PROPOSED RENOVATION
SRO HOUSING
123 CRAWFORD STREET
ROXBURY, MA

CODE SUMMARY:

IBC 2015
USE TYPE:
R2 - Non-transient Boarding House with 24 units

OCCUPANCY:
6718 gross sf building area/200 gross sf per occupant
Total occupancy = 34

CONSTRUCTION TYPE: VB

FIRE PROTECTION: NFPA-13 automatic sprinkler system, automatic fire alarm & detection system

HEIGHT & AREA LIMITS:
Type VB sprinklered
Allowable Height: 60' per table 504.3; three stories per Table 504.4
Allowable Area: 21,000 sf per Table 506.2 (SM)

FIRE RATINGS:
Table 601: primary structural frame, bearing walls, interior partitions, floor and roof construction are not required to be fire rated.
Table 602: Infill portions of exterior walls w/ <10' separation to maintain 1 hour rating.
708.3 exception 2: dwelling unit separations shall be 1/2-hour rated with sprinkler
Table 1020.1: corridor occupant load less than 10 not required to be rated

EGRESS:
Table 1017.2: Maximum length of exit access travel 250' with sprinkler
1020.2 Corridor width 36" minimum, occupancy <50
1020.4 Exception 2: Maximum dead end corridor 50' with sprinkler

SOUND TRANSMISSION:
1207.2: Partitions separating dwelling units from each other or from public areas STC 50 minimum.

ACCESSIBILITY:
Existing kitchen to remain accessible.
Two Existing accessible Group 2B full baths to remain accessible.

SHEET INDEX

KEY

- 8'-0 — CEILING HEIGHT
- 32 — WINDOW SILL HEIGHT
- E — WINDOW TAG
- 1 — REVISION TAG
- T — TEMPERED GLAZING
- $\mathcal{L}$ — CENTER LINE
- 1 / A6 — BUILDING SECTION
- 1 / A8 — DETAIL
- ELEVATION

ABBREVIATIONS

A.F.F	ABOVE FINISHED FLOOR
APPROX	APPROXIMATELY
A.S.F.	ABOVE SUBFLOOR
BD	BOARD
BET	BETWEEN
BLDG	BUILDING
B.O.	BOTTOM OF
BOTT	BOTTOM
BM	BEAM
CL	CENTER LINE
CLG	CEILING
CLR	CLEAR
COL	COLUMN
CONC	CONCRETE
CONT	CONTINUOUS
DET	DETAIL
DN	DOWN
EA	EACH
EL	ELEVATION
ELEC	ELECTRIC/ELECTRICAL
EX'G	EXISTING
FIN	FINISHED
FTG	FOOTING
H	HEIGHT; HIGH
HD	HOLDDOWN
HORIZ	HORIZONTAL
HR	HOUR
HSS	HOLLOW STRUCTURAL SECTION
HT	HEIGHT
HVAC	HEATING, VENTILATION AND AIR CONDITIONING
INS	INSULATION
MAX	MAXIMUM
MECH	MECHANICAL
MIN	MINIMUM
MISC	MISCELLANEOUS
NO	NUMBER
N.T.S.	NOT TO SCALE
O.C.	ON CENTER
OPN'G	OPENING
PLYWD	PLYWOOD
PT	PRESSURE TREATED
PTD	PAINTED
PTN	PARTITION
R	RISER
REQ'D	REQUIRED
REINF	REINFORCING; REINFORCE
R.O.	ROUGH OPENING
SCHED	SCHEDULE
SIM	SIMILAR
SQ	SQUARE
STL	STEEL
STRUCT	STRUCTURE; STRUCTURAL
SYM	SYMMETRICAL
T	TREAD
T&G	TONGUE AND GROOVE
TMP	TEMPERED
T.O.	TOP OF
T.O.C.	TOP OF CONCRETE
TYP	TYPICAL
U.N.O.	UNLESS NOTED OTHERWISE
VERT	VERTICAL; VERTICALLY
V.I.F.	VERIFY IN FIELD
VL	VERSA-LAM
W	WIDTH
W/	WITH
WD	WOOD
WF	WIDE FLANGE

SCOPE OF WORK:

EXTERIOR:

Landscaping:
Trim tress & shrubs, new plantings and lawn replacement where needed at front, sides and rear
Repair cracked concrete sidewalk at rear left side

Masonry:
Repair foundation cracks
Repair/replace bowed foundation wall @basement access
Repair chimney as needed

Exterior Woodwork:
Remove & replace all fascia, gutters and downspouts
Remove & replace all exterior trim
Remove & replace soffit
Remove & replace porch & deck decking, rails, trim & apron; replace underlying structure
Remove & replace clapboard siding
Paint new exterior trim and prime exposed edges of siding
Paint existing cornice molding and eave brackets at front and sides of original building

Doors and Windows:
Replace all exterior & vestibule doors and hardware on all levels (except as noted to remain)
Replace all windows (except as noted to remain or be removed)

Roofing:
Replace asphalt shingle roof
Replace all flashing including at chimney
Replace EPDM flat roof

Exterior Electrical:
Replace existing light fixtures with new LED fixtures

INTERIOR:
Gut & renovate existing full & half baths except where noted
Replace existing carpeting/vinyl with wood or vinyl as noted
Painting:
- 2nd & 3rd floors: walls, ceilings, trim & any painted doors in all remodeled areas, bathrooms, interior corridors, hallways & stairways
- 1st floor: areas of walls, ceilings trim & painted doors not included in Phase l, including both entry vestibules; touch-up as needed in 1st floor corridors & stairway
- Stairway from 1st floor to bsmt: Stair & corridor walls, ceiling, trim & painted doors up to crawl space & basement doors

MEP:
Replace hot water, boiler and controls
Electrical upgrades
Lighting
See MEP documents

GENERAL NOTES:

All work is to be performed in accordance with all applicable codes including 780 CMR 9th Edition, 521 CMR, MA Stretch Energy Code & EPA RRP rules; regulations, ordinances and requirements of authorities having jurisdiction; and in accordance with best local building practices. Contractor shall obtain and pay for all permits.

Drawings and specifications are intended to provide the basis for the proper completion of the Project suitable for the intended use of the Owner. Items not expressly set forth but which are reasonably implied or necessary for the proper performance of this work shall be included. Contractor shall be responsible for informing the Architect in writing as to any inconsistencies between local requirements and construction documents prior to work being performed in the areas in question.

The Contractor shall field verify all existing dimensions and conditions shown on drawings and shall notify the Architect immediately of any discrepancies between documents and field measurements. The Contractor shall field verify the sizes of all windows and window sill heights and notify Architect of any discrepancies prior to placing material order. Do not scale drawings. Refer to written dimensions only. Any questions concerning the layout of the building, missing dimensions, dimensional inaccuracy, or any other questions or inconsistencies are to be referred directly to the Architect. All dimensions are to centerline or face of stud, unless otherwise noted. Door dimensions are in INCHES; ie: "3680" denotes a 36" wide by 80" high door.

The Contractor shall coordinate the work of all trades and use experienced installers. The Contractor shall coordinate with local authorities and utilities.

Provide cutting and patching work to properly complete the Project. Cut with tools appropriate for materials to be cut. Patch with materials and methods to produce patch which is not visible from a distance of five feet. Do not cut and patch in a manner that would result in a failure of the work to perform as intended, decrease fire performance, decrease acoustical performance, decrease energy performance, decrease operational life, or decrease safety factors. Wall and ceiling separation of dwelling units from each other and from common areas require minimum ½ hour fire rating and STC 50.

Provide and install fireblocking as required by 780 CMR 9th edition.

Deliver, handle, and store materials in strict accordance with manufacturer's instructions. Inspect substrates and report unsatisfactory conditions in writing. Do not proceed until unsatisfactory conditions have been corrected. Take field measurements prior to fabrication where practical. Form to required shapes and sizes with true edges, lines and angles. Provide inserts and templates as needed for work of other trades. Install materials in exact accordance with manufacturer's instructions and approved submittals. Install materials in proper relation with adjacent construction and with proper appearance. Remove and replace work which does not conform to the contract documents at no additional expense to the Owner. Restore units damaged during installation. Replace units which cannot be restored at no additional expense

SRO Housing
123 Crawford Street
ROXBURY, MA

Commonwealth Land Trust
1059 Tremont St.
Roxbury, MA 02120

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175 MAPLE STREET SHERBORN, MA 01770
ph 508.653.5223 fax 508.650.4849

CONSULTANT:

REGISTERED ARCHITECT KECIA G. LIFTON No. 9813 SHERBORN COMMONWEALTH OF MASSACHUSETTS

DATE:
13 NOV 2019 BID

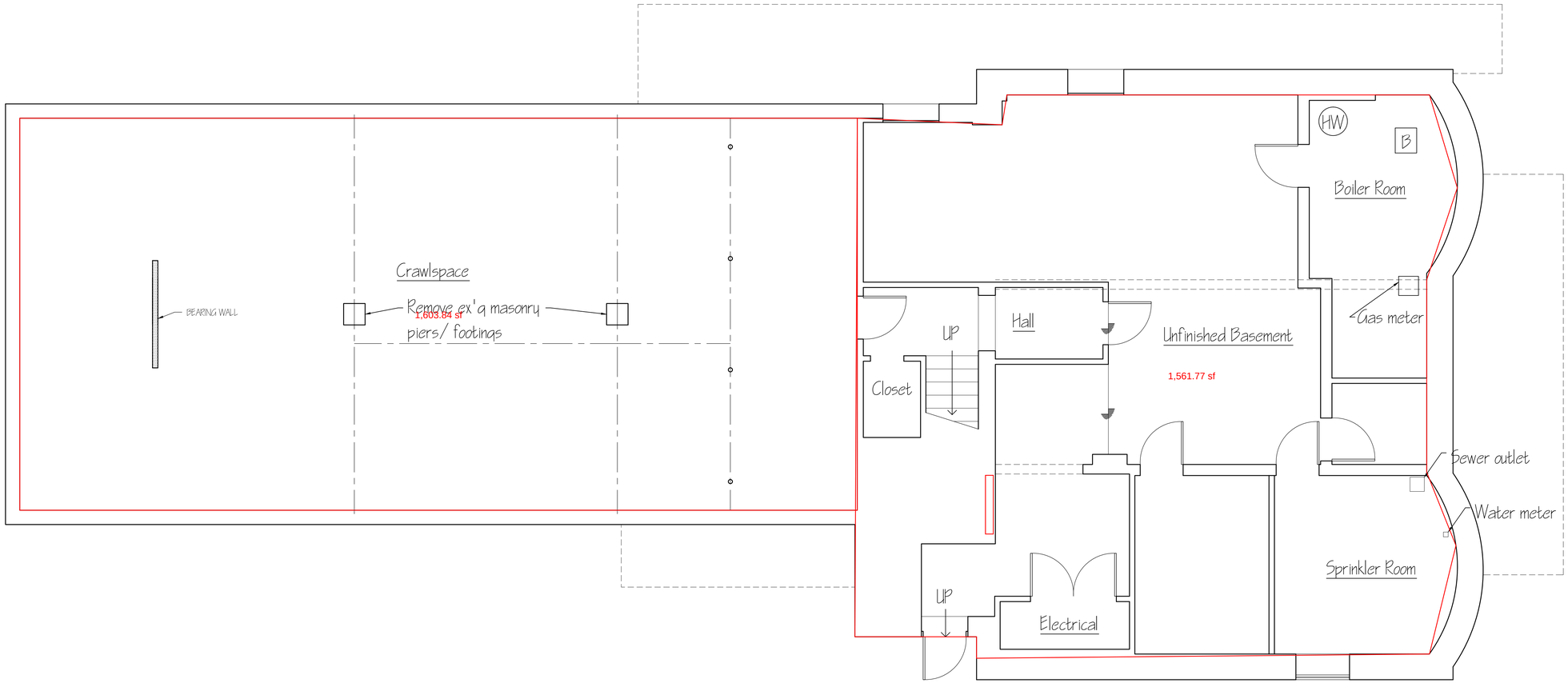
SCALE:
AS NOTED

DRAWN BY:
KGL

CHECKED BY:
KGL

SHEET TITLE:
COVER SHEET NOTES

SHEET NUMBER:
A0



Existing Basement Floor Plan

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REGISTERED ARCHITECT REGINA G. LIETZ No. 9813 SHERBORN MA COMMONWEALTH OF MASSACHUSETTS

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

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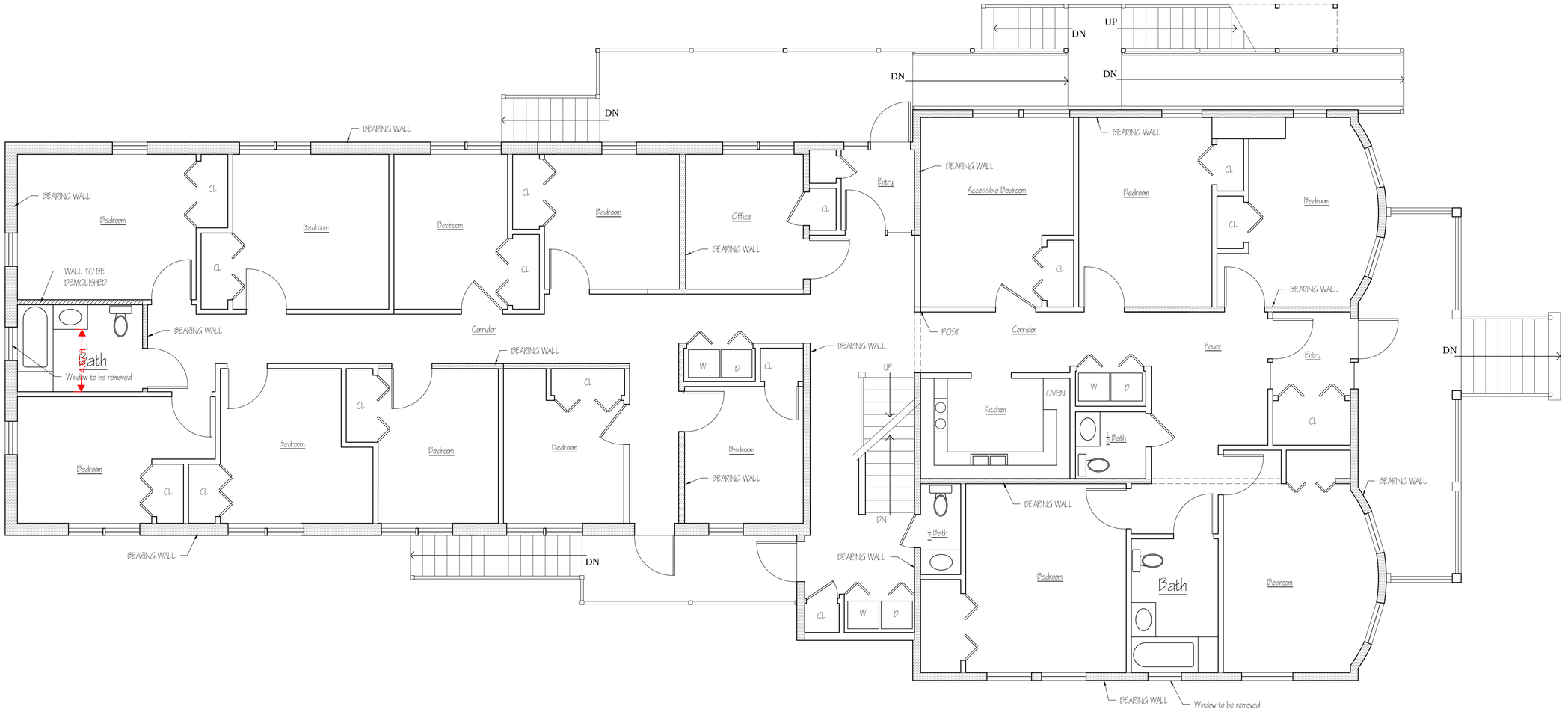
SHEET TITLE:
EXISTING BASEMENT PLAN

SHEET NUMBER:
A1



Existing First Floor Plan

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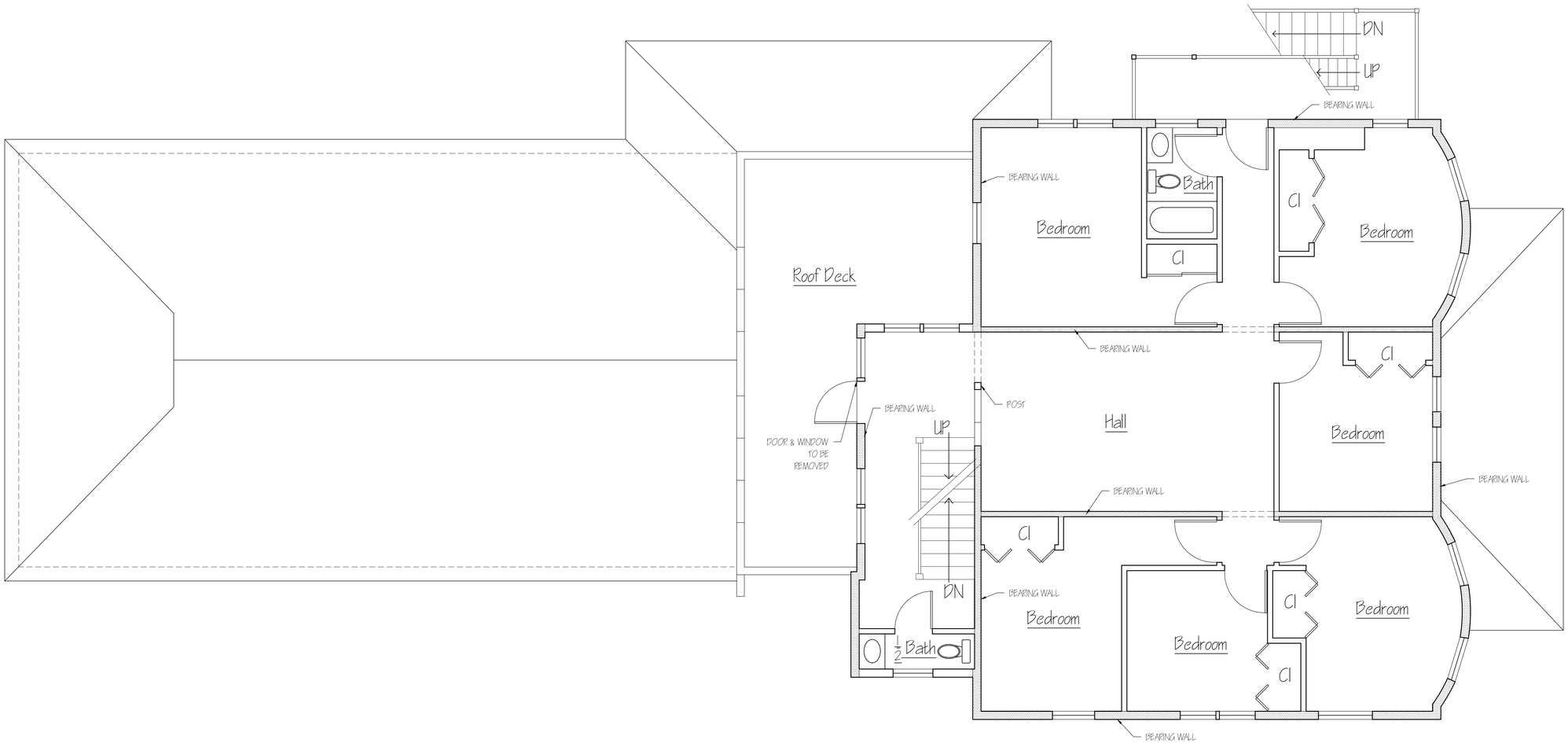
EXISTING FIRST FLOOR PLAN

