surface-mounted Fire Extinguisher Cabinets at locations indicated on the plans and per NFPA 10

PORTABLE FIRE EXTINGUISHERS AND CABINETS

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2. Attachment hardware and all accessories needed for a complete assembly and installation.

1.03 REFERENCES

- A. NFPA 10 – Portable Fire Extinguishers
- B. MA 521 CMR – Massachusetts Architectural Access Board Regulations

1.04 SUBMITTALS

- A. Submit manufacturer's product data under provisions of Section 01300, Submittals.
- B. Data to illustrate each accessory at large scale and show installation method.
- C. Submit manufacturer's installation instructions.

1.05 DELIVERY, STORAGE, AND HANDLING

- A. Pack accessories individually in a manner to protect accessory and its finish.

1.06 PROTECTION

- A. Protect adjacent or adjoining finished surfaces and work from damage during installation of work of this Section.

PART 2 – PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

- A. Fire extinguishers and cabinets shall be U.S. approved and as manufactured by Ansol, Kidde, General, Potter-Roemer or Larsen's Manufacturing Company.
- B. For the purpose of establishing a standard of quality and design, products of Larsen's Manufacturing Co. will be specified.
 1. Fire extinguisher cabinets shall be Model 2712-SM surface-mounted, "Break Glass" type with labels and lettering indicating fire extinguisher. Cabinets shall be sheet steel with white baked enamel finish. Door shall be glazed.
 2. Each cabinet shall be provided with one 2-1/2 gallon PW Series pressurized water extinguisher.
- C. Materials furnished under this Section shall bear Underwriter's label.

PART 3 – EXECUTION

PORTABLE FIRE EXTINGUISHERS AND CABINETS **10820 - 2**

3.01 PREPARATION

- A. Deliver inserts and rough-in frames to job site at appropriate time for building-in. Provide templates and rough-in measurements as required.
- B. Before starting work notify Architect in writing of any conflicts detrimental to installation or operation of units.
- C. Verify with Architect exact location of accessories. All accessories shall be installed in accordance with the Massachusetts Access Board Regulations and the dimensional requirements of ADA.

3.02 INSTALLATION

- A. Install fire extinguisher cabinet units in accordance with manufacturer's instructions, using fasteners which are appropriate to substrate and recommended by manufacturer of unit. Install units plumb and level, firmly anchored in locations and at heights indicated. Provide solid blocking at all anchor locations.

END OF SECTION

DIVISION 15000

MECHANICAL

SECTION 15100

VIBRATION CONTROL AND SEISMIC RESTRAINT

File Sub-Bid Required
This Section Individually Combined with Sections
15100, 15300, 15400, 15600, 16000

PART 1 – GENERAL

1.01 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **This Section (Vibration Control and Seismic Restraint)** is included in the Filed Sub-Bids under Part D, Item 2 of the Form for General Bid and is combined individually with sections 15100, 15300, 15400, 15600, and 16000.
- 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 15100 Vibration Control and Seismic Restraint is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.

1.02 DESCRIPTION

- A. General: The work noted within section 15100 is referenced by division 15300, 15400, 15600, 16000. Provide all necessary labor & material in each division as required herein.
- B. Intent:
 - 1. All mechanical equipment, piping, and ductwork shall be mounted on vibration isolators to prevent the transmission of vibration and mechanically transmitted sound to the building structure. Vibration isolators shall be selected in accordance with the weight distribution so as to produce reasonably uniform deflections.
 - 2. All isolators and isolation materials shall be of the same manufacturer and shall be certified by the manufacturer.

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3. It is the intent of the seismic portion of this specification to keep all mechanical and electrical building system components in place during a seismic event.
 4. All such systems must be installed in strict accordance with seismic codes, component manufacturer's, and building construction standards. Whenever a conflict occurs between the manufacturer's or construction standards, the most stringent shall apply.
 5. This specification is considered to be minimum requirements for seismic consideration and is not intended as a substitute for legislated, more stringent, national, state or local construction requirements (i.e. California Title 24, California OSHPD, Canadian Building Codes, or other requirements).
 6. Any variance or non-compliance with these specification requirements shall be corrected by the contractor in an approved manner.
- C. The work in this section includes, but is not limited to the following:
1. Vibration isolation for piping, ductwork and equipment.
 2. Equipment isolation bases.
 3. Flexible piping connections.
 4. Seismic restraints for isolated equipment.
 5. Seismic restraints for non-isolated equipment.
 6. Certification of seismic restraint designs and installation supervision.
 7. Certification of seismic attachment of housekeeping pads.
 8. All mechanical and electrical systems. Equipment buried underground is excluded but entry of services through the foundation wall is included. Equipment referred to below is typical. (Equipment not listed is still included in this specification).
- | | |
|-----------------------------|--------------------|
| AC Units | Generators |
| Air Cooled Condensing Units | Light Fixtures |
| Battery Racks | Motor Control Ctrs |
| Bus Ducts | Piping |
| Cable Trays | Switching Gear |
| Conduit | Tanks (all types) |
| Ductwork | Transformers |
| Electrical Panels | Unit Substations |
| Fans (all types) | Var. Freq. Drives |
| | Water Heaters |

D. Definitions:

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1. Life Safety Systems
 - a. All systems involved with fire protection including sprinkler piping, fire pumps, jockey pumps, fire pump control panels, service water supply piping, water tanks, fire dampers and smoke exhaust systems.
 - b. All systems involved with and/or connected to emergency power supply including all generators, transfer switches, transformers, and all flowpaths to fire protection and/or emergency lighting systems.
 - c. All medical and life support systems.
 - d. Fresh air & relief systems on emergency control sequence including air handlers, conduit, duct, dampers, etc.
2. Positive Attachment
 - a. A positive attachment is defined as a cast-in anchor, a drill-in wedge anchor, a double sided beam clamp loaded perpendicular to a beam, or a welded or bolted connection to structure. Single sided "C" type beam clamps for support rods of overhead piping, ductwork, fire protection, electrical conduit, bus duct, or cable trays, etc. are not acceptable as seismic anchor points.
3. Transverse Bracing
 - a. Restraint(s) applied to limit motion perpendicular to the centerline of the pipe, duct or conduit.
4. Longitudinal Bracing
 - a. Restraint(s) applied to limit motion parallel to the centerline of the pipe, duct or conduit.

1.03 SUBMITTAL DATA REQUIREMENTS

- A. In addition to requirements of Section 01300, the manufacturer of vibration isolation and seismic restraints shall provide submittals for products as follows:
 1. Descriptive Data
 - a. Catalog cuts or data sheets on vibration isolators and specific restraints detailing compliance with the specification.
 - b. Detailed schedules of flexible and rigidly mounted equipment, showing vibration isolators and seismic restraints by referencing numbered descriptive drawings.
 2. Shop Drawings

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PHASE III RENOVATIONS TO THE
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- a. Submit fabrication details for equipment bases including dimensions, structural member sizes and support point locations.
 - b. Provide all details of suspension and support for ceiling hung equipment.
 - c. Where walls, floors, slabs or supplementary steel work are used for seismic restraint locations, details of acceptable attachment methods for ducts, conduit and pipe must be included and approved before the condition is accepted for installation. Restraint manufacturers' submittals must include spacing, static loads and seismic loads at all attachment and support points.
 - d. Provide specific details of seismic restraints and anchors; include number, size and locations for each piece of equipment.
3. Seismic Certification and Analysis
- a. Seismic restraint calculations must be provided for all connections of equipment to the structure. Calculations must be stamped by a registered professional engineer with at least five years of seismic design experience, licensed in the state of the job location.
 - b. All restraining devices shall have a pre-approval number from California OSHPD or some other recognized government agency showing maximum restraint ratings. Pre-approvals based on independent testing are preferred to pre-approvals based on calculations. Where pre-approved devices are not available, submittals based on independent testing are preferred. Calculations (including the combining of tensile and shear loadings) to support seismic restraint designs must be stamped by a registered professional engineer with at least five years of seismic design experience and licensed in the state of the job location. Testing and calculations must include both shear and tensile loads as well as one test or analysis at 450 to the weakest mode.
 - c. Analysis must indicate calculated dead loads, static seismic loads and capacity of materials utilized for connections to equipment and structure. Analysis must detail anchoring methods, bolt diameter, embodiment and/or welded length. All seismic restraint devices shall be designed to accept, without failure, the forces required acting through the

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equipment center of gravity. Overturning moments may exceed forces at ground level.

1.04 CODE AND STANDARDS REQUIREMENTS

A. Typical Applicable Codes, Standards, and Categories:

1. International Building Code with an effective peak acceleration coefficient of 0.15.
2. Massachusetts State Building Code Version 7.0 chapter 16, section 1612.7.
3. Seismic hazard exposure group of I, II, III and seismic performance category of C, D.

1.05 MANUFACTURER'S RESPONSIBILITY

A. Manufacturer of vibration isolation and seismic control equipment shall have the following responsibilities:

1. Determine vibration isolation and seismic restraint sizes and locations.
2. Provide vibration isolation and seismic restraints.
3. Provide calculations and materials if required for restraint of unisolated equipment.
4. Provide installation instructions, drawings and trained field supervision to insure proper installation and performance.

1.06 RELATED WORK

A. Housekeeping Pads:

1. Housekeeping pads shall be coordinated with restraint vendor and sized to provide a minimum edge distance of ten (10) bolt diameters all around the outermost anchor bolt to allow development of full drill-in wedge anchor ratings. If cast-in anchors are to be used, the housekeeping pads shall be sized to accommodate the ACI requirements for bolt coverage and embedment.

B. Supplementary Support Steel:

1. Contractor shall supply supplementary support steel for all equipment, piping, ductwork, etc. including roof mounted equipment.

C. Attachments:

1. Contractor shall supply restraint attachment plates cast into housekeeping pads, concrete inserts, double sided beam clamps, etc. in accordance with the requirements of the vibration vendor's calculations.

PART 2 - PRODUCTS

2.01 INTENT

- A. All vibration isolators and seismic restraints described in this section shall be the product of a single manufacturer. Mason Industry's products are the basis of these specifications; products of other manufacturers are acceptable provided their systems strictly comply with the specification.
- B. For the purposes of this project, failure is defined as the discontinuance of any attachment point between equipment or structure, vertical permanent deformation greater than 1/8 inch and/or horizontal permanent deformation greater than 1/4 inch.

2.02 PRODUCT DESCRIPTIONS

A. Vibration Isolators and Seismic Restraints.

SPECIFICATION:

1. Two layers of 3/4" thick neoprene pad consisting of 2" square waffle modules separated horizontally by a 16 gauge galvanized shim. Load distribution plates shall be used as required. Pads shall be Type Super "W" as manufactured by Mason Industries, Inc.
2. Bridge-bearing neoprene mountings shall have a minimum static deflection of 0.2" and all directional seismic capability. The mount shall consist of a ductile iron casting containing two separated and opposing molded neoprene elements. The elements shall prevent the central threaded sleeve and attachment bolt from contacting the casting during normal operation. The shock absorbing neoprene materials shall be compounded to bridge-bearing specifications. Mountings shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be Type BR as manufactured by Mason Industries, Inc.
3. Sheet metal panels shall be bolted to the walls or supporting structure by assemblies consisting of a neoprene bushing cushioned between 2 steel sleeves. The outer sleeve prevents the sheet metal from cutting into the neoprene. Enlarge panel holes as required. Neoprene elements pass over the bushing to cushion the back panel horizontally. A steel disc covers the inside neoprene element and the inner steel sleeve is elongated to act as a stop so tightening the anchor bolts does not interfere with panel isolation in 3 planes. Bushing assemblies can be applied to the ends of steel cross members where applicable. All neoprene shall be bridge bearing quality. Bushing assemblies shall be type PB as manufactured by Mason Industries, Inc.
4. A one (1) piece molded bridge bearing neoprene washer/bushing. The bushing shall surround the anchor bolt and have a flat washer face to avoid

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metal to metal contact. Neoprene bushings shall be type HG as manufactured by Mason Industries, Inc.

5. Spring isolators shall be free standing and laterally stable without any housing and complete with a molded neoprene cup or 1/4" neoprene acoustical friction pad between the baseplate and the support. All mountings shall have leveling bolts that must be rigidly bolted to the equipment. Spring diameters shall be no less than 0.8 of the compressed height of the spring at rated load. Springs shall have a minimum additional travel to solid equal to 50% of the rated deflection. Submittals shall include spring diameters, deflection, compressed spring height and solid spring height. Mountings shall be Type SLF as manufactured by Mason Industries, Inc.
6. Restrained spring mountings shall have an SLF mounting as described in Specification 5, within a rigid housing that includes vertical limit stops to prevent spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the spring so as not to interfere with the spring action. Limit stops shall be out of contact during normal operation. Since housings will be bolted or welded in position there must be an internal isolation pad. Housing shall be designed to resist all seismic forces. Mountings shall have Anchorage Pre-approval "R" Number from OSHPD in the state of California certifying the maximum certified horizontal and vertical load ratings. Mountings shall be SLR as manufactured by Mason Industries, Inc.
7. Spring mountings as in specification 5 built into ductile iron or steel housing to provide all directional seismic snubbing. The snubber shall be adjustable vertically and allow a maximum of 1/4 inch travel in all directions before contacting the resilient snubbing collars. Mountings shall have an Anchorage Pre-approval "R" number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Mountings shall be SSLFH as manufactured by Mason Industries, Inc.
8. Air Springs shall be manufactured with upper and lower steel sections connected by a replaceable flexible nylon reinforced neoprene element. Air spring configuration shall be multiple bellows to achieve a maximum natural frequency of 3 Hz. Air Springs shall be designed for a burst pressure that is a minimum of three times the published maximum operating pressure. All air spring systems shall be connected to either the building control air or a supplementary air supply and equipped with three leveling valves to maintain leveling within plus or minus 1/8". Submittals shall include natural frequency, load and damping tests performed by an

independent lab or acoustician. Air Springs shall be Type MT and leveling valves Type LV as manufactured by Mason Industries, Inc.

9. Restrained air spring mountings shall have an MT air spring as described in Specification 8, within a rigid housing that includes vertical limit stops to prevent air spring extension when weight is removed. The housing shall serve as blocking during erection. A steel spacer shall be removed after adjustment. Installed and operating heights are equal. A minimum clearance of 1/2" shall be maintained around restraining bolts and between the housing and the air spring so as not to interfere with the air spring action. Limit stops shall be out of contact during normal operation. Housing shall be designed to resist all seismic forces. Mountings shall be SLR-MT as manufactured by Mason Industries, Inc.
10. Hangers shall consist of rigid steel frames containing minimum 1 1/4" thick neoprene elements at the top and a steel spring with general characteristics as in specification 5 seated in a steel washer reinforced neoprene cup on the bottom. The neoprene element and the cup shall have neoprene bushings projecting through the steel box. To maintain stability the boxes shall not be articulated as clevis hangers nor the neoprene element stacked on top of the spring. Spring diameters and hanger box lower hole sizes shall be large enough to permit the hanger rod to swing through a 30° arc from side to side before contacting the rod bushing and short circuiting the spring. Submittals shall include a hanger drawing showing the 30° capability. Hangers shall be type 30° as manufactured by Mason Industries, Inc.
11. Hangers shall be as described in specifications 10, but they shall be pre-compressed and locked at the rated deflection by means of a resilient seismic upstop to keep the piping or equipment at a fixed elevation during installation. The hangers shall be designed with a release mechanism to free the spring after the installation is complete and the hanger is subjected to its full load. Deflection shall be clearly indicated by means of a scale. Submittals shall include a drawing of the hanger showing the 30° capability. Hangers shall be type PC30N as manufactured by Mason Industries, Inc.
12. Seismic Cable Restraints shall consist of galvanized steel aircraft cables sized to resist seismic loads with a minimum safety factor of two and arranged to provide all-directional restraint. Cable end connections shall be steel assemblies that swivel to final installation angle and utilize two clamping bolts to provide proper cable engagement. Cables must not be allowed to bend across sharp edges. Cable assemblies shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified load ratings. Cable assemblies shall be Type SCB at the ceiling and at the clevis bolt, SCBH between the hanger rod nut and the clevis or SCBV if clamped to a beam all as manufactured by Mason Industries, Inc.

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13. Seismic solid braces shall consist of steel angles or channels to resist seismic loads with a minimum safety factor of 2 and arranged to provide all directional restraint. Seismic solid brace end connectors shall be steel assemblies that swivel to the final installation angle and utilize two through bolts to provide proper attachment. Seismic solid brace assembly shall have anchorage pre-approval "R" number from OSHPD in the state of California verifying the maximum certified load ratings. Solid seismic brace assemblies shall be type SSB as manufactured by Mason Industries, Inc.

Note: Specifications 12 - 14 apply to trapeze as well as clevis hanger locations. At trapeze anchor locations piping must be shackled to the trapeze. Specifications apply to hanging equipment as well.

14. Steel angles, sized to prevent buckling, shall be clamped to pipe or equipment rods utilizing a minimum of three ductile iron clamps at each restraint location when required. Welding of support rods is not acceptable. Rod clamp assemblies shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California. Rod clamp assemblies shall be Type SRC as manufactured by Mason Industries, Inc.
15. Pipe clevis cross bolt braces are required in all restraint locations. They shall be special purpose performed channels deep enough to be held in place by bolts passing over the cross bolt. Clevis cross braces shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California. Clevis cross brace shall be type CCB as manufactured by Mason Industries, Inc.
16. All-directional seismic snubbers shall consist of interlocking steel members restrained by a one-piece molded neoprene bushing of bridge bearing neoprene. Bushing shall be replaceable and a minimum of 1/4 inch thick. Rated loading shall not exceed 1,000 psi. A minimum air gap of 1/8 inch shall be incorporated in the snubber design in all directions before contact is made between the rigid and resilient surfaces. Snubber end caps shall be removable to allow inspection of internal clearances. Neoprene bushings shall be rotated to insure no short circuits exist before systems are activated. Snubbers shall have an Anchorage Pre-approval "R" Number from OSHPD in the State of California verifying the maximum certified horizontal and vertical load ratings. Snubber shall be Type Z-1 225 as manufactured by Mason Industries, Inc.
17. All directional seismic snubbers shall consist of interlocking steel members restrained by shock absorbent rubber materials compounded to bridge bearing specifications. Elastomeric materials shall be replaceable and a minimum of 3/4" thick. Rated loadings shall not exceed 1,000 psi. Snubbers shall be manufactured with an air gap between hard and resilient material of not less than 1/8" nor more that 1/4". Snubbers shall be installed with factory set clearances. The capacity of the seismic snubber

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at 3/8" deflection shall be equal or greater than the load assigned to the mounting grouping controlled by the snubber multiplied by the applicable "G" force. Submittals shall include the load deflection curves up to 1/2" deflection in the x, y and z planes. Snubbers shall have an anchorage pre-approval "R" number from OSHPD in the state of California verifying the maximum certified horizontal and vertical load ratings. Snubbers shall be series Z-101 1 as manufactured by Mason Industries, Inc.

18. Stud wedge anchors shall be manufactured from full diameter wire, not from undersized wire that is "rolled up" to create the thread. The stud anchor shall also have a safety shoulder which fully supports the wedge ring under load. The stud anchors shall have an evaluation report number from the I.C.B.0 Evaluation Service, Inc. verifying its allowable loads. Drill-in stud wedge anchors shall be type SAS as manufactured by Mason Industries, Inc.
19. Female wedge anchors are preferred in floor locations so isolators or equipment can be slid into place after the anchors are installed. Anchors shall be manufactured from full diameter wire, and shall have a safety shoulder to fully support the wedge ring under load. Female wedge anchors shall have an evaluation report number from the I.C.B.0 Evaluation Service, Inc. verifying to its allowable loads. Drill-in female wedge anchors shall be type SAB as manufactured by Mason Industries, Inc.
20. Vibration isolation manufacturer shall furnish integral structural steel bases. Rectangular bases are preferred for all equipment. Centrifugal refrigeration machines and pump bases may be T or L shaped where space is a problem. Pump bases for split case pump shall include supports for suction and discharge elbows. All perimeter members shall be steel beams with a minimum depth equal to 1/10 of the longest dimension of the base. Base depth need not exceed 14' provided that the deflection and misalignment is kept within acceptable limits as determined by the manufacturer. Height saving brackets shall be employed in all mounting locations to provide a base clearance of 1 ". Bases shall be type WF as manufactured by Mason Industries, Inc.
21. Vibration isolation manufacturer shall furnish rectangular steel concrete pouring forms for floating and inertia foundations. Bases for split case pumps shall be large enough to provide for suction and discharge elbows. Bases shall be a minimum of 1/1 2 of the longest dimension of the base but not less than 6". The base depth need not exceed 1 2" unless specifically recommended by the base manufacturer for mass or rigidity. Forms shall include minimum concrete reinforcing consisting of 1/2" bars welded in place on 6" centers running both ways in a layer 1 1/2" above the bottom. Forms shall be furnished with steel templates to hold the anchor bolts sleeves and anchors while concrete is being poured. Height saving brackets shall be employed in all mounting locations to maintain a

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1 " clearance below the base. Wooden formed bases leaving a concrete rather than a steel finish are not acceptable. Base shall be type BMK or K as manufactured by Mason Industries, Inc.

22. Flexible spherical expansion joints shall employ peroxide cured EPDM in the covers, liners and Dacron tire cord friction ring. Solid steel rings shall be used within the raised face rubber ends to prevent pullout. Flexible cable bead wire is not acceptable. Sizes 2" and larger shall have two spheres reinforced with a ring between spheres to maintain shape and complete with split ductile iron or steel flanges with hooked or similar interlocks. Sizes 16' to 24" may be single sphere. Sizes 3/4" to 1 1/2" may have threaded bolted flange assemblies, one sphere and cable retention. 14" and smaller connectors shall be rated at 250 psi up to 190°F. with a uniform drop in allowable pressure to 190 psi at 250°F. 16" and larger connectors are rated 180 psi at 190°F. and 135 psi at 250°F. Safety factors to burst and flange pullout shall be a minimum of 3/1. All joints must have permanent markings verifying a 5 minute factory test at twice the rated pressure. Concentric reducers to the above specifications may be substituted for equal ended expansion joints

Expansion joints shall be installed in piping gaps equal to the length of the expansion joints under pressure. Control rods need only be used in unanchored piping locations where the manufacturer determines the installation exceeds the pressure requirement without control rods, as control rods are not desirable in seismic work. If control rods are used, they must have 1/2" thick Neoprene washer bushings large enough in area to take the thrust at 1000 psi maximum on the washer area. Expansion joints shall be installed on the equipment side of the shut off valves.

Submittals shall include two test reports by independent consultants showing minimum reductions of 20 DB in vibration accelerations and 10 DB in sound pressure levels at typical blade passage frequencies on this or a similar product by the same manufacturer. All expansion joints shall be installed on the equipment side of the shut off valves. Expansion joints shall be SAFEFLEX SFDEJ, SFEJ, SFDCR or SFU and Control Rods CR as manufactured by Mason Industries, Inc.

23. Flexible stainless steel hose shall have stainless steel braid and carbon steel fittings. Sizes 3" and larger shall be flanged. Smaller sizes shall have male nipples. Minimum lengths shall be as tabulated:

	<u>Flanged</u>		<u>Male Nipples</u>
3 x 14	10 x 26	1/2 x 9	1-1/2 x 13
4 x 15	12 x 28	3/4 x 10	2 x 14
5 x 19	14 x 30	1 x 11	2-1/2 x 18
6 x 20	16 x 32	1-1/4 x 12	
8 x 22			

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Hoses shall be installed on the equipment side of the shut-off valves horizontally and parallel to the equipment shafts wherever possible. Hoses shall be type BSS as manufactured by Mason Industries, Inc.

24. All-directional acoustical pipe anchor, consisting of two sizes of steel tubing separated by a minimum 1/2" thick 60 durometer neoprene. Vertical restraint shall be provided by similar material arranged to prevent vertical travel in either direction. Allowable loads on the isolation material should not exceed 500 psi and the design shall be balanced for equal resistance in any direction. All-directional anchors shall be type ADA as manufactured by Mason Industries, Inc.
25. Pipe guides shall consist of a telescopic arrangement of two sizes of steel tubing separated by a minimum 1/2" thickness of 60 durometer neoprene. The height of the guides shall be preset with a shear pin to allow vertical motion due to pipe expansion or contraction. Shear pin shall be removable and reinsertable to allow for selection of pipe movement. Guides shall be capable of + 1 5/8" motion, or to meet location requirements. Pipe guides shall be type VSG as manufactured by Mason Industries, Inc.
26. Split Wall Seals consist of two bolted pipe halves with minimum 3/4" thick neoprene sponge bonded to the inner faces. The seal shall be tightened around the pipe to eliminate clearance between the inner sponge face and the piping. Concrete may be packed around the seal to make it integral with the floor, wall or ceiling if the seal is not already in place around the pipe prior to the construction of the building member. Seals shall project a minimum of 1" past either face of the wall. Where temperatures exceed 240°F., 10# density fiberglass may be used in lieu of the sponge. Seals shall be Type SWS as manufactured by Mason Industries, Inc.
27. The horizontal thrust restraint shall consist of a spring element in series with a neoprene molded cup as described in specification 5 with the same deflection as specified for the mountings or hangers. The spring element shall be designed so it can be preset for thrust at the factory and adjusted in the field to allow for a maximum of 1/4" movement at start and stop. The assembly shall be furnished with 1 rod and angle brackets for attachment to both the equipment and the duct work or the equipment and the structure. Horizontal restraints shall be attached at the centerline of thrust and symmetrical on either side of the unit. Horizontal thrust restraints shall be type WBI/WBD as manufactured by Mason Industries, Inc.

PART 3 - EXECUTION

3.01 GENERAL

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- A. All vibration isolators and seismic restraint systems must be installed in strict accordance with the manufacturers written instructions and all certified submittal data. At the completion of all construction work the vibration and seismic device supplier shall inspect all installations and provided a written report of installation compliance to the engineer of record. A copy of this written certification shall also be provided in the operations manual provided to the owner.
- B. Installation of vibration isolators and seismic restraints must not cause any change of position of equipment, piping or duct work resulting in stresses or misalignment.
- C. No rigid connections between equipment and the building structure shall be made that degrades the noise and vibration control system herein specified.
- D. The contractor shall not install any equipment, piping, duct or conduit which makes rigid connections with the building unless isolation is not specified. "Building" includes, but is not limited to, slabs, beams, columns, studs and walls.
- E. Coordinate work with other trades to avoid rigid contact with the building.
- F. Any conflicts with other trades which will result in rigid contact with equipment or piping due to inadequate space or other unforeseen conditions should be brought to the architects/engineers attention prior to installation. Corrective work necessitated by conflicts after installation shall be at the responsible contractors expense.
- G. Bring to the architects/engineers attention any discrepancies between the specifications and the field conditions or changes required due to specific equipment selection, prior to installation. Corrective work necessitated by discrepancies after installation shall be at the responsible contractors expense.
- H. Correct, at no additional cost, all installations which are deemed defective in workmanship and materials at the contractors expense.
- I. Overstressing of the building structure must not occur because of overhead support of equipment. Contractor must submit loads to the structural engineer of record for approval. Generally bracing may occur from:
 - 1. Flanges of structural beams.
 - 2. Upper truss cords in bar joist construction.
 - 3. Cast in place inserts or wedge type drill-in concrete anchors.
- J. Specification 12 cable restraints shall be installed slightly slack to avoid short circuiting the isolated suspended equipment, piping or conduit.

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- K. Specification 12 cable assemblies are installed taut on non-isolated systems. Specification 13 seismic solid braces may be used in place of cables on rigidly attached systems only.
- L. At locations where specification 12 or 13 restraints are located, the support rods must be braced when necessary to accept compressive loads with specification 14 braces.
- M. At all locations where specification 12 or 13 restraints are attached to pipe clevis's, the clevis cross bolt must be reinforced with specification type 15 braces.
- N. Drill-in concrete anchors for ceiling and wall installation shall be specification type 18, and specification type 19 female wedge type for floor mounted equipment.
- O. Vibration isolation manufacturer shall furnish integral structural steel bases as required. Independent steel rails are not permitted on this project.
- P. Hand built elastomeric expansion joints may be used when pipe sizes exceed 24" or specified movements exceed specification 23 capabilities.
- Q. Where piping passes through walls, floors or ceilings the vibration isolation manufacturer shall provide specification 27 wall seals.
- R. Air handling equipment and centrifugal fans shall be protected against excessive displacement which results from high air thrust in relation to the equipment weight. Horizontal thrust restraint shall be specification type 28.
- S. Locate isolation hangers as near to the overhead support structure as possible.

3.02 VIBRATION ISOLATION OF PIPING

- A. Where piping connects to rotating or vibrating mechanical equipment install specification 23 expansion joints or specification 24 stainless hoses if 23 is not suitable for the service.
- B. Seismic Restraint of Piping:
 - 1. Seismically restrain all piping listed as a, b or c below. Use specification 12 cables.
 - a. Fuel oil piping, gas piping, medical gas piping, and compressed air piping.
 - b. Piping located in boiler rooms, mechanical equipment rooms, and refrigeration equipment rooms that is 1 1/4" I.D. and larger.
 - c. All other piping 2 1/2" diameter and larger.

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2. Transverse piping restraints shall be at 40' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
3. Longitudinal restraints shall be at 80' maximum spacing for all pipe sizes, except where lesser spacing is required to limit anchorage loads.
4. Where thermal expansion is a consideration, guides and anchors may be used as transverse and longitudinal restraints provided they have a capacity equal to or greater than the restraint loads in addition to the loads induced by expansion or contraction.
5. For fuel oil and all gas piping transverse restraints must be at 20' maximum and longitudinal restraints at 40' maximum spacing.
6. Transverse restraint for one pipe section may also act as a longitudinal restraint for a pipe section of the same size connected perpendicular to it if the restraint is installed within 24" of the elbow or TEE or combined stresses are within allowable limits at longer distances.
7. Hold down clamps must be used to attach pipe to all trapeze members before applying restraints in a manner similar to clevis supports.
8. Branch lines may not be used to restrain main lines.

C. Seismic restraint of ductwork:

1. Seismically restrain all duct work with specification 12 or 13 restraints as listed below:
 - a. Restrain rectangular ducts with cross sectional area of 6 sq. ft. or larger.
 - b. Restrain round ducts with diameters of 28" or larger.
 - c. Restrain flat oval ducts the same as rectangular ducts of the same nominal size.
2. Transverse restraints shall occur at 30' intervals or at both ends of the duct run if less than the specified interval. Transverse restraints shall be installed at each duct turn and at each end of a duct run.
3. Longitudinal restraints shall occur at 60' intervals with at least one restraint per duct run. Transverse restraints for one duct section may also act as a longitudinal restraint for a duct section connected perpendicular to it if the restraints are installed within 4' of the intersection of the ducts and if the restraints are sized for the larger duct. Duct joints shall conform to SMACNA duct construction standards.

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4. The ductwork must be reinforced at the restraint locations. Reinforcement shall consist of an additional angle on top of the ductwork that is attached to the support hanger rods. Ductwork is to be attached to both upper angle and lower trapeze.
 5. A group of ducts may be combined in a larger frame so that the combined weights and dimensions of the ducts are less than or equal to the maximum weight and dimensions of the duct for which bracing details are selected.
 6. Walls, including gypsum board non bearing partitions, which have ducts running through them may replace a typical transverse brace. Provide channel framing around ducts and solid blocking between the duct and frame.
- D. Seismic Restraint of Electrical Services:
1. All electrical conduit 2-1/2" in diameter and larger shall be restrained with specification type 12 seismic cable restraints or specification type 13 for seismic solid brace restraints.
 2. All electrical bus ducts, cable trays and ladder trays shall be restrained with specification type 12, seismic cable restraints or specification 13 seismic solid brace restraints.
 3. Transverse restraints shall occur at 30' intervals or both ends if the electrical run is less than the specified interval. Transverse restraints shall be installed at each electrical services turn and at each end of the electric run.
 4. Longitudinal restraints shall occur at 60' intervals with at least one restraint per electric run. Transverse restraints for one electric section may also act as a longitudinal restraint for a duct for an electric section connected perpendicular to it if the restraints are installed within 4' of the intersection of the electric run and if the restraints are sized for the larger electric run.
 5. All rigid floor mounted equipment must have a resilient media between the equipment mounting hole and the anchor bolt. Neoprene bushings shall be specification type 4 and anchor bolts shall be specification type 18 or 19.
 6. Wall mounted panels shall be mounted with specification type 3 bushings. Floor mounted panels shall be mounted on specification type 4 bushings. Anchor bolts shall be specification type 18 or 19.
- E. All fire protection piping shall be braced in accordance with NFPA 13 and 14.
- F. All mechanical equipment shall be vibration isolated and seismically restrained.

VIBRATION CONTROL AND SEISMIC RESTRAINT
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1. All fire protection equipment is considered life safety equipment and shall be seismically restrained.

3.03 SEISMIC RESTRAINT EXCLUSIONS

A. Piping:

1. All piping less than 2 1/2" except for gas and fire protection piping.
2. All piping in boiler and mechanical equipment rooms less than 1 1/4" I.D.
3. All clevis or trapeze supported piping suspended from hanger rods where the point of attachment is less than the 12" in length from the structure to the structural connection of the clevis or trapeze.
4. All PVC and fiberglass suspended waste or vent pipe 6" in diameter and smaller.

B. Ductwork:

1. Rectangular, square or oval ducts less than 6 sq.ft. in cross sectional area.
2. Round duct less than 28" in diameter.
3. Duct supported by hanger rods where the point of attachment is less than 12" in length from the structure to the structural connection of the duct work.

C. Electrical:

1. All conduit less than 2 1/2" diameter suspended by individual hanger rods.
2. All clevis or trapeze supported conduits suspended by hanger rods where the point of attachment is less than 12" in length from the structure to the structural connection of the clevis or trapeze.

END OF SECTION

DIVISION 15

MECHANICAL

SECTION 15300

FIRE PROTECTION

File Sub-Bid Required

Fire Protection

PART 1 – GENERAL

Combined with Sections 15100, 15300

1.00 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **Fire Protection** is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid and is combined with sections 15100 and 15300.
- 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 15300 Fire Protection is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

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1.02 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment, services and accessories necessary to Design, Furnish and Install the work of this Section, complete and functional, as indicated in the Contract Documents and as specified herein. The Design shall conform to the documents and shall be subject to approval by the Architect.
- B. Without limiting the generality thereof, the work to be performed under this Section includes:
 - 1. A hydraulically designed automatic sprinkler system to provide 100% protection for building as noted on the Drawings. Refer to Fire Protection Criteria on the Drawings. Prepare Working Drawings for approval of the Architect, the local authority having jurisdiction, and the owner's insurance company under stamp of an independent Registered Professional Engineer.
 - 2. Backflow Control Device
 - 3. Fire Department Connections.
 - 4. Pipe and Fittings
 - 5. Valves
 - 6. Hangers
 - 7. Sprinkler Heads
 - 8. Furnishing and installation of Supervisory Switches and Controls
 - 9. Systems Identification
 - 10. Flushing and Testing of the interior system as provided herein. Coordinate, witness, and certify the flushing and testing of the exterior system and submit certificates.
 - 11. Drilling, Coring, Cutting & Patching of holes and openings (where the largest dimension thereof does not exceed 12 inches), for Fire Protection Piping and Equipment. All such holes require sleeves.
 - 12. Scaffolding, Rigging, and Staging required for all Fire Protection Work. Comply with Division 1 requirements.
 - 13. Provide Seismic Restraints for all Fire Protection Systems.
 - 14. Furnishing of Access Panels.
 - 15. Smoke and Firestopping Seals and sealing of all wall penetrations as detailed on the drawings. Refer to Section 07920 which defines the firestopping materials and methods.

1.03 RELATED WORK

- A. The following items of work related to the Fire Protection Work are

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included under other Sections of the Specifications:

1. Cutting & Patching beyond 1.02, B.11 above: DIVISION 01 – GENERAL REQUIREMENTS.
2. Installation of Access Panels: Respective finish section.
3. Excavation and Backfill: SECTION 02200 – EXCAVATION AND BACKFILL
4. Finish Painting: SECTION 09900: PAINTING
5. Wiring for Supervisory Switches, Electrical Alarm, and Flow Switches, and Power Wiring: SECTION 16000 - ELECTRICAL
6. Temporary Facilities: SECTION 01500 - TEMPORARY FACILITIES

1.04 CODES, ORDINANCES, AND PERMITS

- A. Perform all work in accordance with the following Codes:
 1. 780 CMR: The State Building Code.
 2. 527 CMR: The Fire Prevention Regulations.
 3. NFPA-13-2007, and Owner's insurance company requirements.
 4. All applicable Local, State, and Federal Codes, Statutes, or Regulations.
 5. City of Waltham Fire Department.
 6. City of Waltham Building Department.
- B. Obtain all permits, approvals, etc., from the governing authorities and pay all fees and include cost in the bid, including approvals for the cross connection control device. Provide the Owner with the cross connection permit for the device in the Owner's name.
- C. Refer to DIVISION 01 – GENERAL REQUIREMENTS for information regarding municipal permit and inspection fees.

1.05 RECORD DRAWINGS

- A. Maintain on the Site two (2) sets of the approved Working Drawings, black or blue line on white, bearing original signatures or approval stamps of the various authorities having jurisdiction. On one (1) of these sets, clearly and neatly indicate in colored pencil, the actual location of all piping, sprinklers, and other equipment as it is being installed. Mains, sub-mains, control valves, etc., shall be dimensioned. These Drawings shall be available to the Architect/Engineer's field representative at all times.

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- B. Upon completion of the work and prior to final payment, transfer the above information onto reproducible copies (mylars) of the plans of the system, showing sizing, arrangement, and locations of all heads, piping, fittings, drains, test connections, flushing connections, valves, and valve lists. Refer to 780 CMR 9.0 for additional requirements.

1.06 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- A. Provide operating instructions to the owner's designated representative with respect to operation functions and maintenance procedures for all equipment and systems installed. At the completion of the project, turn over to the Architect four (4) complete manuals in three-ring, loose-leaf binders, containing the following:
 - 1. Complete Shop Drawings of all equipment.
 - 2. Operation description of all systems.
 - 3. Names, addresses, and telephone numbers of all suppliers of the system.
 - 4. Preventive maintenance instructions for all systems.
 - 5. Spare parts list of all system components.

1.07 SHOP DRAWINGS AND MATERIAL SCHEDULES

- A. Refer to DIVISION 01 – GENERAL REQUIREMENTS for substitution of equipment and submittal of Shop Drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in or additional connections, piping, supports or construction, same shall be provided as the responsibility, and at the expense, of the Fire Protection Subcontractor.
- B. Fabrication of any material or performing of any work prior to the final approval of the Submittals will be entirely at the risk of the Subcontractor. The Subcontractor is responsible for furnishing and installing materials called for in the Contract Documents, even though these materials may have been omitted from approved Submittals.
- C. Submit Shop Drawings for the following materials and equipment.
 - 1. Coordinated Working Drawings and hydraulic calculations including size, type, length, temperature rating of sprinkler heads, piping and the like. Indicate flow test results, design criteria, hydraulic reference points, diffuser and light locations.
 - 2. Access Panels and Covers
 - 3. Sprinkler Heads
 - 4. Hangers and Seismic Restraints
 - 5. Pipe, Fittings, and Appurtenances

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6. Systems Identification
7. Valves
8. Fire Department Connection
9. Cross Connection Devices

1.08 COORDINATION DRAWINGS

- A. Before materials are purchased or Work is begun, prepare and submit to the Architect, Coordination Drawings showing the size and location of all equipment and piping lines relevant to the complete system. Ensure that these Drawings are compatible and correctly annotated and cross-referenced at their interfaces.
- B. Coordination Drawings are for the Contractor's and the Architect's use during Construction and shall not be construed as replacing any Shop or Record Drawings required elsewhere in these Contract Documents.
- C. Detailed procedures for Coordination Drawings are contained in DIVISION 01 of these Contract Documents.

1.09 GUARANTEE

- A. Guarantee all work under this Section free from defects in workmanship or materials for a period of one (1) year from the date of final acceptance of the building, as set forth in the Contract.
- B. Replace any such defective work developing during this period, unless such defects are clearly the result of bad usage of equipment by others. Where such defective work results in damage to work of other Sections of the Specifications, restore such work to its original condition by mechanics skilled in the affected trade.

1.10 DRAWINGS

- A. All work shown on the Drawings is intended to be approximately correct to scale but shall be taken in a sense as diagrammatic. Sizes of pipes and general method of running them are shown, but it is not intended to show every offset and fitting. To carry out the true intent and purpose of the plans, furnish all necessary parts to make a complete working system ready for use.
- B. The Drawings and Specifications are intended to supplement each other so that any details shown on the Drawings and not mentioned in the Specifications, or vice-versa, shall be executed the same as if mentioned in the Specifications and shown on the Drawings.
- C. Refer to the Architectural, Structural, and Other Mechanical and Electrical Drawings which indicate the construction in which this work shall be installed. Locations shown on the plans shall be checked against the

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general and detailed drawings of the construction proper. All measurements must be taken at the building.

1.11 SYSTEM DESCRIPTION

- A. The building is to be 100% sprinklered with an automatic wet sprinkler system. The system shall be designed in accordance with NFPA-13-2007.
- B. Building is to be 100% sprinklered. The Electric Rooms are constructed with 2 hour rated enclosures and conform to the exceptions provided in NFPA-13-2007, paragraph 8.15.10 and are not sprinklered, there shall be no storage allowed in this room. The elevator machine room and elevator shaft are not sprinklered.
- C. Refer to Fire Protection Criteria on the Drawings. Conform to the zoning shown on the plans.
- D. Locations of sprinkler heads are shown in some of the areas to be sprinklered only to establish the patterns and design intent. Major equipment and runs of piping may also be shown. Refer to reflected ceiling plan for location of all sprinkler heads. All sprinkler heads are to be installed dead center of tile.
- E. The documents require that the building be covered 100%. This includes all, combustible concealed spaces, and other areas as required under NFPA-13-2007. These areas are to be included in the Sub-contractor's bid whether or not the heads are shown on the sprinkler plans.

1.12 ALARM FACILITIES

- A. Furnish and install all Supervisory Switches, Flow Switches, Pressure Switches, and other Alarm Devices. Install all such devices on the piping and coordinate with the Electrical Subcontractor who shall wire all such devices to the Fire Alarm System. Every shutoff valve installed on this project shall have a supervisory trouble switch wired to the Fire Alarm Panel.

1.13 PIPE MARKER IDENTIFICATION SYSTEM

- A. Mark all fire mains installed under this Section with a marking system in basic colors conforming to those specified in A.S.A. A-13. Markings shall indicate pipe content and direction of flow. Apply markers every 20' on center on piping which is exposed in mechanical or storage areas and above suspended accessible ceilings. Also, apply at all access panels, valves, tee joints, alarms, and/or controls.
- B. Adhesive system may be used throughout except at the mechanical rooms in which case markings shall be painted on.

1.14 VALVE TAGS

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- A. All valves installed in the Fire Protection Contract shall be tagged. Tags shall be secured to valves with chain link and shall be marked with 3/4" high letters as to function. All valve tags shall indicate the Fire Zone.

1.15 IDENTIFICATION SIGNS

- A. All equipment and systems shall be identified with signs furnished and attached in accordance with NFPA 13.

1.16 BREAKDOWN

- A. Submit a breakdown of the contract price to aid the Architect in determining the value of the work installed as the job progresses.
- B. No requisition will be approved until the breakdown is delivered to the Architect.

1.17 VISIT TO SITE

- A. Prior to submitting a bid, visit the site of work and become familiar with existing conditions at the site of the work. Any assumptions made are at this Subcontractor's expense.

PART 2 - PRODUCTS

2.01 GENERAL

- A. All materials and equipment furnished under this Section shall be new, unused, first quality of a manufacturer of established reputation and shall be U.L./F.M. approved. Each valve, fitting, section of pipe, piece of equipment, etc., shall have cast or indelibly stamped thereon the manufacturer's name, pressure rating where applicable, type, etc. All threads for fire department connection shall conform to the standards of the Local Fire Department.

2.02 PIPE AND FITTINGS

- A. Pipe and fittings shall conform to the latest A.S.A., A.S.T.M., C.A., and F.S. Standards. All grooved products shall be of one manufacturer to conform to NFPA Standards.
- B. All piping installed under this Section shall be in accordance with the following:

<u>Service</u>	<u>Materials</u>
Trim piping around alarm valves, sprinkler piping 1-1/2" and smaller	ASTM A-53, Schedule 40 steel pipe, black for wet system, galvanized for dry
Sprinkler and standpipe piping 2" to 6"	Schedule 10, ASTM A-135 U.L./F.M. steel by Allied, or equal, black for wet system, galvanized for dry

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- C. Fittings on fire line piping, 2" and larger, shall be Victaulic Fire Lock Ductile Iron Fittings conforming to ASTM A-536 with integral grooved shoulder and back stop lugs and grooved ends for use with Style 009-EZ or Style 005 couplings.
- D. Fittings for standpipes and risers, 2-1/2" and larger, and where ever required to conform to Seismic Requirements shall be Victaulic Vic-Flex Style 75 or 77 with Fire Lock Gasket.
- E. Branch line fittings shall be welded or shall be Victaulic 920/920N Mechanical Tees.
- F. Schedule 10 pipe shall be roll grooved. Schedule 40 pipe where used with mechanical couplings shall be rolled groove and shall be threaded where used with screwed fittings.
- G. Fittings for threaded piping shall be malleable iron screwed sprinkler fittings.
- H. All pipe and fittings shall be U.L./F.M. approved for sprinkler and standpipe service. All pipe and fittings shall be galvanized for dry system and black for wet system.

2.03 JOINTS

- A. Threaded pipe joints shall have an approved thread compound applied on male threads only. Teflon tape shall be used for threads on sprinkler heads.
- B. Joints on piping, 2" and larger, shall be made up with Victaulic, or equal, Fire Lock Style 005, rigid coupling of ductile iron and pressure responsive gasket system for wet or dry sprinkler system as recommended by manufacturer. Cutting, roll grooving, lubrication, and assembly of all joints shall be made strictly in accordance with manufacturer's recommendations. Exercise particular caution in the use of lubricant to avoid "squeeze out" of lubricant when system is in service.

2.04 VALVES

- A. All shutoff and control valves shall be U.L./F.M. approved, indicating type valves equipped with a supervised trouble switch wired to the fire alarm system. Shutoffs and zone valves may be either OS&Y indicating gates or butterfly valves.
- B. Gate valves shall be outside screw and yoke indicating type, 175 psi W.P. and U.L./F.M. listed, Jenkins or equal. All such valves shall have supervised trouble switch.

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- C. Butterfly valves shall be Victaulic Series 705-W for 2-1/2" and larger, and Milwaukee indicating type U.L./F.M. butterfly for threaded service. Coordinate with Electrical Sub-contractor to have factory installed monitor switches compatible with the remainder of the Fire Alarm System.
- D. Check valves shall be iron body bronze mounted U.L./F.M., 175# W.P. or U.L./F.M. wafer checks. Grooved end valves shall be Victaulic Style 717 Fire Lock Check Valve.
- E. Ball drips shall be Potter Roemer #5682, 3/4" straight design ball drip valve.
- F. Drains shall be provided in the systems as may be required by field conditions. Provide drains at all low points and wherever necessary to insure that all portions of the sprinkler piping may be completely drained. Test connections shall be provided as required to test all portions of the system. Pipe low point drains and test connections to suitable receptor as determined in field or shown on Drawings.
- G. Install an inspector's test connection at the furthest point of each sprinkler zone. Run discharge back to a suitable receptor. Exterior wall penetration is permitted with test drain but only as approved by the Architect.

2.05 SPRINKLERS

- A. All sprinklers to be used on this project shall be Quick Response type and shall be stamped with date of manufacture and temperature rating. Temperature ratings shall be determined by the location of the heads and shall be 155 degrees F. throughout except in special areas around heat producing equipment in which case use temperature rating to conform with hazard as specified in NFPA 13-2007. Orifice diameter and K factor shall be appropriate to meet the hydraulic design criteria, the available water supply, and NFPA Standards.
- B. Furnish spare heads of each type installed located in a cabinet along with special sprinkler wrenches. The number of spares, location of cabinet, etc., shall be in complete accord with NFPA 13-2007.
- C. Upright sprinkler heads in areas with no ceilings shall be Tyco Model "TY-FRB" Quick Response, white polyester. Include heavy duty sprinkler guards in all mechanical and storage rooms.
- D. Sidewall heads shall be Tyco Model "TY-FRB" Quick Response with white polyester head and escutcheon.
- E. Pendent wet sprinkler heads shall be Tyco Model "TY-FRB" Quick Response recessed adjustable escutcheon, white polyester finish.
- F. Pendent dry sprinkler heads shall be Tyco Model "DS-1" Quick Response dry type, white polyester adjustable escutcheon.

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- G. Dry sidewall heads shall be Tyco Model "DS-1" dry horizontal sidewall heads, white polyester.
 - H. Sprinkler heads located in concealed combustible spaces shall be Tyco Model "CC2" upright sprinkler head, natural brass finish.
 - I. Residential pendent sprinkler heads shall be Tyco Model "LFII" Rapid Response with white polyester coated head and escutcheon.
 - J. Residential horizontal sidewall heads shall be Tyco Model "LFII" Rapid Response with white polyester coated head and escutcheon.
- 2.06 FIRE DEPARTMENT CONNECTION
- A. Fire Department Inlet Connection shall be Croker 4" storz connection, brass plate, and stamped "Sprinkler". Install 1/2" ball drip valve and chrome plated trim wall fitting on bottom of inlet fitting body. Provide
- 2.07 FIRE STANDPIPE EQUIPMENT
- A. Fire Department Valves shall be Croker Series 5015 Fire Department Valves fitted with 2-1/2" x 1-1/2" iron pipe reducer, caps and chains all conforming to Local Fire Department thread standard. Valves shall be polished chrome plated and shall be mounted in a surfaced mounted cabinet as indicated on Drawings.
 - B. Cabinets for the Fire Department Valves shall be Croker #2700 - Modified 18" x 18" x modified 10" deep cabinet, surface mounted, solid door, prime painted steel. Include graphic and door catch.
- 2.08 SUPPLEMENTARY STEEL, CHANNEL, AND SUPPORTS
- A. Furnish and install All Supplementary Steel, Channels, and Supports required for the proper installation, mounting, and support of all equipment.
 - B. Supplementary Steel and Channels shall be firmly connected to building construction in a manner approved by the Architect.
 - C. The type and size of the Supporting Channels and Supplementary Steel shall be determined by the Fire Protection Subcontractor and shall be sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.
 - D. All Supplementary Steel and Channel shall be installed in a neat and workmanlike manner parallel to the walls, floor, and ceiling construction. All turns shall be made with 90 degree fittings, as required to suit the construction and installation conditions.
- 2.09 HANGERS AND SEISMIC RESTRAINTS
- A. Hangers shall be furnished, installed, and supported from the building structure in accordance with NFPA - 13, Section 15100 and Drawing VS-1 and VS-2.

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- B. All piping shall be seismic restrained.

2.10 ALARM DEVICES

- A. Flow switches shall be vane type water flow detectors with O-70 Sec. Adjustable non-accumulative retard device and (2) single pole double throw contacts, Notifier Series WFD Potter, VSR.F or equal.
- B. Pressure switches shall be adjustable Potter Model PS10A or equal.
- C. High/Low pressure switches shall be adjustable Potter Model PS40A or equal.
- D. Supervisory switches on all O.S. & Y. gate valves shall be Notifier NGV complete with mounting bracket.
- E. The wet system alarm device shall be Reliable or equal Model 'E' alarm valve with "E1" trimmings package to include Model 'C' water motor alarm and electric sprinkler alarm switch.
- F. Refer to Drawings for additional devices. Co-ordinate, prior to ordering devices, with the Electrical Sub-Contractor to assure device compatibility with the Fire Alarm System.

2.11 DOUBLE CHECK VALVE ASSEMBLY

- A. Double check valve assembly shall be State approved, U.L./F.M. approved, with iron body bronze mounted construction complete with supervised OS & Y gate valves and test cocks. Furnish two (2) spare sets of gaskets and repair kits.
- B. Double check valve assembly shall be of one of the following:
 - 1. Watts Series 757-OSY
 - 2. Wilkins 350A-OSY
 - 3. Conbraco Series 4S-100
- C. In the name of the owner pay for, file for, and obtain required permits from D.E.P. and/or local authority whichever has jurisdiction prior to installation.

2.12 ACCESS DOORS

- A. Furnish Access Doors for access to all concealed control valves, drains, inspector's tests, supervisory devices, and to all other concealed parts of the system that require accessibility for the proper operation and maintenance of the system. These doors shall be installed under the appropriate Section of the Specifications for the surface upon which the panels are mounted.
- B. All Access Doors shall be located in a workmanlike manner in closets, storage rooms, and/or non-public areas, positioned so that the valve or part can be easily reached, and the size shall be sufficient for this purpose

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(minimum size 12" x 16"). When access doors are required in corridors, lobbies, or other habitable areas, they shall be located as directed by the Architect.

- C. Access Doors shall be prime painted and be complete with cylinder lock and two (2) keys as manufactured by Acudor, Inland Steel Products Company "Milcor", or Walsh-Hannon-Gladwin, Inc., "Way Lector". Type shall be as follows:

Acoustical Tile Ceiling	Acudor AT-5020
G.W.B. Surfaces	Acudor DW-5040
Masonry Construction	Acudor UF-5000
Fire Rated Construction	Acudor FB-5060

- D. Access Doors Shop Drawings shall be submitted to the Architect for approval.

2.13 TEST HEADER

- A. Furnish and install a Croker model 6817-PC test header where indicated on the drawings.

PART 3 - EXECUTION

3.01 WORKMANSHIP AND INSTALLATION METHODS

- A. All work shall be installed in a first-class manner consistent with the best current trade practices. All materials shall be securely installed plumb and/or level, and all flush mounted equipment shall have front edge flush with finished wall surface.
- B. Protect all concealed heads. Coordinate and advise finishing trades so as to prevent painting of sprinkler heads or inadvertent filling with paint or jointing compound of required air spaces in the case of the concealed type sprinkler heads.

3.02 WORK COORDINATION AND JOB OPERATIONS

- A. The equipment shall not be installed in congested and possible problem areas without first coordinating the installation of same.
- B. Before materials are purchased or work is begun, prepare and submit to the Architect, Coordination Drawings showing the size and location of all equipment and piping lines relevant to the complete system. Ensure that these Drawings are compatible and correctly annotated and cross-referenced at their interfaces.
- C. Coordination Drawings are for the Contractor's and the Architect's use during construction and shall not be construed as replacing any Shop or Record Drawings required elsewhere in these Contract Documents.
- D. Detailed procedures for coordination Drawings are contained in

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DIVISION 01 of these Contract Documents.

- E. Particular attention shall be directed to the coordination of piping and other equipment installed in the ceiling areas. Coordinate the elevations of all piping in hung ceiling areas to insure adequate space for the installation of recessed lighting fixtures before other mechanical equipment is installed.
- F. Furnish to the General Contractor, and all other Subcontractors, all information relative to the portion of the Fire Protection installation that will affect them, sufficiently in advance so that they may plan their work and installation accordingly.
- G. In case of failure to give proper information as indicated above, sufficiently in advance, pay for all back-charges for the modification, renovation, and relocation of any portion of the work already performed.
- H. Obtain from the other trades, all information relative to the Fire Protection Work to be executed in conjunction with the installation of their respective equipment.

3.03 CUTTING AND CORE DRILLING

- A. Perform all cutting and core drilling operations that are outlined in Part 1 of this SECTION. Throughout the performance of the cutting and coring work, ensure that the structural integrity of the walls, floors, overhead structure, and other structural components is maintained until permanent work is installed. Prior to any coring or cutting, verify all locations of same with the General Contractor. All cutting and coring is to be performed in accordance with approved Coordination Drawings.
- B. Cut all masonry and concrete with an approved diamond blade concrete saw in a neat straight direction, perpendicular to the plane of the wall or floor.
- C. Use a core drilling process which produces clean, sharp edges and the minimum hole size which will accommodate the size of pipe sleeve specified.
- D. Patch all holes up to the sizes indicated in Section with material and methods as are specified in the Section of the Specifications for the finish trade involved. Holes which are improperly done due to poor materials or method, shall be patched to the satisfaction of the Architect by the finish trade and back-charged to this Subcontractor.

3.04 CLEANING AND PROTECTION

- A. Protect all materials and equipment during shipment and installation and properly handle and store at the job site so as to prevent damage. Assume full responsibility for protection of work until its completion and final acceptance.

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- B. Keep the premises reasonable clean at all times and remove rubbish caused by the Fire Protection work as directed by the Architect.
- C. Upon completion of this work, clean all sprinklers, and equipment and replace damaged parts. Failure to fulfill this obligation will result in back-charges for correction of the defective work by others.

3.05 SLEEVES, INSERTS, AND ESCUTCHEONS

- A. All piping passing through slabs, floors, walls, and partitions shall be sleeved and all such sleeves shall be furnished and installed by the Fire Protection Subcontractor as detailed on the Drawings and herein specified. Fire Protection Contractor, shall do his core drilling as approved by the Architect and the cored opening shall have a sleeve caulked and leaded in place. Set sleeves in concrete floors and walls as soon as forms set and before concrete is poured.
- B. All pipes passing through floor, whether slab-on grade or above grade levels shall be sleeved with sleeve extending 1" above floor. This includes all piping in toilet room pipe space, stairwells, closets, partitions, etc. In mechanical penthouses, pipe sleeves shall extend 4" above floor.
- C. All sleeves shall be Schedule 40 galvanized steel pipe and shall be reamed. There shall be 1/2" annular space between the sleeve and pipe. Sleeves on drywall, masonry, or concrete walls and partitions shall be flush with wall
- D. The space between sleeve and pipe, in all cases, shall be filled with U.L./F.M. approved caulking compound. This includes pipes concealed in chases and/or partitions.
- E. Inserts, where required, shall be furnished and set by the Fire Protection Subcontractor and, where necessary, may be drilled or power driven and shall be sized such that the insert will not exceed a depth of penetration of 1" into concrete.
- F. Escutcheons: All exposed pipe, uncovered, passing through walls, or floors, or ceilings, shall be fitted with C.P. brass spun or split type escutcheons with approved clamping device for holding in position. Floor escutcheons shall be deep enough to fit over sleeves, fastened to pipe, and extend down to floor.

3.06 TESTING

- A. Flush the system and test all work in the presence of the Architect and/or Engineer and as required by NFPA and the Insurance Company. The flushing and testing procedures to be followed are specified herein. At the completion of the testing, submit fully executed copies of Contractor's Material and Test Certificate for both above ground and underground piping as contained in NFPA-13.

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1. Water Supply:
 - a. Flushing: Underground/exterior service entrance shall be flushed at a minimum velocity of 10 fps in accordance with NFPA Standards 13, 14, and 24. The Fire Protection sub-contractor shall coordinate with Division 2 and shall notify the Water and Fire Departments prior to testing of the entire exterior system.
2. Sprinkler System:
 - a. Hydrostatic Testing: The interior system shall be hydrostatically tested at 200 psi for 2 hours in accordance with NFPA 13 paragraph 24.2.1.
 - b. Operational Testing: Water flow switches and associated alarm systems shall be tested by water flow through the inspectors test assemblies in accordance with NFPA 13, 24.2.3.
 - c. Main Drain Test: A flow test shall be performed on the main drain valve and recorded on the Contractor's test certificate in conformance with NFPA 13, 24.2.3.4.
 - d. Backflow Preventor Flow Test: The double check valve assembly shall be flow tested in conformance with NFPA 13, 24.2.5.
3. Standpipe or Bulk Fire Main:
 - a. Flushing: The fire department connection piping shall be flushed at a minimum velocity of 10 fps in conformance with NFPA 13, and NFPA 14.
 - b. Hydrostatic Testing: All piping shall be pressure tested at 200 psi for 2 hours in conformance with NFPA 14.
 - c. Flow Tests: The system shall be flow tested at the hydraulically most remote hose connection in conformance with NFPA 14.
 - d. Valve and Supervisory Switch Test: All valves and tamper switches will be tested by opening and closing valves in conformance with NFPA 14.

END OF SECTION

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DIVISION 15

MECHANICAL

SECTION 15400

PLUMBING

File Sub-Bid Required
Fire Protection

PART 1 – GENERAL

Combined with Sections 15100, 15400

1.00 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **Plumbing** is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid and is combined with sections 15100 and 15400.
- 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 15400 Plumbing is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.
- F. The Filed Sub-Bidder for the work of this SECTION 15400 shall list, in Paragraph E, of the FORM FOR SUB-BID, the name of each person, firm, or corporation, whom he proposes to use to perform the following classes of work or part thereof, at the bid price therefore:

CLASS OF WORK	SECTION NUMBERS
INSULATION	2.05

1.01 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.
- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.

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- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 DESCRIPTION OF WORK

- A. Provide all labor, materials, equipment, services and accessories necessary to furnish and install the work of this Section, complete and functional, as indicated in the Contract Documents and as specified herein.
- B. The work covered by this Section of the Specifications includes the furnishing of all labor and materials and in performing all operations in connection with the installation of the Plumbing Work.
- C. Without limiting the generality thereof, the work to be performed under this Section includes:
1. Domestic water service to 10' outside building and/or as shown on the Drawings.
 2. Complete Sanitary, Waste & Vent System to 10 ft. outside building and/or as shown on the drawings.
 3. Potable Cold and Hot Water System.
 4. Natural Gas System.
 5. Furnish and install boiler breeching.
 6. Insulation.
 7. Potable Water Heating Equipment.
 8. Fixtures and Equipment
 9. Connection to Equipment Furnished by Others
 10. Flushing, Sterilization, and Tests
 11. Furnishing of Access Panels
 12. Drilling, Coring and Cutting & Patching of holes and openings where the largest dimension thereof does not exceed 12 inches for Plumbing Piping and Equipment.
 13. Demolition.
 14. Provide and maintain temporary water service as directed by General Contractor. General Contractor to pay for all water use.
 15. Scaffolding, Rigging, and Staging required for all Plumbing Work. Comply with Division 1 requirements.

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16. Provide Seismic Restraints for all Plumbing Systems conforming to the requirements of Section 15100 which Section is herein incorporated by reference. Seismic restraints are required on all new systems whether in new or existing building.
17. Preparation of Co-ordination Drawings.
18. At Project close out the Plumbing Sub-Contractor shall provide the services of an outside firm who shall run an underground video camera, locating all drainage system lines including depth, preparing a video and identifying & correcting any problem areas. The Plumbing Sub-Contractor shall rod-out and power wash all underground drainage systems. Turn over 4 copies of the video and written report to the owner.

1.03 RELATED WORK

- A. The following Related Work will be performed under the designated Sections:
 1. Domestic Water Service to 10' outside – SECTION 02670 – WATER PIPE AND HYDRANT INSULATION.
 2. Cutting and Patching beyond 1.02, C.12 above: DIVISION 01 – GENERAL REQUIREMENTS
 3. Installation Of Roof Drains, Flashing for vents through roof: SECTION 07620 - SHEET METAL FLASHING AND TRIM
 4. Electric Power Wiring: SECTION 16000 - ELECTRICAL
 5. HVAC Equipment: SECTION 15600 - HVAC
 6. Excavation and Backfill: SECTION 02200 – EXCAVATION AND BACKFILL
 7. Finish Painting: SECTION 09900 - PAINTING
 8. Installation of Access Panels: SECTION describing material in which panel is installed.
 9. Toilet Room Accessories: SECTION 10810 - TOILET ACCESSORIES
 10. Temporary Facilities: SECTION 01500 - TEMPORARY FACILITIES

1.04 CODES, ORDINANCES, AND PERMITS

- A. Perform all work in accordance with the requirements of the City of Waltham Building Department, Massachusetts State Plumbing and Fuel Gas Codes, D.E.P., A.D.A., NFPA, The Architectural Barrier Code, and applicable State and Federal Laws. Give all requisite notices, file all requisite plans, and obtain all permits required to perform all Plumbing

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Work. Where the Contract Documents indicate more stringent requirements than the above Codes and Ordinances, the Contract Documents shall take precedence.

- B. Refer to DIVISION 1 – GENERAL REQUIREMENTS for information regarding local municipal permit and inspection fees and utility company back charges.

1.05 SHOP DRAWING AND MATERIAL SCHEDULES

- A. Refer to SECTION 01300 - SUBMITTALS for submittal of Shop Drawings. If apparatus or materials are substituted for those specified, and such substitution necessitates changes in or additional connections, piping, supports or construction, same shall be provided as the responsibility, and at the expense, of the Plumbing Subcontractor.
- B. Fabrication of any material or performing of any work prior to the final approval of the Submittals will be entirely at the risk of the Subcontractor. The Subcontractor is responsible for furnishing and installing materials called for in the Contract Documents, even though these materials may have been omitted from approved Submittals.
- C. Submit Shop Drawings for the following materials and equipment.
 - 1. Valves, Piping, couplings and Fittings
 - 2. Fixtures, Drains and Equipment including Supports
 - 3. Backflow Preventers
 - 4. Access Panels and Covers
 - 5. Insulation
 - 6. Drains, and Hydro Mechanical Specialties
 - 7. Hose Bibs, Wall Hydrants
 - 8. Hangers, Anchors, Guides, and Supports including Seismic Restraints
 - 9. Cleanouts
 - 10. Piping Identification System
 - 11. Water Heating Equipment
 - 12. Gas fire furnace and water heater breeching including coordinated working drawings of installation.

1.06 COORDINATION DRAWINGS

- A. Before materials are purchased or Work is begun, prepare and submit to the Architect, Coordination Drawings showing the size and location of all equipment and piping lines relevant to the complete system. Ensure that

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these Drawings are compatible and correctly annotated and cross-referenced at their interfaces (match lines).

- B. Coordination Drawings are for the Contractor's and the Architect's use during Construction and shall not be construed as replacing any Shop or Record Drawings required elsewhere in these Contract Documents.
- C. Detailed procedures for Coordination Drawings are contained in DIVISION 01 of these Contract Documents.

1.07 RECORD DRAWINGS

- A. Refer to Section 01700, the general conditions, and the supplementary conditions for requirements for record documents. The following paragraphs supplement the above.
- B. Provide electronic AutoCad drawings to indicate revisions to piping which shall be accurate, clear, and complete, showing the actual locations of all equipment and piping as it is being installed. The Record Drawings shall be available to the Architect/Engineer's field representative at all times.
- C. The Drawings and the original Contract Documents shall be used to make the final inspection of the work completed under the Contract.
- D. Non-availability of Record Drawings or inaccuracies therein will postpone the final inspection until they are available.
- E. All valves shown on these Drawings shall be numbered with numbers corresponding to those on the valve charts.
- F. All costs related to the foregoing requirements shall be paid by the Plumbing Subcontractor.

1.08 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- A. Provide operating instructions to the Owner's designated representative with respect to operation functions and maintenance procedures for all equipment and systems installed. At the completion of the project, turn over to the Architect four (4) complete manuals, in three-ring, loose-leaf binders, containing the following:
 - 1. Complete Shop Drawings of all equipment.
 - 2. Operation description for all systems.
 - 3. Names, addresses, and telephone numbers of all suppliers of the system.
 - 4. Preventative maintenance instructions for all systems.
 - 5. Spare parts lists of all system components.
 - 6. Two (2) copies of video of new piping.

1.09 GUARANTEE

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- A. Refer to Division 1 of the Contract. Guarantee all work under this Section free from defects in workmanship and materials for a period of one (1) year from the date of final acceptance of the building, as set forth in the Contract. Replace any such defective work developing during this period, unless such defects are clearly the result of bad usage of equipment by others. Where such defective work results in damage to work of other Sections of the Specifications, restore such work to its original condition by mechanics skilled in the affected trade.

1.10 DRAWINGS

- A. All work shown on the Drawings is intended to be approximately correct to scale, but shall be taken in a sense as diagrammatic. Sizes of pipes and general method of running them are shown, but it is not intended to show every offset and fitting. To carry out the true intent and purpose of the plans, furnish all necessary parts to make complete working systems ready for use. The Plumbing Drawings are intended to show the main stacks and risers and may or may not necessarily show all runout piping particularly in lavatories and gang toilet areas. Contractor shall include all runout piping to all referenced and schedule fixtures, drains downspouts, etc. appearing on the Plumbing Drawings.
- B. All floor drains installed on this project, including all kitchen floor drains and trough drains, shall be equipped with trap primers. The trap primer and piping is not shown on the drawings and shall be located in the field by the Contractor as dictated by field piping conditions.
- C. The Plumbing Drawings and Specifications are intended to supplement each other so that any details shown on the Drawings and not mentioned in the Specifications, or vice-versa, shall be executed the same as if mentioned in the Specifications and shown on the Drawings.
- D. Refer to the Architectural, Structural, and other Mechanical and Electrical Drawings, which indicate the construction in which this Work shall be installed. Locations shown on the plans shall be checked against the general and detailed Drawings of the construction proper. All measurements shall be taken at the Building.

1.11 VALVE TAGS, NAMEPLATES, AND CHARTS

- A. All valves on pipes of every description shall have neat circular brass valve tags at least 1-1/2" in diameter attached with brass hook to each valve stem. Stamp on these valve tags, in letters as large as practical, the number of the valve and the service, such as "H.W., C.W., GAS" for hot water, cold water and gas respectively. The numbers for each service shall be consecutive.
- B. All valves on tanks and pumps shall be numbered by 3" red metal discs with white numbers 2" high, secured to stem of valves by means of small solid link brass chain, to correspond to numbers indicated for valves on

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the Record Drawings and on two (2) printed detailed lists. These printed lists shall state the numbers and locations of each valve and the fixture or group of fixtures which it controls, and other necessary information such as requiring the opening or closing of another valve or valves when any one valve is to be opened and closed, and shall be prepared in form to meet approval of the Architect, and shall be framed under glass.

- C. Nameplates, catalog numbers, and rating identifications shall be securely attached to Electrical and Mechanical equipment with screws or rivets. Adhesives or cements will not be permitted.

1.12 PIPE MARKER IDENTIFICATION SYSTEM

- A. Mark all piping installed under this Section and located in mechanical spaces, storage rooms, above suspended ceilings, and at all Access Panels with a marking system in basic colors conforming to those specified in A.S.A. #A-13. Markings shall indicate pipe content and direction of flow. Markers shall be applied at all valves and tee joints, and on straight runs of pipe at every 20'-0" o.c. Adhesive markings are not acceptable. Markers shall be painted on under the scope of this Section or may be snap-on system.
- B. Clearly mark potable and non-potable water system with 3" wide colored bands every twenty-five (25) feet on center on all piping installed whether it is concealed or exposed and also on both sides of floor and/or wall penetrations. Mark potable water green and non-potable yellow. Within 6" of each band identify with letter "Potable C.W.", Non-Potable H.W.", etc. Color of letter shall match banding. Snap-on are not to be used

1.13 SANITARY, WASTE AND VENT

- A. Furnish and install complete Sanitary, Waste, and Vent Systems (all hereinafter called Drainage Systems) to convey wastes from all Soil and Waste Stacks, Fixtures, and Equipment as indicated and/or described in these Plans and Specifications. Urinal waste shall be 2" cast iron or sizes indicated on the drawings. Waste piping smaller than 3" shall not be used underground. The use of double "Y's" in the horizontal shall not be permitted. All piping shall be installed straight and true and located concealed within building construction.
- B. All horizontal Drainage Systems Piping within the building, 3" and smaller, shall be pitched at least 1/4" per ft. in the direction of flow. Drainage Piping 4" and larger shall be pitched at least 1/8" per ft. Make changes in direction of drainage lines with 45 wyes, long turn wyes, or sweep bends.
- C. Furnish and install all cleanouts indicated on the Drawings and/or where required in Drainage Pipes regardless of size so that the distance between cleanouts does not exceed 45' o.c. Cleanouts shall be installed at the base of all risers and at each change of direction.

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- D. Refer to drawings for termination points, which generally are connection to existing piping or to 10 feet outside the building.

1.14 DOMESTIC WATER SYSTEMS

- A. Furnish, install, sterilize, and test in accordance with the documents and the Plumbing Code, complete potable and non-potable Domestic Cold, Hot, and Hot Water Recirculating Systems including all piping, valves, low point drains, air chambers, hangers, insulation, backflow preventers and water heating equipment. Clearly mark the systems as provided above. This work shall start as indicated on the Drawings.
- B. In general, piping shall pitch upward in the direction of flow with each branch and riser separately valved and with 1/2" hose end drain on the outlet side of the valve and at all low points in the system. Install shutoff valves for each battery of fixtures and other valves as necessary to isolate any part of each system.
- C. Install pipe air chambers on hot and cold water piping to each fixture. Air chambers shall be same size as piping to fixtures by 24" high. This is in addition to all shock absorbers shown on the Drawings and/or specified.

1.15 FUEL GAS SYSTEM

- A. Furnish and install a complete Natural Gas Supply System including pipe, fittings, valves, connections to all gas fired equipment requiring gas, and all accessories and incidentals as indicated or specified. Installation shall be made in accordance with the State Gas Code requirements. Piping shall be installed with an 8" long sediment leg at the base of all risers. All changes in direction shall be made with plugged tees for cleaning piping out.
- B. All horizontal Gas Piping shall be pitched not less than 1/4" in 15' to prevent traps. Pitch piping to risers. Install an 8" long sediment leg at the base of all risers. All changes in direction shall be made with plugged tees for cleaning piping out. All horizontal branch outlet pipes shall be taken from the top or side of horizontal mains and not from the bottom.
- C. Arrange with the Local Gas Company for the installation of the gas meters, services, and gas pressure regulators. Refer to section DIVISION 01 GENERAL REQUIREMENTS for information regarding Utility Company Charges.
- D. Provide seismic restraints for all gas piping per requirements of 1612.7.4 of the Mass. Building Code. Refer also to Section 15100.

1.16 EQUIPMENT FURNISHED BY OTHERS

- A. Miscellaneous items, including but not necessarily limited to the following, shall be furnished and set by others as specified in other SECTIONS of the Documents.

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Dishwashers

Kitchen Equipment

Miscellaneous Sinks

- B. Verify the extent of the connection requirements from the General and Mechanical Plans and Specifications and be responsible for: Setting in place, all such sinks and furnishing and installing trim and roughing including, but not limited to, drains, vent, water, gas, air or other plumbing piping, traps, tailpiece, nipples, escutcheons, faucets, stop valves, etc., for all items which above are not so supplied. The equipment sections specify sinks including faucets and tailpieces as well as countertop turrets for gas. Include for all sinks which are installed in cabinet work a pair of 1/2" ball valve stops (same as specified under 2.04) and a rough bronze p-trap, special waste trap, or sediment trap as required.
- C. The Plumbing Subcontractor shall be responsible in making final connections to all equipment furnished by others to ascertain complete cross-connection prevention compliance and to furnish and install vacuum breaker and backflow preventers which may be required to be Code compliant and are not so furnished with the equipment.

1.17 DEMOLITION

- A. When and as directed by the General Contractor perform all demolition work.
- B. All hangers, valves, piping, pumps, fixtures, controllers, and other miscellaneous equipment and materials in the existing building not specifically designated for reuse in the documents shall remain the property of the Owner.
- C. Remove as indicated existing Plumbing piping, fixtures, and equipment including all hangers and supports and disconnect all Plumbing connections to equipment to be removed under other Sections of the Specifications. Clean, recondition, and relocate where indicated all items to be reused.
 - 1. Carefully remove shower and toilet room fixtures and trim and deliver in good condition to an on-site location designated by the Architect. The Owner will review all the fixtures and trim and select the items to be kept and the items to be disposed. The disposal of all items not wanted by Owner is specified by the Demolition Section.
 - 2. In cases where main piping is to remain, remove all existing piping to fixtures being removed and cap said piping back to riser or main. All caps or plugs to be installed shall be of like material as pipe being capped or plugged.
 - 3. All piping, valves, hangers, and fittings shall be removed from

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ceiling and walls as indicated and placed on the floor by this Section. The General Contractor shall remove from the floor and dispose.

4. Any disputes between this Subcontractor and other Contractors or Subcontractors relative to the responsibility for removal of equipment shall be referred to the Architect for decision. The Architect's decision shall be firm and binding and to whomever he designates responsibility for removal of equipment shall do so without any additional cost to the Owner.

1.18 PAINTING

- A. All exposed piping is to be painted and all painting, except as noted, will be done by the Painting Subcontractor. All uncovered piping and hangers shall be thoroughly cleaned of rust, oil, etc., by the Plumbing Subcontractor and left ready to receive primer coat. Painting for pipe markings shall be done under this Section.

1.19 BREAKDOWN

- A. Submit a breakdown of the contract price to aid the Architect in determining the value of the work installed as the job progresses.
- B. No requisition will be approved until the breakdown is delivered to the Architect.

1.20 VISIT TO SITE

- A. Prior to submitting a Bid, visit the site of work and become familiar with existing conditions. Any assumptions made are at this Subcontractor's expense.

PART 2 – PRODUCTS

2.01 GENERAL

- A. All materials and equipment furnished under this SECTION shall be new, unused, first quality of a manufacturer of established reputation. Each valve, fitting, section of pipe, piece of equipment, etc., shall have cast or indelibly stamped thereon the manufacturer's name, pressure rating where applicable, type, etc. Materials shall conform to Massachusetts Code as a minimum requirement.

2.02 PIPE AND FITTINGS

- A. Pipe and fittings shall conform to the latest A.S.A., A.S.T.M., C.A., and F.S. standards.
- B. All piping installed under this SECTION shall be in accordance with the following:

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<u>Service</u>	<u>Material</u>
Underground Domestic Water Service	Class 52 cement lined ductile iron pipe
Underground Drainage and Vent piping	Service weight cast iron soil pipe-coated
Above ground Drainage and Vent, piping 2" and larger	No Hub cast iron soil pipe and fittings (C.I.S.P.I. 301-75)
Above ground drainage, and Vent piping 2" and smaller	Type 'L' hard tempered copper tubing
Trap primer piping from Primer to floor drain	Type 'K' soft rolled copper tubing with Swaged ends
Domestic water piping above ground	Type 'L' hard tempered copper tubing
Gas piping above ground	ASTM A-53 Schedule 40 black steel pipe
C.	Fittings for underground Drainage Piping shall be service weight bell and spigot pattern C.I. soil pipe fittings. Above ground shall be no hub C.I. soil pipe fittings, Massachusetts Standard.
D.	Fittings for sweat drainage piping shall be cast bronze or wrought copper of recessed drainage pattern.
E.	Fittings for Type 'L' hard tempered copper tubing for laboratory vacuum and for potable and non-potable water piping shall be cast bronze or wrought copper sweat type, water pattern fittings.
F.	Fittings for gas piping 2" in size and smaller shall be threaded malleable iron gas pattern fittings for screwed pipe. All gas piping 2 1/2" in size and larger shall be welded and shall utilize butt welded steel pipe fittings.
G.	Fittings for underground domestic water service shall be 250 psi gray iron cement lined fittings with mechanical joint ends.

2.03 JOINTS

- A. Joints for underground cast iron bell and spigot soil pipe shall be made up with jute or oakum packing, caulked with 16 oz. of molten virgin pig lead per nominal inch diameter of pipe or with resilient gaskets. Above ground shall be made up of heavy duty – 4 band stainless steel clamps, and gaskets conforming to Massachusetts Code. Husky "SD 4000", Clamp - All HI-TORQ 125, or Mission "HW".

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- B. Copper tubing and sweat fittings shall be assembled with lead free solder, Silverbrite, or equal, and a non-corrosive flux recommended by the manufacturer (includes waste piping and water piping).
- C. Joints between copper waste/vent tubing and cast iron shall be made with cast iron threaded fittings and copper thread by sweat fittings.
- D. Joints between copper tubing and ductile iron water pipe or at flanged joints to tanks shall be made with a combination iron and brass flange with composition gasket and iron bolts.
- E. Joints at water heaters or other tanks having threaded connections shall be made up with dielectric unions.
- F. Joints between floor or wall flanges and fixtures shall be made with one-piece special molded neoprene gaskets which shall be furnished by the fixture manufacturer.
- G. Threaded pipe joints including plastics shall be made up with teflon tape.
- H. Joints on screwed gas piping shall be made up with thread compound on male threads only. Welded joints shall be made up by certified welders. All joints on piping 2-1/2" and larger, shall be welded.

2.04 VALVES

- A. Furnish and install valves where indicated on the Drawings or where specified and located so that they may be operated, repaired, or replaced with a minimum effort and repacked under pressure.
- B. The following list of valves is intended only as a guide for type and quality. Valves shall be as manufactured by Walworth, Apollo, Jenkins, or Watts.

Shutoff valves 2" and smaller	Apollo #70-202 through #70-208 solder end ball valves
Shutoff valves, 2-1/2" and 3"	Apollo #70-109 and #70-100
Balancing valves	Apollo# 70-222 through #70-228 with memory stop
Gate valves 4" and larger	Jenkins 651-A
Stop and waste valves 1" and smaller	Apollo #95-203 through #95-205
Check valves	Walworth #406 SJ

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Gas service stops, 2" and smaller	Apollo #70-102-07 through #70-108-07 with tee handle
Gas service stops, 2-1/2" and larger	Rockwell #143 lubricated plug valve
Drain valves	Apollo #78-103-01 or #78-203-01 ball valve with cap and chain 1/2" x 3/4" hose end

2.05 INSULATION

- A. Insulation for all water piping and all horizontal roof leaders whether concealed or exposed shall be 1" thick, heavy density, preformed snap-on insulation equal to Johns Manville Micro-Lok HP, 850 degrees snap-on system. Insulation for cold water piping shall have a factory applied vapor barrier with ends and butts sealed with overlapping 4" sealing strips.
- B. Valves, fittings, and the underside of roof drain bodies shall be insulated with pre-formed fiberglass fitting insulation cut from dense fiberglass blanket and covered with pre-molded P.V.C. fitting covers. P.V.C. covers shall overlap the adjoining insulation and shall be secured with pressure sensitive vinyl tape over a vapor barrier adhesive seal at the joints. (Note: Staples or tacks are not permitted on covers).
- C. All insulation shall have self-sealing type, all service jacket (ASJ-SSL) factory applied. At exposed piping areas in locker room or gymnasium cover jacket with continuous p.v.c. jacket.
- D. Sealers, solvents, tapes, and adhesives, and mastics used in conjunction with the installation of insulation under this Section shall possess the maximum possible fire safe qualities available and shall be NFPA approved.
- E. Covering shall be applied over clean and dry surfaces. No covering shall be applied until after the approval of all pressure and leakage tests.
- F. Insulation shall be as manufactured by Johns Manville, Inc., Owens-Corning Fiberglass Corporation SSL II-ASJ, or Knauf Insulation 1000. Insulation shall be applied by skilled insulation mechanics in a first class manner.

2.06 TRAPS

- A. Furnish and install traps with cleanouts on all fixtures and equipment requiring connection to the sanitary system of the same size and material as the pipe on which they occur. Traps installed on threaded pipe shall be recessed drainage pattern.

2.07 DRAIN VALVES

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- A. It shall be possible to drain the water from all sections of the Hot and Cold Water Piping. Furnish and install 1/2" x 3/4" hose end ball valves with cap and chain. (see 2.04 for model no.)

2.08 SHOCK ABSORBERS

- A. Furnish and install, where shown on Drawings and where required to prevent water hammer, Zurn Manufacturing Company Series Z-1700 shock absorbers, or equal, as manufactured by J.R. Smith Manufacturing Company or Josam Manufacturing Company. Installation of absorbers shall be as per manufacturer's recommendations.

2.09 PIPING ACCESSORIES

- A. Pressure and Temperature Relief Valves shall be A.S.M.E. rated temperature relief 210° F. double BTU rated, self-closing, as manufactured by Watts Regulator Company or equal by Wilkins or McDonnell and Miller.
- B. Vacuum reliefs shall be Watts Regulator Company #36 or equal by Wilkins or Lawler.
- C. Temperature gauges shall be 4-1/2" diameter dial thermometers, any angle and range, 40 degrees F. to 240 degrees F. as manufactured by Albert A. Weiss and Sons, Inc., U.S. Gauge, or Trerice.
- D. Pressure gauges shall be 4" diameter with a range of 0 to 150 psi as manufactured by U.S. Gauge.
- E. Furnish and install on the Hot Water Pipe, expansion joints and anchors sized for 1-1/2" expansion per one hundred feet. Expansion joints shall be as manufactured by Flexonic Company or equal by Metraflex, Hyspan, or equal. Piping shall be anchored and guided to force the expansion in the proper direction.
- F. Furnish and install where indicated on Drawings, Watts Regulator Company reducing valve and strainer combination size as indicated on the Drawing or equal, as manufactured by Donnelly Products Company or McDonnell and Miller.
- G. Trap primer connections are required on all floor drains to maintain trap seal. The requirement for trap primer connections shall include all floor drains in the kitchen including trough drains furnished by others. Trap primers shall be Precision Plumbing Products, Inc. Model P/N-PR-500 prime-rite trap-primer valve or shall, where appropriate, be Zurn, Josam, Smith or equal in-line connections installed on lavatory or sink supply.

2.10 WALL HYDRANT AND HOSE BIBB

- A. Wall hydrants shall be Zurn Series Z-1310 Ecolotrol cast brass 3/4" non-freeze wall hydrant with integral backflow preventer, 3/4" hose

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connections, polished nickel bronze face, loose key handle, brass wall sleeve, and fitted with brass locknut.

- B. Hose bibb shall be T & S Brass or equal model #B-720 modified, chrome plated, 3/4" hose end, integral stop, vacuum breaker, modified with lock shield and loose tee handle.

2.11 CLEANOUTS

- A. Cleanout plugs on the Sanitary System shall be of heavy cast brass of the screwed type. Plugs shall be full size up to and including 4".
- B. For piping running under floor slab, cleanouts shall be brought up to just under the floor slab level. Furnish and install access cover for all floor-type cleanouts, Zurn ZN-1400 Series with scoriated nickel bronze or equal by Josam or Smith. In the garage area and at exterior locations use Zurn model #Z-1474 cleanout housing set over brass cleanout plug.

2.12 ACCESS DOORS

- A. Furnish Access Doors for access to all concealed control valves, cleanouts, valves, expansion joints, and to all other concealed parts of the Plumbing System that require accessibility for the proper operation and maintenance of the system. These doors shall be installed under the appropriate SECTION of the Specifications as determined by the surface upon which the panels are mounted.
- B. All Access Doors shall be located in a workmanlike manner in closets, storage rooms, and/or other non-public areas, positioned so that the valve or part can be easily reached, and the size shall be sufficient for this purpose (minimum size 12" x 16"). Furnish Access Doors for each pipe space to permit thorough inspection of same. When access doors are required in corridors, lobbies, or other habitable areas, they shall be located as directed by the Architect.
- C. Access doors shall be prime painted and completed with cylinder lock and two (2) keys as manufactured by Acudor, Inland Steel Products Company "Milcor", or Walsh-Hannon-Gladwin, Inc., "Way Loctor". Type shall be as follows:

Acoustical Tile Ceiling	Acudor AT-5020
G.W.B. Surfaces	Acudor DW-5040
Masonry Construction	Acudor UF-5000
Fire Rated Construction	Acudor FB-5060

- D. Access Door Shop Drawings shall be submitted to the Architect for approval.

2.13 SUPPLEMENTARY STEEL, CHANNEL, AND SUPPORTS

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- A. Furnish and install all supplementary steel, channels, and supports required for the proper installation, mounting, and support of all equipment.
- B. Supplementary Steel and Channels shall be firmly connected to building construction in a manner approved by the Architect.
- C. The type and size of the Supporting Channels and Supplementary Steel shall be determined by the Plumbing Subcontractor and shall be sufficient strength and size to allow only a minimum deflection in conformance with the manufacturer's requirements for loading.
- D. All Supplementary Steel and Channel shall be installed in a neat and workmanlike manner parallel to the walls, floor, and ceiling construction. All turns shall be made with 90° fittings, as required to suit the construction and installation conditions.

2.14 HANGERS, ANCHORS, GUIDES, AND PIERS

- A. All piping shall be supported from the Building Structure by means of approved hangers and supports. Piping shall be supported to maintain required 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.
- B. The spacing for hangers for horizontal piping shall be in accordance with the following:
 - 1. Cast Iron Soil Pipe: 5'-0" at the hubs for 5' lengths.
For 10' lengths, use one (1) hanger at the hub and one (1) at midpoint of the length.
 - 2. Copper Tubing: 6'-0" o.c. for 1-1/4" and smaller, and 10'-0" o.c. for 1-1/2" and larger.
 - 3. Steel Pipe: 10'-0" o.c. for 1-1/2" and over; 8' - 0" for 1-1/4"; 6' - 0" for 1" and smaller.
- C. Vertical lines shall be adequately supported at their bases by a suitable hanger placed in the horizontal line near the riser and at every 10' interval.
- D. All Hangers (including those for acid-waste) shall be adjustable Clevis Hanger. Hanger rods shall have machine threads. Malleable iron brackets of approved type shall be used along the walls. All Hangers for copper tubing shall be copper plated except where pipe is insulated, in which case, Steel Clevis Hanger and pipe shield shall be used.
- E. Piping shall not be hung from the hangers of other trades.
- F. Provide seismic restraints for all new piping per requirements of 1612.7.4 of the Mass Code and Section 15100.

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- G. Hangers shall be manufactured by Grinnell, Carpenter and Paterson, Fee and Mason, or equal.
- H. Wire and strap hangers will not be permitted in this installation.
- I. Install a 14 gauge metal pipe shield between pipe insulation and all pipe hangers. Hangers shall be sized so that the pipe insulation passes through the hanger and is supported on the shield.

2.15 DRAINS

- A. Furnish and install all floor drains where shown on the Drawings. Furnish all roof drains for installation by the General Contractor.
- B. All floor drains in flooring systems without waterproofing membranes shall have galvanized iron clamping rings with 6-pound lead flashing to bond 9" in all directions. All drains shall be checked with Architect's Drawings to determine depth of the flashing collar. Brass extension pieces shall be provided if necessary.
- C. All floor drains installed on this project shall be fitted with Automatic Trap Primer Connections. Field determine appropriate location for Trap Primer valve and drain piping.
- D. Drain Schedule:
 - 1. Type "A" - Zurn #ZN-415B-P dura coated cast iron body floor drain with clamping collar and with 6" dia. nickel bronze adjustable strainer head. Trap primer connection.
 - 2. Type "B" - Zurn #Z-550-Y-P dura coated cast iron body floor drain, sediment bucket, cast iron grate. Trap primer connection

2.16 PLUMBING FIXTURES

- A. Furnish and install all fixtures and equipment, including supports, connections, fittings, and any incidentals, to make a complete installation in accordance with the Drawings and as specified. This project includes hard wired electronic actuated fixtures. Furnish transformers. Electrical Subcontractor shall wire all the fixtures requiring power.
- B. The Architect shall be final judge as to whether fixtures and trim fulfill the requirements of the Specifications and as to whether they are of suitable quality.
- C. All fixtures requiring hot and cold water shall have the cold water faucet on the right hand side of the fixture and the hot water faucet on the left hand side of the fixture.
- D. Escutcheons shall be furnished and installed on all supplies and traps. Escutcheons shall be one (1) piece chrome plated brass with set screws.

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- E. All fixtures shall have the manufacturer's guaranteed label or trademark indicating first quality. All acid resisting enameled ware shall bear the manufacturer's symbol signifying acid resisting material.
- F. Unless otherwise specified, faucets and all exposed fittings shall be chromium plated.
- G. All supply pipes shall run in a reasonable straight vertical line from the stops to faucets. Traps shall be installed perpendicular to walls.
- H. Vitreous china and acid resisting enameled fixtures shall be of one manufacturer by Kohler, American Standard, or Eljer; Trim shall be Symmons, Speakman, Chicago, or T & S Brass; Flush valves shall be Sloane, Delaney, or Zurn XL Series.
- I. Note: All fixtures and fittings shall be vandal proof mounted, unless specifically noted otherwise.
- J. Carefully coordinate roughing for flush valves so that the dimension from top of fixture to C-L of flush valve is a minimum of 6".
- K. Fixture Schedule:
 - 1. P-1 Water Closet:

Kohler Cimarron Comfort Height, K-3497, vitreous china, 1.5 gallon flush water saver, floor mounted, elongated, siphon jet bowl.

Kohler K-4664-0 solid plastic white seat with check hinge.

Cast iron floor flange, bolt caps.
 - 2. P-2 Countertop Lavatory:

Kohler Brookline, K-2202-4, self-rimming 19" vitreous china lavatory, 4" centers.

Kohler Trend, K-11800-U, deck mounted lav faucet, 1-1/4" pop-up waste.

McGuire H67 (PR) C.P., 3/8 IPS angle supply with loose key stop.

McGuire Model B-8902, 1-1/4" x 1-1/2" cast brass adjustable 'P' trap with cleanout and #17 GA. tubing outlet to wall.
 - 3. P-3 Tub/Shower:

Lasco model 2603-SG Lascoat combination tub shower with inegral soap shelf white in color, 60" x 32" x 72" h. with anti-slip surface. Coordinate drain and valve location with Architectural

K-7160-TF drain fitting with overflow and 1-1/2" tailpiece.

Kohler K-T14420-4 tub and shower trim, concealed pressure balanced shower valve with lever handle, integral checkstops,

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- factory pre-set temperature limit stops, 2.5 gpm flow restrictor.
4. P-4 Shower:
Lasco Model 1423-C Lascoat shower stall with integral soap shelf and seat. Center drain location and slip resisitent, textured bottom.
Kohler K-T14422-4 shower trim, concealed pressure balanced shower valve with lever handle, integral checkstops, factory pre-set temperature limit stops, 2.5 gpm flow restrictor.
5. P-5 Kitchen Sink:
Kohler K-3206-3 Ballard, single bowl, 22" x 25", self-rimming countertop mounted, 10" deep, 18 ga. type 304 stainless steel sink with center outlet; three (3) hole
Kohler K-15162-L-CP Coralais, one-piece deck faucet.
Kohler K-8801 Durostriner with 1-1/2" tailpieve and stainless steel ground seat stopper.
1-1/2" x 2" chrome plated P-trap with cleanout, waste outlet with escutcheon.
Pair of 1/2" x 3/8" supplies with stops and escutcheons.
6. P-6 Clothes Washer:
Symmons #W-602-X Laundry-Mate Supply and Drain Fixture, recessed mounting box 1/2" hot and cold water connections, 2" waste connection, integral stops.
7. P-7 Water closet:
K-4430 "Kingston Lite Toilet", vitreous china, 1.5 gallon flush water saver, wall hung, elongated, siphon jet bowl with 1-1/2" top spud.
K-4670-C Lustra solid plastic white open front seat with check hinge.
Sloan Royal 111 water conserving flush valve with vacuum breaker.
Zurn 300-pound carrier as required to suit.
P-7A water closet, handicapped:
Same as specified for P-1 except mounting height shall be 18" from finished floor to top of seat.
8. P-8 Handicapped lavatory:
K-2054 "Jamestown" 20" x 18" wall hung vitreous china slab lavatory punched for concealed arm chair carrier and drilled for 4"

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centers.

Symmons S-60-H "Scot" 4" centreset, hot and cold water self-closing, mixing, metering faucet with handicap lever handle, 0.5 GPM rose spray.

K-13885, 1-1/4" offset drain with open grid strainer.

K-7607 (pair) C.P., 3/8 IPS angle supply with loose key stop.

K-9000 C.P., 1-1/4" x 1-1/2" cast brass adjustable 'P' trap with cleanout and tubing outlet to wall.

J.R. Smith #700-27-M31 concealed arm carrier modified with 4" long escutcheon to set lavatory 22" off the wall.

Wrap all exposed roughing under lavatory with two (2) laps of armafex tape insulation.

2.17 BACKFLOW PREVENTERS

- A. Main line backflow preventers, 1" and larger, shall be reduced pressure type furnished complete with shutoff valves, Massachusetts Approved, and shall be Watts #909 all bronze complete with strainer and soft seated check valve or equal by Beeco or Wilkins. Size shall be as indicated on Drawings. Mount backflow preventer 3'(+/-) above finished floor. Provide indirect waste funnel and run pipe to an air gapped discharge at sink or floor drain. Furnish a spare parts kit and parts list mounted in the vicinity of the device.
- B. Prior to the installation of devices in the name of the Owner file for, pay for, and obtain all required permits and approvals for cross connection control devices from the Authority having Jurisdiction.

2.18 UNION AND NIPPLES

- A. All connections between copper tubing and galvanized piping or between copper tubing and all tanks (such as water heaters, chillers, etc.) shall be made with dielectric unions and nipples.
- B. All connection to Water Heaters, Meters, Pumps, and other equipment requiring maintenance or alteration shall be made up with unions. Unions on brass piping, 2" and smaller, shall be brass composition "E" in strict accordance with Federal Specification WW-U-516. On plastic piping, use unions of the same material as the piping.
- C. All close and shoulder nipples shall be corresponding materials as the pipe and shall be extra heavy.

2.19 DOMESTIC WATER HEATER

- A. Furnish and install where shown on the Drawings for generating hot water, one tankless gas fired type water heater. Water heater shall be RUUD Model Pronto RUTG-74DVN having a natural gas input of 199,900

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BTU/hr. Water heater shall have the A.G.A. seal of certification and shall meet ASHRAE Standard 90 energy efficient standards. Water heater shall also be supplied with oxygen depletion sensor, overheat limiter, built-in electric blower and 120 volt power cord. Water heater shall be factory assembled, including a pressure regulator properly adjusted for operation on natural gas; and energy cutoff. Complete unit shall have a maximum temperature setting of 120 degrees F.

- B. Furnish and install Category III stainless steel air intake and exhaust vent up through the roof. Type "B" vent is not permitted.

2.20 POINT-OF-USE WATER HEATER

- A. Furnish and install where shown on the Drawings a Eemax Singe Point tankless electrical heater, 240V, 1phase, and nichrome heating coils. EWH-1 shall be model EX120. EWH-2 shall be model EX280.

2.21 WATER METER

- A. Furnish and install water meter with inlet strainer in accordance with the standards of the Local Water Department. Coordinate the installation with the water department and include in the Plumbing Bid the cost of the meter. Refer to Part 1 of this section regarding assessments, and the like.

2.22 BREECHING, CHIMNEYS AND STACKS

- A. The vent shall be of the double-wall, factory-built type for use on condensing appliances or pressurized venting systems serving Category II, III or IV appliances or as specified by the equipment manufacturer.
- B. Maximum temperature shall not exceed 550°F.
- C. Vent shall be listed for an internal static pressure of 6" w.g. and tested to 15" w.g.
- D. Vent shall be constructed with an inner and outer wall, with a 1" annular insulating air space.

The inner wall (vent) shall be constructed of AL29-4C superferritic stainless steel, .015 thickness for 4"-12" diameters and .024 thickness for 14"-24" diameters.

The outer wall (casing) shall be constructed of type 430 stainless steel, .018 thickness for 4"-12" diameters and .024 thickness for 14"-24" diameters.

Inner and outer walls shall be connected by means of spacer clips that maintain the concentricity of the annular space and allow unobstructed differential thermal expansion of the inner and outer walls.

- E. All parts exposed to the weather shall be stainless steel.
- F. All supports, roof or wall penetrations, terminations, appliance connectors and drain fittings, required to install the vent system shall be included.

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- G. Roof penetration pieces shall be UL listed and provided by the vent manufacturer.
- H. All inner vent connections shall be secured by means of profiled connector bands with gear clamp tighteners. Joints shall be sealed with waterproof sealant. Where exposed to weather, the outer closure band shall be sealed to prevent rainwater from entering the space between inner and outer walls.
- I. Vent shall terminate in accordance with installation instructions and local codes.
- J. Manufacturers: Subject to compliance with requirements, provide all steel, insulated, positive pressure double wall vents of one of the following:
 - Metal-Fab, Corr/Guard Model CG
 - Selkirk Heat-Fab Saf-T Vent CI
 - Schebler eVENTplus

PART 3 – EXECUTION

3.01 WORKMANSHIP AND INSTALLATION METHODS

- A. All work shall be installed in a first-class manner consistent with the best current practices. All materials shall be securely installed plumb and/or level, and all flush mounted equipment shall have front edge flush with finished wall surface.
- B. All piping shall be installed true to line and grade in the case of underground piping. All piping above ceilings or exposed shall be grouped together, be parallel to each other, and be either parallel or perpendicular to the structure. Utilize gang hangers wherever feasible. Group all valves together where feasible.

3.02 WORK COORDINATION AND JOB OPERATIONS

- A. The equipment shall not be installed in congested and possible problem areas without first coordinating the installation of same.
- B. Particular attention shall be directed to the coordination of piping and other equipment installed in the ceiling areas. Coordinate the elevations of all piping in hung ceiling areas to insure adequate space for the installation of recessed lighting fixtures before other mechanical equipment is installed.
- C. Furnish to the General Contractor, and all other Subcontractors, all information relative to the portion of the Plumbing installation that will affect them, sufficiently in advance so that they may plan their work and installation accordingly.

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- D. In case of failure to give proper information as indicated above sufficiently in advance, pay for all back-charges for the modification, renovation, and relocation of any portion of the work already performed.
- E. Obtain from the other trades, all information relative to the Plumbing Work to be executed in conjunction with the installation of their respective equipment.

3.03 CUTTING AND CORE DRILLING

- A. Perform all cutting and core drilling operations that are outlined in Part 1 of this SECTION. Throughout the performance of the cutting and coring work, ensure that the structural integrity of the walls, floors, overhead structure, and other structural components, which are to remain, is maintained until permanent work is installed. Prior to any coring or cutting, verify all locations of same with the General Contractor. All cutting and coring is to be performed in accordance with approved Coordination Drawings
- B. Cut all masonry and concrete with an approved diamond blade concrete saw in a neat straight direction, perpendicular to the plane of the wall or floor.
- C. Use a core drilling process which produces clean, sharp edges and the minimum hole size which will accommodate the size of pipe sleeve specified. Submit procedures for cutting thru existing steel beams to Architect for review.
- D. The patching of holes shall be performed by Plumbing Sub-contractor utilizing methods outlined for the finish trade involved. Holes shall be patched to the satisfaction of the Architect.

3.04 CLEANING AND PROTECTION

- A. Protect all materials and equipment during shipment and so as to prevent damage. Water closets, lavatories, and sinks shall be boarded over and all other fixtures shall be protected with pasted on paper. Post notice prohibiting the use of the fixtures prior to completion. Assume full responsibility for protection of work until its completion and final acceptance.
- B. Keep the premises reasonably clean at all times and remove rubbish caused by the Plumbing Work as directed by the Architect.
- C. Upon completion of this work, clean all fixtures and equipment installed herein and replace damaged parts. Failure to fulfill this obligation will result in back-charges for correction of the defective work.

3.05 SLEEVES, INSERTS, AND ESCUTCHEONS

- A. All piping passing through slabs, floors, walls, and partitions shall be sleeved and all such sleeves shall be furnished and installed by the

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Plumbing Subcontractor as detailed on the Drawings and herein specified. Set sleeves in concrete floors and walls as soon as forms are set and before concrete is poured. Core drilling openings shall have a sleeve caulked and leaded in place.

- B. All pipes passing through floor, whether slab-on grade or above grade levels, shall be sleeved with sleeve extending 1" above floor. This includes all piping in toilet room pipe space, stairwells, closets, partitions and pre-cast planks.
- C. All sleeves shall be Schedule 40 galvanized steel and shall be reamed. There shall be a minimum of 1" annular space between the sleeve and pipe provide greater clearance where seismic requirements dictate. Sleeves on insulated pipe shall be large enough to allow insulation to pass through sleeve. Sleeves on drywall, masonry, or concrete walls and partitions, shall be flush with wall on both sides.
- D. The space between sleeve and pipe in all cases shall be filled with a U.L./F.M. approved caulking compound. This includes pipes concealed in chases and/or partitions.
- E. Inserts where required shall be furnished and set by the Plumbing Subcontractor and where necessary may be drilled or power driven and shall be sized such that the insert will not exceed a depth of penetration of 1" into concrete.
- F. Escutcheons: All exposed pipe, uncovered, passing through walls or floors or ceilings shall be fitted with C.P. brass spun or split type escutcheons with approved clamping device for holding in position. Floor escutcheons shall be deep enough to fit over sleeves, fastened to pipe, and extend down to floor.

3.06 TESTING

- A. Test all Work in the presence of the Architect and/or Engineer and as required by Local Codes.
- B. After Soil and Vent Piping is in place and before being buried or furred in, plug lower ends and fill the system with water up to the top of stacks. Piping is to be left tight under these conditions and water lever shall be maintained intact for the period of at least four (4) hours.
- C. Test all water piping by applying a hydrostatic pressure of 150 PSIG using a pump for this purpose. Make sure that all lines are properly plugged or capped and that air has been vented before applying pressure which shall remain constant without pumping for two (2) hours at least.
- D. Test gas piping per State Gas Code.
- E. Any leaks in joints or evidence of defective pipe on fittings disclosed by test shall be immediately corrected by replacing defective parts with new joints or materials. No makeshift repair effected by caulking threaded

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pipe with lead wool, application of Wilky or patented compounds will be permitted.

3.07 CHLORINATION

- A. Upon completion of the Plumbing Work, thoroughly chlorinate the entire domestic water system before putting same in service. The chlorinating agent shall be as a solution of sodium hypochlorite. Water shall be fed slowly into the new line with chlorine in the proper amount to produce a dosage of 40-50 PPM. Open and close all valves while system is being chlorinated.
- B. After the sterilization agent has been applied for 24 hours, test for residual chlorine. A residual of not less than 5 PPM shall be required in all parts of the line.
- C. If test show at least 5 PPM of residual chlorine, flush out system until all traces of the chemical used are removed.

3.08 INSTALLATION OF BREECHING, CHIMNEYS AND STACKS

- A. **VIBRATION CONTROL AND SEISMIC RESTRAINT:** Refer to section 15100 and drawing VS-1 and VS-2 for the appropriate support of each piece of equipment noted as requiring such. The vibration control and seismic restraint manufacturer shall recommend the correct connection and device as outlined in section 15100 and drawing VS-1 and VS-2.
- B. Install Type B gas vents in accordance with manufacturer's installation instructions and UL listing. Maintain minimum clearances from combustibles specified in UL listing.
- C. Install all steel, positive pressure, double wall gas vents in accordance with manufacturer's installation instructions and UL listing. Maintain minimum clearances from combustibles specified in UL listing.
- D. Seal joints between sections of positive pressure vents in accordance with manufacturer's installation instructions, and using only sealants recommended by manufacturer.
- E. Support vents at intervals recommended by the manufacturer to support the weight of the vent and all accessories, without exceeding loading of appliances.
- F. Install barometric and thermostatically operated dampers in accordance with manufacturer's instructions. Locate as close to draft hood collar as possible.
- G. Clean breechings internally during installation, to remove dust and debris. Clean external surfaces to remove welding slag and mill film. Grind welds smooth.

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- H. Temporary Closure: At ends of breechings and chimneys which are not completed or connected to equipment, provide temporary closure which will prevent entrance of dust and debris until installations are completed.

END OF SECTION

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MECHANICAL

SECTION 15600

HVAC

PART 1 - GENERAL

File Sub-Bid Required
HVAC

Combined with Sections 15100, 15600

1.01 FILING SUB-BIDS

- A. **HVAC** is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid and is combined with sections 15100 and 15600.
- 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 15600 HVAC is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.
- F. The Filed Sub-Bidder for the work of this SECTION 15600 shall list, in Paragraph E, of the FORM FOR SUB-BID, the name of each person, firm, or corporation, whom he proposes to use to perform the following classes of work or part thereof, at the bid price therefore:

CLASS OF WORK

Insulation	2.04, 3.03
Sheet Metal and Accessories	2.02, 2.09, 2.10, 2.11, 2.01, 2.08, 2.09, 2.10
Automatic Temperature Control	2.17, 3.16
Air and Water Balancing	3.17

1.02 RELATED DOCUMENTS

- A. Work performed under this section of the specifications shall be subject to the General Conditions of the Contract and Division 01000 General Requirements.
- B. Examine all Drawings and other Sections of the Specification for requirements affecting the Work of this Section.

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- C. Refer to Section 01030 for alternates which may affect the work of this Section.

1.03 WORK TO BE PERFORMED

- A. The work described herein shall be interpreted as work to be done by the HVAC Subcontractor. Work to be performed by other trades will always be specifically referenced to that trade.
- B. Furnish all staging, rigging, temporary support, labor, materials, and perform all operations in connection with the installation of the HVAC work.
- C. Without limiting the generality thereof, the work to be performed under this Section includes complete new HVAC systems with the following major sub systems:
 - 1. Gas Fired Air Handling with "A" Frame Cooling Coils
 - 2. Air Cooled Condensing Units
 - 3. Exhaust Fan
 - 4. Ductwork with Insulation, Diffusers, Registers and Grilles
 - 5. Terminal Heating Units

1.04 RELATED WORK

- A. Cutting beyond the requirements as stated herein, and patching of all openings regardless of size, is specified in the respective Sections of the trade responsible for furnishing and installing similar new materials.
- B. For temporary controls coordinate with Construction Manager.
- C. For flashing of vents through roof and setting of roof curbs and flashing of such, refer to Section 07 62 00.
- D. For power wiring of mechanical equipment refer to Section 26 00 01.
- E. For excavation and backfill of below grade mechanical and related systems refer to Section 02200.
- F. For firestopping not called for in this Section refer to Section 10520.
- G. For finished painting of mechanical systems not called for in this Section refer to Section 09900.
- H. For interior concrete work relating to this Section refer to Section 03310.
- I. For exterior concrete work relating to this Section refer to Section 03310.

1.05 CODES, ORDINANCES, AND PERMITS

- A. Perform all work in accordance with the requirements of the Town of Waltham Building Department, State of Massachusetts Building Code, and applicable State and Federal Laws. Give all requisite notices, file all

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requisite plans, and obtain all permits required to perform HVAC Work.
Pay all fees and include in the Bid.

1.06 QUALITY ASSURANCE

A. Codes and Standards:

1. HI Compliance: Design, manufacture, and install HVAC pumps in accordance with HI Hydraulic Institute Standards".
2. UL Compliance: Design, manufacture, and install HVAC pumps in accordance with UL 779 "Motor Operated Water Pumps".
3. ANSI Standards: Comply with ANSI A13.1 for pipe, valve, and equipment identification.
4. I=B=R Compliance: Provide cast iron boilers that have been tested and rated in accordance with Institute of Boiler and Radiator Manufacturers (I=B=R) "Testing and Rating Standard for Cast Iron and Steel Heating Boiler", and bear I=B=R emblem on nameplate affixed to boiler.
5. NFPA Compliance: Install oil fire cast iron boilers in accordance with NFPA Standard 31 "Standard for the Installation of Oil Burning Equipment".
6. ASME Compliance: Construct cast iron boilers in accordance with ASME Boiler and Pressure Vessel Code, Section IV "Heating Boilers".
7. UL and NEMA Compliance: Provide cast iron boiler ancillary electrical components, which have been listed and labeled UL, and comply with NEMA Standards.
8. FM Compliance: Provide control devices and control sequences in accordance with requirements of Factory Mutual System (FM).
9. IRI Compliance: Provided control devices and control sequences in accordance with requirements of Industrial Risk Insurance (IRI).
10. AMCA Compliance: Test and rate air handling units in accordance with AMCA standards.
11. AGA Compliance: Provide gas controls and devices in accordance with American Gas Associates.
12. ARI Compliance: Test and rate air handling units in accordance with ARI 430 "Standard for Central-Station Air Handling Units", display certification symbol on units of certified models.
13. ASHRAE Compliance: Construct and install refrigerant coils in accordance with ASHRAE 15 "Safety Code for Mechanical Refrigeration".

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14. NFPA Compliance: Provide air handling unit internal insulation having flame spread rating not over 25 and smoke developed rating no higher than 50; and complying with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems".
 15. UL and NEMA Compliance: Provide electrical components required as part of air handling units, which have been listed and labeled by UL and comply with NEMA standards.
 16. NEC Compliance: Comply with National Electrical Code (NFPA 70) as applicable to installation and electrical connections of ancillary electrical components of air handling units.
- B. MSS Standard Practices: Comply with the following standards for valves:
1. MSS SP-45: Bypass and Drain Connection Standard
 2. MSS SP-67: Butterfly Valves
 3. MSS SP-70: Cast Iron Gate Valves, Flanged and Threaded Ends
 4. MSS SP-71: Cast Iron Swing Check Valves, Flanged
 5. MSS SP-72: Ball Valves with Flanged or Butt-Welding Ends for General Service
 6. MSS SP-78: Cast Iron Plug Valves, Flanged and Threaded Ends
 7. MSS SP-80: Bronze Gate, Globe Angle and Check Valves
 8. MSS SP-84: Steel Valves - Socket Welding and Threaded Ends
 9. MSS SP-85: Cast Iron Globe and Angle Valves, Flanged with Threaded Ends
 10. MSS SP-92: MSS Valve User Guide
- C. Automatic Temperature Control Contractor Qualifications: Firms specializing in manufacturing and installation of control system for not less than 5 years.
1. Codes and Standards:
 - a. Electrical Standards: Provide electrical components of control systems which have been UL-listed and labeled, and comply with NEMA standards.
 - b. NEMA Compliance: Comply with NEMA standards pertaining to components and devices for pneumatic control systems.
 - c. NFPA Compliance: Comply with NFPA 90A "Standard for the Installation of Air Conditioning and Ventilating Systems" where applicable to controls and control sequences.

1.07 DISCREPANCIES IN DOCUMENTS

- A. Where Drawings or Specifications conflict or are unclear, advise Architect in writing before Award of Contract. Otherwise, Architect's interpretation of Contract Documents shall be final, and no additional compensation shall be permitted.
- B. Where Drawings or Specifications do not coincide with manufacturers recommendations, or with applicable codes and standards, alert Architect in writing before installation.
- C. If the required material, installation, or work can be interpreted differently from drawing to drawing, for between drawings and specs, this contractor shall provide that material, installation, or work which is of the more stringent.
- D. It is the intent of these contract documents to have the contractor provide systems and components that are fully complete and operational and fully suitable for the intended use. There may be situations in the documents where insufficient information exists to precisely describe a certain component or subsystem, or the routing of a system. In cases such as this, where the contractor has failed to notify the Architect of the situation in accordance with Paragraph (A) above, the contractor shall provide the specific component or subsystem with all parts necessary for the intended use, fully complete and operational, and installed in workmanlike manner.

1.08 PHASING

- A. The mechanical subcontractor shall construct the subject project in phases as directed by the Architect to suit the project progress schedule, as well as the completion date of the project.
- B. For additional information related to phasing, review the General Conditions and Supplementary Conditions and the Architectural drawings.

1.09 CONTRACT DRAWINGS

- A. All work shown on the Drawings is intended to be approximately correct to scale, but shall be taken in a sense as diagrammatic. Sizes of pipes and general method of running them are shown, but it is not intended to show every offset and fitting. To carry out the true intent and purpose of the plans, furnish all necessary parts to make complete working systems ready for use.
- B. The HVAC Drawings and Specifications are intended to supplement each other so that any details shown on the Drawings and not mentioned in the Specifications, or vice-versa, shall be executed the same as if mentioned in the Specifications and shown on the Drawings.
- C. Refer to the Architectural, Structural, and other Mechanical and Electrical Drawings which indicate the construction in which this work shall be installed. Locations shown on the plans shall be checked against the

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general and detailed Drawings of the construction proper. All measurements must be taken at the building.

1.10 ACCESSIBILITY

- A. Install equipment and materials to provide required access for servicing and maintenance. Coordinate the final location of concealed equipment and devices requiring access with final location of required access panels and doors. Allow ample space for removal of all parts that require replacement or servicing.
- B. Extend all grease fittings to an accessible location.

1.11 ROUGH IN

- A. Verify final locations for rough-ins with field measurements and with the requirements of the actual equipment to be connected.

1.12 DEMOLITION

- A. All existing heating equipment shall be removed by the General Contractor.

1.13 NOTIFICATION OF RELATED TRADES

- A. Notify all other trades responsible for installing chases, inserts, sleeves, anchors, louvers, etc. when ready for such installation and for final checking immediately before concrete is placed. Cooperate with such trades to obtain proper installation.
- B. Leave openings in walls for pipes, ducts, etc. for mechanical and electrical work as shown on Drawings or required by layout of mechanical or electrical systems.

1.14 MECHANICAL INSTALLATIONS

- A. Coordinate mechanical equipment and materials installation with other building components.
- B. Verify all dimensions by field measurements.
- C. Arrange for chases, slots, and openings in other building components to allow for mechanical installations.
- D. Coordinate the installation of required supporting devices and sleeves to be set in poured in place concrete and other structural components, as they are constructed.
- E. Sequence, coordinate, and integrate installations of mechanical materials and equipment for efficient flow of the work. Give particular attention to large equipment requiring positioning prior to closing-in the building.
- F. Coordinate the cutting and patching of building components to accommodate the installation of mechanical equipment and materials.

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- G. Where mounting heights are not detailed or dimensioned, install mechanical services and overhead equipment to provide the maximum headroom possible.
- H. Install mechanical equipment to facilitate maintenance and repair or replacement of equipment components. As much as practical, connect equipment for ease of disconnecting, with minimum of interference with other installations.
- I. Coordinate connection of mechanical system with overhead utilities and services. Comply with requirements of governing regulations, franchised service companies, and controlling agencies. Provide required connection for each service.

1.15 CUTTING AND PATCHING

- A. Drilling, coring, and cutting of new and existing structures (through walls, floors, ceiling, etc.) where the largest dimension does not exceed 12" shall be by this Contractor.
- B. Throughout the performance of the cutting and coring work, ensure that the structural integrity of the existing walls, floors, overhead structure, and other structural components, which are to remain, is maintained until permanent work is installed. Prior to any coring or cutting verify all locations of same with the General Contractor. All cutting and coring is to be performed in accordance with approved coordination drawings. All cutting or coring of structural must receive approval of the Architect prior to proceeding.
- C. No additional compensation will be authorized for cutting and patching work that is necessitated by ill-timed, defective, or non-conforming installations.
- D. Patching of surfaces shall be by the trade responsible for the surface penetrated.
- E. Refer to various architectural sections for additional reference.

1.16 SUBMITTALS

- A. Refer to Section 01300 for submittal definitions, requirements, and procedures. The following paragraphs supplement the requirements of Section 01300.
- B. Submittal of Shop Drawings, product data, and samples will be accepted only when submitted by the General Contractor. Data submitted by Sub-contractors and material suppliers directly to the Architect/Engineer will not be processed.
- C. Provide submittals for the following equipment:
 - 1. Gas Fired Air Handling Units

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2. Hangers and Attachments
 3. Mechanical Identification
 4. Mechanical Insulation
 5. Air Cooled Condenser
 6. Terminal Heating Units
 7. Power and Gravity Ventilators
 8. Metal Ductwork
 9. Ductwork Accessories
 10. Air Outlets and Inlets
 11. Testing, Adjusting, Balancing, and Commissioning
- D. If a Shop Drawing is not accepted after two submissions, a third submission from the same manufacturer will not be considered.
- E. Check Shop Drawings and other submittals to assure compliance with contract documents before submittal to A/E.
- F. Review of Shop Drawings is final and no further changes shall be considered without written application. Shop Drawings review does not apply to quantities, nor relieve this Contractor of his responsibility for furnishing materials or performing his work in full compliance with these Contract Drawings and Specifications. Review of these shop drawings shall not be considered a guarantee of the measurements of this building or the conditions encountered.

1.17 SUBSTITUTIONS

- A. Refer to, Section 01300 for requirements in requesting substitutions. The following paragraphs supplement the requirements of Section 01300.
- B. If materials or equipment are substituted for specified items that alter the systems shown or its physical characteristics, or which have different operating characteristics, clearly note the alterations or difference and call it to the attention of the a/e. Under no circumstances shall substitutions be made unless material or equipment has been successfully operated for at least three consecutive years.
- C. Any modifications to the design, as a result of approving a substitution, shall be the responsibility of this contractor. Any additional cost to this contractor or any other contractor, directly or indirectly, as a result of such substitutions, shall be the responsibility of this contractor.

1.18 PRODUCT LISTING

- A. Prepare listing of major mechanical equipment and materials for the project.

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- B. Provide all necessary information.
- C. Submit to the A/E through the General Contractor, within twenty (20) days of signing contract, this listing indicating all equipment and manufacturers, as a part of the submittal requirement. If the product list is not submitted, it will be the responsibility of the sub-contractor to submit one (1) of the three (3) named equal manufacturers.
- D. When two or more items of same material or equipment are required they shall be of the same manufacturer. Product manufacturer uniformity does not apply to raw materials, bulk materials, pipe, tube, fittings (except flanged and grooved types), sheet metal, wire, steel bar stock, welding rods, solder, fasteners, motors for dissimilar equipment units, and similar items used in work, except as otherwise indicated.
- E. Provide products, which are compatible within systems and other connected items.

1.19 NAMEPLATE DATA

- A. Provide permanent operational data nameplate on each item of power operated mechanical equipment, indicating manufacturer, product name, mode, number, serial number, capacity, operating, and power characteristics labels of tested compliances, and similar essential data. Locate nameplates in an accessible location.

1.20 DELIVERY, STORAGE AND HANDLING

- A. Refer to Section General Conditions for delivery, storage, and handling of equipment. The following paragraphs supplement the requirements of Section General Conditions.
- B. Deliver products to project properly identified with names, model numbers, types, grades, compliance labels, and similar information needed for distinct identifications; adequately packaged and protected to prevent damage during shipment, storage, and handling.
- C. Store equipment and materials at the site, unless off-site storage is authorized in writing. Protect stored equipment and materials from damage.
- D. Coordinate deliveries of mechanical materials and equipment to minimize construction site congestion. Limit each shipment of materials and equipment to the items and quantities needed for the smooth and efficient flow of installations.

1.21 RECORD DOCUMENTS

- A. Refer to Section 01700, the general conditions, and the supplementary conditions for requirements for record documents. The following paragraphs supplement the above.

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- B. Provide electronic autocad drawings to indicate revisions to piping and ductwork, size and location both exterior and interior; including locations of coils, dampers and other control devices, filters, boxes, and similar units requiring periodic maintenance or repair; actual equipment locations, dimensioned from column lines; concealed equipment, dimensioned to column line; mains and branches of piping systems, with valves and control devices located and numbered, concealed unions located, and with items requiring maintenance located.

1.22 OPERATION AND MAINTENANCE DATA

- A. Refer to Section 01700 for procedures and requirements for preparation and submittal of maintenance manuals. The following paragraphs supplement the requirements of Section 01700.
- B. In addition to the information required by Section 01700 for maintenance data, include the following information:
 - 1. Description of function, normal operating characteristics and limitations, performance curves, engineering data and tests, and complete nomenclature and commercial numbers of all replaceable parts.
 - 2. Manufacturer's printed operating procedures to include start-up, break-in, routine and normal operating instructions; regulation, control, stopping, shut-down, and emergency instructions; and user summer and winter operating instructions.
 - 3. Maintenance procedures for routine preventative maintenance and trouble-shooting; disassembly, repair, and reassembly; aligning and adjusting instructions.
 - 4. Servicing instructions and lubrication charts and schedules.

1.23 WARRANTIES

- A. The contractor shall provide a two (2) year minimum warrantee on all product (unless otherwise stated in the product specification for a specific product) and labor for work under this section.
- B. Refer to Section General Conditions and Section 01700 Project Closeout for additional procedures and submittal requirements for warranties.

PART 2 - PRODUCTS

2.01 ELECTRICAL REQUIREMENTS FOR MECHANICAL EQUIPMENT

- A. Pursuant to Massachusetts General Laws Chapter 141, a Massachusetts Licensed electrician shall install all low and line voltage wiring required by this section.

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B. General: The following are basic requirements for simple or common motors. For special motors, more detailed and specific requirements are specified in the individual equipment specifications.

1. All motors for all mechanical equipment shall be premium efficiency matching the following:

	HP	RPM	Efficiency
a.	1	1800	85.5%
b.	1.5	1800	86.5%
c.	2	1800	86.5%
d.	3	1800	89.5%
e.	5	1800	89.5%
f.	7.5	1800	91.0%
g.	10	1800	91.7%
h.	15	1800	93.0%
i.	20	1800	93.0%
j.	25	1800	93.6%
k.	30	1800	94.1%
l.	40	1800	94.1%
m.	50	1800	94.5%

2. Torque characteristics shall be sufficient to satisfactorily accelerate the driven loads.

3. Motor sizes shall be large enough so that the driven load will not require the motor to operate in the service factor range.

4. 2-speed motors shall have 2 separate windings on poly-phase motors.

5. Temperature Rating: Rated for 40° C. environment with maximum 50° C temperature rise for continuous duty at full load (Class A Insulation).

6. Starting Capability: Frequency of starts as indicated by automatic control system, and not less than 5 evenly time spaced starts per hour for manually controlled motors.

7. Service Factor: 1.15 for poly-phase motors and 1.35 for single phase motors.

8. Motor Construction: NEMA Standard MG 1, general purpose, continuous duty, Design "B", except "C" where required for high starting torque.

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9. Frames: NEMA Standard No. 48 or 54; use driven equipment manufacturer's standards to suit specific application.
 10. Bearings:
 - a. Ball or roller bearings with inner and outer shaft seals.
 - b. Re-greasable, except permanently sealed where motor is normally inaccessible for regular maintenance.
 - c. Designed to resist thrust loading where belt drivers or other drives produce lateral or axial thrust in motor.
 - d. For fractional horsepower, light duty motors, sleeve type bearings are permitted.
 11. Enclosure Type:
 - a. Open drip-proof motors for indoor use where satisfactorily housed or remotely located during operation.
 - b. Guarded drip-proof motors where exposed to contact by employees or building occupants.
 - c. Weather protected Type I for outdoor use, Type II where not housed.
 12. Overload Protection: Built-in thermal overload protection and, where indicated, internal sensing device suitable for signaling and stopping motor at starter.
 13. Noise Rating: "Quiet".
 14. Efficiency: "Energy Efficient" motors shall have a minimum efficiency as scheduled in accordance with IEEE Standard 112, test method B. If efficiency not specified, motors shall have a higher efficiency than "average standard industry motors", in accordance with IEEE Standard 112, Test Method B.
 15. Nameplate: Indicate the full identification of manufacturer, ratings, characteristics, construction, special features and similar information.
- C. **STARTERS, ELECTRICAL DEVICES, AND WIRING: (PROVIDED BY THE HVAC CONTRACTOR FOR EACH PACKAGED PIECE OF HVAC EQUIPMENT REQUIRING SUCH):**
1. Motor Starter Characteristics:
 - a. Enclosures: NEMA 1, general purpose enclosures with padlock ears, except in wet locations shall be NEMA 3R with conduit hubs, or units in hazardous locations which shall have NEC proper class and division.

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- b. Type and size of starter shall be as recommended by motor manufacturer and the driven equipment manufacturer for applicable protection and start-up condition.
 2. Manual Switches shall have:
 - a. Pilot lights and extra position for multi-speed motors.
 - b. Overload Protection: Melting alloy type thermal overload relays.
 3. Magnetic Starters:
 - a. Maintained contact push buttons and pilot lights, properly arranged for single speed or multi-speed operation as indicated.
 - b. Trip-free thermal overload relays, each phase.
 - c. Interlocks, switches and similar devices as required for coordination with control requirements of Division 15 Controls Sections.
 - d. Built-in 120 volts control circuit transformer, fused from line side, where service exceeds 240 volts.
 - e. Externally operated manual reset.
 - f. Under-voltage release or protection.
 4. Capacitors:
 - a. Individual unit cells.
 - b. All welded steel housing.
 - c. Each capacitor internally fused.
 - d. Non-flammable synthetic liquid impregnant.
 - e. Craft tissue insulation.
 - f. Aluminum foil electrodes.
 - g. KVAR size shall be as required to correct motor power factor to 90% or better and shall be installed on all motors 1 horsepower and larger, that have an uncorrected power factor of less than 85% at rated load.
 5. Disconnect Switches (Those specified under this Section):
 - a. Fusible Switches: Fused, each phase; general duty; horsepower rated; non-teasible quick-make, quick-break mechanism; dead front line side shield; solderless lugs suitable for copper or aluminum conductors; spring reinforced fuse clips; electro silver plated current carrying parts; hinged doors; operating lever arranged for locking in

the "OPEN" position; arc quenchers; capacity and characteristics as indicated.

- b. Non-fusible Switches: For equipment 2 horsepower and smaller, shall be horsepower rated; toggle switch type; quantity of poles and voltage rating as indicated. For equipment larger than 2 horsepower, switches shall be the same as fusible type.

2.02 HANGERS & ATTACHMENTS

A. Horizontal-Piping Hangers and Supports:

- 1. General: Except as otherwise indicated, provide factory-fabricated horizontal piping hangers and supports complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacture for each piping service. Select size of hangers and supports to exactly fit pip size for bare piping, and to insulated piping. Provide copper-plated hangers and supports for copper-piping systems.
 - a. Adjustable Steel Clevises Hangers: MSS Type 1.
 - b. Steel Pipe Clamps: MSS Type 4.
 - c. Pipe Slides and Slide Plates: MSS Type 35, including one of the following plate types:
 - 1) Plate: Unguided type.
 - 2) Plate: Guided type.
 - 3) Plate: Hold-down clamp type.
 - d. Pipe Saddle Supports: MSS Type 36, including steel pipe base-support and cast-iron floor flange.
 - e. Pipe Stanchion Saddles: MSS Tube 37, including steel pip base support and cast-iron floor flange.
 - f. Adjustable Pipe Saddle Supports: MSS Type 38, including steelpipe base support and cast-iron floor flange.
 - g. Single Pipe Rolls: MSS Type 41.
 - h. Adjustable Roller Hangers: MSS Type 43.
 - i. Pipe Roll Stands: MSS Type 44.
 - j. Pipe Rolls and Plates: MSS Type 45.
 - k. Adjustable Pipe Roll Stands: MSS Type 46.

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2. Manufacturer: Subject to compliance with requirements, provide hangers and supports of one of the following:
 - a. Carpenter and Patterson, Inc.
 - b. Corner & Lada Co., Inc.
 - c. Elcen Metal Products Co.
 - d. Fee & Mason Mfg. Co.; Div. Figgie International
 - e. ITT Grinnel Corp.
- B. Vertical-Piping Clamps:
1. General: Except as otherwise indicated, provide factory-fabricated vertical-piping clamps, complying with MSS SP-58, of one of the following types listed, selected by Installer to suit vertical piping systems, in accordance with MSS SP-69 and manufacturer's published product information. Select size of vertical piping clamps to exactly fit pipe size of bare pipe. Provide copper-plated clamps for copper-piping systems.
 - a. Two-Bolt Riser Clamps: MSS Type 8.
 - b. Four-Bolt Riser Clamps: MSS Type 42.
 2. Manufacturer: Subject to compliance with requirements, provide hangers and supports of one of the following:
 - a. Carpenter and Patterson, Inc.
 - b. Corner & Lada Co., Inc.
 - c. Elcen Metal Products Co.
 - d. Fee & Mason Mfg. Co.; Div. Figgie International
 - e. ITT Grinnel Corp.
- C. Hanger-Rod Attachments:
1. General: Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-pipe hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
 - a. Steel Turnbuckles: MSS Type 13.
 - b. Swivel Turnbuckles: MSS Type 15.
 - c. Malleable Iron Sockets: MSS Type 16.

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2. Manufacturer: Subject to compliance with requirements, provide hangers and supports of one of the following:
 - a. Carpenter and Patterson, Inc.
 - b. Corner & Lada Co., Inc.
 - c. Elcen Metal Products Co.
 - d. Fee & Mason Mfg. Co.; Div. Figgie International
 - e. ITT Grinnel Corp.
- D. Building Attachments:
 1. General: Except as otherwise indicate, provide factory-fabricated building attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.
 - a. Concrete Inserts: MSS Type 18.
 - b. Top Beam C-Clamp: MSS Type 19.
 - c. Side Beam or Channel Clamps: MSS Type 20.
 - d. Center Beam Clamps: MSS Type 21.
 - e. Welded Beam Attachments: MSS Type 22.
 - f. C-Clamps: MSS Type 23.
 - g. Top Beam Clamps: MSS Type 25.
 - h. Side Beam Clamps: MSS Type 27.
 - i. Steel Beam Clamps W/Eye Nut: MSS Type 28.
 - j. Linked Steel Clamps W/Eye Nut: MSS Type 29.
 - k. Malleable Beam Clamps: MSS Type 30.
 - l. Steel Brackets: One of the following for indicated loading:
 - 1) Light Duty: MSS Type 31.
 - 2) Medium Duty: MSS Type 32.
 - 3) Heavy Duty: MSS Type 33.
 - m. Side Beam Brackets: MSS Type 34.
 - n. Plate Lugs: MSS Type 57.
 - o. Horizontal Travelers: MSS Type 58.

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2. Manufacturer: Subject to compliance with requirements, provide hangers and supports of one of the following:
 - a. Carpenter and Patterson, Inc.
 - b. Corner & Lada Co., Inc.
 - c. Elcen Metal Products Co.
 - d. Fee & Mason Mfg. Co.; Div. Figgie International
 - e. ITT Grinnel Corp.
- E. Saddles and Shields:
 1. General: Except as otherwise indicated, provide saddles or shields under piping hangers and supports, factory-fabricated, for all insulated piping. Size saddles and shields for exact fit to mate with pipe insulation.
 2. Protection Saddles: MSS Type 39; fill interior voids with segments of insulation matching adjoining insulation.
 3. Protection Shields: MSS Type 40; of length recommended by manufacturer to prevent crushing of insulation.
 4. Manufacturer: Subject to compliance with requirements, provide thermal hanger shields of one of the following:
 - a. Elcen Metal Products Co.
 - b. Pipe Shields, Inc.
 - c. Carpenter Patterson, Inc.
 - d. ITT Grinnel Corp.
- F. Miscellaneous Materials:
 1. Metal Framing: Provide products complying with NEMA STD ML 1.
 2. Steel Plates, Shapes, and Bars: Provide products complying with ASTM A 36.
 3. Cement Grout: Portland cement (ASTM C 150, Type I or Type III) and clean uniformly graded, natural sand (ASTM C 404, Size No. 2). Mix at a ratio of 1.0 part cement to 3.0 parts sand, by volume, with minimum amount of water required for placement and hydration.
 4. Heavy Duty Steel Trapezes: Fabricate from steel shapes selected for loads required; weld steel in accordance with AWS standards.
 5. Pipe Guides: Provide factory-fabricated guides, of cast semi-steel or heavy fabricated steel, consisting of bolted two-section outer cylinder and base with two-section guiding spider bolted tight to

pipe. Size guide and spiders to clear pipe and insulation (if any), and cylinder. Provide guides of length recommended by manufacturer to allow indicated travel.

2.03 MECHANICAL IDENTIFICATION

A. Plastic Pipe Markers:

1. Snap-On Type: Provide manufacturer's standard pre-printed, semi-rigid snap-on, color-coded pipe markers, complying with ANSI A13.1
2. Pressure-Sensitive Type: Provide manufacturer's standard pre-printed, permanent adhesive, color-coded, pressure-sensitive vinyl pipe markers, complying with ANSI A13.1
3. Insulation: Furnish 1" thick molded fiberglass insulation with jacket for each plastic pipe marker to be installed on uninsulated pipes subjected to fluid temperatures of 125°F (52°C) or greater. Cut length to extend 2" beyond each end of plastic pipe marker.
4. Small Pipes: For external diameters less than 6" (including insulation if any), provide full-band pipe markers, extending 360 degrees around pipe at each location, fastened by one of the following methods:
 - a. Snap-on application of pre-tensioned semi-rigid plastic pipe marker.
 - b. Adhesive lap joint in pipe marker overlap.
 - c. Laminated or bonded application of pipe marker to pipe (or insulation).
 - d. Taped to pipe (or insulation) with color-coded plastic adhesive tape, not less than 3/4" wide; full circle at both ends of pipe marker, tape lapped 1-1/2".

B. Valve Tags:

1. Brass Valve Tags: Provide 19-gage polished brass valve tags with stamp-engraved piping system abbreviation in 1/4" high letters and sequenced valve numbers 1/2" high, and with 5/32" hole for fastener.
 - a. Provide 1-1/2" diameter tags, except as otherwise indicated.
 - b. Provide size and shape as specified or scheduled for each piping system.
 - c. Fill tag engraving with black enamel.
2. Valve Tag Fasteners: Provide manufacturer's standard solid brass chain (wire link or beaded type), or solid brass S-hooks of the sizes

required for proper attachment of tags to valves, and manufactured specifically for that purpose.

- C. Valve Schedule Frames:
 - 1. General: For each page of valve schedule, provide glazed display frame, with screws for removable mounting on masonry walls. Provide frames of finished hardwood or extruded aluminum, with SSB-grade sheet glass.
- D. Plastic Equipment Markers:
 - 1. General: Provide manufacturer's standard laminated plastic, color-coded equipment markers. Conform to the following color code:
 - a. Green: Cooling equipment and components.
 - b. Yellow: Heating equipment and components.
 - c. Yellow/Green: Combination cooling and heating equipment and components.
 - d. Blue: Equipment and components that do not meet any of the above criteria.
 - 2. Nomenclature: Include the following, matching terminology on schedules as closely as possible:
 - a. Name and plan number.
 - b. Equipment service.
 - c. Design capacity.
 - 1) Other design parameters such as pressure drop, entering and leaving conditions, rpm, etc.
 - 3. Size: Provide approximate 2-1/2" x 6" markers for each piece of equipment.
 - 4. Application: Provide equipment labels for the following equipment:
 - a. Air Handling Units
 - b. Exhaust Fans
 - c. Condensing Units

2.04 MECHANICAL INSULATION

- A. Piping Insulation Materials:
 - 1. Fiberglass Piping Insulation: ASTM C 547, Class 45 required.
 - a. Class 1 for use to 450 degrees F; Class 2 for use to 650 degrees F; Class 3 for use to 1200 degrees F.

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2. Flexible Unicellular Piping Insulation: ASTM C 534, Type as required.
 - a. Type I - tubular; Type II - sheet. For use between -40 degrees F and 200 degrees F.
 3. Jackets for piping Insulation: ASTM C 921, with vapor barrier for piping with temperatures below ambient.
 4. Encase pipe fittings insulation with one-piece premolded PVC fitting covers, fastened as per manufacturer's recommendations.
 5. Encase straight pipe insulation, where exposed in occupied and outdoor locations areas, with one piece 20-mil thick PVC Jacketing. Fasten and seal as per manufacturer's recommendations. Outdoor piping covering shall be UV protected with color by Architect (grey color shall be base design).
 6. Encase exterior piping insulation with aluminum jacket with weather-proof construction.
 7. Staples, Bands, Wires and Cement: As recommended by insulation manufacturer for applications indicated.
 8. Adhesives, Sealants and Protective Finishes: As recommended by insulation manufacturer for applications indicated.
- B. Piping Insulation Application and Thickness:
1. Application: Cold Piping (40 Degrees F to Ambient):
 - a. Insulate the following cold HVAC piping systems:
 - 1) Air conditioner condensate drain piping.
 - 2) Refrigerant liquid and suction piping.
 - b. Insulate each piping system specified above with the following type and thicknesses of insulation:
 - 1) Fiberglass: 1" thick.
- C. Ductwork Insulation Materials:
1. Rigid Fiberglass Ductwork Insulation: ASTM C 612, Class as required.

CLASS 2 - 400 DEGREES F; 4 LBS./FT³.
CLASS 3 - 850 DEGREES F; 12 LBS./FT³.
CLASS 4 - 1000 DEGREES F; 12 LBS./FT³.
CLASS 5 - 1800 DEGREES F; 20 LBS./FT³.
 2. Flexible Fiberglass Ductwork Insulation: ASTM C 512, Class as required.

CLASS 2 - 400 DEGREES F; .75 LBS./FT3.

CLASS 3 - 850 DEGREES F; 1.5 LBS./FT3.

3. Jackets for Ductwork Insulation: ASTM C 921, with vapor barrier.
4. Ductwork Insulation Accessories: Provide staples, bands, wire, tape, anchors, corner angles and similar accessories as recommended by insulation manufacturer for applications indicated.
5. Ductwork Insulation Compounds: Provide cements, adhesives, coatings, sealers, protective finishes and similar compounds as recommended by insulation manufacturer for applications indicated.

D. Ductwork Insulation Application and Thickness:

1. Application: Ventilation and AC System Ductwork:
 - a. Insulate the following ductwork:
 - 1) Outdoor air intake ductwork between air entrance and air handling unit inlet.
 - 2) HVAC supply ductwork between HVAC unit discharge and room terminal outlet.
 - 3) Insulate neck and bells of supply diffusers.
 - 4) HVAC return ductwork between room terminal inlet and HVAC unit inlet; except omit insulation on return ductwork located in return air ceiling plenums.
 - 5) HVAC plenums and unit housing not pre-insulated at factory or lined.
 - 6) Exhaust ductwork between in-line exhaust fan and point of exit in building.
 - b. Insulate each ductwork system specified above with the following type and thicknesses of insulation:
 - 1) Rigid Fiberglass: In machine rooms, fan rooms, and mechanical spaces insulate all supply air, return air and outside air ductwork with 2" thick rigid. All exposed outdoor ductwork in occupied areas shall be insulated internally with same thickness and material.
 - 2) Flexible Fiberglass: 3" thick, application limited to concealed locations which shall include above ceilings, in chases, shafts etc.

3) All outside air ductwork shall be 2" rigid.

2.05 REFRIGERANT PIPING

- A. General: Provide piping materials and factory-fabricated piping products of sizes, types, pressure ratings, temperature ratings, and capacities as indicated. Where not indicated, provide proper selection as determined by Installer to comply with installation requirements. Provide materials and products complying with ANSI B31.5 Code for refrigeration piping where applicable, base pressure rating on refrigerant piping system maximum design pressures. Provide sizes and types matching piping and equipment connections; provide fittings of materials which match pipe materials used in refrigerant piping systems. Where more than one type of materials and products are indicated, selection is Installer's option.
- B. Material: Provide pipes and pipe fittings in accordance with the following listing:
 - 1. Tube Size 4-1/8" and Smaller: Copper tube; Type ACR, hard-drawn temper; wrought-copper, solder-joint fittings; brazed joints.
- C. Soldered Joints: Solder joints using silver-lead solder, ASTM B32, Grade 96 TS.
- D. Brazed Joints: Braze joints using American Welding Society (AWS) classification BCUO-4 for brazing filler metal.
- E. Piping Specialties: Provide piping specialties complying with Division-15 "Hydronic Piping" in accordance with the following listing:
 - 1. Pipe escutcheons.
 - 2. Drip pans.
 - 3. Sleeves.
 - 4. Sleeve seals.
- F. Refrigerant Valves: Special valves required for refrigerant piping include the following types.
 - 1. Globe Shutoff Valves: Forged brass, packed, back seating, winged seal cap, 300 degrees F (149 degrees C) temperature rating, 500 psi working pressure.
 - 2. Check Valves: Forged brass, accessible internal parts, soft synthetic seat, fully guided piston and stainless steel spring, 250 degrees F (121 degrees C) temperature rating, 500 psi working pressure.
 - 3. Manufacturer: Subject to compliance with requirements, provide globe and check valves of one of the following:
 - a. Henry Valve CO.

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- b. Parker Hannifin Corp.; Refrigeration & Air Cond. Div.
 - c. Sporlan Valve Co.
4. 2-Way Solenoid Valves: Forged brass, designed to conform to ARI 760, normally closed, teflon valve seat, NEMA 1 solenoid enclosure, 24 volt, 60 Hz., UL-listed, ½” conduit adapter, 250 degrees F (121 degrees C) temperature rating, 400 psi working pressure.
 5. Manufacturer: Subject to compliance with requirements, provide solenoid valves of one of the following:
 - a. Alco Controls Div.; Emerson Electric Co.
 - b. Automatic Switch Co.
 - c. Sporland Valve CO.
 6. Refrigerant Strainers: Brass shell and end connections, brazed joints, monel screen, 100 mesh, UL-listed, 350 psi working pressure.
 7. Moisture-Liquid Indicators: Forged brass, single port, removable cap, polished optical glass, solder connections, UL-listed, 200 degrees F (93 degrees C) temperature rating, 500 psi working pressure.
 8. Refrigerant Filter-Driers: Steel shell, ceramic fired desiccant core, solder connections, UL-listed, 500 psi working pressure.
 9. Refrigerant Filter-Driers: Corrosion-resistant steel shell, steel flange ring and spring, wrought copper fittings, ductile iron coverplate with steel cap screws, replaceable filter-drier core, 500 psi working pressure.
 10. Evaporator Pressure Regulators: Provide corrosion-resistant, spring loaded, stainless steel springs, pressure operated, evaporator pressure regulator, in size and working pressure indicated, with copper connections.
 11. Refrigerant Discharge Line Mufflers: Provide discharge line mufflers as recommended by equipment manufacturer for use in service indicated, UL-listed.
 12. Manufacturer: Subject to compliance with requirements, provide refrigeration accessories of one of the following:
 - a. Alco Controls Div.; Emerson Electric CO.
 - b. Henry Valve CO.
 - c. Parker-Hannifin Corp.; Refrigeration & Air Conditioning Div.

d. Sporlan Valve Co.

G. Basic Vibration Control: Provide vibration control products as required in accordance with the following listing:

1. Isolation hangers.
 - a. Riser isolators.
 - b. Riser support isolators.
 - c. Flexible pipe connectors.

2.06 GAS-FIRED FURNACE (AHU) (UPFLOW/HORIZ)

- A. General: Provide where shown on the drawings sealed combustion direct vent high efficiency 90%+ efficient horizontal and/or upflow gas-fired furnace and air handling package.
- B. Cabinet: Shall be heavy gage steel with wrap around cabinet construction. Cabinet interior shall be lined with 1" foil face fiberglass insulation. Cabinet exterior shall be painted with baked enamel finish. All service shall be performed from the front without the need to remove any side or rear panels.
- C. Furnace: Shall be heavy gage aluminized steel heat exchange with aluminized steel non-limiting burner. Burner shall be designed to operate on natural gas and shall be A.G.A. certified. **Provide 2 stage gas fired heating furnace.**
- D. Fan: Shall be of the direct drive centrifugal design provided with minimum three (3) speed settings. **Provide variable speed ECM motor assembly.**
- E. Accessories: Provide the following factory installed accessories:
 1. 1" air filter
 2. Electronic ignition.
 3. Dual solenoid combination gas valve and regulator.
 4. Pilot flame sensor.
 5. Manual shut off valve.
 6. Limit and adjustable fan control.
 7. Air conditioning fan relay
 8. Control transformer.
 9. Vent safety shut-off switch.
 10. Blower door safety switch.
 11. Flame roll out safety switch.

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12. Condensate neutralization kit
 13. Vertical concentric vent/intake kit
- F. Cooling: Provide manufacturers standard "A" frame cased cooling coil completely piped ready for field mounting to above furnace/air handling package. In addition, provide matched air cooled condensing unit. Provide capacity, voltage, phase etc. as indicated in schedule on drawings.
- G. Manufacturer: Subject to compliance with requirements, provide furnace units of one of the following:
1. Trane (The) Co.; Div. of American Standard Inc.
 2. Carrier Air Conditioning; Div. of Carrier Corp.
 3. McQuay Air Conditioning Group; McQuay Inc.
 4. York; Div. of York International.

2.07 AIR COOLED CONDENSERS

- A. Air-Cooled Condensing Units (ACC)
1. General: Factory-assembled and tested air-cooled condensing units, consisting of compressor, condenser coil, fan, motor, refrigerant reservoir, and operating controls. Capacity and electrical characteristics are scheduled on the Drawings.
 2. Casing: Galvanized steel finished with baked enamel, complete with removable panels for access to controls, weep holes for water drainage, and mounting holes in base. Unit shall be complete with brass service valves, fittings, and gage ports on exterior of casing.
 3. Compressor: Hermetically sealed with built-in overloads and vibration isolation. Compressor motor, shall have thermal and current sensitive overload devices, internal high-pressure protection, high and low pressure cutout switches, start capacitor and relay, 2-pole contractor, crankcase heater, and temperature actuated switch and timer to prevent compressor rapid cycle. Evaporator defrost control, minimum run time switch and anti-short cycle switch.
 4. Condenser: Coil shall have copper tubes and aluminum fins, or aluminum tubes and aluminum fins; complete with liquid accumulator and liquid subcooler. Aluminum propeller fan shall be direct driven, with permanently lubricated fan motor having thermal overload protection.
 5. Efficiency: Unit efficiency shall be minimum 14 SEER.
 6. Accessories: Provide manufacturer's standard options including the following: evaporator defrost costs, crank case heater, ant-

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short cycle timer, compressor acoustic blankets, rubber isolator kit, hard start kit.

7. Manufacturers: Subject to compliance with requirements, provide residential air-cooled condensing units of one of the following:
 - a. Trane (The) Co.; Div. American Standard Inc.
 - b. Carrier Air Conditioning; Div. Carrier Corp.
 - c. McQuay Air Conditioning Group; McQuay Inc.
 - d. York; Div. York International.

