CAMBRIDGE HISTORICAL COMMISSION

831 Massachusetts Avenue, 2nd Fl., Cambridge, Massachusetts 02139
Telephone: 617 349 4683 TTY: 617 349 6112
E-mail: histcomm@cambridgema.gov URL: www.cambridgema.gov/Historic

APPLICATION FOR CERTIFICATE

1. **The undersigned hereby applies to the Cambridge Historical Commission for a Certificate of (check one box): [X] Appropriateness, [ ] Nonapplicability, or [ ] Hardship, in accordance with Chapter 40C of the Massachusetts General Laws and/or Chapter 2.78 of the Municipal Code.**

2. **Address of property:** 86 Otis Street (sometimes referred to 69 Sciarappa Street or Fourth and Otis Streets), **Cambridge, Massachusetts**

3. **Describe the proposed alteration(s), construction or demolition in the space provided below: (An additional page can be attached, if necessary).**

Please see attached letter for Putnam School Apartments.

I certify that the information contained herein is true and accurate to the best of my knowledge and belief.
The undersigned also attests that he/she has read the statements printed on the reverse.

Name of Property Owner of Record: Cambridge Housing Authority
Mailing Address: 362 Green Street, 3rd Floor, Cambridge MA 02139
Telephone/Fax: (617) 520-6228 **E-mail:** mjjohnston@cambridge-housing.org
⇨ **Signature of Property Owner of Record:** _____
(Required field; the application will not be considered complete without the property owner's signature)

Name of proponent, if not record owner: _____
Mailing Address: _____
Telephone/Fax: _____ **E-mail:** _____

(for office use only):
Date Application Received: _____ **Case Number:** _____ **Hearing Date:** _____
Type of Certificate Issued: _____ **Date Issued:** _____

Instructions for Completing this Application:
An application must be filed with the Cambridge Historical Commission (CHC) before work begins. Twelve (12) copies of the application should be attached to twelve (12) copies of supplementary material such as sketches, scale drawings, site plans, specifications, or photographs sufficient to enable the CHC to understand the details of the work proposed and to make a determination on the application. Plans no larger than 11" x 17" are preferred. Please submit reduced copies of plans if the originals are of a larger dimension. Do not use spiral bindings, plastic covers, or heavy stock (these will be removed prior to mailing). Double sided copies are encouraged to save paper and postage. See our website or call for a list of meeting dates and deadlines.

The CHC staff welcomes advance inquiries for interpretations or advice. Call 617/349-4683 for appointment. An application is considered incomplete without accompanying plans and drawings. The CHC reserves the right to determine an application incomplete at the time of hearing the application if it determines that the plans, drawings and other information submitted are not sufficient to enable it to determine whether to grant or deny a certificate.

Owners are urged to appear before the CHC in person or to designate an agent to act for them. The CHC will deem the agent to be authorized by the owner to make decisions regarding the extension or waiver of the period within which the CHC is otherwise required to make a determination on the application. All meetings are open to the public.

Administration of Historic Districts, Landmarks, and Protected Properties:
The administration of historic districts and landmarks is guided by the provisions of Ch. 40C of the Mass. General Laws and by Ch. 2.78 of the Code of the City Of Cambridge. Other properties may also be subject to CHC jurisdiction including properties with conditional variances and properties governed by individual preservation restrictions.

Any new construction, alteration of exterior architectural features, or demolition within an historic district or on the premises of a protected property or a designated landmark must be reviewed by the CHC. No building permit for such work on a protected property, designated landmark, or property within a historic district may be issued by the Inspectional Services Department until a certificate has been issued. The CHC must approve the alteration or construction of all structures, including signs, fences, walls, terraces, walks, driveways, light fixtures and the like, which are "open to view from a public street, public way, public park or public body of water," whether or not a building permit is required, and must approve changes in exterior color for properties within a historic district or as otherwise agreed.

Prior to each hearing, the CHC staff will take slides or digital photographs of the subject property in daylight with ordinary camera equipment for the purpose of documenting the publicly visible conditions of buildings and exterior architectural features for the CHC and the public to view at the hearing. More information can be provided on request.

The CHC issues three types of certificates. A Certificate of Appropriateness will be issued when the CHC has determined that the construction or alteration will be appropriate for or compatible with the preservation or protection of the historic district, designated landmark, or other protected property. A Certificate of Nonapplicability may be issued when an application does not involve an exterior feature, or when the exterior feature is not then subject to CHC review. A Certificate of Hardship may be issued when failure to approve an otherwise inappropriate project would involve substantial hardship to the applicant and the CHC determines that the project can be accomplished without substantial detriment to the purposes of the district, preservation restriction, or landmark designation.

The CHC considers each application on its own merits, and does not apply specific architectural guidelines. Landscaping with plant materials is not subject to CHC review unless it is planned in conjunction with alterations or new construction. The CHC must approve projects that are not incongruous with the historic aspects or the architectural characteristics of the protected property, landmark, or historic district.

Cambridge Housing Authority

April 13, 2021

Cambridge Historic Commission
831 Massachusetts Avenue, 2nd Fl.
Cambridge, Massachusetts 02139

Re: Putnam School Apartments (86 Otis Street) Application For Certificate

Dear Board Members, Putnam School Apartments (86 Otis Street) is a 33-unit Cambridge Housing Authority (CHA)property that provides subsidized housing for seniors and disabled residents in East Cambridge. The property has only been selectively repaired since it was converted to housing in 1985 and it is therefore scheduled to undergo a comprehensive modernization starting in October 2021. The construction work will focus on the interior of the building and will include replacing the elevator, installing a new heating and cooling system, providing ventilation in units and common areas, upgrading the electrical distribution system, extending the sprinkler system and replacing the fire alarm system, and providing new kitchens and baths. In addition, the property's fourth floor congregate units, which have been difficult to lease and maintain occupied, will be converted into one-bedroom and two-bedroom units and a much-needed new affordable unit will be created, increasing the total unit count to 34.

Below is a list of exterior work that is part of the planned rehabilitation at Putnam School Apartments. The numbering of these exterior changes corresponds to the marking on the plans that are being submitted as part of this application.

1. **Masonry Repointing:** Isolated masonry restoration of the brick and brownstone facades to restore the integrity of the historic character and weather tightness of the envelope.
    a. Repointing at deteriorated areas of wall
    b. Repointing at open masonry joints
    c. Crack repair at step cracks and vertical cracks with epoxy repair
2. **Repair Brown Stone:** Isolated repairs to spalled and cracked brownstone sills, banding, and water table to restore and protect envelope.
    a. Repoint and seal head joints at banding and water table.
    b. Epoxy repairs at cracked stones.
    c. Face repairs at spalled stone
    d. Replace brownstone units that are deteriorated beyond repairable condition.
3. **Repair Copper Flashing:** Isolated repairs of copper flashing related to slate roofing, roof transitions and gutters.
4. **Repair Slate Roofing:** Isolated repairs of slate shingle roofing where damage has occurred as well as larger areas of repair and replacement to accommodate dormer modifications (item 5 below).
5. **Dormer Enlargements and Addition:** As part of the construction, the CHA is proposing to enlarge two dormers (one facing south and the other facing east) and add a new dormer on the south façade. The addition of a dormer and enlargement of two existing dormers on the 4th floor

are necessary in order to convert the property's congregate units into two- and one-bedroom units while still meeting natural daylight requirements.

5.a. Enlarge Existing Dormer (Dormer #1): Change required to accommodate two separate one-bedroom units at fourth floor (units 404 and 405).

5.b. New Dormer - Single Bay (Dormer #2): Addition of dormer required to bring daylight and ventilation into bedroom of new one-bedroom unit.

5.c. Enlarge Existing Dormer (Dormer #3): Change required to accommodate two separate one-bedroom units at fourth floor (units 406 and 407).

6. **Replace Existing Window with Door:** This change is proposed at three locations;
   a. **Trash Access Door:** At the basement level Mechanical Room we are proposing a number of changes to allow removal of trash from the building through the Mechanical Room to the rear driveway instead of the current removal directly onto the pedestrian sidewalk. This includes one basement window being changed to a double access door.
   b. **Accessible Door to Resident Lounge:** Change on the first floor will provide a direct access from Resident Lounge / Social Room to the proposed accessible ramp leading to rear yard. The window opening width and lintel will be maintained with new door fitting to existing masonry.
   c. **Required for HVAC Access:** Change on the third floor is required to provide access to the proposed mechanical roof from the third-floor mechanical closet. The window opening width and lintel will be maintained with new door fitting to existing masonry.
7. **Replace Existing Window with Louver:** At one location at the basement level Mechanical Room, a side yard basement window is required to be changed to a louver for the ventilation system upgrade.
8. **Replace Existing Door with Louver:** At one location in the basement level Mechanical Room, a side yard basement access door is required to be changed to a louver for ventilation system upgrade.
9. **Replace Brick Infill with Window:** At one basement location on the side yard, brick infill of an historic window will be replaced with a new window. This is proposed for adding daylight to new resident community space in basement.
10. **Replace Brick Infill with Louver:** At two basement locations facing the side and rear yard (West), brick infill of historic windows will be replaced with new louvers. This change is required for the ventilation system upgrade.
11. **Remove all Window AC Units:** Presently, the building has no cooling equipment and cooling in residential units is accomplished through window fans or individual air conditioners. The renovations include the installation of VRF Air Source Heat Pump to provide cooling and the removal of all window AC units.
12. **Mechanical Roof Screen:** The mechanical system for the VRF Air Source Heat Pump system will be located on the roof of the two-story wing in the back of the building and surrounded by a metal screen to provide sound dampening for the neighbors. The mechanical equipment and screen will be minimally visible from adjacent streets. We have included photographs with the application package depicting sight lines from adjacent streets.
13. **Replace Exterior Lighting In-kind:** Existing lighting is marginally functional, high pressure sodium lamping that cause glare when on. Proposed fixtures are traditional carriage type lanterns that match existing, with LED lamping and appropriate reflectors to reduce glare.

14. **New Accessible Ramp:** Presently, the building has only one handicap accessible entrance and residents with mobility problems can only access the outdoor sitting area via steps at the building's west elevation entrance as the sitting area is separated from the driveway by fencing. The existing west elevation entrance will be modified with a handicap ramp to allow residents with mobility issues to access the outdoor sitting area. The ramp at this location at the rear of the property will be minimally visible from Otis Street.
15. **Outdoor Common Area Improvements:** Exterior outdoor common space will be improved for resident use.

The construction project at Putnam School Apartments is being funded through federal and state historic tax credits. The exterior changes noted above have been reviewed and approved by the Massachusetts Historical Commission and the National Park Service as part of the historic tax credit review. In addition, only masonry and roofing contractors who have been certified as being able to meet historic requirements by the Massachusetts Division of Capital Asset Management and Maintenance will be used for the rehabilitation.

We thank you for your consideration and if you need any additional information, please contact Nathalie Janson, Senior Project Manager, at njanson@cambridge-housing.org or by phone at (617) 405-5516.

Sincerely,

Michael J. Johnston
Executive Director, Cambridge Housing Authority

Modernization of Putnam School Apartments

86 OTIS STREET, CAMBRIDGE MA 02141

CHA Project # 1381

DRAWING LIST

APRIL 13, 2021

CAMBRIDGE HISTORICAL COMMISSION SUBMISSION

LOCUS MAP
NTS

ARCHITECT

bh+a

Bargmann Hendrie + Archetype, Inc.
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(617) 350 0450

PROJECT NAME

Modernization of Putnam School Apartments
86 Otis Street, Cambridge, MA 02141

CLIENT

Cambridge Housing Authority
362 Green Street, Cambridge, MA 02139

PROJECT TEAM

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Landscape Architect
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508.757.7993

Elevator Consultant
B Squared Engineering
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Stamford, CT 06902
203.989.9029

REVISIONS

1
2
3
4
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7
8
DATE

DRAWING TITLE

Cover Sheet

DRAWING INFORMATION

April 13, 2021
DATE OF ISSUE

Cambridge Historical Commission Submission
DESCRIPTION

1" = 1'-0" | RY, MT
SCALE | DRAWN BY

3431 |
PROJECT # | FILE NAME

DRAWING NUMBER

A000

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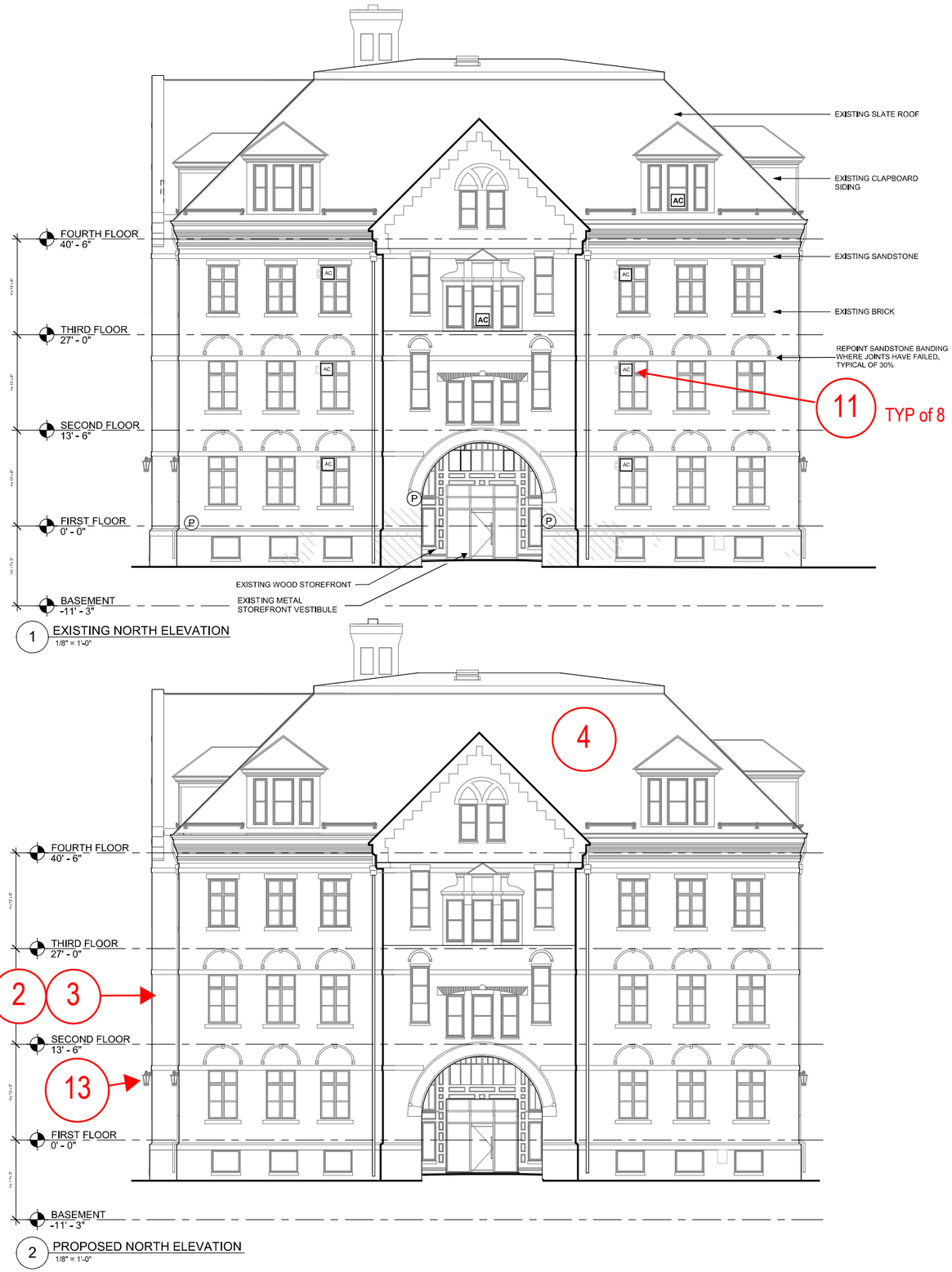
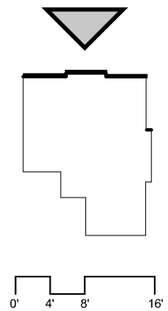
4/13/2021 11:36:07 AM RY, MT



1 EXISTING NORTH ELEVATION
1/8" = 1'-0"

2 PROPOSED NORTH ELEVATION
1/8" = 1'-0"



EXTERIOR ALTERATION SCOPE

1. Masonry Repointing - Isolated repairs
2. Repair Brown Stone - Isolated repairs
3. Repair Copper Flashing - Isolated repairs
4. Repair Slate Roofing
5. Dormer Modifications
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9. Replace Brick Infill with Window
10. Replace Brick Infill with Louver
11. Remove all Window AC Units
12. Mechanical Roof Screen and Equipment
13. Replace Exterior Lighting In-kind
14. New Accessible Ramp

GENERAL NOTES: EXTERIOR ELEVATION

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF SANDSTONE

MASONRY RESTORATION LEGEND

- (P) **FAILING MASONRY PATCHING IN SANDSTONE** — REMOVE EXISTING PATCHING AND REPLACE
- (CS) **DAMAGED CONCRETE SILL** — CRACK AT CONCRETE SILL, REPAIR IN FULL DEPTH
- **VERTICAL CRACK IN SANDSTONE** — CLEAN OUT CRACK AND PROVIDE EPOXY REPAIR
- **STEP CRACK IN BRICK** — CLEAN OUT CRACK, PROVIDE NEW MORTER TO FILL IN THE CRACK TO MATCH EXISTING
- **ERODED GROUT** — REMOVE ERODED MORTAR JOINT IN BRICK AND REPOINT
- (AC) **AIR CONDITIONER** — THROUGH WINDOW AC UNIT MOUNTED TO WINDOW JAMB OR EXTERIOR WALL. REMOVE BRACKETS AND AIR CONDITIONER PLATFORM. INFILL FASTENER HOLES IN BRICK
- **MASONRY INFILL** — INFILL EXISTING OPENINGS AS REQUIRED FOR THE INSTALLATION OF NEW DOORS, WINDOWS, AND LOUVES. USE SALVAGED BRICK.

GENERAL NOTES:

1. NEW MECHANICAL LOUVERS AT GRADE LEVEL MATCH EXISTING IN PROFILE AND FINISHED TO MATCH EXISTING METAL WINDOWS
2. EXISTING MECHANICAL LOUVERS TO BE REFINISHED "PATINA GREEN" TO MATCH NEW LOUVERS.

ARCHITECT

bh+a

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617 350-0450 Tel
www.bhplus.com

PROJECT NAME

Putnam School Apartments

86 Otis Street
Cambridge, MA 02141

CLIENT

Cambridge Housing Authority

362 Green Street
Cambridge, MA 02139

PROJECT TEAM

Civil Engineer
Design Consultants, Inc.
120 Middlesex Avenue
Somerville, MA 02145
617.776.3350

Landscape Architect
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Revisions

#	Description	Date

DRAWING TITLE

North Elevations

DRAWING INFORMATION

04/30/2020
DATE OF ISSUE

Historic Tax Credit Submission
DESCRIPTION

As indicated
SCALE

Author
DRAWN BY
CHA Putnam

3431
PROJECT #

School_Central_R20.rvt
FILE NAME

DRAWING NUMBER

AH001

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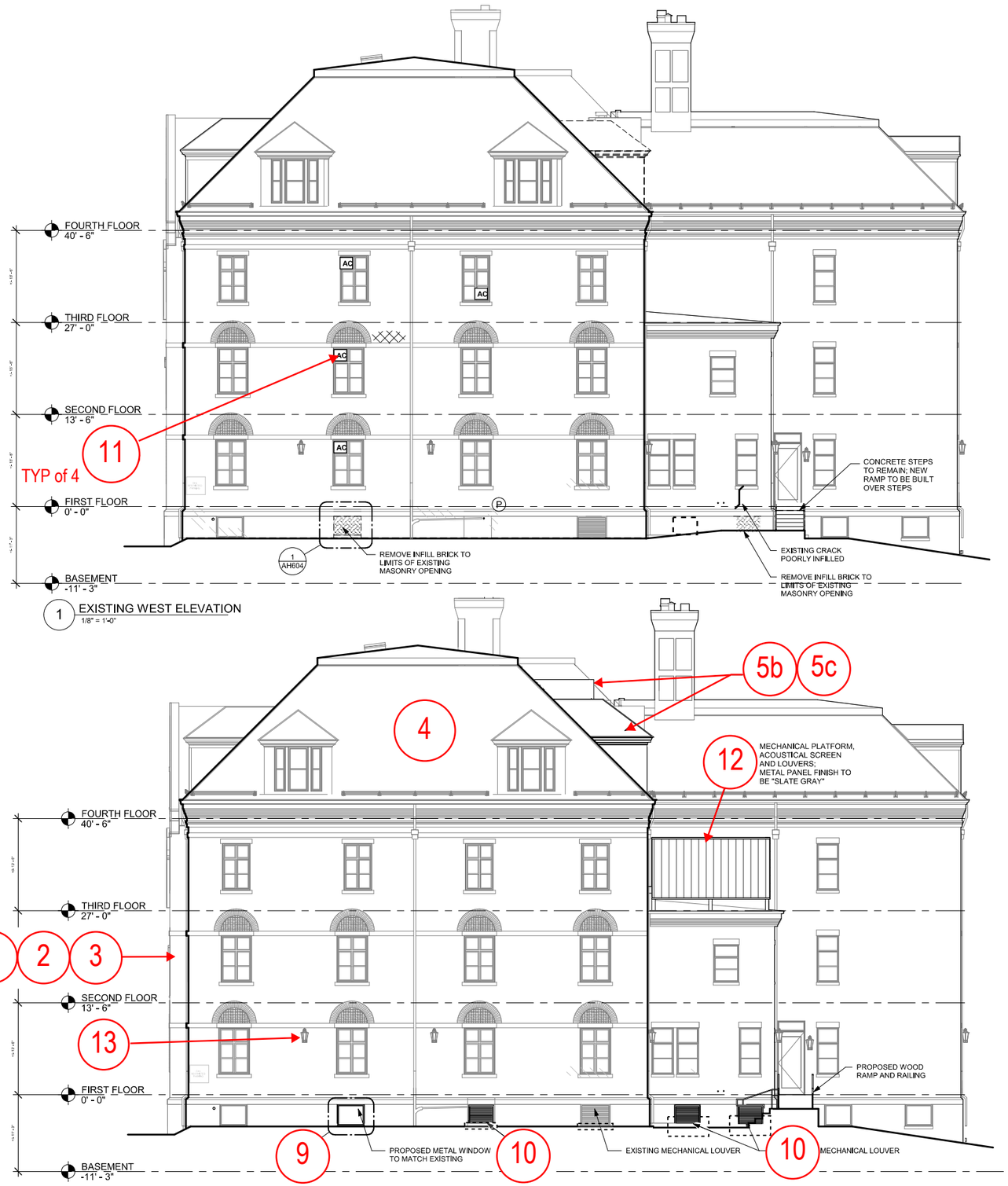
4/16/2020 7:56:35 AM Author



1 EXISTING WEST ELEVATION
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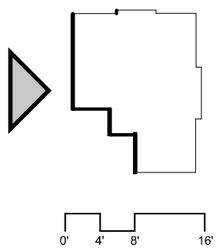
2 PROPOSED WEST ELEVATION
1/8" = 1'-0"



EXTERIOR ALTERATION SCOPE

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13. Replace Exterior Lighting In-kind
14. New Accessible Ramp

ARCHITECT

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617 350-0450 Tel

PROJECT NAME

CHA Putnam School Apartments

86 Otis Street, Cambridge, MA 02141
86 Otis Street
Cambridge, MA 02141

CLIENT

Cambridge Housing Authority

362 Green Street
Cambridge, MA 02139

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REVISIONS

1
2
3
4
5
DATE

DRAWING TITLE

West Elevations

DRAWING INFORMATION

04/30/2020
DATE OF ISSUE

Historic Tax Credit Submission
DESCRIPTION

As indicated — SCALE
Author — DRAWN BY

3431 — PROJECT #
CHA-Putnam School — FILE NAME

DRAWING NUMBER

AH002

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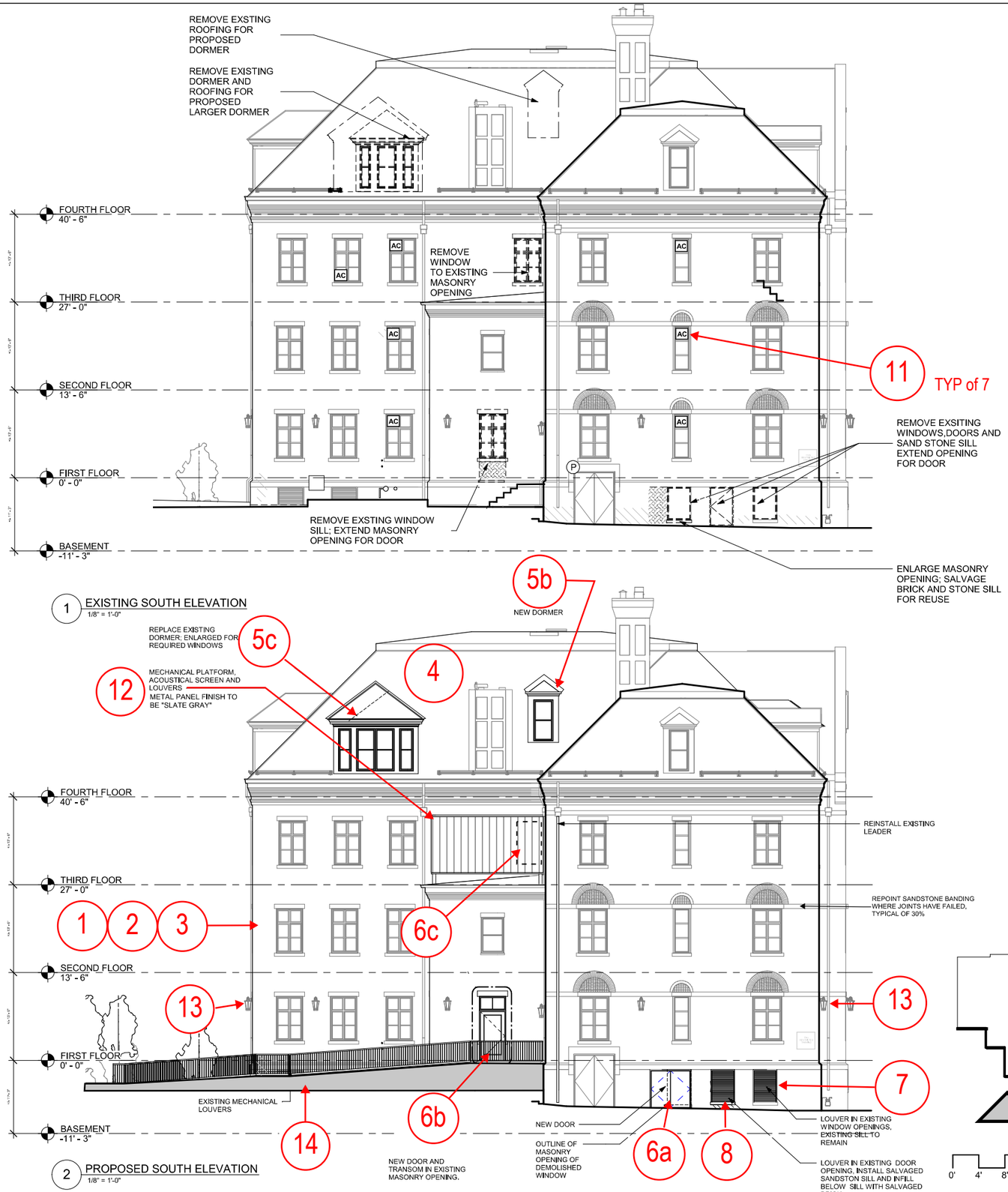
4/16/2020 7:56:49 AM Author



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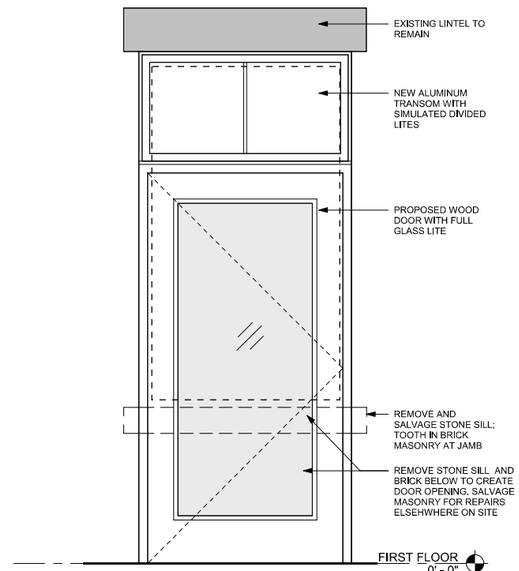

6b PROPOSED EXTERIOR DOOR ELEVATION
3/4" = 1'-0"

ARCHITECT
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PROJECT NAME
Putnam School Apartments

86 Otis Street
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CLIENT
Cambridge Housing Authority

362 Green Street
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Revisions

#	Description	Date

DRAWING TITLE
South Elevations

DRAWING INFORMATION

04/30/2020
DATE OF ISSUE

Historic Tax Credit Submission
DESCRIPTION

As indicated
SCALE

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CHA Putnam

3431
PROJECT #

School_Central_R20.rvt
FILE NAME

DRAWING NUMBER
AH003

C:\Users\cyoung\Documents\CHA Putnam School_Central_R20_cyoung.rvt
4/16/2020 7:56:39 AM Author

1 EXISTING EAST ELEVATION
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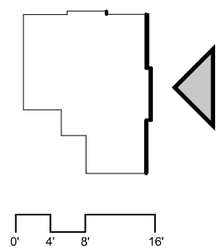
2 PROPOSED EAST ELEVATION
1/8" = 1'-0"



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PROJECT NAME
Putnam School Apartments

86 Otis Street
Cambridge, MA 02141

CLIENT
Cambridge Housing Authority

362 Green Street
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Revisions

#	Description	Date

DRAWING TITLE
East Elevations

DRAWING INFORMATION

04/30/2020
DATE OF ISSUE

Historic Tax Credit Submission
DESCRIPTION

As indicated
SCALE

Author
DRAWN BY

3431
PROJECT #

CHA Putnam School Central_R20.rvt
FILE NAME

DRAWING NUMBER
AH004

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4/16/2020 7:56:44 AM Author

1A VIEW FROM OTIS STREET
12" = 1'-0"

1B VIEW FROM OTIS STREET, PROPOSED
12" = 1'-0"

2A VIEW FROM SCIARAPPA AND THORNDIKE STREETS
12" = 1'-0"

2B VIEW FROM SCIARAPPA AND THORNDIKE STREETS, PROPOSED
12" = 1'-0"

3A VIEW FROM THORNDIKE STREET
12" = 1'-0"

3B VIEW FROM THORNDIKE STREET, PROPOSED
12" = 1'-0"

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4/13/2021 11:35:31 AM Author

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Boston, MA 02210
(617) 350 0450

PROJECT NAME
Modernization of Putnam School Apartments
86 Otis Street, Cambridge, MA 02141

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362 Green Street, Cambridge, MA 02139

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REVISIONS
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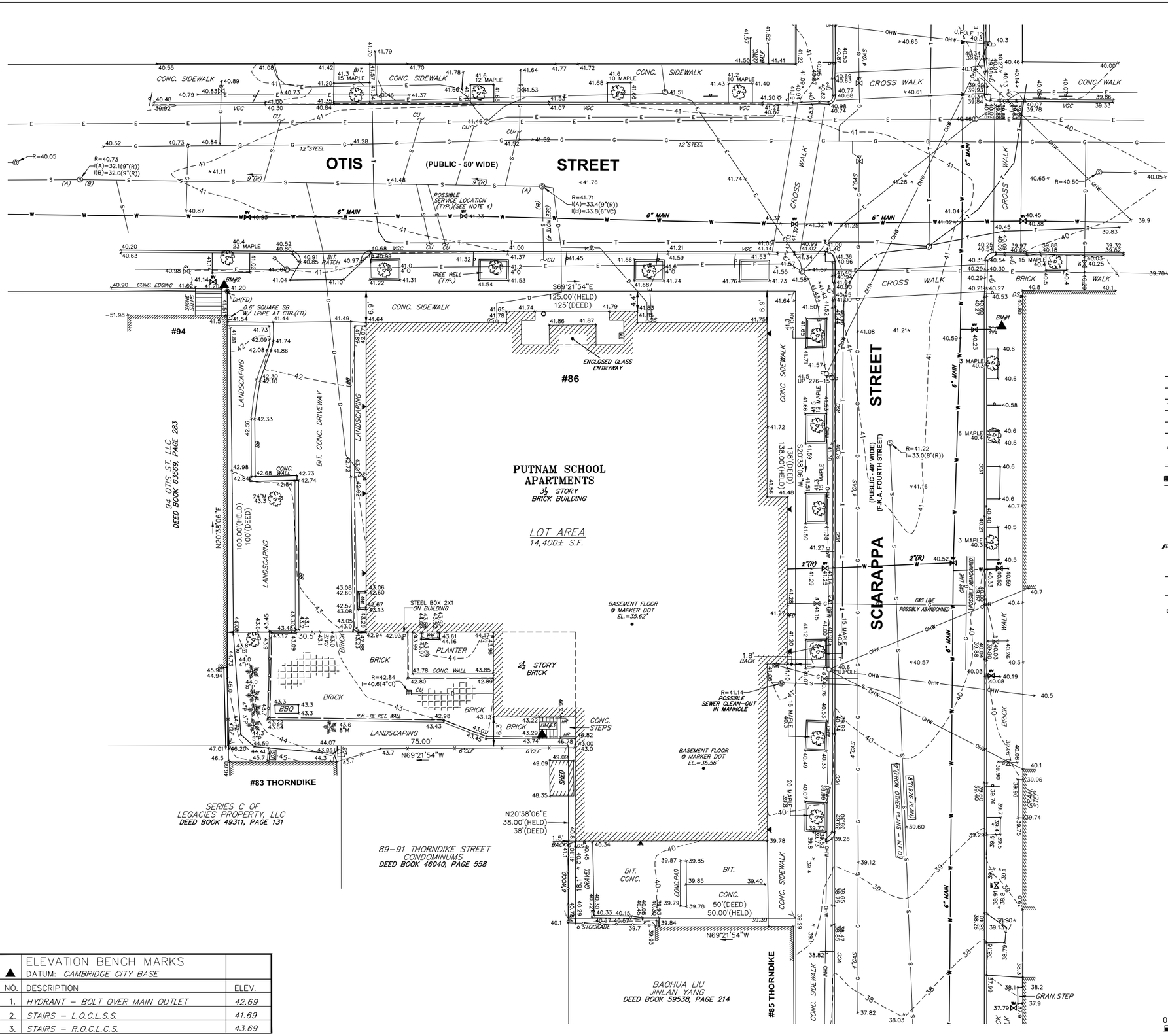
DATE

DRAWING TITLE
Exterior Views

DRAWING INFORMATION

April 13, 2021
DATE OF ISSUE
Cambridge Historical Commission Submission
DESCRIPTION
12" = 1'-0" — SCALE
Author — DRAWN BY
3431 — PROJECT #
FILE NAME

DRAWING NUMBER
AH005



▲	ELEVATION BENCH MARKS DATUM: *CAMBRIDGE CITY BASE*	
NO.	DESCRIPTION	ELEV.
1.	*HYDRANT – BOLT OVER MAIN OUTLET*	*42.69*
2.	*STAIRS – L.O.C.L.S.S.*	*41.69*
3.	*STAIRS – R.O.C.L.C.S.*	*43.69*

NOTES:

1. EXISTING CONDITIONS TAKEN FROM PLAN ENTITLED "EXISTING CONDITIONS PLAN OF LAND IN CAMBRIDGE, MA" PREPARED BY HANCOCK ASSOCIATES, DATED 3/9/20.
2. ELEVATIONS SHOWN HEREON REFER TO CITY OF CAMBRIDGE DATUM. PROJECT SOURCE BENCHMARK IS THE BONNET-BOLT ON THE FIRE HYDRANT TO THE NORTHWEST OF THE INTERSECTION OF THIRD STREET AND THORNDIKE STREET. ELEVATION=27.52.
3. UNDERGROUND UTILITIES SHOWN HEREON ARE COMPILED FROM FIELD LOCATIONS OF STRUCTURES AND FROM AVAILABLE RECORD INFORMATION ON FILE AT THE CITY ENGINEERING OFFICES, CITY D.P.W., AND UTILITY COMPANIES. OTHER UNDERGROUND UTILITIES MAY EXIST. IT SHALL BE THE RESPONSIBILITY OF HE CONTRACTOR TO VERIFY THE LOCATION, SIZE & ELEVATION OF ALL UTILITIES WITHIN THE AREA OF PROPOSED WORK AND TO CONTACT "DIG-SAFE" AT 811 AT LEAST 72 HOURS PRIOR TO ANY EXCAVATION, DEMOLITION OR CONSTRUCTION.
4. BUILDING OFFSETS SHOWN HEREON ARE TO CORNER BRICK.
5. LOCATION OF SEWER SERVICE TO BUILDING WAS DETERMINED VIA VIDEO INSPECTION ON 8/4/20 AND 12/29/20.