SHEET NUMBER:
A2



Existing Second Floor Plan

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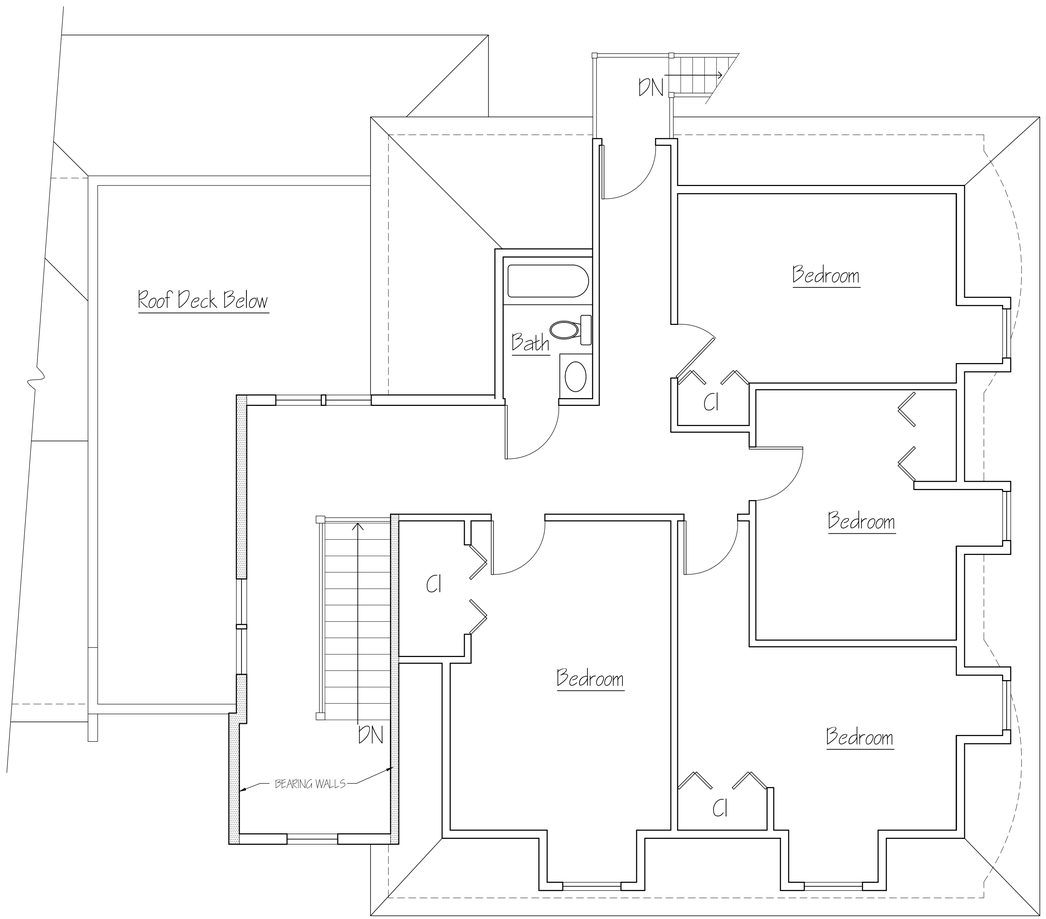
EXISTING SECOND FLOOR PLAN

SHEET NUMBER:
A3



Existing Attic Floor Plan

DEMOLITION NOTES:

Survey existing conditions and correlate with Drawings to verify extent of demolition required. Areas to be demolished are shaded.
Verify conditions at site to determine whether demolition methods proposed for use will not endanger existing structures by overloading, failure, or unplanned collapse.
Notify Owner of schedule of any shut-off of utilities which serve occupied spaces.
Protect portions of building, site and adjacent structures affected by demolition operations.
Perform demolition operations by methods which do not endanger or impact adjacent spaces, structures, or the public.
Remove abandoned utilities and wiring systems in work areas. Perform demolition operations to prevent dust and pollutant hazards.
Provide chutes as required to control dust and debris.
Comply with EPA Renovation, Repair & Painting rules.
Provide removal and disposal of materials in accordance with all applicable Federal, State and local laws, codes and regulations, by properly licensed subcontractors.
Verify existing conditions upon completion of demolition and report any discrepancies to the Architect.

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EXISTING
ATTIC PLAN/
DEMOLITION NOTES

SHEET NUMBER:
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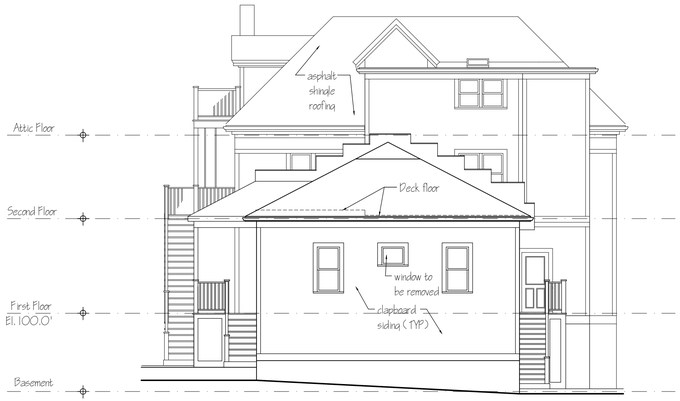

Existing Rear Elevation

Existing Left Side Elevation

Existing Right Side Elevation

Existing Front Elevation

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CONSULTANT:

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SCALE:
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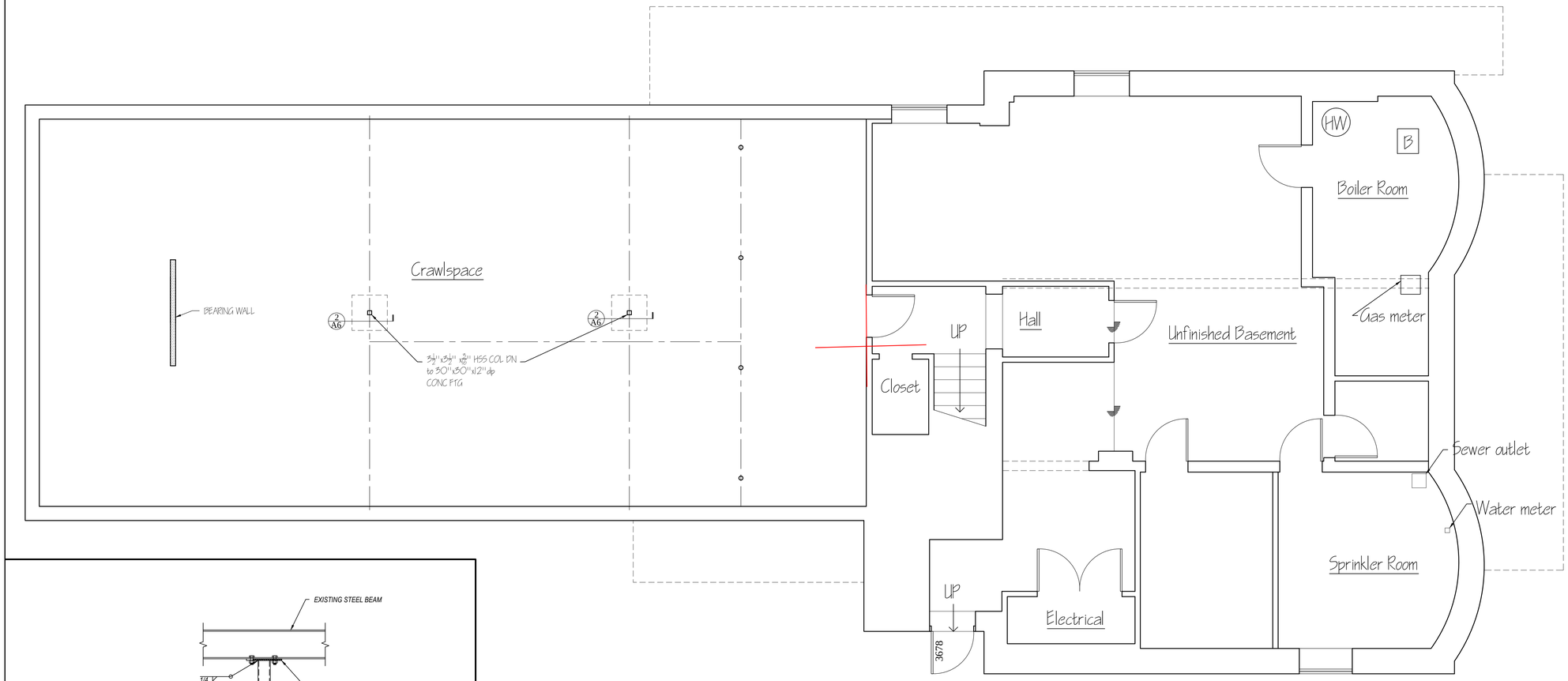
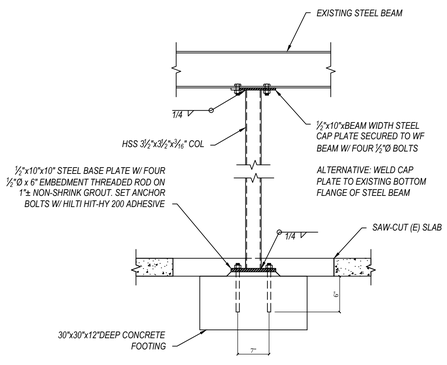
SHEET TITLE:
EXISTING ELEVATIONS

SHEET NUMBER:
A5



1 PROPOSED BASEMENT PLAN

1/4" = 1'-0"



2 NEW HSS COLUMN DETAIL

SCALE: ¾" - 1'-0"

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SIEGEL ASSOCIATES
Structural Engineers
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ph 617.244.1612

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DATE:
13 NOV 2019 BID

SCALE:
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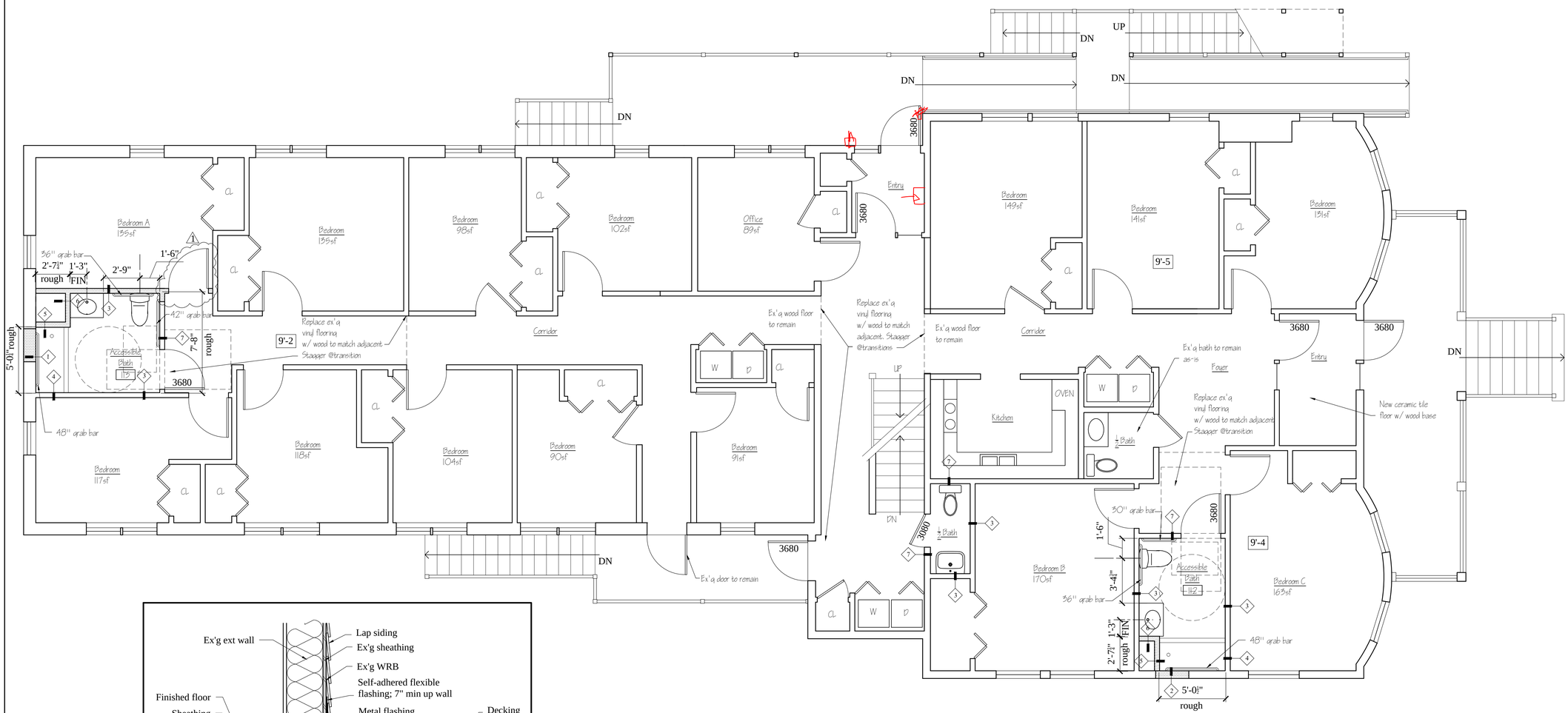
SHEET TITLE:
PROPOSED
BSMT/FNDN
PLAN

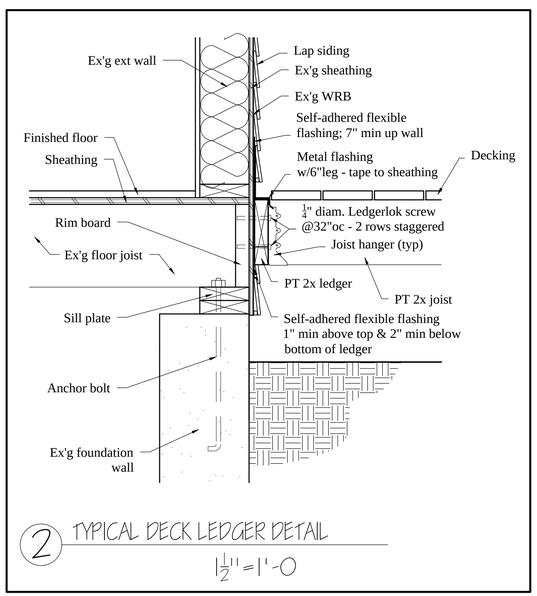
SHEET NUMBER:
A6



1 PROPOSED FIRST FLOOR PLAN

1/4" = 1'-0"

New walls



2 TYPICAL DECK LEDGER DETAIL

1½" = 1'-0

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DATE:
13 NOV 2019 BID
⚠14 NOV 2019