2.08 TERMINAL HEATING UNITS (ELECTRIC)

A. ELECTRIC PROPELLER UNIT HEATERS (UH)

1. Materials and Equipment:
 - a. General: Except as otherwise indicated, provide manufacturer's standard electric propeller unit heater materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for a complete installation.
2. Heating Elements:
 - a. General: Except as otherwise indicated, provide manufacturer's standard heating elements of types, sizes, capacities, and ratings for duty indicated; consisting of resistance elements in steel sheath with extended fins, or with spirally finned sheath.
 - b. Heating Capacity: Size elements for indicated fan speed, CFM, room heating load (BTUH), entering air temperature, and electric inputs (watts, voltage, phase).
3. Casings:
 - a. General: Provide casings braced and reinforced to provide required stiffness, and with adjustable heating element supports and brackets. Provide rounded corners. Phosphatize and paint casings inside and out with single coat of baked-on enamel; and zinc plate hardware. Include fan orifice (venturi) in casing, as well as threaded hanger connections (weld nuts). Fabricate from 18-gage galvanized steel.
4. Air Deflectors:
 - a. General: Provide manufacturer's standard air deflectors of the following types:

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- 1) 4-way finned louvers.
 - 2) Cone diffusers.
 - 3) Vane outlets.
 - 4) Louver outlets.
5. Motors:
- a. General: Provide totally enclosed shaded-pole, or permanent-split capacitor motors, Class "B" insulation, resiliently mounted, tap wound with built-in thermal overload protection, and with sleeve type or permanently lubricated ball bearings.
 - b. Internal Electrical Wiring: Provide units with high temperature, heat-resistant electrical wiring enclosed in flexible metal conduit extending from terminal junction box to electrical devices. Provide fusing for motor and control circuit wiring.
 - c. Devices: Provide propeller unit heaters with the following devices:
 - 1) Thermally activated fan switch to keep fan motor operating until residual heat is dissipated.
 - 2) Disconnect switch.
 - 3) Automatic reset, high limit cut-out switch located in discharge air stream.
 - 4) Magnetic contractor.
 - 5) Transformer.
6. Fans:
- a. General: Provide aluminum propeller fans which are balanced statically and dynamically, of indicated capacity. Provide fans suitable for standard or sparkproof application.
7. Manufacturers: Subject to compliance with requirements, provide propeller unit heaters of one if the following:
- a. QMark
 - b. Chromalox Div.; Emerson Electric Co.
 - c. Federal Pacific Electric Co.
 - d. Indeco, Inc.
- B. ELECTRIC CABINET HEATERS (UH)

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1. Materials and Equipment:
 - a. General: Except as otherwise indicated, provide electric cabinet heater manufacturer's standard materials and components as indicated by published product information, designed and constructed as recommended by manufacturer, and as required for complete installation.
2. Heating Elements:
 - a. General: Except as otherwise indicated, provide manufacturer's standard heating elements of types, sizes, capacities and ratings for duty indicated; consisting of resistance elements enclosed in steel sheath with extended fins, or with spirally finned sheath.
 - b. Electric Heating Capacity: Size elements for indicated fan speed, CFM, room heating load (BTUH), entering air temperature, and electric input (watts, voltage, phase).
3. Cabinets:
 - a. General: Provide cabinets braced and reinforced to provide required stiffness, and with adjustable heating element supports. Provide 1/2" thick, 2 lb. density, glass fiber insulation on interior of front panel. Phosphatize and paint cabinets inside and out with single coat of baked-on primer. Include discharge air grilles in cabinet, die formed with fixed directional louvers. Provide cabinets with removable front panels secured by slide bolt, camlock or Phillip head type screws. Fabricate from 16-gage galvanized steel.
 - b. Cabinet Accessories: Provide manufacturer's standard accessories of the following types; manufacturer's option applies where more than one type is indicated for each accessory.
 - 1) Gaskets for installation between front panel and enclosure; of manufacturer's standard gasket material.
 - 2) Discharge duct collars.
 - 3) Inlet duct collars.
 - 4) Hinged access doors with tamper-proof latches.
 - 5) Disposable air filters, 1" thick.
 - 6) Tamper-proof panel fasteners consisting of either allen head type machine screws, or spanner wrench type operating cam fasteners.

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- 7) Overlap on 3 or 4 sides (as required) for recessed and semi-recessed cabinets to concealing recesses.
 - c. Cabinet Finish: Provide factory finishes of the following:
 - 1) Special finishes of the type indicated.
 - 2) Baked enamel finishes selected from manufacturer's standard colors.
4. Motors:
 - a. General: Provide totally enclosed shaded-pole, or permanent-split capacitor motors, Class "B" insulation, resiliently mounted tap wound with built-in thermal overload protection, and with permanently lubricated type sleeve or ball bearings.
 - b. Extended Motor Oilers: Provide plastic tubes for lubricating motor bearings which are installed beneath grille.
 - c. Motor Controls: Provide multi-speed motor control switch with OFF position, mounted behind access door.
 - d. Internal Electrical Wiring: Provide units with high temperature, electrical heat-resistant wiring in flexible metal conduit from terminal junction box to electrical devices. Provide fusing for motor and control circuit wiring.
 - e. Devices: Provide cabinet heaters with the following devices:
 - 1) Thermally activated fan switch to keep fan motor operating until residual heat is dissipated.
 - 2) Disconnect switch.
 - 3) Automatic reset, high limit cut-out switch located in discharge air stream.
 - 4) Magnetic contractor.
5. Fans:
 - a. General: Provide double width, double inlet centrifugal fans, which are balanced statically and dynamically, of indicated capacity. Select fans with single or double extended motor shaft, with fan housing and motor fastened as an integral assembly to a motorboard.
6. Construction:
 - a. Wheels: Talc-filled polypropylene or aluminum.

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- b. Housing: Galvanized steel.
- c. Motorboard: Galvanized steel.
- 7. Vibration Isolation: Provide types and sizes of vibration isolators as recommended by manufacturer.
- 8. Manufacturers: Subject to compliance with requirements, provide cabinet heaters of one of the following:
 - a. QMark
 - b. Chromalox Div.; Emerson Electric Co.
 - c. Federal Pacific Electric Co.
 - d. Indeco, Inc.

2.09 POWER AND GRAVITY VENTILATORS

- A. General: Except as otherwise indicated, provide standard prefabricated power and gravity ventilator units of type and size indicated, modified as necessary to comply with requirements, and as required for complete installation.
- B. Refer to Division-15 automatic temperature control for control sequence.
- C. EXHAUST FANS (EF)
 - 1. Type: Centrifugal fan, direct or belt driven as scheduled. Provide aluminum, or galvanized steel, weatherproof housings as scheduled. Provide square base to suit roof curb. Provide permanent split-capacitor type motor for direct driven fans; capacitor-start, induction-run type motor for belt driven fans.
 - 2. Electrical: Provide factory-wired non-fusible type disconnect switch at motor in fan housing. Provide thermal overload protection in fan motor. Provide conduit chase within unit for electrical connection.
 - 3. Bird Screens: Provide removable bird screens, 1/2" mesh, 16-ga. aluminum or brass wire.
 - 4. Gravity Operated Dampers: Provide gravity-actuated, felt edge, louvered dampers in curb bases.
 - 5. Motor Operated Dampers: Provide louvered dampers with linkage below curb base (maximum of 6").
 - 6. Manufacturer: Subject to compliance with requirements, provide centrifugal roof ventilators of one of the following:
 - a. Greenheck Fan Corp.
 - b. Carnes Co., Div. of Wehr Corp.
 - c. Cook Co., Loren.

d. Penn Ventilator Co., Inc.

2.10 METAL DUCTWORK

A. Ductwork Materials:

1. Exposed Ductwork Materials: Where ductwork is indicated to be exposed to view in occupied spaces, provide materials which are free from visual imperfections including piping, seam marks, roller marks, stains and discolorations, and other imperfections, including those which would impair painting.
2. Sheet Metal: Except as otherwise indicated, fabricate ductwork from galvanized sheet steel complying with ASTM A 527, lock forming quality, with G 90 zinc coating in accordance with ASTM A 525; and mill phosphatized for exposed locations.

B. Miscellaneous Ductwork Materials:

1. General: Provide miscellaneous materials and products of types and sizes indicated and, where not otherwise indicated, provide type and size required to comply with ductwork system requirements including proper connection of ductwork and equipment.
2. Fittings: Provide radius type fittings fabricated of multiple sections with maximum 15 degree change of direction per section. Unless specifically detailed otherwise, use 45 degree laterals and 45 degree elbows for branch takeoff connections. Where 90 degree branches are indicated, provide conical type tees.
3. Duct Liner: Refer to "Acoustic Duct Lining Section".
4. Duct Liner Adhesive: Comply with ASTM C 916 "Specification for Adhesives for Duct Thermal Insulation".
5. Duct Liner Fasteners: Comply with SMACNA HVAC Duct construction Standards, Article S2.11.
6. Duct Sealant: Non-hardening, non-migrating mastic or liquid elastic sealant, type applicable for fabrication/installation details, as compounded and recommended by manufacturer specifically for sealing joints and seams in ductwork.
7. Ductwork Support Materials: Except as otherwise indicated, provide hot-dipped galvanized steel fasteners, anchors, rods, straps, trim and angles for support of ductwork.
 - a. For exposed stainless steel ductwork, provide matching stainless steel support materials.

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- b. For aluminum ductwork, provide aluminum support materials except where materials are electrically separated from ductwork.
- 8. Flexible Ducts: Corrugated aluminum complying with UL 181.
 - a. Where installed in unconditioned spaces other than return air plenums, provide 1" thick continuous flexible fiberglass sheath with vinyl vapor barrier jacket.
- C. Fabrication:
 - 1. Shop fabricated ductwork in 4, 8, 10 or 12-ft lengths, unless otherwise indicated or required to complete runs. Pre-assembled work in shop to greatest extent possible, so as to minimize field assembly of systems. Disassemble systems only to extent necessary for shipping and handling. Match-mark sections for reassembly and coordinated installation.
 - 2. Shop fabricated ductwork of gages and reinforcement complying with SMACNA "HVAC Duct Construction Standards".
 - 3. Fabricate duct fittings to match adjoining ducts, and to comply with duct requirements as applicable to fittings. Except as otherwise indicated, fabricate elbows with center-line radius equal to 1-1/2 times associated duct width; or squared metered elbows with double thickness turning vanes. Limit angular tapers to 30 degrees for contracting tapers and 20 degrees for expanding tapers.
 - 4. Fabricate ductwork with accessories installed during fabrication to the greatest extent possible. Refer to section "Ductwork Accessories" for accessory requirements.
 - 5. Fabricate ductwork with duct liner in each section of duct where indicated. Laminate liner to internal surfaces of duct in accordance with instructions by manufacturers of lining and adhesive, and fasten with mechanical fasteners.
- D. Factory-Fabricated Low Pressure Round And Oval Ductwork:
 - 1. General: Provide factory-fabricated duct and fittings.
 - 2. Material: Material type shall be as indicated or, galvanized sheet steel complying with ASTM A 527, lock forming quality, with ASTM A 525, G90 zinc coating, mill phosphatized.
 - 3. Gage: 28-gage minimum for round and oval ducts and fittings, 4" through 24" diameter.
 - 4. Seams: All seams shall be spiral lockseams.

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5. Elbows: One piece construction for 90 degrees and 45 degree elbows 14" and smaller. Provide multiple gore construction for larger diameters with standing seam circumferential joint.
6. Divided flow Fittings: 90 degree tees, constructed with saddle tap spot welded and bonded to duct fitting body.
7. Manufacturers: Subject to compliance with requirements, provide factory-fabricated ductwork of one of the following:
 - a. Semco Mfg., Inc.
 - b. United Sheet Metal Div., United McGill Corp.

2.11 DUCTWORK ACCESSORIES

A. Dampers:

1. Low Pressure Manual Dampers: Provide dampers of single blade type or multiblade type, constructed in accordance with SMACNA "HVAC Duct construction Standards".
2. Automatic Control Dampers: Refer to Division-15 section "Automatic Temperature Control" for control dampers; not work of this section.
3. Backdraft Relief Dampers: Provide dampers with parallel blades, counterbalanced and factory-set to relieve at .05" static pressure. Construct blades of 16-ga. aluminum, provide 1/2" diameter ball bearings, 1/2" diameter steel axles spaced on 9" centers. Construct from 2" x 1/2" x 1/8" steel channel for face areas 25 sq. ft. and under; 4" x 1-1/4" x 16 ga. channel for face areas over 25 sq. ft. Provide galvanized steel finish on frame with aluminum touch-up. Provide felted or rubber trim to assure tight, leak-proof seal when closed.
4. Manufacturer: Subject to compliance with requirements, provide dampers of one of the following:
 - a. Air Balance, Inc.
 - b. Airgarde Corp.
 - c. American Warming & Ventilating, Inc.
 - d. Arrow Louver and Damper; Div. of Arrow United Industries, Inc.
 - e. Louvers & Dampers, Inc.
 - f. Penn Ventilator Co.
 - g. Ruskin Mfg. Co.

B. Fire Dampers:

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1. Fire Dampers: Provide fire dampers, of types and sizes indicated. Construct casings of 11-ga. galvanized steel. Provide fusible link rated at 160 to 165 degrees F (71 to 74 degrees C) unless otherwise indicated. Provide out of air stream type damper in open position and with positive lock in closed position, and with the following additional features:
 - a. Damper Blade Assembly: Curtain type.
 - b. Blade Material: Steel, match casing.
 - c. Blade Material: Stainless steel.
 2. Manufacturer: Subject to compliance with requirements, provide fire and smoke dampers of one of the following:
 - a. Air Balance, Inc.
 - b. American Warming & Ventilating, Inc.
 - c. Arrow Louver and Damper; Div. of Arrow United Industries, Inc.
 - d. Louvers & Dampers, Inc.
 - e. Penn Ventilator Co.
 - f. Phillips-Aires
 - g. Ruskin Mfg. Co.
- C. Turning Vanes:
1. Manufactured Turning Vanes: Provide double thickness airfoil turning vanes constructed of 1-1/2" wide curved blades set at 3/4" o.c., supported with bars perpendicular to blades set at 2" o.c, and set into side strips suitable for mounting in ductwork.
 2. Manufacturer: Subject to compliance with requirements, provide turning vanes of one of the following:
 - a. Aero Dyne Co.
 - b. Airsan Corp.
 - c. Anemostat Products Div.; Dynamics Corp. of America.
 - d. Barber-Colman Co.
 - e. Duro Dyne Corp.
 - f. Environmental Elements Corp.; Subs, Koppers Co., Inc.
 - g. Hart & Cooley Mfg. Co.
 - h. Register & Grille Mfg. Co., Inc.
 - i. Souther, Inc.

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D. Duct Hardware:

1. General: Provide duct hardware, manufactured by one manufacturer for all items on project, for the following:
 - a. Test Holes: Provide in ductwork at fan inlet and outlet, and elsewhere as indicated, duct test holes, consisting of slot and cover, for instrument tests.
 - b. Quadrant Locks: Provide for each damper, quadrant lock device on one end of shaft; and end bearing plate on other end for damper lengths over 12". Provide extended quadrant locks and end extended bearing plates for externally insulated ductwork.
2. Manufacturer: Subject to compliance with requirements, provide duct hardware of one of the following:
 - a. Ventfabrics, Inc.
 - b. Young Regulator Co.

E. Duct Access Doors:

1. General: Provide duct access doors of a size as required to service and maintain device in duct. Provide on (1) access door at each control damper, humidifier, coil, fire damper, and any device that requires attention.
2. Construction: Construct of same or greater gage as ductwork served, provide insulated doors for insulated ductwork. Provide flush frames for uninsulated ductwork, extended frames for externally insulated duct. Provide one side hinged, other side with one handle-type latch for doors 12" high and smaller, 2 handle-type latches for larger doors.
3. Manufacturer: Subject to compliance with requirements, provide duct access doors of one of the following:
 - a. Air Balance, Inc.
 - b. Duro Dyne Corp.
 - c. Register & Grille Mfg. Co., Inc.
 - d. Ruskin Mfg. Co.
 - e. Ventfabrics, Inc.
 - f. Zurn Industries, Inc.; Air Systems Div.

F. Flexible Connectors:

1. General: Provide flexible duct connections wherever ductwork connects to vibration isolated equipment. Construct flexible connections of neoprene-coated flameproof fabric crimped into

duct flanges for attachment to duct and equipment. Make airtight joint. Provide adequate joint flexibility to allow for thermal, axial, transverse, and torsional movement, and also capable of absorbing vibration of connected equipment.

2. Manufacturer: Subject to compliance with requirements, provide flexible connections of one of the following:
 - a. American/Elgen Co.; Energy Div.
 - b. Duro Dyne Corp.
 - c. Flexaust (The) Co.
 - d. Ventfabrics, Inc.

2.12 AIR OUTLETS AND INLETS

A. Ceiling Air Diffusers:

1. General: Except as otherwise indicated, provide manufacturer's standard ceiling air diffusers where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation. Stamped face diffusers will not be acceptable.
2. Performance: Provide ceiling air diffusers that have, as minimum, temperature and velocity traverses, throw, drop and noise criteria ratings for each size device as listed in manufacturer's current data.
3. Ceiling Compatibility: Provide diffusers with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling module with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling systems which will contain each type of ceiling air diffuser.
4. Types: Provide ceiling diffusers of type, capacity, throw, blow and with accessories as listed on diffuser schedule.
 - a. Ceiling Diffusers shall be of the restricted multi-orificed jet induction and air mixing type consisting of louver sections with built-in diffusing vanes. The vanes shall be arranged to discharge air from adjacent louvers at an angle of 45 degrees in opposite directions to insure rapid mixing of primary and room air. Diffusing vanes shall be welded and mechanically fastened to the adjacent louver sections to make a rigid unit. The vanes shall extend to the discharge edges of the louvers. Where louver sections join the core frame, the louver ends shall be welded to the core frame. The leaving edge of each louver shall be hemmed and the

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louver ends shall be rounded and hemmed before welding to the core frames.

- b. Diffusers shall be fabricated of aluminum or steel-welded construction, and shall be provided with a removable core permitting easy access to the neck connection. The diffuser neck shall extend no less than 1" above the core to accommodate an internal duct connection to prevent leakage into the ceiling space.
 - c. Finish shall be baked enamel. Color as selected by A/E.
5. Diffuser Dampers:
- a. Opposed Blade: Adjustable opposed blade damper assembly, key operated from face of diffuser. Provide in each ceiling diffuser.
6. Provide manufacturers integral radiation damper for registers, grilles and diffusers as scheduled on the drawings.
- a. Price
 - b. Tuttle & Bailey Agitair (Air Devices)
 - c. Nailor
7. Manufacturer: Subject to compliance with requirements, provide diffusers of one of the following:
- a. Price
 - b. Tuttle & Bailey Agitair Series
 - c. Metalaire – “5000 IV”
 - d. Nailor
- B. Wall Registers and Grilles:
- 1. General: Except as otherwise indicated, provide manufacturer's standard registers and grilles where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.
 - 2. Performance: Provide registers and grilles that have, as minimum, temperature and velocity traverses, throw and drop, and noise criteria ratings for each size device and listed in manufacturer's current data.
 - 3. Compatibility: Provide registers and grilles with border styles that are compatible with adjacent systems, and that are specifically manufactured to fit into wall and ceiling construction with accurate fit and adequate support. Refer to general construction drawings

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and specifications for types of construction which will contain each type of register and grille.

4. Types: Provide registers and grilles of type, capacity, and with accessories and finishes as listed on register and grille schedule:
5. Pattern: Register and grille patterns shall have style as identified on Drawings:
6. Dampers: Opposed Blade adjustable assembly, key operated from face of register.
7. Accessories:
 - a. Plaster Frame: Perimeter frame designed to act as plaster stop and register or grille anchor. Provide where required.
 - b. Operating Keys: Tools designed to fit through register or grille face and operate volume control device and/or pattern adjustment.
8. Finish: Register and Grille Finishes shall be baked enamel color as selected by the Architect.
9. Manufacturer: Subject to compliance with requirements, provide registers and grilles of one the following:
 - a. Price
 - b. Tuttle & Bailey Agitair (Air Devices)
 - c. Nailor

C. Ceiling Registers and Grilles:

1. General: Except as otherwise indicated, provide manufacturer's standard "Egg-Crate" type registers and grilles where shown; of size, shape, capacity and type indicated; constructed of materials and components as indicated, and as required for complete installation.
2. Compatibility: Provide registers and ceiling grilles with border styles that are compatible with adjacent ceiling systems, and that are specifically manufactured to fit into ceiling construction with accurate fit and adequate support. Refer to general construction drawings and specifications for types of ceiling construction.
3. Types: Provide registers and grilles of type, capacity, and with accessories and finishes as listed on register and grille schedule.
4. Register and Grille Materials:
 - a. Aluminum Construction: Manufacturer's standard extruded aluminum frame and core.
5. Register and Grille Faces:

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- a. 1/2" x 1/2" "Egg-Crate" with 1" border frame.
6. Register and Grille Dampers:
 - a. Opposed Blade: Adjustable opposed blade damper assembly, key operated from face of register (provide for registers only).
7. Register and Grille Finishes shall be baked enamel color as selected by the Architect.
8. Provide manufacturers integral radiation damper for registers, grilles and diffusers as scheduled on the drawings.
 - a. Price
 - b. Tuttle & Bailey Agitair (Air Devices)
 - c. Nailor
9. Manufacturer: Subject to compliance with requirements, provide registers and grilles of one of the following:
 - a. Price
 - b. Tuttle & Bailey Agitair (Air Devices)
 - c. Nailor

2.13 WALL AND CEILING ACCESS DOORS

- A. Furnish access doors for access to all concealed control valves, motor operated dampers, fire doors, etc, and all other concealed parts of the HVAC system that require accessibility for the proper operation and maintenance of the system.
- B. Access doors shall be heavy gage steel with 1" frame. Door shall be fastened to frame with continuous piano hinge. Entire door and frame assembly shall be prime painted and be completed with cylinder lock and two (2) keys. Door and frame shall match fire rating of wall or ceiling installed into.
- C. Manufacturer: Subject to compliance with requirements, provide access doors of one of the following:
- D. Inland Steel Products Company, "Milcor"
- E. Walsh-Hannon-Gladwin Inc., "Way Loctor"

2.14 CONDENSATE DISCHARGE PUMPS

- A. General: Provide where indicated, condensate pumps of capacity as scheduled, to be field installed in various air handling equipment drain pans, consisting of ABS housing, pump, check valve, safety switch, and thermal overload protection. Factory assembled unit must be UL/CSA listed.

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B. High-Capacity Pumps

1. Reservoir: Construct of ABS plastic with a 3/10 capacity volume.
2. Pump: 25 GPH@15TDH vertical type pump with stainless steel motor shaft, rustproof, ABS volute, with safety switch.
3. Housing and Cover: Each shall be ABS plastic.
4. Manufacturers: Subject to compliance with requirements, provide high-capacity condensate pump of Little Giant or approved equal.

C. Low-Capacity Pumps

1. Pump: 8 GPH@33TDH reciprocating piston pump direct discharge with no storage reservoir.
2. Detection Unit: Low-maintenance filter free with a three level float (on/off/alarm).
3. Pump Housing and Detection Unit: Each shall be ABS plastic.
Manufacturers: Subject to compliance with requirements, provide low-capacity condensate pump of Sauermann or approved equal.

2.15 AUTOMATIC TEMPERATURE CONTROLS ELECTRIC/ELECTRONIC:

- A. General: Provide electric/electronic control products in sizes and capacities indicated, consisting of valves, dampers, thermostats, clocks, sensors, controllers, and other components as required for a complete installation. Except as otherwise indicated, provide manufacturer's standard control system components as indicated by published product information, designed and constructed as recommended by manufacturer. All equipment and systems shall be installed by factory trained, certified, and authorized technicians. Provide electric/electronic control systems with following functional and construction features as indicated.
- B. The following incidental work shall be furnished by the designated contractor under the supervision of the control contractor.
 1. The HVAC Contractor shall:
 - a. Install automatic valves and separable wells that are specified to be supplied by the control contractor.
 - b. Furnish and install all necessary valved pressure taps, water, drain and overflow connections and piping.
 - c. Provide, on magnetic starters furnished, all necessary auxiliary contacts, with buttons and switches in the required configurations.
 2. The sheet metal contractor shall:
 - a. Install all automatic dampers.

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- b. Provide necessary blank-off plates (safing) required to install dampers that are smaller than duct size.
 - c. Assemble multiple section dampers with required interconnecting linkages and extend required number of shafts through duct for external mounting of damper motors.
 - d. Provide necessary sheet metal baffle plates to eliminate stratification and provide air volumes specified. Locate baffles by experimentation and affix and seal permanently in place only after stratification problem has been eliminated.
 - e. Provide access doors at each automatic damper control equipment.
 - f. Install duct smoke detectors.
- C. Electric Wiring:
- 1. All electric wiring and wiring connections, either line voltage or low voltage, from the main electric panels to the ATC panels, and from the ATC related panels to the individual control devices i.e. VAV boxes, valves, dampers, etc. required for the installation of the control system, as herein specified, shall be provided by the control contractor unless specifically shown on the electrical drawings or called for in the electrical specifications. The wiring installation shall be in accordance with National and Local Codes and with the Electrical portion of these specifications. All wiring shall be run concealed wherever possible. Exposed wiring in occupied areas shall be run in raceways. Raceways shall be Wiremold 200 series with all elbows, raceways, covers, mounting stops, box extensions and wiring for a complete and neat installation. All wiring located in mechanical spaces, boiler rooms, fan rooms, etc. shall be installed in metal conduit.
 - 2. All wiring above ceilings, in boiler rooms, and all mechanical spaces shall follow routing of piping and where not possible shall be in conduit. All exposed wire shall be bundled and wire tied and shall be supported to adjacent piping. Draped and free floating wire will not be allowed.
 - 3. All terminations of wire at control devices shall be looped and supported adequately.
 - 4. All wiring shall comply with the requirements of the electrical section of the specification.
- D. Control Valves: Provide factory-fabricated electrical control valves of type, body material and pressure class indicated. Where type or body

material is not indicated, provide selection as determined by manufacturer for installation requirements and pressure class, based on maximum pressure and temperature rating of piping system. Except as otherwise indicated, provide valves which mate and match material of connecting piping. Equip control valves with control valve motors and with proper shutoff ratings for each individual application.

1. Water Service Valves: Equal percentage characteristics with rangeability of 50 to 1, and maximum full flow pressure drop of 3 psig.
 2. Steam Service Valves: Linear characteristics with rangeability of 30 to 1, and maximum full flow pressure drop of 80% of inlet pressure for low pressure systems, and 42% for high pressure systems.
 3. Single-Seated Valves: Cage type trim, providing seating and guiding surfaces for plug on "top and bottom" guided plugs.
 4. Double-Seated Valves: Balanced plug-type, with cage type trim providing seating and guiding surfaces for plugs on "top and bottom" guided plugs.
 5. Valve Trim and Stems: Polished stainless steel.
 6. Packing: Spring-loaded Teflon, self-adjusting.
 7. Terminal Unit Control Valves: Provide control valves for control of terminal units including, but not necessarily limited to, convectors, finned tube radiation, and fan coil units that are of integral motor type. Provide 2 position or modulating type valves (as required in sequence of operation) electrically actuated.
- E. Dampers: Provide automatic control dampers as indicated, with damper frames not less than formed 13-ga galvanized steel. Provide mounting holes for enclosed duct mounting. Provide damper blades not less than formed 16-ga galvanized steel, with maximum blade width of 8". Equip dampers with motors, with proper rating for each application.
1. Secure blades to ½" diameter zinc-plated axles using zinc-hardware. Seal off against spring stainless steel blade bearings. Provide blade bearings of nylon and provide thrust bearings at each end of every blade. Construct blade linkage hardware of zinc-plated steel and brass. Submit leakage and flow characteristics, plus size schedule for controlled dampers.
 2. Operating Temperature Range: From - 20 degrees to 200 degrees F (-29 degrees to 93 degrees C).
 3. Provide parallel or opposed blade design (as selected by manufacturer's sizing techniques) with inflatable seal blade edging, or replaceable rubber seals, rated for leakage at less than 10 CFM

- sq. ft. of damper area, at differential pressure of 4" w.g. when damper is being held by torque of 50 inch-pounds.
4. Provide unit ventilator outside air dampers with adjustable minimum settings (indicated on schedule) so that ventilation can be adjusted for each space or room.
- F. Room Thermostats: (Appropriate thermostat determined by Sequence of Operation). Provide room thermostats with locking covers and with concealed or easily-accessible adjustment devices and dead band as indicated. Also provide clear acrylic locking vented housing over each thermostat.
1. Line-Voltage On-Off Thermostats: Provide thermostats of bi-metal actuated open contact, or bellows actuated enclosed snap-switch type, or equivalent solid-state type; UL-Listed at electrical rating comparable with application. Provide bimetal thermostats which employ heat anticipation. Equip thermostats which control electric heating loads directly, with "Off" position on dial wired to break ungrounded conductors.
 2. Low Voltage On-Off Thermostats: Comply with general requirement indicated for line-voltage thermostats. Provide thermostats of bimetal operated mercury-switch type, with either adjustable or fixed universal anticipation heater.
 3. Low-Voltage Modulating Thermostats: Provide potentiometer type, operated by vapor-filled bellows.
- G. Low-Temperature Protection Thermostats (Freezestat): Provide low - temperature protection thermostats of manual-reset type, with sensing elements 8' - 0" or 20' - 0" in length. Provide thermostat designed to operate in response to coldest 1' - 0" length of sensing element, regardless of temperature at other parts of element. Support element properly to cover entire duct width. Provide separate thermostats for each 25 sq. ft. of coil face area or fraction thereof. Provide on all AHU, classroom unit ventilators and all other coils subject to receiving outside air at any quantity.
- H. Clocks: Provide electronic time clocks specified as part of temperature control sequences, of 7-day, 24-hour type, with weekend or skip-a-day features. Equip time clocks with battery back-up to maintain time schedule in case of power failure.
- I. Step Controllers: Provide step controllers for control sequencing or for control of electric heat power loads, of 6 or 10-stage type, with heavy-duty switching rated to handle loads, UL-Listed and operated by electric motors of quality specified for valve and damper actuation.

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- J. Electronic Sensors: Provide electronic temperature and relative humidity sensors of supersensitive resistance type, which are vibration and corrosion-resistant, and of wall mounted immersion, duct mounting, averaging or bulb type as required for application.
- K. Damper and Valve Actuators: Provide direct or reverse acting proportional low voltage (24V) control (refer to sequence of operation). Units shall be provided with an integral helical spring to return motor shaft to normal position. Motor and gear train shall be oil-immersed. Select actuator to produce smooth unobstructed movement in a 30 to 60 second timing stroke.
 - 1. Provide two-way and three-way, two position and modulating damper and valve actuators as required in the sequence of operation.
 - 2. Equip motors for outdoor locations and for outside air intakes with "O ring" gaskets designed to make motors completely weatherproof, and equip with internal heaters to permit normal operation at -40 degrees F (-40 degrees C).
 - 3. Furnish non-spring return motors for dampers larger than 25 sq. ft., and for valves larger than 2-1/2", sized for running torque rating of 150 inch-pounds, and breakaway torque rating of 300 inch-pounds. Size spring-return motors for running torque rating 150 inch-pounds, and breakaway torque rating of 150 inch-pounds.
- L. Electric Contactors: Provide contactors for operating or limit-control of electric heating loads which are UL-Listed for 100,000 cycles of resistive loads. Equip with replaceable molded coils and replaceable silver cadmium oxide contacts. Coat core laminations with heat-resistant inorganic film to reduce core losses. Provide line and load terminals on contactors with higher-than-35-amp rating, or provide one piece formed-and-welded pressure type. Provide screw-type contactors for 35-amp-or-lower rating. Equip field-mounted contactors with suitable steel enclosures; and provide open type mounting for those installed in factory-fabricated panels.
- M. AHU System Control Panels: Provide control panels with suitable brackets for either wall or floor mounting, for each supply fan system. Locate panel where shown on the drawings.
 - 1. Provide standard steel cabinets as required to contain temperature controllers, relays, switches, and similar devices, except limit controllers and other devices excluded in sequence of operations. Provide full enclosure cabinets, with painted gray finish.
- N. MANUFACTURER: Subject to compliance with requirements, provide electric control systems of one of the following:

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1. Johnson Controls, Inc.
 2. Honeywell, Inc.
 3. Landis & Gyr Powers, Inc.
- O. SEQUENCE OF OPERATIONS:
1. AIR HANDLING UNIT CONTROL (GAS FIRED WATER)
 - a. Occupied Heating: Supply, fan shall run continuously. The outside air damper shall open to pre-set minimum air position, and the gas-fired heating section shall operate to maintain the space temperature set-point (70 deg F adj). The cooling circuit shall be de-energized. Provide a minimum position (adj.) for the outdoor dampers as indicated in the schedule.
 - b. Unoccupied Heating: Supply air fans shall cycle in response to the space night thermostat setpoint. The outside dampers shall close. The gas-fired heating section shall operate to maintain the night setback set point (60 deg F adj.). The cooling circuit shall be de-energized.
 - c. Occupied Cooling: Supply, fan shall run continuously. The thermostat shall cycle the compressor to maintain the set-point. The outside dampers shall open to minimum OA setting position and exhaust fan damper shall open. The gas fired heating section shall be de-energized.
 - d. Unoccupied Cooling: Supply fan shall be de-energized. The outside and exhaust air dampers shall close. The compressors shall be de-energized normally. The unit shall be energized in cooling mode if space temperature exceeds night setback temperature setpoint (85 deg F, adj.). Unit shall return to unoccupied mode after satisfying space temperature setpoint.
 - e. Heating/Cooling cycle shall be determined by the unit thermostat controllers, which shall determine occupied/unoccupied condition of operation based on programmable schedules. Contractor shall program thermostats and coordinate schedule requirements with owner.
 2. AIR COOLED CONDENSING UNIT CONTROL
 - a. In cooling mode, the air cooled condensing circuits shall be energized. The AHU controller shall cycle the compressor to maintain the set-point. The compressor control circuit shall be interlocked with the evaporator coil fan to be off if

the supply fan is off and only run if the supply fan is running.

3. EXHAUST FAN CONTROL: Refer to drawings and schedules for type of control required for each fan. Where details on the drawings call for motor operated dampers, these dampers shall be provided and wired by this contractor to open during the occupied cycle and close during the unoccupied cycle, unless otherwise noted.
 - a. Type I: Exhaust fan shall be interlocked with noted air handling unit (refer to schedule) to run when air handling unit runs, and de-energize when air handling unit is off.
 - b. Type II: Exhaust fan is controlled by space thermostat. On a rise in space temperature, the exhaust fan shall start and make-up air dampers shall open.
 - c. Type III: Exhaust fan is controlled from a wall mounted switch with pilot light. Switch and pilot light provided by Division 15, wired by Division 16.
 - d. Type IV: Exhaust fan is wired into lighting circuit to operate when lights are on. Wired by Division 16.
 - e. Type V: Exhaust fan shall be wired into building (or zone) time clock to operate during occupied conditions and off during unoccupied conditions.
4. OCCUPIED/UNOCCUPIED CONTROL (STD):
 - a. Each air handling unit shall be considered (1) zone with individual thermostat controller with programmable time clock. Each Occupied/unoccupied zone shall be individually controlled via the system time clock scheduling program. Each zone will have the capability of individual time scheduling with the option of temporary overriding from the time clock.

PART 3 - EXECUTION

3.01 INSTALLATION OF HANGERS AND ATTACHMENTS

- A. Examine areas and conditions under which supports and anchors are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
- B. Proceed with installation of hangers, supports and anchors only after required building structural work has been completed in areas where the work is to be installed. Correct inadequacies including (but not limited to) proper placement of inserts, anchors, and other building structural attachments.

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- C. Prior to installation of hangers, supports, anchors, and associated work, Installer shall meet at project site with Contractor, installer of each component of associated work, inspection and testing agency representatives (if any), installers of other work requiring coordination with work of this section and Architect/Engineer for purposes of reviewing material selections and procedures to be followed in performing the work in compliance with requirements specified.
- D. Install building attachments at required locations within concrete or on structural steel for proper piping support. Space attachments within maximum piping span length indicated in MSS SP-69. Install additional concentrated loads, including valves, flanges, guides, strainers, expansion joints, and at changes in direction of piping. Install concrete inserts before concrete is placed; fasten insert securely to forms. Where concrete with compressive strength less than 2500 psi is indicated, install reinforcing bars through the openings at the tops of inserts.
- E. Install hangers, supports, clamps, and attachments to support piping properly from building structure; comply with MSS SP-69. Arrange for grouping of parallel runs of horizontal piping to be supported together on trapeze type hangers where possible. Install supports with maximum spacings complying with MSS SP-69. Where piping of various sizes is to be supported together by trapeze hangers, space hangers for smallest pipe size or install intermediate supports for smaller diameter pipe. Do not use wire or perforated metal to support piping, and do not support piping from other piping.
 - 1. Install hangers and supports complete with necessary inserts, bolts, rods, nuts, washers, and other accessories. Except as otherwise indicated for exposed continuous pipe runs, install hangers and supports of same type and style as installed for adjacent similar piping.
 - 2. Prevent electrolysis in support of copper tubing by the use of hangers and supports which are copper plated, or by other recognized industry methods.
 - 3. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement between pipe anchors, and to facilitate action of expansion joints, expansion loops, expansion bends, and similar units.
 - 4. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
 - 5. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 Pressure Piping Codes are not exceeded.

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6. Insulated Piping: Comply with the following installation requirements:
 - a. Clamps: Attach clamps, including spacers (if any), to piping with clamps projecting through insulation; do not exceed pipe stresses allowed by ANSI B31.
 - b. Shields: For pipe sizes up to and including 4" provide heavy gage shield at each hanger point.
 - c. Saddles: For all pipe sizes over 4" provide saddle at each hanger point. Completely fill void in saddle with loose insulation.
- F. Install anchors at proper locations to prevent stresses from exceeding those permitted by ANSI B31, and to prevent transfer for loading and stresses to connected equipment.
- G. Fabricate and install anchor by welding steel shapes, plates, and bars to piping and to structure. Comply with ANSI B31 and with AWS standards.
- H. Where expansion compensators are indicated, install anchors in accordance with expansion unit manufacturer's written instructions, to limit movement of piping and forces to maximums recommended by manufacturer for each unit.
- I. Anchor Spacings: Where not otherwise indicated, install anchors at ends of principal pipe-runs, at intermediate points in pipe-runs between expansion loops and bends. Make provisions for preset of anchors as required to accommodate both expansion and contraction of piping.
- J. Provide concrete housekeeping bases for all floor-mounted equipment. Size bases to extend minimum of 4" beyond equipment base in any direction; and 4" above finished floor elevation. Construct of reinforced concrete, roughen floor slab beneath base for bond, and provide steel rod anchors between floor and base. Locate anchor bolts using equipment manufacturer's templates. Chamfer top and edge corners.
- K. Provide structural steel stands to support equipment not floor mounted or hung from structure. Construct of structural steel members or steel pipe and fittings. Provide factory-fabricated tank saddles for tanks mounted on steel stands.
- L. Adjusting and Cleaning:
 1. Hanger Adjustment: Adjust hangers so as to distribute loads equally on attachments.
 2. Support Adjustment: Provide grout under supports so as to bring piping and equipment to proper level and elevations.
 3. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.

3.02 MECHANICAL IDENTIFICATION

- A. Coordination: Where identification is to be applied to surfaces which require insulation, painting or other covering or finish, including valve tags in finished mechanical spaces, install identification after completion of covering and painting. Install identification prior to installation of acoustical ceilings and similar removable concealment.
- B. Mechanical Equipment Identification:
- C. General: Install engraved plastic laminate sign or plastic equipment marker on or near each major item of mechanical equipment and each operational device, as specified herein if not otherwise specified for each item or device.
- D. Lettering Size: Minimum 1/4" high lettering for name of unit where viewing distance is less than 2' - 0", 1/2" high for distances up to 6' - 0", and proportionately larger lettering for greater distances. Provide secondary lettering of 2/3 to 3/4 of size of the principal lettering.
- E. Adjusting and Cleaning:
 - 1. Adjusting: Relocate any mechanical identification device which has become visually blocked by work of this division or other divisions.
 - 2. Cleaning: Clean face of identification devices, and glass frames of valve charts.

3.03 MECHANICAL INSULATION

- A. Installation of Piping Insulation:
 - 1. General: Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its intended purpose.
 - 2. Install insulation materials with smooth and even surfaces. Insulate each continuous run of piping with full-length units of insulation, with a single cut piece to complete run. Do not use cut pieces or scraps abutting each other.
 - 3. Clean and dry pipe surfaces prior to insulating. Butt installation joints firmly together to ensure a complete and tight fit over surfaces to be covered.
 - 4. Maintain integrity of vapor-barrier jackets on pipe insulation, and protect to prevent puncture or other damage.
 - 5. Cover valves, fittings and similar items in each piping system with equivalent thickness and composition of insulation as applied to adjoining pipe run. Install factory molded, precut or job fabricated

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units (at Installer's option) except where specific form or type is indicated.

6. Extend piping insulation without interruption through walls, floors and similar piping penetrations, except where otherwise indicated.
7. Butt pipe insulation against pipe hanger insulation inserts. For hot pipes, apply 3" wide vapor barrier tape or band over the butt joints. For cold piping apply wet coat of vapor barrier lap cement on butt joints and seal joints with 3" wide vapor barrier tape or band.

B. Installation of Ductwork Insulation:

1. General: Install insulation products in accordance with manufacturer's written instructions, and in accordance with recognized industry practices to ensure that insulation serves its indented purpose.
2. Install insulation materials with smooth and even surfaces.
3. Clean and dry ductwork prior to insulating. Butt insulation joints firmly together to ensure complete and tight fit over surfaces to be covered.
4. Maintain integrity of vapor-barrier on ductwork insulation, and protect it to prevent puncture and other damage.
5. Extend ductwork insulation without interruption through walls, floors and similar ductwork penetrations, except where otherwise indicated.
6. Lined Ductwork: Except as otherwise indicated, omit insulation on ductwork where internal insulation or sound absorbing linings have been installed.

C. Protection and Replacement:

1. Replace damaged insulation which cannot be repaired satisfactorily, including units with vapor barrier damage and moisture saturated units.
2. Protection: Insulation Installer shall advise Contractor of required protection for insulation work during remainder of construction period, to avoid damage and deterioration.

3.04 REFRIGERANT PIPING AND ACCESSORIES

A. Piping Installations:

1. Locations and Arrangements: Drawings indicate the general location and arrangement of piping systems. Locations and arrangements of piping take into consideration pipe sizing and friction loss, and other design consideration. So far as practical, install piping as indicated.

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2. Install pipe sleeves at all wall and floor penetrations.
3. Install escutcheons at all exposed pipe wall penetrations.

3.05 INSTALLATION OF UPFLOW GAS-FIRED FURNACE

- A. General: Install units where indicated, in accordance with equipment manufacturer's published installation instructions, and with recognized industry practices, to ensure that units comply with requirements and serve intended purposes.
- B. Coordination: Coordinate with other work, including ductwork, floor construction, roof decking, and piping, as necessary to interface installation of units with other work.
- C. Access: Provide access space around units for service as indicated, but in no case less than that recommended by manufacturer.
- D. Support: Install units on 2" high reinforced concrete pad, 4" larger on each side than unit base.
- E. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
 1. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 16 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment Installer.
- F. Duct Connections: Provide ductwork, accessories, and flexible connections as required.
- G. Venting: Unless indicated otherwise, provide manufacturer's concentric vent kit and vent combustion air and vent connections to the outdoors in accordance with manufacturer's and all local code requirements.
- H. Cooling Coil: Install cooling section on top of fan section and install associated remote air cooled condensing unit where shown on drawings. Pipe and wire as required by manufacturer's installation requirements. Pipe cooling coil condensate drain pan to nearest drain as indicated on plans. Provide condensate pump as specified where drainage by gravity is not possible.
- I. Grounding: Provide positive equipment ground for unit components.
- J. Testing: Upon completion of installation of units, start-up and operate equipment to demonstrate capability and compliance with requirements. Field correct malfunctioning units, then retest to demonstrate compliance.
- K. Provide one complete extra set of filters for each unit. Install new filters at completion of system work and prior to testing, adjusting, and balancing work. Obtain receipt from owner that new filters have been installed.

3.06 AIR COOLED CONDENSERS

A. General:

1. Verify all dimensions by field measurements. Verify roof structure, mounting supports, and membrane installations are completed to the proper point to allow installation of roof mounted units. Examine rough-in for refrigerant piping systems to verify actual locations of piping connections prior to installation. Do not proceed until unsatisfactory conditions have been corrected.
2. Install air-cooled condensers in accordance with manufacturers installation instructions. Install units plumb and level, firmly anchored in locations indicated, and maintain manufacturer's recommended clearances.

B. Field Quality Control:

1. Provide the services, to include a written report, of a factory authorized service representative to examine the field assembly of the components, installation, and piping and electrical connections.
2. Charge systems with refrigerant and oil, and test for leaks. Repair leaks and replace lost refrigerant and oil.

C. Demonstration:

1. Provide the services of a factory authorized service representative to provide start-up service and to demonstrate and train the Owner's maintenance personnel as specified below.
2. Start-up service: Place units into operation and adjust controls and safeties. Replace damaged or malfunctioning components and controls.

D. Training:

1. Train the Owner's maintenance personnel on start-up and shut-down procedures, troubleshooting procedures, and servicing and preventative maintenance schedules and procedures.
2. Schedule training with Owner through the Architect/Engineer with at least 7 days prior notice.

3.07 TERMINAL HEATING UNITS (ELECTRIC)

A. Installation of Electric Heating Terminals:

1. Install electric heating terminal units including components as indicated, in accordance with equipment manufacturer's written instructions, and with recognized industry practices; complying with applicable installation requirements of NEC and NECA's "Standard of Installation".

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2. Coordinate with other electrical work, including wiring/cabling, as necessary to properly interface installation of heating terminal units with other work.
 3. Clean dust and debris from each heating terminal as it is installed to ensure cleanliness.
 4. Comb out damaged fins where bent or crushed before covering elements with enclosures.
 5. Touch-up scratched or marred heating terminal enclosure surfaces to match original finishes.
 6. Tighten connectors and terminals, including screws and bolts, in accordance with equipment manufacturer published torque tightening values for equipment connectors. Where manufacturer's torquing requirements are not indicated, tighten connectors and terminal to comply with tightening torques specified in UL Std. 486A.
- B. Grounding:
1. Provide equipment grounding connections for electric heating terminals as indicated, Tighten connections to comply with tightening torque values specified in UL std. 486A to assure permanent and effective grounding.
- C. Electrical Wiring:
1. General: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electric Installer.
 - a. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division 16 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.
 - b. Upon completion of installation of electric heating terminals, and after building circuitry has been energized, test heating terminals to demonstrate capability and compliance with requirements. Where possible, field correct malfunctioning units, then retest to demonstrate compliance; otherwise, remove and replace with new units and proceed with retesting.
 - c. Replace electric heating terminals and accessories which are damaged and remove damaged items from construction site.
- D. Adjusting and Cleaning:

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1. General: After construction is completed, including painting, clean unit exposed surfaces, vacuum clean terminal coils and inside of cabinets.
2. Retouch any marred or scratched surfaces of factory-finished cabinets, using finish materials furnished by manufacturer.
3. Install new filter units for terminals at completion of project.

3.08 POWER AND GRAVITY VENTILATORS

- A. General: Except as otherwise indicated or specified, install ventilators in accordance with manufacturer's installation instructions and recognized industry practices to insure that products serve the intended function.
- B. Coordinate ventilator work with work of roofing, walls and ceilings, as necessary for proper interfacing.
- C. Ductwork: Connect ducts to ventilators in accordance with manufacturer's installation instruction, and details on drawings.
- D. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to Electrical Installer.
 1. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-16 sections. Verify proper rotation direction of fan wheels. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.
- E. Remove shipping bolts and temporary supports within ventilators. Adjust dampers for free operation.
- F. Testing: After installation of ventilators has been completed, test each ventilator to demonstrate proper operation of unit at performance requirements specified. When possible, field correct malfunctioning units, and then retest to demonstrate compliance. Replace units which cannot be satisfactorily corrected.
- G. Cleaning: Clean factory-finished surface. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- H. General: Furnish to Owner, with receipt, one spare set of belts for each belt driven power ventilator.

3.09 METAL DUCTWORK

- A. Installation of Metal Ductwork:
 1. General: Assemble and install ductwork in accordance with recognized industry practices which will achieve air-tight (5% leakage for systems rated 3" and under; 1% for systems rated over 3") and noiseless (no objectionable noise) systems, capable of

performing each indicated service. Install each run with minimum number of joints. Align ductwork accurately with internal surface smooth. Support ducts rigidly with suitable ties, braces, hangers and anchors of type which will hold ducts true-to-shape and to prevent buckling. Support vertical ducts at every floor.

2. Sealing: All ductwork joints and seams shall be sealed with flexible duct sealer to assure an airtight installation.
 3. Penetrations: Where ducts pass through interior partitions and exterior walls, and are exposed to view, conceal space between construction opening and duct or duct insulation with sheet metal flanges of same gage as duct. Overlap opening on 4 sides by at least 1-1/2". Fasten to duct and substrate.
 4. Where ducts pass through fire-rated floors, walls, or partitions, provide firestopping between duct and substrate.
 5. Coordination: Coordinate duct installation with installation of accessories, dampers, coil frames, equipment, controls and other associated work of ductwork system.
 6. Installation: Install metal ductwork in accordance with "SMACNA HVAC Duct Construction Standards".
- B. Installation of Duct Liners:
1. General Install duct liners in accordance with SMACNA "HVAC Duct Construction Standards".
- C. Installation of Flexible Ducts:
1. Maximum Length: For any duct run using flexible ductwork, do not exceed 4'-0" extended length.
 2. Installation: Install in accordance with Section II of SMACNA's, "HVAC Duct Construction Standards, Metal and Flexible".
- D. Field Quality Control:
1. Leakage Tests: After each duct system, which is constructed for duct classes over 3" is completed, test for duct leakage in accordance with SMACNA "HVAC Air Duct Leakage Test Manual". Repair leaks and repeat tests until total leakage is less than 1% of system design air flow.
- E. Equipment Connections:
1. General: Connect metal ductwork to equipment as indicated, provide flexible connection for each ductwork connection to equipment mounted on vibration isolators, and/or equipment containing rotating machinery.
- F. Adjusting and Cleaning:

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1. Clean ductwork internally, unit by unit as it is installed, of dust and debris. Clean external surfaces of foreign substances which might cause corrosive deterioration of metal or, where ductwork is to be painted, might interfere with painting or cause paint deterioration.
2. Temporary Closure: At ends of ducts which are not connected to equipment or air distribution devices at time of ductwork installation, provide temporary closure of polyethylene film or other covering which will prevent entrance of dust and debris until final connections are to be completed.
3. Balancing: Refer to Division 15 section "Testing, Adjusting, and Balancing" for air distribution balancing of metal ductwork. Seal any leaks in ductwork that become apparent in balancing process.

3.10 DUCTWORK ACCESSORIES

- A. Install ductwork accessories in accordance with manufacturer's installation instructions, with applicable portions of details of construction as shown in SMACNA standards, and in accordance with recognized industry practices to ensure that products serve intended function.
- B. Install turning vanes in square or rectangular 90 degree elbows in supply, return, and exhaust air systems, and elsewhere as indicated.
- C. Install splitter damper with adjusting rod in each supply branch. Install according to detail on drawings.
- D. Install access doors to open against system air pressure, with latches operable from either side, except outside only where duct is too small for person to enter.
- E. Operate installed ductwork accessories to demonstrate compliance with requirements. Test for air leakage while system is operating. Repair or replace faulty accessories, as required to obtain proper operation and leak proof performance.
- F. Adjusting: Adjust ductwork accessories for proper settings, install fusible links in fire dampers and adjust for proper action.
- G. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
- H. Furnish extra fusible links to owner, one link for every 10 installed of each temperature range; obtain receipt.

3.11 AIR OUTLETS AND INLETS

- A. General: Install air outlets and inlets in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended function.

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- B. Locate ceiling air diffusers, registers, and grilles, as indicated on general construction "Reflected Ceiling Plans". Unless otherwise indicated, locate units in center of acoustical ceiling module.
- 3.12 WALL AND CEILING ACCESS DOORS
- A. General: Install access doors in accordance with manufacturer's written instructions and in accordance with recognized industry practices to insure that products serve intended function.
 - 1. All access doors shall be located in a workmanlike manner in closets, storage rooms, and/or other non-public areas, positioned so that the item or part can be easily reached, and the size shall be sufficient for this purpose (minimum size 12" X 16"). Furnish access doors to permit thorough inspection. When access doors are required in corridors, lobbies, or other habitable areas, they shall be located as directed by the Architect.
- 3.13 INSTALLATION OF CONDENSATE DISCHARGE PUMPS
- A. Examine areas and conditions under which pumps are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to installer.
 - B. INSTALLATION OF EQUIPMENT
 - 1. General: Install equipment in accordance with manufacturer's installation instructions. Install units plumb and level, firmly anchored in drain pans and locations indicated, and maintain manufacturer's recommended clearances.
 - 2. Accessories: Install equipment accessories not installed at factory.
 - 3. Connections: Connect discharge piping as indicated and terminate where indicated on the contract documents.
 - 4. Electrical Wiring: Install electrical devices furnished by manufacturer but not specified to be factory-mounted. Furnish copy of manufacturer's wiring diagram submittal to electrical installer.
 - a. Verify that electrical wiring installation is in accordance with manufacturer's submittal and installation requirements of Division-16 sections. Do not proceed with equipment start-up until wiring installation is acceptable to equipment installer.
 - C. FIELD QUALITY CONTROL
 - 1. General: Start-up equipment, in accordance with manufacturer's start-up instructions. Test controls and demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.

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- D. CLOSEOUT PROCEDURES
 - 1. Training: Instruct Owner's personnel in operation and maintenance of condensate discharge pumps.
- 3.14 INSTALLATION OF AUTOMATIC TEMPERATURE CONTROLS ELECTRIC/ELECTRONIC
 - A. INSPECTION:
 - 1. Examine areas and conditions under which electric/electronic control systems are to be installed. Do not proceed with work until unsatisfactory conditions have been corrected in manner acceptable to Installer.
 - B. INSTALLATION OF ELECTRIC/ELECTRONIC CONTROL SYSTEMS:
 - 1. General: Install systems and materials in accordance with manufacturer's instructions and roughing-in drawings, and details on drawings. Install electrical components and use electrical products complying with requirements of applicable Division-16 sections of these specifications. Mount controllers at convenient locations and heights.
 - 2. Control Wiring: The term "control wiring" is defined to include providing of wire, conduit and miscellaneous materials as required for mounting and connecting electric control devices.
 - 3. Wiring Systems: Install complete control wiring system for electric control systems. Conceal wiring except in mechanical rooms and areas where other conduit and piping are exposed. Provide multi-conductor instrument harness (bundle) in place of single conductors where number of conductors can be run along common path. Fasten flexible conductors bridging cabinets and doors, neatly along hinge side, and protect against abrasion. Tie and support conductors neatly.
 - 4. Number-code or color-code conductors, excluding those used for local individual room controls, appropriately for future identification and servicing of control system.
 - 5. Reset Limit Controls: Install manual-reset limit controls to be independent of power controllers' automatic duct heater resets may, at Contractor's option, be installed in interlock circuit of power controllers.
 - 6. Unit-Mounted Equipment: Where control devices are indicated to be unit-mounted, ship electric relays, electric switches, valves, dampers, and damper motors to limit manufacturer for mounting and wiring at factory.

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C. ADJUSTING AND CLEANING:

1. Start-up: Start-up, test, and adjust electric control systems in presence of manufacturer's authorized representative. Demonstrate compliance with requirements. Replace damaged or malfunctioning controls and equipment.
2. Cleaning: Clean factory-finished surfaces. Repair any marred or scratched surfaces with manufacturer's touch-up paint.
3. Final Adjustment: After completion of installation, adjust thermostats, control valves, motors and similar equipment provided as work of this section.
 - a. Final adjustment shall be performed by specially trained personnel in direct employ of manufacturer of primary temperature control system.

D. CLOSEOUT PROCEDURES:

1. Owner's Instructions: Provide services of manufacturer's technical representative for one 8-hour day to instruct Owner's personnel in operation and maintenance of electric control systems.
 - a. Schedule instruction with Owner, provide at least 7-day notice to Contractor and Engineer of training.

3.15 TESTING, ADJUSTING, AND BALANCING

A. Requirements:

1. Requirements include measurement and establishment of the fluid quantities of the mechanical systems as required to meet specifications, and recording and reporting the results.
2. Test, adjust and balance the following mechanical systems:
 - Supply air systems.
 - Return air systems.
 - Exhaust air systems.
 - Outside air systems.
 - Heating and cooling systems.
 - Verify temperature control system operation.
3. Do not include:
 - a. Installation of adjusting and balancing devices. If devices must be added to achieve proper adjusting and balancing. Contact Mechanical Contractor and the Engineer for direction.

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B. Report:

1. Format: Report forms shall be those standard forms prepared by the referenced standard for each respective item and system to be tested, adjusted, and balanced. Bind report forms complete with schematic systems diagrams and other data in reinforced, vinyl, three-ring binders. Provide binding edge labels with the project identification and a title descriptive of the contents. Divide the contents of the binder into the below listed divisions, separated by divider tabs:
 - a. General Information and Summary.
 - b. Air Systems.
 - c. Hydronic cooling systems.
2. Contents: Provide the following minimum information, forms and data:
 - a. General Information and Summary: Inside cover sheet to identify testing, adjusting, and balancing agency, Contractor, Owner, Architect, Engineer, and Project. Include addresses, and contact names and telephone numbers. Also include a certification sheet containing the seal and name address, telephone number, and signature of the Certified Test and Balance Engineer. Include in this division a listing of the instrumentation used for the procedures along with the proof of calibration.
 - b. The remainder of the report shall contain the appropriate forms containing as a minimum, the information indicated on the standard report forms prepared by the AABC for each respective item and system.
 - c. Submit proof that all required instrumentation has been calibrated to tolerances specified in the referenced standards, within a period of six months prior to starting the project.

C. Quality Assurance:

1. An independent testing, adjusting, and balancing agency certified by the AABC or NEBB as a Test and Balance Engineer in those testing and balancing disciplines required for this project.
2. Codes and Standards:
 - a. AABC: "National Standards For Total System Balance".
 - b. ASHRAE: ASHRAE Handbook, 1984 Systems Volume, Chapter 37, Testing, Adjusting, and Balancing.

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3. Pre-Balancing Conference: Prior to beginning of the testing, adjusting, and balancing procedures, schedule and conduct a conference with the Architect/Engineer and Mechanical Contractor. The objective of the conference is final coordination and verification of system operation and readiness for testing, adjusting, and balancing.
4. System Operation: Systems shall be fully operational prior to beginning procedures. All new automatic temperature controls shall be fully operational. Test, adjust and balance the air systems before refrigerant systems. Test, adjust and balance air conditioning systems during summer season, and heating systems during winter season, including at least a period of operation at outside conditions within 5° F. wet bulb temperature of maximum summer design condition, and within 10° F. dry bulb temperature of minimum winter design condition. Take final temperature reading during seasonal operation.

D. Preliminary Procedures:

1. Air Systems:
 - a. Obtain drawings and become thoroughly acquainted with the systems.
 - b. Compare drawings to installed equipment and field installations.
 - c. Walk the system from the system air handling equipment to terminal units to determine variations in installation.
 - d. Check filters for cleanliness.
 - e. Check all dampers (volume and fire) for correct and locked position, and temperature control for completeness of installation before starting fans.
 - f. Prepare report test sheets for both fans and outlets. Obtain manufacturer's outlet factors and recommended procedures for testing. Prepare a summation of required outlet volumes to permit a cross check with required fan volumes.
 - g. Determine best locations in main and branch ductwork for most accurate duct traverses. Traverses shall be performed in each supply and return duct main and sub-mains for each AHU and return air fan.
 - h. Place outlet dampers in the full open position.
 - i. Prepare schematic diagrams of system "as-built" ductwork and piping layouts to facilitate reporting.
 - j. Verify lubrication of all motors and bearings.

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- k. Check fan belt tension.
 - l. Check fan rotation.
 - 2. Hydronic/Refrigeration Systems:
 - a. Remove and clean all strainers.
 - b. Set temperature controls so all coils are calling for full flow.
 - c. Check operation of automatic bypass valves.
 - d. Check and set operating temperatures of furnaces and condensers to design requirements.
 - e. Verify lubrication of all motors and bearings.
 - 3. Measurements:
 - a. Provide all required instrumentation to obtain proper measurements, calibrated to the tolerance specified in the referenced standards. Instruments shall be properly maintained and protected against damage.
 - b. Provide instruments meeting the specifications of the referenced standards.
 - c. Use only those instruments which have the maximum field measuring accuracy and are best suited to the function being measured.
 - d. Apply instrument as recommended by the manufacturer.
 - e. Use instruments with minimum scale and maximum subdivisions and with scaled ranges proper for the value being measured.
 - f. When averaging values, take a sufficient quantity of readings which will result in a repeatability error of less than 5%. When measuring a single point, repeat readings until 2 consecutive identical values are obtained.
 - g. Take all reading with the eye at the level of the indicated value to prevent parallax.
 - h. Use pulsation dampeners where necessary to eliminate error involved in estimating average of rapidly fluctuation readings.
 - i. Take measurements in the system where best suited to the task.
- E. Performing Testing, Adjusting, and Balancing:

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1. Test, adjust and balance all noted systems according to SMACNA standards and as follows:
 - a. Perform testing and balancing procedures on each system identified, in accordance with the detailed procedures outlined in the referenced standards.
 - b. Cut insulation and ductwork for installation of test probes to the minimum extent necessary to allow adequate performance of procedures.
 - c. Patch insulation, ductwork, and housings, using materials identical to those removed.
 - d. Seal ducts and test for and repair leaks.
 - e. Seal insulation to re-establish integrity of the vapor barrier.
 - f. Mark equipment settings, including damper control positions, valve indicators, fan speed control levers, and similar controls and devices, to show final settings. Mark with paint or other suitable, permanent identification materials.
 - g. Retest, adjust and balance system subsequent to significant system modifications, and resubmit test results.
 2. System Deficiencies:
 - a. The Balancing Contractor shall advise the Mechanical Contractor and the Engineer of all system deficiencies in writing. Report all motors not running, missing dampers, inoperative valves and controls, lack of access, etc.
 - b. Upon completion of system deficiencies, Balancing Contractor shall balance and record data.
- F. Subject to compliance with the above requirements and certifications, provide the services of air and water testing and balancing of one of the following:
1. Thomas Young - Marion, MA
 2. Leonhardt Co. - Wellesley, MA
 3. Arden Engineering - Pawtucket, RI
 4. American Testing and Balancing - South Boston, MA

END OF SECTION

HVAC
15600 - 63

DIVISION 16000

ELECTRICAL

SECTION 16000

ELECTRICAL

**File Sub-Bid Required
Electrical**

Combined with Sections 15100, 16000

PART 1 - GENERAL

1.00 GENERAL PROVISIONS – FILED SUB-BID REQUIRED

- A. **Electrical** is stipulated as a Filed Sub-Bid under Part D, Item 2 of the Form for General Bid and is combined with sections 15100 and 16000.
- 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 twelve o'clock noon, Boston time, on the date stipulated in the Advertisement.
- D. Specific information relating 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 this Section 16000 Electrical is shown on Drawings numbered G0-01 THRU G0-02, D1-01 THRU D4-04, C-1 THRU C-2, L1-01, A1-01 THRU A7-01, S1-03, FPD1.1 THRU FP1.4, PD1.1 THRU P1.4, M1.3D THRU M2.1, VS.1, ED1.1 THRU E3.3, inclusive.
- F. The Filed Sub-Bidder for the work of this SECTION 16000 shall list, in Paragraph E, of the FORM FOR SUB-BID, the name of each person, firm, or corporation, whom he proposes to use to perform the following classes of work or part thereof, at the bid price therefore:

CLASS OF WORK	SECTION NUMBERS
NONE	

1.21 GENERAL REQUIREMENTS

- A. Include the General Conditions, Modifications to the General Conditions, and applicable parts of Division 01000 as part of this Section.
- B. Examine all other Sections of the Specifications for requirements which affect Work of this Section whether or not such Work is specifically mentioned in this Section.

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- C. Coordinate Work with that of all other trades affecting or affected by Work of this Section. Cooperate with such trades to assure the steady progress of all Work under Contract.
- D. It is the intent of the Specifications and the Drawings to require that all the material, labor, and equipment be furnished complete in every respect, and that this Contractor shall provide all material, labor, and equipment needed and usually furnished in connection with such systems to provide a complete installation including all demolition, disposal, and patching of adjacent surfaces. Materials, equipment, and articles incorporated in the Work shall be new and of the best grade of their respective kinds.

1.02 WORK TO BE PERFORMED

- A. Work described herein shall be interpreted as work to be done by the Electrical Subcontractor. Work to be performed by other trades will be referenced to a particular Contractor or Subcontractor.
- B. Provide all labor, materials, tools, and equipment, including scaffolding, to complete the installation of the electrical system. Install, equip, adjust, and put into operation the respective portions of the installation specified, and so interconnect various items or sections of work in order to form a complete and operating whole. The work shall consist of, but shall not necessarily be limited to the following:
 - 1. Secondary service equipment including main distribution panel and metering, meter centers, motor controls, panelboards, including feeders, and subfeeders.
 - 2. Fire Alarm System, addressable
 - 3. Emergency power system, including battery units, emergency lighting and exit signs.
 - 4. Lighting systems exterior and interior, including lamps, fixtures, time clocks, controls, etc.
 - 5. All raceway systems, including boxes, couplings, and fittings.
 - 6. All branch circuit wiring systems, including wiring devices, plates, etc.
 - 7. Connections for all building equipment, including mechanical, plumbing, fire protection and the like.
 - 8. All testing of equipment installed.
 - 9. Any other item of work hereinafter specified or indicated on Electrical Drawings.
 - 10. Drilling, coring, and cutting of holes (where the largest dimension thereof does not exceed 12 inches) for electrical conduit, systems, and equipment.

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11. Systems Identification.
12. Scaffolding, Rigging, and Staging for all Electrical Work.
13. Fire stopping shall be performed by this Contractor.
14. Provide Seismic Restraints for all Electrical Systems conforming to the requirements of Section 23 48 05 which Section is herein incorporated by reference.
15. Coordination Drawings.
16. Demolition of existing systems.
17. Temporary light and power.
18. Telephone and CATV cables.

1.03 DEFINITIONS

- A. Most terms used within the documents are industry standard. Certain words or phrases shall be understood to have specific meanings as follows:
1. Provide: Furnish and install completely connected up and in operable condition.
 2. Furnish: Purchase and deliver to a specific location within the building or site.
 3. Install: With respect to equipment furnished by others, install means to receive, unpack, move into position, mount and connect, including removal of packaging materials.
 4. Conduit: Raceways of the metallic type which are not flexible. Specific types as specified.
 5. Connect: To wire up, including all branch circuitry, control and disconnection devices so item is complete and ready for operation.
 6. Subject to Mechanical Damage: Equipment and raceways installed exposed and less than eight feet above finished floor in mechanical rooms or other areas where heavy equipment may be in use or moved.

1.04 ITEMS TO BE FURNISHED ONLY

- A. Furnish the following items for installation under designated sections.
1. Duct smoke detectors with sampling tube, Section 15600 – HVAC.

1.05 ITEMS TO BE INSTALLED ONLY

- A. Install the following items furnished under designated sections.
1. None.

1.06 RELATED WORK

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- A. The following related work is to be performed under designated sections.
 - 1. Temp. Controls: SECTION 01500 – TEMPORARY FACILITIES.
 - 2. Excavation and Backfill: SECTION 02000 - SITE WORK.
 - 3. Concrete Bases, Pads and Duct Envelopes: SECTION 03000 - CONCRETE.
 - 4. Insulation: SECTION 07221 - BUILDING INSULATION.
 - 5. Finish Painting: SECTION 09900 - PAINTING.
 - 6. Payment for energy for temporary light and power shall be made by General Contractor.
 - 7. Cutting beyond 1.02, B.11 above and patching of all openings regardless of size is to be provided by trade responsible for surface on which penetration occurs.
 - 8. Automatic Temperature Control: SECTION 15600 - HEATING, VENTILATING, AND AIR CONDITIONING.
 - 9. Hardware: Section 08700 – FINISH HARWARE
- 1.07 CONTRACT COST BREAKDOWN
 - A. Submit a breakdown of contract price to aid Architect in determining value of work installed as job progresses.
- 1.08 INSPECTION OF SITE
 - A. Electrical bidders will be permitted to inspect site. Failure to inspect existing conditions or to fully understand work which is required shall not excuse the Electrical Subcontractor from his obligations to supply and install work in accordance with specifications and the Drawings and under all site conditions as they exist.
- 1.09 CONTRACTOR'S REPRESENTATIVE
 - A. Retain a competent representative on the project.
- 1.10 COOPERATION
 - A. Work shall be carried on under usual construction conditions, in conjunction with other Contractor's work. Cooperate with other contractors, coordinate work and proceed in a manner as not to delay progress.
 - B. Before proceeding, examine all Construction Drawings and consult other Contractors to coordinate installation and avoid interference.
 - C. In case of dispute, the Architect will render a decision in accordance with General and Supplementary General Conditions.
- 1.11 CODES, ORDINANCES, AND PERMITS

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A. Codes and Ordinances:

1. All material and work provided shall be in accordance with the following codes and standards as most recently amended.

Commonwealth of Massachusetts Building Code 8th Edition

Massachusetts Electric Code, 2008 Edition

State Department of Public Safety

NFPA 101 "Life Safety Code"

NFPA Standards

Standards of the Underwriters Laboratories (UL)

Occupational Safety and Health Act (OSHA)

Americans with Disabilities Act (ADA)

Energy Conservation Code

Town of Waltham

2. Where contract documents indicate more stringent requirements than codes, the contract documents shall take precedence.

- B. Permits: Be responsible for filing documents, and securing of inspection and approvals. Utility Company back charges will be paid directly by the Owner. Refer to INSTRUCTIONS TO BIDDERS.

1.12 ELECTRICAL ROOMS OR SPACES

- A. Be responsible for ensuring that the dedicated space and clearances required in the NEC, Sections 110-26 are maintained for all electrical equipment.
- B. Call other contractors' attention to the requirements contained in the above mentioned code sections, prior to the installation of equipment by other contractors, in order to ensure no violations.

1.13 SUBMITTALS

- A. Refer to Supplementary General Conditions for information relative to submission of Shop Drawings. Six (6) copies are required. No equipment for which review is required shall be installed prior to review, except at Contractor's own risk.
- B. Notwithstanding any restrictions upon contractor proposed substitutions, should apparatus or materials be permitted by Architect to be substituted for those specified for good cause, and such substitution necessitates changes in or additional connections, piping, supports, or construction, same shall be provided. Assume cost and entire responsibility thereof.
- C. Submit the following samples:

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1. Lighting fixtures as may be requested.
2. Other items as may be requested.

1.14 GUARANTEE

- A. Keep work in repair without expense to Owner as far as concerns defects in workmanship or materials for a period of not less than one year from date of substantial completion.

1.15 ELECTRICAL CHARACTERISTICS

- A. In general, and unless specifically indicated otherwise, all building service, heating, ventilating, air conditioning, and plumbing equipment shall be of the following characteristics:
 1. Motors up to and including 1/3 HP shall be suitable for 120 volts, one phase operation.
 2. Motors larger than 1/3 HP shall be suitable for 208volts, three phase operation.
 3. Electric heating equipment 1.5 KW and less shall be suitable for 120 volt, single phase operation. Over 1.5 KW shall be 208 volt, three phase.
- B. Power Factor: All equipment provided rated greater than 1,000 watts and lighting equipment greater than 15 watts with an inductive reactance load component shall have a power factor of not less than 90% under rated load conditions.

1.16 TEMPORARY LIGHT & POWER

- A. Refer to and comply with SECTION 01500 - TEMPORARY FACILITIES and the following:
- B. Provide capacity from the existing electrical service for temporary service and pay all expenses related thereto. Provide any equipment as may be required, including transformer, etc.
- C. Temporary light and power shall be provided constantly from 1/2 hour before normal until 1/2 hour after normal working hours.
- D. Temporary light shall be based on one 200 watt lamp covering each 1,000 square feet of floor area. Each room 100 square feet and over shall have a minimum of one 100 watt lamp. Motors up to 3/4 HP only shall be provided for. No provisions are to be made for electric welders or hoisting equipment.
- E. Provide outlets located at convenient points so extension cords of not over 50' will reach all work.

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- F. Subcontractors of other trades shall furnish their own extension cords and shall also pay cost of all temporary wiring of their construction offices and shanties.
 - G. Any temporary wiring of a special nature other than mentioned above shall be paid for by subcontractor using same.
 - H. Cost of energy consumed by all trades will be paid by General Contractor.
 - I. Permanently installed lighting fixtures may be used for temporary lighting with the provision that any burned out lamps be replaced at time when Owner takes beneficial occupancy.
 - J. Any portion of the permanent electrical system, used for temporary shall be restored to "as new" condition.
 - K. Temporary Wiring System (Secondary):
 - 1. Every precaution shall be taken to make any necessary temporary open wiring inaccessible to unqualified personnel. Rooms containing electrical equipment with energized exposed parts shall be locked.
 - 2. All temporary work shall be furnished and installed in conformity with National Electric Code and in accordance with requirements of OSHA and local ordinances.
 - 3. All temporary wiring shall be maintained throughout construction period and shall be removed when no longer needed.
- 1.17 TEMPORARY ELECTRICAL SUPPORT FACILITIES
- A. Refer to Section 01500 –TEMPORARY FACILITIES.
 - B. Provide own field office and/or storage facilities which shall be located as directed or permitted by General Contractor and in accordance with local regulations. Provide all tools, equipment, ladders, and temporary construction required for execution of the work.
 - C. All scaffolding, ladders, and other temporary construction shall be rigidly built in accordance with all local and state requirements, and shall be removed upon completion.
- 1.18 INSPECTIONS AND TESTS
- A. Inspection: If inspection of materials installed shows defects, such defective work, materials, and/or equipment shall be replaced and inspection and tests repeated.
 - B. Tests: Make reasonable tests and prove integrity of work and leave electrical installation in correct adjustment and ready to operate. All panels and switchboards shall have phases balanced as near as practical. A consistent phase orientation shall be adhered to at all terminations.

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1.19 ENERGY REBATE PROGRAM

- A. This project has been designed to incorporate equipment approved for energy rebate such as fixtures, ballasts and lamps. Provide unit prices for each fixture type scheduled.

1.20 RECORD DRAWINGS

- A. Provide two (2) sets of black or blue line on white Drawings to maintain and submit Record Drawings, one set shall be maintained at site and which shall be accurate, clear, and complete showing actual location of all equipment as installed. Record Drawings shall be updated at least monthly. Record Drawings shall show outlet from which homeruns are taken, and location of all junction boxes and access panels. These Drawings shall be available to Architect/Engineer field representative.
- B. Any addenda sketches and Supplementary Drawings issued during course of construction shall be attached to Drawings.
- C. At completion, submit an accurate checked set of Drawings.
- D. After approval of these Drawings, photo reproductions of original tracings shall be revised to incorporate changes, including addenda sketches and Supplementary Drawings. Fitup Drawings for tenant areas shall also be revised in the same manner. These "as-built" photo reproductions shall be certified as correct and delivered to the Architect along with two (2) sets of black line prints. Sepia reproducibles are not acceptable.

1.21 OPERATING INSTRUCTIONS AND MAINTENANCE MANUALS

- A. Operating Instructions: Furnish operating instructions to Owner's designated representative with respect to operations, functions and maintenance procedures for equipment and systems installed. Cost of such instruction up to a full three (3) days of Electrical Subcontractor's time shall be included in contract. Cost of providing a manufacturer's representative at site for instructional purposes shall also be included.
- B. Maintenance Manuals:
 - 1. At completion of the project, provide four copies of complete manuals containing the following:
 - a. Complete Shop Drawings of equipment.
 - b. Operation description of systems.
 - c. Names, addresses, and telephone numbers of suppliers of systems.
 - d. Vendors' P.O. numbers for equipment installed.
 - e. Preventive maintenance instructions for systems.
 - f. Spare parts list of system components.

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2. All information shall be in one binder.

1.22 DEMOLITION AND DEACTIVATION OF EXISTING SERVICES (Building will be vacant)

- A. During the execution of the work, required relocation, rerouting, etc. of existing equipment and systems in the existing building areas where new work is to be installed or new connections are scheduled to be made, all work shall be performed by the Electrical Subcontractor, as required by job conditions and as determined by the Architect in the field, to facilitate the installation of the new system, while demolition will be performed. This procedure shall be repeated to suit the Owner's working schedule, as many times as required until all work is complete. No disconnection or deactivation of service shall occur by the Electrical Contractor without the written authorization of the Owner prior to commencing of work. Give notice of any scheduled shutdowns, a minimum of (2) weeks in advance.
- B. Prior to deactivation for demolition work, consult the drawings and arrange a conference with the Architect, the General Contractor and the Owner's representative in the field to inspect each of the areas to be deactivated for demolition.
- C. Where existing outlets are to be abandoned, they shall be removed and blank plates installed. Each bidder shall, before submitting his bid, visit the site and make a thorough examination of the conditions in the existing buildings in order to determine the extent of the work to be done.
- D. All disconnection and deactivation of electrical systems and equipment shall be provided by the Electrical Subcontractor. All demolition and removal of electrical systems and equipment designated to be demolished shall be provided by the General Contractor. The Electrical Contractor shall inform the General Contractor what equipment contains hazardous materials so that those containing hazardous materials (PCB lighting ballasts, fluorescent lamps, etc.) are stacked separately from the remainder of demolished materials for their separate removal per all current legal disposal regulations and requirements. All hazardous electrical materials will be legally disposed by the General Contractor.
- E. Controlled Process:
 - 1. The Electrical Subcontractor shall coordinate with the General Contractor for the deconstruction of the subject in a controlled daily, 3 stage process as coordinated with the Architect to suit the project progress schedule, as well as the completion date of the project.
 - a. Disconnection and deactivation of area by Electrical Contractor.

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- b. Demolition removal of demoed material by the General Contractor to staging area for later removal from site by General Contractor.
 - c. "Broom swept" cleaning of area demolished by General Contractor.
2. For additional information related to demolition, review the General Conditions and Supplementary Conditions and the Architectural drawings.
- F. Inspection of Site:
- 1. Electrical bidders shall inspect site for disconnection and deactivation required for demo work to be performed. Failure to inspect existing conditions or to fully understand demo work which is required shall not excuse this contractor from his obligations to deactivate and coordinate with General Contractor for removal of all materials as required in accordance with specifications and the drawings and under all site conditions as they exist.

1.23 RETURN AIR PLENUM

- A. Area above hung ceiling is not a return air plenum.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Product specifications are written in such a manner so as to specify what materials may be used in a particular location or application and therefore do not indicate what is not acceptable or suitable for a particular location or application.
- B. For purpose of establishing a standard of quality and not for purpose of limiting competition, the basis of this Specification is upon specified models and types of equipment and materials, as manufactured by specified manufacturers.
- C. In all cases, standard cataloged materials and systems have been selected. Materials such as lighting fixtures specially manufactured for this particular project and not part of a manufacturers' standard product line will not be acceptable. In the case of systems, the system components shall be from a single source regularly engaged in supplying such systems. A proposed system made up of a collection of various manufacturers' products will be unacceptable.
- D. Where Specifications list manufacturers' names and/or "as approved" or "equal approved by Architect", other manufacturers' equipment will be considered if equipment meets Specification requirements and has all features of the specified items as are considered essential by Architect.

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E. All material shall be new and shall be UL listed.

2.02 RACEWAYS AND FITTINGS

A. Raceways - General:

1. No raceway shall be used smaller than 3/4" diameter and shall have no more than four (4) 90° bends in any one run, and where necessary, pull boxes shall be provided. Only rigid metal conduit or intermediate metal conduit is allowed for slab work. Cable systems, if allowed to be used by other sections of this specification, shall not be used exposed or in slabs, whether listed by "UL" for such use or not.
2. Rigid metal conduit conforming to, and installed in accordance with, Article 344 shall be heavy wall zinc coated steel conforming to American Standard Specification C80-1 and may be used for service work, exterior work, slab work, and below grade level slab, wet locations, and in penthouse for drops down to equipment from elevations above eight feet and also where raceway may be subject to mechanical damage.
3. Intermediate metal conduit conforming to, and installed in accordance with, Article 342, may be used for all applications where rigid metal conduit is allowed by these specifications.
4. Electrical Metallic Tubing (EMT), conforming to, and installed in accordance with, Article 358 shall be zinc coated steel, conforming to industry standards, may be used in masonry block walls, stud partitions, above furred ceilings, where exposed but not subject to mechanical damage, and may be used for fire alarm work.
5. Surface metal raceways conforming to, and installed in accordance with, Article 386 shall be used where raceways cannot be run concealed, in finish spaces.
6. Flexible metal conduit shall be used for final connections to recessed lighting fixtures from above ceiling junction boxes and for final flexible connections to motors and other rotating or vibrating equipment. Liquid tight flexible metal conduit shall be used for the above connections which are located in moist locations. Moist locations shall include mechanical rooms, penthouses and exterior locations with mechanical equipment (i.e.; cooling tower). All flexible connections shall include an insulated grounding conductor.
7. Rigid non-metallic conduit shall be used for underground electric and telephone services outside the foundation wall and shall be polyvinyl chloride (PVC) schedule 40, 90°C. All sweeps shall be rigid steel when stubbins above grade.

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8. PVC Schedule 40 may also be used for below grade circuits outside building confines. Below slab rigid non-metallic conduits do not require concrete encasement. Raceways and fittings shall be produced by same manufacturer.
9. Acceptable manufacturers:
Pittsburgh Standard Conduit Company
Republic Steel and Tube
Youngstown Sheet and Tube Company
Carlson
10. Fittings:
 - a. Provide insulated bushings on all raceways 1 inch diameter or larger.
 - b. Manufacturer's standard fittings shall be used for raceway supports.
 - c. Expansion Fittings: Expansion fittings shall be used where structural and concrete expansion joints occur and shall include a ground strap.
 - d. Couplings for rigid metal and intermediate metal conduit shall be threaded type.
 - e. Threadless fittings for EMT shall be watertight compression type (wet locations) or set-screw type (dry-locations). All fittings shall be concrete tight. No diecast fittings allowed except for raceways larger than 1 inch diameter.
 - f. Cable supports in vertical raceways shall be of the split wedge type. Armored cable supports for vertical runs to be of wire mesh basket design.
 - g. Wall entrance seals shall be equal to O.Z. Gedney type "WSK".
 - h. Couplings, elbows and other fittings used with rigid nonmetallic conduit shall be of the solvent cemented type to secure a waterproof installation.
 - i. Acceptable manufacturers:
O.Z.
Crouse Hinds
Appleton
EFCOR

Steel City

B. Outlets, Pull and Junction Boxes:

1. Outlets:

- a. Each outlet in wiring or raceway systems shall be provided with an outlet box to suit conditions encountered. Boxes installed in normally wet locations or surface mounted shall be of the cast-metal type having hubs. Concealed boxes shall be cadmium plated or zinc coated sheet metal type. Old work boxes with Madison clamps not allowed in new construction. Thru the wall boxes are not permitted.
- b. Each box shall have sufficient volume to accommodate number of conductors in accordance with requirements of Code. Boxes shall not be less than 1-1/2" deep unless shallower boxes are required by structural conditions and are specifically approved by Architect. Ceiling and bracket outlet boxes shall not be less than 4" octagonal except that smaller boxes may be used where required by particular fixture to be installed. Flush or recessed fixtures shall be provided with separate junction boxes when required by fixture terminal temperature requirements. Switch and receptacle boxes shall be 4" square or of comparable volume.
- c. Far side box supports shall be Caddy J-1A.
- d. Acceptable manufacturers:
Appleton
Crouse Hinds
Steel City
RACO

2. Pull and Junction Boxes: Where indicated on plans, and where necessary to terminate, tap off, or redirect multiple raceway runs or to facilitate conductor installation, furnish, and install appropriately designed boxes. Boxes shall be fabricated from code gauge steel assembled with corrosion resistant machine screws. Box size shall be as required by Code.

Boxes in moist or wet areas shall be galvanized type. Boxes larger than 4-11/16 inches square shall have hinged covers. Boxes larger than 12 inches in one dimension will be allowed to have screw fastened covers, if a hinged cover would not be capable of being opened a full 90 degrees due to installation location.

- a. Acceptable Manufacturers:

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Brasch
Hoffman
Keystone
Lee Products Co.
McKinstry Inc.
Eldon Inc.

2.03 CONDUCTORS

A. All conductors shall be a minimum size of #12 AWG except for control wiring and fire alarm wiring where #14 AWG may be used. For all exit sign circuits, emergency only circuits, exterior lighting circuits, and also where distance from panelboard to first outlet exceeds 80', #10 AWG shall be minimum size wire allowed. All feeder and branch circuit conductor shall be color coded as follows:

- | | | | |
|----|---------------------------|---------|--------------------------|
| 1. | 208Y/120V | Phase A | Black |
| 2. | 208Y/120V | Phase B | Red |
| 3. | 208Y/120V | Phase C | Blue |
| 4. | Grounded Conductor | | |
| | | 120/208 | White |
| 5. | Equipment Ground | | |
| | | 120/208 | Green |
| 6. | Isolated Equipment Ground | | |
| | | 120/208 | Green with orange stripe |

B. All conductors not installed in accordance with color scheme shall be replaced. All conductors larger than #6 AWG must be identified with colored tape.

C. Connections throughout the entire job shall be made with solderless type devices.

1. For #10 AWG and smaller: spring type.
2. For #8 AWG and larger: circumferential compression type.
3. Acceptable manufacturers:
3M "Scotchlock"
IDEAL "Wingnut"
BURNDY
MAC

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4. Any splices made up in ground mounted pull boxes shall be resin cast waterproof type or waterproof pressure type, as manufactured by King Technology, St. Louis, MO.
- D. Conductors shall be copper, soft drawn, and annealed of 98% conductivity. Conductors larger than #10 AWG shall be stranded; #10 AWG and smaller shall be solid. Conductors shall be insulated for 600 volts and be of the following types:
 1. All conductors shall have heat/moisture resistant thermoplastic insulation type THHN/THWN (75°C) except as follows:
 - a. In sizes #1 AWG and larger: Crosslinked polyethylene insulation type XHHW (75°C - 90°C) may be used.
 - b. Fire alarm system conductors shall be #14 AWG, type THHN, solid. Color coding of fire alarm conductors shall be in accordance with fire codes.
 - c. Fixture whips #16AWG type "SF".
- E. Stranded conductors for all wiring systems except fire alarm will be allowed if installed and terminated as specified under Execution Section.
- F. Mineral-Insulated Metal-Sheathed Fire-Resistive Cables (Type MI) - Cables shall consist of a factory assembly of one or more solid copper conductors insulated with highly-compressed magnesium oxide and enclosed in a seamless, liquid-and-gas-tight continuous copper sheath. Cables shall be rated for 600 volts and less. Cables shall comply with Article 332 of the National Electrical Code. Cables shall be classified by Underwriters Laboratories, Inc. as having a 2-hour fire resistive rating. Cable terminations shall be made with UL listed mineral-insulated cable fittings. Approved Manufacturer - Pyrotenax USA, Inc. or equal.
- G. Type MC cable may be used for concealed branch circuits in hollow spaces where allowed by code if installed and terminated as specified under Execution Section. Armor to be galvanized steel, and shall be UL listed for 2 hour fire wall penetration. Nonmetallic – sheathed cable may be used for branch circuits within dwelling units where concealed and allowed by code.
- H. Type stabily MC Cable with aluminum conductors and aluminum armor will be allowed for dwelling unit feeders and shall be equal to Alcan Cable Co. and shall be UL Listed for 2 hour fire wall penetration. Provide compression fittings at termination points or UL Listed equivalent method.
- I. Acceptable manufacturers:
 - AFC Cable Systems
 - American Wire & Cable
 - Alcan Cable Co.

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Cerro
Cornish
Cresent
General Cable
Okonite

2.04 ACCESS PANELS

- A. Provide access panels for access to concealed junction boxes and to other concealed parts of system that require accessibility for operation and maintenance. In general, electrical work shall be laid out so access panels are not required.
- B. Access panels shall be located in a workmanlike manner in closets, storage rooms, and/or other non-public areas, positioned so that junction can be easily reached and size shall be sufficient for purpose (minimum size 12" x 12"). When access panels are required in corridors, lobbies, or other habitable areas, they shall be located as directed by the Architect.
- C. Access panels shall be prime painted and equipped with screwdriver operated cam locks.
- D. Acceptable manufacturers:
 - Inland Steel Products Company - Milcor
 - Miami Carey
 - Walsh-Hannon-Gladwin, Inc. - Way LocatorSpecific types:
 - 1. Acoustical Tile Ceiling "Milcor Type AT"
 - 2. Plastered Surfaces "Milcor Type K"
 - 3. Masonry Construction "Milcor Type M"
 - 4. Drywall Construction "Milcor Type DW"
- E. Furnish Access Panel Shop Drawings.

2.05 SLEEVES, INSERTS, AND OPENINGS

- A. Sleeves: Provide sleeves of proper sizes for all openings required in concrete floors and walls. Sleeves passing through floors shall be set with top of sleeve 1" above finished floor. Core drilling will also be acceptable if in accordance with any structural standards. Any unsleeved openings shall be waterproofed.
- B. Inserts: Provide inserts or other anchoring devices in concrete and masonry construction as required to support raceways and equipment.

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- C. Openings: Where an opening is required in concrete slabs to allow passage of a multitude of raceways, give adequate notice to General Contractor so he may box out opening in form work.
- D. Any openings through fire rated surfaces shall be closed off with fireproofing materials providing the same rating as the surface penetrated.
Acceptable Manufacturers:
Specified Technologies Inc.
Thomas & Betts
International Protective Coatings Corp.
3M Fire Protection Products
Dow Corning

2.06 WIRING DEVICES

- A. RECEPTACLES: Receptacles shall be flush mounted. All standard 20 ampere devices to be of same manufacturer. 15 ampere wiring devices will be acceptable for dwelling units only.
Acceptable Manufacturers:
Twenty (20) ampere duplex grounding type NEMA 5-20R,
Cooper 5362,
Hubbell HBL5362,
Pass and Seymour CRB5362,
Leviton 5362
Twenty (20) ampere tamper resistant,
Cooper TR8300,
Pass & Seymour TR20,
Leviton TBR20
Twenty (20) ampere tamper resistant GFCI duplex grounding type NEMA 5-20R,
Hubbell GFR5362TR,
Pass & Seymour 2095-TR,
Leviton T7899
Thirty (30) ampere, 250 volt NEMA 14-30R complete with plate,
Cooper 1257,
Hubbell HBL9430A,
Pass and Seymour 3864

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Fifty (50) ampere, 250 volt NEMA 14-50R complete with plate,
Cooper 1258,
Hubbell HBL9450A,
Pass & Seymour 3894,
Leviton 279

- B. Switches: 20 ampere,
Arrow Hart 1991 series,
Hubbell 1221,
Pass and Seymour 20AC-2,
Leviton 1221.
- C. Composition material of wiring devices to be nylon with ivory finish.
- D. Coverplates: Brushed US 302 stainless steel for public spaces, common areas and residential dwelling units.

Provide gaskets on all wiring device plates where devices are on walls separating conditioned and non-conditioned spaces.

- E. Dimmer Controls:
1. All devices shall be UL listed specifically for the required loads (i.e., incandescent, fluorescent, magnetic low voltage, electronic low voltage). Manufacturer shall provide file card upon request. Universal dimmers are not acceptable. Incandescent dimmers shall be rated for 1000 Watts minimum.
 2. All dimmers and switches shall incorporate an air gap switch. The air gap switch shall be capable of meeting all applicable requirements of UL 20 for air gap switches on incandescent dimmers.
 3. All dimmers and switches shall provide power- failure memory. Should power be interrupted and subsequently returned, the lights will come back on to the same levels set prior to the power interruption. Restoration to some other default level is not acceptable.
 4. Dimmers and switches shall meet ANSI/IEEE Std. C62.41-1980, tested to withstand voltage surges of up to 6000V and current surges of up to 200A without damage.
 5. Dimmers and switches shall meet the UL 20 limited short circuit test requirement for snap switches.
 6. Dimmer shall provide a smooth and continuous Square Law dimming curve.

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7. Dimmers shall be voltage regulated so that +10% variation in line voltage shall cause not more than + 5% variation in load voltage when dimmer is operating at 40V (5% light output).
 8. Dimmers, where ganged, shall be derated in accordance with manufacturer's instructions. Ratings in watts listed on the Drawings are the derated ratings.
 9. Dimmers shall be Lutron, Leviton or Lightolier.
- F. Exterior Outlets with Lockable Covers:
1. Provide exterior outlets with lockable covers at all exterior outlet locations. Provide GFCI Circuit Breakers on all branch circuits provide Hubbell Cat #96067 weatherproof locking covers.

2.07 LIGHTING FIXTURES

- A. Provide lighting fixtures complete with lamps, ballasts, and other devices as required for a first class installation. Furnish Ceiling Subcontractor with instructions concerning openings necessary, and provide frames for NEMA standard ceiling types or special mounting frames, as may be required. Fixtures shall be supported independently of hung ceiling construction.
- B. Non-electronic fluorescent ballasts shall be for operation on 120 volts, be ETL/CBM high power factor class "P" low profile, low temperature with internally protected automatic resetting thermal cutouts equal to Advance Mark III.
 1. Sound rating of ballasts shall be "A" for 430 ma, "B" for 800 ma, and "D" for 1500 ma. All ballasts in a particular type of lighting fixture shall be of same manufacturer.
- C. Electronic ballasts shall be energy efficient in single, two, and three lamp versions and input current total harmonic Distortion not exceeding 20% but not less than 10%.
- D. All specialized lamps to be of a type recommended by the fixture manufacturers in their photometric reports.
- E. Standard incandescent lamps shall be wattmiserplus inside frosted/99 long life (2500) hours unless otherwise specified and rated at 130 volts.
- F. All T-8 fluorescent lamps shall be Sylvania Octron 3500 K.
- G. Provide universal arrows on all exit signs and punch out directions as shown on floor plans.
- H. Pendant mounted fixtures shall be suspended by means of manufacturer's aircraft cable and canopy in finished areas or threaded rods in non-public areas. Length of suspension method to be as required to mount fixtures at

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the elevations called for or as otherwise shown on Drawings or architectural elevations.

- I. Fixture types shall be as scheduled. Standard cataloged products have been selected. Fixtures specially manufactured for this particular project and not part of a manufacturers standard line will not be acceptable.
- J. All lamps used in the same room shall have the same Kelvin Temperature Rating and similar CRI.
- K. All fluorescent ballasts shall have a ballast factor greater than 0.97.

2.08 ELECTRICAL POWER EQUIPMENT

A. Motor Controls - Manual and Magnetic:

- 1. Individually-mounted magnetic starters shall be NEMA rated across-the-line type with thermal overload on each phase, single-speed, two-speed, or reduced voltage start as indicated.
- 2. Motor Starters shall be furnished by Electrical Sub-Contractor unless part of package mechanical equipment such as rooftop units.
- 3. Starters shall be of maintained contact type, of size and type required for particular motor horsepower and voltage. Minimum size starter to be size 1 FVNR, unless noted otherwise.
 - a. Starters shall have OL reset button, green push-to-test type pilot light to indicate "ON", and "HAND-OFF-AUTO" switch in cover.
 - b. Starters to have 120 volt control transformers with fused output being provided for those units operating on 277/480 volt system.
 - c. Provide Class 20 fixed heater overloads with auto/manual reset.
 - d. Provide four (4) sets of auxiliary contacts of convertible type N.O. to N.C. for each starter.
 - e. Motor starters shall have NEMA I enclosures. Those in wet locations shall be NEMA 3R.
 - f. Acceptable Manufacturers:
Square D/Groupe Schneider
Westinghouse/Cutler Hammer
Siemens
GE
Allen Bradley

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4. Manual motor starters shall have pilot lights and shall be furnished with thermal overloads on each phase.
- B. Motors: Each motor shall have disconnect switch and starter provided under this section.
1. Provide motor terminal boxes for each motor not furnished with same.
- C. Disconnect Switches:
1. Disconnect (safety) switches shall conform to industrial standards of NEMA, be UL listed and shall be heavy duty type, quick-make, quick-break type with interlocking cover mechanism and provisions for padlocking switch handle in "OFF" position. Three pole toggle switches are not acceptable as substitute for disconnect switches.
 2. Disconnect switches shall be of fused or unfused type as indicated with number of disconnecting poles indicated. The grounded conductor shall not be switched. Switches for use with current limiting fuses shall be rejection type and those used in conjunction with motors shall be horsepower rated. Provide oversize termination lugs if required by conductor size.
 3. Enclosures shall be of proper NEMA type for intended location and shall be phosphate coated or equivalent code gauge galvanized sheet steel with ANSI #24 dark gray baked enamel finish.
 4. Acceptable Manufacturers:
Square D/Groupe Schneider
Westinghouse/Cutler Hammer
Siemens
GE
Allen Bradley
- D. Fuses:
1. Provide a complete set of fuses for each item of fusible type equipment. Fusible equipment furnished by other contractors will be complete with fuses, unless noted otherwise on Electrical Drawings.
 2. Turn over to authorized representative of Owner upon completion a spare set of fuses of each different type and ampere rating installed. These spares shall be bound with twine and tagged.
 3. Secondary system fuses, rated at 600 volts or less, shall be UL listed and constructed in conformance with the applicable

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standards set forth by NEMA and ANSI. All fuses of a particular class shall be of same manufacturer.

4. All fuses in distribution panelboards and switchboards shall be class "L" above 600 amperes and class "RK1" for 600 amperes and below.
5. Main, Feeder, and Branch Circuits:
 - a. Circuits 601 amperes and above shall be protected by (Bussmann type KRP-C LOW-PEAK) current limiting time delay fuses.
 - b. Circuits 0-600 amperes shall be protected by (Bussmann "LOW-PEAK" dual element), time delay current limiting fuses, LPN-RK (250 volts), LPS-RK (600 volts), UL class RK-1.
6. Acceptable Manufacturers:

Bussmann, Division of McGraw
Gould/Shawmut
GEC-ALSTHOM

2.09 ELECTRICAL SYSTEM CONTROLS AND INSTRUMENTS

- A. Provide a complete power system consisting of branch circuits, motor disconnect switches, pushbutton stations, motor starters, and other devices to connect up and leave in operating condition each piece of electrically operated equipment provided either under this section or other Divisions.
- B. All control wiring, not indicated in the Electrical Specifications or not shown on Electrical Drawings, will be provided by Temperature Control Subcontractor.

2.10 GROUNDING SYSTEM

- A. All equipment and systems shall be grounded. Refer especially to NEC Section 250 Requiring Connections to Building Steel, Foundation, Water Service, and Interior Piping. Provide transformer pad grounding to be in accordance with utility company standards.
- B. The grounded conductor shall be supplemented by an equipment grounding system.
- C. The equipment grounding system shall be installed so all conductive items in close proximity to electrical circuits operate continuously at ground potential and provide a low impedance path for ground fault currents.
- D. Grounding conductors shall be so installed as to permit shortest and most direct path to ground.

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- E. Maximum measured resistance to ground of 5.0 ohms shall not be exceeded. Ground separately derived systems (dry type transformers) in accordance with Article 250-26 by grounding neutral to transformer ground lug and providing insulated grounding electrode conductor to nearest effectively grounded building steel or, if unavailable, to nearest available effectively grounded metal water pipe.
- F. Equipment grounding conductors and straps shall be sized in compliance with Code Table 250.
- G. Grounding conductors shall be insulated with green color. Grounding conductors for use on isolated ground receptacles shall be green with trace color to differentiate between normal ground conductors.
- H. Branch circuits shall consist of phase and grounded conductor installed in common metallic raceway. All circuits shall have a separate insulated grounding conductor installed. Any flexible cable system or non-metallic raceway system shall have an insulated grounding conductor. Any cable system for use on isolated ground circuits shall have both an isolated ground conductor as well as an equipment ground conductor, both of which shall be insulated.
- I. Each electrical expansion fitting shall be furnished with a bonding jumper. Provide grounding bushings and ground connections for all raceways terminating below equipment where there is no metal-to-metal continuity.
- J. Continuity between all metallic and non-metallic raceway systems and equipment shall be maintained.
- K. Outdoor lighting fixtures shall be grounded and bonded in common with building system via a separate grounding conductor.

2.11 PANELBOARDS

- A. Panelboards shall be dead front, door in door safety type equipped with single or multi pole circuit breakers suitable for 120/208 volt, 3 phase, 4 wire operation. Panelboards shall be UL listed and manufactured in accordance with NEMA PB-1.
- B. Buses shall be copper. Panelboards shall have a circuit directory card mounted in a frame with plastic cover on inside of door. Panelboards to have a copper ground bus with terminals for each circuit. Panelboards serving isolated ground receptacles shall have a separate ground bus for terminations of the isolated grounds. The isolated ground bus shall be mounted to the panel tub via non conducting means with a separate grounding conductor run to the normal panel ground bus. Provide oversize lugs for any termination requiring same due to oversize conductors.
- C. Cabinets shall be minimum of 20 inches wide and be made of code gauge steel. Surface type shall be ordered without knockouts.

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D. Trims shall be made of code gauge steel, surface or flush as indicated. Panelboards shall be keyed alike. Trims shall be provided with full length piano hinge on one side, and secured to tub with sufficient quantity of latches opposite the hinge side to allow trim to fit flush with tub and when released, allow full access to wiring gutters. Inner door shall allow access to circuit breakers only.

E. Panelboards shall be of the following types with minimum circuit breaker frame sizes listed below. Refer to schedules for larger circuit breaker frame sizes due to fault current availability.

1. 120/208 volt, three phase, four wire. Symmetrical interrupting capacity 42,000 AIC.

Style	(Panelboards)	(Load Centers) (Dwelling Units only)
Westinghouse type PRL 1	BAB Breakers (bolt on)	HQP Breakers (plug in)
Square D type NQOD	QOB Breakers (bolt on)	QO Breakers (plug in)
Siemens type CDP 7	BQ Breakers (bolt on)	QP Breakers (plug in)
General Electric Type AL	HHQB Breakers (bolt on)	THQL Breakers (plug in)

2. Distribution Panels

a. Where scheduled as circuit breaker type, symmetrical interrupting capacity 42,000 AIC.

Westinghouse type PRL 3	FD Breakers
Square D I Line type	FA Breakers
Siemens SPP	FXD6 Breakers
General Electric CCB	THED Breakers

F. Load Centers

1. Dwelling unit load centers shall be for flush mounting and shall be dead front with door and directory. All dwelling unit load centers shall have plug-in branch circuit breakers with an interrupting capacity rating as indicated on plans. Load centers shall have

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neutral bus and separate ground bus. Grounding conductors shall not be terminated on neutral buses. Buses may be aluminum.

2. All breakers in dwelling unit load centers shall be of the arc fault type except bathrooms and kitchens.

G. Panelboards, load centers and distribution panels shall be of same manufacturer.

2.12 METER CENTERS

- A. General: Multi-metering equipment shall be surface-mounted where indicated on the plans and shall be approved by the utility company. All components shall have been tested and Underwriters' Laboratories listed for use as an integral part of the multi-metering system. This equipment shall be made as herein specified and shown on the associated electrical drawings. This contractor shall provide all necessary supports and channels for its support.
- B. Enclosure Construction: Enclosure shall be constructed of formed and welded code gauge sheet metal, finished with gray baked enamel over a rust-inhibiting phosphate primer and suitable for indoor surface mounting. Mounting holes shall be provided in the back of each device for attaching to walls or other vertical support. All devices must be bonded together with bolted connections. Meter units shall be provided with individual removable covers for each meter position. All compartments containing unmetered circuits shall be provided with sealing means. Each circuit breaker position shall be provided with means for sealing or padlocking each individual breaker in the "OFF" position.
- C. Interior Construction: All components shall be factory-assembled with all current-carrying parts constructed of plated bus bars. Components shall be constructed of such design as to require only main interconnecting cross bus to provide a completely bused meter center. Meter units must be connected in a "hot" sequence arrangement.
- D. Arrangement: Meter-breaker component must be of such design to permit arrangement to allow load feeder to enter at the top or permit the installation of units with different meter socket ratings in the same meter center.
- E. Meter sockets shall be provided to meet utility company specifications. Sockets shall be rated at 200 amperes minimum. Meter sockets for three-pole branch shall be 7-JAW with lever type bypass and JAW release or without meter bypass and be furnished with a fifth terminal.
- F. Circuit Breakers: Circuit breakers shall be three-pole, plug-in type rated at 42,000 amperes RMS symmetrical as a minimum. Ampere ratings shall be as indicated on the plans.

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- G. Rating: The multi-metering equipment shall be suitable for connection to a 120/208 volt, three phase, four wire system and shall have meter/breaker devices phase balanced to provide an overall three phase balanced system throughout. Main bus ampere rating shall be as indicated.
 - H. Main Termination Devices: Multi-metering equipment service conductor shall terminate as indicated on the plans.
- 2.13 TELEPHONE AND CATV SYSTEMS
- A. Provide all wiring for telephone and CATV systems between service entrance Demarcation point in Basement and each individual dwelling unit. Provide (1) coaxial RF cable, RG6QUAD with copper clad center conductor and F-Connector for CATV and (1) category 5 four pair telephone cable to each dwelling unit. Terminate wiring in each dwelling unit within a telecommunications/video cabinet, (TVC).
 - B. Provide one (1) telecommunications/video cabinet, TVC per dwelling unit. TVC cabinet shall be equal to Cooper Devices #5576-E18 Enclosure with #5576-C18 cover with the following modules:
 - 1. AC power accessory – 5591
 - 2. Telephone master hub – 5578
 - 3. Video amplifier hub – 5580
 - C. Provide raceways for both systems as indicated on drawings, including pull wires for both site underground distribution and raceway links between low tension closets and tenant spaces.
 - D. Raceway stubups at backboards to be located as indicated on the drawings. Provide a double duplex receptacle and a #6 AWG green insulated ground connection adjacent to the conduit stub up at incoming backboard.
 - E. Sleeves or openings thru slabs to allow for future cable installation shall be located within 6 inches of walls and shall be in a single row.
 - F. For each data outlet indicated on the drawings, provide an appropriate 4” sq. flush outlet box with single gang raised cover opening and 1” sleeve stubbed out to above nearest accessible ceiling.
- 2.14 FIRE ALARM SYSTEM EXTENSION
- A. Scope
 - 1. Provide complete addressable fire detection, alarm system extension in compliance with all specifications and drawings. The system shall interface to other building systems to conduct monitoring and control functions as described herein.
 - 2. The system shall be a microprocessor fire alarm system which will integrate peripheral devices onto the system via digital data communications.

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3. Evacuation notification shall consist of audio evacuation tone, pre-recorded voice messaging, manual one-way paging, and visual (strobe) signaling.
4. Each initiating device shall have full analog detection capabilities; will maintain operating characteristics stored in dedicated EEPROM memory, identify its' exact location, and shall operate as described elsewhere in these specifications.
5. Work in this section, as shown or specified, shall be in accordance with the related contract documents.
6. All exceptions, variances and substitutions of operating capabilities or equipment called for in these specifications shall be listed in writing and forwarded to the Engineer at the time of bid.
7. Provide automatic and manual, closed circuit, multiplex fire alarm communications according to the contract documents, wired, connected and left in first class operating condition.
8. Final connections, testing, and adjusting of the system shall be done under the direct supervision of the system supplier.
9. The existing FACP is to remain.
10. The system design and installation shall conform to the following standards:
 - a. All equipment shall be UL listed for its intended purpose.
 - b. NFPA standards 70, 72, 90A, 92A, and 101.
 - c. BOCA Basic Building Code - Latest Edition.
 - d. Current State Building Code.
 - e. The Americans with Disabilities Act (ADA).
 - f. All requirements of all local authorities having jurisdiction.
11. Submit 12 complete sets of shop drawings to include:
 - a. Complete point-to-point riser diagram showing all equipment and size, type and number of all conductors and devices.
 - b. Large scale drawings of each panel showing module placement and spare capacity allowances.
 - c. Address listing of all field devices shown on floor plans for coordination of LCD message text assignments.
 - d. Original catalog data sheets for all items to assure compliance with these specifications. This equipment shall be subject to approval, and no equipment shall be ordered without prior approval.

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- e. Provide calculations to support the size of standby batteries notification circuits and power supplies submitted. Calculations shall demonstrate proper current draw, voltage drop, wire size considerations and spare capacity allowances.
 - f. Confirmation that the equipment supplier will provide on-site project management and supervision during system installation, and perform system testing and instruction.
- 12. Conform to all UL standards for testing (and provide certification) of the completed installation by a UL approved testing company.
 - 13. The equipment supplier shall conduct the initial programming of the system and a complete rack/test of hardware panels prior to delivery to the installing contractor.
 - 14. Provide verification that all room names and numbers on the construction drawings will be coordinated with final room names and numbers as designated by the school. Update all risers and drawings accordingly for Operating & Maintenance manuals at the completion of the project. Addresses shall be programmed using final room names and numbers.
 - 15. Provide copies of Operating & Maintenance manuals with the request for final inspection. O & M Manuals shall include the following:
 - a. All of the information submitted in the shop drawings.
 - b. As-built documentation which incorporates all modifications to the system, whether made as a field change or by a change order.
 - c. Include a copy of the final test report, [UL certificate] and test contract.
- B. Sequence of Operation
- 1. The operation of a manual station or activation of any automatic alarm initiating device (system smoke, heat, waterflow) shall automatically:

Initiate the transmission of the alarm to the Municipal Fire Station via a local energy masterbox.
 - a. Sound a code 3 temporal evacuation signal over all audio circuits (except in designated areas of assembly. In designated areas of assembly [sound a pre-recorded voice message, and/or] conduct manual voice evacuation from the system microphone[s] located at the FACP or remote location[s] in accordance with the local requirements).

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- b. Flash all visual signals throughout the building in a synchronized manner.
- c. Flash an alarm LED and sound an audible signal at the FACP. Upon Acknowledgment, the alarm LED shall light steadily and the audible shall silence. Subsequent alarms shall re-initiate this sequence.
- d. Upon alarm initiation by an elevator lobby smoke detector or other designated recall device, recall all elevators that serve the floor of initialization to the main egress level. If the alarm initiates on the main egress level, return the elevator to the alternate floor as directed by the local authority having jurisdiction. Provide for shunt tripping of elevator power in accordance with applicable codes.
- e. Visually indicate the alarm initiating device type and location via the LCD display located at the FACP [and at any remote annunciators] [and illuminate the appropriate alarm zone LED at the remote annunciator].
- f. Automatically shut down or control HVAC equipment to initiate smoke control functions as required. Manual override controls and programmable relay interface shall serve as an interface to the Building Automation System.
- g. Operate prioritized outputs to release all magnetically held smoke doors and magnetically locked doors throughout the building.
- h. Activate the exterior weatherproof beacon.

C. General Requirements

- 1. The fire alarm system shall be designed and UL and FM approved for Fire, Audio Evacuation and Security applications. The system operational characteristics shall be stored in non-volatile EEPROM memory, shall be field programmable and capable of being edited with no factory involvement.
- 2. The system shall utilize broadcast polling techniques and microprocessor-based detectors to minimize the required response time and possible false alarms. Individual initiating and control devices shall retain pre-programmed response characteristics, history logging, and support electronic addressing. A system-wide response (alarm sequence) to an alarm condition shall take place within 3 seconds.
- 3. The system shall support analog sensing techniques to monitor individual devices which enable the user to set sensitivity parameters. All inputs shall be subject to multi-level alarm

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verification. The system shall be capable of reporting the status and sensitivity of each device and vectoring this information to a printer. The system shall automatically identify any detector which becomes dirty (maintenance alert), prior to false alarming.

4. The system shall be supported by standby batteries. In the event of a loss of primary power, batteries shall support 60 hours of full supervisory operation followed by 15 minutes of alarm.
5. The system shall be capable of nine levels of alarm prioritization, and allow control by event, and may include cross zoning, stepping, and/or logic statement inputs.
6. All equipment shall be new and unused. All components and systems shall be designed for uninterrupted duty. All equipment, materials and accessories covered by these requirements shall be provided by a single manufacturer, or if provided by different manufacturers recognized as compatible by both manufacturers.
7. **Circuiting Guidelines.** Each initiating device and indicating circuit shall be electronically supervised and individually addressable. All wiring shall be as follows:
 - a. Individual addressable modules shall be used to monitor waterflow, tamper, and status conditions from any related systems or conventional devices.
 - b. Addressable control modules or relays shall provide auxiliary control functions.
 - c. Addressable loop wiring shall support all devices shown and allow for a minimum of 25% spare capacity and be wired in a Class A, Style 7 fashion.
 - d. As a minimum, power supplies, amplifiers and notification appliance circuits shall operate all devices shown plus 25% spare capacity, and be wired in a Class A, Style Z fashion.
 - e. Audio and visual signals shall be circuited separately to allow continued operation of the visual signal in the event of a silencing of the audible signal.

D. System Components:

1. Fire Alarm Network Control Panel
 - a. Provide additional power supplies, etc. as required for the additional devices.
2. Intelligent System Devices: Provide intelligent analog devices where shown and required. Each device shall retain operating characteristics in non-volatile memory and conduct algorithms to distinguish real fire conditions from unwanted nuisance alarms. All

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analog devices shall provide dual LED indicators, a green LED shall flash to denote active communication, and a red LED shall flash to denote an alarm condition. Devices shall be interchangeable with twist-lock bases which may include a supervised remote LED output, fault isolation circuitry, or an auxiliary relay contact. In the event of an addressable loop communications failure, devices shall remain capable of initiating an alarm sequence.

- a. Multi-sensing Smoke Detector: Provide multi sensing analog smoke detectors in shop areas where shown and required. Each detector shall employ photoelectric, ionization and thermal sensing principles.
- b. Photoelectric Smoke Detector: Provide analog photoelectric smoke detectors where shown and required.
- c. Analog Heat Detectors: Provide Analog Heat Detectors for fixed temperature operation for combined fixed temperature/rate-of-rise operation. Analog heat detectors shall be rated for 70 foot spacing and will cause an alarm when the temperature reaches 65 degrees above ambient. The fixed temperature rating shall be 135 degrees and the rate of rise shall be rated for 15 degrees per minute. Where otherwise required, provide conventional heat detectors (V280 series) in lieu of analog heat detectors. Each conventional heat detector shall be individually addressable via an intelligent input module.
- d. Analog Duct Smoke Detector: Provide analog photoelectric duct smoke detectors mounted in air ducts where shown and required. Each detector shall be supplied with duct mounting plate, remote test station/indicator and sampling tubes sized according to duct width. Provide the required auxiliary relay outputs or addressable relay control modules with each detector in order to accomplish the required HVAC control and override functions.
- e. Intelligent Manual Pull Stations: Provide intelligent addressable manual stations where shown. The station shall be double action type with screw terminals, toggle switch, and integral addressable electronics. The station shall be constructed of red Lexan with white raised letters and a key reset switch. The station shall be keyed alike to the FACP.
- f. Monitor Module: Provide addressable input monitor modules to monitor related systems or integrate conventional initiating devices onto the addressable loop.

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- g. Control Module: Provide addressable output control modules to supervise and control conventional devices (indicating circuits, AHUs, door holders, etc.) over the addressable loop. Control modules shall provide a supervised output rated for 1 or 2 amps @ 24VDC, as required.
 - h. Isolation Modules: Provide Isolator Modules to protect circuit integrity in the event of a wiring fault. Provide a minimum of one module per floor/zone, or one for every 25 devices; whichever is greater.
- 3. Primary Notification Appliances: Flush mounted combination horn/strobe Audio/Visual signaling appliances where practical. Stand alone devices may be used to augment combination units when necessary. Specific audible and visual characteristics shall be as follows:
 - a. Visual Signals: Furnish and install self-synchronizing xenon strobes in compliance with NFPA 72 chapter 6. Strobes shall have an effective intensity rating of 15 candela in corridors and other areas up to 20' x 20', 30 candela in areas up to 30' x 30' and 110 candela in areas up to 50' x 50'.
 - b. Audible Signals: Provide multi-tapped speakers. Each speaker shall have selective 3, 2, 1, or 2 watt taps to produce a minimum sound output of 87dbA at 10'. Provide re-entrant speakers in high ambient noise areas or where weatherproof devices are required.
- 4. System Accessories
 - a. Municipal Connection: Revise existing master box.
 - b. Sprinkler System Devices: The electrical contractor shall coordinate the following to ensure that the required installation and wiring of all waterflow and tamper switches is accomplished in a manner that will result in a complete operable and tested sprinkler system. Each device shall be monitored as a separate and distinct point.
 - 1) Waterflow will activate the alarm sequence.
 - 2) Tamper OSY U2A will activate a supervisory trouble.
 - c. Terminal Cabinets: Provide fire alarm terminal cabinets where necessary. The cabinets, which shall have a removable hinged cover with key lock and red finish are intended to house analog/addressable modules and facilitate field wiring junctions.

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- d. Remote Alarm Indicators: Provide remote LED indicators for sensors located behind locked doors. Provide a permanent label on each indicator identifying the device type and actual location.
- e. Auxiliary Power Supplies: Where the power requirements exceed that which is supplied by the FACP, auxiliary power supplies may be used. Each auxiliary power supply shall be supervised for loss of AC power and Battery Fail, and each notification circuit served shall be individually supervised.
- f. Device Guards: Provide clear Lexan (StopperII) covers where required over manual pull stations. Each shall have an integral audible device which shall sound when lifted, and shall be powered from the external 24Vdc system power.
- g. Door Holders: Provide 24VDC magnetic door holders where shown and required. Door holders shall be powered by system power, but are not required to operate under standby battery.

E. Installation

- 1. Installation shall be supervised and tested by the system supplier. The work shall be performed by skilled technicians under the direction of experienced engineers, all of whom are properly trained and qualified.

F. Wiring

- 1. All wiring for the system shall be in accordance with Articles 760, 725, and 800 of the National Electrical Code and local electrical codes.
- 2. Provide complete wiring and conduit between all equipment. All devices shall be mounted upon and splices made in UL listed boxes. Wiring splices and transposing or changing of colors will not be permitted.
- 3. All junction boxes shall be painted red and labeled as 'Fire Alarm System' with decal or approved markings
- 4. Fire Alarm control systems and equipment shall be connected to separate dedicated branch circuits, sized as required for proper service. Circuits shall be labeled 'FIRE ALARM'.

G. Final Tests / Warranty

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1. The system shall be fully tested by a UL certified testing company, in accordance with UL guidelines and NFPA standards. Each and every device shall be tested.
2. A copy of the final test report [and UL certificate] shall be submitted indicating proper functioning of the system and conformance to the specifications. The test shall be performed by UL certified and factory-trained qualified technicians. Each and every device shall be tested, and standalone operation of remote panels shall be verified. Final testing [and UL certification] shall be performed by the same company that will hold and execute the Test and Inspection contract.
3. The manufacturer shall guarantee all system equipment for a period of three (3) years from the date of final acceptance.
4. The contractor shall guarantee all raceways and wiring to be free from inherent mechanical or electrical defects for one (1) year from the date of final acceptance of the system.

H. Fire Alarm Test and Inspection Contract

1. Each contractor shall include as part of their base bid the cost of a one-year test and inspection contract. This contract shall provide for quarterly tests according to UL, NFPA and local requirements. Upon its' expiration, the contract shall be renewable by the User Agency.

I. Training

1. The contractor shall provide the services of the manufacturer's representative for a period of 4 hours, during normal business hours, to instruct the User Agency's designated personnel and fire department response teams on the operation of the system.

2.15 SEALS

A. Water Tight Seals

1. Conduits entering from the exterior or below grade shall have water tight fittings on the outside and on the inside of the conduit.
 - a. Fittings on the outside of the conduit shall be O-Z Gedney type FSK or approved equal. Provide type WSK if penetration is within two feet of the high water table. Provide grounding attachment.
 - b. Fittings on the inside of the conduit shall be O-Z Gedney type CSBI or approved equal. Provide type CSBG if penetration is within two feet of the high water table. Provide a blank fitting to seal spare or empty conduits.
 - c. O-Z Gedney type CSM fitting may be used when sealing

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within a sleeve or cored hole.

2. Submit on seals to be used.
- B. Environmental Seals
1. Provide seals on raceways exposed to widely different temperatures, as in refrigerating or cold storage areas. Install seal to prevent circulation of air from warmer to colder sections through the raceway.
- C. Hazardous Area Seals
1. Provide explosion proof seals as required by the Electric Code for the following areas.
 - a. None.
- D. Smoke and Fire Stopping Seals
1. Provide a seal around raceways or cables penetrating full height walls (slab to slab), floors or ventilation or air handling ducts so that the spread of fire or products of combustion shall not be substantially increased.
 2. Penetrations through fire-resistant-rated walls, partitions, floors or ceilings shall be firestopped using approved methods and NRTL listed products to maintain the fire resistance rating.
 3. Fire stopping in sleeves or in areas that may require the addition or modification of installed cables or raceways shall be a soft, pliable, non-hardening fire stop putty. Putty shall be water resistant and intumescent. Provide for all sleeves and raceways.
 4. Firestopping in locations not likely to require frequent modification shall be NRTL listed putty, caulk or mortar to meet the required fire resistant rating.
 5. Box penetrations into a fire rated wall or shaft shall have a fire stopping pad installed on the back of the box.
 6. Firestopping of cable trays or busways through walls shall be with a non-hardening putty or with seal bags.
 7. Firestopping materials shall be NRTL listed to UL 1479 (ASTM E814). Installation methods shall conform to a UL firestopping system. Submit specifications and installation drawings for the type of material to be used. Firestopping materials shall be as manufactured by 3M, International Protective Coatings Corp., RayChem or approved equal.

PART 3 - EXECUTION

3.01 WORK COORDINATION AND JOB OPERATIONS

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- A. Equipment shall not be installed in congested and possible problem areas without first coordinating installation of same with other trades. Relocate electrical equipment installed in congested or problem areas should it interfere with the proper installation of equipment to be installed by other trades.
- B. Particular attention shall be directed to coordination of lighting fixtures and other electrically operated equipment requiring access which is to be installed in ceiling areas. Coordinate with other trades, the elevations of equipment in hung ceiling areas to insure adequate space for installation of recessed fixtures before said equipment is installed. Conflicts in mounting heights and clearances above hung ceilings for installation of recessed lighting fixtures or other electrically operated equipment requiring access shall be brought to the attention of Architect for a decision prior to equipment installation.
- C. Furnish to General Contractor and other Subcontractors information relative to portions of electrical installation that will affect other trades sufficiently in advance so that they may plan their work and installation.
- D. Obtain from other trades information relative to electrical work which he, the Electrical Subcontractor, is to execute in conjunction with installation of other trades' equipment.
- E. Lighting fixtures in mechanical spaces or utility/ storage rooms shall only be installed after all mechanical equipment is in place.

3.02 PLANS AND SPECIFICATIONS

- A. Plans:
 - 1. Drawings showing layout of electrical systems indicate approximate location of raceways, outlets, and apparatus. Runs of feeders and branch circuits are schematic and are not intended to show exact routing. Final determination as to routing shall be governed by structural conditions and as indicated on the approved coordination Drawings.
- B. Specifications:
 - 1. Specifications supplement Drawings and provide specifics pertaining to methods and material to be used.

3.03 IDENTIFICATION

- A. Equipment shall be marked for ease of identification as follows.
 - 1. Provide screw-on nameplates on switchboards, panelboards, F.A. terminal cabinets, starters, and disconnect switches. Nameplates to be of black phenolic with white engraving. For starters and disconnect switches lettering shall be minimum of 1/4" high. Nameplates on panelboards shall have the following information.

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- a. Line 1 - Panel designation in 1/2" high letters.
 - b. Line 2 - Utilization voltage in 3/8" high letters.
 - c. Line 3 - Distribution source "Fed from" in 1/4" high letters.
2. Neatly typed directory cards listing circuit designations shall be fastened inside the cover of panelboards. Spare circuits shall be penciled.
 3. Color coding schedules. If there is more than a single system voltage, different voltages shall have separate color codes, as previously specified. A copy of the color code schedule shall be affixed to each secondary switchboard and distribution panel and shall be of the phenolic nameplate type as previously specified. A typewritten color code schedule shall also be affixed, under plastic, inside each panelboard door.
 4. Outlet boxes both concealed and exposed shall be identified as to panel origination and circuit number by means of fibre pen on the inside of coverplate.
 5. Special system outlet boxes concealed above hung ceilings shall be identified as to system by spray painting during roughing. The following systems shall be identified.
 - a. Fire Alarm - red.
 - b. Normal/Emergency - yellow.
 - c. Security - blue.
 - d. Sound - green.
 6. Wiring device plates on devices connected to normal-emergency circuits shall be red in color.
 7. All conductors in boxes larger than standard outlet boxes, in all wireways, trench headers, etc. shall be grouped logically and be identified.
 8. Grounding conductors and neutrals shall be labeled in panels, wireways, etc. as to circuits associated with.

3.04 PROTECTION AND CLEANUP

A. Protection:

1. Materials and equipment shall be suitably stored and protected from weather.
2. During progress of work, pipe and equipment openings shall be temporarily closed so as to prevent obstruction and damage.
3. Be responsible for maintenance and protection of material and equipment until final acceptance.

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B. Cleanup:

1. Keep job site free from accumulation of waste material and rubbish. Remove all rubbish, construction equipment, and surplus materials from site and leave premises in a clean condition.
2. At completion, equipment with factory finished surfaces shall be cleaned and damaged spots touched up with the same type paint applied at factory.
3. Particular attention is called to Section 110-12(c) of the NEC, which requires that internal parts of electrical equipment not be contaminated by construction operations.

3.05 PORTABLE OR DETACHABLE PARTS

- A. Retain possession of and be responsible for spare parts, portable and detachable parts, and other removable portions of installation including fuses, keys, locks, blocking clips, inserts, lamps, instructions, Drawings, and other devices or materials that are relative to and necessary for proper operation and maintenance of the system until final acceptance, at which time such parts shall be installed or turned over to the Owner, as the case may be.

3.06 SAFETY PRECAUTIONS

- A. Provide proper guards, signage, and other necessary construction required for prevention of accidents and to insure safety of life and property. Remove any temporary safety precautions at completion.

3.07 MOUNTING HEIGHTS

- A. All electrical equipment shall be mounted at the following heights unless noted or detailed otherwise on Drawings. Notes on architectural Drawings shall supersede those noted below or detailed on the electrical Drawings. If mounting height of an electrical component is questionable, obtain clarification from Architect before installation.
1. Duplex convenience outlets, microphone outlets, and telephone outlets - 18 inches.
 2. Light switches, pushbutton stations, HOA switches, and all other toggle or control switches for the operation of heating, ventilating, and air conditioning, plumbing, and general service - 48 inches.
 3. Clock outlets - 84 inches.
 4. Fire alarm pull stations - 48 inches.
 5. Fire alarm audio visual signals - 80 inches or 6 inches below ceiling, whichever is lower.
 6. Panelboards for lighting, power, telephone, and other auxiliary systems - 78" to top.

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7. Equipment located in lobbies shall be located as detailed on architectural Drawings or as directed by Architect.
 8. All receptacles, light switches, fire alarm signals, and clocks sharing a common location shall be symmetrically arranged.
 9. Exterior and interior wall brackets shall be as detailed on architectural Drawings or as directed by Architect.
- B. Mounting heights given are from finished floor to centerline. In the case of a raised floor, surface of raised floor is the finished floor.

3.08 WORKMANSHIP AND INSTALLATION METHODS

- A. Work shall be installed in first-class manner consistent with best current trade practices. Equipment shall be securely installed plumb and/or level. Flush-mounted outlet boxes shall have front edge flush with finished wall surface. No electrical equipment shall be supported by work of other trades. Cable systems shall be supported and not draped over ducts and piping or laid on ceiling suspension members. Lighting fixtures shall be installed to agree with Architects reflected ceiling plans.
- B. Supports:
1. Support work in accordance with best industry practice and by use of standard fittings.
 2. In general, walls and partitions will not be suitable for supporting weight of panelboards, dry type transformers and the like. Provide supporting frames or racks extending from floor slab to structure above.
 3. Provide supporting frames or racks for equipment, intended for vertical surface mounting in free standing position where no walls exist.
 4. Supporting frames or racks shall be of standard angle, standard channel or specialty support system steel members, rigidly bolted or welded together and adequately braced to form a substantial structure. Racks shall be of ample size to assure a workmanlike arrangement of equipment.
 5. Provide 3/4" thick painted plywood mounting surfaces in all electric and telephone areas and for all equipment on free standing racks. All plywood shall be fire retardant and painted both sides and edges with 2 coats of white paint.
 6. No work for exposed installations in damp locations shall be mounted directly on any building surface. In such locations, flat bar members or spacers shall be used to create a minimum of 1/4" air space between building surfaces and work.

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7. Nothing (including outlet, pull and junction boxes and fittings) shall depend on electric raceways or cables for support. All outlet, pull, and junction boxes shall be independently supported.
 8. Nothing shall rest on, or depend for support on, suspended ceiling or its mounting members.
 9. Support surface or pendant mounted lighting fixtures:
 - a. From outlet box by means of an interposed metal strap, where weight is less than five pounds.
 - b. From outlet box by means of a hickey or other direct threaded connection, where weight is from five to fifty pounds.
 - c. Directly from structural slab, deck or framing member, where weight exceeds fifty pounds.
 - d. Pendant lighting fixtures shall be supported by threaded rods in non-public areas and by manufacturers standard tube hangers with swivel aligner and canopy in public areas. Provide non-standard pendant lengths where required to mount fixtures at elevations either called for on Drawings or as shown in architectural elevations.
 10. Support recessed lighting fixtures directly from structural slabs, decks or framing members, by means of jack chain or air craft cable, one at each end of fixture at opposite corners.
 11. Where support members must of necessity penetrate air ducts, provide airtight sealing provisions which allow for a relative movement between the support members and the duct walls.
 12. Provide channel sills or skids for leveling and support of all floor mounted electrical equipment.
 13. Where permitted loading is exceeded by direct application of electrical equipment to a slab or deck, provide proper dunnage as required to distribute the weight in a safe manner.
 14. Support metallic raceways by either running within steel frame or hung from the building frame. Anything hung from building frame shall be attached with metallic fasteners.
- C. Fastenings:
1. Fasten electric work to building structure in accordance with the best industry practice.
 2. Where weight applied to attachment points is 100 pounds or less, fasten to building elements of:
 - a. Wood -- with wood screws.

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- b. Concrete and solid masonry -- with bolts and expansion shields.
 - c. Hollow construction -- with toggle bolts.
 - d. Solid metal -- with machine screws in tapped holes or with welded studs.
 3. Where weight applied to attachment points exceeds 100 pounds, fasten as follows:
 - a. At field poured concrete slabs, provide inserts with 18" minimum length slip-through steel rods, set transverse to reinforcing steel.
 - b. Where building is steel framed, utilize suitable auxiliary channel or angle iron bridging between structural steel elements to establish fastening points. Bridging members shall be suitably welded or clamped to building steel. Provide threaded rods or bolts to attach to bridging members.
 4. Floor mounted equipment shall not be held in place solely by its own dead weight. Provide floor anchor fastenings. Floor mounted equipment over 72 inches in height shall also be braced to nearest wall or overhead structural elements.
 5. For items which are shown as being mounted at locations where fastenings to the building construction element above is not possible, provide suitable auxiliary channel or angle iron bridging to building structural elements.
 6. Fastenings for metallic raceways using the fastening as support shall be of the metallic type. Fastenings to hold raceways or cables in place may be via tyrops.
- D. General Raceway Installation:
 1. Install the various types of raceways in permitted locations as previously specified. All raceways shall be run concealed. Consult Architect for instruction for raceways which must be exposed in public spaces.
 2. Raceways for normal-emergency or emergency only wiring cannot contain other conductors.
 3. Raceways shall be properly aligned, grouped, and supported in accordance with code. Exposed raceways shall be installed at right angles to or parallel with structural members. Concealed raceways may take most direct route between outlets.
 4. Raceways run on trapeze hangers shall be secured to the trapeze.

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5. Raceways shall be continuous and shall enter and be secured to all boxes in such a manner that each system shall be electrically continuous from service to all outlets. Provide grounding bushings and bonding jumpers where raceways attach to painted enclosures or terminate below equipment.
6. Where raceways enter boxes, cabinets, tap boxes, other than those having threaded hubs, a standard locknut shall be used on the outside and locknut and bushing on the inside.
7. Where raceways terminate below equipment and there is no direct metal to metal continuity, provide grounding bushings on raceways and interconnect with equipment grounding conductor.
8. All empty raceways shall be provided with a pull wire.
9. All raceway sleeves, stub-ups, or stub-outs, where not connected to a box or cabinet, shall be terminated with a bushing.
10. All raceway joints shall be made up tight and no running threads will be permitted.
11. Where raceways are cut, the inside edge shall be reamed smooth to prevent injury to conductors.
12. All vertical raceways passing through floor slabs shall be supported.
13. Raceways shall not be installed in concrete slabs above grade or below waterproofed slabs.
14. Electric raceways and/or sleeves passing through floors or walls shall be of such size and in such location as not to impair strength of construction. Where raceways alter structural strength or the installation is questionable, the structural engineer shall be contacted for approval.
15. Raceways shall not run directly above or below heat producing apparatus such as boilers, nor shall raceways run parallel within 6 inches of heated pipes. Raceways crossing heated pipes shall maintain at least a 1 inch space from them.
16. Raceways shall be installed in such a manner as to prevent collection of trapped condensates, and all runs shall be arranged to drain.
17. Raceways passing between refrigerated and non-refrigerated spaces and those penetrating enclosures with air movement shall be provided with seals.
18. Raceways feeding fire and jockey pumps shall be rigid metal conduit either run below slab or inside 2 hour rated enclosure. Final connections to motors shall be liquidtight flexible conduit.

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19. Where two alternate wiring methods interconnect such as EMT to flexible metal conduit, an outlet box shall be provided.
20. All empty raceways entering building and all sleeves or core drilled openings through floors shall be sealed.
21. Each exterior raceway or assembly in a ductbank shall be provided with continuous warning tape installed 12 inches above raceway or ductbank.
22. Underground rigid non-metallic raceways where allowed and run as a ductbank encased in concrete shall be installed with plastic spacers to ensure a separation of 3 inches between raceways. Top of ductbanks shall be 30 inches below grade, unless otherwise detailed.
23. Elbows and extensions of rigid non-metallic raceway systems which penetrate slabs shall be rigid or intermediate metal conduit.
24. Raceways used for transformer connections shall be flexible type and shall contain a grounding conductor.
25. Raceways entering building through foundation wall into a basement area shall be provided with wall entrance seals or with other acceptable waterproofing method.

E. General Outlet Box Installation:

1. Boxes shall be set flush with finish surface and provided with proper type extension rings or plaster covers. Thru the wall boxes are not permitted. Check device or fixture to be mounted to box to ensure box orientation is proper.
2. In addition to boxes shown, install additional boxes where needed to prevent damage to cables and wires during pulling-in operation.
3. Remove knockouts only as required and plug unused openings.
4. Where required for horizontal and vertical alignment of boxes in stud partitions, bar hangers spanning two studs shall be used. Device boxes for insertion type receptacles shall be provided with far side box supports where there are less than two entering nonflexible raceways, and where bar rangers are not provided.
5. Boxes flush mounted in fire rated partitions and on opposite sides of the partition shall be separated by a distance of 24 inches in accordance with UL listing for the box.
6. Locations of outlets indicated on Drawings are approximate. For items exposed to view, refer to architectural Drawings and coordinate locations with masonry joints, panel joints, ceiling grids, structural members, etc.

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7. In case of conflict with standard mounting heights and device alignment, consult Architect prior to roughing.
 8. Check all door swings on architectural Drawings to ensure lighting switches are installed on strike side of door.
 9. The right to make any reasonable change in location of outlets prior to roughing is reserved by Architect. "Reasonable change" shall be interpreted as movement within 10 feet of location shown.
 10. Obtain dimensioned plan from Architect for floor outlets.
 11. Outlet boxes for use where surface metal raceways are allowed shall be of a type specifically designed to be used with such surface metal raceway systems.
 12. Outlet boxes shall not line up back to back in partition walls.
- F. Conductor Installation:
1. No conductors shall be pulled into individual raceways until such raceway system is complete and free of debris. No harmful lubricants shall be used to ease pulling.
 2. All conductors shall be wired so that grounded conductor is unbroken; switches in all cases being connected in ungrounded conductor.
 3. Connections throughout the entire job shall be made with solderless type devices of approved design satisfactory to Inspector of Wires.
 4. All taps and splices shall be insulated equal to that of conductor insulation.
 5. All conductors of each feeder in pull boxes etc. shall be grouped, tied together, supported, and identified.
 6. All conductors in panelboards and other wiring enclosures shall be neatly formed and grouped.
 7. All conductors of emergency only and/or normal/emergency shall be run in separate raceway systems to final outlet box.
 8. Provide support for conductors in vertical raceways in accordance with Article 300-19.
 9. Strip insulation from conductors with approved tools and only of sufficient length for proper termination. Cutting of conductor stranding is unacceptable.
 10. Taps from paralleled conductors shall be of a type which tap each conductor, such as ILSCO "PTA" series.

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11. Grounding conductors are to be identified as to associated power circuits.
- G. Type MC Cable Installation:
1. Where cable is permitted under the products section, the installation of same shall be done in accordance with code and the following:
 - a. Cable shall be supported in accordance with code. Tie wire is not an acceptable means of support. Horizontally run cable supports such as Caddy WMX-6, and clamps on vertical runs such as Caddy CJ6 shall be used. Where cables are supported by the structure and only need securing in place, then ty-raps will also be acceptable. Ty-raps are not acceptable as a means of support. All fittings, hangers, and clamps for support and termination of cables shall be of types specifically designed for use with cable, i.e., romex connectors not acceptable.
 - b. Armor of cable shall be removed with rotary cutter device equal to roto-split by Seatek Co., not with hacksaw.
 - c. Use split "insuliner" sleeves at terminations.
 - d. Any cable system used in conjunction with isolated ground circuits shall have both an isolated ground conductor and an equipment ground conductor.
- H. Stranded Conductor Installation:
1. If Contractor selects stranded conductors for # 10 AWG and smaller, terminate such conductors as follows:
 - a. No stranded conductor may be terminated under a screwhead. Provide insulated terminal lugs for all screw connections equal to Thomas & Betts "STA-KON" type RC with forked tongue and turned up toes. Installation of lugs shall be done with compression tool such as T&B WT-145C which prevents opening of tool until full compression action is completed.
 - b. Backwired wiring devices shall be of clamp type; screw tightened. Force fit connections not allowed.
 2. Stranded conductors will not be allowed for fire alarm work.
- I. Accessibility:
1. Electrical equipment requiring service or manual operation shall be accessible.

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2. Work switches for equipment within accessible hung ceiling spaces, such as fan powered terminal boxes, shall be located at terminal box, and so located so as to be accessible.

J. Vibration Elimination: All equipment connections to rotating equipment or equipment capable of vibration shall be made up by flexible raceways.

K. Wiring Device Gaskets: Provide wiring device gaskets at coverplates where device is mounted in wall separating conditioned and non-conditioned spaces.

3.09 FEEDER CIRCUITS

A. Provide feeders as called for on the Drawings.

B. Feeders shall be defined as any circuit originating from the main building switchboard and/or distribution panels.

C. All feeder conductors shall be continuous from origin to panel or equipment termination without splicing.

D. All feeders shall be conductors pulled into raceways. Cable systems are not allowed for feeders unless specifically indicated.

3.10 BRANCH CIRCUITS

A. Provide all branch circuit wiring and outlets for a complete and operating system. The system shall consist of insulated conductors connected to the panelboards and run in raceways or as cable systems if permitted under products section, as required to the final outlet and shall include outlet boxes, supports, fittings, receptacles, plates, fuses, etc.

B. Physical arrangement of branch circuit wiring shall correspond to circuit numbering on Drawings. Combining of circuits and raceways will be allowed up to a 3 phase, 4 wire circuit in a single raceway, unless shared neutrals are not allowed by other sections of this Division, or are indicated as separate neutrals on the Drawings. Any combination of homeruns such as this, however, shall be indicated on record Drawings. Combining of conductors and raceways for tenant fitup work is allowed only for fitup boxes in accordance with details on Drawings. When a common grounded conductor is used for more than one circuit, the arrangement shall be such that a receptacle, fixture, or other device may be removed or disconnected without disconnecting the grounded conductor for other circuits. Ground fault circuit breakers and isolated ground outlets shall be wired with separate neutrals and separate grounding conductors per circuit. A consistent phase orientation shall be adhered to throughout project at terminations.

C. Circuits feeding three phase equipment shall not be combined into common raceways, unless specifically indicated.

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- D. All wiring in panelboards and cabinets shall be neatly formed and grouped.
- 3.11 FIREPROOFING AND WATERPROOFING
- A. Fireproof and waterproof all openings in slabs and walls.
- 3.12 CUTTING AND PATCHING
- A. All cutting of surfaces, including core drilling of walls and slabs, shall be done by Electrical Subcontractor except as previously indicated. Openings through new wall surfaces will be provided by General Contractor if Electrical Subcontractor gives suitable notice as erection of surface proceeds. If suitable notice is not given, Electrical Subcontractor shall then be responsible for cost of corrective work required.
 - B. Patching will be provided by the trade responsible for the surface to be patched.
- 3.13 MECHANICAL SYSTEM COORDINATION
- A. The Mechanical System Subcontractor will be providing various items of mechanical services equipment and control apparatus. In general, Electrical Subcontractor shall connect up power wiring to this equipment.
 - B. The Mechanical and Electrical Subcontractor shall closely coordinate their respective portions of work.
 - C. If, due to local regulations, electric heating equipment furnished by the mechanical systems subcontractor is required to be installed by licensed electricians in order to allow connection by Electrical Subcontractor's licensed electricians, it will then be Mechanical Subcontractor's responsibility to engage and pay for services of such licensed electricians.
 - D. Power wiring to be provided by Electrical Subcontractor is the line voltage power supply wiring. Control wiring is responsibility of Mechanical System Subcontractor unless specifically indicated on electrical Drawings, or in this Division of the specifications. Temperature Control Subcontractor shall refer to electrical Drawings for location of all magnetic starters.
 - E. 120 volt control wiring source to (1) temperature control panel is the responsibility of Electrical Subcontractor.
- 3.14 DISTRIBUTION EQUIPMENT TESTING
- A. All meter centers, individual motor starters, main distribution panels, motor controls, feeder conductors, and emergency systems shall be tested in accordance with the following. In general, all tests shall be done in accordance with the 1995 Acceptance Testing Specifications of the International Electrical Testing Association.

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- B. The Testing Subcontractor may be an independent contractor or a manufacturer of the equipment, which is to be tested.
- C. Test report forms, delineating tests to be made, and method of recording same shall be submitted prior to commencing work. Test reports when submitted shall include interpretation of results and recommendation for any corrective work required.
- D. Main Distribution Panels:
 - 1. Visual Inspection:
 - a. Check for foreign material within bus enclosure.
 - b. Check for missing hardware.
 - c. Inspect entire assemblies for transit damage or factory defects.
 - d. Check for all bus dimensions and bracing per specifications.
 - e. Check ratings of current transformers and potential transformers.
 - f. Check ratings of all protective relays per drawings.
 - 2. Physical Inspection:
 - a. Torque all bus hardware to proper tension.
 - b. Circuit breaker interlocks all work properly.
 - c. All doors and hinged panels open and close properly.
 - d. Relay blocking removed from all control and protective relays.
 - e. All circuit breakers operate, close and trip mechanically.
 - f. Torque all feeder conductors to terminal manufacturers' recommendations.
 - 3. Electrical Testing:
 - a. Breakers operated electrically trip and close from local and remote positions.
 - b. All circuit breakers calibrated to manufacturer's respective time current curves as specified.
 - 1. Long time pick-up amps.
 - 2. Long time delay tripping at 300% of current setting.
 - 3. Resets okay at 80% of pick-up value.
 - 4. Short time pick-up current.

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5. Short time delay trip time at 105% of setting.
 6. Instantaneous minimum pick-up current.
 - c. All protective relays calibrated to manufacturer's characteristic time curves for pick-up, drop-out, instantaneous and time delay.
 - d. All instruments calibrated for accuracy.
 - e. Protective relay schemes to be electrically tested by primary injection of current through current transformers and the tripping of associated circuit breakers.
 - f. Insulation resistance tests made on all circuit breakers, line to load breaker open, line to ground breaker closed, 3 poses tested individually. Switchgear bus to be tested phase to phase and phase to ground with Megohmmeter type instrument. Relays also to be insulation resistance tested.
- E. Magnetic Starters:
1. Visual inspection to determine:
 - a. Shipping damage.
 - b. Proper bussing and contactor sizes.
 - c. Correct overload relay heater ratings. Any incorrectly sized overloads shall be replaced by the contractor who originally provided same.
 2. Electrical Testing:
 - a. Electrical operation of control relays, timing relay, and contactor coils.
 - b. Insulation resistance test on all current carrying bus to ground and between phases.
 - c. Calibration check of overload heater to ascertain tripping point and time delay at 300% of heater rating.
- F. Conductors:
- All secondary service conductors and all feeder conductors from distribution panels shall be tested.
1. Visual and mechanical inspection.

Conductors to be inspected for physical damage and proper connection and sizing in accordance with single line diagram.

Conductor connections shall be torque tested to manufacturer's recommended values.
 2. Electrical Tests:

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Perform insulation resistance test on each conductor with respect to ground and adjacent conductor.

Perform continuity test to insure proper conductor connection.

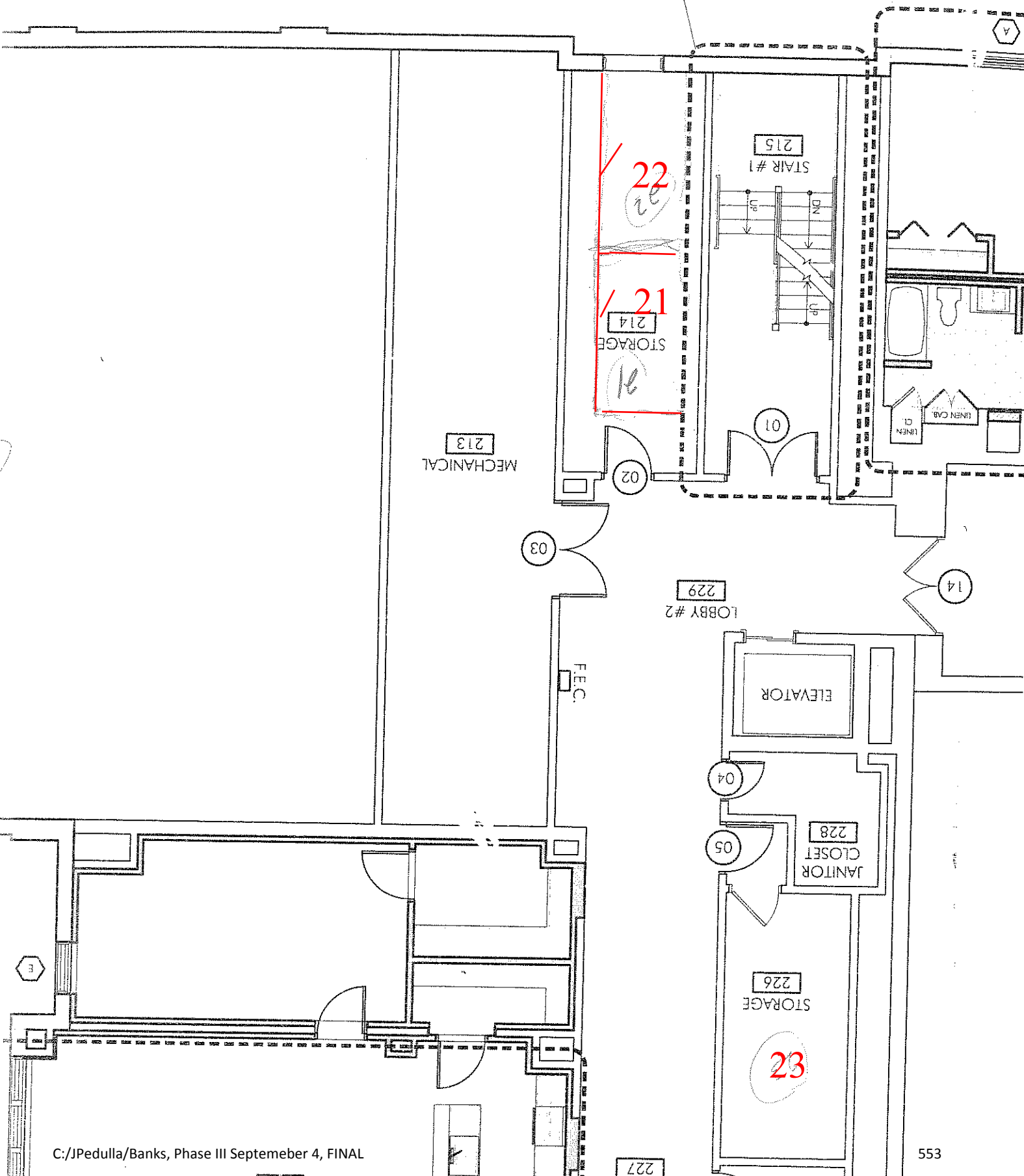
- H. Grounding Grids or Electrodes: Measurement of resistance from ground grids or electrodes to earth to determine adequacy of grounding system in building and compliance with specifications and/or electrical code.
- I. Settings of Adjustable Devices: Using the result of the fault current and coordination study specified hereinafter, the Testing Contractor shall set all adjustable devices.