LEGEND

102	SURFACE CONTOUR
	EDGE OF PAVEMENT
6'CL	CHAIN LINK FENCE & HEIGHT
	METAL FENCE
	WOOD FENCE
HR	HANDRAIL
86.75 / 86.25	CURB WITH TOP AND BOTTOM CURB ELEVATION
S 8"CI S	SEWERLINE & MANHOLE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION
D 12"RCP D	DRAINLINE WITH PIPE SIZE, MATERIAL & FLOW DIRECTION, CATCHBASIN, MANHOLE & ROUND CATCHBASIN
W 6"CI	WATER MANHOLE, WATER MAIN WITH SIZE, TEE, GATE VALVE & FIRE HYDRANT
GV G 12"STEEL	GAS MAIN WITH SIZE & GATE VALVE
#181 OHW	UTILITY POLE WITH DESIGNATION OVERHEAD WIRES AND GUY POLE
E	ELECTRIC MANHOLE & UNDERGROUND ELECTRIC LINES
T	TELEPHONE LINES
98.8 / 93.2	RETAINING WALL WITH TOP AND BOTTOM ELEVATIONS
× 100.7	SPOT ELEVATION
43.8 8"BI	PROMINENT DECIDUOUS TREE WITH ELEVATION, SIZE AND SPECIES
44.0 8"P	PROMINENT CONIFEROUS TREE WITH ELEVATION, SIZE AND SPECIES
	LIGHT POLE
RCP	REINFORCED CONCRETE PIPE
CI	CAST IRON
CMP	CORRUGATED METAL PIPE
ASB.	ASBESTOS PIPE
VC	VITRIFIED CLAY
PVC	POLYVINYL CHLORIDE
CPP	CORRUGATED PLASTIC PIPE
DH	DRILL HOLE
SB	STONE BOUND
GM	GAS METER
EM	ELECTRIC METER
FD	FIRE DEPARTMENT CONNECTION
CU	CONNECTION UNKNOWN
	BOLLARD
DS	DOWN SPOUT
	SIGN
M	MANHOLE (UNKNOWN UTILITY)
	LIGHT ON BUILDING
2–L	TWO LIMBED
VGC	VERTICAL GRANITE CURB
BB	BITUMINOUS CONCRETE BERM
BIT. CONC.	BITUMINOUS CONCRETE
DS	ROOF DOWNSPOUT
(R)	RECORD
(C)	CALCULATED
(R/H)	RECORD AND HELD
(M)	FIELD MEASURED
N.F.O.	NOT FIELD OBSERVED

0 10 20 30 40

SCALE: 1" = 10'

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ARCHITECT
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PROJECT NAME
Modernization of Putnam School Apartments
86 Otis Street, Cambridge, MA 02141

CLIENT
Cambridge Housing Authority
362 Green Street, Cambridge, MA 02139

PROJECT TEAM

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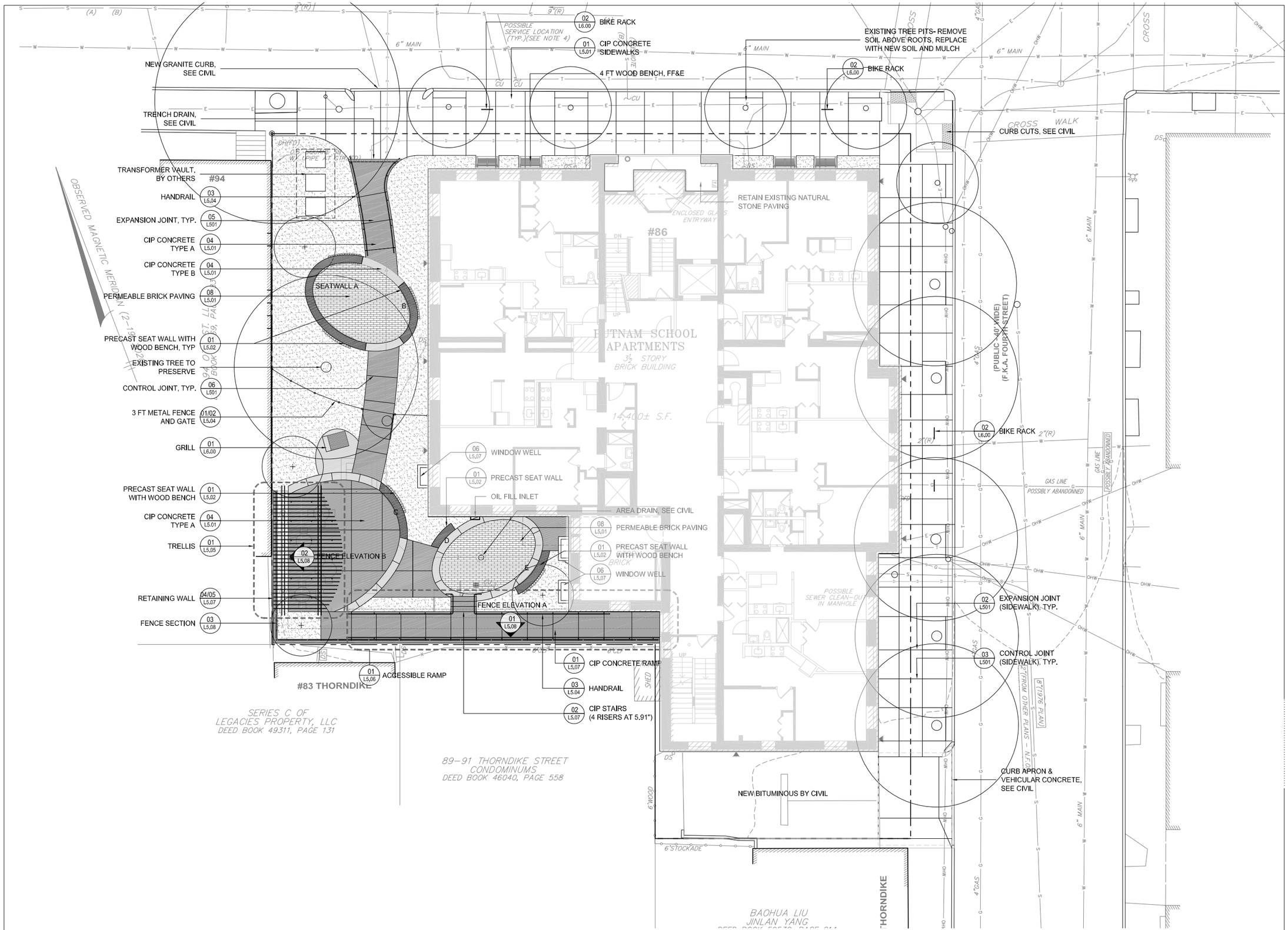
DRAWING TITLE
EXISTING CONDITIONS PLAN

DRAWING INFORMATION

3/24/21	
DATE OF ISSUE	
100% Construction Documents	
DESCRIPTION	
1"=10'	WK
SCALE	DRAWN BY
2020-008.00	2020-008_EXIT_CON2.dwg
PROJECT #	FILE NAME

DRAWING NUMBER
V101



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Revisions

#	Description	Date
1	75% CDs	09/08/2020
2	95% CDs	02/22/2021
3	100% CDs	03/24/2021

DRAWING TITLE

Material Plan

DRAWING INFORMATION

02/22/2021
DATE OF ISSUE

95% Construction Documents
DESCRIPTION

1/8" = 1'-0"
SCALE

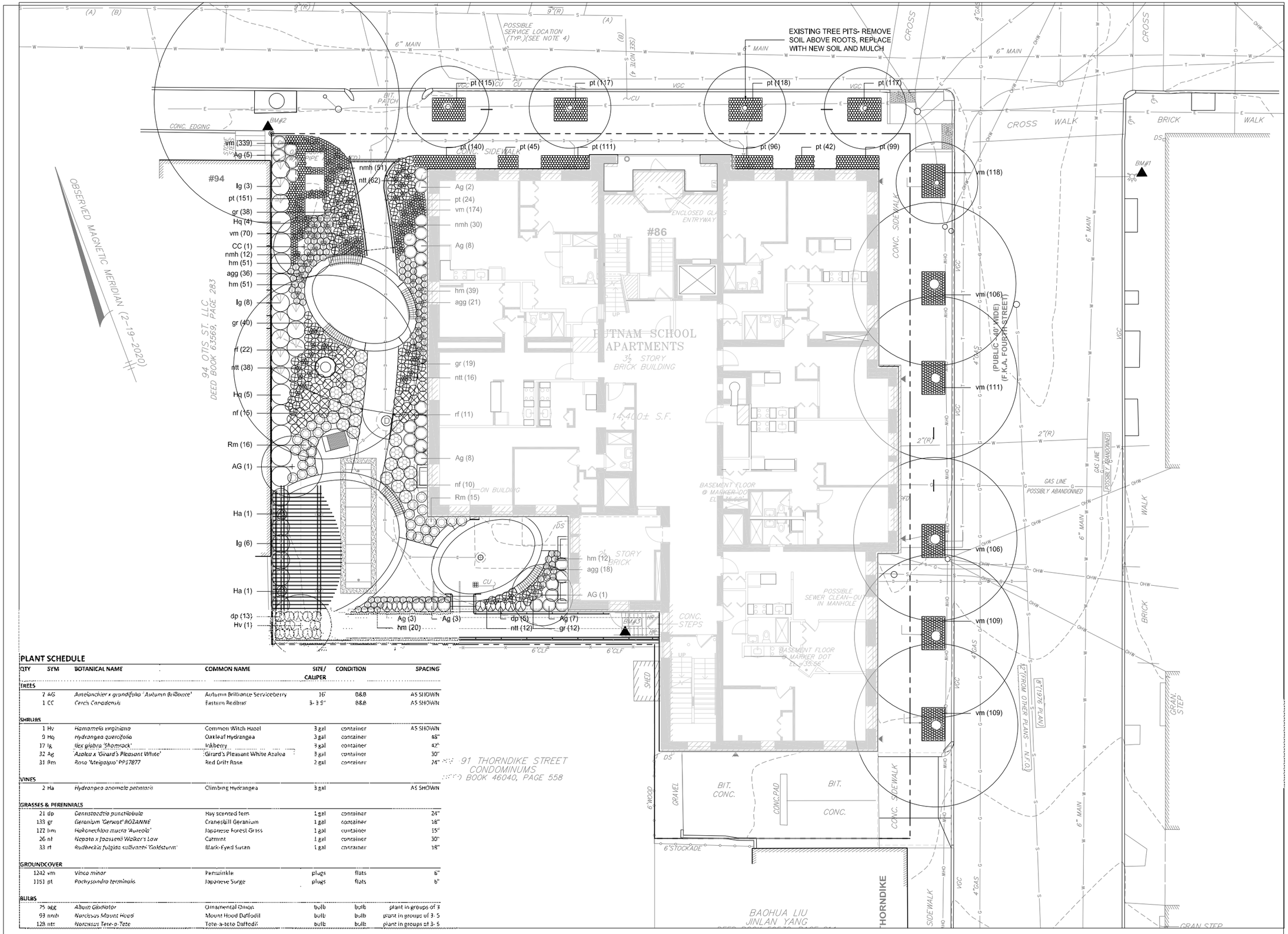
DRAWN BY
CHA Putnam

3431
PROJECT #

School Central R20.rvt
FILE NAME

DRAWING NUMBER

L102



PLANT SCHEDULE

QTY	SYM	BOTANICAL NAME	COMMON NAME	SIZE/ CALIPER	CONDITION	SPACING
TREES						
7	AG	*Amelanchier x grandiflora 'Autumn Brilliance'*	Autumn Brilliance Serviceberry	16'	B&B	AS SHOWN
1	CC	*Cercis Canadensis*	Eastern Redbud	3-3.5"	B&B	AS SHOWN
SHRUBS						
1	Hv	*Hamamelis virginiana*	Common Witch Hazel	3 gal	container	AS SHOWN
9	Hq	*Hydrangea quercifolia*	Oakleaf Hydrangea	3 gal	container	48"
17	Ig	*Ilex glabra 'Shamrock'*	Inkberry	3 gal	container	42"
32	Ag	*Azalea x 'Girard's Pleasant White'*	'Girard's Pleasant White Azalea	3 gal	container	30"
31	Rm	*Rosa 'Meigalpio' PP17877*	Red Drift Rose	2 gal	container	24"
VINES						
2	Ha	*Hydrangea anomala petiolaris*	Climbing Hydrangea	3 gal		AS SHOWN
GRASSES & PERENNIALS						
21	dp	*Dennstaedtia punctilobula*	Hay scented fern	1 gal	container	24"
133	gr	*Geranium 'Gerwat' ROZANNE*	Cranesbill Geranium	1 gal	container	18"
122	hm	*Hakonechloa macra 'Aureola'*	Japanese Forest Grass	1 gal	container	15"
26	nf	*Nepeta x faassenii Walker's Low*	Catmint	1 gal	container	30"
33	rf	*Rudbeckia fulgida sullivantii 'Goldsturm'*	Black-Eyed Susan	1 gal	container	18"
GROUNDCOVER						
1242	vm	*Vinca minor*	Periwinkle	plugs	flats	6"
1151	pt	*Pachysandra terminalis*	Japanese Sorge	plugs	flats	6"
BULBS						
75	agg	*Allium Gladiator*	Ornamental Onion	bulb	bulb	plant in groups of 3
93	nmh	*Narcissus Mount Hood*	Mount Hood Daffodil	bulb	bulb	plant in groups of 3-5
128	ntt	*Narcissus Tete-a-Tete*	Tete-a-tete Daffodil	bulb	bulb	plant in groups of 3-5

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Revisions

#	Description	Date
1	75% CDs	09/08/2020
2	95% CDs	02/22/2021
3	100% CDs	03/24/2021

DRAWING TITLE

Planting Plan

DRAWING INFORMATION

02/22/2021
DATE OF ISSUE

95% Construction Documents
DESCRIPTION

SCALE	DRAWN BY
3431	CHA Putnam
PROJECT #	FILE NAME: School Central_R20.vwx

DRAWING NUMBER

L104

KEY NOTES: DEMOLITION

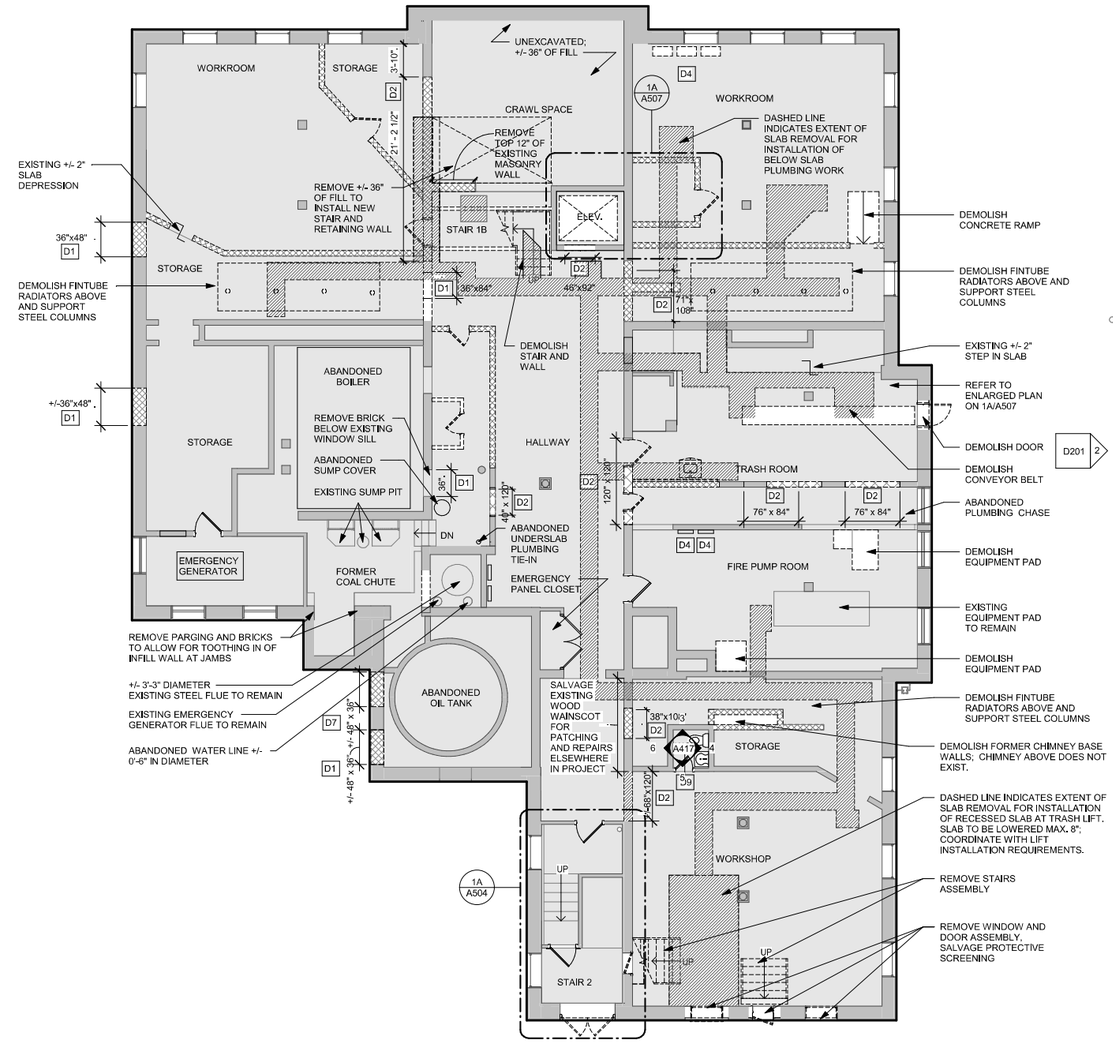
D1	DEMOLISH BRICK INFILL IN EXISTING MASONRY OPENING.
D2	DEMOLISH BRICK TO PROVIDE FOR MASONRY OPENING , WIDTH OF EXISTING BRICK PARTITION VARIES; REFER TO FLOOR PLANS.
D3	DEMOLISH EXISTING WINDOW AND BRICK BELOW EXISTING WINDOW TO CONVERT WINDOW OPENING TO DOOR OPENING.
D4	DEMOLISH ELECTRICAL PANELS, SEE ELECTRICAL
D5	AREA OF EXPLORATORY DEMOLITION
D6	DEMOLISH EXISTING BASEBOARD HEATERS, REFER TO MEP DRAWINGS
D7	PROVIDE MASONRY OPENING FOR DUCTWORK OR NEW WINDOW/LOUVER; PROVIDE LINTELS PER STRUCTURAL DRAWINGS. .
D8	DEMOLISH EXISTING SHELVING AND SHELVING SUPPORTS
D9	AT UNIT KITCHENS AND BATHROOMS, REMOVE ALL FINISHES, FIXTURES AND CASEWORK, REFER TO MEP DEMOLITION DRAWINGS
D10	DEMOLISH TRASH CHUTE IN ITS ENTIRETY INCLUDING HOPPER DOOR
D11	PARTIALLY DEMOLISH EXISTING FLUE TO ALLOW FOR NEW DUCTWORK

GENERAL NOTES: DEMOLITION

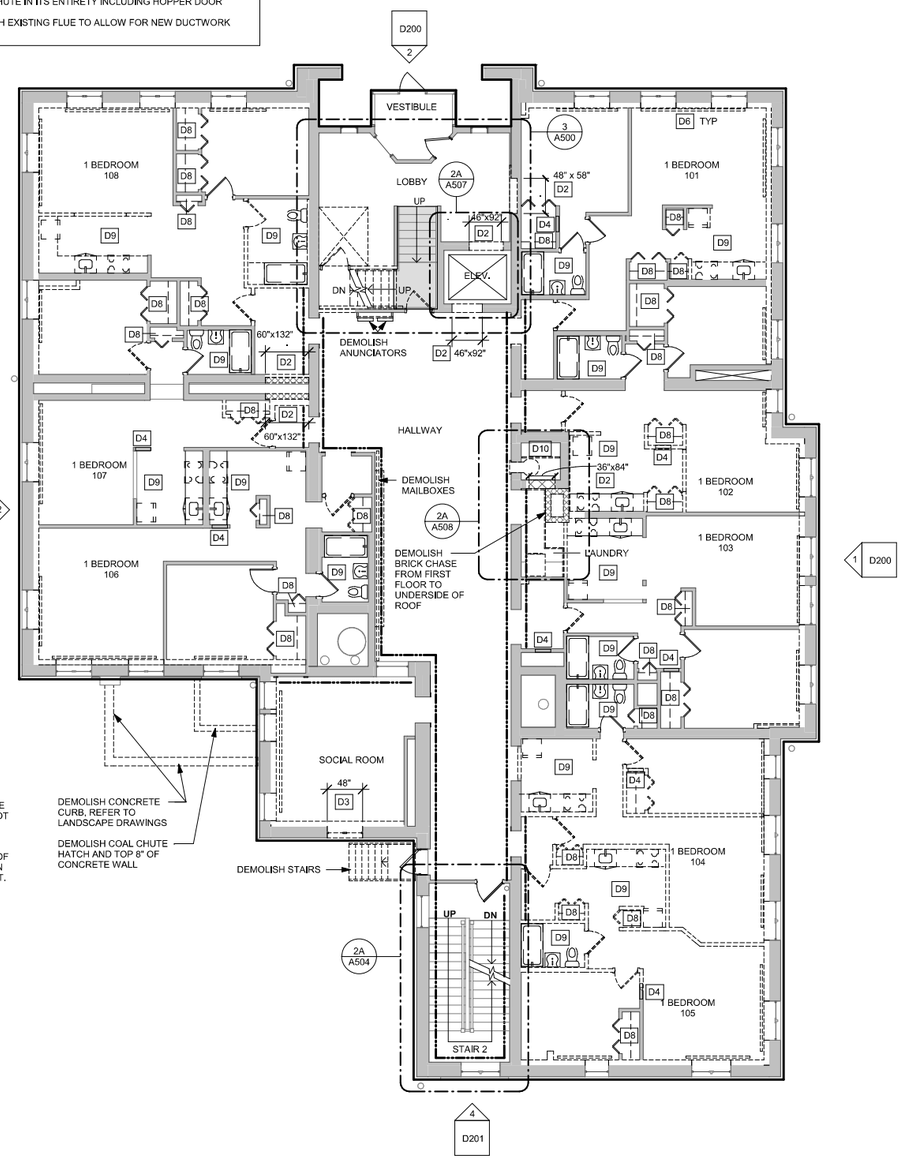
1. DRAWINGS ARE BASED ON THE 1984 RENOVATION DRAWINGS, SOME DIMENSIONS AND DETAILS MAY NOT BE ACCURATE. NOTIFY ARCHITECT OF ANY DISCREPENCIES BETWEEN THE CONTRACT DRAWINGS AND FIELD CONDITIONS.
2. REMOVE ALL EXISTING FLOORING, WALLS AND WALL FINISHES, WALL BASE, PLUMBING FIXTURES, RESTROOM ACCESSORIES, MECHANICAL EQUIPMENT, FIRE ALARM EQUIPMENT AND WIRING,INTERIOR LIGHTING AND WIRING, WINDOW TREATMENTS, AND INTERIOR SIGNAGE UNLESS OTHERWISE NOTED IN WRITING OR GRAPHICALLY.
3. REFER TO MEP/FP DRAWINGS FOR SCOPE OF MECHANICAL, ELECTRICAL, FIRE ALARM, FIRE PROTECTION AND PLUMBING FIXTURES TO BE REMOVED AND THOSE TO BE SALVAGED.
4. REFER TO LANDSCAPE DRAWINGS FOR EXTERIOR DEMOLITION WORK.
5. REFER TO WALL SECTIONS FOR ADDITIONAL DEMOLITION WORK.
6. SALVAGE ALL REMOVED BROWNSTONE, EXTERIOR AND INTERIOR BRICK FOR REPAIR WORK ELSEWHERE.
7. REMOVE TILE AND GYPSUM WALLBOARD SUBSTRATE AT ALL UNIT BATHROOMS.
8. REFER TO STRUCTURAL FOR LINTEL SIZES AT ALL NEW MASONRY OPENINGS.
9. REFER TO GENERAL NOTES 8 AND 9 FOR GYPSUM WALLBOARD DEMOLITION RELATED TO THE INSTALLATION OF NEW MEP/FP WORK.
10. PRIOR TO DEMOLITION, THE CONTRACTOR AND OWNER TO WALK THROUGH THE BUILDING TO IDENTIFY ITEMS TO BE SALVAGED INCLUDING BUT NOT LIMITED TO CASEWORK; MECHANICAL AND PLUMBING EQUIPMENT AND FIXTURES, AND APPLIANCES.
11. REFER TO THE SPECIFICATION 022820 FOR ABATEMENT SCOPE.

DEMOLITION PLAN LEGEND

- EXISTING ITEMS TO REMAIN
- EXISTING WALLS TO REMAIN: SELECTIVE DEMOLITION AND WALL CAVITY ACCESS IS REQUIRED FOR MEP/FP WORK.
- INTERIOR WALL WITH ORIGINAL PLASTER AND WAINSCOT AND TRIM TO REMAIN
- WALLS AND ELEMENTS TO BE DEMOLISHED
- AREA OF SLAB REMOVAL
- DEMOLISH MASONRY; REFER TO STRUCTURAL DRAWINGS
- REMOVE SLATE ROOF INCLUDING STRUCTURE, SALVAGE SLATE



1 BASEMENT DEMOLITION FLOOR PLAN
1/8" = 1'-0"



2 FIRST FLOOR DEMOLITION PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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CLIENT
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DRAWING TITLE
Basement and First Floor Demolition Plans

DRAWING INFORMATION

March 24, 2021 — DATE OF ISSUE
100% Construction Documents — DESCRIPTION
1/8" = 1'-0" — SCALE
Author — DRAWN BY
3431 — PROJECT #
FILE NAME

DRAWING NUMBER
D100

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3/19/2021 4:52:27 PM Author

KEY NOTES: DEMOLITION

D1	DEMOLISH BRICK INFILL IN EXISTING MASONRY OPENING.
D2	DEMOLISH BRICK TO PROVIDE FOR MASONRY OPENING . WIDTH OF EXISTING BRICK PARTITION VARIES; REFER TO FLOOR PLANS.
D3	DEMOLISH EXISTING WINDOW AND BRICK BELOW EXISTING WINDOW TO CONVERT WINDOW OPENING TO DOOR OPENING.
D4	DEMOLISH ELECTRICAL PANELS, SEE ELECTRICAL
D5	AREA OF EXPLORATORY DEMOLITION
D6	DEMOLISH EXISTING BASEBOARD HEATERS, REFER TO MEP DRAWINGS
D7	PROVIDE MASONRY OPENING FOR DUCTWORK OR NEW WINDOW/LOUVER; PROVIDE LINTELS PER STRUCTURAL DRAWINGS. .
D8	DEMOLISH EXISTING SHELVING AND SHELVING SUPPORTS
D9	AT UNIT KITCHENS AND BATHROOMS, REMOVE ALL FINISHES, FIXTURES AND CASEWORK. REFER TO MEP DEMOLITION DRAWINGS
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D11	PARTIALLY DEMOLISH EXISTING FLUE TO ALLOW FOR NEW DUCTWORK

GENERAL NOTES: DEMOLITION

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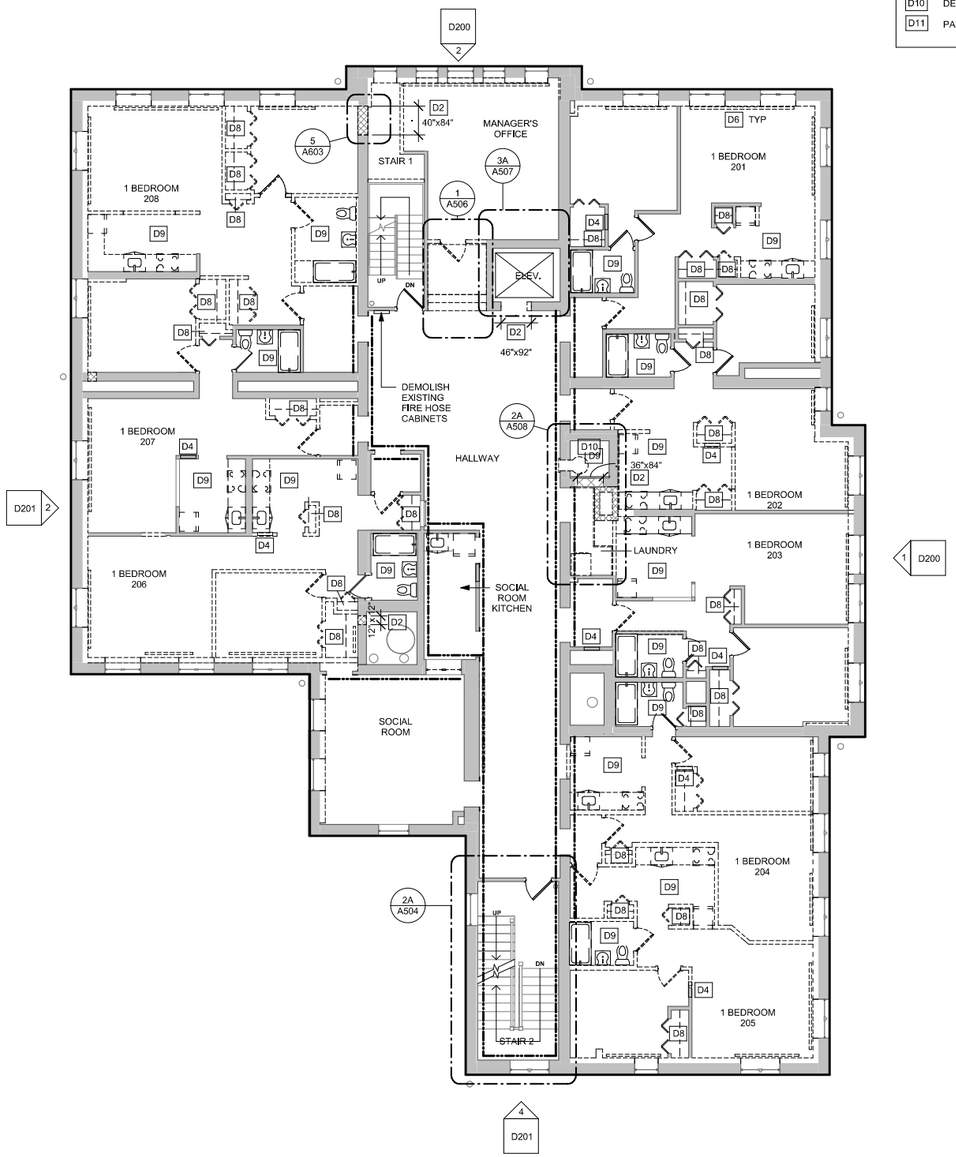
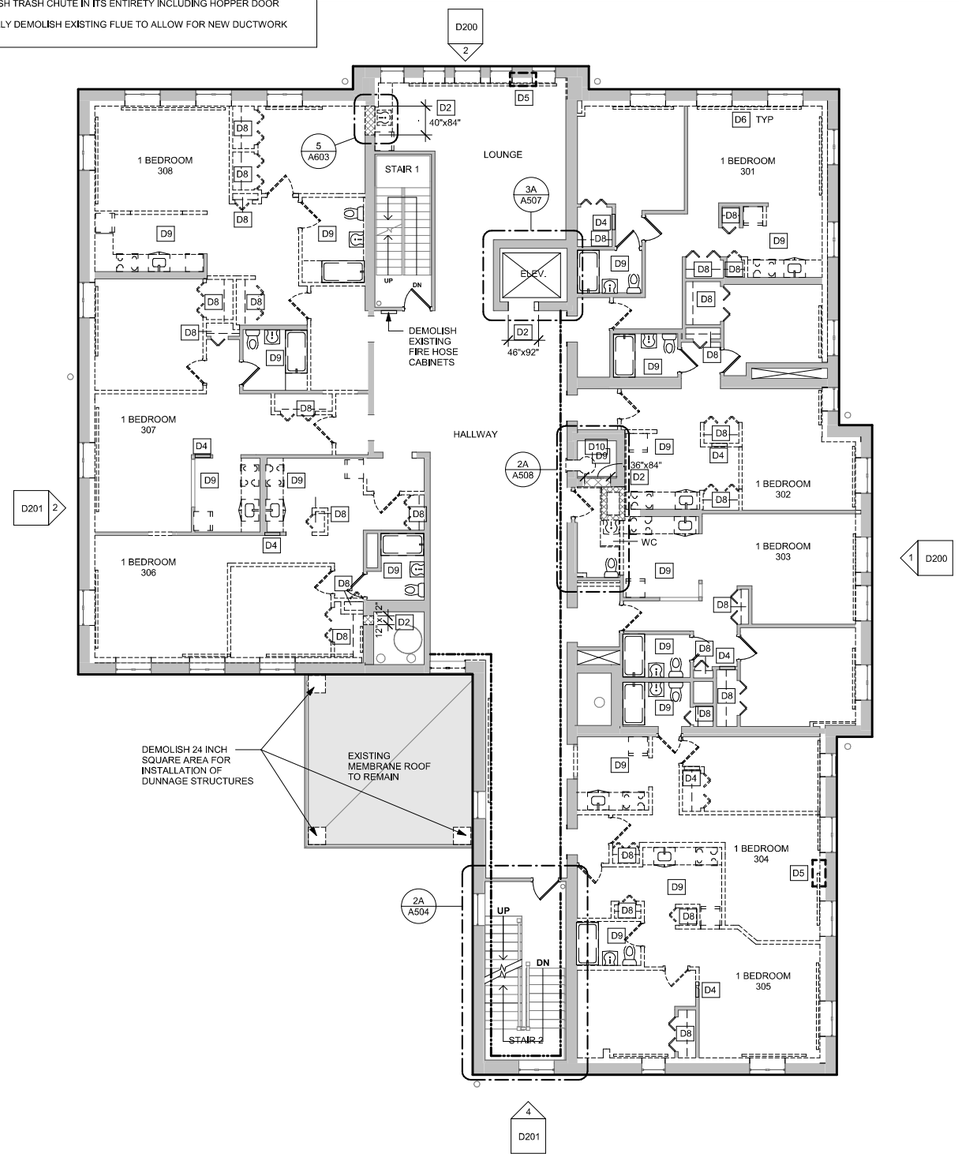


1 SECOND FLOOR DEOMOLITION PLAN
1/8" = 1'-0"



2 THIRD FLOOR DEMOLITION PLAN
1/8" = 1'-0"

DEMOLITION WITHIN APARTMENTS ON FLOORS 1-3 IS ___.