SCALE:
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PROPOSED PLANS

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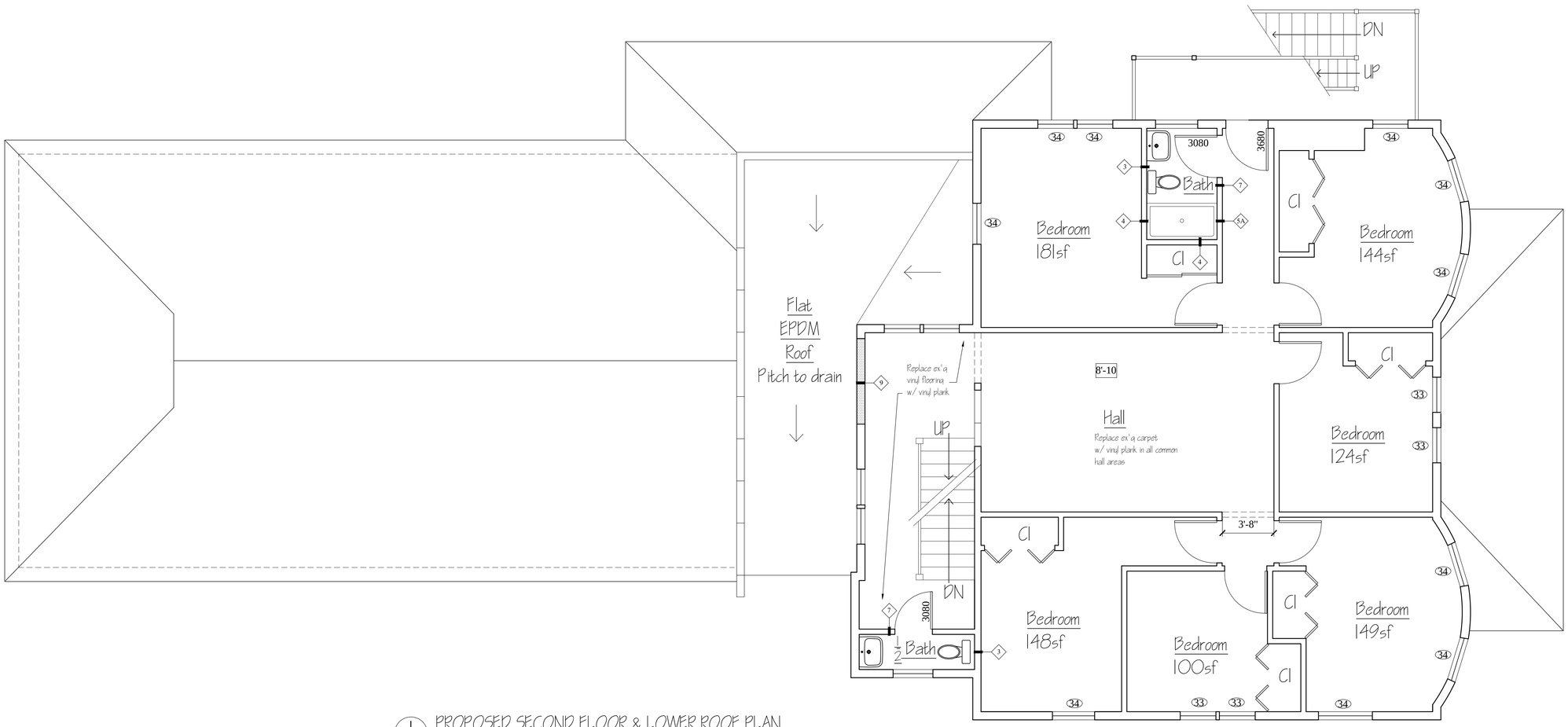
A7



1 PROPOSED SECOND FLOOR & LOWER ROOF PLAN
1/4" = 1'-0"

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PROPOSED PLANS

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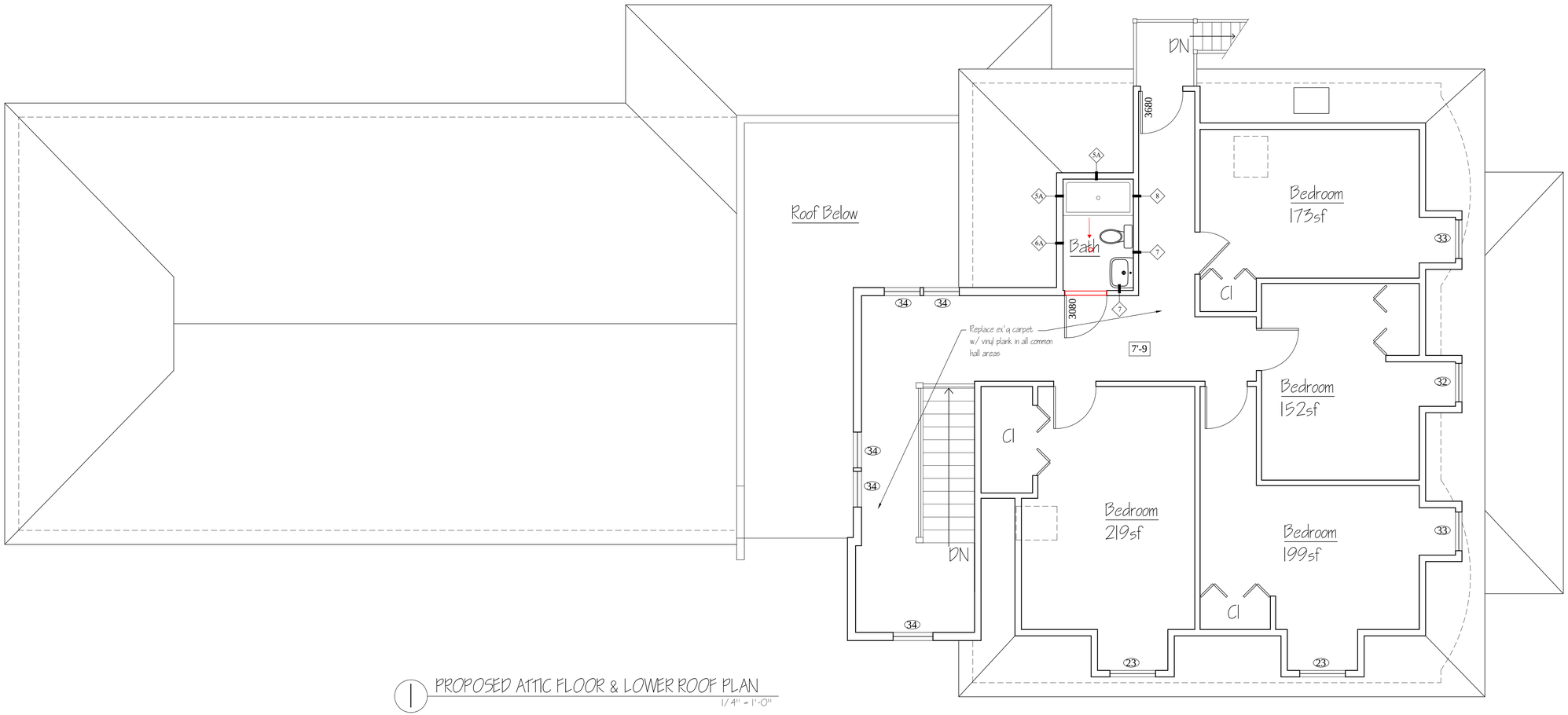
A8



1 PROPOSED ATTIC FLOOR & LOWER ROOF PLAN
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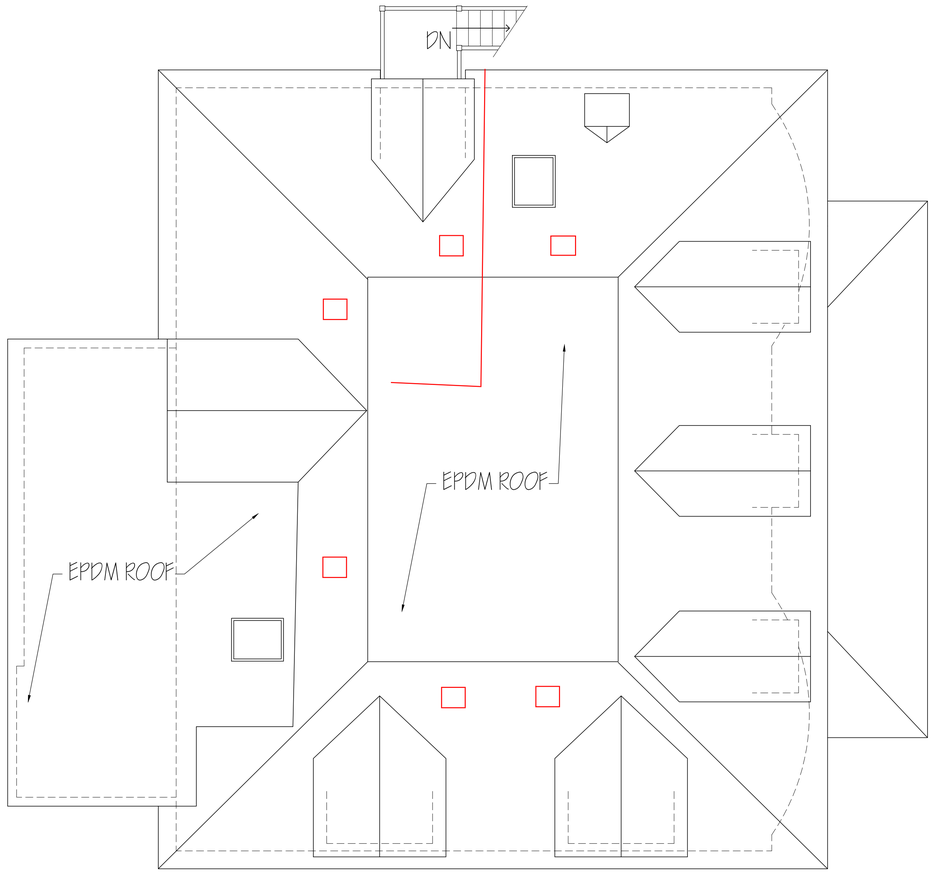
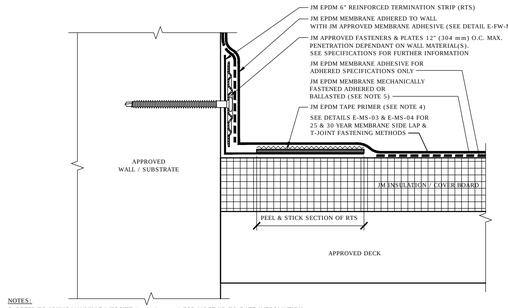
A9



1 UPPER ROOF PLAN

1/4" = 1'-0"

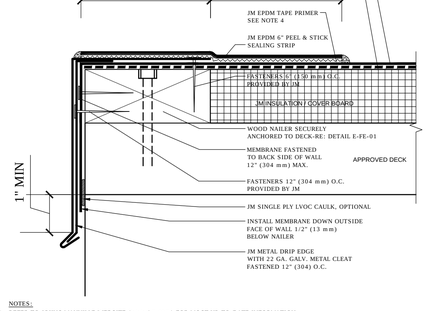


NOTES:

1. REFER TO JOHNS MANVILLE WEBSITE (www.jm.com) FOR MOST UP-TO-DATE INFORMATION.
2. PLEASE SEE SINGLE PLY FLASHING SPECIFICATIONS FOR A FULL DESCRIPTION OF INSTALLATION INSTRUCTIONS AND REQUIREMENTS WHICH ARE CONSIDERED A PART OF THIS DETAIL.
3. ANY CARPENTRY OR METAL WORK SHOULD BE DESIGNED AND CONSTRUCTED IN ACCORDANCE WITH LOCAL CODE REQUIREMENTS AND/OR PROJECT SPECIFICATIONS. THESE COMPONENTS SHOULD BE REVIEWED AND APPROVED BY A LICENSED DESIGN PROFESSIONAL.
4. JM EPDM TAPE PRIMER OR JM SINGLE PLY MEMBRANE PRIMER (LOW VOC) MUST BE APPLIED ON ALL JM EPDM PEEL & STICK PRODUCTS. ROLL MEMBRANE WITH HAND ROLLER UNDER PRESSURE AT PEEL & STICK.
5. REINFORCED JM EPDM MEMBRANE IS REQUIRED FOR MECHANICALLY FASTENED INSTALLATIONS.

3 EPDM ROOF / WALL INTERSECTION DETAIL

N.T.S.



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2 EPDM ROOF EDGE DETAIL

N.T.S.

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SHEET TITLE:
UPPER ROOF PLAN
ROOF DETAILS

SHEET NUMBER:
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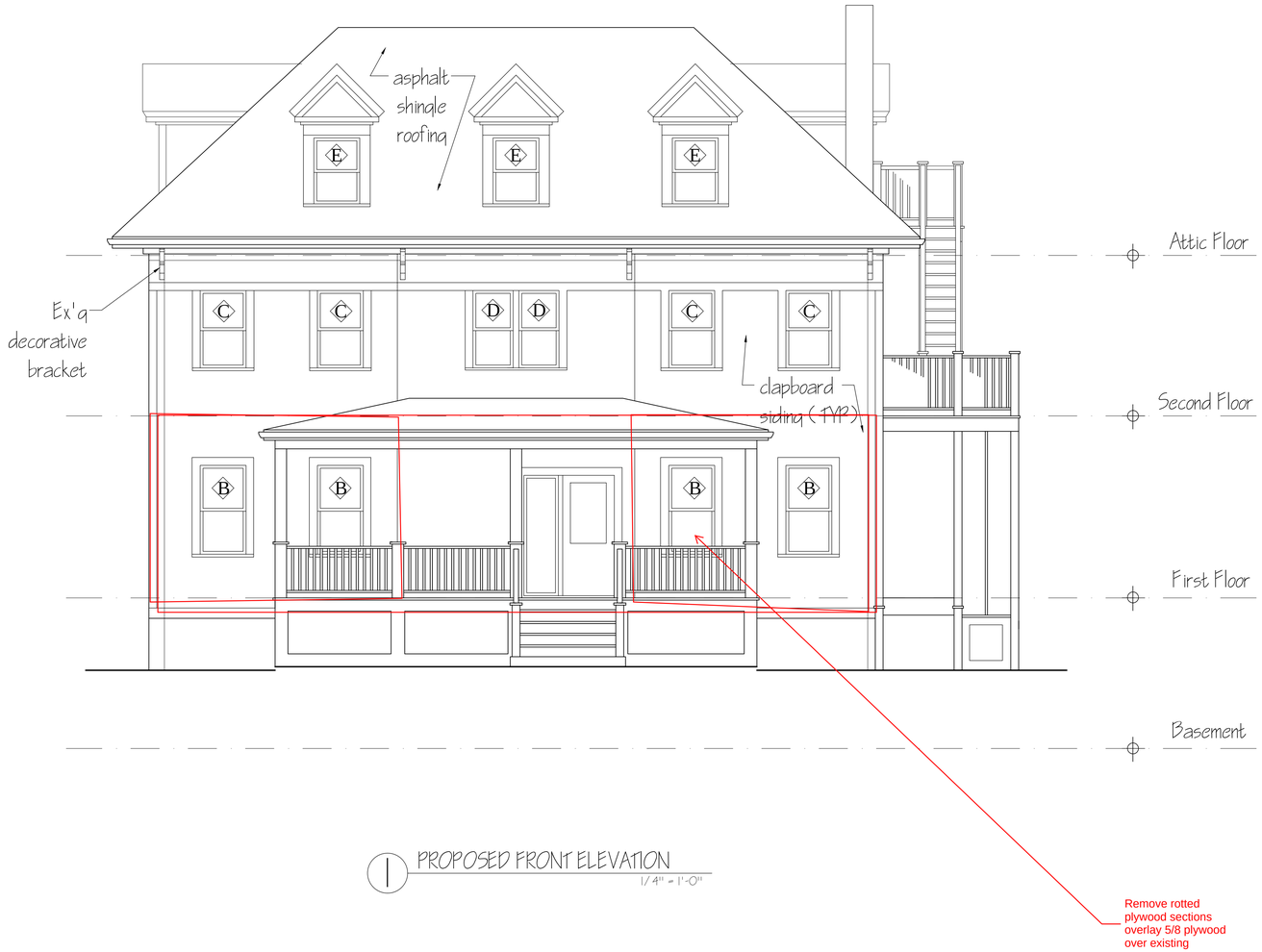

PROPOSED FRONT ELEVATION
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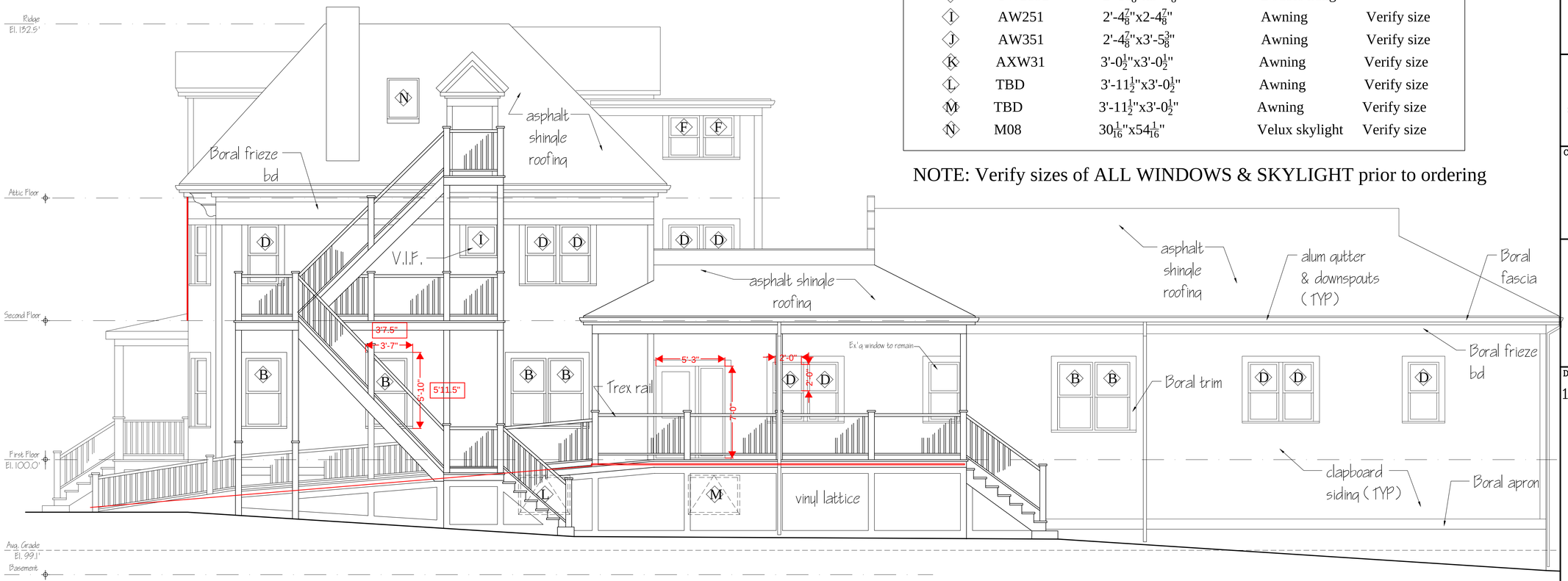
A11