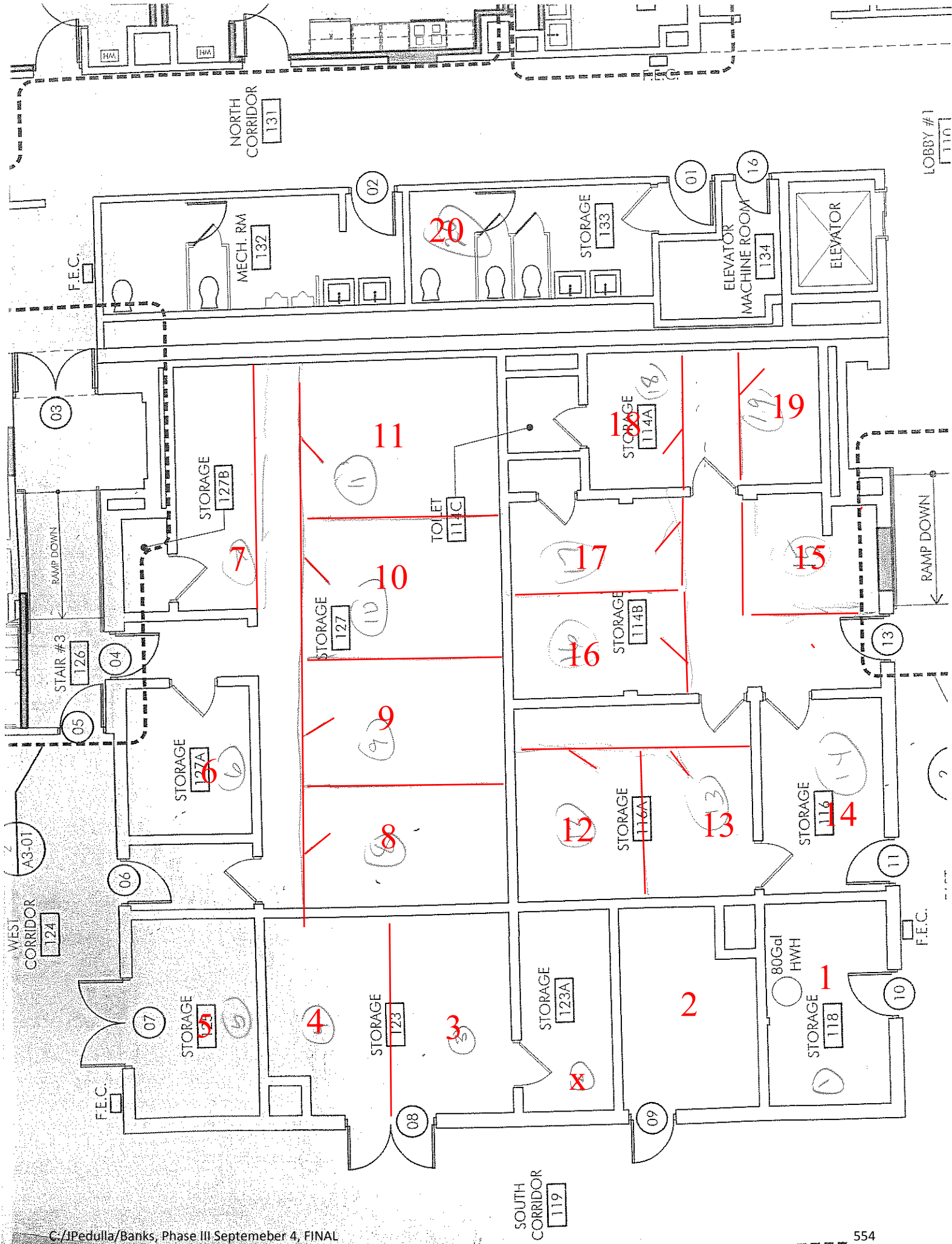
END OF SECTION

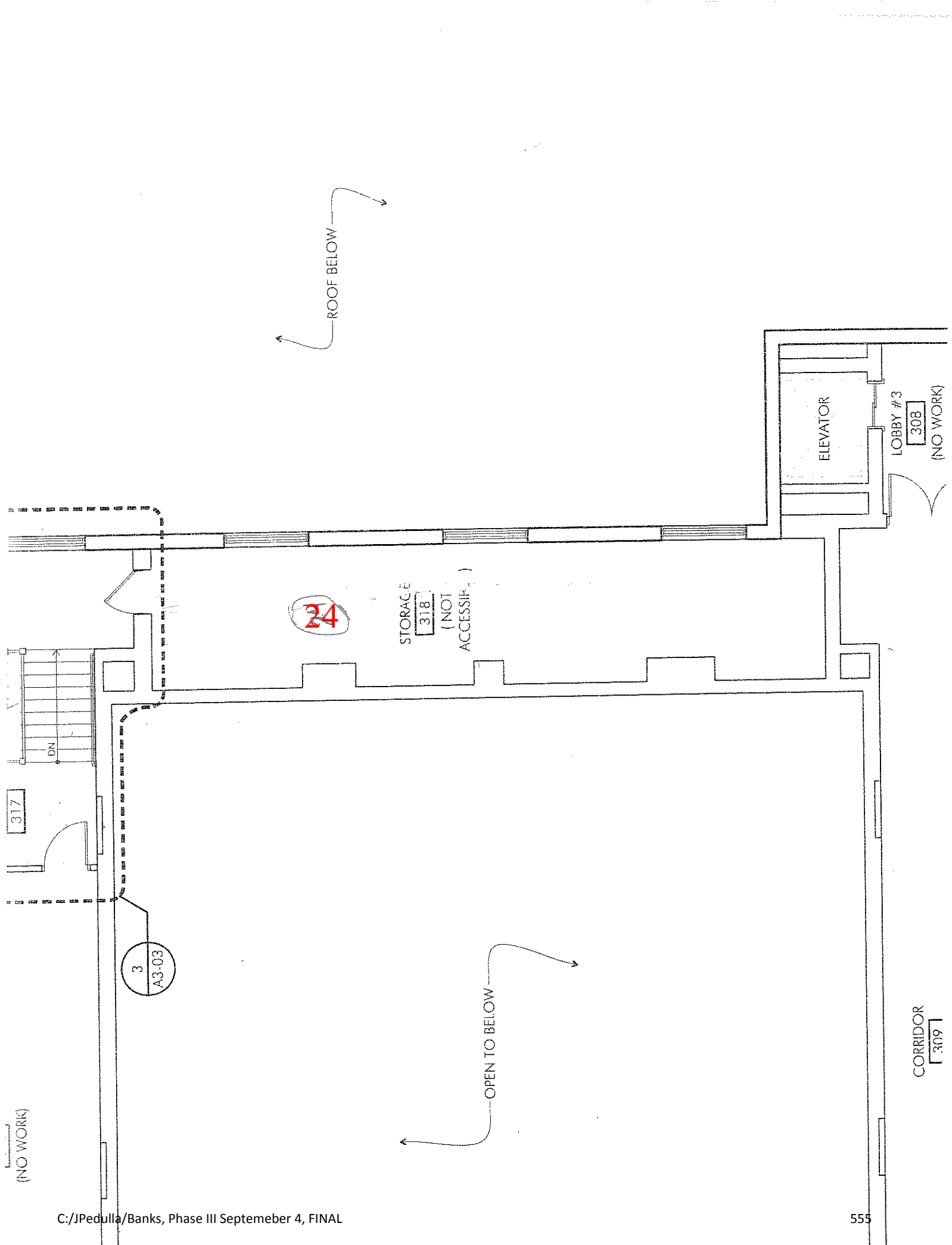
PHASE III RENOVATIONS TO THE
FORMER BANKS SCHOOL
WALTHAM, MA

ATTACHMENT “A”

A3-01
2







ROOF BELOW

ELEVATOR

LOBBY #3

308

(NO WORK)

STORAGE

318

(NOT ACCESSIBLE)

24

OPEN TO BELOW

CORRIDOR

309

3

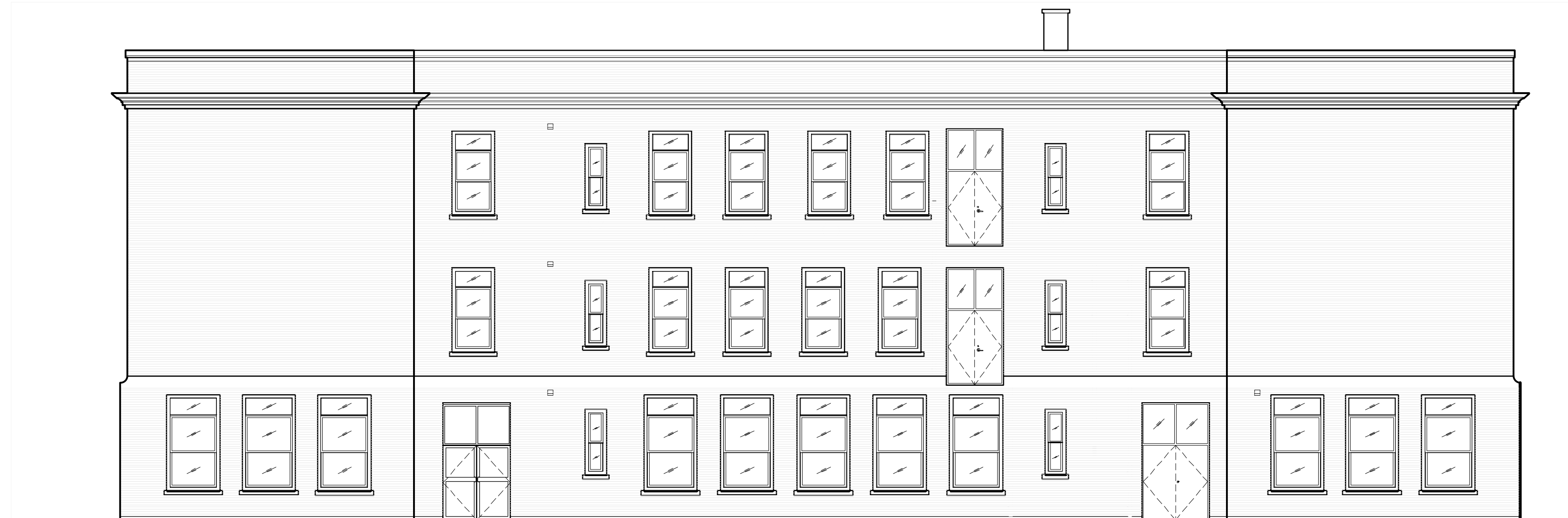
A3-03

(NO WORK)

PHASE III

RENOVATIONS TO THE FORMER BANKS SCHOOL

ELDERLY HOUSING CONDOMINIUMS



DRAWING LIST:

- GENERAL**
 G0-01 COVER SHEET
 G0-02 PARTITION FIRE RATING DIAGRAMS
- DEMOLITION**
 D1-01 FIRST FLOOR DEMOLITION PLAN
 D4-01 UNITS 100 & 102 INTERIOR DEMOLITION ELEVATIONS
 D4-02 UNIT 101 INTERIOR DEMOLITION ELEVATIONS
 D4-03 UNIT 103 INTERIOR DEMOLITION ELEVATIONS
 D4-04 UNITS 104 & 105 INTERIOR DEMOLITION ELEVATIONS
 D4-05 UNIT 106 INTERIOR DEMOLITION ELEVATIONS
- SITE**
 LI-01 SITE PLAN
- ARCHITECTURAL**
 A1-01 FIRST FLOOR PLAN
 A1-02 SECOND FLOOR PLAN
 A1-03 THIRD FLOOR PLAN
 A1-04 ROOF PLAN
 A1-05 FIRST FLOOR REFLECTED CEILING PLAN
 A1-06 ENLARGED UNITS 100 & 102 REFLECTED CEILING AND FLOOR PLANS
 A1-07 ENLARGED UNIT 101 REFLECTED CEILING AND FLOOR PLANS
 A1-08 ENLARGED UNIT 103 REFLECTED CEILING AND FLOOR PLANS
 A1-09 ENLARGED UNITS 104 & 105 REFLECTED CEILING AND FLOOR PLANS
 A1-10 ENLARGED UNIT 106 REFLECTED CEILING AND FLOOR PLANS
 A1-11 GYM TOILET ROOMS REFLECTED CEILING PLAN AND FLOOR PLAN
 A1-12 ENLARGED BATHROOM PLANS AND DETAILS
 A2-01 BUILDING ELEVATIONS
 A2-02 BUILDING ELEVATIONS
 A3-01 STAIRWELL #3 FIRST FLOOR PLANS AND SECTION
 A4-01 UNITS 100 & 102 INTERIOR ELEVATIONS
 A4-02 UNIT 101 INTERIOR ELEVATIONS
 A4-03 UNIT 103 INTERIOR ELEVATIONS
 A4-04 UNITS 104 & 105 INTERIOR ELEVATIONS
 A4-05 UNIT 106 INTERIOR ELEVATIONS
 A5-01 FINISH SCHEDULE, PARTITION TYPES AND DETAILS
 A5-02 TYPICAL UNIT ENTRY DETAIL PLAN AND SECTIONS
 A5-03 TYPICAL DETAILS
 A5-04 TYPICAL ROOF DETAILS
 A6-01 WINDOW AND NOTES, ELEVATIONS, DETAILS AND NOTES
 A6-02 WINDOW ELEVATIONS AND DETAILS
 A6-03 WINDOW ELEVATIONS AND DETAILS
 A7-01 DOOR SCHEDULE AND DETAILS

- STRUCTURAL**
 S1-01 FIRST FLOOR STRUCTURAL PLAN
 S2-01 GENERAL NOTES AND DETAILS
- FIRE PROTECTION**
 FP0.1 LEGEND, NOTES AND DETAILS
 FPD1.1 FIRST FLOOR DEMOLITION PLAN
 FP1.1 FIRST FLOOR PLAN
- PLUMBING**
 P0.1 PLUMBING LEGEND, NOTES & DETAILS
 P0.2 PLUMBING RISER DIAGRAMS
 PD1.1 FIRST FLOOR PLUMBING DEMOLITION PLAN
 P1.1U UNDERSLAB PIPING PLAN
 P1.1G FIRST FLOOR GAS PIPING PLAN
 P1.1 FIRST FLOOR PLUMBING PLAN
- MECHANICAL**
 MD1.1 HVAC FIRST FLOOR DEMOLITION PLAN
 M1.1 HVAC FIRST FLOOR PLAN
 M1.2 HVAC ATTIC PLAN
 M1.2 HVAC ROOF PLAN
 M2.1 HVAC DETAILS AND SCHEDULES
 VS.1 VIBRATION AND SEISMIC DETAILS
 VS.2 VIBRATION AND SEISMIC DETAILS
- ELECTRICAL**
 E0.1 ELECTRICAL SYMBOL LIST
 E0.2 ELECTRICAL SITE DETAILS AND SCHEDULE
 ED1.1 FIRST FLOOR DEMOLITION PLAN
 E1.1 FIRST FLOOR ELECTRICAL PLAN
 E1.2 TYPICAL UNIT ELECTRICAL PLAN
 E1.3 ELECTRICAL FIRST FLOOR PLAN-TYPICAL UNIT
 E1.4 ELECTRICAL ROOF PLAN
 E3.0 ONE-LINE POWER RISER DIAGRAM
 E3.1 SCHEDULES AND DETAILS
 E3.2 FIRE ALARM RISER AND DETAILS
 E3.3 SCHEDULES AND DETAILS

LIST OF ABBREVIATIONS	
A.F.F.	ABOVE FINISH FLOOR
APPROX	APPROXIMATE
CAB.	CABINET
CB	CATCH BASIN
CL	CLOSET
CMU	CONCRETE MASONRY UNIT
CONC.	CONCRETE
CONT.	CONTINUOUS
D.F.	DRINKING FOUNTAIN
EQ	EQUAL
E.W.	EACH WAY
FD	FLOOR DRAIN
HC	HANDICAP
HT	HEIGHT
I IN	INVERT IN
I OUT	INVERT OUT
ID	INTERIOR DIAMETER
L.C.C.	LEAD COATED COPPER
MAC	MAXIMUM
MIN.	MINIMUM
N/A	NOT APPLICABLE
N.I.C.	NOT IN CONTRACT
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
O.H.	OPPOSITE HAND
PAV.	PAVERS
P.T.	PRESSURE TREATED
RCP	REFLECTED CEILING PLAN
S.A.T.	SUSPENDED ACOUSTICAL CEILING
SIM.	SIMILAR TO
S.S.	STAINLESS STEEL
T.	TREAD
TYP.	TYPICAL
U.O.N.	UNLESS OTHERWISE NOTED
V.I.F.	VERIFY IN FIELD
VCB	VINYL COVE BASE
W/C	WITH
L.C.C.	LEAD COATED STEEL
Ø	DIAMETER
±	PLUS OR MINUS

SYMBOL LEGEND	
	SEE DETAIL 88 ON SHEET
	BREAK LINE
	DIMENSION LINE
	EGRESS DOOR TAG
	WINDOW TAG

CONTACT INFORMATION:

Architect



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 F: (617) 464-2971

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Owner

City of Waltham Mayor's Office
 City Hall, 2nd Floor
 610 Main Street
 Waltham, MA 02452

Contact:
 Mr. Don Cusano, Clerk of Works
 P: 781-314-3192
 F: 781-314-3176

CONSULTANT INFORMATION:

Mechanical, Electrical, Plumbing & Fire Protection Engineers of Record:



Garcia-Galuska-DeSousa Engineers
 370 Faunce Corner Road
 Dartmouth, MA 02747
 P: 508-998-5700
 F: 508-998-0883

Code Consultant



Rol Jensen & Associates, Inc.
 1661 Worcester Road
 Suite 501
 Framingham, MA 01701
 P: 508-620-8900
 F: NA

LOCATOR MAP

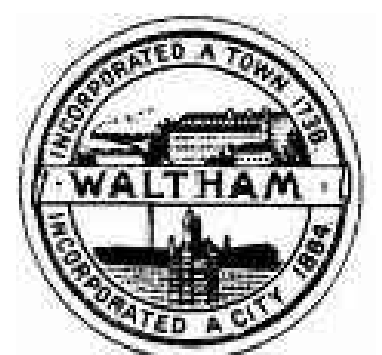


NOTE:
 CONTRACTOR TO FIELD VERIFY ALL
 DIMENSIONS AND CONDITIONS.



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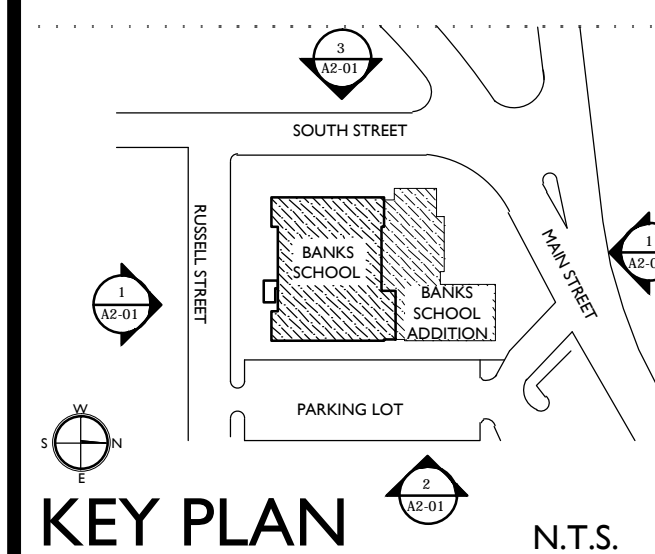
PHASE III
 RENOVATIONS TO
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 ELDERLY HOUSING
 CONDOMINIUMS
 948 MAIN STREET
 WALTHAM, MA



CITY OF
 WALTHAM
 CITY HALL
 610 MAIN STREET
 WALTHAM, MA

Drawing Title:

COVER SHEET

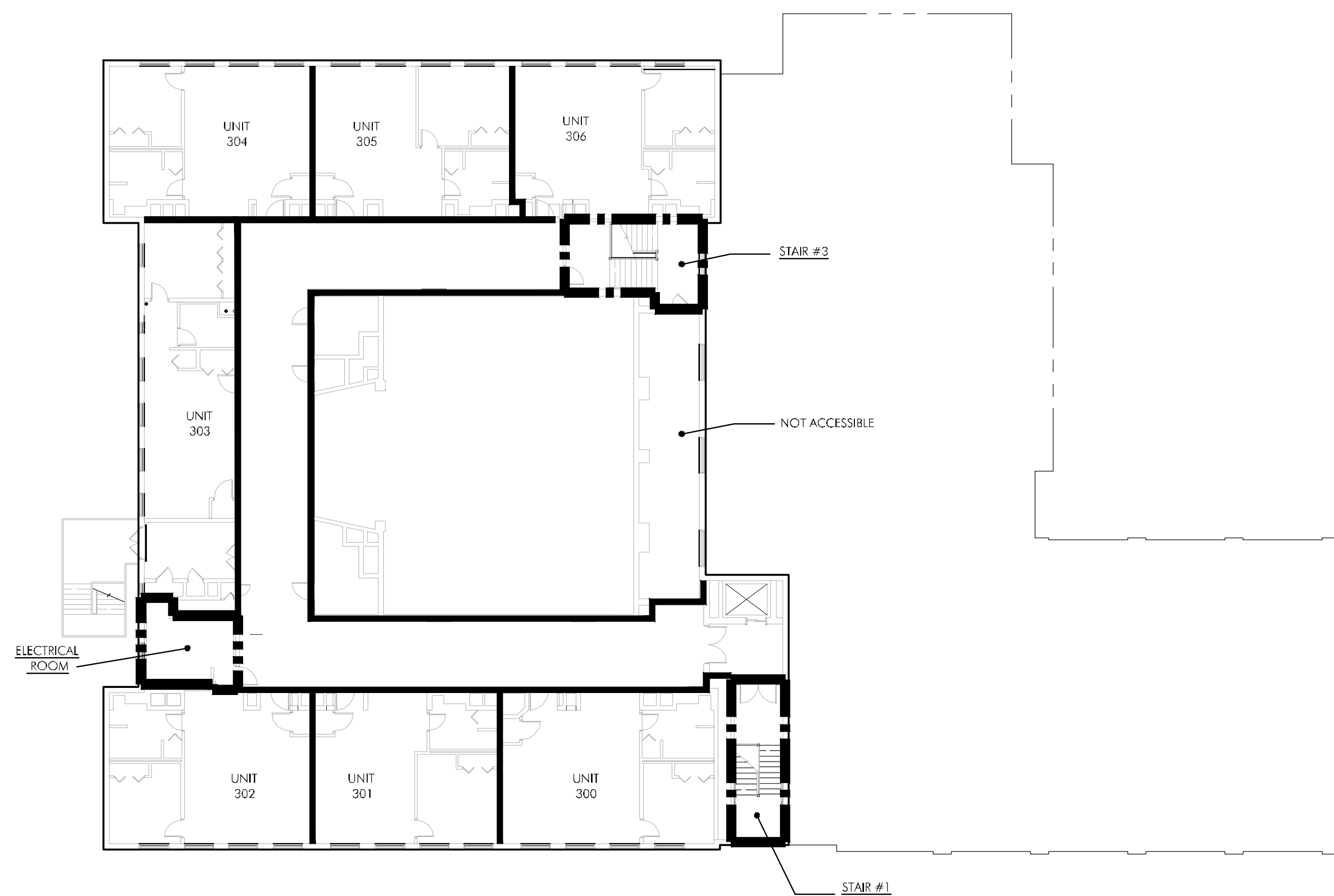


Revisions:

BID DOCUMENTS

Date: 03-07-2011
 Project Number: 10025-A
 Project Manager: SAW
 Drawn By: MJB
 Scale: AS NOTED

G0-01



3 THIRD FLOOR FIRE RATING DIAGRAM
SCALE: N.T.S.

CODE PLAN LEGEND

ALL NEW WORK SHALL COMPLY WITH THE FOLLOWING IN AREAS NOTED ON THE FIRE RATING DIAGRAMS.

- 1 HR. RATED FIRE SEPARATION WALL, FLOOR AND CEILING ASSEMBLIES. ALL NEW DOOR ASSEMBLIES WITHIN A 1-HR RATED WALL ASSEMBLY SHALL HAVE A 45 MINUTE RATING, TYPICAL.
- 2 HR. RATED FIRE SEPARATION WALL, FLOOR AND CEILING ASSEMBLIES. ALL NEW DOOR ASSEMBLIES WITHIN A 2-HR RATED WALL ASSEMBLY SHALL HAVE A 90 MINUTE RATING, TYPICAL.
- 30 MIN. RATED FIRE SEPARATION WALL, FLOOR AND CEILING ASSEMBLIES. TYPICAL BETWEEN OCCUPIED UNITS AND PATH OF EGRESS CORRIDORS.) ALL NEW DOOR ASSEMBLIES WITH A 30-MINUTE RATED WALL ASSEMBLY SHALL HAVE A 20-MINUTE RATING, TYPICAL.

- GENERAL NOTES:**
- G1 CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS. IN CASE OF CONFLICT, THE ARCHITECT SHALL BE NOTIFIED AND SHALL RESOLVE THE CONFLICT.
 - G2 IN ANY CASE OF CONFLICT BETWEEN THE DRAWINGS AND THE PROJECT SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.
 - G3 THE CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT PRIOR REVIEW BY THE ARCHITECT.
 - G4 WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
 - G5 ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND LOCAL LAWS AND REGULATIONS. AT THE TIME THIS PROJECT WAS PERMITTED, THE SEVENTH EDITION OF THE MASSACHUSETTS STATE BUILDING CODE (780 CMR) PREVAILED.
 - G6 GENERAL CONTRACTOR SHALL COORDINATE LOCATIONS OF OPENINGS, PITS, BOXES, SUMPS, TRENCHES, SLEEVES, DEPRESSIONS, GROOVES, AND CHAMFERS, WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES.
 - G7 THE STRUCTURAL DESIGN OF THE BUILDING IS BASED ON THE FULL INTERACTION OF ALL ITS COMPONENT PARTS. NO PROVISIONS HAVE BEEN MADE FOR CONDITIONS OCCURRING DURING CONSTRUCTION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE PROPER AND ADEQUATE PROVISIONS FOR STABILITY OF, AND ALL STRESSES TO, THE STRUCTURE DUE TO ANY CAUSE DURING CONSTRUCTION.
 - G8 CONTRACTOR SHALL NOT SCALE DRAWINGS. CONTRACTOR SHALL REQUEST ALL DIMENSIONS OR INFORMATION REQUIRED TO PERFORM THE WORK FROM THE ARCHITECT. WORK COMPLETED BY THE CONTRACTOR WITHOUT DIMENSIONS OR INFORMATION SHALL BE DONE AT HIS OWN RISK AND SHALL BE REMOVED AND REINSTALLED TO THE SPECIFICATIONS OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
 - G9 MEANS AND METHODS OF CONSTRUCTION AS WELL AS COMPLIANCE WITH OSHA AND OTHER SAFETY LAWS AND REGULATIONS IS EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR, HIS SUBCONTRACTOR(S), SUPPLIERS, CONSULTANTS AND SERVANTS.



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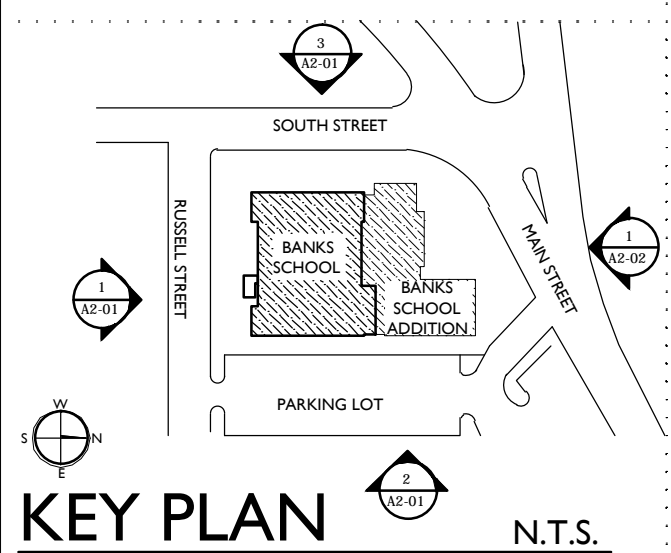
**PHASE III
RENOVATIONS TO
THE FORMER
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ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**FIRE RATING
DIAGRAMS AND
GENERAL NOTES**

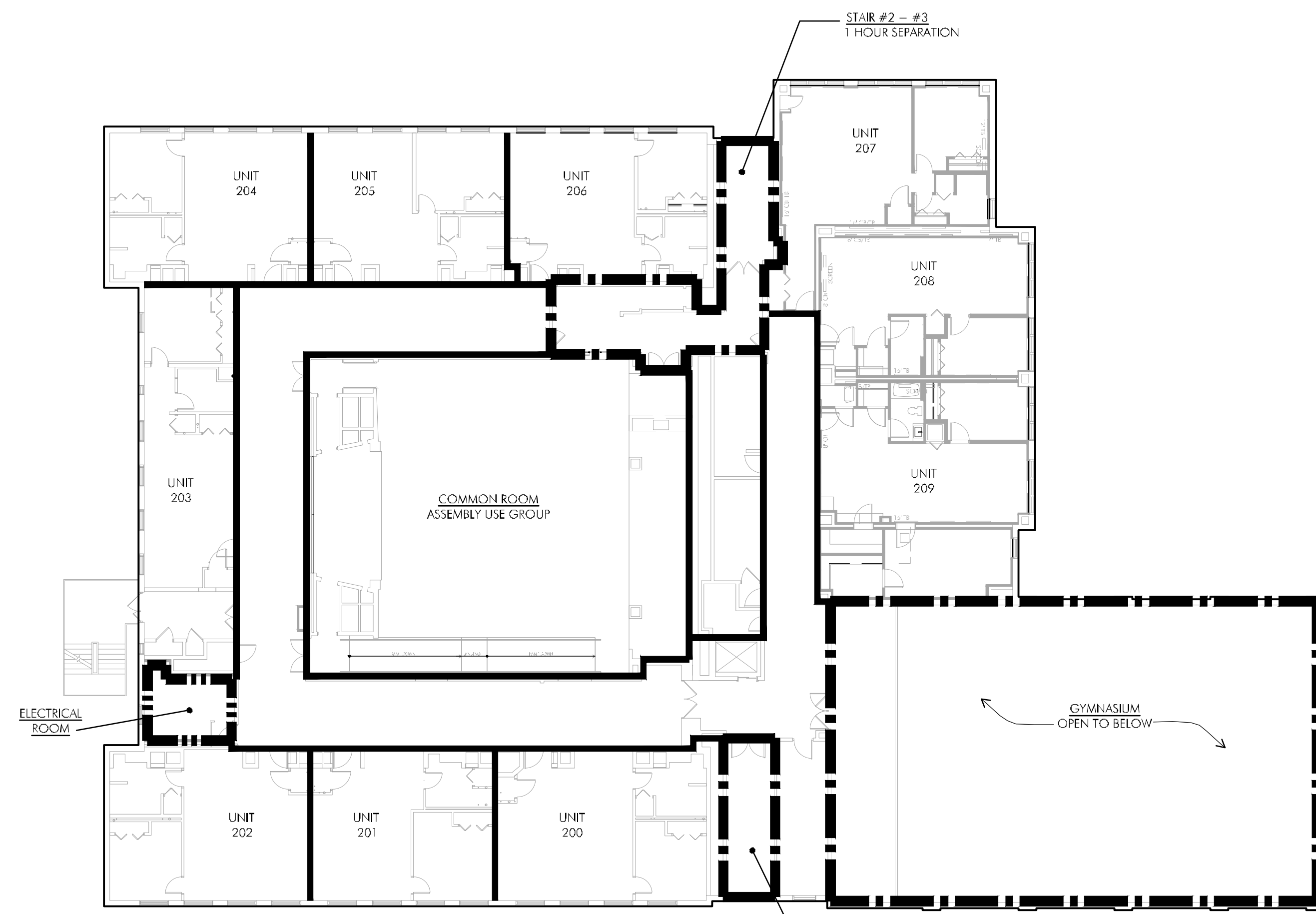


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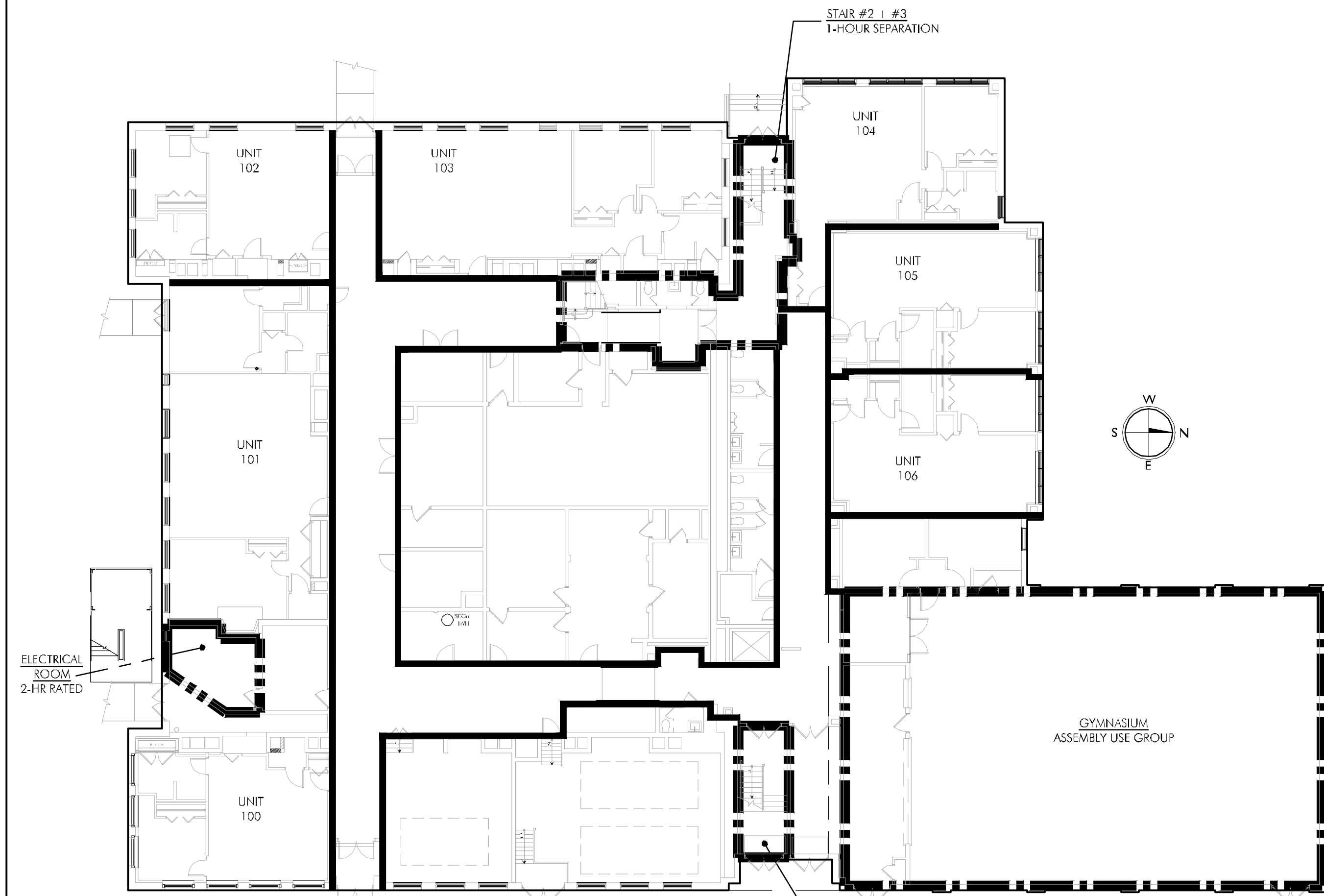
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Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: DJB
Scale: N.T.S.

G0-02



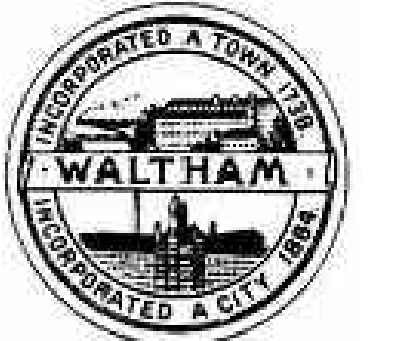
2 SECOND FLOOR FIRE RATING DIAGRAM
SCALE: N.T.S.



1 FIRST FLOOR FIRE RATING DIAGRAM
SCALE: N.T.S.

PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS

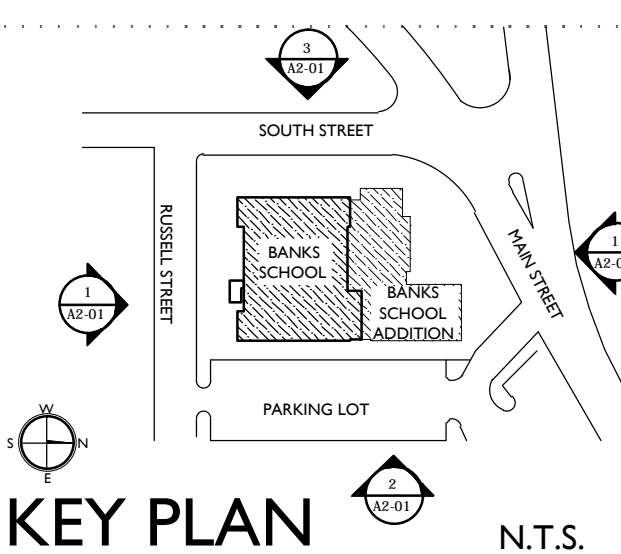
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CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

FIRST FLOOR
DEMOLITION
PLAN



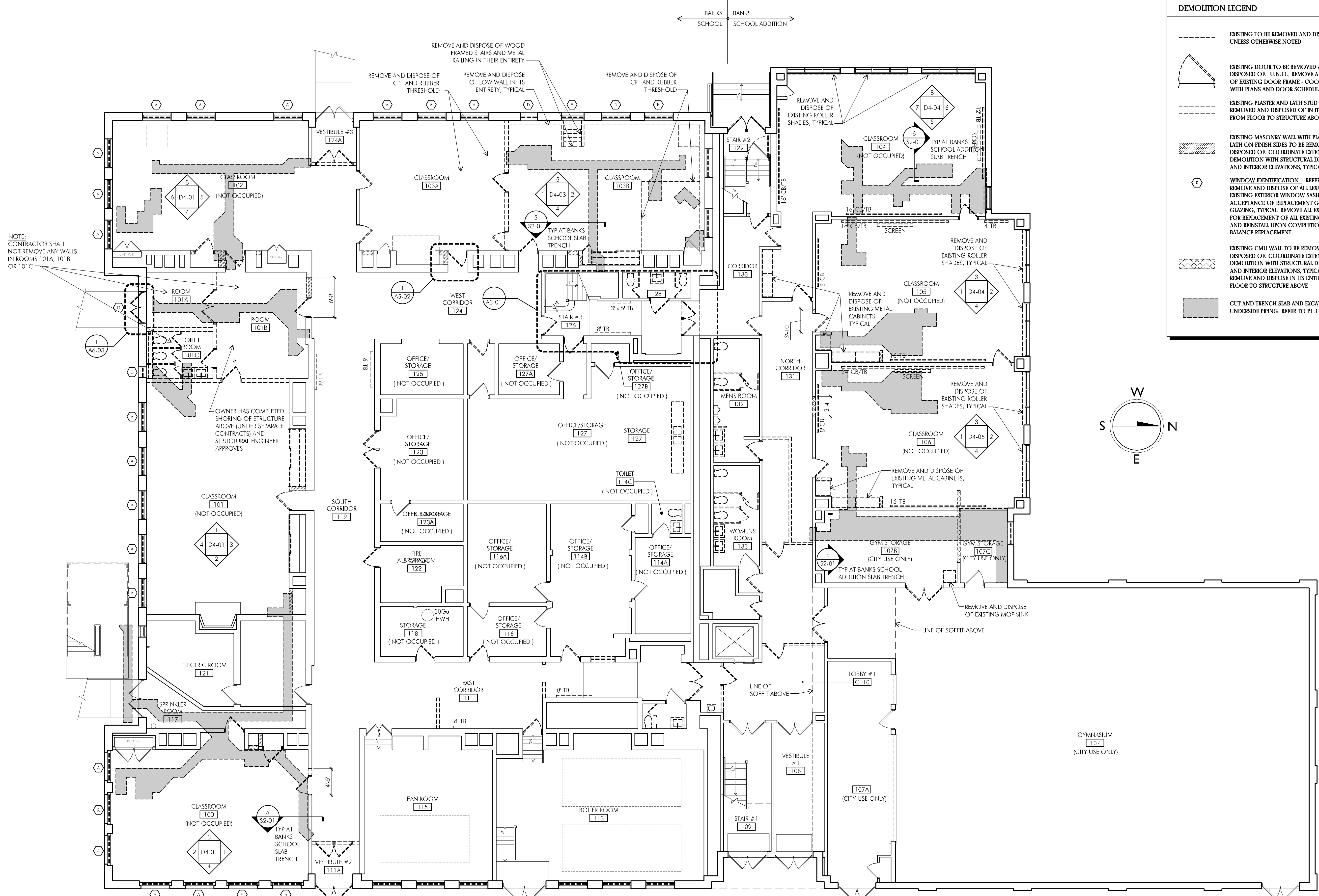
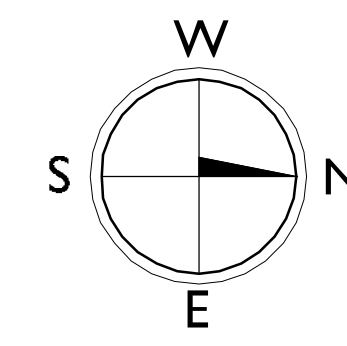
Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8" = 1'-0"

DI-01

DEMOLITION LEGEND	
	EXISTING TO BE REMOVED AND DISPOSED OF, UNLESS OTHERWISE NOTED
	EXISTING DOOR TO BE REMOVED AND DISPOSED OF. U.N.O., REMOVE AND DISPOSE OF EXISTING DOOR FRAME - COORDINATE WITH PLANS AND DOOR SCHEDULE
	EXISTING PLASTER AND LATH STUD WALL TO BE REMOVED AND DISPOSED OF IN ITS ENTIRETY FROM FLOOR TO STRUCTURE ABOVE
	EXISTING MASONRY WALL WITH PLASTER AND LATH ON FINISH SIDES TO BE REMOVED AND DISPOSED OF. COORDINATE EXTENT OF DEMOLITION WITH STRUCTURAL DRAWINGS AND INTERIOR ELEVATIONS, TYPICAL
	WINDOW IDENTIFICATION: REFER TO A6-01 REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, AND REINSTALL UPON COMPLETION OF BALANCE REPLACEMENT.
	EXISTING CMU WALL TO BE REMOVED AND DISPOSED OF. COORDINATE EXTENT OF DEMOLITION WITH STRUCTURAL DRAWINGS AND INTERIOR ELEVATIONS, TYPICAL. U.N.O., REMOVE AND DISPOSE IN ITS ENTIRETY FROM FLOOR TO STRUCTURE ABOVE
	CUT AND TRENCH SLAB AND EXCAVATE FOR UNDERSIDE PIPING. REFER TO P1.1U

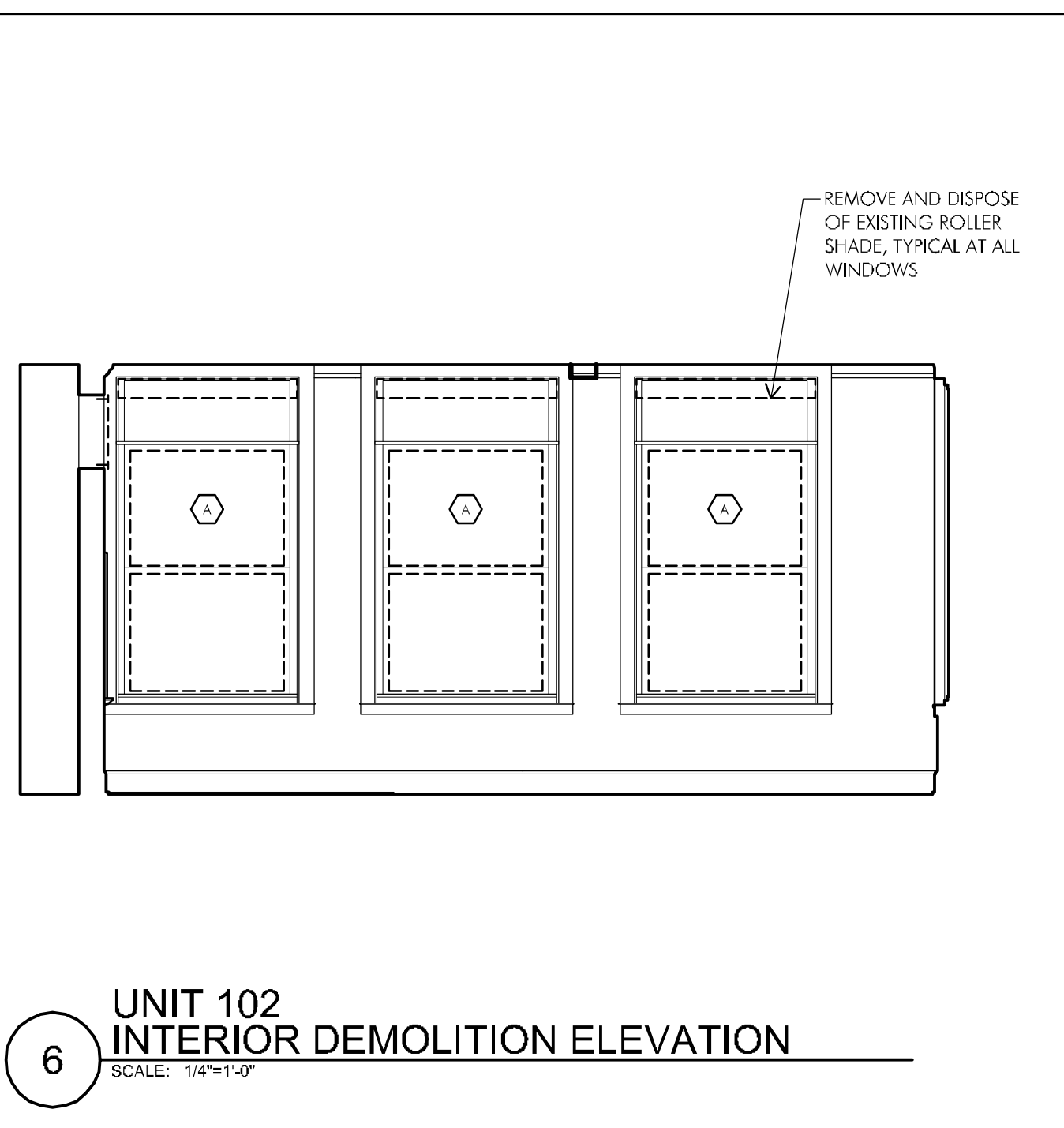


NOTE:
CONTRACTOR SHALL
NOT REMOVE ANY WALLS
IN ROOMS 101A, 101B
OR 101C

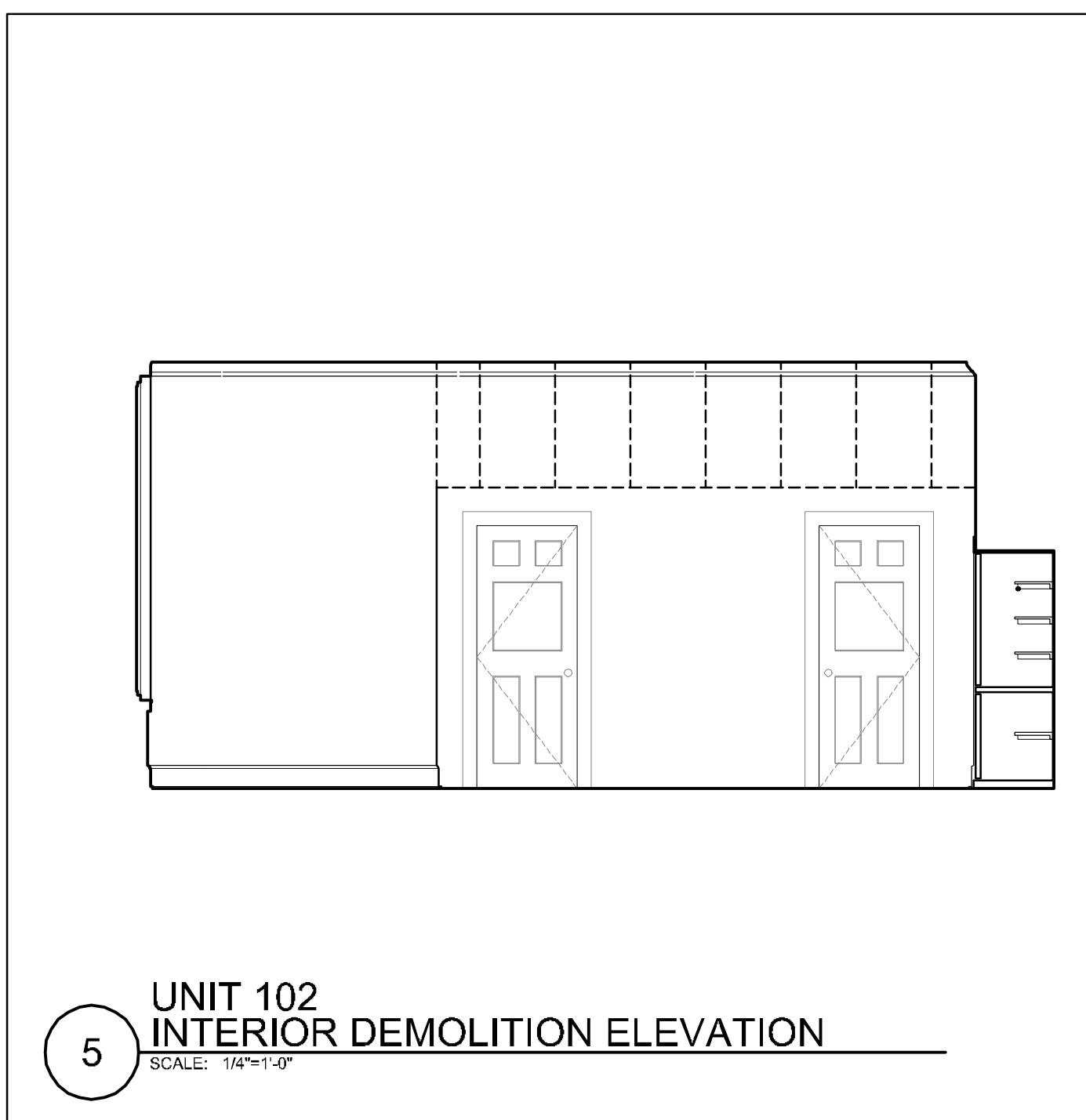
OWNER HAS COMPLETED
SHORING OF STRUCTURE
ABOVE (UNDER SEPARATE
CONTRACTS) AND
STRUCTURAL ENGINEER
APPROVES

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

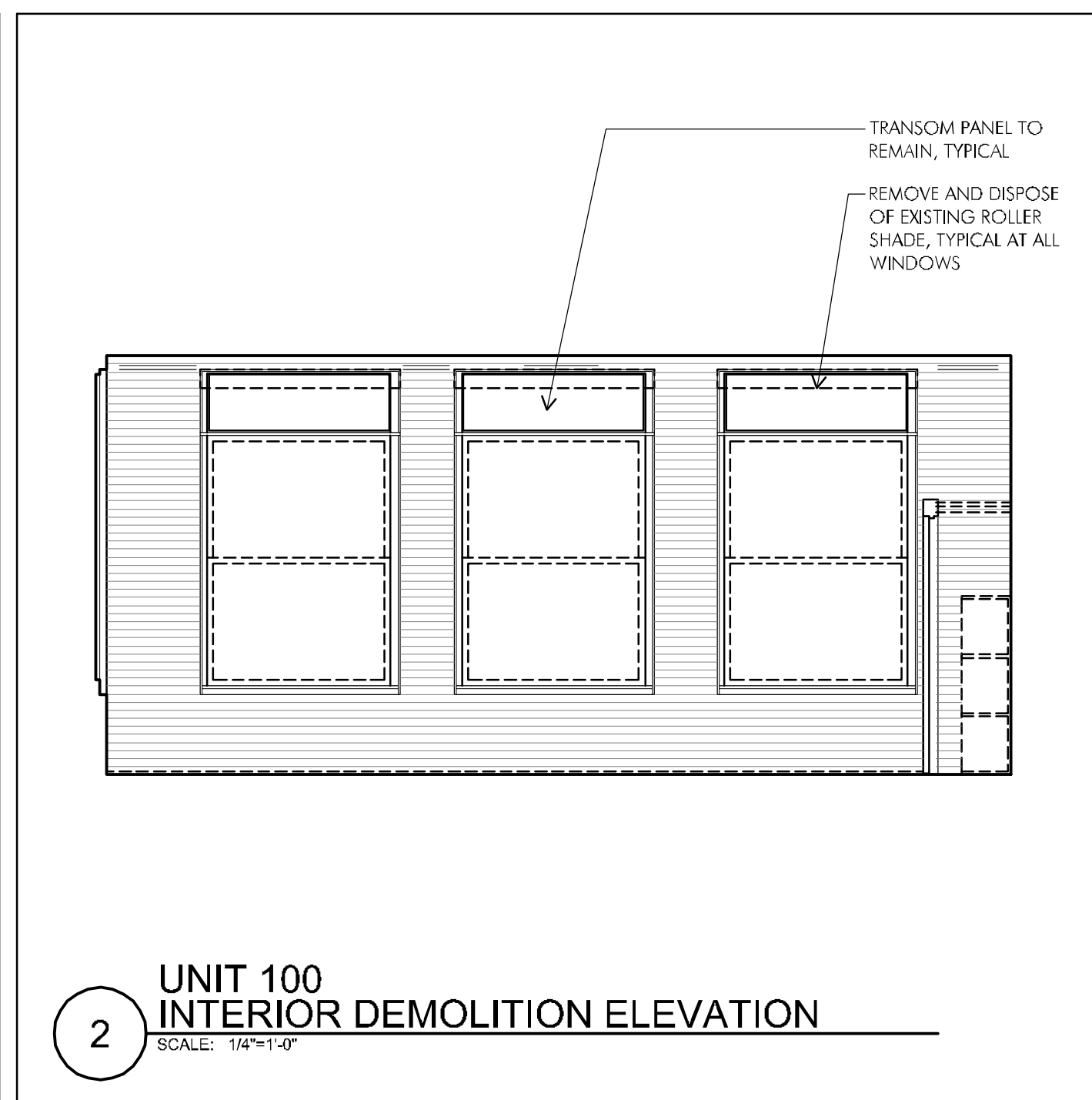
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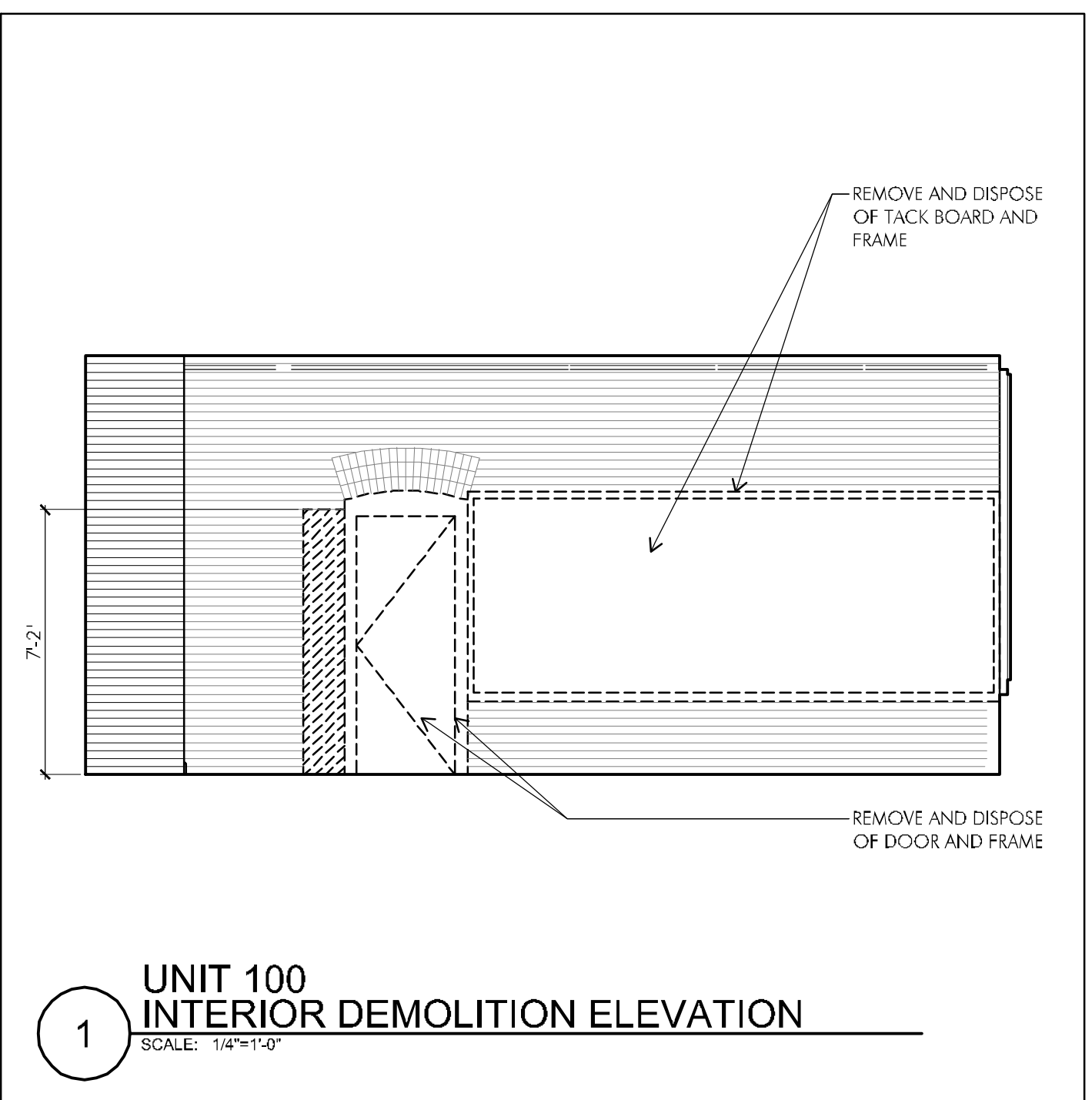
6 UNIT 102 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



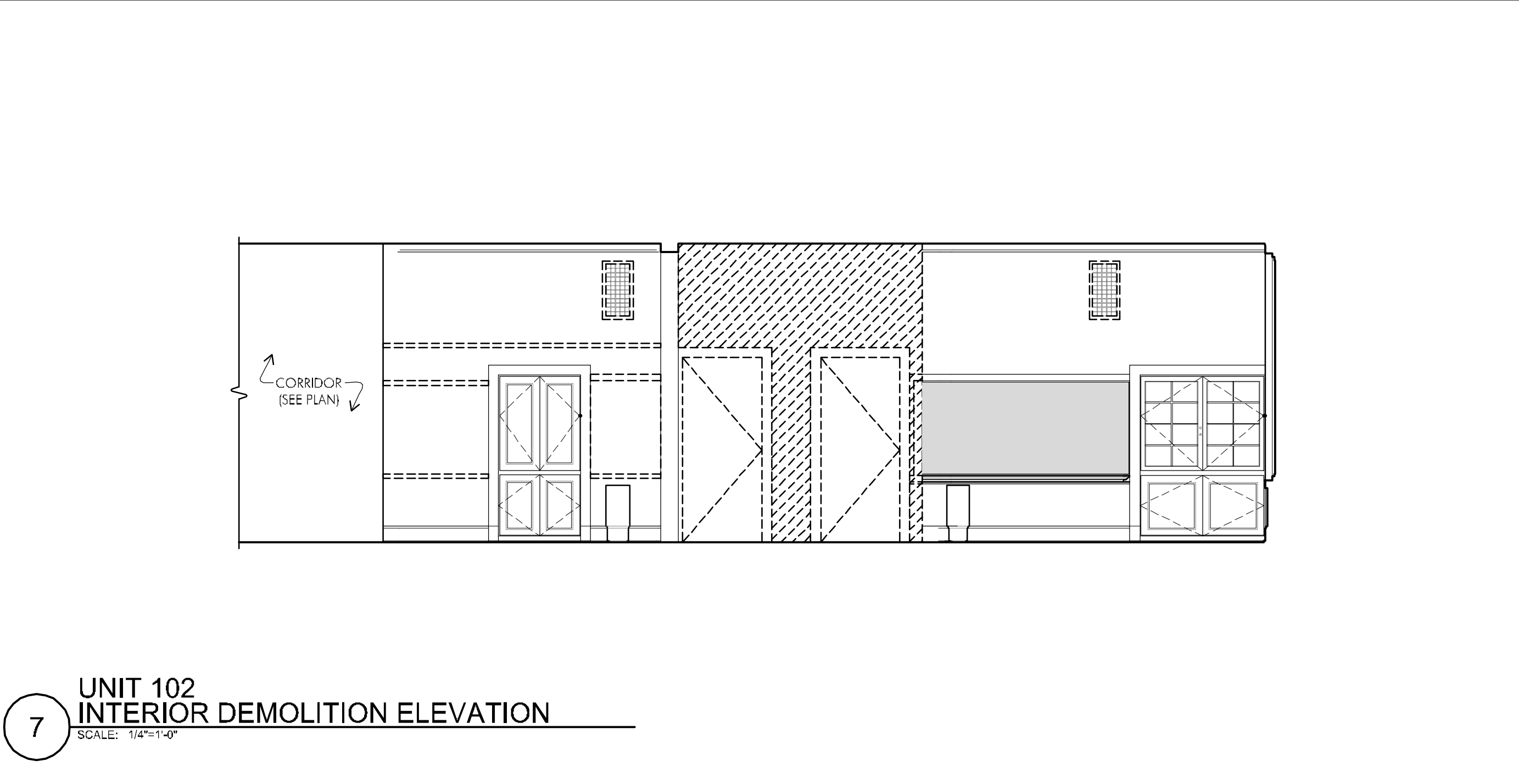
5 UNIT 102 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



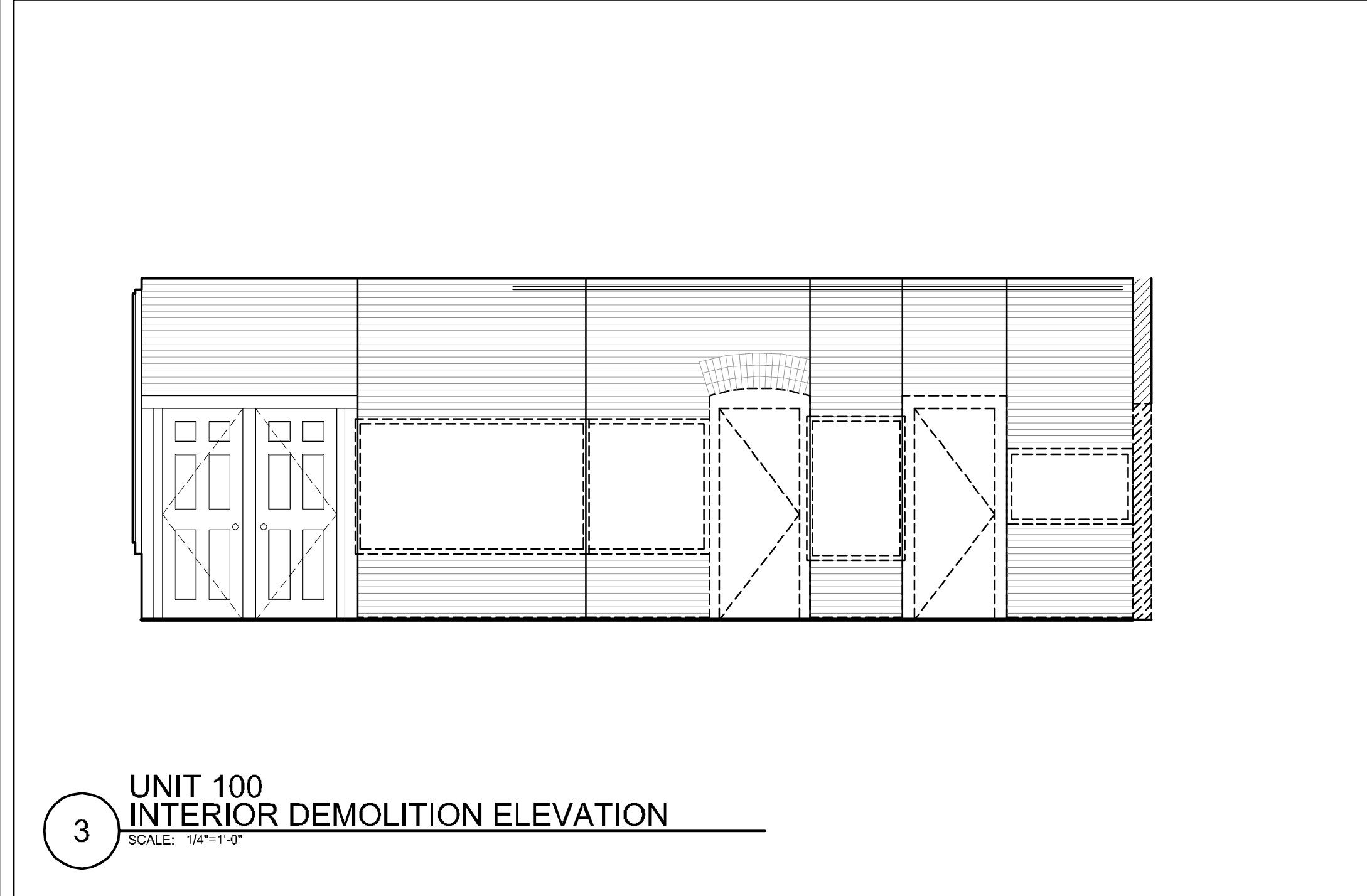
2 UNIT 100 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



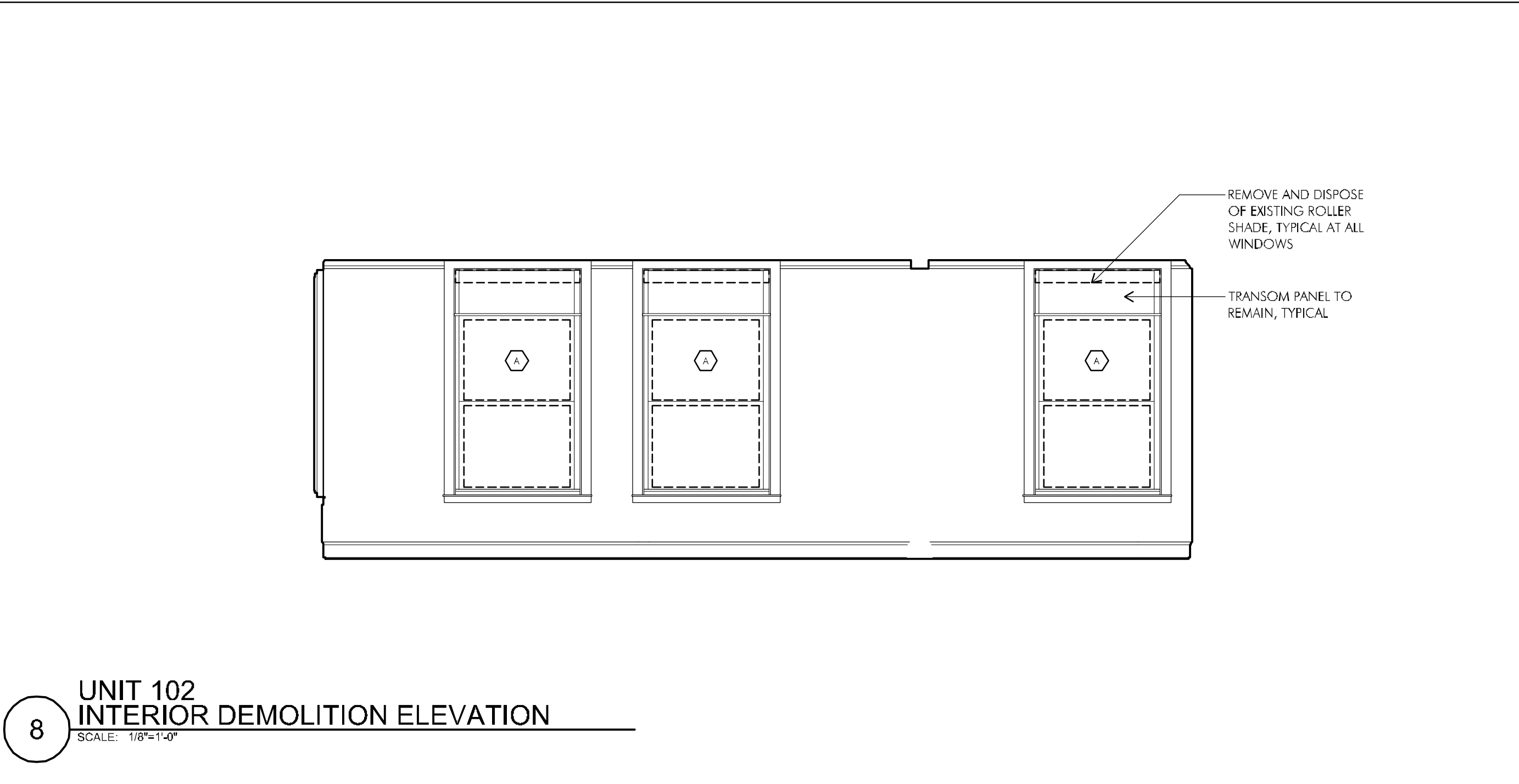
1 UNIT 100 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



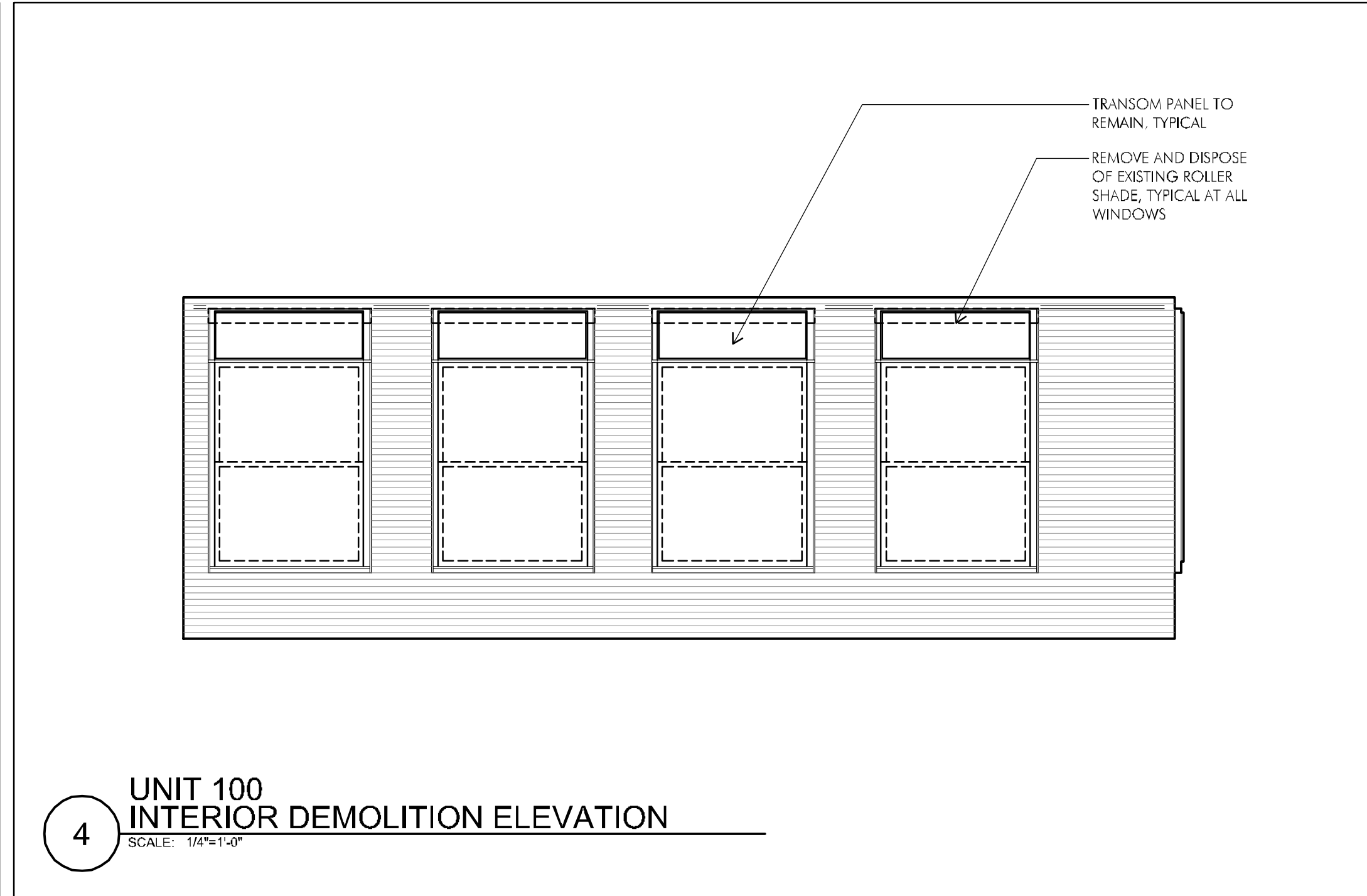
7 UNIT 102 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



3 UNIT 100 INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



8 UNIT 102 INTERIOR DEMOLITION ELEVATION
SCALE: 1/8"=1'-0"



4 UNIT 100 INTERIOR DEMOLITION ELEVATION
SCALE: 1/8"=1'-0"

INTERIOR DEMO ELEVATION LEGEND

- WINDOW IDENTIFICATION: REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING. TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION. REFER TO A6-01 FOR SIZES.
- EXISTING CHALK BOARD TO REMAIN
- EXISTING TACK BOARD TO REMAIN
- EXISTING TO BE REMOVED AND DISPOSED OF UNLESS NOTED OTHERWISE
- REMOVE AND DISPOSE OF EXISTING METAL GRILLE VENT AND FRAME AND PREP FOR INFILL

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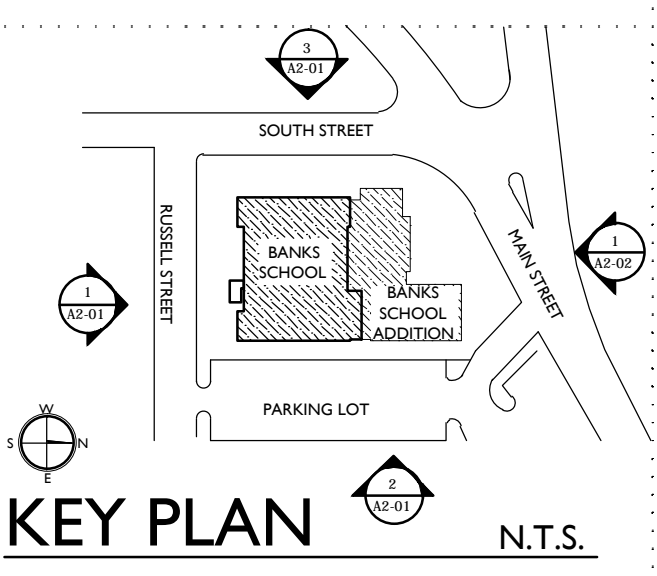
PHASE III RENOVATIONS TO THE FORMER BANKS SCHOOL ELDERLY HOUSING CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

UNITS 100 & 102 INTERIOR DEMOLITION ELEVATIONS

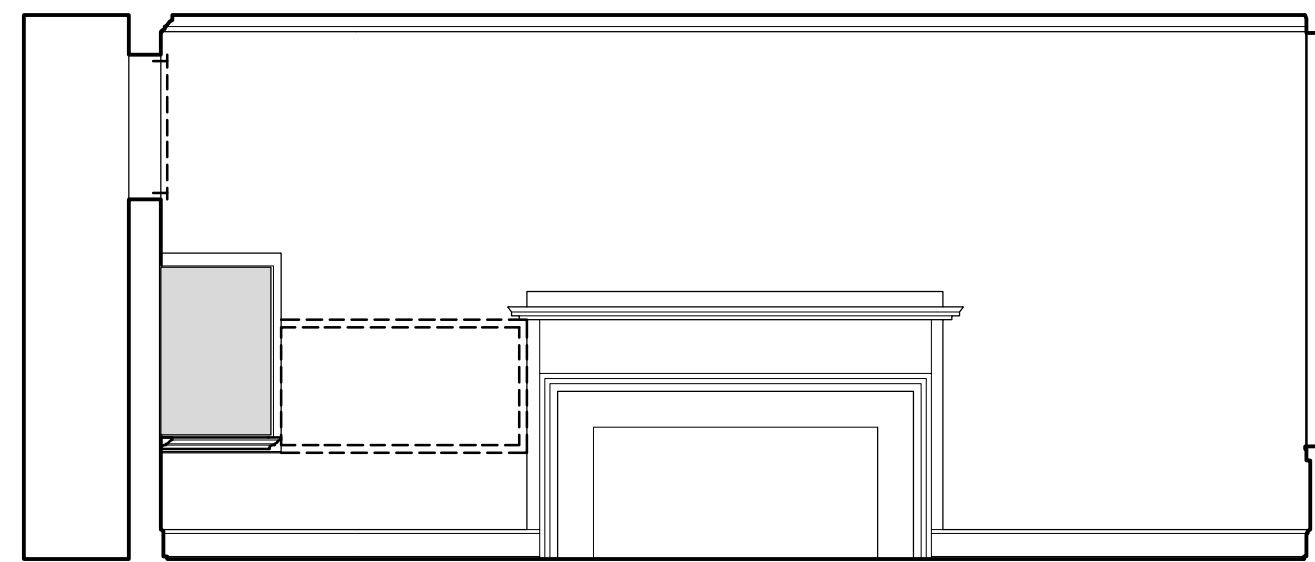


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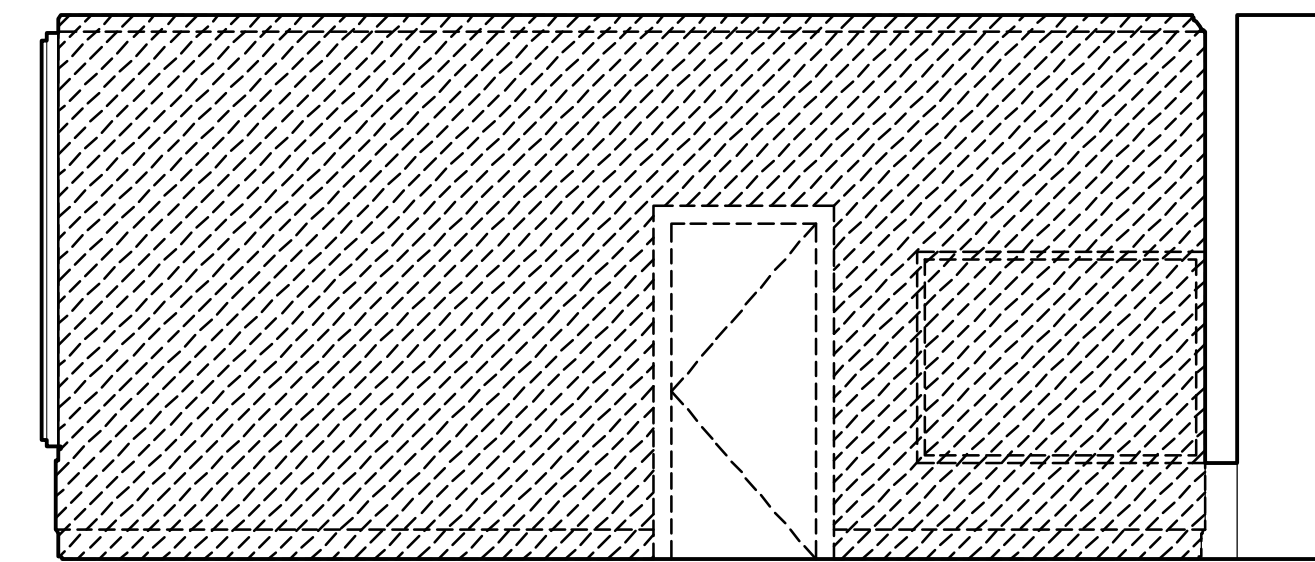
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

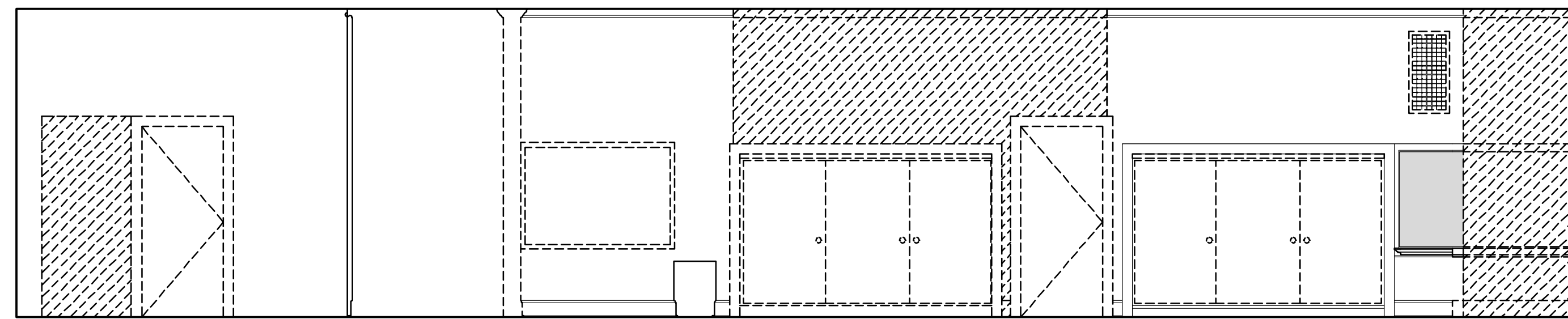
D4-01



2 UNIT 101
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



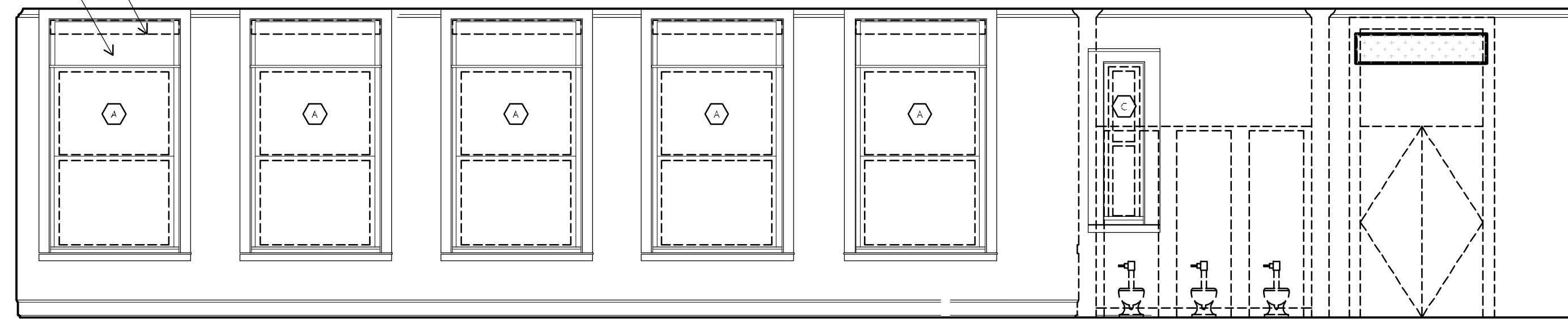
1 UNIT 101
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



3 UNIT 101
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

REMOVE AND DISPOSE
OF EXISTING ROLLER
SHADE, TYPICAL AT ALL
WINDOWS

TRANSOM PANEL TO
REMAIN, TYPICAL



4 UNIT 101
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

INTERIOR DEMO ELEVATION LEGEND	
	WINDOW IDENTIFICATION: REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING. TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION. REFER TO A6-01 FOR SIZES.
	EXISTING CHALK BOARD TO REMAIN
	EXISTING TACK BOARD TO REMAIN
	EXISTING TO BE REMOVED AND DISPOSED OF UNLESS NOTED OTHERWISE
	REMOVE AND DISPOSE OF EXISTING METAL GRILLE VENT AND FRAME AND PREP FOR INFILL



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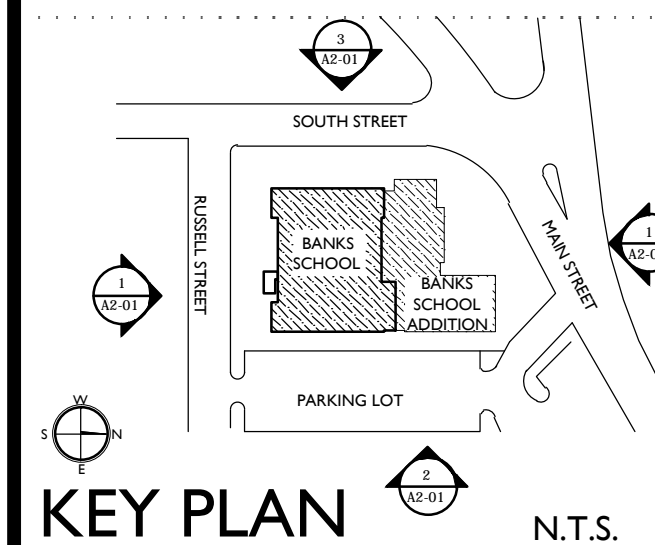
PHASE III
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THE FORMER
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ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

UNIT 101
INTERIOR
DEMOLITION
ELEVATIONS



Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

D4-02

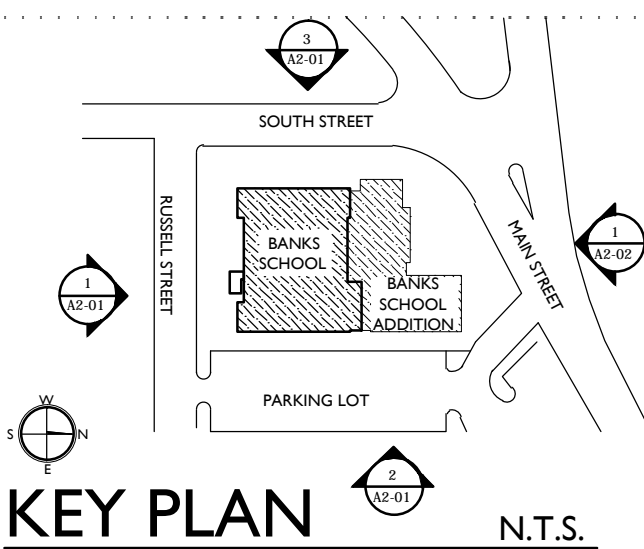
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
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CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNIT 103
INTERIOR
DEMOLITION
ELEVATIONS**



Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

D4-03

3 NOT USED
SCALE: 1/4"=1'-0"

2 UNIT 103B
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

1 UNIT 103
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

REMOVE AND DISPOSE OF
WINDOW SASH, FRAME, AND
WOOD TRIM IN ITS ENTIRETY

4 UNIT 103
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

5 UNIT 103
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

REMOVE AND DISPOSE OF
WINDOW SASH, FRAME, AND
WOOD TRIM IN ITS ENTIRETY

REMOVE AND DISPOSE OF
WINDOW SASH, FRAME, AND
WOOD TRIM IN ITS ENTIRETY

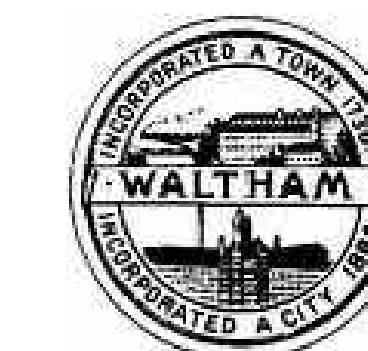
REMOVE AND DISPOSE OF
WOOD FRAMED STAIRS AND
METAL RAILINGS

REMOVE AND DISPOSE OF
LOW WALL

INTERIOR DEMO ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING. TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION. REFER TO A6-01 FOR SIZES
- EXISTING CHALK BOARD TO REMAIN
- EXISTING TACK BOARD TO REMAIN
- EXISTING TO BE REMOVED AND DISPOSED OF UNLESS NOTED OTHERWISE
- REMOVE AND DISPOSE OF EXISTING METAL GRILLE VENT AND FRAME AND PREP FOR INFILL

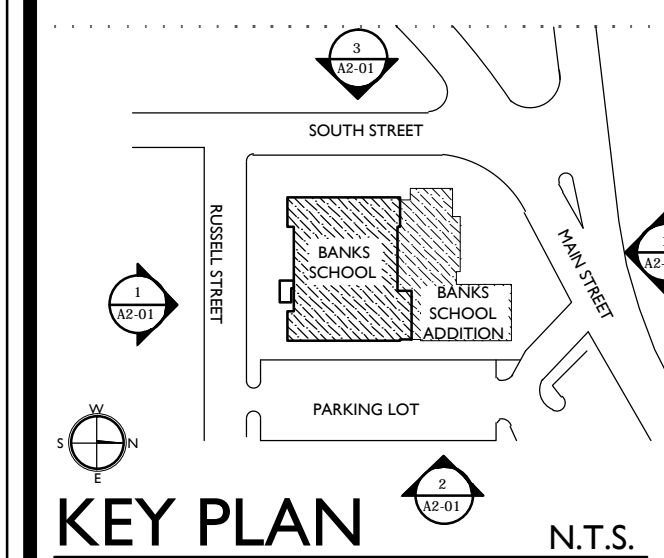
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNITS 104 & 105
INTERIOR
DEMOLITION
ELEVATIONS**

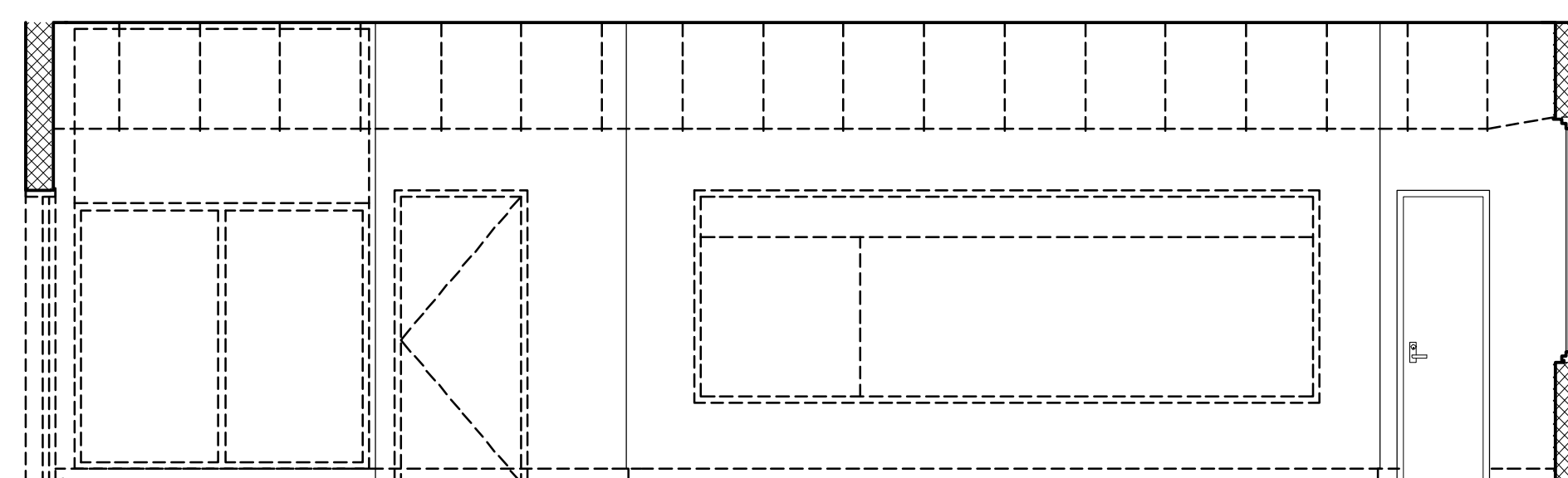


Revisions:

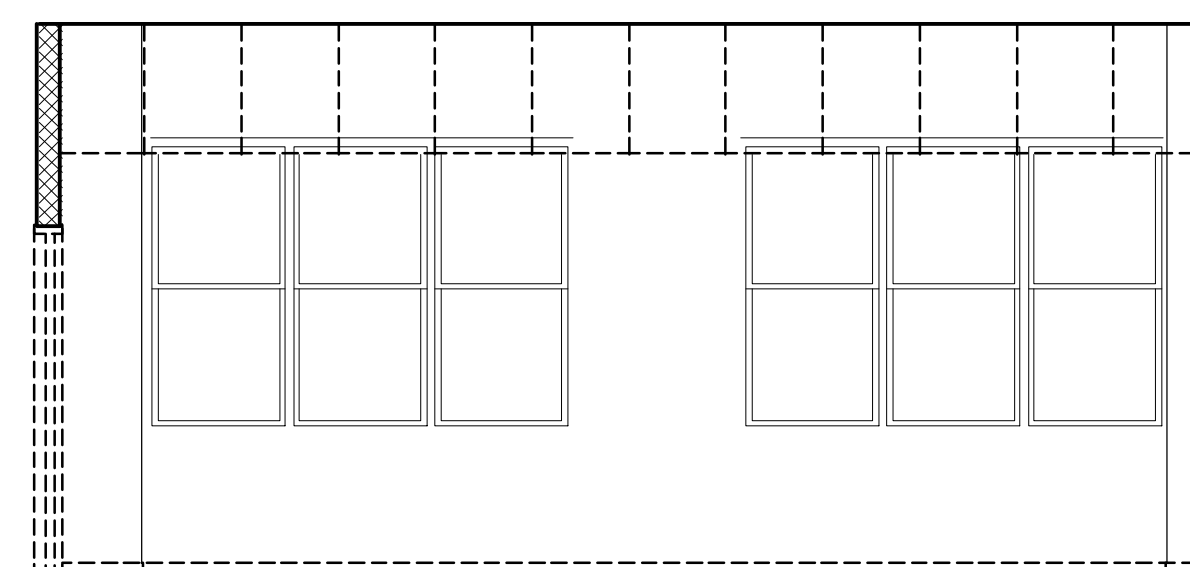
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

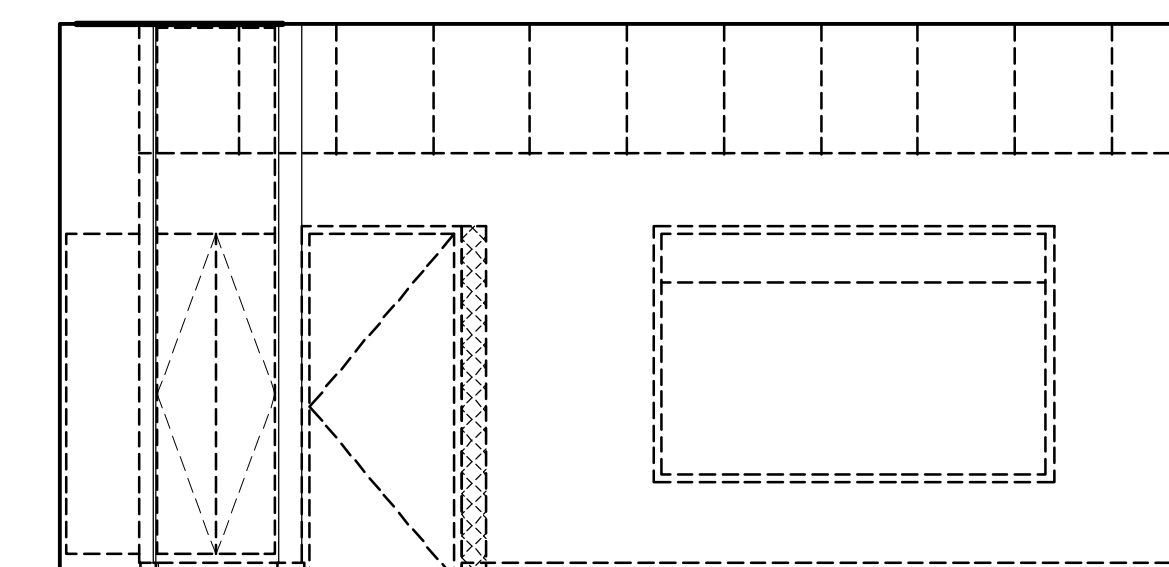
D4-04



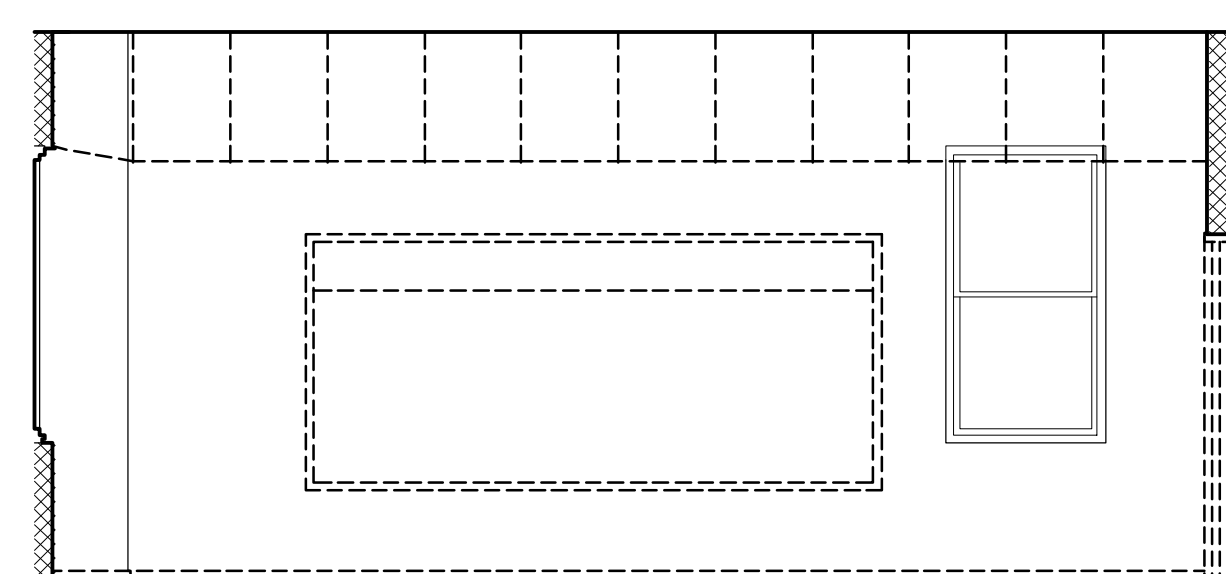
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**UNIT 104
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



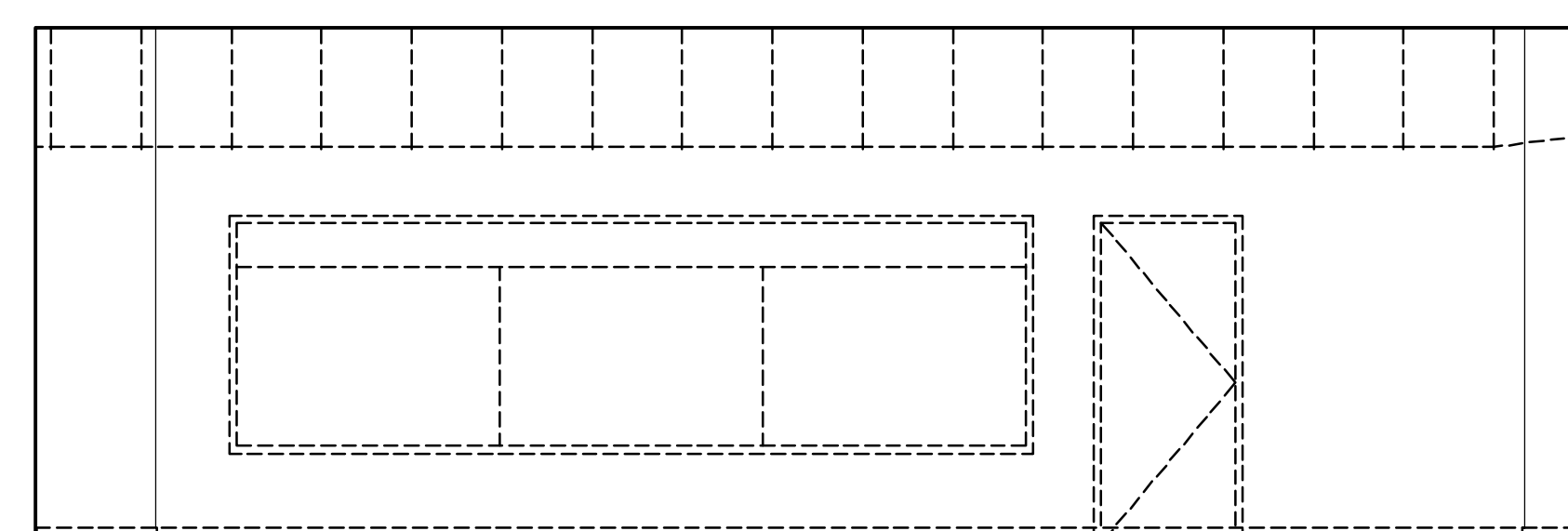
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**UNIT 105
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



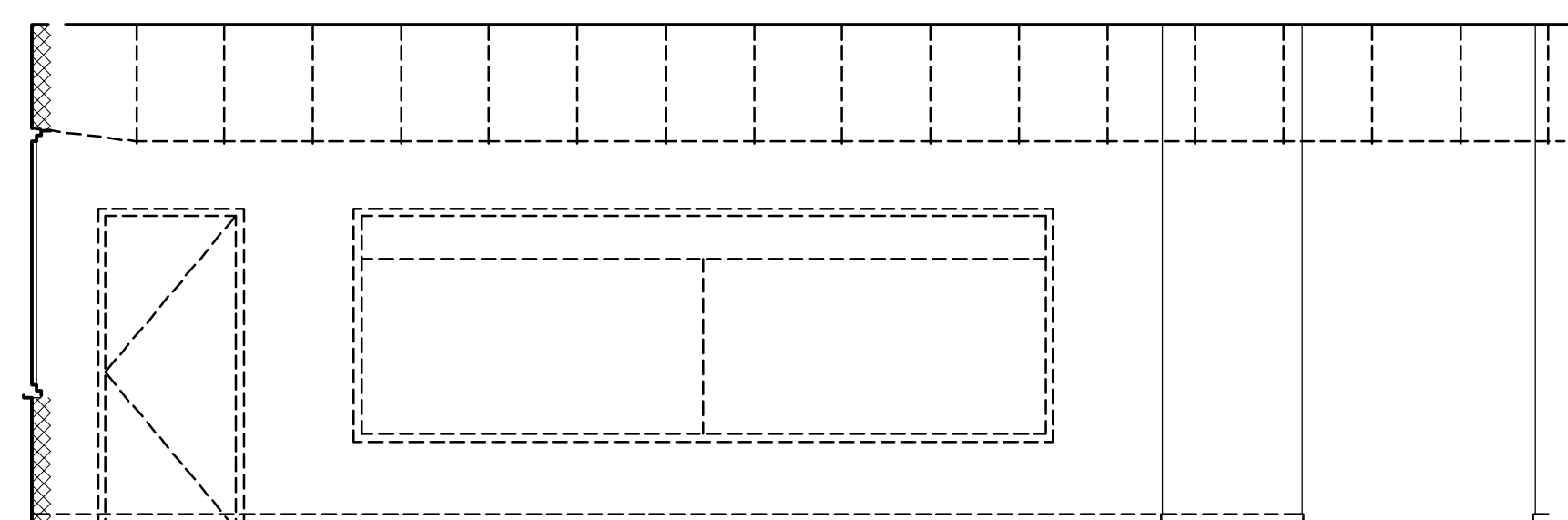
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**UNIT 105
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



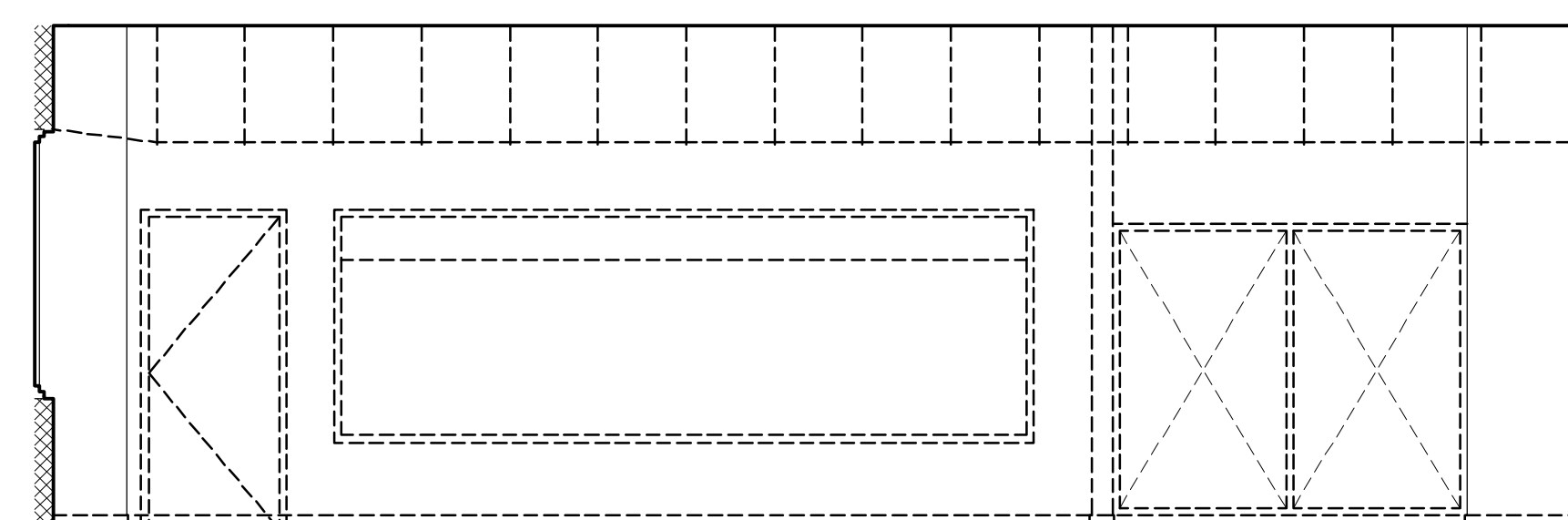
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**UNIT 104
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



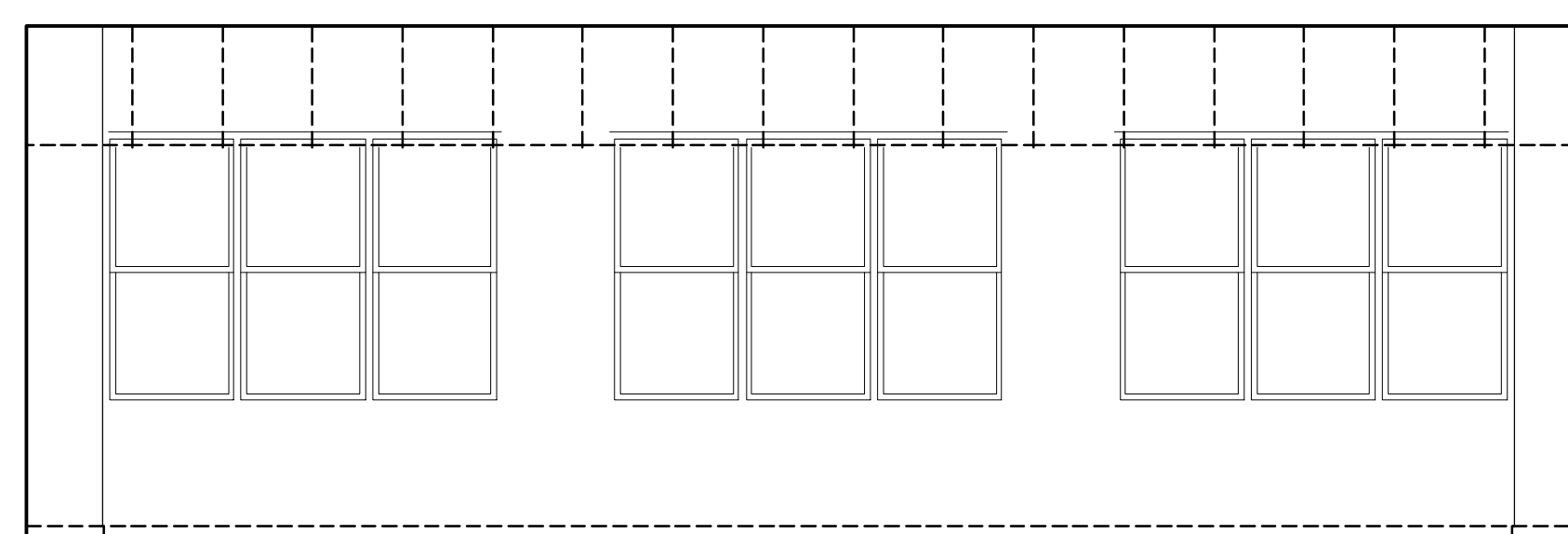
3
**UNIT 105
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



7
**UNIT 104
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



4
**UNIT 105
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"



8
**UNIT 104
INTERIOR DEMOLITION ELEVATION**
SCALE: 1/4"=1'-0"

INTERIOR DEMO ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAK FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING. TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF EXISTING BALANCES. (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION. REFER TO A6-01 FOR SIZES
- EXISTING CHALK BOARD TO REMAIN
- EXISTING TACK BOARD TO REMAIN
- EXISTING TO BE REMOVED AND DISPOSED OF UNLESS NOTED OTHERWISE
- REMOVE AND DISPOSE OF EXISTING METAL GRILLE VENT AND FRAME AND PREP FOR INFILL

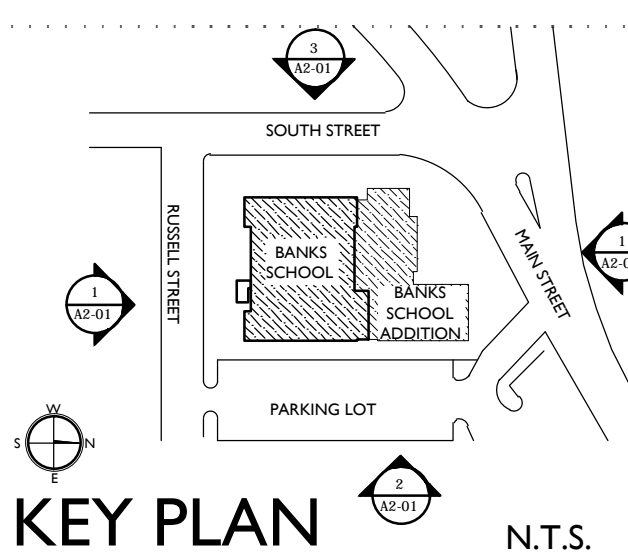
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNIT 106
INTERIOR
DEMOLITION
ELEVATIONS**

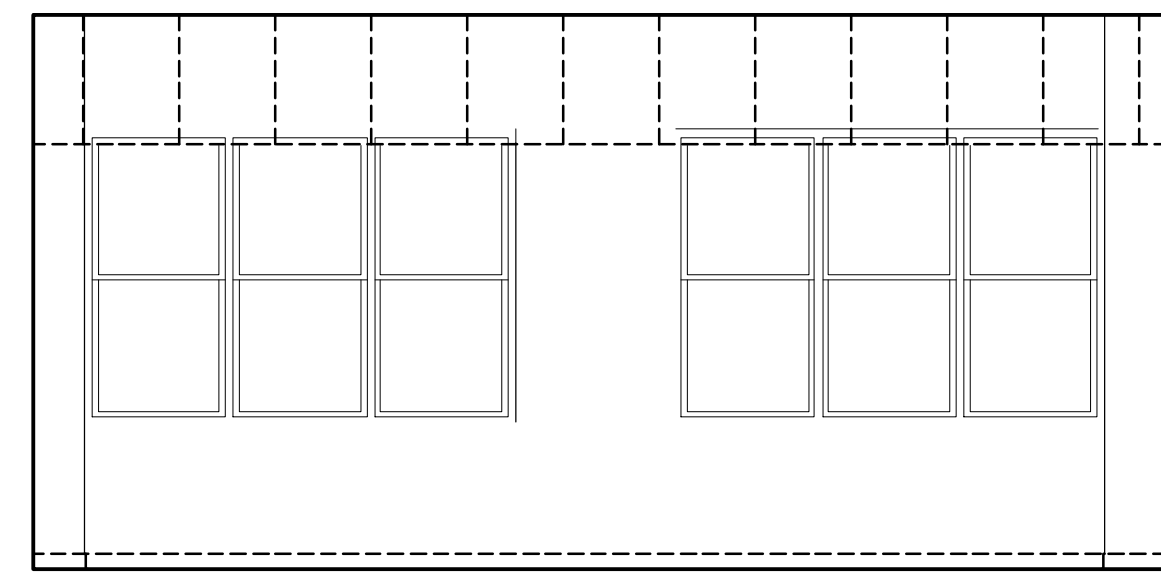


Revisions:

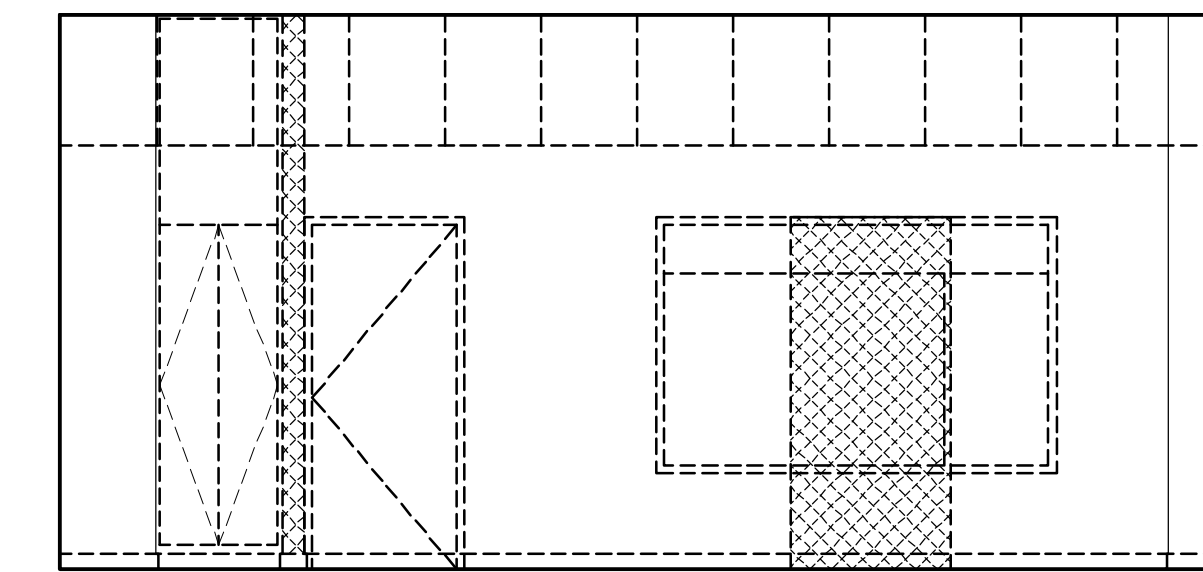
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

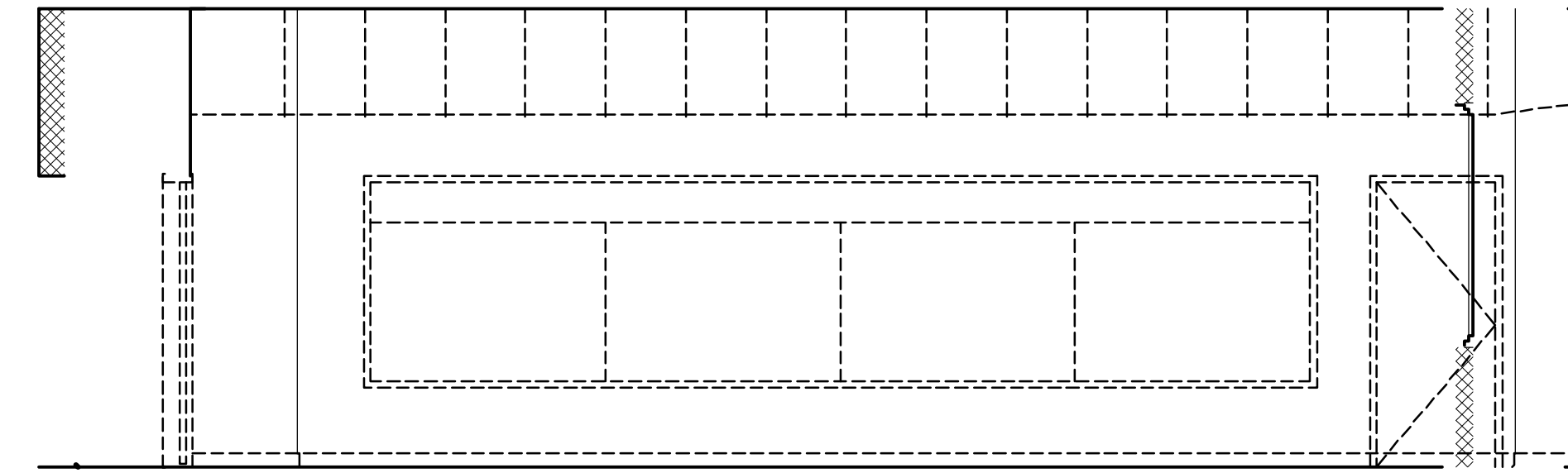
D4-05



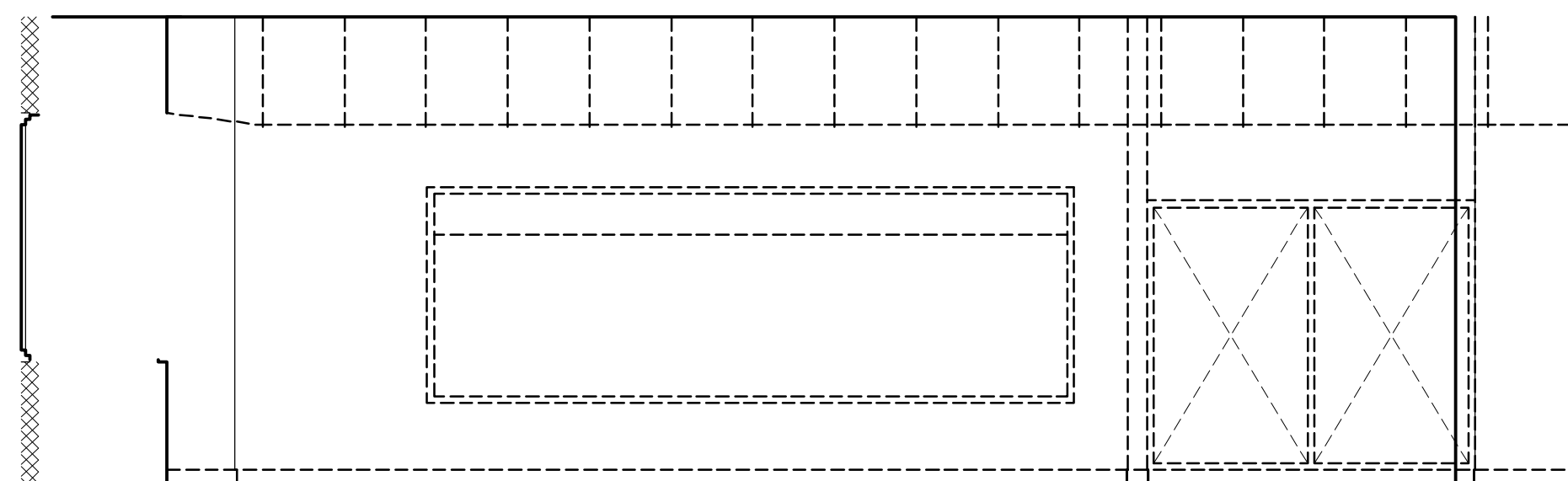
2 UNIT 106
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



1 UNIT 106
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"



3 UNIT 106
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

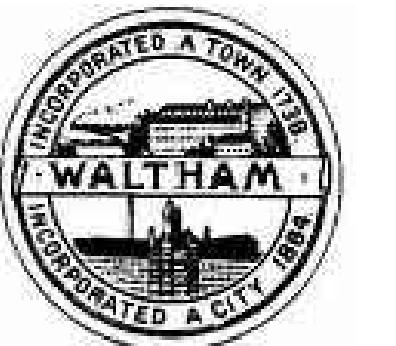


4 UNIT 106
INTERIOR DEMOLITION ELEVATION
SCALE: 1/4"=1'-0"

INTERIOR DEMO ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING EXTERIOR WINDOW SASH FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING. TYPICAL REMOVE ALL EXISTING SASH FOR REPLACEMENT OF EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION. REFER TO A6-01 FOR SIZES.
- EXISTING CHALK BOARD TO REMAIN
- EXISTING TACK BOARD TO REMAIN
- EXISTING TO BE REMOVED AND DISPOSED OF UNLESS NOTED OTHERWISE
- REMOVE AND DISPOSE OF EXISTING METAL GRILLE VENT AND FRAME AND PREP FOR INFILL

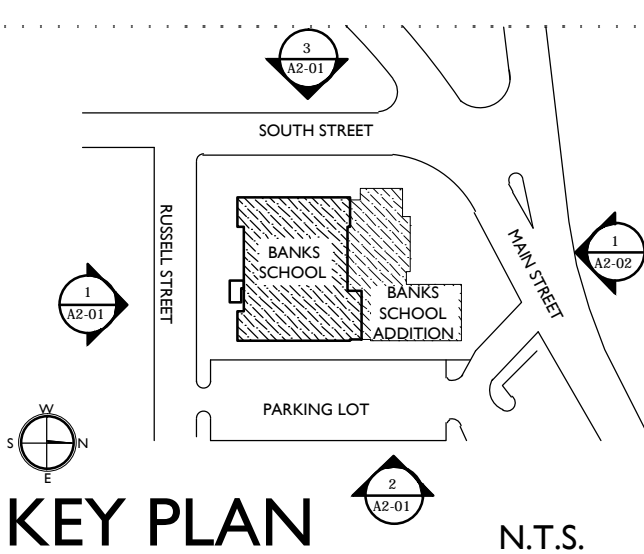
PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

SITE PLAN

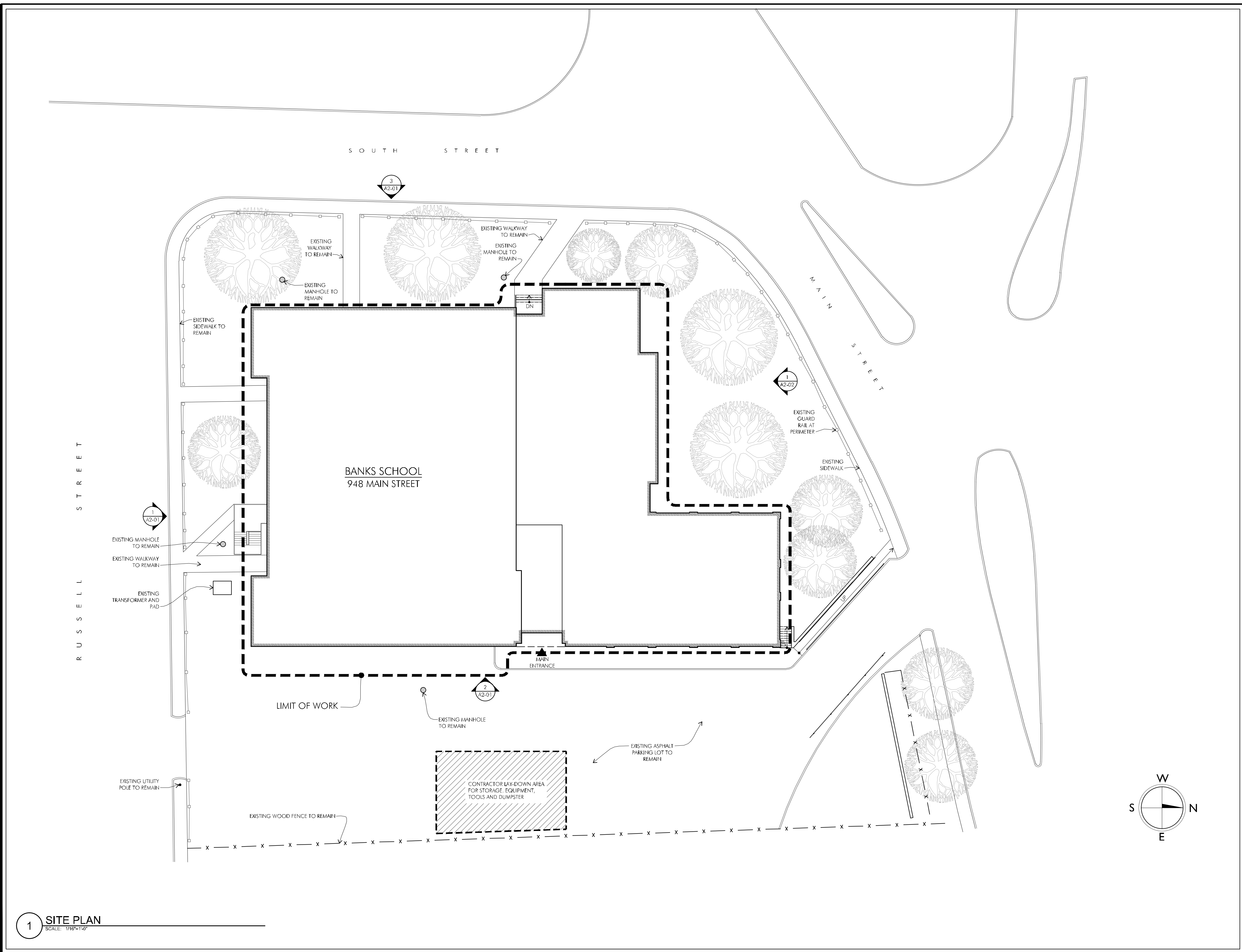


Revisions:

BID DOCUMENTS

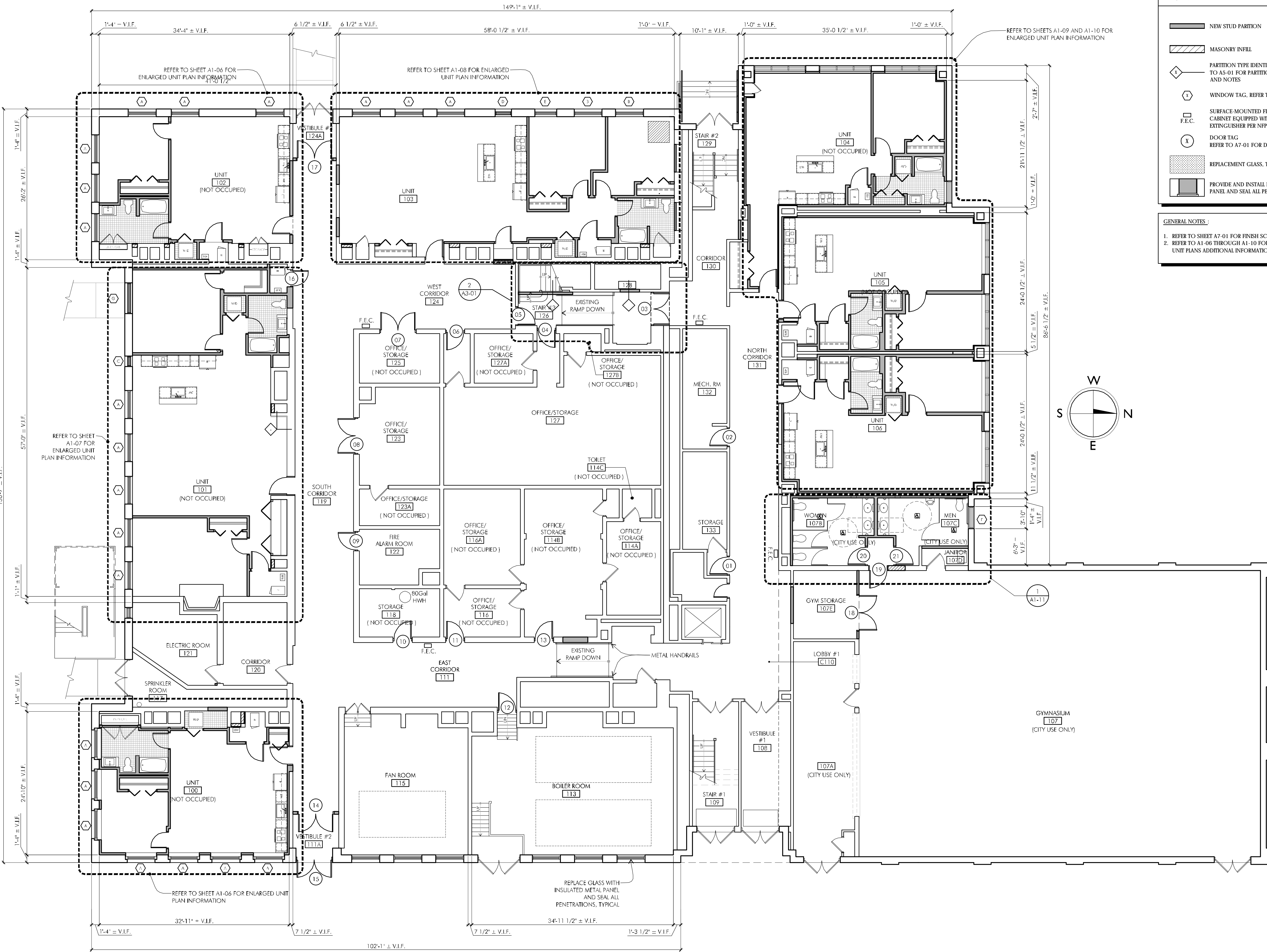
Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: BLO
Scale: AS NOTED

LI-01



1 **SITE PLAN**
SCALE: 1/16"=1'-0"

P:\2010\10025-A\Streets\1st FLOOR (Phase 3)\10025-A.LI-01.dwg Mar 06, 2012 - 8:08 pm BOSBORNE

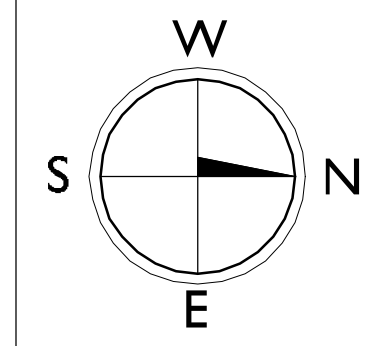


LEGEND

- NEW STUD PARTITION
- ▨ MASONRY INFIL
- ◇ PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
- ⊕ WINDOW TAG, REFER TO A6-01.
- ⊖ SURFACE MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
- ⊙ DOOR TAG. REFER TO A7-01 FOR DOOR SCHEDULE
- ▨ REPLACEMENT GLASS, TYPICAL
- ▨ PROVIDE AND INSTALL INSULATED METAL PANEL AND SEAL ALL PENETRATIONS.

GENERAL NOTES:

1. REFER TO SHEET A7-01 FOR FINISH SCHEDULE
2. REFER TO A1-06 THROUGH A1-10 FOR ENLARGED UNIT PLANS ADDITIONAL INFORMATION



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



250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

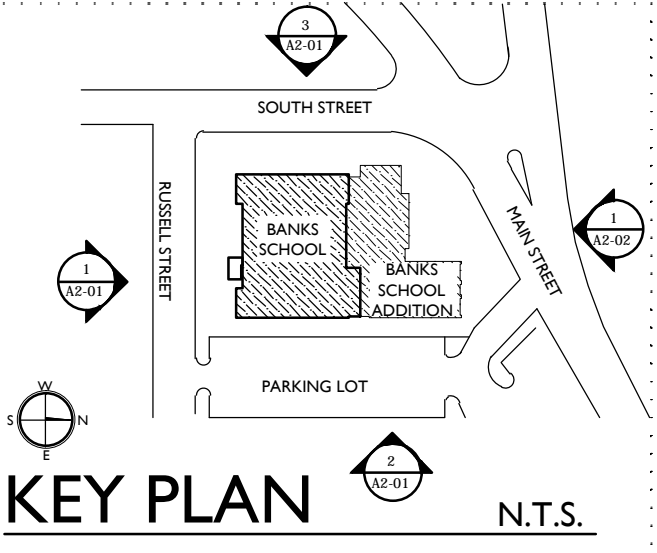
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**FIRST FLOOR
PLAN**



Revisions:

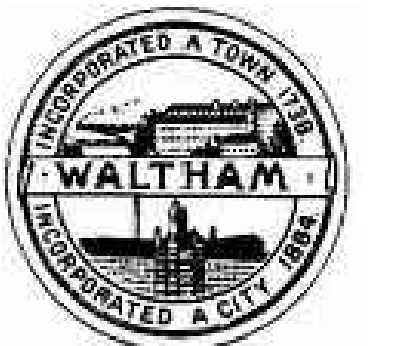
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8"=1'-0"

A1-01

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**

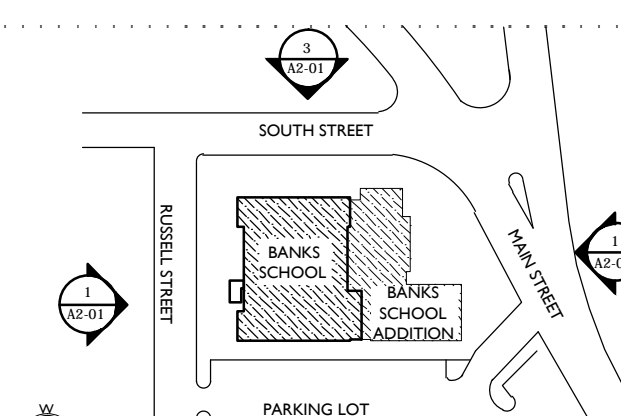
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**SECOND FLOOR
PLAN**



KEY PLAN N.T.S.

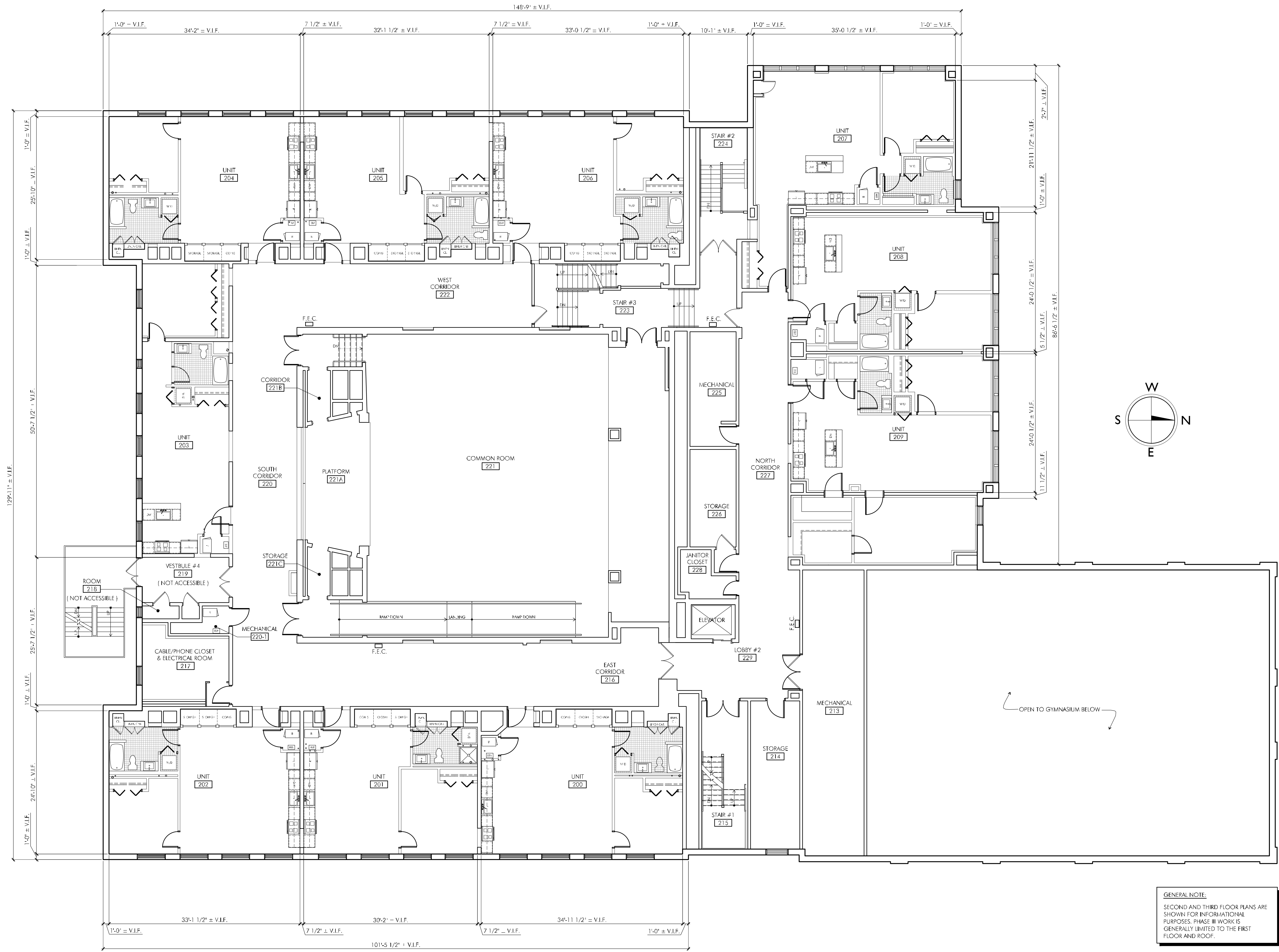
Revisions:

BID DOCUMENTS

GENERAL NOTE:
SECOND AND THIRD FLOOR PLANS ARE SHOWN FOR INFORMATIONAL PURPOSES. PHASE III WORK IS GENERALLY LIMITED TO THE FIRST FLOOR AND ROOF.

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8" = 1'-0"

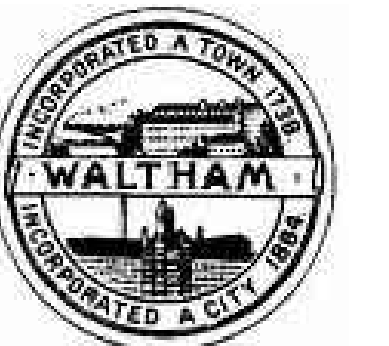
A1-02



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

P:\2010\10025-A\Streets\Floor (Phase 3)\10025-A A1-02.dwg Plot: 06, 2012 - 8:09 pm BOSBORNE

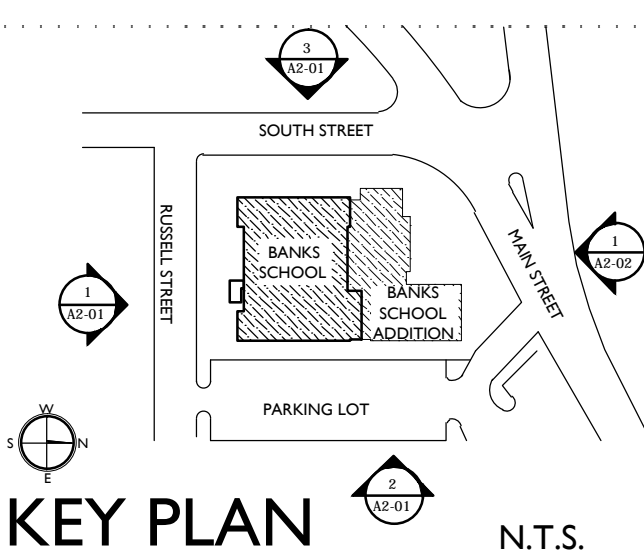
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**THIRD FLOOR
PLAN**

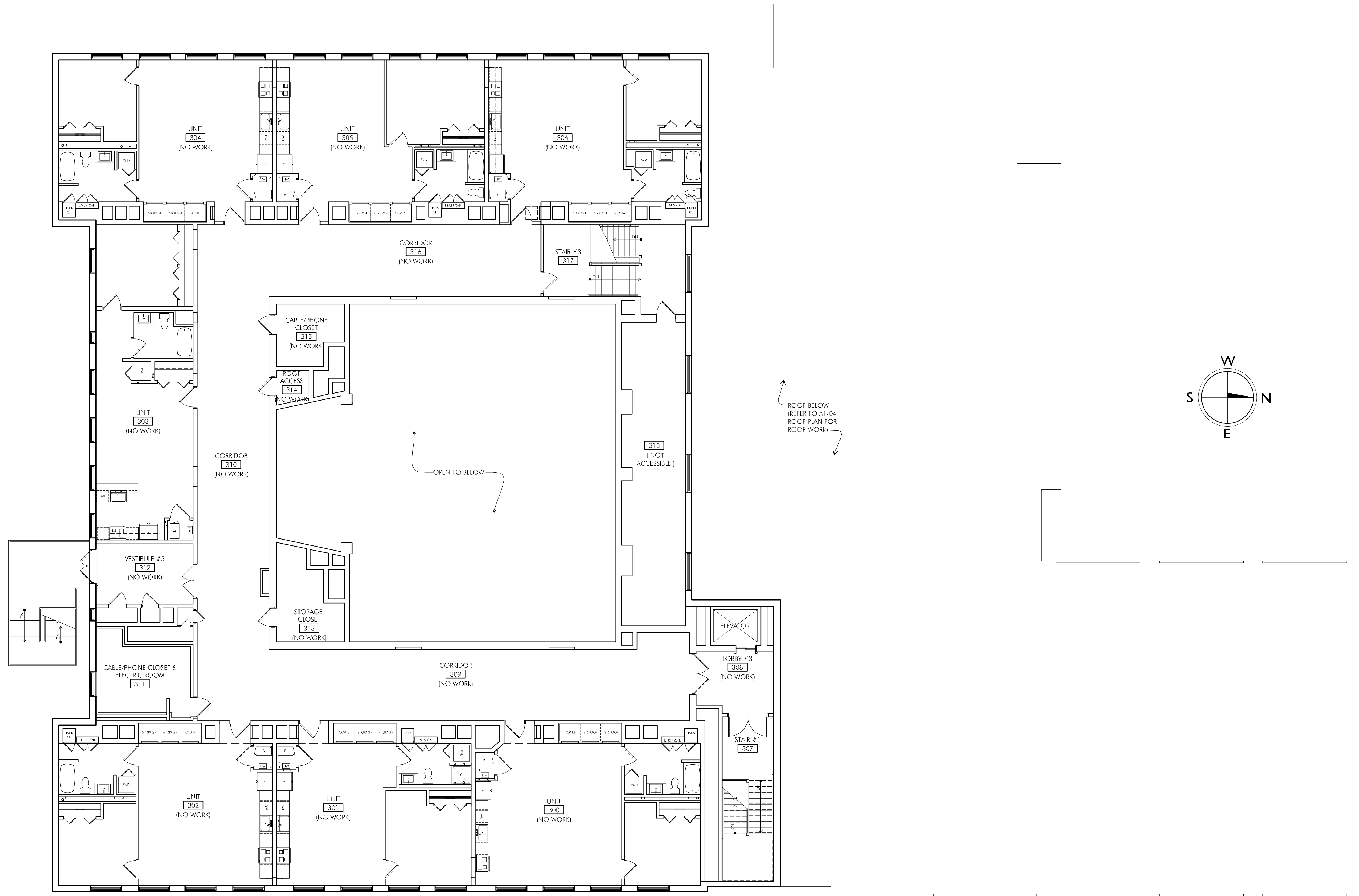


Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8"=1'-0"

AI-03



GENERAL NOTE:
SECOND AND THIRD FLOOR PLANS ARE SHOWN FOR INFORMATIONAL PURPOSES. PHASE III WORK IS GENERALLY LIMITED TO THE FIRST FLOOR AND ROOF.

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

P:\2010\10025-A\Streets\1st Floor (Phase 3)\10025-A AI-03.dwg Pdr: 06, 2012 - 8:10 pm BOSBORNE

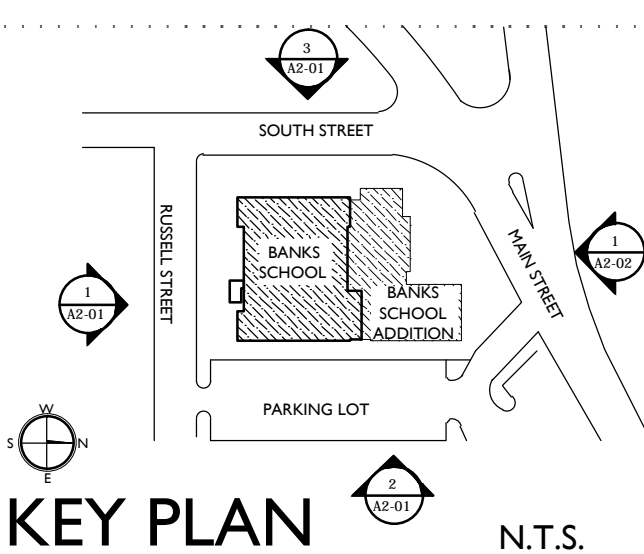
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**ROOF
PLAN**



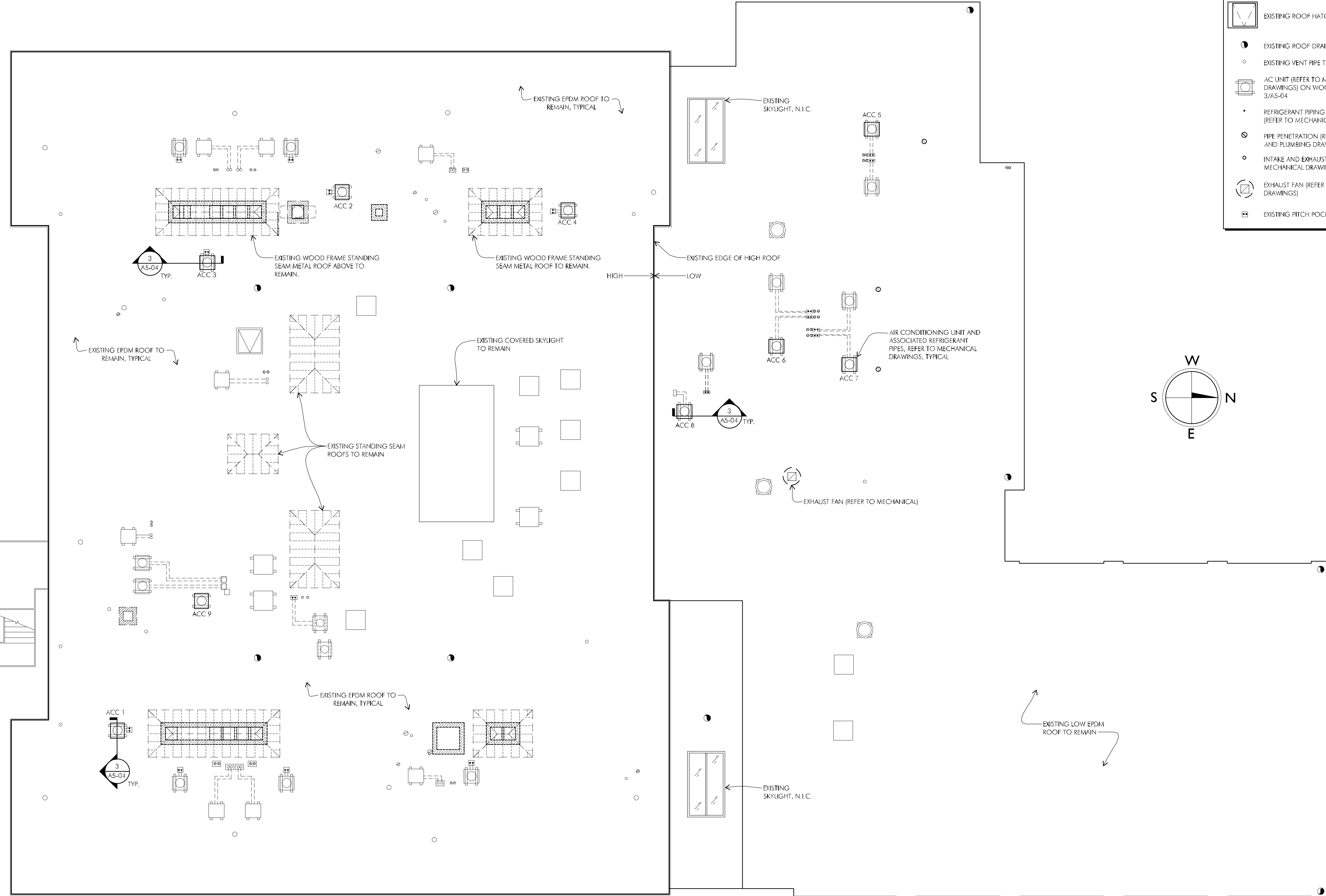
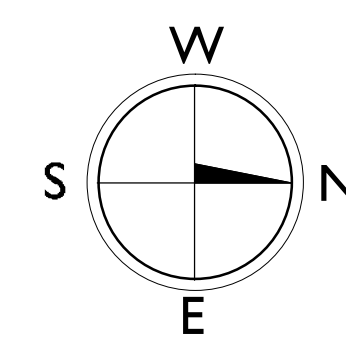
Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB, LR
Scale: 1/8" = 1'-0"

A1-04

ROOFING LEGEND	
	EXISTING MASONRY CHIMNEY
	EXISTING AC UNIT ON CURB TO REMAIN
	EXISTING ROOF HATCH TO REMAIN
	EXISTING ROOF DRAIN TO REMAIN
	EXISTING VENT PIPE TO REMAIN
	AC UNIT (REFER TO MECHANICAL DRAWINGS) ON WOOD CURB. REFER TO 3/A5-04
	REFRIGERANT PIPING (REFER TO MECHANICAL DRAWINGS)
	PIPE PENETRATION (REFER TO MECHANICAL AND PLUMBING DRAWINGS)
	INTAKE AND EXHAUST FLUES (REFER TO MECHANICAL DRAWINGS)
	EXHAUST FAN (REFER TO MECHANICAL DRAWINGS)
	EXISTING PITCH POCKET

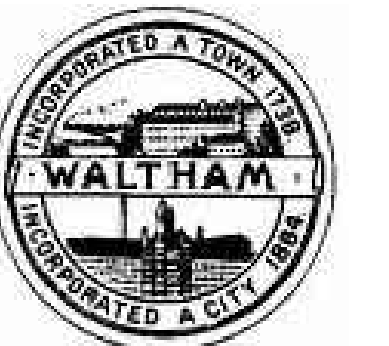


1 ROOF PLAN
SCALE: 1/8"=1'-0"

P:\2010\10025-A\Streets\FLOOR (Phase 3)\10025-A A1-04.dwg Pdr: 07, 2012 - 6:10 pm BOSBORNE

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**

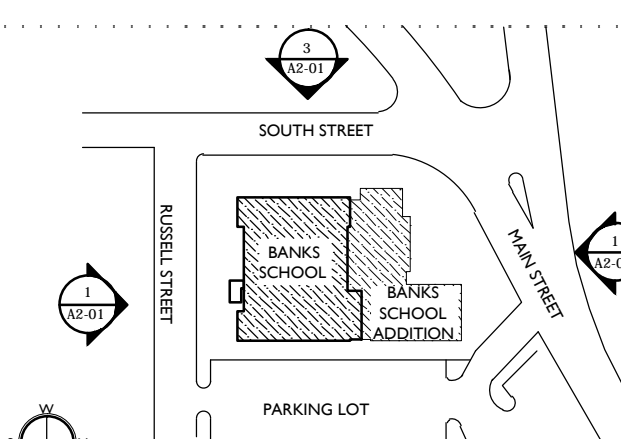
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**FIRST FLOOR
REFLECTED
CEILING PLAN**



KEY PLAN N.T.S.