0' 4' 8' 16'

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DRAWING TITLE
Second and Third Floor Demolition Plans

DRAWING INFORMATION

March 24, 2021
DATE OF ISSUE
100% Construction Documents
DESCRIPTION
1/8" = 1'-0" SCALE
Author DRAWN BY
3431 PROJECT #
FILE NAME

DRAWING NUMBER
D101

KEY NOTES: DEMOLITION

D1	DEMOLISH BRICK INFILL IN EXISTING MASONRY OPENING.
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GENERAL NOTES: DEMOLITION

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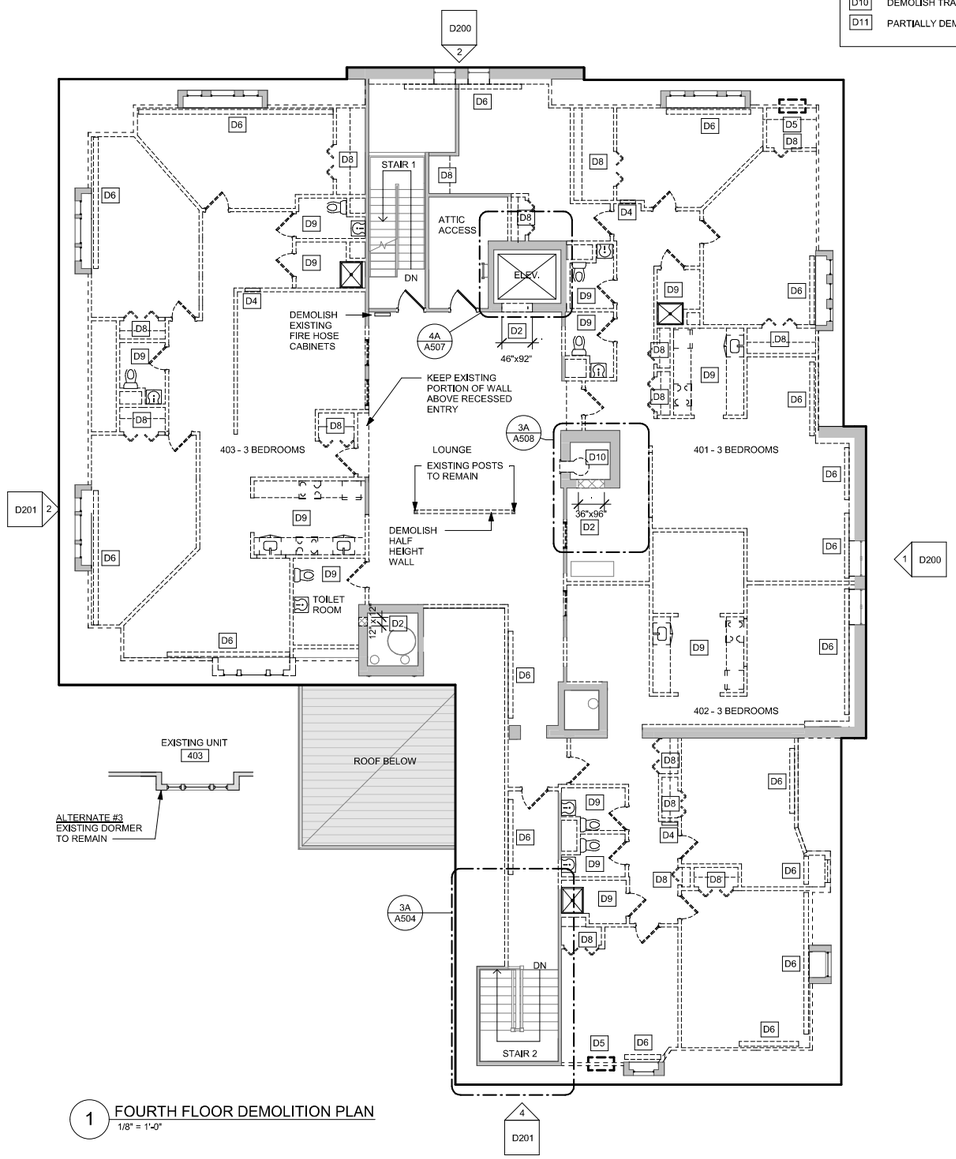
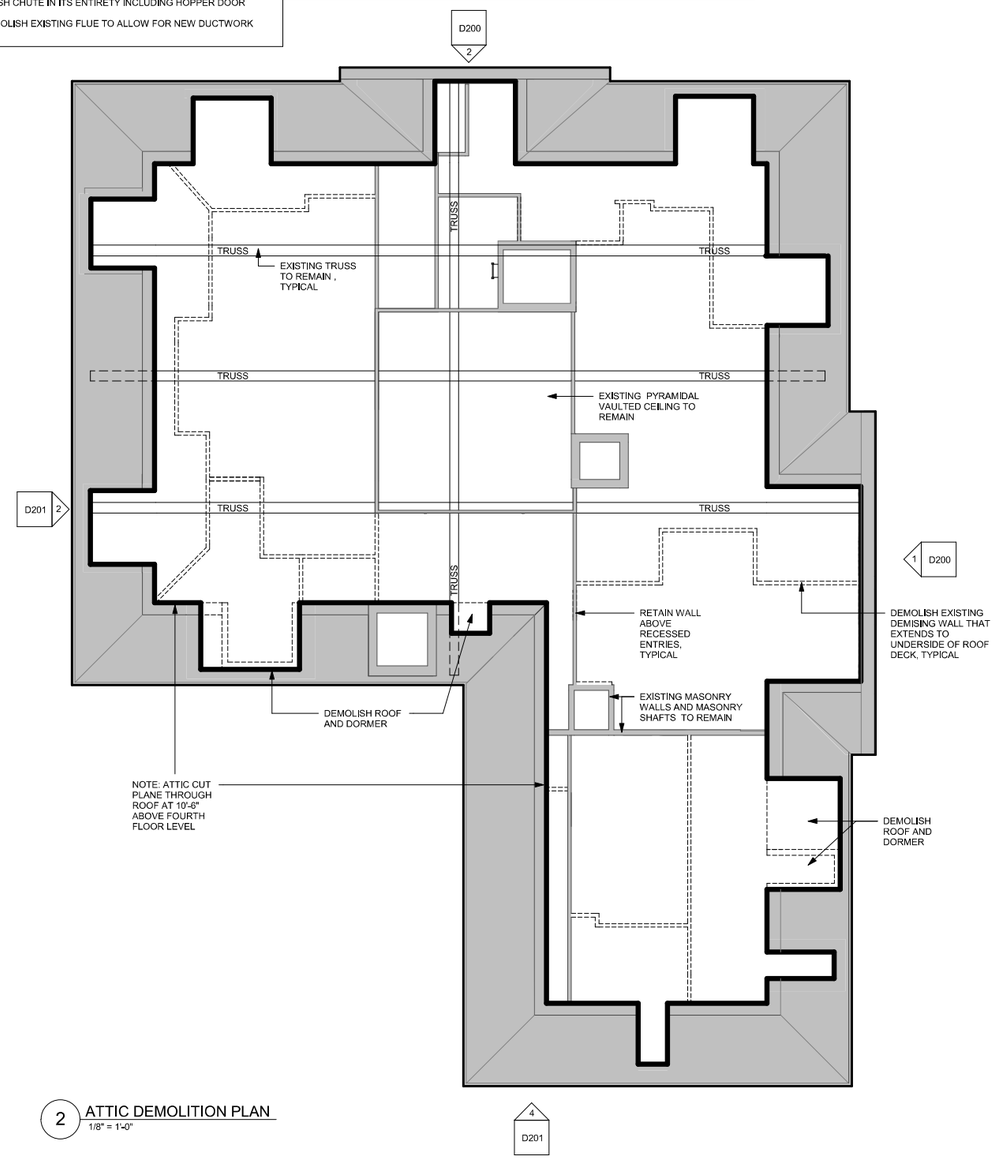
2. REMOVE ALL EXISTING FLOORING, WALLS AND WALL FINISHES, WALL BASE, PLUMBING FIXTURES, RESTROOM ACCESSORIES, MECHANICAL EQUIPMENT, FIRE ALARM EQUIPMENT AND WIRING,INTERIOR LIGHTING AND WIRING, WINDOW TREATMENTS, AND INTERIOR SIGNAGE UNLESS OTHERWISE NOTED IN WRITING OR GRAPHICALLY.
3. REFER TO MEP/FP DRAWINGS FOR SCOPE OF MECHANICAL, ELECTRICAL, FIRE ALARM, FIRE PROTECTION AND PLUMBING FIXTURES TO BE REMOVED AND THOSE TO BE SALVAGED.
4. REFER TO LANDSCAPE DRAWINGS FOR EXTERIOR DEMOLITION WORK.
5. REFER TO WALL SECTIONS FOR ADDITIONAL DEMOLITION WORK.
6. SALVAGE ALL REMOVED BROWNSTONE, EXTERIOR AND INTERIOR BRICK FOR REPAIR WORK ELSEWHERE.
7. REMOVE TILE AND GYPSUM WALLBOARD SUBSTRATE AT ALL UNIT BATHROOMS.
8. REFER TO STRUCTURAL FOR LINTEL SIZES AT ALL NEW MASONRY OPENINGS.
9. REFER TO GENERAL NOTES 8 AND 9 FOR GYPSUM WALLBOARD DEMOLITION RELATED TO THE INSTALLATION OF NEW MEP/FP WORK.
10. PRIOR TO DEMOLITION, THE CONTRACTOR AND OWNER TO WALK THROUGH THE BUILDING TO IDENTIFY ITEMS TO BE SALVAGED INCLUDING BUT NOT LIMITED TO CASEWORK; MECHANICAL AND PLUMBING EQUIPMENT AND FIXTURES, AND APPLIANCES.
11. REFER TO THE SPECIFICATION 022820 FOR ABATEMENT SCOPE.

DEMOLITION PLAN LEGEND

- EXISTING ITEMS TO REMAIN
- EXISTING WALLS TO REMAIN: SELECTIVE DEMOLITION AND WALL CAVITY ACCESS IS REQUIRED FOR MEP/FP WORK.
- INTERIOR WALL WITH ORIGINAL PLASTER AND WAINSCOT AND TRIM TO REMAIN
- WALLS AND ELEMENTS TO BE DEMOLISHED
- AREA OF SLAB REMOVAL
- DEMOLISH MASONRY; REFER TO STRUCTURAL DRAWINGS
- REMOVE SLATE ROOF INCLUDING STRUCTURE, SALVAGE SLATE



1 FOURTH FLOOR DEMOLITION PLAN
1/8" = 1'-0"



2 ATTIC DEMOLITION PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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PROJECT NAME
Modernization of Putnam School Apartments
86 Otis Street, Cambridge, MA 02141

CLIENT
Cambridge Housing Authority
362 Green Street, Cambridge, MA 02139

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REVISIONS

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DRAWING TITLE
Fourth Floor and Attic Demolition Plans

DRAWING INFORMATION

March 24, 2021
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DESCRIPTION
1/8" = 1'-0" SCALE | Author DRAWN BY
3431 PROJECT # | FILE NAME

DRAWING NUMBER
D102

KEY NOTES: DEMOLITION

D1	DEMOLISH BRICK INFILL IN EXISTING MASONRY OPENING.
D2	DEMOLISH BRICK TO PROVIDE FOR MASONRY OPENING , WIDTH OF EXISTING BRICK PARTITION VARIES; REFER TO FLOOR PLANS.
D3	DEMOLISH EXISTING WINDOW AND BRICK BELOW EXISTING WINDOW TO CONVERT WINDOW OPENING TO DOOR OPENING.
D4	DEMOLISH ELECTRICAL PANELS, SEE ELECTRICAL
D5	AREA OF EXPLORATORY DEMOLITION
D6	DEMOLISH EXISTING BASEBOARD HEATERS, REFER TO MEP DRAWINGS
D7	PROVIDE MASONRY OPENING FOR DUCTWORK OR NEW WINDOW/LOUVER; PROVIDE LINTELS PER STRUCTURAL DRAWINGS. .
D8	DEMOLISH EXISTING SHELVING AND SHELVING SUPPORTS
D9	AT UNIT KITCHENS AND BATHROOMS, REMOVE ALL FINISHES, FIXTURES AND CASEWORK, REFER TO MEP DEMOLITION DRAWINGS
D10	DEMOLISH TRASH CHUTE IN IT'S ENTIRETY INCLUDING HOPPER DOOR
D11	PARTIALLY DEMOLISH EXISTING FLUE TO ALLOW FOR NEW DUCTWORK

GENERAL NOTES: DEMOLITION

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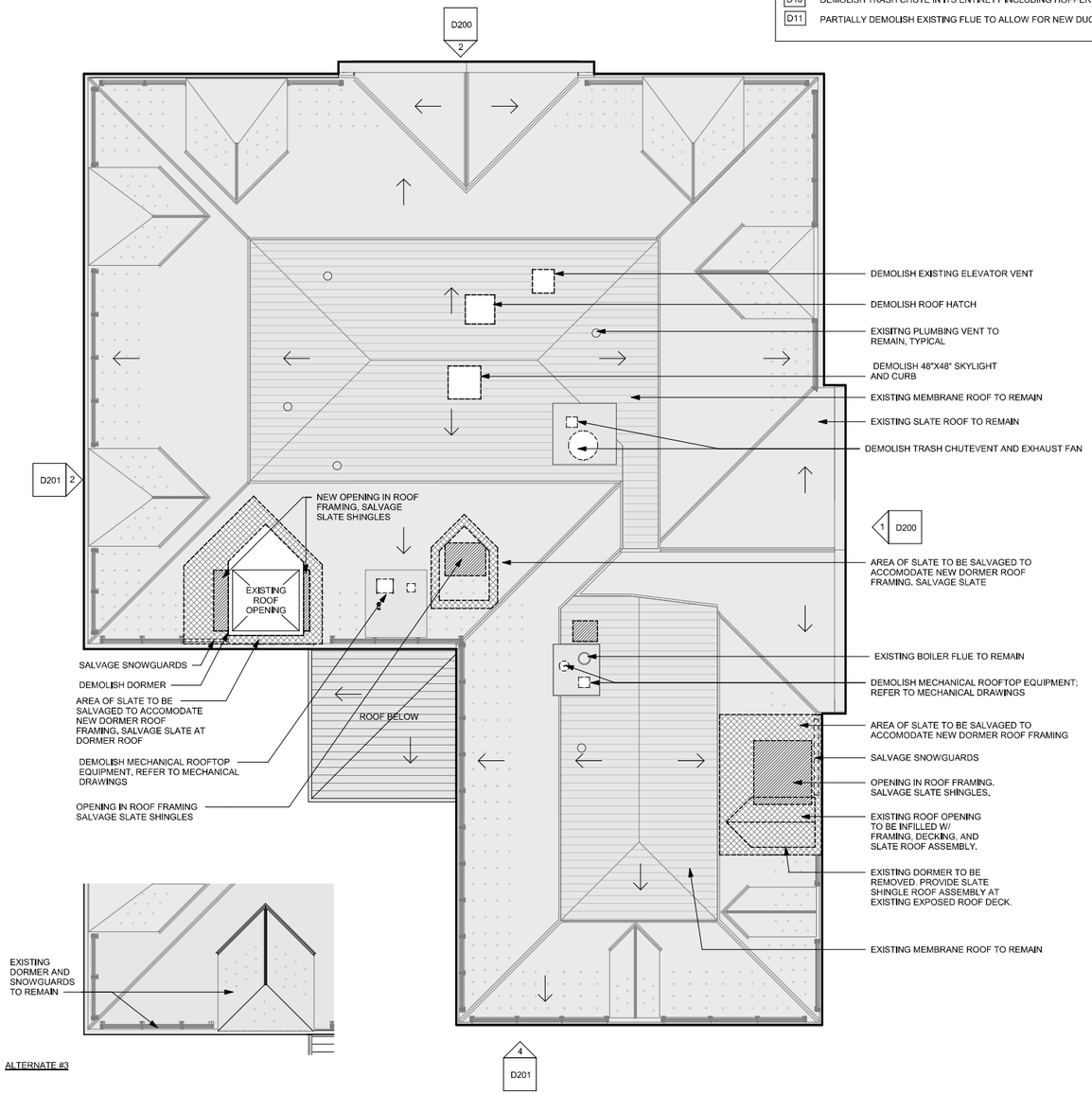

1 ROOF DEMOLITION PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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PROJECT NAME

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DRAWING TITLE

Roof Demolition Plan

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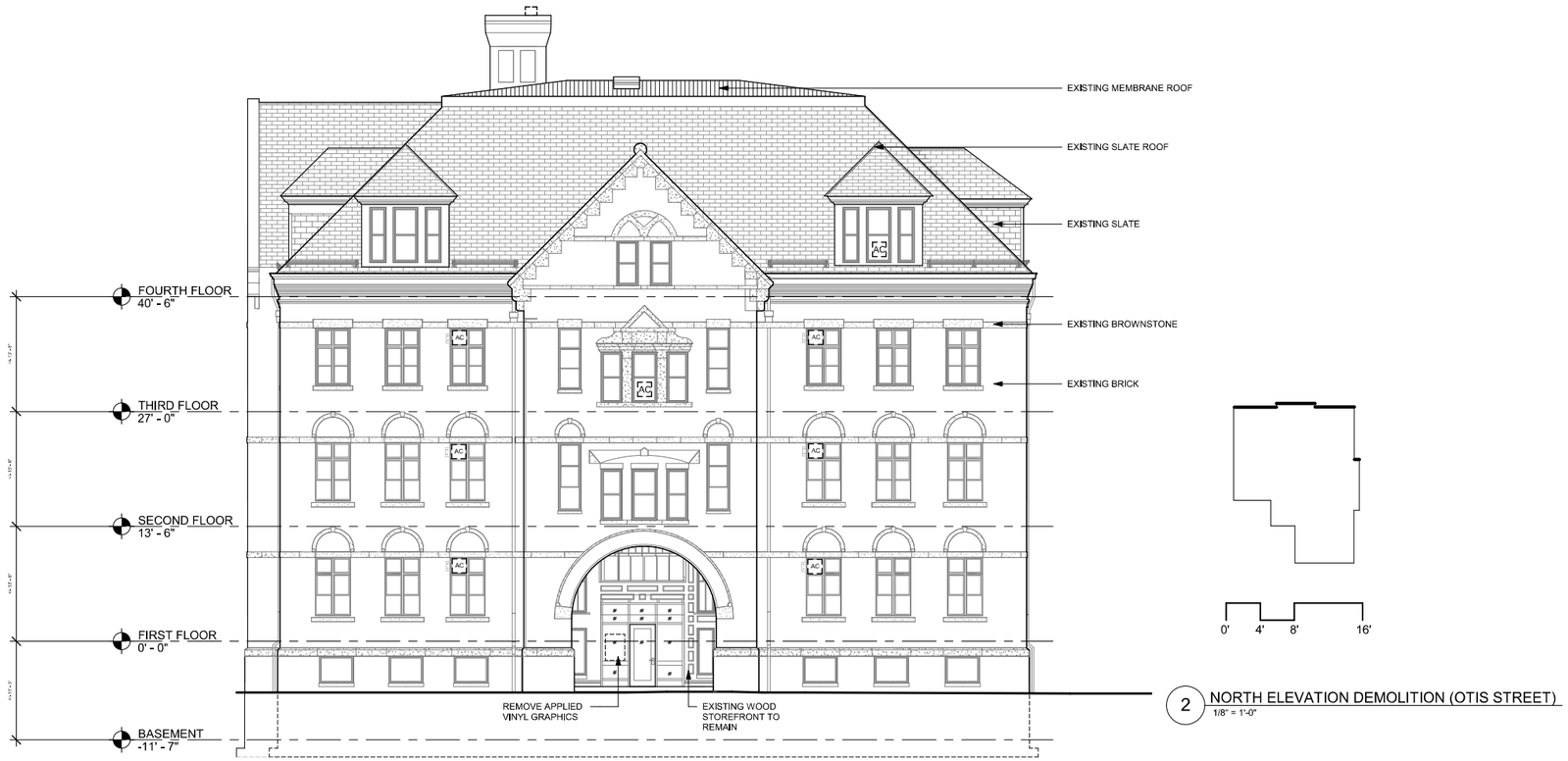
1 EAST ELEVATION DEMOLITION (SCIARAPPA STREET)
1/8" = 1'-0"



2 NORTH ELEVATION DEMOLITION (OTIS STREET)
1/8" = 1'-0"

GENERAL NOTES: EXTERIOR ELEVATIONS

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF BROWNSTONE . REPOINT 100% OF BROWNSTONE JOINTS.
3. NEW MECHANICAL LOUVERS AT GRADE LEVEL TO MATCH EXISTING LOUVERS IN PROFILE.
4. EXISTING MECHANICAL LOUVERS TO BE REFINISHED "PATINA GREEN." NEW MECHANICAL LOUVERS TO BE FINISHED "PATINA GREEN."
5. REMOVE AND RESINTALL DOWNSPOUTS IN ORDER TO REPAIR AND CLEAN MASONRY.
6. REMOVE AND RESINTALL GUTTERS AT LOW ROOF WHERE THE CORBELLED BRICK IS CALLED TO BE REPAIRED.

DEMOLITION ELEVATION LEGEND

AIR CONDITIONING UNITS
THROUGH WINDOW AC UNIT MOUNTED TO WINDOW JAMB OR EXTERIOR WALL. REMOVE BRACKETS AND AIR CONDITIONER PLATFORM. INFILL FASTENER HOLES IN BRICK

REMOVE ELEMENTS

REMOVE SLATE ROOF

MEMBRANE ROOF
EXISTING MEMBRANE ROOF TO REMAIN. REFER TO ROOF DRAWINGS AND DETAILS FOR EXTENT OF REPAIR

BROWNSTONE
EXISTING BROWNSTONE ELEMENTS TO REMAIN. REFER TO EXTERIOR ELEVATIONS FOR EXTENT OF REPAIR

EXTERIOR LIGHT FIXTURE
REMOVE LIGHT FIXTURE. REFER TO ELECTRICAL DRAWINGS

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DRAWING TITLE
North and East Demolition Elevations

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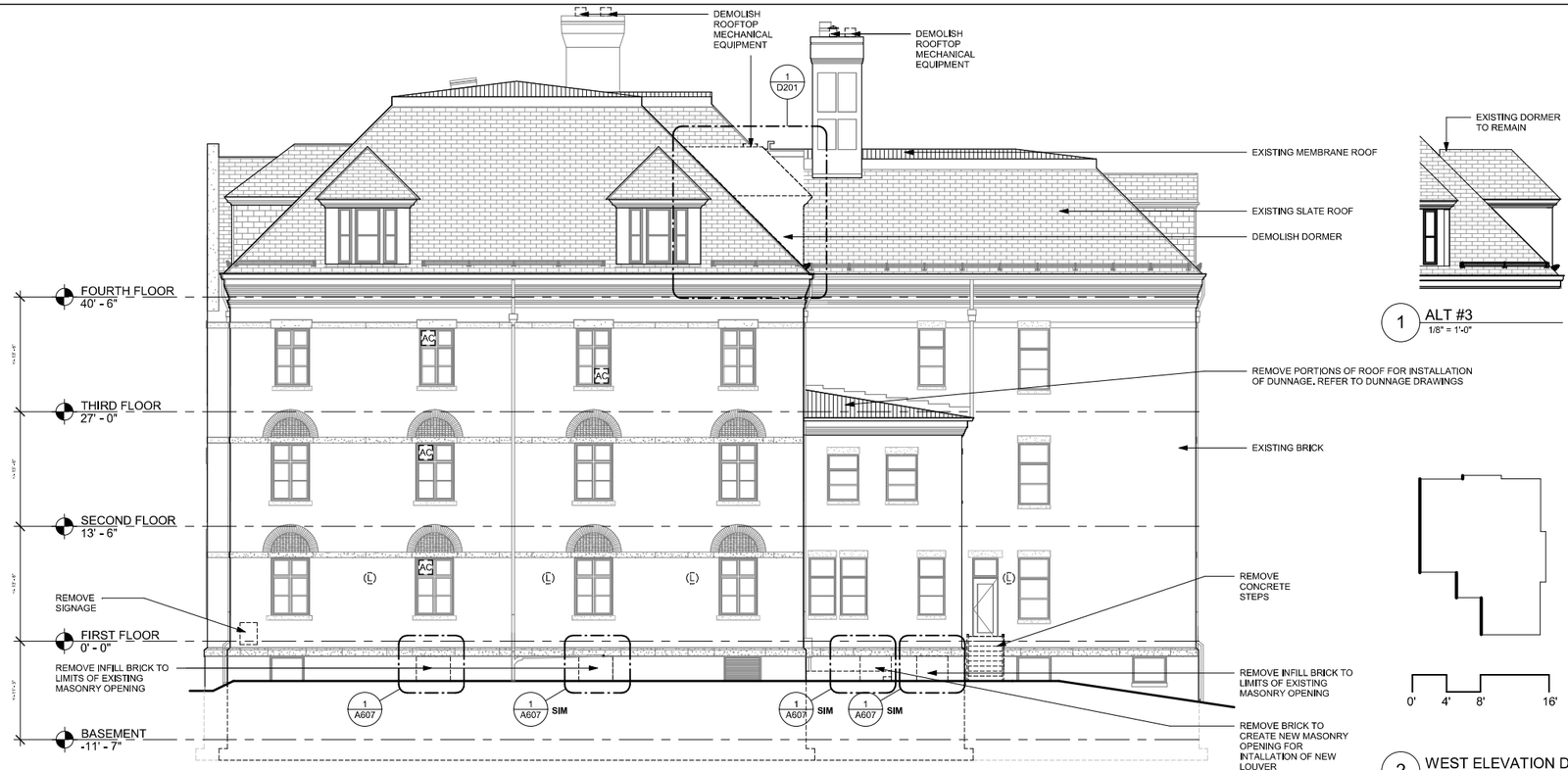
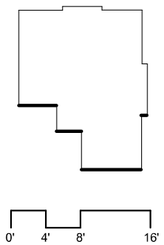


1 ALT #3
1/8" = 1'-0"

2 WEST ELEVATION DEMOLITION
1/8" = 1'-0"

3 ALTERNATE #3
1/8" = 1'-0"



4 SOUTH ELEVATION ELEVATION
1/8" = 1'-0"

GENERAL NOTES: EXTERIOR ELEVATIONS

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF BROWNSTONE , REPOINT 100% OF BROWNSTONE JOINTS.
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DEMOLITION ELEVATION LEGEND

AIR CONDITIONING UNITS
THROUGH WINDOW AC UNIT MOUNTED TO WINDOW JAMB OR EXTERIOR WALL. REMOVE BRACKETS AND AIR CONDITIONER PLATFORM. INFILL FASTENER HOLES IN BRICK

REMOVE ELEMENTS

REMOVE SLATE ROOF

MEMBRANE ROOF
EXISTING MEMBRANE ROOF TO REMAIN. REFER TO ROOF DRAWINGS AND DETAILS FOR EXTENT OF REPAIR

BROWNSTONE
EXISTING BROWNSTONE ELEMENTS TO REMAIN. REFER TO EXTERIOR ELEVATIONS FOR EXTENT OF REPAIR

EXTERIOR LIGHT FIXTURE
REMOVE LIGHT FIXTURE. REFER TO ELECTRICAL DRAWINGS

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DRAWING TITLE
South and West Demolition Elevations

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Author — DRAWN BY

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FILE NAME

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D201

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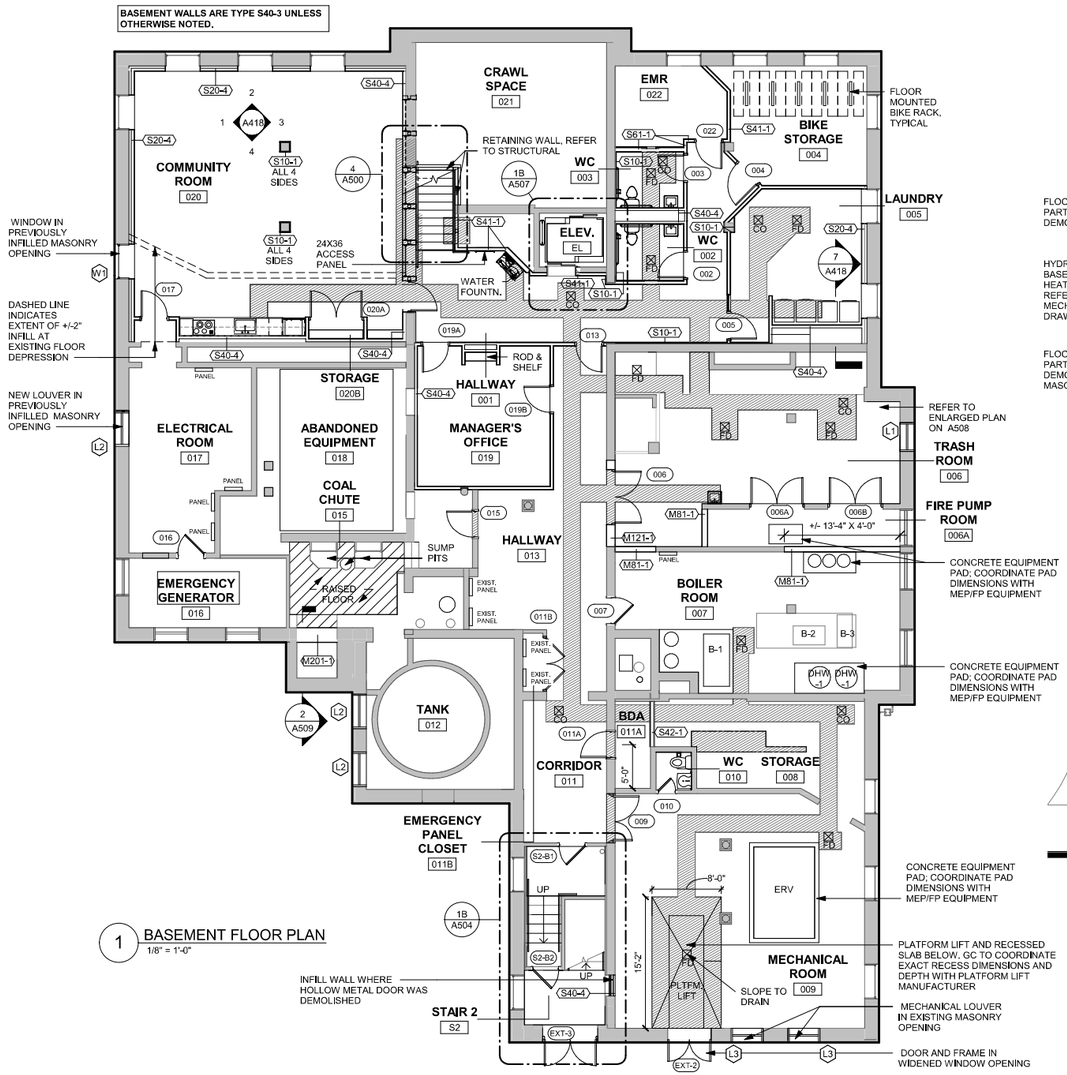
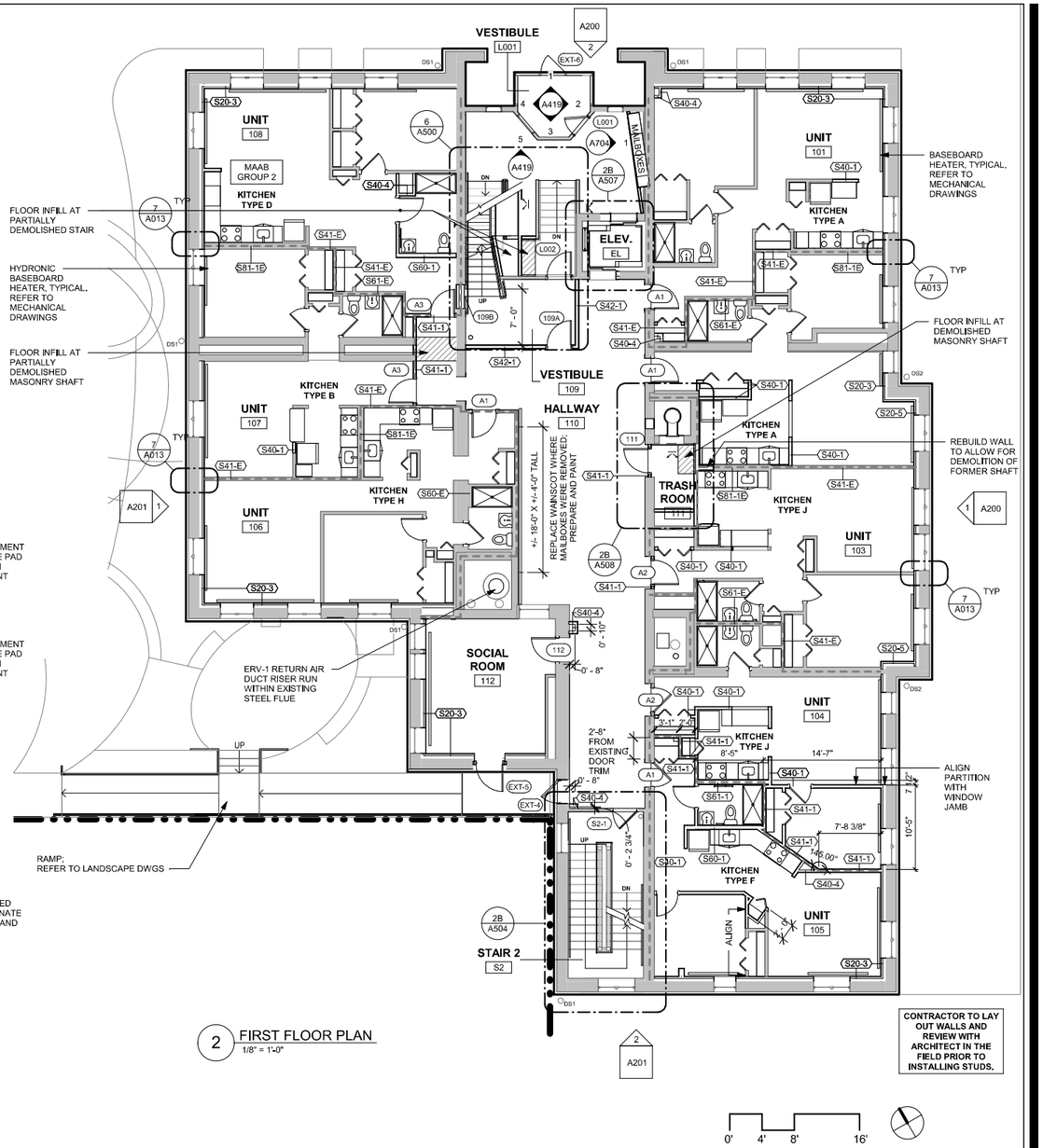
BASEMENT WALLS ARE TYPE S40-3 UNLESS OTHERWISE NOTED.