1 PROPOSED RIGHT SIDE ELEVATION
1/4" = 1'-0"

WINDOW SCHEDULE

Andersen 400 series windows w/Low-E4 glazing U≤.30

Symbol	Size	R.O. w x h	Type	Notes
B	TW2852	2'-10 1/8"x5'-4 7/8"	Double hung	
C	TW2846	2'-10 1/8"x4'-8 7/8"	Double hung	
D	TW2446	2'-6 1/8"x4'-8 7/8"	Double hung	
E	TW28310	2'-10 1/8"x4'-0 7/8"	Double hung	
F	TW2432	2'-6 1/8"x3'-4 7/8"	Double hung	
G	TW2452	2'-6 1/8"x5'-4 7/8"	Double hung	
H	TW2832	2'-10 1/8"x3'-4 7/8"	Double hung	
I	AW251	2'-4 7/8"x2-4 7/8"	Awning	Verify size
J	AW351	2'-4 7/8"x3'-5 3/8"	Awning	Verify size
K	AXW31	3'-0 1/2"x3'-0 1/2"	Awning	Verify size
L	TBD	3'-11 1/2"x3'-0 1/2"	Awning	Verify size
M	TBD	3'-11 1/2"x3'-0 1/2"	Awning	Verify size
N	M08	30 1/16"x54 1/16"	Velux skylight	Verify size

NOTE: Verify sizes of ALL WINDOWS & SKYLIGHT prior to ordering

SRO Housing
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Roxbury, MA 02120

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CONSULTANT:

REGISTERED ARCHITECT REGINA G. LIPTON No. 9813 SHERBORN MA COMMONWEALTH OF MASSACHUSETTS

DATE:
13 NOV 2019 BID

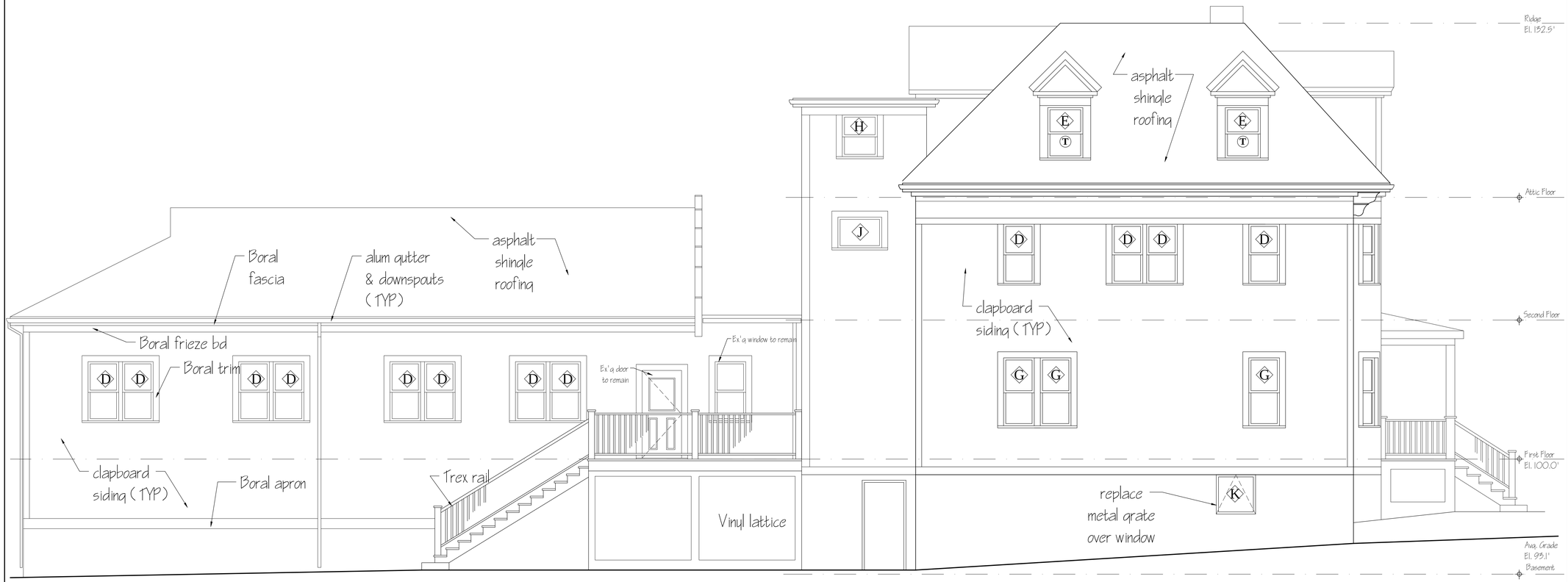
SCALE:
1/4" = 1'-0"

DRAWN BY:
KGL

CHECKED BY:
KGL

SHEET TITLE:
PROPOSED ELEV.
WINDOW SCHEDULE

SHEET NUMBER:
A12



1 PROPOSED LEFT SIDE ELEVATION
1/4" = 1'-0"

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CONSULTANT:

REGINALD G. LISTON
No. 9813
SHERBORN
MA
REGISTERED ARCHITECT
COMMONWEALTH OF MASSACHUSETTS

DATE:
13 NOV 2019 BID

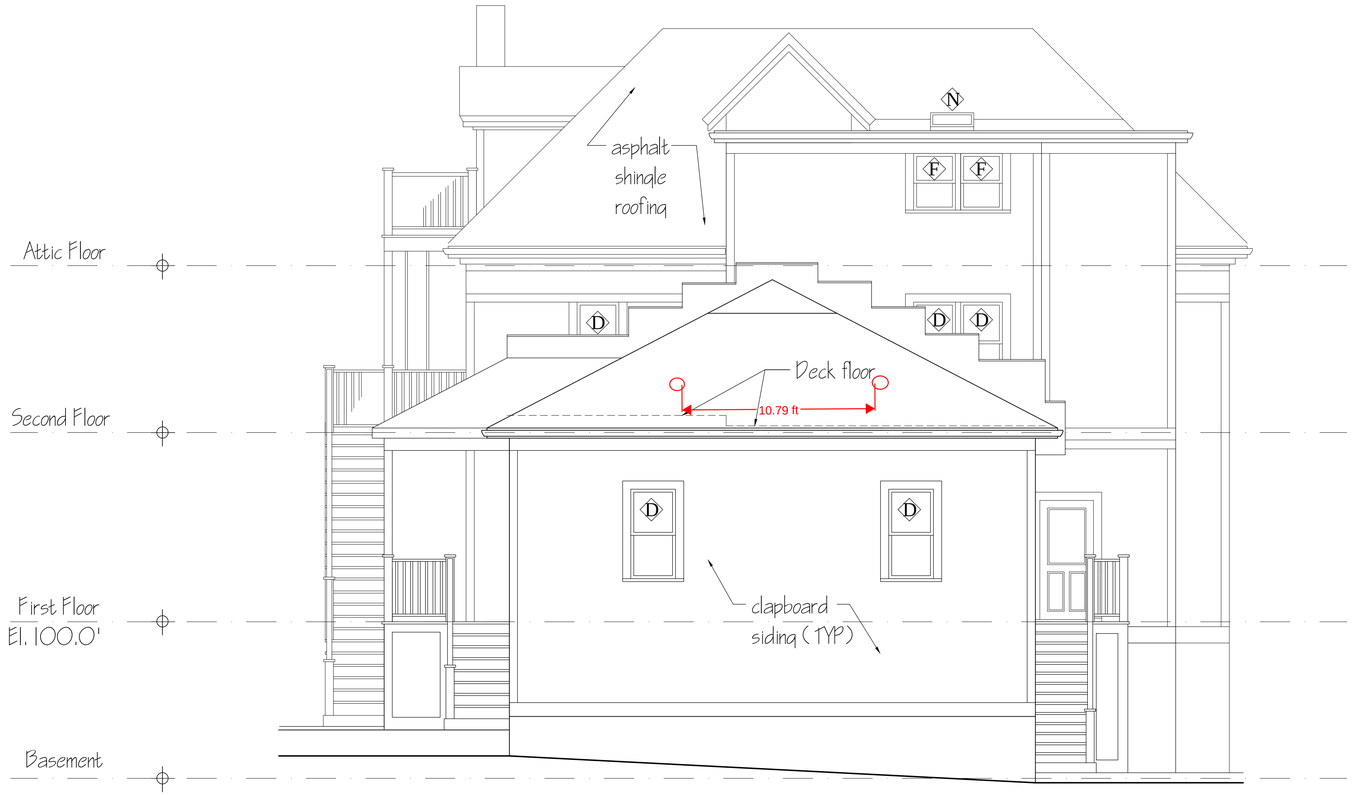
SCALE:
1/4" = 1'-0"

DRAWN BY:
KGL

CHECKED BY:
KGL

SHEET TITLE:
PROPOSED
ELEVATION

SHEET NUMBER:
A13



1 PROPOSED REAR ELEVATION
1/4" = 1'-0"

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Roxbury, MA 02120

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CONSULTANT:

REGINALD LIETZ No. 9813 REGISTERED ARCHITECT COMMONWEALTH OF MASSACHUSETTS SHERBORN MA

DATE:
13 NOV 2019 BID

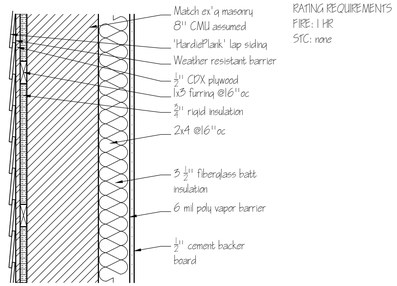
SCALE:
1/4" = 1'-0"

DRAWN BY:
KGL

CHECKED BY:
KGL

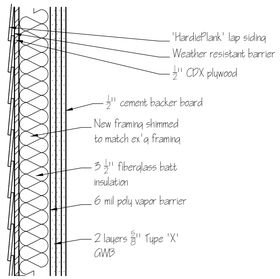
SHEET TITLE:
PROPOSED
ELEVATION

SHEET NUMBER:
A14



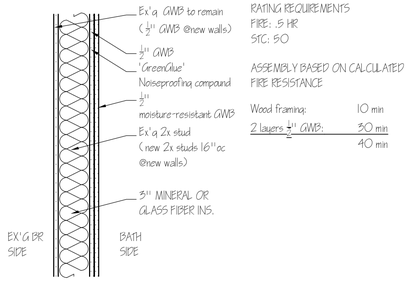
RATING REQUIREMENTS
FIRE: 1 HR
STC: none

1 1½" = 1'-0"



RATING REQUIREMENTS
FIRE: 1 HR
STC: none

2 1½" = 1'-0"

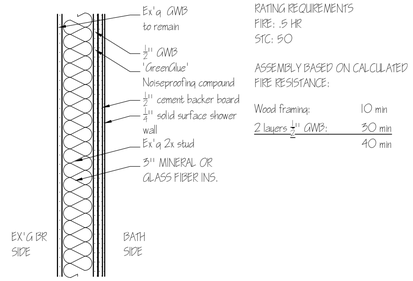


RATING REQUIREMENTS
FIRE: .5 HR
STC: 50

ASSEMBLY BASED ON CALCULATED FIRE RESISTANCE

Wood framing:	10 min
2 layers ½" GWB:	30 min
	40 min

3 1½" = 1'-0"

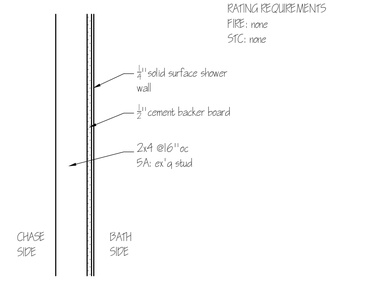


RATING REQUIREMENTS
FIRE: .5 HR
STC: 50

ASSEMBLY BASED ON CALCULATED FIRE RESISTANCE:

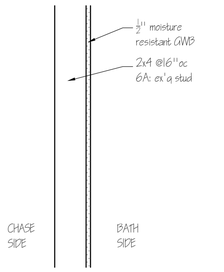
Wood framing:	10 min
2 layers ½" GWB:	30 min
	40 min

4 1½" = 1'-0"



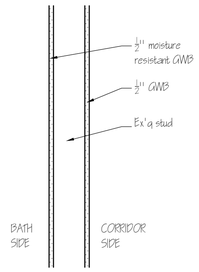
RATING REQUIREMENTS
FIRE: none
STC: none

5 1½" = 1'-0"



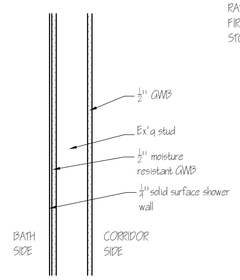
RATING REQUIREMENTS
FIRE: none
STC: none

6 1½" = 1'-0"



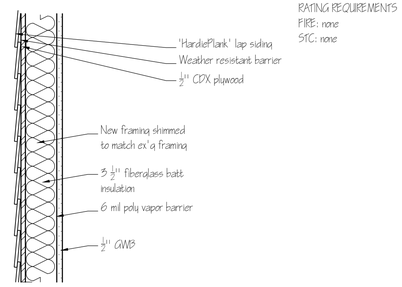
RATING REQUIREMENTS
FIRE: none
STC: none

7 1½" = 1'-0"



RATING REQUIREMENTS
FIRE: none
STC: none

8 1½" = 1'-0"



RATING REQUIREMENTS
FIRE: none
STC: none

9 1½" = 1'-0"

WALL TYPE NOTES

1. Existing wall construction assumptions based upon renovation drawings by Elton & Associates, Architects dated 7-15-1992.

2. Maintain integrity of existing fire rated walls.

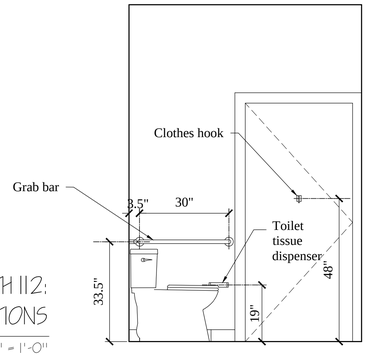
3. See floor plans for wall type tags & locations.

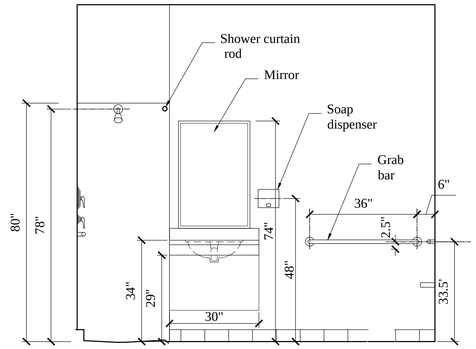
4. Construct all rated assemblies per GA-600 Fire Resistance Design Manual guidelines and 780 CMR MA State Building Code.

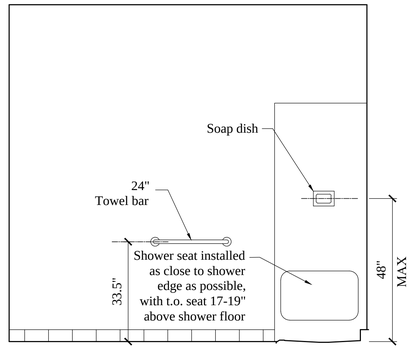
5. In each system containing batt or blanket insulation the insulation is specified to be either mineral or glass fiber and, for fire resistance, the system shall be built using the type specified.

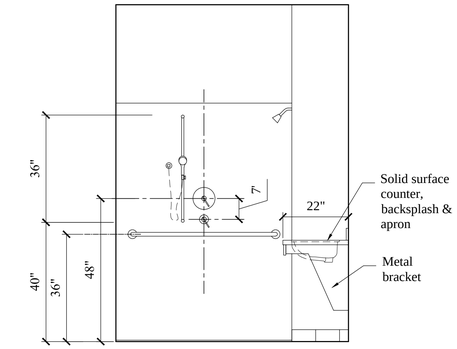
ACCESSIBLE BATH 112: INTERIOR ELEVATIONS

9 ½" = 1'-0"



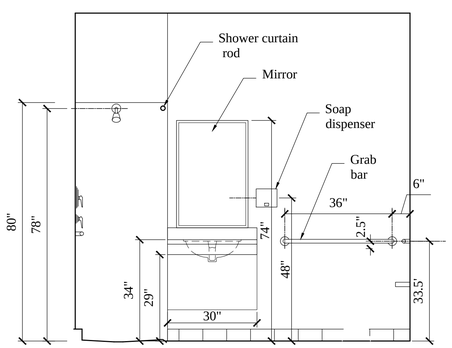


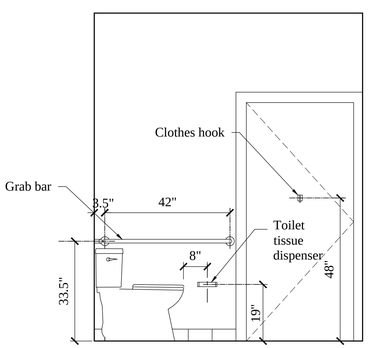


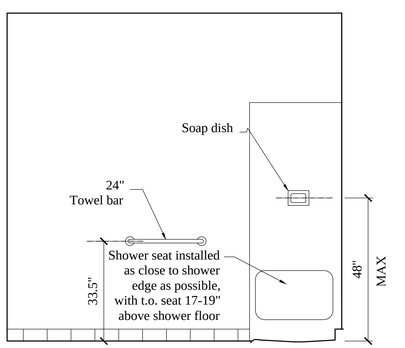


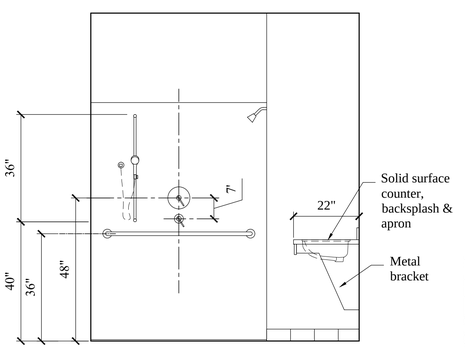
ACCESSIBLE BATH 113: INTERIOR ELEVATIONS

10 ½" = 1'-0"









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CONSULTANT:

REGISTERED ARCHITECT
REGINA G. LIETZ
No. 9813
SHERBORN
COMMONWEALTH OF MASSACHUSETTS

DATE:
13 NOV 2019 BID

SCALE:
AS NOTED

DRAWN BY:
KGL

CHECKED BY:
KGL

SHEET TITLE:
WALL TYPES
INTERIOR ELEVS

SHEET NUMBER:
A15

EXTERIOR NOTES

Landscaping

Trim tress & shrubs, new plantings and lawn replacement
where needed at front, sides and rear
$10,000 ALLOWANCE

Repair cracked concrete sidewalk at rear left side
$5,000 ALLOWANCE

Masonry

Repair foundation cracks

Repair/replace bowed foundation wall @basement access

Repair chimney as needed
$10,000 ALLOWANCE

Typical Exterior

Boral 'TruExterior' 4/4 trim boards.