Revisions:

BID DOCUMENTS

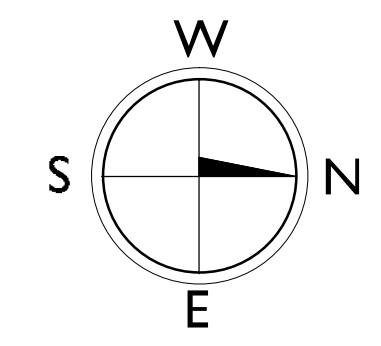
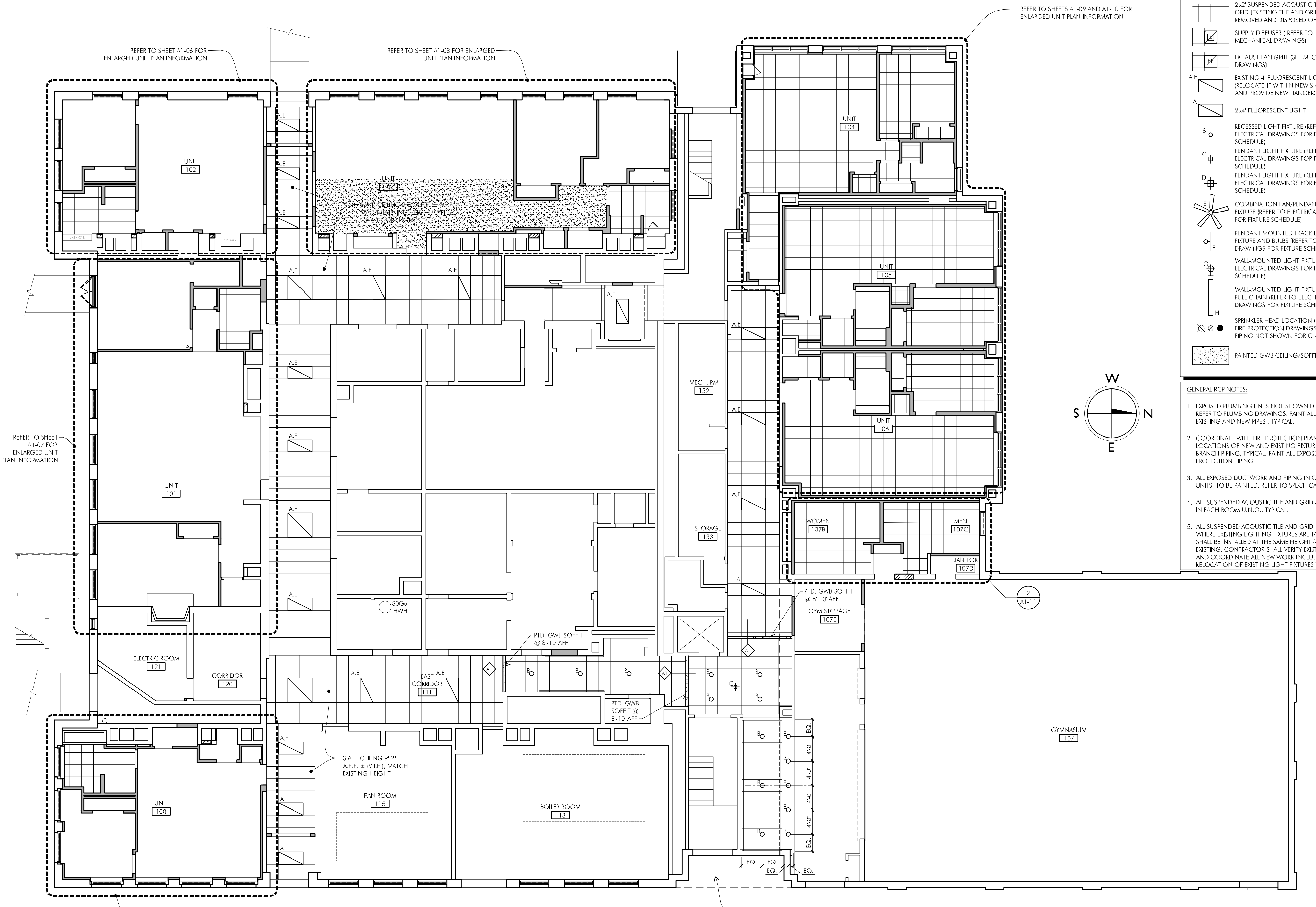
Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB, LR
Scale: 1/8"=1'-0"

A1-05

REFLECTED CEILING PLAN LEGEND

	2x4 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
	2x2 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
	SUPPLY DIFFUSER (REFER TO MECHANICAL DRAWINGS)
	EXHAUST FAN GRILL (SEE MECHANICAL DRAWINGS)
	EXISTING 4' FLUORESCENT LIGHT (RELOCATE IF WITHIN NEW S.A.T. GRID AND PROVIDE NEW HANGERS, TYPICAL)
	2x4 FLUORESCENT LIGHT
	RECESSED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	COMBINATION FAN/PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	PENDANT MOUNTED TRACK LIGHTING FIXTURE AND BULBS (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
	SPRINKLER HEAD LOCATION (REFER TO FIRE PROTECTION DRAWINGS) SPRINKLER PIPING NOT SHOWN FOR CLARITY.
	PAINTED GWB CEILING/SOFFIT

- GENERAL RCP NOTES:**
- EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
 - COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING, TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
 - ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM U.N.O., TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.

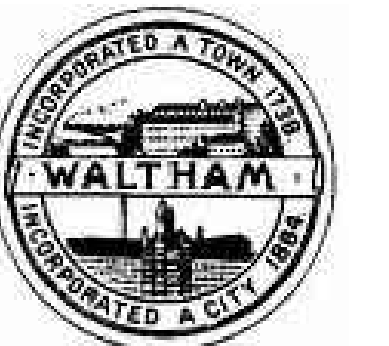


P:\2010\10025-A\Sheet\1st FLOOR (Phase 3)\10025-A A1-05.dwg Plot: 06/11/2011 8:11 pm BOSBORNE

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

PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS

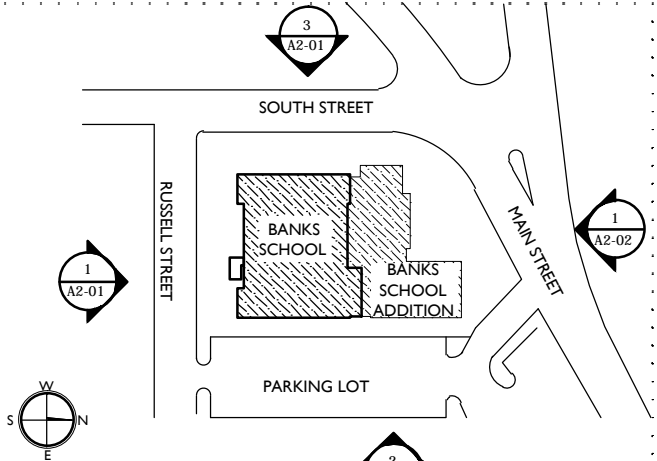
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

ENLARGED
UNITS 100 & 102
REFLECTED CEILING
AND FLOOR PLANS



KEY PLAN N.T.S.

Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8"=1'-0"

A1-06

REFLECTED CEILING PLAN LEGEND

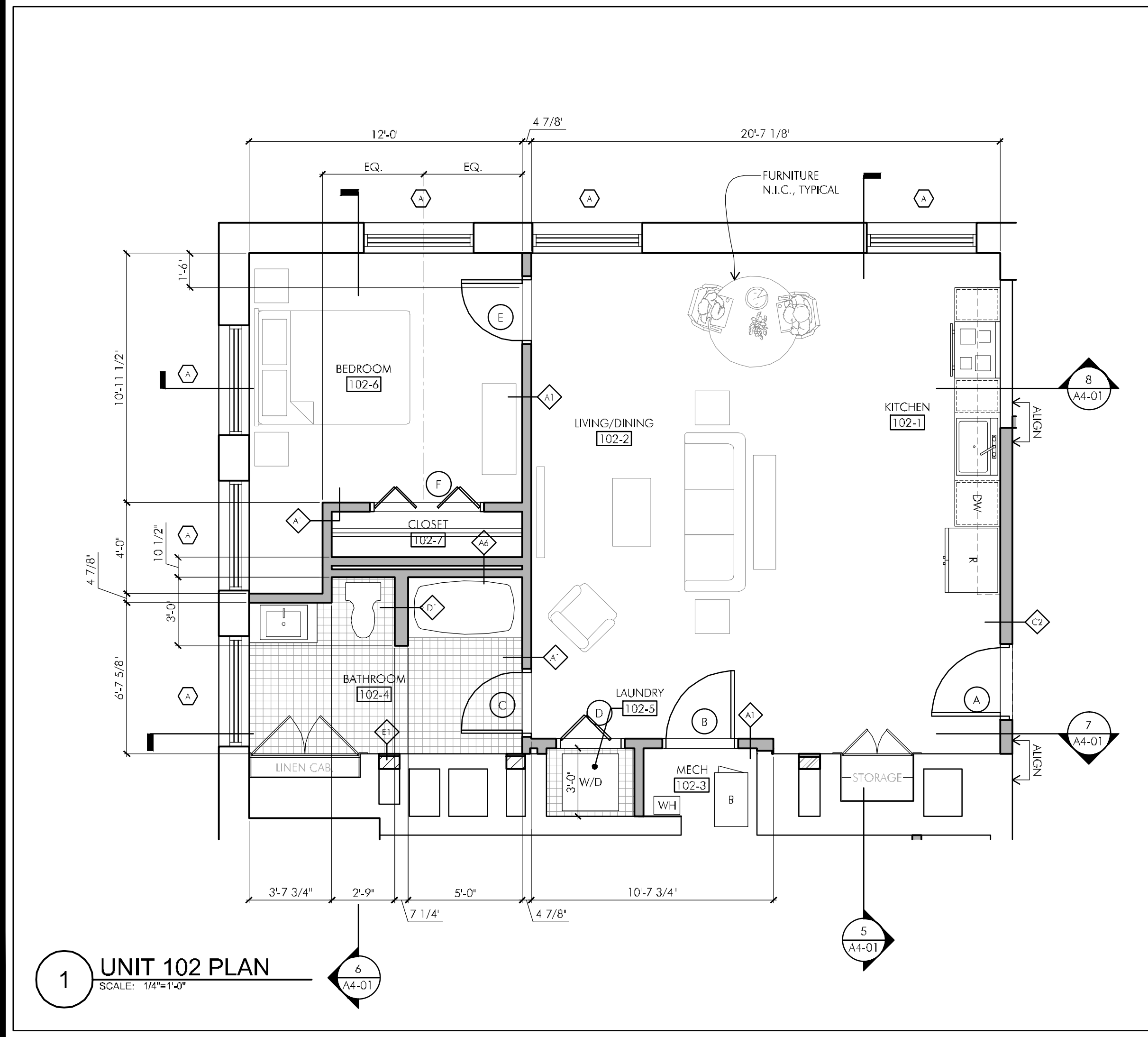
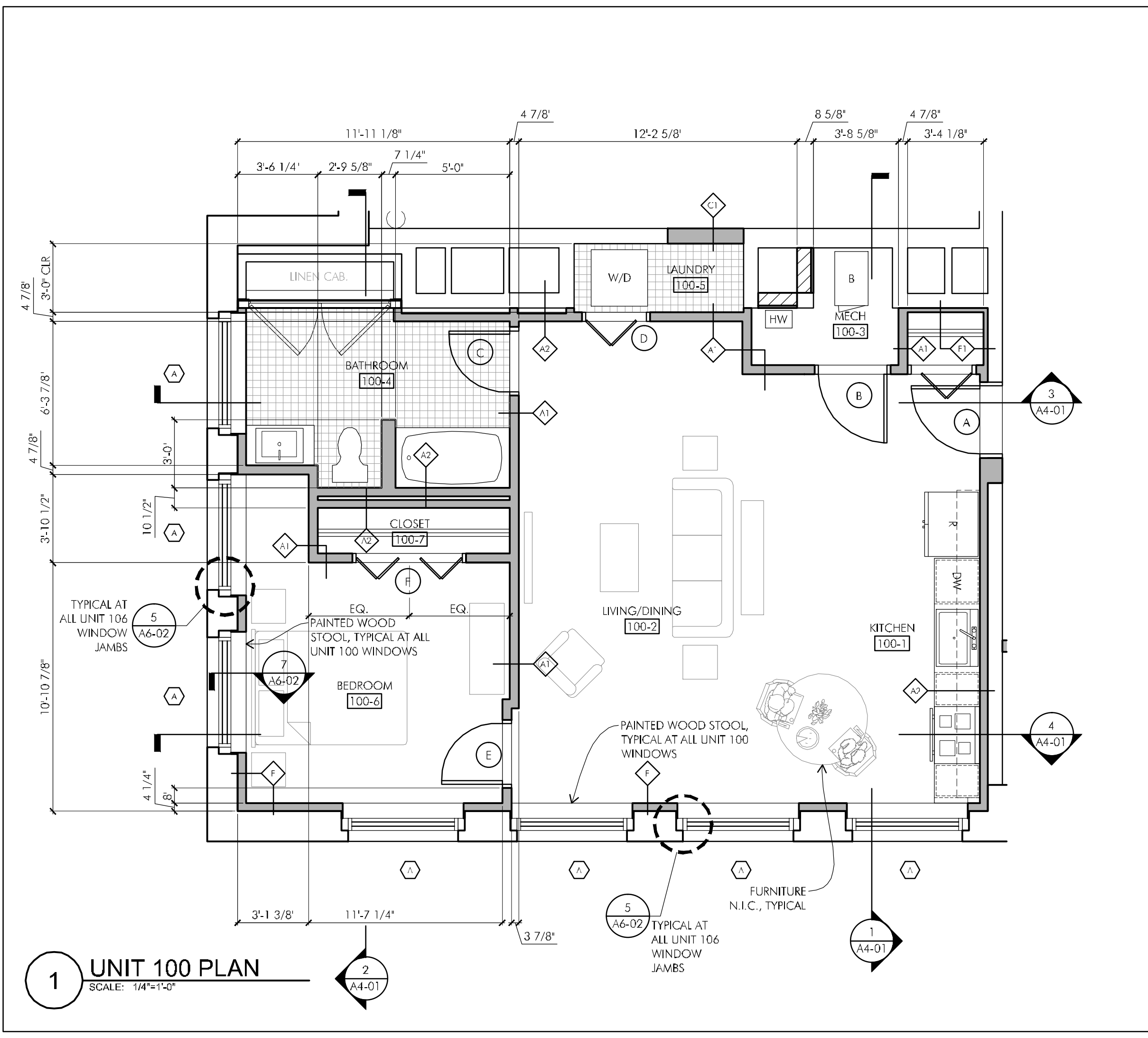
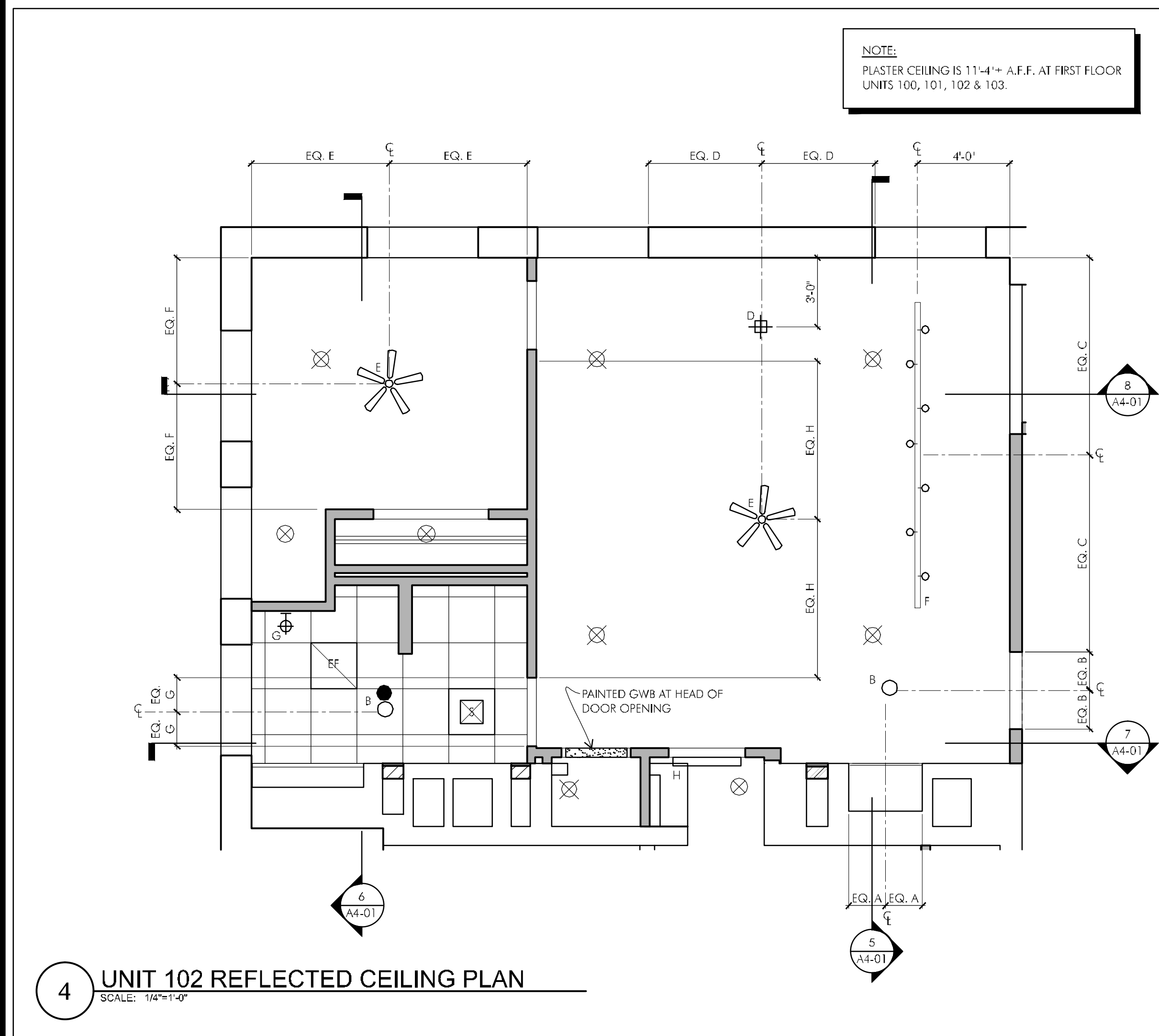
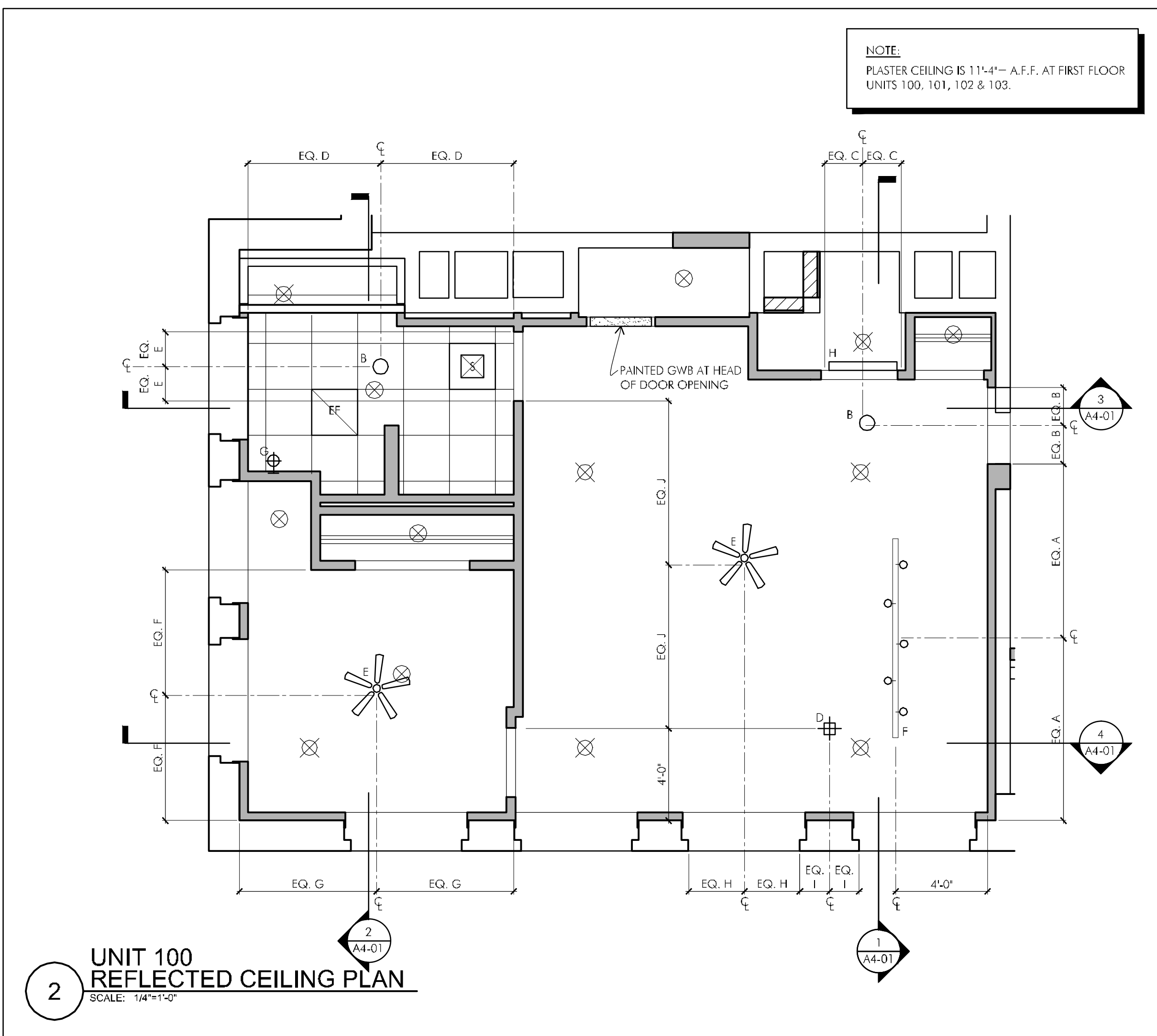
- 2x4 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- 2x2 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- SUPPLY DIFFUSER (REFER TO MECHANICAL DRAWINGS)
- EXHAUST FAN GRILL (SEE MECHANICAL DRAWINGS)
- EXISTING 4' FLUORESCENT LIGHT. (RELOCATE IF WITHIN NEW S.A.T. GRID AND PROVIDE NEW HANGERS, TYPICAL)
- 2x4 FLUORESCENT LIGHT
- RECESSED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- COMBINATION FAN/PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT MOUNTED TRACK LIGHTING FIXTURE AND BULBS (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- SPRINKLER HEAD LOCATION (REFER TO FIRE PROTECTION DRAWINGS) SPRINKLER PIPING NOT SHOWN FOR CLARITY.
- PAINTED GWB CEILING/SOFFIT

- GENERAL RCP NOTES:**
- EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
 - COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING, TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
 - ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM U.N.O., TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.

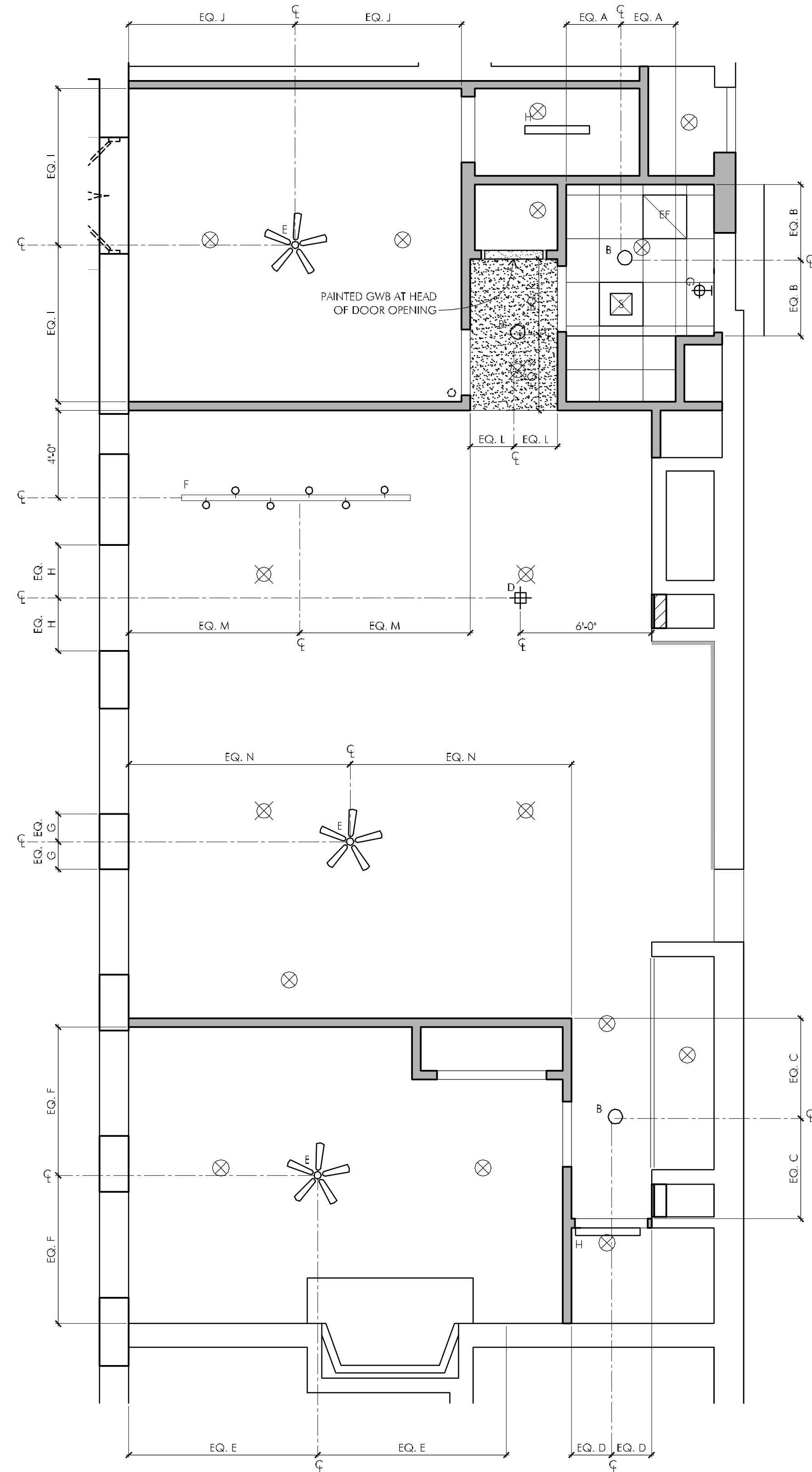
LEGEND

- NEW STUD PARTITION
- MASONRY INFILL
- PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
- WINDOW TAG, REFER TO A6-01.
- SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
- DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE

- GENERAL NOTES:**
- REFER TO A7-01 FOR FINISH SCHEDULE
 - REFER TO A5-01 FOR PARTITION/FRAMING NOTES

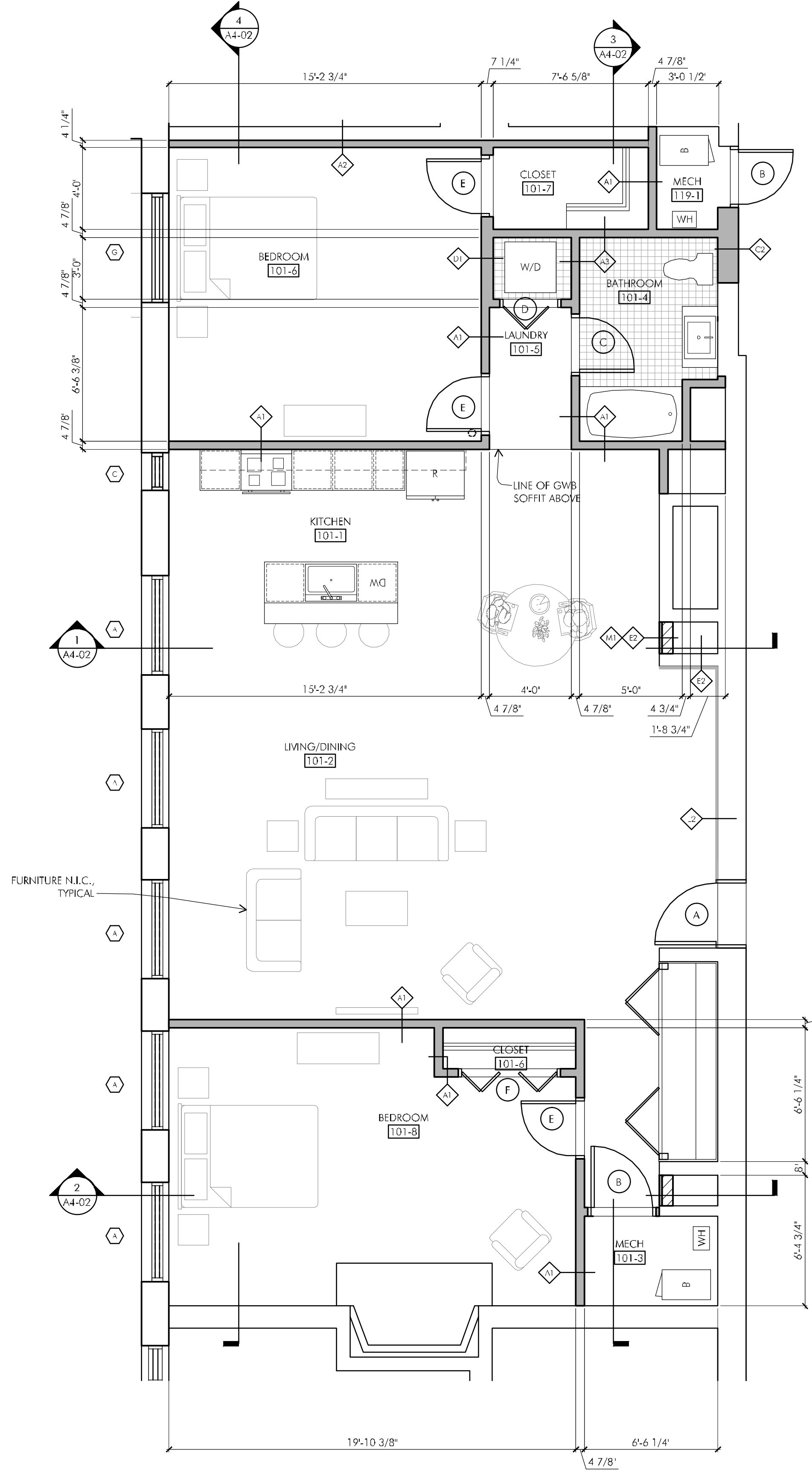


P:\2010\10025-A\Sheet1st FLOOR (Phase 3)\10025-A A1-06.dwg Plot: 07/2012 4:28 pm BOSBORNE



NOTE:
PLASTER CEILING IS 11'-4" A.F.F. AT FIRST FLOOR UNITS 100, 101, 102 & 103.

2 UNIT 101 REFLECTED CEILING PLAN
SCALE: 1/4"=1'-0"



1 UNIT 101 PLAN
SCALE: 1/4"=1'-0"

REFLECTED CEILING PLAN LEGEND

- 2x4 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- 2x2 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- SUPPLY DIFFUSER (REFER TO MECHANICAL DRAWINGS)
- EXHAUST FAN GRILL (SEE MECHANICAL DRAWINGS)
- EXISTING 4' FLUORESCENT LIGHT. (RELOCATE IF WITHIN NEW S.A.T. GRID AND PROVIDE NEW HANGERS, TYPICAL)
- 2x4 FLUORESCENT LIGHT
- RECESSED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- COMBINATION FAN/PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT MOUNTED TRACK LIGHTING FIXTURE AND BULBS (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- SPRINKLER HEAD LOCATION (REFER TO FIRE PROTECTION DRAWINGS) SPRINKLER PIPING NOT SHOWN FOR CLARITY.
- PAINTED GWB CEILING/SOFFT

GENERAL RCP NOTES:

1. EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
2. COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING. TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
3. ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
4. ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM. U.N.O., TYPICAL.
5. ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.

LEGEND

- NEW STUD PARTITION
- MASONRY INFILL
- PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
- WINDOW TAG, REFER TO A6-01.
- SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
- DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE

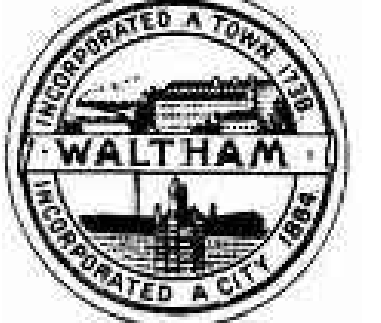
GENERAL NOTES:

1. REFER TO SHEET A7-01 FOR FINISH SCHEDULE



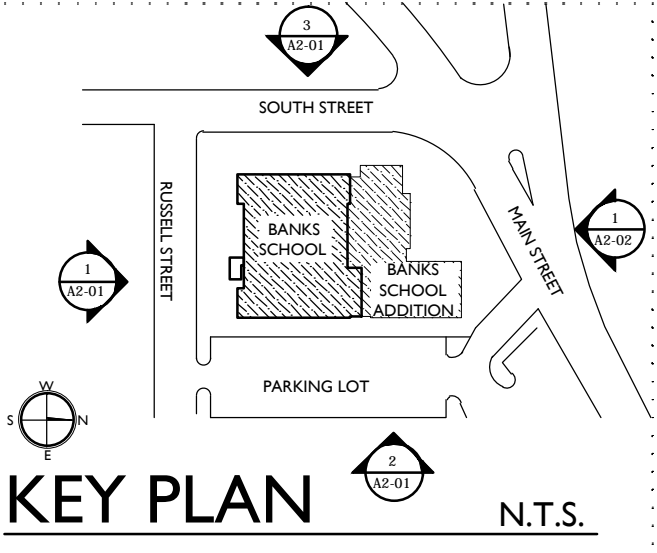
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
F: (617) 464-2971
cbi@cbiconsultinginc.com
www.cbiconsultinginc.com

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

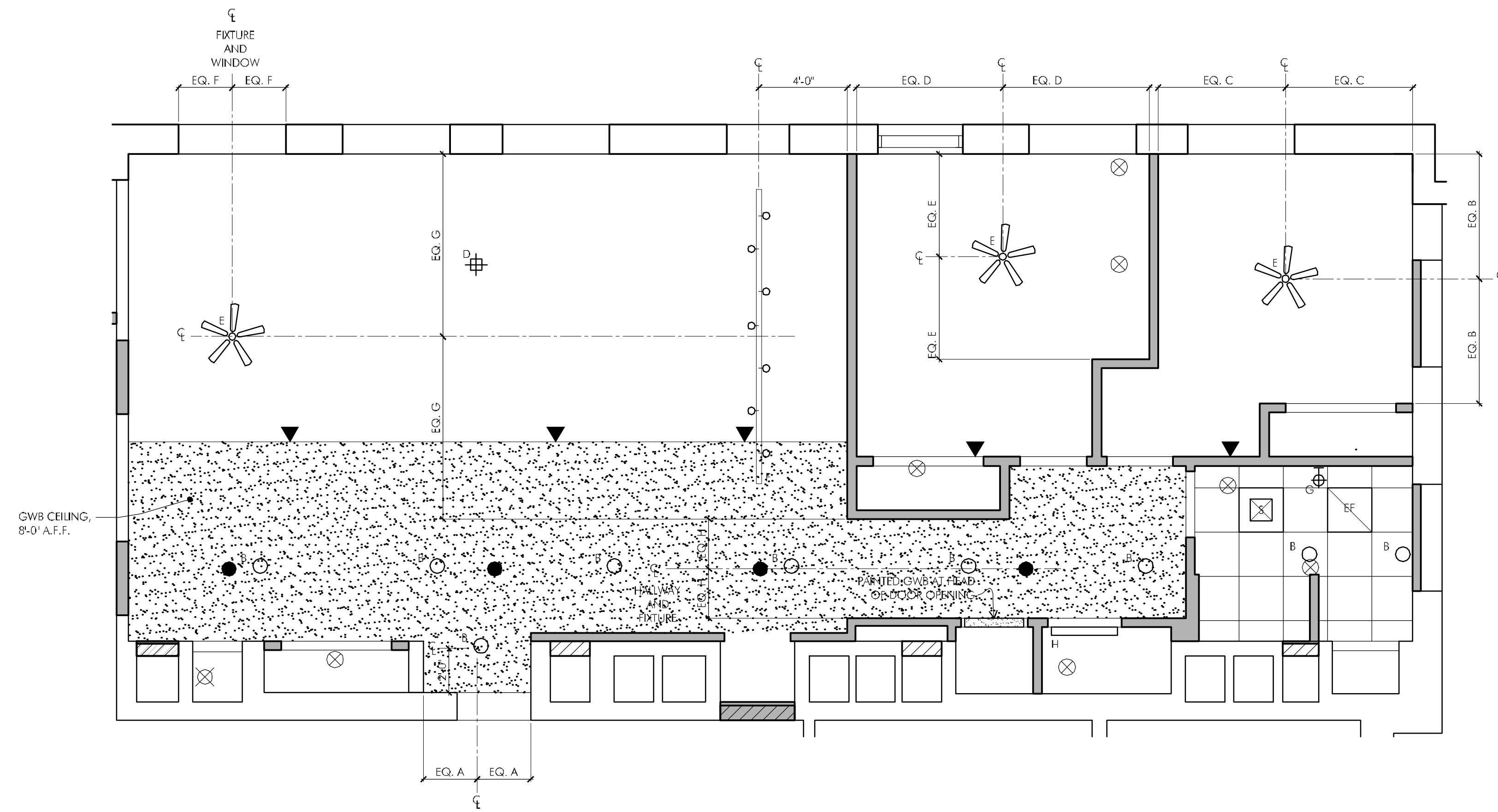
Drawing Title:
**ENLARGED
UNIT 101
REFLECTED CEILING
AND FLOOR PLANS**



KEY PLAN N.T.S.
Revisions:
BID DOCUMENTS

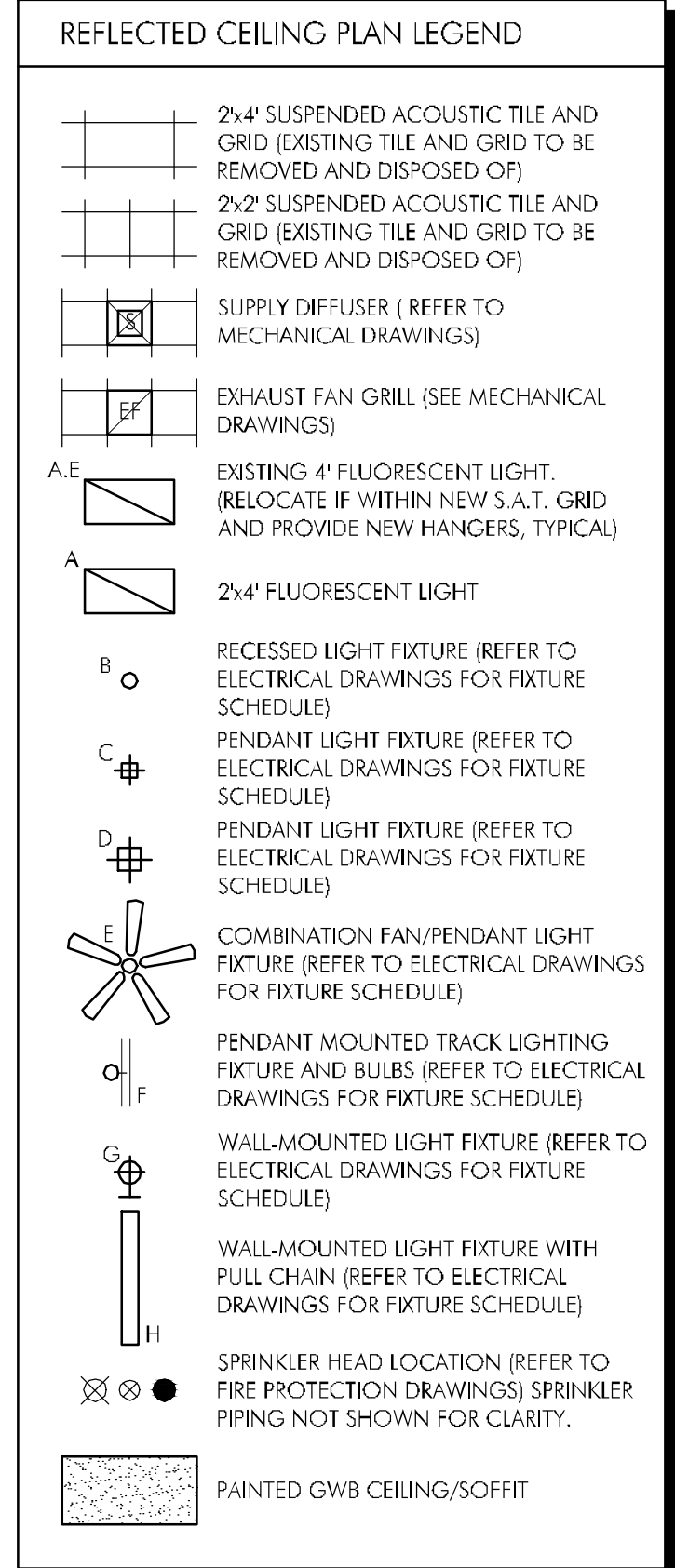
Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/4"=1'-0"

AI-07

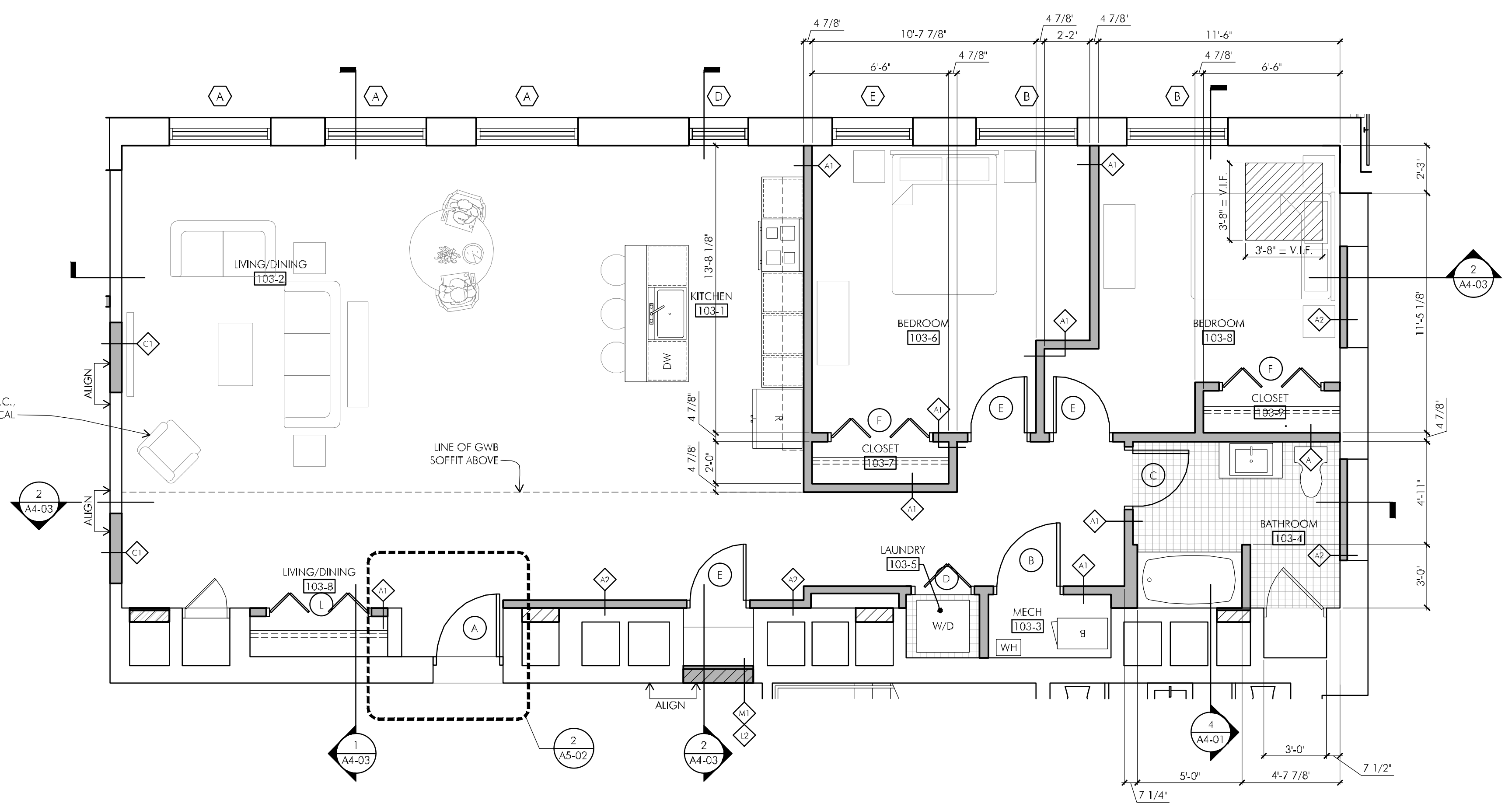


2 UNIT 103 REFLECTED CEILING PLAN
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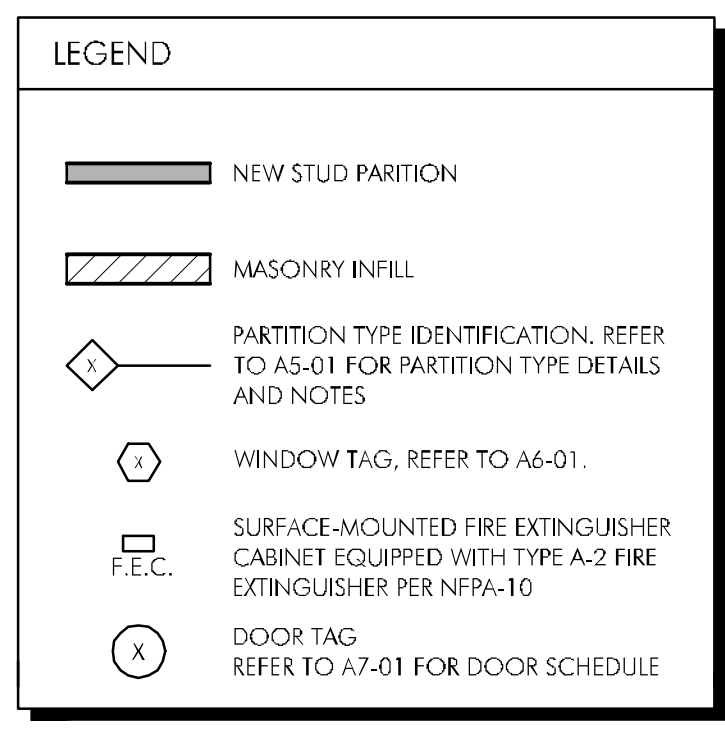
- GENERAL RCP NOTES:**
1. EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
 2. COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING, TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
 3. ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
 4. ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM U.N.O., TYPICAL.
 5. ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.



NOTE:
PLASTER CEILING IS 11'-4"= (V.I.F.) A.F.F. AT FIRST FLOOR UNITS 100, 101, 102 & 103.



1 UNIT 103 PLAN
SCALE: 1/4"=1'-0"

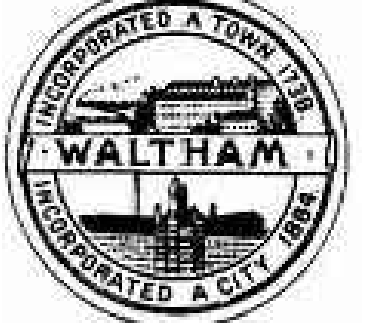


GENERAL NOTES:
1. REFER TO SHEET A7-01 FOR FINISH SCHEDULE



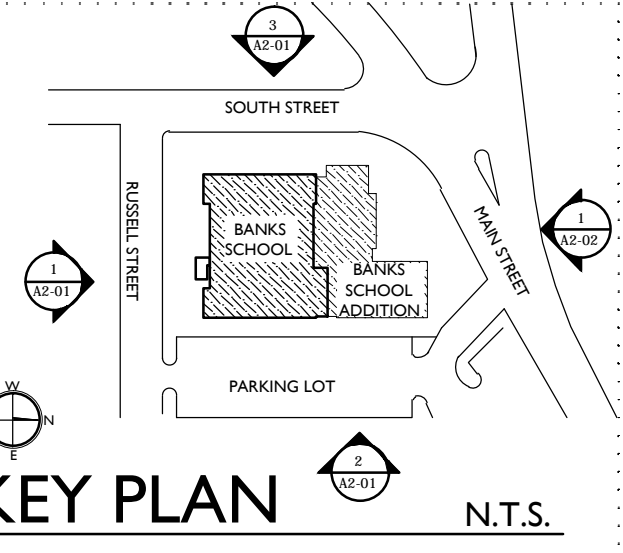
250 DORCHESTER AVENUE
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**PHASE III
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948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA**

Drawing Title:
**ENLARGED
UNIT 103
REFLECTED CEILING
AND FLOOR PLANS**

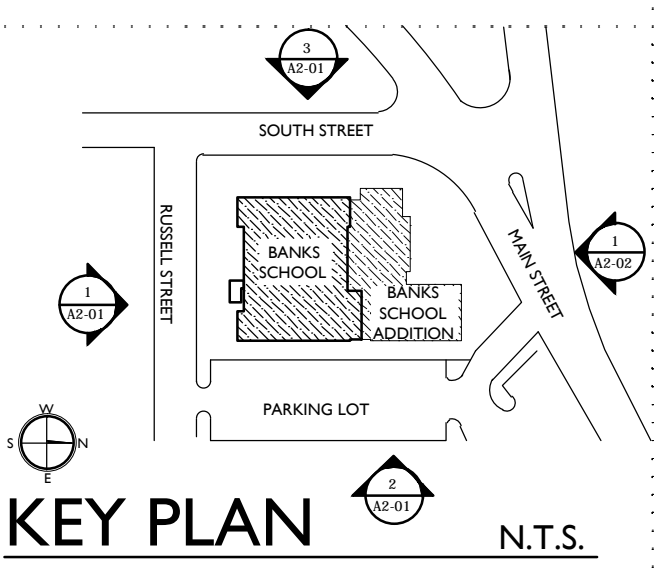


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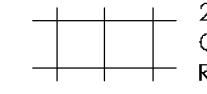
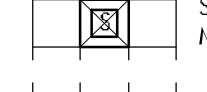
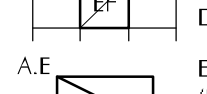
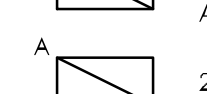
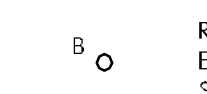

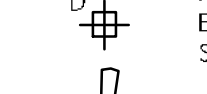
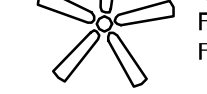
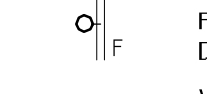
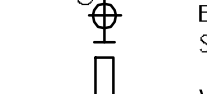
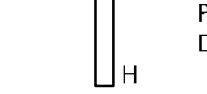

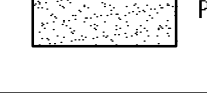

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8"=1'-0"

A1-08

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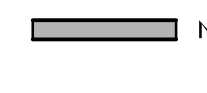

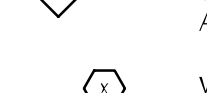

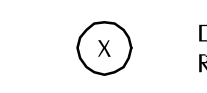



REFLECTED CEILING PLAN LEGEND

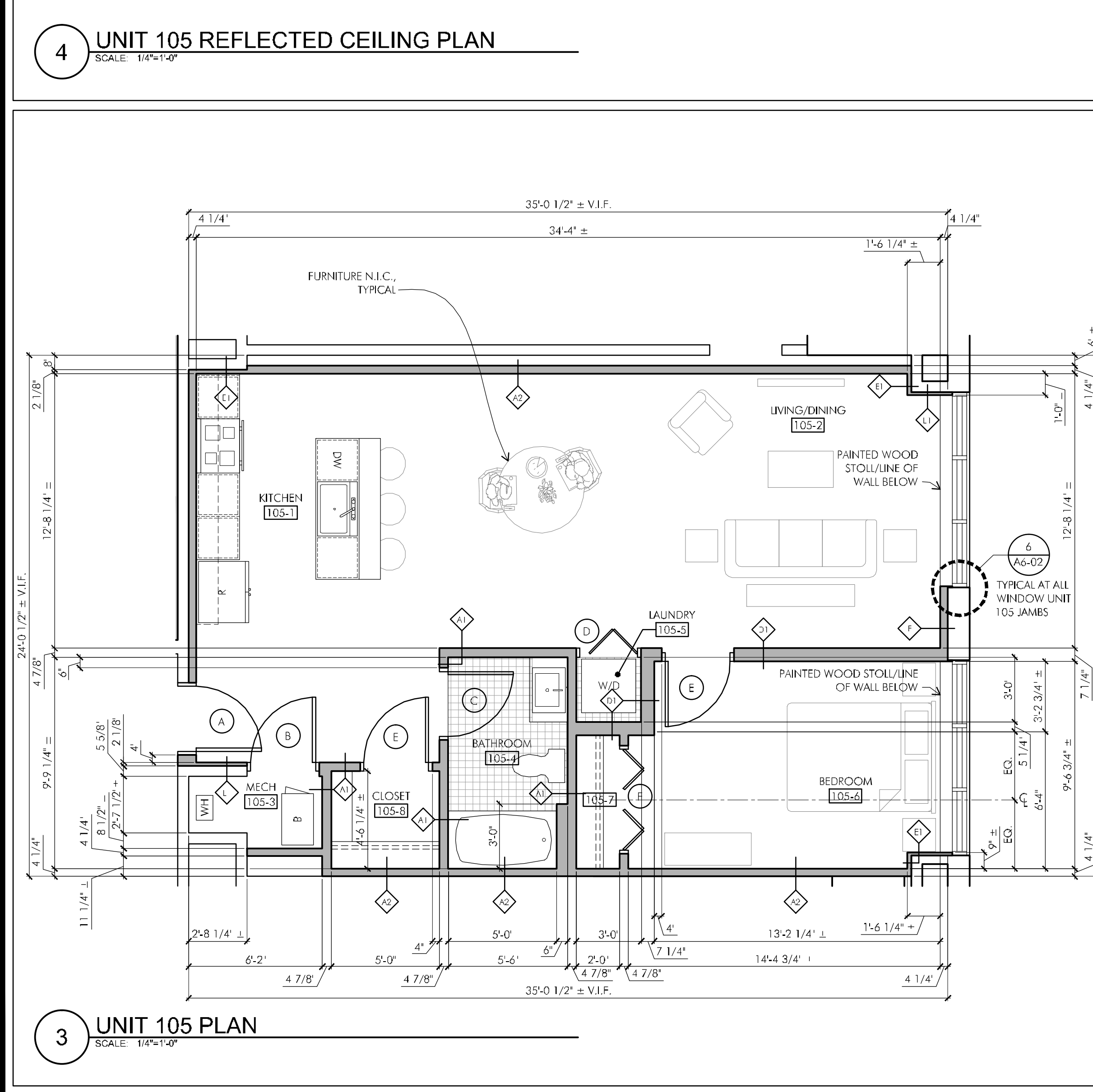
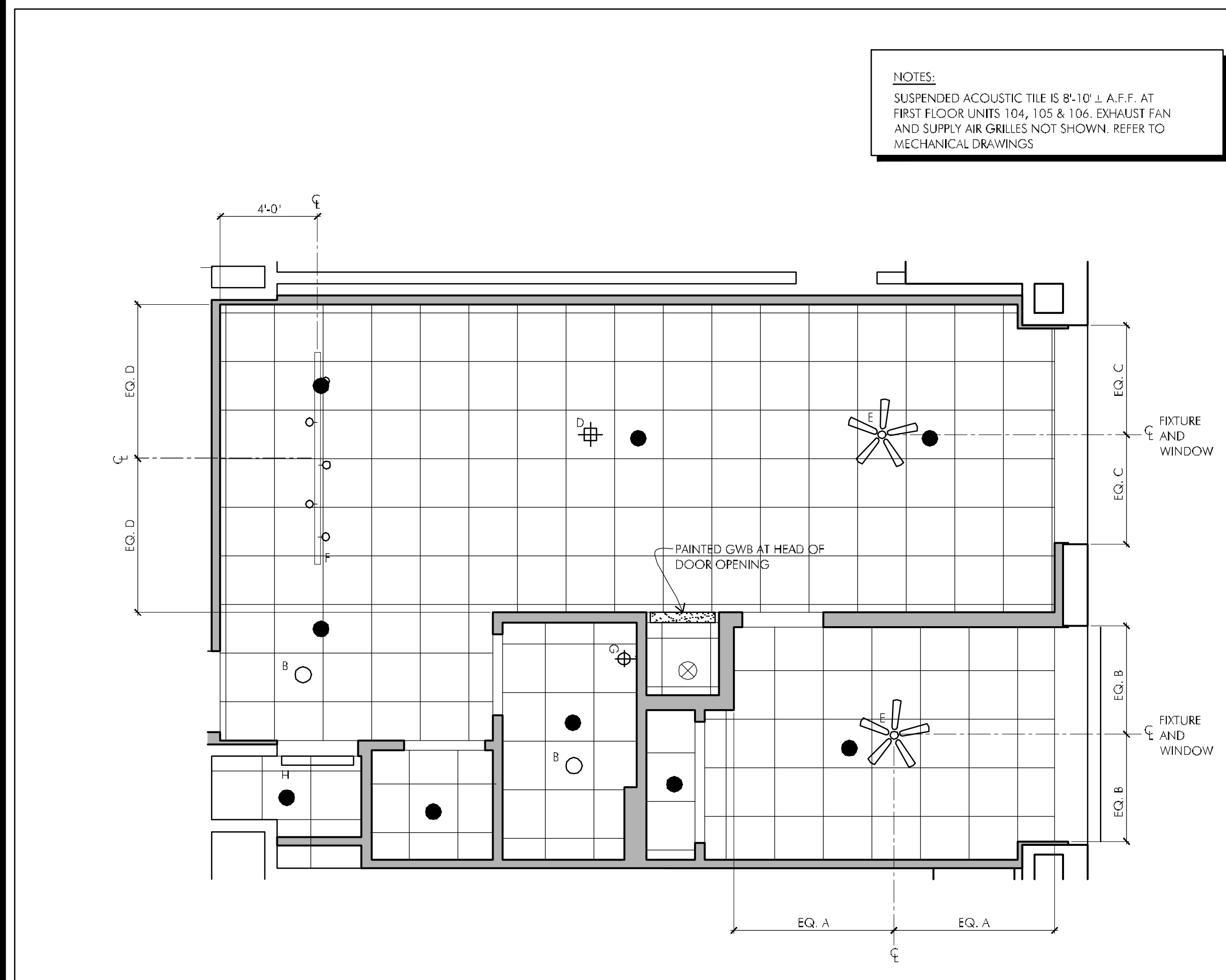
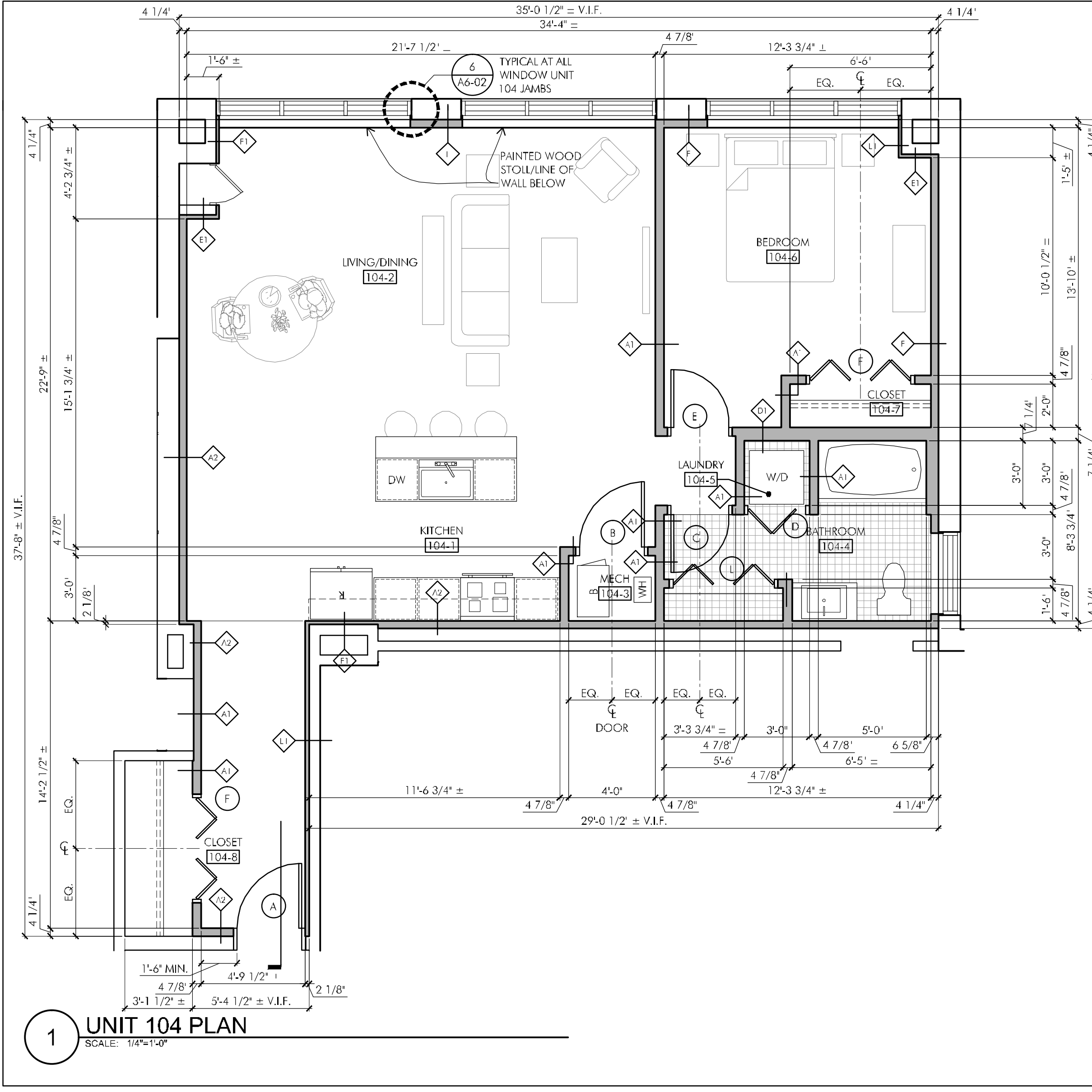
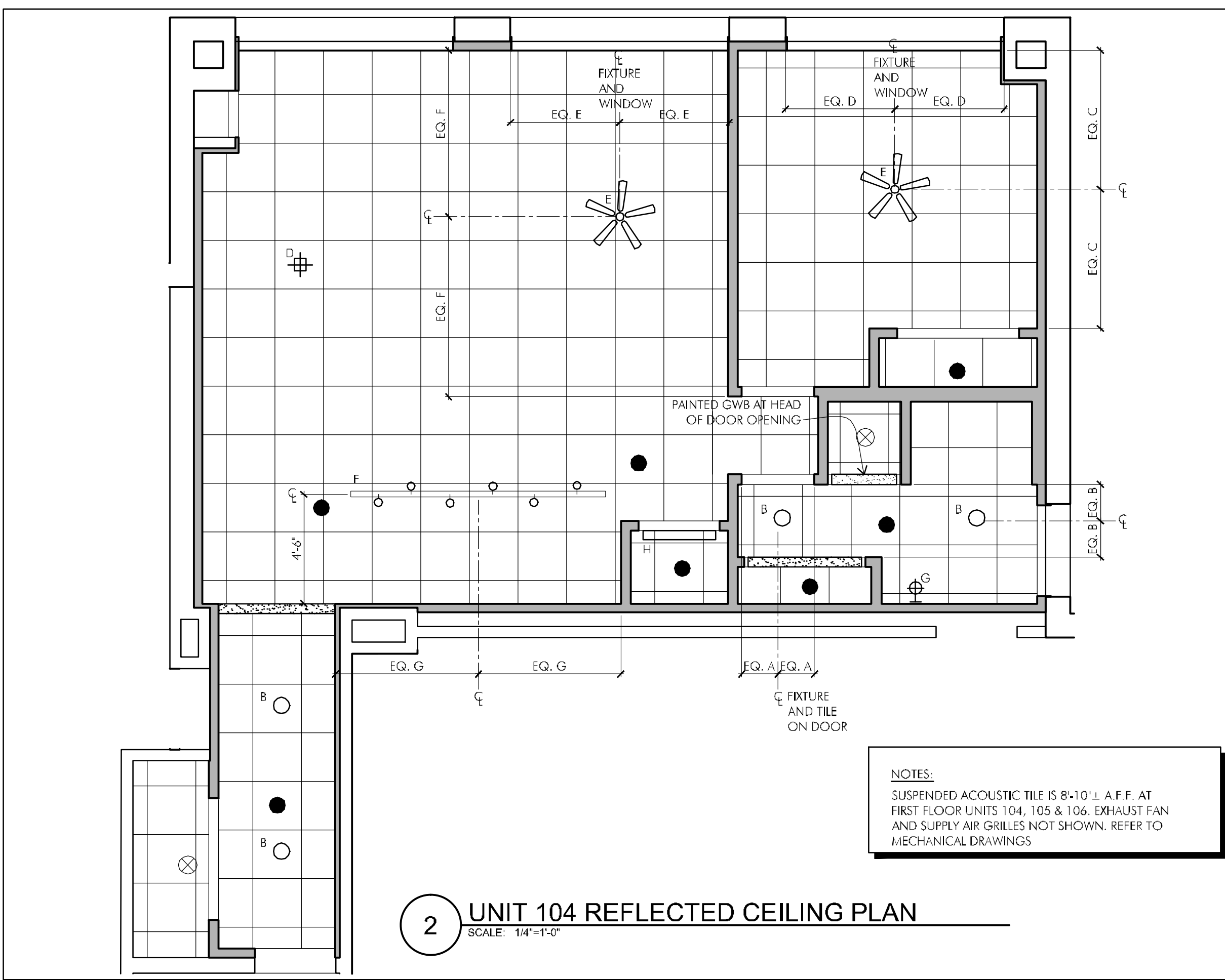
-  2x4 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
-  2x2 SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
-  SUPPLY DIFFUSER (REFER TO MECHANICAL DRAWINGS)
-  EXHAUST FAN GRILL (SEE MECHANICAL DRAWINGS)
-  EXISTING 4' FLUORESCENT LIGHT (RELOCATE IF WITHIN NEW S.A.T. GRID AND PROVIDE NEW HANGERS, TYPICAL)
-  2x4 FLUORESCENT LIGHT
-  RECESSED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  COMBINATION FAN/PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  PENDANT MOUNTED TRACK LIGHTING FIXTURE AND BULBS (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  WALL-MOUNTED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
-  SPRINKLER HEAD LOCATION (REFER TO FIRE PROTECTION DRAWINGS) SPRINKLER PIPING NOT SHOWN FOR CLARITY.
-  PAINTED GWB CEILING/SOFFIT

- GENERAL RCP NOTES:**
- EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
 - COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING. TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
 - ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS TO BE CENTERED IN EACH ROOM. U.N.O., TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.

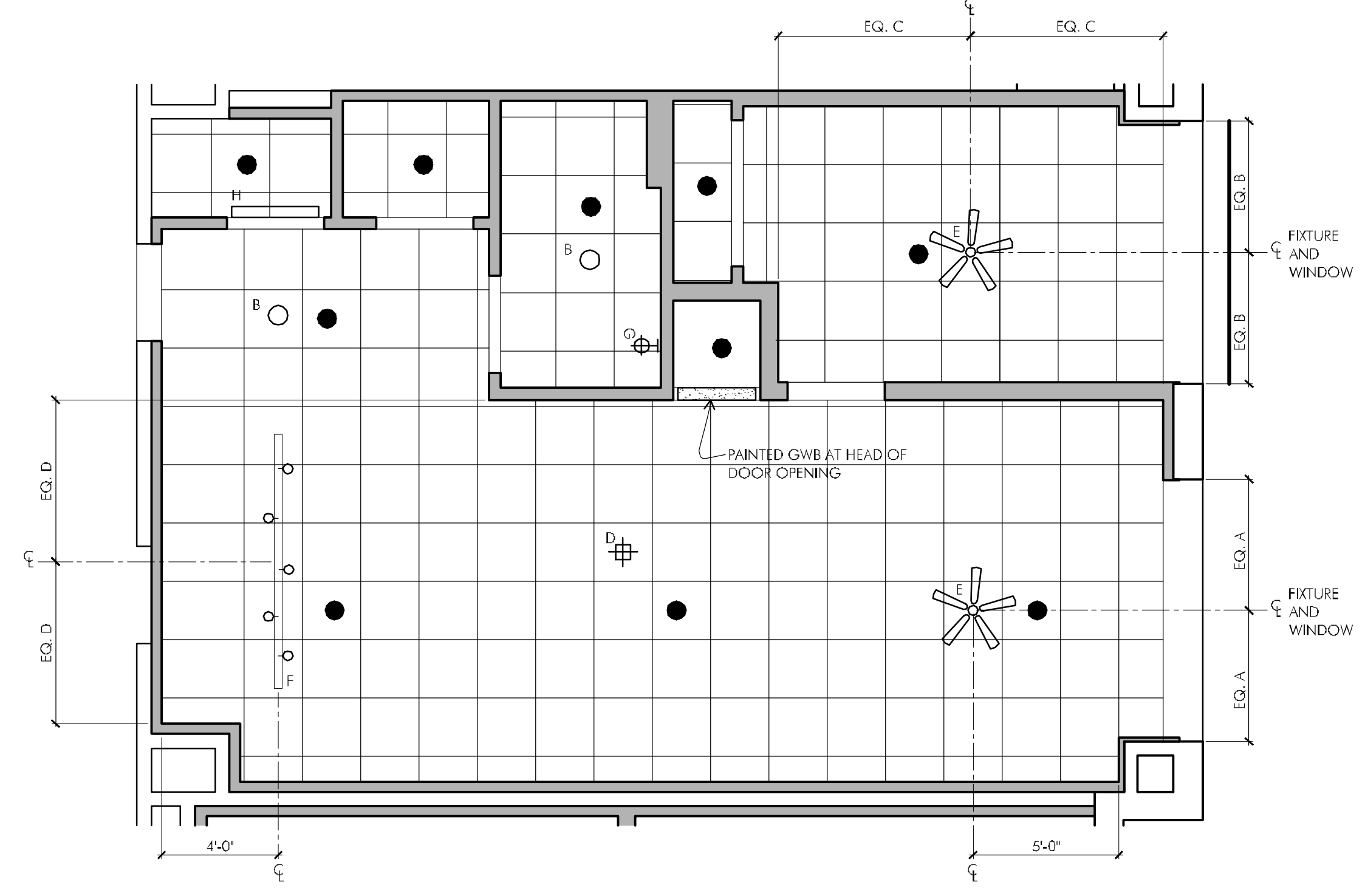
LEGEND

-  NEW STUD PARTITION
-  MASONRY INFILL
-  PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
-  WINDOW TAG, REFER TO A6-01.
-  SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
-  DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE

- GENERAL NOTES:**
- REFER TO SHEET A7-01 FOR FINISH SCHEDULE



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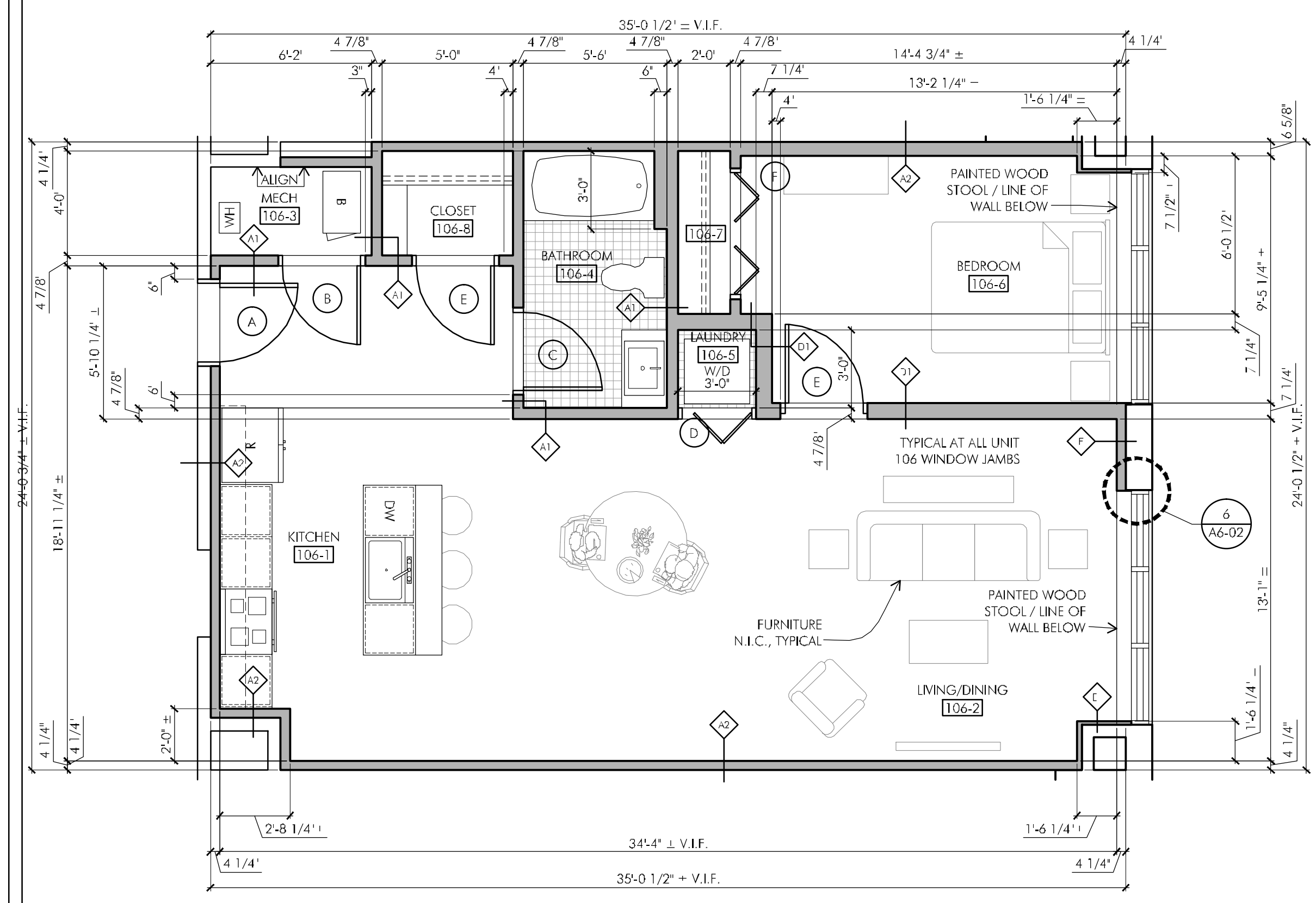
2 UNIT 106 REFLECTED CEILING PLAN
SCALE: 1/4"=1'-0"

NOTE:
SUSPENDED ACOUSTIC TILE IS 8'-10" L. A.F.F. AT FIRST FLOOR UNITS 104, 105 & 106. EXHAUST FAN AND SUPPLY AIR GRILLES NOT SHOWN. SEE MECHANICAL DRAWINGS.

REFLECTED CEILING PLAN LEGEND

- 2x4' SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- 2x2' SUSPENDED ACOUSTIC TILE AND GRID (EXISTING TILE AND GRID TO BE REMOVED AND DISPOSED OF)
- SUPPLY DIFFUSER (REFER TO MECHANICAL DRAWINGS)
- EXHAUST FAN GRILL (SEE MECHANICAL DRAWINGS)
- EXISTING 4' FLUORESCENT LIGHT (RELOCATE IF WITHIN NEW S.A.T. GRID AND PROVIDE NEW HANGERS, TYPICAL)
- 2x4' FLUORESCENT LIGHT
- RECESSED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- COMBINATION FAN/PENDANT LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- PENDANT MOUNTED TRACK LIGHTING FIXTURE AND BULBS (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- WALL-MOUNTED LIGHT FIXTURE WITH PULL CHAIN (REFER TO ELECTRICAL DRAWINGS FOR FIXTURE SCHEDULE)
- SPRINKLER HEAD LOCATION (REFER TO FIRE PROTECTION DRAWINGS) SPRINKLER PIPING NOT SHOWN FOR CLARITY.
- PAINTED GWB CEILING/SOFFIT

- GENERAL RCP NOTES:**
- EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
 - COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING. TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
 - ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM. U.N.O., TYPICAL.
 - ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.



1 UNIT 106 PLAN
SCALE: 1/4"=1'-0"

LEGEND

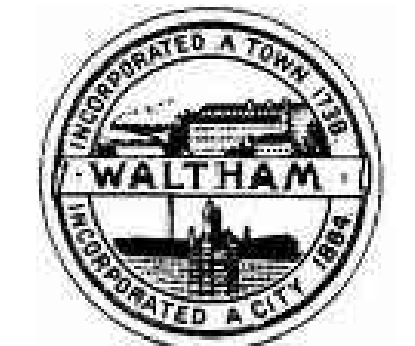
- NEW STUD PARTITION
- MASONRY INFILL
- PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
- WINDOW TAG, REFER TO A6-01.
- SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
- DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE

- GENERAL NOTES:**
- REFER TO SHEET A5-01 FOR FINISH SCHEDULE AND FINISH NOTES



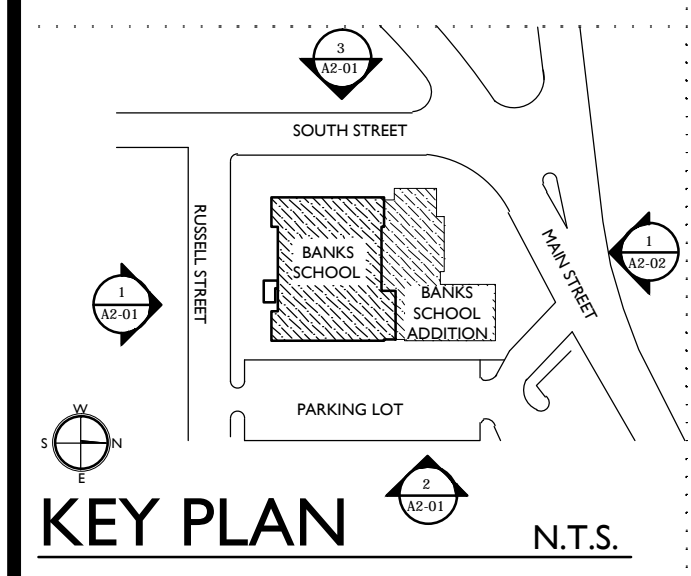
250 DORCHESTER AVENUE
BOSTON, MA 02127
P: (617) 268-8977
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RENOVATIONS TO
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CONDOMINIUMS**
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WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:
**ENLARGED
UNIT 106 ENLARGED
REFLECTED CEILING
AND FLOOR PLANS**

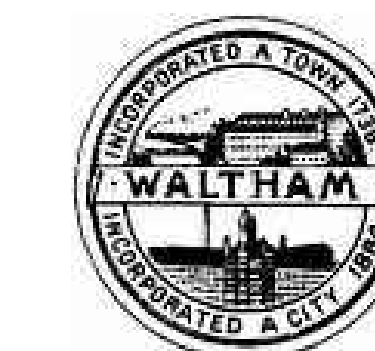


BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/4"=1'-0"

AI-10

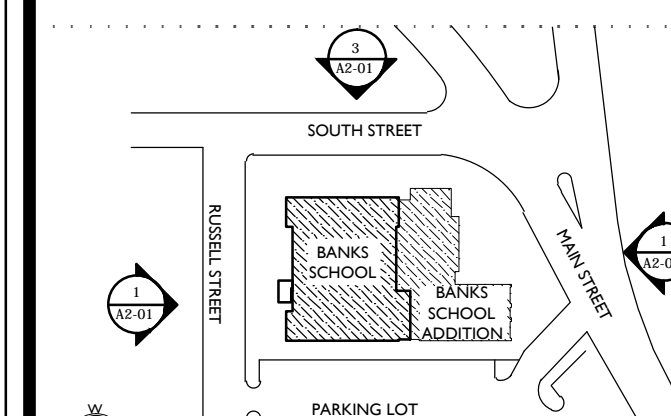
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**GYM TOILET ROOMS
REFLECTED CEILING
AND FLOOR PLANS**



KEY PLAN N.T.S.

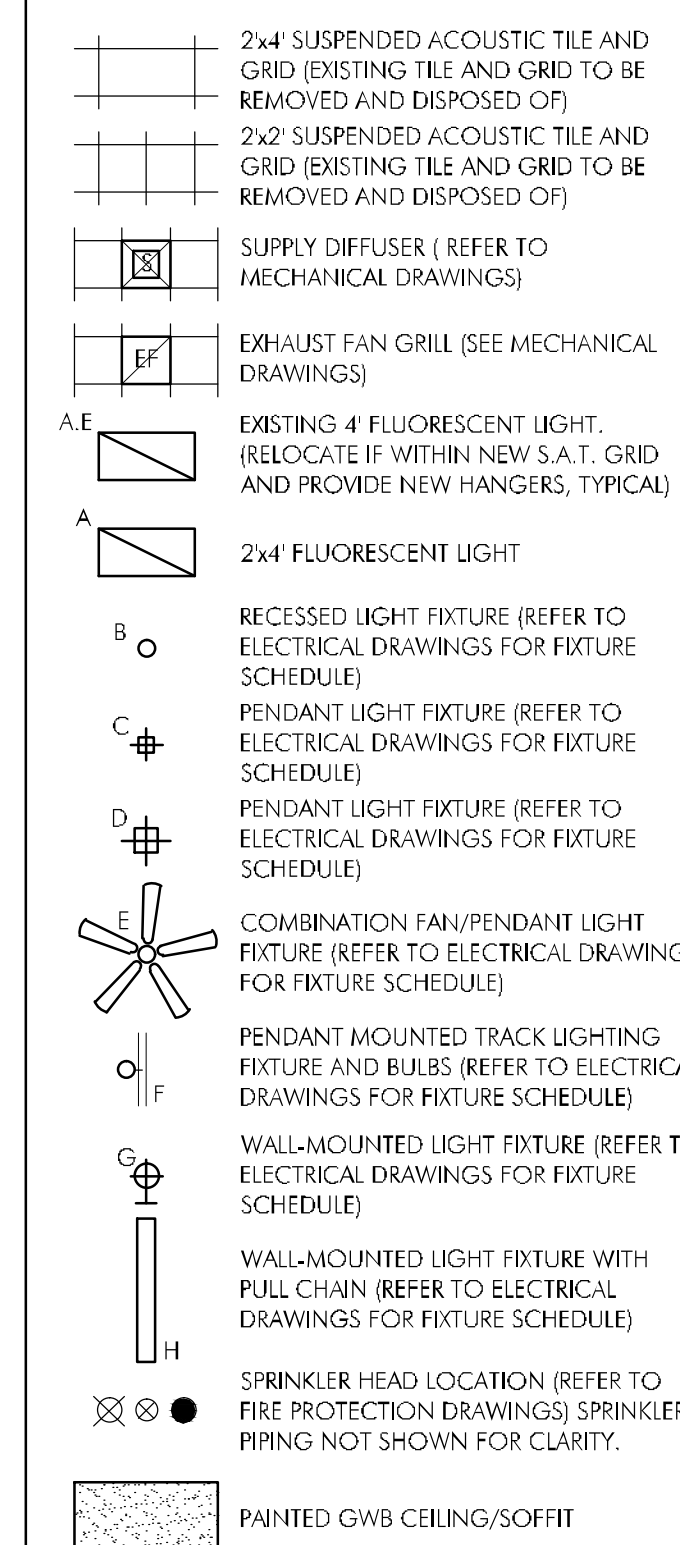
Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: 1/8"=1'-0"

AI-11

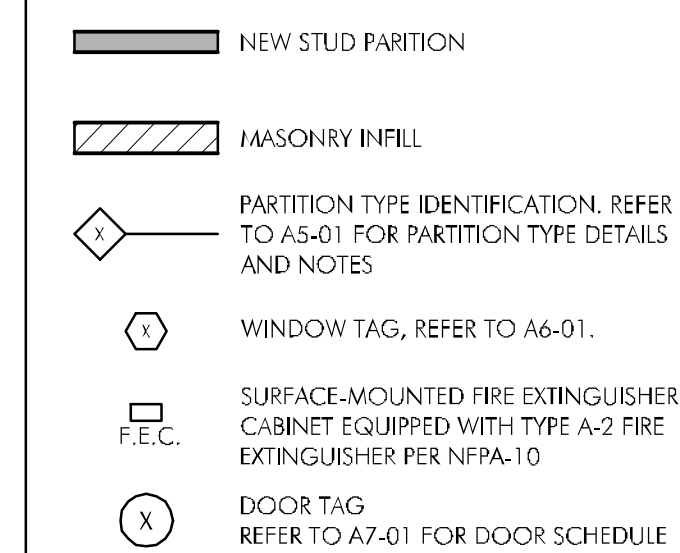
REFLECTED CEILING PLAN LEGEND



GENERAL RCP NOTES:

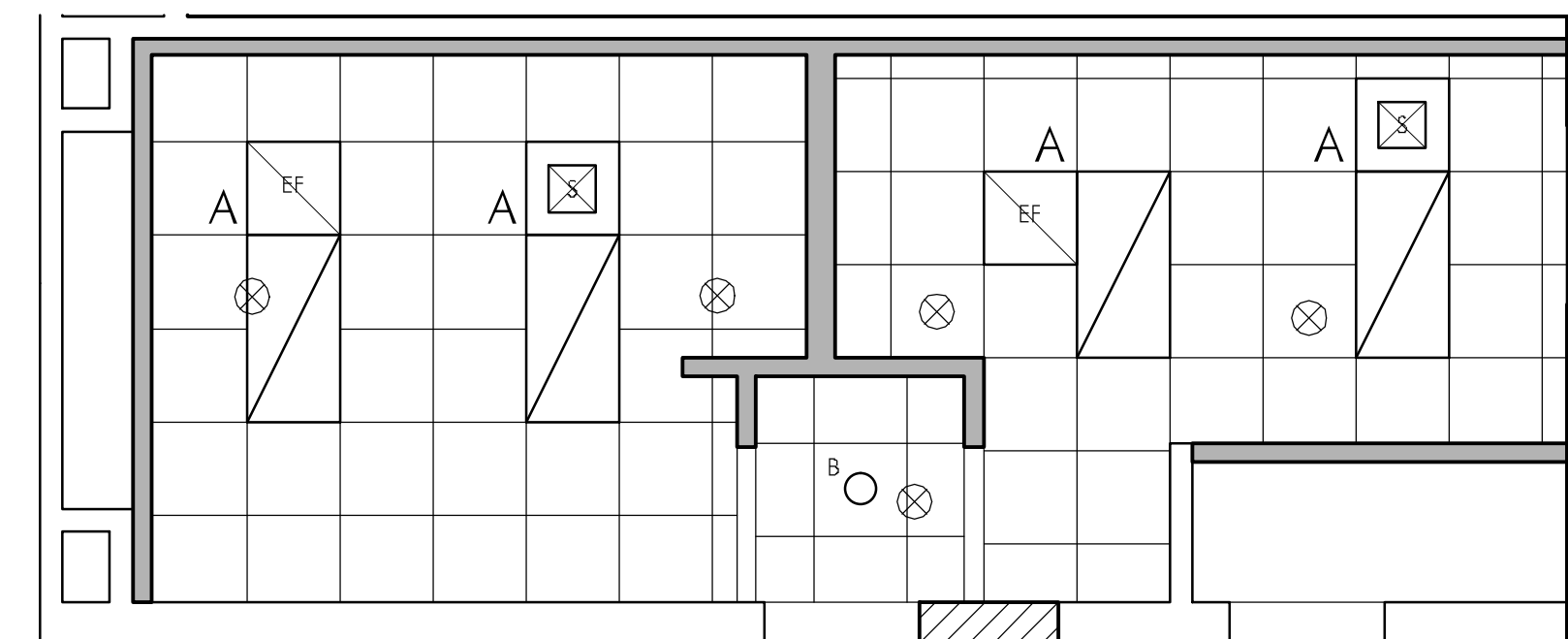
1. EXPOSED PLUMBING LINES NOT SHOWN FOR CLARITY. REFER TO PLUMBING DRAWINGS. PAINT ALL EXPOSED EXISTING AND NEW PIPES, TYPICAL.
2. COORDINATE WITH FIRE PROTECTION PLANS FOR LOCATIONS OF NEW AND EXISTING FIXTURE HEADS AND BRANCH PIPING. TYPICAL. PAINT ALL EXPOSED FIRE PROTECTION PIPING.
3. ALL EXPOSED DUCTWORK AND PIPING IN CONDOMINIUM UNITS TO BE PAINTED. REFER TO SPECIFICATION, TYPICAL.
4. ALL SUSPENDED ACOUSTIC TILE AND GRID ARE CENTERED IN EACH ROOM U.N.O., TYPICAL.
5. ALL SUSPENDED ACOUSTIC TILE AND GRID IN CORRIDORS WHERE EXISTING LIGHTING FIXTURES ARE TO REMAIN SHALL BE INSTALLED AT THE SAME HEIGHT (A.F.F.) AS EXISTING. CONTRACTOR SHALL VERIFY EXISTING HEIGHT AND COORDINATE ALL NEW WORK INCLUDING THE RELOCATION OF EXISTING LIGHT FIXTURES TO BE REUSED.

LEGEND



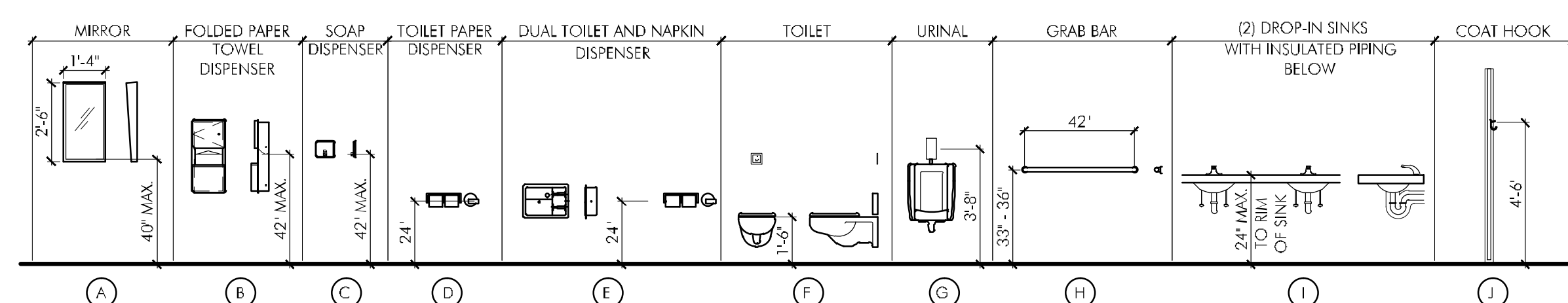
GENERAL NOTES:

1. REFER TO SHEET A7-01 FOR FINISH SCHEDULE

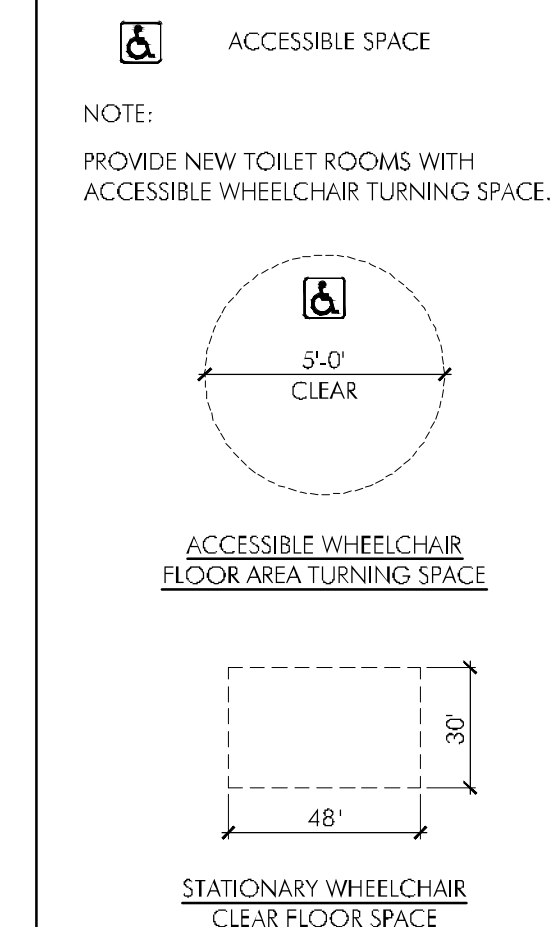


2 GYM TOILET ROOMS REFLECTED CEILING PLAN

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



ACCESSIBILITY LEGEND

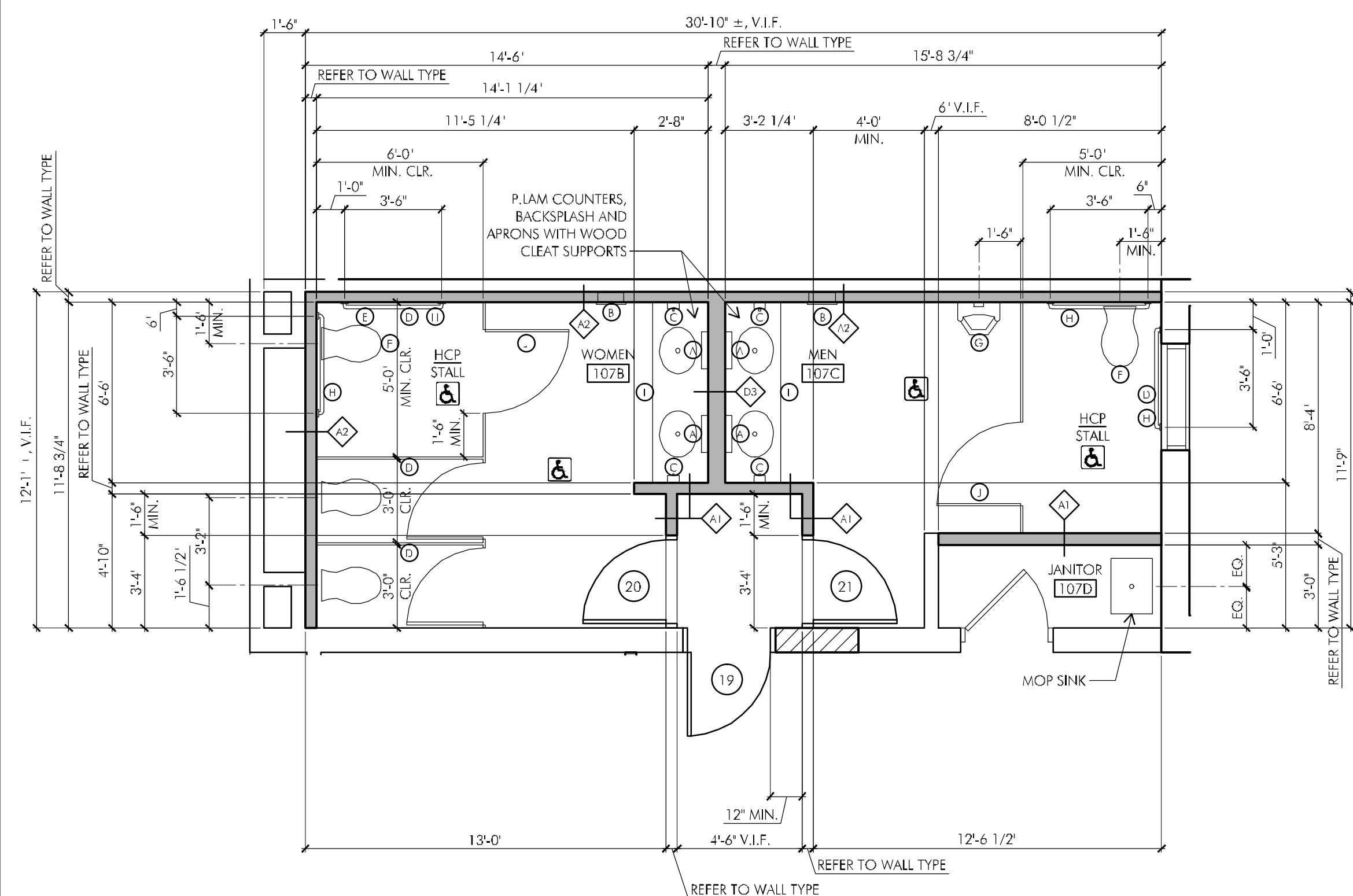


3 TYPICAL FIXTURE/ACCESSORY ELEVATIONS AND CLEAR SPACE SYMBOLS

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

1 ENLARGED PARTIAL GYM TOILET ROOM PLAN

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



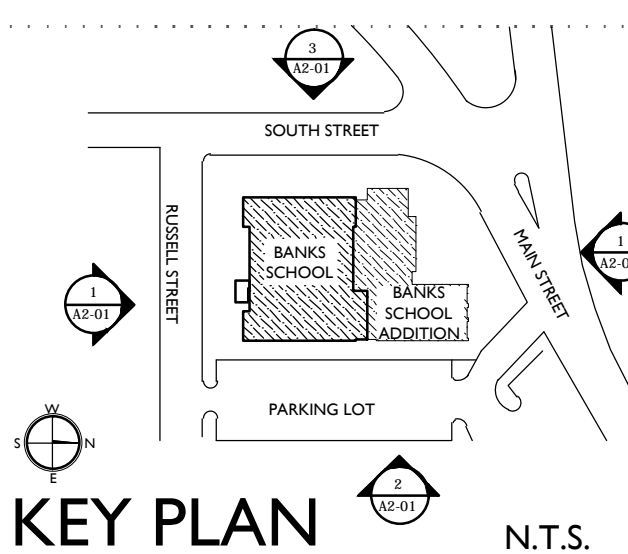
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**ENLARGED
BATHROOM PLANS
AND DETAILS**

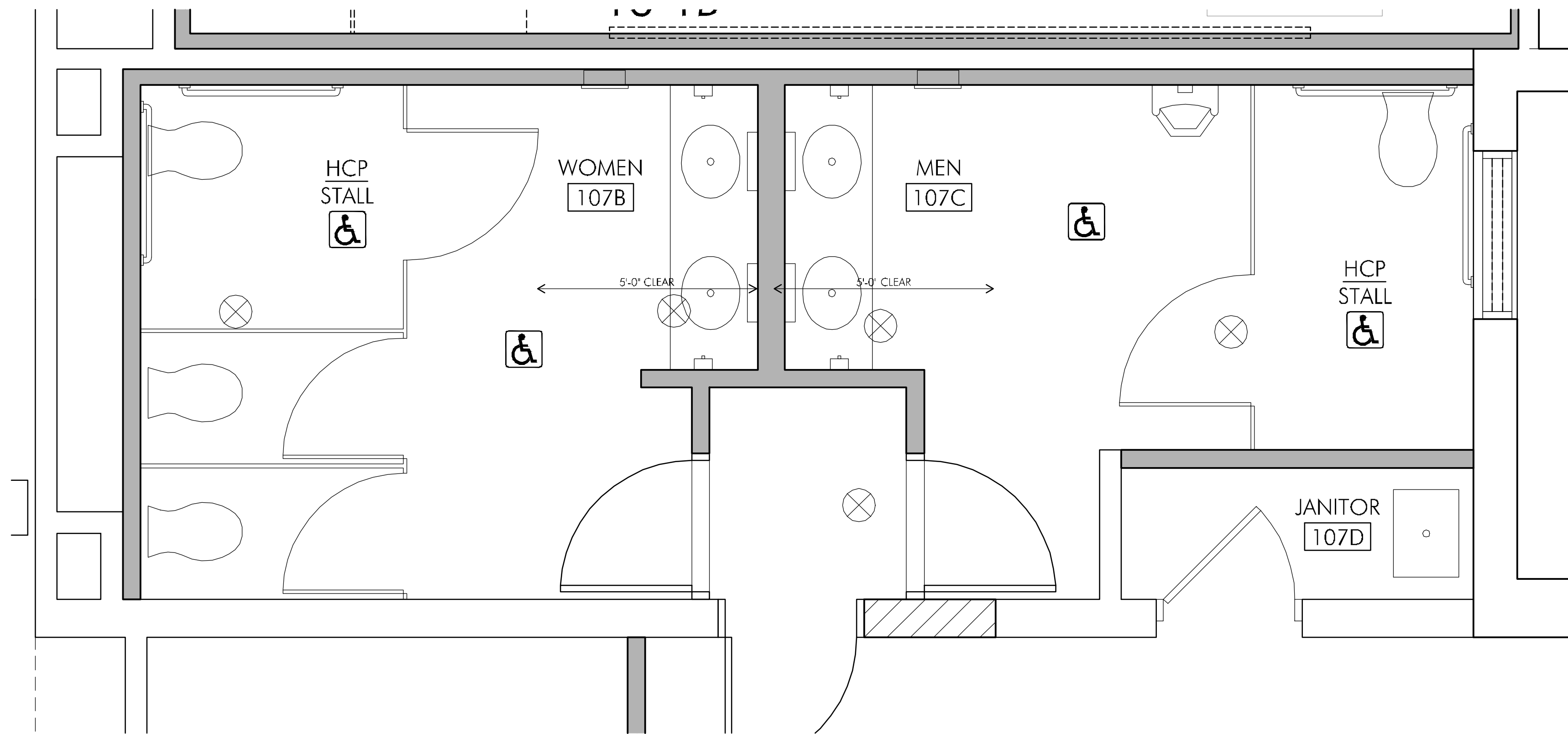


Revisions:

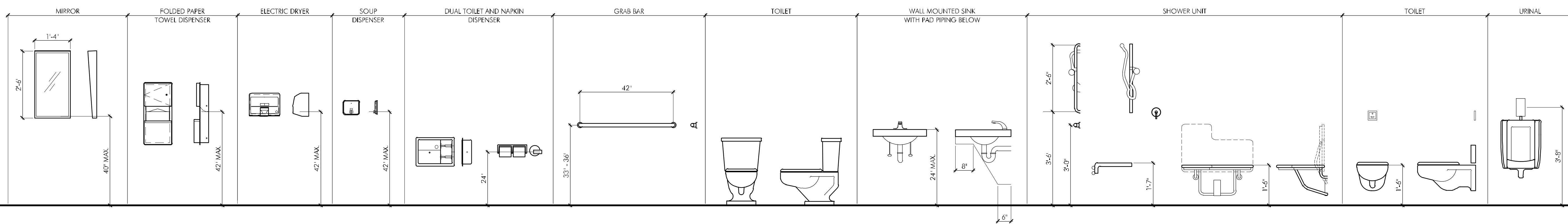
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: DJB
Scale: AS NOTED

AI-12



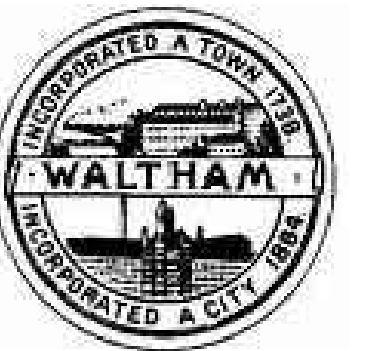
ENLARGED BATHROOM PLAN
SCALE: 1/2"=1'-0"



**TYPICAL
ALTERNATE ACCESSIBLE STALL PLAN**
SCALE: 1/2"=1'-0"

P:\2010\10025-A\Sheet\1st FLOOR (Phase 3)\10025-A AI-12.dwg Pdr: 08/2012 - 9/18 am BOSBORNE

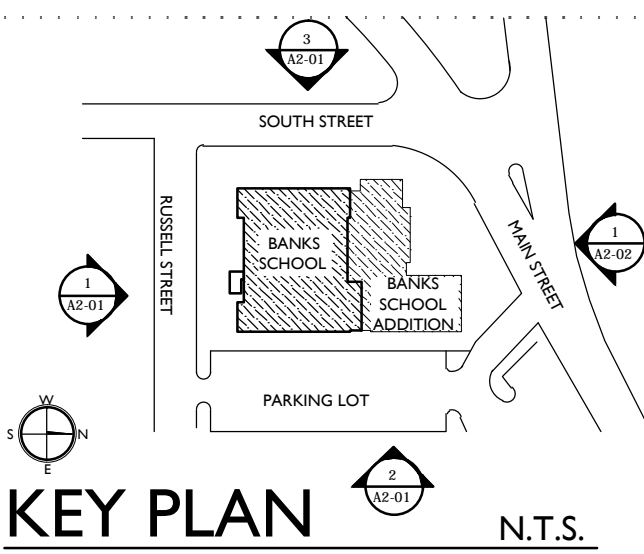
PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

BUILDING
ELEVATIONS



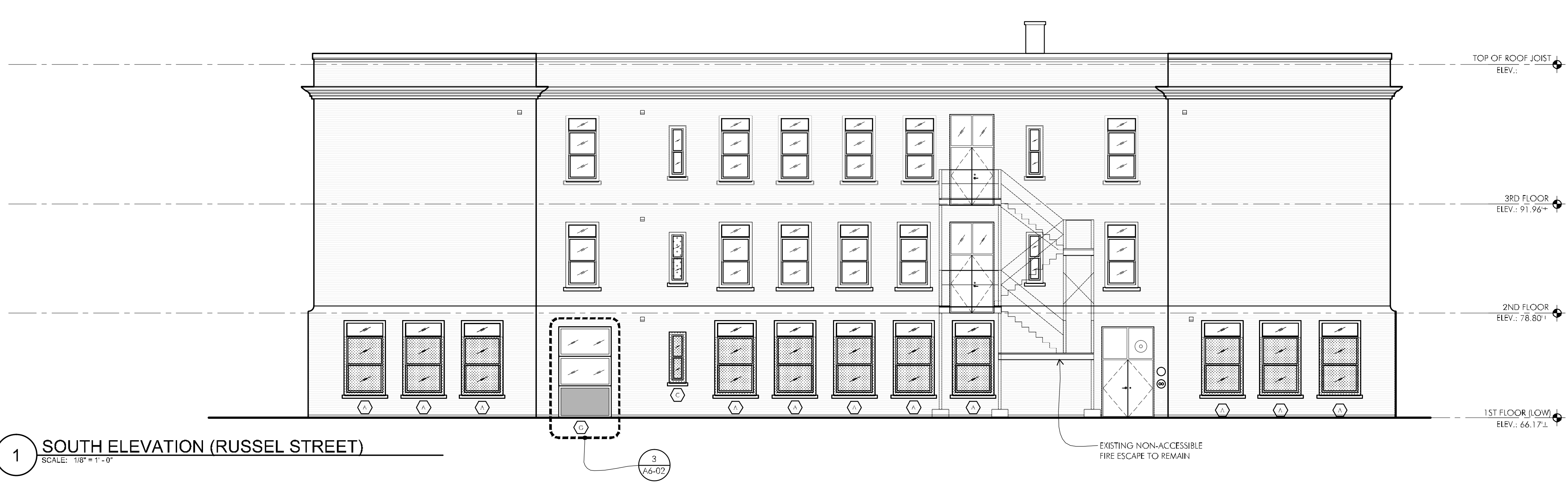
Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: LR,BLO
Scale: AS NOTED

A2-01

1 SOUTH ELEVATION (RUSSEL STREET)
SCALE: 1/8" = 1'-0"



LEGEND

- NEW STUD PARTITION
- ▨ MASONRY INFILL
- ◇ PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
- ⬡ WINDOW TAG, REFER TO A6-01.
- F.E.C. SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
- ⊙ DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE
- ▨ REPLACEMENT GLASS, TYPICAL
- ▨ PROVIDE AND INSTALL INSULATED METAL PANEL AND SEAL ALL PENETRATIONS.

2 EAST ELEVATION (PARKING LOT SIDE)
SCALE: 1/8" = 1'-0"



3 PARTIAL WEST ELEVATION (SIDE)
SCALE: 1/8" = 1'-0"



P:\2010\10025-A\Sheet\1st Floor (Phase 3)\10025-A A2-01.dwg Pdr: 07.2012 - 4:57 pm BOSBORNE

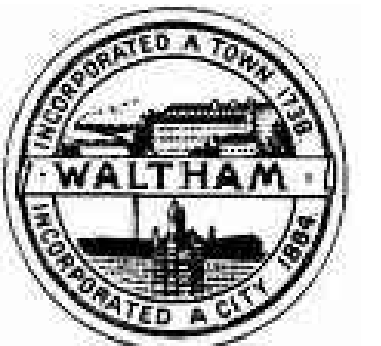
LEGEND	
	NEW STUD PARTITION
	MASONRY INFILL
	PARTITION TYPE IDENTIFICATION. REFER TO A5-01 FOR PARTITION TYPE DETAILS AND NOTES
	WINDOW TAG, REFER TO A6-01.
	SURFACE-MOUNTED FIRE EXTINGUISHER CABINET EQUIPPED WITH TYPE A-2 FIRE EXTINGUISHER PER NFPA-10
	DOOR TAG REFER TO A7-01 FOR DOOR SCHEDULE
	REPLACEMENT GLASS, TYPICAL
	PROVIDE AND INSTALL INSULATED METAL PANEL AND SEAL ALL PENETRATIONS.



CBI
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BOSTON, MA 02127
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www.cbiconsultinginc.com

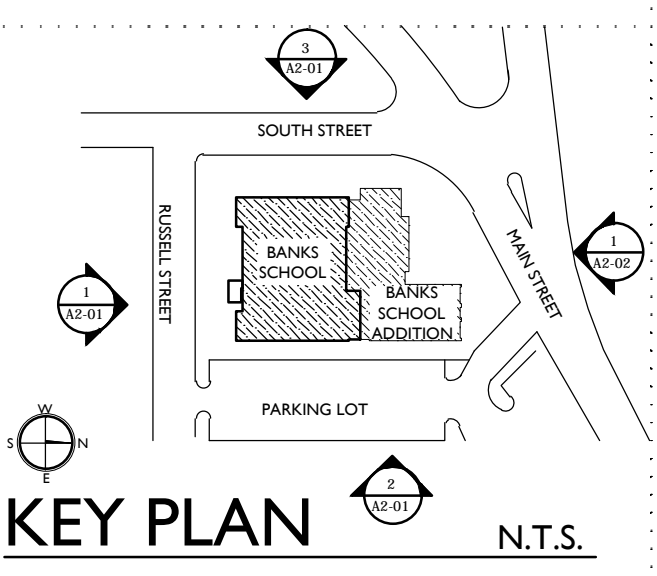
PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

BUILDING
ELEVATIONS



Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: LR,BLO
Scale: AS NOTED

A2-02

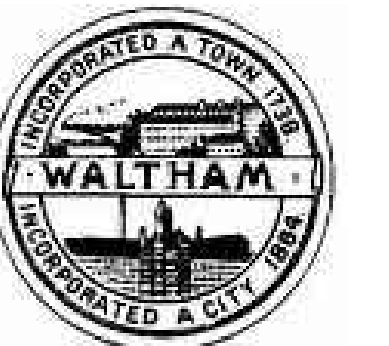


1 NORTH ELEVATION (MAIN STREET)
SCALE: 1/8" = 1'-0"

REPLACE EXISTING INSULATING
GLASS WITH OBSCURE GLASS AT
MENS' ROOM

P:\2010\10025-A\Streets\1st FLOOR (Phase 3)\10025-A A2-02.dwg Plot: 06, 2012 - 8:23 pm BOSBORNE

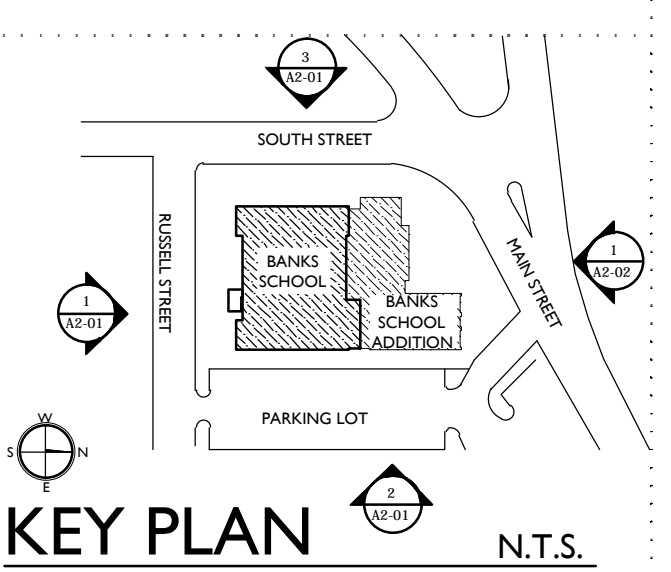
PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

STAIRWELL 3
FIRST FLOOR PLAN
AND SECTION

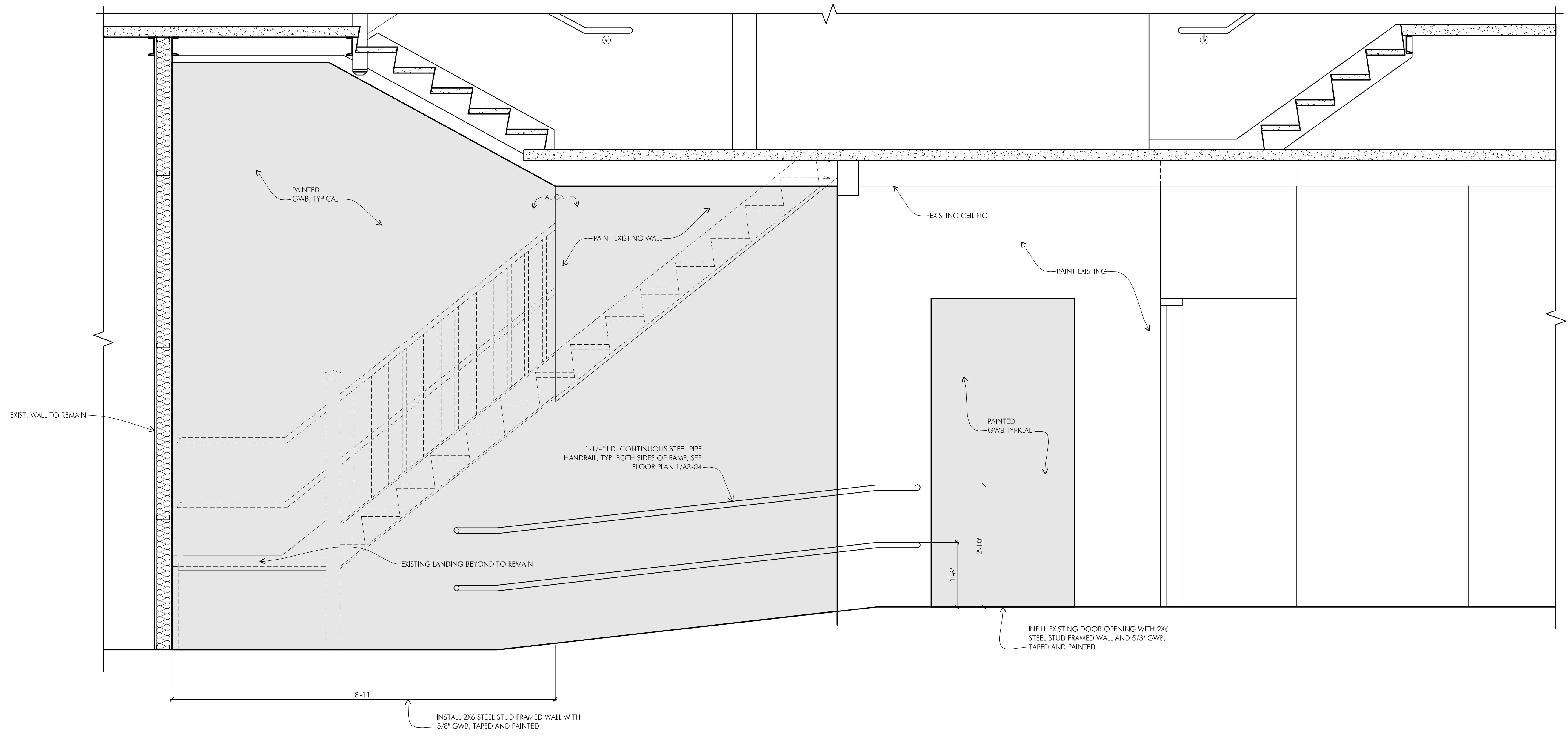


Revisions:

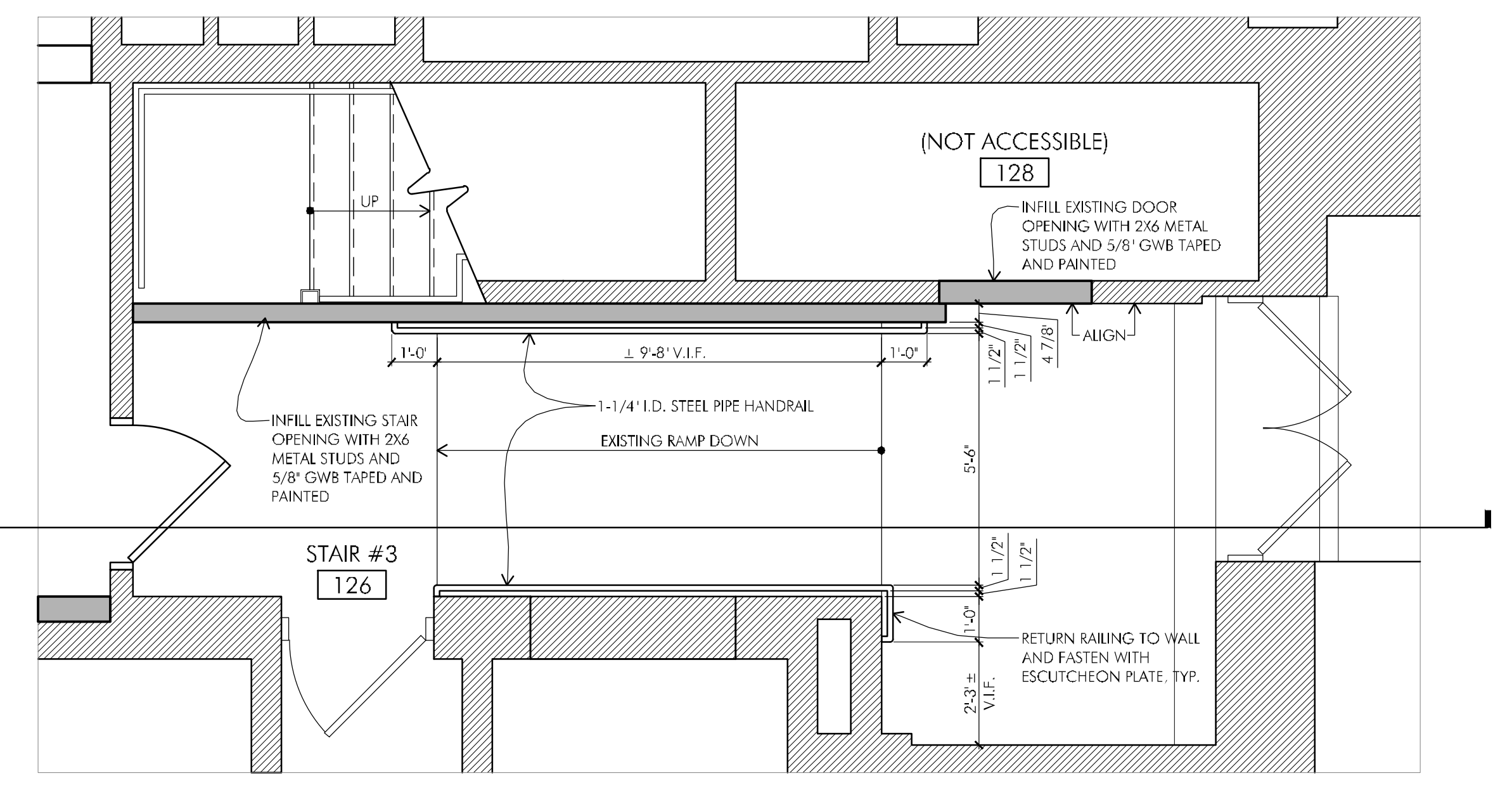
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: LR,BLO
Scale: AS NOTED

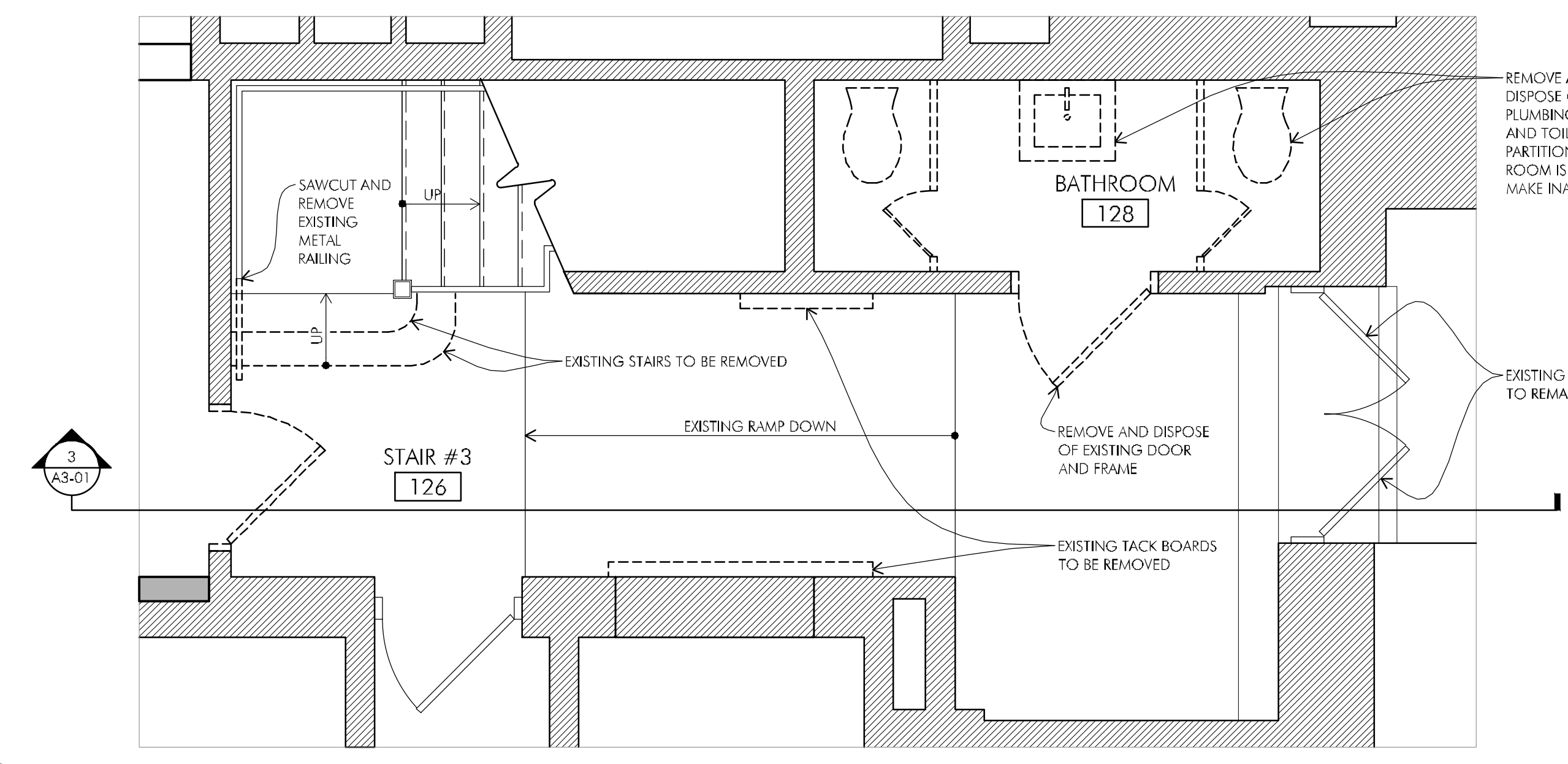
A3-01



3 STAIR SECTION AT STAIRWELL #3
SCALE: 3/4"=1'-0"

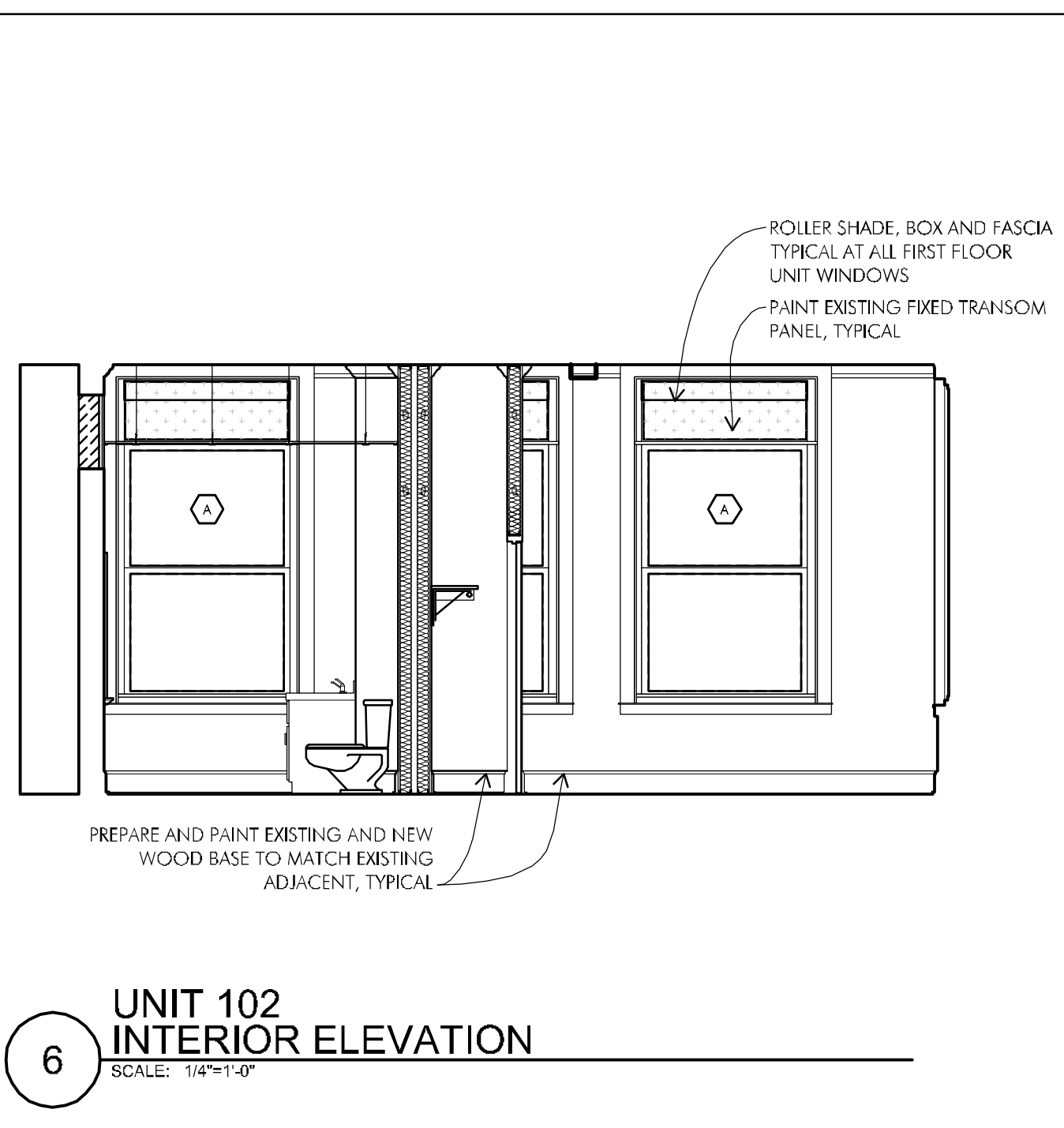


2 FIRST FLOOR PLAN
SCALE: 3/8"=1'-0"

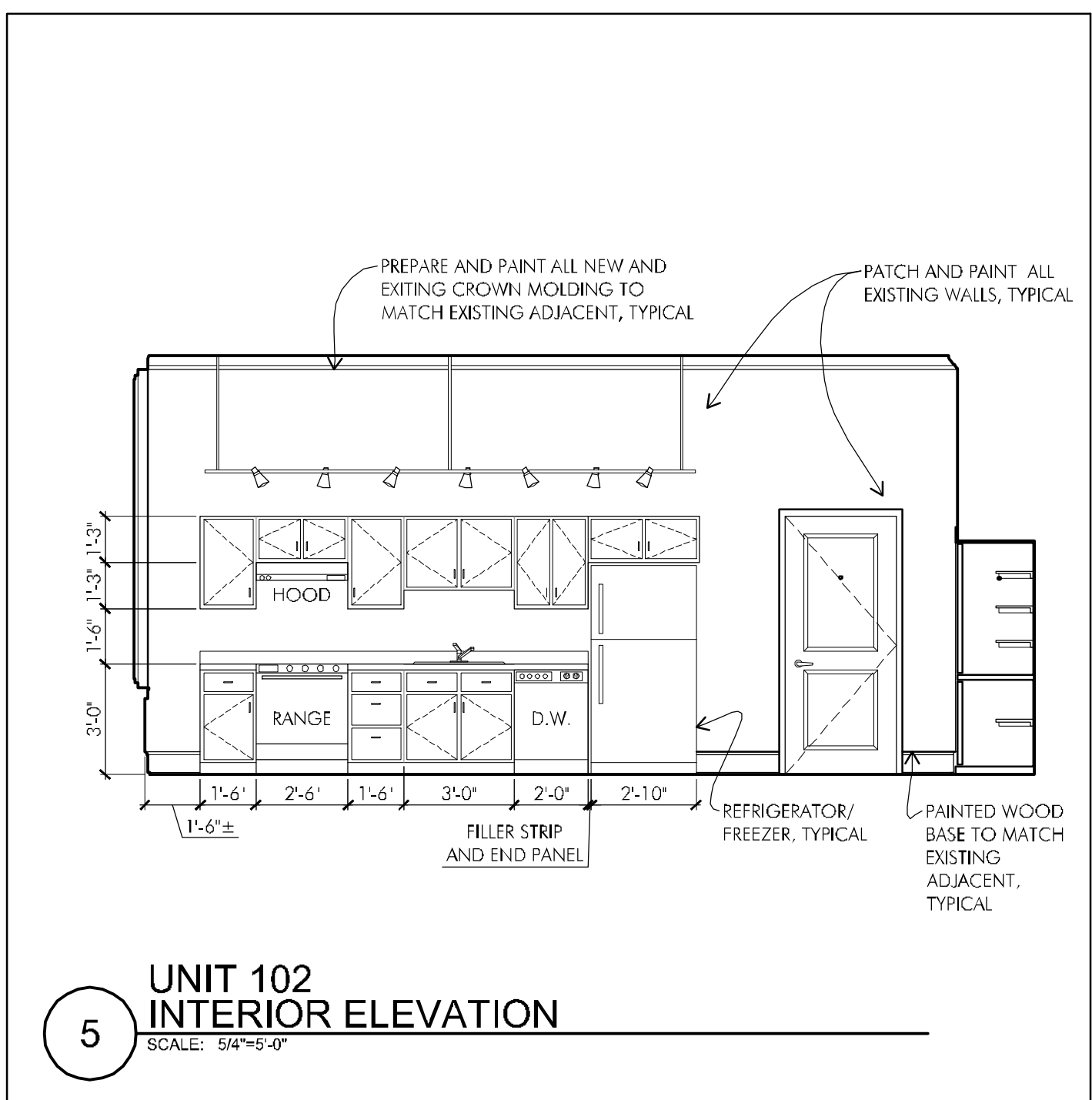


1 FIRST FLOOR DEMOLITION PLAN
SCALE: 3/8"=1'-0"

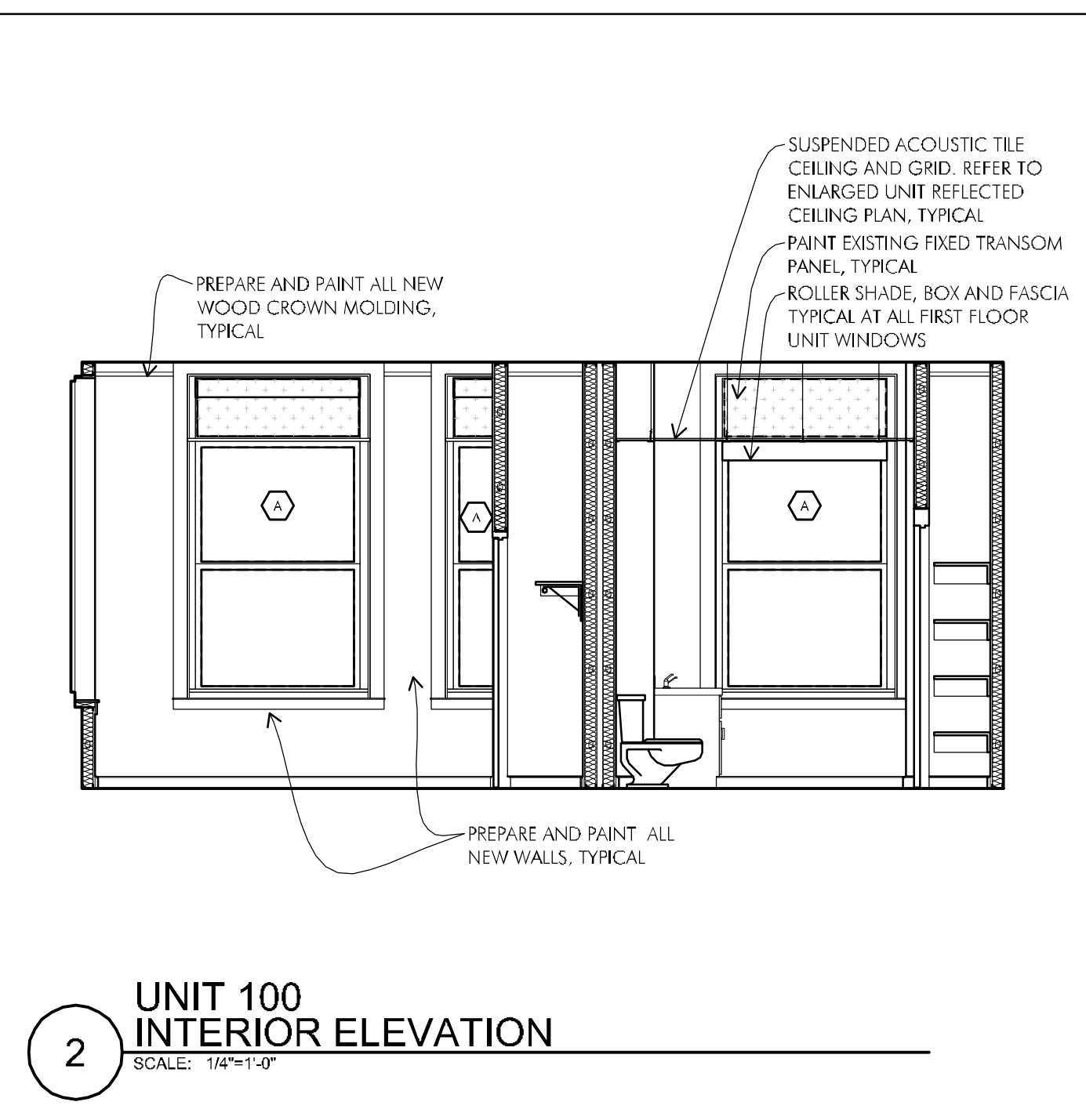
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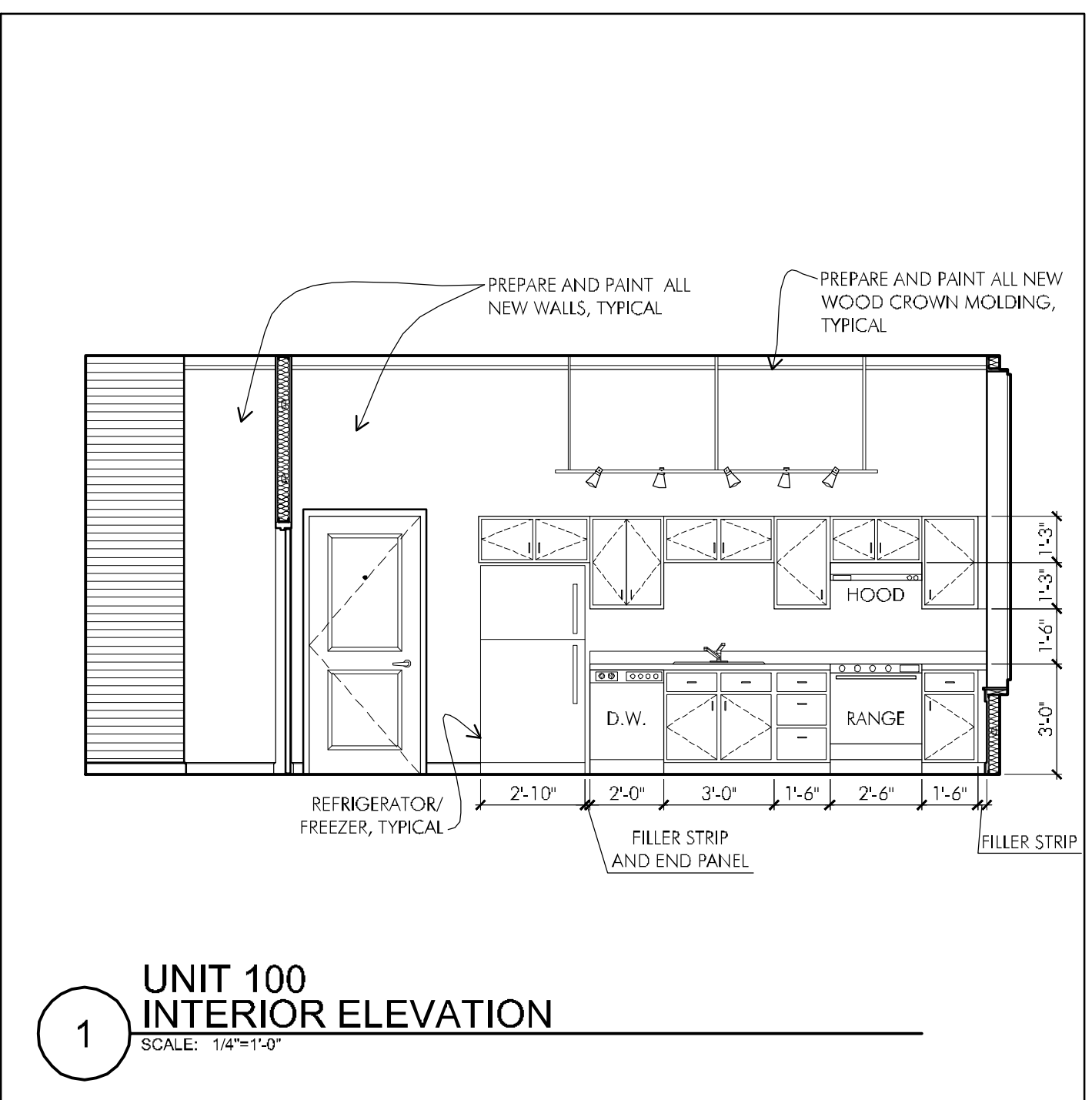
6 UNIT 102 INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



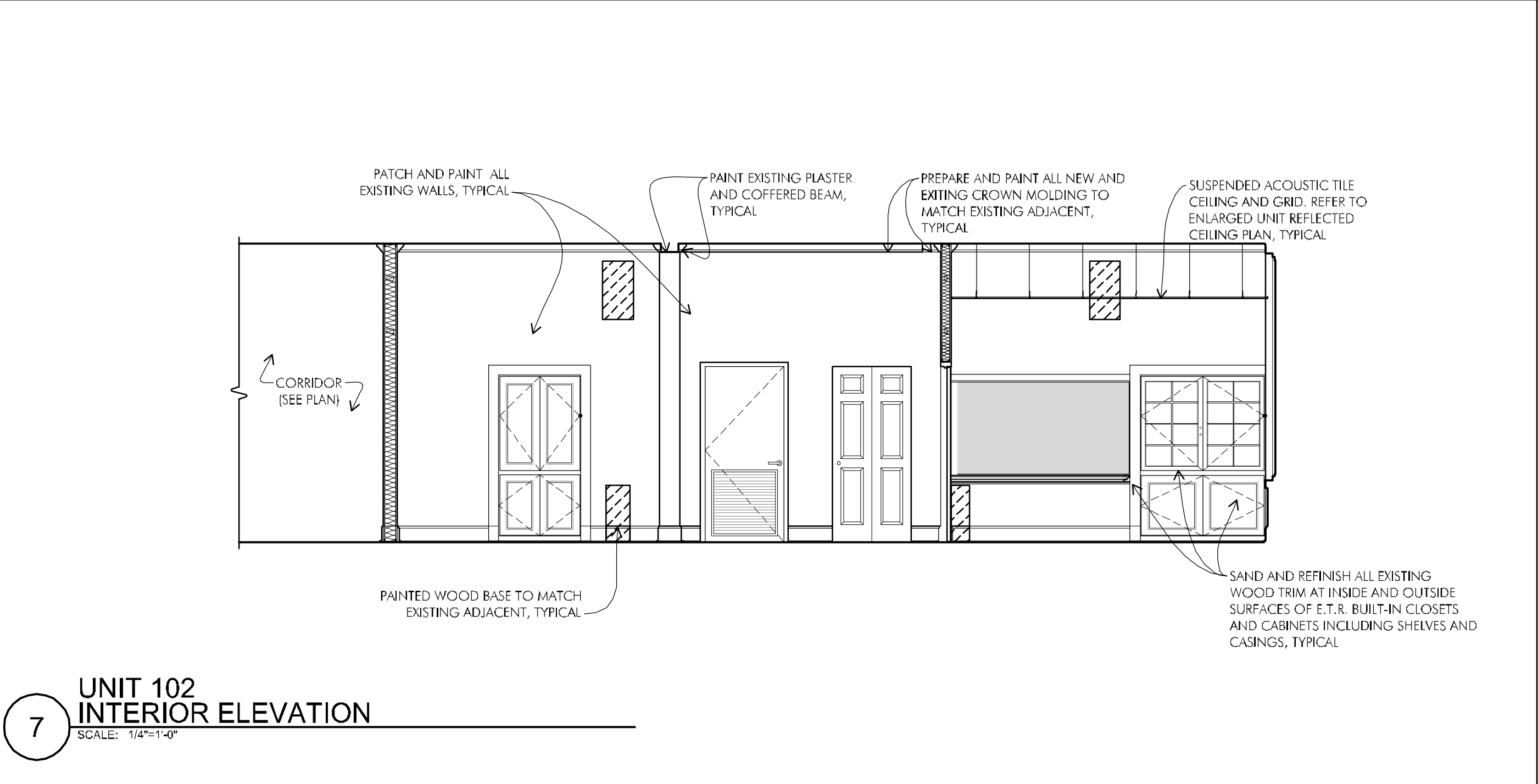
5 UNIT 102 INTERIOR ELEVATION
SCALE: 3/4"=5'-0"



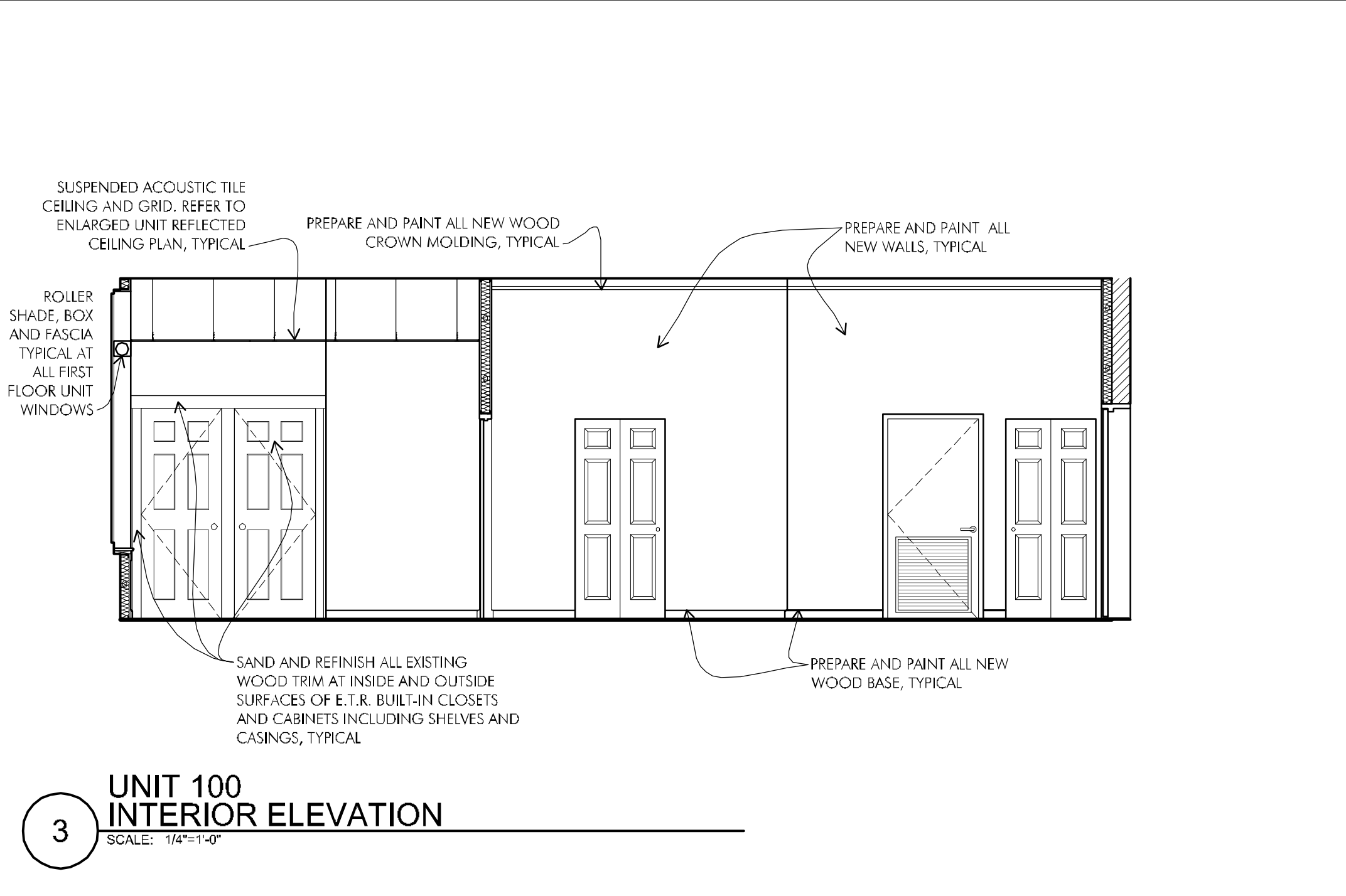
2 UNIT 100 INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