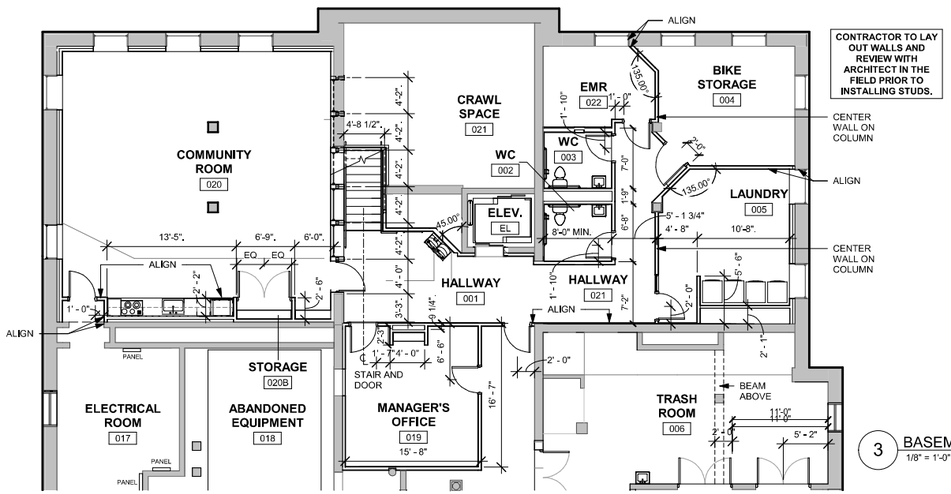


1 BASEMENT FLOOR PLAN
1/8" = 1'-0"



2 FIRST FLOOR PLAN
1/8" = 1'-0"

CONTRACTOR TO LAY OUT WALLS AND REVIEW WITH ARCHITECT IN THE FIELD PRIOR TO INSTALLING STUDS.



3 BASEMENT DIMENSIONAL PLAN
1/8" = 1'-0"

CONTRACTOR TO LAY OUT WALLS AND REVIEW WITH ARCHITECT IN THE FIELD PRIOR TO INSTALLING STUDS.

0' 4' 8' 16'

UNIT TYPE ENLARGED PLAN KEY	
UNIT #	ENLARGED PLAN
101; 201; 301	1A/B ON A400
102; 202; 302	2A/B ON A400
103; 203; 303	3A/B ON A400
104; 204; 304	4A/B ON A401
105; 205; 305	5A/B ON A401
106	6A/B ON A401
107	7A/B ON A402
108	8A/B ON A402
209; 309	9A/B ON A402
206	1A/B ON A403
306	2A/B ON A404
207; 307	1A/B ON A404
208; 308	1A/B ON A405
209; 309	9A/B ON A405
401	2A/B ON A405
402	1A/B ON A406
403	2A/B ON A406
404	1A/B ON A407
405	2A/B ON A407
406	3A/B ON A407
407	1A/B ON A408
408	2A/B ON A408

FLOOR PLAN LEGEND

- EXISTING SURFACE
- EXISTING WALL OR ARCHITECTURAL FEATURE TO REMAIN
- WALLS
- AREA OF SLATE ROOF REPLACEMENT USING SALVAGED SLATE
- AT FOURTH FLOOR, SLOPED CEILING BELOW 6'-8" CLEARANCE
- RAISED FLOOR OR FLOOR INFILL FRAMING, SEE STRUCTURAL DWGS.
- SLAB INFILL AT TRENCHING FOR THE INSTALLATION OF PLUMBING LINES OR FOOTINGS. REFER TO STRUCTURAL AND PLUMBING DRAWINGS.
- 1 HR RATED DEMISING WALL
- FD FLOOR DRAIN OR CO CLEANOUT, RESOECTIVELY
- DS1 DS2 DOWNSPOUT WITH BOOT OR INTERNAL CONNECTION, RESPECTIVELY
- ALIGN

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Basement and First Floor Plans

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FILE NAME

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A100

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UNIT TYPE ENLARGED PLAN KEY	
UNIT #	ENLARGED PLAN
101; 201; 301	1A/B ON A400
102; 202; 302	2A/B ON A400
103; 203; 303	3A/B ON A400
104; 204; 304	4A/B ON A401
105; 205; 305	5A/B ON A401
106	6A/B ON A401
107	7A/B ON A402
108	8A/B ON A402
209; 309	9A/B ON A402
206	1A/B ON A403
306	2A/B ON A404
207; 307	1A/B ON A404
208; 308	1A/B ON A405
209; 309	9A/B ON A405
401	2A/B ON A405
402	1A/B ON A406
403	2A/B ON A406
404	1A/B ON A407
405	2A/B ON A407
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407	1A/B ON A408
408	2A/B ON A408

FLOOR PLAN LEGEND

- EXISTING SURFACE
- EXISTING WALL OR ARCHITECTURAL FEATURE TO REMAIN
- WALLS
- AREA OF SLATE ROOF REPLACEMENT USING SALVAGED SLATE
- AT FOURTH FLOOR, SLOPED CEILING BELOW 6'-8" CLEARANCE
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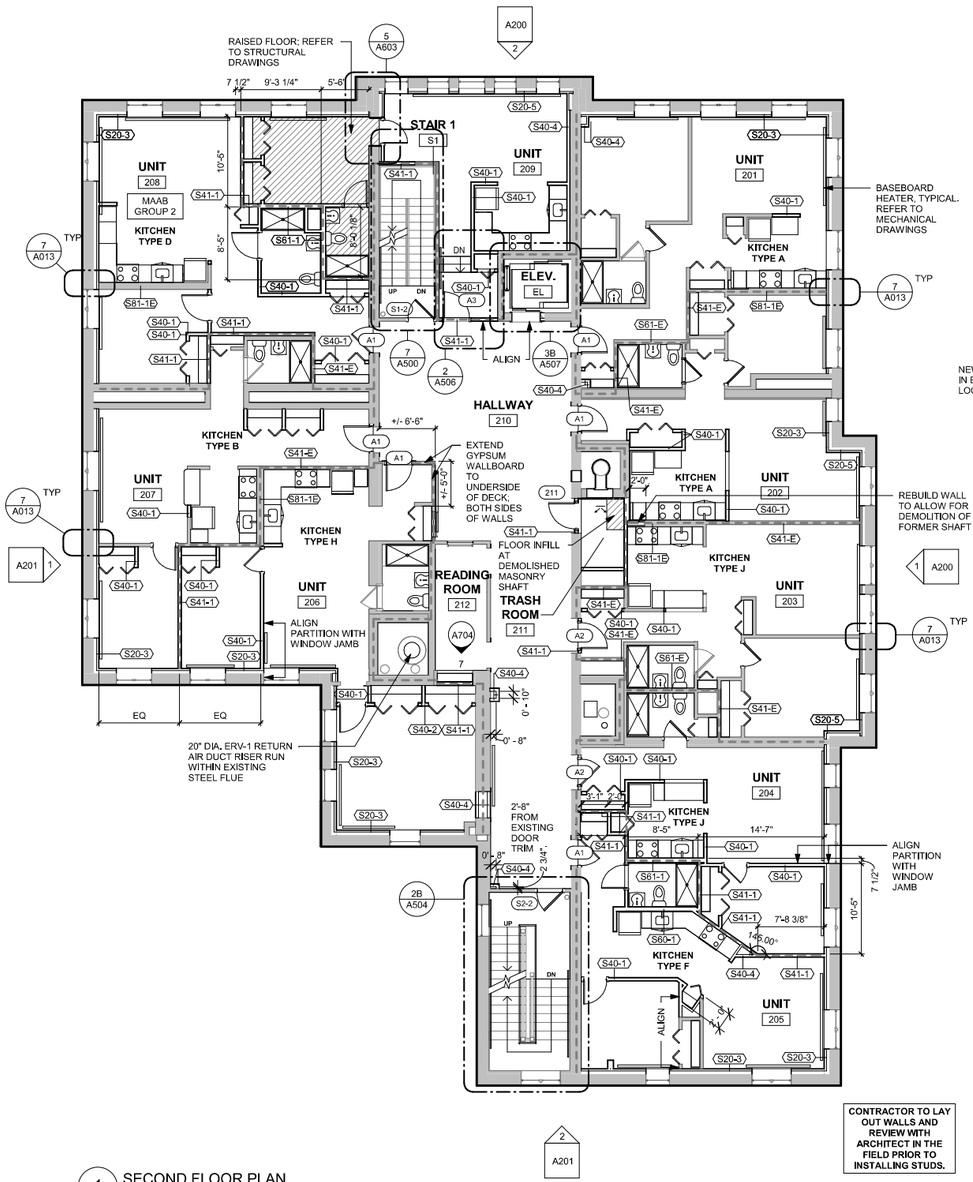
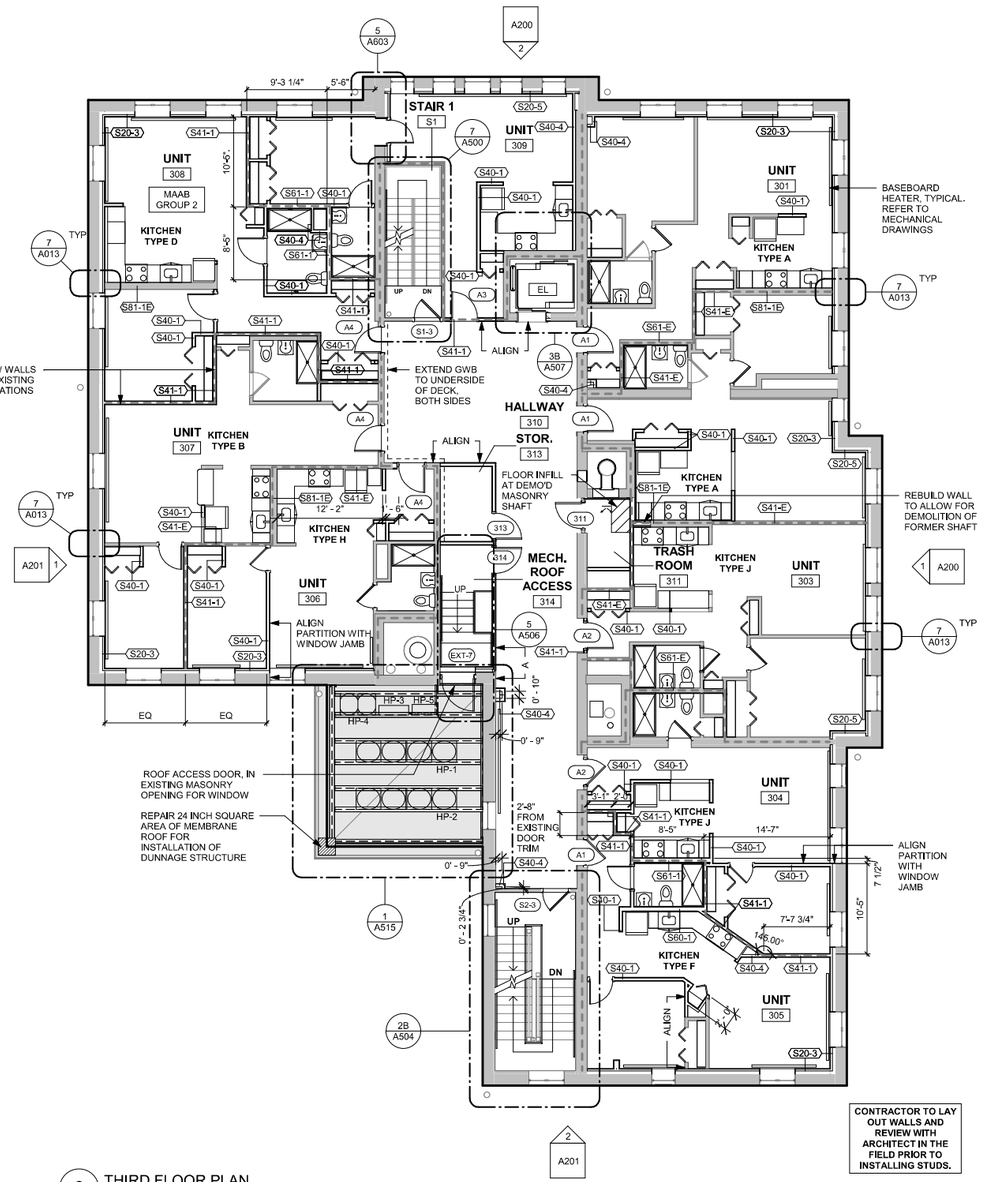
- FD FLOOR DRAIN OR CLEANOUT, RESOECTIVELY
- DS1 DS2 DOWNSPOUT WITH BOOT OR INTERNAL CONNECTION, RESPECTIVELY
- A ALIGN



1 SECOND FLOOR PLAN
1/8" = 1'-0"



2 THIRD FLOOR PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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DRAWING TITLE
Second and Third Floor Plans

DRAWING INFORMATION

March 24, 2021
DATE OF ISSUE
100% Construction Documents
DESCRIPTION
1/8" = 1'-0" | Author
SCALE | DRAWN BY
3431 | FILE NAME
PROJECT #

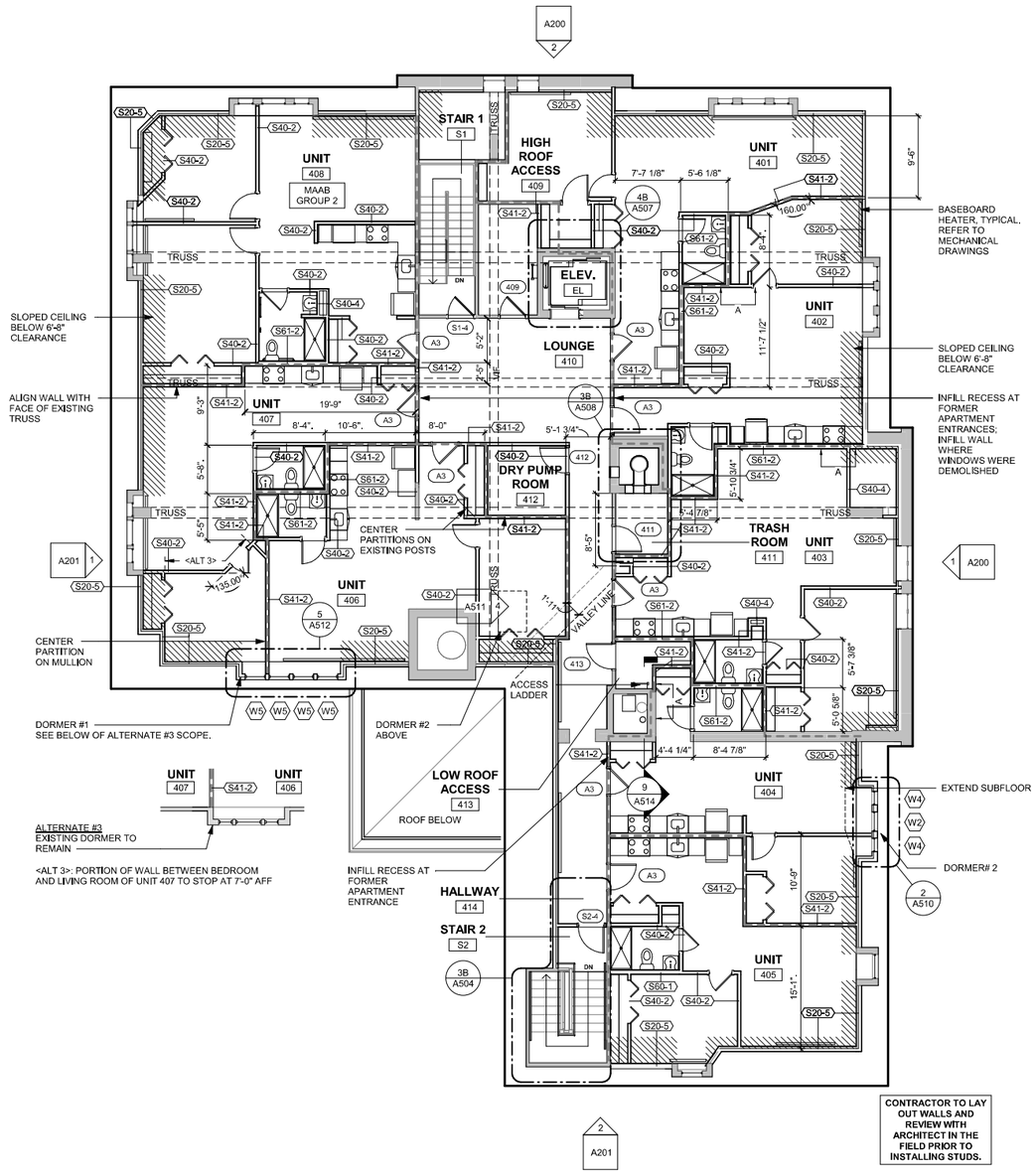
DRAWING NUMBER
A101

UNIT TYPE ENLARGED PLAN KEY

UNIT #	ENLARGED PLAN
101; 201; 301	1A/B ON A400
102; 202; 302	2A/B ON A400
103; 203; 303	3A/B ON A400
104; 204; 304	4A/B ON A401
105; 205; 305	5A/B ON A401
106	6A/B ON A401
107	7A/B ON A402
108	8A/B ON A402
209; 309	9A/B ON A402
206	1A/B ON A403
306	2A/B ON A404
207; 307	1A/B ON A404
208; 308	1A/B ON A405
209; 309	9A/B ON A405
401	2A/B ON A405
402	1A/B ON A406
403	2A/B ON A406
404	1A/B ON A407
405	2A/B ON A407
406	3A/B ON A407
407	1A/B ON A408
408	2A/B ON A408

FLOOR PLAN LEGEND

- EXISTING SURFACE
- EXISTING WALL OR ARCHITECTURAL FEATURE TO REMAIN
- WALLS
- AREA OF SLATE ROOF REPLACEMENT USING SALVAGED SLATE
- AT FOURTH FLOOR, SLOPED CEILING BELOW 6'-8" CLEARANCE
- RAISED FLOOR OR FLOOR INFILL FRAMING, SEE STRUCTURAL DWGS.
- SLAB INFILL AT TRENCHING FOR THE INSTALLATION OF PLUMBING LINES OR FOOTINGS. REFER TO STRUCTURAL AND PLUMBING DRAWINGS.
- 1 HR RATED DEMISING WALL
- FD CO — FLOOR DRAIN OR CLEANOUT, RESOECTIVELY
- DS1 DS2 — DOWNSPOUT WITH BOOT OR INTERNAL CONNECTION, RESPECTIVELY
- A — ALIGN



1 FOURTH FLOOR PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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PROJECT NAME
Modernization of Putnam School Apartments
86 Otis Street, Cambridge, MA 02141

CLIENT
Cambridge Housing Authority
362 Green Street, Cambridge, MA 02139

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DATE

DRAWING TITLE
Fourth Floor Plan

DRAWING INFORMATION

March 24, 2021
DATE OF ISSUE
100% Construction Documents
DESCRIPTION
1/8" = 1'-0" SCALE
Author DRAWN BY
3431 PROJECT #
FILE NAME

DRAWING NUMBER
A102

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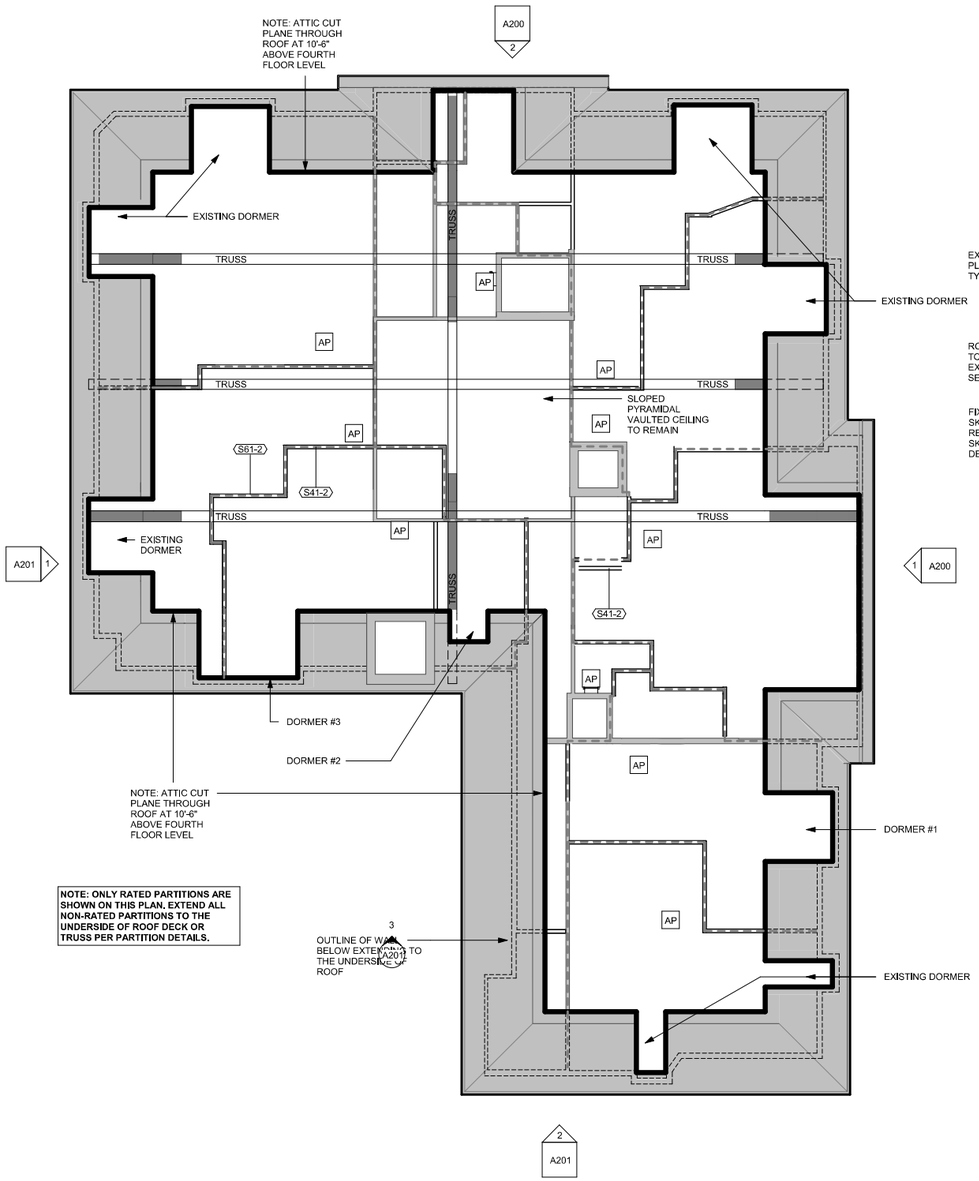
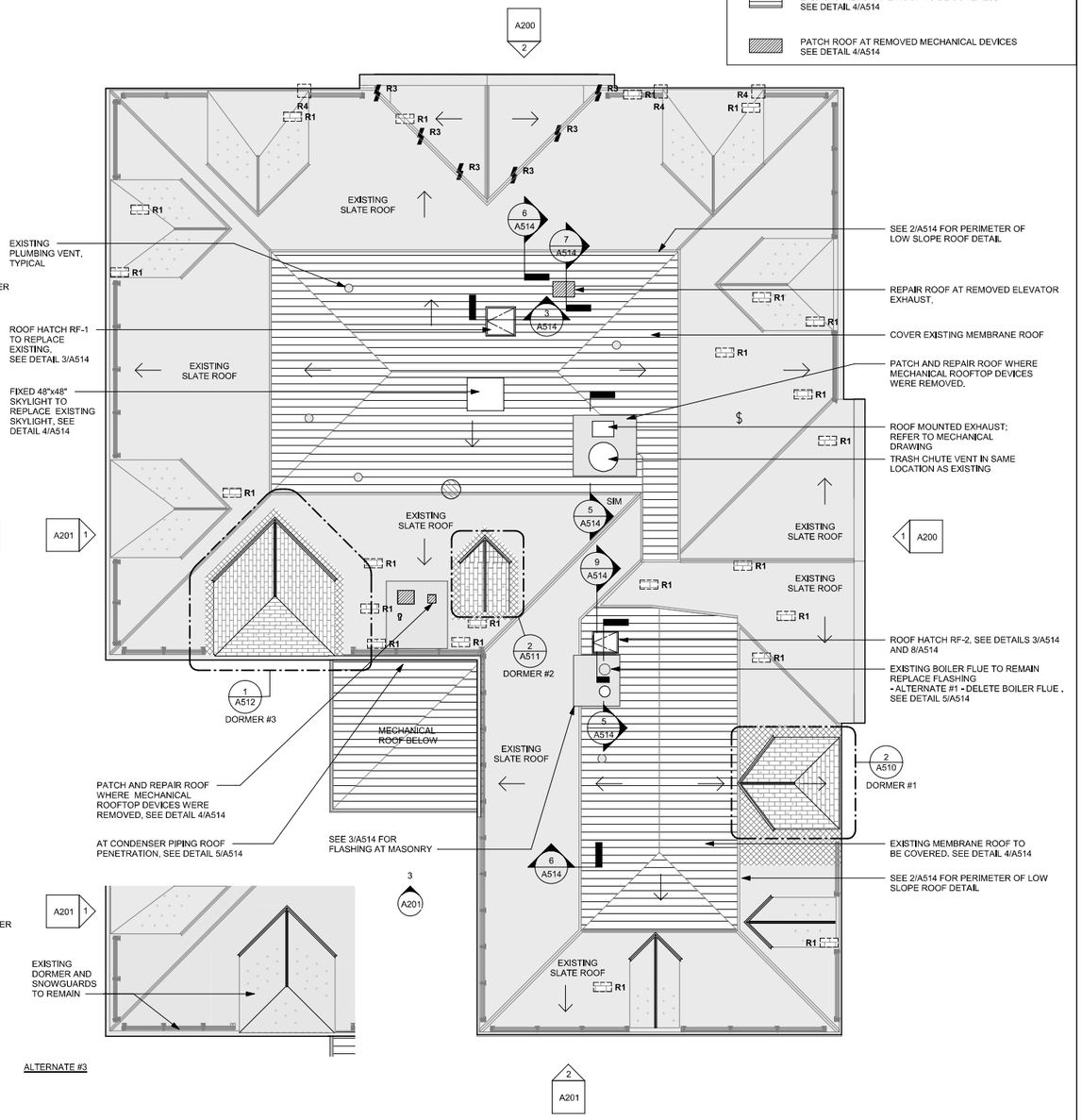
3/19/2021 4:47:56 PM Author

ROOF RESTORATION LEGEND

- **AIR BUBBLE AT ROOF** — OPEN BUBBLE TO SEE IF THERE IS AIR OR WATER AND RELEASE AIR/WATER AND PATCH TO EXISTING CONDITION
- R3 — **GAP AT METAL FLASHING** — INSTALL SPLINE PIECE OF METAL FLASHING
- R1 — **MISSING SLATE** — REMOVE AND REPLACE
- R4 — **GAP AT WOOD JOINTS OR DECROTIVE MOULDINGS** — REINSTALL WOOD TRIM OR SECURE AND SEAL
- AREA OF SLATE ROOF REPLACEMENT USING SALVAGED MATERIALS
- EXISTING MEMBRANE ROOF TO BE COVERED. SEE DETAIL 4/A514
- PATCH ROOF AT REMOVED MECHANICAL DEVICES SEE DETAIL 4/A514



1 ATTIC PLAN
1/8" = 1'-0"



ALTERNATE #3

3 ALT #3
1/8" = 1'-0"

2 ROOF PLAN
1/8" = 1'-0"

0' 4' 8' 16'

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DRAWING TITLE
Attic and Roof Plans

DRAWING INFORMATION

March 24, 2021
DATE OF ISSUE

100% Construction Documents
DESCRIPTION

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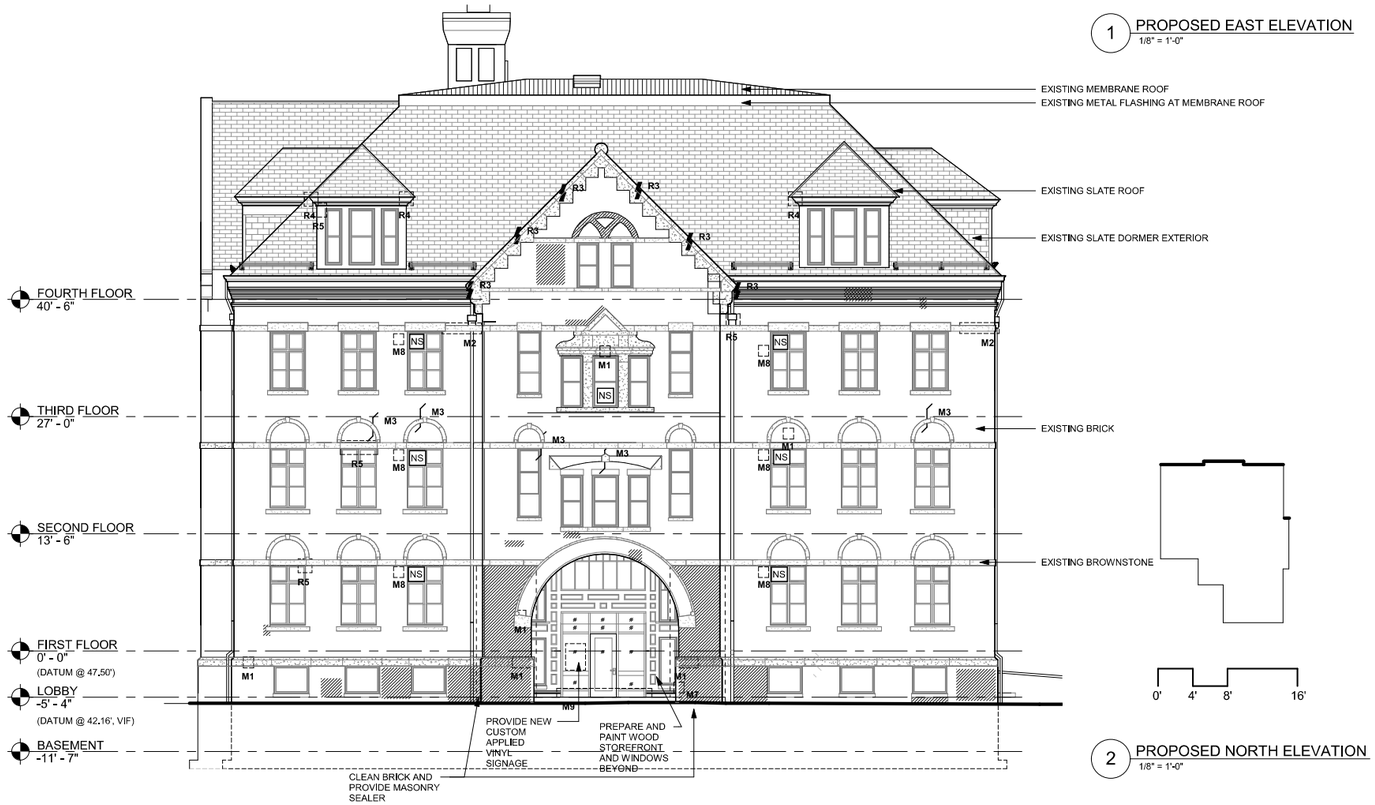
SCALE	DRAWN BY
3431	
PROJECT #	FILE NAME

DRAWING NUMBER
A103

1 PROPOSED EAST ELEVATION
1/8" = 1'-0"



2 PROPOSED NORTH ELEVATION
1/8" = 1'-0"

GENERAL NOTES: EXTERIOR ELEVATIONS

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF BROWNSTONE , REPOINT 100% OF BROWNSTONE JOINTS.
3. NEW MECHANICAL LOUVERS AT GRADE LEVEL TO MATCH EXISTING LOUVERS IN PROFILE.
4. EXISTING MECHANICAL LOUVERS TO BE REFINISHED "PATINA GREEN." NEW MECHANICAL LOUVERS TO BE FINISHED "PATINA GREEN."
5. REMOVE AND RESINTALL DOWNSPOUTS IN ORDER TO REPAIR AND CLEAN MASONRY.
6. REMOVE AND RESINTALL GUTTERS AT LOW ROOF WHERE THE CORBELLED BRICK IS CALLED TO BE REPAIRED.

EXTERIOR MASONRY RESTORATION LEGEND

REPAIRS REFERENCED ON ELEVATIONS ARE REPRESENTATIVE AND APPROXIMATE IN LOCATION AND QUANTITY; REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES. IF NOT INDICATED IN UNIT PRICING, CARRY SCOPE INDICATED ON DRAWINGS.