James Hardie 'HardiePlank' pre-finished fiber cement lap siding;
install per manufacturer's instructions
prime cut ends

Typical Roof

Comply with NRCA Roofing and Waterproofing Manual and manufacturer's instructions.

25-year EPDM roof @flat areas, Johns Manning or equivalent;
Color: white

30-year Architectural GAF Timberline Ultra HD asphalt shingles
or equivalent.

Galvanized metal drip-edge.

Aluminum gutters & downspouts, 5" K-style, w/leaders and/or splash blocks.

Step flashing at sidewalls.

Replace existing flashing including at chimney.

15# felt - hand nail w/plastic roofing caps.

Bituthene underlayment - Grace Roof Detail Membrane:
hips: 36"
valleys: 36"
eaves: 48"
sidewalls: 24"
rakes: 12"
around all roof penetrations

Windows

Andersen 400 series clad wood windows

U .30 max

White exterior, pine interior.

Standard hardware, Stone & full screen.

Install windows & flashing per manufacturer's instructions.

Seal gaps around windows with backer rod & caulk.

Entry Doors

$1\frac{3}{4}$" insulated steel or fiberglass w/tempered glazing.

U≤.27, SHGC ≤.30

Match design and glazing of existing doors.

Provide kickplate on each side.

Schlage D series hardware: ANSI F-86 keyed single-cylinder
lockset w/lever handle and vandal guard function
Falcon/Arrow interchangeable core
All keying to match Owner's existing

Typical Deck/Ramp/Porch & Exterior Stairs

Structure: ACQ or CA ressure treated dimensional lumber
Hot-dip galvanized steel or stainless steel fasteners, anchors & hardware only. Do not mix types. Do not place dissimilar metals in contact with each other.

Wolf 'Perspective' composite decking

Wolf 'Distinction' railing

Boral TruExterior 4/4 trim

Vinyl lattice apron

Exterior Painting & Finishing

Provide surface preparation & painting for all paintable exterior surfaces.

Back & end prime all exposed surfaces to be painted

Protect hardware and adjacent surfaces.

Apply paint to achieve manufacturer's recommended dry film thicknesses.

Recoat areas which show bleed-through or defects.

Clean paint spatter from adjacent surfaces and glass.

Touch-up damaged surfaces at completion of construction.

Benjamin Moore Low-VOC Acrylic Latex Exterior Primer & Paint

Colors selected by Owner

Two finish coats

Sheen: flat

INTERIOR NOTES

Comply with Architectural Woodwork Institute (AWI) "Architectural Woodwork Quality Standards."

Install work plumb, level and in proper alignment.

Provide work free from tool marks and blemishes.

Securely fasten to substrates.

Install in lengths to minimize joints and seams.

Touch-up damaged or abraded finishes.

Interior Doors (Bathrooms only)

Masonite $1\frac{3}{4}$"lauan flush solid core wood slab door, stained
ANSI F-76 lever handle hardware mounted 36"-48" AFF
No closers

Floors

Front vestibule: Non-slip ceramic or porcelain tile on thinset mortar on cementitious underlayment; wood base

Bathrooms: Non-slip ceramic or porcelain tile on thinset mortar on cementitious underlayment; ceramic tile base

Thresholds: Shall not exceed $\frac{1}{2}$" in height and shall be beveled on both sides with a slope no greater than one-in-two (50%)

Changes in floor finish materials: shall have an edge strip or threshold that is beveled at a ratio of one-in-two (50%)

Common Areas: replace with either:
Prefinished $\frac{3}{4}$" oak strip flooring to match ex'g 1st floor;
or
Roppe 'Northern Timbers Solutions' vinyl plank flooring as noted on plans;
Provide wood base at any areas of new flooring without ex'g wood base

Stairs-1st to 2nd & 2nd to 3rd floors: Roppe raised design rubber stair treads and risers

Bathrooms:

Shower pan, Typical bathrooms: Swanston SS-3260 32"x60" Single Threshold Shower Pan

Shower pan, Accessible bathrooms: Freedom Showers Accessible Acrylic Shower Pan Model APF6030BFPAN 60"x31"; install with $\frac{1}{2}$" max threshold ($\frac{1}{4}$" min thick tile req'd)

Shower seat: CSI Bathware 26"x18" Folding Shower Seat w/padded top (Accessible bathrooms only)

Shower valve, tub spout & shower heads: Symmons Temptrol $820
Commercial Tub/Shower/Hand Shower
Model C-96-600-B30-V-X w/T736 36" slide bar & wand (hand shower required in accessible bathrooms only)

Shower surround: $\frac{1}{4}$" solid surface over $\frac{1}{2}$" cement backer board

Soap dish: Bobrick B-4380 Recessed Heavy-Duty Soap Dish

Shower curtain rod: Bobrick B-207x60 Shower Curtain Rod w/concealed mounting

Toilet: Niagara "The Original" w/side handle N7717 0.8 GPF single flush toilet; elongated bowl w/12" rough-in

Sink: Duravit D-Code 231065 25" single hole wall-mounted washbasin (non-accessible bathrooms only)

Accessible sink assembly:
Kohler K-2210 Caxton Oval bathroom sink, white
A&M Hardware ADA 21" Vanity Brackets
Solid surface counter, backsplash and apron
Stained wood angled front panel

Faucet: Chicago Faucets 333-665PSHABCP chrome single supply hot/cold water basin faucet w/self closing button handle; single hole installation

Towel bars/grab bars: Bobrick 5806 stainless steel grab bar
Provide grab bars per code in accessible bathrooms only
Provide one 24" towel bar per full bathroom
Provide blocking at each installation

Mirror: Bobrick B-165 24"x36" channel-frame mirror w/stainless steel frame

Toilet Tissue dispenser: Bobrick B-2730

Soap dispenser: Bobrick 818615 Heavy-Duty Surface Mounted

Clothes hook: Bobrick B-212

ADD ALT: Ceramic tile wainscoting to 48" AFF; $5/sf tile allowance

INTERIOR NOTES (cont.)

Painting & Finishing

Provide painting and surface preparation for interior surfaces as noted in scope of work.

Remove cover plates and protect hardware and adjacent surfaces.

Apply paint to achieve manufacturer's recommended dry film thicknesses.

Recoat areas which show bleed-through or defects.

Clean paint spatter from adjacent surfaces and glass.

Touch-up damaged surfaces at completion of construction.

Benjamin Moore Low-VOC Interior Latex paint, colors to be selected by Owner.

Painting Schedule:

Veneer Plaster Walls: 1 coat latex primer, 2 coats latex finish.
Sheen: eggshell

Veneer Plaster Ceilings: 1 coat latex primer, 2 coats latex finish.
Sheen: flat

Wood for Painted Finish: 1 coat latex primer, 2 coats latex enamel.
Sheen: semigloss

Wood floors for Clear Finish: stain, 1 coat water-base sealer, 3 topcoats.
Sheen: gloss with final topcoat satin
Submit finish sample for Owner approval before starting finish work.

HVAC

Provide & install new baseboard heating covers in all bathrooms to be renovated.

Provide & install specified exhaust fans/ERVs per MEP documents.

Provide new heating system and controls per MEP documents.

PLUMBING

Provide and install domestic water supply and pvc soil waste and vent systems per MEP documents.

Provide and install indirect 120 gallon water tank per MEP documents. Retain existing hot water heater as back-up.

Reconfigure fixtures in accessible bathrooms as shown on plans.

Provide and install specified fixtures and fittings.

ELECTRIC

Provide receptacles, life safety and accessibility equipment per MEP documents and as required by code.

Upgrade electrical service to 400 amps per MEP documents.

Provide (1) 20 amp outlet in each bedroom and office for window AC (25 total).

Install new 125 amp main breaker branch panel to feed new 20 amp receptacles and equipment for upgraded boiler.

Provide and install LED light fixtures in common areas.

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CONSULTANT:

REGISTERED ARCHITECT REGINA G. LIPTON No. 9813 SHERBORN MA COMMONWEALTH OF MASSACHUSETTS

DATE:
13 NOV 2019 BID

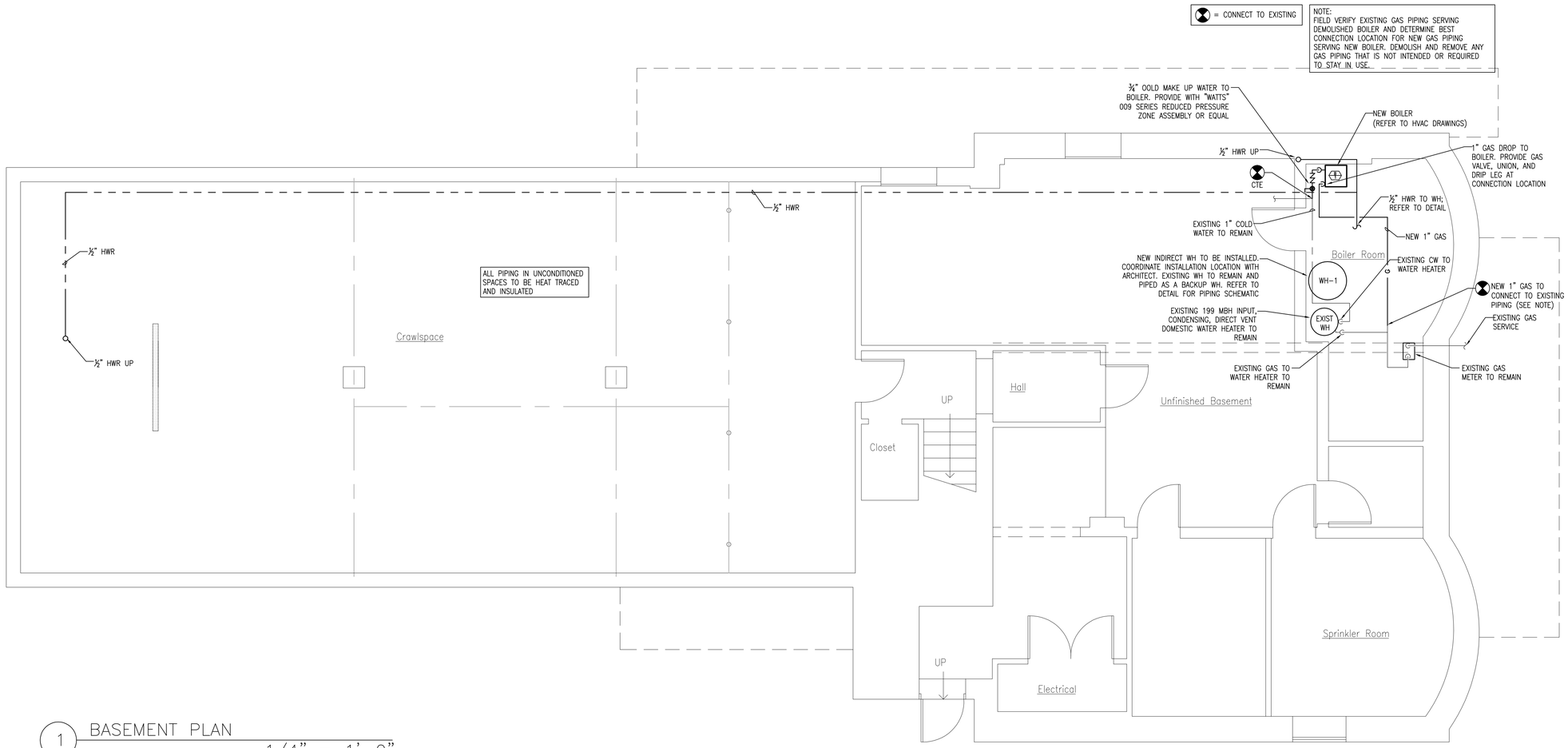
SCALE:

DRAWN BY:
KGL

CHECKED BY:
KGL

SHEET TITLE:
MATERIAL NOTES/ SPECIFICATIONS

SHEET NUMBER:
A16



1 BASEMENT PLAN
1/4" = 1'-0"

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COMMONWEALTH OF MASSACHUSETTS
CHRISTIANE Y. PERRIN
MECHANICAL
No. 38315
REGISTERED PROFESSIONAL ENGINEER

DATE:
10/18/2019 PERMIT

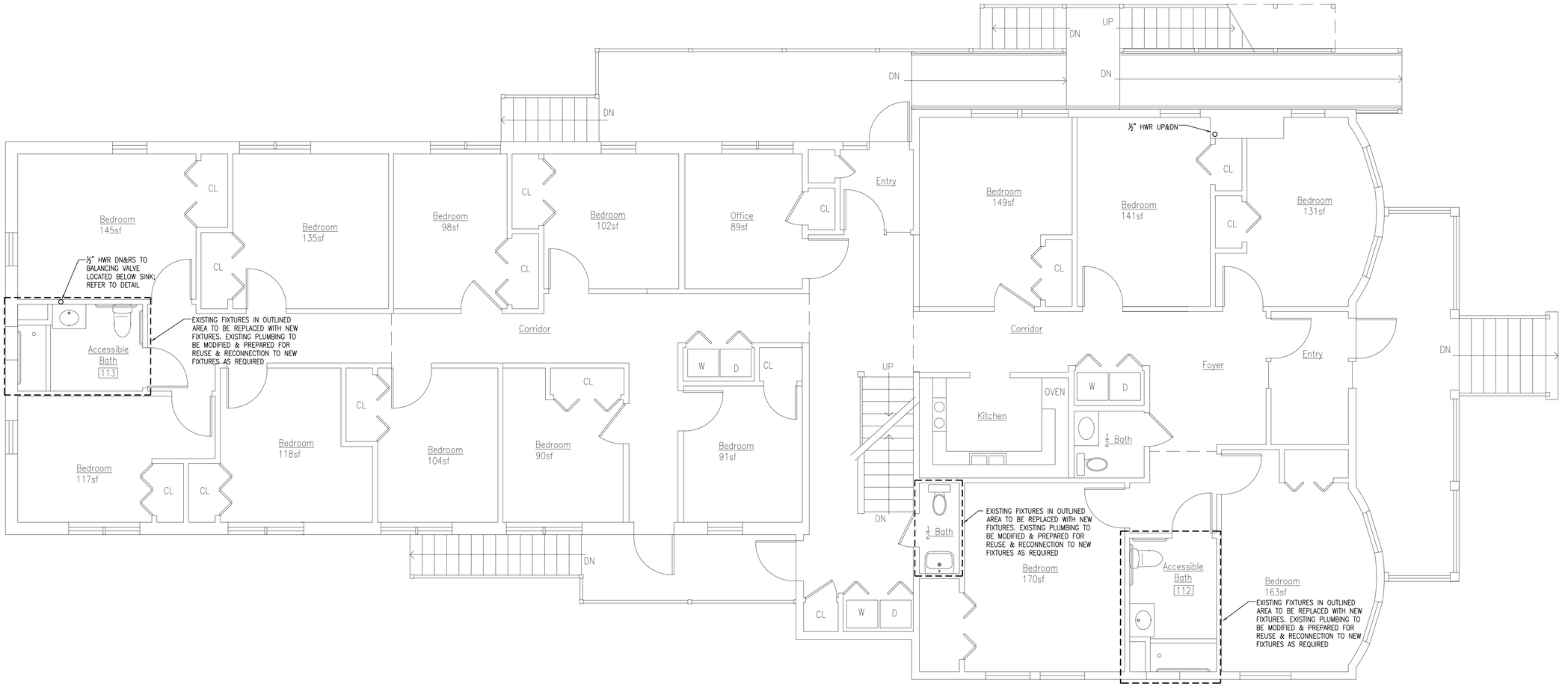
SCALE:
1/4" = 1'-0"

DRAWN BY:
PP

CHECKED BY:
PP

SHEET TITLE:
PLUMBING BASEMENT PLAN

SHEET NUMBER:
P1



1 FIRST FLOOR PLAN
1/4" = 1'-0"

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Roxbury, MA 02120

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COMMONWEALTH OF MASSACHUSETTS
CHRISTIANE Y. PERRIN
MECHANICAL
No. 38315
REGISTERED PROFESSIONAL ENGINEER