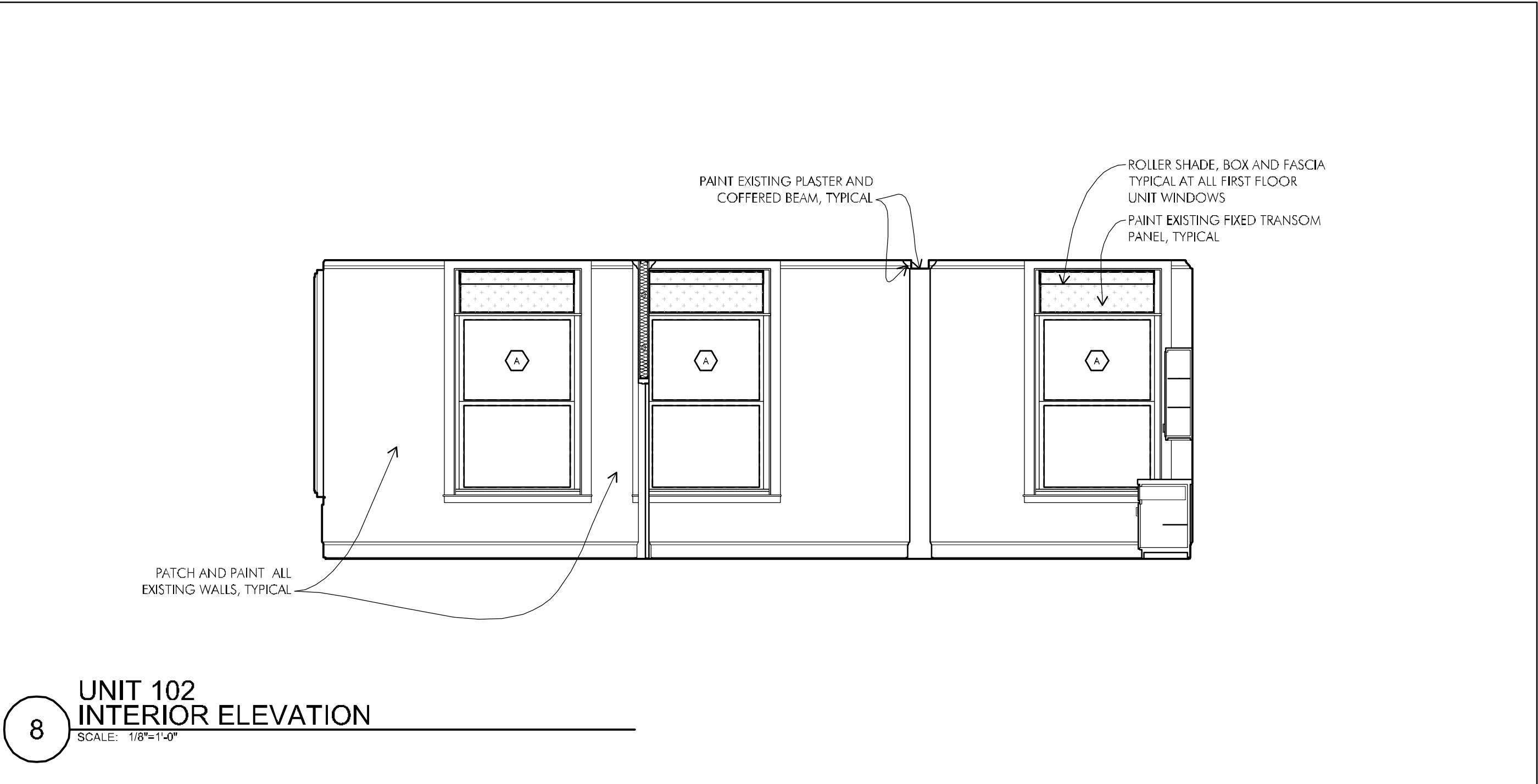
1 UNIT 100 INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



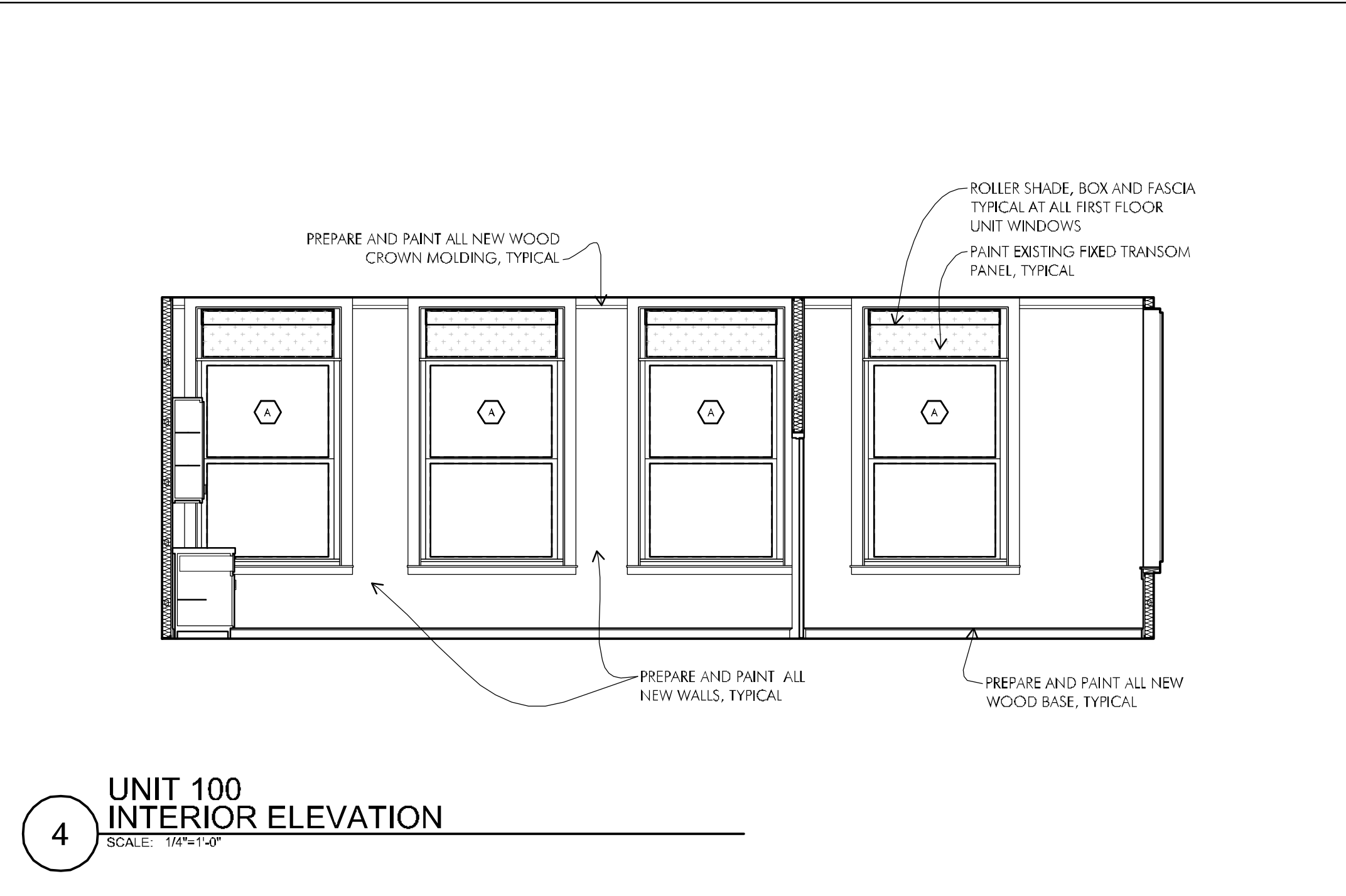
7 UNIT 102 INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



3 UNIT 100 INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



8 UNIT 102 INTERIOR ELEVATION
SCALE: 1/8"=1'-0"



4 UNIT 100 INTERIOR ELEVATION
SCALE: 1/8"=1'-0"

INTERIOR ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING WINDOW FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL. REMOVE EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION.
- PAINT EXISTING CHALK BOARD TO REMAIN
- PAINT EXISTING TACK BOARD TO REMAIN
- PROVIDE BLOWN-IN INSULATION TO COMPLETELY FILL THE ENTIRE EXISTING WALL CAVITY BETWEEN ALL STUDS AND BRACING, TYPICAL AT EXISTING STUD PARTY WALLS TO REMAIN
- WALL TO BE INFILLED. ALL MATERIALS AND FINISHES TO MATCH EXISTING ADJACENT, TYPICAL
- EXISTING POP CORN WALL FINISH TEXTURE TO BE MATCHED AT NEW ADJACENT WALL AND FINISHES, TYPICAL THROUGHOUT

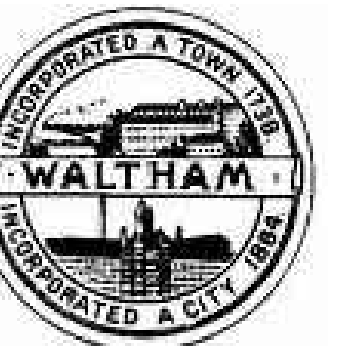


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www.cbiconsultinginc.com

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**

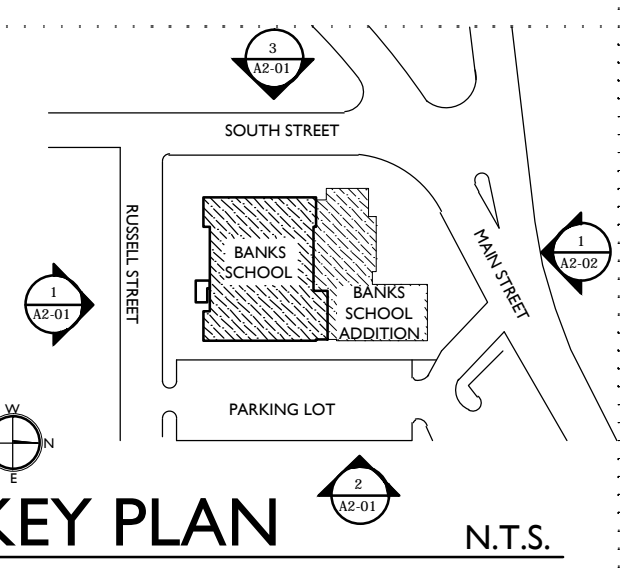
948 MAIN STREET
WALTHAM, MA

CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA



Drawing Title:

**UNITS 100 & 102
INTERIOR
ELEVATIONS**



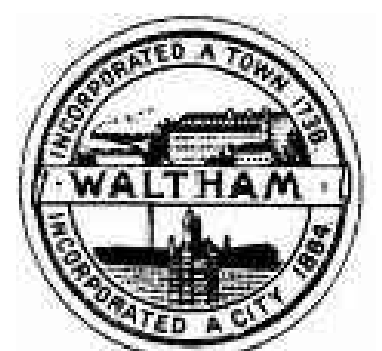
Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

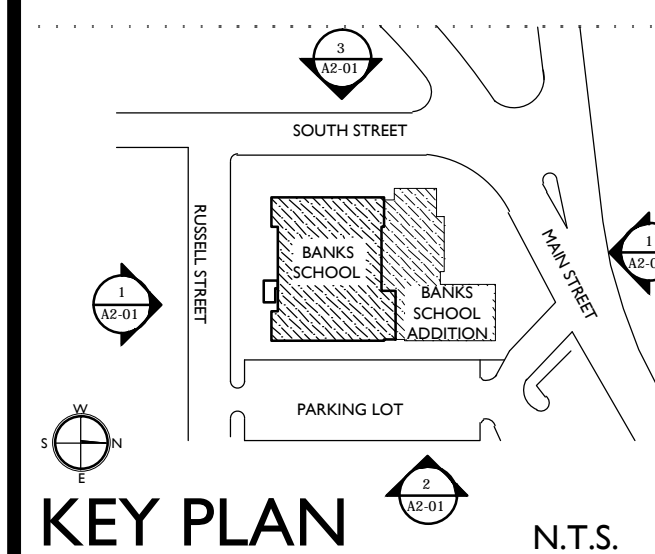
A4-01

P:\2010\10025-A\Streets\1st Floor (Phase 3)\10025-A A4-01.dwg Plot: 07, 2012, 3:26 pm BOSBORNE



Drawing Title:

UNIT 101
INTERIOR
ELEVATIONS

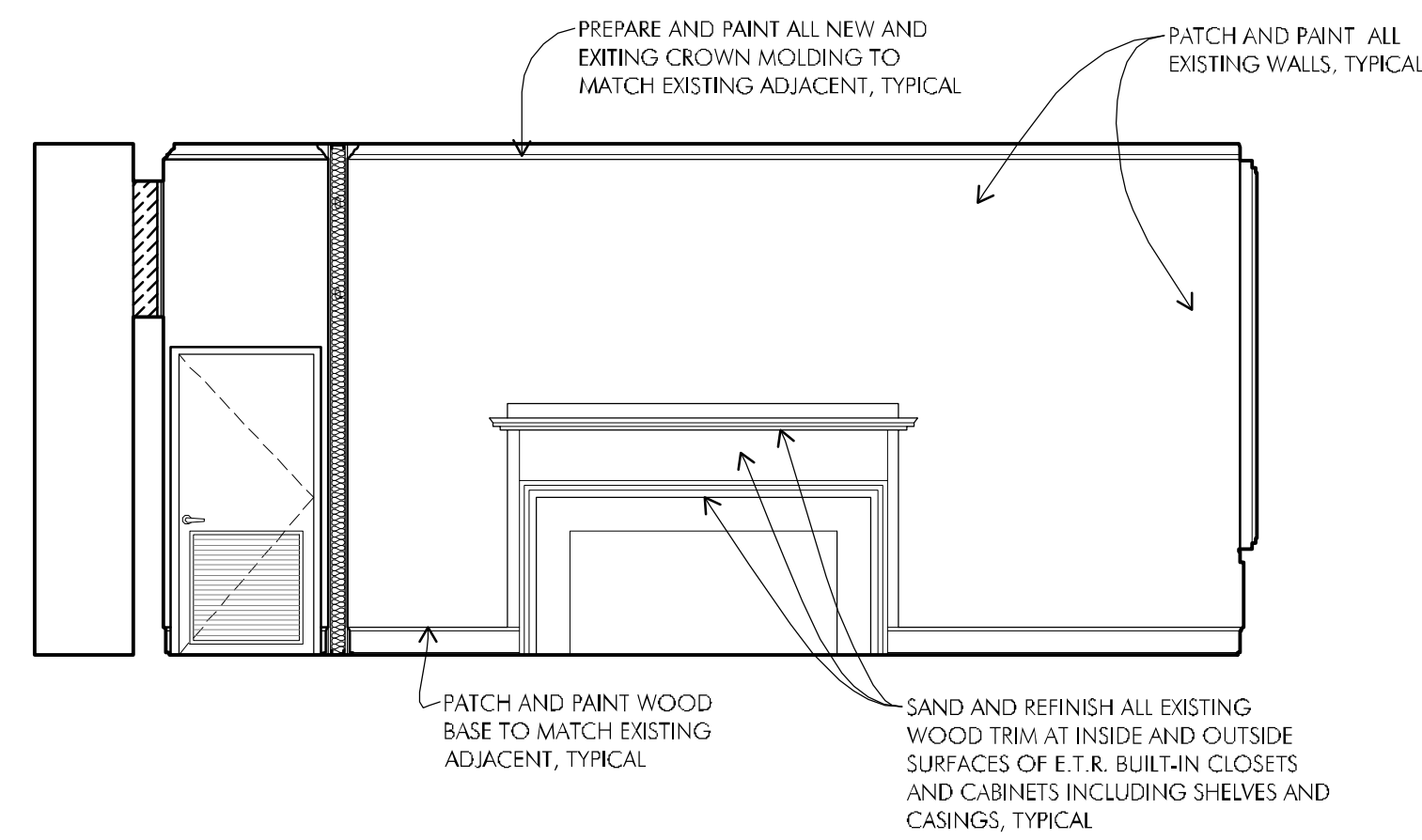


Revisions:

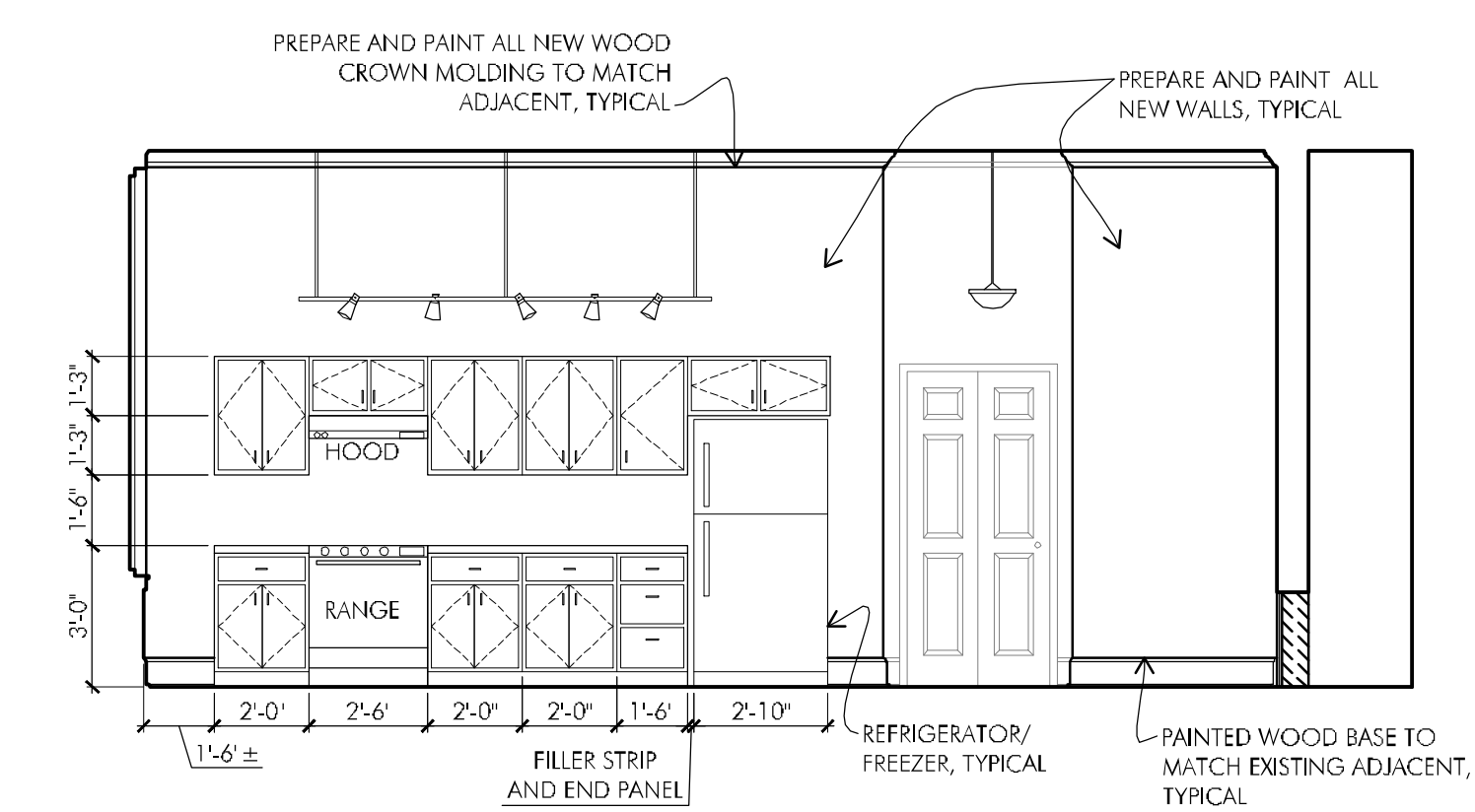
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

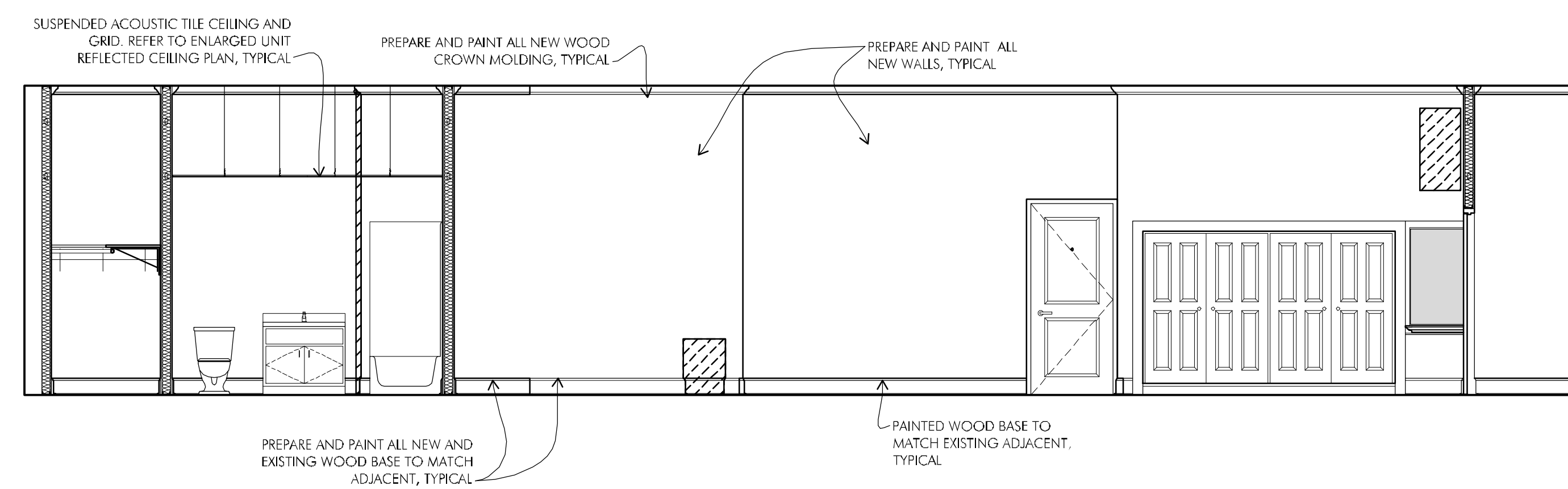
A4-02



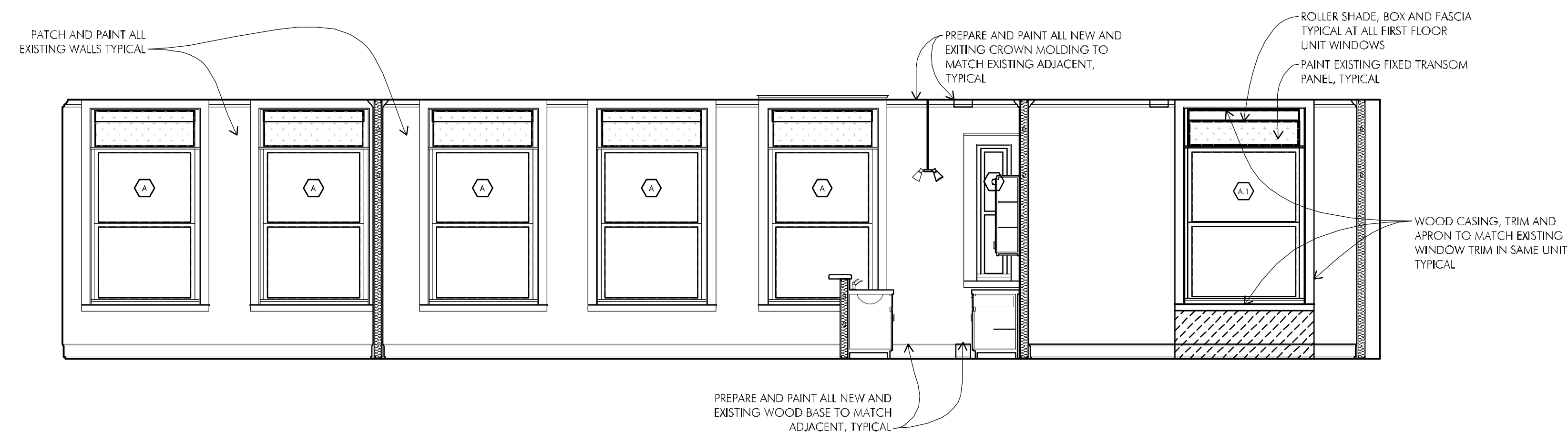
2
UNIT 101
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



1
UNIT 101
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



3
UNIT 101
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"

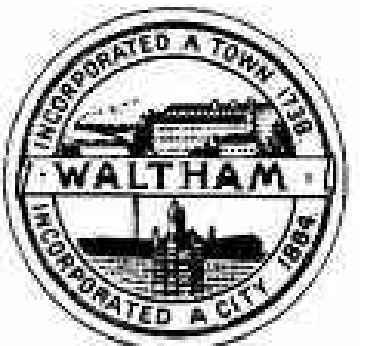


4
UNIT 101
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"

INTERIOR ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING WINDOW FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL. REMOVE EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION.
- PAINT EXISTING CHALK BOARD TO REMAIN
- PAINT EXISTING TACK BOARD TO REMAIN
- PROVIDE BLOWN-IN INSULATION TO COMPLETELY FILL THE ENTIRE EXISTING WALL CAVITY BETWEEN ALL STUDS AND BRACING, TYPICAL AT EXISTING STUD PARTY WALLS TO REMAIN
- WALL TO BE INFILLED. ALL MATERIALS AND FINISHES TO MATCH EXISTING ADJACENT, TYPICAL
- EXISTING POP CORN WALL FINISH TEXTURE TO BE MATCHED AT NEW ADJACENT WALL AND FINISHES, TYPICAL THROUGHOUT

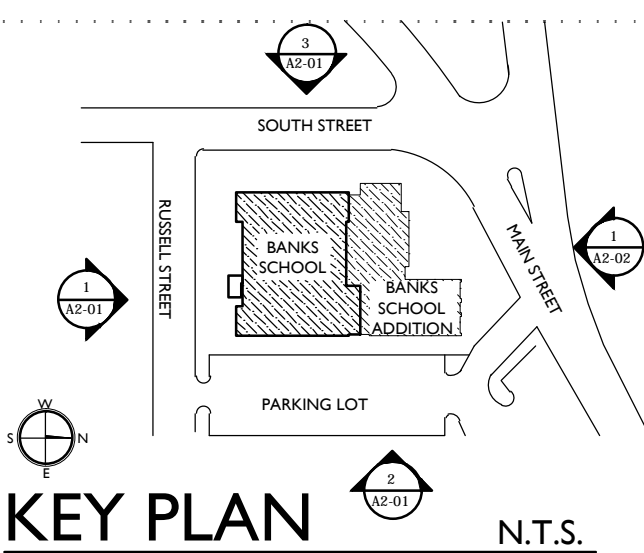
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNIT 103
INTERIOR
ELEVATIONS**

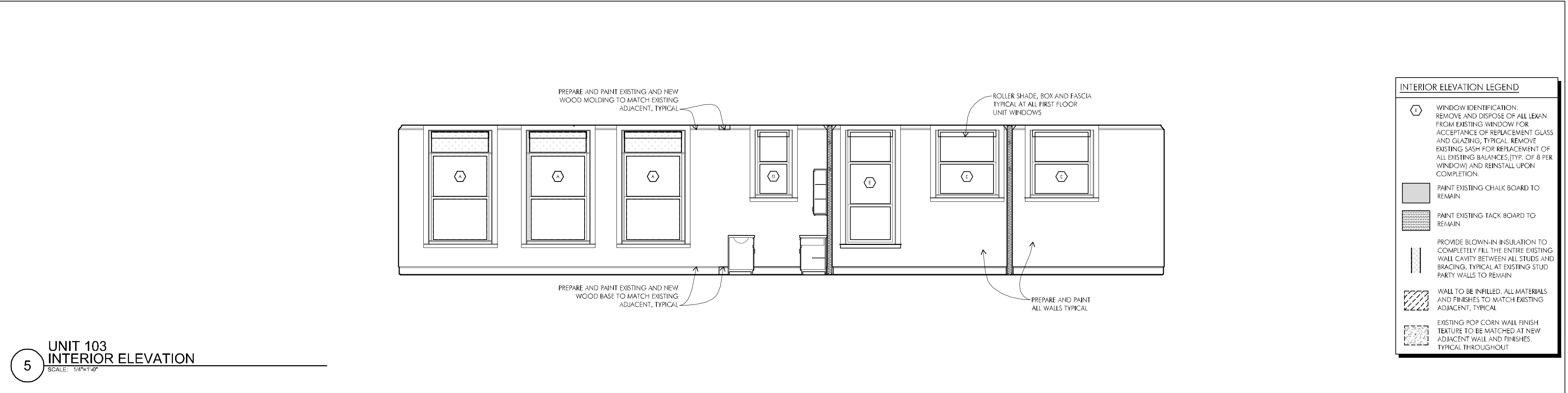
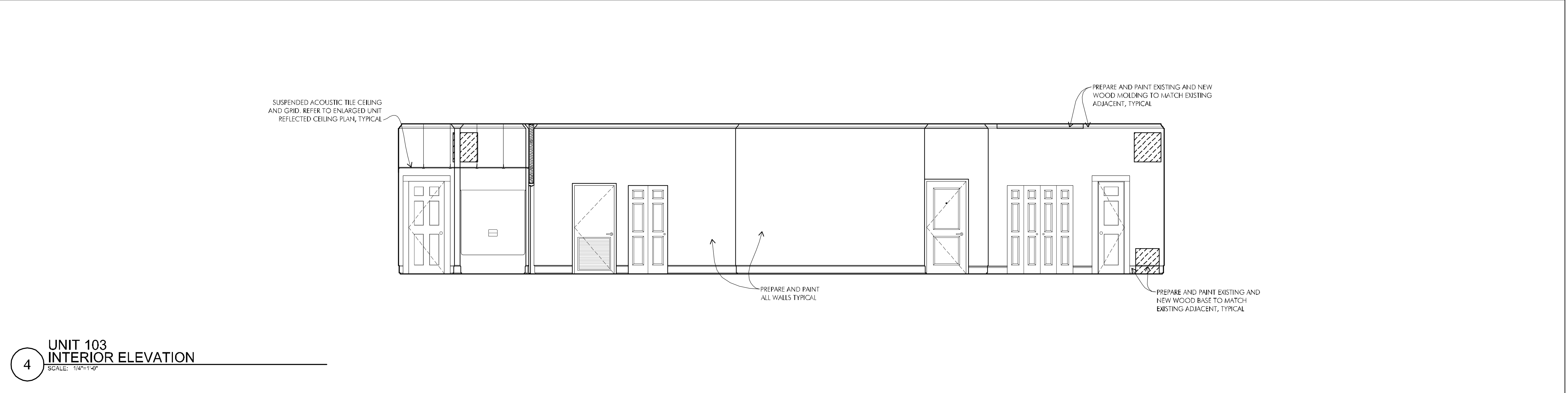
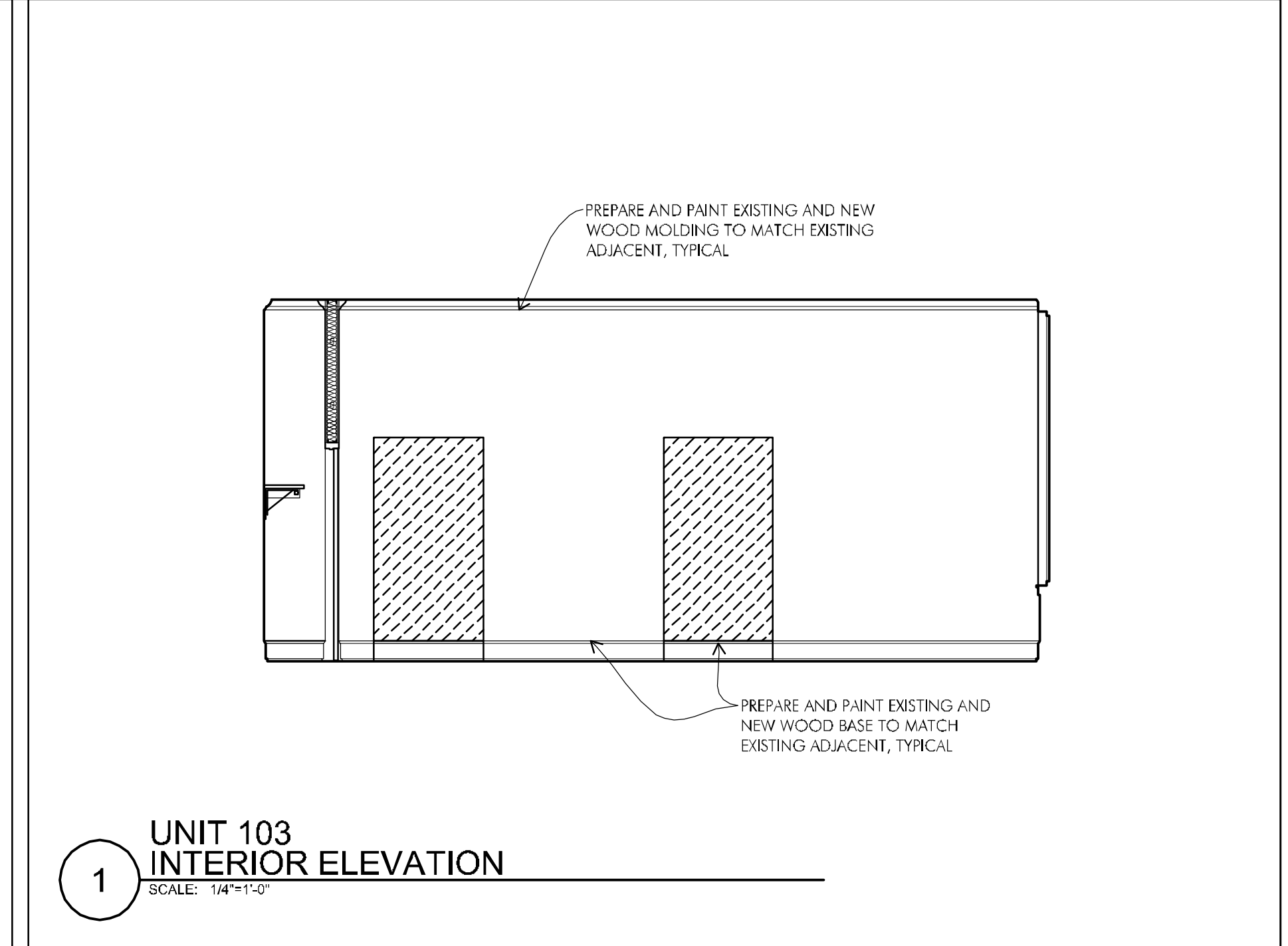
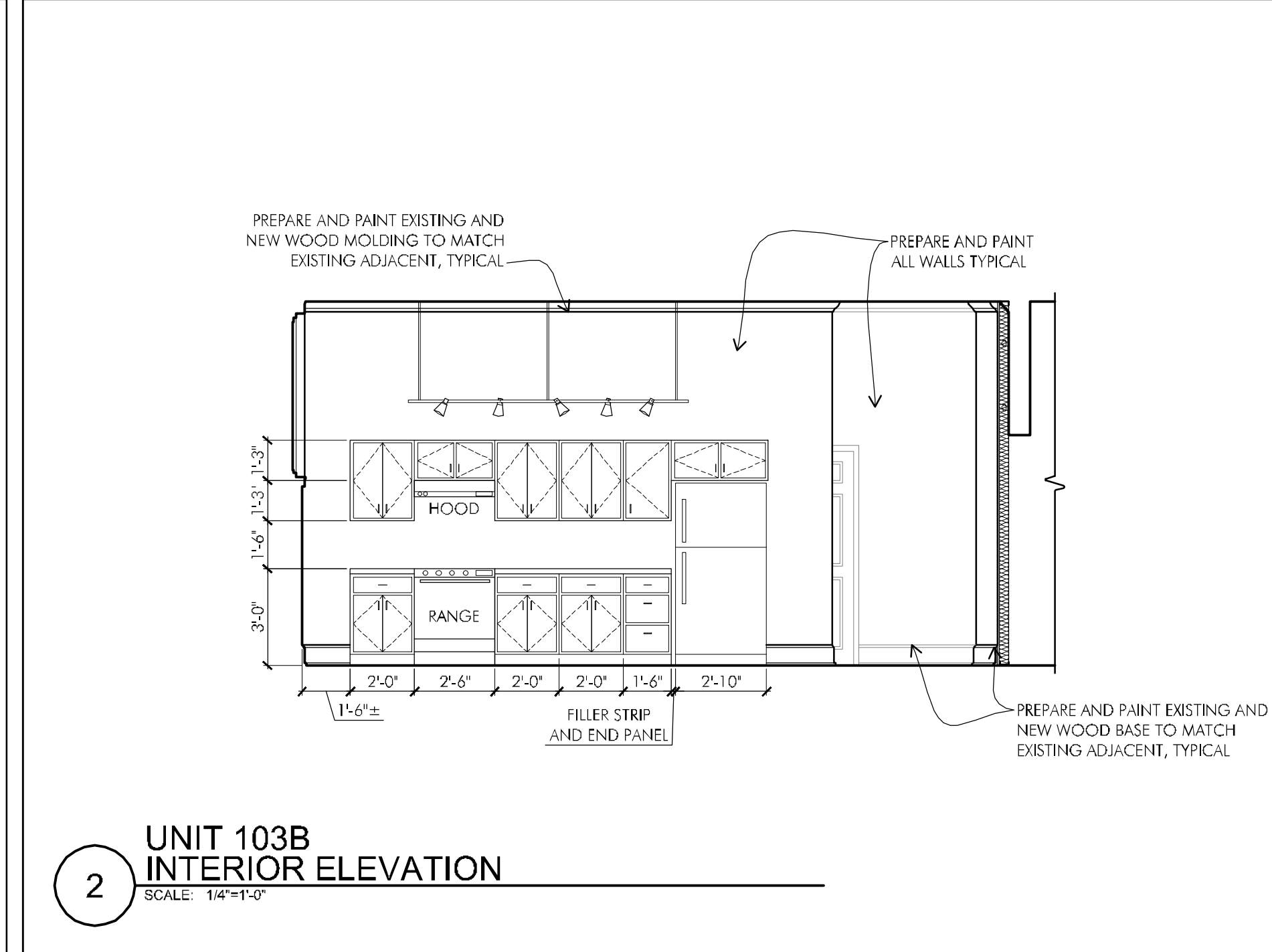
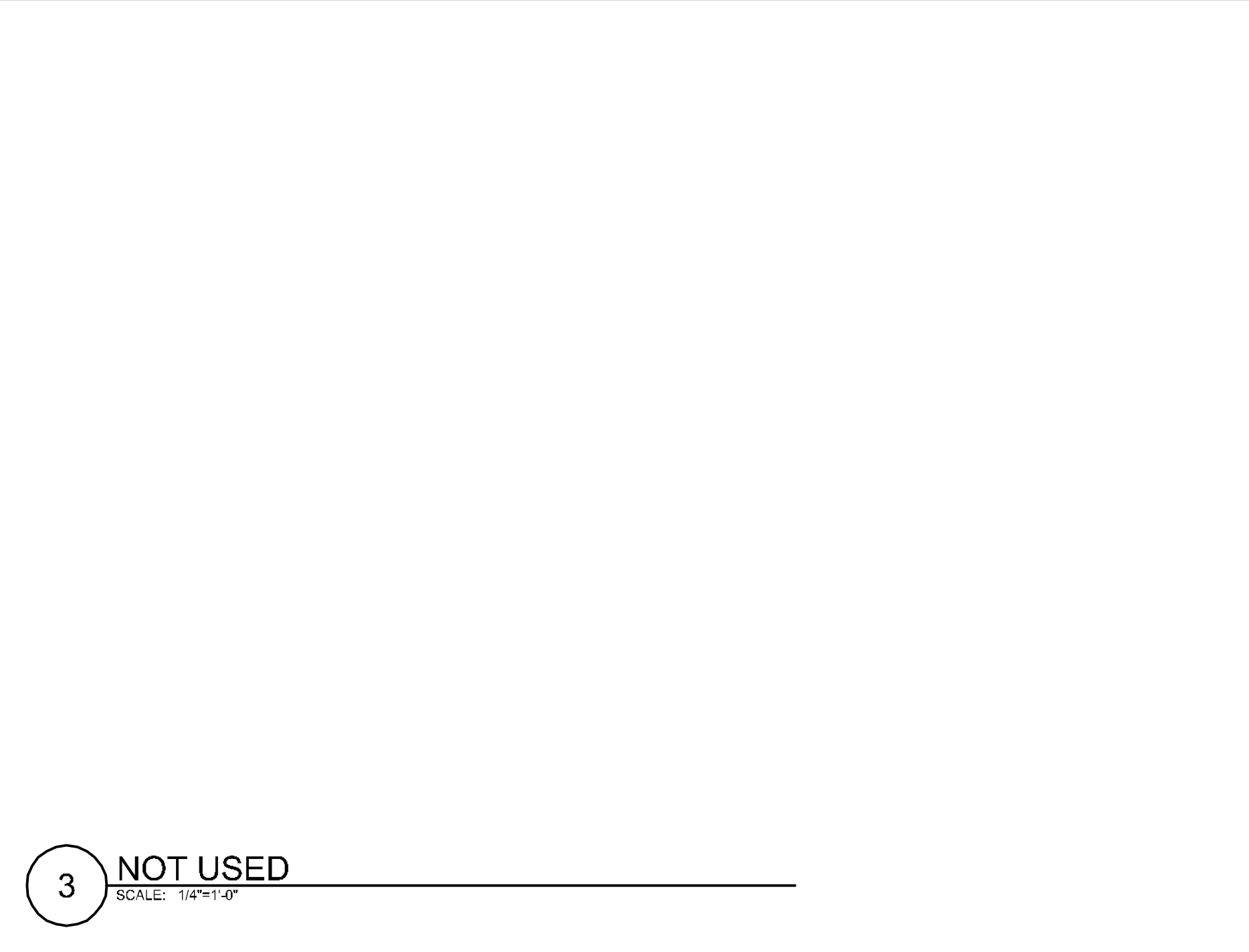


Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

A4-03



INTERIOR ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEAN FROM EXISTING WINDOW FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL. REMOVE EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION.
- PAINT EXISTING CHALK BOARD TO REMAIN
- PAINT EXISTING TACK BOARD TO REMAIN
- PROVIDE BLOWN-IN INSULATION TO COMPLETELY FILL THE ENTIRE EXISTING WALL CAVITY BETWEEN ALL STUDS AND BRACING, TYPICAL AT EXISTING STUD PARTY WALLS TO REMAIN
- WALL TO BE INFILLED. ALL MATERIALS AND FINISHES TO MATCH EXISTING ADJACENT, TYPICAL
- EXISTING POP CORN WALL FINISH TEXTURE TO BE MATCHED AT NEW ADJACENT WALL AND FINISHES, TYPICAL THROUGHOUT

P:\2010\10025-A\Streets\1st Floor (Phase 3)\10025-A A4-03.dwg Pdr: 08, 2012, 9:20 am BOSBORNE

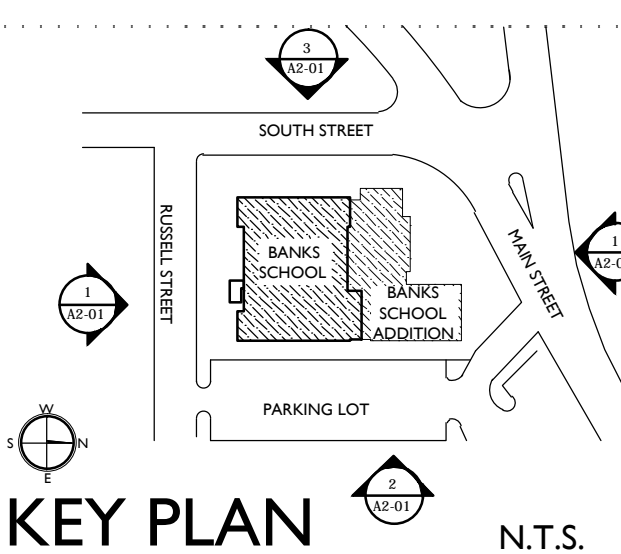
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNITS 104 & 105
INTERIOR
ELEVATIONS**

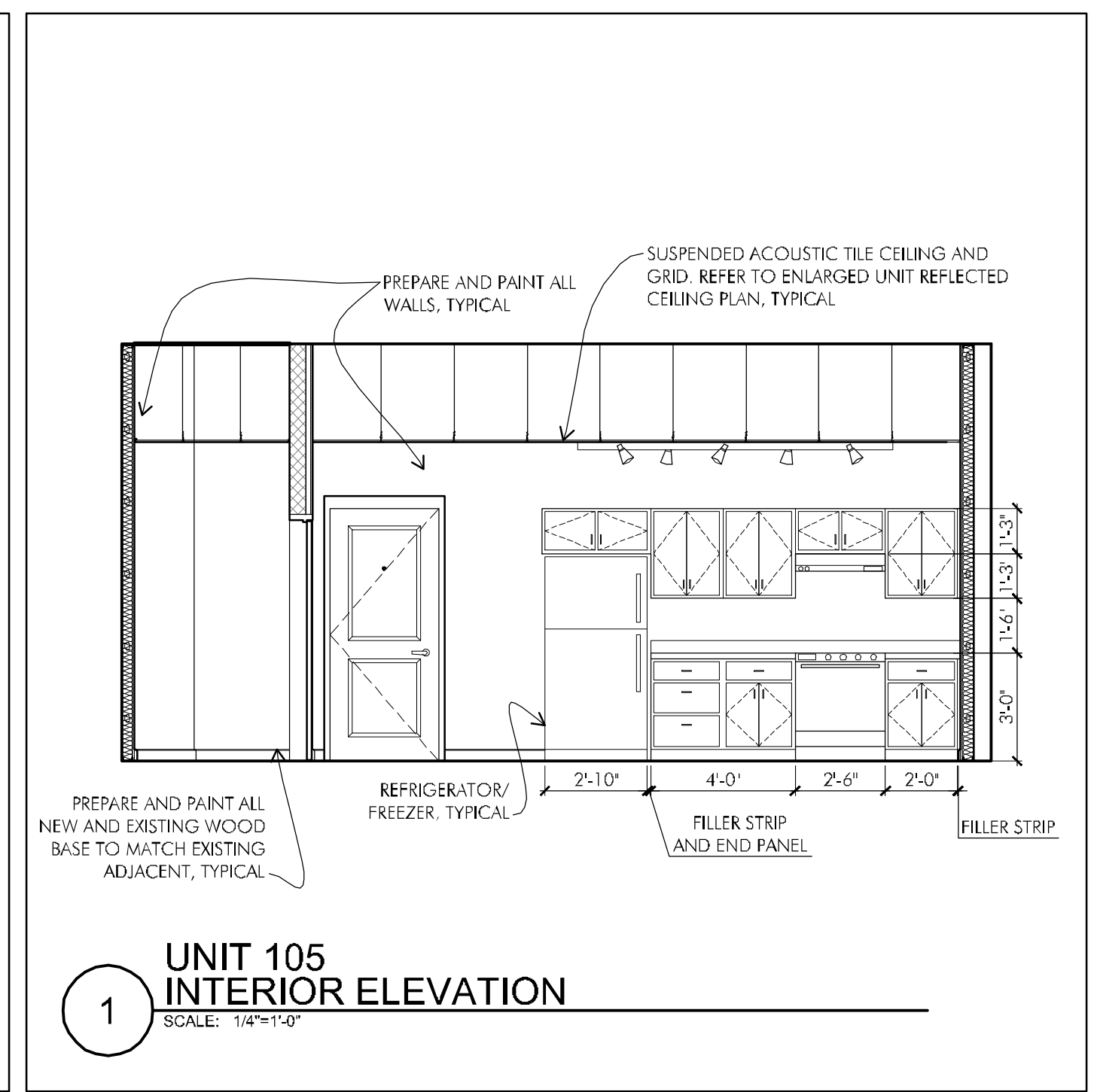


Revisions:

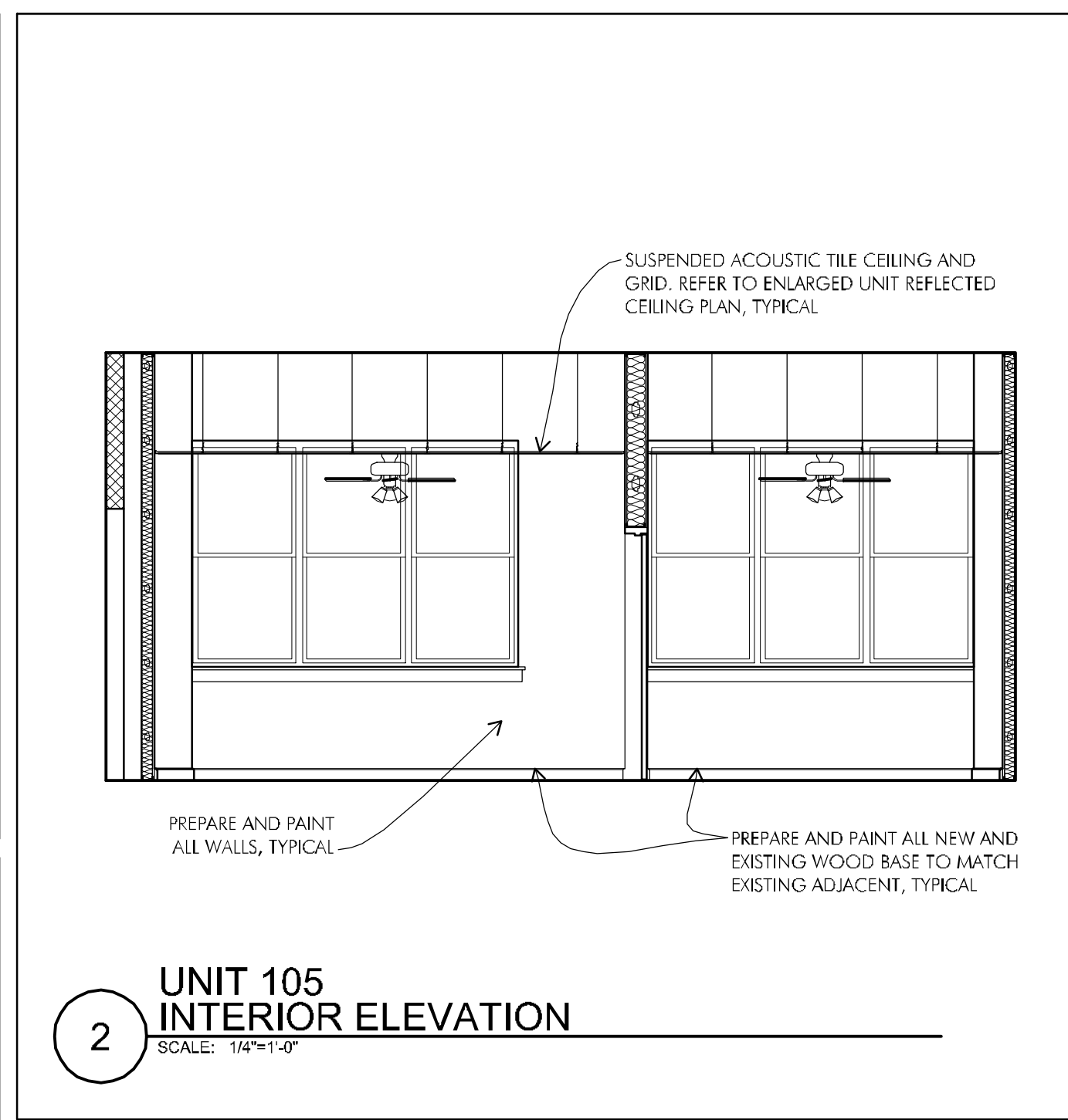
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

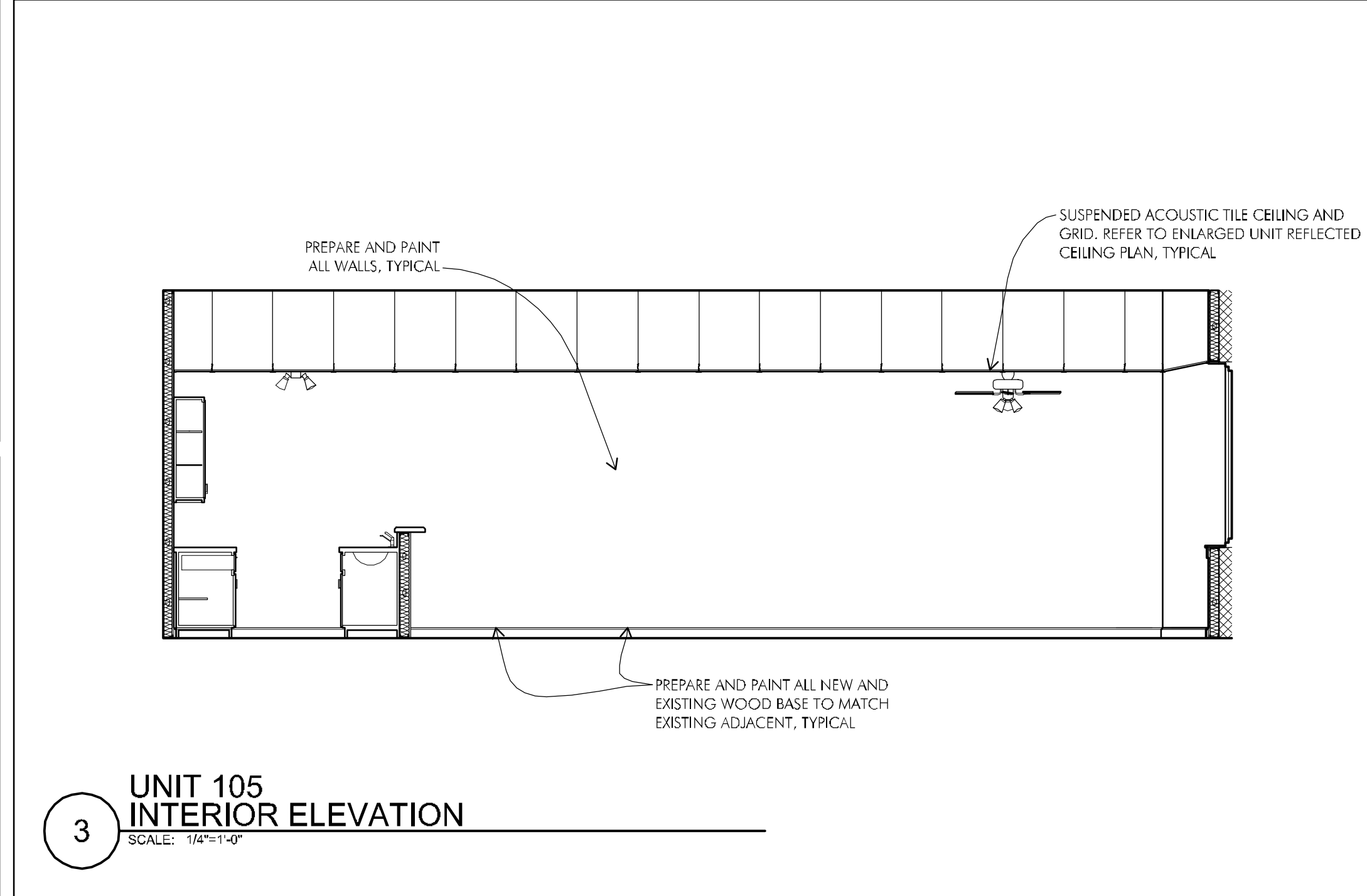
A4-04



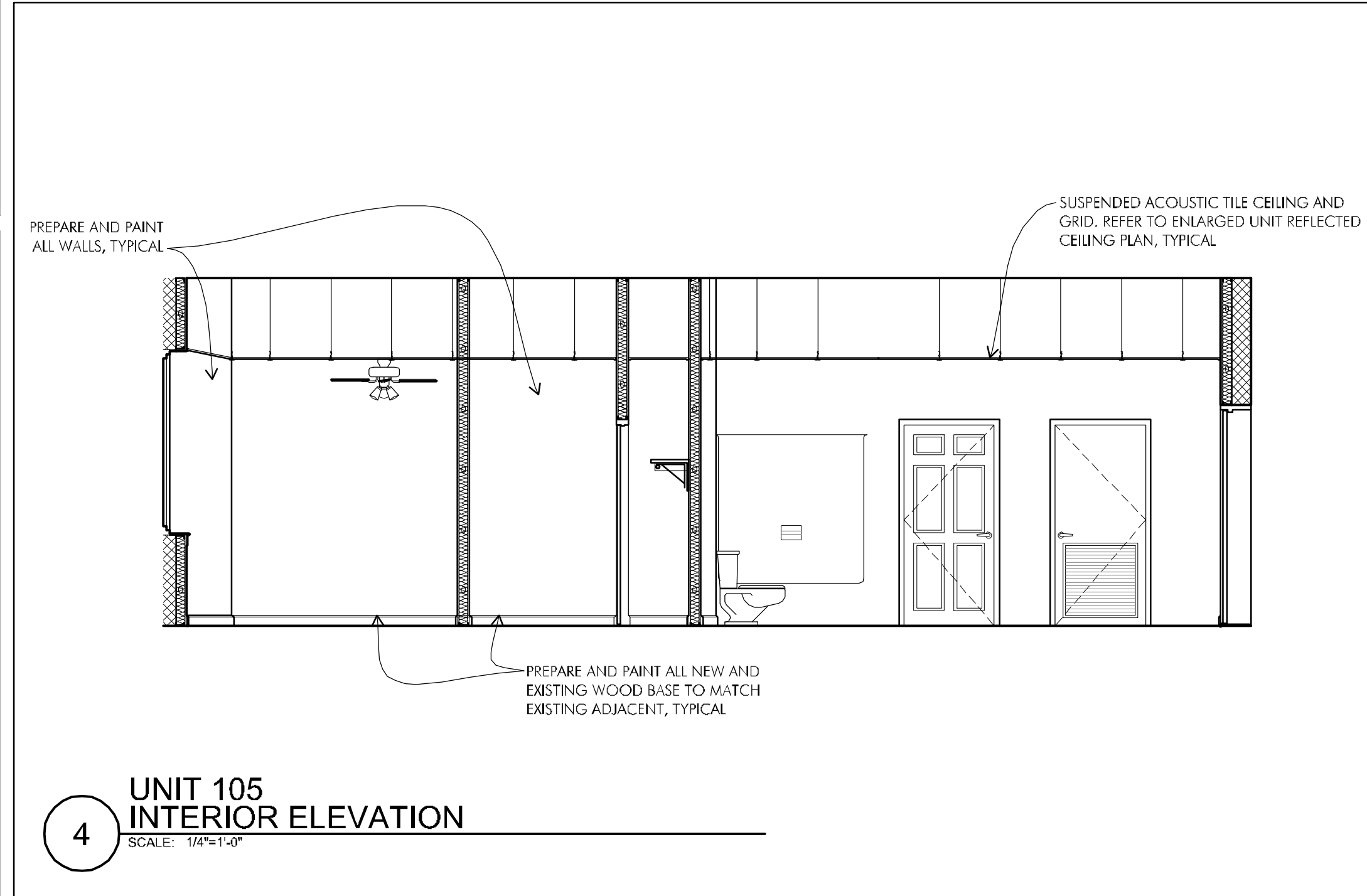
1
**UNIT 105
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



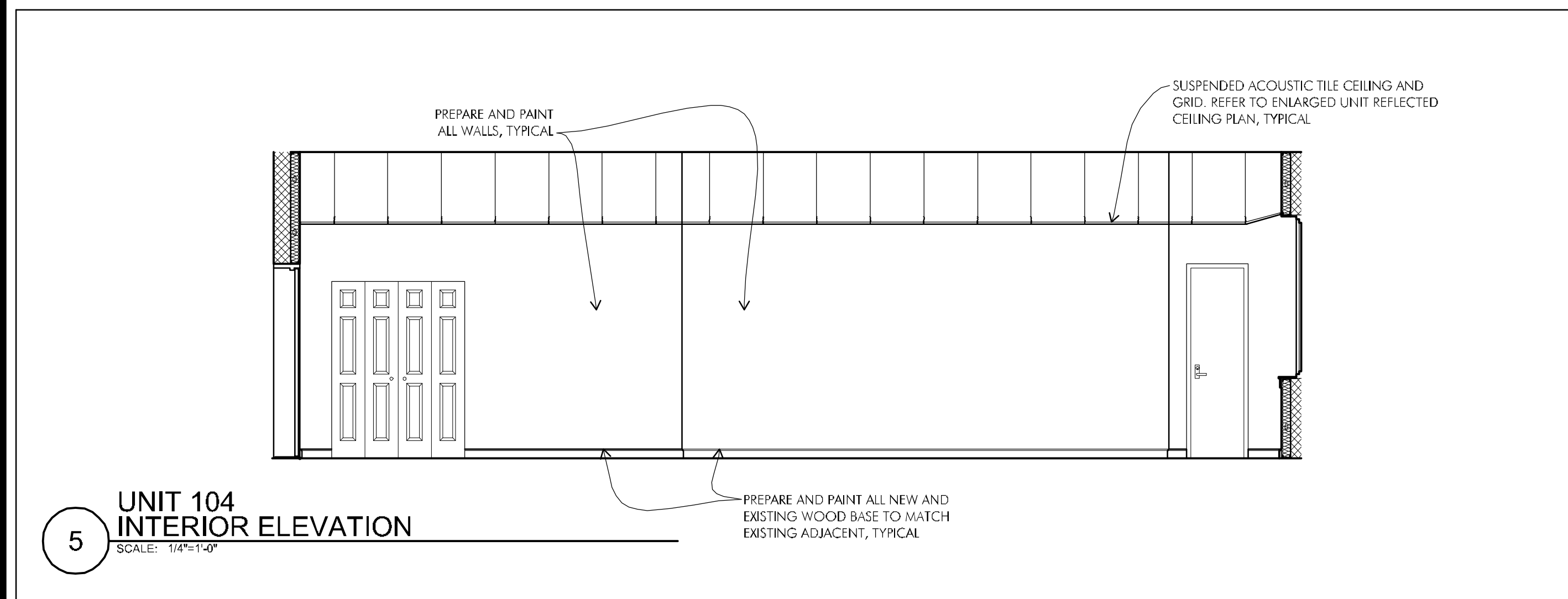
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**UNIT 105
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



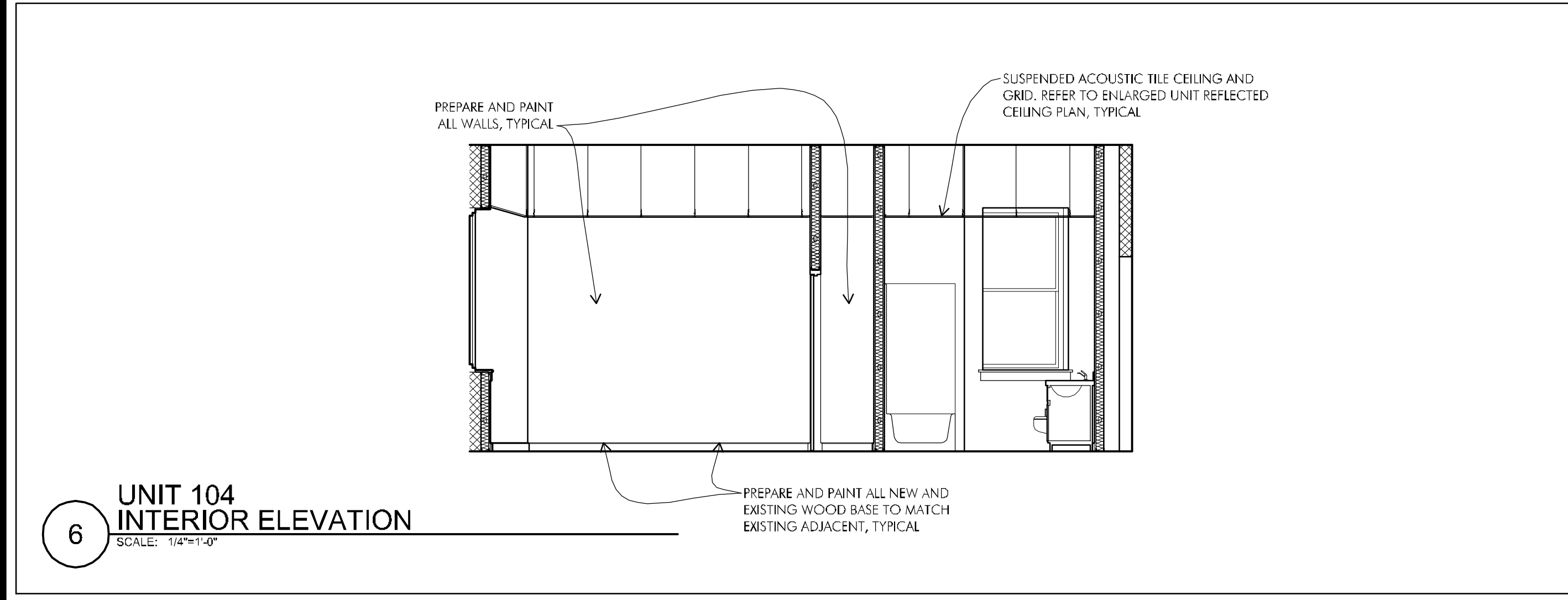
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**UNIT 105
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



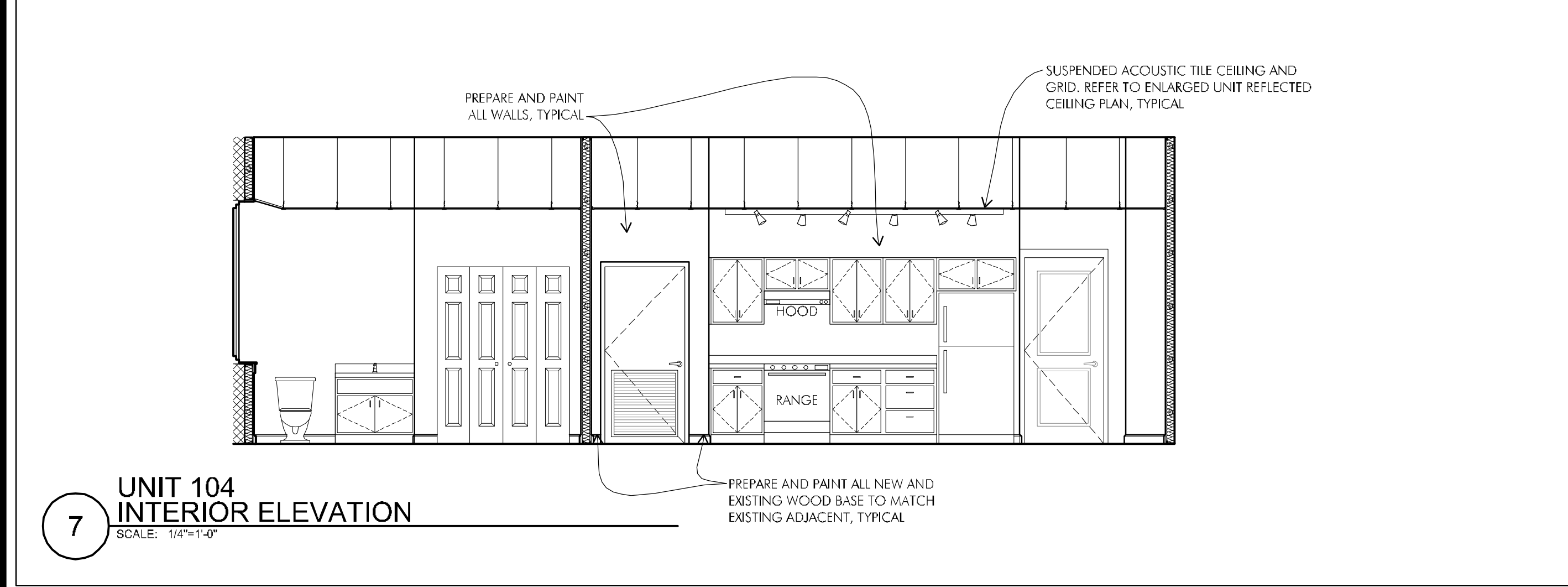
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**UNIT 105
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



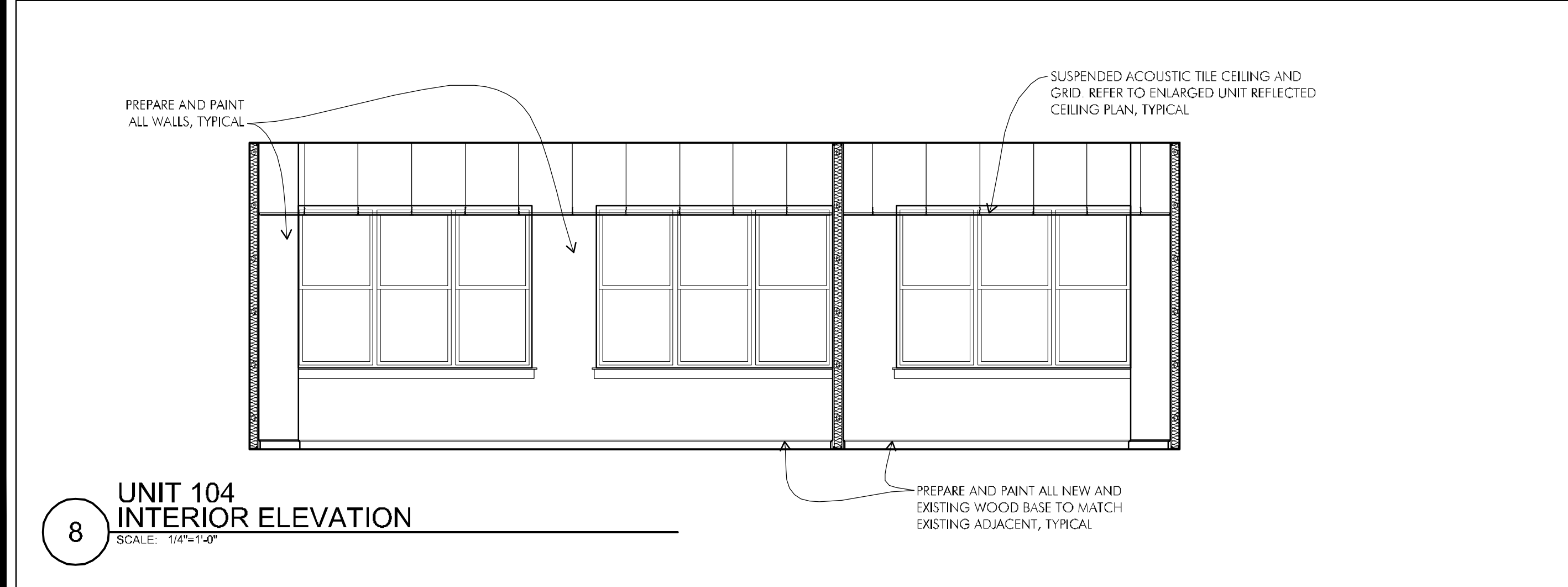
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**UNIT 104
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



6
**UNIT 104
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



7
**UNIT 104
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"



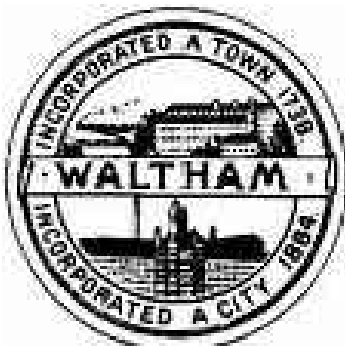
8
**UNIT 104
INTERIOR ELEVATION**
SCALE: 1/4"=1'-0"

INTERIOR ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEXAN FROM EXISTING WINDOW FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL. REMOVE EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION.
- PAINT EXISTING CHALK BOARD TO REMAIN
- PAINT EXISTING TACK BOARD TO REMAIN
- PROVIDE BLOW-IN INSULATION TO COMPLETELY FILL THE ENTIRE EXISTING WALL CAVITY BETWEEN ALL STUDS AND BRACING, TYPICAL AT EXISTING STUD PARTY WALLS TO REMAIN
- WALL TO BE INFILLED. ALL MATERIALS AND FINISHES TO MATCH EXISTING ADJACENT, TYPICAL
- EXISTING POP CORN WALL FINISH TEXTURE TO BE MATCHED AT NEW ADJACENT WALL AND FINISHES, TYPICAL THROUGHOUT

P:\2010\10025-A\Sheet\1st Floor (Phase 3)\10025-A A4-04.dwg Pld: 07. 2012. 3:24 pm BOSBORNE

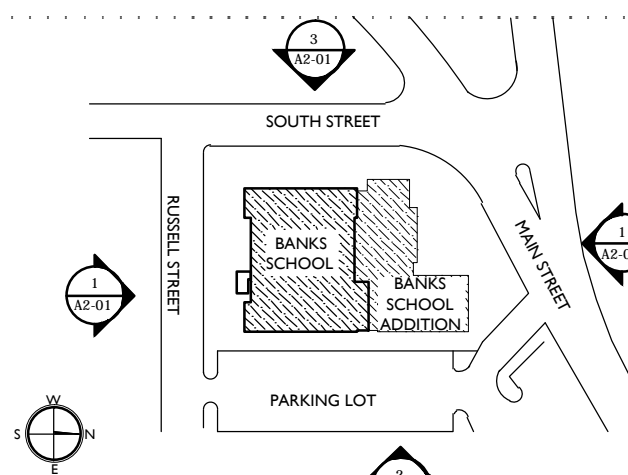
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**UNIT 106
INTERIOR
ELEVATIONS**



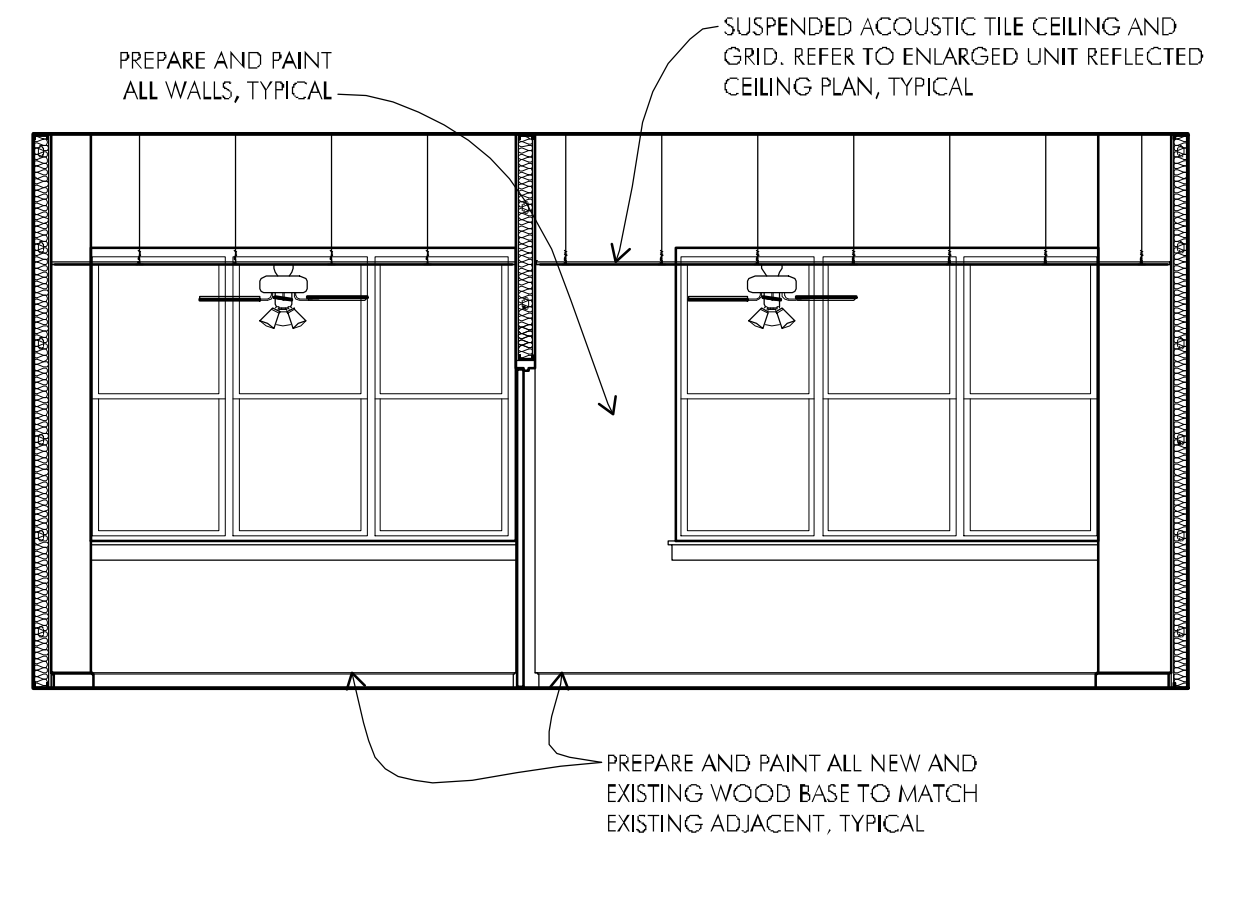
KEY PLAN N.T.S.

Revisions:

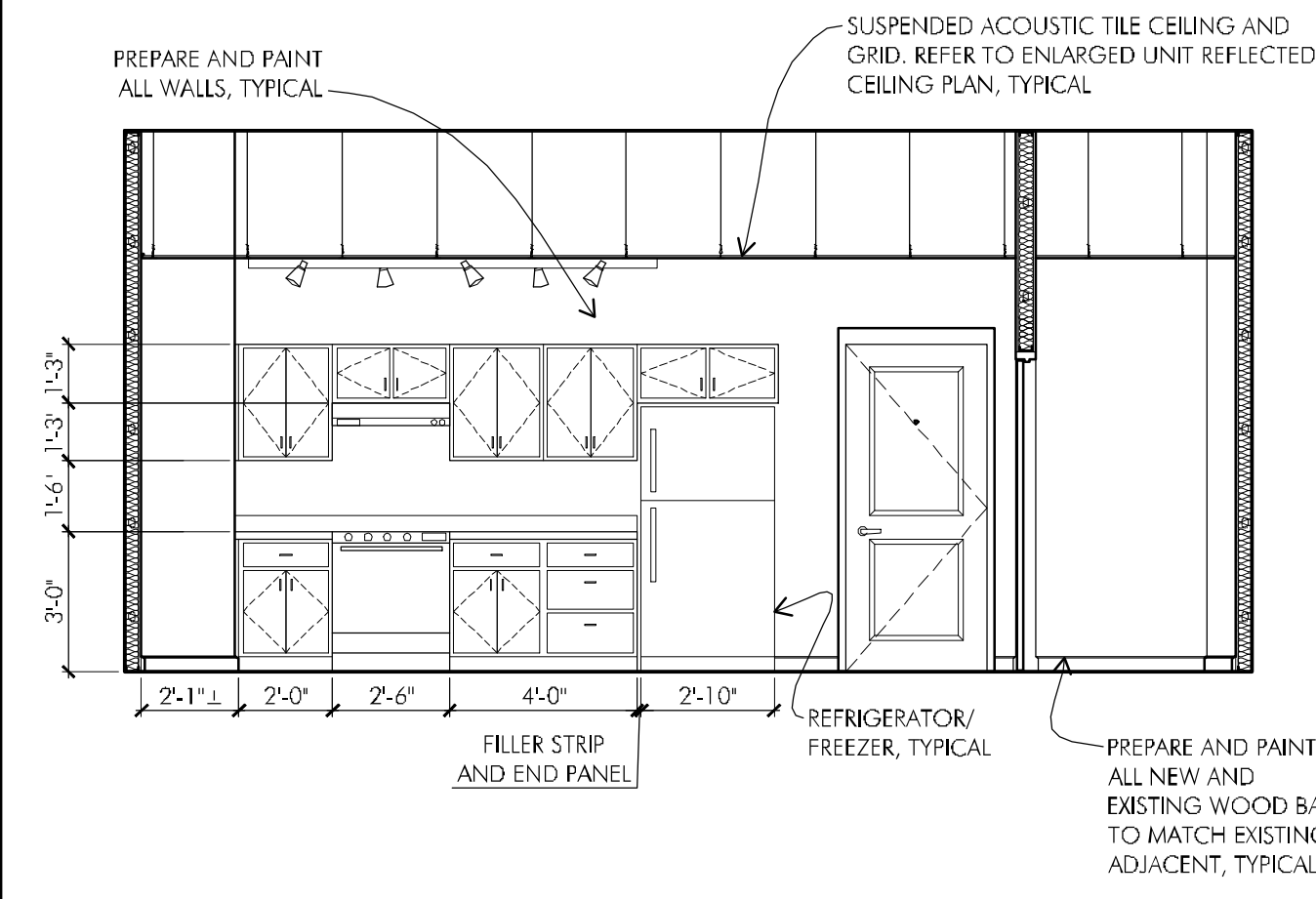
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

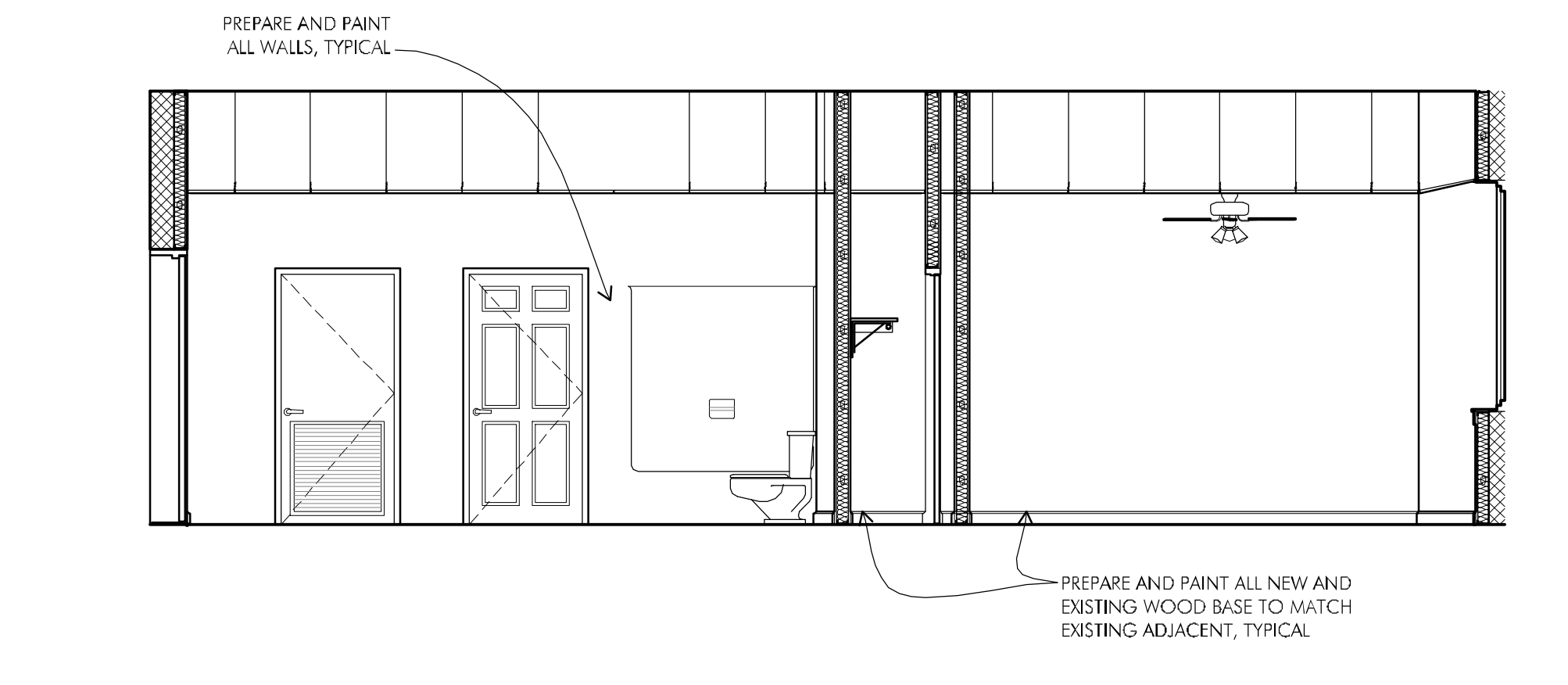
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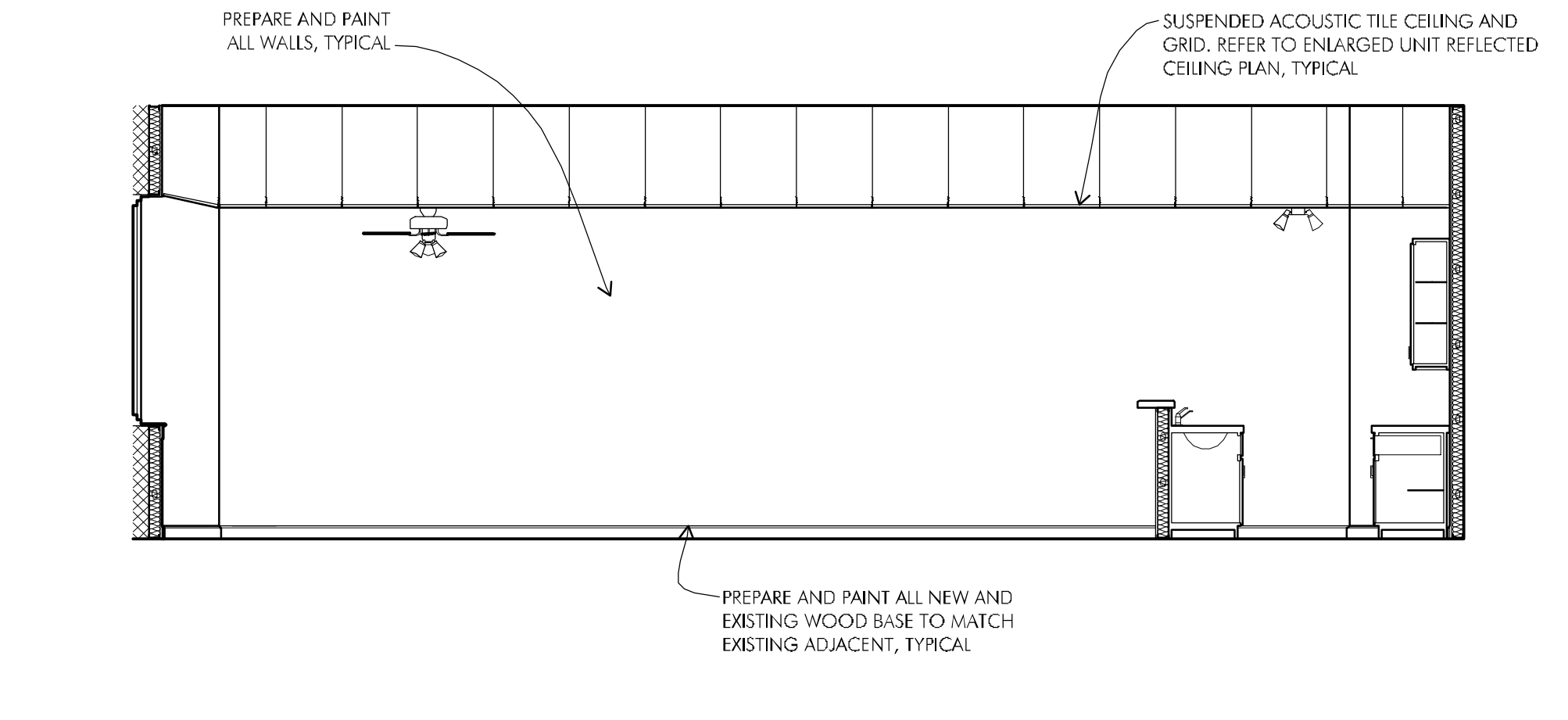
2 UNIT 106
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



1 UNIT 106
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"



3 UNIT 106
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"

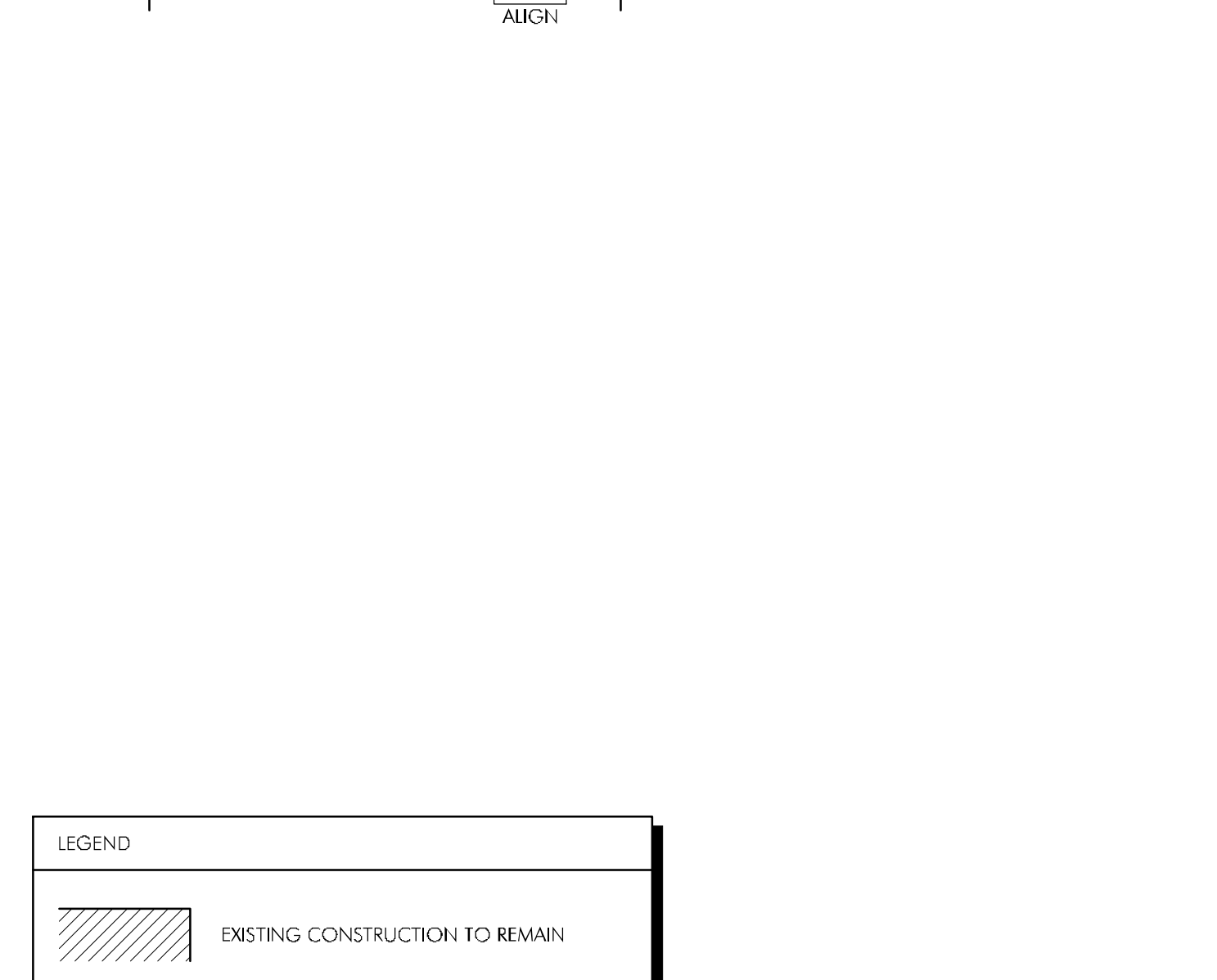
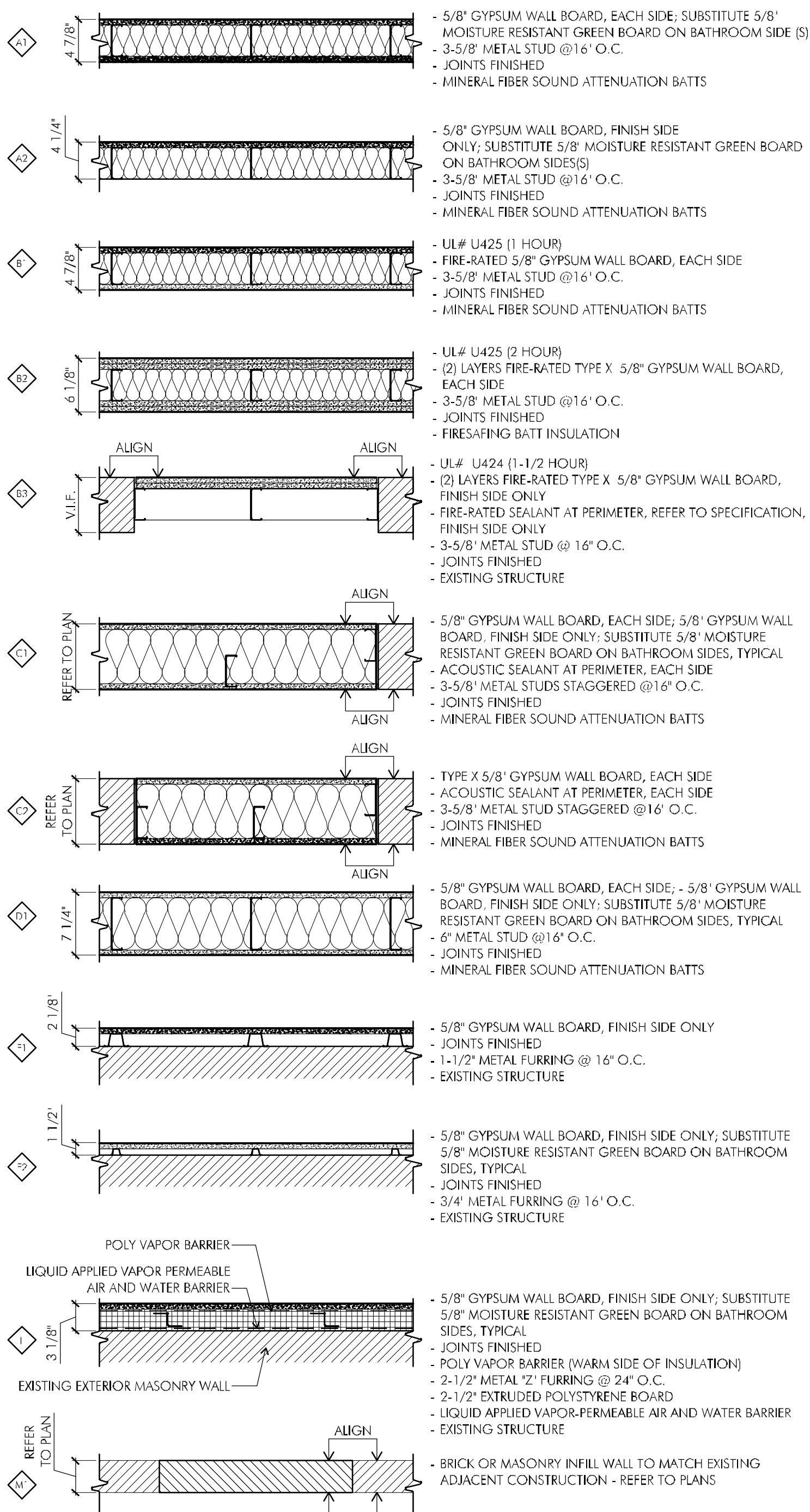


4 UNIT 106
INTERIOR ELEVATION
SCALE: 1/4"=1'-0"

INTERIOR ELEVATION LEGEND

- WINDOW IDENTIFICATION. REMOVE AND DISPOSE OF ALL LEXAN FROM EXISTING WINDOW FOR ACCEPTANCE OF REPLACEMENT GLASS AND GLAZING, TYPICAL. REMOVE EXISTING SASH FOR REPLACEMENT OF ALL EXISTING BALANCES, (TYP. OF 8 PER WINDOW) AND REINSTALL UPON COMPLETION.
- PAINT EXISTING CHALK BOARD TO REMAIN
- PAINT EXISTING TACK BOARD TO REMAIN
- PROVIDE BLOWN-IN INSULATION TO COMPLETELY FILL THE ENTIRE EXISTING WALL CAVITY BETWEEN ALL STUDS AND BRACING, TYPICAL AT EXISTING STUD PARTY WALLS TO REMAIN
- WALL TO BE INFILLED. ALL MATERIALS AND FINISHES TO MATCH EXISTING ADJACENT, TYPICAL
- EXISTING POP CORN WALL FINISH TEXTURE TO BE MATCHED AT NEW ADJACENT WALL AND FINISHES, TYPICAL THROUGHOUT

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1 TYPICAL PARTITION TYPES
 SCALE: 1/4"=1'-0"

TYPICAL UNIT FINISH SCHEDULE

UNIT No.	ROOM	FLOOR		BASE		SHARED CORRIDOR WALLS		SHARED UNIT WALLS		EXTERIOR WALLS		CEILING		REMARKS	
		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH		
UNITS 100-103	TYP. KITCHENS	VCT	-	E.T.R.	WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT	
UNITS 100-103	TYP. LIVING/DINING ROOMS	CARPET+PAD	-	E.T.R.	WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT	
UNITS 100-103	TYP. MECHANICAL ROOMS	E.T.R.	-	N/A	N/A	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT		
UNITS 100-103	TYP. BATHROOMS	C.T.	-	C.T.	N/A	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-		
UNITS 100-103	TYP. LAUNDRY ROOMS	C.T.	-	C.T.	N/A	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT	PAINTED SOFFIT AT DOOR HEAD	
UNITS 100-103	TYP. BEDROOMS	CARPET+PAD	-	E.T.R.	WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT	
UNITS 100-103	TYP. BEDROOM CLOSETS	CARPET+PAD	-	WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT		
UNITS 100-103	TYP. PANTRY	CARPET+PAD	-	E.T.R.	WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R.	PAINT	
UNITS 104-106	TYP. KITCHENS	VCT	-	E.T.R.	WD	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-	
UNITS 104-106	TYP. LIVING/DINING ROOM	VCT	-	WOOD	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-		
UNITS 104-106	TYP. MECHANICAL ROOM	E.T.R.	-	GWB	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-		
UNITS 104-106	TYP. BATHROOM	C.T.	-	C.T.	GWB	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-	
UNITS 104-106	TYP. LAUNDRY	C.T.	-	C.T.	GWB	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-	PAINTED SOFFIT AT DOOR HEAD
UNITS 104-106	TYP. BEDROOM	CARPET+PAD	-	WOOD	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-		
UNITS 104-106	TYP. BEDROOM CLOSET	CARPET+PAD	-	WOOD	PAINT	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-		
UNITS 104-106	TYP. PANTRY/COAT CLOSET	VCT	-	RUBBER	-	GWB	PAINT	GWB	PAINT	GWB	PAINT	SAT	-		

FINISH SCHEDULE

ROOM No.	ROOM NAME	FLOOR		BASE		NORTH WALL		EAST WALL		SOUTH WALL		WEST WALL		CEILING		REMARKS	
		MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH	MATERIAL	FINISH		
107B	WOMENS BATHROOM	CT	-	CT	-										SAT	-	
107C	MENS BATHROOM	CT	-	CT	-										SAT	-	
107D	JANITORS CLOSET	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
107E	GYM STORAGE	E.T.R.	-	E.T.R.	-	GWB	PAINT	E.T.R.	PAINT	E.T.R./NEW CMU	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
110	VEST #1	E.T.R.	-	E.T.R.	-	GWB	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
111	EAST CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
112	TOILET																
113	BOILER ROOM	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
114A	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
114B	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
114C	TOILET	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
115	FAN ROOM	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
116	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
116A	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
117	SPRINKLER	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
118	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
119	SOUTH CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
120	CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
120A	MECHANICAL	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
122	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
123	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
123A	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
124	CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
125	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
126	STAIR #3	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
127	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
127A	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
127B	STORAGE	VCT	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
128	TOILET	E.T.R.	-	RUBBER	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	
130	CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
131	NORTH CORRIDOR	CARPET+PAD	-	WD/ETR WD	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	E.T.R./NEW GWB	PAINT	SAT	-
132	MECHANICAL ROOM	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R./SAT	-	-	
133	STORAGE	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R./SAT	-	-	
134	ELEVATOR MACHINE RM.	E.T.R.	-	E.T.R.	-	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	E.T.R.	PAINT	-	

- NOTES:
 1. COORDINATE FINISH SCHEDULE WITH OVERALL AND ENLARGED FLOOR PLANS, REFLECTED CEILING PLANS AND INTERIOR ELEVATIONS, WHICH MAY INDICATE ADDITIONAL FINISH WORK AND EXTENT.
 2. SAND AND STAIN E.T.R. WOOD TRIM AND PAINT E.T.R. FINISH WALLS AND FLOORS WITHIN BUILT-IN COAT CLOSETS AND LINEN CABINETS, TYPICAL ALL RESIDENTIAL UNITS.
 3. PAINT ALL ETR. CHALKBOARDS AND TACKBOARDS, TYPICAL ALL RESIDENTIAL UNITS.

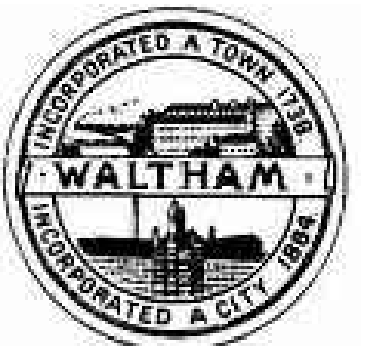
- GENERAL PARTITION NOTES:
 1. ALL DIMENSIONS TO AND FROM PARTITIONS ARE TO FACE OF FINISH WALL.
 2. ALL EXPOSED GYPSUM WALL BOARD SHALL BE TAPED, SPACKLED, SANDED, AND PAINTED, TYPICAL.
 3. ALL WALLS SHALL CONTINUE TO UNDERSIDE OF HARD CEILING OR DECK ABOVE, UNLESS OTHERWISE NOTED.
 4. ALL WALLS SHALL BE MINIMUM 30-MINUTE RATING. IN THE CASE OF INFORMATIONAL CONFLICT, THE MORE STRINGENT & HIGHEST RATED OF THE CONFLICTING ITEMS SHALL GOVERN. REFER TO G9-02.
 5. UNLESS NOTED OTHERWISE, THE CONTRACTOR SHALL MAINTAIN THE CONTINUOUS STRUCTURAL, ACOUSTICAL, THERMAL INSULATION, SMOKE, AND FIRE RATING INTEGRITY OF ALL PARTITION WALLS.
 6. FOR REQUIRED FIRE AND SMOKE RATINGS OF WALL & PARTITION ASSEMBLIES, SEE PLANS AND FIRE RATING DIAGRAMS.
 7. SEALANTS:
 a. SEALANTS AT PARTITIONS SHALL BE ACOUSTICAL SEALANTS.
 b. SEALANTS AT FIRE-RATED PARTITIONS SHALL BE FIRESTOPPING SEALANTS.
 8. INSULATION:
 a. BATT INSULATION AT PARTITIONS SHALL BE BLOW-IN ACOUSTICAL BATT INSULATION.
 b. BATT INSULATION AT FIRE-RATED PARTITIONS SHALL BE FIRESAFING INSULATION.
 9. UNLESS NOTED OTHERWISE, ALL NEW INTERIOR NON-MASONRY PARTITIONS SHALL BE TYPE "A1" AND ALL NEW INTERIOR MASONRY PARTITIONS SHALL BE TYPE "M1".
 10. FOR WALLBOARD TYPES AND APPLICATIONS, SEE WALLBOARD SCHEDULE-THIS SHEET, AND SPECIFICATIONS.
 11. FOR WALL FINISHES, SEE FINISH SCHEDULE & DRAWINGS. AT ALL ASSEMBLIES SEPARATING AIR-CONDITIONED SPACES FROM NON-AIR-CONDITIONED SPACES, USE MINIMUM R-10 THERMAL BATT INSULATION IN LIEU OF ACOUSTICAL BATT AND PROVIDE AND INSTALL CONTINUOUS VAPOR BARRIER AT WARM SIDE OF INSULATION AND SEAL TO ADJACENT CONSTRUCTION.
 12. PROVIDE AND INSTALL VERTICAL CONTROL JOINTS, STRAIGHT PLUMB AND TRUE, AT ALL CONTINUOUS WALLBOARD AND MASONRY INSTALLATIONS 30' O.C. MAX, VISIBLE OR NOT - U.N.O. - SEE CONTROL JOINT DETAILS THIS SHEET - SEE INTERIOR ELEVATIONS FOR FURTHER INFO.

- GENERAL FINISH NOTES:
 1. ALL FINISH E.T.R. WALLS ARE PLASTER - LATH UNLESS OTHERWISE NOTED.
 2. ALL RESIDENTIAL UNIT ROOMS AND COMMON CORRIDORS SHALL HAVE PAINTED WOOD BASE, CHAIR RAILS, AND CROWN MOLDING TO MATCH EXISTING.
 3. ALL NEW WALL FINISHES SHALL MATCH EXISTING ADJACENT WALL FINISHES.
 4. SAND AND STAIN FINISH ALL E.T.R. WOOD TRIM AT UNIT BUILT-IN CLOSETS AND LINEN CABINETS, TYPICAL.



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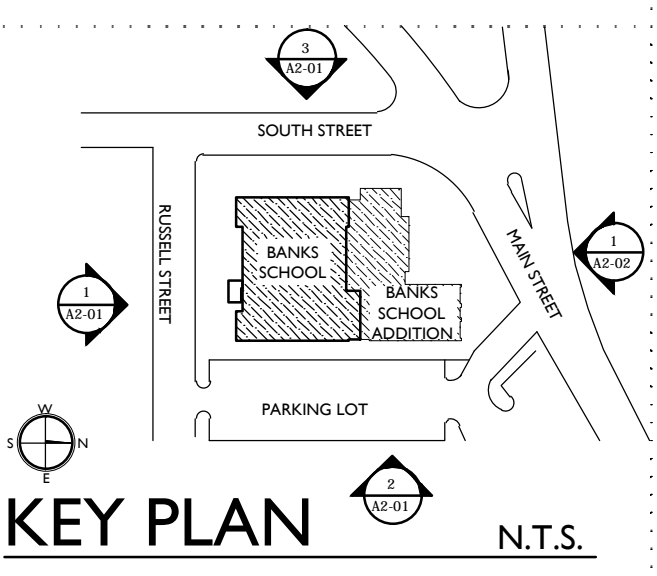
PHASE III
 RENOVATIONS TO
 THE FORMER
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 ELDERLY HOUSING
 CONDOMINIUMS
 948 MAIN STREET
 WALTHAM, MA



CITY OF
 WALTHAM
 CITY HALL
 610 MAIN STREET
 WALTHAM, MA

Drawing Title:

FINISH SCHEDULE
 AND
 PARTITION TYPES



Revisions:

BID DOCUMENTS

Date: 03-07-2011
 Project Number: 10025-A
 Project Manager: SAW
 Drawn By: BLO, MJB
 Scale: AS NOTED

A5-01

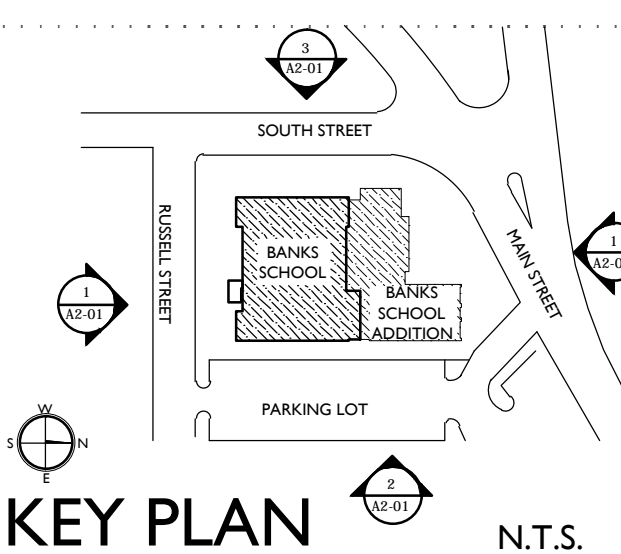
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**TYPICAL UNIT
ENTRY DETAIL
PLAN & SECTIONS**

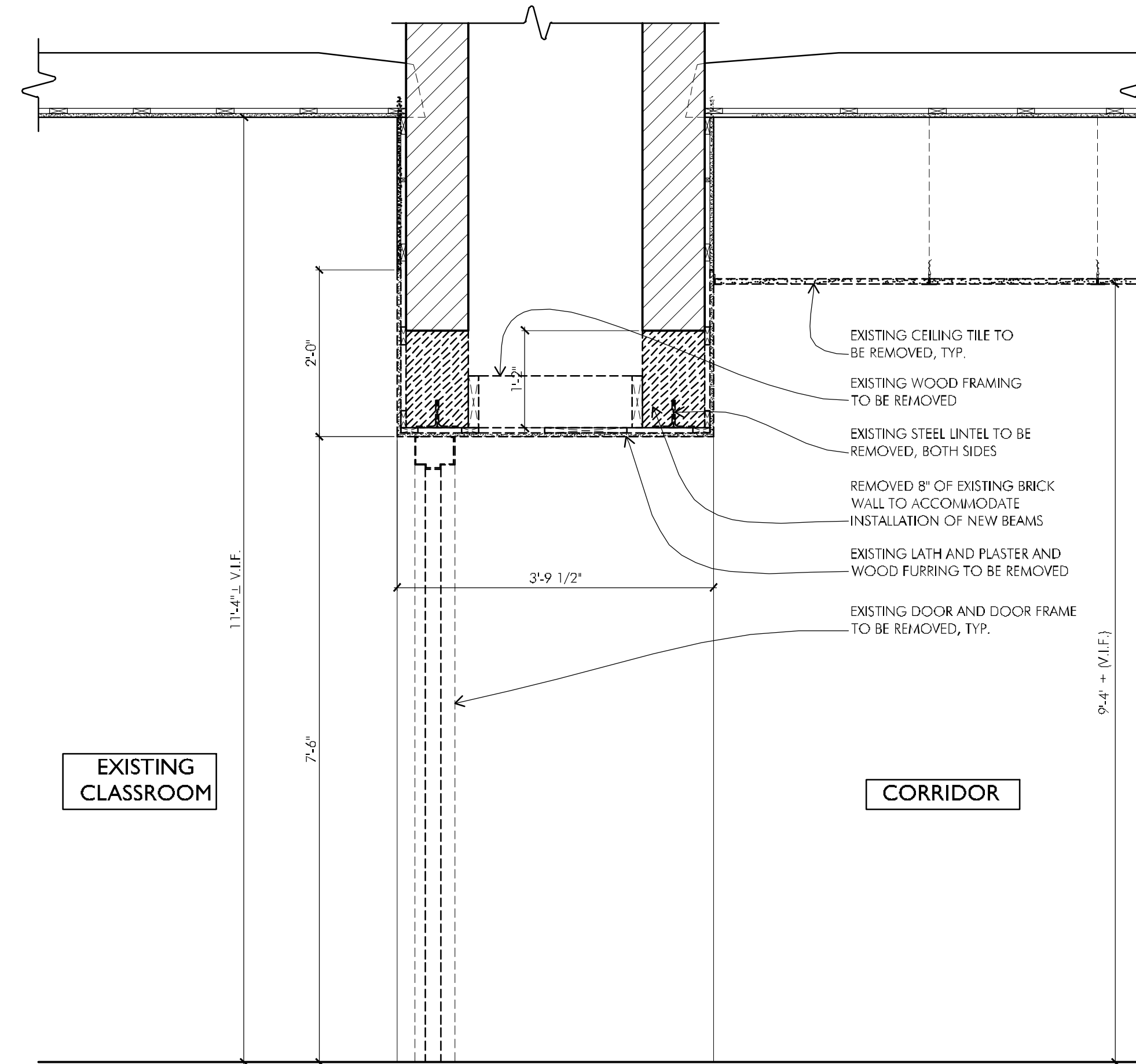


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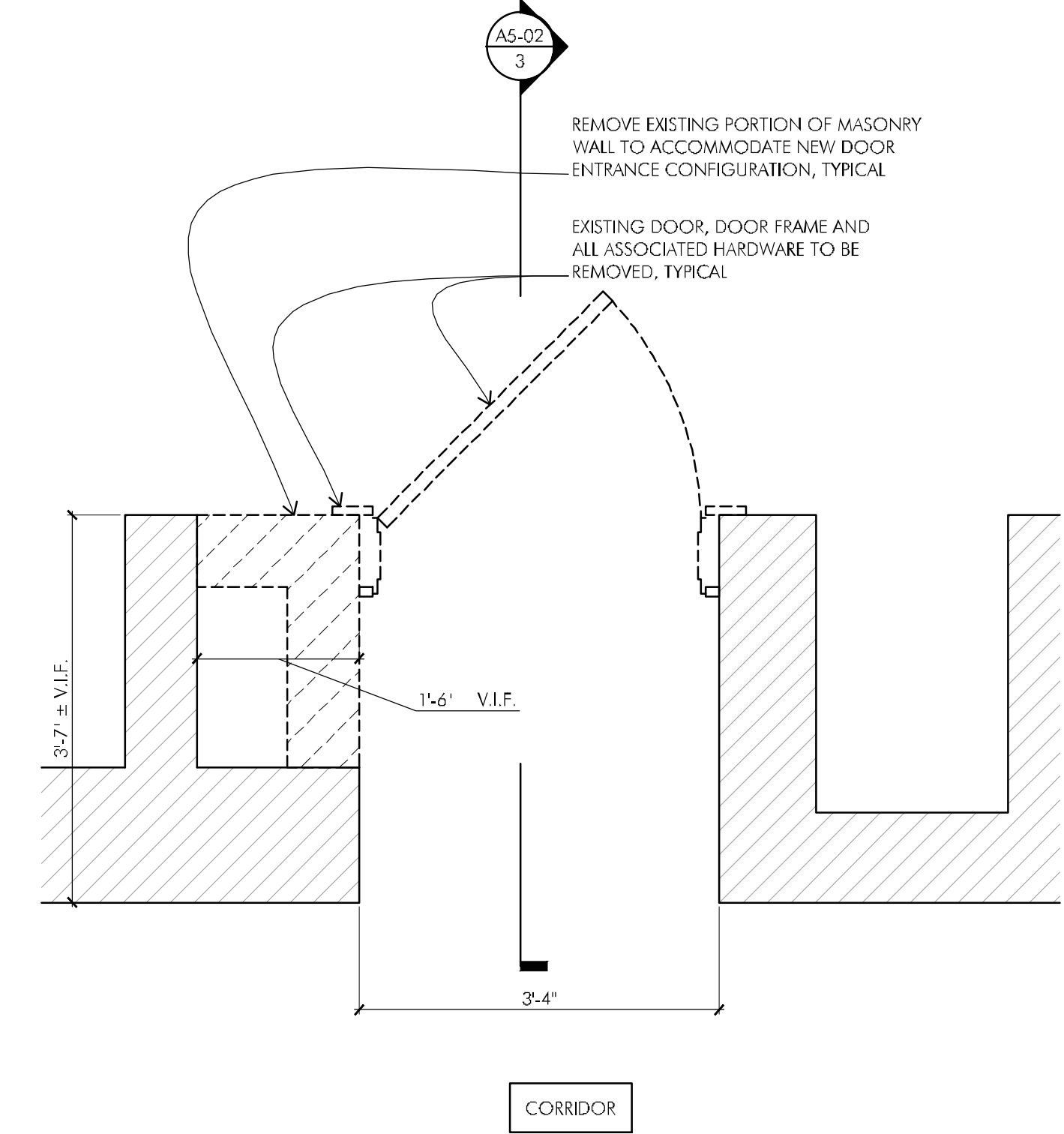
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

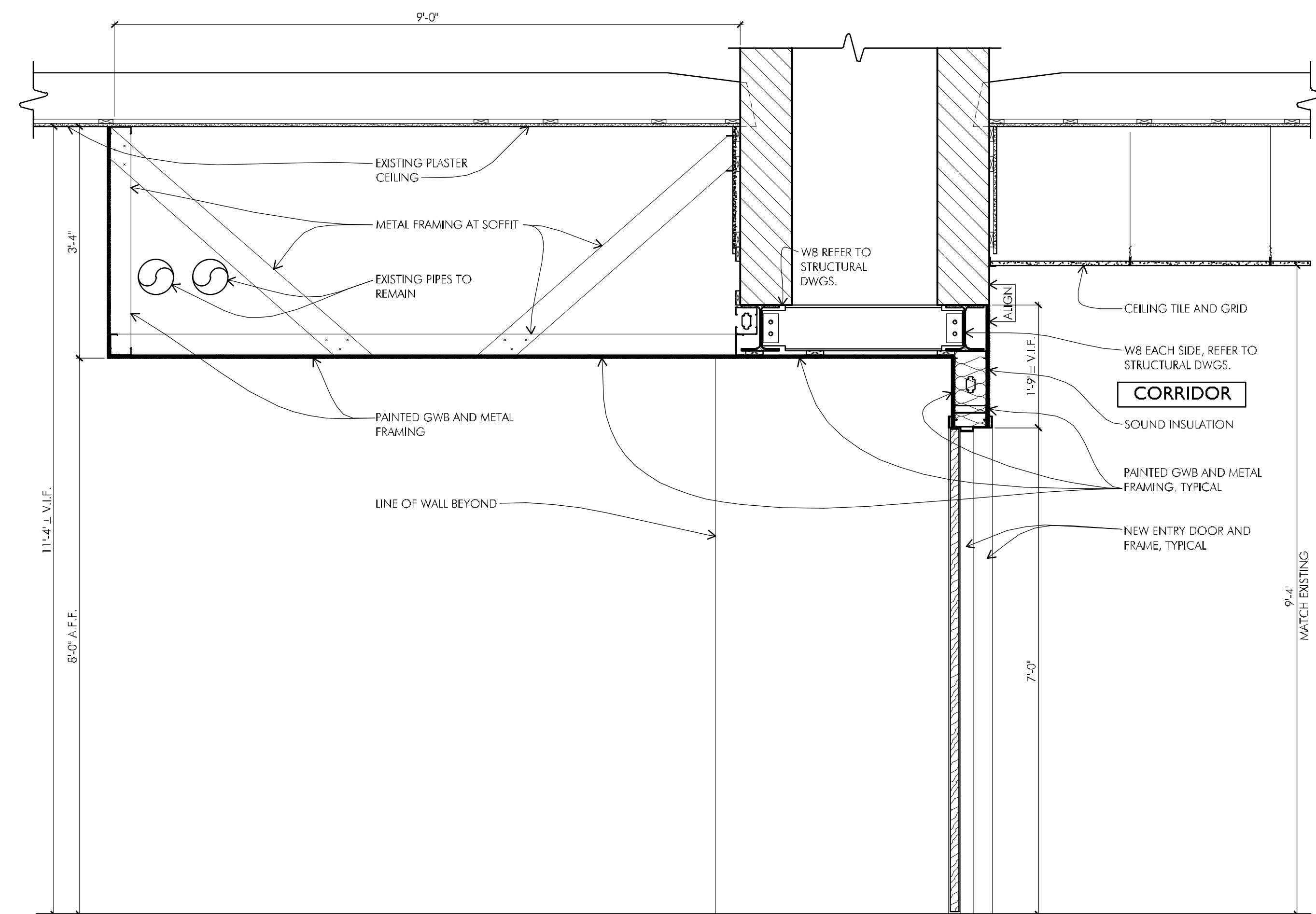
A5-02



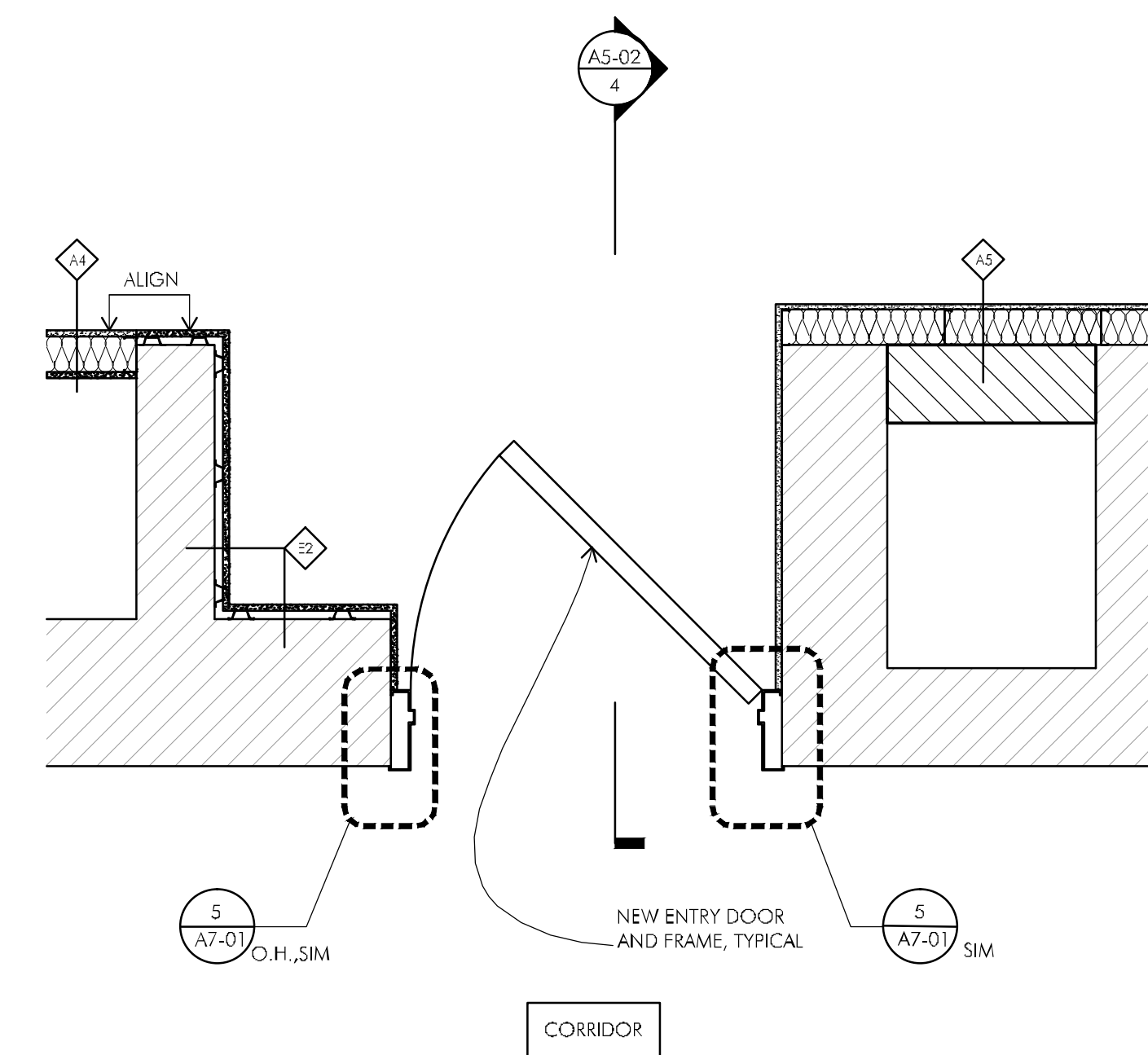
3 DEMOLITION SECTION AT UNIT 103 ENTRY
SCALE: 3/4"=1'-0"



1 UNIT 103 ENTRY DEMOLITION DETAIL PLAN
SCALE: 3/4"=1'-0"

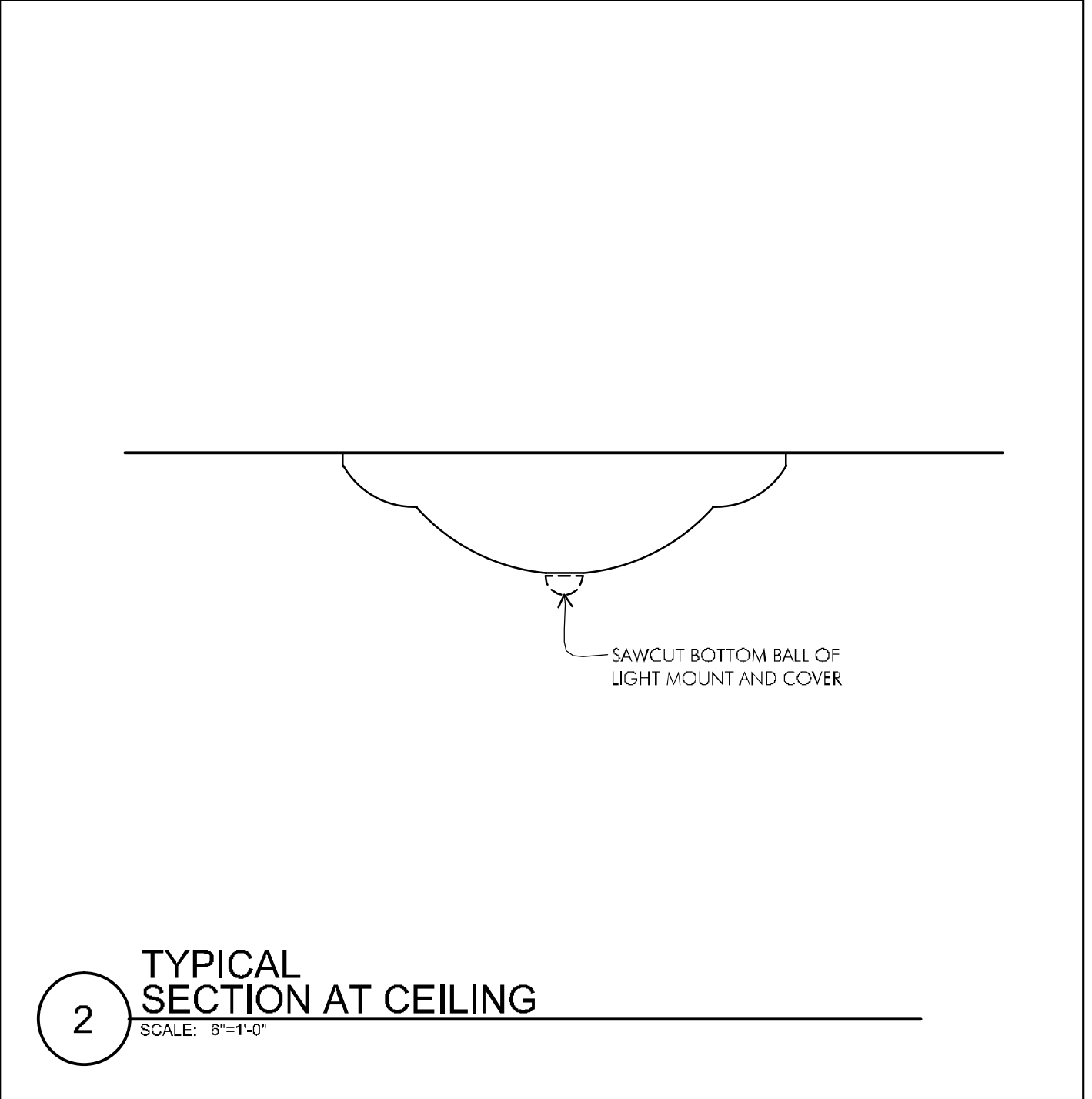
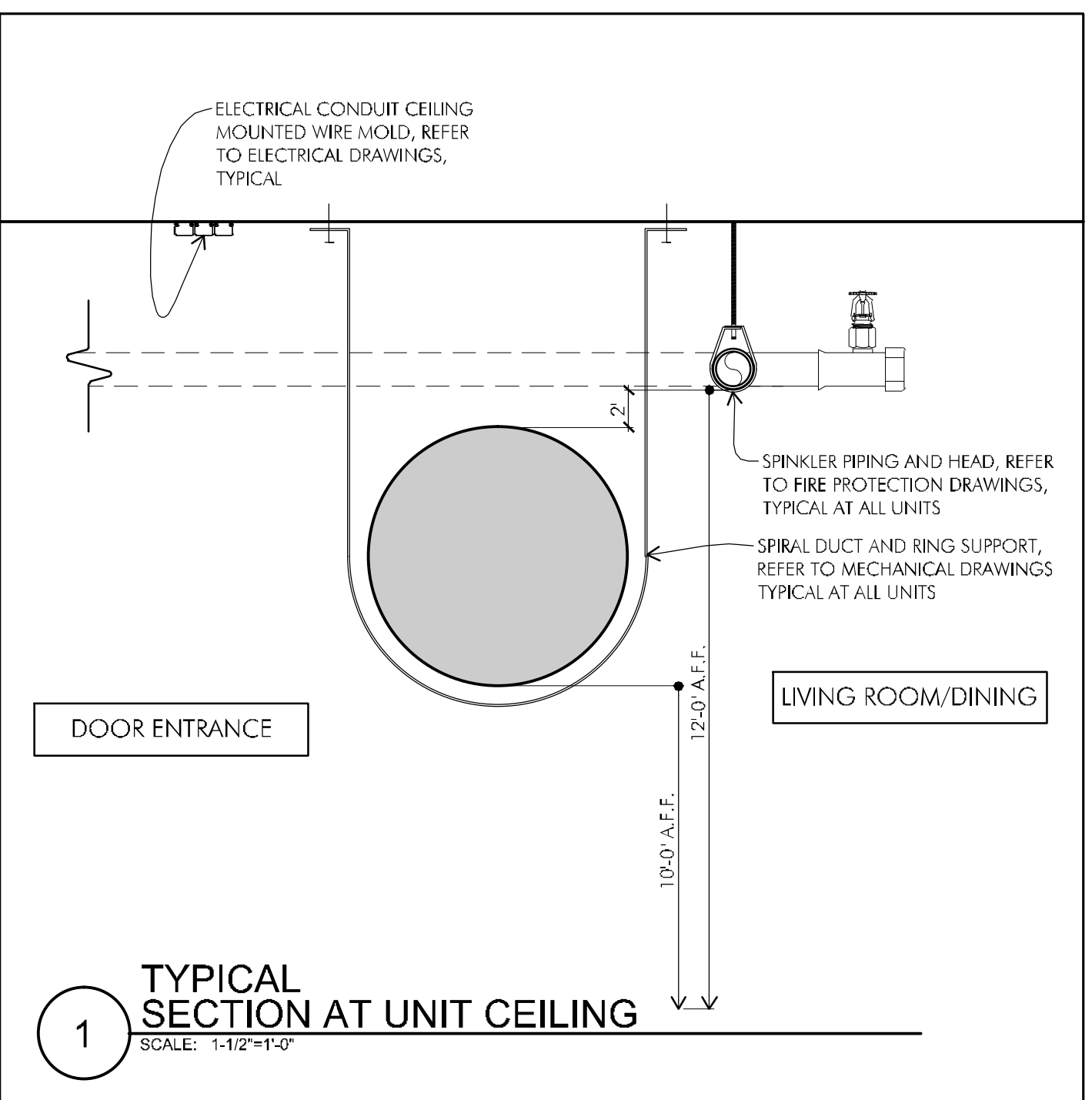


4 SECTION AT UNIT 103 ENTRY
SCALE: 3/4"=1'-0"



2 UNIT 103 ENTRY DETAIL PLAN
SCALE: 3/4"=1'-0"

P:\2010\10025-A\Streets\1st FLOOR (Phase 3)\10025-A-A5-03.dwg Pdr: 06, 2012 - 8:26 pm BOSBORNE



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**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**

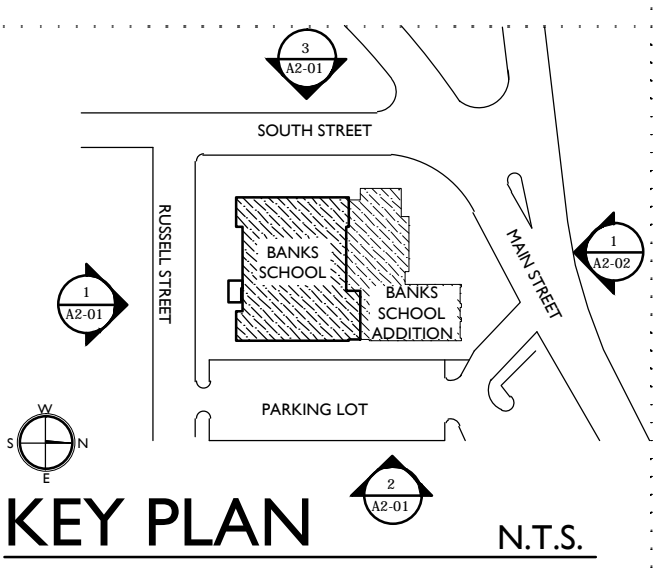
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**TYPICAL
DETAILS**



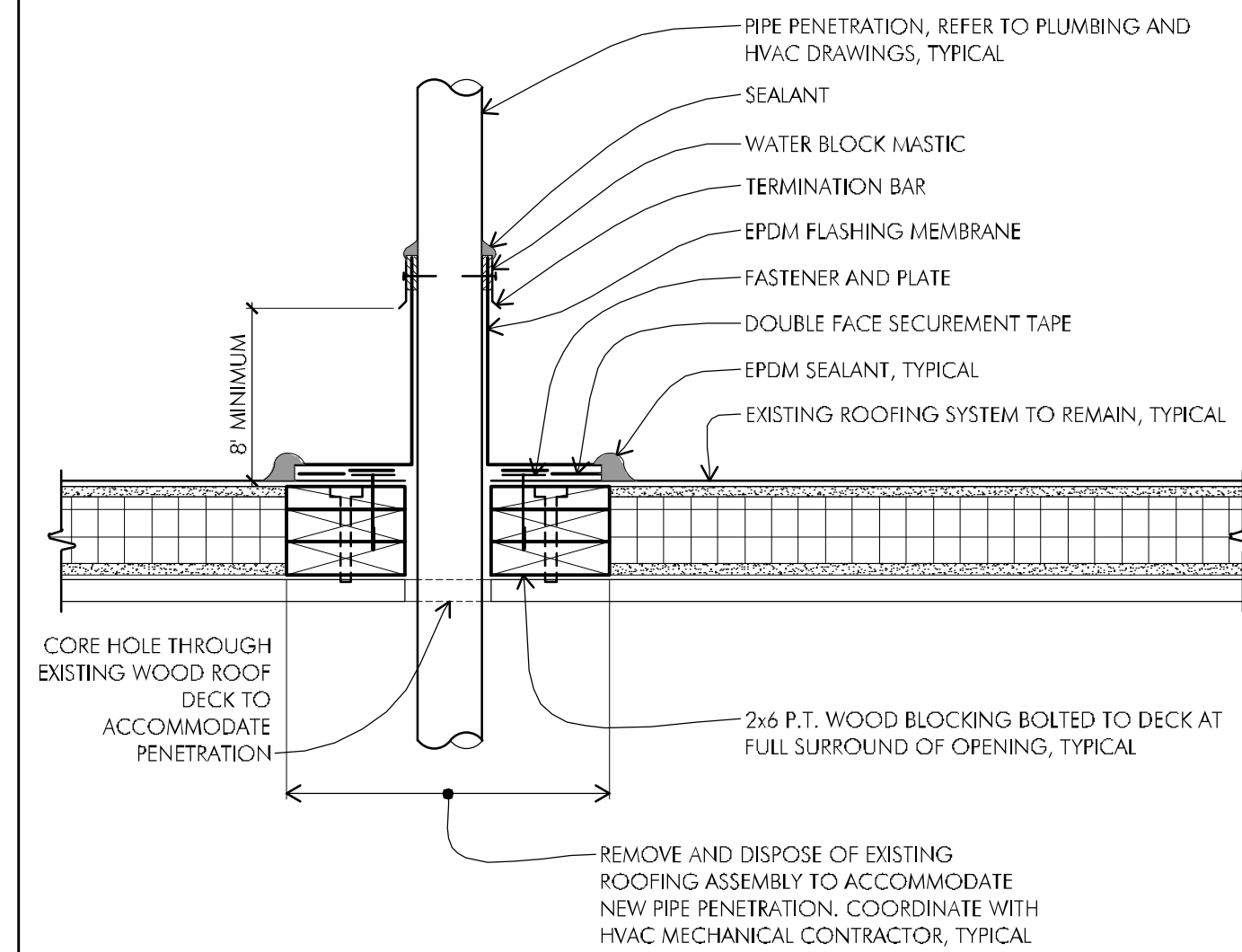
Revisions:

BID DOCUMENTS

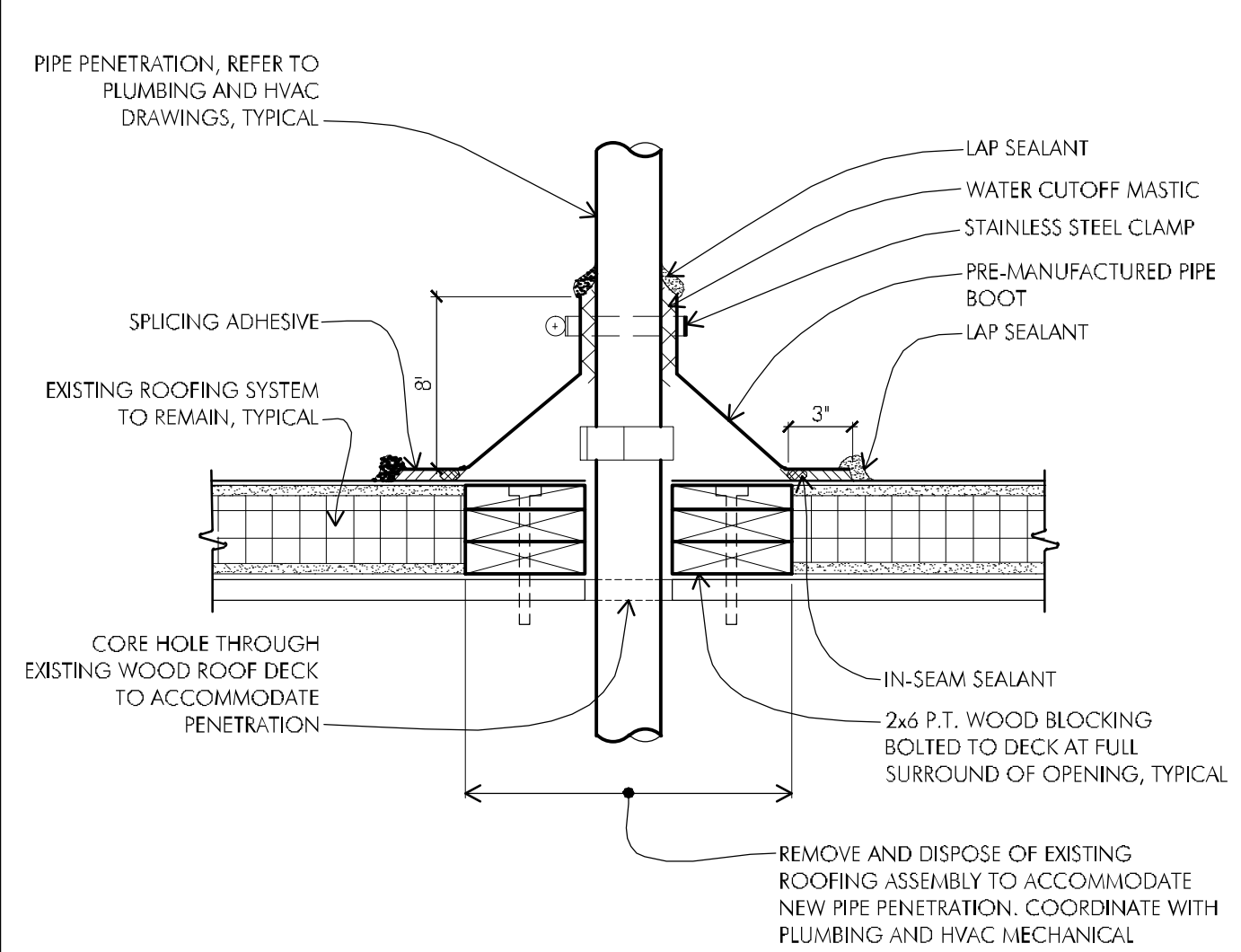
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Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB
Scale: AS NOTED

A5-03

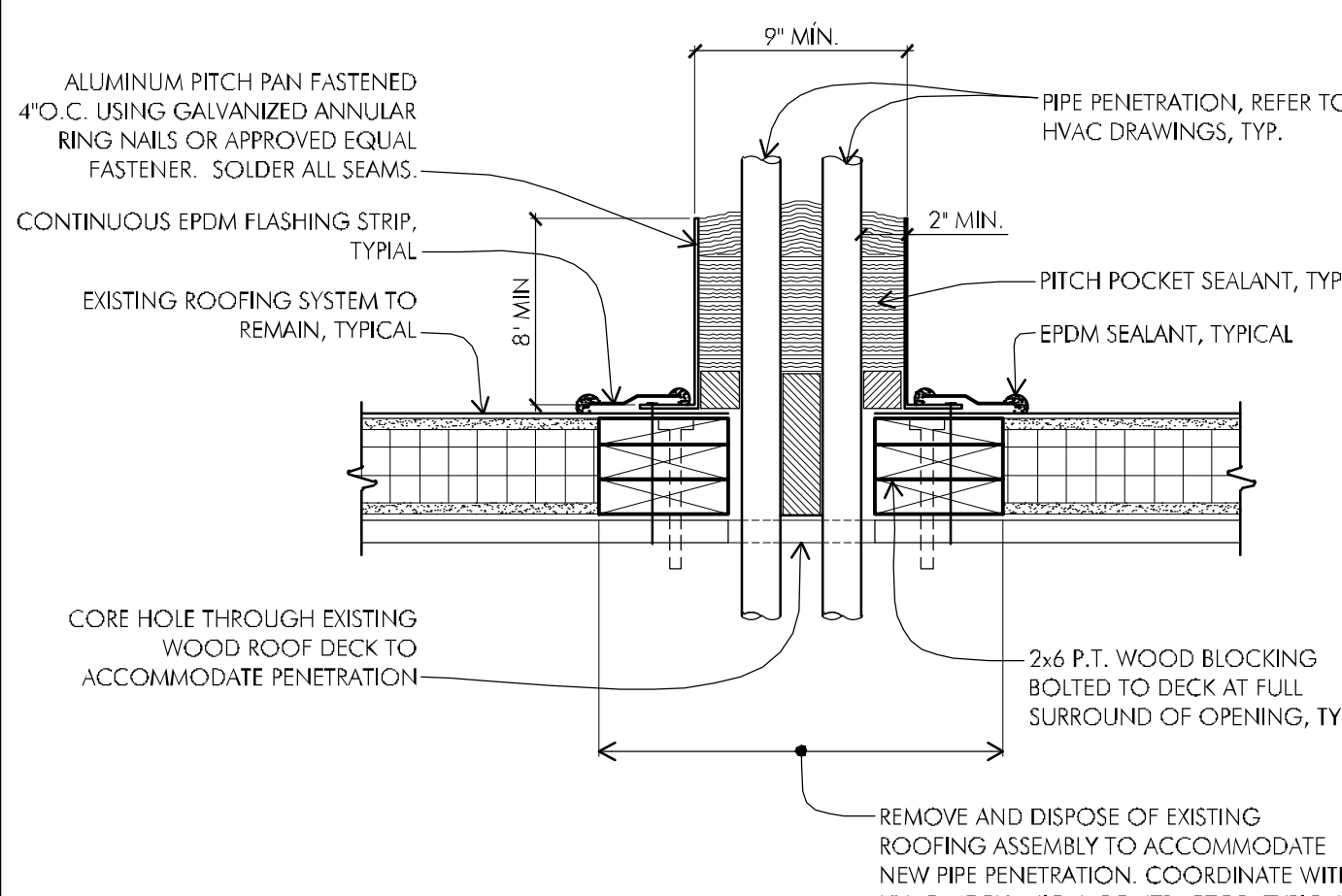
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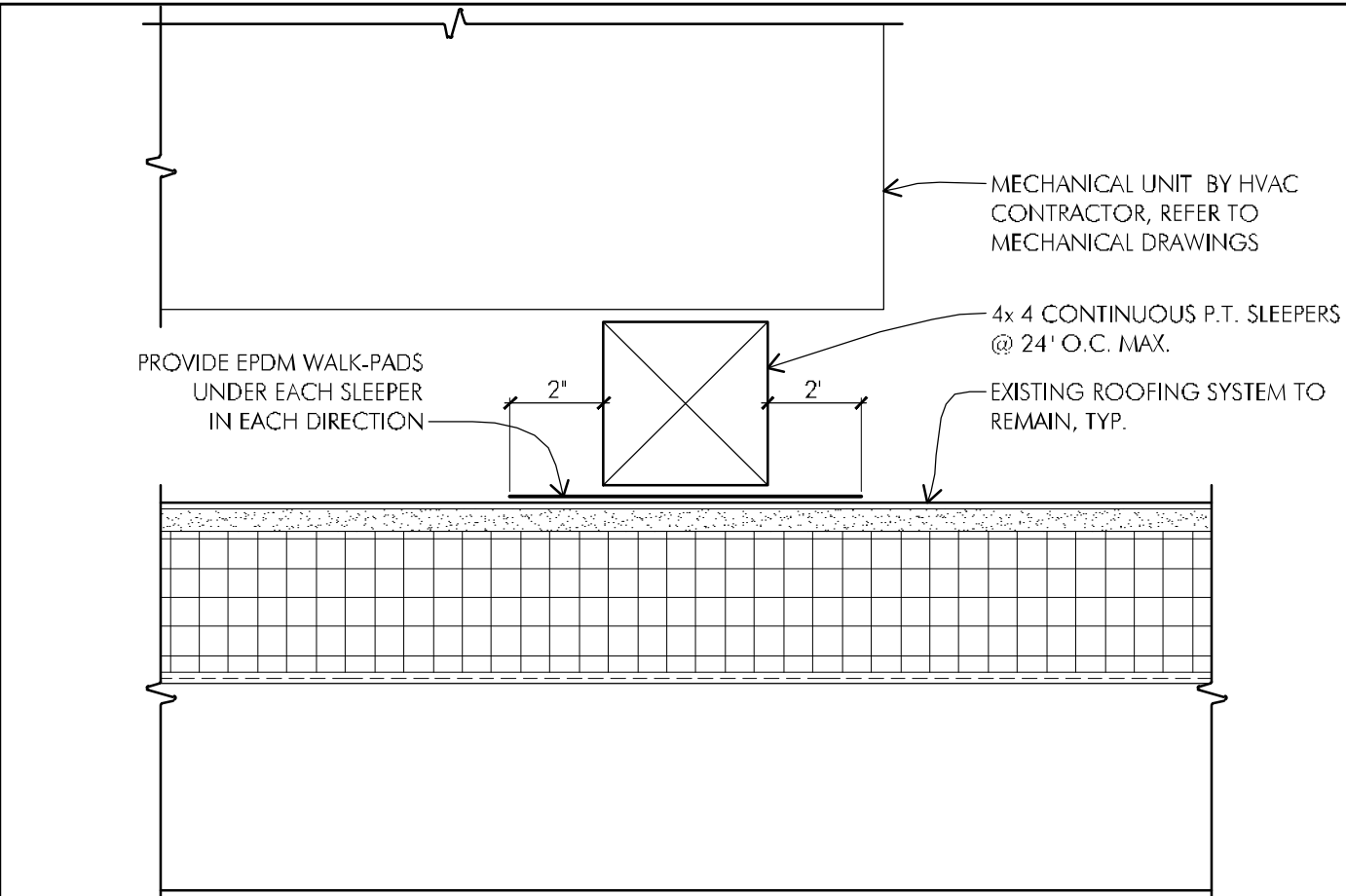
4 TYPICAL FIELD-WRAPPED PIPE PENETRATION DETAIL
SCALE: 1/12" = 1'-0"



1 TYPICAL PIPE PENETRATION DETAIL
SCALE: 1/12" = 1'-0"



2 TYPICAL PITCH POCKET DETAIL
SCALE: 1/12" = 1'-0"

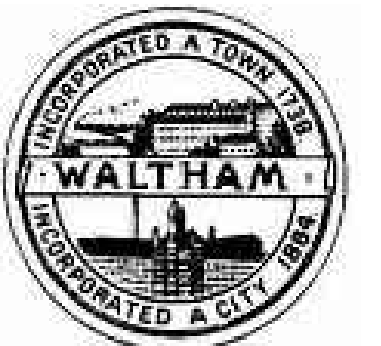


3 TYPICAL MECHANICAL UNIT SUPPORT CURB
SCALE: 3" = 1'-0"



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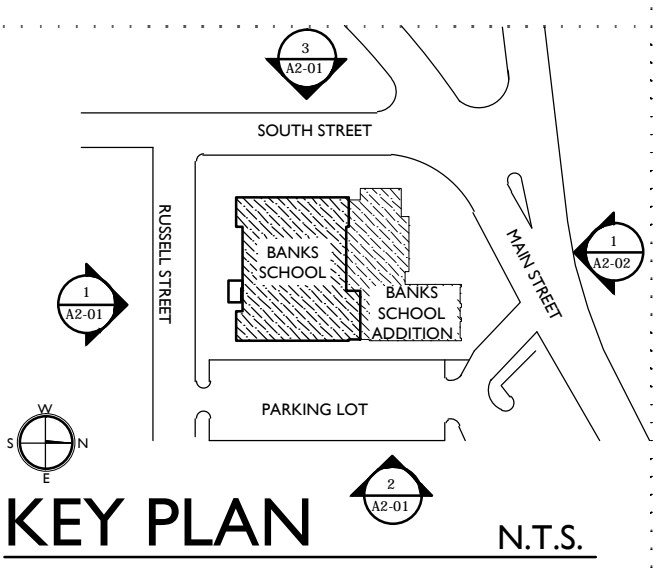
**PHASE III
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ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**TYPICAL
ROOF
DETAILS**