BROWNSTONE
REPOINT 100% OF BROWNSTONE JOINTS (NOT INCLUDING BRICK TO BROWNSTONE JOINTS)
AT COPING STONE JOINTS, PROVIDE CAULK INSTEAD OF MORTAR.
CLEAN 100% OF BROWNSTONE

M1 **FAILING MASONRY PATCHING IN BROWNSTONE**
REMOVE EXISTING PATCHING AND REPLACE

M2 **DELAMINATED BROWNSTONE**
REPAIR USING RESTORATION MORTAR

M3 **VERTICAL CRACK IN BROWNSTONE**
CLEAN OUT CRACK AND PROVIDE EPOXY REPAIR

M4 **STEP CRACK IN BRICK**
REMOVE AND REBUILD WITH SALVAGED BRICK

M5 **DISPLACED BRICK**
REMOVE AND REBUILD WITH SALVAGED BRICK

M6 **ERODED MORTAR**
REMOVE ERODED MORTAR JOINT IN BRICK AND REPOINT

M7 **SPALLING/HOLE IN BRICK**
REMOVE AND REBUILD SPALLED BRICKS WITH SALVAGED BRICK

M8 **MASONRY REPAIR AT REMOVED AC WINDOW UNIT**
REMOVE BRACKETS AND AIR CONDITIONER PLATFORM, INFILL FASTENER HOLES IN BRICK.

M9 **MASONRY REPAIR AT CONCRETE CURB AT VESTIBULE**
REPAIR THROUGH CRACKS AT PERIMETER OF VESTIBULE (ALL THREE ELEVATIONS), INTERIOR AND EXTERIOR AND PAIN.

M10 **MASONRY REPAIR AT CONTROL JOINT**
REMOVE EXISTING MORTAR AND REPLACE WITH SEALANT.

INTERIOR MASONRY RESTORATION SCOPE

REPOINT INTERIOR FACE OF EXTERIOR MAOSONRY WALLS WHERE JOINT DETERIORATION IS GREATER THAN 1". THIS IS NOT EXPOSED FINISH MASONRY AND WILL BE CONCEALED BEHIND FURRED WALLS. REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES.

ROOF, FLASHING AND SEALANT REPAIR LEGEND

R1 **MISSING SLATE**
REMOVE AND REPLACE

R2 **AIR BUBBLE AT ROOF**
OPEN BUBBLE TO SEE IF THERE IS AIR OR WATER AND RELEASE AIR/WATER AND PATCH TO EXISTING CONDITION

R3 **GAP AT METAL FLASHING**
INSTALL SPLINE PIECE OF METAL FLASHING

R4 **DETERIORATED JOINTS AT WOOD TRIM**
REINSTALL WOOD TRIM OR SECURE AND SEAL

R5 **MISSING SEALANT OR FAILED SEALANT**
REMOVE AND REPLACE

WINDOW REPAIR LEGEND

NS **REPLACE SASH AT REMOVED AC WINDOW UNIT**
PROVIDE REPLACEMENT SASH & GLAZING WHERE THROUGH AIR CONDITIONER WAS REMOVED.

ELECTRICAL LEGEND

EXTERIOR SCONCE
INSTALL NEW SCONCE IN EXISTING LOCATIONS. REFER TO ELECTRICAL DRAWINGS.

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DRAWING TITLE
North and East Elevations

DRAWING INFORMATION
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Author — DRAWN BY
3431 — PROJECT #
FILE NAME

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A200

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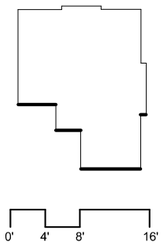
1 PROPOSED WEST ELEVATION
1/8" = 1'-0"

3 ALTERNATE #3- EXISTING DORMER TO REMAIN
1/8" = 1'-0"



2 PROPOSED SOUTH ELEVATION
1/8" = 1'-0"

GENERAL NOTES: EXTERIOR ELEVATIONS

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF BROWNSTONE . REPOINT 100% OF BROWNSTONE JOINTS.
3. NEW MECHANICAL LOUVERS AT GRADE LEVEL TO MATCH EXISTING LOUVERS IN PROFILE.
4. EXISTING MECHANICAL LOUVERS TO BE REFINISHED "PATINA GREEN." NEW MECHANICAL LOUVERS TO BE FINISHED "PATINA GREEN."
5. REMOVE AND RESINTALL DOWNSPOUTS IN ORDER TO REPAIR AND CLEAN MASONRY.
6. REMOVE AND RESINTALL GUTTERS AT LOW ROOF WHERE THE CORBELLED BRICK IS CALLED TO BE REPAIRED.

EXTERIOR MASONRY RESTORATION LEGEND

REPAIRS REFERENCED ON ELEVATIONS ARE REPRESENTATIVE AND APPROXIMATE IN LOCATION AND QUANTITY; REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES. IF NOT INDICATED IN UNIT PRICING, CARRY SCOPE INDICATED ON DRAWINGS.

BROWNSTONE
REPOINT 100% OF BROWNSTONE JOINTS (NOT INCLUDING BRICK TO BROWNSTONE JOINTS)
AT COPING STONE JOINTS, PROVIDE CAULK INSTEAD OF MORTAR.
CLEAN 100% OF BROWNSTONE

M1 **FAILING MASONRY PATCHING IN BROWNSTONE**
REMOVE EXISTING PATCHING AND REPLACE

M2 **DELAMINATED BROWNSTONE**
REPAIR USING RESTORATION MORTAR

M3 **VERTICAL CRACK IN BROWNSTONE**
CLEAN OUT CRACK AND PROVIDE EPOXY REPAIR

M4 **STEP CRACK IN BRICK**
REMOVE AND REBUILD WITH SALVAGED BRICK

M5 **DISPLACED BRICK**
REMOVE AND REBUILD WITH SALVAGED BRICK

M6 **ERODED MORTAR**
REMOVE ERODED MORTAR JOINT IN BRICK AND REPOINT

M7 **SPALLING/HOLE IN BRICK**
REMOVE AND REBUILD SPALLED BRICKS WITH SALVAGED BRICK

M8 **MASONRY REPAIR AT REMOVED AC WINDOW UNIT**
REMOVE BRACKETS AND AIR CONDITIONER PLATFORM. INFILL FASTENER HOLES IN BRICK.

M9 **MASONRY REPAIR AT CONCRETE CURB AT VESTIBULE**
REPAIR THROUGH CRACKS AT PERIMETER OF VESTIBULE (ALL THREE ELEVATIONS), INTERIOR AND EXTERIOR AND PAIN.

M10 **MASONRY REPAIR AT CONTROL JOINT**
REMOVE EXISTING MORTAR AND REPLACE WITH SEALANT.

INTERIOR MASONRY RESTORATION SCOPE

REPOINT INTERIOR FACE OF EXTERIOR MAOSONRY WALLS WHERE JOINT DETERIORATION IS GREATER THAN 1". THIS IS NOT EXPOSED FINISH MASONRY AND WILL BE CONCEALED BEHIND FURRED WALLS. REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES.

ROOF, FLASHING AND SEALANT REPAIR LEGEND

R1 **MISSING SLATE**
REMOVE AND REPLACE

R2 **AIR BUBBLE AT ROOF**
OPEN BUBBLE TO SEE IF THERE IS AIR OR WATER AND RELEASE AIR/WATER AND PATCH TO EXISTING CONDITION

R3 **GAP AT METAL FLASHING**
INSTALL SPLINE PIECE OF METAL FLASHING

R4 **DETERIORATED JOINTS AT WOOD TRIM**
REINSTALL WOOD TRIM OR SECURE AND SEAL

R5 **MISSING SEALANT OR FAILED SEALANT**
REMOVE AND REPLACE

WINDOW REPAIR LEGEND

NS **REPLACE SASH AT REMOVED AC WINDOW UNIT**
PROVIDE REPLACEMENT SASH & GLAZING WHERE THROUGH AIR CONDITIONER WAS REMOVED.

ELECTRICAL LEGEND

EXTERIOR SCONCE
INSTALL NEW SCONCE IN EXISTING LOCATIONS. REFER TO ELECTRICAL DRAWINGS.

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DRAWING TITLE
South and West Elevations

DRAWING INFORMATION

March 24, 2021
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DESCRIPTION
As indicated
SCALE
Author
DRAWN BY
3431
PROJECT #
FILE NAME

DRAWING NUMBER
A201

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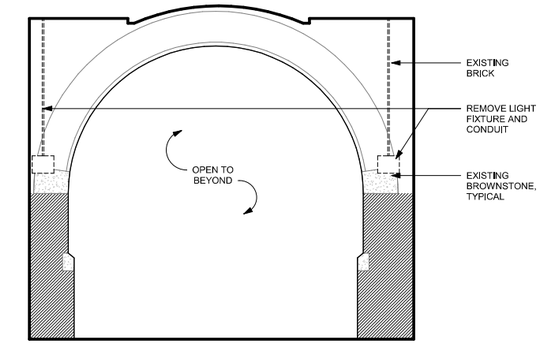
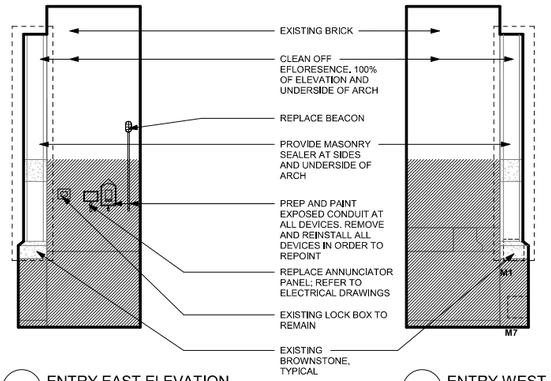


1 ENTRY NORTH ELEVATION DEMOLITION
1/4" = 1'-0"



2 ENTRY EAST ELEVATION
1/4" = 1'-0"

3 ENTRY WEST ELEVATION
1/4" = 1'-0"

GENERAL NOTES: EXTERIOR ELEVATIONS

1. ALL EXTERIOR MATERIAL IS BRICK UNLESS OTHERWISE NOTED
2. CLEAN 100% OF BROWNSTONE , REPOINT 100% OF BROWNSTONE JOINTS.
3. NEW MECHANICAL LOUVERS AT GRADE LEVEL TO MATCH EXISTING LOUVERS IN PROFILE.
4. EXISTING MECHANICAL LOUVERS TO BE REFINISHED "PATINA GREEN." NEW MECHANICAL LOUVERS TO BE FINISHED "PATINA GREEN."
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6. REMOVE AND RESINTALL GUTTERS AT LOW ROOF WHERE THE CORBELLED BRICK IS CALLED TO BE REPAIRED.

EXTERIOR MASONRY RESTORATION LEGEND

REPAIRS REFERENCED ON ELEVATIONS ARE REPRESENTATIVE AND APPROXIMATE IN LOCATION AND QUANITITY; REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES. IF NOT INDICATED IN UNIT PRICING, CARRY SCOPE INDICATED ON DRAWINGS.

BROWNSTONE
REPOINT 100% OF BROWNSTONE JOINTS (NOT INCLUDING BRICK TO BROWNSTONE JOINTS)
AT COPING STONE JOINTS, PROVIDE CAULK INSTEAD OF MORTAR.
CLEAN 100% OF BROWNSTONE

M1 **FAILING MASONRY PATCHING IN BROWNSTONE**
REMOVE EXISTING PATCHING AND REPLACE

M2 **DELAMINATED BROWNSTONE**
REPAIR USING RESTORATION MORTAR

M3 **VERTICAL CRACK IN BROWNSTONE**
CLEAN OUT CRACK AND PROVIDE EPOXY REPAIR

M4 **STEP CRACK IN BRICK**
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M5 **DISPLACED BRICK**
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M9 **MASONRY REPAIR AT CONCRETE CURB AT VESTIBULE**
REPAIR THROUGH CRACKS AT PERIMETER OF VESTIBULE (ALL THREE ELEVATIONS), INTERIOR AND EXTERIOR AND PAIN.

M10 **MASONRY REPAIR AT CONTROL JOINT**
REMOVE EXISTING MORTAR AND REPLACE WITH SEALANT.

INTERIOR MASONRY RESTORATION SCOPE

REPOINT INTERIOR FACE OF EXTERIOR MAOSONRY WALLS WHERE JOINT DETERIORATION IS GREATER THAN 1". THIS IS NOT EXPOSED FINISH MASONRY AND WILL BE CONCEALED BEHIND FURRED WALLS. REFER TO UNIT PRICING SECTION 012200 FOR BASE SCOPE QUANTITIES.

ROOF, FLASHING AND SEALANT REPAIR LEGEND

R1 **MISSING SLATE**
REMOVE AND REPLACE

R2 **AIR BUBBLE AT ROOF**
OPEN BUBBLE TO SEE IF THERE IS AIR OR WATER AND RELEASE AIR/WATER AND PATCH TO EXISTING CONDITION

R3 **GAP AT METAL FLASHING**
INSTALL SPLINE PIECE OF METAL FLASHING

R4 **DETERIORATED JOINTS AT WOOD TRIM**
REINSTALL WOOD TRIM OR SECURE AND SEAL

R5 **MISSING SEALANT OR FAILED SEALANT**
REMOVE AND REPLACE

WINDOW REPAIR LEGEND

NS **REPLACE SASH AT REMOVED AC WINDOW UNIT**
PROVIDE REPLACEMENT SASH & GLAZING WHERE THROUGH AIR CONDITIONER WAS REMOVED.

ELECTRICAL LEGEND

EXTERIOR SCONCE
INSTALL NEW SCONCE IN EXISTING LOCATIONS. REFER TO ELECTRICAL DRAWINGS.

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362 Green Street, Cambridge, MA 02139

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DRAWING TITLE
Exterior Entry Elevations

DRAWING INFORMATION

March 24, 2021
DATE OF ISSUE
100% Construction Documents
DESCRIPTION
As indicated — SCALE
MT — DRAWN BY
3431 — PROJECT #
FILE NAME

DRAWING NUMBER
A202

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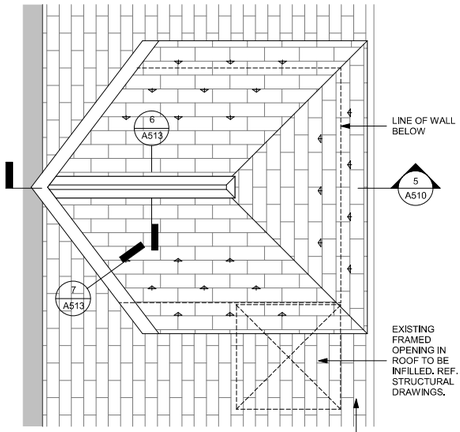
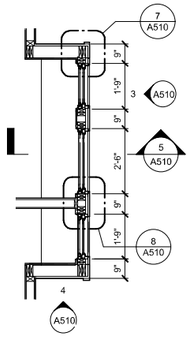
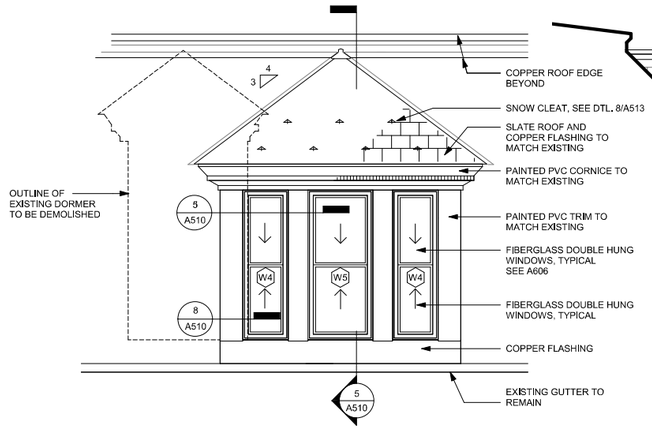


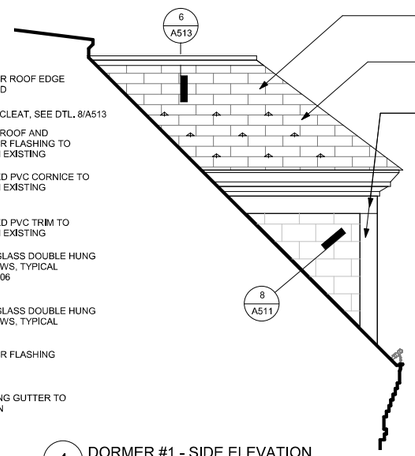
1 DORMER #1 - ROOF PLAN
3/8" = 1'-0"



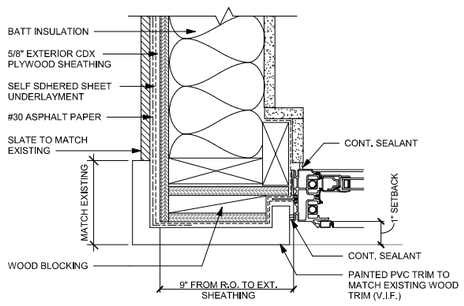
2 DORMER #1 ENLARGED PLAN
3/8" = 1'-0"

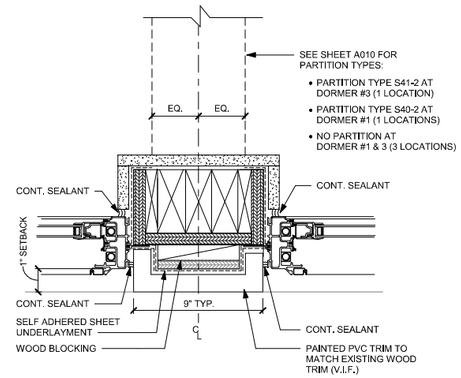


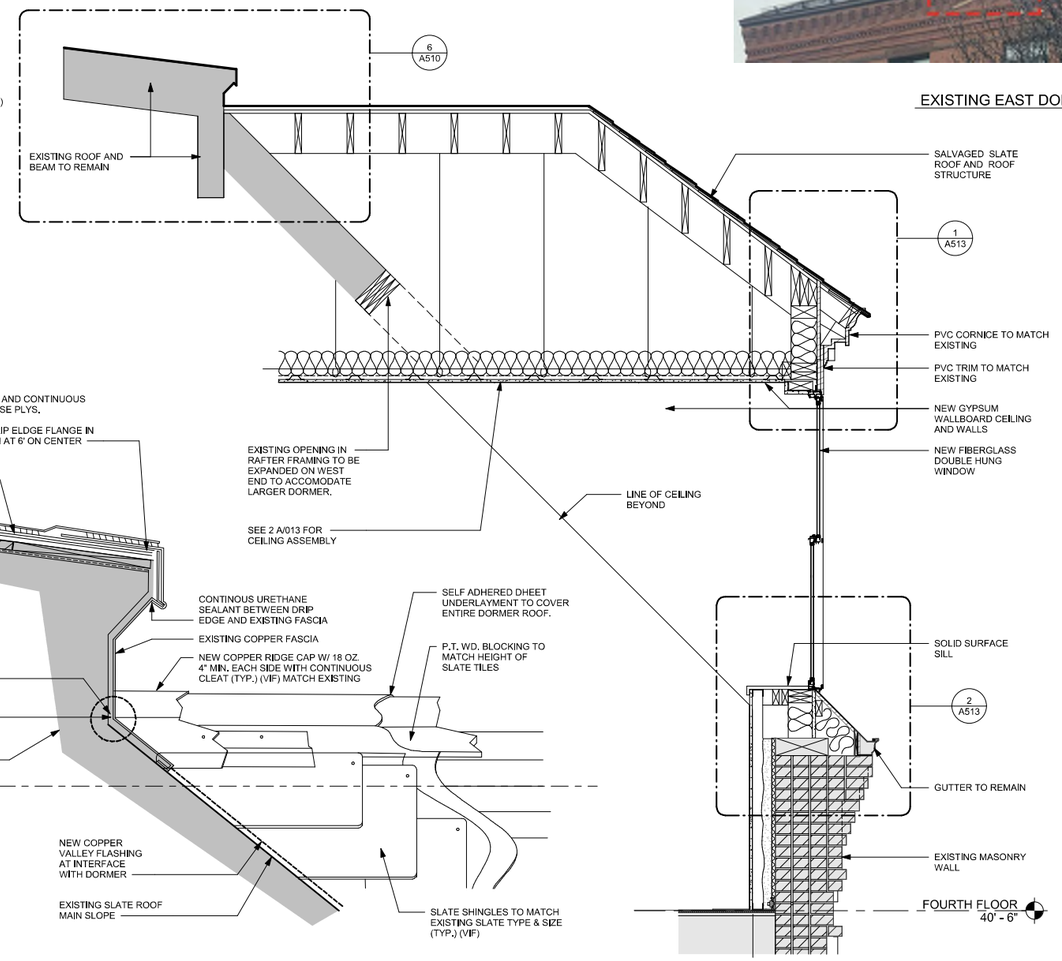
3 DORMER #1 - FRONT ELEVATION
3/8" = 1'-0"



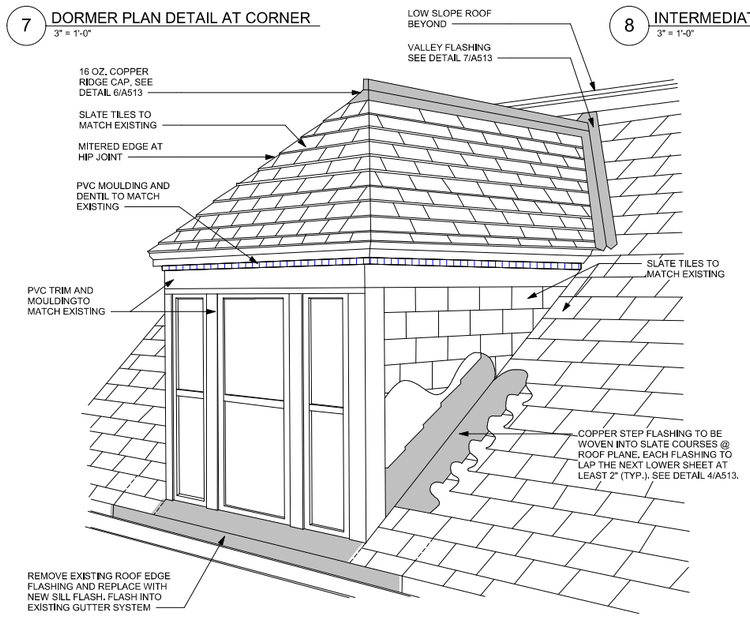
4 DORMER #1 - SIDE ELEVATION
3/8" = 1'-0"







5 DORMER #1 - WALL SECTION
3/4" = 1'-0"



DORMER #1 AXON

7 DORMER PLAN DETAIL AT CORNER
3" = 1'-0"

8 INTERMEDIATE MULLION AT DORMER
3" = 1'-0"

6 PERIMETER FLASHING @ UPPER ROOF
3" = 1'-0"

EAST DORMER INTERIOR

EXISTING EAST DORMER

ARCHITECT
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Boston, MA 02210
(617) 350 0450

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362 Green Street, Cambridge, MA 02139

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DRAWING TITLE
Dormer #1

DRAWING INFORMATION

March 24, 2021
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100% Construction Documents
DESCRIPTION
As Indicated
SCALE
Author
DRAWN BY
3431
PROJECT #
FILE NAME

DRAWING NUMBER
A510

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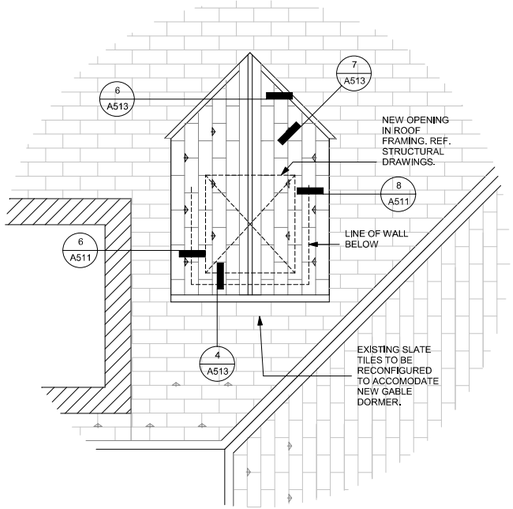
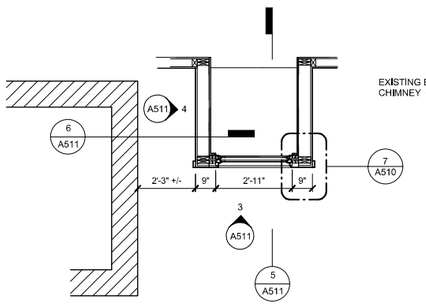
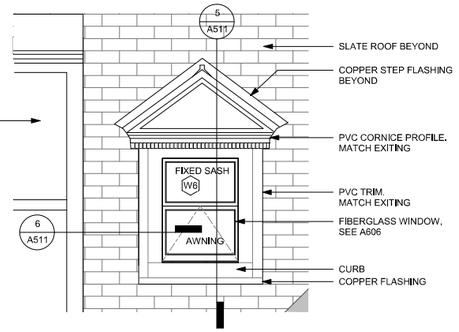
Author



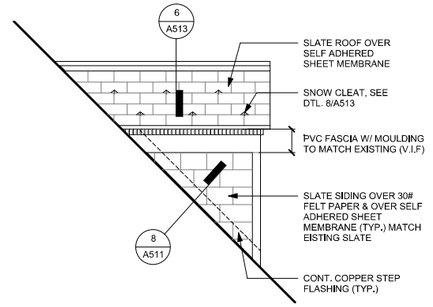
1 DORMER #2 - ROOF PLAN
3/8" = 1'-0"



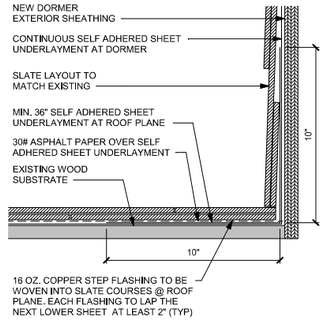
2 DORMER #2 PLAN
3/8" = 1'-0"



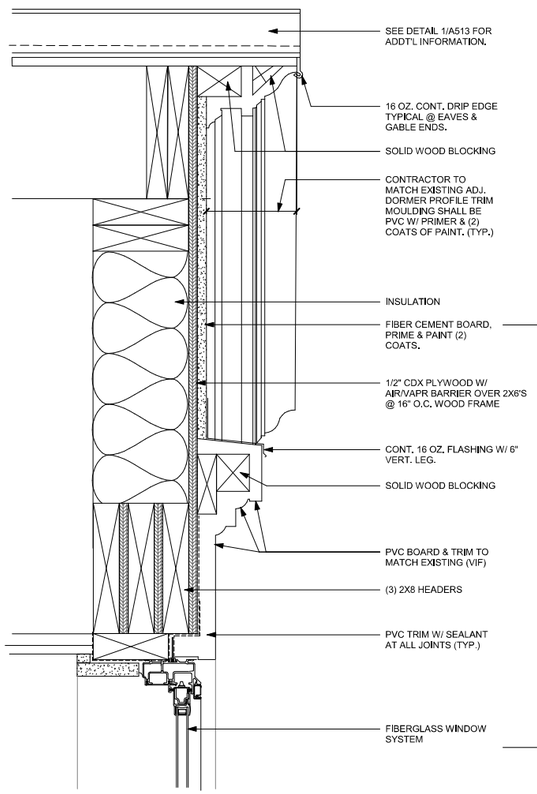
3 DORMER #2 FRONT ELEVATION
3/8" = 1'-0"



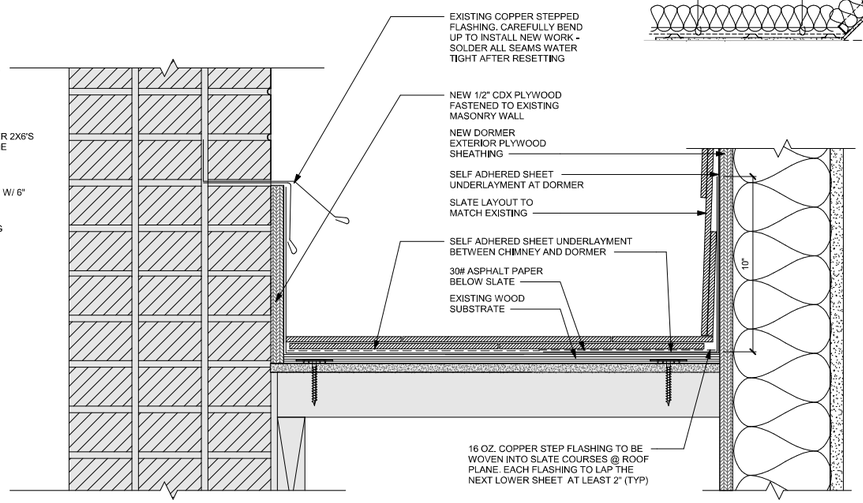
4 DORMER #2 SIDE ELEVATION
3/8" = 1'-0"



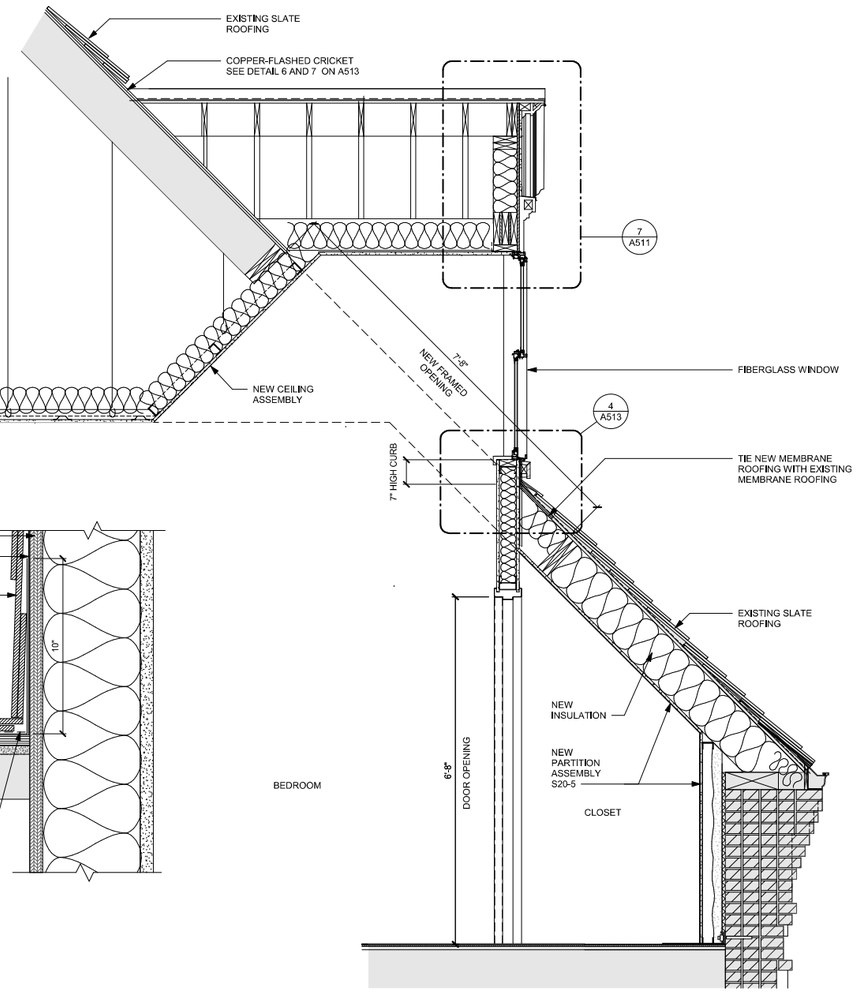
8 DORMER TO SLATE ROOF DETAIL
3" = 1'-0"



7 DORMER #2 - GABLE DETAIL
3" = 1'-0"



6 DORMER TO SLATE BRICK DETAIL
3" = 1'-0"



5 DORMER #2 - WALL SECTION
3/4" = 1'-0"

ARCHITECT
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DRAWING TITLE
Dormer #2

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3431 — PROJECT #
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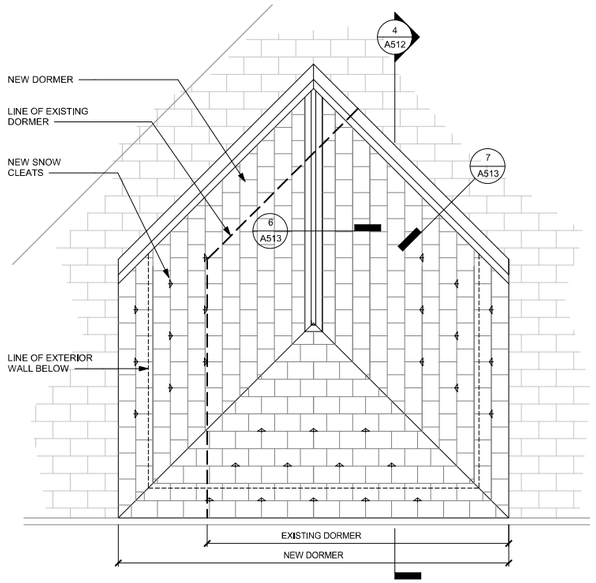
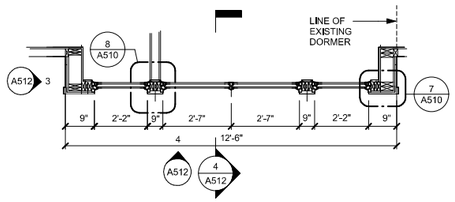
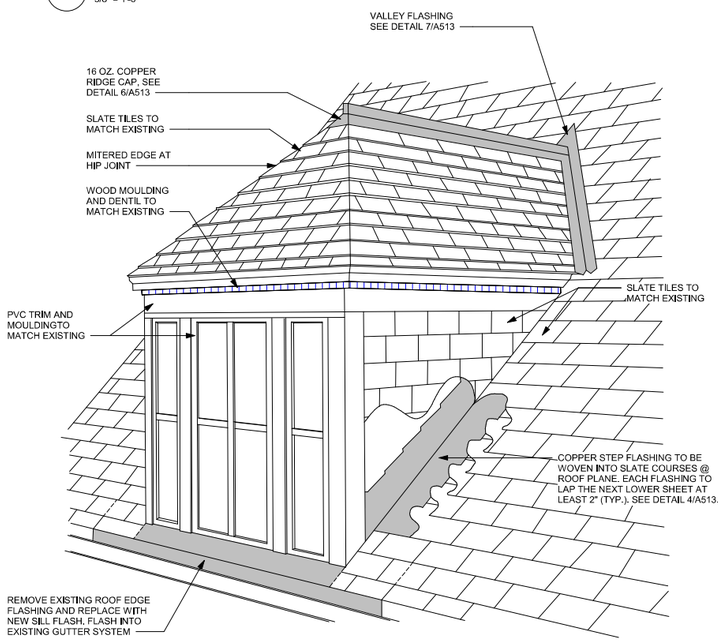