DATE:
10/18/2019 PERMIT

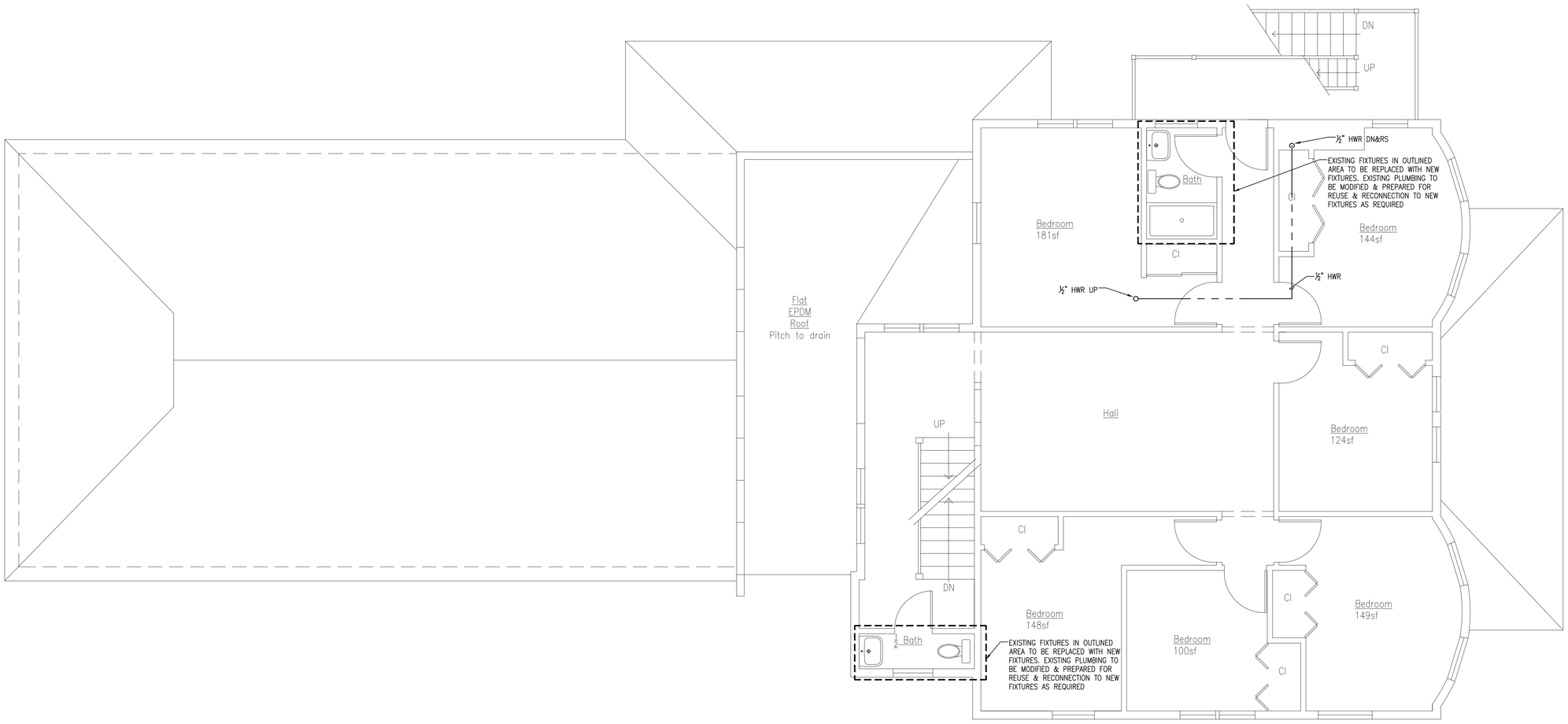
SCALE:
1/4" = 1'-0"

DRAWN BY:
PP

CHECKED BY:
PP

SHEET TITLE:
PLUMBING FIRST FLOOR PLAN

SHEET NUMBER:
P2



1 SECOND FLOOR PLAN
1/4" = 1'-0"

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Commonwealth
Land Trust
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Roxbury, MA 02120

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CONSULTANT:
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Westford, Massachusetts 01886
Tel: (978) 443 7888

COMMONWEALTH OF MASSACHUSETTS
CHRISTIANE Y. PERRIN
MECHANICAL
No. 38315
REGISTERED PROFESSIONAL ENGINEER

DATE:
10/18/2019 PERMIT

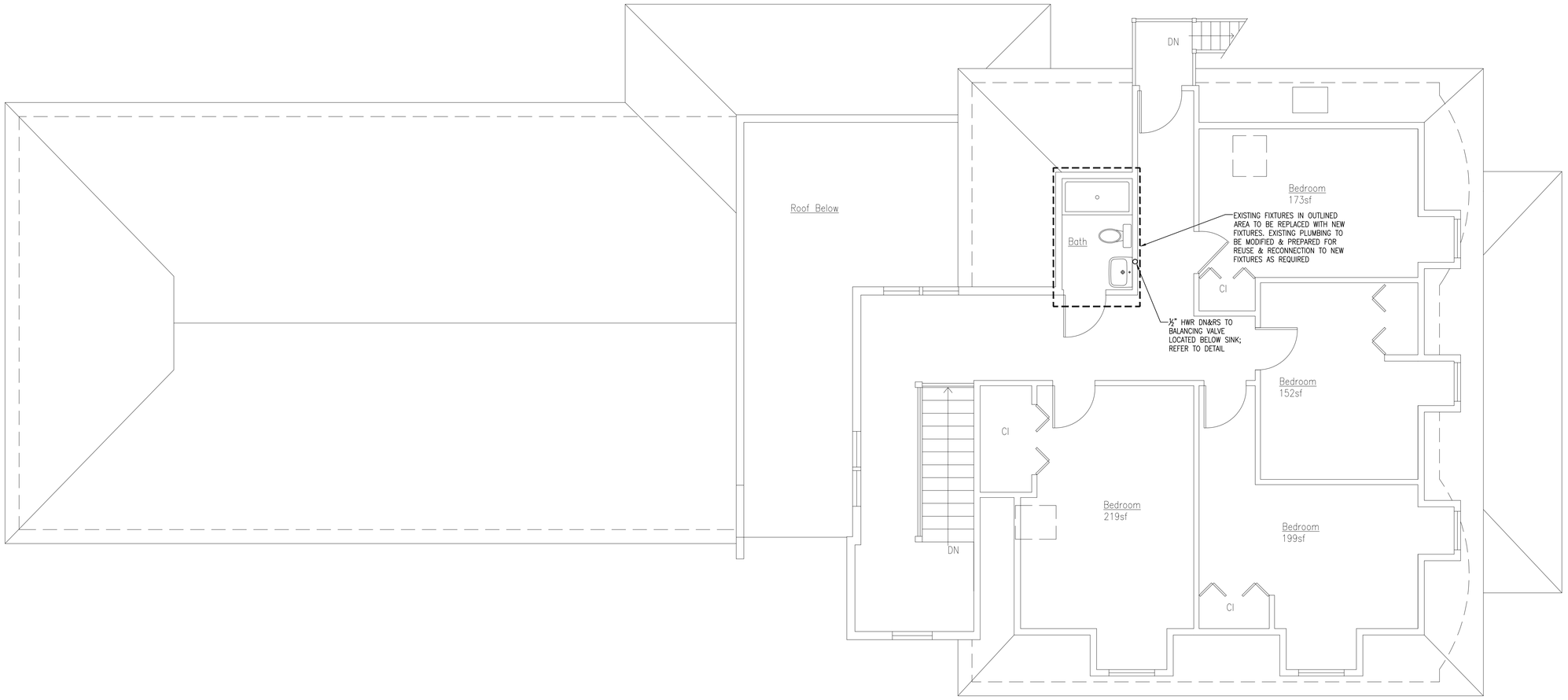
SCALE:
1/4" = 1'-0"

DRAWN BY:
PP

CHECKED BY:
PP

SHEET TITLE:
PLUMBING SECOND FLOOR PLAN

SHEET NUMBER:
P3



1 ATTIC FLOOR PLAN
1/4" = 1'-0"

SRO Housing
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ROXBURY, MA

Commonwealth
Land Trust
1059 Tremont St.
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COMMONWEALTH OF MASSACHUSETTS
CHRISTIANE Y. PERRIN
MECHANICAL
No. 38315
REGISTERED PROFESSIONAL ENGINEER

DATE:
10/18/2019 PERMIT

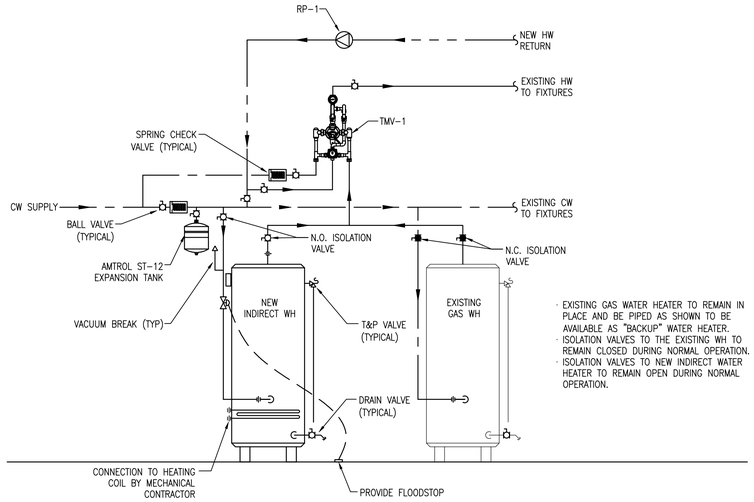
SCALE:
1/4" = 1'-0"

DRAWN BY:
PP

CHECKED BY:
PP

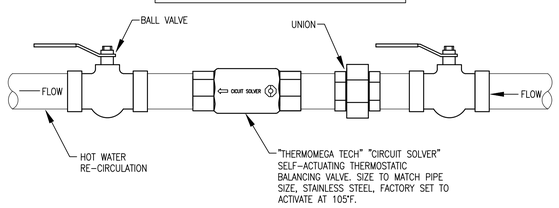
SHEET TITLE:
PLUMBING SECOND FLOOR PLAN

SHEET NUMBER:
P4



NEW INDIRECT WATER HEATER AND EXISTING GAS WATER HEATER PIPING SCHEMATIC | N.T.S.

NOTE:
IRRESPECTIVE OF WHAT IS SHOWN ON THE DESIGN DOCUMENTS, THE RECIRCULATING HOT WATER BALANCING STATION SHALL BE INSTALLED IN FIELD VERIFIED ACCESSIBLE LOCATION OR BE MADE ACCESSIBLE WITH THE USE OF A ACCESS PANEL. THE INSTALLATION OF ACCESS PANELS SHALL BE COORDINATED WITH THE GENERAL CONTRACTOR.



RE-CIRCULATING BALANCING STATION DETAIL | N.T.S.

SCHEDULE OF WATER HEATER

DESIGNATION	NAME	LOCATION	DESCRIPTION
WH-1	INDIRECT WATER HEATER	AS NOTED	"TRIANGLE TUBE" SMART 120, 120 GALLON INDIRECT WATER HEATER. 300 MBH BOILER OUTPUT AT 180° WATER, 400 GPH RECOVERY @90° RISE

SCHEDULE OF MIXING VALVE

DESIGNATION	NAME	LOCATION	DESCRIPTION
TMV	THERMOSTATIC MIXING VALVE	AS NOTED	"LEONARD" TM-420B-LF-DT THERMOSTATIC HI-LO MIXING VALVE, ¾" INLET/OUTLETS, 49GPM MAX FLOW @10PSI DROP, 1GPM MIN FLOW

SCHEDULE OF CIRCULATOR PUMPS

DESIGNATION	NAME	LOCATION	DESCRIPTION
RP-1	HW RECIRC. PUMP	AS NOTED	"GRUNDFOS" ALPHA 15-55SF 4" GPM @ 14' HD; ⅛ HP, 120/1/60. 45W MAX, COMPLIANT WITH NSF161

1. FOR EXACT LOCATION OF PLUMBING FIXTURES SEE ARCHITECTURAL DRAWINGS.
2. EXAMINE ALL CONTRACT DRAWINGS, GENERAL CONDITIONS AND SPECIFICATIONS WHICH MAY AFFECT THE WORK.
3. ALL PLUMBING WORK MUST BE COORDINATED WITH ALL OTHER TRADES BEFORE PROCEEDING WITH INSTALLATION.
4. CHECK INVERT ELEVATIONS AND EXACT LOCATIONS OF ALL OUTSIDE UTILITIES BEFORE INSTALLING ANY UNDERGROUND.
5. NO CHANGES ARE TO BE MADE IN PLUMBING LAYOUT WITHOUT WRITTEN PERMISSION OF THE ARCHITECT.
6. NO PIPING SHALL RUN EXPOSED IN FINISHED AREAS.
7. IRRESPECTIVE OF WHAT IS IDENTIFIED ON THE DRAWINGS, ALL PLUMBING SYSTEMS SHALL BE INSTALLED IN STRICT ACCORDANCE WITH THE LOCAL AND STATE PLUMBING CODES.
8. ROUGH-IN DIMENSIONS OF TOILET FIXTURES MUST BE COORDINATED WITH GENERAL CONTRACTOR.
9. INSTALL ALL HOT AND COLD WATER PIPING AS PER SPECIFICATIONS.
10. INSTALL SHUTOFF VALVES ON ALL BRANCH SUPPLY LINES AND AT THE BASE OF HOT AND COLD WATER RISERS.
11. ALL ACCESS PANELS SHALL BE BY GENERAL CONTRACTOR. PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING THEIR LOCATIONS.
12. INSTALL ALL FLOOR CLEANOUTS TO CLEAR EQUIPMENT.
13. THE PLUMBING CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS, FEES, AND CHARGES IN CONNECTION WITH THEIR WORK.
14. THE PLUMBING CONTRACTOR SHALL PROVIDE WATERTIGHT SLEEVES FOR ALL PIPES PASSING THROUGH BASEMENT WALLS.
15. INSTALL CLEANOUTS AT THE BASE OF ALL SANITARY STACKS.
16. INSTALL ALL HORIZONTAL RUNS OF PIPING AS HIGH AS POSSIBLE, PITCH ALL WATER PIPING TO DRAIN, PROVIDE DRAW OFFS AT ALL LOW POINTS.
17. PLUMBING CONTRACTOR SHALL MAKE ALL FINAL CONNECTIONS TO OUTSIDE UTILITIES AS NEEDED.
18. IT SHALL BE THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS; NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR WORK THAT MAY HAVE BEEN AVOIDED BY EXAMINING THE EXISTING PIPING ARRANGEMENTS.
19. PRIOR TO COMMENCEMENT OF WORK AND UPON COMPLETION OF PIPING INSTALLATION, THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING A VIDEO INSPECTION OF THE EXISTING AND NEWLY INSTALLED WASTE LINES SERVING THE BUILDING. THE PLUMBING CONTRACTOR SHALL PROVIDE THE BUILDING OWNER A DIGITAL OR VIDEO TAPED COPY OF THE INSPECTION FINDINGS.
20. NO ADDITIONAL COMPENSATION WILL BE CONSIDERED FOR CHANGES REQUIRED DUE TO LACK OF ADHERENCE TO THE LOCAL AND STATE PLUMBING CODES.

GENERAL NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL OF ALL EXISTING PIPING SERVING FIXTURES AND/OR CONNECTIONS TO EQUIPMENT WHICH ARE SHOWN ON PLAN TO BE REMOVED.
2. FIELD VERIFY POINTS OF NEW CONNECTION TO EXISTING PRIOR TO PERFORMING WORK AND PURCHASING MATERIALS.
3. ALL DEMOLITION WORK SHALL BE PERFORMED IN A SAFE AND ACCEPTABLE MANNER TO THE AHJ AND BUILDING OWNER
4. ALL DRAINAGE AND VENT PIPING REMOVAL SHALL BE PERFORMED SUCH THAT NO "DEAD ENDS" EXIST WHEN DEMOLITION IS COMPLETE.
5. REMOVE ALL PORTIONS OF PIPING EXPOSED DURING DEMOLITION INCLUDING BUT NOT LIMITED TO WATER, SANITARY WASTE, CONDENSATE WASTE, SANITARY VENT, AND FUEL GAS PIPING. ANY EXPOSED PIPING NOT REQUIRED TO STAY IN OPERATION SHALL HAVE THE EXPOSED PORTION REMOVED AND OPEN ENDS CUT, CAPPED, AND MADE SAFE.
6. REMOVE SINKS, TRIM, AND ALL PIPING SERVING SINKS AS NOTED ON PLAN
7. REMOVE LAVATORIES, LAVATORY TRIM, AND ALL PIPING SERVING LAVATORIES AS NOTED ON PLAN.
8. REMOVE WATER CLOSETS, WATER CLOSET TRIM, AND ALL PIPING SERVING WATER CLOSET AS NOTED ON PLAN.
9. REMOVE EXISTING DOMESTIC HOT WATER GENERATION SYSTEM AND ALL ANCILLARY COMPONENTS.
10. THE CONTRACTOR SHALL NOT CONSIDER DEMOLITION NOTES AND PLAN TO BE ALL INCLUSIVE. IT SHALL BE THE RESPONSIBILITY OF THE PLUMBING CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS; NO ADDITIONAL COMPENSATION SHALL BE PROVIDED FOR WORK THAT MAY HAVE BEEN AVOIDED BY EXAMINING THE EXISTING PIPING ARRANGEMENTS.