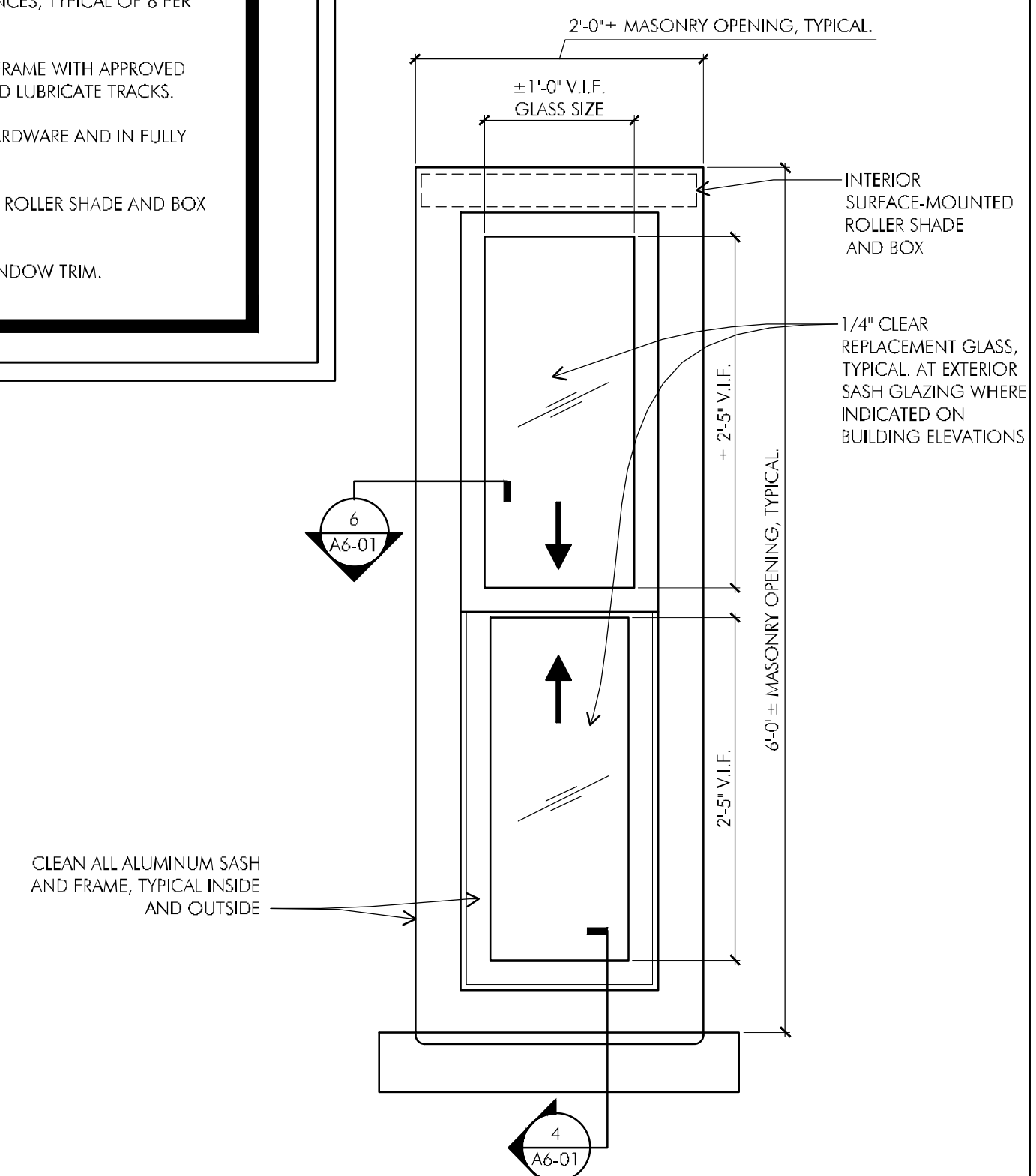
Revisions:

BID DOCUMENTS

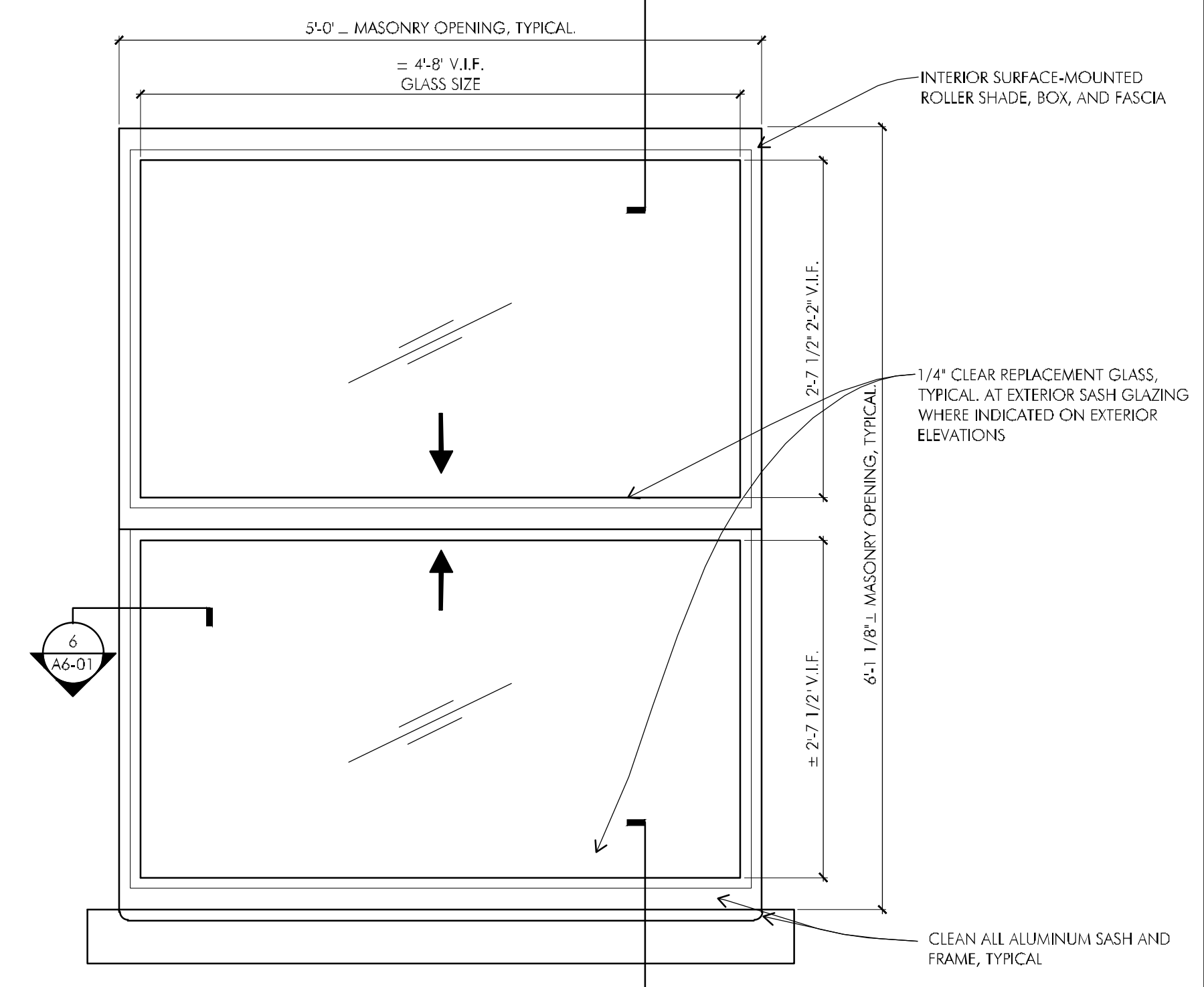
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Project Number: 10025-A
Project Manager: SAW
Drawn By: BLO
Scale: AS NOTED

A5-04

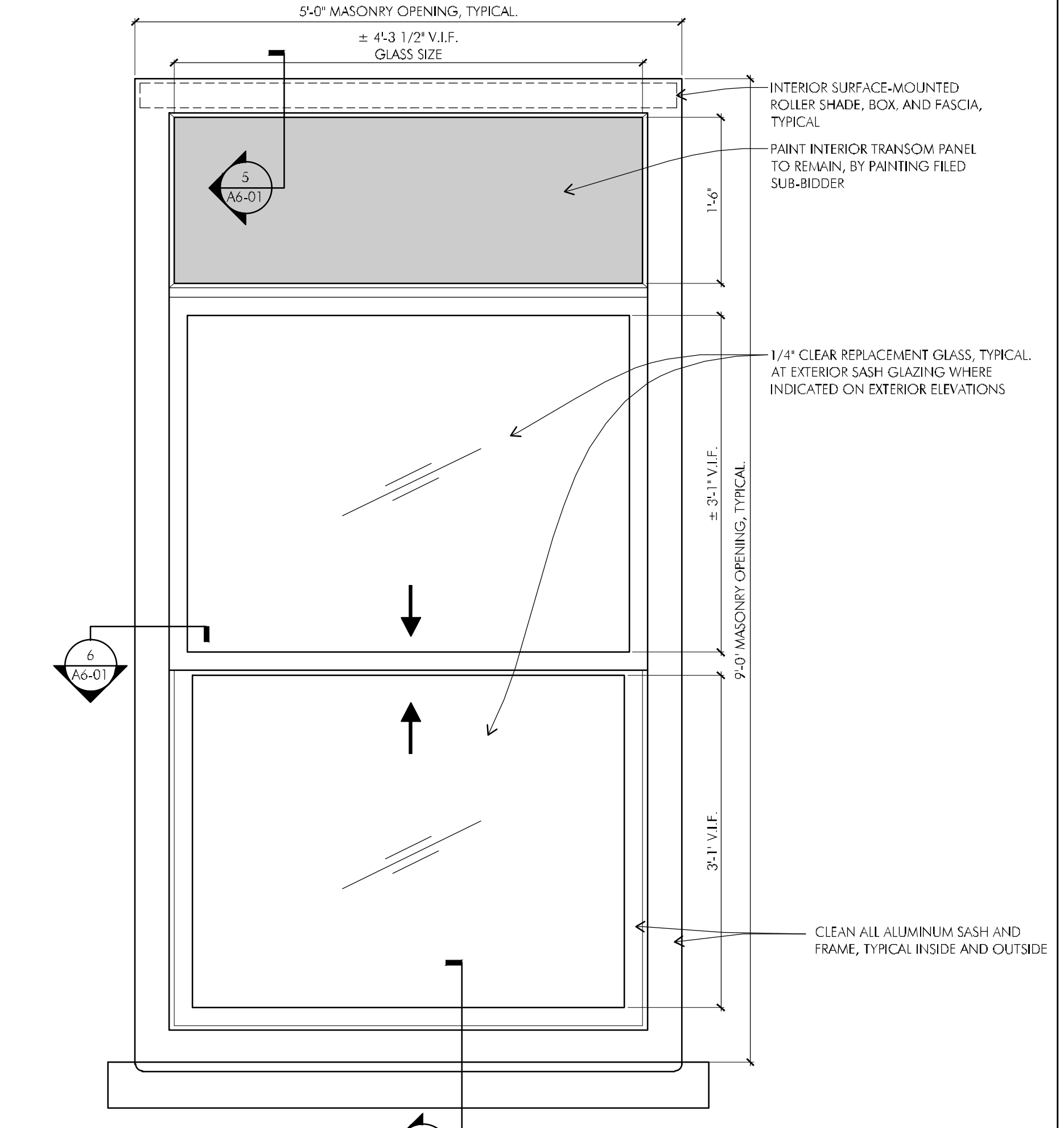
- TYPICAL WINDOW NOTES:**
1. REMOVE ALL DOUBLE-HUNG SASH (INTERIOR AND EXTERIOR) FOR REMOVAL OF GLASS AND CLEANING.
 2. CAREFULLY REMOVE ALL EXISTING GLASS FROM INTERIOR DOUBLE-HUNG SASH, CLEAN GLASS AND REINSTALL GLASS IN EXISTING SASH WITH NEW CONTINUOUS RUBBER GASKET.
 3. AT ALL EXTERIOR DOUBLE-HUNG SASH, REMOVE AND DISPOSE OF 1/4" LEXAN AND REPLACE WITH NEW 1/4" CLEAR GLASS AND NEW CONTINUOUS RUBBER GASKET.
 4. REPLACE ALL DOUBLE-HUNG BALANCES, TYPICAL OF 8 PER WINDOW.
 5. CLEAN ALL ALUMINUM SASH AND FRAME WITH APPROVED ALUMINUM CLEANING AGENT, AND LUBRICATE TRACKS.
 6. REINSTALL SASH WITH ALL NEW HARDWARE AND IN FULLY OPERATING CONDITION.
 7. PROVIDE FULL WIDTH AND HEIGHT ROLLER SHADE AND BOX AT ALL WINDOW HEADS.
 8. RE-FINISH ALL EXISTING WOOD WINDOW TRIM. (BY PAINTING FILED SUB-BIDDER)



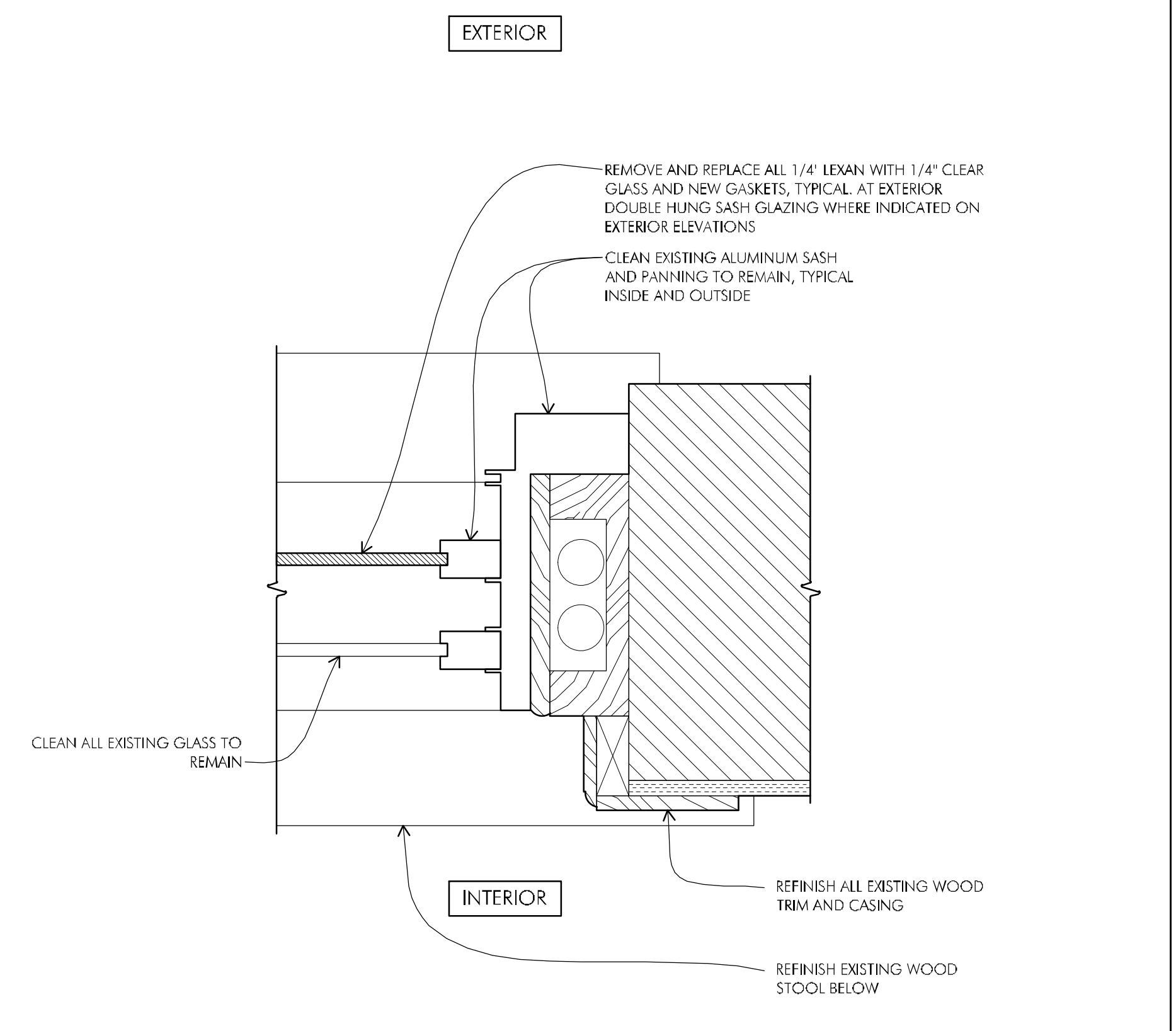
3 TYPICAL TYPE 'C' WINDOW ELEVATION
SCALE: 1" = 1'-0"



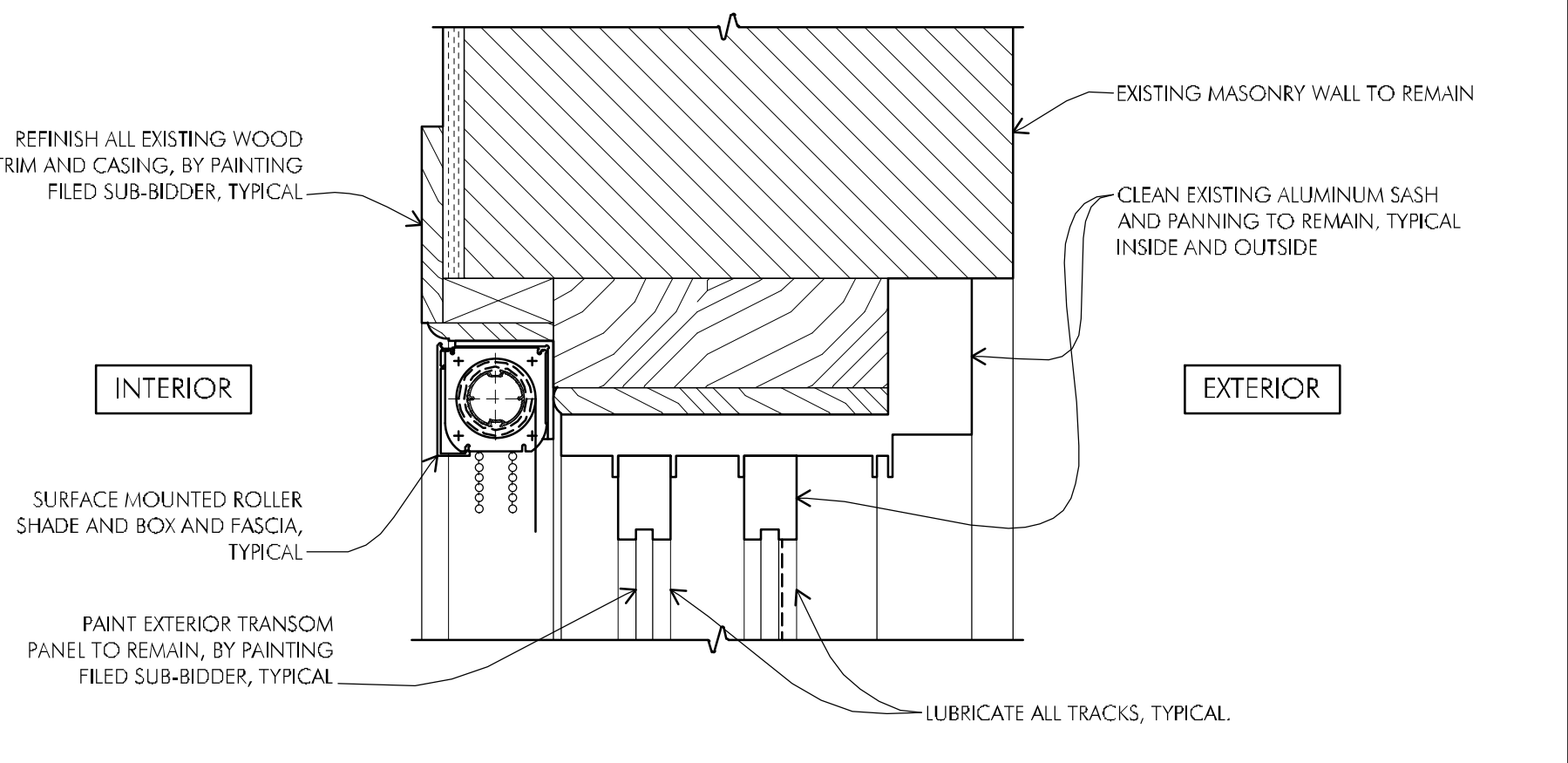
2 TYPICAL TYPE 'B' WINDOW ELEVATION
SCALE: 1" = 1'-0"



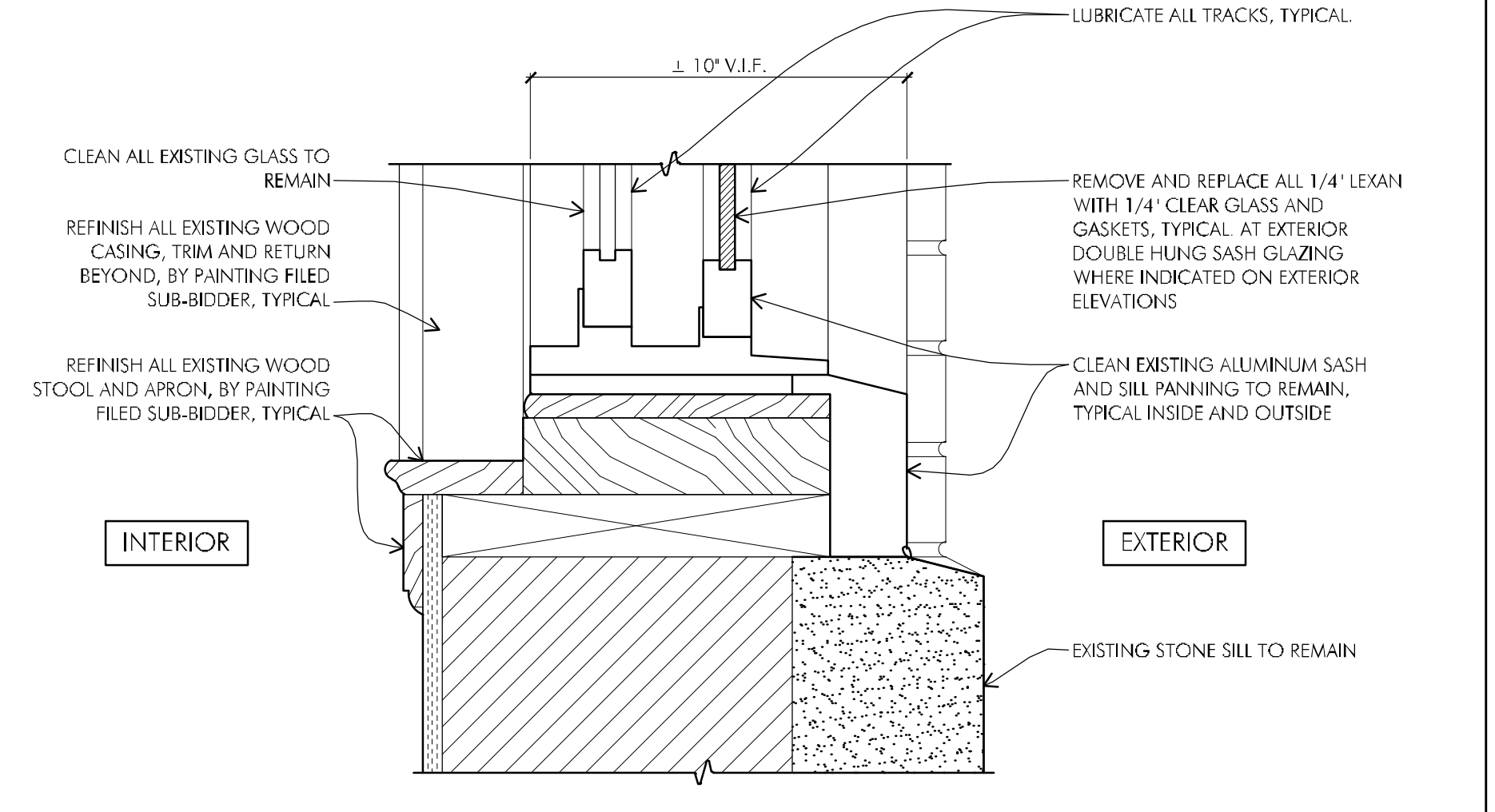
1 TYPICAL TYPE 'A' WINDOW ELEVATION
SCALE: 1" = 1'-0"



6 TYPICAL WINDOW JAMB DETAIL
SCALE: 3/4" = 1'-0"



5 TYPICAL TRANSOM WINDOW HEAD DETAIL
SCALE: 3/4" = 1'-0"

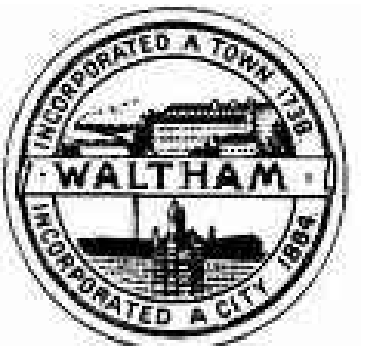


4 TYPICAL WINDOW SILL DETAIL
SCALE: 3/4" = 1'-0"



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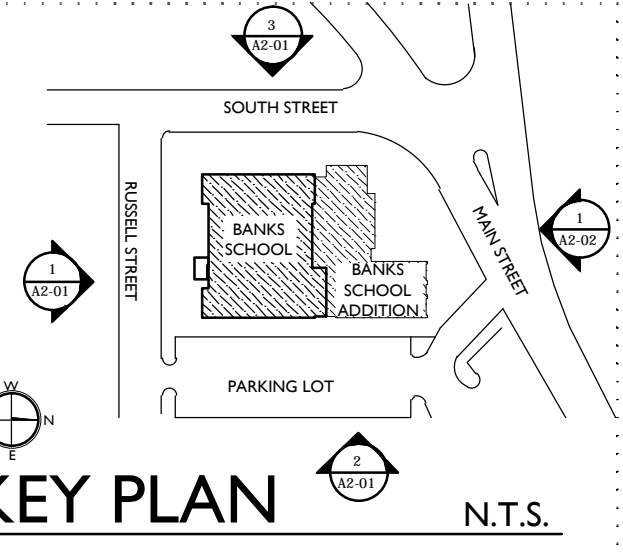
**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**WINDOW
ELEVATIONS,
DETAILS, AND
NOTES**



KEY PLAN N.T.S.

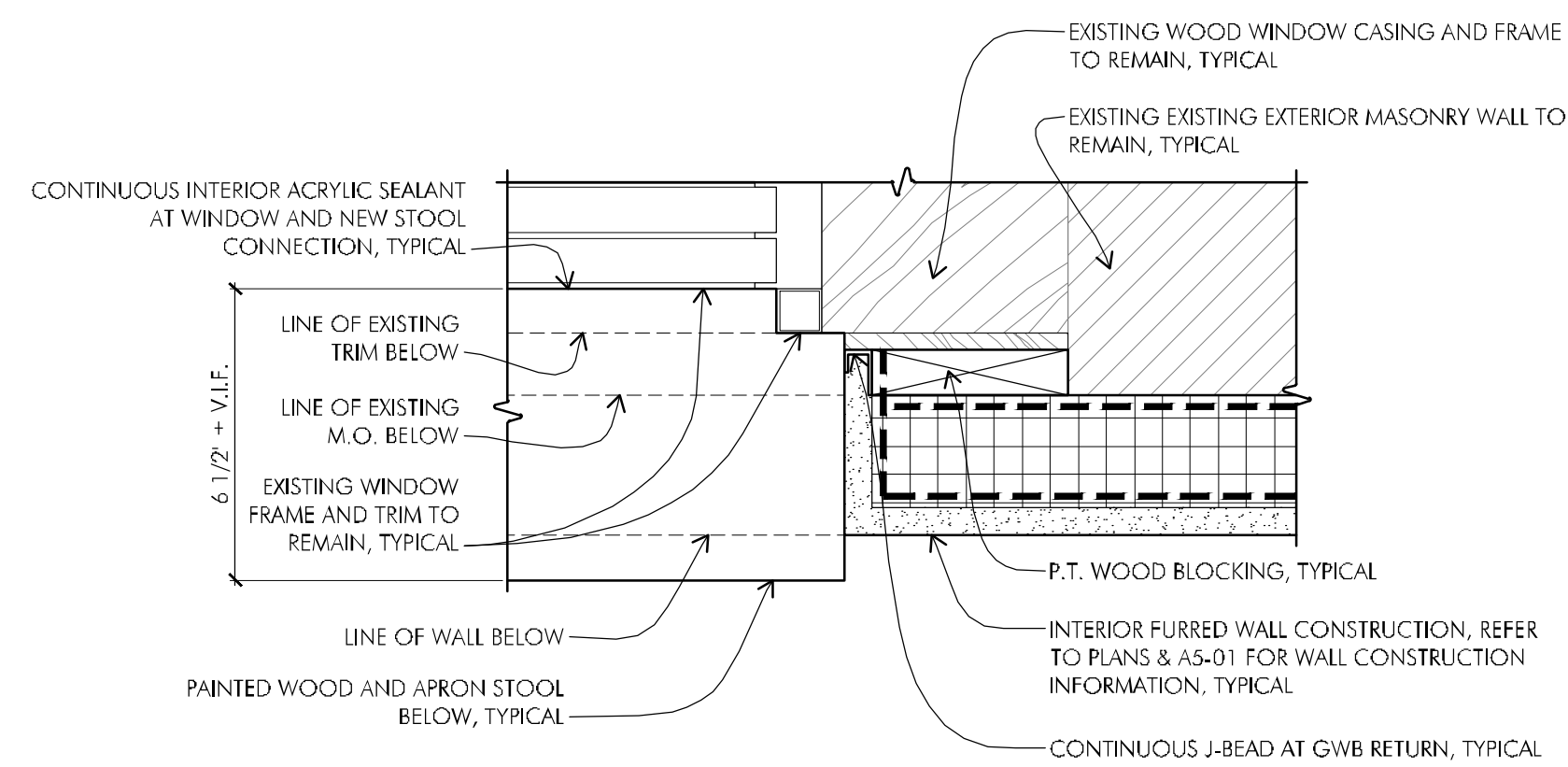
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: DJB
Scale: AS NOTED

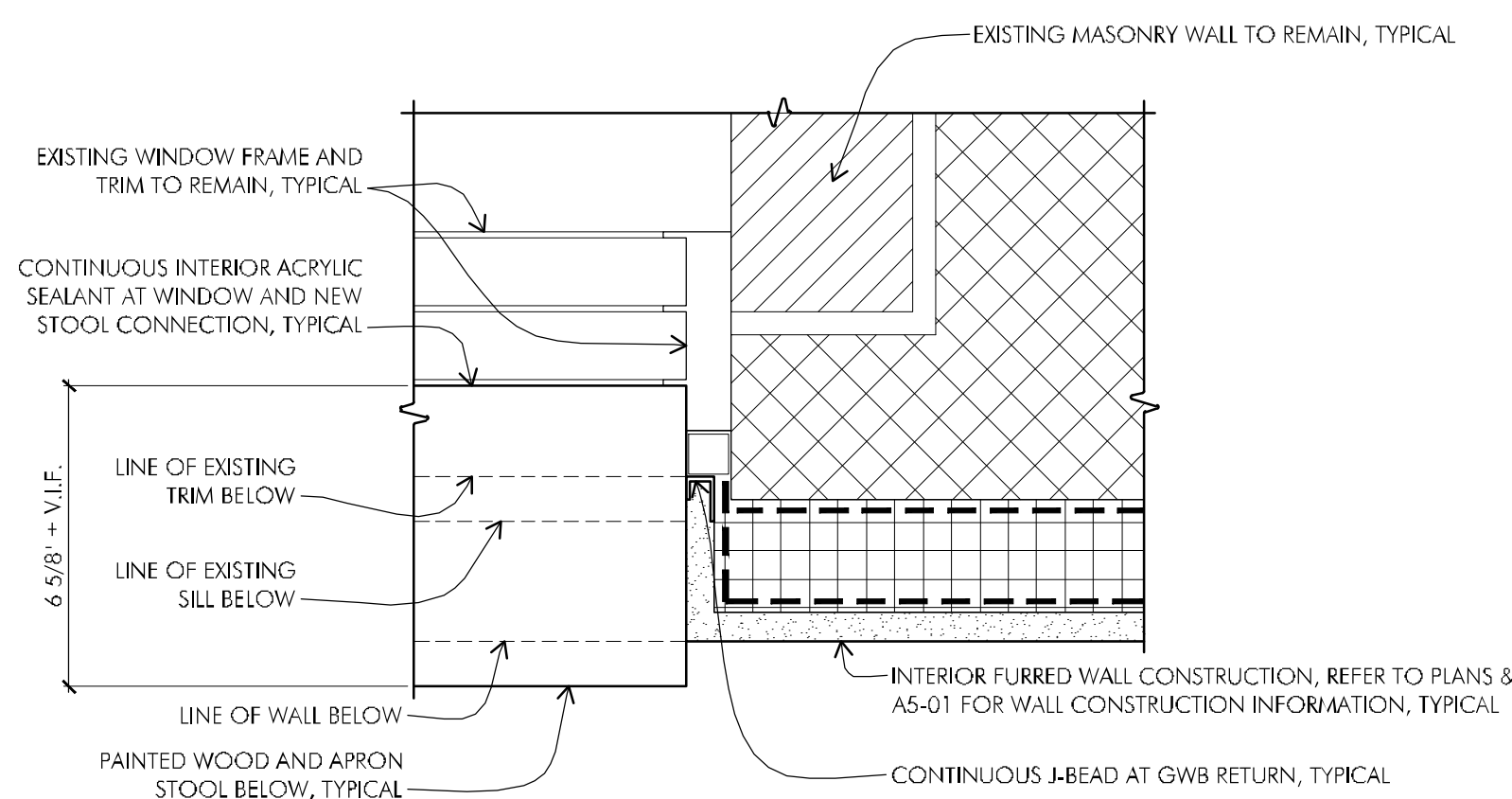
A6-01

TYPICAL WINDOW NOTES:

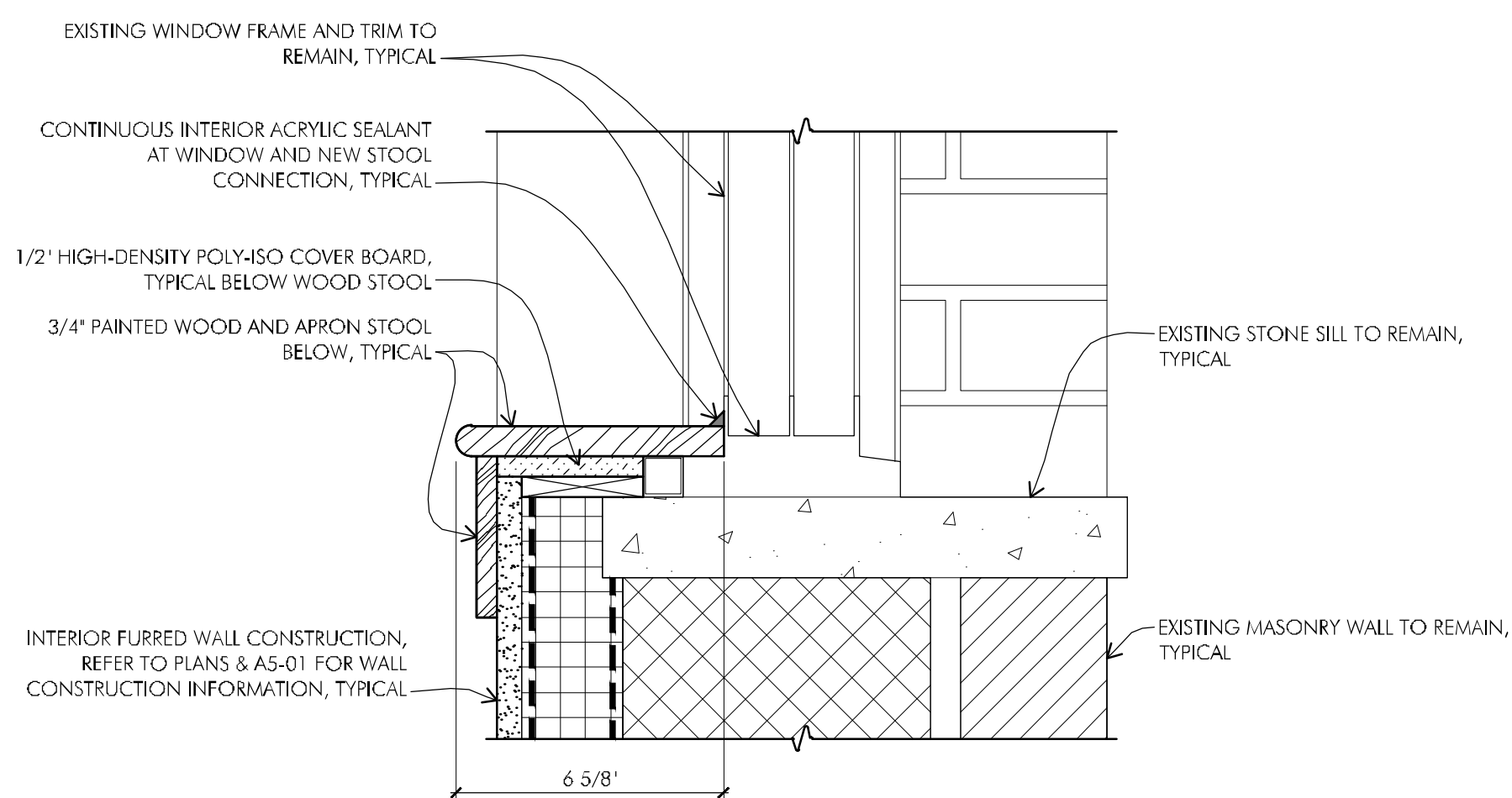
1. REMOVE ALL DOUBLE HUNG SASH (INTERIOR AND EXTERIOR) FOR REMOVAL OF GLASS AND CLEANING.
2. CAREFULLY REMOVE ALL EXISTING GLASS FROM INTERIOR DOUBLE-HUNG SASH, CLEAN GLASS AND REINSTALL GLASS IN EXISTING SASH WITH NEW CONTINUOUS RUBBER GASKET.
3. AT ALL EXTERIOR DOUBLE-HUNG SASH, REMOVE AND DISPOSE OF 1/4" LEXAN AND REPLACE WITH NEW 1/4" CLEAR GLASS AND NEW CONTINUOUS RUBBER GASKET.
4. REPLACE ALL DOUBLE-HUNG BALANCES, TYPICAL OF 8 PER WINDOW.
5. CLEAN ALL ALUMINIUM SASH AND FRAME WITH APPROVED ALUMINIUM CLEANING AGENT, AND LUBRICATE TRACKS.
6. RE-INSTALL SASH WITH ALL NEW HARDWARE AND IN FULLY OPERATING CONDITION.
7. PROVIDE FULL WIDTH AND HEIGHT ROLLER SHADE AND BOX AT ALL WINDOW HEADS.
8. RE-FINISH ALL EXISTING WOOD WINDOW TRIM. (BY PAINTING FILES SUB-BIDDER)



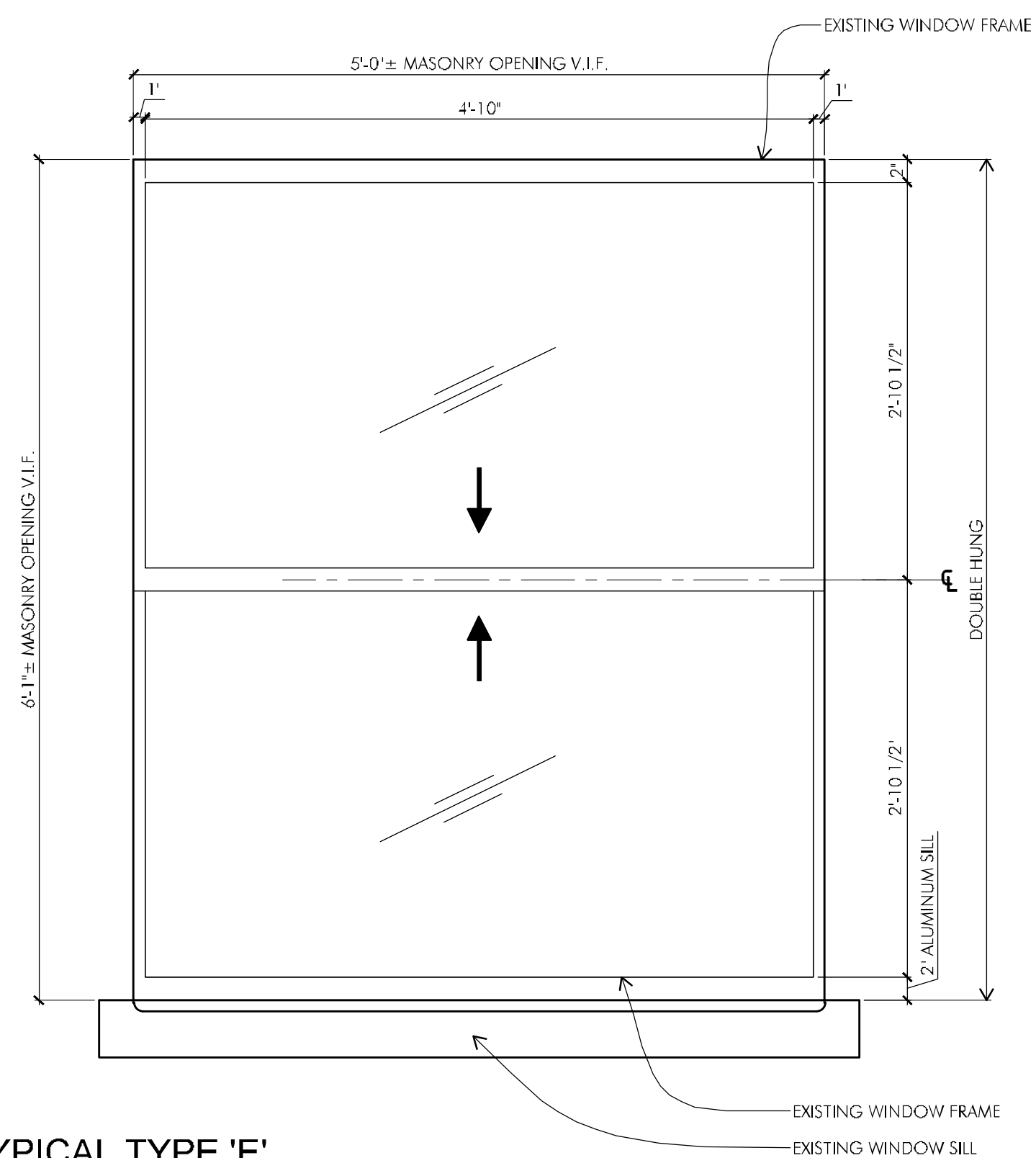
5 TYPICAL INTERIOR JAMB DETAIL AT UNIT 100 WINDOW OPENINGS
SCALE: 1" = 1'-0"



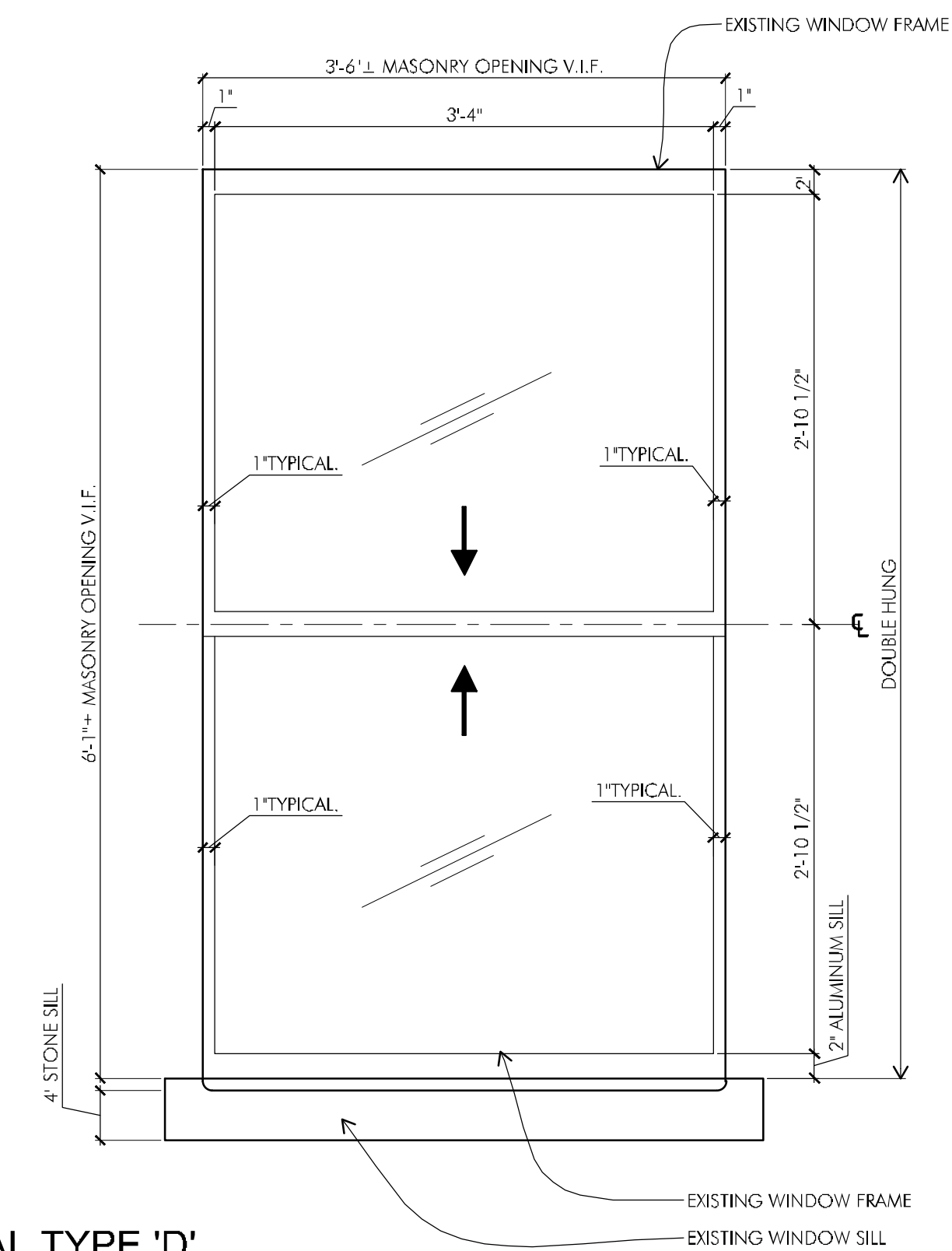
6 TYPICAL INTERIOR JAMB DETAIL AT UNIT 104, 105 & 106 WINDOW OPENINGS
SCALE: 1" = 1'-0"



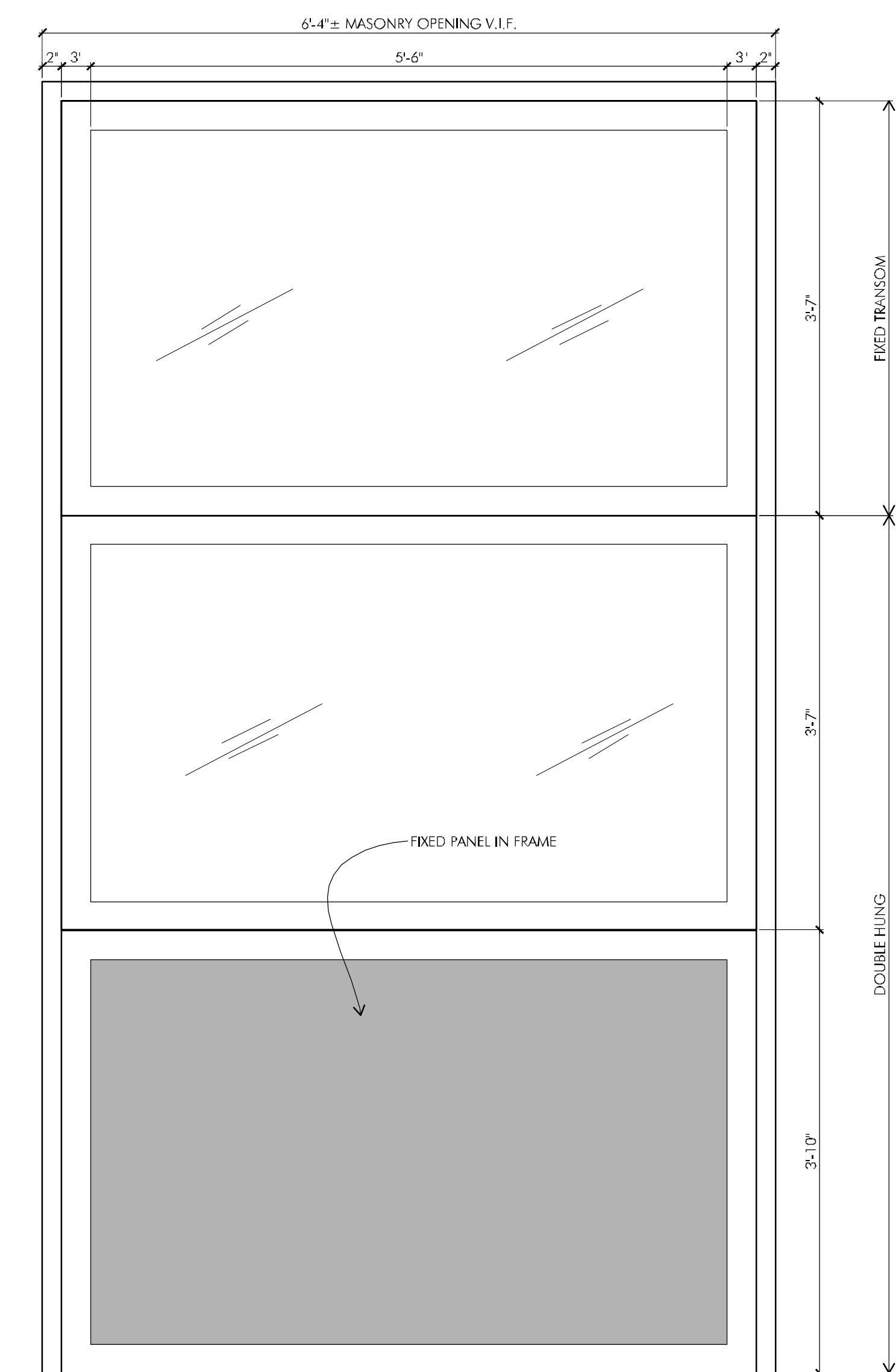
7 TYPICAL INTERIOR SILL DETAIL AT UNIT 104, 105 & 106 WINDOW OPENINGS (UNIT 100 SILL IS SIM.)
SCALE: 1" = 1'-0"



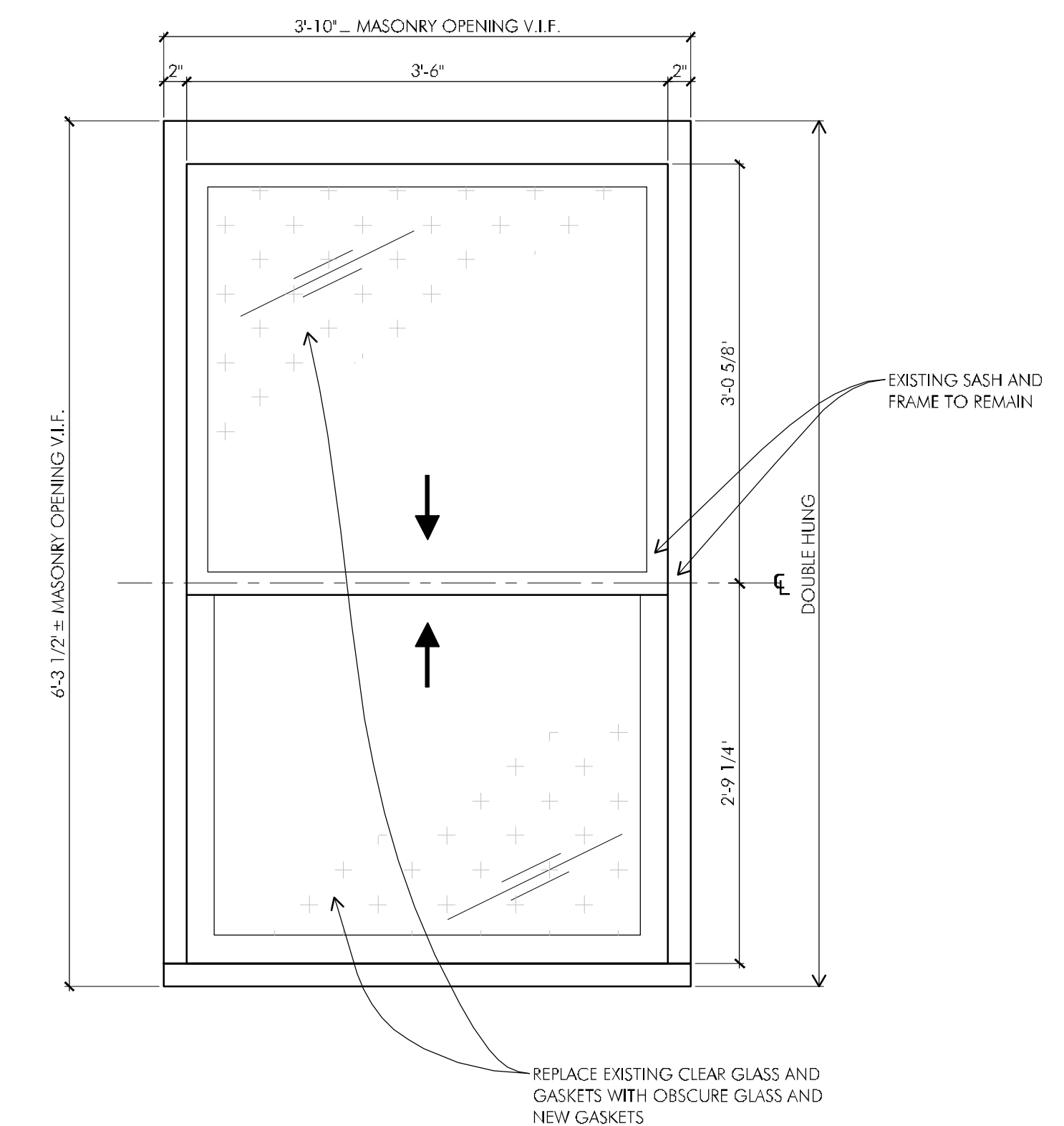
4 TYPICAL TYPE 'E' WINDOW ELEVATION
SCALE: 1" = 1'-0"



2 TYPICAL TYPE 'D' WINDOW ELEVATION
SCALE: 1" = 1'-0"



3 TYPICAL TYPE 'G' WINDOW ELEVATION
SCALE: 1" = 1'-0"

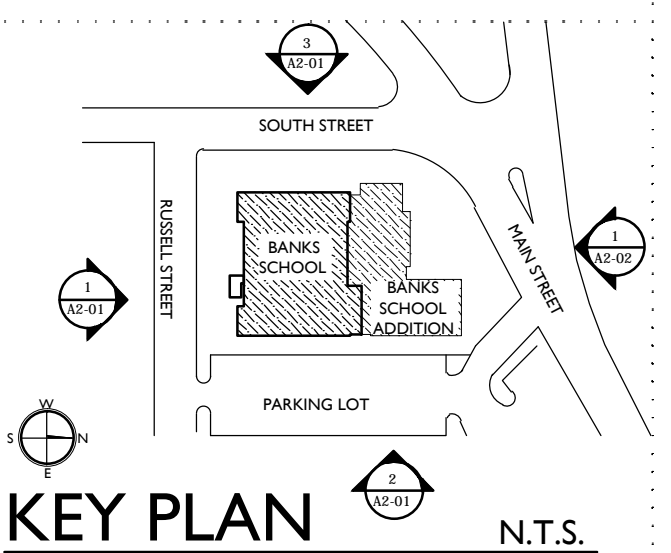


1 TYPICAL TYPE 'F' WINDOW ELEVATION
SCALE: 1" = 1'-0"



Drawing Title:

WINDOW
ELEVATIONS,
DETAILS, AND
NOTES

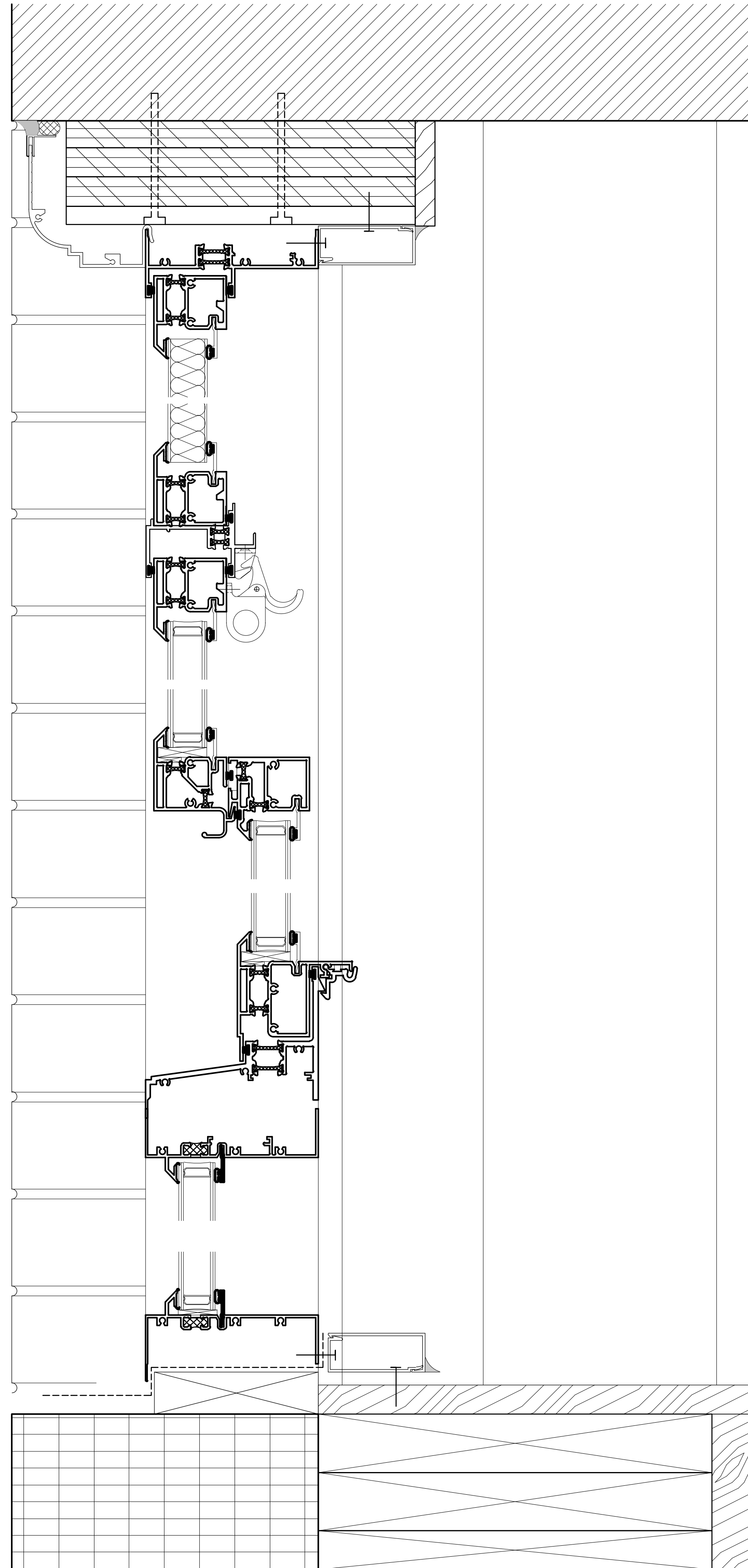


Revisions:

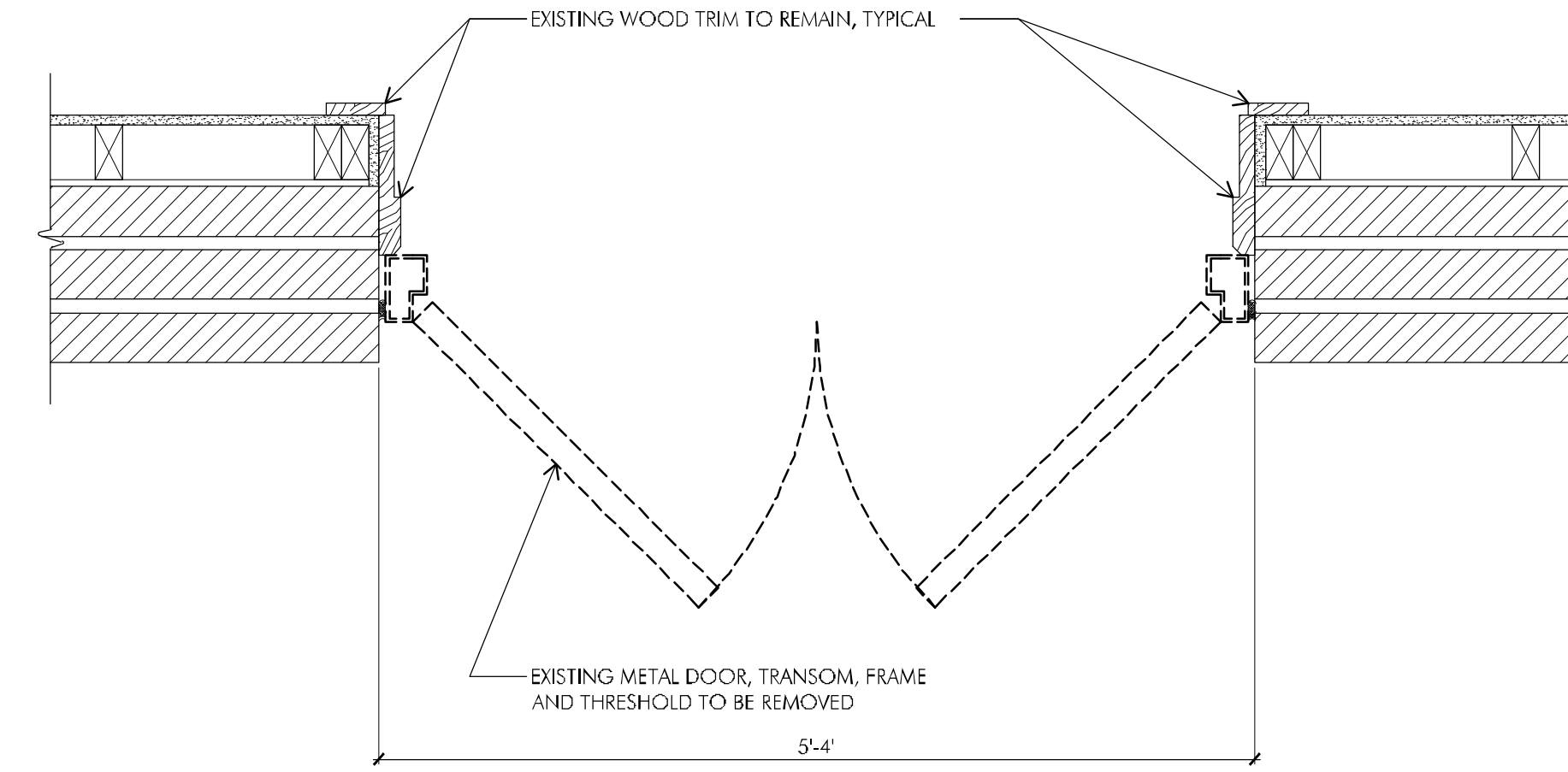
BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: DJB
Scale: AS NOTED

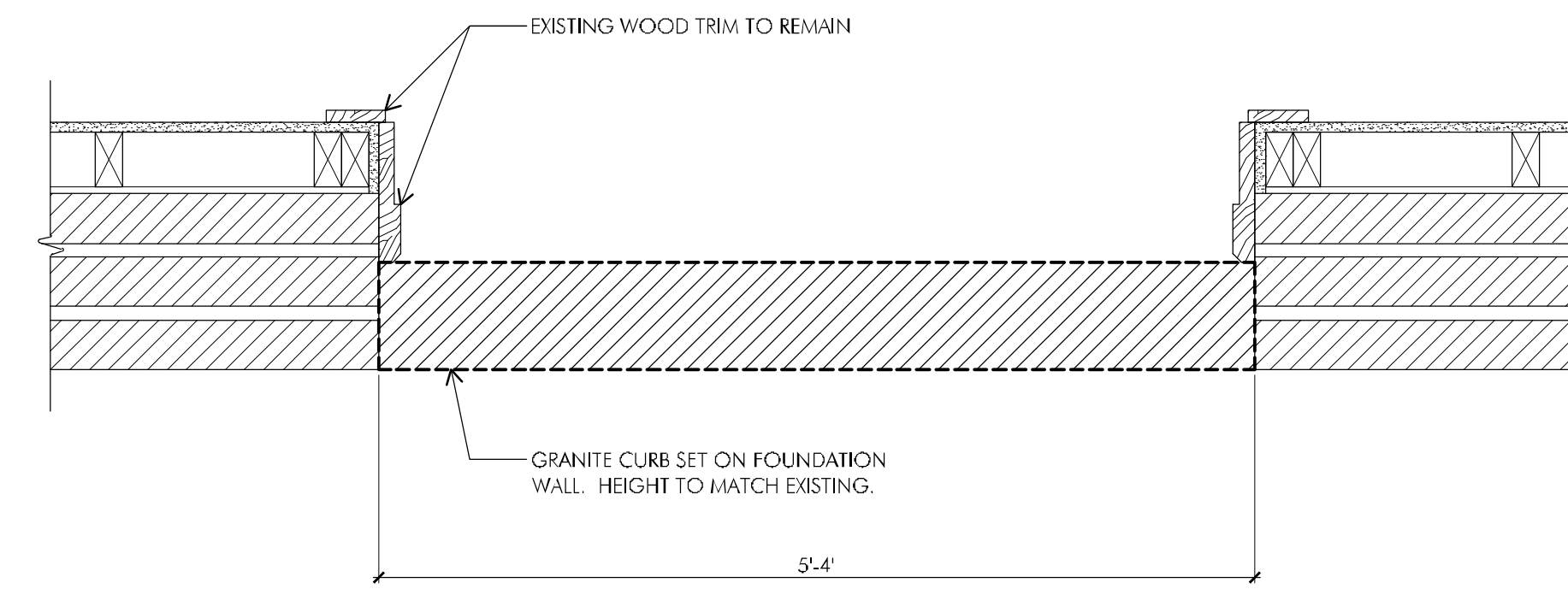
A6-02



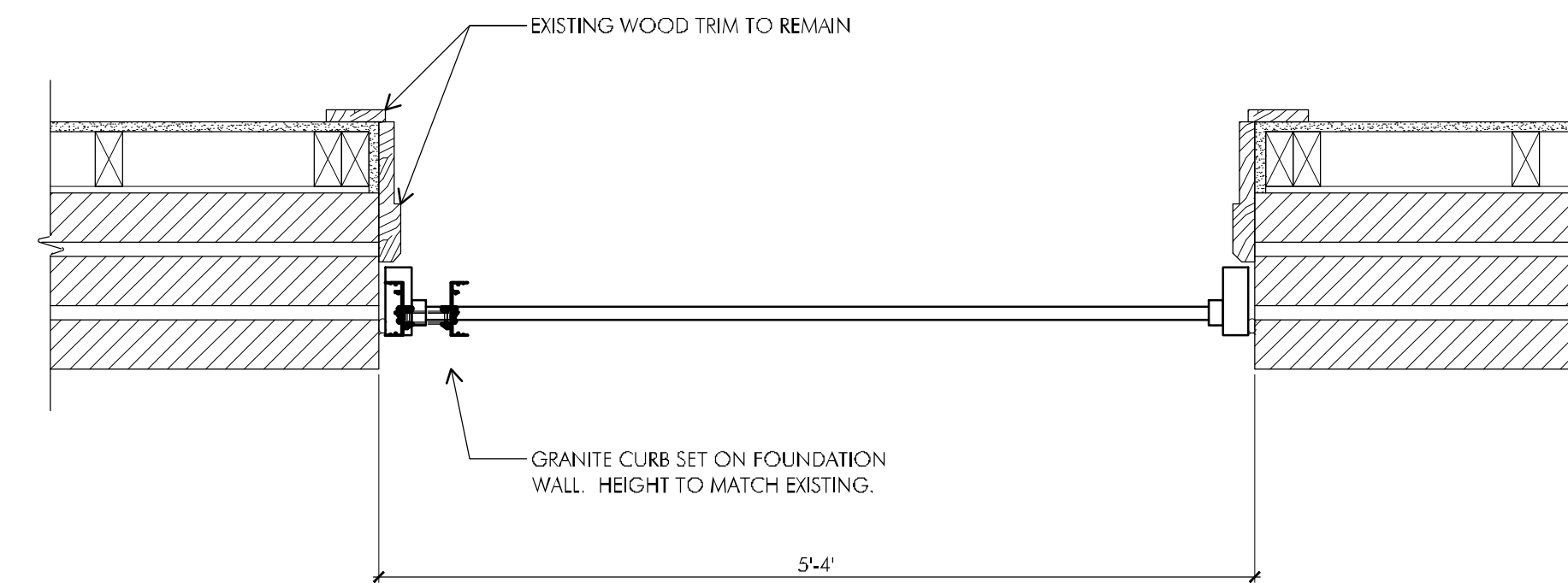
4 TYPICAL WINDOW JAMB DETAIL
SCALE: 6"=1'-0"



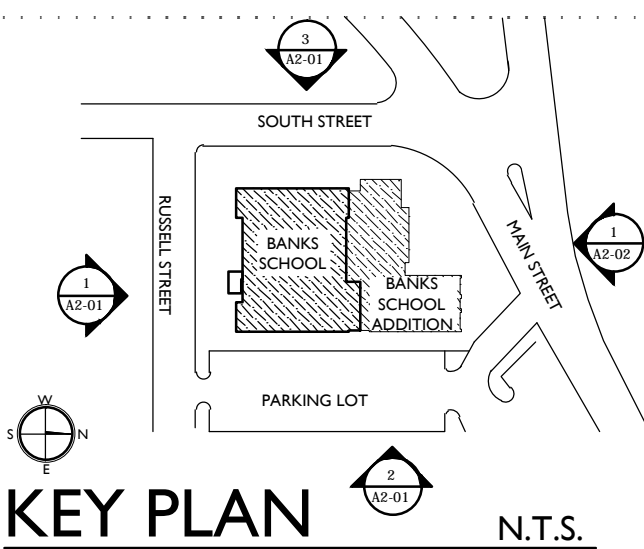
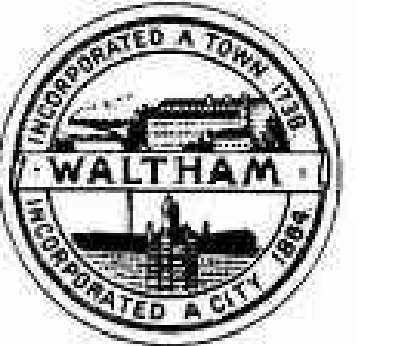
1 DOOR DEMOLITION PLAN AT WINDOW 'G'
SCALE: 1"=1'-0"



2 WINDOW TYPE 'G' SILL DETAIL
SCALE: 1"=1'-0"

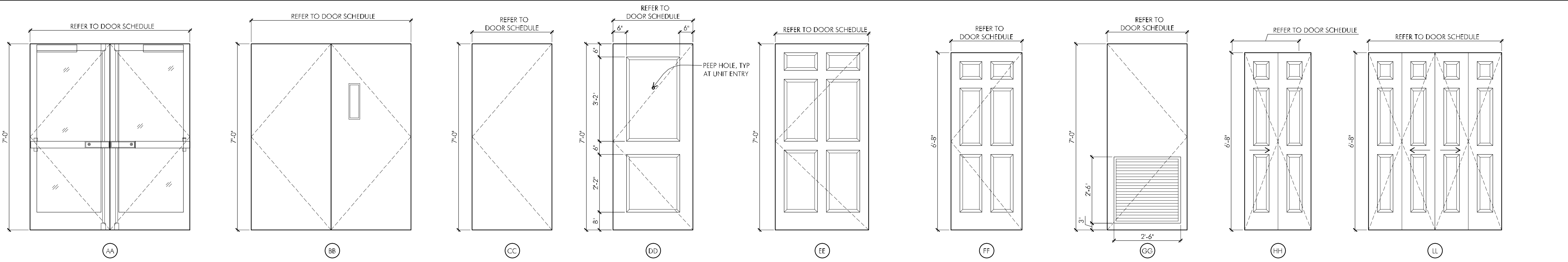


3 WINDOW TYPE 'G' DETAIL
SCALE: 1"=1'-0"

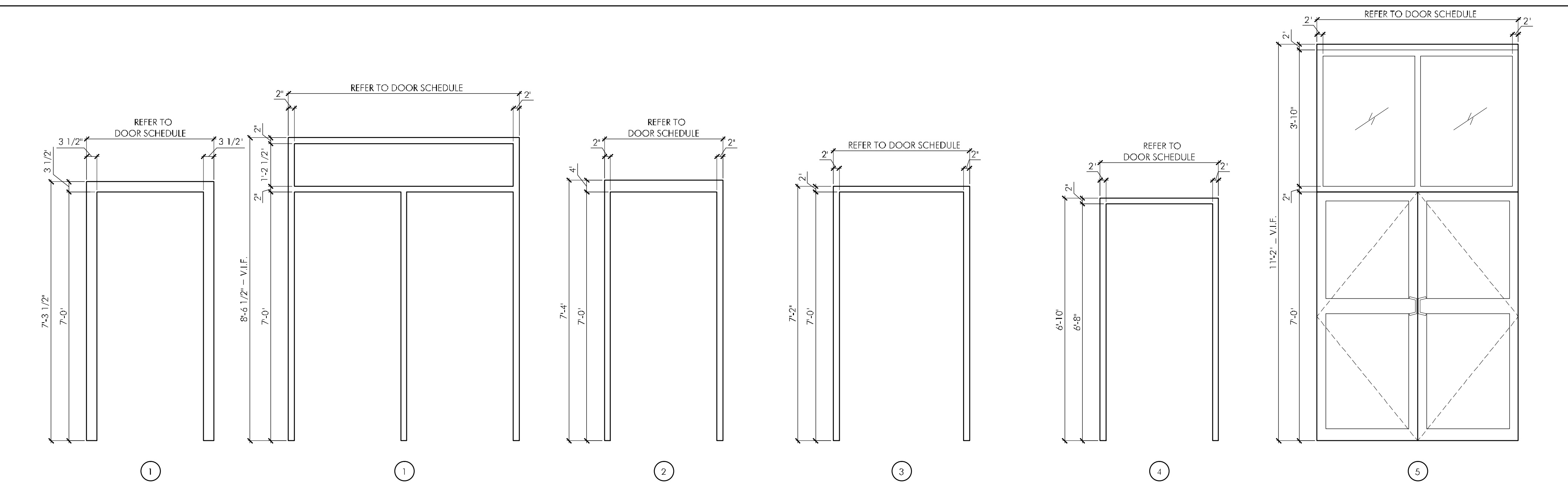


LOCATION	TAG	Door Schedule											REMARKS	TAG		
		SIZE	TYPE	MATERIAL	FINISH	TYPE	MATERIAL	FINISH	CLOSER	UNDERCUT	THRESHOLD	VISION PANEL			WEATHER STRIPPING	FIRE RATING
TYP. UNIT ENTRY	A	(1) 3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	2	HOLLOW METAL	PAINT	YES	NO	NO	NO	YES	20 MIN	PEEP HOLE	A
TYP. UNIT MECH. ROOM	B	(1) 3'-0"x6'-8"	GG	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	NO	NO	NO	YES	-	LOUVRE - COORDINATE WITH MECHANICAL CONTRACTOR	B
TYP. UNIT BATHROOM	C	(1) 2'-8"x6'-8"	FF	MASONITE	PAINT	4	WOOD	PAINT	YES	NO	NO	NO	YES	-		C
TYP. UNIT LAUNDRY	D	3'-0"x6'-8" BI-FOLD	HH	MASONITE	PAINT	4	WOOD	PAINT	NO	NO	NO	NO	YES	-		D
TYP. UNIT BEDROOM	E	(1) 2'-8"x6'-8"	FF	MASONITE	PAINT	4	WOOD	PAINT	NO	NO	NO	NO	YES	-		E
TYP. UNIT BEDROOM CLOSET	F	5'-0"x6'-8" BI-FOLD	LL	MASONITE	PAINT	4	WOOD	PAINT	NO	NO	NO	NO	YES	-		F
TYP. COAT CLOSET	G	(1) 2'-8"x6'-8"	FF	MASONITE	PAINT	4	WOOD	PAINT	NO	NO	NO	NO	YES	-		G
STORAGE #133	01	3'-0"x7'-0"	GG	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	NO	NO	20 MIN		01
MECHANICAL ROOM #132	02	3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	NO	NO	20 MIN		02
STAIR #3	03	(2) 3'-0"x7'-0"	BB	HOLLOW METAL	PAINT	2	HOLLOW METAL	PAINT	YES	NO	NO	YES	NO	45 MIN		03
STORAGE #127	04	3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	45 MIN		04
WEST CORRIDOR/STAIR #3	05	3'-0"x7'-0"	DD	HOLLOW METAL	PAINT	ETR	HOLLOW METAL	PAINT	YES	NO	NO	YES	YES	45 MIN		05
CORRIDOR	06	3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		06
STORAGE #125	07	(2) 3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		07
STORAGE #123	08	(2) 3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		08
STORAGE #122	09	2'-11"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		09
STORAGE #118	10	3'-2"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		10
STORAGE LOBBY	11	3'-0"x7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		11
BOILER ROOM	12	3'-5"x7'-2"	CC	HOLLOW METAL	PAINT	2	HOLLOW METAL	PAINT	YES	NO	NO	YES	YES	45 MIN		12
STORAGE	13	3'-0"x7'-0"	ETR	SC WOOD	STAIN/FINISH	ETR	WOOD	PAINT	YES	NO	NO	YES	YES	20 MIN		13
VESTIBULE #2	14	(2) 3'-0"x7'-0"	AA	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	NO	YES	NO	YES	-		14
VESTIBULE #2 EXTERIOR	15	5'-8"x11'-2" M.O.	AA	HOLLOW METAL	PAINT	5	ALUMINUM	ANNODIZED	YES	NO	YES	NO	YES	-	STOREFRONT	15
MECHANICAL ROOM	16	3'-0" x 7'-0"	DD	SC WOOD	STAIN/FINISH	1	WOOD	PAINT	YES	NO	NO	NO	NO	20 MIN	REPLACEMENT HARDWARE SET	16
VESTIBULE #3	17	(2) 3'-0"x7'-0"	AA	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	NO	YES	NO	YES	-		17
GYM STORAGE	18	(2) 3'-0"x7'-0"	BB	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	NO	NO	NO	NO	-		18
GYMNASIUM	19	3'-0" x 7'-0"	CC	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	NO	NO	NO	NO	45 MIN		19
WOMENS TOILET	20	3'-0" x 7'-0"	CC	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	YES	YES	YES	NO	-		20
MENS TOILET	21	3'-0" x 7'-0"	CC	HOLLOW METAL	PAINT	3	HOLLOW METAL	PAINT	YES	YES	YES	YES	NO	-		21
JANITORS CLOSET	22	3'-0" x 7'-0"	ETR	ETR/HM	PAINT	ETR	HOLLOW METAL	PAINT	YES	NO	NO	NO	NO	45 MIN		22

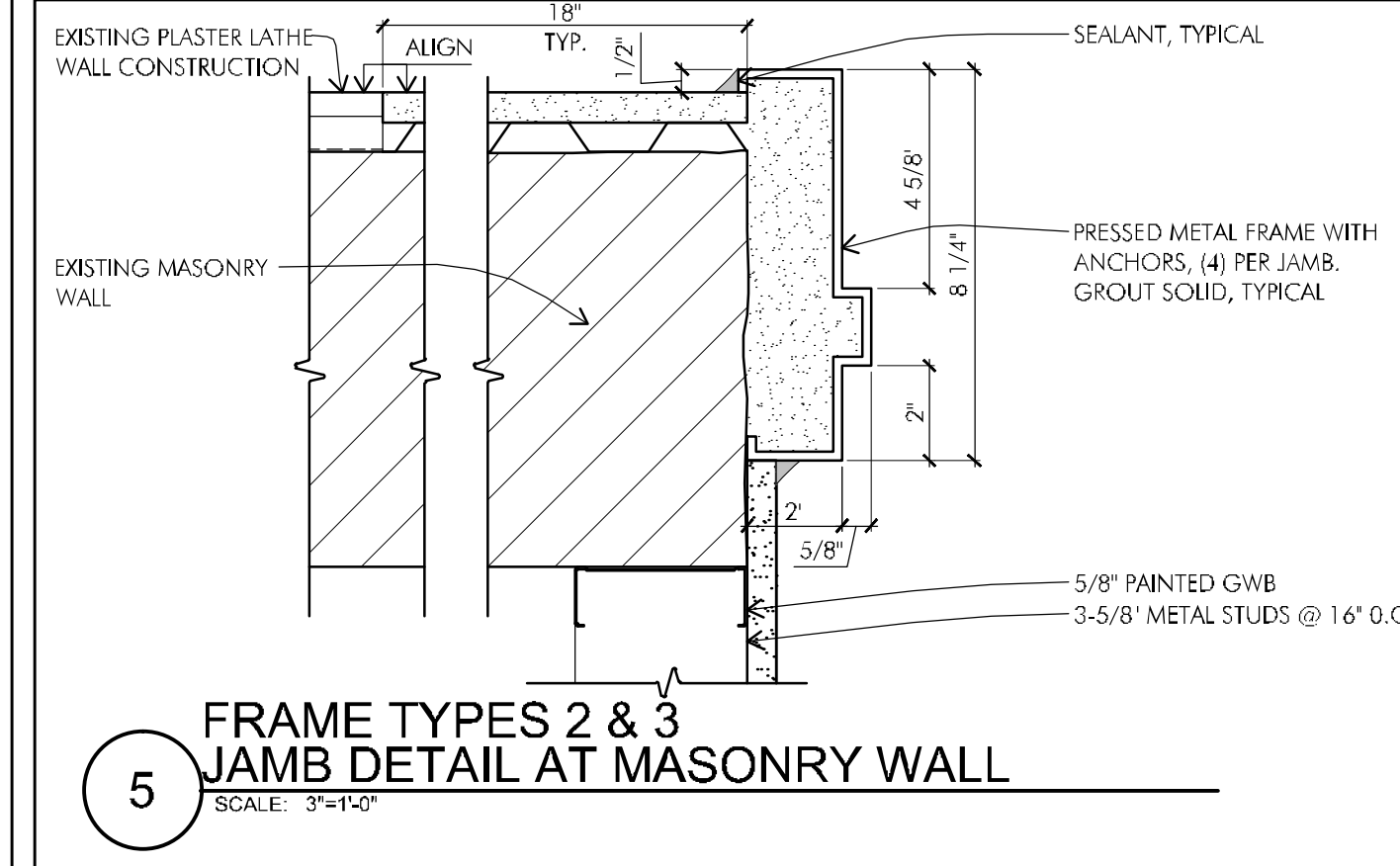
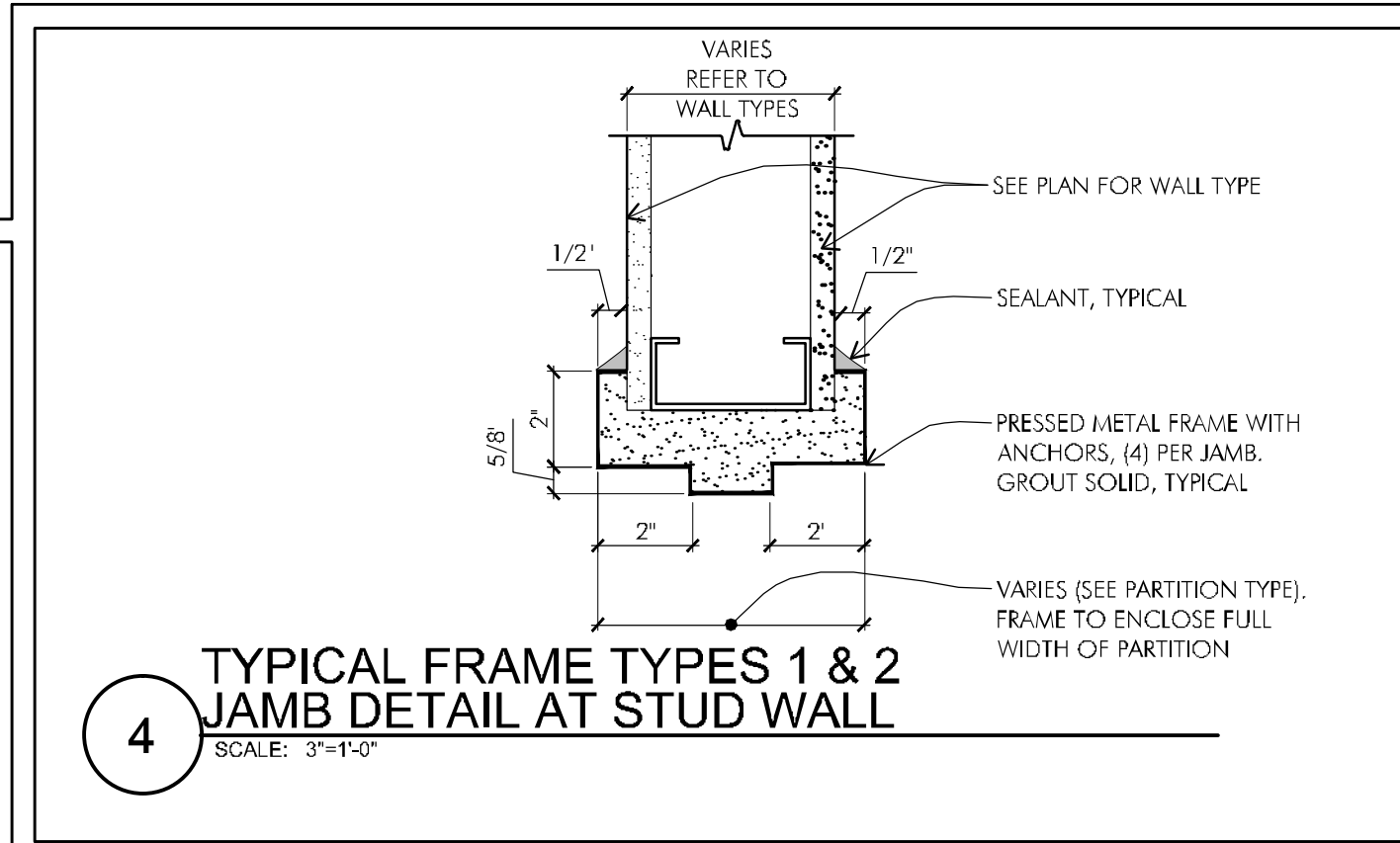
NOTES:
1. REFER TO OVERALL AND ENLARGED FLOOR PLANS FOR LOCATION(S), AND QUANTITY OF TYPICAL UNIT DOORS AND FRAMES.
2. GENERAL CONTRACTOR SHALL COORDINATE DOOR AND FRAME SIZES WITH EXTENT OF DEMOLITION. REFER TO DEMOLITION DRAWINGS.



1 TYPICAL DOOR TYPE ELEVATIONS
SCALE: 1/2"=1'-0"



2 TYPICAL FRAME TYPE ELEVATIONS
SCALE: 1/2"=1'-0"

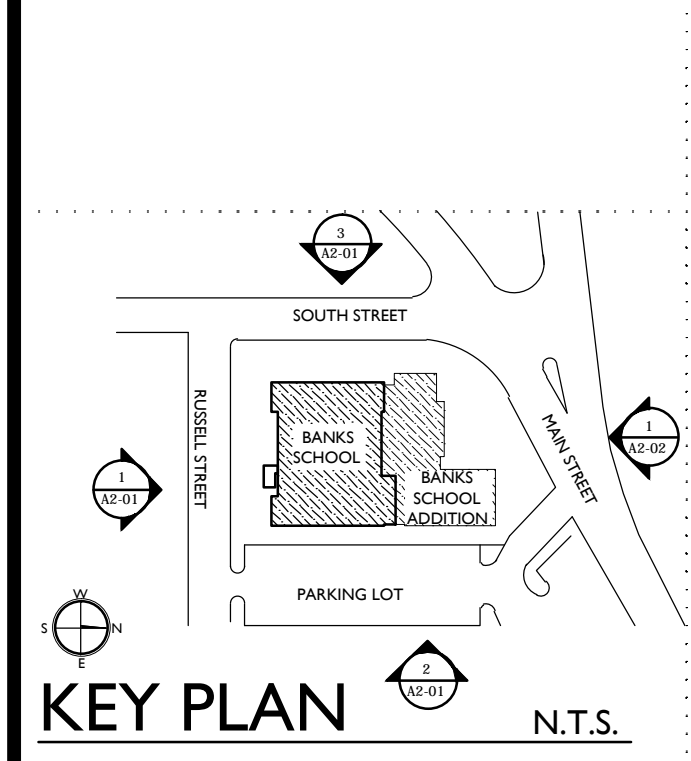


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PHASE III
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CITY HALL
610 MAIN STREET
WALTHAM, MA

DOOR SCHEDULE AND DETAILS



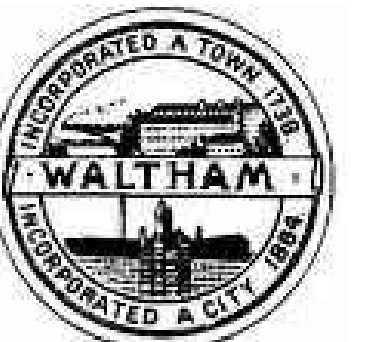
Revisions:
Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: DJB
Scale: AS NOTED

BID DOCUMENTS

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PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS

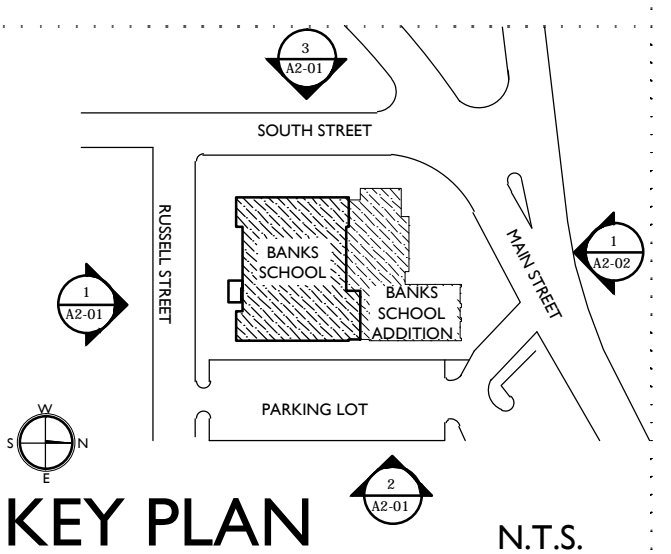
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

FIRST FLOOR
STRUCTURAL PLAN

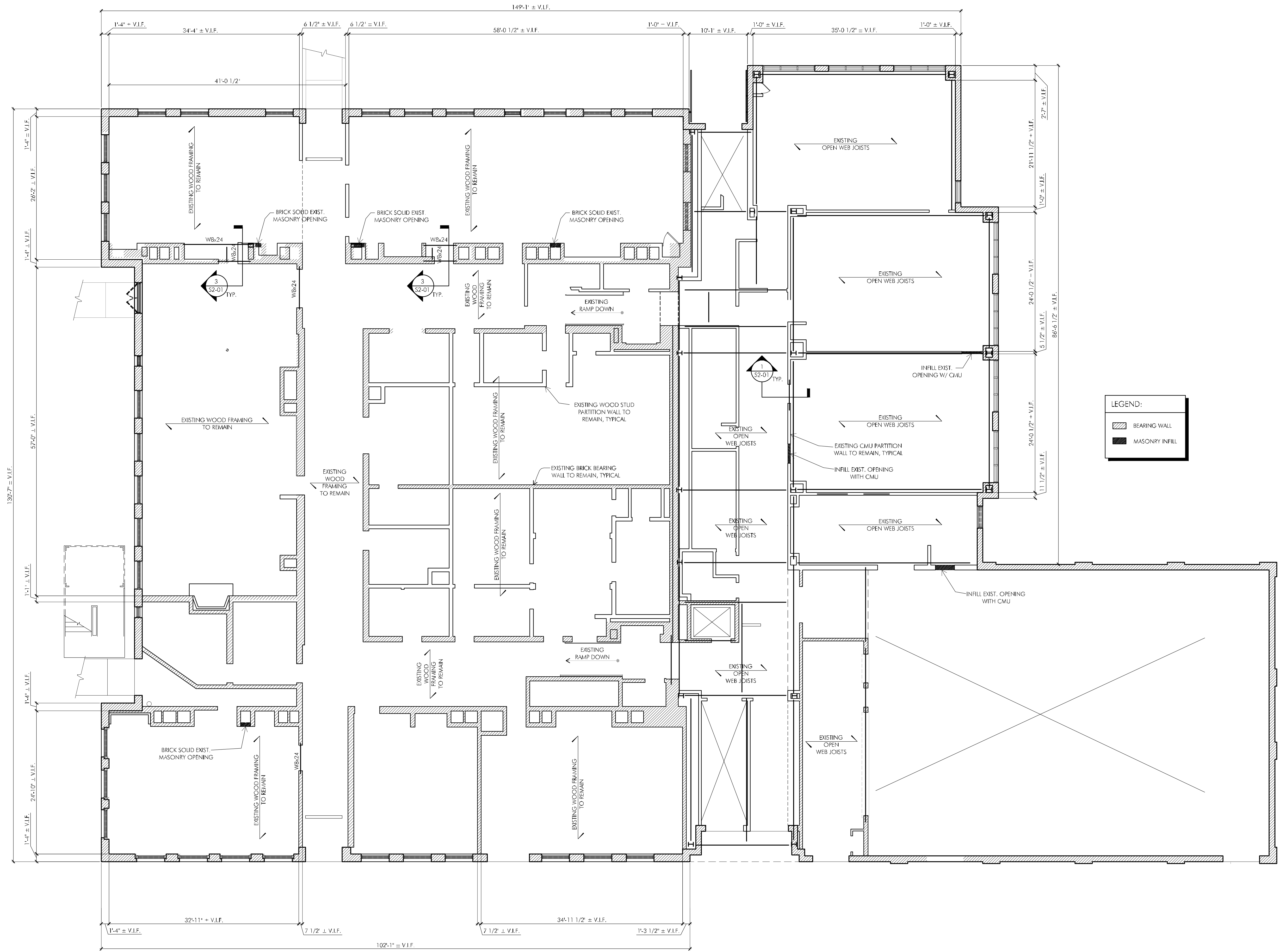


Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB, BLO
Scale: 1/8" = 1'-0"

SI-01



P:\2010\10025-A\Struct\1st Floor (Phase 3)\STRUCTURAL\10025-A SI-01.dwg Mar 06, 2012 - 8:37 pm BOBSONNE

1 FIRST FLOOR PLAN / 2ND FLOOR FRAMING
SCALE: 1/8" = 1'-0"

GENERAL

- G1 CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING AND COORDINATING ALL DIMENSIONS WITH ARCHITECTURAL DRAWINGS. IN CASE OF CONFLICT, THE ARCHITECT SHALL BE NOTIFIED AND SHALL RESOLVE THE CONFLICT.
- G2 IN ANY CASE OF CONFLICT BETWEEN THE DRAWINGS AND THE PROJECT SPECIFICATIONS, THE MORE STRINGENT REQUIREMENTS SHALL GOVERN.
- G3 THE CONTRACTOR SHALL MAKE NO DEVIATION FROM DESIGN DRAWINGS WITHOUT PRIOR REVIEW BY THE ARCHITECT.
- G4 WORK NOT INDICATED ON A PART OF THE DRAWINGS BUT REASONABLY IMPLIED TO BE SIMILAR TO THAT SHOWN AT CORRESPONDING PLACES SHALL BE REPEATED.
- G5 ALL WORK SHALL COMPLY WITH APPLICABLE CODES AND LOCAL LAWS AND REGULATIONS.
- G6 GENERAL CONTRACTOR SHALL COORDINATE LOCATIONS OF OPENINGS, PITS, BOXES, SUIPS, TRENCHES, SLEEVES, DEPRESSIONS, GROOVES, AND CHAMFERS, WITH MECHANICAL, ELECTRICAL AND PLUMBING TRADES.
- G7 THE STRUCTURAL DESIGN OF THE BUILDING IS BASED ON THE FULL INTERACTION OF ALL ITS COMPONENT PARTS. NO PROVISIONS HAVE BEEN MADE FOR CONDITIONS OCCURRING DURING CONSTRUCTION. IT IS THE SOLE RESPONSIBILITY OF THE CONTRACTOR TO MAKE PROPER AND ADEQUATE PROVISIONS FOR STABILITY OF, AND ALL STRESSES TO, THE STRUCTURE DUE TO ANY CAUSE DURING CONSTRUCTION.
- G8 CONTRACTOR SHALL NOT SCALE DRAWINGS. CONTRACTOR SHALL REQUEST ALL DIMENSIONS OR INFORMATION REQUIRED TO PERFORM THE WORK FROM THE ARCHITECT. WORK COMPLETED BY THE CONTRACTOR WITHOUT DIMENSIONS OR INFORMATION SHALL BE DONE AT HIS OWN RISK AND SHALL BE REMOVED AND REINSTALLED TO THE SPECIFICATIONS OF THE ARCHITECT AT NO ADDITIONAL COST TO THE OWNER.
- G9 MEANS AND METHODS OF CONSTRUCTION AS WELL AS COMPLIANCE WITH OSHA AND OTHER SAFETY LAWS AND REGULATIONS IS EXCLUSIVE RESPONSIBILITY OF THE CONTRACTOR, HIS SUBCONTRACTOR(S), SUPPLIERS, CONSULTANTS AND SERVANTS.

STRUCTURAL DESIGN CRITERIA

- 1 CODES: MASSACHUSETTS STATE BUILDING CODE - SEVENTH EDITION
- 2 DESIGN LOADS:
 - A LIVE LOADS
 - i ROOMS 40 PSF
 - ii CORRIDORS 80 PSF
 - iii STAIRWAYS 100 PSF
 - B CONCENTRATED LIVE LOAD
 - i RESIDENTIAL N/A
 - C SNOW LOAD
 - i GROUND SNOW LOAD 55 PSF
 - ii FLAT ROOF SNOW LOAD 42.5 PSF
 - iii SLOPED ROOF SNOW LOAD N/A
 - D WIND LOAD
 - i BASIC WIND SPEED 105 MPH
 - ii WIND IMPORTANCE FACTOR 1.0 (OCCUPANCY II)
 - iii WIND EXPOSURE EXPOSURE B
 - E SEISMIC LOAD
 - i SEISMIC IMPORTANCE FACTOR 1.0 (OCCUPANCY II)
 - ii SHORT PERIOD S.R.A. (S_g) 0.28
 - iii LONG PERIOD S.R.A. (S_l) 0.069
 - iv SITE CLASS D
 - v SPECTRAL RESPONSE COEFF. (S_{ds}) 0.29
 - vi SPECTRAL RESPONSE COEFF. (S_{d1}) 0.11
 - vii SEISMIC DESIGN CATEGORY B
 - viii BASIC RESISTING SYSTEM UNREINFORCED MASONRY
 - ix DESIGN BASE SHEAR 1.651 kips
 - x SEISMIC RESPONSE COEFF. (C_s) 0.272
 - xi RESPONSE MODIFICATION FACTOR (R) 1.25
 - xii ANALYSIS PROCEDURE SIMPLIFIED ANALYSIS
- 3 FOUNDATION CONDITIONS ASSUMED FOR FOUNDATION DESIGN INCLUDE AN ALLOWABLE SOIL BEARING CAPACITY OF 2 TSF, WATER TABLE WELL BELOW THE FINISHED FIRST FLOOR LEVEL, AND FROST DEPTH OF 4 FT.

STRUCTURAL STEEL

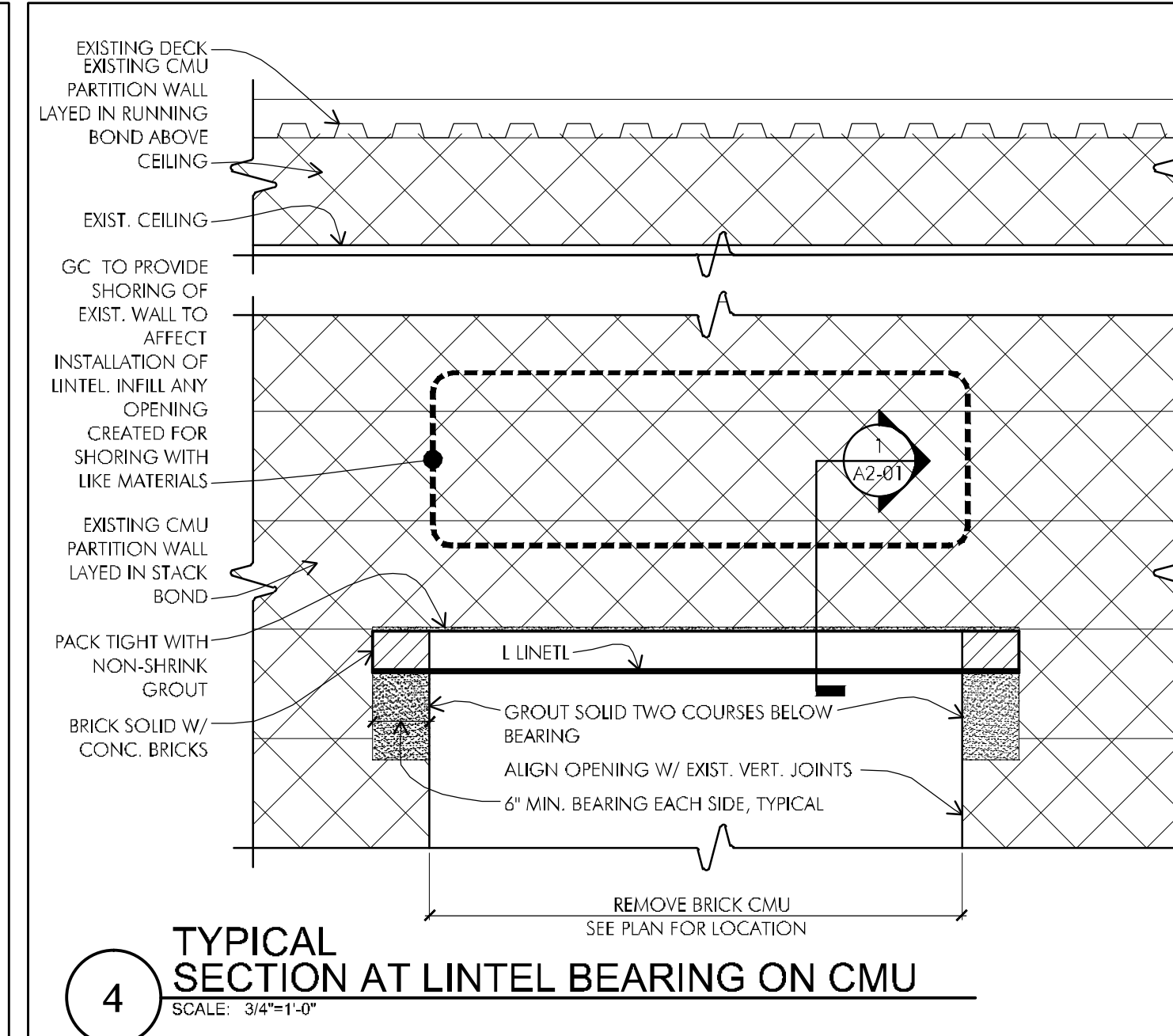
- S1 REFER TO THE PROJECT SPECIFICATIONS FOR DETAILED REQUIREMENTS FOR MATERIALS AND WORKMANSHIP.
- S2 STRUCTURAL STEEL DESIGN, MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE REQUIREMENTS OF THE LATEST EDITION OF THE AISC SPECIFICATIONS FOR THE DESIGN, FABRICATION, AND ERECTION OF STRUCTURAL STEEL BUILDINGS.
- S3 STRUCTURAL STEEL SHALL BE NEW STRUCTURAL CARBON STEEL CONFORMING TO:
 - WIDE FLANGE SHAPES: ASTM A992 GRADE 50
 - PLATES, BARS, CHANNELS AND ANGLES: ASTM A36
 - STRUCTURAL TUBING: ASTM A500 GRADE B
- S4 ALL SHOP AND FIELD CONNECTIONS SHALL BE BY WELDING OR HIGH STRENGTH BOLTS, AND SHALL BE AT LEAST ABLE TO DEVELOP THE FULL AXIAL OR FLEXURAL LOADING OF THE MEMBER TO BE CONNECTED UNLESS OTHERWISE SHOWN ON THE DRAWINGS.
- S5 ALL BEAM-TO-BEAM, BEAM-TO-GIRDER, AND BEAM OR GIRDER-TO-COLUMN CONNECTIONS SHALL BE PER AISC SPECIFICATIONS.
- S6 WELDING SHALL CONFORM TO AWS D1.1, SHALL BE DONE BY CERTIFIED WELDERS AND SHALL BE UNDERTAKEN BY A FABRICATOR QUALIFIED BY THE AWS.
- S7 UNLESS OTHERWISE NOTED ALL BOLTED CONNECTIONS SHALL BE BEARING TYPE. ALL BOLTS IN BOLTED CONNECTIONS SHALL BE 3/4 INCH DIAMETER HIGH-STRENGTH BOLTS CONFORMING TO ASTM A325 UNLESS OTHERWISE NOTED. THE MINIMUM NUMBER OF BOLTS TO EACH CONNECTED MEMBER SHALL BE TWO.
- S8 ALL WELDS SHALL BE 1/4" FILLET WELDS UNLESS OTHERWISE NOTED OR THE AISC MINIMUM WELD SIZE IS GREATER. ALL WELDING ELECTRODES SHALL BE GRADE E-70.
- S9 ALL STRUCTURAL STEEL EXPOSED TO WEATHER SHALL BE HOT-DIP GALVANIZED AFTER FABRICATION.
- S10 ALL CUTS, HOLES, COPINGS, ETC., REQUIRED IN THE STEEL SHALL BE SHOWN ON THE SHOP DRAWINGS AND MADE IN THE SHOP. CUTS, COPINGS, OR BURNING OF HOLES, ETC. IN STRUCTURAL STEEL MEMBERS IN THE FIELD WILL NOT BE PERMITTED.
- S11 TEMPORARY BRACING OF STEEL MEMBERS DURING CONSTRUCTION IS REQUIRED AND IS THE RESPONSIBILITY OF THE CONTRACTOR.
- S12 ALTERNATE CONNECTION DETAILS THAN THOSE SHOWN ON THE DRAWINGS MAY BE USED IF SUCH DETAILS ARE SUBMITTED TO THE ARCHITECT FOR REVIEW AND ACCEPTANCE. HOWEVER, THE ARCHITECT SHALL BE THE SOLE JUDGE OF ACCEPTABILITY AND THE CONTRACTOR'S BID SHALL ANTICIPATE THE USE OF THOSE SPECIFIC DETAILS SHOWN ON THE DRAWINGS. IN ANY EVENT, THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ANY ALTERNATE DETAILS WHICH HE PROPOSES AND ALL ADDITIONAL COSTS ATTENUATED THEREWITH.
- S13 THE CONTRACTOR SHALL COORDINATE OPENING SIZES AND LOCATIONS IN THE FLOORS AND ROOF FROM THE ARCHITECT AND MECHANICAL DRAWINGS AND SHALL PROVIDE HEADER MEMBERS IF REQUIRED.
- S14 APPROVAL BY THE OWNER'S AUTHORIZED REPRESENTATIVE OF SHOP DRAWINGS PREPARED BY THE FABRICATOR IS IN NO WAY INTENDED TO TRANSFER RESPONSIBILITY TO THIS REPRESENTATIVE FOR THE PROPER AND ERROR-FREE INCORPORATION OF ALL PERTINENT INFORMATION (E.G., BEAM SIZES, DIMENSIONS, STEEL GRADES, SPECIFIC CONNECTIONS) INTO THE SHOP DRAWINGS. WHERE THE FABRICATOR MUST SELECT OR COMPLETE CONNECTION DETAILS NOT SPECIFICALLY DETAILED ON THE CONTRACT DRAWINGS, HE SHALL BE RESPONSIBLE FOR THE ADEQUACY OF THE DESIGN OF THESE CONNECTIONS. HE IS OTHERWISE RESPONSIBLE FOR CORRECT INCORPORATION INTO THE SHOP DRAWINGS, NOT THE ADEQUACY OF THE DESIGN, OF ALL OTHER PERTINENT INFORMATION SHOWN ON THE CONTRACT DRAWINGS.
- S15 ALL SHOP AND FIELD WELDING IS SUBJECT TO INSPECTION. COMPLETE PENETRATION WELDS IN MOMENT-RESISTING CONNECTIONS SHALL BE TESTED BY ULTRASOUND OR RADIOGRAPHY AS PART OF THE PROGRAM OF STRUCTURAL TESTS AND INSPECTIONS.
- S16 ALL EXPANSION ANCHORS SHALL BE KWIK BOLT III BY HILL.

MASONRY

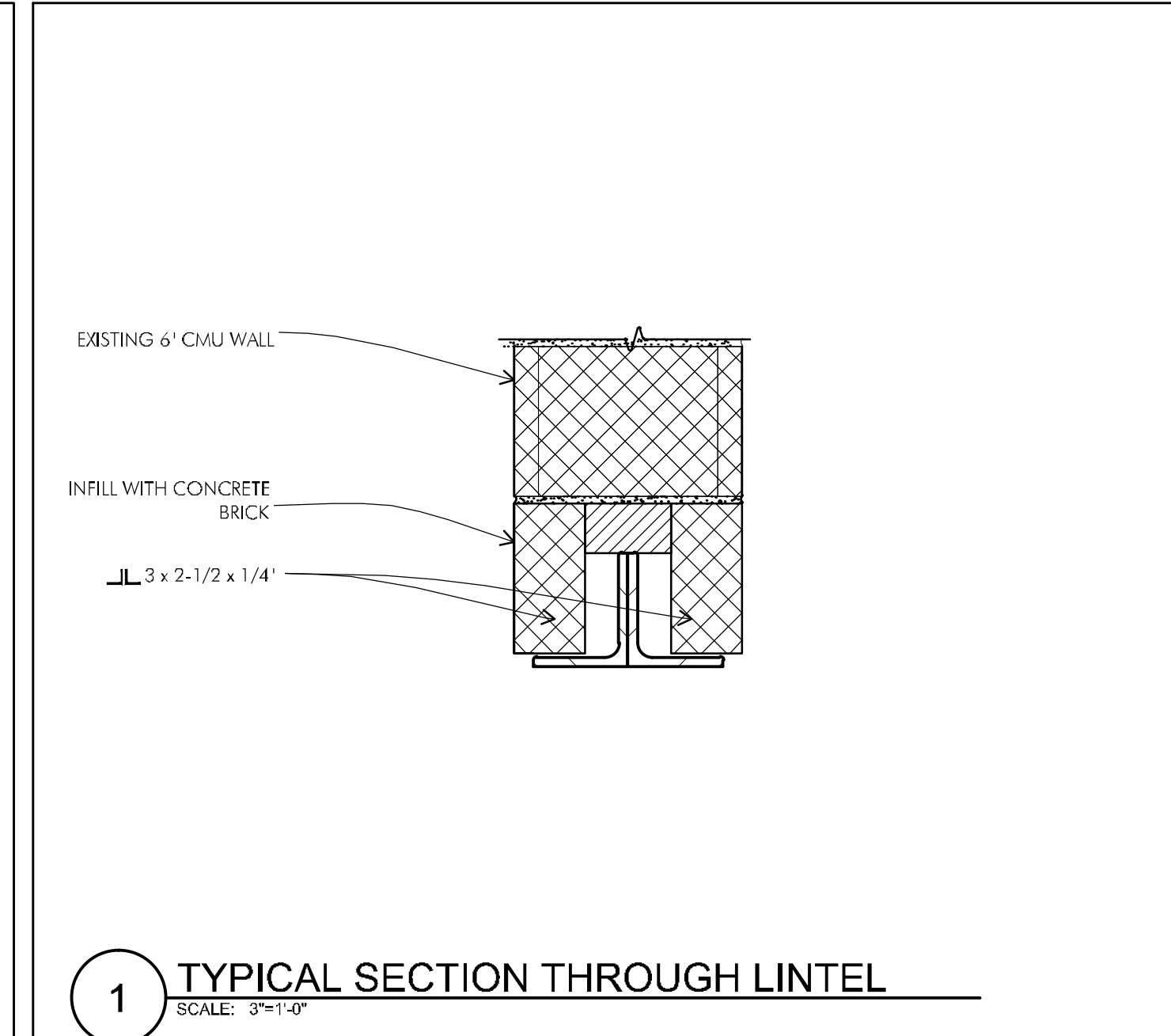
- M1 CLAY MASONRY UNITS, AKA BRICK SHALL STRUCTURAL BUILDING BRICK CONFORMING TO ASTM C2 GRADE MW.
- M2 CONCRETE MASONRY UNITS SHALL BE LOAD BEARING GRADE N-1 UNITS HAVING A MINIMUM NET COMPRESSIVE STRENGTH OF 2,500 PSI, CONFORMING TO ASTM C90, FOR A RESULTING FM NOT LESS THAN 1,500 PSI. USE 2 CELL HOLLOW CMU UNITS FOR ALIGNMENT OF WEBS IN REINFORCED WALLS.
- M3 MORTAR SHALL BE TYPE M (FC - 2500 PSI).
- M4 GROUT SHALL BE 2,500 PSI WITH PEA GRAVEL OF MAXIMUM AGGREGATE SIZE, CONFORMING TO NCMA STANDARDS.
- M5 REINFORCING SHALL CONFORM TO ASTM A615 GRADE 60. DOWEL ALL REINFORCEMENT TO OBTAIN 36 DIAMETER LAP FOR ALL VERTICAL AND HORIZONTAL SPLICES (TYPICAL). POSITION VERTICAL REINFORCING STEEL IN CENTER OF CELLS U.O.N. PLACE GROUT IN CONFORMANCE WITH EITHER LOW LIFT OR HIGH LIFT PROCEDURES AS OUTLINED BY NCMA. PROVIDE VERTICAL BARS AT ALL CORNERS, INTERSECTIONS, AND EACH SIDE OF OPENINGS. PROVIDE TWO #5 FULL HEIGHT EACH SIDE OF ALL OPENINGS AND AT DISCONTINUOUS ENDS OF ALL MASONRY WALLS AND GROUT SOLID FULL HEIGHT.
- M6 BRICK AND BLOCK SHALL BE SET WITH FULL FACE AND BED JOINTS. VISIBLE JOINTS SHALL HAVE A TOOLED CONCAVE JOINT. WINTER MASONRY SHALL BE PLACED USING TMS AND NCMA STANDARDS AND RECOMMENDED PROCEDURES.

SHOP DRAWINGS

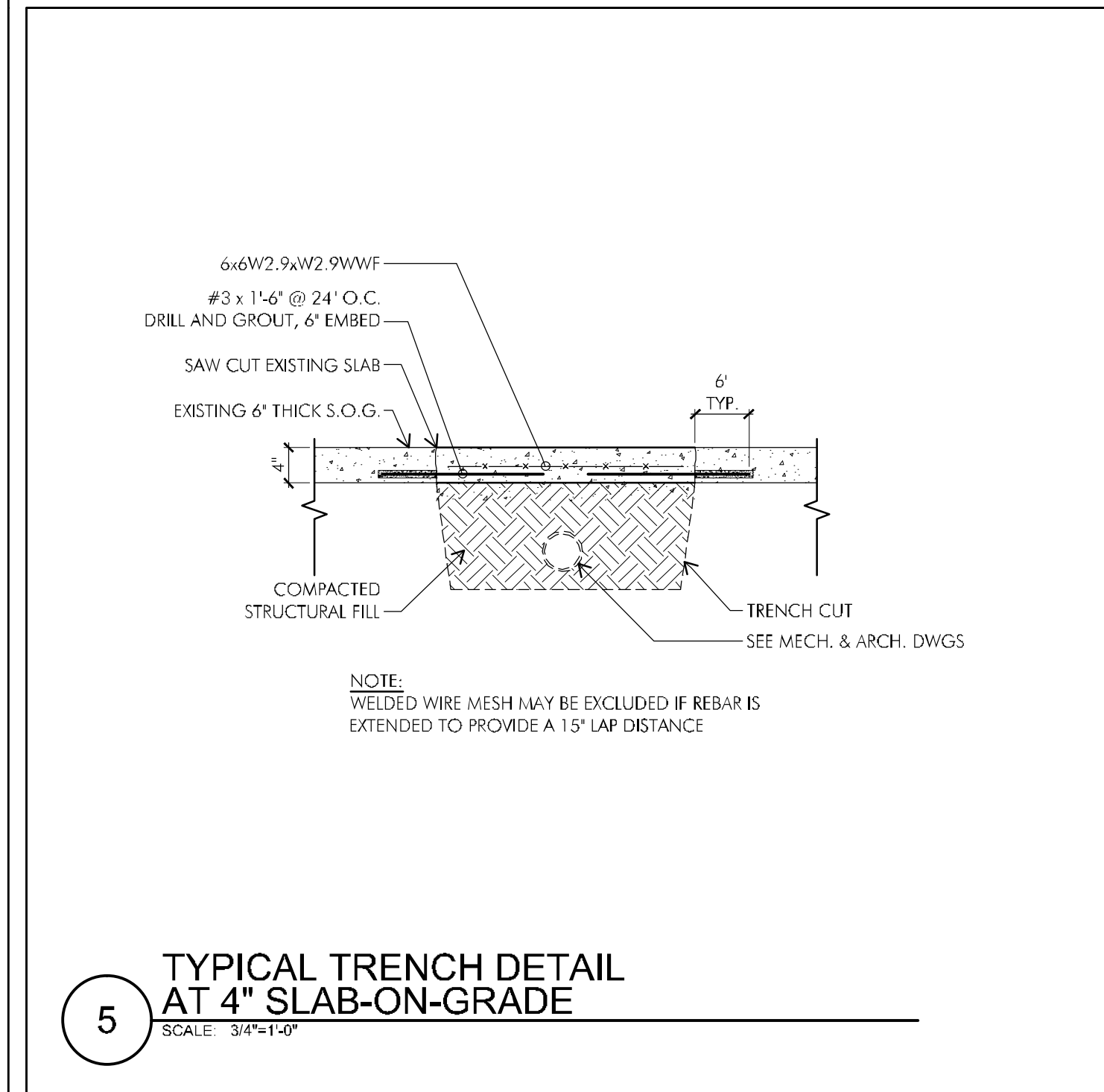
- SD1 SHOP DRAWINGS SHALL BE SUBMITTED FOR STRUCTURAL STEEL AND REINFORCING STEEL.
- SD2 DRAWINGS SHALL SHOW ALL LENGTHS, CONNECTIONS, SIZES, WELDS, ETC. AND RELATIONS OF MEMBERS TO AFFECTED CONSTRUCTION TRADES.
- SD3 DEVIATIONS FROM PLAN DETAILS SHALL BE CLEARLY SHOWN.
- SD4 SHOP DRAWINGS WILL NOT BE CHECKED FOR DIMENSIONS.



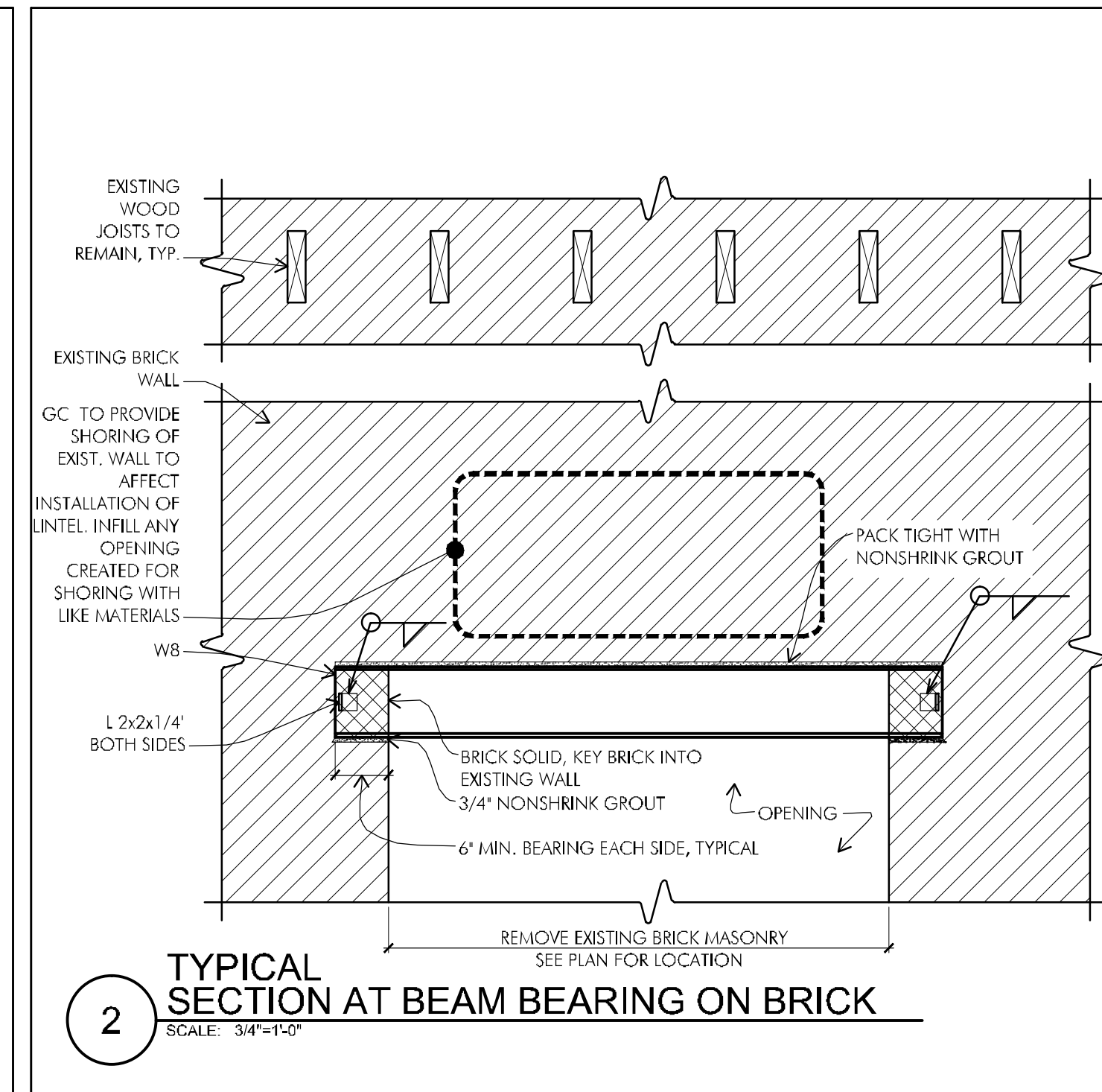
4 TYPICAL SECTION AT LINTEL BEARING ON CMU
SCALE: 3/4"=1'-0"



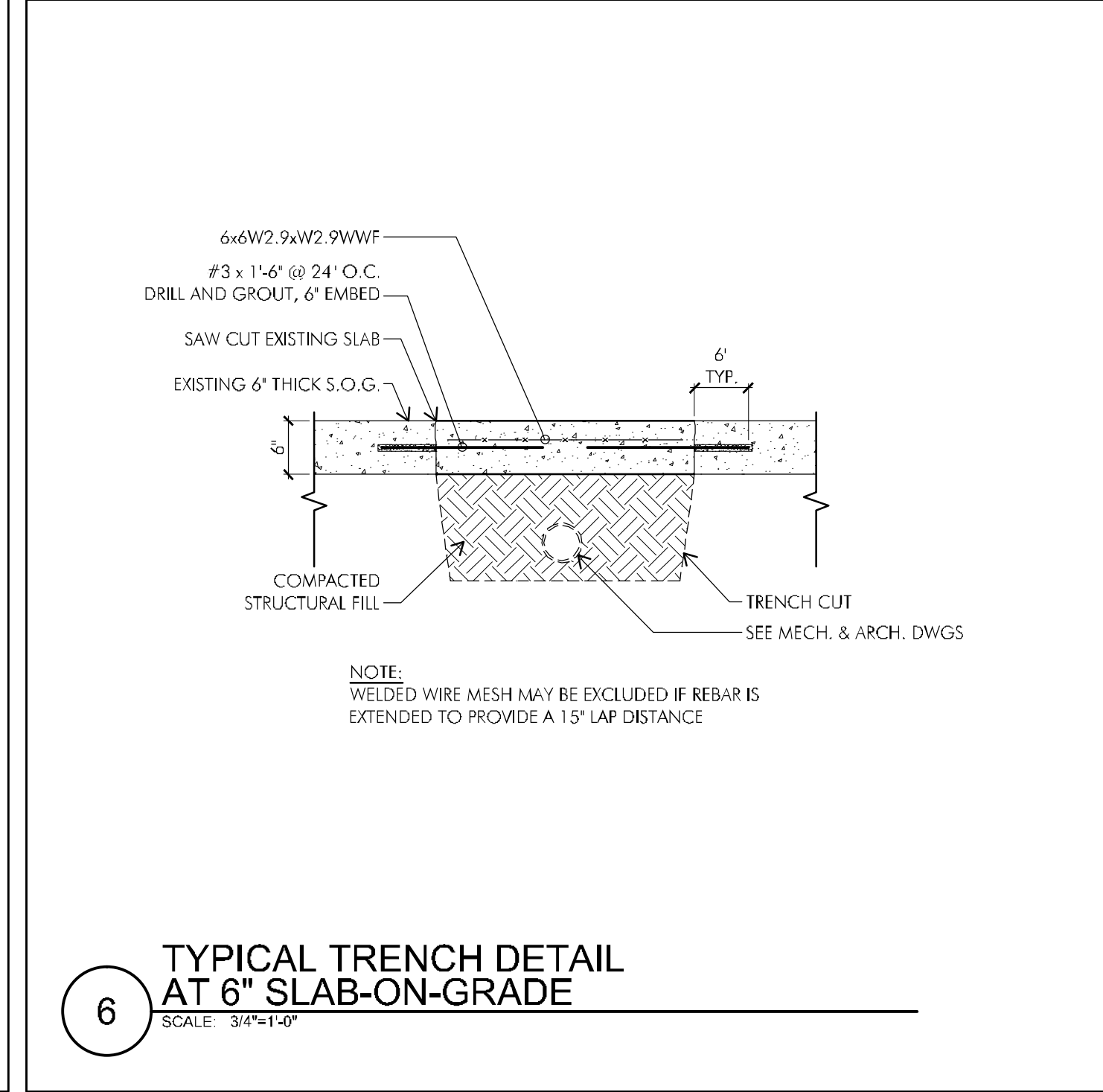
1 TYPICAL SECTION THROUGH LINTEL
SCALE: 3/4"=1'-0"



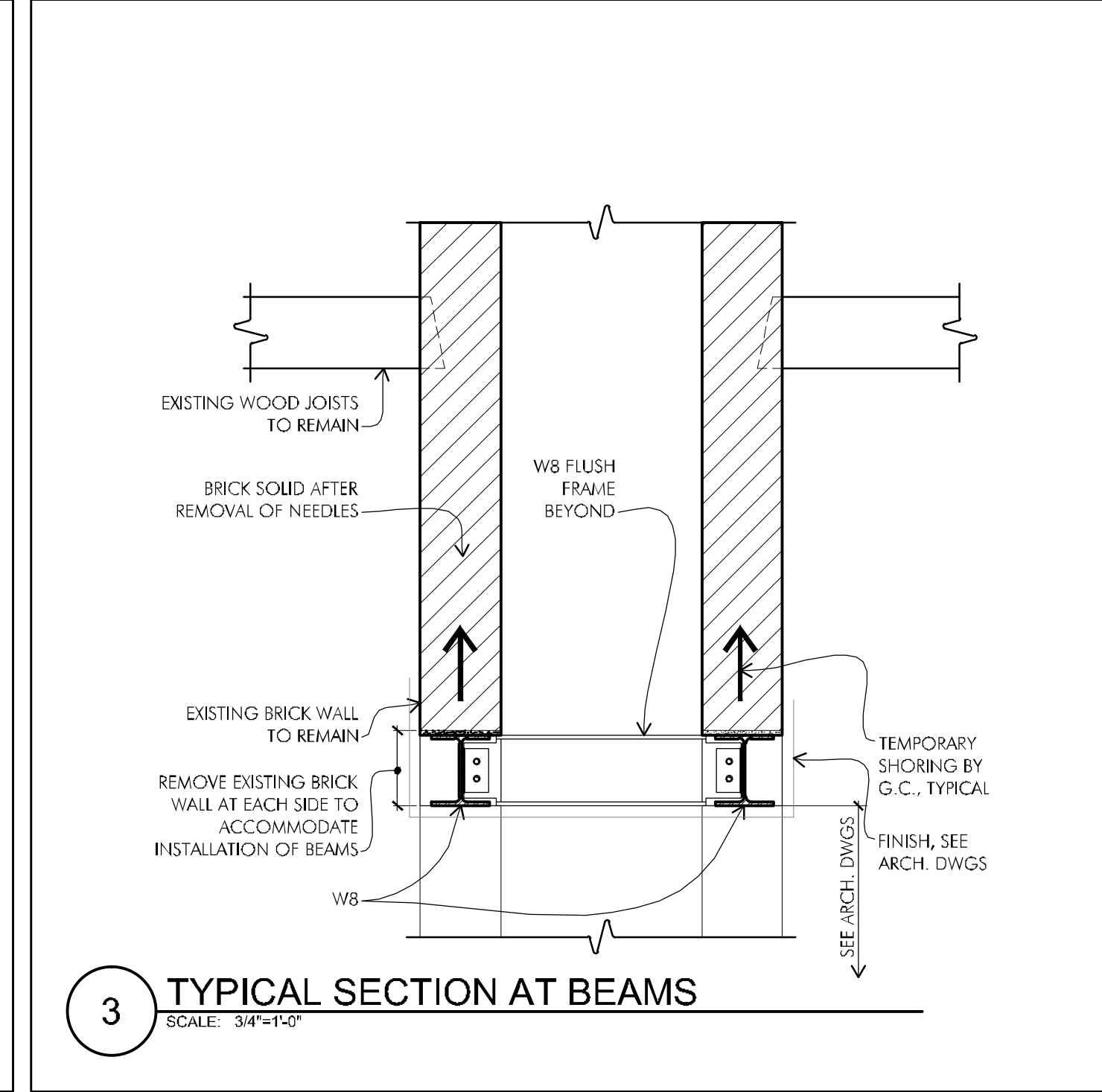
5 TYPICAL TRENCH DETAIL AT 4" SLAB-ON-GRADE
SCALE: 3/4"=1'-0"



2 TYPICAL SECTION AT BEAM BEARING ON BRICK
SCALE: 3/4"=1'-0"



6 TYPICAL TRENCH DETAIL AT 6" SLAB-ON-GRADE
SCALE: 3/4"=1'-0"

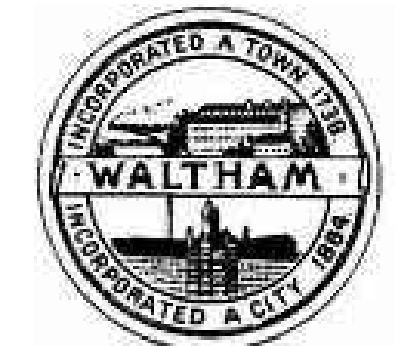


3 TYPICAL SECTION AT BEAMS
SCALE: 3/4"=1'-0"



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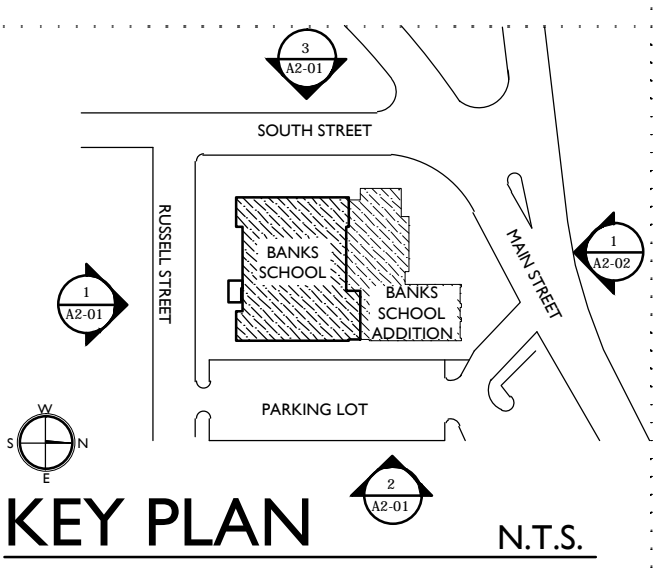
PHASE III
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Drawing Title:

GENERAL NOTES
AND DETAILS

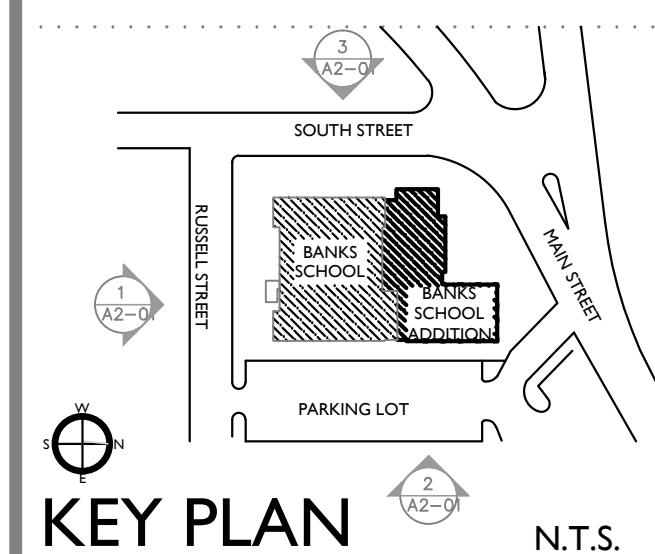


Revisions:

BID DOCUMENTS

Date: 03-07-2011
Project Number: 10025-A
Project Manager: SAW
Drawn By: MJB,BLO
Scale: 1/8"=1'-0"

S2-01



LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
---	NEW	NEW WORK (DARK)
---	EX	EXISTING WORK (LIGHT)
F	F	FIRE LINE ABV. GRADE
F	F	FIRE LINE UNDERGROUND
SP	SP	SPRINKLER LINE (WET)
⊗	RE	EXISTING SPRINKLER TO REMAIN
⊗	RE	EXISTING SPRINKLER TO BE REMOVED
⊙		PENDANT SPRINKLER HEAD
⊙		EXPOSED UPRIGHT SPRINKLER HEAD
⊙		CONCEALED PENDANT SPRINKLER HEAD
○	DP, DN	PIPE DROP OR DOWN
○	UP	PIPE RISE OR UP
⊥		TEE LOOKING DOWN
⊥		CAP ON END OF PIPE
	RE	REMOVE EXISTING
---		STRAINER UNION
PG		PRESSURE GAGE
CV		CHECK VALVE
SCV		SUPERVISED CONTROL VALVE
VIV		VALVE IN VERTICAL
FDC		FIRE DEPARTMENT CONNECTION
FS		FLOW SWITCH
CTE		CONNECT TO EXISTING
TYP.		TYPICAL
AC		CONCEALED ABOVE CEILING
⊙C		EXPOSED AT CEILING
AP		ACCESS PANEL
AFF		ABOVE FINISHED FLOOR
F&I		FURNISH AND INSTALL
FPC		FIRE PROTECTION CONTRACTOR
PC		PLUMBING CONTRACTOR
GC		GENERAL CONTRACTOR
HVAC		HEAT, VENT & AIR COND. CONTRACTOR
EC		ELECTRICAL CONTRACTOR
DCVA		DOUBLE CHECK VALVE ASSEMBLY
EXP		EXPOSED
FDV		FIRE DEPARTMENT VALVE
FDVC		FIRE DEPT. VALVE CABINET
FHC		FIRE HOSE CABINET
SCVA		SPRINKLER FLOOR CONTROL VALVE ASSEMBLY
NAS		NO AUTOMATIC SPRINKLERS

NOTE: NOT ALL SYMBOLS LISTED ARE APPLICABLE TO THIS PROJECT.

GENERAL NOTES

- THE FIRE PROTECTION DRAWINGS ARE DIAGRAMMATIC AND ARE TO BE USED FOR THE PURPOSE OF ESTABLISHING GENERAL LOCATIONS OF PIPING RUNS, SIZES OF PIPING, AND QUANTITIES OF FIXTURES AND EQUIPMENT TO BE FURNISHED HEREIN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS FOR EXACT LOCATIONS OF ALL SPRINKLER HEADS, AND EQUIPMENT, INCLUDING MOUNTING HEIGHTS. IN THE EVENT OF CONFLICT OR IF DIMENSIONS ARE NOT SHOWN, OBTAIN FIELD DIRECTIVE FROM THE ARCHITECT AS TO THE LOCATIONS OF ALL VISIBLE EQUIPMENT.
- ALL PIPING SHOWN ON THESE PLANS OR THOSE TO BE DESIGNED HEREIN SHALL BE RUN CONCEALED ABOVE SUSPENDED CEILINGS, IN CHASES, OR IN PARTITIONS UNLESS SPECIFICALLY NOTED OTHERWISE.
- ALL SPRINKLER HEADS IN CEILING TILES SHALL BE LOCATED IN THE EXACT CENTER OF TILE UNLESS SPECIFICALLY APPROVED OTHERWISE BY THE ARCHITECT.
- REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR CEILING HEIGHTS AND CEILING MATERIALS AND LAYOUTS. REFER TO THE RESPECTIVE PLUMBING, HVAC AND ELECTRICAL DRAWINGS FOR LIGHTING, DIFFUSER AND REGISTER LAYOUTS IN CEILINGS AND FOR PIPING, DUCTWORK AND EQUIPMENT ABOVE CEILINGS FOR COORDINATION PURPOSES. IN THE EVENT OF CONFLICT OR IF DIMENSIONS ARE NOT SHOWN, OBTAIN FIELD DIRECTIVE FROM THE ARCHITECT AS TO THE LOCATIONS OF ALL VISIBLE EQUIPMENT.
- THE SPRINKLER CONTRACTOR SHALL PROVIDE AS PART OF THIS CONTRACT ALL SPRINKLERS BELOW FIXED OBSTRUCTIONS 48" AND LARGER AS REQUIRED BY NFPA 13, 8.6.5.3.3. IT IS THE RESPONSIBILITY OF THE SPRINKLER CONTRACTOR TO PROVIDE THE REQUIRED SPRINKLERS AND ALL ASSOCIATED PIPING, FITTINGS, HANGERS, ETC. FOR A COMPLETE INSTALLATION.
- ATTENTION IS CALLED TO THE REQUIREMENT FOR THE PREPARATION OF COORDINATION DRAWINGS. IN ADDITION TO THE PREPARATION OF SHOP DRAWINGS ALSO PREPARE COORDINATION DRAWINGS AS OUTLINED IN THE SPECIFICATION. THE APPROVAL OF THE SHOP DRAWINGS INCLUDING DIMENSIONS SHOWN THEREIN DOES NOT RELIEVE THE CONTRACTOR.
- SPECIFIC ATTENTION IS DIRECTED TO THE REQUIREMENTS OF MBC 914.7, 3305.3, 3306.1, AND NFPA 241-2004 REGARDING THE MAINTENANCE OF FIRE PROTECTION SYSTEMS INCLUDING STANDPIPES AND BULK FIRE MAINS BOTH DURING CONSTRUCTION AND DEMOLITION. MAINTAIN THE SYSTEMS AS REQUIRED BY THESE STANDARDS AS A MINIMUM.
- THE SPRINKLER CONTRACTOR SHALL PROVIDE AS PART OF HIS CONTRACT AN INSPECTOR'S TEST STATION ON EACH SPRINKLER ZONE. THE INSPECTOR'S TEST STATION WILL BE LOCATED AT THE MOST HYDRAULICALLY REMOTE PART OF EACH ZONE AND SHALL BE IDENTIFIED ON THE SPRINKLER SHOP DRAWINGS.
- REFER TO NFPA 13 TABLE 8.3.2.5(o) FOR TEMPERATURE RATING OF SPRINKLERS BASED ON DISTANCE FROM HEAT SOURCES SUCH AS HEATING DUCTS, DIFFUSERS AND UNIT HEATERS.

FIRE PROTECTION CRITERIA

- THE PURPOSE OF THE FIRE PROTECTION DRAWINGS AND SPECIFICATIONS IS TO ESTABLISH THE CRITERIA FOR DESIGN, MATERIALS, AND LOCATIONS OF THE COMPLETE SPRINKLER SYSTEM. THE FIRE PROTECTION SUB-CONTRACTOR IS RESPONSIBLE FOR THE FINAL DESIGN OF THE SPRINKLER SYSTEM AND SAID DESIGN AND INSTALLATION SHALL INCLUDE ALL COMPONENTS TO PROVIDE FOR THE COMPLETE SYSTEM WITHOUT ANY ADDITIONAL EXPENSE TO THE OWNER. THE SUB-CONTRACTOR SHALL VERIFY THAT THE NUMBER OF HEADS SHOWN ON HIS WORKING PLANS AND HYDRAULIC CALCULATIONS ARE ADEQUATE TO PROTECT ALL AREAS OF THE BUILDING AND SHALL INCLUDE ANY COST FOR ADDITIONAL SPRINKLER HEADS AND PIPING NOT SHOWN ON THESE DRAWINGS IN HIS CONTRACT PRICE.
- THE BUILDING IS TO BE 100% SPRINKLERED INCLUDING ALL CLOSETS AND TELEPHONE ROOMS. THE ELECTRIC ROOMS SHALL BE CONSTRUCTED AND OCCUPIED TO MEET THE EXCEPTIONS LISTED UNDER NFPA 13-2007 PARAGRAPH 8.15.10 AND ARE NOT SPRINKLERED. THE ELEVATOR MACHINE ROOM AND ELEVATOR SHAFT ARE NOT SPRINKLERED.
- THE BUILDING IS GENERALLY MASONRY AND WOOD CONSTRUCTION. THE SPACE SHALL BE PROTECTED THROUGHOUT WITH A WET TYPE SPRINKLER SYSTEM WITH THE HEADS LOCATED WHERE SHOWN. ALL ABOVE CEILING COMBUSTIBLE SPACES SHALL BE PROTECTED.
- CODE REQUIREMENTS:

BUILDING USE:	MIXED USE
	A-1 - AUDITORIUM
	R-2 - RESIDENTIAL
FLOOR AREA:	FIRST FLOOR: 21,000 S.F. ±
	SECOND FLOOR: 17,300 S.F. ±
	THIRD FLOOR: 12,500 S.F. ±
	TOTAL: 50,800 S.F. ±
CONSTRUCTION:	3B

PER 780 CMR - 903.2.1.1 - SPRINKLERS ARE REQUIRED IN USE GROUP A-1, 12,000 S.F.
PER 780 CMR - 903.2.8 - SPRINKLERS ARE REQUIRED IN USE GROUP R-2.
MGL-C148-S26G - REQUIRES SPRINKLERS IN COMMERCIAL USE BUILDING GREATER THAN 7,500 S.F.
PER 780 CMR - 905.3.1 - REQUIRES CLASS 3 STANDPIPE SYSTEM WHERE THE FLOOR LEVEL OF THE HIGHEST STORY IS LOCATED MORE THAN 30' ABOVE THE LOWEST LEVEL OF FIRE DEPARTMENT VEHICLE ACCESS.

SYSTEM DESIGN PROVIDES FOR A BULK MAIN SPRINKLER SYSTEM TO PROTECT THE BUILDING.

REFER TO ARCHITECT'S DRAWINGS FOR ADDITIONAL CODE SUMMARY INFORMATION AND DELINEATION OF FIRE SEPARATIONS.

REFER TO ELECTRICAL DRAWINGS FOR DETAILS OF THE FIRE ALARM SYSTEM.

- PROVIDE COMPLETE HYDRAULIC CALCULATIONS AND DISTRIBUTION SYSTEM DESIGN UTILIZING THE DESIGN CRITERIA ESTABLISHED ON THE CONTRACT DOCUMENTS. SYSTEM DESIGN SHALL BE BASED ON FLOW TEST DATA PROVIDED HEREIN. THE FLOW TEST WAS CONDUCTED ON SEPTEMBER 8, 2010 BY JOHN HOADLEY AND SONS, INC., ON RUSSELL STREET. ELEVATION OF THE GAGE HYDRANT IS APPROXIMATELY 66.17'.

STATIC PRESSURE =	85 PSI
RESIDUAL PRESSURE =	65 PSI
FLOW =	1,100 GPM
AVAILABLE FLOW @ 20 PSI =	2,078 GPM

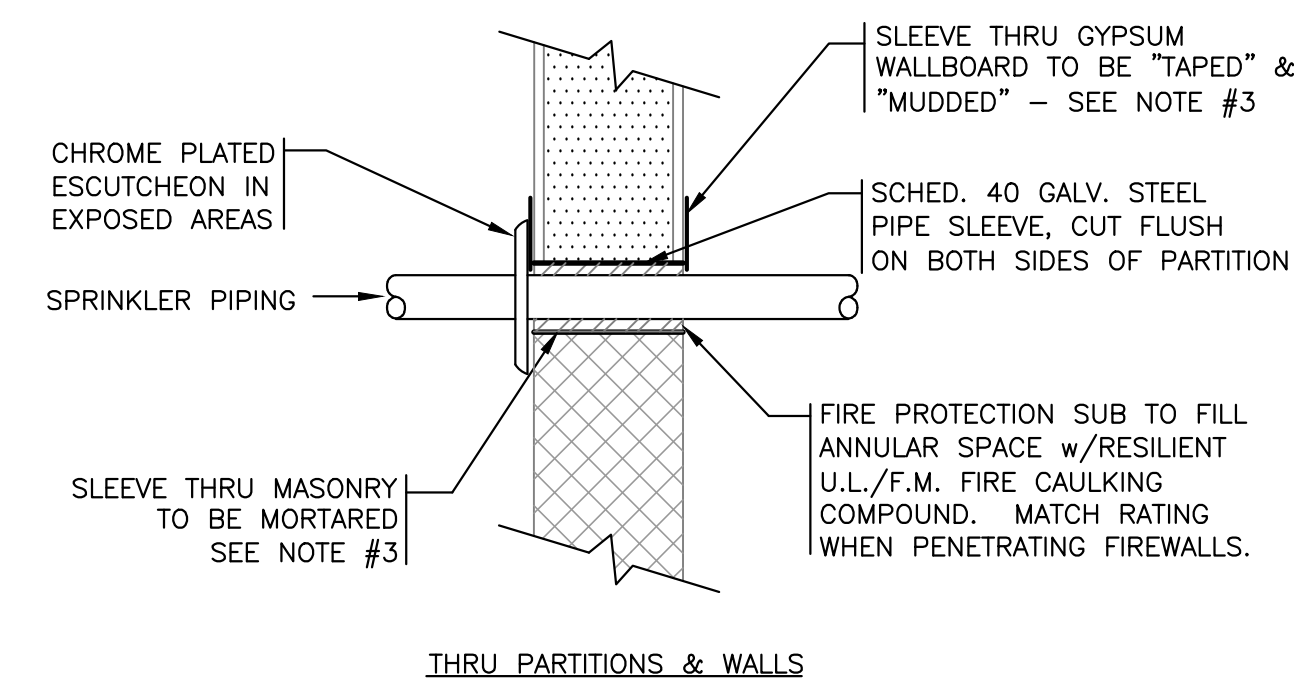
REQUIRED DESIGN FLOWS:

- A. DESIGN HAZARDS:
- | | |
|-------------------------------|-------------------|
| 1. MECHANICAL ROOMS | ORDINARY, GROUP 1 |
| 2. STORAGE ROOMS | ORDINARY, GROUP 1 |
| 3. ALL OTHER AREAS NOT LISTED | LIGHT |
- * REFER TO DRAWINGS INDICATING THE DELINEATIONS.

B. REQUIRED DESIGN DENSITIES:

- LIGHT HAZARD AREAS 0.10 GPM OVER 1,500 S.F.
- ORDINARY HAZARD GROUP 1 0.15 GPM OVER 1,500 S.F.
- SPRINKLER SPACING (MAX.):

LIGHT HAZARD AREAS:	225 S.F.
ORDINARY HAZARD AREAS:	130 S.F.
SIDEWALL HEADS:	TABLE 8.7.2.2.1 OF NFPA 13
- FOLLOW THE HEAD LAYOUTS SHOWN ON THE DRAWINGS IN FINISHED AREAS. ALL SPRINKLER HEADS SHALL BE LOCATED DEAD CENTER ON THE CEILING TILE AND SWING JOINTS IF REQUIRED MAY BE USED TO MEET THIS REQUIREMENT.
- HYDRAULIC CALCULATIONS FOR THE SYSTEM SHALL INCLUDE A 10 PSI CUSHION AND SHALL LIMIT WATER FLOW VELOCITY TO A MAXIMUM OF 20 FT./SEC.

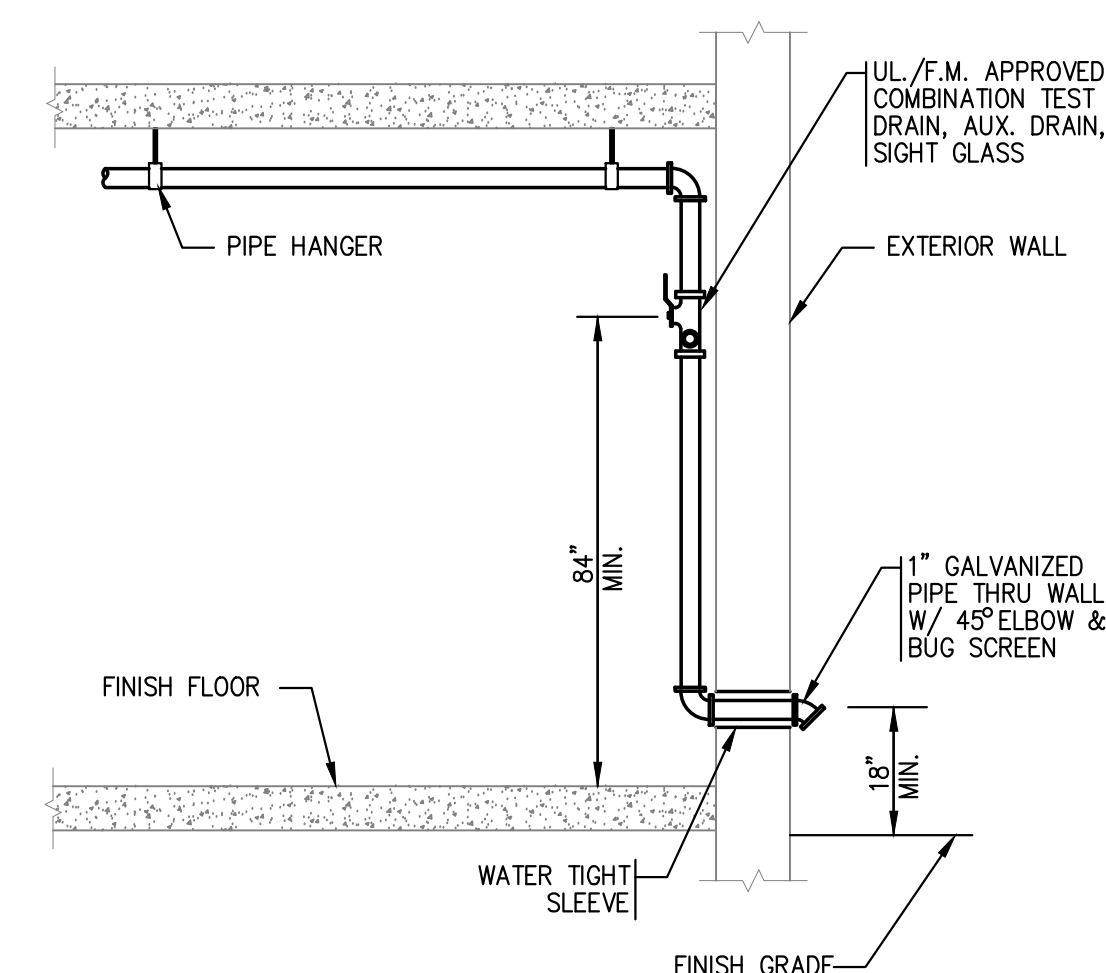


TYPICAL SLEEVE CONDITION DETAILS

N.T.S.