1 DORMER #1 - ROOF PLAN
3/8" = 1'-0"



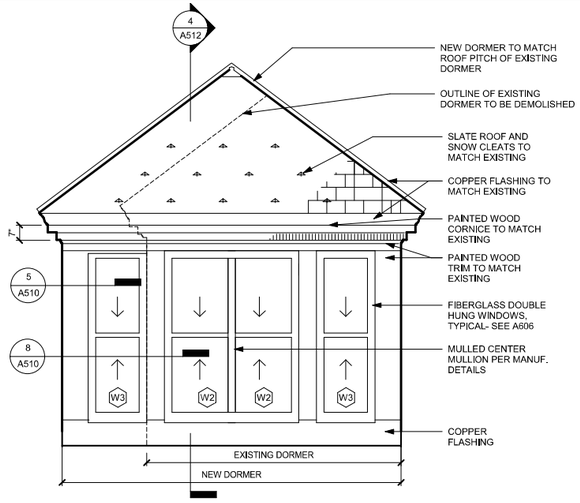
5 DORMER #1 - ENLARGED PLAN
3/8" = 1'-0"



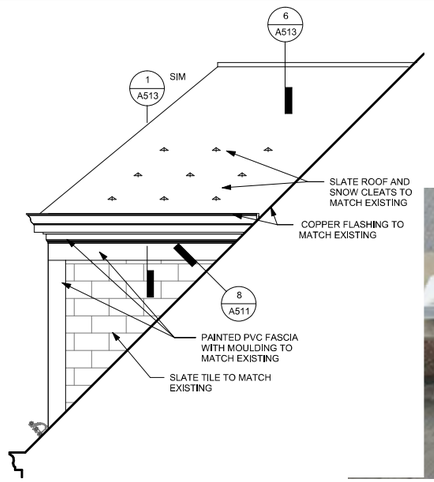
DORMER #3 AXONMETRIC DIAGRAM

EXISTING DORMER #1 - INTERIOR PHOTO

EXISTING DORMER #1 - EXTERIOR PHOTO



2 DORMER #3 - FRONT ELEVATION
3/8" = 1'-0"

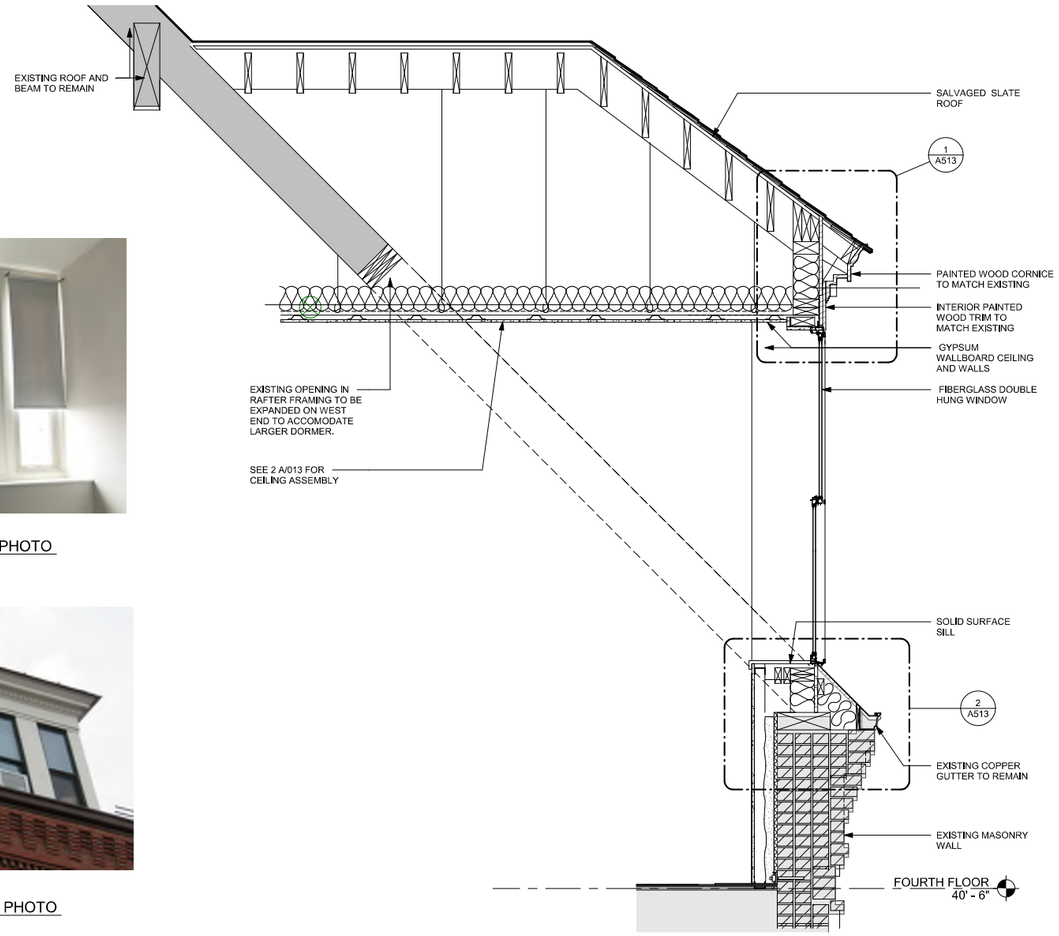


3 DORMER #1 - SIDE ELEVATION
3/8" = 1'-0"

ALTERNATE #3

EXISTING DORMER TO REMAIN; REPAIR BROKEN SLATE SHINGLES AND REPLACE MISSING SNOW CLEATS

EXISTING DORMER #1 - ROOF PHOTO



4 DORMER #1 - WALL SECTION
3/4" = 1'-0"

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Dormer #3

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3431 — PROJECT #
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A512

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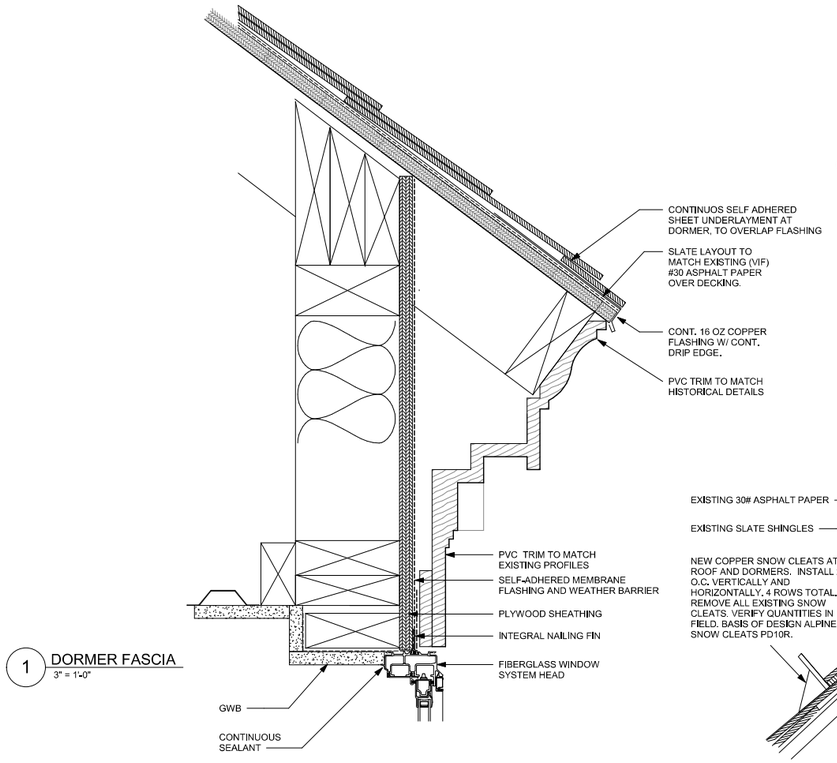
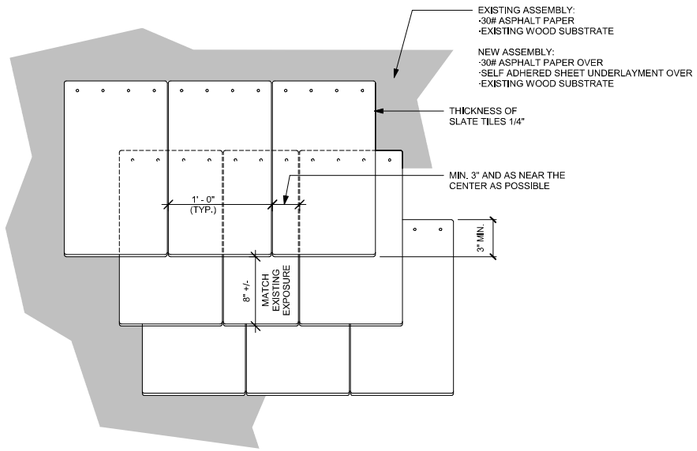
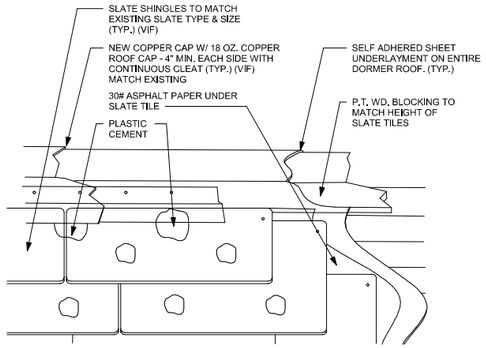


1 DORMER FASCIA
3" = 1'-0"



3 TYPICAL SLATE DETAILS
1 1/2" = 1'-0"



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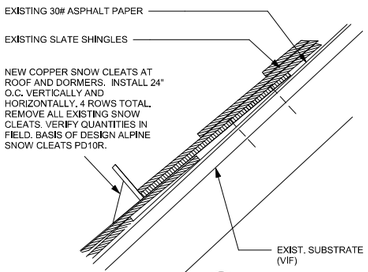
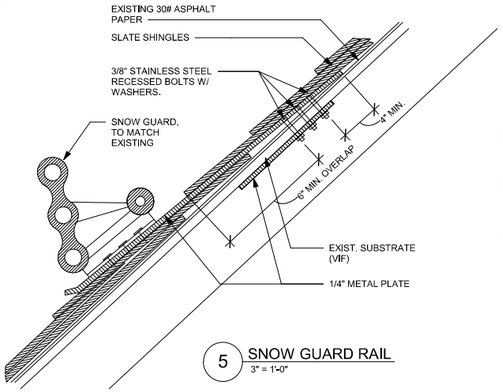
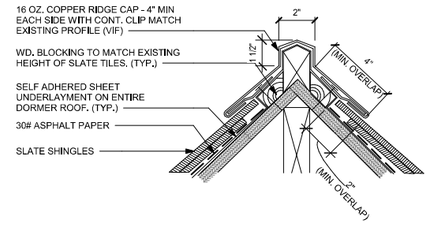


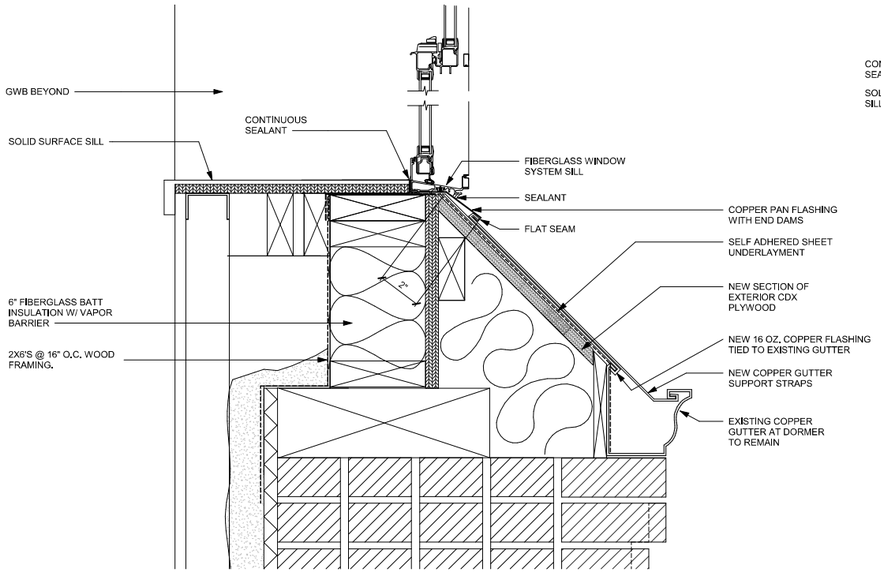
8 SNOW CLEAT
3" = 1'-0"



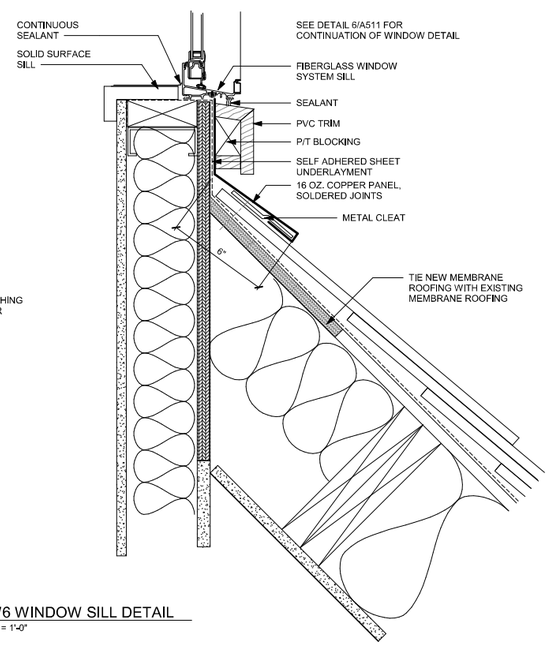
5 SNOW GUARD RAIL
3" = 1'-0"



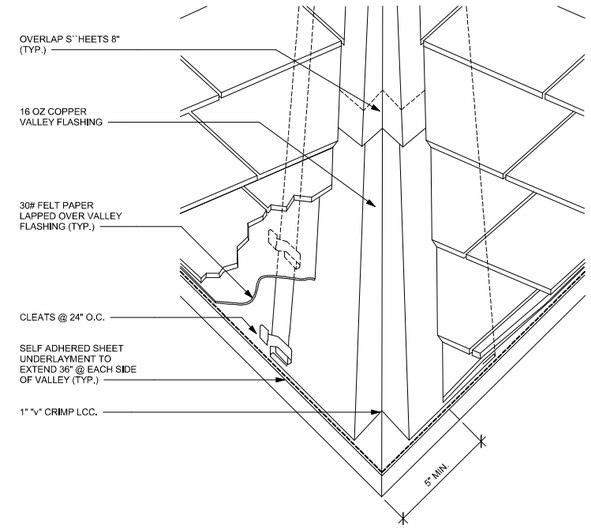
6 DORMER ROOF - RIDGE CAP DETAIL
3" = 1'-0"



2 SOUTH DORMER EXTERIOR SILL DETAIL
3" = 1'-0"



4 W6 WINDOW SILL DETAIL
3" = 1'-0"



7 DORMER ROOF - VALLEY FLASHING DETAIL
3" = 1'-0"

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Roof Details

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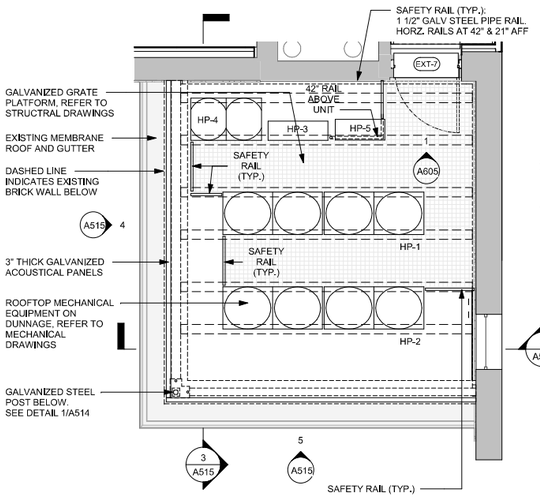
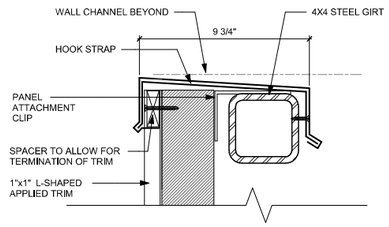
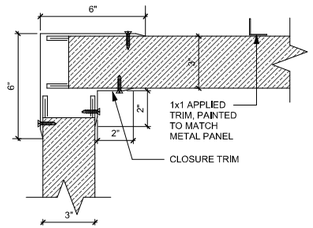


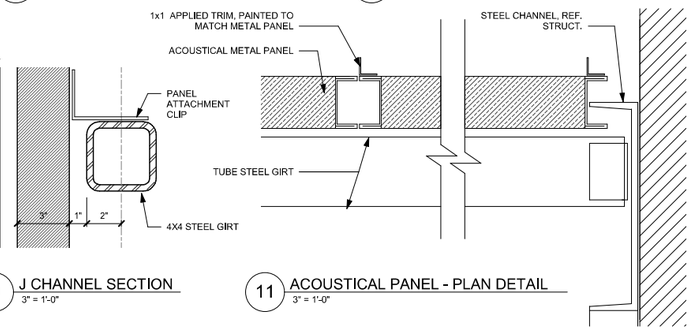
1 LOWER ROOF PLAN
1/4" = 1'-0"



8 ALUMINUM WALL COPING
3" = 1'-0"

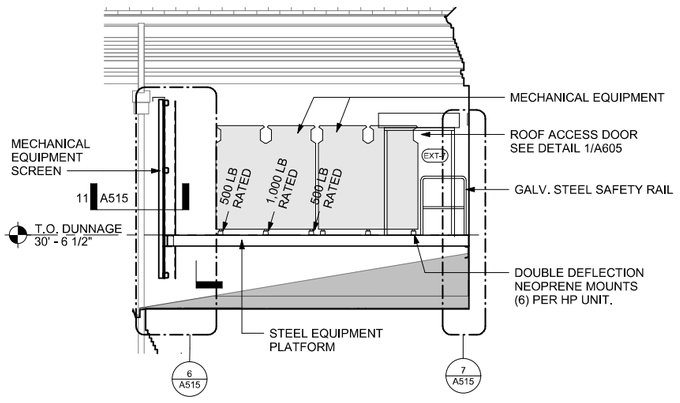


10 CORNER SECTION - PLAN DETAIL
3" = 1'-0"

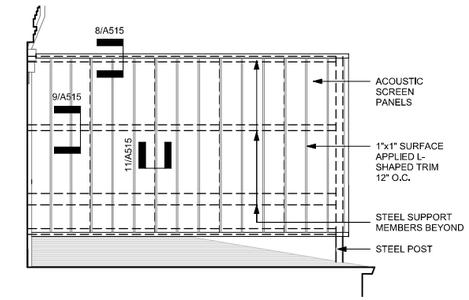


9 J CHANNEL SECTION
3" = 1'-0"

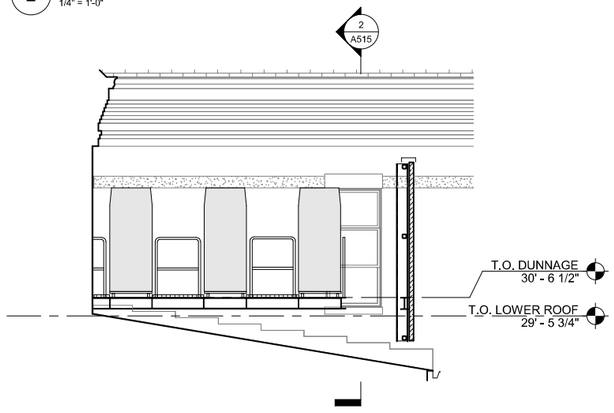
11 ACOUSTICAL PANEL - PLAN DETAIL
3" = 1'-0"



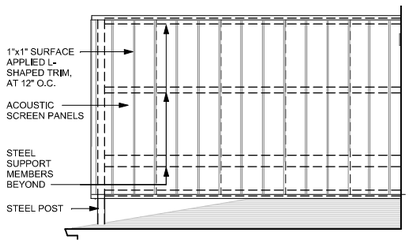
2 SECTION THROUGH STRUCTURAL DECK WEST-EAST
1/4" = 1'-0"



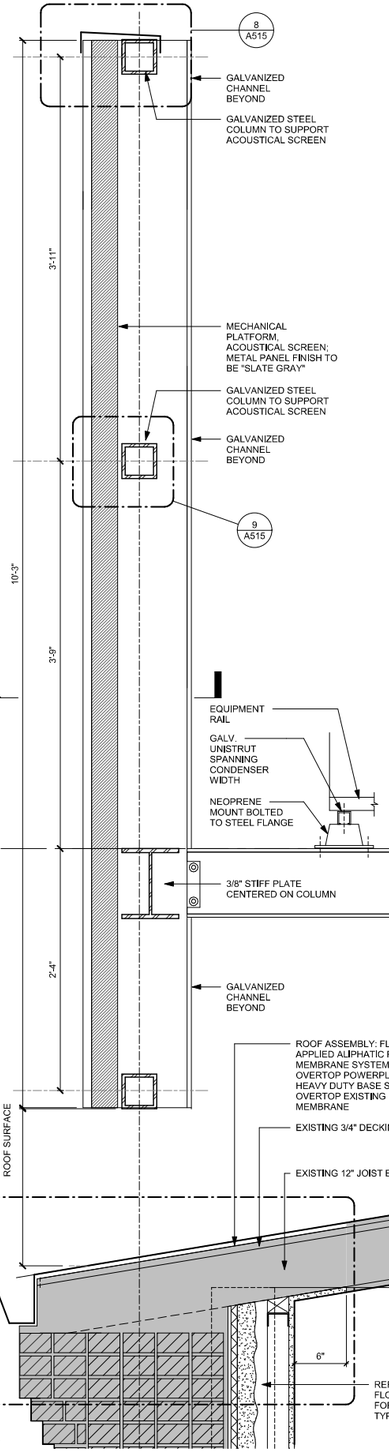
4 STRUCTRUAL DECK WEST ELEVATION
1/4" = 1'-0"



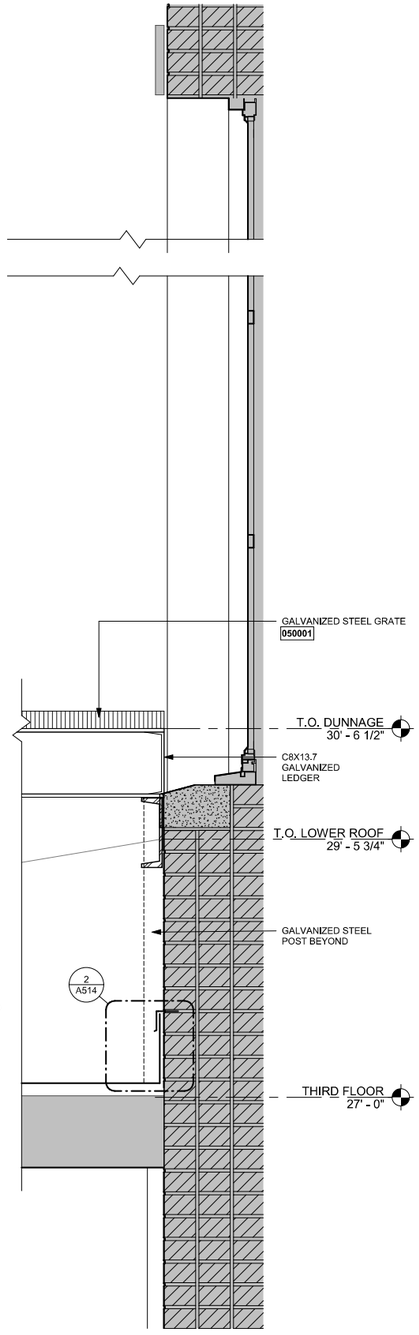
3 SECTION THROUGH STRUCTURAL DECK NORTH-SOUTH
1/4" = 1'-0"



5 STRUCTURAL DECK SOUTH ELEVATION
1/4" = 1'-0"



6 SECTION THROUGH ACOUSTIC SCREEN
1 1/2" = 1'-0"



7 SECTION THROUGH EXTERIOR WALL
1 1/2" = 1'-0"

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PROJECT NAME
Modernization of Putnam School Apartments
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REVISIONS

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DRAWING TITLE
Dunnage Plans Sections and Details

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SECTION 049100

MASONRY RESTORATION

(Part of Work of Section 040001 – MASONRY WORK, Filed Sub-Bid Required)

PART 1 – GENERAL

1.0 RESTORATION INTENT

The intent of the project is to retain as much as possible of the existing brick and brownstone on the building, except at areas with architectural changes.

The intent is to repair areas of damage, particularly areas where water infiltration has and will otherwise continue to lead to deterioration of the masonry and building wall. Areas of general wear such as small dents and chipped corners are intended to remain.

1.1 DESCRIPTION OF WORK

Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

(Note: **MX** designations and **BOLD** descriptions correspond to areas of work and legend terminology on drawings, where they aid in identifying scope locations and quantities. Not all scope includes this reference. These references are noted on various products within these specifcations to help clarify products and requirements.)

A. **M1 FAILING MASONRY PATCHING IN BROWNSTONE**
Remove existing patch and provide new patch. See masonry patching products and execution.

B. M2 DELAMINATED BROWNSTONE
Remove unsound material and patch to replicate original profile. See masonry patching products and execution.

C. M3 VERTICAL CRACK IN BROWNSTONE
Clean out and provide epoxy repair. See epoxy repair products and execution.

D. M4 STEP CRACK IN BRICK
Remove cracked brick and rebuild with salvaged brick or new brick to match, as indicated on drawings. See brick products.

E. M5 DISPLACED BRICK
Remove and rebuild with salvaged brick or new brick to match, as indicated on drawings. See brick products.

F. M6 ERODED MORTAR

Remove eroded mortar in brick and repoint. See repointing mortar and repointing execution.

G. M7 SPALLING/HOLE IN BRICK

Fill hole in brick. See patching mortar and execution.

H. M8 MASONRY REPAIR AT REMOVED AC WINDOW UNIT

I. M9 MASONRY REPAIR AT CONCRETE CURB AT VESTIBULE

J. M10 MASONRY REPAIR AT CONTROL JOINT

K. Replacement of spalled or otherwise damaged brick with salvaged or new brick.

L. Cutting out and repointing of mortar at all brownstone.

M. Other repairs as noted on the drawings.

N. Salvage of existing brick and brownstone for use at other locations on the building.

O. Submit Unit pricing for all defined work scopes for valuation of unanticipated scope changes.

1.2 RELATED WORK

A. Examine Contract Documents for requirements that affect work of this Section. Other Specification Sections that relate directly to work of this Section include, but are not limited to:

1 Section 012220 – UNIT PRICES
2 Section 024119 – SELECTIVE DEMOLITION for removal of existing masonry and demolition requirements in addition to what is specified in this section.
3 Section 028000 – ENVIRONMENTAL PROCEDURES for procedures required related to the removal and disposal of lead and asbestos-containing materials.
4 Section 042000 – UNIT MASONRY for work at non-restoration areas.
5 Section 049300 – MASONRY CLEANING for cleaning of exterior stone and brick.
6 Section 079200 – SEALANTS for joint sealants at stone and brick.

1.3 REFERENCES

Comply with applicable requirements of the following standards:

A. American National Standards Institute, Building Code Requirements for Masonry – ANSI 41.4.
B. ASTM: C 144 – Specification for Aggregate Masonry Mortar
C. ASTM: C 150 – Standard Specification for Portland Cement
D. ASTM: C 207 – Hydrated Lime for Masonry Purposes
E. ASTM: C 270 – Standard Specification for Mortar for Masonry Units

F. BIA 1 – Technical Notes on Brick Construction, Cold Weather Masonry Construction, Introduction

G. BIA 1A – Technical Notes on Brick Construction, Cold Weather Masonry Construction, Construction and Protection Recommendations

1.4 REGULATORY REQUIREMENTS

A. Strictly comply with applicable codes, regulations and requirements of authorities having jurisdiction in the City of Cambridge and the Commonwealth of Massachusetts.

1.5 SUBMITTALS

A. Product Data: Foreach type of product indicated include recommendations for application and use. Include test data substantiating that products comply with requirements.

B. Restoration Program: For each phase of work, provide a work plan that includes a detailed description of materials, methods, equipment, schedule and locations for mockups, and sequence of operations to be used for each items of work, including protection of surrounding materials.

C. Submit the following submittals, samples, and mock-ups to the Owner and the Architect for review and approval prior to the start of repairs.

1. Repointing mortar shall match the color, texture, strength, joint width and joint profile of the existing historic masonry.
2. Brick and Stone repair and brick replacements shall match the existing historic masonry. As there are several types of mortar on the building, the Architect will identify the ones to be matched.

3. Good quality overall and close-up color photographs of sample repointing must be submitted to the Owner and Architect for approval and documentation of approval in a manner such that the approved repointing is identified for the duration of the project. On-site inspection will also be required.

C. Samples and Testing of Existing Mortar and Brick Materials: Submit testing and analysis from a qualified independent laboratory employed and paid by the Contractor, indicating and interpreting test results relative to physical and chemical properties of existing masonry materials:

1. Mortar: sample and test mortar from each distinct section of the building, for mortar type, color and aggregate composition. Separate testing, samples and mockups are required for brownstone and for face brick.

2. Clay Brick Masonry: sample and test brick from each distinct section of the building, for color, hardness and porosity.

D. Material test reports from a qualified independent laboratory employed and paid by the Contractor, indicating and interpreting test results relative to compliance of the proposed masonry materials with the requirements indicated:

1. Field-prepared mortar complying with the property requirements of ASTM: C 270. Submit each type of sand used for pointing mortar. For blended sands, provide samples of each component and blend. Identify sources, both supplier and quarry, of each component and blend.

2. BRICK SAMPLE SUBMITTALS
   (a) Submit twenty-five bricks showing typical variations in color and texture of the proposed brick to be used as face brick. Since the brick at different wall areas and those of previous replacements are different colors, the brick for replacement shall match the majority of the surrounding brick in any location. Replacement brick shall match the size of the existing brick.
   (b) Submit certified reports for the required ASTM tests showing that the brick conform to Grade SW.

3. Each type of pointing mortar in the form of sample mortar strips, 6 inches long by 1/2 inch wide, set in aluminum or plastic channels.
   Include with each sample a list of ingredients with proportions of each. Identify sources, both supplier and quarry, of each type of sand and brand names of cementitious materials and pigments if any.

4. Each type of anchor, insert, dowel, and attachment, full size.
   Each type of masonry patching compound in the form of briquettes, at least 3 inches long by 1-1/2 inches wide. Document each sample with manufacturer and stock number or other information necessary to order additional material.

5. Submit a Material Safety Data Sheet (MSDS) for all materials to be used.

6. For patching products, submit certification from manufacturers, at the time of submittal of product information, showing the contractor is an approved installer. This is required for all masonry restoration products for which the manufacturer has this type of certification.

E. SAMPLES AND MOCK-UPS OF REPRESENTATIVE MATERIALS AND WORK

1. Prepare and cure mortar samples for a minimum of 7 days to demonstrate color and shade. The Owner and Architect reserve the right to reject samples, and request resubmissions, until samples having the desired colors and shades are considered an acceptable match to the existing mortar(s). Following the 7-day curing period, the mortar colors chosen shall be reviewed with the Owner and Architect for approval prior to installation.

2. Repoint and repair a 3 foot by 5 foot section of brick masonry wall with the brick and mortar colors and joint tooling proposed for each type of masonry restoration work on the project. This representative wall section of repointing and mortar repair work shall be approved by the Owner and Architect prior to commencement of repair work on the masonry walls. Provide samples as required by the Owner and Architect until color, texture, profile, and workmanship are accepted. The approved sample will be used as a quality control standard for all other repointing.

3. Prepare an exterior crack at a location in the brick masonry wall representative of project conditions. The approved mock-up will be used as a quality control standard for all other step crack repairs. The mock-up must be approved prior to proceeding with these repairs.

4. Repair and/or replace area of loose masonry representative of project conditions. The approved mock-up will be used as a quality control standard for all lintel repairs. The mock-up must be approved prior to proceeding with these repairs.

5. Prepare and fill open seam in representative brownstone units. The stone unit seam repair shall be reviewed and approved by the Architect and Owner, and will function as the quality control standard for the repair of other stonework. The mock-up must be approved prior to proceeding with these repairs.

6. Prepare two patch areas at brownstone, to be used as the quality control standard for all similar locations. One showing deep repair and one shallow. The number of mockups to achieve these two patch areas is as required to achieve a successful match. Mockups must assume a blending of products, and not limited to “out-of-the-box color. Contractor is to document and submit the blends used in each mockup to document the process, options provided, and the successful color.

1.07 QUALIFICATIONS

The Restorer shall be a company specializing in performing the masonry restoration work of the type specified herein, with a minimum of ten years of documented experience, including work on at least (5) five national register listed buildings. The work shall be done by skilled workers, fully instructed as to the requirements specified herein and adequately supervised during the work.

1.08 QUALITY ASSURANCE

A. Single-Source Responsibility for Mortar Materials: Obtain mortar ingredients of uniform quality, including color for exposed masonry, from one manufacturer for each cementitious component, as well as sand from one source for the producer for each aggregate.

B. Representatives of manufacturer providing manufactured patching materials, shall visit the project.

C. Field Inspection: The Owner, Architect, and their representatives shall be allowed access to and use of all staging daily to inspect the masonry repairs and procedures as well as the completed installation. All unsatisfactory work shall be corrected before moving on to new work.

D. Restoration Program: Prepare a written, detailed description of materials, methods, equipment, and sequence of operations to be used for each phase of restoration work including protection of surrounding materials and Project site.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.
2. The detailed Restoration Program is to also include procedures for quantifying, scheduling and pricing additional work scopes beyond those identified by the drawing which may become evident during the course of restoration work.

E. Masonry restoration mockups are to be performed at areas cleaned with the approved masonry cleaning product. In addition to the cleaning mockups required by Section 049300 Masonry Cleaning, clean enough stone and brick to allow for review of patching products.

1. If materials and methods other than those indicated are proposed for any phase of restoration work, add to the Quality-Control Program a written description of such materials and methods, including evidence of successful use on comparable projects, and demonstrations to show their effectiveness for this Project and worker's ability to use such materials and methods properly.

F. Cleaning and Repair Appearance Standard: Cleaned and repaired surfaces are to have a uniform appearance as viewed from 50 feet away by Architect. Perform additional paint and stain removal, general cleaning, and spot cleaning of small areas that are noticeably different, so that surface blends smoothly into surrounding areas.

1.09 DELIVERY, STORAGE, AND HANDLING

A. General: Do not deliver cement, lime, pre-manufactured patching materials, and similar perishable materials to the site until suitable storage is available. Store such materials in weatherproof structures, and ensure that materials are in perfectly fresh condition when brought for use. Protect masonry units and manufactured products of all types from wetting by rain or snow, and keep covered when not in use.

B. Aggregates: Deliver, store, and handle aggregate materials so as to prevent contamination with earth or other foreign materials.