GENERAL DEMOLITION NOTES

LEGEND

W = WASTE
W&T = WASTE AND TRAP
V = VENT
FD = FLOOR DRAIN
FCO = FLOOR CLEAN OUT
CO = CLEAN OUT
PSD = PRIMARY STORM DRAIN
OSD = OVERFLOW STORM DRAIN
RD = ROOF DRAIN
HW = HOT WATER
CW = COLD WATER
DN = DOWN
RS = RISE

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COMMONWEALTH OF MASSACHUSETTS
CHRISTIANE Y. PERRIN
MECHANICAL
No. 36315
REGISTERED PROFESSIONAL ENGINEER

DATE: 10/18/2019 PERMIT

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

DRAWN BY: PD

CHECKED BY: PP

SHEET TITLE: PLUMBING SCHEDULES AND DETAILS

SHEET NUMBER: P5

1 PART 1 - GENERAL

1.1 SCOPE OF WORK

A. WORK INCLUDED: PROVIDE LABOR, MATERIALS AND EQUIPMENT NECESSARY TO COMPLETE THE WORK OF THIS SECTION AND, WITHOUT LIMITING THE GENERALITY THEREOF, INCLUDING:

1. CONNECTION TO EXISTING SANITARY DRAINAGE SYSTEM AND INSTALLATION OF NEW PIPING AS REQUIRED, INCLUDING SOIL, WASTE, AND VENT PIPING.
2. DEMOLITION OF FIXTURES INTENDED TO BE REPLACED AND INSTALLATION OF NEW FIXTURES AS SPECIFIED BY THE ARCHITECTURAL DRAWINGS AS REQUIRED.
3. CONNECTION TO THE EXISTING DOMESTIC COLD AND HOT WATER SYSTEMS AND NEW COLD WATER PIPING TO SERVE THE NEW FIXTURES AND EQUIPMENT.
4. CONNECTION TO THE EXISTING GAS PIPING SYSTEMS AND INSTALLATION OF NEW GAS PIPING TO NEW GAS FIRED EQUIPMENT AS REQUIRED.
5. DRAINAGE SPECIALTIES SUCH AS DRAINS, CLEANOUTS, VACUUM BREAKERS, SHOCK ABSORBERS, WALL HYDRANTS, HOSE BIBBS, ETC. AS REQUIRED.

1.2 CODES, ORDINANCES AND PERMITS

1. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE LAWS, ORDINANCES, RULES AND REGULATIONS OF ALL LOCAL AND STATE AUTHORITIES HAVING JURISDICTION, AND THE RULES AND REGULATIONS OF THE STATE PLUMBING AND GAS CODES. IN CASE OF CONFLICT, THE HIGHER STANDARD SHALL PREVAIL. EXTRA PAYMENT WILL NOT BE ALLOWED FOR WORK OR CHANGES REQUIRED BY CODE ENFORCEMENT AUTHORITIES.
2. APPLY AND PAY FOR INSPECTION PERMITS, CERTIFICATES OF INSPECTION, AND LICENSE FEES IN CONNECTION WITH THIS WORK, AND DELIVER TO THE OWNER AT THE COMPLETION OF THE WORK. ALL DIAGRAMS OR DRAWINGS REQUIRED BY LOCAL OR STATE AUTHORITIES SHALL BE SUPPLIED BY THIS CONTRACTOR.

1.3 INTENT

A. IT IS THE INTENTION OF THESE SPECIFICATIONS AND DRAWINGS TO REQUIRE THE EQUIPMENT TO BE FURNISHED COMPLETE IN EVERY RESPECT, AND THIS CONTRACTOR SHALL FURNISH ALL EQUIPMENT NEEDED AND USUALLY SUPPLIED IN CONNECTION WITH SUCH SYSTEMS. EQUIPMENT, MATERIALS AND ARTICLES INCORPORATED IN THE WORK SHALL BE NEW, AND OF THE BEST GRADE OF THEIR RESPECTIVE KINDS FOR THE TYPE OF WORK INVOLVED.

B. THE CONTRACTOR SHALL BE RESPONSIBLE FOR EXAMINING AND COORDINATING THE PROCUREMENT OF EQUIPMENT AS IDENTIFIED AND REQUIRED ON THE FOOD SERVICE DESIGN DOCUMENTS.

1.4 DRAWINGS

A. THE DRAWINGS SHOW THE EXTENT AND GENERAL ARRANGEMENT OF PIPING, AND LOCATIONS OF THE EQUIPMENT. PIPING, FIXTURES, AND EQUIPMENT ARE SHOWN DIAGRAMMATICALLY. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE LOCATIONS IN THE MOST PRACTICAL MANNER, FREE FROM INTERFERENCE WITH OTHER PIPING OR STRUCTURAL FEATURES. IF ANY CHANGES FROM THE DRAWINGS ARE DEEMED ADVISABLE, DETAILS OF SUCH PROPOSED CHANGES SHALL BE SUBMITTED FOR APPROVAL. NO CHANGES SHALL BE MADE WITHOUT SUCH APPROVAL. MAINTAIN MAXIMUM HEADROOM OR SPACE CONDITIONS AT ALL POINTS. WHERE HEADROOM OR SPACE CONDITIONS APPEAR INADEQUATE, ARCHITECT SHALL BE NOTIFIED BEFORE PROCEEDING WITH THE INSTALLATION.

1.5 SHOP DRAWINGS AND SUBMITTALS

A. PROVIDE 4 COPIES OF SHOP DRAWINGS FOR EQUIPMENT AND MATERIALS TO BE INSTALLED ON THE PROJECT.

1. SHOP DRAWINGS ARE REQUIRED FOR:
   a. PLUMBING FIXTURES AND EQUIPMENT.
   b. PIPE AND FITTINGS.
   c. VALVES.
   d. PIPE INSULATION.
   e. DRAINS AND APPURTENANCES.
   f. PIPE HANGERS, SUPPORTS AND SPECIAL EQUIPMENT.
   g. WATER HEATERS AND ASSOCIATED EQUIPMENT.

1.6 SUBSTITUTIONS

A. SUBSTITUTIONS OF EQUIPMENT OR MATERIALS OTHER THAN THOSE SHOWN ON THE DRAWINGS OR NAMED IN THE SPECIFICATIONS MAY BE MADE ONLY WITH THE WRITTEN APPROVAL OF THE ENGINEER, WHO RESERVES THE RIGHT TO REQUIRE ADEQUATE PROOF OF THE QUALITY OF THE SUBSTITUTE BEFORE PERMITTING ITS USE.

1.7 RECORD DRAWINGS

A. THE CONTRACTOR SHALL PRODUCE AS-BUILT DRAWINGS IN AUTOCAD 2010 FORMAT TO ACCURATELY REFLECT THE ACTUAL PIPE ROUTING AND EQUIPMENT LOCATIONS AT THE END OF THE PROJECT. THE CONTRACTOR SHALL PROVIDE THE ARCHITECT WITH ONE REPRODUCIBLE HARD COPY OF THE DRAWINGS AND ONE COMPACT DISC WITH THE ELECTRONIC FILES IN AUTOCAD 2010 FORMAT.

1.8 EXAMINATION OF SITE

A. BEFORE SUBMITTING PROPOSAL, VISIT THE SITE, EXAMINE ITS CONDITION, AND BECOME ACQUAINTED WITH THE OBSTACLES AND ADVANTAGES FOR PERFORMING THE WORK. STUDY THE DRAWINGS AND SPECIFICATIONS EXPLANATORY OF THE WORK TO BE PERFORMED AND COMPARE THEM WITH THE INFORMATION GATHERED BY THE EXAMINATION OF THE SITE.

B. NO CLAIM FOR EXTRA COMPENSATION WILL BE RECOGNIZED IF DIFFICULTIES ARE ENCOUNTERED WHICH AN EXAMINATION OF THE SITE CONDITIONS AND CONTRACT DOCUMENTS PRIOR TO EXECUTING THE CONTRACT WOULD HAVE REVEALED.

1.9 GUARANTEE

A. ATTENTION IS DIRECTED TO THE PROVISIONS OF THE GENERAL CONDITIONS AND SUPPLEMENTARY CONDITIONS REGARDING GUARANTEES AND WARRANTIES FOR WORK UNDER THIS CONTRACT.

1.10 COORDINATION

A. REFER TO THE ARCHITECTURAL PLANS TO CONFIRM ALL REQUIREMENTS PERTAINING TO FIXTURE SELECTION AND INSTALLATION LOCATIONS.

2 PART 2 - PRODUCTS

2.1 PIPE AND FITTINGS

A. SANITARY WASTE AND VENT PIPING SYSTEMS ABOVE GRADE, WITHIN THE BUILDING FOUNDATION WALLS:

1. PIPING 2" AND LARGER SHALL BE NO-HUB CAST IRON WITH RUBBER GASKETS AND MECHANICAL COUPLINGS.
2. PIPING 1-1/2" AND SMALLER SHALL BE TYPE DWV COPPER PIPING WITH WROUGHT COPPER DRAINAGE FITTINGS, 95/5 LEAD-FREE SOLDER JOINTS.
3. VENTS 1-1/2" SMALLER MAY BE SCHEDULE 40 GALVANIZED STEEL PIPE AND FITTINGS, THREADED JOINTS.

B. SANITARY WASTE AND VENT DRAINAGE PIPING BELOW GRADE:

1. ALL BURIED PIPING: CAST IRON, BELL AND SPIGOT, RUBBER GASKET JOINTS, SERVICE WEIGHT, COATED ON EXTERIOR.

C. WATER PIPING:

1. ABOVE GROUND: COPPER TUBING, TYPE L, CONFORMING TO ASTM B-88 WITH SOLDER JOINT WROUGHT COPPER FITTINGS CONFORMING TO ANSI B16.18 OR B16.22, LEAD-FREE SOLDER JOINTS.

D. GAS PIPING:

1. STANDARD WEIGHT BLACK STEEL PIPE, SCHEDULE 40, ASTM-A-120, GRADE B, WITH STEEL FITTINGS, THREADED FOR PIPING 2" AMD SMALLER.

2.2 VALVES

A. EACH VALVE TYPE SHALL BE OF SAME MANUFACTURER AND APPROPRIATE FOR SERVICE IN WHICH USED; VALVES SHALL BE MILWAUKEE, WATTS, APOLLO OF APPROVED EQUAL. TYPE PROPOSED FOR EACH SERVICE SHALL BE SUBMITTED FOR APPROVAL. IN GENERAL, SHUT- OFF VALVES, EXCEPT FOR EXPOSED STOPS AT FIXTURES, SHALL BE BALL VALVES.

B. EACH SYSTEM SHALL BE PROVIDED WITH VALVES AS REQUIRED BY CODE AND AS SPECIFIED. VALVES SHALL BE INSTALLED FOR ISOLATION AND TO FACILITATE OPERATION, REPLACEMENT AND REPAIR. PROVIDE ACCESS PANELS WHERE VALVES ARE CONCEALED BEHIND NON- REMOVABLE CEILINGS OR WALLS. PROVIDE SHUT OFF VALVES FOR GAS AND WATER SUPPLY PIPING TO INDIVIDUAL FIXTURES AND APPLIANCES.

C. VALVES SHALL BE:

2. BALL VALVES - 2 INCHES AND SMALLER, BRONZE, 400 LB., 1/4 TURN SOLDER ENDS FOR TYPE "L" TUBING, WATTS NO. B-600L.
3. BALL VALVES - 3 INCHES AND LARGER - 400 LB., 1/4 TURN, BRONZE. THREADED ENDS.
4. CHECK VALVES - 2 INCHES AND SMALLER - BRASS, 125 LB., SWING CHECK, SOLDER ENDS, NIBCO #F-918.
5. CHECK VALVES - 2-1/2 INCHES AND LARGER - BRONZE, 125 LB., SWING CHECK, FLANGED ENDS, NIBCO #F-918.
6. DRAIN VALVES - CAST BRONZE, 1/2" AND 3/4", THREADED OUTLET FOR GARDEN TYPE HOSE CONNECTION, NIBCO #72.

2.3 MISCELLANEOUS PIPING MATERIALS

A. NIPPLES: NIPPLES SHALL CONFORM TO WW-N-351 AND SHALL BE THE SAME MATERIAL AS THE PIPING IN WHICH INSTALLED.

B. UNIONS: UNIONS SHALL BE BRASS OR BRONZE, 125 LB., EITHER THREADED OR WITH SOLDER JOINT ENDS, CONFORMING TO WW-U-516 FOR USE IN COPPER TUBING. FOR USE IN STEEL PIPING UNIONS SHALL CONFORM TO WW-U-531.

C. INSULATING BUSHINGS AND UNIONS: HARD RUBBER THREADED BUSHING INSERTED BETWEEN TWO DISSIMILAR METALS.

D. FLANGES ON COPPER TUBE OR PIPE: CAST BRONZE, 150 LB., SOLDER JOINT CONNECTION.

E. FLANGES ON STEEL PIPING: CARBON STEEL, 150 LB., WELDING NECK OR SLIP-ON ASTM A181, GRADE 1, ANSI B16.5

F. FLOOR AND CEILING ESCUTCHEON PLATES: FLOOR AND CEILING ESCUTCHEON PLATES SHALL BE SPLIT HINGED, LOCKED TYPE. PLATES SHALL BE OF PRESSED STEEL WITH A HEAVY COATING OF COPPER, NICKEL AND CHROMIUM.

G. COPPER: COPPER FOR FLASHING SHALL BE SOFT TEMPER OR LIGHT COLD ROLLED, MINIMUM WEIGHT 16 OUNCES PER SQUARE FOOT.

H. SHEET LEAD: SHEET LEAD FOR FLASHING SHALL BE AT LEAST FOUR POUNDS PER SQUARE FOOT.

I. END CLEANOUT: THREADED BRASS TAPERED PLUG FITTED WITH RAISED HEAD FOR CAST IRON PIPING WITH PLUG FITTED WITH RAISED HEAD.

J. WALL CLEANOUTS: CHROME PLATED STEEL ACCESS PANELS, COMPLETE WITH FRAME AND ANCHOR STRAPS, CONCEALED HINGES, SLOTTED ACTUATED CYLINDER LOCK INSTALLED FLUSH WITH WALL TO GAIN ACCESS TO VALVES AND CLEANOUTS. ACCESS PANELS SHALL HAVE GENERAL CHARACTERISTICS OF ZURN, JOSAM, SMITH #4761 OR #4766 OR EQUAL.

K. FLOOR CLEANOUTS: CAST IRON, RAISED HEAD CAULKING PLUG, BRASS CLEANOUT COVER FLUSH MOUNTED WITH FLANGED RING HAVING ANCHOR LUGS, NICKEL-BRONZE SCORIATED HINGED COVER PLATE WITH "CO" CAST IN THE COVER, VANDAL-PROOF SCREWS, SIMILAR TO ZURN, JOSAM, SMITH #4021, OR EQUAL. ACCESS COVERS IN ALL FINISHED AREAS SHALL BE SIMILAR TO ZURN, SMITH #4160 OR 4200 OR EQUAL, WITH IDENTICAL INLAY OF ADJACENT MATERIALS AND VANDAL-PROOF SCREWS.

L. SHOCK OR WATER HAMMER ARRESTORS: SHOCK OR WATER HAMMER ARRESTORS SHALL CONFORM TO THE REQUIREMENTS OF PDI-WH-201, ASSE 1010, OR ANSI A112.26.1, SIZE AS REQUIRED. UNITS SHALL BE THE STANDARD FACTORY PREFABRICATED PRODUCTS AS MANUFACTURED BY JAY R. SMITH, OR EQUAL. PROVIDE AT URINALS, HOT WATER BOOSTERS, ALL CLOTHES WASHER LOCATIONS, AND AT THE LAST FIXTURE ON ALL PIPE RUNS EXCEEDING TWENTY FEET IN LENGTH.

2.4 HANGERS, SUPPORTS AND INSERTS

A. PIPE - 2 INCHES AND SMALLER - 1A BAND TYPE COMPLETE WITH THREADED ROD HANGER NUT, LOCK NUT AND SIZED TO ENCOMPASS INSULATION AND PIPE SUPPORTED, SIMILAR TO CARPENTER-PATTERSON FIG. 1A OR 122 CT OR EQUAL.

B. PIPING - 2-1/2 INCHES AND LARGER - CLEVIS HANGER TYPE COMPLETE WITH THREADED ROD, LOCKING AND ADJUSTING NUTS AND SIZED TO ENCOMPASS INSULATION AND PIPE SUPPORTED, SIMILAR TO CARPENTER-PATTERSON FIG. 100 OR EQUAL.

C. HANGERS AND SUPPORTS SHALL BE FURNISHED COMPLETE WITH ALL APPURTENANCES AND SHALL BE CENTRAL IRON, GRINNELL, CARPENTER-PATTERSON, OR EQUAL. HANGERS AND SUPPORTS SHALL BE HOT-DIPPED GALVANIZED WHERE EXPOSED AND DIP PAINTED, WHERE CONCEALED. COPPER TUBING SHALL BE SUSPENDED FROM COPPER PLATED HANGERS.

2.5 SLEEVES

A. SLEEVES FOR PIPING PASSING THROUGH CONCRETE FLOORS SHALL BE BLACK STEEL PIPE AND SHALL EXTEND ONE INCH ABOVE FLOOR AND BE FLUSH BELOW. WITHIN CHASES 26-GAUGE GALVANIZED SHEET METAL MAY BE USED.

2.6 ACCESS PANELS

A. FURNISH ACCESS PANELS FOR ACCESS TO PLUMBING EQUIPMENT. THE SIZES OF THE ACCESS PANELS FOR HIDDEN VALVES, COCKS AND CLEANOUTS IN WALLS AND CEILINGS SHALL BE 12 X 12 INCHES. THE PANELS SHALL BE FACTORY FABRICATED COMPLETELY FLUSH WITH HEAVY METAL DOOR AND FRAME. FRAMES SHALL BE WELDED CONSTRUCTION OF NOT LESS THAN 14-GAUGE STEEL, WITH HEAVY PIANO TYPE HINGES SET FLUSH WITH FRAME, AND SHALL BE SECURED IN THE CLOSED POSITION. IN NO CASE SHALL OPENING OF THE DOOR REQUIRE REMOVAL OF NUTS, BOLTS, SCREWS, WING-NUTS WEDGES OR ANY OTHER SCREWED OR LOOSE DEVICE. ACCESS PANELS SHALL HAVE UL RATING, CONFORMING TO REQUIREMENTS OF AREA IN WHICH IT IS INSTALLED. ACCESS PANELS SHALL BE NYSTROM RU SERIES TILE READY ACCESS DOOR OR BEST ACCESS DOOR BA-AHD-GYP. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION. ACCESS PANELS SHALL NOT BE REQUIRED IN REMOVABLE TILE CEILINGS. ACCESS PANELS IN FIRE RATED CEILINGS AND/OR WALLS SHALL HAVE U.L. FIRE RATINGS COMPARABLE TO THAT LOCATION INSTALLED.