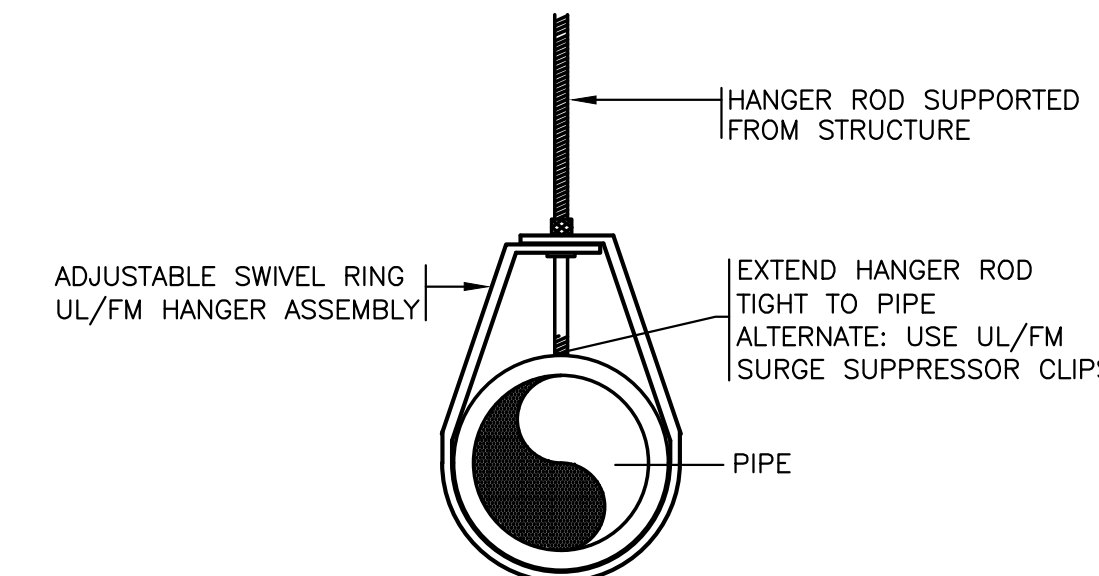
NOTE:

- ALL PIPING PENETRATING ALL PARTITIONS, WHETHER FIRE OR SMOKE RATED OR NOT, CONCEALED OR EXPOSED, SHALL BE SLEEVED AS DETAILED.
- WHERE CONC. WALLS, SLABS, ETC., ARE CORE DRILLED, INSTALL SLEEVE FLUSH WITH BOTH SIDES, CAULKED & LEADED IN PLACE.
- REFER TO DIVISION 4 & 9 FOR PROCEDURES & METHODS OF PATCHING AROUND SLEEVES AT GYPSUM, PLASTER & MASONRY. REFER TO SPECS FOR DELINEATION OF RESPONSIBILITY.
- SLEEVES SHALL BE SIZED TO PROVIDE MIN. 1" CLEARANCE BETWEEN PIPE O.D. & SLEEVE I.D. FOR PIPING UP TO 3" IN SIZE. PROVIDE 2" CLEARANCE BETWEEN PIPE O.D. & SLEEVE I.D. FOR PIPING 4" IN SIZE AND GREATER.



INSPECTOR'S TEST STATION PIPING SCHEMATIC

SCALE: N.T.S.



TYPICAL END-OF-LINE BRANCH PIPE HANGER DETAIL

SCALE: N.T.S.

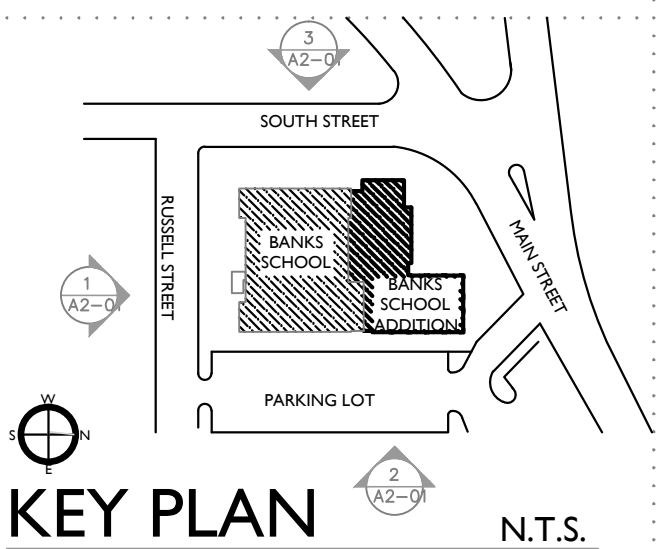
NOTE: TO BE USED AT ALL END-OF-LINE BRANCH HANGERS THROUGHOUT PROJECT

PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA

CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

FIRST FLOOR
FIRE PROTECTION
DEMOLITION PLAN

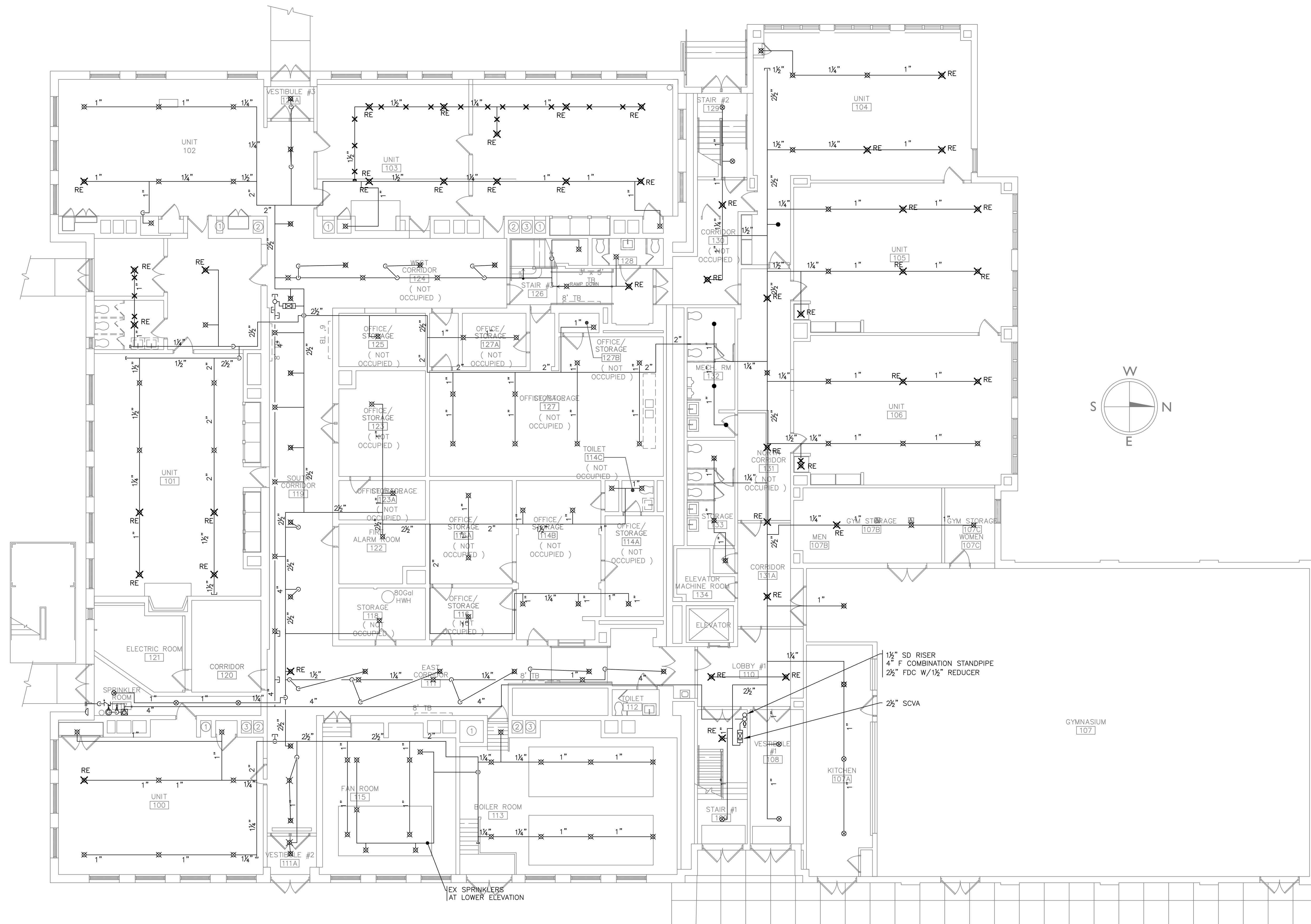


Revisions:

BIDDING
DOCUMENT

Date: 12-30-2011
Project Number: 10025-A
Project Manager: CG
Drawn By: JIG
Scale: 1/8"=1'-0"

FPDI. I



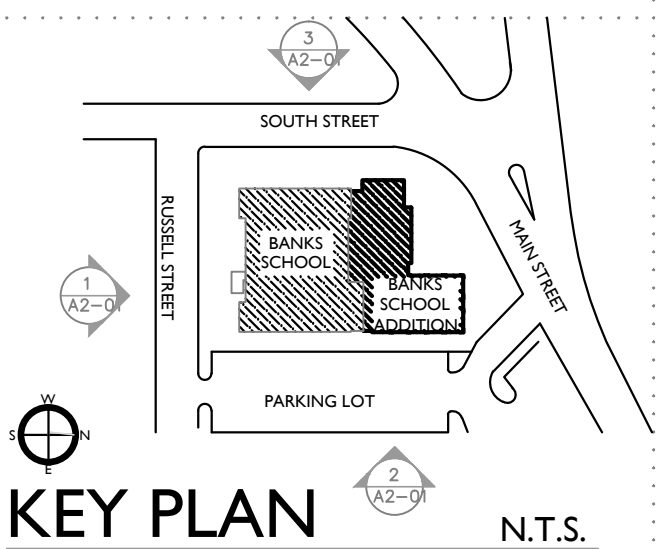
1 FIRST FLOOR DEMOLITION PLAN
SCALE: 1/8"=1'-0"

PHASE III
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Drawing Title:

FIRST FLOOR
FIRE PROTECTION
PLAN

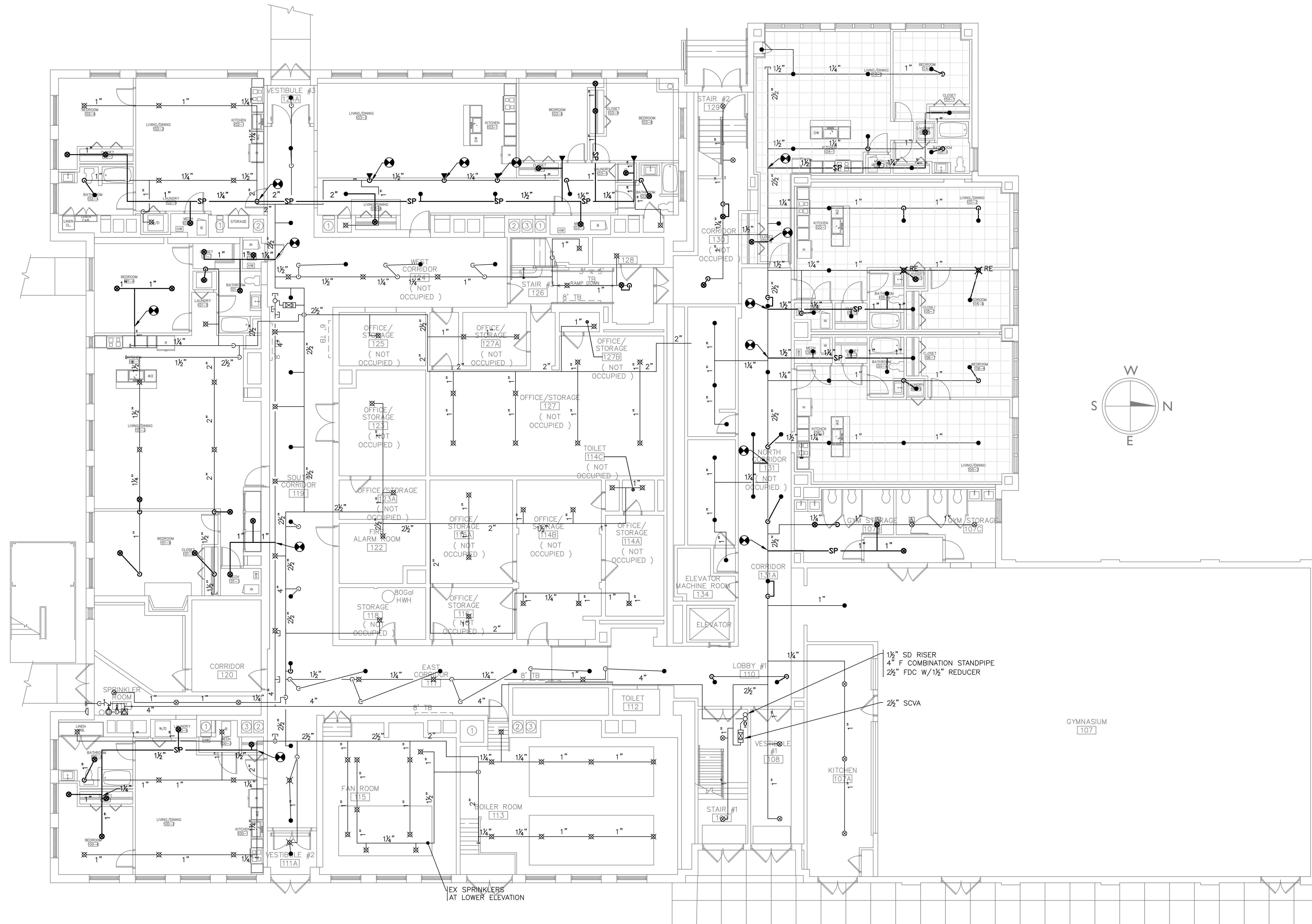


Revisions:

BIDDING
DOCUMENT

Date: 12-30-2011
Project Number: 10025-A
Project Manager: CG
Drawn By: JIG
Scale: 1/8"=1'-0"

FPI.1



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

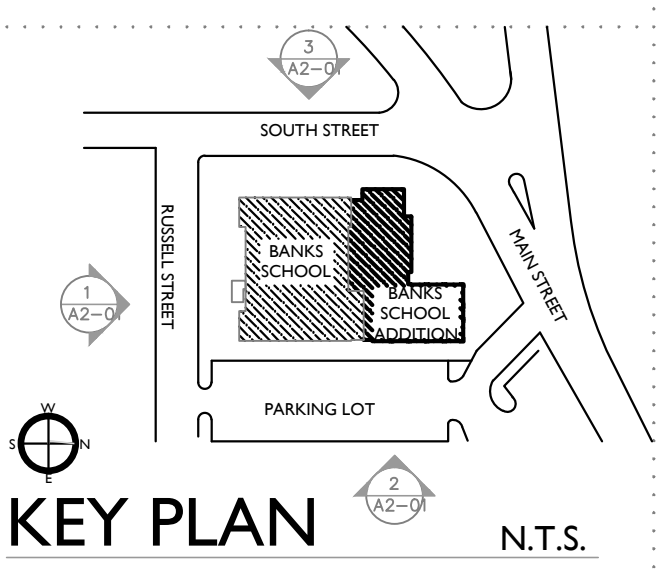
GARCIA-GALUSKA-DESOUZA
CONSULTING ENGINEERS, INC.
370 FRANKLIN CORNER ROAD, DARTMOUTH, MA 02747-1271
508-998-5700 • FAX 508-998-0883 • E-MAIL: info@g-g.com

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA

**CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA**

Drawing Title:

**PLUMBING
LEGEND, NOTES &
DETAILS**



Revisions:

**BIDDING
DOCUMENT**

Date: 12-30-2011
Project Number: 10025-A
Project Manager: CG
Drawn By: JIG
Scale: AS NOTED

P0.1

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CONSULTING ENGINEERS, INC.**
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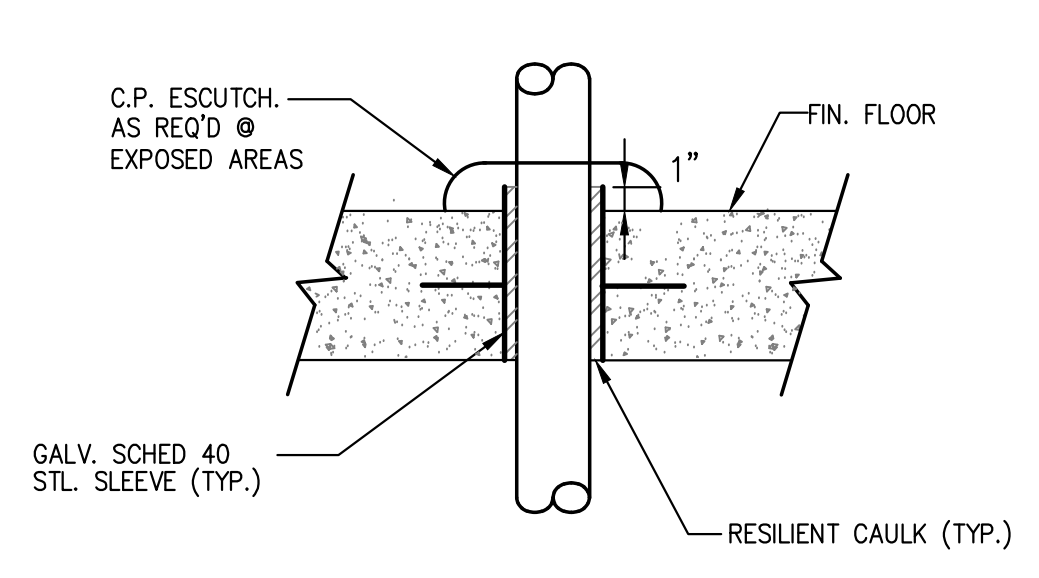
LEGEND

SYMBOL	ABBREV	DESCRIPTION
NEW	NEW	NEW WORK (DARK)
EX	EX	EXISTING WORK (LIGHT)
S/W	S/W	SOIL/WASTE ABV. GRADE
S/W	S/W	SOIL/WASTE UNDERGROUND
V	V	VENT ABV. GRADE
V	V	VENT UNDERGROUND
IW	IW	INDIRECT WASTE
RL	RL	RAIN LEADER ABV. GRADE
RL	RL	RAIN LEADER UNDERGROUND
SSD	SSD	SUB-SOIL DRAIN
FD	FD	FOOTING DRAIN
CW	CW	COLD WATER
HW	HW	HOT WATER
HWR 140'	HWR 140'	HOT WATER RETURN 140°F
HWR 140'	HWR 140'	HOT WATER RETURN 140°F
G	G	FUEL GAS PIPING
DP, DN	DP, DN	PIPE DROP OR DOWN
UP	UP	PIPE RISE OR UP
TEE	TEE	TEE LOOKING DOWN
FD	FD	CAP ON END OF PIPE
RD	RD	FLOOR DRAIN, ROOF DRAIN, AREA DRAIN
AD	AD	STRAINER
CO	CO	CLEANOUT
DCO	DCO	DANDY CLEANOUT
FCO	FCO	FLOOR CLEANOUT
PG/TG	PG/TG	PRESSURE GAGE/TEMPERATURE GAGE
SA	SA	SHOCK ABSORBER
BV	BV	BALANCING VALVE
BV	BV	BALL VALVE
CV	CV	CHECK VALVE
GC	GC	GAS COCK
GR	GR	GAS PRESSURE REGULATOR
GV	GV	SOLENOID VALVE
PRV	PRV	GATE VALVE
PRV	PRV	PRESSURE REDUCING VALVE
BV	BV	BUTTERFLY VALVE
GLV	GLV	GAS COCK LUBRICATED
GLV	GLV	GLOBE VALVE
VOV	VOV	VALVE ON VERTICAL
PT	PT	P-TRAP
S&W	S&W	STOP & WASTE VALVE
EL	EL	EXPANSION LOOP
EL	EL	PIPE GUIDE
EL	EL	PIPE ANCHOR
EL	EL	FLOW IN DIRECTION OF ARROW
HB/WH	HB/WH	HOSE BIBB/WALL HYDRANT
ETR	ETR	EXISTING TO REMAIN
CTE	CTE	CONNECT TO EXISTING
TYP.	TYP.	TYPICAL
AC	AC	CONCEALED ABOVE CEILING
ACB	ACB	CONCEALED ABOVE CEILING BELOW
@C	@C	EXPOSED AT CEILING
@CB	@CB	EXPOSED AT CEILING BELOW
FFE	FFE	FINISHED FLOOR ELEVATION
INV	INV	INVERT ELEVATION
VTR	VTR	VENT THRU ROOF
AVTR	AVTR	ACID VENT THRU ROOF
AP	AP	ACCESS PANEL
AFF	AFF	ABOVE FINISHED FLOOR
AFG	AFG	ABOVE FINISHED GRADE
FG	FG	FINISHED GRADE
CI	CI	CAST IRON
CP	CP	CHROME PLATED
UC	UC	UNDER COUNTER
F&I	F&I	FURNISH AND INSTALL
PC	PC	PLUMBING CONTRACTOR
FPC	FPC	FIRE PROTECTION CONTRACTOR
GC	GC	GENERAL CONTRACTOR
HVAC	HVAC	HEAT, VENT & AIR COND. CONTRACTOR
DCVA	DCVA	DOUBLE CHECK VALVE ASSEMBLY
RFBP	RFBP	REDUCED PRESSURE BACKFLOW PREVENTOR
STCK	STCK	STACK
STP	STP	STANDPIPE
EXP	EXP	EXPOSED

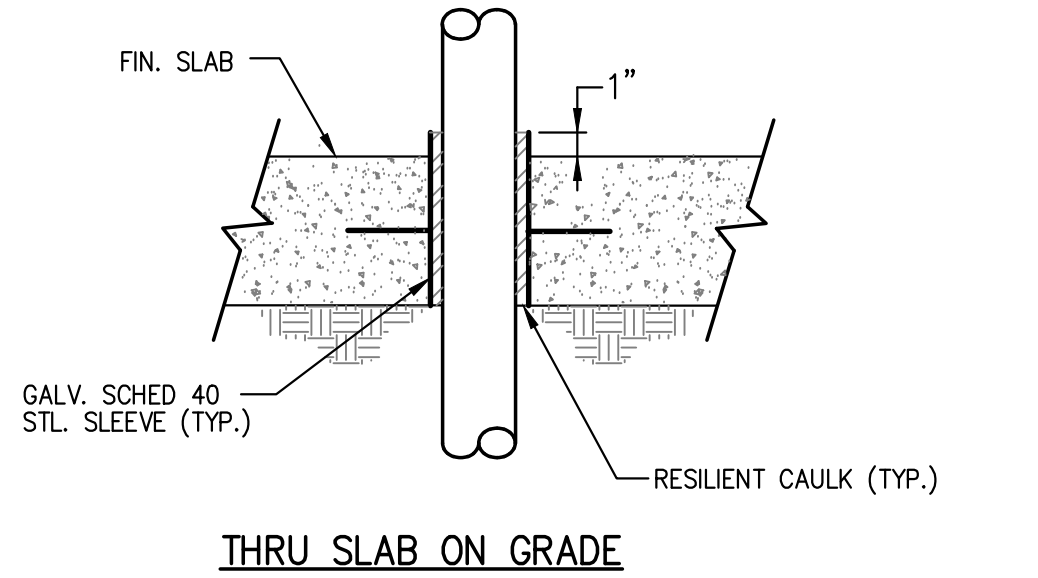
NOTE: NOT ALL SYMBOLS LISTED ARE APPLICABLE TO THIS PROJECT

GENERAL NOTES

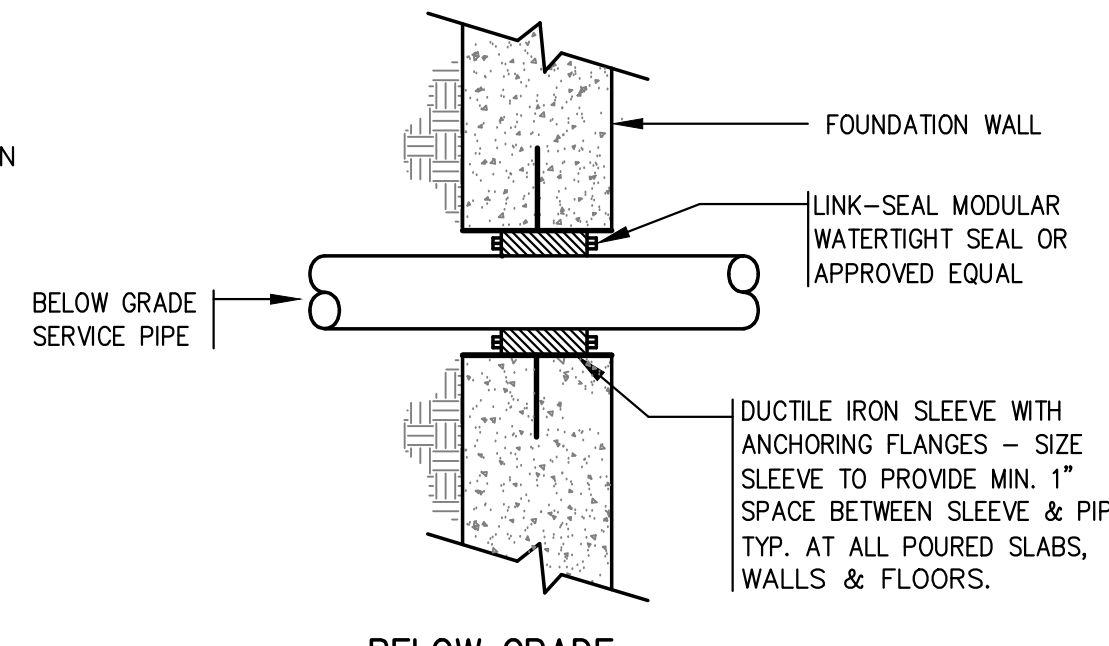
- THE PLUMBING DRAWINGS ARE DIAGRAMMATIC AND ARE TO BE USED FOR THE PURPOSE OF ESTABLISHING GENERAL LOCATIONS OF PIPING RUNS, SIZES OF PIPING, AND QUANTITIES OF FIXTURES AND EQUIPMENT TO BE FURNISHED HEREIN. REFER TO ARCHITECTURAL DRAWINGS FOR DIMENSIONS FOR EXACT LOCATIONS OF ALL PLUMBING FIXTURES, AND EQUIPMENT, INCLUDING FLOOR DRAINS, AND MOUNTING HEIGHTS. IN THE EVENT OF CONFLICT OR IF DIMENSIONS ARE NOT SHOWN, OBTAIN FIELD DIRECTIVE FROM THE ARCHITECT AS TO THE LOCATIONS OF ALL VISIBLE EQUIPMENT. PAY PARTICULAR CARE TO COORDINATE WITH THE ARCHITECT'S FIELD REPRESENTATIVE ALL FLOOR DRAIN AND FLOOR CLEANOUT LOCATIONS.
- ALL PIPING SHOWN ON THIS PLAN SHALL BE RUN CONCEALED ABOVE SUSPENDED CEILINGS, IN CHASES, OR IN PARTITIONS UNLESS SPECIFICALLY NOTED OTHERWISE.
- INSTALL ALL NEW VALVES SO AS TO BE EASILY ACCESSIBLE AND OPERABLE.
- THE PLUMBING DRAWINGS ARE INTENDED TO INDICATE THE SIZING AND DESIGN FOR THE MAIN SUPPLY AND WASTE PIPING AND FOCUSES ON RUNS AND SIZES OF THE MAIN RISERS, STACKS AND VENT TERMINATION. IT IS NOT INTENDED TO INDICATE EVERY TRAP AND FIXTURE CONNECTION, PARTICULARLY IN THE CASE OF GANG TOILETS AND LABORATORY CASEWORK. CONTRACTOR IS REQUIRED TO PROVIDE ALL CONNECTIONS, TO MAKE ALL CONNECTIONS TO ALL DRAINS AND FIXTURES WHICH ARE SHOWN AND SCHEDULED ON THE PLUMBING DRAWINGS.



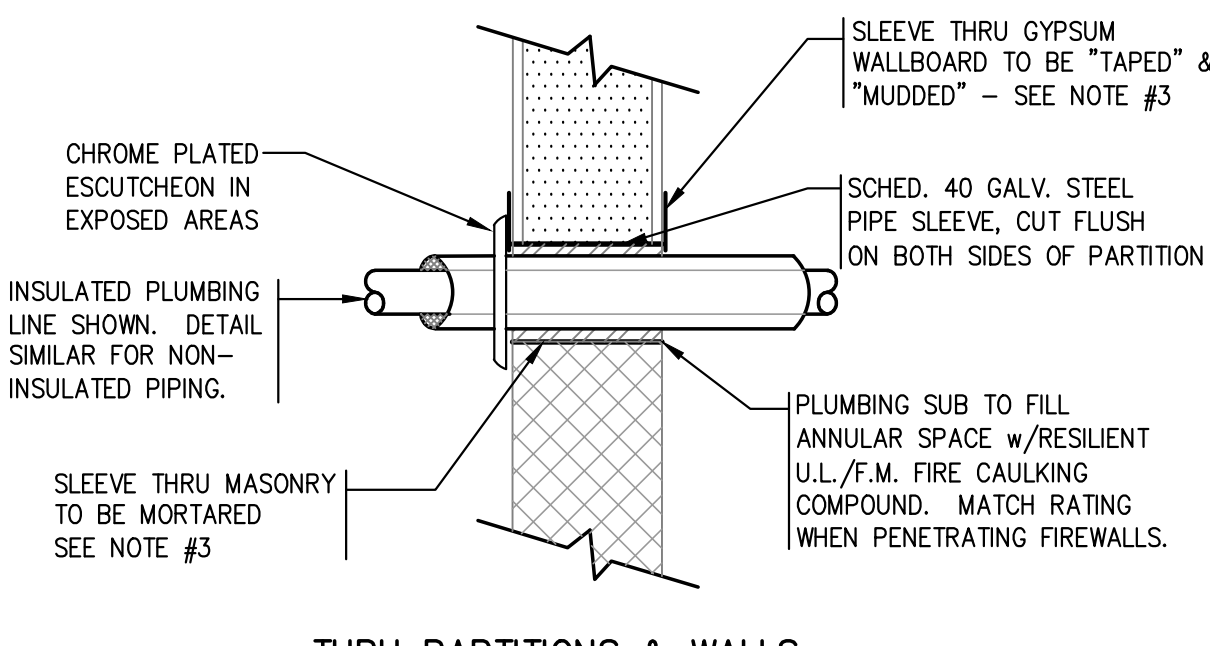
**THRU CONC. FLOORS
N.T.S.**



**THRU SLAB ON GRADE
N.T.S.**



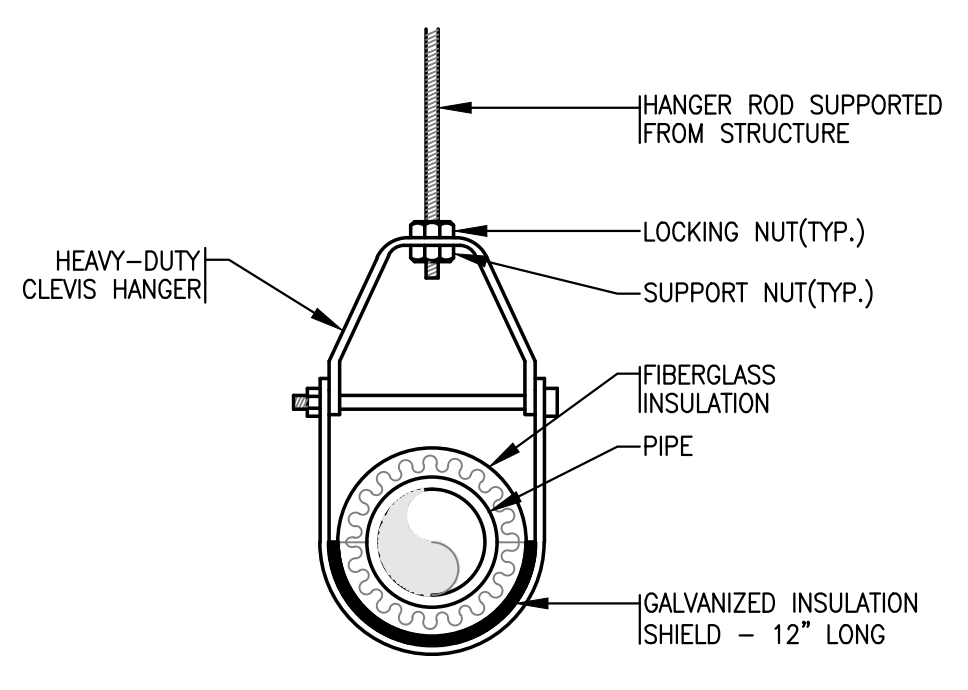
BELOW GRADE



THRU PARTITIONS & WALLS

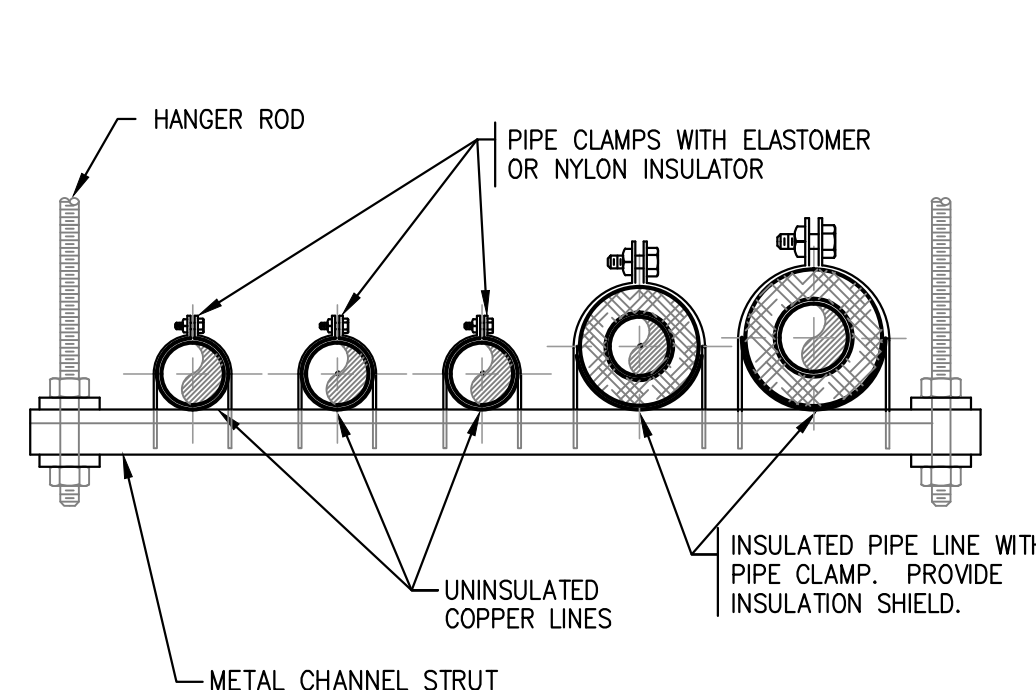
1 TYPICAL PLUMBING SLEEVE CONDITION DETAILS

- NOTE:
- ALL PIPING PENETRATING ALL PARTITIONS, WHETHER FIRE OR SMOKE RATED OR NOT, CONCEALED OR EXPOSED, SHALL BE SLEEVED AS DETAILED.
 - WHERE CONC. WALLS, SLABS, ETC., ARE CORE DRILLED, INSTALL SLEEVE FLUSH WITH BOTH SIDES, CAULKED & LEADED IN PLACE.
 - REFER TO DIVISION 4 & 9 FOR PROCEDURES & METHODS OF PATCHING AROUND SLEEVES AT GYPSUM, PLASTER & MASONRY. REFER TO SPECS FOR DELINEATION OF RESPONSIBILITY
 - SLEEVES SHALL BE SIZED TO PROVIDE MIN. 1" CLEARANCE BETWEEN PIPE O.D. & SLEEVE I.D.



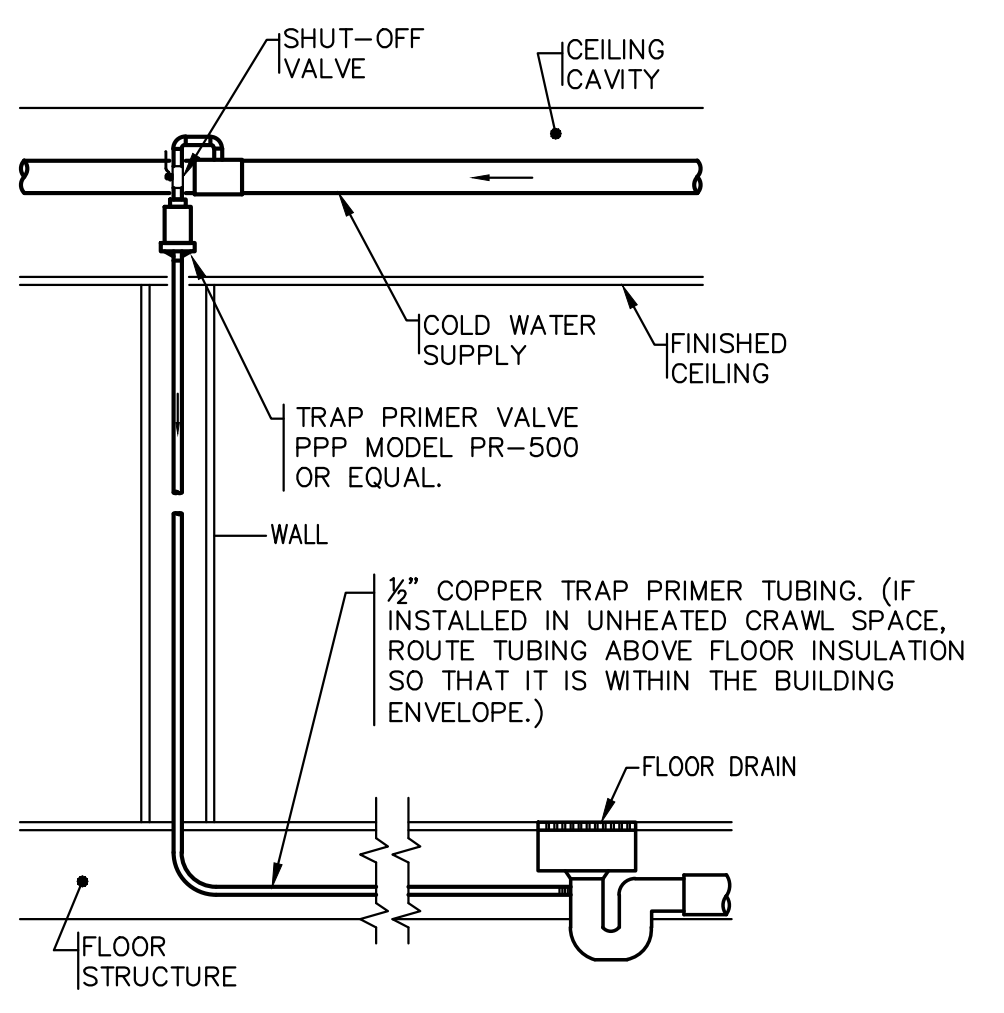
**2 TYPICAL PIPE HANGER DETAIL
P0.1 N.T.S.**

THIS DETAIL INDICATES HANGING OF INSULATED PIPING WHICH MAY BE EITHER WATER OR STORM DRAIN. CLEVIS HANGER DETAIL APPLIES TO ALL PLUMBING PIPING ON THIS PROJECT.

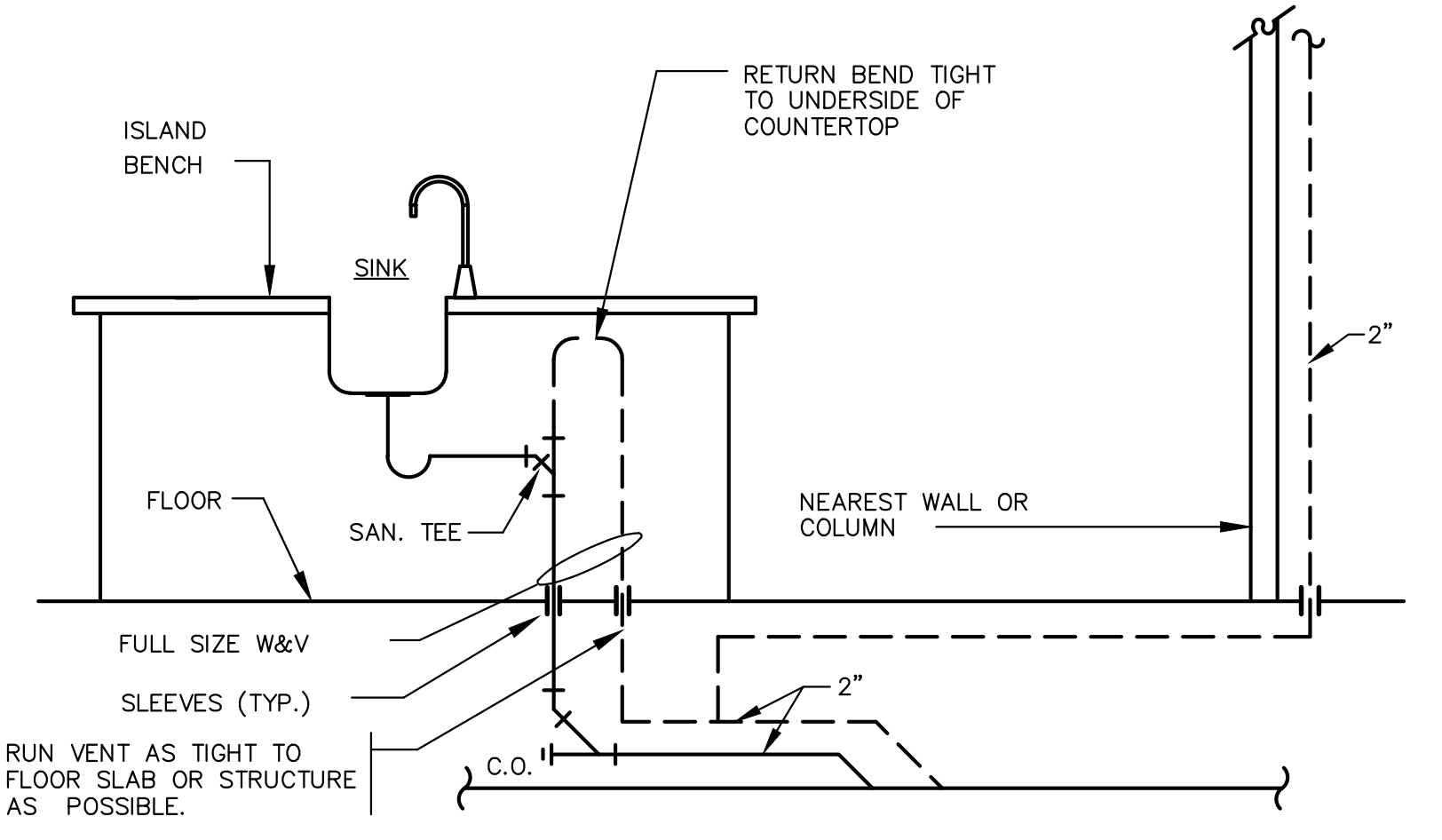


**3 TRAPEZE PIPE HANGER
P0.1 N.T.S.**

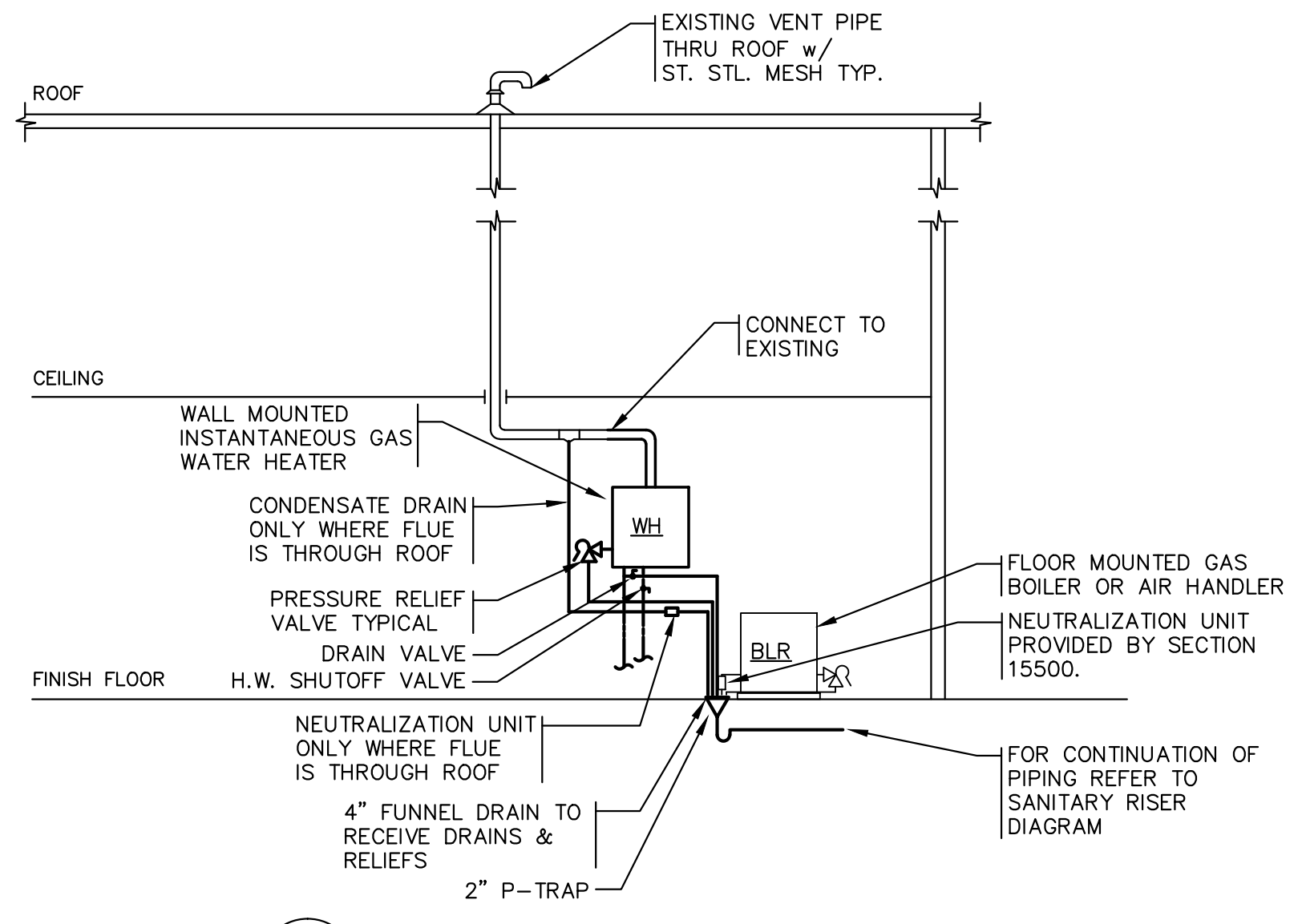
PIPE SIZE TO FIXTURE SCHEDULE						
P. NO.	FIXTURE	S/W	VENT	CW	HW	REMARKS
P-1	WATER CLOSET	4"	2"	3/4"	-	FLOOR MOUNTED, TANK TYPE
P-2	LAVATORY	1-1/2"	1-1/2"	1/2"	1/2"	
P-3	TUB/SHOWER	1-1/2"	1-1/2"	1/2"	1/2"	
P-4	SHOWER	2"	2"	1/2"	1/2"	
P-5	KITCHEN SINK	2"	2"	1/2"	1/2"	
P-6	CLOTHES WASHER	1-1/2"	1-1/2"	1/2"	1/2"	
P-7	WATER CLOSET	4"	2"	1"	-	FLOOR MOUNTED BOTTOM OUTLET, FLUSH VALVE
P-7A	WATER CLOSET	4"	2"	1"	-	ADA FLOOR MOUNTED BOTTOM OUTLET, FLUSH VALVE
P-8	LAVATORY	1-1/2"	1-1/2"	1/2"	1/2"	MOUNT PER ADA REQUIREMENTS
HB	HOSE BIBB	-	-	1/2"	-	TOILET ROOMS 107B & 107C



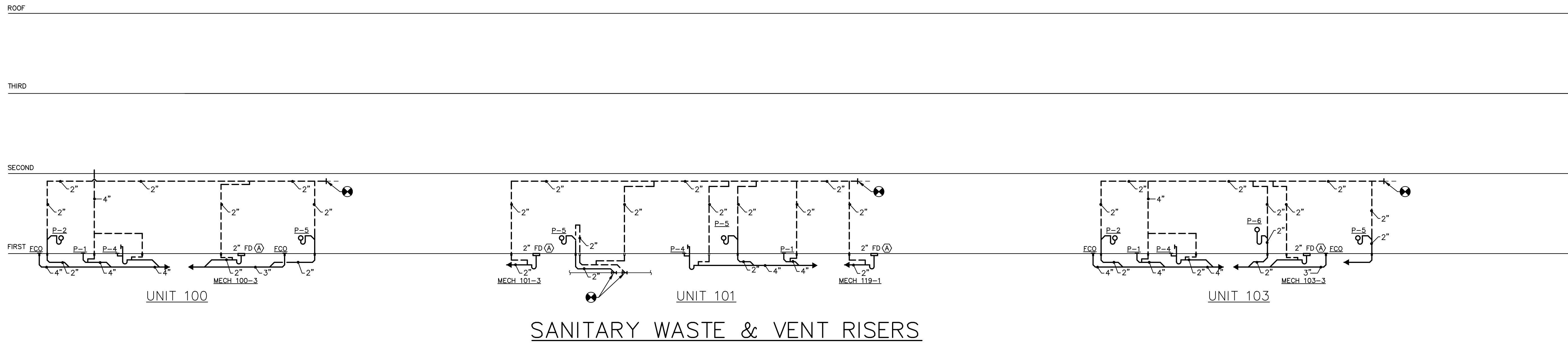
**6 TRAP PRIMER PIPING DETAIL
P0.1 N.T.S.**



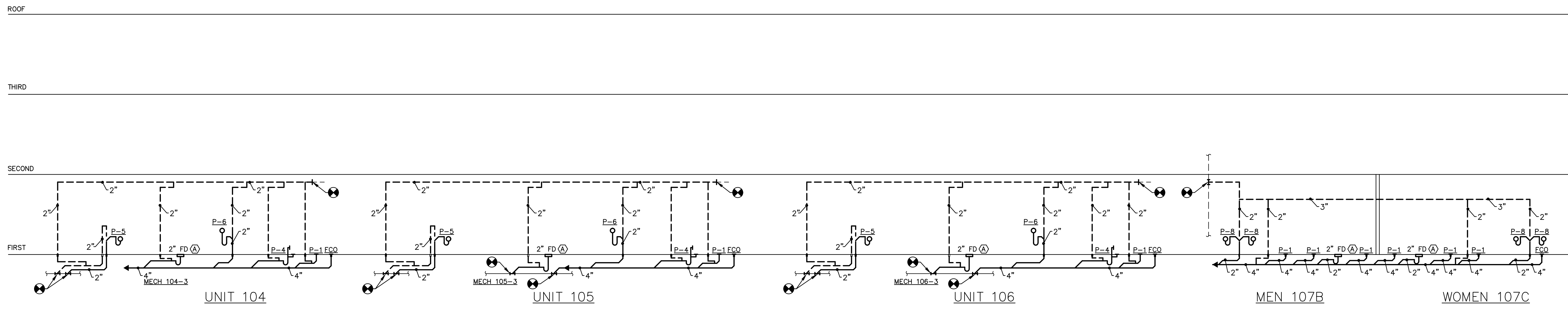
**4 ISLAND SINK BOW VENT DETAIL
P0.1 N.T.S.**



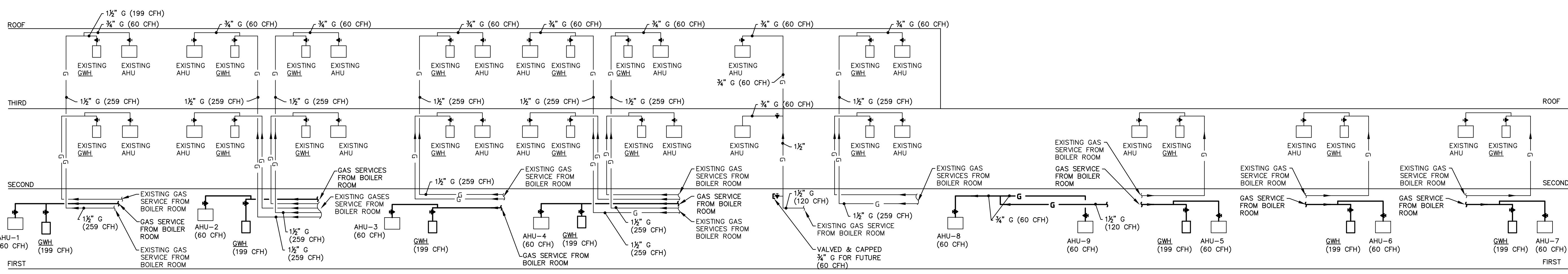
**5 UTILITY ROOM SCHEMATIC
P0.1 N.T.S.**



SANITARY WASTE & VENT RISERS



SANITARY WASTE & VENT RISERS



- GAS RISER**
 N.T.S.
- GAS RISER**
 N.T.S.
- GAS RISER**
 N.T.S.
- GAS RISER**
 N.T.S.
- GAS RISER**
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GAS RISERS



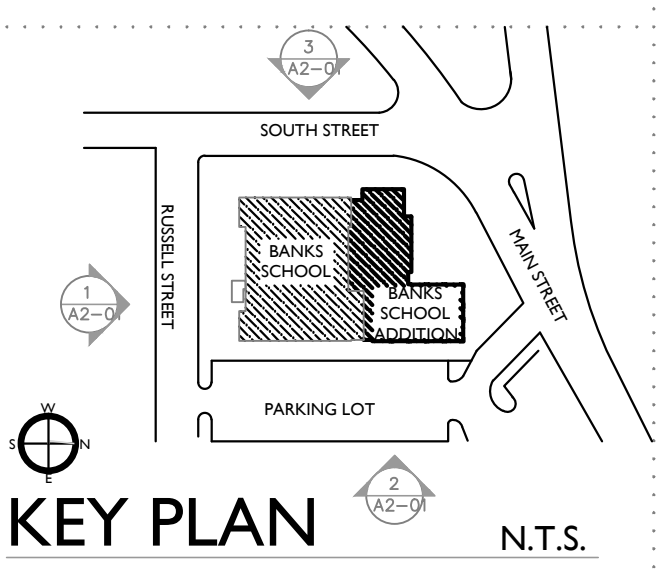
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PHASE III
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Drawing Title:

PLUMBING RISER DIAGRAMS



Revisions:

BIDDING DOCUMENT

Date: 12-30-2011
 Project Number: 10025-A
 Project Manager: CG
 Drawn By: JIG
 Scale: 1/8" = 1'-0"

P0.2



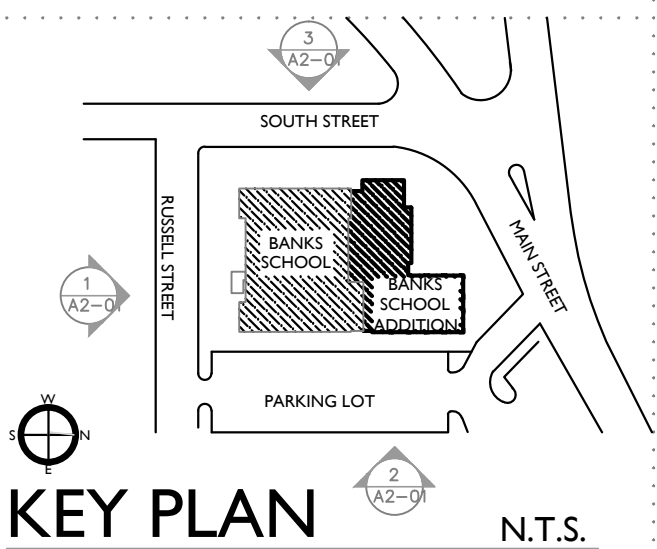
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PHASE III
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Drawing Title:

FIRST FLOOR
PLUMBING
DEMOLITION PLAN

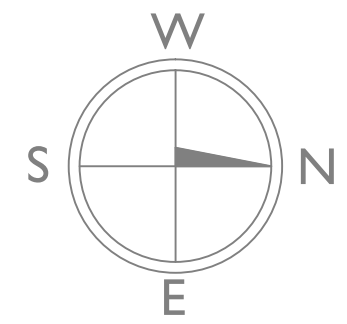
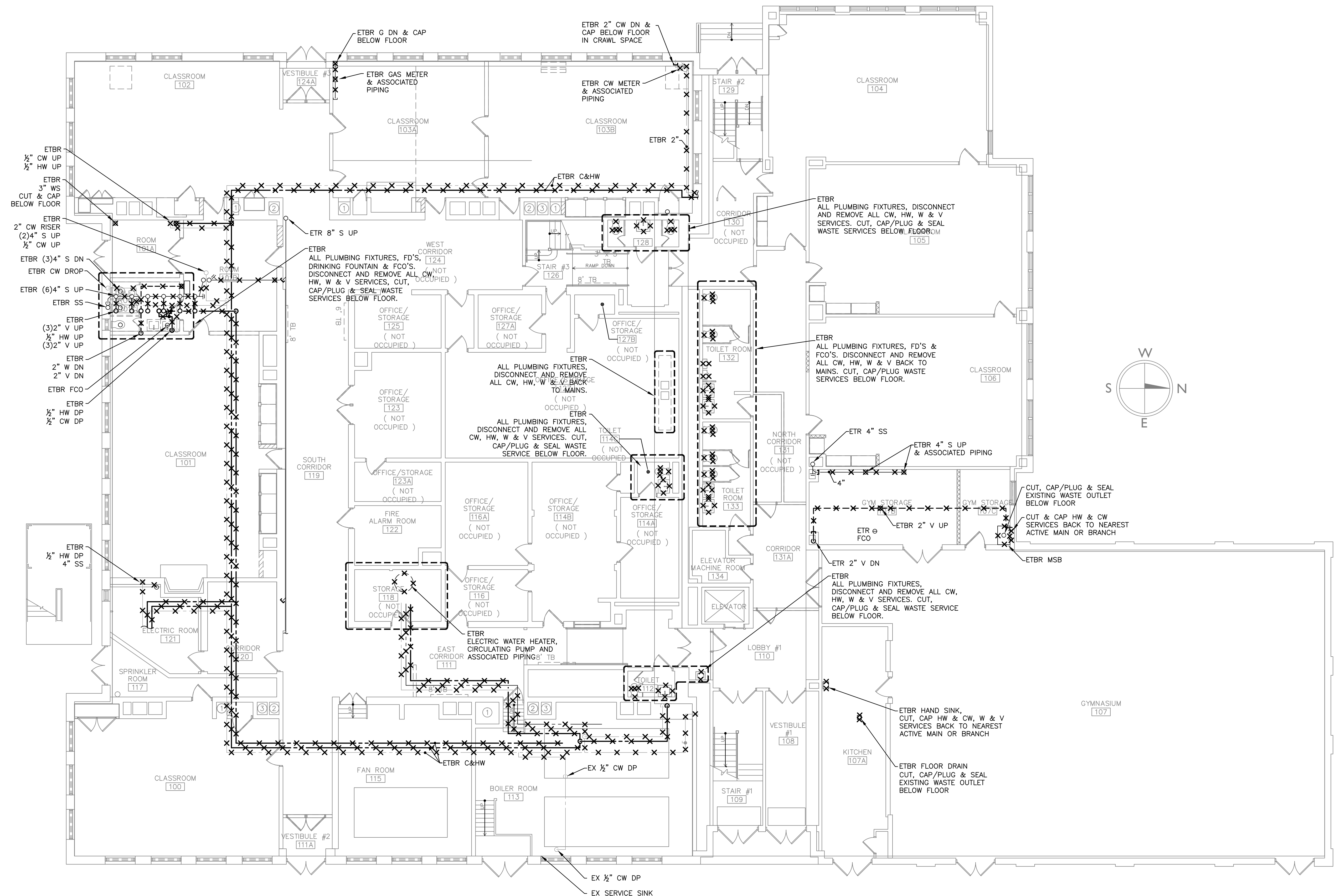


Revisions:

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DOCUMENT

Date: 12-30-2011
Project Number: 10025-A
Project Manager: CG
Drawn By: JIG
Scale: 1/8" = 1'-0"

PDI.I



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

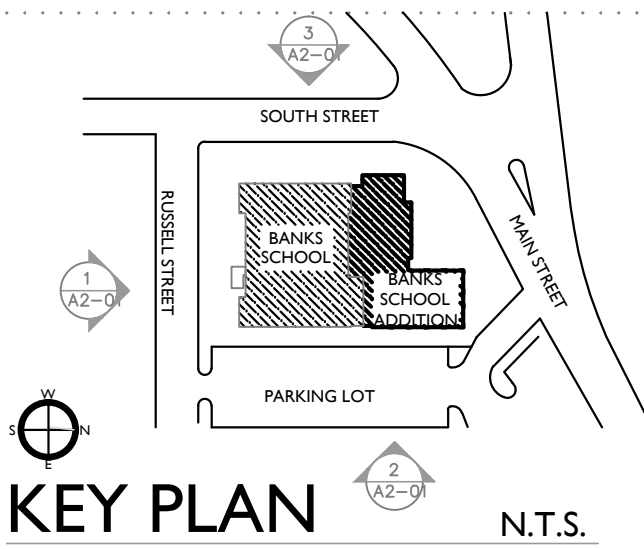
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PHASE III
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Drawing Title:

FIRST FLOOR
UNDERSLAB
PIPING PLAN

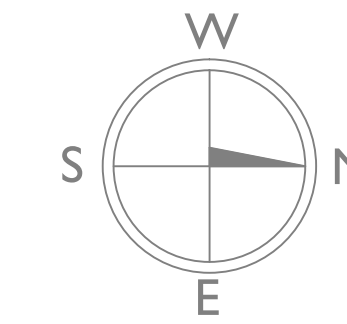
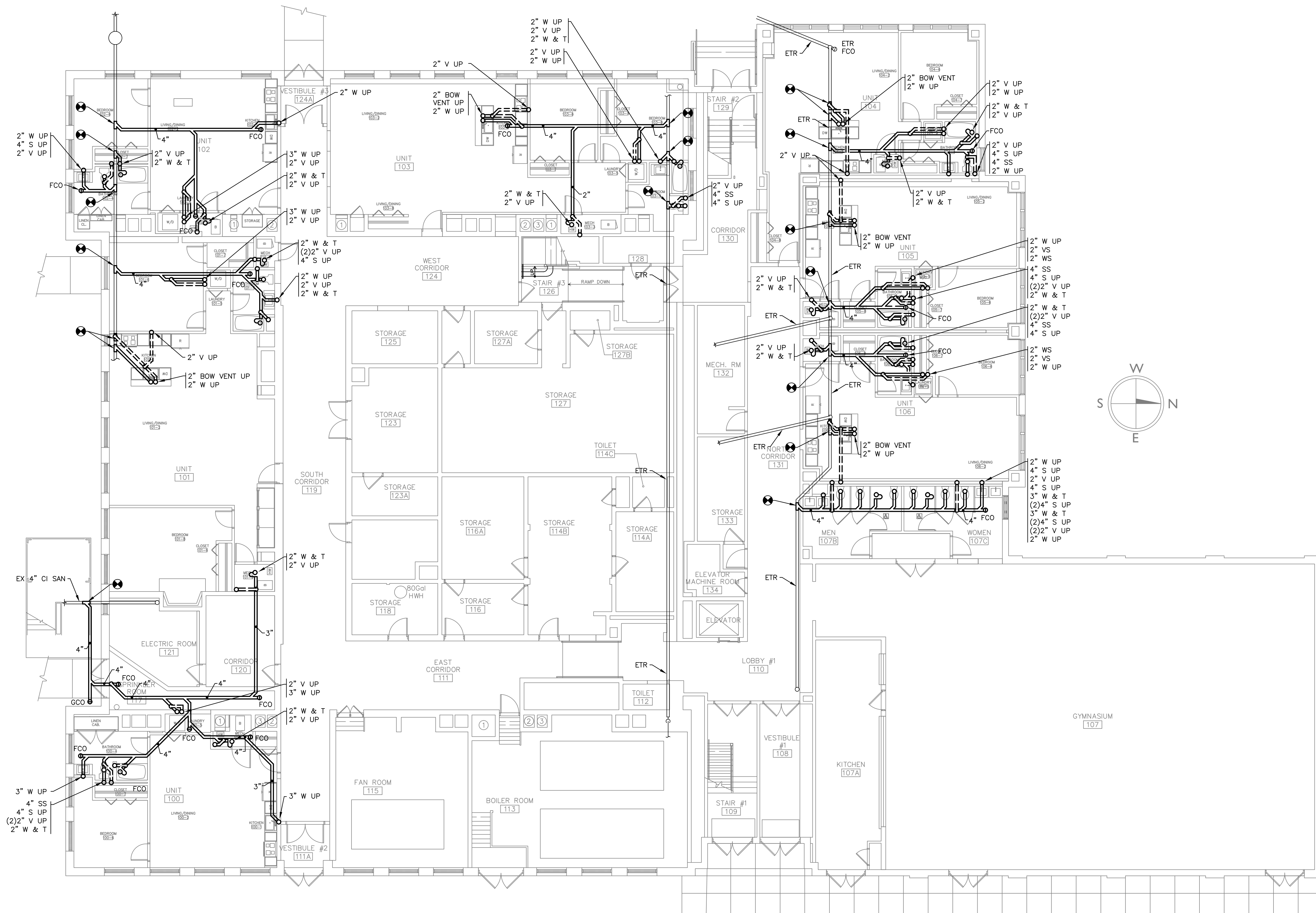


Revisions:

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Date: 12-30-2011
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Project Manager: CG
Drawn By: JIG
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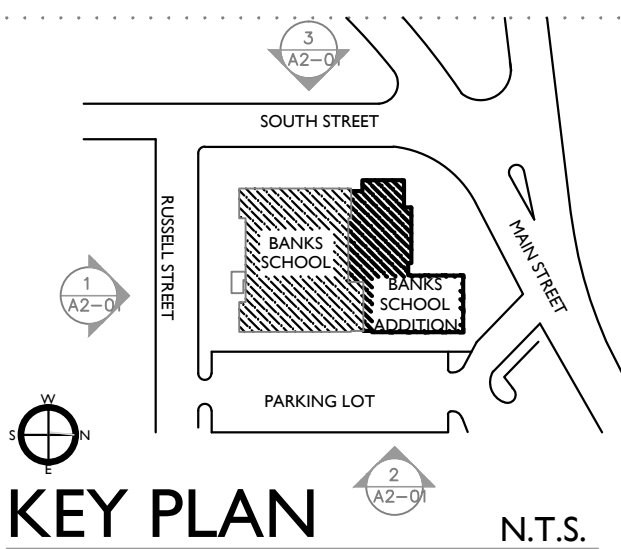
1 FIRST FLOOR PLAN
SCALE: 1/8"=1'-0"

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CITY HALL
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Drawing Title:

**FIRST FLOOR
GAS PIPING
PLAN**

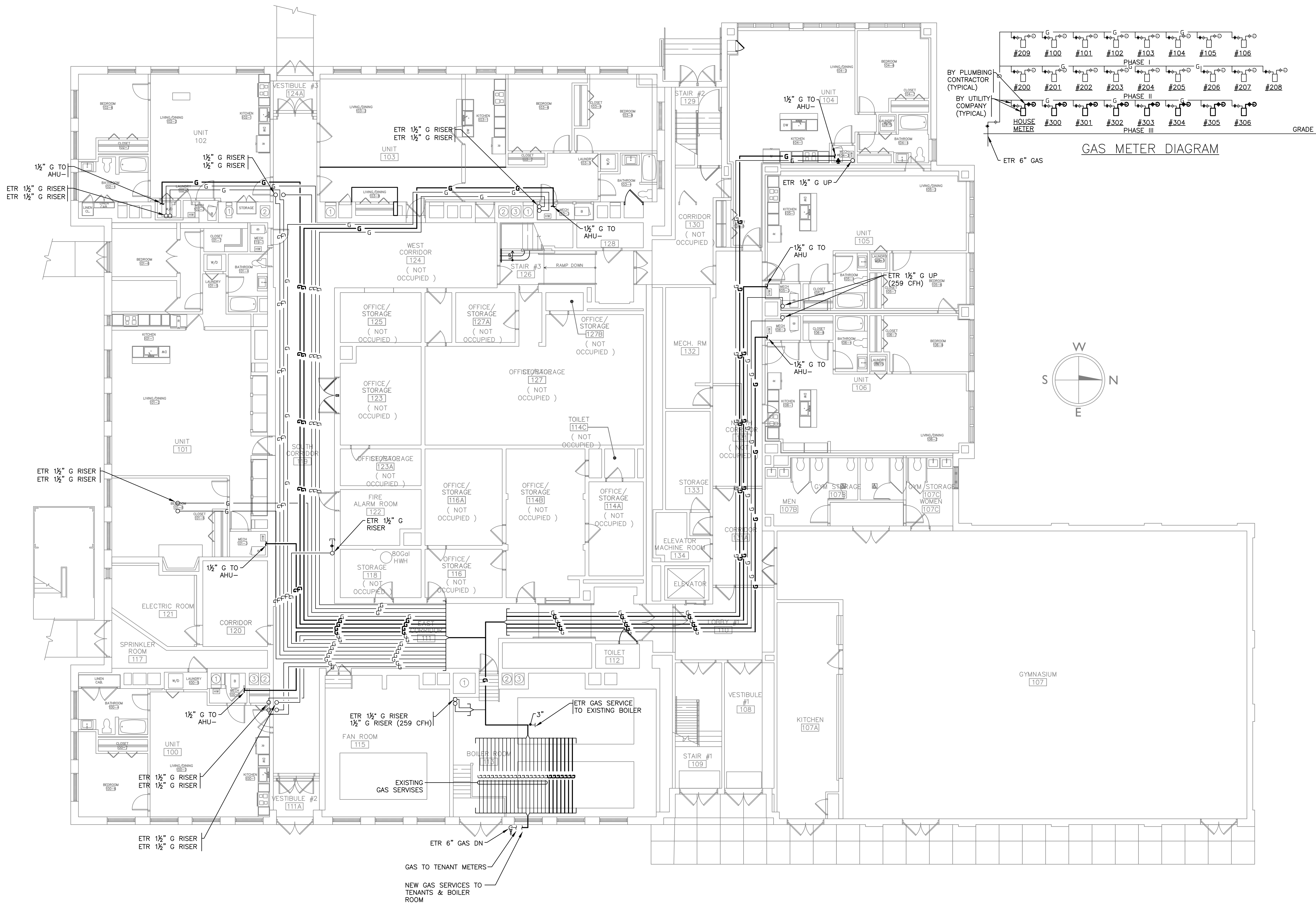


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**BIDDING
DOCUMENT**

Date: 12-30-2011
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Drawn By: JIG
Scale: 1/8" = 1'-0"

PI.IG



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

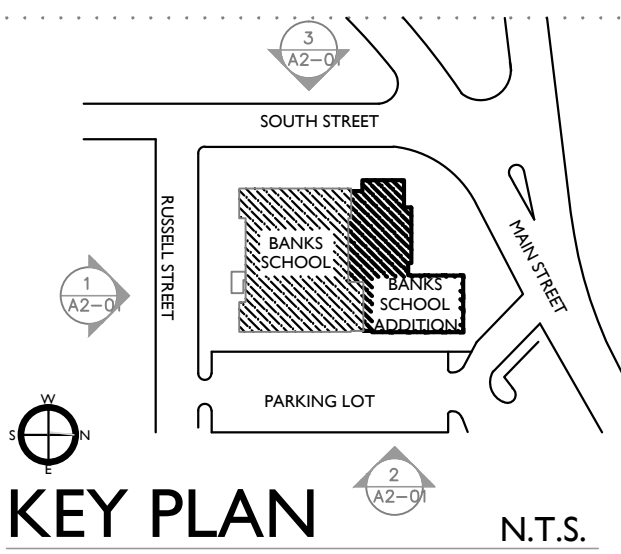
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PHASE III
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Drawing Title:

FIRST FLOOR
PLUMBING
PLAN

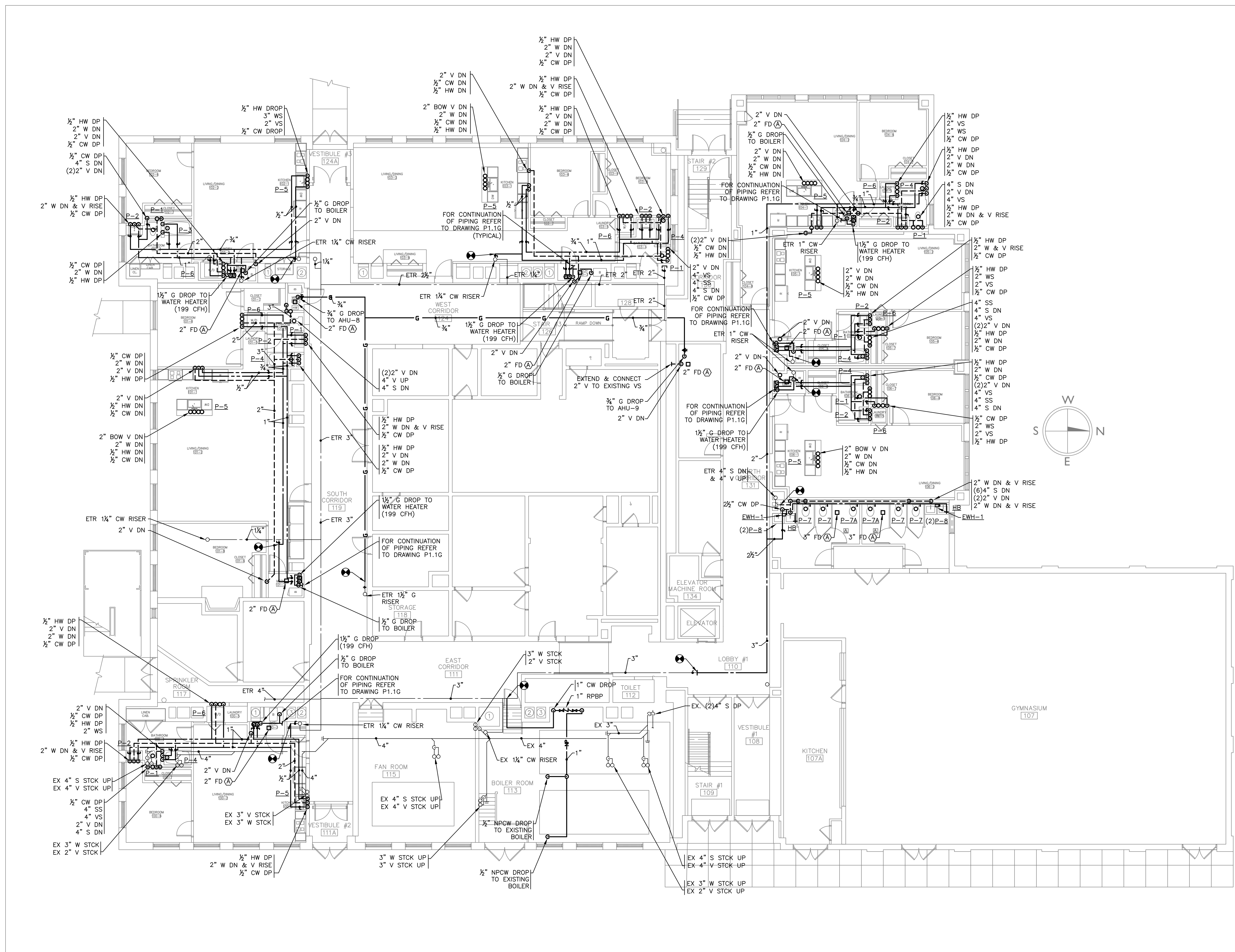


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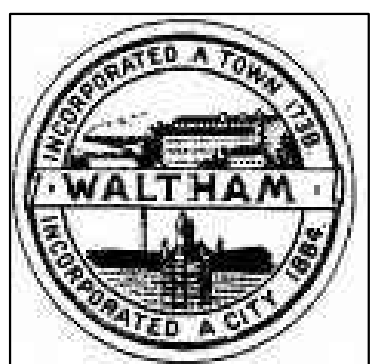
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Date: 12-30-2011
Project Number: 10025-A
Project Manager: CG
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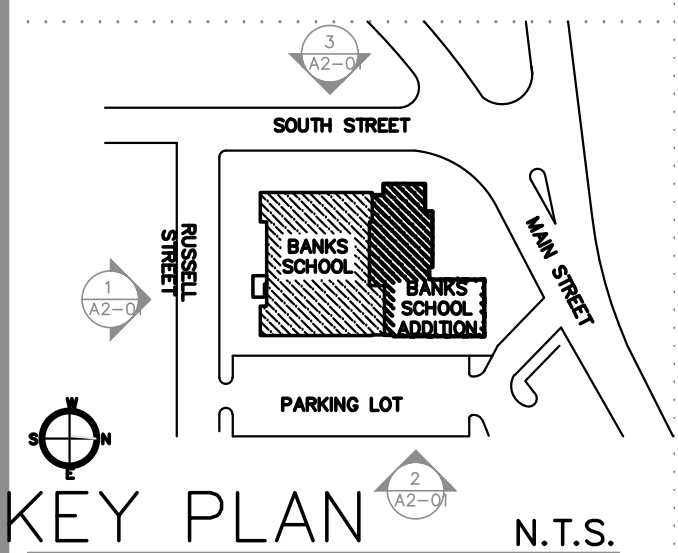


1 FIRST FLOOR PLAN
SCALE: 1/8"=1'-0"



Drawing Title:

HVAC
FIRST FLOOR
DEMO PLAN

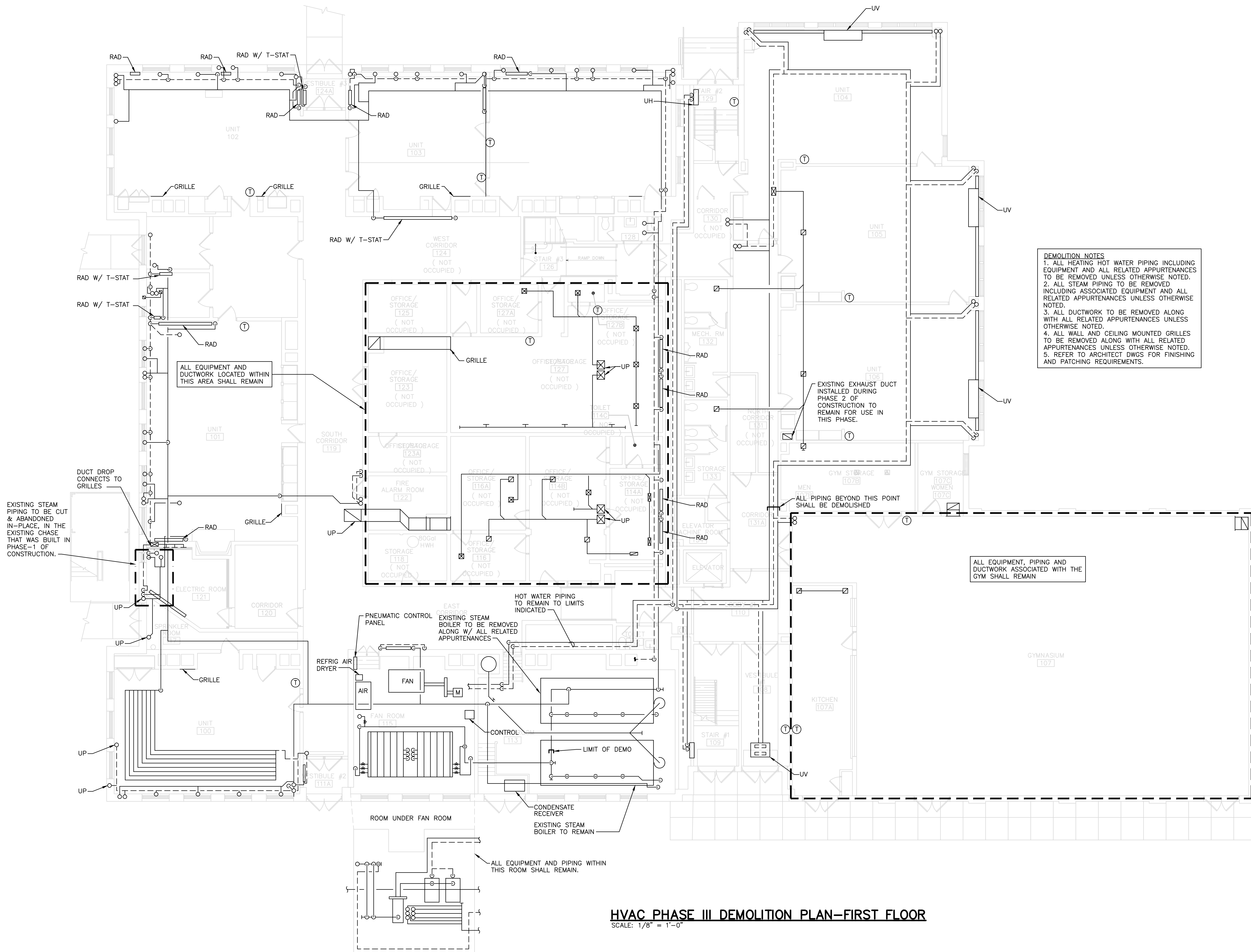


Revisions:

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DOCUMENT

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Project Manager: LV
Drawn By: MVD
Scale: 1/8"=1'-0"

MD1.1



DEMOLITION NOTES
1. ALL HEATING HOT WATER PIPING INCLUDING EQUIPMENT AND ALL RELATED APPURTENANCES TO BE REMOVED UNLESS OTHERWISE NOTED.
2. ALL STEAM PIPING TO BE REMOVED INCLUDING ASSOCIATED EQUIPMENT AND ALL RELATED APPURTENANCES UNLESS OTHERWISE NOTED.
3. ALL DUCTWORK TO BE REMOVED ALONG WITH ALL RELATED APPURTENANCES UNLESS OTHERWISE NOTED.
4. ALL WALL AND CEILING MOUNTED GRILLES TO BE REMOVED ALONG WITH ALL RELATED APPURTENANCES UNLESS OTHERWISE NOTED.
5. REFER TO ARCHITECT DWGS FOR FINISHING AND PATCHING REQUIREMENTS.

ALL EQUIPMENT AND DUCTWORK LOCATED WITHIN THIS AREA SHALL REMAIN

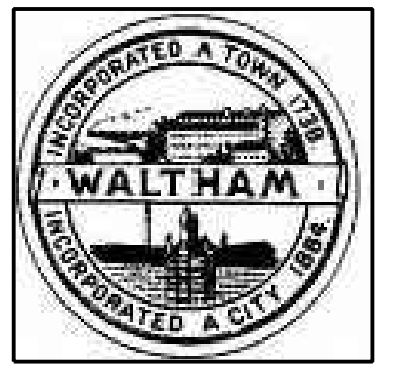
EXISTING EXHAUST DUCT INSTALLED DURING PHASE 2 OF CONSTRUCTION TO REMAIN FOR USE IN THIS PHASE.

ALL EQUIPMENT, PIPING AND DUCTWORK ASSOCIATED WITH THE GYM SHALL REMAIN

EXISTING STEAM PIPING TO BE CUT & ABANDONED IN-PLACE, IN THE EXISTING CHASE THAT WAS BUILT IN PHASE-1 OF CONSTRUCTION.

HVAC PHASE III DEMOLITION PLAN-FIRST FLOOR
SCALE: 1/8" = 1'-0"

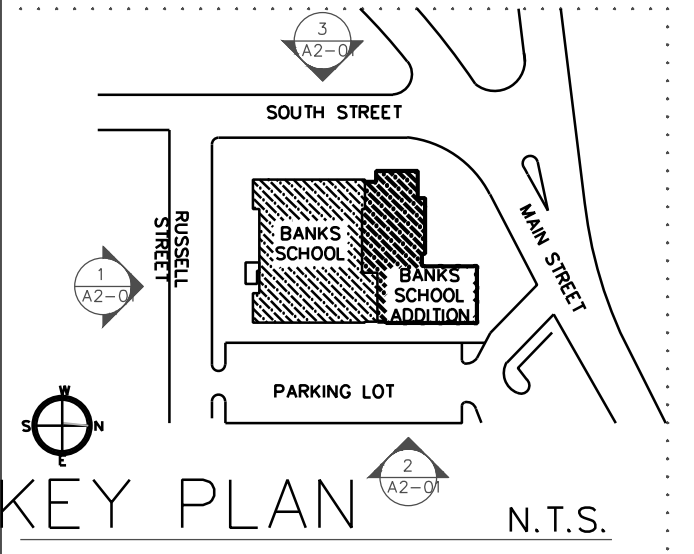
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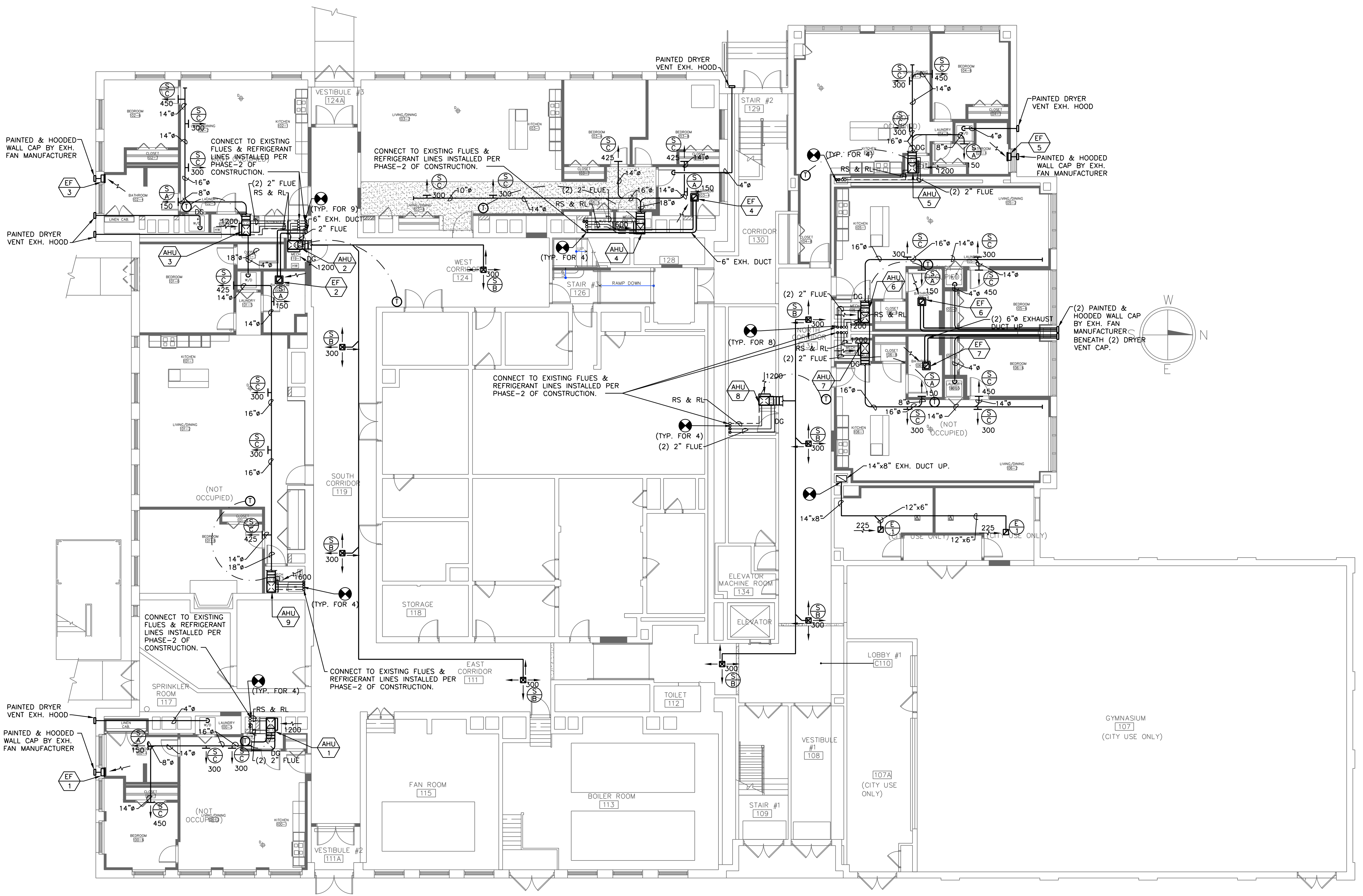
HVAC FIRST
FLOOR PLAN



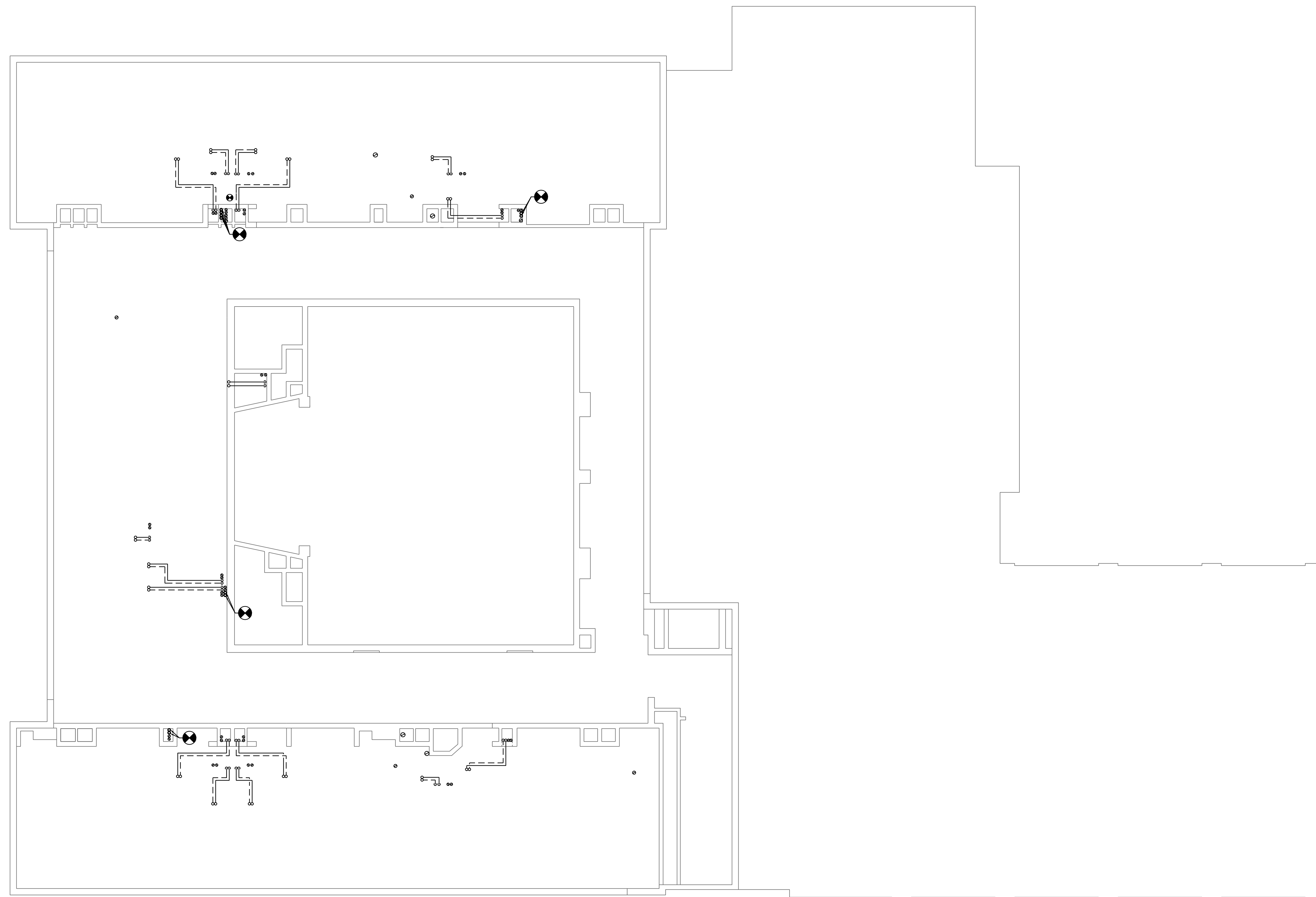
Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager: LV
Drawn By: MVD
Scale: 1/8"=1'-0"

M1.1



HVAC PHASE III NEW WORK PLAN—FIRST FLOOR
SCALE: 1/8" = 1'-0"

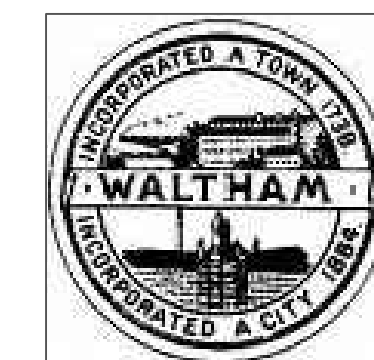


ATTIC HVAC NEW WORK PLAN
SCALE: 1/8" = 1'-0"



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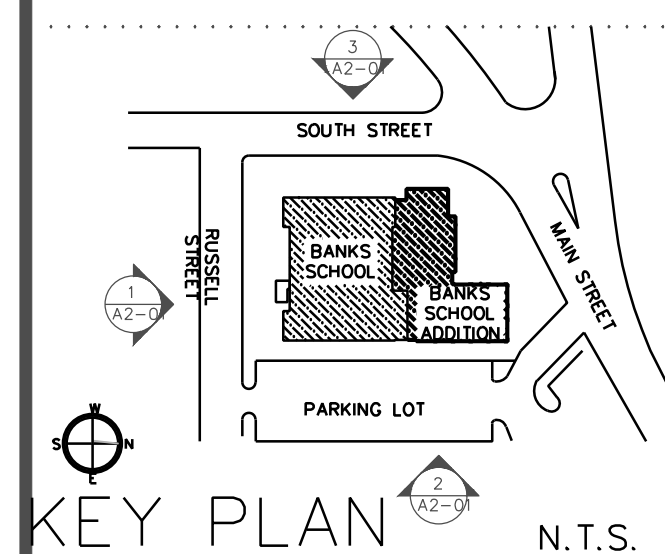
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Drawing Title:

HVAC ATTIC
FLOOR PLAN

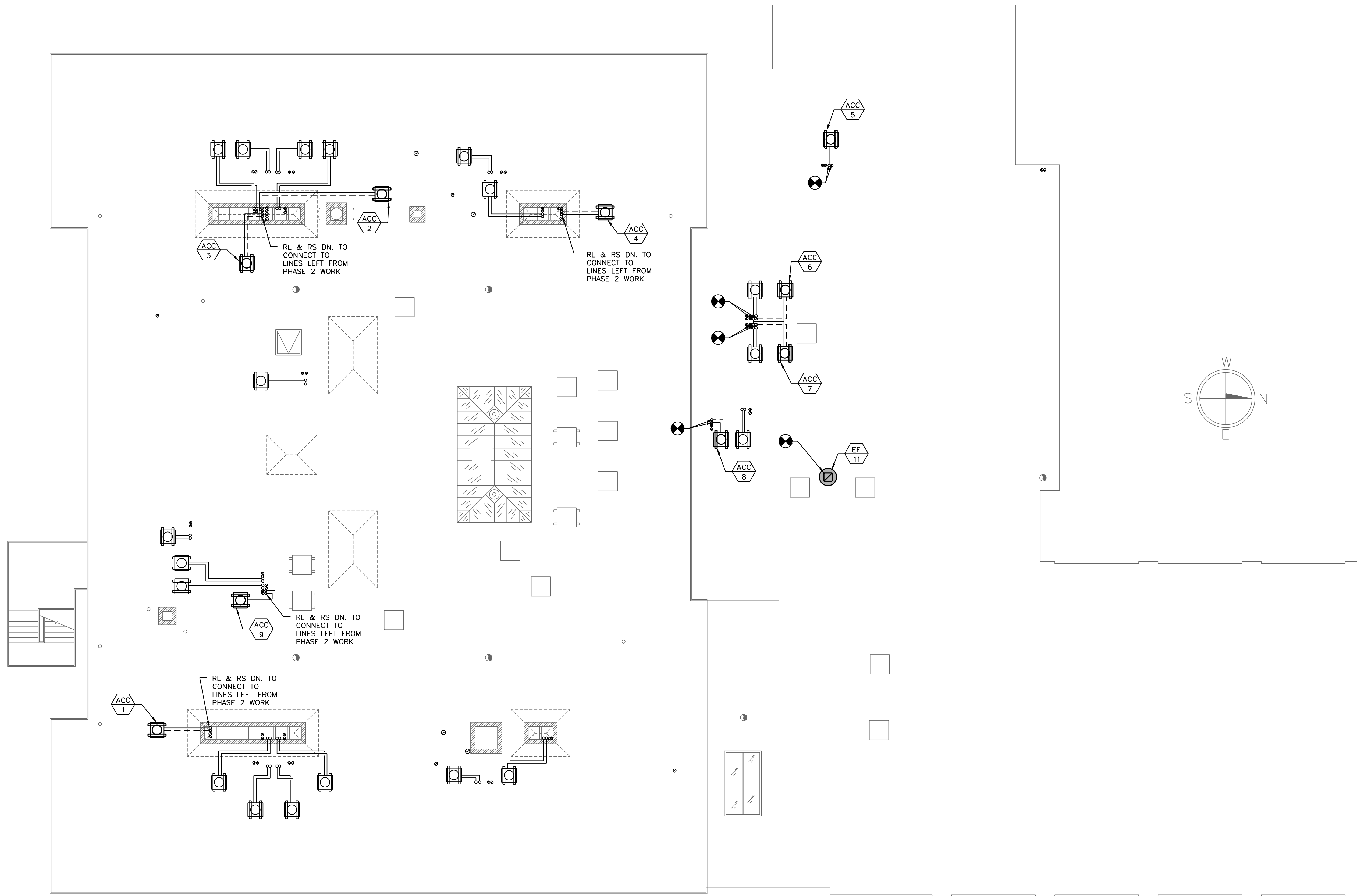


Revisions:

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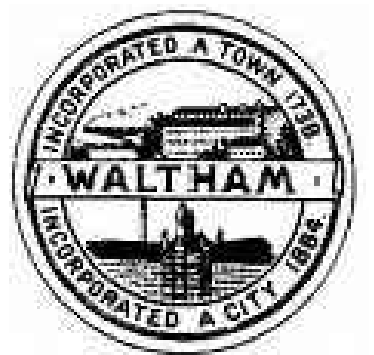
M1.2



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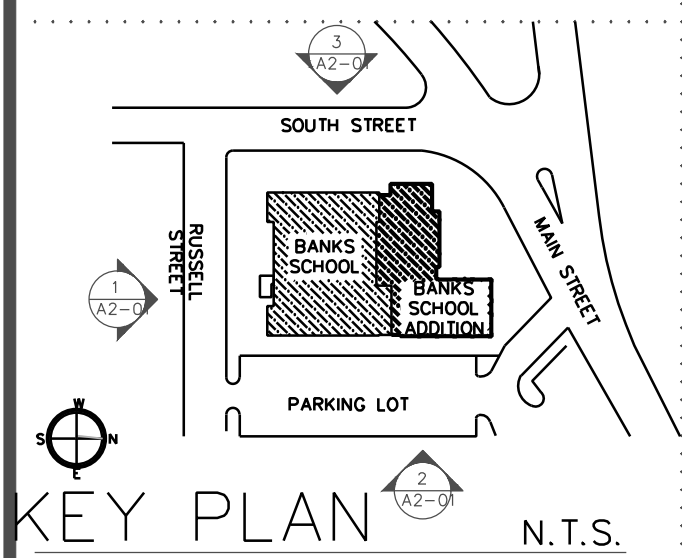
PHASE III
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CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

HVAC
ROOF PLAN



Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager: LV
Drawn By: MVD
Scale: 1/8"=1'-0"

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M1.3

EXHAUST FANS												
UNIT NO.	MANUF. NO.	BUILDING LOCATION	DRIVE TYPE	SP	CFM	RPM	SONES	MOTOR			CONTROL SWITCH	REMARKS
								AMPS	V	PH		
EF-1	509	100-4	DIRECT	0.1"	180	1925	6.5	1.5	120	1	SWITCH	
EF-2	QTXEN150	101-4	DIRECT	0.1"	150	725	1.4	0.5	120	1	SWITCH	
EF-3	509	102-4	DIRECT	0.1"	180	1925	6.5	1.5	120	1	SWITCH	
EF-4	QTXEN150	103-4	DIRECT	0.1"	180	725	1.4	0.5	120	1	SWITCH	
EF-5	509	104-4	DIRECT	0.1"	180	1925	6.5	1.5	120	1	SWITCH	
EF-6	QTXEN150	105-4	DIRECT	0.1"	150	725	1.4	0.5	120	1	SWITCH	
EF-7	QTXEN150	106-4	DIRECT	0.1"	150	725	1.4	0.5	120	1	SWITCH	

SELECTION BASED ON NUTONE FOR EF-1,2,4&6 & BROAN FOR EF-3,5&7.
 PROVIDE ALL ACCESSORIES & COMPONENTS AS REQUIRED FOR A COMPLETE OPENING SYSTEM.
 INSTALL PER MANUFACTURERS RECOMMENDATIONS.

AIR HANDLING UNITS																		
UNIT NO.	MANUF. NO.	BUILDING LOCATION	TOTAL C.F.M.	HEATING				COOLING COILS				MOTOR		EXT. S.P.	REMARKS			
				ENT. AIR	LVG AIR	INPUT MBH	OUTPUT MBH	ENT. COND. D.B.*F	LVG. COND. W.B.*F	SEN	TOT	H.P.	V			PH.		
AHU-1	TUX1B060A9361A	100-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-2	TUX1B060A9361A	119-1	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-3	TUX1B060A9361A	102-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-4	TUX1B060A9361A	103-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-5	TUX1B060A9361A	104-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-6	TUX1B060A9361A	105-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-7	TUX1B060A9361A	106-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-8	TUX1B060A9361A	132	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2
AHU-9	TUX1B060A9361A	101-3	1200	65.0	108	60.0	56.0	81	66.0	57.0	56.0	30.0	36.0	1/3	120	1	0.50	1, & 2

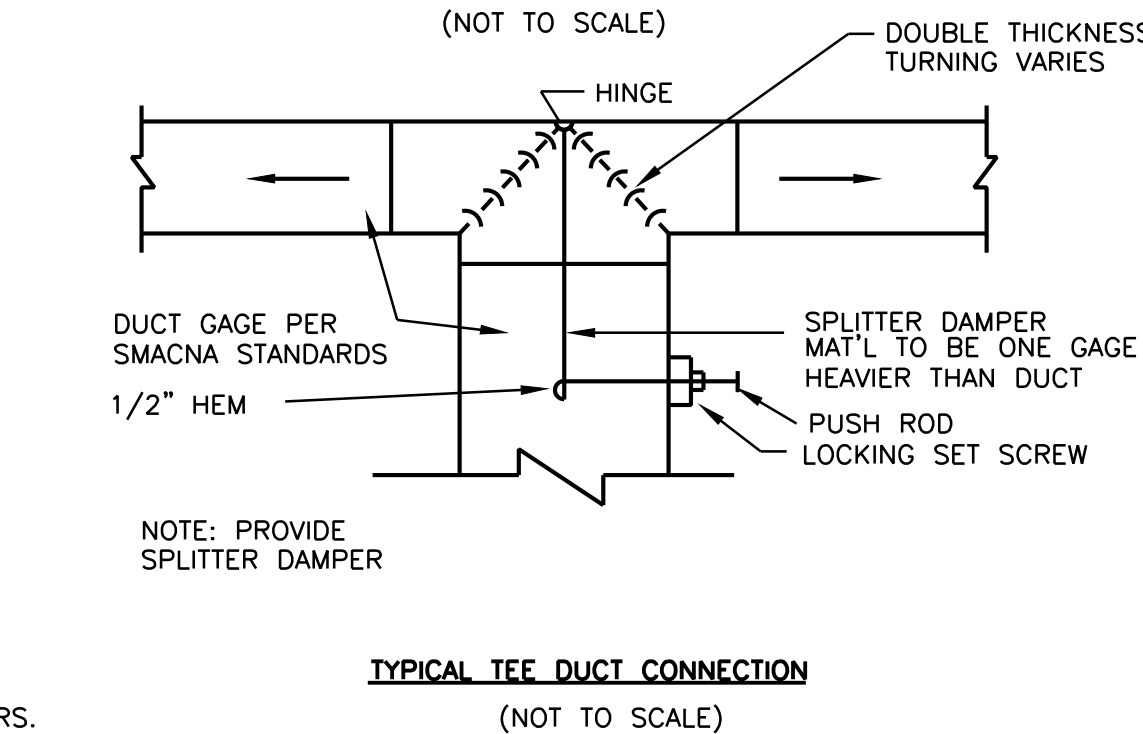
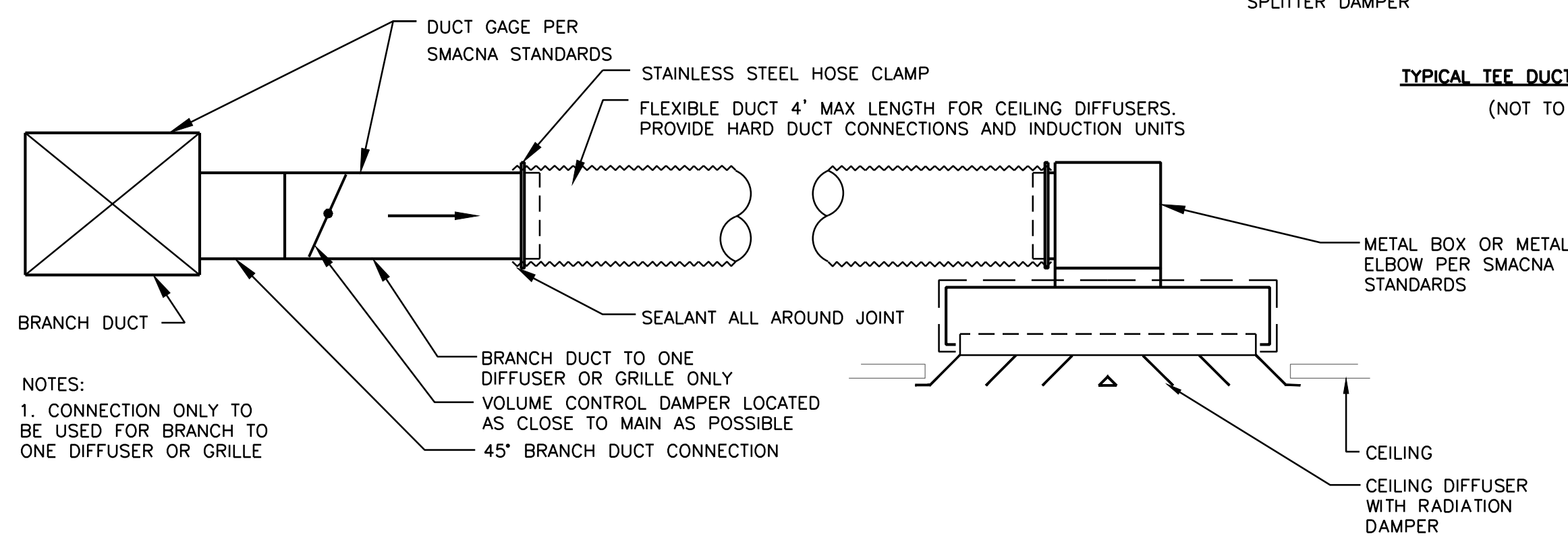
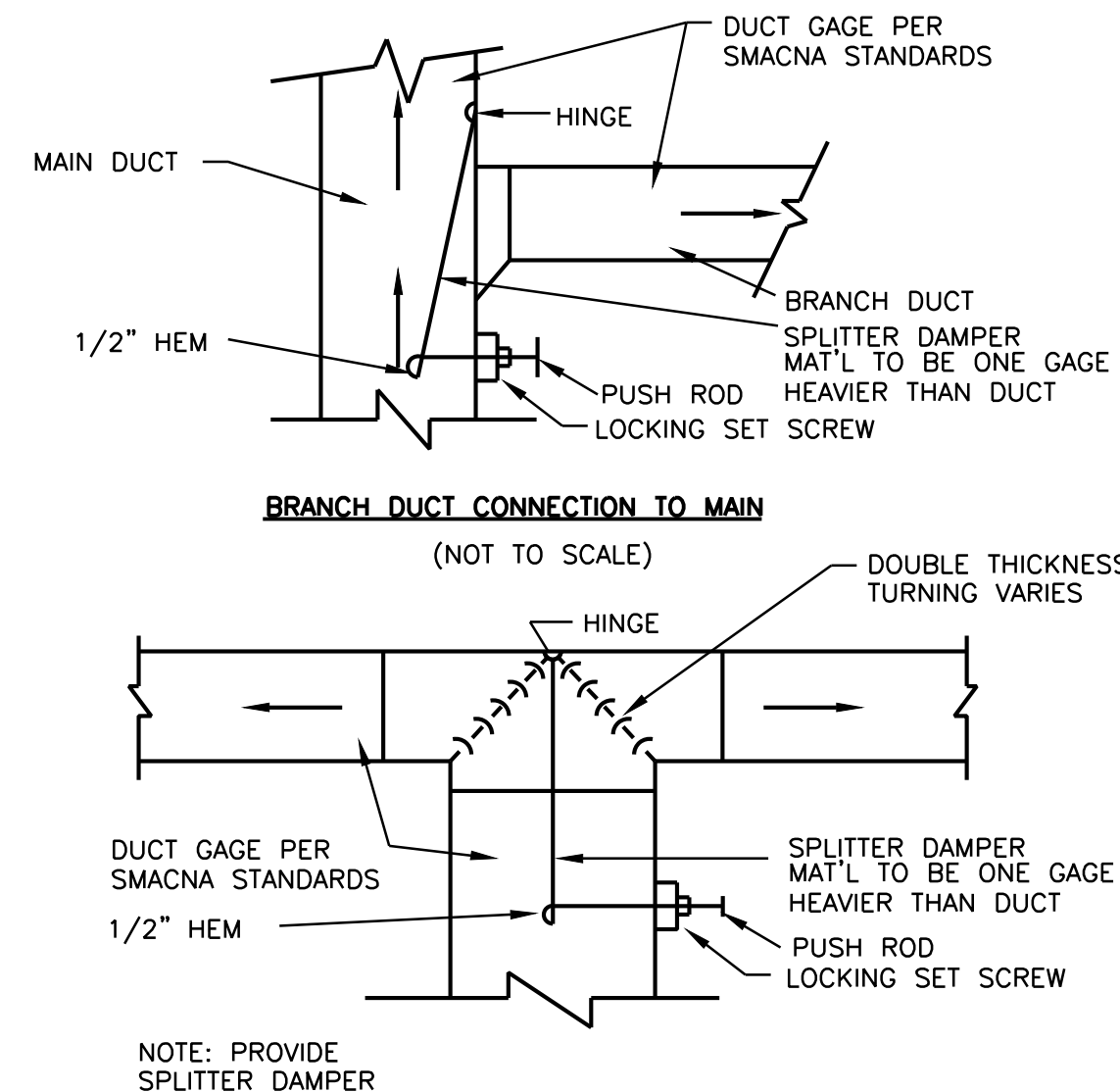
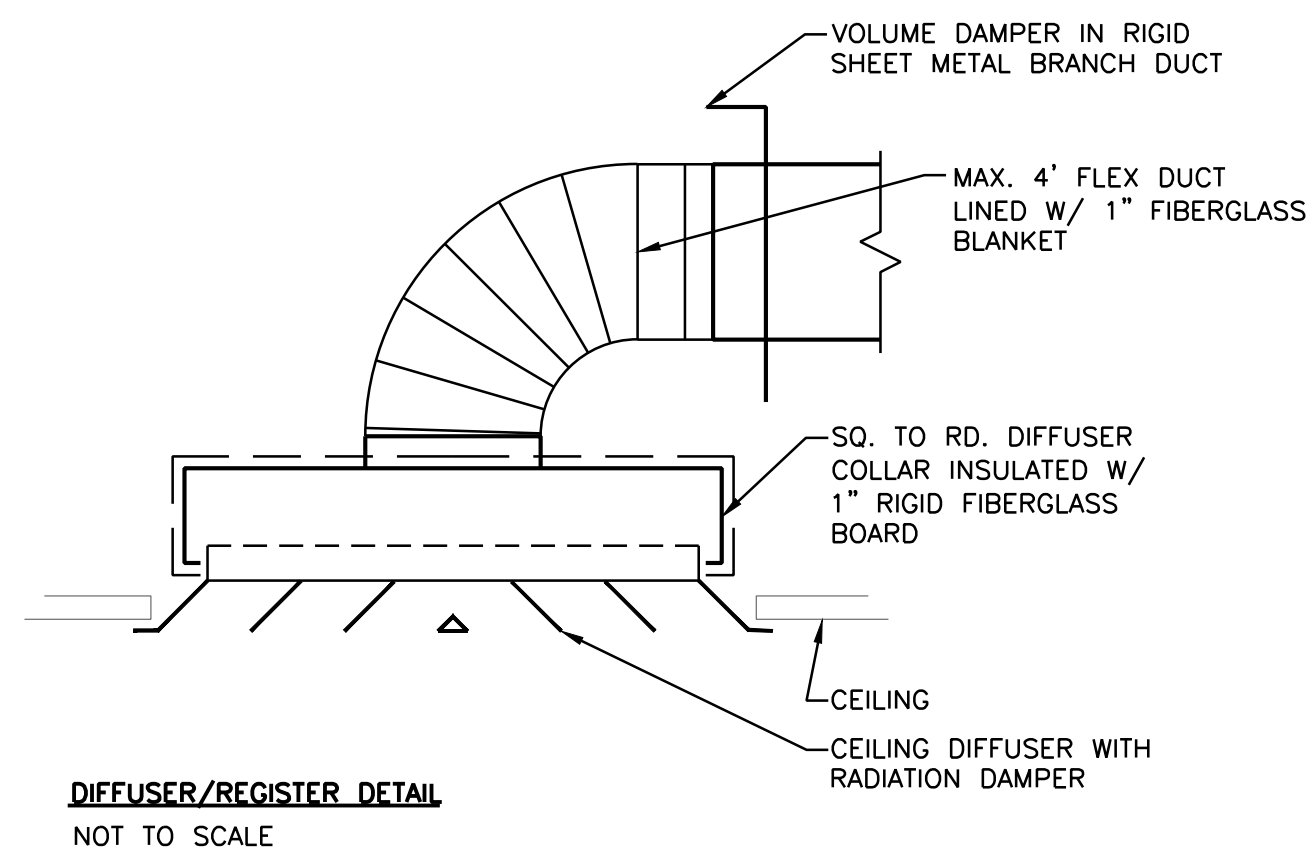
SELECTION BASED ON TRANE XR 90 SERIES
 NOTE #1: PROVIDE DIRECT EXPANSION COILING COIL 4TXC TO MATCH COOLING CONDITIONS ABOVE.
 NOTE #2: PROVIDE WITH CONCENTRIC VENT/INTAKE VERTICAL TERMINATION KIT & RAIN CAPS, INSTALL PER UNIT MANUFACTURE'S RECOMMENDATIONS.

AIR COOLED CONDENSING UNITS								
UNIT NO.	MANUF. NO.	SERVICE	ENT. D.B.	NOMINAL TONS	EER	MAX FUSE	VOLT/PH.	REFRIG CIRCUITS
ACC-2	4TTB-3036	AHU-2	95	3.0	13.0	20.0	208/1	1
ACC-3	4TTB-3036	AHU-3	95	3.0	13.0	20.0	208/1	1
ACC-4	4TTB-3036	AHU-4	95	3.0	13.0	20.0	208/1	1
ACC-5	4TTB-3036	AHU-5	95	3.0	13.0	20.0	208/1	1
ACC-6	4TTB-3036	AHU-6	95	3.0	13.0	20.0	208/1	1
ACC-7	4TTB-3036	AHU-7	95	3.0	13.0	20.0	208/1	1
ACC-8	4TTB-3036	AHU-8	95	3.0	13.0	20.0	208/1	1
ACC-9	4TTB-3036	AHU-9	95	3.0	13.0	20.0	208/1	1

SELECTION BASED ON TRANE XB 13
 PROVIDE UNIT MOUNTED DISCONNECT
 PROVIDE WITH ANTI SHORT CYCLE TIMER, EVAPORATOR DEFROST CONTROL,
 CRANK CASE HEATER, HARD START KIT, & LOW AMBIENT CONTROL.

AIR CONDITIONING DESIGN DATA						
DESIGN AREA	SUMMER				WINTER	
	OUT		IN		OUT	IN
	D.B.	W.B.	D.B.	W.B.	D.B.	D.B.
WALTHAM, MA	87	74	75	78	7	72

DIFFUSERS			REGISTER		
NO.	SIZE	STYLE	NO.	SIZE	STYLE
A	14"x6"	SDGE/FF/A	1	14"x14"	80
B	12"x12"	AMX	SELECTION BASED ON PRICE		
C	16"x8"	SDGE/FF/A	PROVIDE WITH CEILING RADIATION DAMPER		
D	12"x12"	510	SELECTION BASED ON PRICE		



DIFFUSER/GRILLE CONNECTION TO BRANCH (NOT TO SCALE)

GENERAL NOTES

- ALL DUCTWORK UNLESS DIMENSIONED IS SHOWN DIAGRAMATICALLY ONLY. EXACT LOCATION SHALL BE DETERMINED IN FIELD AFTER COORDINATING WITH OTHER WORK.
- EXACT LOCATION OF ALL CEILING DIFFUSERS, REGISTERS, AND GRILLES SHALL BE COORDINATED WITH LIGHTING FIXTURES. REFER TO REFLECTED CEILING PLAN.
- THIS CONTRACTOR SHALL PROVIDE REMOVABLE PANELS AT LOCATIONS WHERE ACCESS TO VALVES, DAMPERS, FIRE DAMPERS, ETC. ARE REQUIRED.
- ALL DUCTWORK SHALL HAVE JOINTS AND SEAMS FILLED WITH SEALANT FOR AIR TIGHT INSTALLATIONS.
- PROVIDE DUCT ACCESS DOORS FOR ALL FIRE AND CONTROL DAMPERS LOCATED IN DUCTWORK RUNS.
- H.V.A.C. CONTRACTOR SHALL COORDINATE ALL WORK WITH PLUMBING AND ELECTRICAL CONTRACTORS.
- H.V.A.C. CONTRACTOR SHALL INFORM G.C. AS TO THE LOCATION AND SIZE OF ALL ACCESS PANELS.
- ALL DOOR GRILLES SHALL BE BY G.C.
- ALL SUPPORT STEEL UNLESS SHOWN ON STRUCTURAL DRAWINGS SHALL BE PROVIDED BY H.V.A.C. CONTRACTOR.
- ALL DUCT ELBOWS SHALL BE LONG RADIUS (R=1.5), OR SQUARE TYPE WITH DOUBLE THICKNESS TURNING VANES.
- THE MANUFACTURER LISTED IN THE SCHEDULES REFLECTS THE BASIS OF DESIGN AS INDICATED ON THE CONTRACT DRAWINGS AND IS NOT INTENDED TO SUGGEST THE REQUIRED PROVIDER. REFER TO THE SPECIFICATIONS FOR A COMPLETE DESCRIPTION OF EACH PRODUCT REQUIRED AND REFERENCE "OR EQUAL" REQUIREMENTS.
- FOR DETAILS OF ROOF CURBS, FLASHING, PIPING, AND VENTS THRU ROOF REFER TO ARCHITECTURAL DRAWINGS.
- CONTRACTOR TO PROVIDE FIRE STOPPING ON ALL CEILING PENETRATIONS.
- AU FLU'S SHALL PENETRATE ROOF & TERMINATE W/ AGA APPROVED RAIN CAPS.
- ALL EXHAUST DUCTS THAT PENETRATE THE ROOF SHALL TERMINATE W/ GOOSENECKS.
- ALL DRYER DUCTWORK TO BE FRICTION FIT W/ TAPPED JOINTS. NO MECHANICAL FASTENERS. PROVIDE NECESSARY FITTING FROM DRYER TO OUTSIDE WALL CAP IN GOOSENECK.
- REFRIGERANT PIPING SHALL BE SIZED PER MANUFACTURERS RECOMMENDATIONS.

LEGEND

SYMBOL	ABBREV	DESCRIPTION
∅	DIA	DIAMETER
—○—	D	DRAIN
—○—		PIPE UP (ELBOW)
—○—		PIPE DOWN (ELBOW)
—○—		CAP ON END OF PIPE
→		FLOW IN DIRECTION OF ARROW
⊖		THERMOSTAT
⊕		SUPPLY DIFFUSER SCHEDULE NO.
⊖		RETURN REGISTER/GRILLE SCHEDULE NO.
⊕		EXHAUST REGISTER/GRILLE SCHEDULE NO.
—○—		SUPPLY AIR DUCT SECTION
—○—		RETURN/EXHAUST AIR DUCT SECTION
—○—		SUPPLY AIR
—○—		RETURN/EXHAUST AIR
—○—		FIRE DAMPER
—○—	FD	VOLUME DAMPER
—○—	VD	BACKDRAFT DAMPER
—○—	BD	SMOKE DETECTOR
—○—		CONNECT TO EXISTING
—○—		DISCONNECT FROM EXISTING
—○—		TYPICAL
—○—	R.T.U.	ROOF TOP UNIT
—○—	EF	EXHAUST FAN
—○—	O.A.	OUTSIDE AIR
—○—	CFM	CUBIC FEET PER MINUTE
—○—	VEL	VELOCITY
—○—	E.A.T.	ENTERING AIR TEMPERATURE
—○—	L.A.T.	LEAVING AIR TEMPERATURE
—○—	D.B.	DRY BULB
—○—	W.B.	WET BULB
—○—	E.D.B.	ENTERING DRY BULB
—○—	E.W.B.	ENTERING WET BULB
—○—	L.D.B.	LEAVING DRY BULB
—○—	L.W.B.	LEAVING WET BULB
—○—	T.S.P.	TOTAL STATIC PRESSURE
—○—	E.S.P.	EXTERNAL STATIC PRESSURE
—○—	P.D.	PRESSURE DROP
—○—	HP	HORSEPOWER
—○—	V	VOLTS
—○—	PH	PHASE
—○—	MANUF	MANUFACTURER
—○—	T*STAT	THERMOSTAT
—○—	A.F.F.	ABOVE FINISHED FLOOR
—○—	U.D.	UNDERCUT DOOR
—○—	N.T.S.	NOT TO SCALE
—○—	CO	CLEANOUT
—○—	H.V.A.C.	HEATING, VENTILATING AND AIR COND.
—○—	A.T.C.	AUTOMATIC TEMP. CONTROL
—○—	G.C.	GENERAL CONTRACTOR
—○—	P.C.	PLUMBING CONTRACTOR
—○—	E.C.	ELECTRICAL CONTRACTOR
—○—	L.H.C.	LIMIT OF HEATING CONTRACT
—○—	L.P.C.	LIMIT OF PLUMBING CONTRACT
—○—	RAF	RETURN AIR FAN
—○—	EXH	EXHAUST
—○—	DG	DOOR GRILLE
—○—	R.A.	RETURN AIR
—○—	S.A.	SUPPLY AIR
—○—	CLG.	CEILING
—○—	O.C.	ON CENTER
—○—	MBH	1000 BTUH
—○—	RPM	FAN RPM



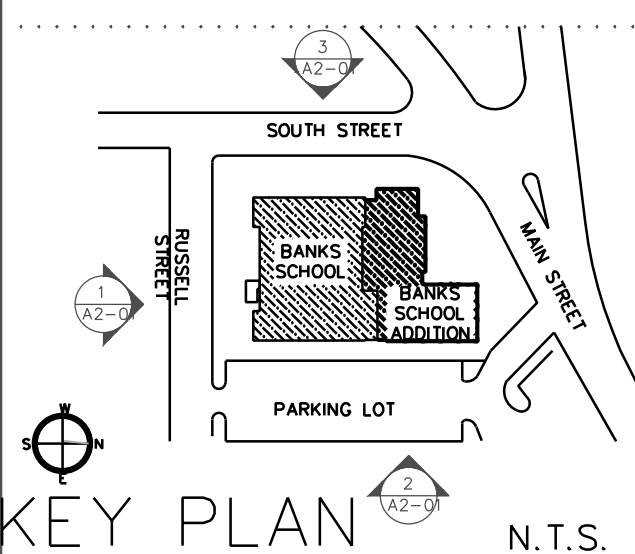
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PHASE III
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 948 MAIN STREET
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Drawing Title:

HVAC DETAILS & SCHEDULES

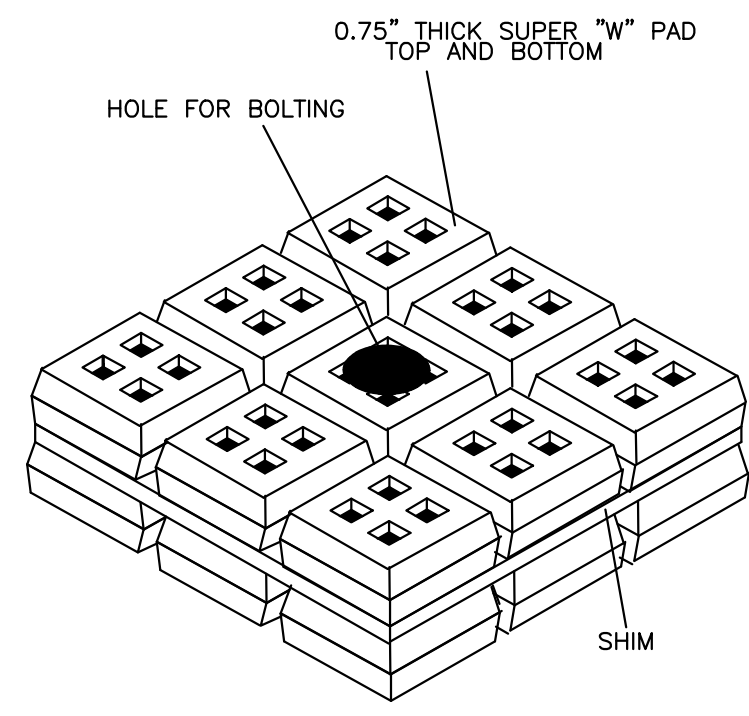


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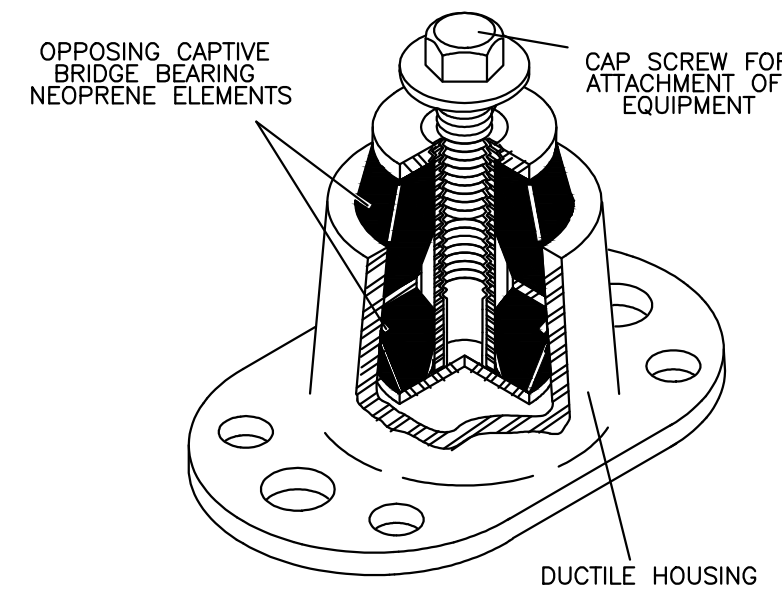
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M2.1

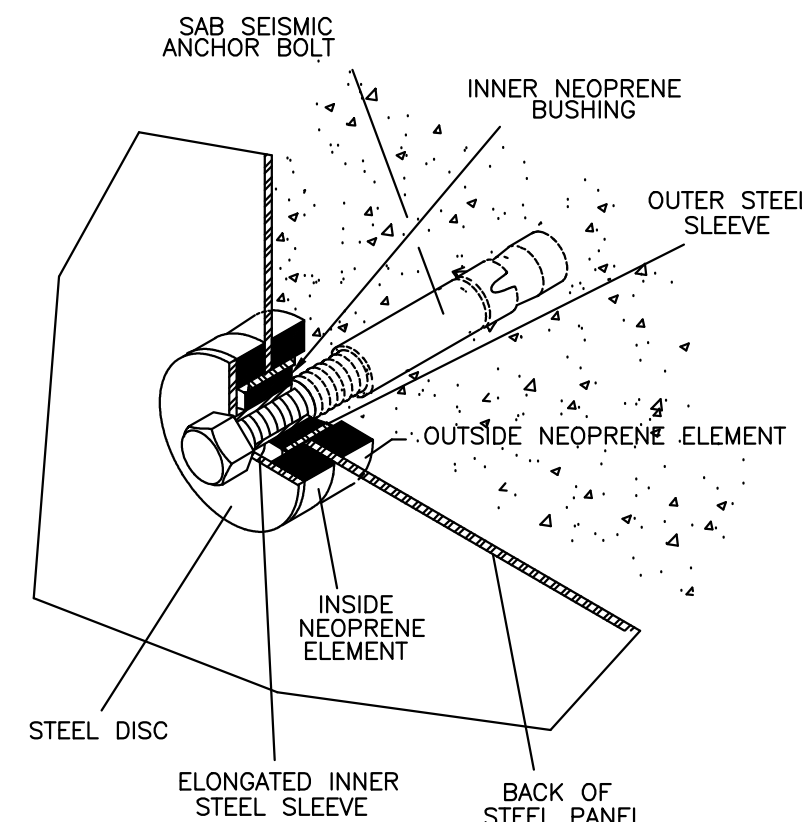
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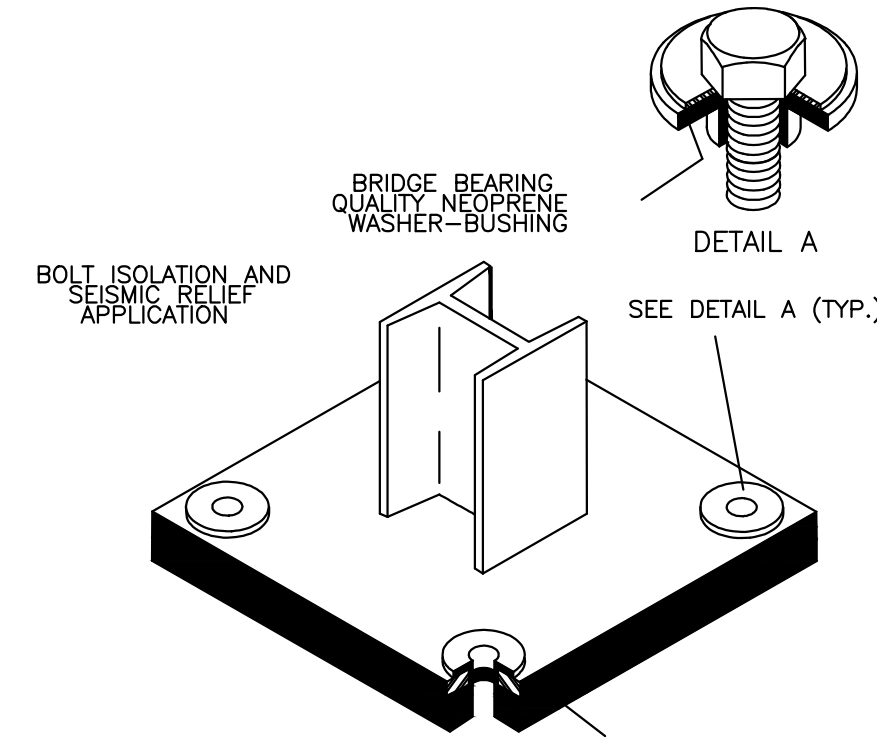
LAYERED SUPER "W" PADS WITH STEEL SHIM SPECIFICATION 1



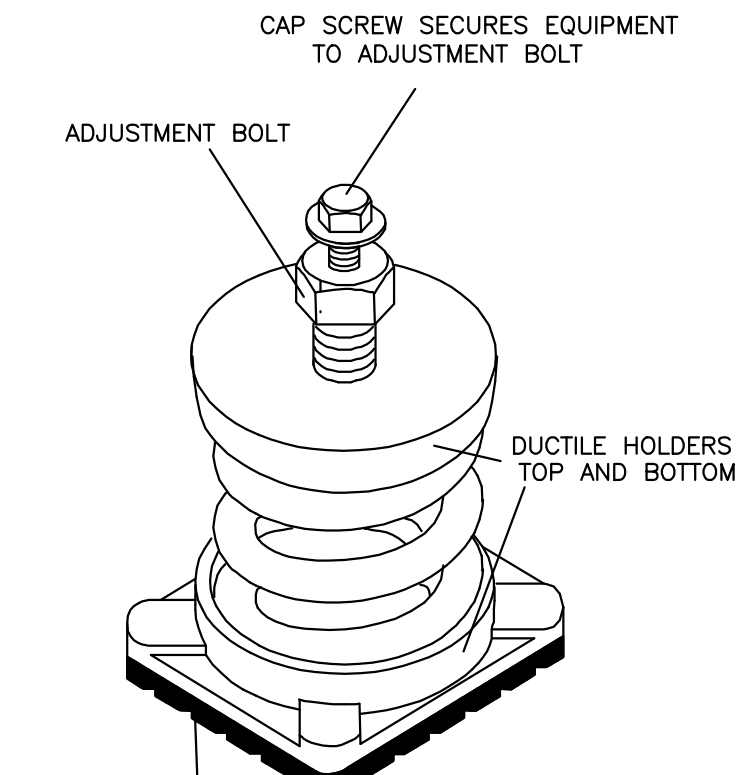
RESTRAINED BR MOUNT SPECIFICATION 2



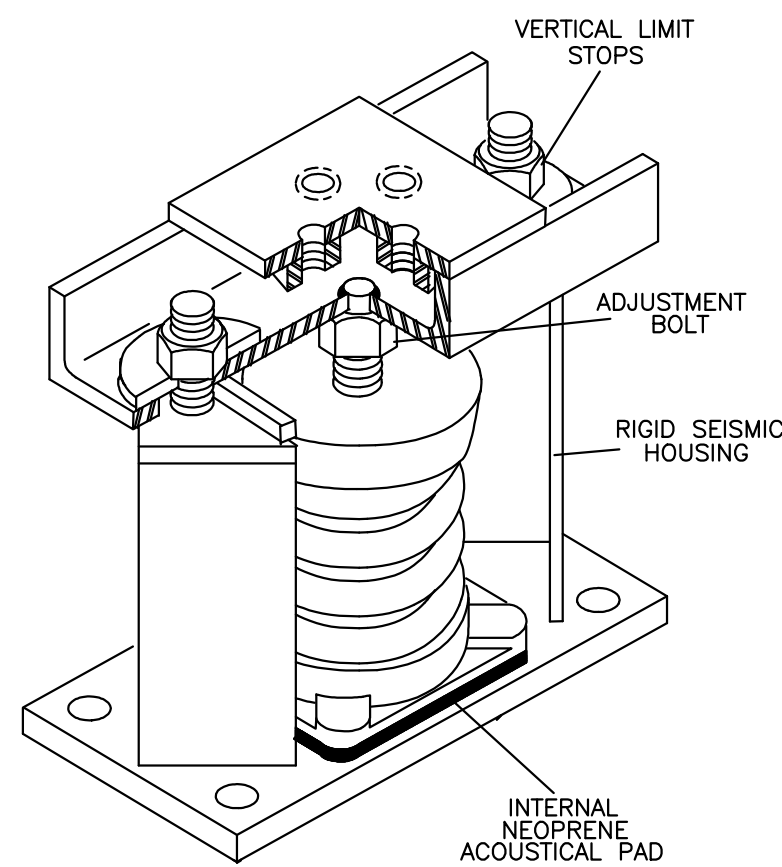
PB BUSHING SPECIFICATION 3



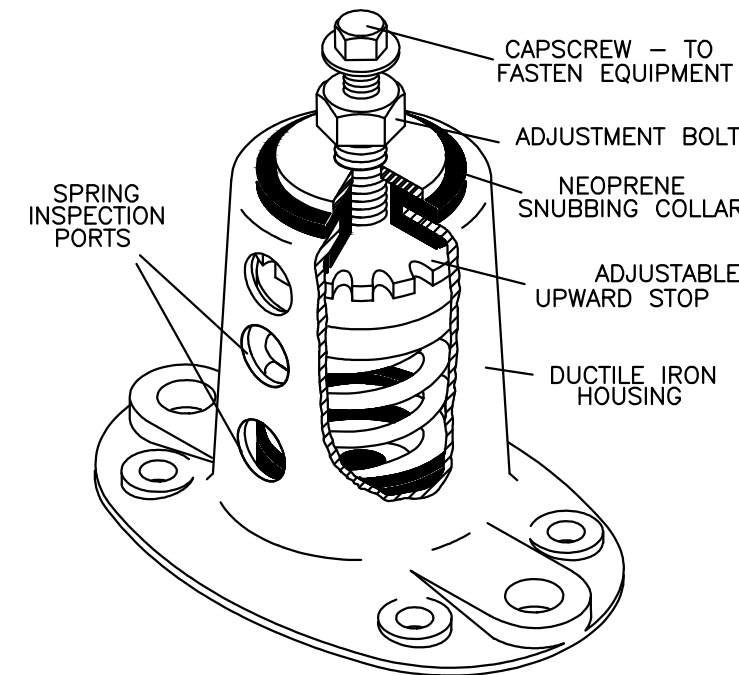
HG NEOPRENE BUSHING SPECIFICATION 4



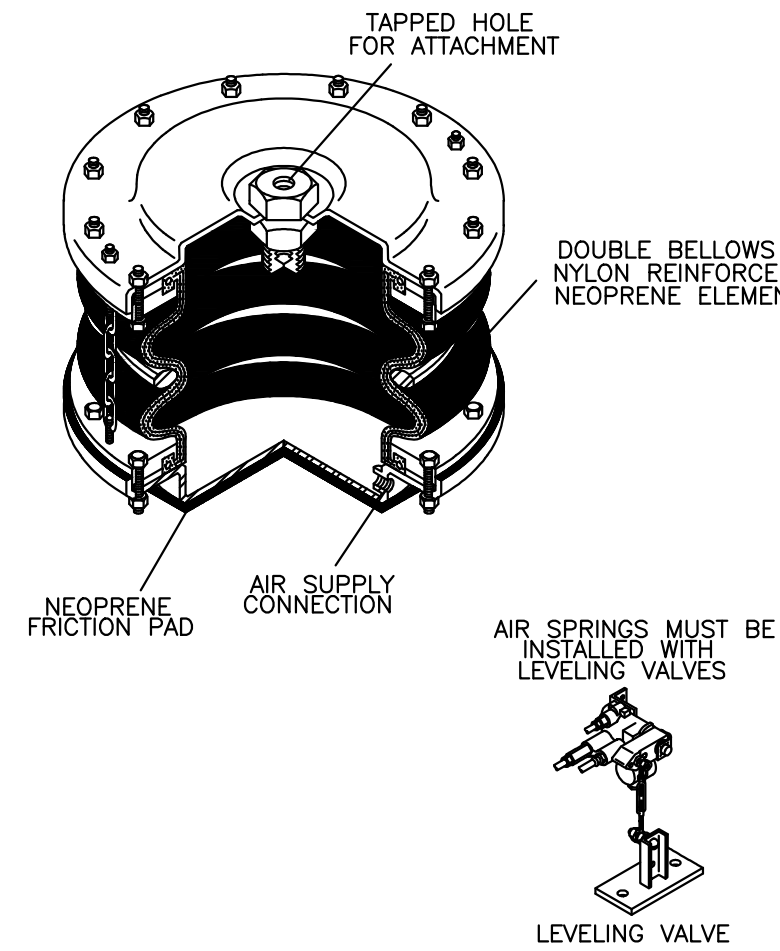
SLF SPRING MOUNT SPECIFICATION 5



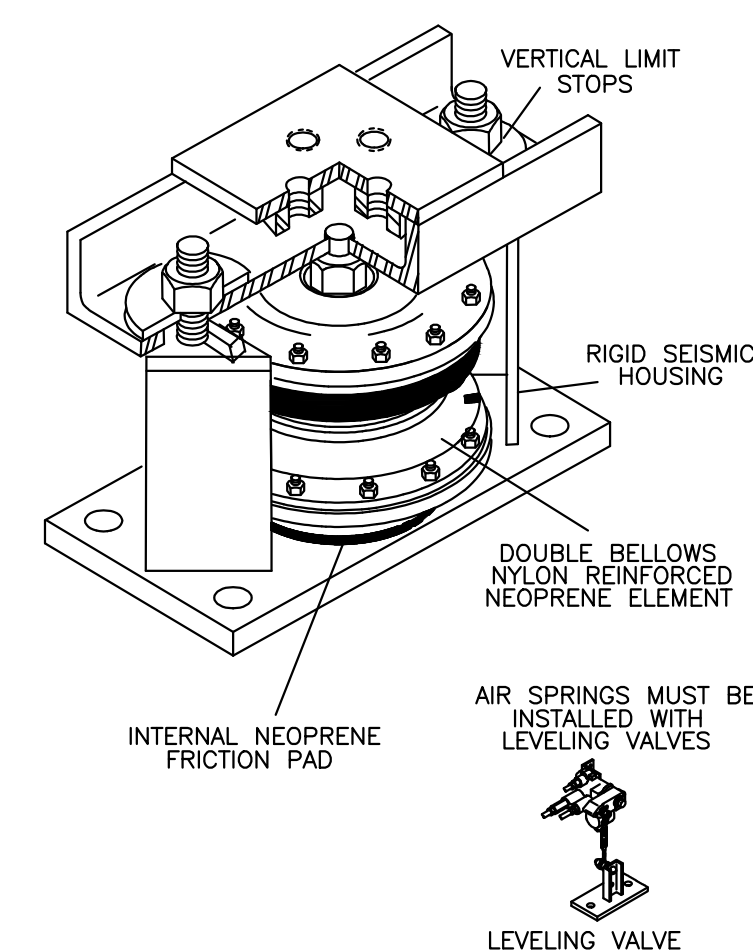
SLR SPRING MOUNT SPECIFICATION 6



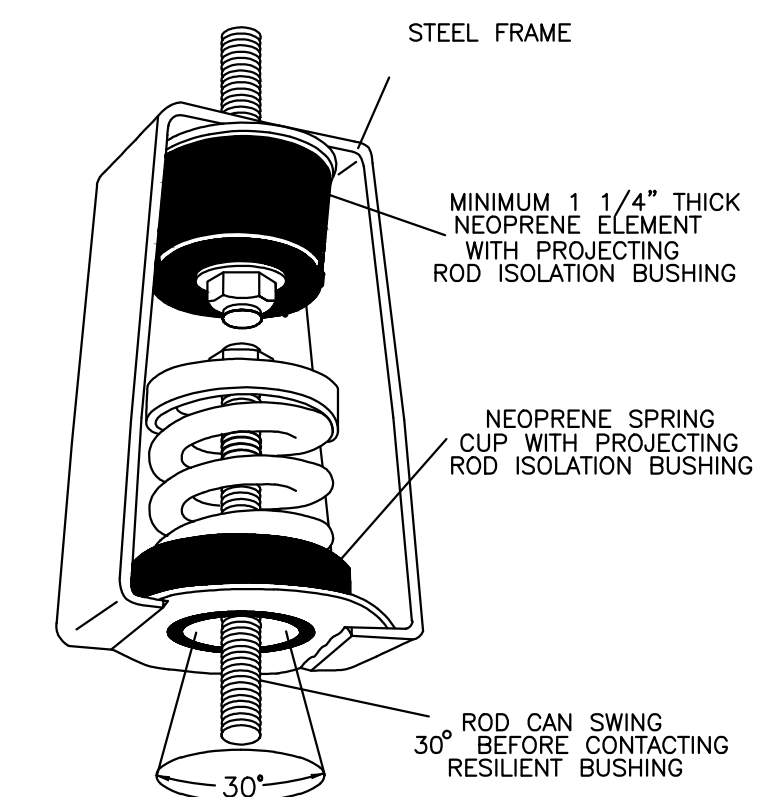
SSLFH HOUSED SPRING MOUNT SPECIFICATION 7



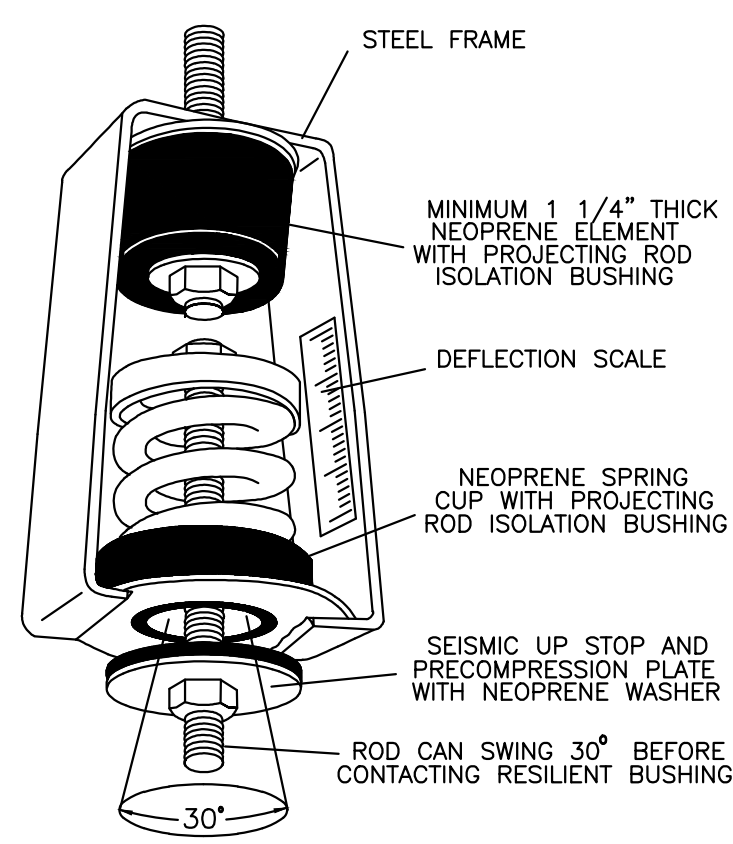
MT AIR SPRING MOUNT SPECIFICATION 8



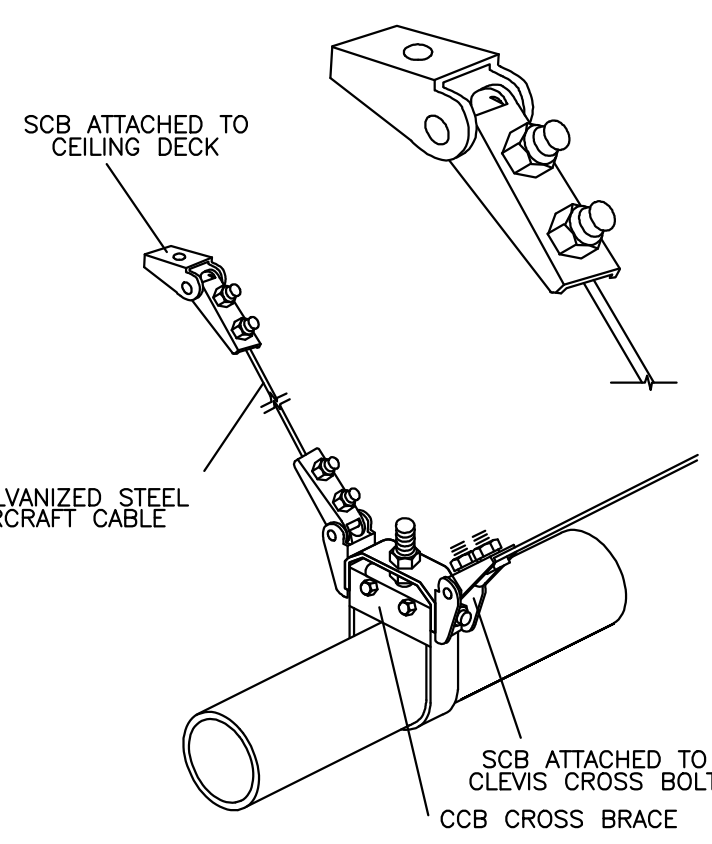
SLR AIR SPRING MOUNT SPECIFICATION 9



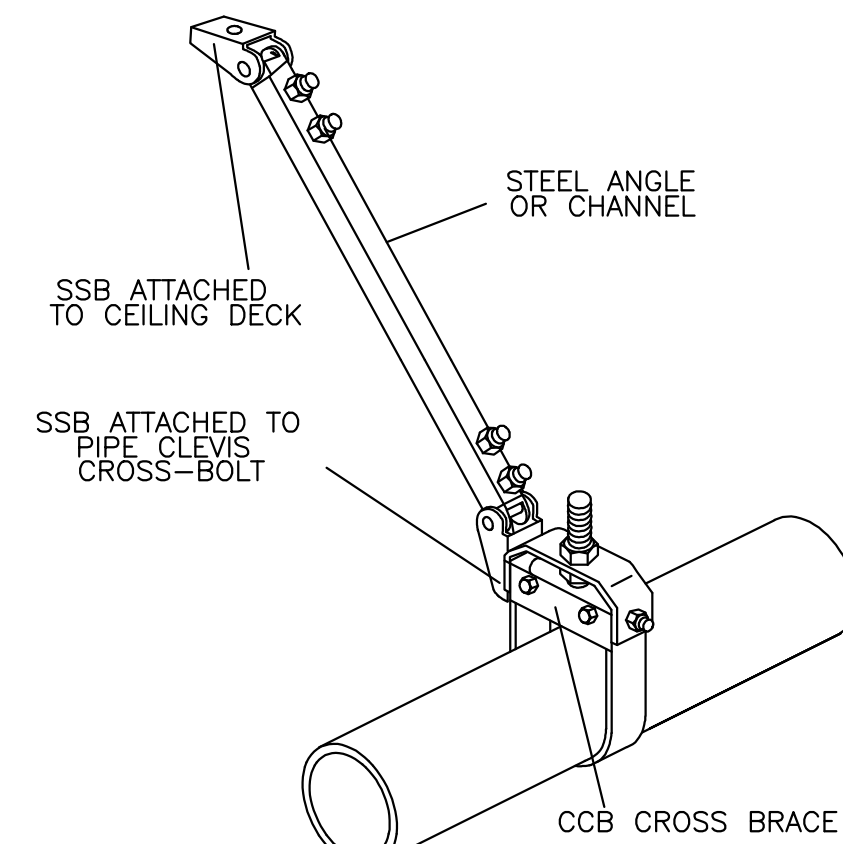
30N SPRING AND NEOPRENE HANGER SPECIFICATION 10