C. Storage: Store cement, lime, and similar products under cover and away from direct contact with earth or floor slabs. Store metal accessories and the like under cover and protected from direct contact with the ground, and in a manner to prevent rust.

D. Damaged Materials: Remove any damaged or contaminated materials from the job site immediately, including materials in broken packages, packages containing water marks, or which show other evidence of damage, unless the Engineer specifically authorizes correction thereof and usage on the project.

1.10 PROJECT CONDITIONS

A. Repoint mortar joints and repair masonry only when air temperature is between and 40 and 90 deg F and is predicted to remain so for at least 7 days after completion of work.

B. Cold-Weather Requirements: Comply with the following procedures for masonry repair and mortar-joint pointing:

1. When air temperature is below 40 deg F, heat mortar ingredients, masonry repair materials, and existing masonry walls to produce temperatures between 40 and 120 deg F.

2. When mean daily air temperature is below 40 deg F, provide enclosure and heat to maintain temperatures above 32 deg F within the enclosure for 7 days after repair and pointing.

C. Hot-Weather Requirements: Protect masonry repair and mortar-joint pointing when temperature and humidity conditions produce excessive evaporation of water from mortar and repair materials. Provide artificial shade and wind breaks and use cooled materials as required. Do not apply mortar to substrates with temperatures of 90 deg F and above.

D. Patch masonry only when air and surface temperatures are between and 55 and 100 deg F and are predicted to remain above 55 deg F for at least 7 days after completion of work. On days when air temperature is predicted to go above 90 deg F, schedule patching work to coincide with time that surface being patched will be in shade or during cooler morning hours.

E. Perform masonry restoration work in the following sequence, after masonry cleaning is completed:

Remove plant growth.
Repair existing masonry, including the following:

a. Reconstructing and resetting existing stone work.

b. Replacing existing masonry with new masonry materials.

Rake out joints that are to be repointed.
Point mortar joints.
Inspect for open mortar joints and repair before cleaning to prevent the intrusion of water and other cleaning materials into the wall.
Masonry patching and coating.

F. As scaffolding is removed, patch anchor holes used to attach scaffolding. Patch holes in masonry units to comply with Part 3 "Masonry Patching and Repairs".

1.11 COORDINATION

Conference: Convene a pre-installation conference to establish procedures to coordinate this work with related and adjacent work.

PART 2 – PRODUCTS

2.01 MORTAR COMPONENTS

A. Portland Cement: Shall be Type I or Type III, ASTM: C 150, non-staining, white color, without air entrainment. Use Type III cement as necessary for laying masonry in cold weather.

B. Sand: Shall be clean, washed, uniformly well-graded, conforming to ASTM: C 144-542. Sand shall conform to the color, grade, composition, and particle sizes of the original, based on the results of the laboratory analysis.

C. Water: Shall be clean and potable without contaminants.

D. Lime: Shall be approved brand of plastic hydrated lime, conforming to ASTM: C 207, Type S.

E. Pigment shall be natural and synthetic oxides of iron and chrome, compounded specifically for use in mortar. The pigment to be used shall have a proven record of satisfactory performance, such as those manufactured by Davis Colors and Solomon Grind-Chem. Mortar colors shall be approved by the Owner and Architect. It should not be assumed that mortar colors straight from a box will match the Architect's selected area on the building. The Contractor is to blend colors in order to achieve an approved color.

2.02 REPLACEMENT BRICK

A. Replacement brick, as needed, shall be similar in size, color and texture to the existing brick. The replacement brick shall be Grade SW and shall conform to the requirements in ASTM: C 216, "Standard Specifications for Facing Brick."

B. Replacement brick, if needed, is to be a manufacturer's standard product that is the closest available match.

1. Brick for public faces of the building, at the street sides and courtyard/existing driveway, and acceptable match is "Traditional Red" by Brickcraft.

2. For the rear of the building, where the existing brick does not match the street-side brick, an acceptable match is "Light Red Waterstruck" by Stiles& Hart Brick Co.

Equal products to these matches will be accepted. A determination of the acceptability of the color and texture match is at the discretion of the Architect.

C Use salvaged brick at locations as noted on the drawings.

2.03 MASONRY PATCHING (FOR BOTH BROWNSTONE AND BRICK)

A. MASONRY PATCHING COMPOUND: FACTORY-MIXED CEMENTITIOUS PRODUCT THAT IS CUSTOM MANUFACTURED FOR PATCHING MASONRY, IS VAPOR- AND

WATER PERMEABLE, EXHIBITS LOW SHRINKAGE, AND DEVELOPS HIGH BOND STRENGTH TO ALL TYPES OF MASONRY.

B. Patching product for thin repairs (up to 1/16") at brownstone is Matrix TR by Conproco (or equal). Assume custom color matching is required, rather than a standard color.

C. Patching product for deeper repairs, approved products include Matrix by Conproco, and KEIM Restauro-Top, or equal, designed for sculpted repairs where feathering is not to be done. Assume custom color matching is required, rather than a standard color.

2.04 MORTAR MIXES

A. Measure mortar ingredients carefully to control proportions, and maintain the proportions throughout the work.

B. Dry mix the mortar with a power-operated batch mixer. Add pigment during the dry mixing of materials in measured quantities and blend it evenly into the mix. Provide not less than five minutes' mixing time to ensure a homogeneous plastic mortar. Provide at least two minutes' mixing time for dry materials.

C. Use a minimum amount of water to produce a workable consistency for the mortar's intended purpose. Mix pointing mortar in small batches for use within a one-hour period. Use mortar for rebuilding wall areas within 2-1/2 hours after initial mixing. Mortar which has stiffened due to evaporation within this period may be re-tempered once to restore workability for rebuilding only.

D. Conform to the proportions for Type N mortar as specified in the property specifications of ASTM: C 270 with a 1:1:6 mix of cement : lime : sand.

2.05 STEEL PLATE/COLUMN REPAIR COATING

A. Coating for repair of rusted plates and columns shall be an alkyd based coating with a minimum of 50% solids such as IronClad Metal Enamel C163 manufactured by Benjamin Moore & Co., Montvale, New Jersey

2.07 PAINT REMOVERS

A. Covered or Skin-Forming Alkaline Coating Removal: Manufacturer's standard covered or skin-forming alkaline formulation for removing paint coatings from masonry.

. 1. Products: Subject to compliance with requirements, provide one of the following
a. Diedrich Technologies Inc.; 606 Multi-Layer Paint Remover or 606X Extra Thick Multi-Layer Paint Remover with pull-off removal system.
b. Dumond Chemicals, Inc.; Peel Away 1 System.
c. PROSOCO; Enviro Klean Safety Peel 1 or Enviro Klean Safety Peel 3 with Enviro Klean Overcoat.

B. Solvent-Type Paint Remover: Manufacturer's standard water-rinsable, solvent-type gel formulation for removing bitumen and sealant residues and graffiti from masonry:
1. Products: Subject to compliance with requirements, provide one of the following:
a. Dumond Chemicals, Inc.; Peel Away 2.
b. PROSOCO; Sure Klean Fast Acting Stripper.

2.08 EPOXY REPAIRS

A. Epoxy crack repair products by Akemi, Sika or Equal. Include crushed brownstone from salvaged pieces at the surface to minimize the appearance of the crack repair.

2.09 Stone to stone adhesive: 2-part polyester or epoxy-resin stone adhesive with a 15- to 45-minute cure at 70 deg F or 1-part cementitious stone adhesive, recommended by adhesive manufacturer for type of stone repair indicated, and matching stone color.

Available Products: Subject to compliance with requirements, manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Two-Part Polyester or Epoxy:
1. Akemi North America; Akepox.

3. Bonstone Materials, Inc.; A-199-T/B-439-T.

4. Edison Coatings, Inc.; Flexi-Weld 520T.

a)Aggregate for mixing with epoxy: Granite of the same color as the area to be patched, reduced to a fine aggregate with a mallet. Use particles that pass through a No. 50 sieve and are retained on a No. 200 sieve.

b. One-Part Cementitious Stone Adhesive:
1) Cathedral Stone Products, Inc.; Jahn Restoration Adhesive.

2.10 WATER REPELLENT
Siloxane PD by Prosoco.

PART 3 – EXECUTION

3.01 PREPARATION

A. All materials specified shall be delivered to the site in approved manufacturer's sealed containers bearing the manufacturer's name and material identification, including date of manufacture. Store the materials on pallets in a dry place. Cover the pallets holding new materials and salvaged brick to prevent damage in accordance with the manufacturer's instructions and recommendations.

B. Weather conditions shall be dry. Ambient temperatures shall be between 40°F and 80°F during application operations and for twenty-four hours following the installation. At temperatures above 80°F protective tenting and other pre-approved methods are to be used to maintain reduced surface temperatures and allow for the proper cleaning of the pointing mortar. The surfaces to receive the work shall be as clean and dry as practicable, and all such conditions shall be in conformance with the requirements of this specification and BIA (Brick Institute of America).

C. During the performance of work of this Section, protect existing materials not receiving work at all times from mortar drippings, stains, and damage by the exercise of reasonable care and precautions. Clean or repair all existing materials which are soiled or otherwise damaged by this work to match the original profiles and finishes. Existing materials and finishes which cannot be cleaned or repaired shall be removed and replaced with new work to match the existing.

D. Immediately remove stains, efflorescence, or other excesses resulting from the work of this Section.

E. Protect landscaping, walkways, and roof areas from damage and debris resulting from the work of this Section. Damaged items shall be replaced by the Contractor with matching or equivalent items acceptable to the Owner.

F. Remove and store lights to allow repair of the brick walls. Upon completion of the masonry repairs, reinstall the lights.

G. Use vacuums attached to grinders to reduce dust.

H. Newly-laid material is to be protected while susceptible from staining by rain or other inclement conditions.

3.02 REPAIR AND REPOINTING OF EXISTING MASONRY

It is the intent of 3.02 to describe repairs to mortar joints in the brick walls and all stone as described in Paragraph 1.02.

G. Rake out loose or disintegrated mortar, including corners and returns at openings, as follows:

1. Rake out mortar from joints to depths equal to 2-1/2 times their widths, but not less than 1 inch, and not less than that required to expose sound, unweathered mortar. If voids are found in the bedding mortar during raking operations beyond the 1 inch depth, fill all voids

to 1 inch depth in same manner as pointing mortar installation. In all cases all weathered and loose material shall be removed.

a. Cut out old mortar by hand with a chisel and mallet, unless otherwise indicated. Width of chisel shall be narrower than the width of the existing joint.
   1) For narrow joints 1/8 inch or less, mortar shall be raked out manually with a sharp knife blade or cutter made for this purpose. The cutter may be used with or without the aid of a hammer.

b. For raking horizontal joints, contractor may propose alternate mechanical methods, such as the use of a power grinder with a 3 inch carborundum blade thinner than the width of the joint.
   1) Do not use power-operated grinders without Architect's written approval based on submission by Contractor of a satisfactory quality-control program and demonstrated ability of operators to use tools without damaging masonry based on test panels. Quality-control program shall include provisions for supervising performance and preventing damage due to worker fatigue. If mechanical grinding is found unacceptable, use only non-power tools.
   2) Power grinders shall not be used to remove mortar from joints less than 5/16 inch wide or for the raking out of vertical (head) mortar joints.
   3) Do not use blades thicker than 3/32 inch for scoring joints.
   4) The initial power tool cut shall be in the center of the joint. Remove the remaining mortar using hand tools. The Contractor shall set the depth of the blade so that the resulting kerf does not exceed the minimum depth.
   5) Stop the kerf a minimum 3/4 times the blade diameter from inside corners and projecting elements. Remove the remaining mortar using hand tools.
   6) The Contractor may construct jigs to guide the power tools and to prevent damage to adjacent masonry.

c. Remove mortar from brick surfaces within raked-out joints to provide reveals with square backs and to expose brick for contact with pointing mortar. Brush, vacuum, or flush joints to remove dirt and loose debris.

2. Do not spall edges of masonry units or widen joints. Sound brick damaged by the cutting process shall be replaced at the Contractor's expense with new, custom brick as specified for brick replacement for the Work.

3. All raking shall cease if, in the judgment of the Architect, the methods employed by the Contractor are causing damage to the brick or stone. No work shall commence until tools, workmen, and methodology are corrected to meet the quality standard of the test panel

H. Prepare masonry for repointing as follows:

1. When raking out is complete, remove dust and loose material by pressured air or brushing.

2. 24 hours prior to repointing, rinse masonry and joint surfaces with water under mains pressure to remove dust and mortar particles, and pre-wet the wall.

3. Immediately prior to repointing, prewet joints. Joints shall be left in a damp, but no standing water ("surface saturated dry"), condition for repointing.

   a. Do not allow the masonry to dry out. Continue to mist masonry with water as required as work progresses to maintain surface-saturated dry condition in the area of work.

I. Repoint masonry as follows:

1. Pack raked out areas tightly with specified mortar. Pack back corners of joints. Apply mortar first to areas where the existing mortar is either missing, or depth is greater than 1 inch. Fill joint in one lift to be slightly proud of the surface.
    a. Perform work with fresh mortar; do not use dead mortar droppings. Do all pointing while mortar is still soft and plastic. If hardened, chisel defect out and refill solidly with fresh additional mortar.
    b. Where existing masonry units have worn and rounded corners, recess the mortar slightly, so as not to fill in the worn areas.
2. When the mortar stiffens slightly (5 to 15 minutes) compress and tool the joint.
3. When the mortar is green hard, stiff enough to dent with a fingernail, brush or texture the joint as determined by test panel.
4. Protect and keep joints damp for 10 days after repointing to cure mortar. Protect from direct sunlight, wind, direct rainfall and rapid drying by covering with wet burlap. Mist wall and burlap periodically with water to keep moist.
5. After 10 days, treat the mortar surface with pigment as determined by test panel to match the existing adjacent mortar.

J. In addition to repointing work, remove and replace existing bricks that are loose, cracked through, or otherwise seriously deteriorated as determined by the Architect or Engineer. Install in fresh mortar, pointed to eliminate evidence of replacement. Replace removed brick with new or salvaged brick to match the bonding and coursing pattern of the existing brick.

3.03 REPLACEMENT OF SPALLED / DAMAGED BRICK

It is the intent of 3.03 to describe the installation of replacement brick in areas with spalled and / or missing brick, as described in Paragraph 1.02.

A. Remove spalled / damaged brick areas from the exterior wythe of brick. Remove all mortar from the surfaces of the brick abutting the brick replacement location. Take care to avoid damaging the abutting brick.

B. Wet the surfaces of the brick and mortar within the wall opening prior to the installation of new mortar and replacement brick. Allow no standing water on the brick surfaces or in the openings.

C. Fill the back of the openings at the inner wythes of the wall with mortar.

D. Install replacement brick with full head and bed joints of mortar. Tuck point the joints to ensure that they are filled with mortar. Match the brick to the coursing and plane of the abutting brick. Tool the joints to match the mock-up accepted by the Owner. Mortar shall be as specified in paragraph 2.04.

E. As the work proceeds, use clean sand, burlap, or a brush to remove most of the mortar from the surface of the brick before the mortar sets.

3.04 CLEANING OF REPOINTED / REBUILT BRICK MASONRY WALLS

It is the intent of 3.04 to describe the cleaning of rebuilt wall areas and areas of pointing in the masonry walls. Clean pointed wall areas, the rebuilt brick masonry walls, and newly installed brick in accordance with the requirements of the manufacturer of the cleaning material and the following additional requirements:

A. Proceed with cleaning of the repointed and rebuilt masonry wall areas only after the mortar has been allowed to cure for seven days.

B. Test the surrounding areas for compatibility with the cleaning material and/or protect all surrounding surfaces. Protect surfaces below the area to be cleaned, including shrubbery and other plants.

C. Saturate with water the wall area to be cleaned and all wall areas below.

D. Dilute one part pre-manufactured cleaner with the same number of parts of water used to clean the approved cleaning sample. Apply the diluted solution using a densely packed soft-fiber masonry washing brush.

E. Allow the solution to remain on the wall for a period of three to five minutes, depending on the drying conditions. Do not allow the cleaning material to dry.

F. Rinse the area thoroughly with fresh water to remove all cleaning material and residue. Keep all lower surfaces wet at all times to avoid staining of masonry.

3.05 REBUILD LOOSE AND DAMAGED WALL AREAS

It is the intent of 3.05 to describe the rebuilding of loose areas in the brick walls due to age, water infiltration and / or other reasons not specifically identified or otherwise described in Paragraph 1.02. .

A. Remove the loose brick from the wall areas starting with the exterior wythe until sound masonry is reached and remove the steel embedment. Clean and store salvage brick in a separate pile.

B. Remove all loose brick from the inner wythes in the wall.

C. Remove all mortar from the surface of the sound masonry surrounding the opening. Remove all dust from the surface of the brick at the opening.

D. Inspect all exposed steel for deterioration and review all substandard conditions with the Architect and Owner. Completely remove the rust scale from the surface of steel members adjacent to the surrounding brickwork by using power tools. Use hand tools to clean crevices and corners.

E. Coat the top surface of the relieving angle/lintel and any other over-exposed surfaces with two coats of a rust-inhibiting paint. Care should be taken not to allow paint to drip onto the masonry below.

F. Lay inner wythes of brick using replacement brick and Type N mortar with full mortar, bed, head, and collar joints.

G. Lay exterior wythe of brick with a blend of salvaged and replacement brick. The bricks are to be laid to match the brick coursing in the surrounding wall area with Type N mortar which contains the approved color. Tool the mortar joints to match the tooling in the mortar joints in the surrounding walls.

3.08 REPAIR OF EXTERIOR STEP CRACKS IN JOINTS AT MASONRY WALLS

It is the intent of 3.08 to describe the repair to exterior step cracks which may or may not extend through the full thickness of the wall to the interior of the building, as described in Paragraph 1.02:

A. Rake back all mortar from the joints to a minimum depth of 1-1/2 inch from the exterior face of the brick, or, where deteriorated mortar is greater than 1-1/2 inch in depth, until sound mortar is reached. Take special precautions to ensure that brick faces and profiles are not damaged during the process of raking out or repointing. All raking shall cease if, in the judgment of the Architect, the methods employed by the Contractor are causing damage to the brick. Use a water hose or compressed air to remove all loose material from the joints. Do not use power chisels or jack hammer-type devices to cut back mortar at joints.

B. Wet the surface at each joint prior to the installation of pointing mortar. Allow no standing water on the brick surface during pointing.

C. Pack joints, holes, and cracks tightly with the specified mortar in 1/4" layers. Pack back corners of joints.

1. First apply mortar, prepared as specified in Part 2, to areas where the existing mortar is either missing, or the depth is greater than 1".

2. Permit each layer to become stiff (thumb-print hardness) before applying the next layer.

3. The final layer shall be tooled to leave a smooth uniform appearance and compacted and tooled to match the surrounding joint.

4. Moist cure the pointing mortar for 72 hours.

D. Where step cracks extending through the wall to the interior are ¼” opening or greater, provide epoxy injection repair to the interior crack as described in the following section 3.09.

3.09 REPAIR OF CRACKS IN GRANITE UNITS BY EPOXY INJECTION

It is the intent of 3.09 to describe the repair by epoxy injection of cracks which extend to the granite units at the base of the wall, as described in Paragraph 1.02:

A. Repair cracks on the surface of the granite units at the base of the wall using the following procedure:

1. Remove all dust laitance, disintegrated material, grease, and any other contaminants from the area to be repaired.

2. Make openings (ports) along the length of the crack through which epoxy will be injected. Stich the crack with openings, staggered on either side of the crack.

3. Install epoxy in the lowest opening in the unit with cartridge mixing epoxy gun until the epoxy is level with the bottom of the port. Allow the first layer of epoxy to set

up. Fill the first port with high early mortar. Install epoxy starting at the second port until full. Repeat the above sequence of steps until the crack is complete.

A. Fill the enlarged opening with caulking material as specified in Section 07910 of this Specification.

3.10 REPAIR OF SPALLED AND DETERIORATED BASE AND WATERTABLE STONE UNITS

It is the intent of 3.10 to describe the installation of patches at spalled and deteriorated brownstone and granite units and repair defective patches in the units, as described in Paragraph 1.02:

A. Remove all loose and deteriorated stone from the surface of the brownstone and granite units. Remove the front face of the stones to a point where the weathered back seams have been removed.

B. If one-quarter of the three dimensional area of the brownstone or granite unit has been removed, completely remove the existing and replace it with a new unit sized to provide ⅜" wide joints between the new units and the brick walls. Carve and tool Dutchman stone to match original profile and tooling of existing stone. Secure with stainless steel pins into pre-drilled holes. Join pieces together , carefully aligning edges and faces so they are flush with no lippage. Secure repaired unit in position until adhesive is set.

C. For locations with minor damage and previous unsuccessful patches:
   1. Cut out all deteriorated stone and/or existing patching material.
   2. The edges of the stones that are to be patched shall be cut perpendicular to the face of the wall and a minimum of ¼" deep.
   3. Feathered edges will not be permitted. Color, texture and profile to match existing adjacent material, per approved mock-up and as approved by the Architect.

3.11 REPAIR OF CRACKED BROWNSTONE

It is the intent of 3.11 to describe repairs to cracks in the BROWNSTONE units, as described in Paragraph 1.02:

A. Remove all dust laitance, disintegrated material, grease, and any other contaminants from the area to be repaired. Review sizes of all cracks with the Architect prior to proceeding. Wider cracks (larger than 1/8", will require cutting out and PATCHING.

B. Install epoxy in the lowest opening in the unit with cartridge mixing epoxy gun until the epoxy is level with the bottom of the port. Allow the first layer of epoxy to set up. Fill the first port with high early mortar. Install epoxy starting at the second port until full. Repeat the above sequence of steps until the crack is complete.

3.12 REPAIR RUSTED METAL PLATES IN MASONRY AND STRUCTURAL STEEL

It is the intent of 3.10 to describe the paint repair to the steel plates where rust/rust scale is removed as well as the paint repair to the steel structure including beams and columns that are uncovered during masonry repairs where rust / rust scale and deteriorated steel is found . as described in Paragraph 1.02:

A. Completely remove the rust scale from the joints between the steel relieving angles/lintels and the brickwork above by using power tools. Use hand tools to clean crevices and corners.

B. Coat the top surface of the relieving angle/lintel and any other over-exposed surfaces with two coats of a rust-inhibiting paint. Care should be taken not to allow paint to drip onto the masonry below.

3.13 CLEANING AND REMOVAL OF GRAFFITI STAINED AREAS

It is the intent of 3.11 to describe the removal and cleaning of the graffiti stained areas of the building. Remove the stained areas in the following manner:

A. The workmen shall wear proper protective clothing during the application, removal, and disposal processes of the Fast Acting Stripper. See the manufacturer for protective clothing requirements.

B. Apply masking tape to all window and door openings. The surface of all windows and doors must be protected.

C. Test a minimum 4 ft by 4 ft area on each type of masonry. Use manufacturer's application instructions. Let the test panel dry 3 to 7 days before inspection. Use manufacturer's application instructions. Keep test panels available for comparison throughout the cleaning project.

D. Before applying, read "Preparation" and "Safety Information" sections of the Manufacturer's Product Data Sheet for Fast Acting Stripper. Do not dilute or alter.

E. Apply a thick coating of Fast Acting Stripper to dry surface. Let stripper dwell 15-30 minutes or until coating "lifts" or shows signs of dissolving. Periodic agitation with a stiff bristle brush improves penetration. Some coatings will need multiple applications/increased dwell time. Remove stripper and residue with pressure-water rinse. Heated water (150 degrees F – 180 degrees F) (65.5 degrees C – 82 degrees C) may improve stripping efficiency.

F. The best combination of rinsing pressure and water volume is provided by masonry washing equipment generating 400-1000 psi with a water flow rate of 6-8 gallons per minute delivered through a 15-45 degree fan spray tip. Equipment should be adjustable to reduce water flow rate and rinsing pressure as required for controlled cleaning of more sensitive surfaces. See also "Equipment" section of the Product Data Sheet. Thoroughly clean with the appropriate Sure Klean product.

G. Cleaning of Existing Brick Masonry Walls

Power wash all brick walls with a high-pressure water spray to remove dust and loose coatings which were installed as part of recent renovations. The walls should be power washed using a pressure of 2500 psi with the nozzle held approximately 4" away from the main wall and approximately 1" away from the mortar joints. All loose and flaking paint should be removed. The exact pressure and distances away from the wall required will be determined during the mock-up cleaning.

3.14

PAINT EXPOSED LINTEL SURFACES TYPICAL

It is the intent of Section 3.12 to describe the painting of exposed steel intel surfaces.

A. Completely remove the paint and rust from the exposed surfaces of the relieving angles/lintels at window/door openings using power tools.

B. Coat the exposed surface of the relieving angle/lintel with two coats of a rust-inhibiting paint. Care should be taken not to allow paint to drip onto the masonry below.

END OF SECTION 049100

SECTION 049300

MASONRY CLEANING

(Part of Work of Section 040001 –MASONRY WORK, Filed Sub-Bid Required)

PART 1 - GENERAL

1.1 SUMMARY

Provide overall cleaning of exterior masonry as well as removing of encrustations, paint spatter and inappropriate coatings, bituminous and sealant residue, without damaging underlying materials. Give masonry a clean, uniform appearance without blotches, streaks, runs or any other kind of spotty appearance.

A. The Work of this section includes, but is not limited to, preparation and cleaning by methods other than medium pressure water blasting.

B. Clean the exterior brick and brownstone, and other elements indicated for cleaning as identified in the documents.

1.2 INTENT

A. The intent of this Section is to provide performance guidelines for removal of the existing grime, loose materials, and coatings.

B. The final selection of products, pressure and procedures shall be submitted by the Contractor for review and approval by Architect, and will be based on review of mockups.

1.3 RELATED SECTIONS

A. Section 012200 – UNIT PRICES
B. Section 028000 – ENVIRONMENTAL PROCEDURES for runoff from cleaning material.
C. Section 049100 - MASONRY RESTORATION for repairs to brick and stone.
D. Section 076200 - SHEET METAL FLASHING AND TRIM for coordination with roofing items
E. Section 079100 – SEALANTS for joint sealants

1.4 REFERENCES

A. ASTM D4258-83-88, Standard Practice for Surface Cleaning Masonry

1.5 REGULATORY REQUIREMENTS

A. Strictly comply with applicable codes, regulations and requirements of authorities having jurisdiction in the City of Cambridge and Commonwealth of Massachusetts.

1.6 SUBMITTALS

A. Procedures: Contractor shall submit proposed methods and procedures to be utilized. Submittal shall include:

1. Type of equipment used.

   Cleaning agents used. Product Data: Manufacturer's product data sheets, specifications, chemical, functional, and environmental characteristics. Include manufacturer's test data demonstrating compliance with specifications. Product data sheets to include shelf life, mixing instructions, application instructions and storage requirements.

   a. Provide Material Data Safety Sheets (MSDS).

2. Work Description: Prior to commencing the cleaning operations, the Contractor shall submit a written description of the entire methods and procedures proposed for cleaning the masonry including, but not limited to: method of application, dilution of application, temperature of application, length of time of surface contact, method of rinsing surface (temperature, pressure, and duration), repetition of procedure, etc.
3. Methods of Protection: Prior to commencing the cleaning operations, the Contractor shall submit a written description of proposed materials and methods of protection for preventing damage to any material not being cleaned, for review.
4. Methods of Effluent Control: Prior to commencing the cleaning operations, the Contractor shall submit a written description of proposed materials and methods for the containment, neutralization and disposal of all effluent.
5. Manufacturer's use instructions for filtration equipment and cleaning equipment.
6. Include masonry cleaning in overall masonry restoration work plan than describes work and sequences. Note that masonry cleaning is to be done in advance of repointing and patching work.

B. Approvals: Submit evidence that the proposed procedures are acceptable to the agencies having jurisdiction.

B. Qualifications: Submit Contractor's qualifications in the form of a firm brochure, list of completed projects, and a list of Contractor and Architect/Engineer references which demonstrating compliance with the article QUALITY ASSURANCE. References shall include current telephone numbers.

1.7 MOCK-UPS

A. Provide test panel mock-ups for cleaning to demonstrate standards for work of this Section. For brownstone, provide mock-ups of the three listed products in order for a selection to be made. Provide panels for each of the condition specified below, having minimum sizes as noted. Prepare the mockup panels in locations selected by the Architect. Use materials and methods proposed for completed Work and prepare samples under same weather conditions to be expected during remainder of Work.

1. Chemical cleaning of brick and brownstone to remove general soil and stains, in addition to areas of carbon deposits. Provide separate mock-ups for each material.

2. Chemical cleaning of brick to remove residues of bituminous materials and sealant, if applicable.

3. Chemical cleaning of brick to remove paint spatter, if applicable.

B. Notify Architect 7 days in advance of the dates and times when test panels will be prepared.

C. Mockups shall be prepared using the same workmen, methods and materials that shall be employed for the remainder of the Work At the discretion of the Architect, mockups shall be prepared in the presence of the Architect.

D. Prepare as many mock-ups as required until appearance of cleaned masonry is acceptable to the Architect.

E. Test cleaners and methods on samples of adjacent materials for possible adverse reactions, unless cleaners and methods are known to have a deleterious effect.

F. Allow a waiting period of not less than 7 dry days after completion of sample cleaning to permit a study of mock-ups for negative reactions. Cleaning test panels must be fully dry for review.

G. Obtain Architect's approval of mock-ups before starting the remainder of masonry cleaning.

H. The accepted mock-up, including both cleaning chemical and method of procedure for removing each type of surface soiling, will become the standard for reviewing subsequent Work of this Section. Approved mock-ups shall become part of the Work.

1.8 QUALITY ASSURANCE

A. Contractor shall be have been regularly engaged in masonry cleaning for a minimum of ten years. The contractor shall have a minimum of 10 projects completed and must submit examples of work to show successful masonry cleaning on at least five National Register listed buildings.

B. The cleaning materials manufacturer's representative shall be present during testing and first day of work.

C. Source of Materials: Obtain materials for masonry cleaning from a single source, batch and lot for each type of material required to ensure consistent composition and quality.

D. Comply with the United States Secretary of the Interior Standards for Rehabilitation Guidelines for Rehabilitating Historic Buildings, except as specified otherwise.

1.9 PROJECT CONDITIONS

A. The Project Site is bounded by City Streets and public ways. Take necessary precautions and follow requirements of the City of Cambridge.

B. Owner assumes no responsibility for actual condition of the building components. Conditions existing at time of inspection for bidding purpose will be maintained by Owner as far as practical.

C. The Owner has indicated that materials being cleaned and / or removed may contain lead based products..

1. If materials suspected of containing hazardous materials are encountered, do not disturb; immediately notify Architect and Owner.

E. Clean masonry surfaces only when air and wall surface temperature is 50 deg F and above and will remain so for at least 7 days after completion of cleaning.

F. Do not wash down or wet surfaces when temperature may drop below 40 degrees Fahrenheit within 24 hours.

G. Do not perform work of this Section when winds are greater than 10 miles per hour.

PART 2 - PRODUCTS

2.1 EQUIPMENT AND SUPPLIES

A.. Water: Potable. Make arrangements with utilities to provide adequate water supply for cleaning operations.

B. Power: Provide compressors and fuel necessary to operate the equipment.

2.2 PROTECTION

A. Provide all necessary materials to construct dams, diverters, filters, and screens necessary to satisfy authorities having jurisdiction.
B. Provide all necessary scaffolds, framing, sheeting, covers, and masking necessary to protect adjacent persons and property from the over-spray.
C. Protect existing windows to remain from masonry cleaning products.

2.3 CLEANING AGENTS

Manufacturer: To establish a standard of quality, and function desired, specifications have been based on ProSoCo, Inc., Kansas City KS. Other manufacturers offering similar products which may be considered as equal, as determined by the Architect, include the following, or equal:
1. Diedrich Chemicals, Restoration Technologies Inc., Oak Creek WI
2. K & E Chemical Company Inc., Cleveland OH.
For specific products to be considered “Equal” they must show evidence of the same performance as the specific Prosoco products listed, the same level of environmental safety, and provide the same level of manufacturer oversight of mockups.

A. Provide cleaning agents that are designed for brick masonry, brownstone (sandstone)and granite stonework restoration cleaning.

B. The following products are considered to be acceptable, subject to review of mockups. The intent is to use the gentlest product that provides satisfactory cleaning.

Brownstone – General Cleaning
1. EK Revive 5:1 water: concentrate
2. EK SafRestorer 1:1 water:concentrate
3. EK Restoration Cleaner
4. SK 776 Limestone & Masonry Prewash followed by the Limestone & Masonry Afterwash

Rust Stains
1. 800 Stain Remover
2. Ferrous Stain Remover
3. EK Restoration Cleaner

Lime Run (White Calcium Carbonate) under curved brick at building entry
1. Heavy Duty Concrete Cleaner 1:1 water: concentrate

Brick (as indicated on drawings)
1. EK Revive

C. Cleaner for removing asphalt, tar, and paint: Thixotropic, solvent-based, water-rinseable paint remover suitable for use on stone such as “SureKlean Fast Acting Stripper”, available from ProSoCo, Inc., Lawrence, Kansas, 66046, 800-255-4255, or approved alternative material.

PART 3 - EXECUTION

3.1 PREPARATION

A. Install necessary protection measures required to contain adjacent persons, vehicles, and property.

B. Coordinate installation of protections with required approvals of authorities having jurisdiction.

C. Review information provided in Prosoco, Inc. Technical Bulletin 200-CW Controlled Handling of Cleaning Wastewater. Incorporate protection and disposal into work plan submission.

3.2 APPLICATION

A. Wet the stone only as recommended by the manufacturer for the product selected, after mockups. (Some products are recommended to clean dry masonry.)
The contractor shall apply the appropriate equipment and water pressure necessary to achieve the masonry and stone surface defined under article DESIRED SURFACE CONDITIONS.

B. Cleaning of vertical masonry surfaces shall be done from bottom-to-top sequence. Keep all cleaned surfaces wet while work is carried on above to prevent rundown stains.

B. Cleaning agents may be brush applied.

F. The water spray shall be directed at a 45 degree angle to the wall. Never apply the spray directly at the wall (perpendicular).

G. Scrub wall areas which are stained or heavily soiled with a stiff bristle masonry brush to achieve a consistent finished appearance.

H. Cleaning is to include all exposed surfaces of brownstone, including returns at windows and other crevices that may not be shown on the elevation drawings. It also includes areas behind items such as rainleaders and other elements that cover brownstone (and brick). See drawings for elements that are to be removed or removed and reinstalled in order to provide access to stone surfaces.

3.3 DESIRED SURFACE CONDITIONS

A. The objective of cleaning is to remove all loose masonry materials, sealant, paint, and coatings. These materials may have been loosened by blasting or by other methods specified in masonry restoration and repair sections.

B. The cleaning shall remove all environmental grime and contaminants necessary to prepare surface for repair material, brick matches and repointing as specified in other sections of the specifications.