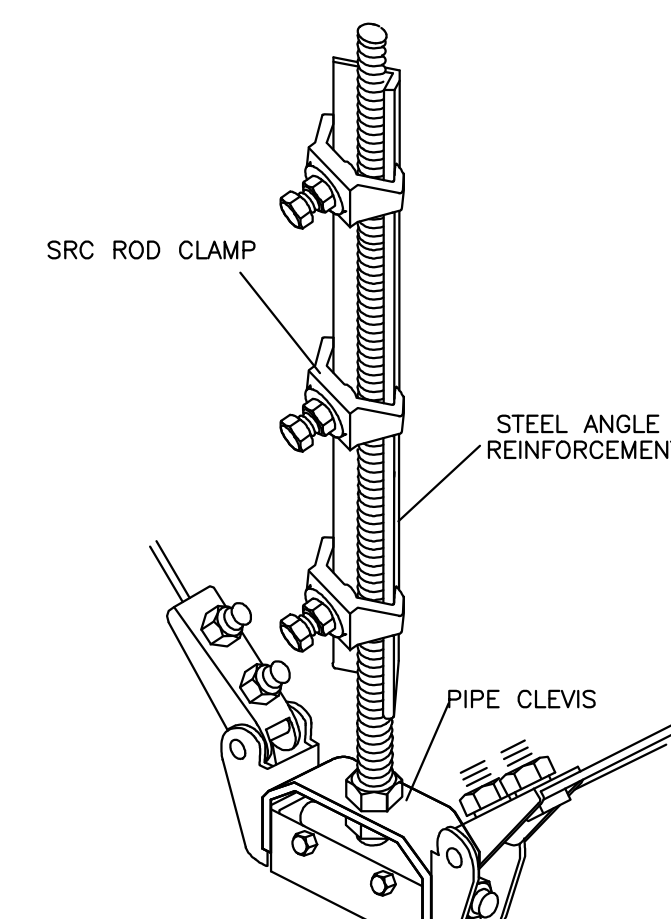
PC30N PRECOMPRESSED SPRING AND NEOPRENE HANGER SPECIFICATION 11



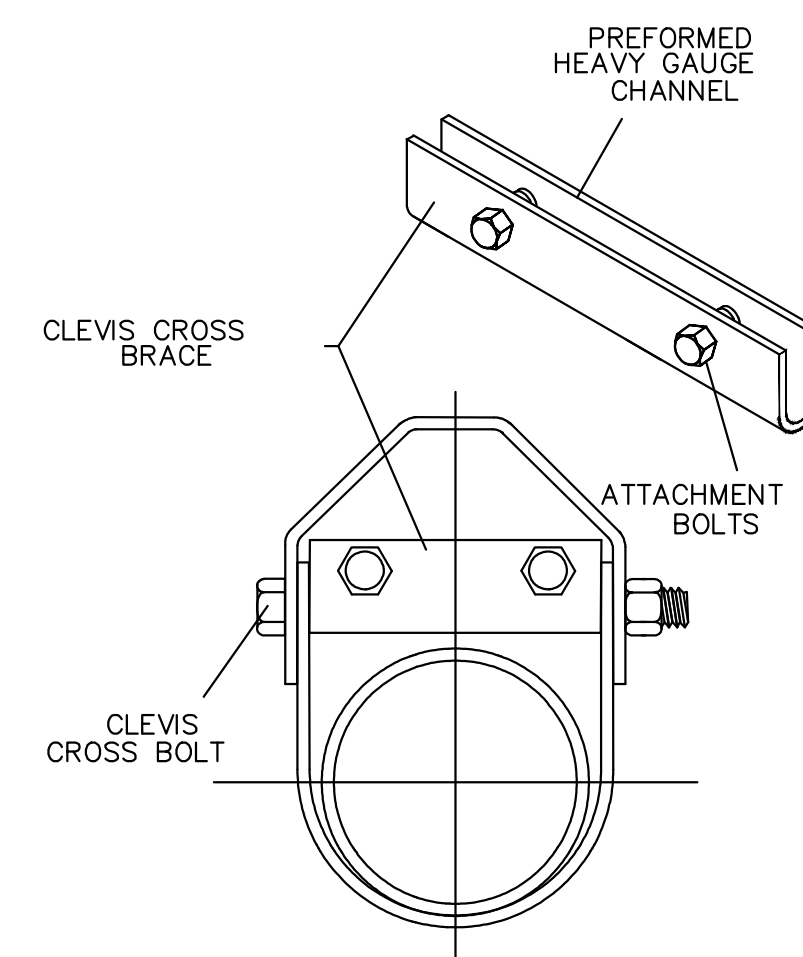
SCB, SCBH, AND SCBV CABLE RESTRAINTS OSPD PRE-APPROVAL NO. 0202 SPECIFICATION 12



SEISMIC SOLID BRACE SPECIFICATION 13



SRC SEISMIC ROD CLAMPS SPECIFICATION 14



CCB CLEVIS CROSS BRACE

REFER TO VS.2 SHEET FOR ADDITIONAL SPECIFICATION DETAILS

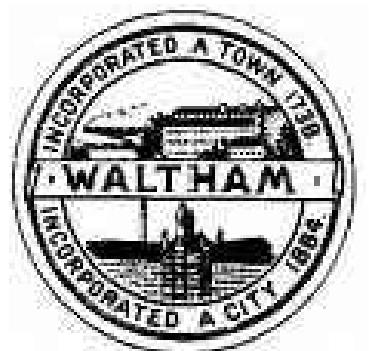
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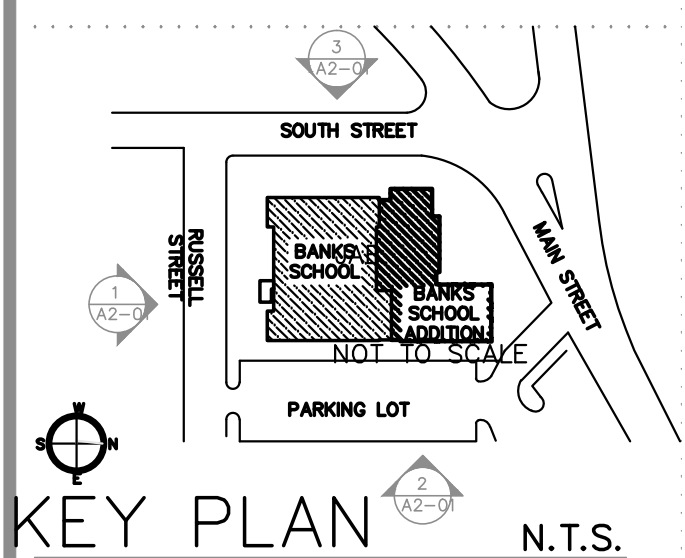
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Drawing Title:

VIBRATION
& SEISMIC DETAIL

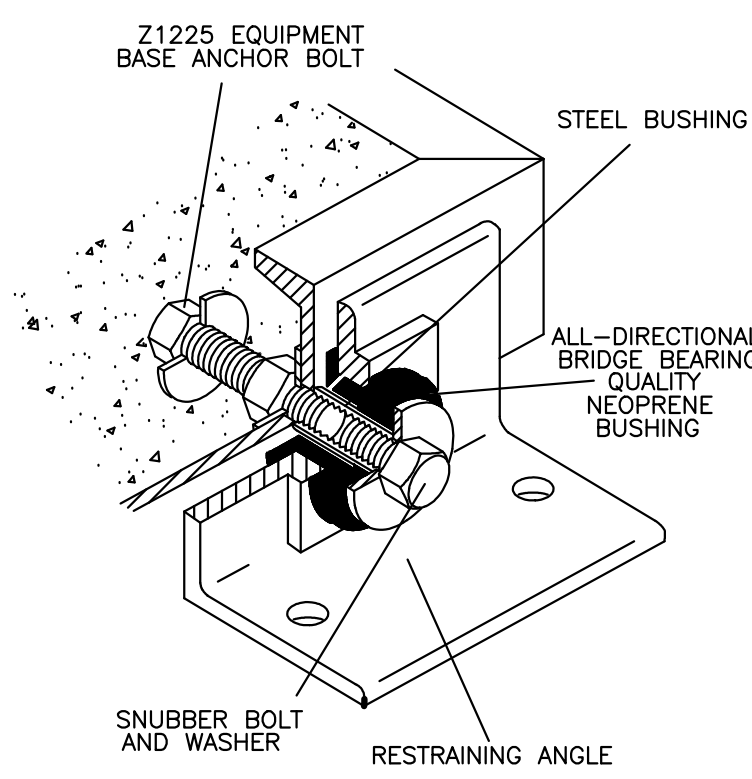


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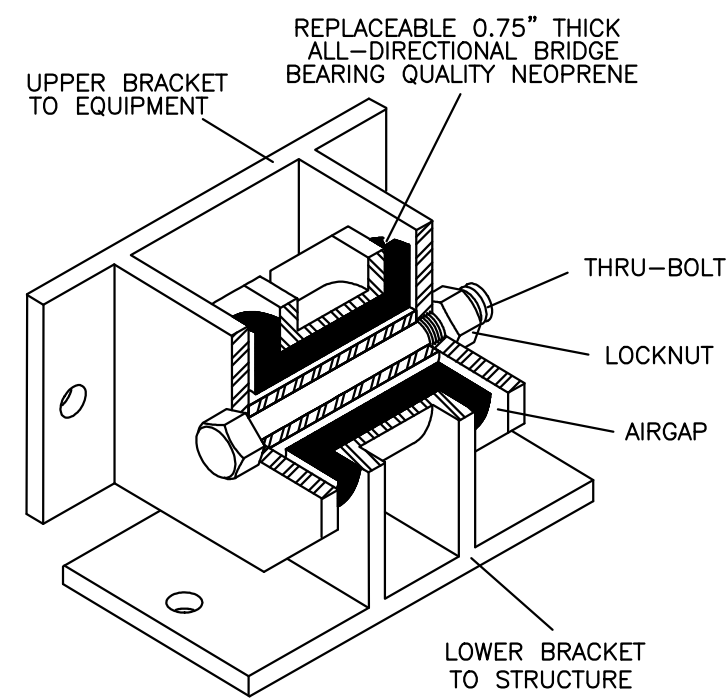
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DOCUMENT

Date: 12-30-2011
Project Number: 10025-A
Project Manager: LV
Drawn By: MVD
Scale: NTS

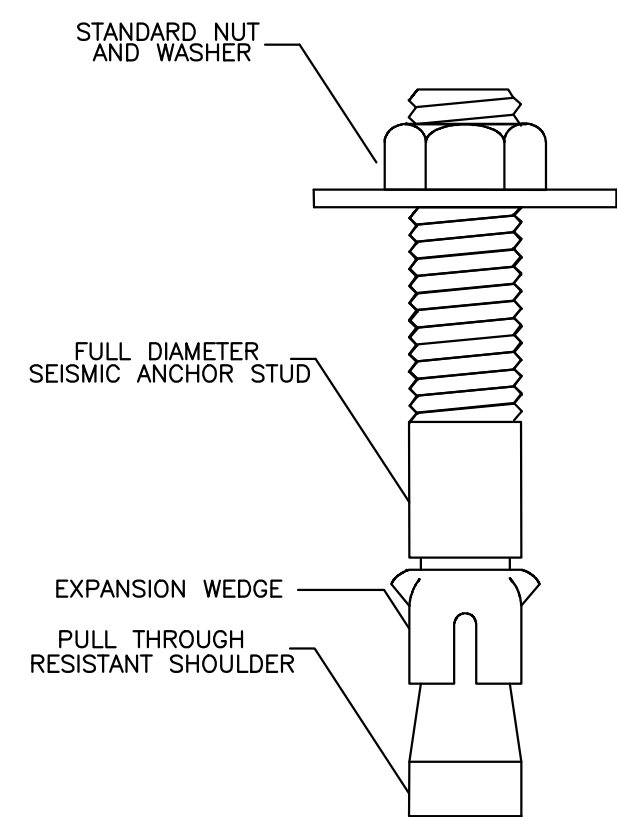
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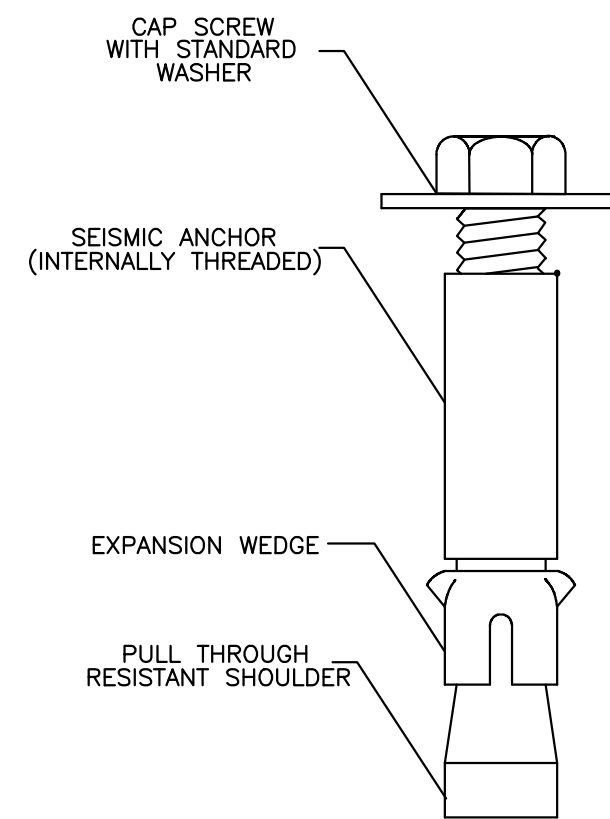
Z1225 ALL DIRECTIONAL SEISMIC SNUBBER SPECIFICATION 16



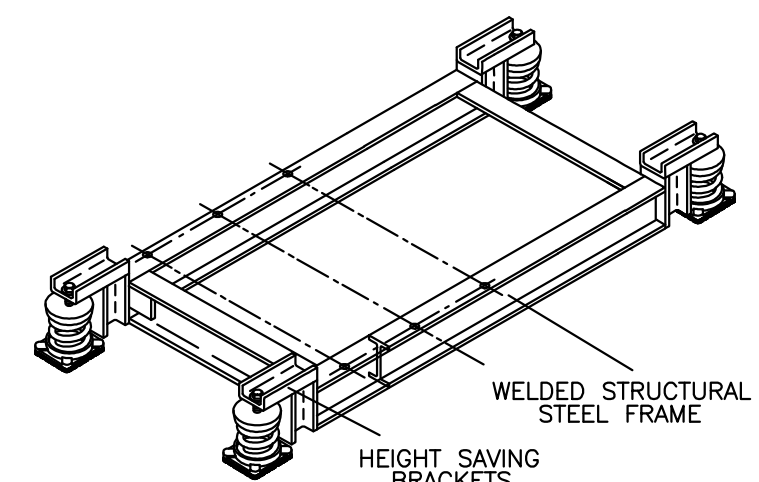
Z1011 ALL DIRECTIONAL SEISMIC SNUBBER SPECIFICATION 17



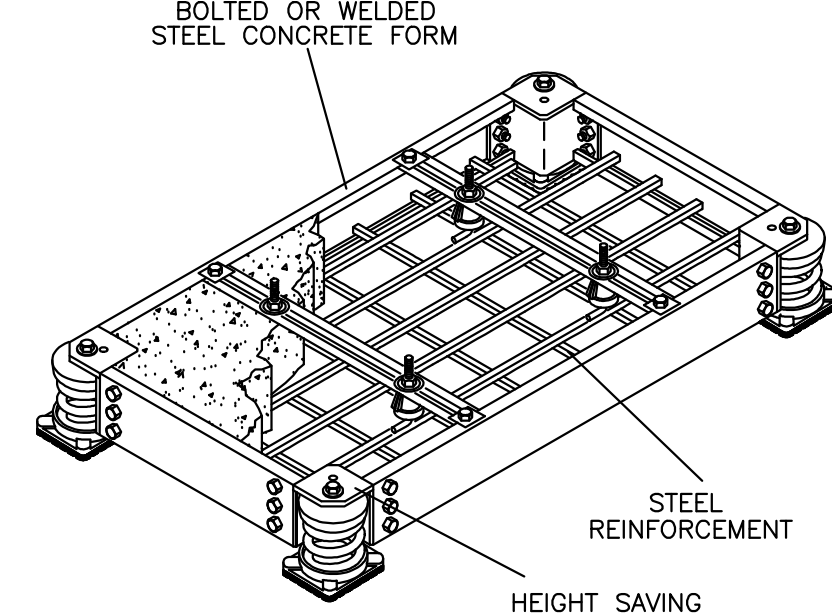
SAS SEISMIC ANCHOR STUD SPECIFICATION 18



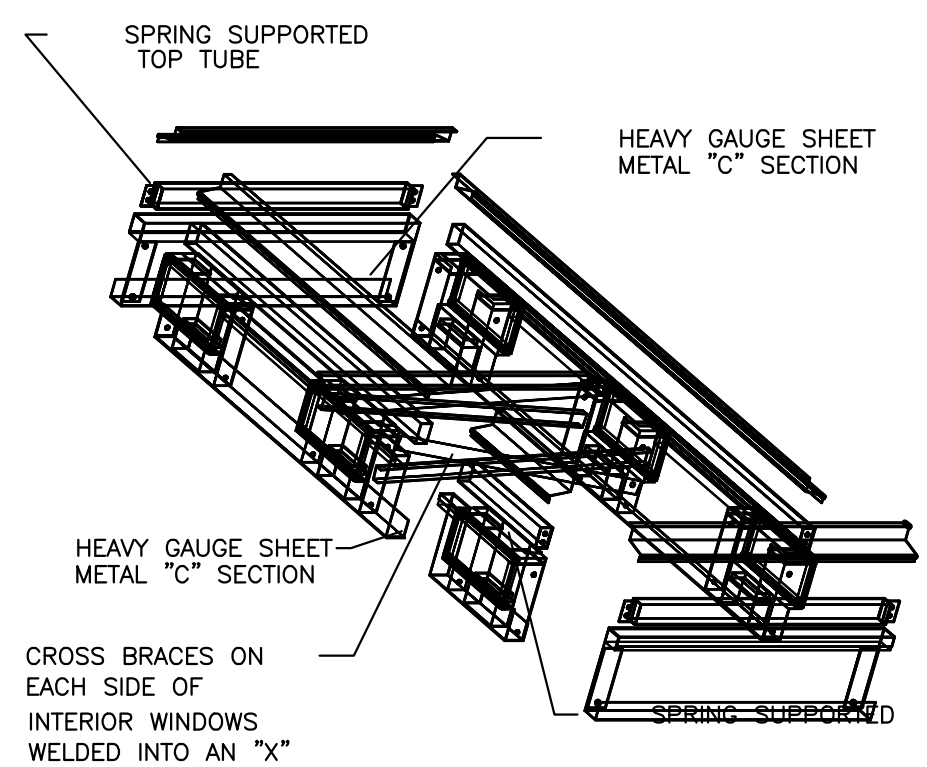
SAB SEISMIC ANCHOR BOLT SPECIFICATION 19



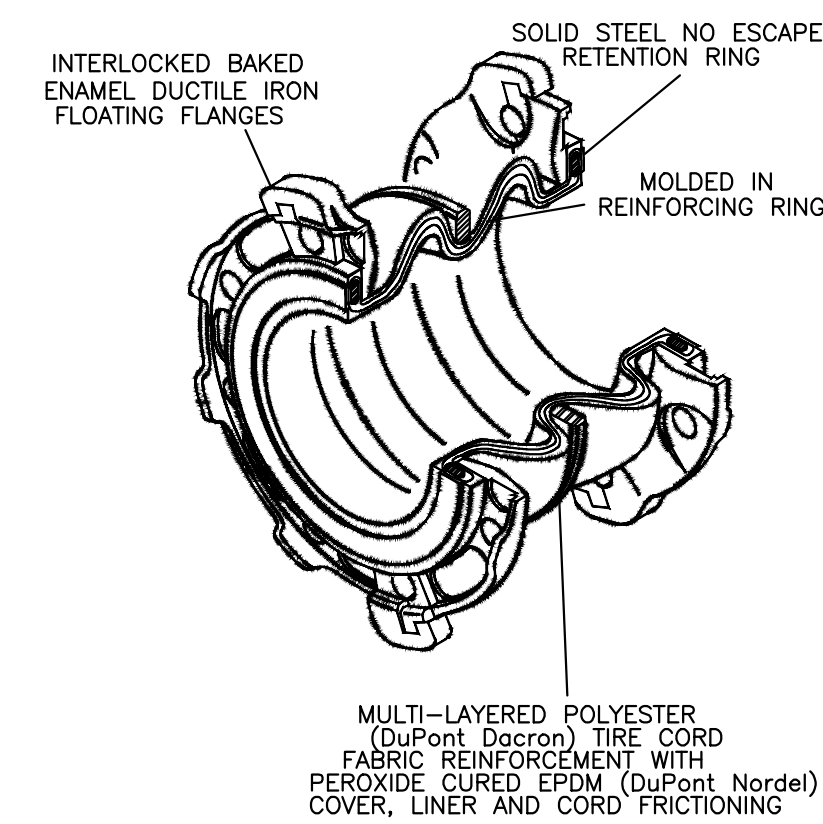
WF WIDE FLANGE STEEL BASE SPECIFICATION 20



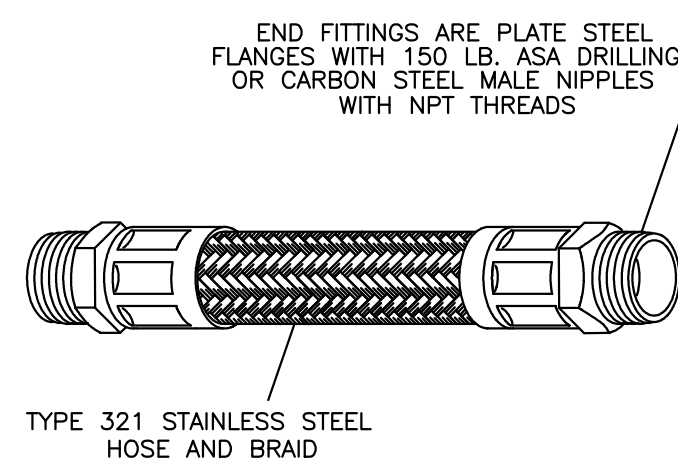
BMK CONCRETE FORM BASE SPECIFICATION 21



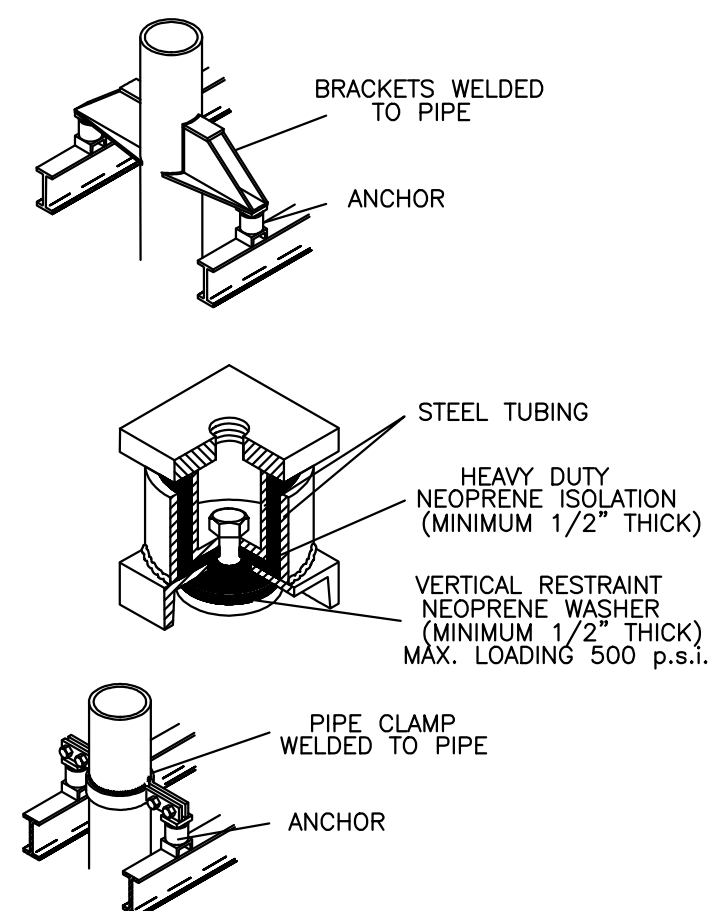
RSC SEISMIC ROOFTOP CURB SPECIFICATION 22



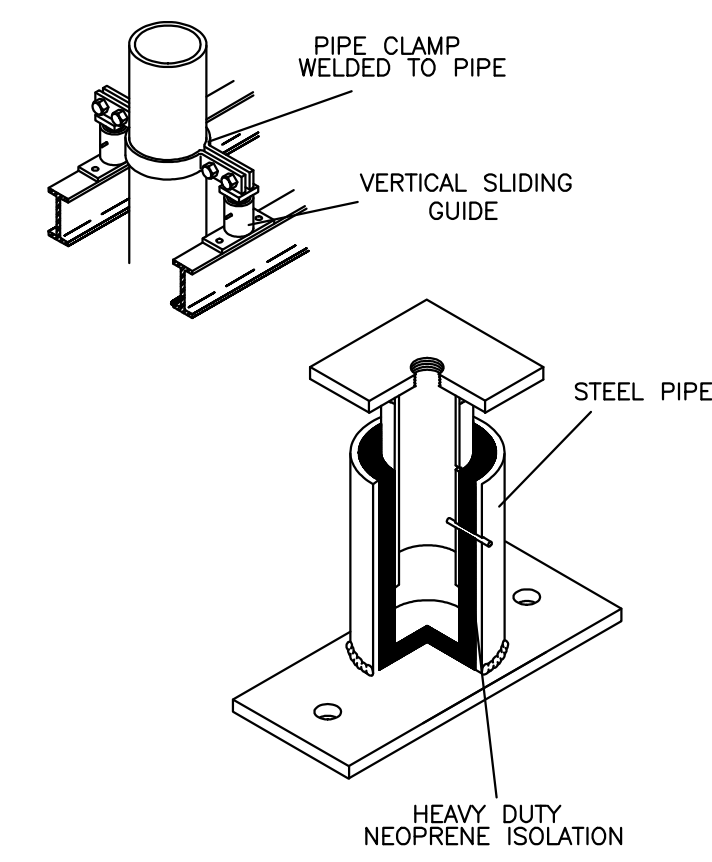
SFDEJ MOLDED EXPANSION JOINT SPECIFICATION 23



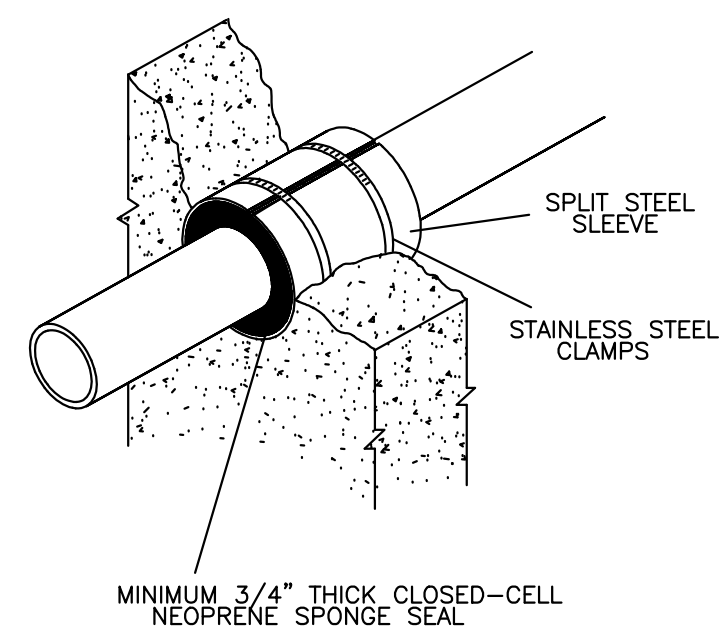
BSS STAINLESS STEEL HOSE SPECIFICATION 24



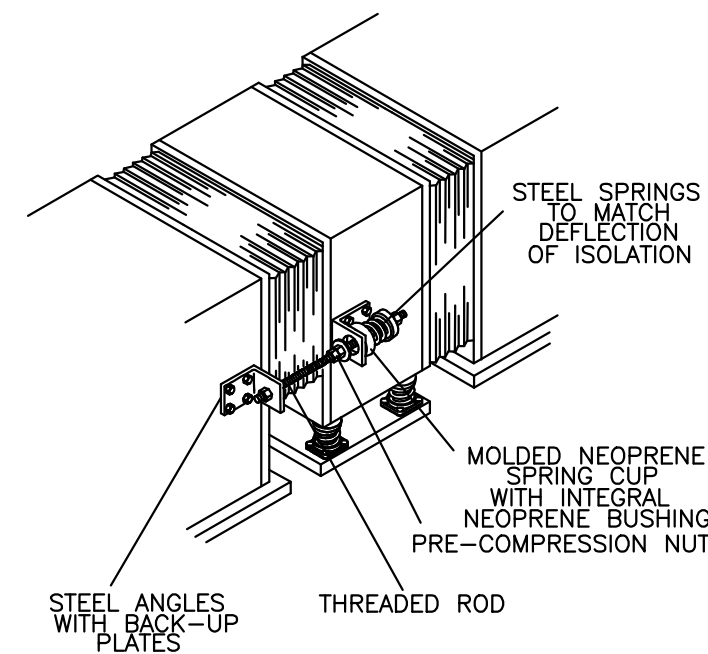
ADA ALL DIRECTIONAL ANCHOR SPECIFICATION 25



VSG VERTICAL SLIDING GUIDES SPECIFICATION 26



SWS ACOUSTICAL WALL, CEILING OR FLOOR SEAL SPECIFICATION 27

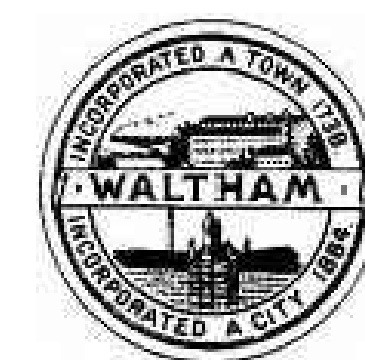


WB HORIZONTAL THRUST RESTRAINTS USED IN PAIRS SPECIFICATION 28



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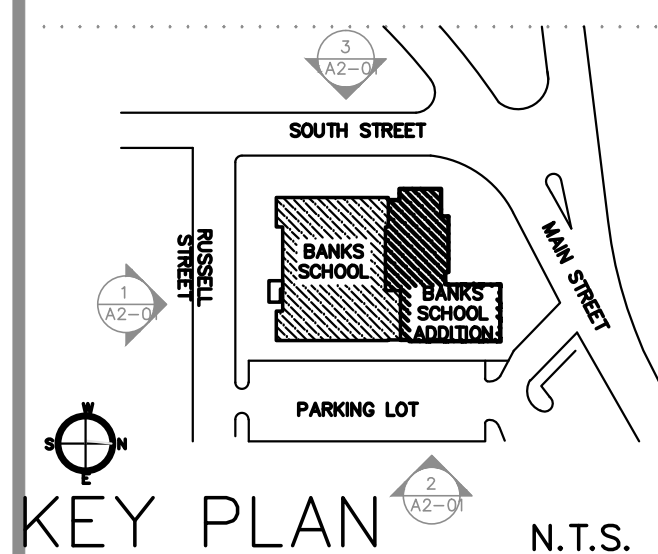
PHASE III
RENOVATIONS
TO THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS
948 MAIN STREET
WALTHAM, MA



CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

VIBRATION
& SEISMIC DETAIL



Revisions:

BIDDING
DOCUMENT

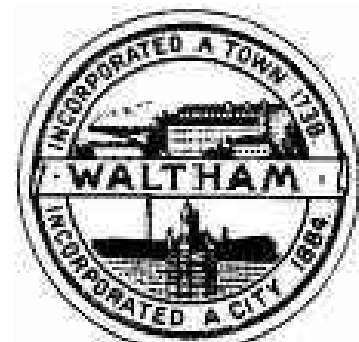
Date: 12-30-2011
Project Number: 10025-A
Project Manager: LV
Drawn By: MVD
Scale: NTS

VS. 2

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**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**

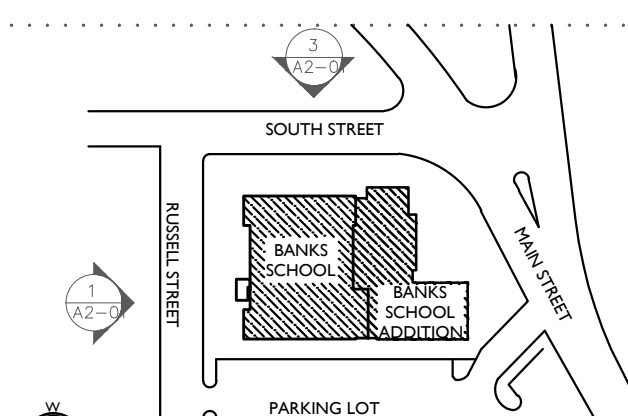
948 MAIN STREET
WALTHAM, MA



**CITY OF
WALTHAM**
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

**ELECTRICAL
SYMBOL LIST**



KEY PLAN N.T.S.

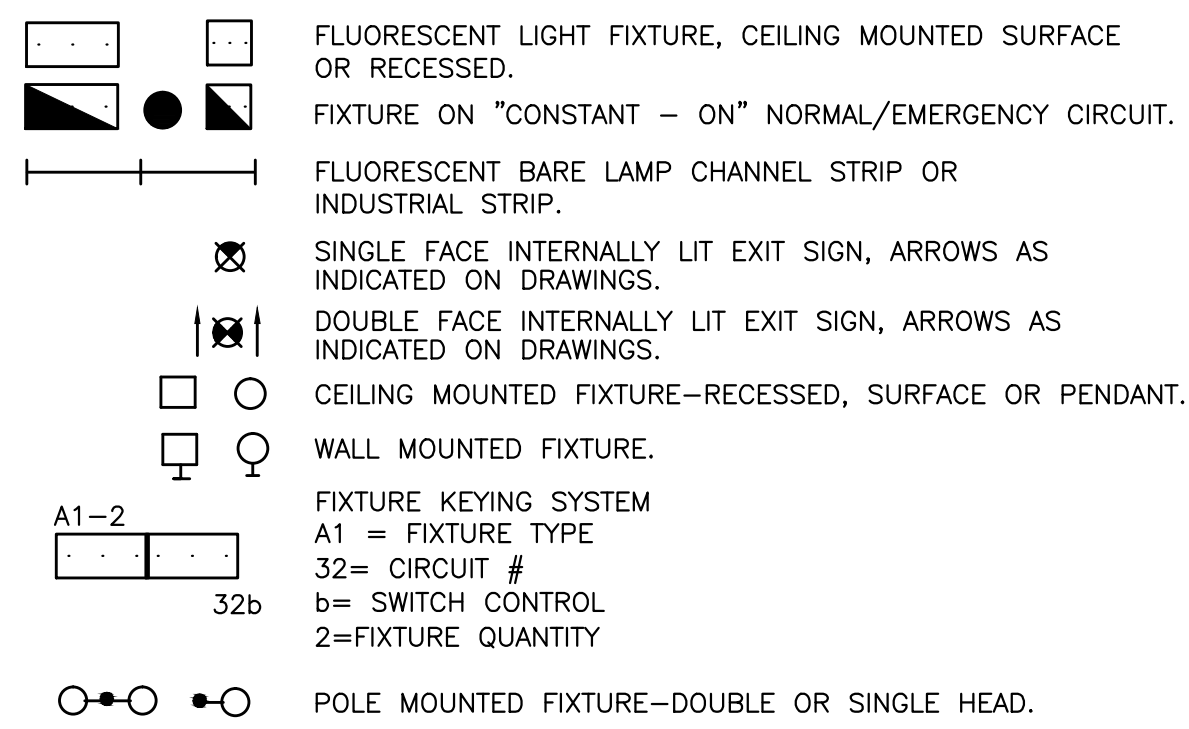
Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager:
Drawn By: DMP
Scale: AS NOTED

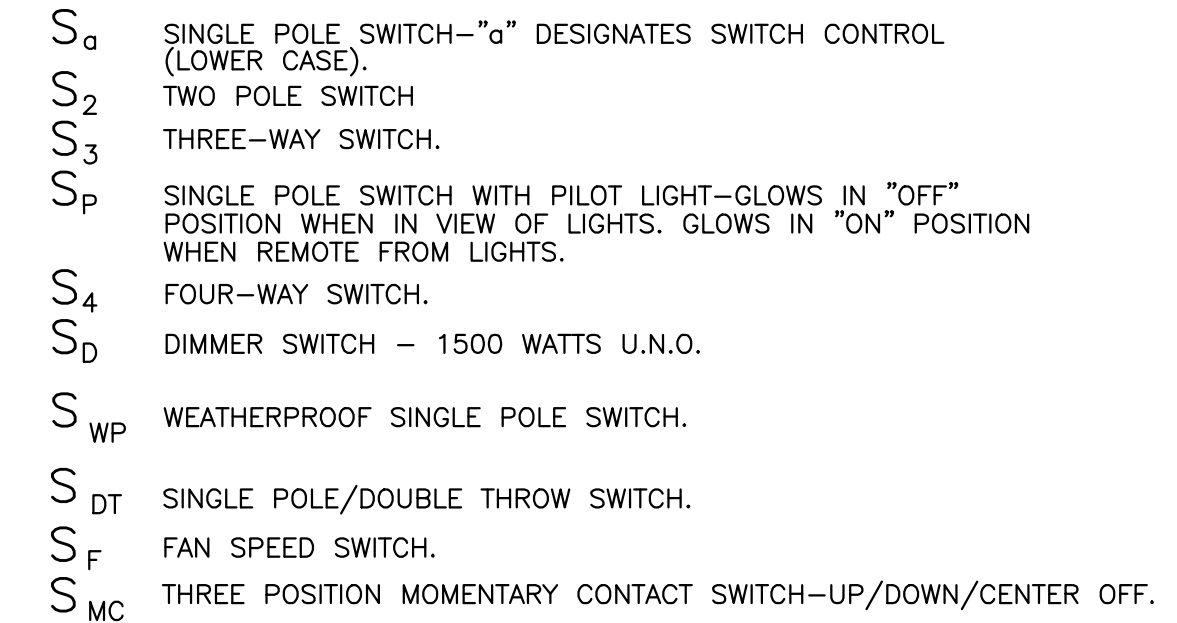
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SYMBOL LIST

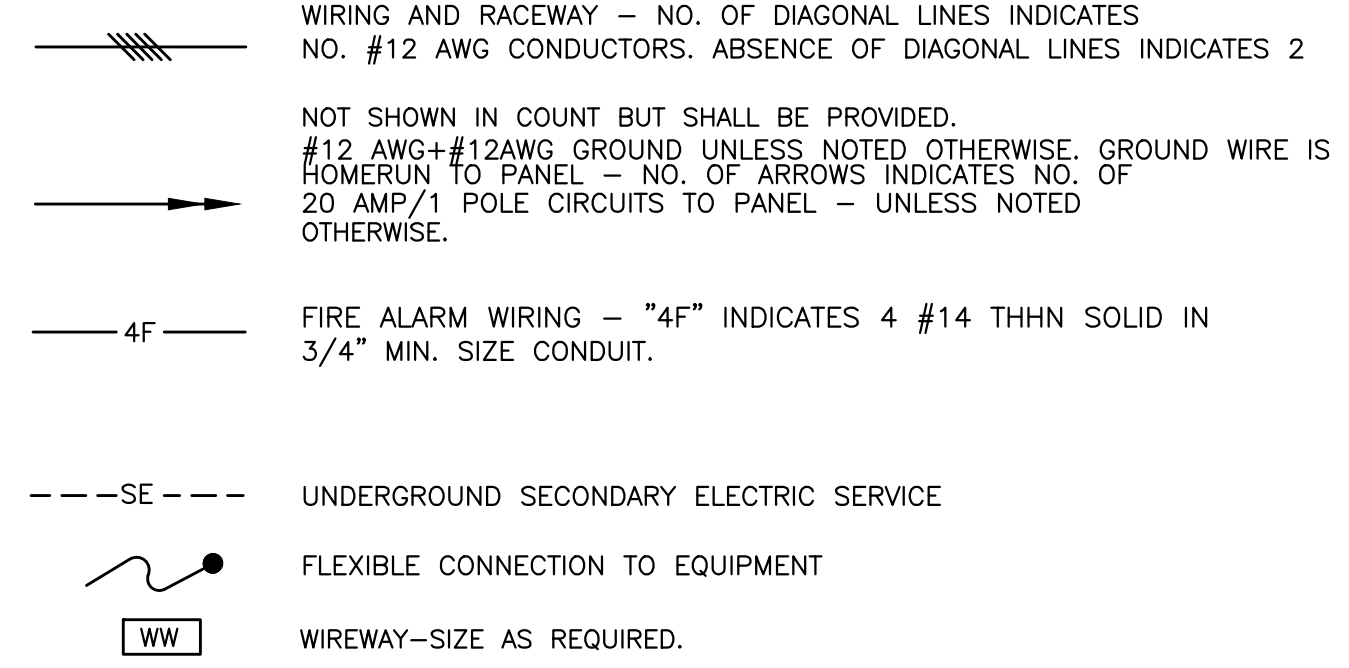
LIGHTING FIXTURES (see lighting fixture schedule)



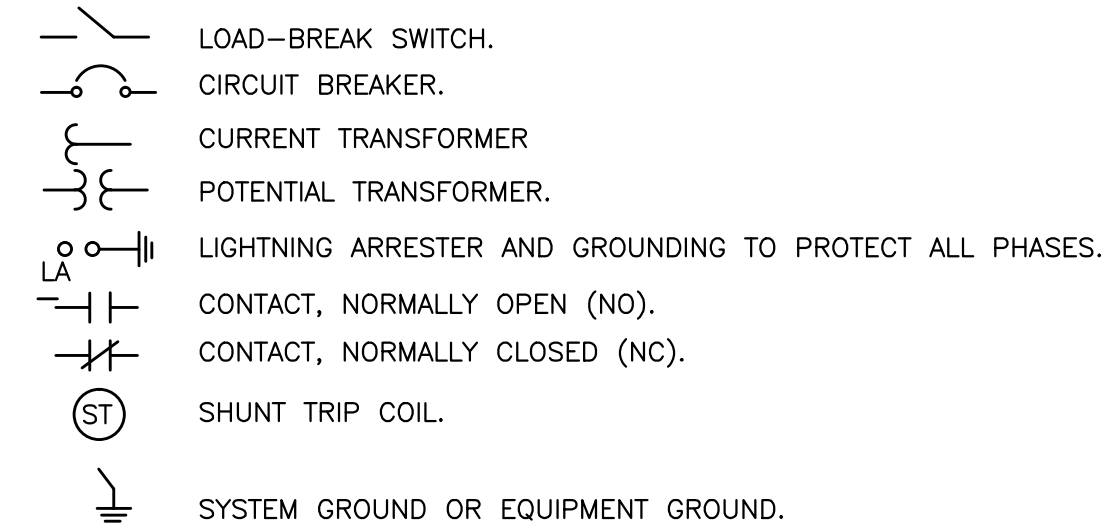
SWITCHES (typically mtd 48" AFF U.N.O)



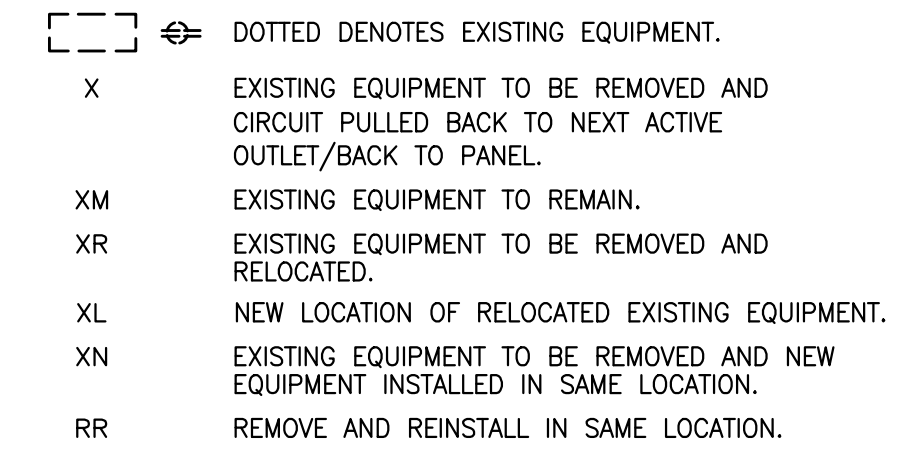
WIRE AND RACEWAYS



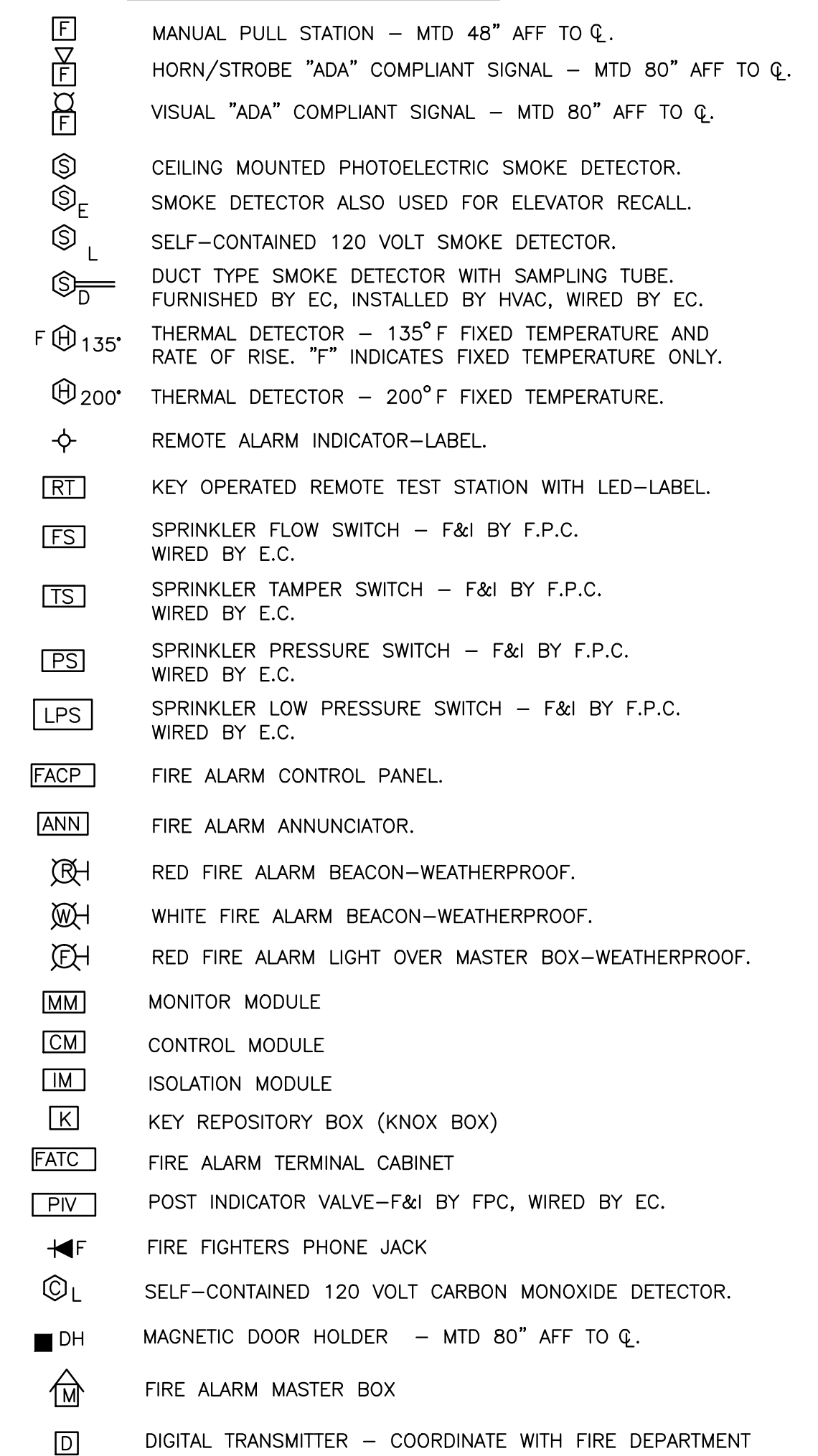
ONE LINE POWER



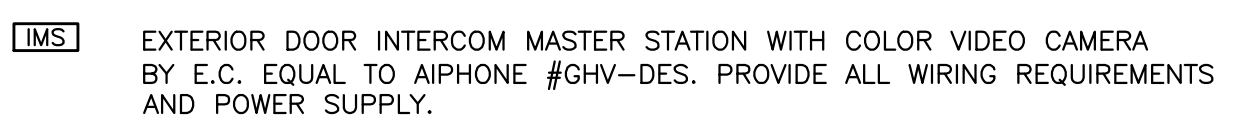
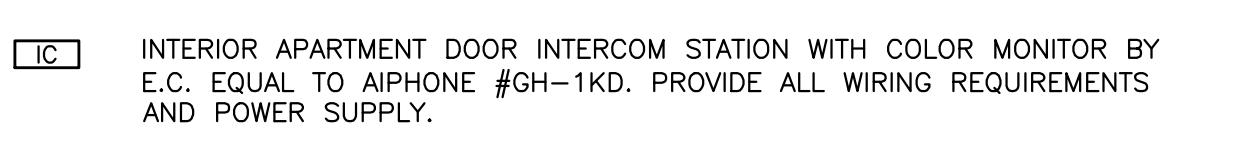
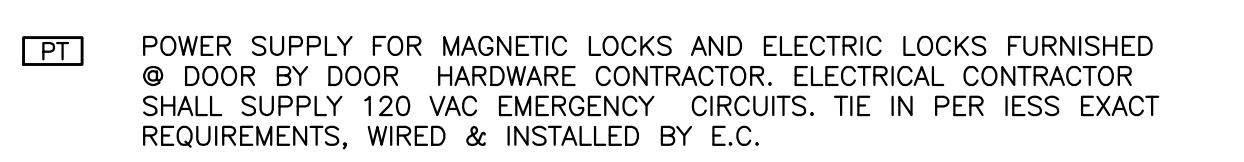
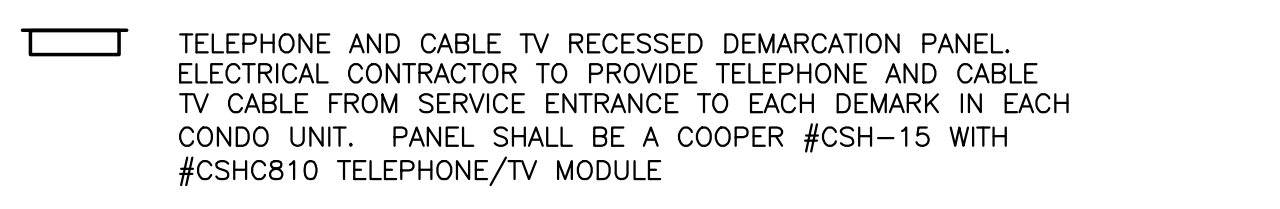
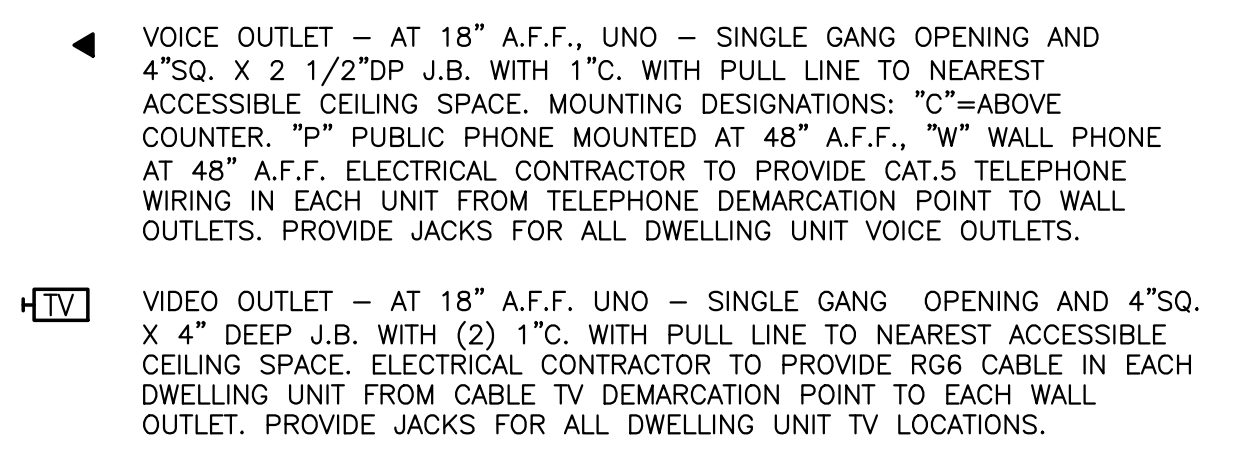
EXISTING EQUIPMENT



FIRE ALARM SYSTEM

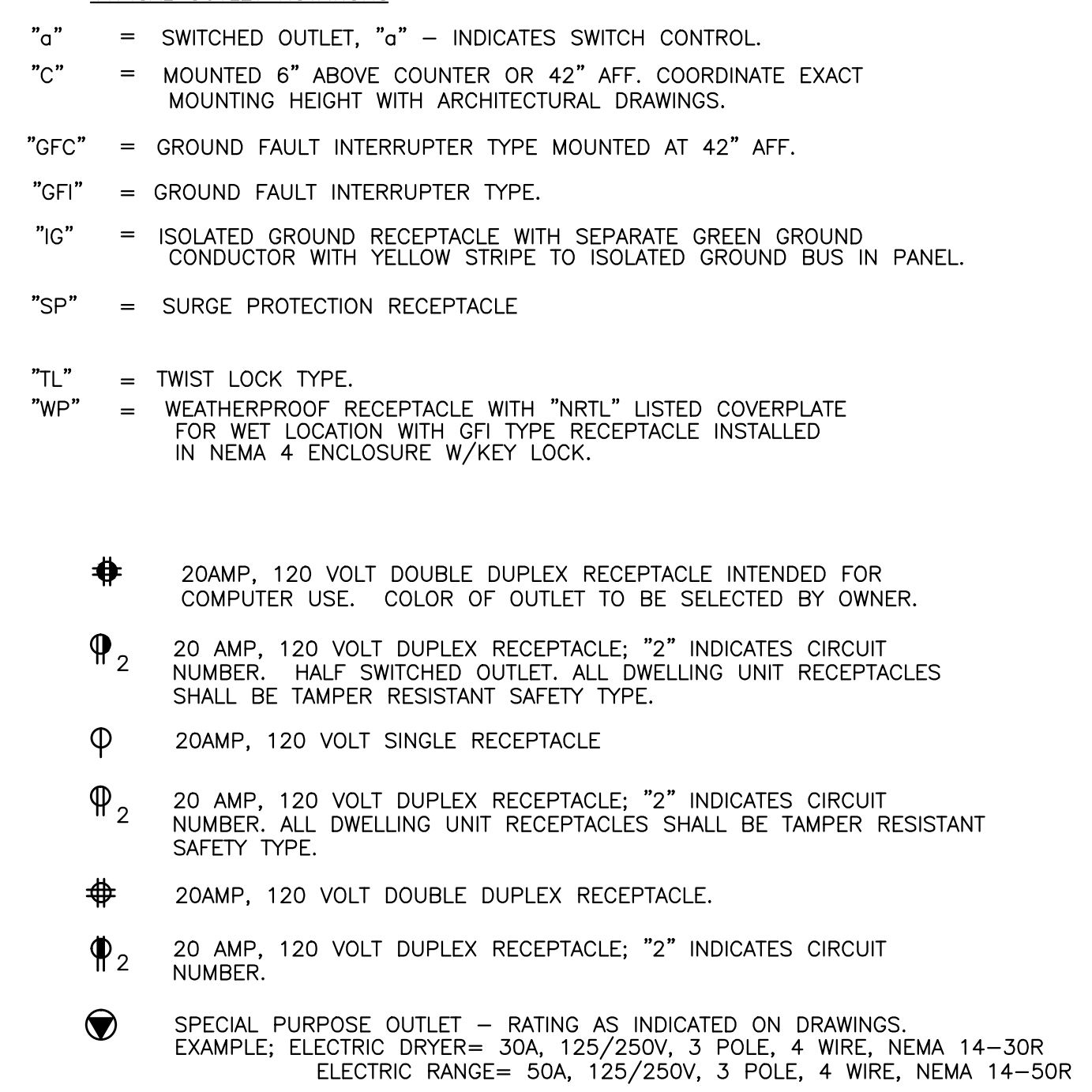


TELECOMMUNICATIONS & VIDEO

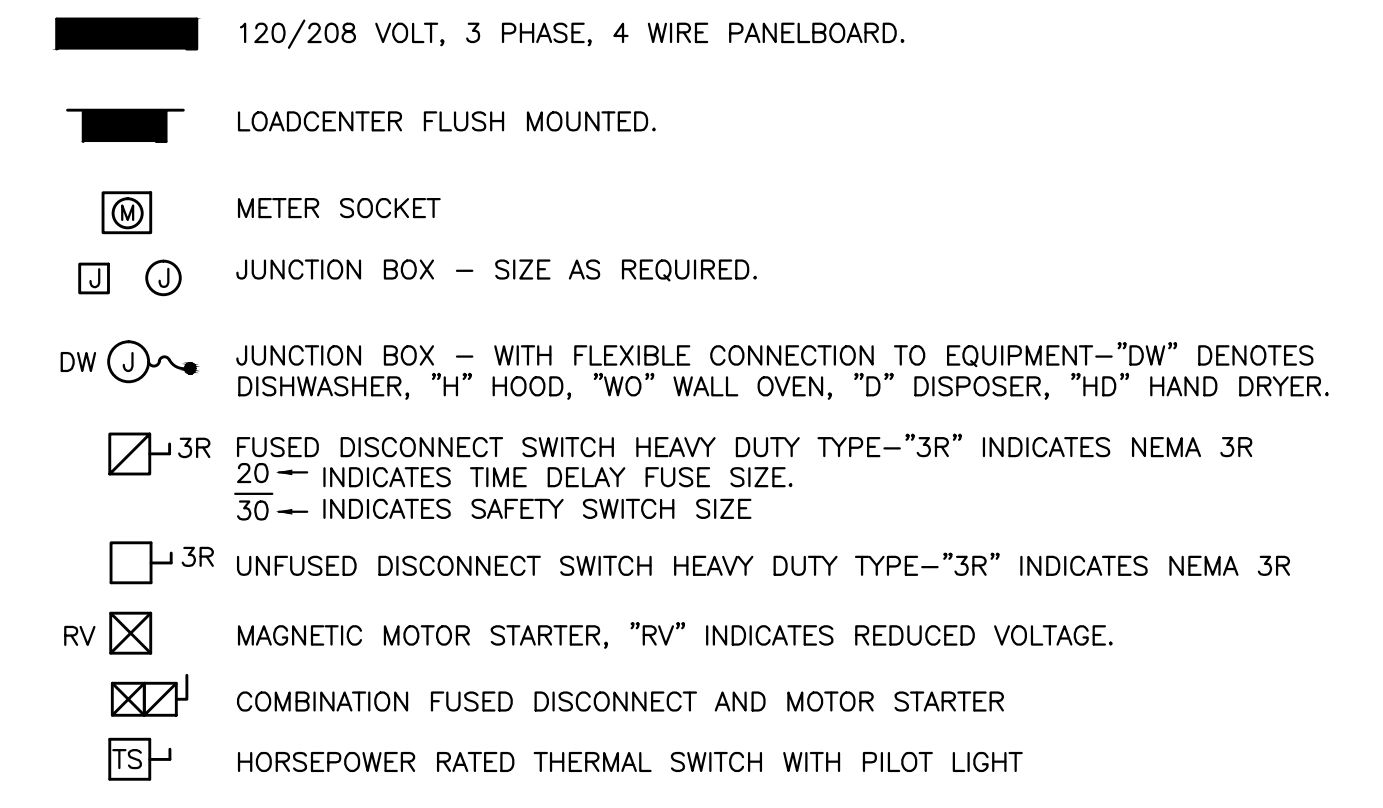


LEGEND NOTES:
A. THIS SHEET IS A GENERAL LIST OF SYMBOLS AND ABBREVIATIONS AND SHALL BE USED AS A DICTIONARY TO DEFINE ITEMS INDICATED ON DRAWINGS. NOT ALL SYMBOLS OR ABBREVIATIONS ARE NECESSARILY USED ON THIS PROJECT. ALL EQUIPMENT IS TO BE PROVIDED UNDER THIS SECTION UNLESS SPECIFICALLY INDICATED OTHERWISE.

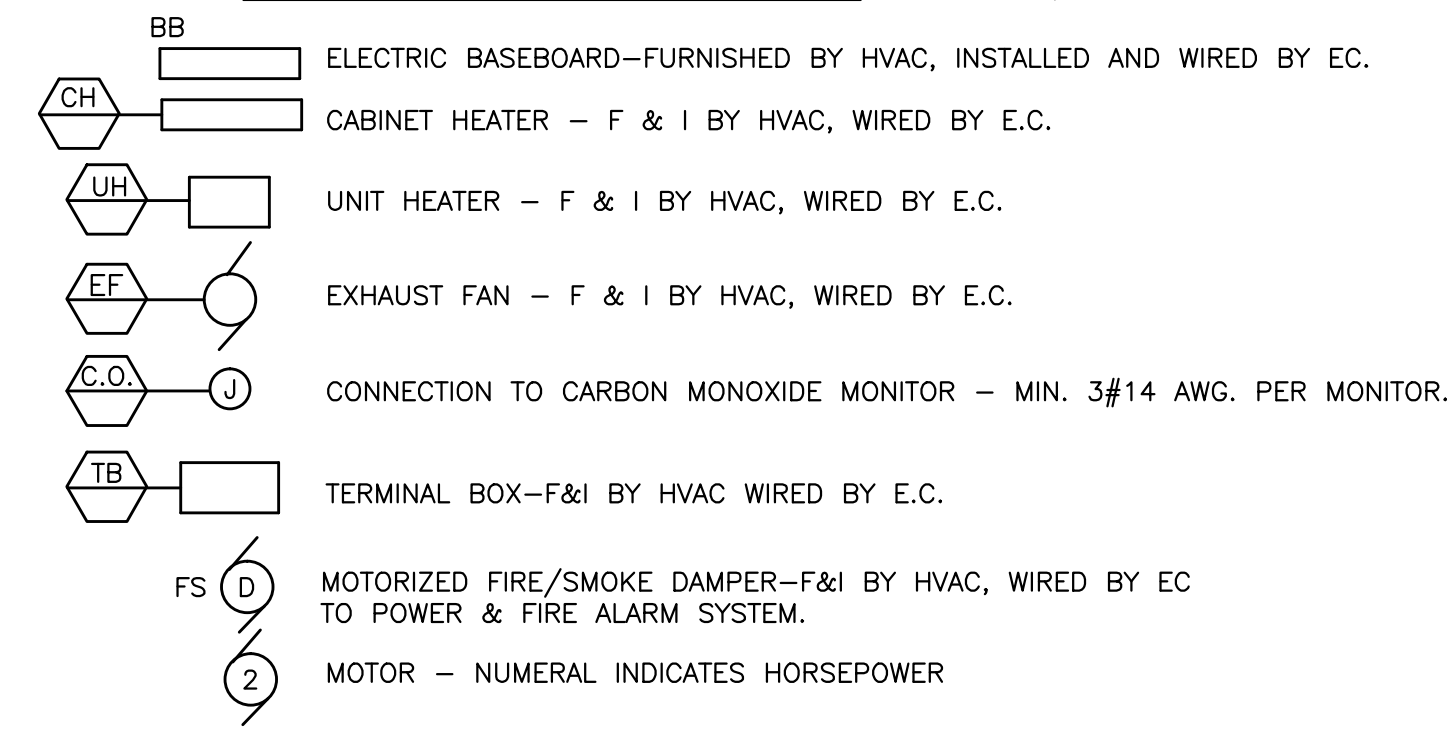
RECEPTACLES (typically mtd. at 18" a.f.f., uno)



POWER



MECHANICAL EQUIPMENT (REFER TO MECHANICAL EQUIPMENT SCHEDULE)



LIGHTING FIXTURE SCHEDULE								
ALL FIXTURES SHALL BE FURNISHED COMPLETE WITH ALL HARDWARE, LAMPS, HANGERS, FITTING, ETC., FOR A COMPLETE AND PROPER INSTALLATION.								
TYPE	MANUFACTURER	CATALOG NO.	MTG.	VOLTAGE	LAMPS			REMARKS
					No.	WATTAGE	TYPE	
FS4	LITHONIA	CS-2-32-MVOLT-GEB10RS	S	120	2	32	F32/T8	
FW4	LITHONIA	WC-1-32-MVOLT-GEB10IS-S1	W	120	1	32	F32/T8	WITH PULL CHAIN SWITCH
R1	NUVO	60-3364	PENDANT	120	1	18	PLT	
PF1	MONTE CARLO	5DI52WHD	PENDANT	120	1	50	HALOGEN	
RC1	LITHONIA	AF-1/26DTT-6AR-120	R	120	1	26	DTT	6" DOWNLIGHT
T1	WAC LIGHTING	HT8-BK	PENDANT	120				TRACK
TL1	WAC LIGHTING	HTK-720-BK	TRACK	120	1	50	PAR20	
TL2	WAC LIGHTING	HTK-524WT/BN	PENDANT	120	1	50	JCD-50X	
P1	SEAGULL	65005-962	PENDANT	120	1	100	A-19	
W1	NUVO	60-3351	W	120	2	13	PLT	VANITY
	LIGHTALARMS	LCA-2SQ	W	120	2	6W	HALOGEN	
F23	LITHONIA	2GT8-332-A12-MVOLT-1/3-GEB10IS	R	120	3	32	F32/T8	2' X 4' RECESSED FLUORESCENT TROFFER
SL3	LITHONIA	SIL2-T3-150PS-UNV-DL-CLDPK	W	120	1	150	MH	EXTERIOR WALL PACK
SL4E	VISIONAIRE	SIL1-T4-42-CF-UNV-DL-CLDPK	W	120	1	42	TRT	EXTERIOR WITH 0' EMERGENCY BALLAST COLOR BY ARCHITECT

LIGHTING FIXTURE NOTES

- FURNISH ALL LIGHTING FIXTURES COMPLETE WITH MOUNTING ACCESSORIES TO MEET THE JOB REQUIREMENTS. VERIFY CEILING AND GRID TYPE PRIOR TO ORDERING FIXTURES.
- DESCRIPTIONS AND NOTES MAY INDICATE ITEMS THAT ARE NOT INDICATED IN THE CATALOG NUMBER. SUBSTITUTIONS SUBMITTED SHALL BE DOCUMENTED AS EQUAL IN PERFORMANCE AND APPEARANCE TO THE SPECIFIED ITEM.
- COMPACT FLUORESCENT FIXTURES SHALL HAVE HIGH POWER FACTOR, THERMALLY PROTECTED ELECTRONIC BALLASTS WITH THD LESS THAN 20%, AND GREATER THAN 10%, WITH END OF LAMP LIFE SENSING CAPABILITY WHICH WILL CORRECT ITSELF UPON RELAMPING, EQUAL TO OSRAM/SYLVANIA.
- VERIFY FIXTURE MOUNTING HEIGHTS AND LOCATIONS WITH ENGINEER. EXACT LOCATION OF FIXTURES SHALL BE CONFIRMED WITH THE ENGINEER PRIOR TO ROUGHING.
- FLUORESCENT FIXTURES SHALL HAVE HIGH POWER FACTOR, CLASS P, ELECTRONIC BALLASTS, UNLESS OTHERWISE INDICATED, WITH THD LESS THAN 20% AND GREATER THAN 10% - APPROVED AS AN ASSEMBLY WITH LAMPS SUPPLIED.
- ALL FLUORESCENT AND COMPACT FLUORESCENT LAMPS SHALL HAVE 3500 KELVIN COLOR TEMPERATURE, WITH A COLOR RENDERING INDEX OF 82. METAL HALIDE LAMPS SHALL HAVE SHROUDED ARC TUBE, COLOR PROVIDE CANOPIES FOR LOCATIONS WHERE HANGER MOUNTS TO UNFINISHED CEILING STRUCTURE (WHERE VISIBLE) CORRECTING COATING ON OUTER ENVELOPE WITH A 4100 KELVIN COLOR TEMPERATURE HAVING A COLOR RENDERING INDEX OF 75.
- INCANDESCENT LAMPS SHALL BE RATED 130 VOLTS UNLESS OTHERWISE SPECIFIED.
- FINISH COLOR FOR ALL FIXTURES, UNLESS SPECIFICALLY INDICATED SHALL BE SELECTED OR CONFIRMED BY ENGINEER FROM MANUFACTURER'S STANDARD COLORS.
- ALL LAMPS AND BALLASTS PROVIDED SHALL MEET THE LATEST UTILITY COMPANY INCENTIVE REQUIREMENTS. COORDINATE WITH THE UTILITY COMPANY.

GENERAL NOTES:

- THE SCOPE OF WORK SHALL INCLUDE PROVIDING ALL WORK INDICATED, AND COORDINATION WITH ALL TRADES. SCOPE OF WORK IS INDICATED ON THE CONTRACT DOCUMENTS INCLUDING THE DRAWINGS AND THE SPECIFICATIONS, WHICH ARE COMPLIMENTARY. WORK INDICATED IN ANY CONTRACT DOCUMENT SHALL BE CONSIDERED PART OF THE SCOPE OF WORK. IN GENERAL, WORK REQUIREMENTS ARE NOT INDICATED IN BOTH DOCUMENTS. WHERE DOCUMENTS CONFLICT WITHIN THEMSELVES OR WITH CODES AND REGULATIONS, PROVIDE THE HIGHER QUANTITY AND QUALITY AND FOLLOW THE STRICTER REQUIREMENTS.
- ELECTRICAL WORK SHALL BE IN ACCORDANCE WITH OSHA, NFPA STANDARDS, THE ELECTRICAL CODE AND THE LOCAL GOVERNING AUTHORITIES. THE DRAWINGS AND SPECIFICATIONS DO NOT ATTEMPT TO INDICATE ALL WORK REQUIRED BY CODES AND AUTHORITIES.
- TEST ALL EQUIPMENT AND SYSTEMS INSTALLED TO CERTIFY COMPLIANCE WITH DRAWINGS, SPECIFICATIONS, CODES, LOCAL AUTHORITIES AND REGULATIONS. INCLUDE LABOR AND COSTS FOR TESTING, REVIEWS, APPROVALS AND CERTIFICATIONS.
- DRAWINGS ARE DIAGRAMMATIC ONLY. EXACT LOCATION, MOUNTING HEIGHTS OF EQUIPMENT AND ROUTING OF RACEWAYS SHALL BE COORDINATED WITH THE EQUIPMENT REQUIREMENTS AND FIELD CONDITIONS.
- FURNISH AND INSTALL ALL INCIDENTAL ACCESSORIES NECESSARY TO MAKE THE ELECTRICAL WORK COMPLETE AND READY FOR OPERATION.
- SUPPORT ALL WORK FROM THE BUILDING STRUCTURE.
- ALL MOUNTING HEIGHTS ARE TO CENTERLINE UNLESS OTHERWISE INDICATED.
- IF EXACT MOUNTING OR RACEWAY ROUTINGS ARE NOT INDICATED (LOCATION OR HEIGHT) REQUEST CLARIFICATION PRIOR TO ROUGHING, OR INSTALLATION.
- ELECTRICAL WORK SHALL BE RECESSED INTO WALLS OR CEILINGS UNLESS OTHERWISE INDICATED.
- DO NOT INSTALL OUTLETS BACK TO BACK. PROVIDE 24 INCH SPACING IN FIRE RATED WALLS.
- PROVIDE ELECTRICAL OUTLET PLATE GASKET SEALS AT RECEPTACLES, SWITCHES AND OTHER ELECTRICAL BOXES ON EXTERIOR WALLS AND INTERIOR WALLS BETWEEN CONDITIONED AND NON-CONDITIONED SPACES.
- INSTALL A GREEN GROUNDING CONDUCTOR WITHIN EACH RACEWAY SIZED IN ACCORDANCE WITH THE ELECTRIC CODE.
- PROVIDE WATERTIGHT AND GAS TIGHT SEALS INSIDE AND OUTSIDE OF CONDUITS THAT PENETRATE THE BUILDING BELOW GRADE, O.Z. GEDNEY OR APPROVED EQUAL. PROVIDE WEATHER TIGHT SEAL AT PENETRATIONS ABOVE GRADE.
- PROVIDE NRTL LISTED SMOKE AND FIRE SEALS AT ALL PENETRATIONS THROUGH FLOORS OR FULL HEIGHT (SLAB TO SLAB) WALLS.
- USE CAUTION TO AVOID DAMAGE TO EXISTING UTILITY LINES AND/OR HARM TO PERSONNEL WORKING IN THESE AREAS.
- ALL BRANCH CIRCUIT CONDUCTORS SHALL BE COPPER MINIMUM #12 AWG. SIZE UNLESS OTHERWISE INDICATED.

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**PHASE III
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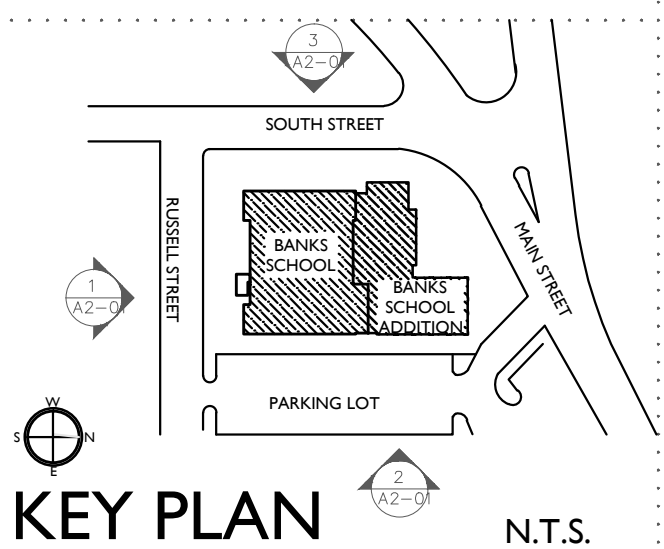
948 MAIN STREET
 WALTHAM, MA



**CITY OF
 WALTHAM**
 CITY HALL
 610 MAIN STREET
 WALTHAM, MA

Drawing Title:

**ELECTRICAL
 SITE DETAILS
 AND SCHEDULE**



Revisions:

Date: 03-2-2012
 Project Number: 10025-A
 Project Manager:
 Drawn By: JR
 Scale: AS NOTED

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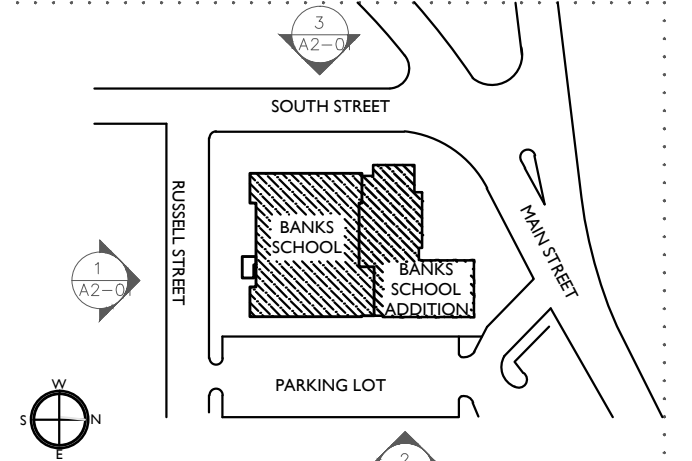
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**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA

**CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA**

Drawing Title:

**FIRST FLOOR
ELECTRICAL PLAN
DEMOLITION**



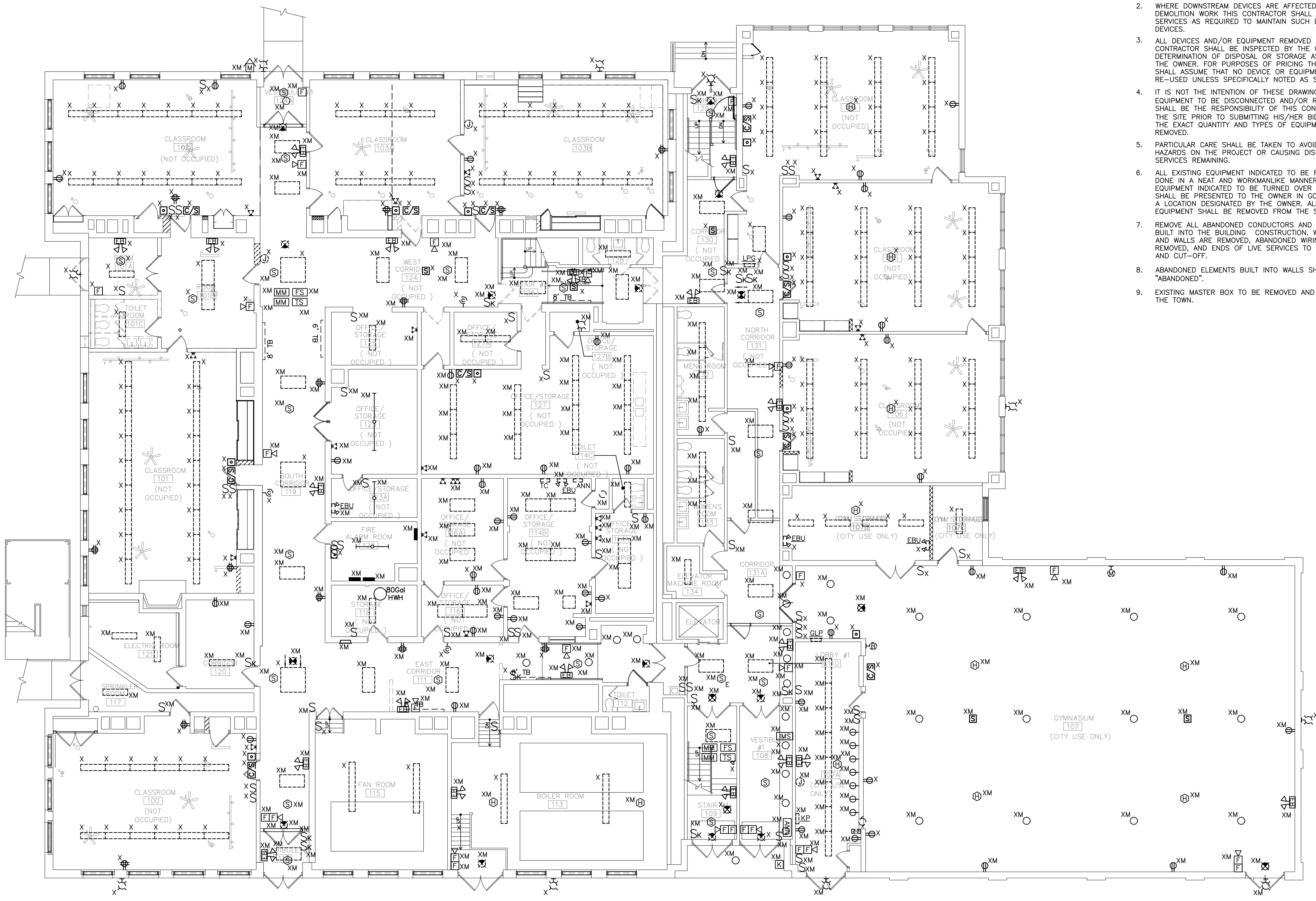
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Revisions:

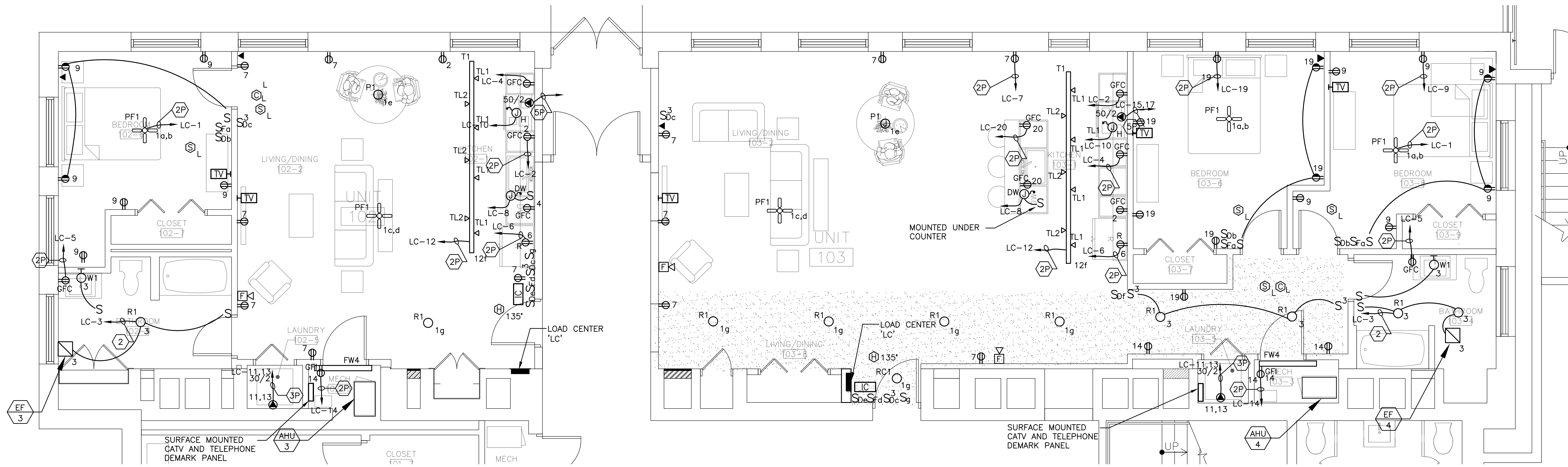
Date:	03-2-2012
Project Number:	10025-A
Project Manager:	
Drawn By:	JR
Scale:	1/8"=1'-0"

GENERAL DEMOLITION NOTES:

- REFER TO DEMOLITION SECTION OF SPECIFICATION FOR ADDITIONAL REQUIREMENTS.
- WHERE DOWNSTREAM DEVICES ARE AFFECTED BY THE DEMOLITION WORK THIS CONTRACTOR SHALL PROVIDE NEW SERVICES AS REQUIRED TO MAINTAIN SUCH DOWNSTREAM DEVICES.
- ALL DEVICES AND/OR EQUIPMENT REMOVED BY THIS CONTRACTOR SHALL BE INSPECTED BY THE OWNER FOR DETERMINATION OF DISPOSAL OR STORAGE AS DIRECTED BY THE OWNER. FOR PURPOSES OF PRICING THIS CONTRACTOR SHALL ASSUME THAT NO DEVICE OR EQUIPMENT WILL BE RE-USED UNLESS SPECIFICALLY NOTED AS SUCH.
- IT IS NOT THE INTENTION OF THESE DRAWINGS TO SHOW ALL EQUIPMENT INDICATED TO BE DISCONNECTED AND/OR REMOVED. IT SHALL BE THE RESPONSIBILITY OF THIS CONTRACTOR TO VISIT THE SITE PRIOR TO SUBMITTING HIS/HER BID TO DETERMINE THE EXACT QUANTITY AND TYPES OF EQUIPMENT TO BE REMOVED.
- PARTICULAR CARE SHALL BE TAKEN TO AVOID CREATING HAZARDS ON THE PROJECT OR CAUSING DISRUPTION OF SERVICES REMAINING.
- ALL EXISTING EQUIPMENT INDICATED TO BE REMOVED SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER. ALL EXISTING EQUIPMENT INDICATED TO BE TURNED OVER TO THE OWNER SHALL BE PRESENTED TO THE OWNER IN GOOD CONDITION AT A LOCATION DESIGNATED BY THE OWNER. ALL OTHER EQUIPMENT SHALL BE REMOVED FROM THE SITE.
- REMOVE ALL ABANDONED CONDUCTORS AND EQUIPMENT NOT BUILT INTO THE BUILDING CONSTRUCTION WHERE CEILING AND WALLS ARE REMOVED. ABANDONED WIRING SHALL BE REMOVED, AND ENDS OF LIVE SERVICES TO BE DISCONNECTED AND CUT-OFF.
- ABANDONED ELEMENTS BUILT INTO WALLS SHALL BE MARKED "ABANDONED".
- EXISTING MASTER BOX TO BE REMOVED AND TURNED OVER TO THE TOWN.



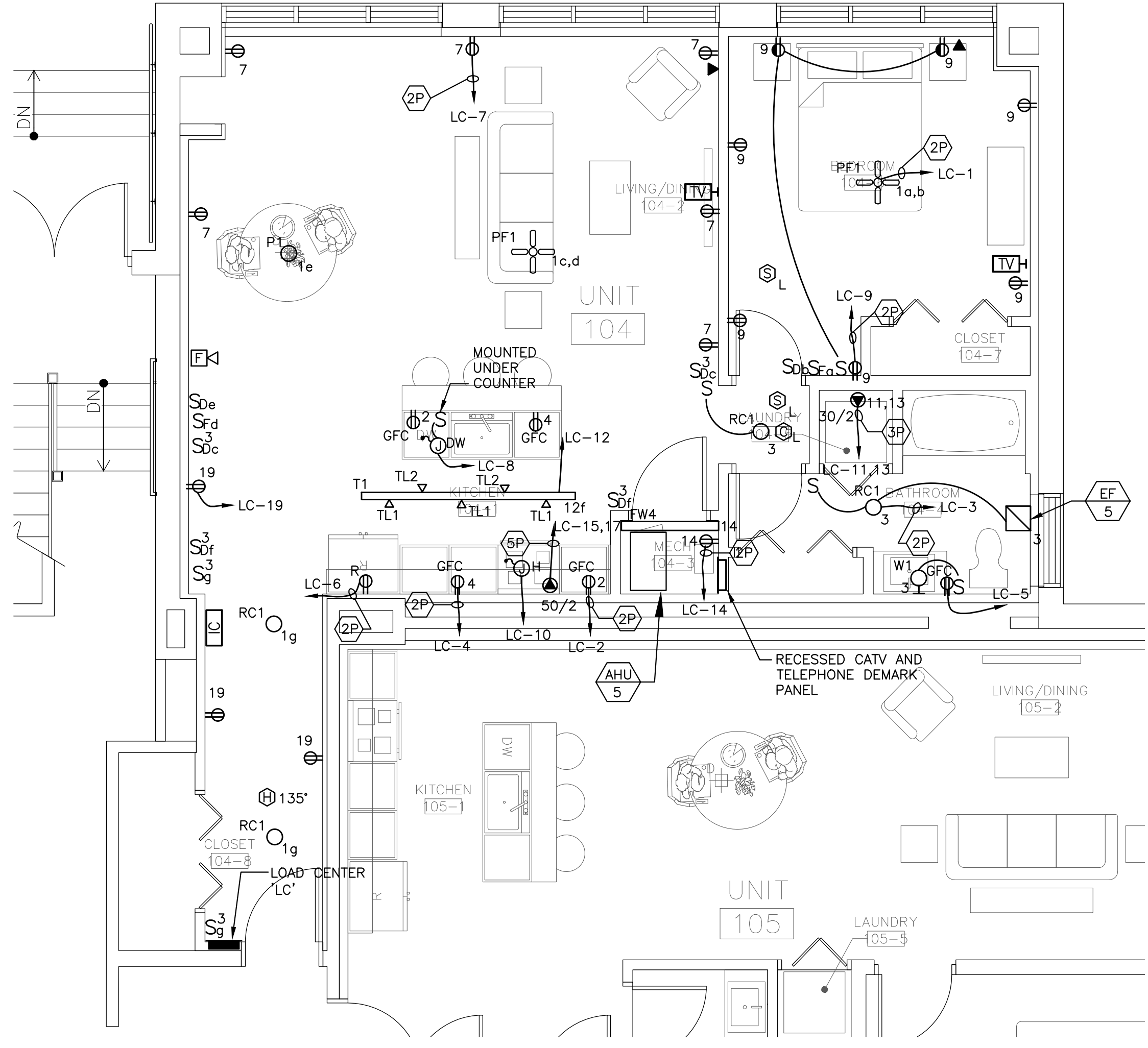
1 FIRST FLOOR ELECTRICAL PLAN-DEMOLITION
ED1.1 SCALE: 1/8"=1'-0"



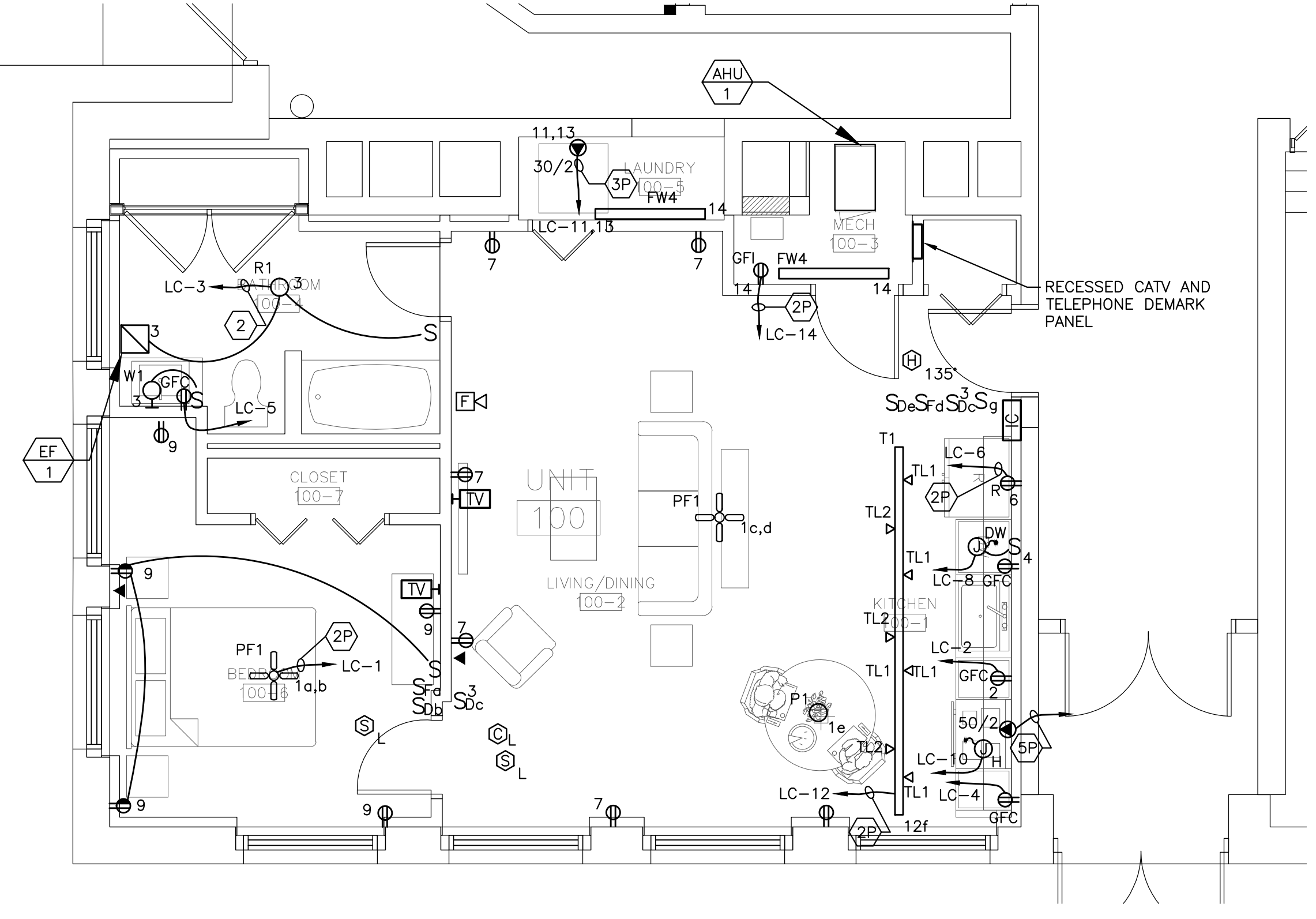
1 TYPICAL UNIT ELECTRICAL PLAN
E1.2 SCALE: 1/4"=1'-0"

WIRING NOTES:

1. WIRING IS INDICATED ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
2. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
3. ALL SWITCH CONTROLS SHALL BE PROVIDED WITH WIRING AND CONDUIT AS REQUIRED.
4. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.
5. RACEWAYS SHALL BE LIMITED TO FOUR CURRENT CARRYING CONDUCTORS AND GROUNDING CONDUCTOR, UNLESS OTHERWISE INDICATED.
6. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
7. REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
8. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
9. DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
10. CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
11. ALL OUTLETS ON EXTERIOR WALLS WITH ALL OUTLETS ON CASEWORK/FINTUBE SHALL BE MOUNTED 6" ABOVE CASEWORK/FINTUBE. CONFIRM HEIGHT OF CASEWORK/FINTUBE WITH THE HVAC ENGINEER AND ARCHITECT PRIOR TO ROUGHING.
12. DO NOT TAP METAL ROOF DECK FOR SUPPORT OF ANY ELECTRICAL EQUIPMENT. PROVIDE UNISTRUT AS REQUIRED FOR SUPPORT OF ALL ELECTRICAL EQUIPMENT.
13. PROVIDE PULL STRINGS IN ALL EMPTY CONDUITS.



2 TYPICAL UNIT ELECTRICAL PLAN
E1.2 SCALE: 1/4"=1'-0"



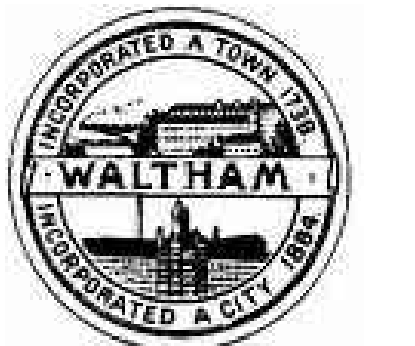
3 TYPICAL UNIT ELECTRICAL PLAN
E1.2 SCALE: 1/4"=1'-0"



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PHASE III
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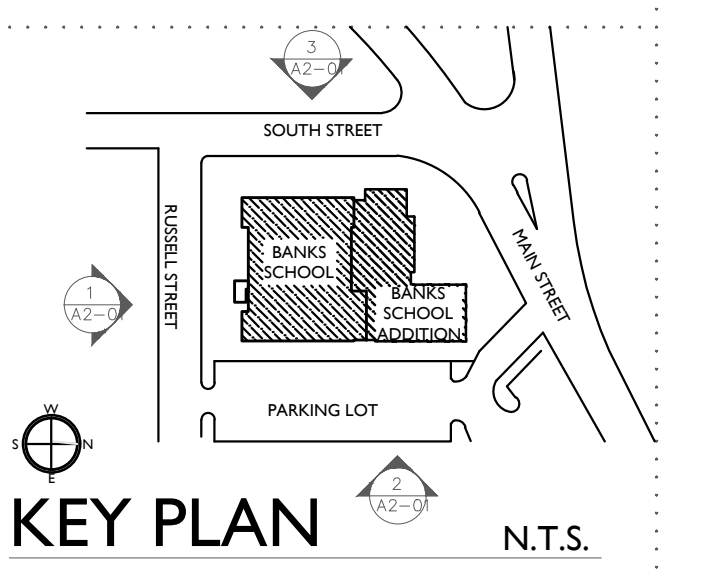
948 MAIN STREET
WALTHAM, MA



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WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA

Drawing Title:

TYPICAL UNIT
ELECTRICAL PLAN



Revisions:

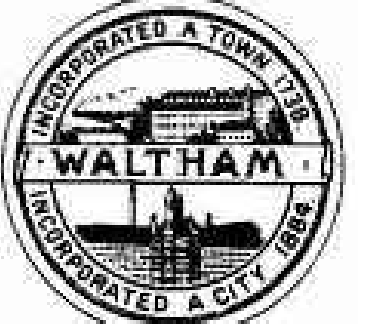
Date: 03-2-2012
Project Number: 10025-A
Project Manager:
Drawn By: MVD
Scale: AS NOTED

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E1.2

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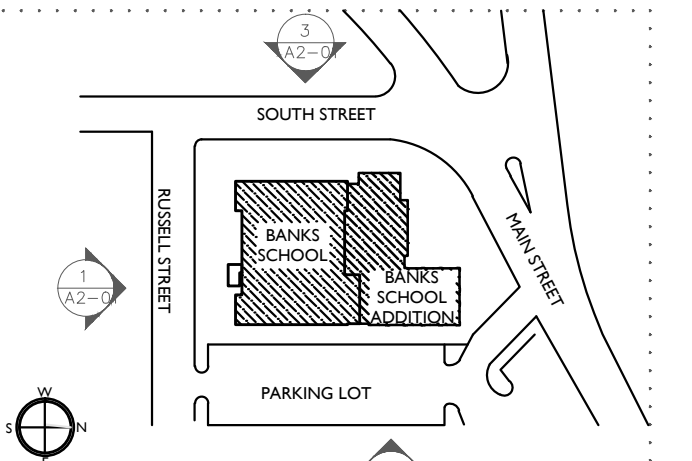
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CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
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Drawing Title:

ELECTRICAL FIRST
FLOOR PLAN
TYPICAL UNIT

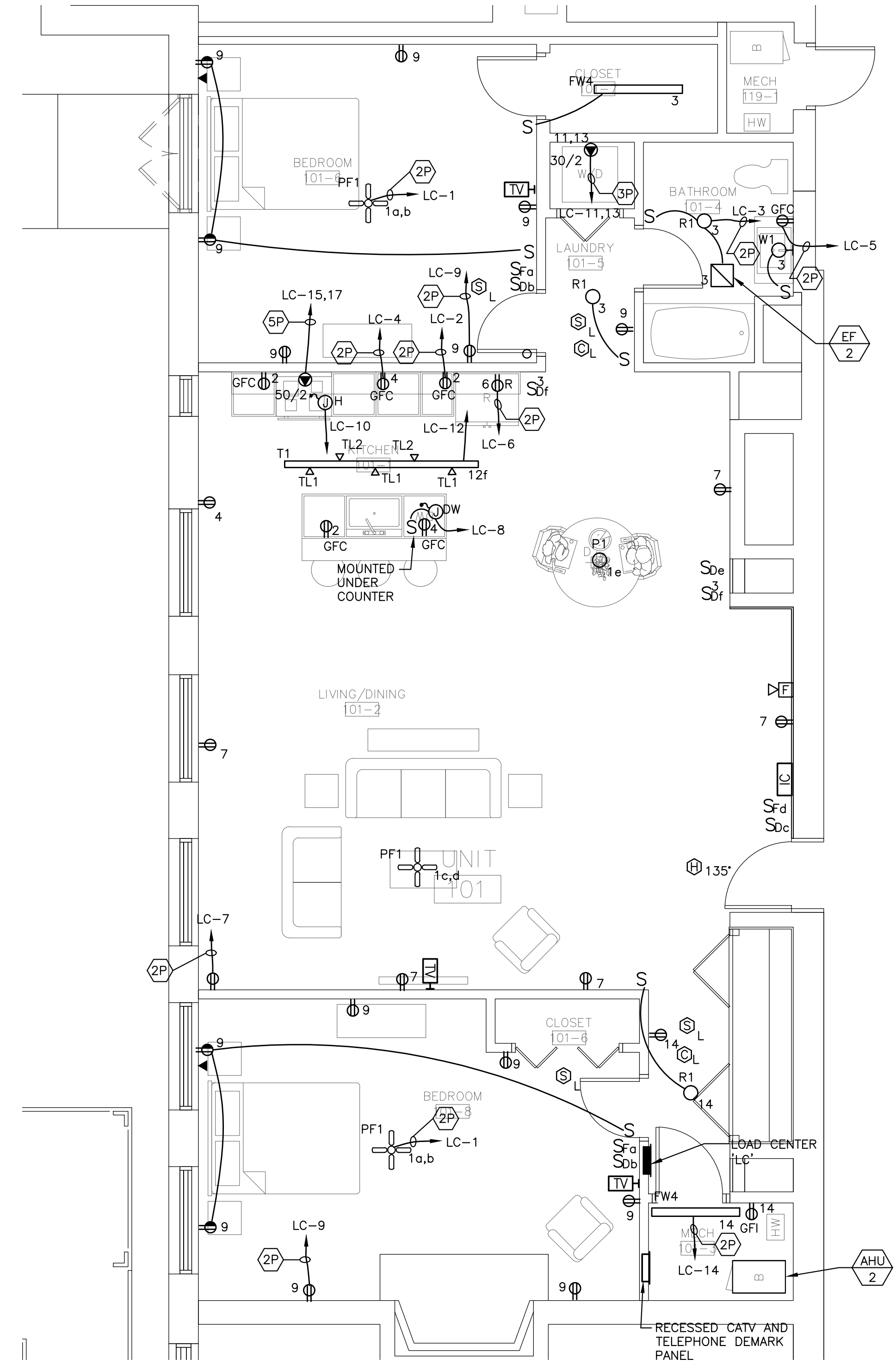


KEY PLAN N.T.S.

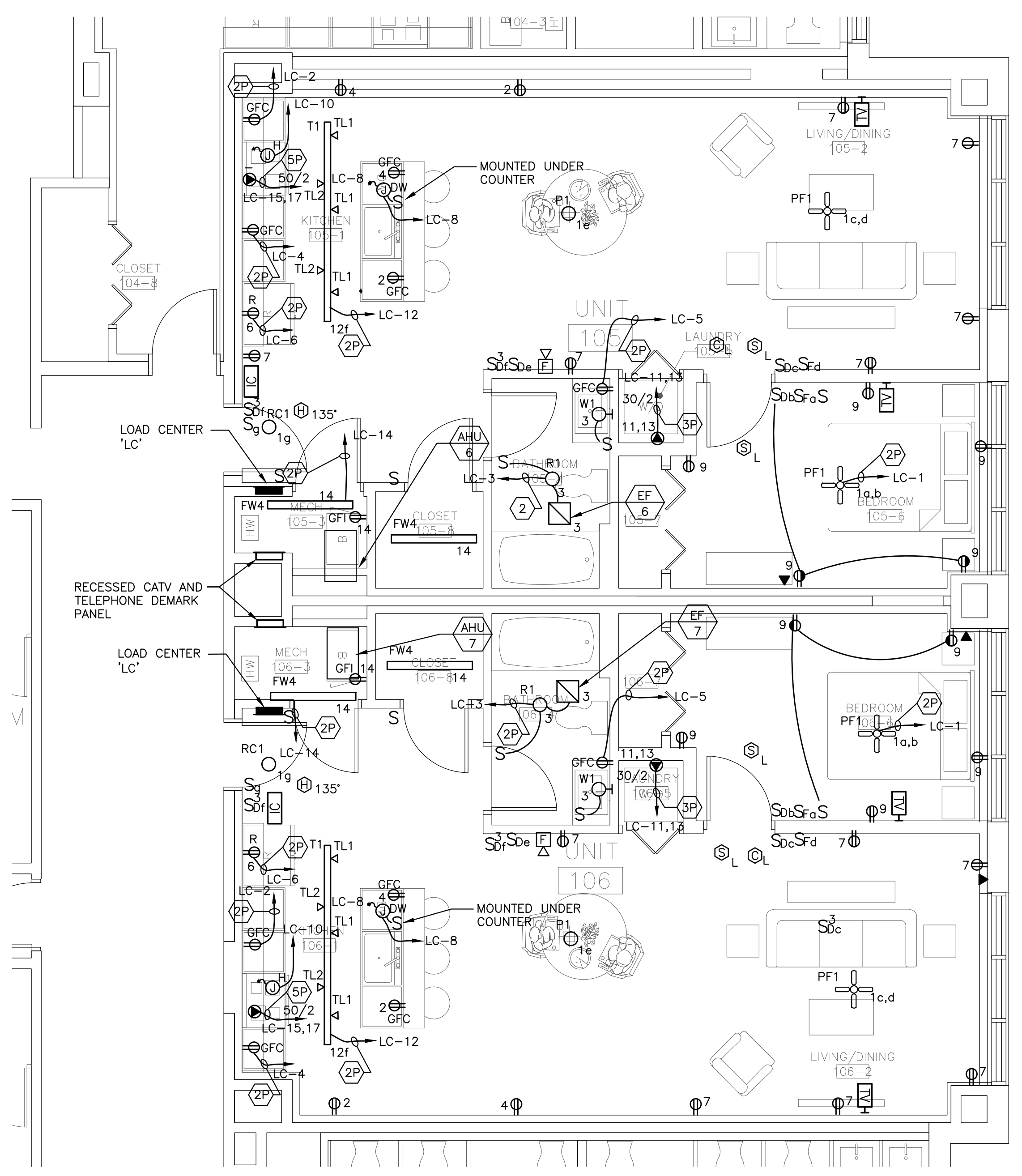
Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager:
Drawn By: MVD
Scale: 1/8"=1'-0"

EI.3



1 TYPICAL UNIT ELECTRICAL PLAN
E1.3 SCALE: 1/4"=1'-0"



2 TYPICAL UNIT ELECTRICAL PLAN
E1.3 SCALE: 1/4"=1'-0"

SINGLE PHASE CIRCUIT SCHEDULE (COPPER CONDUCTORS)					
CIRCUIT SYMBOL	CONDUCTORS (1 PHASE, 2 WIRE) WITH GROUND	SIZE CONDUIT	CONDUCTORS (1 PHASE, 3 WIRE) WITH GROUND	SIZE CONDUIT	CIRCUIT OR OVERCURRENT RATING
1P	2#12&1#12G	ROMEX	-	-	15A, 1P
2P	2#12&1#12G	ROMEX	-	-	20A, 1P
3P	3#10&1#10G	ROMEX	-	-	30A, 2P
4P	3#8&1#10G	ROMEX	-	-	40A, 2P
5P	3#6&1#10G	ROMEX	-	-	50A, 2P

- NOTES:**
- COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT W/ARCHITECT PRIOR TO INSTALLATION.
 - ALL BRANCH CIRCUIT CONDUCTORS SHALL BE TYPE NONMETALLIC-SHEATHED CABLE (WHERE RUN CONCEALED) 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
 - EXACT PLACEMENT OF RECEPTACLES SHALL BE IN COMPLIANCE WITH NEC ARTICLE 210-52. COORDINATE PLACEMENT OF OUTLETS WITH ENGINEER PRIOR TO ROUGHING IN.

WIRING NOTES:

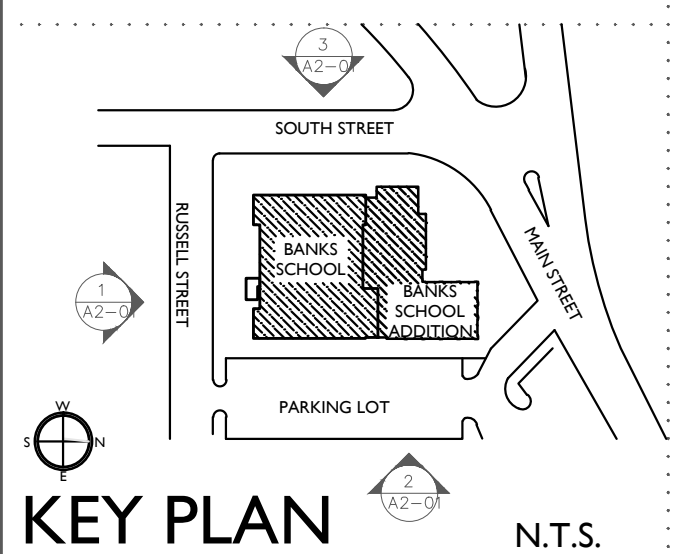
- WIRING IS INDICATED ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
- WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
- ALL SWITCH CONTROLS SHALL BE PROVIDED WITH WIRING AND CONDUIT AS REQUIRED.
- ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.
- RACEWAYS SHALL BE LIMITED TO FOUR CURRENT CARRYING CONDUCTORS AND GROUNDING CONDUCTOR, UNLESS OTHERWISE INDICATED.
- COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
- REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
- ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
- DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
- CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
- ALL OUTLETS ON EXTERIOR WALLS WITH ALL OUTLETS ON CASEWORK/FINTUBE SHALL BE MOUNTED 6" ABOVE CASEWORK/FINTUBE. CONFIRM HEIGHT OF CASEWORK/FINTUBE WITH THE HVAC ENGINEER AND ARCHITECT PRIOR TO ROUGHING.
- DO NOT TAP METAL ROOF DECK FOR SUPPORT OF ANY ELECTRICAL EQUIPMENT. PROVIDE UNISTRUT AS REQUIRED FOR SUPPORT OF ALL ELECTRICAL EQUIPMENT.
- PROVIDE PULL STRINGS IN ALL EMPTY CONDUITS.

**PHASE III
RENOVATIONS TO
THE FORMER
BANKS SCHOOL
ELDERLY HOUSING
CONDOMINIUMS**
948 MAIN STREET
WALTHAM, MA

**CITY OF
WALTHAM
CITY HALL
610 MAIN STREET
WALTHAM, MA**

Drawing Title:

**ELECTRICAL
ROOF PLAN**



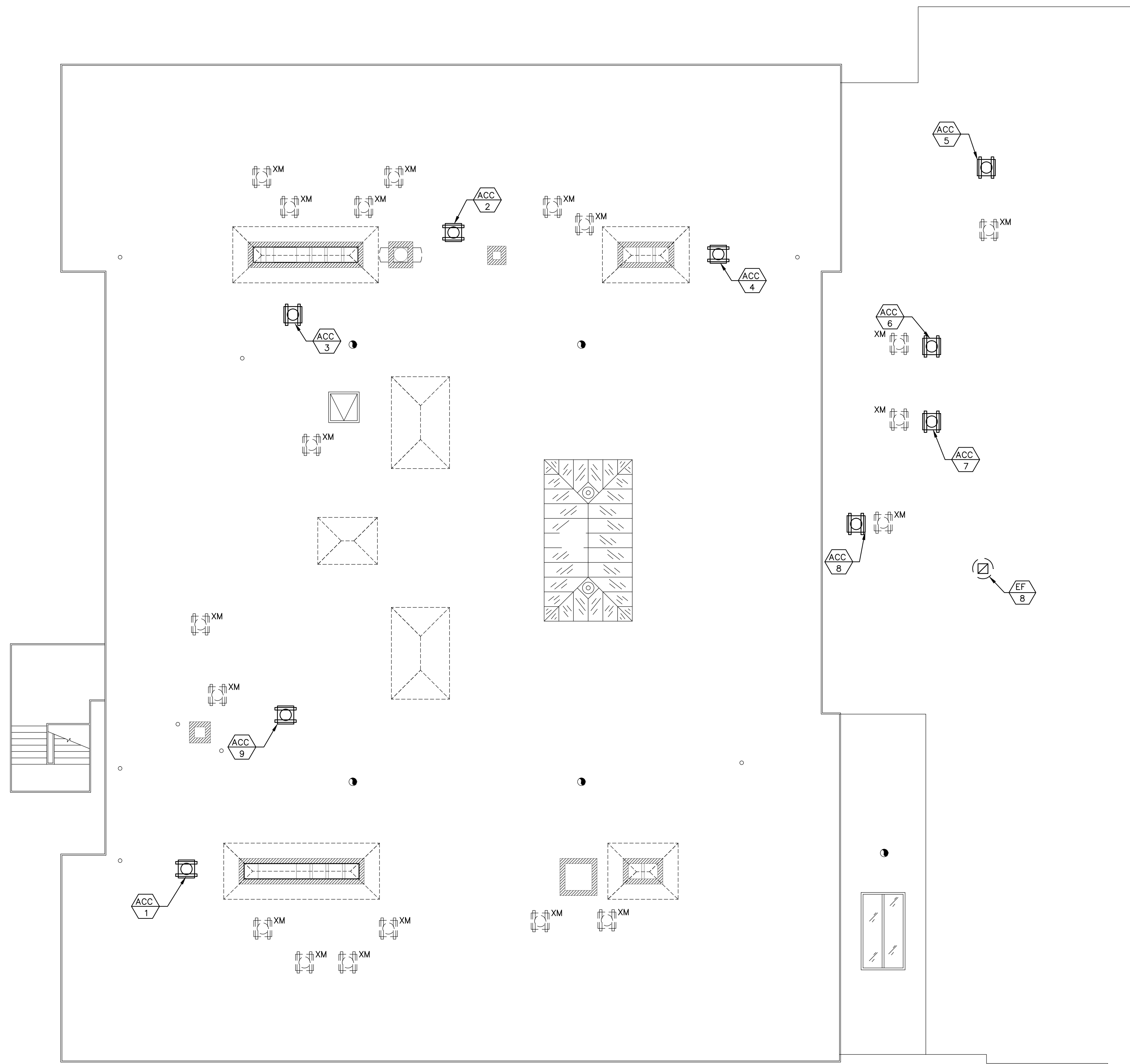
Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager:
Drawn By: JR
Scale: 1/8"=1'-0"

E1.4

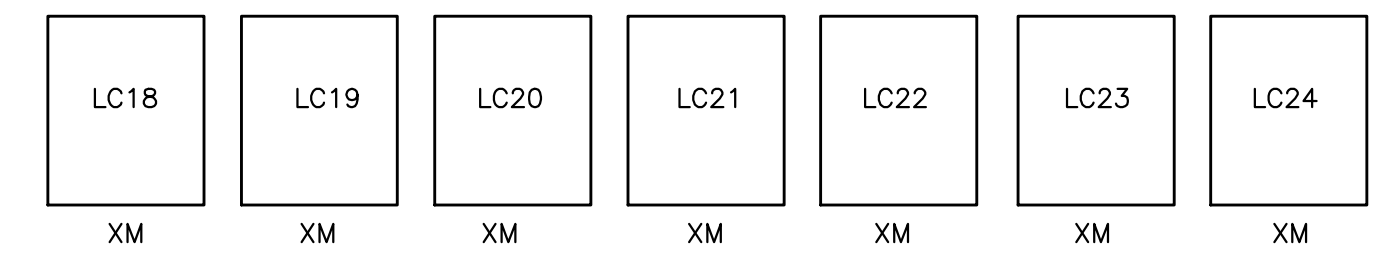
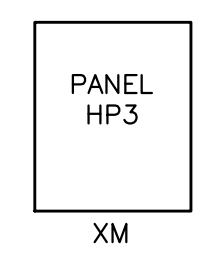
WIRING NOTES:

1. WIRING IS INDICATED ON DRAWINGS ONLY FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS.
2. WIRING AND CONDUIT SHALL BE REQUIRED BETWEEN ALL OUTLETS INDICATED WITH CIRCUIT NUMBERS AND PANEL DESIGNATIONS.
3. ALL SWITCH CONTROLS SHALL BE PROVIDED WITH WIRING AND CONDUIT AS REQUIRED.
4. ALTHOUGH ALL BRANCH CIRCUIT WIRE AND CONDUIT IS NOT SHOWN, IT IS THE INTENT OF THESE DOCUMENTS THAT A COMPLETE BRANCH CIRCUIT WIRING SYSTEM BE PROVIDED.
5. RACEWAYS SHALL BE LIMITED TO FOUR CURRENT CARRYING CONDUCTORS AND GROUNDING CONDUCTOR, UNLESS OTHERWISE INDICATED.
6. COORDINATE EXACT LOCATION OF ALL DEVICES AND EQUIPMENT WITH ARCHITECT PRIOR TO INSTALLATION.
7. REFER TO MECHANICAL PLANS FOR ANY CHANGES AND FOR EXACT LOCATION OF ALL HVAC EQUIPMENT.
8. ALL BRANCH CIRCUIT CONDUCTORS SHALL BE 98% CONDUCTIVITY, COPPER MINIMUM #12 AWG SIZE, THWN/THHN INSULATION, 600 VOLTS RATED UNLESS OTHERWISE NOTED.
9. DO NOT PENETRATE STAIRS WITH ANY UTILITIES EXCEPT FOR UTILITIES SPECIFICALLY SERVING THAT STAIR.
10. CONFIRM RATINGS & FINAL LOCATIONS OF EQUIPMENT WITH OWNER PRIOR TO ROUGHING.
11. ALL OUTLETS ON EXTERIOR WALLS WITH ALL OUTLETS ON CASEWORK/FINTUBE SHALL BE MOUNTED 6" ABOVE CASEWORK/FINTUBE. CONFIRM HEIGHT OF CASEWORK/FINTUBE WITH THE HVAC ENGINEER AND ARCHITECT PRIOR TO ROUGHING.
12. DO NOT TAP METAL ROOF DECK FOR SUPPORT OF ANY ELECTRICAL EQUIPMENT. PROVIDE UNISTRUT AS REQUIRED FOR SUPPORT OF ALL ELECTRICAL EQUIPMENT.
13. PROVIDE PULL STRINGS IN ALL EMPTY CONDUITS.
14. EXIT SIGNS SHALL BE SELF-POWERED CONNECTED AHEAD OF ANY SWITCHING, "CONSTANT ON" AND CONNECTED TO NEW PANEL HP3.
15. EMERGENCY BATTERY UNITS SHALL BE CONNECTED AHEAD OF ANY SWITCHING, "CONSTANT ON" AND CONNECTED TO THE SAME LIGHTING CIRCUIT SERVING THE SAME AREA.

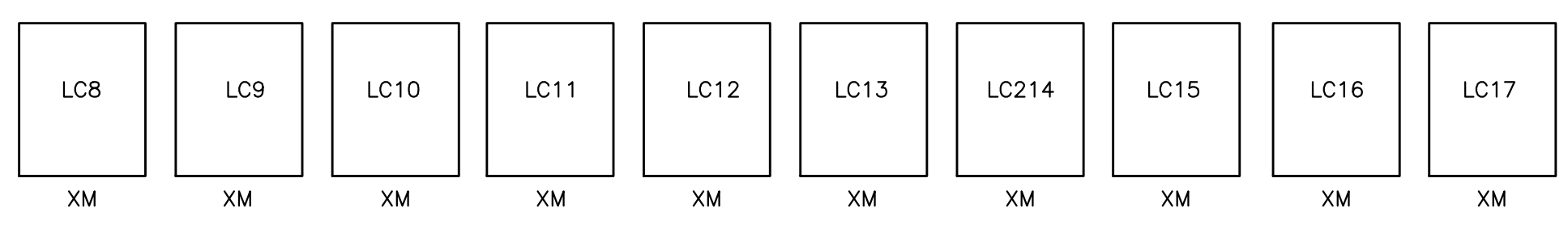


1 ELECTRICAL ROOF PLAN
E1.4 SCALE: 1/8"=1'-0"

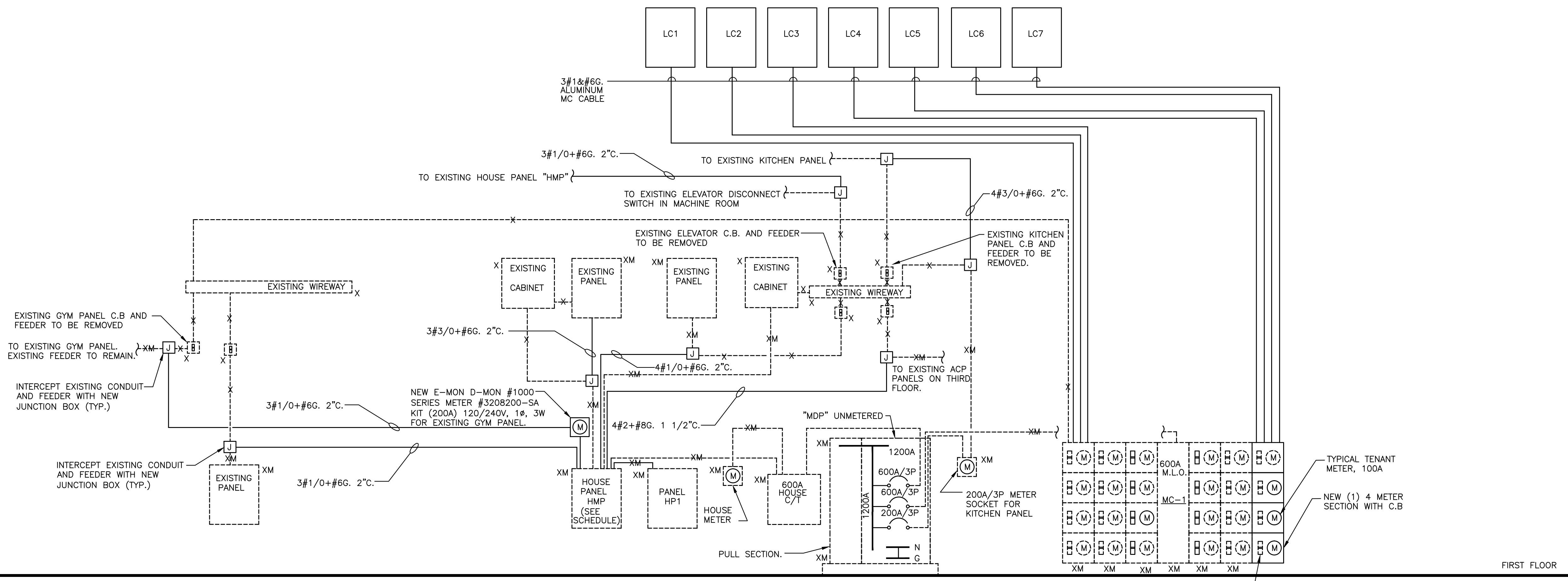
ROOF



THIRD FLOOR



SECOND FLOOR



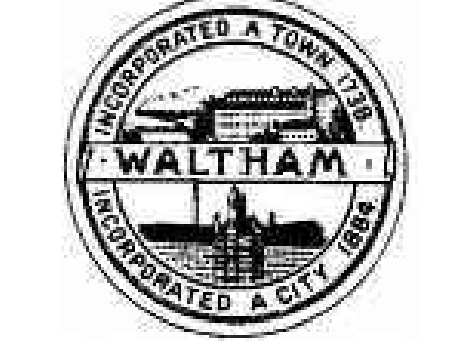
FIRST FLOOR

1 ONE-LINE POWER RISER
E3.0 SCALE: N.T.S.



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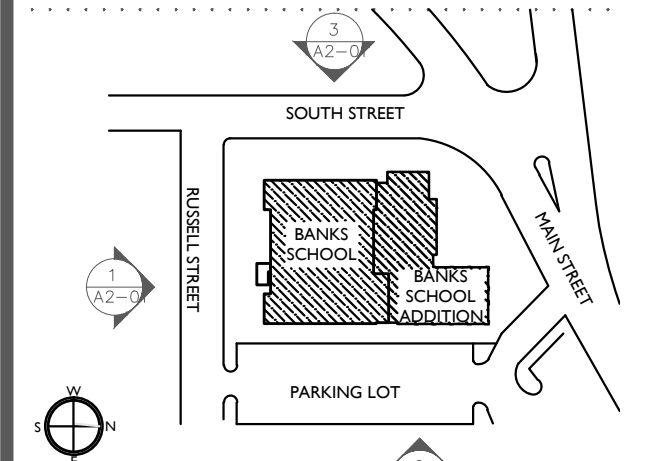
PHASE III
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WALTHAM, MA

Drawing Title:

ONE-LINE
POWER RISER
DIAGRAM



KEY PLAN N.T.S.

Revisions:

Date: 03-2-2012
Project Number: 10025-A
Project Manager:
Drawn By: DMP
Scale: AS NOT

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E3.0

I:\CBI Consulting\Banks School\Phase 2 & 3\Drawings\ELEC\Phase3\1st Flr\E3.0.dwg Mar 05, 2012 - 7:01 pm JORGE ROSA

DISTRIBUTION PANEL "HMP" SCHEDULE						
AIC: 42,000 A RMS SERVICE: 120/208V, 3Ø, 4W, 600A MLO						
OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
1	100	100	PANEL 'HP1'	EXISTING	EXISTING	
2	-	100	SPACE PROVISIONS	-	-	
3	200	225	SPARE	EXISTING	EXISTING	
4	100	100	PANEL 'HP3'	EXISTING	EXISTING	
5	200	225	SPARE	EXISTING	EXISTING	
② 6	100	100	EXISTING PANEL ACP	-	1 1/2"	
7	-	100	SPACE PROVISIONS	-	-	
8	100	100	SPARE	-	-	
9	-	225	SPACE PROVISIONS	-	-	
② 10	125	225	EXISTING ELEVATOR	3#1/0 & 1#6G	2"	
② 11	150	225	EXISTING PANEL	3#1/0 & 1#6G	2"	
② 12	200	225	EXISTING PANEL	3#3/0 & 1#6G	2"	TWO POLE CIRCUIT BREAKER
② 13	150	225	EXISTING GYM PANEL	3#1/0 & 1#6G	2"	TWO POLE CIRCUIT BREAKER
② 14	200	225	EXISTING PANEL	3#3/0 & 1#6G	2"	TWO POLE CIRCUIT BREAKER

- ① PROVIDE CURRENT LIMITING BREAKERS. UL LISTED SERIES RATED FOR 42,000A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS IS ACCEPTABLE.
- ② PROVIDE NEW BREAKERS IN EXISTING PANEL AS SHOWN.

120/208V, 3Ø, 4W, 42KAIC SERIES RATED														
PANEL SCHEDULE (TYPICAL FOR BUILDING #3)														
PANEL NO.	LOCATION	MTG	MAIN BUS AMPS	MAIN CB	BRANCH CKT BREAKER (AMPS)						TOTAL POLES	OTHERS		
					1 POLE		2 POLE		3 POLE					
					15	20	30	15	20	30			15	20
② ① LC	DWELLING UNITS--(SEE FLOOR PLAN)	F	100	MLO	-	16	-	-	2	-	-	-	24	③ (1) 50A/2
④ HP1	MAIN ELECT. ROOM	S	100	MLO	-	30	-	-	-	-	-	-	42	EXISTING
④ HP3	THIRD FLOOR ELECT. ROOM	S	100	MLO	-	20	-	-	2	-	-	-	42	EXISTING

- ① DWELLING UNIT LOAD CENTER - TYPICAL FOR 7.
- ② PROVIDE ARC FAULT BREAKERS FOR ALL RECEPTACLES IN BEDROOMS, LIVING ROOMS, DINING ROOMS AND CLOSET WITHIN THE DWELLING UNITS
- ③ PROVIDE LOAD CENTER AT 120/208V, 1Ø, 3W
- ④ PROVIDE NEW BREAKERS IN EXISTING PANEL AS SHOWN.

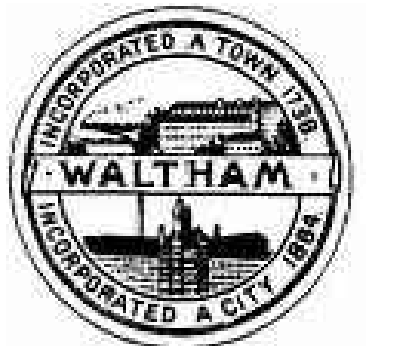
METERBANK "MB" SCHEDULE						
AIC: 42,000 A RMS SERVICE: 120/208V, 3Ø, 4W, 600A MLO						
OVER CURRENT DEVICES			CIRCUIT	FEEDER SIZE	COND. SIZE	REMARKS
No.	TRIP	FRAME				
① 1	100/2	100	PANEL "LC1"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 2	100/2	100	PANEL "LC2"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 3	100/2	100	PANEL "LC3"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 4	100/2	100	PANEL "LC4"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 5	100/2	100	PANEL "LC5"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 6	100/2	100	PANEL "LC6"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
① 7	100/2	100	PANEL "LC7"	3#1 & 1#6G-AL	MC CABLE	TWO POLE CIRCUIT BREAKER
8	100/2	100	PANEL "LC8"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
9	100/2	100	PANEL "LC9"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
10	100/2	100	PANEL "LC10"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
11	100/2	100	PANEL "LC11"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
12	100/2	100	PANEL "LC12"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
13	100/2	100	PANEL "LC13"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
14	100/2	100	PANEL "LC14"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
15	100/2	100	PANEL "LC15"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
16	100/2	100	PANEL "LC16"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
17	100/2	100	PANEL "LC17"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
18	100/2	100	PANEL "LC18"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
19	100/2	100	PANEL "LC19"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
20	100/2	100	PANEL "LC20"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
21	100/2	100	PANEL "LC21"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
22	100/2	100	PANEL "LC22"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
23	100/2	100	PANEL "LC23"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER
24	100/2	100	PANEL "LC24"	EXISTING	MC CABLE	TWO POLE CIRCUIT BREAKER

- ① PROVIDE UL LISTED SERIES RATED FOR 42,000 A RMS @ RATED VOLTAGE WITH DOWNSTREAM BREAKERS.



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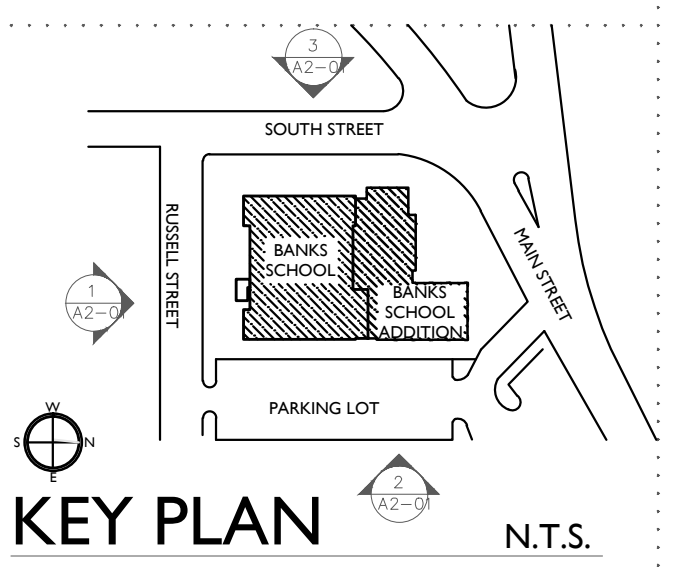
PHASE III
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CITY OF
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Drawing Title:

SCHEDULES &
 DETAILS



Revisions:

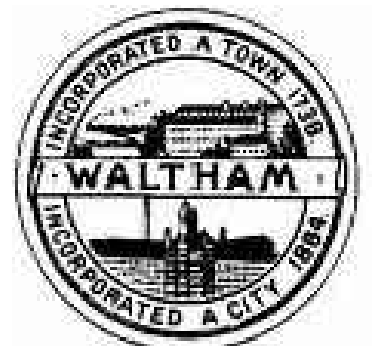
Date: 03-2-2012
 Project Number: 10025-A
 Project Manager:
 Drawn By: DMP
 Scale: AS NOTED

E3.1

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**PHASE III
 RENOVATIONS TO
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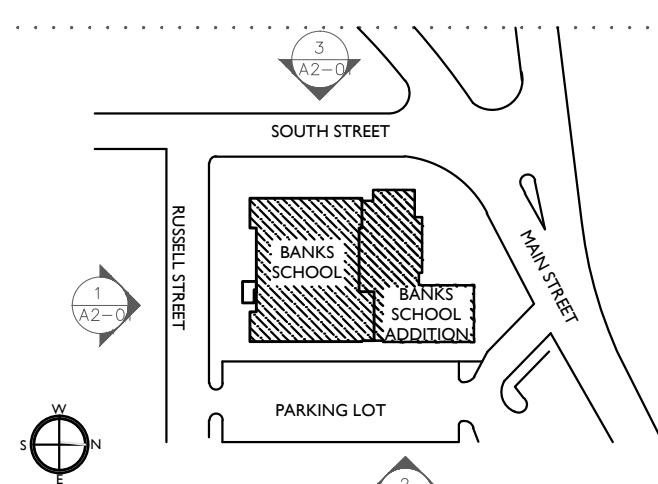
948 MAIN STREET
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**CITY OF
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 610 MAIN STREET
 WALTHAM, MA

Drawing Title:

**FIRE ALARM
 RISER &
 DETAILS**

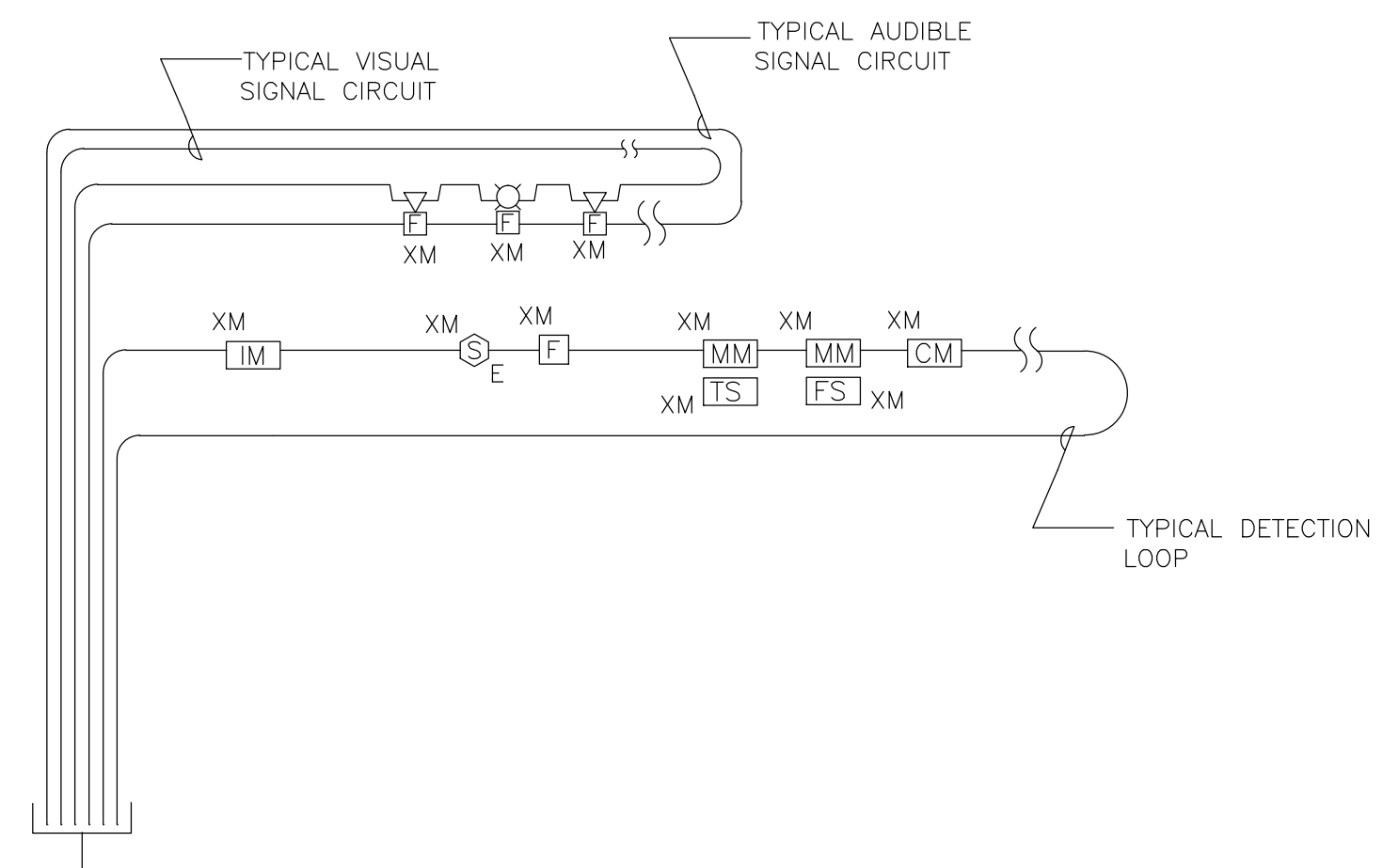


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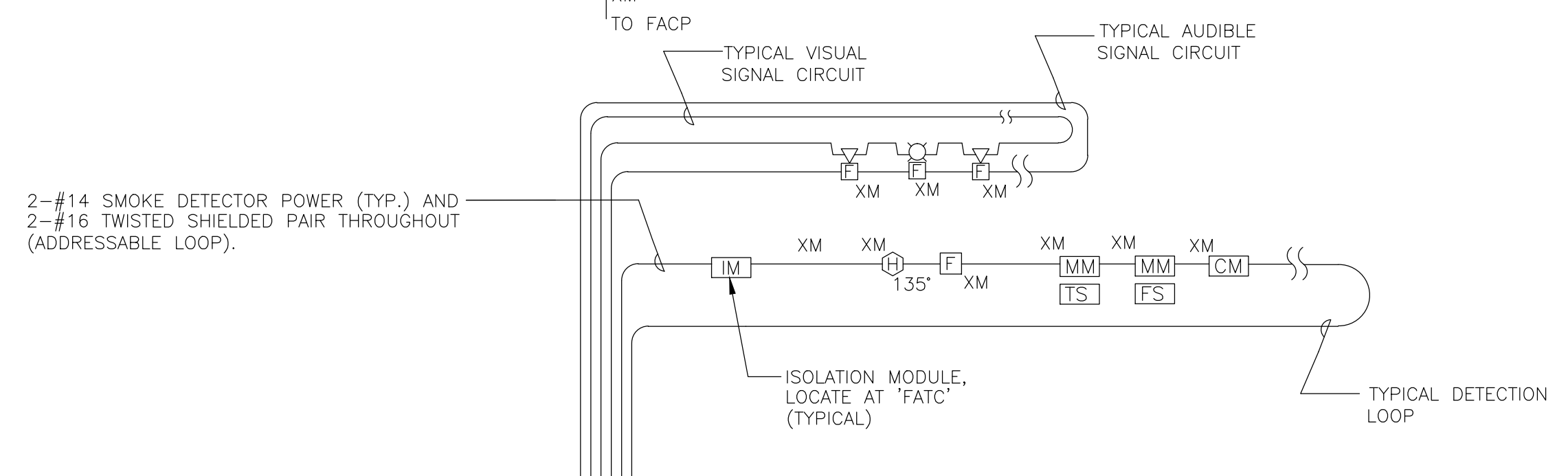
Date: 03-2-2012
 Project Number: 10025-A
 Project Manager:
 Drawn By: DMP
 Scale: AS NOTED

E3.2

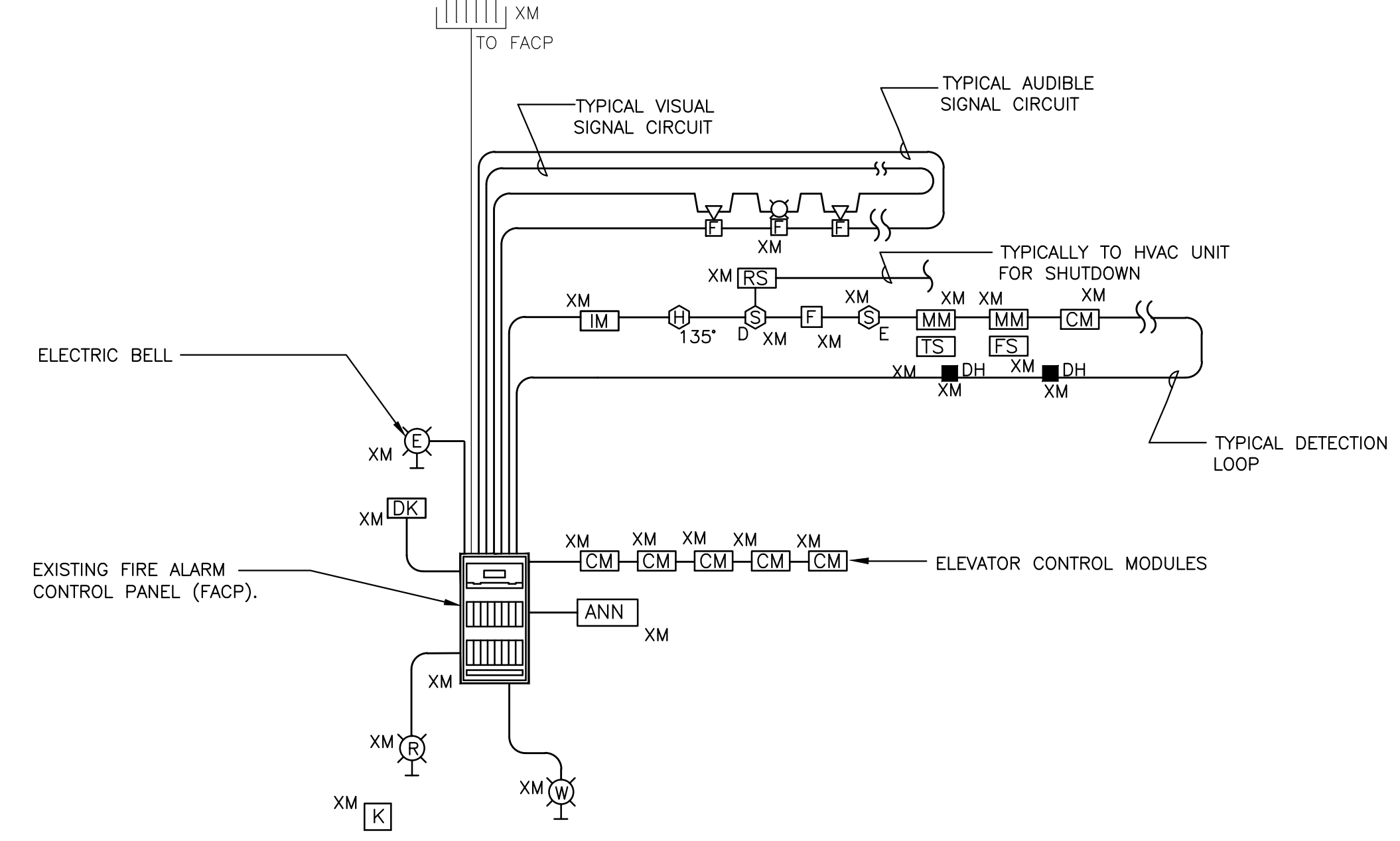
ROOF



THIRD FLOOR



SECOND FLOOR



FIRST FLOOR

1 FIRE ALARM RISER DIAGRAM
 E3.2 SCALE: NONE

SPACING ALLOCATION FOR WALL-MOUNTED VISUAL ALARMS

MAXIMUM AREA OF COVERAGE	MINIMUM REQUIRED LIGHT OUTPUT, CANDELA () (EFFECTIVE INTENSITY)		
	ONE LIGHT PER AREA	TWO LIGHTS PER AREA	FOUR LIGHTS PER AREA
20' x 20'	15	NOT PERMITTED	NOT PERMITTED
28' x 28'	30	15	NOT PERMITTED
40' x 40'	60	30	NOT PERMITTED
50' x 50'	95	60	NOT PERMITTED
60' x 60'	135	95	NOT PERMITTED
70' x 70'	185	95	NOT PERMITTED
80' x 80'	240	135	60
90' x 90'	305	185	95
100' x 100'	375	240	95
110' x 110'	455	240	135
120' x 120'	540	305	135
130' x 130'	635	375	185

ROOM SPACING ALLOCATION FOR WALL-MOUNTED VISIBLE SIGNALING APPLIANCES

MAXIMUM ROOM SIZE (FT)	ONE LIGHT (CD)	TWO LIGHTS OPPOSITE WALLS (CD)	ONE LIGHT PER WALL (CD)
20' x 20'	15	-	-
28' x 28'	30	15	-
40' x 40'	60	30	-
50' x 50'	95	60	-
60' x 60'	135	95	-
70' x 70'	185	95	-
80' x 80'	240	135	60
90' x 90'	305	185	95
100' x 100'	375	240	95
110' x 110'	455	240	135
120' x 120'	540	305	135
130' x 130'	635	375	185

LOOP NUMBER	ADDRESSABLE LOOP SCHEDULE
1	LOWER LEVEL/ENTRY LEVEL
2	SECOND FLOOR & THIRD FLOOR

NOTES

- ELECTRICAL CONTRACTOR SHALL REFER TO SPECIFICATIONS AND DRAWINGS FOR QUANTITY OF DEVICES, SPARE CAPACITY, PARTS, ETC.
- ELECTRICAL CONTRACTOR SHALL REFER TO HVAC DRAWINGS FOR EXACT LOCATION OF UNITS AND FOR LOCATIONS OF DUCT MOUNTED SMOKE DETECTORS. DUCT DETECTORS FURNISHED AND WIRED BY ELECTRICAL CONTRACTOR; INSTALLED BY HVAC.
- TYPICALLY FIRE ALARM SYSTEM SIGNAL CONDUCTORS SHALL BE #14 AWG MINIMUM, TYPE THHN SOLID. ALL WIRING SHALL RUN CONCEALED. PROVIDE A SYSTEM OF RACEWAYS EQUAL TO WIREMOLD WHERE EXPOSED TO PUBLIC SPACES.
- TYPICALLY ALL HORN/STROBE UNITS SHALL BE WIRED SO THAT THE SPEAKERS CAN BE SILENCED AND THE STROBES WILL REMAIN FLASHING UNTIL RESET.
- ALL HORN/STROBES WITHIN ALL AREAS SHALL BE MULTI-TAPPED TYPE. ELECTRICAL CONTRACTOR SHALL OWN dB ADJUSTING DURING FIRE DEPARTMENT TESTING.
- ALL HORN/STROBES SHALL BE MOUNTED IN ACCORDANCE WITH ADA ROOM SPACING ALLOCATION TABLES FOR VISUAL SIGNALING DEVICES.
- PROVIDE CONTROL MODULES TO OVERRIDE MAGLOCKS FOR CARD ACCESS. REFER TO FLOOR PLAN FOR EXACT LOCATION AND QUANTITIES.
- ALL DEVICES SHALL BE LABELED WITH CLEAR TAPE WITH BLACK INK. LABEL SHALL IDENTIFY LOOP# AND DEVICE NUMBER.
- ALL REMOTE TEST STATIONS SHALL BE KEYED AND MOUNTED ADJACENT TO FACP OR AS DIRECTED BY LOCAL FIRE DEPT. LABEL EACH UNIT.
- PULL STATIONS SHALL BE DOUBLE ACTION TYPE. PROVIDE TAMPER RESISTANT PLASTIC STOPPER II COVERS ON ALL PULL STATIONS.
- A/V DEVICES SHALL NOT BE INSTALLED WITHIN MARKER BOARDS. COORDINATE EXACT LOCATION OF ALL A/V DEVICES W/ARCH. PRIOR TO INSTALLING.
- ALL TAMPER AND SUPERVISORY SWITCHES SHALL BE WIRED AS LOCAL TROUBLE ALARM CONDITION UPON ACTIVATION. TROUBLE OR SUPERVISORY SHALL BE SELF RESTORING. TRANSMIT SIGNAL TO FIRE DEPT. BUT DO NOT ALARM BUILDING.
- PRIOR TO SUBMITTING SHOP DRAWINGS, COORDINATE WITH LOCAL FIRE DEPT. FOR EXACT REQUIREMENTS. OBTAIN FIRE PREVENTION RULES AND REGULATIONS WHEN AVAILABLE AND COMPLY IN FULL.
- COORDINATE WITH SELECTED SYSTEM MANUFACTURER FOR WIRING REQUIREMENTS.
- ALL DETECTION & SIGNAL WIRING SHALL BE CLASS "A".
- SUBMIT AS PART OF SHOP DRAWINGS COMPLETE FLOOR PLANS & RISERS WITH ALL DEVICES SHOWN AND WITH DEVICE ADDRESSES.
- PROVIDE ISOLATION MODULE FOR EVERY 25 DEVICES. (TYPICAL.)