3.4 PROTECTIONS

A. Construct and maintain required protections at all times.

B. Control run-off, and contain all liquids generated during cleaning operations.

C. Liquids shall be legally discharged or placed in containers and removed from the site. All liquids removed from the site shall be legally disposed of.

3.5 CLEANING AND PROTECTION

A. Protect areas of the Work until Restoration Work begins.

B. Remove all equipment, waste materials, and protections from the site.

END OF SECTION 049300

SECTION 073126

SLATE SHINGLE ROOFING

(Part of Work of Section 070002 –ROOFING AND FLASHING, Filed Sub-Bid Required)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. The conditions and general requirements of the Contract, Division 00 and Division 01 apply to the work of this Section, included in its entirety.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Document conditions of slate to confirm scope of existing damaged slate.
2. Remove and replace damaged, cracked, or broken slate.
3. Slate for modifications to roof areas.
4. Waterproofing underlayment.
5. Underlayment for slate
6. Removal of existing slate shingles and salvaging samples for new to match existing.
7. Coordination of work related to snow guards.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 012200 - UNIT PRICES.
2. Section 024100 - SELECTIVE DEMOLITION for selective demolition requirements in addition to what is specified in this section.
3. Section 028000 - ENVIRONMENTAL PROCEDURES for procedures required related to the removal and disposal of lead and asbestos containing materials.
4. Section 040140 - STONE MASONRY RESTORATION for reglets in stone.
5. Section 061000 - ROUGH CARPENTRY for wood nailers, cants and replacement wood roof deck.
6. Section 076200 SHEET METAL FLASHING AND TRIM for valleys, flashing and gutters and other trim.
7. Section 077200 – ROOF ACCESSORIES for snow guards.
8. Section 079200 - JOINT SEALANTS for joint sealants.

1.3 SUBMITTALS

A. Documentation: Photo document full conditions of existing slate roofing prior to beginning work. This will be used as a measure of what additional damaged slates may be due to Contractor work.

1. Submittal survey confirming scope of slate removal to be performed, including slates removed and reinstalled for flashing and other work and slates requiring replacement due to condition.

B. Compile submittals for roofing and flashing assemblies together in one package. Submittals will not be reviewed until information for all components has been received.

C. Product Data: For each type of product indicated.

D. Samples for Verification: For the following products, of sizes indicated, to verify color selected:

1. Slate Shingles: Full size, of each size, texture, and shape. Color to match existing as closely as possible. Submit three (3) samples of each color of slate being considered. Include as part of sample submittal at least three existing slates salvaged from the building, representative of existing slate, for purposes of evaluating and deciding upon options for new slate.
2. Fasteners: Three fasteners of each type, length, and finish. Include samples of fasteners proposed for locations where individual slates are in be installed where nailing is not possible and hook-type or nail and bib is to be used.

E. Shop Drawings: Shop drawings including but not limited to:

1. Roof assembly including underlayment.
2. Slate installation at valleys, hips, rake edges, copings, gutters.
3. Roof plan or elevations, showing areas to receive new slate and areas to receive salvaged slate.

F. Material Test Reports: Based on evaluation of comprehensive tests performed by a qualified testing agency, for each slate variety.

G. Maintenance Data: For roofing to include in maintenance manuals.

H. Qualification Data: For Installer and manufacturer. Include list of completed projects; include names, addresses, and names of architects and owners. Also include names of key craftspeople who will work on this specific job, their experience, and jobs worked on.

1.4 QUALITY ASSURANCE

A. Installer Qualifications: A qualified firm with a minimum of years of experience.

1. In addition to the above, qualifications shall include ten (10) years of experience with projects of comparable quality and level of work, with demonstrated success, including projects considered to be “historic” structures. Each craftsperson doing work on the building is required to do a mock-up for review and approval, to show an acceptable level of craftsmanship.

B. Use skilled workmen who are trained especially in properly laying and nailing slate and who are completely familiar with the specified requirements and methods needed for proper performance of the work of this section.

C. Source Limitations: Obtain each color of slate shingle from single quarry capable of producing slate of consistent quality in appearance and physical properties.

D. Mock-up: Provide mock-up of typical shingle installation, including full size samples of all detail components including 4’ x 6’ area of shingles, and 2’-0” minimum sample length of valley, hip and other edge conditions. If acceptable to Architect mock-up may become part of work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store underlayment rolls on end, on pallets or other raised surfaces. Do not double stack rolls.

1. Handle, store, and place roofing materials in a manner to avoid significant or permanent damage to roof deck or structural supporting members.

B. Protect unused underlayment from weather, sunlight, and moisture when left overnight or when roofing work is not in progress.

C. Environmental Requirements:

1. Do not remove roofing from structures when rain is forecasted or in progress.
2. Do not apply new or repaired shingle roofs in wet weather.
3. If roofing is to be removed on a clear day, remove no more than can be replaced or repaired in one day.

1.6 WARRANTY

A. Special Project Warranty: Roofing Installer's Warranty, signed by roofing Installer, covering Work of this Section, in which roofing Installer agrees to repair or replace components of roofing that fail in materials or workmanship within the following warranty period:

1. Warranty Period: Seventy five year material warranty and five year labor warranty from date of Substantial Completion.

1.7 EXTRA MATERIALS

A. Furnish extra materials described below that match product installed.

1. Furnish quantity of slate shingle roofing equal to five percent (5%) of amount installed, but not less than seventy-five (75) full-size, unbroken units.

B. Deliver extra material on wood pallet(s) to the Owner’s designated storage location.

PART 2 - PRODUCTS

2.1 SLATE SHINGLES

A. Slate Shingles: ASTM C 406, Grade S1; hard, dense, and sound; chamfered edges, with nail holes machine punched or drilled and countersunk. No broken or cracked slates, no broken exposed corners, and no broken corners on covered ends that could sacrifice nailing strength or laying of a watertight roof.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. New England Slate Company (The).
b. Vermont Specialty Slate, Inc.
c. Vermont Structural Slate Company.
d. Vintage Slate Company, Inc.
e. Other as approved by Architect.

2. Basis of Design:

a. Color: Existing slate on the building is understood to be “Heathermoor” (also known as “Strata Grey”), quarried in Vermont and installed in 2010. This slate, with its distinctive dark veining, is not available, so slate expected to be the best match will be either “Vermont Gray”, “Vermont Gray/Black”, or “Vermont Black”. Samples of each are to be provided.
b. Thickness: To match existing. Assume ¼”-3/8” thickness..
c. Surface Texture: to match existing.
d. Size: To match existing. Assume 10” x 20”. Include 15” wide slates for edges such as hips, valleys and rake edges to avoid slivers of slate (widths less than a half slate).
e. Nail Holes: Two per shingle.
f. Butt Shape: Standard square cut.

B. Starter Slate: Slate shingles with chamfered nail holes front-side punched.

C. Fabrication: Fabricate slate shingles with vertical grain orientation.

2.2 UNDERLAYMENT MATERIALS

A. Felt: ASTM D 226, Type II, asphalt-saturated organic felts, nonperforated. Reuse of existing is permitted if undamaged.

B. Self-Adhering Sheet Underlayment, Polyethylene Faced: ASTM D 1970, minimum of 40-mil-thick, slip-resisting, polyethylene-film-reinforced top surface laminated to SBS-modified asphalt adhesive, with release paper backing; cold applied.

1. Manufacturers: Subject to compliance with requirements, available manufacturers offering products that may be incorporated into the Work include, but are not limited to, the following:

a. Carlisle Coatings & Waterproofing, Inc.
b. Grace, W. R. & Co.
c. Henry Company.
d. Approved equal.

2.3 ACCESSORIES

A. Asphalt Roofing Cement: ASTM D 4586, Type II, asbestos free.

B. Butyl Sealant: ASTM C 1311, single-component, solvent-release butyl rubber sealant; polyisobutylene plasticized; heavy bodied.

C. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in slate-shingle roofing and remain watertight.

D. Slating Nails: ASTM F 1667, copper, smooth shanked, wire nails; 0.135-inch minimum thickness; sharp pointed; with 3/8-inch-minimum diameter flat head; of sufficient length to penetrate a minimum of 3/4 inch into sheathing.

1. Where nails are in contact with metal flashing, use nails made from same metal as flashing.

E. Slate Hooks: Stainless steel hooks, specially manufactured for replacement slate installation.

F. Felt Underlayment Nails: Aluminum, stainless-steel, or hot-dip galvanized-steel wire with low-profile capped heads or disc caps, 1-inch minimum diameter.

2.4 METAL FLASHING AND TRIM

A. General: Comply with requirements in Section 076200 - SHEET METAL FLASHING AND TRIM.

B. Fabricate sheet metal flashing and trim to comply with recommendations that apply to design, dimensions, metal, and other characteristics of the item in SMACNA's "Architectural Sheet Metal Manual."

2.5 SNOW GUARDS

A. General: Comply with requirements in Section 077200 – ROOF ACCESSORIES.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer and General Contractor present, for compliance with requirements for installation tolerances and other conditions affecting performance of the Work, particularly with regard to condition of roof deck..

1. Inspect the deck to determine whether it is sound, at all locations where new slate will be installed. Document conditions of roof deck to confirm where substrate is sound and where replacement deck is required. Replace any rotted, damaged, or warped sheathing that is unsuitable for new slate and fasteners. Examine roof sheathing to verify that sheathing joints are supported by framing and blocking, or metal clips and that installation is within flatness tolerances.
2. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and completely anchored and that provision has been made for flashings and penetrations through roofing.
3. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Roofing subcontractor shall inspect full slate roof area and identify all slates damaged or missing.

B. Remove and dispose of damaged and cracked slate shingles. Salvage slate shingles which are without chips, cracks, or other damage as required for samples.

C. Do not apply underlayment or shingles over wet roof decking.

D. Apply slate shingle work as soon as practicable. Do not use the permanent building felts as temporary roofing, uncovered or unprotected during inclement weather or overnight. Provide temporary polyethylene sheet, or other type, protective coverings over all exposed portions of the roof deck if the slate shingle work is not applied immediately after installation of sheathing, in manner to assure positive weather protection.

3.3 UNDERLAYMENT INSTALLATION

A. General: Comply with underlayment manufacturer's written installation instructions applicable to products and applications indicated unless more stringent requirements apply.

B. Existing Felt Underlayment: Cut back at eaves and retain enough to lap over new membrane a minimum of 6”.

C. Self-Adhering Sheet Underlayment: Install, wrinkle free, on roof deck up to 3’-0” at eaves as shown. Comply with low-temperature installation restrictions of underlayment manufacturer if applicable. Install at locations indicated below, lapped in direction to shed water. Lap sides not less than 3-1/2 inches. Lap ends not less than 6 inches staggered 24 inches between courses. Roll laps with roller. Cover underlayment within seven days.

1. Eaves: Extend from edges of eaves 36 inches beyond interior face of exterior wall.
2. Valleys: Extend from lowest to highest point 18 inches on each side.
3. Ridges: Extend 36 inches on each side or as shown.

3.4 METAL FLASHING INSTALLATION

A. General: Install metal flashings and other sheet metal to comply with requirements in Section 076200 - SHEET METAL FLASHING AND TRIM.

1. Install metal flashings according to recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual."

3.5 SLATE-SHINGLE INSTALLATION

A. General: Beginning at eaves, install slate shingles according to manufacturer's written instructions and to details and recommendations in NRCA's "The NRCA Roofing and Waterproofing Manual." As this is a partial replacment, confirm exposure for rows removed and for achieving edge detail as shown on drawings.

1. Install wood nailer strip cant at eave edges.
2. Install shingle starter course chamfered face down.

B. Install first and succeeding shingle courses with chamfered face up. Install full-width first course at rake edge.

1. Offset joints of uniform-width slate shingles by half the shingle width in succeeding courses.
2. Offset joints of random-width slate shingles a minimum of 3 inches (75 mm) in succeeding courses.

C. Maintain a 3-inch-minimum head lap between succeeding shingle courses.

D. Maintain uniform exposure of shingle courses between eaves and ridge.

E. Extend shingle starter course and first course 1 inch over fasciae at eaves.

F. Extend shingle starter course and succeeding courses 1 inch over fasciae at rakes, or to match existing conditions.

G. Cut and fit slate neatly around roof vents, pipes, ventilators, and other projections through roof.

H. Hang slate with two slating nails for each shingle with nail heads lightly touching slate. Do not drive nails home drawing slates downward or leave nail head protruding enough to interfere with overlapping shingle above.

I. Hips: Install and anchor slate hips in saddle configuration, to match existing.

1. Install and anchor wood nailer strips of thickness to match abutting courses of slate shingles. Cover nailer strip with underlayment strip, extending on to underlying slate but concealed by hip slate. Anchor hip slate to nailer strip with two nails located in upper third of hip-slate length.
2. Notch starter shingle and first shingle course at hip to fit around nailer strips so no wood is exposed at ridge eave.
3. Lay hip slate in bed of butyl sealant.

J. Infill slates: Install slate hook or other approved fastener without damage to slate or substrate and without leaving perforations subject to water infiltration. Fasteners must be secure.

K. No exposed nail heads are permitted.

L. Use wide slates at valleys, hips and rake edges to avoid narrow slates that do not permit secure fastening.

M. Open Valleys: Cut slate shingles to form straight lines at open valleys, trimming upper concealed corners of shingles. Width of valleys shall match existing.

1. Do not nail shingles to valley metal flashings.

N. Blend: Select slate colors that blend with the existing. Use salvaged slates for replacement shingle locations in prominent areas (street sides), and use new slate at less prominent areas, as reviewed with the Architect and to the extent that salvaging existing slates are called for in the contract documents. The exception to this is that new slate can be used at new or reconfigured dormers at street sides.

O. Contractor shall draw slates from several pallets at once (shuffle) so as to blend the material on the roofs.

P. Where slates of random width are used, the overlapping slate shall be laid jointed as near the center of the underlaying slate as possible and not less than 3 inches from any underlaying joint.

Q. No through joints shall occur from the roof surface to the felt. The joints in each slate course shall be well separated from those below.

R. Slate overlapping sheet metal work shall have the nails so placed to avoid puncturing the sheet metal.

S. Any nail holes that must be field punched are to be punched from the back of the slate so as to provide the proper countersink of the fastener head. The only exception is holes in the starter course.

T. Cutting slate in the field: All field slate shall be cut from the back side so as to produce the proper orientation of the beveled edge.

U. Build in, and place, all flashing pieces required for proper performance of the roof. Each course of slate shall have copper step flashing neatly woven into the slate.

3.6 ADJUSTING AND CLEANING

A. Remove and replace damaged or broken slate shingles resulting from construction activity. No slate with a broken corner larger than two (2) inches by two (2) inches shall remain in the finished roof.

B. Remove excess slate and debris from Project site, including from rainleaders and underground drainage system.

END OF SECTION

SECTION 076200

SHEET METAL FLASHING AND TRIM

(Part of Work of Section 070002 – ROOFING AND FLASHING, Filed Sub-Bid Required)

PART 1 - GENERAL

1.1 GENERAL PROVISIONS

A. The conditions and general requirements of the Contract, Division 00 and Division 01 apply to the work of this Section, included in its entirety.

1.2 DESCRIPTION OF WORK

A. Work Included: Provide labor, materials and equipment necessary to complete the work of this Section, including but not limited to the following:

1. Sheet metal flashing and trim for the following applications, as indicated on the drawings:

a. Most existing metal flashing and trim to remain. Remove and reinstall select existing items to allow for masonry and roof work. See drawings for scope.
b. Remove select metal items and replace with new where deteriorated or damaged.
c. Ridge cap and select gutters to match existing.
d. Formed wall flashings and trim.
e. Formed roof flashing and trim.

B. Related Work: The following items are not included in this Section and are specified under the designated Sections:

1. Section 024100 – SELECTIVE DEMOLITION for selective demolition requirements in addition to what is specified in this section.
2. Section 049100 - MASONRY RESTORATION for reglets in masonry.
3. Section 061000 - ROUGH CARPENTRY for wood nailers, curbs, and blocking.
4. Section 073126 – SLATE SHINGLE ROOFING for slate work coordinated with flashings and trim.
5. Section 075300 – FLUID APPLIED MEMBRANE ROOFING for membrane roofing work coordinated with flashings and trim.
6. Section 077200 – ROOF ACCESSORIES for snow guards.
7. Section 079200 - JOINT SEALANTS for joint sealants.

1.3 PERFORMANCE REQUIREMENTS

A. General: Install sheet metal flashing and trim to withstand wind loads, structural movement, thermally induced movement, and exposure to weather without failing, rattling, leaking, and fastener disengagement.

B. Fabricate and install roof edge flashing and copings capable of resisting Wind Zone forces required by Code according to recommendations in FMG Loss Prevention Data Sheet 1-49.

C. Thermal Movements: Provide sheet metal flashing and trim that allow for thermal movements resulting from the following maximum change (range) in ambient and surface temperatures by preventing buckling, opening of joints, hole elongation, overstressing of components, failure of joint sealants, failure of connections, and other detrimental effects. Provide clips that resist rotation and avoid shear stress as a result of sheet metal and trim thermal movements. Base engineering calculation on surface temperatures of materials due to both solar heat gain and nighttime-sky heat loss.

1. Temperature Change (Range): 120 deg F, ambient; 180 deg F material surfaces.

D. Water Infiltration: Provide sheet metal flashing and trim that do not allow water infiltration to building interior.

1.4 SUBMITTALS

A. Product Data: For each type of product indicated. Include construction details, material descriptions, dimensions of individual components and profiles, and finishes.

B. Shop Drawings: Show layouts of all sheet metal flashing and trim, including plans and elevations. Distinguish between shop- and field-assembled work. Include the following:

1. Identify material, thickness, weight, and finish for each item and location in Project.
2. Details for forming sheet metal flashing and trim, including profiles, shapes, seams, and dimensions.
3. Details for fastening, joining, supporting, and anchoring sheet metal flashing and trim, including fasteners, clips, cleats, and attachments to adjoining work.
4. Details of expansion-joint covers, including showing direction of expansion and contraction.

In lieu of shop drawings, full size mock-ups can be substituted to show profiles and attachments. Where material is to match existing profiles, retain an intact piece of the existing so as to allow mockup to be compared to the intended profile. The existing and mock-up can either both be in-place or both loose. Materials must be made available and accessible for Architect review.

C. Samples for Verification: For each type of exposed finish required, prepared on Samples of size indicated below:

1. Sheet Metal Flashing: 12 inches long. Include fasteners, cleats, clips, closures, and other attachments.
2. Trim: 12 inches long. Include fasteners and other exposed accessories.
3. Accessories: Full-size Sample.

1.5 QUALITY ASSURANCE

A. Sheet Metal Flashing and Trim Standard: Comply with SMACNA's "Architectural Sheet Metal Manual." Conform to dimensions and profiles shown unless more stringent requirements are indicated.

B. Mock-up: Provide mock-up of each typical sheet metal flashing and trim for Architect approval. Approved mock-up conditions may be left as part of work. See Submittals section above for requirements to include existing shape to be matched.

C. Preinstallation Conference: Conduct conference at Project site to comply with requirements in Division 01.

1. Meet with the Owner, Architect and Owner's insurer if applicable, Installer, and installers whose work interfaces with or affects sheet metal flashing and trim including installers of roofing materials, roof accessories, unit skylights, and roof-mounted equipment.
2. Review methods and procedures related to sheet metal flashing and trim.
3. Examine substrate conditions for compliance with requirements, including flatness and attachment to structural members.
4. Document proceedings, including corrective measures and actions required, and furnish copy of record to each participant.

1.6 DELIVERY, STORAGE, AND HANDLING

A. Deliver sheet metal flashing materials and fabrications undamaged. Protect sheet metal flashing and trim materials and fabrications during transportation and handling.

B. Unload, store, and install sheet metal flashing materials and fabrications in a manner to prevent bending, warping, twisting, and surface damage.

C. Stack materials on platforms or pallets, covered with suitable weathertight and ventilated covering. Do not store sheet metal flashing and trim materials in contact with other materials that might cause staining, denting, or other surface damage.

1.7 COORDINATION

A. Coordinate installation of sheet metal flashing and trim with interfacing and adjoining construction to provide a leakproof, secure, and noncorrosive installation.

PART 2 - PRODUCTS

2.1 SHEET METALS

A. Copper Sheet: ASTM B 370, cold-rolled copper sheet, H00 temper, of minimum uncoated weight (thickness) indicated;

1. Products: Subject to compliance with requirements, available products that may be incorporated into the Work include, but are not limited to, the following:

a. Revere Copper Products, Inc.;
b. Approved equal.

2.2 UNDERLAYMENT MATERIALS

A. Self-Adhering, High-Temperature Sheet: 30 to 40 mils thick minimum, consisting of slip-resisting polyethylene-film top surface laminated to layer of butyl or SBS-modified asphalt adhesive, with release-paper backing; cold applied. Provide primer when recommended by underlayment manufacturer.

1. Thermal Stability: Stable after testing at 240 deg F; ASTM D 1970.
2. Low Temperature Flexibility: Passes after testing at minus 20 deg F; ASTM D 1970.
3. Available Products:

a. Carlisle Coatings & Waterproofing, Div. of Carlisle Companies Inc.; Dri-Start "HR" High Performance Roofing Underlayment.
b. Grace, W. R. & Co.; Vycor Ultra.
c. Henry Company; Perma-Seal PE.
d. TC MiraDRI; WIP 300HT.

B. Slip Sheet: Rosin-sized paper, minimum 3 lb/100 sq. ft. Rosin paper to be provided under all copper sheet, in addition to membrane, whether shown on the detail or not.

2.3 MISCELLANEOUS MATERIALS

A. General: Provide materials and types of fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required for complete sheet metal flashing and trim installation.

B. Fasteners: Wood screws, annular threaded nails, self-tapping screws, self-locking rivets and bolts, and other suitable fasteners designed to withstand design loads.

1. Exposed Fasteners: Heads matching color of sheet metal by means of plastic caps or factory-applied coating.
2. Fasteners for Flashing and Trim: Blind fasteners or self-drilling screws, gasketed, with hex washer head.
3. Blind Fasteners: High-strength aluminum or stainless-steel rivets.

C. Copper: ASTM B 32, 100 percent tin, with maximum lead content of 0.2 percent, as recommended by sheet metal manufacturer.

D. Sealing Tape: Pressure-sensitive, 100 percent solids, polyisobutylene compound sealing tape with release-paper backing. Provide permanently elastic, nonsag, nontoxic, nonstaining tape.

E. Elastomeric Sealant: ASTM C 920, elastomeric polyurethane polymer sealant; of type, grade, class, and use classifications required to seal joints in sheet metal flashing and trim and remain watertight.

F. Epoxy Seam Sealer: Two-part, noncorrosive, aluminum seam-cementing compound, recommended by aluminum manufacturer for exterior nonmoving joints, including riveted joints.

G. Isolation Coating: ASTM D 1187, cold-applied asphalt emulsion, VOC compliant, compounded for 15-mil dry film thickness per coat. Provide inert-type noncorrosive compound free of asbestos fibers, sulfur components, and other deleterious impurities.

H. Asphalt Roofing Cement: ASTM D 4586, asbestos free, of consistency required for application.

2.4 FABRICATION, GENERAL

A. General: Custom fabricate sheet metal flashing and trim to comply with recommendations in SMACNA's "Architectural Sheet Metal Manual" that apply to design, dimensions, metal, and other characteristics of item indicated. Shop fabricate items where practicable. Obtain field measurements for accurate fit before shop fabrication.

B. Fabricate sheet metal flashing and trim in thickness or weight needed to comply with performance requirements, but not less than that specified for each application and metal.

C. Fabricate sheet metal flashing and trim without excessive oil canning, buckling, and tool marks and true to line and levels indicated, with exposed edges folded back to form hems.

1. Seams for Aluminum: Fabricate nonmoving seams with flat-lock seams. Form seams and seal with epoxy seam sealer. Rivet joints for additional strength.
2. Seams for Other Than Aluminum: Fabricate nonmoving seams in accessories with flat-lock seams. Tin edges to be seamed, form seams, and solder.

D. Sealed Joints: Form nonexpansion but movable joints in metal to accommodate elastomeric sealant to comply with SMACNA recommendations.

E. Expansion Provisions: Where lapped or bayonet-type expansion provisions in the Work cannot be used, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

F. Conceal fasteners and expansion provisions where possible on exposed-to-view sheet metal flashing and trim, unless otherwise indicated.

G. Fabricate cleats and attachment devices from same material as accessory being anchored or from compatible, noncorrosive metal.

1. Thickness: As recommended by SMACNA's "Architectural Sheet Metal Manual" for application but not less than thickness of metal being secured.

2.5 SHEET METAL FABRICATIONS

A. Roof Edge Flashing (Gravel Stop) and Fascia Caps: Unless otherwise indicated, fabricate in minimum 96-inch-long, but not exceeding 10-foot- long, sections. Furnish with 6-inch-wide joint cover plates.

1. Joint Style: Butt, with 12-inch-wide concealed backup plate.
2. Fabricate from the following material:

a. Copper: 20 oz./sq. ft. (0.68 mm thick).

B. Copings: Unless otherwise indicated, fabricate in minimum 96-inch-long, but not exceeding 10-foot-long, sections. Fabricate joint plates of same thickness as copings. Furnish with continuous cleats to support edge of external leg and drill elongated holes for fasteners on interior leg. Miter corners, seal, and solder or weld watertight.

1. Joint Style: Butt, with 12-inch-wide concealed backup plate.
2. Fabricate copings from the following material:

a. Copper: 24 oz./sq. ft. (0.82 mm thick).

C. Decorative Elements: Miter corners, seal, and solder or weld watertight.

1. Fabricate from the following material:

a. Copper: 24 oz./sq. ft. (0.82 mm thick).

D. Base Flashing: Fabricate from the following material:

1. Copper: 20 oz./sq. ft. (0.68 mm thick)

E. Counterflashing: Fabricate from the following material:

1. Copper: 16 oz./sq. ft. (0.55 mm thick).

F. Roof-Penetration Flashing: Fabricate from the following material:

1. Copper: 16 oz./sq. ft. (0.55 mm thick).

G. Roof-Drain Flashing: Fabricate from the following material:

1. Copper: 12 oz./sq. ft. (0.41 mm thick).

H. Through-Wall Flashing, Typical: Fabricate continuous flashings in minimum 96-inch-long, but not exceeding 12 foot long, sections, under copings, at shelf angles, and where indicated. Fabricate discontinuous lintel, sill, and similar flashings to extend 6 inches beyond each side of wall openings. Form with 2-inch-high end dams. Fabricate from the following material:

1. Copper: 16 oz./sq. ft. (0.55 mm thick).

I. Hanging Gutters: Fabricate to cross-section indicated, complete with end pieces, outlet tubes, and other accessories as required. Fabricate in minimum 96-inch long sections. Furnish flat-stock gutter spacers and gutter brackets fabricated from same metal as gutters, of size recommended by SMACNA but not less than twice the gutter thickness. Fabricate expansion joints, expansion-joint covers, and gutter accessories from same metal as gutters.

1. Gutter Style: As indicated on Drawings to match existing.
2. Expansion Joints: Lap type.
3. Gutters with Girth up to 20 Inches: Fabricate from the following materials:

a. Copper: 16 oz./sq. ft.

4. Gutters with Girth greater than 20 Inches: Fabricate from materials and minimum thicknesses recommended by SMACNA.

J. Downspouts: Fabricate downspouts complete with mitered elbows. Furnish with metal hangers, from same material as downspouts, and anchors.

1. Downspout Shape: As indicated on Drawings.
2. Hanger Style: As indicated on Drawings.
3. Downspouts: Fabricate from the following materials:

a. Copper: 16 oz./sq. ft.

K. Splash Blocks: Provide precast concrete splash blocks where downspouts are not indicated to connect to drainage system.

2.6 FINISHES

A. Comply with NAAMM's "Metal Finishes Manual for Architectural and Metal Products" for recommendations for applying and designating finishes.

B. Protect mechanical and painted finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.

C. Appearance of Finished Work: Variations in appearance of abutting or adjacent pieces are acceptable if they are within one-half of the range of approved Samples. Noticeable variations in the same piece are not acceptable. Variations in appearance of other components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine substrates, areas, and conditions, with Installer present, to verify actual locations, dimensions and other conditions affecting performance of work.

1. Verify that substrate is sound, dry, smooth, clean, sloped for drainage, and securely anchored.
2. Proceed with installation only after unsatisfactory conditions have been corrected.

3.2 INSTALLATION, GENERAL

A. General: Anchor sheet metal flashing and trim and other components of the Work securely in place, with provisions for thermal and structural movement. Use fasteners, solder, welding rods, protective coatings, separators, sealants, and other miscellaneous items as required to complete sheet metal flashing and trim system.

1. Torch cutting of sheet metal flashing and trim is not permitted.

B. Metal Protection: Where dissimilar metals will contact each other or corrosive substrates, protect against galvanic action by painting contact surfaces with bituminous coating or by other permanent separation as recommended by fabricator or manufacturers of dissimilar metals.

1. Coat side of stainless-steel sheet metal flashing and trim with isolation coating where flashing and trim will contact wood, ferrous metal, or cementitious construction.
2. Underlayment: Where installing metal flashing directly on cementitious or wood substrates, install a course of felt underlayment and cover with a slip-sheet or install a course of polyethylene underlayment.
3. Bed flanges in thick coat of asphalt roofing cement where required for waterproof performance.

C. Install exposed sheet metal flashing and trim without excessive oil canning, buckling, and tool marks.

D. Install sheet metal flashing and trim true to line and levels indicated. Provide uniform, neat seams with minimum exposure of solder, welds, and elastomeric sealant.

E. Install sheet metal flashing and trim to fit substrates and to result in watertight performance. Verify shapes and dimensions of surfaces to be covered before fabricating sheet metal.

1. Space cleats not more than 12 inches apart. Anchor each cleat with two fasteners. Bend tabs over fasteners.

F. Expansion Provisions: Provide for thermal expansion of exposed flashing and trim. Space movement joints at a maximum of 10 feet with no joints allowed within 24 inches of corner or intersection. Where lapped or bayonet-type expansion provisions cannot be used or would not

be sufficiently watertight, form expansion joints of intermeshing hooked flanges, not less than 1 inch deep, filled with elastomeric sealant concealed within joints.

G. Fasteners: Use fasteners of sizes that will penetrate substrate not less than 1-1/4 inches for nails and not less than 3/4 inch for wood screws.

1. Aluminum: Use aluminum or stainless steel fasteners.
2. Stainless Steel: Use stainless steel fasteners.
3. Copper: Use copper or stainless steel fasteners.

H. Seal joints with elastomeric sealant as required for watertight construction.

1. Where sealant-filled joints are used, embed hooked flanges of joint members not less than 1 inch into sealant. Form joints to completely conceal sealant. When ambient temperature at time of installation is moderate, between 40 and 70 deg F set joint members for 50 percent movement either way. Adjust setting proportionately for installation at higher ambient temperatures. Do not install sealant-type joints at temperatures below 40 deg F.
2. Prepare joints and apply sealants to comply with requirements in Section 079200 - JOINT SEALANTS.

I. Soldered Joints: Clean surfaces to be soldered, removing oils and foreign matter. Pretin edges of sheets to be soldered to a width of 1-1/2 inches except where pretinned surface would show in finished Work.

1. Do not solder aluminum sheet.
2. Stainless-Steel Soldering: Pretin edges of uncoated sheets to be soldered using solder recommended for stainless steel and phosphoric acid flux. Promptly wash off acid flux residue from metal after soldering.
3. Do not use open-flame torches for soldering. Heat surfaces to receive solder and flow solder into joints. Fill joints completely. Completely remove flux and spatter from exposed surfaces.

3.3 UNDERLAYMENT INSTALLATION

A. Self-Adhering Sheet Underlayment: Install self-adhering sheet underlayment, wrinkle free, on sheathing under sheet metal. Apply primer if required by underlayment manufacturer. Comply with temperature restrictions of underlayment manufacturer for installation; use primer rather than nails for installing underlayment at low temperatures. Apply in shingle fashion to shed water, with end laps of not less than 6 inches staggered 24 inches between courses. Overlap side edges not less than 3-1/2 inches. Roll laps with roller. Cover underlayment within 14 days.

B. Install flashings to cover underlayment.

C. Apply slip-sheet over underlayment before installing sheet metal.

3.4 ROOF FLASHING INSTALLATION

A. General: Install sheet metal roof flashing and trim to comply with performance requirements[, sheet metal manufacturer's written installation instructions,] and SMACNA's "Architectural Sheet Metal Manual." Provide concealed fasteners where possible, set units true to line, and level as indicated. Install work with laps, joints, and seams that will be permanently watertight.

B. Counterflashing: Coordinate installation of counterflashing with installation of base flashing. Insert counterflashing in reglets or receivers and fit tightly to base flashing. Extend counterflashing 4 inches over base flashing. Lap counterflashing joints a minimum of 4 inches and bed with elastomeric sealant.

1. Secure in a waterproof manner by means of snap-in installation and sealant.

C. Roof-Penetration Flashing: Coordinate installation of roof-penetration flashing with installation of roofing and other items penetrating roof. Install flashing as follows:

1. Seal with elastomeric sealant and clamp flashing to pipes penetrating roof except for flashing on vent piping.

3.5 WALL FLASHING INSTALLATION

A. General: Install sheet metal wall flashing to intercept and exclude penetrating moisture according to SMACNA recommendations and as indicated. Coordinate installation of wall flashing with installation of wall-opening components such as windows, doors, and louvers.

3.6 ROOF-EDGE DRAINAGE INSTALLATION

A. General: Install sheet metal roof drainage items to produce complete roof drainage system according to SMACNA recommendations and as indicated. Coordinate installation of roof perimeter flashing with installation of roof drainage system.

B. Downspouts: Join sections with 1-1/2-inch telescoping joints.

1. Provide hangers with fasteners designed to hold downspouts securely to walls. Locate hangers at top and bottom and at approximately 60 inches o.c. in between.
2. Connect downspouts to underground drainage system indicated.

C. Splash Blocks: Install where downspouts discharge onto low-slope roofs and where indicated. Set in cement or sealant compatible with roofing membrane.

3.7 FIELD QUALITY CONTROL

A. Provide one day of water testing at roof area above where ceilings are removed. Include all materials and personnel needed to spray water at full length of flashings, as well as access to underside of roof deck so Architect can inspect for water infiltration.

3.8 CLEANING AND PROTECTION

A. Clean exposed metal surfaces of substances that interfere with uniform oxidation and weathering.

B. Clean and neutralize flux materials. Clean off excess solder and sealants.

C. Remove temporary protective coverings and strippable films as sheet metal flashing and trim are installed. On completion of installation, clean finished surfaces, including removing unused fasteners, metal filings, pop rivet stems, and pieces of flashing. Maintain in a clean condition during construction.

D. Replace sheet metal flashing and trim that have been damaged or that have deteriorated beyond successful repair by finish touchup or similar minor repair procedures.

END OF SECTION