2.7 SPECIALTIES AND ACCESSORIES

A. VACUUM BREAKERS SHALL HAVE BRONZE BODY AND INTERNAL TRIM WITH HIGH TEMPERATURE RESISTING RUBBER DISC AND EXTERNAL TRIM, SIMILAR TO CHICAGO, BEACON, WATTS #188, OR EQUAL. FURNISH AT HOSE BIBBS, WALL HYDRANTS AND AT LOCATIONS SHOWN ON THE DRAWINGS AND GOVERNED BY CODE.

2.8 INSULATION

A. ALL INSULATION WORK SHALL BE AS MANUFACTURED BY JOHNS-MANVILLE, GUSTIN-BACON, OWENS-CORNING FIBERGLASS CORP. OR EQUAL, AND BE EXECUTED BY A QUALIFIED INSULATION SUB-CONTRACTOR WHO IS THOROUGHLY EXPERIENCED IN THIS TYPE OF WORK, WHO HAS ADEQUATE FACILITIES AND EQUIPMENT FOR ERECTING SAME; WHO IS ACCEPTABLE TO THE ARCHITECT. APPLICATION AND FINISH ON ALL PIPES, FITTING AND VALVES SHALL BE AS RECOMMENDED BY MANUFACTURER AND APPROVED BY THE ARCHITECT. DETAILS SHALL BE SUBMITTED FOR APPROVAL. ALL JACKETS AND ADHESIVES SHALL BE FLAME RETARDANT. INSULATION SHALL BE PROVIDED ON ALL PIPING, VALVES AND FITTINGS.

B. HOT WATER SUPPLY PIPING:

1. PIPING - 1 INCH THICK FOR 1-½ INCH PIPING AND LARGER, 1 INCH THICK FOR 1-1/4 INCH PIPING AND SMALLER. INSULATION SHALL BE FIBROUS GLASS, 3-1/2 POUND PER CUBIC FOOT DENSITY MINIMUM SECTIONAL PIPE INSULATION WITH FACTORY APPLIED WHITE ALL SERVICE JACKET (ASJ) WITH BUTT STRIPS AND BENJAMIN-FOSTER, OR EQUAL BF85-75, OR LONGITUDINAL SEAMS.
2. FITTINGS AND VALVES - SHALL BE INSULATED WITH INSULATION CEMENT OR MOLDED FITTING INSULATION TO THICKNESS OF ADJOINING INSULATION FINISHED WITH TWO COATS OF BENJAMIN-FOSTER, OR EQUAL "FOSTER SEALFAS" 30-36 LAGGING CLOTH.

C. COLD WATER PIPING:

1. PIPING -½ INCH THICK FOR ALL PIPING. INSULATION SHALL BE FIBROUS GLASS, 3-1/2 POUND PER CUBIC FOOT DENSITY MINIMUM SECTIONAL PIPE INSULATION WITH FACTORY APPLIED WHITE ALL SERVICE JACKET (ASJ) WITH BUTT STRIPS AND BENJAMIN-FOSTER, OR EQUAL BF85-75, OR LONGITUDINAL SEAMS. NO STAPLES SHALL BE UTILIZED OR ACCEPTED ON THE INSTALLATION OF THE INSULATION ON COLD WATER PIPING.
2. FITTINGS AND VALVES - SHALL BE INSULATED WITH INSULATION CEMENT OR MOLDED FITTING INSULATION TO THICKNESS OF ADJOINING INSULATION FINISHED WITH TWO COATS OF BENJAMIN-FOSTER, OR EQUAL "FOSTER SEALFAS" 30-36 LAGGING CLOTH.

D. ALL PIPE INSULATION SHALL HAVE A FLAME SPREAD RATING OF 25.

2.9 PIPE LABELS

A. ALL HYDRONIC PIPING SHALL BE LABELED WITH PLASTIC ADHESIVE LABELS AT A MINIMUM. LABELS SHALL INDICATE THE PIPING SYSTEM (HOT WATER, HOT WATER RECIRC, COLD WATER, ETC.), AND SHALL INDICATE THE DIRECTION OF FLOW. PIPING SHALL BE LABELED EVERY 20 FEET MINIMUM ON STRAIGHT RUNS AND SHALL BE LABELED WITHIN FIVE FEET OF CHANGES OF DIRECTION. LABELS SHALL BE APPLIED TO THE INSULATION JACKET.

2.10 PLUMBING FIXTURES

A. SEE ARCHITECTURAL DESIGN PACKAGE FOR PLUMBING FIXTURE SELECTIONS.

B. MOUNTING HEIGHTS SHALL BE AS SHOWN ON ARCHITECTURAL DETAILS.

C. EACH INDIVIDUAL FIXTURE SHALL BE PROVIDED WITH SUPPLY STOPS FOR EACH WATER SERVICE.

2.11 FLOOR DRAINS

A. FURNISH AND INSTALL ALL FLOOR DRAINS AS INDICATED AND REQUIRED. DRAINS SHALL BE BY JOSAM, JR SMITH, WATTS OR APPROVED EQUAL.

2.12 TRAP PRIMERS

A. FURNISH AND INSTALL TRAP PRIMERS FOR FLOOR DRAINS AS REQUIRED.

B. TRAP PRIMERS SHALL BE JAY R. SMITH PRIME EZE OR EQUAL.

C. MULTIPLE TRAP DISTRIBUTION UNITS SHALL BE MIFAB MI-DU OF EQUAL TO SERVE TWO, THREE OR FOUR FLOOR DRAINS.

D. PROVIDE ACCESS PANELS AT ALL TRAP PRIMER LOCATIONS.

3 PART 3 - EXECUTION

3.1 INSTALLATION

A. THE PLUMBING DRAWINGS INTEND TO SHOW ONLY THE SCOPE OF THE DESIGN, AND THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR THE CORRECT INSTALLATION OF HIS WORK IN A MANNER SATISFACTORY TO THE BEST PRACTICES OF HIS TRADE AND TO COMPLETE THE SCOPE OF THIS WORK IN ALL RESPECTS.

B. THE CONTRACTOR IS RESPONSIBLE FOR FIELD VERIFYING ALL EXISTING CONDITIONS FOR CONNECTIONS TO EXISTING SYSTEMS, AND SHALL MODIFY THE CONNECTION POINTS AS NECESSARY BASED ON EXISTING CONDITIONS.

C. THE LOCATION OF PIPING AS INDICATED ON THE DRAWINGS IS DIAGRAMMATIC ONLY, AND THE EXACT LOCATION SHALL BE DETERMINED IN THE FIELD. THE RUN AND ARRANGEMENT OF ALL PIPES SHALL BE APPROXIMATELY AS SHOWN ON THE DRAWINGS, AS DIRECTED DURING INSTALLATION, AS STRAIGHT AND DIRECT AS POSSIBLE, FORMING RIGHT ANGLES OR PARALLEL LINES WITH BUILDING WALL AND OTHER PIPES, AND NEATLY SPACED. ALL RISERS SHALL BE ERECTED TRUE AND PLUMB, PARALLEL WITH WALLS AND OTHER PIPES, AND NEATLY SPACED. ALL HORIZONTAL RUNS OF PIPING EXCEPT WHERE CONCEALED IN PARTITIONS, SHALL BE KEPT AS HIGH AS POSSIBLE AND CLOSE TO WALLS. WHEREVER POSSIBLE, ADJACENT PIPE LINES, BOTH HEATING AND PLUMBING, SHALL BE GROUPED IN THE SAME VERTICAL OR HORIZONTAL PLANES. ALL PIPING SHALL BE CONCEALED AND SHALL HAVE A MINIMUM NUMBER OF FITTINGS. PIPING SHALL NOT INTERFERE WITH THE OPERATION OR ACCESSIBILITY OF DOORS, WINDOWS, ACCESS PANELS, OR EQUIPMENT AND SHALL NOT ENCROACH ON AISLES OR PASSAGEWAYS. ALL PIPING SHALL BE INSTALLED TO PRESERVE ACCESS TO ALL VALVES, TRAPS AND EQUIPMENT.

D. THIS CONTRACTOR SHALL BE RESPONSIBLE FOR THE CORRECTNESS OF FIELD DIMENSIONS AND SHALL CHECK FOR HIMSELF ALL GRADES, LINES, MEASUREMENTS, AND OTHER DATA IN ANY WAY AFFECTING HIS WORK. HE SHALL REFER TO THE PROJECT, PHASING SCHEDULE TOGETHER WITH ARCHITECTURAL, STRUCTURAL, AND DRAWINGS OF OTHER TRADES FOR A FULL COMPREHENSION OF THE EXTENT OF THE WORK TO BE PERFORMED AND TO AVOID INTERFERENCE, AND SHALL NOT BE ENTITLED TO ANY EXTRA COMPENSATION FOR ANY ADDITIONAL WORK OR EXPENSE ARISING FROM HIS FAILURE TO DO SO. IN CASE INTERFERENCE DEVELOPS, THE ARCHITECT SHALL DECIDE WHICH WORK IS TO BE RELOCATED, REGARDLESS OF WHICH WAS FIRST INSTALLED. WORK INSTALLED BY THE CONTRACTOR WHICH IS IMPROPERLY LOCATED AND/OR INTERFERES WITH OR MODIFIES EITHER THE PHASING SCHEDULE OR THE ARCHITECTURAL OR STRUCTURAL DESIGN, SHALL BE CHANGES AS DIRECTED BY THE ARCHITECT, AND ALL COSTS INCIDENTAL TO SUCH CHANGES SHALL BE PAID BY THE PLUMBING CONTRACTOR.

E. THE PLUMBING CONTRACTOR SHALL ALSO PROVIDE THE NECESSARY DATA AND SUPERVISION FOR THE PROVISION OF ALL OPENINGS IN THE STRUCTURE, INCLUDING BOLT HOLE TEMPLATES, WEIGHTS OF EQUIPMENT AND MANUFACTURER'S RECOMMENDATIONS FOR PROPER EMPLACEMENT DESIGN. THIS SHALL BE FURNISHED TO THE GENERAL CONTRACTOR AND OTHER RELATED TRADES.

3.2 SANITARY SYSTEMS

A. INTERIOR SANITARY PIPING SHALL PITCH IN ACCORDANCE WITH CODE REQUIREMENTS, UNLESS OTHERWISE NOTED. BURIED SOIL AND WASTE PIPING SHALL BE MINIMUM OF 2 INCHES IN DIAMETER.

3.3 DOMESTIC COLD AND HOT WATER PIPING

A. ALL INTERIOR WATER PIPING SHALL BE INSTALLED WITHOUT TRAPS OR POCKETS AND SHALL PITCH TO DRAW-OFFS SO THAT THE WHOLE SYSTEM OR INDIVIDUAL SECTIONS CAN BE PROPERLY DRAINED. PIPING SHALL BE GRADED AND VALVED TO ALLOW FOR COMPLETE DRAINAGE OF THE SYSTEM. ALL DRAW-OFF VALVES SHALL HAVE HOSE END WHICH SHALL BE CAPPED. PIPING SHALL BE PITCHED UP TOWARD RISERS AND FIXTURES FOR PROPER AIR RELIEF. PIPING SUBJECT TO EXPANSION SHALL BE FLEXIBLE AND INSTALLED TO SAFELY ABSORB ALL DEFLECTION STRESSED.

3.4 VALVES

A. VALVES SHALL BE INSTALLED FOR EACH FIXTURE, ALL LOCATIONS REQUIRED BY CODE, AND AS SHOWN ON THE DRAWINGS.

3.5 HANGERS AND SUPPORTS

A. SANITARY PIPING SHALL HAVE A HANGER AT EACH HUB OR EVERY 5 FEET, WHICHEVER IS LESS. WATER AND GAS PIPING SHALL BE SUPPORTED AT ALL CHANGES IN DIRECTION, ON BRANCH LINES REGARDLESS OF LENGTH, AT BASE AND AT TOP OF RISERS. PIPING ADJACENT TO FLOOR, WHERE CEILING HANGERS ARE IMPRACTICAL, SHALL BE ADEQUATELY SUPPORTED BY A SUITABLE HANGER, AS APPROVED BY THE ARCHITECT, WITH ROD TO PLATE AT FLOOR, SAID PLATE TO BE SECURED TO FLOOR.

3.6 ACCESS PANELS

A. ACCESS PANELS SHALL BE TURNED OVER TO THE GENERAL CONTRACTOR FOR INSTALLATION INTO STRUCTURE. THIS CONTRACTOR SHALL DIRECT THE GENERAL CONTRACTOR AS TO LOCATION OF ACCESS PANELS.

3.7 SLEEVES

A. PROVIDE SLEEVES FOR ALL PIPING PENETRATING FLOORS. WHERE PIPES RUN THROUGH SLEEVES, THE ANNULAR OPENINGS SHALL BE SEALED WITH FIRE RESISTANT MATERIALS AS CALLED FOR UNDER PART 2 - MATERIALS.

3.8 FIRESTOPPING

A. THE CONTRACTOR SHALL PROVIDE UL LISTED THROUGH PENETRATION FIRE STOPPING SYSTEMS FOR ALL PENETRATIONS OF FIRE RATED FLOOR/CEILING, ROOF/CEILING AND WALL ASSEMBLIES. COORDINATE THE REQUIRED UL SYSTEM WITH THE ARCHITECTURAL PLANS AND THE MATERIAL OF THE PIPING.

B. SUBMIT EACH UL LISTED THROUGH PENETRATION FIRE STOPPING SYSTEM TO THE ARCHITECT FOR REVIEW.

3.9 TESTING

A. THE PLUMBING CONTRACTOR SHALL NOTIFY THE ARCHITECT THREE WORKING DAYS PRIOR TO DAY TESTS ARE TO BE MADE. TEST ALL PIPING AND MAKE IT GAS AND WATER TIGHT, IN ACCORDANCE WITH THE AUTHORITY HAVING JURISDICTION'S ORDINANCES AND IN THE PRESENCE AND TO THE SATISFACTION OF THE APPLICABLE INSPECTOR ALONG WITH THE ARCHITECT AND HIS REPRESENTATIVE.

B. NO PIPING SHALL BE BURIED, CONCEALED OR INSULATED BEFORE TESTED AND APPROVED. PARTIAL TESTS SHALL BE MADE AS REQUIRED, BY THE PROGRESS OF THE WORK, AND THE PLUMBING CONTRACTOR SHALL ACCOMMODATE THE TESTING OPERATIONS TO THE PROGRESS OF THE PROJECT. FURNISH ALL EQUIPMENT, LABOR, SERVICES AND APPARATUS, ALSO PAY FOR ALL COSTS FOR PERTINENT TESTS. ALL APPROVALS SHALL BE RENDERED IN WRITING AND SUBMITTED TO THE ARCHITECT. REMEDY ALL DEFECTIVE WORK AND REPLACE ALL DEFECTIVE MATERIALS, EQUIPMENT OR FIXTURES WITH NEW ONES OF THE SPECIFIED GRADE. NO CAULKING, PEENING, OR WICKING OF SCREWED JOINTS OR HOLES WILL BE ACCEPTABLE. THIS CONTRACTOR SHALL MAKE AND REMOVE ALL TEMPORARY PIPING AND LINE CONNECTIONS REQUIRED FOR THE TESTS AND SHALL DISPOSE OF TEST WATER AND ALL WASTES AFTER TESTS IN A SATISFACTORY AND NON-DAMAGING MANNER.

C. PIPING SYSTEMS

1. UPON COMPLETION OF THE ROUGHING IN AND BEFORE SETTING PLUMBING FIXTURES, THE ENTIRE WATER PIPING SYSTEM SHALL BE TESTED AT A HYDROSTATIC PRESSURE OF NOT LESS THAN 150 PERCENT OF THE MAXIMUM WORKING PRESSURE OF THE SYSTEM, AND SHALL HOLD TIGHT AT THIS PRESSURE FOR 2 HOURS, WITHOUT ADDITIONAL PUMPING. WHERE A PORTION OF THE WORK IS TO BE CONCEALED BEFORE COMPLETION, THIS PORTION SHALL BE TESTED SEPARATELY IN THE SAME MANNER S DESCRIBED FOR THE ENTIRE SYSTEM.
2. UPON ROUGHING IN AND BEFORE SETTING FIXTURES, ALL OUTLETS IN SOIL, WASTE, RAINWATER AND VENT SYSTEMS SHALL BE TEMPORARILY CAPPED AND MADE TIGHT. THE PIPING WITHIN THE BUILDING SHALL THEN BE FILLED WITH WATER UP TO THE ROOF AND MUST REMAIN FULL, WITHOUT SHOWING ANY LEAKAGE OF WATER. ALL PARTS OF THE SYSTEM SHALL BE SUBJECT TO NOT LESS THAN 10 FEET OF HYDROSTATIC HEAD, ABOVE THE POINT BEING TESTED. TEST TEES SHALL BE PROVIDED AS TO FACILITATE TESTING.
3. ALL BURIED PIPING IN THE SANITARY AND STORM DRAINAGE SYSTEMS UNDER THE BUILDING AND OUTSIDE THE BUILDING WALLS SHALL BE TESTED AS SPECIFIED IN 2. ABOVE BY PROVING THE LINES TIGHT UNDER A HEAD OF 10 FT. OF WATER ABOVE THE HIGHEST HORIZONTAL LINE TO BE TESTED.

3.10 CLEANING AND STERILIZATION OF SYSTEMS

A. THE PLUMBING CONTRACTOR SHALL BE RESPONSIBLE FOR THE CLEANING AND PURGING OF ALL PERTINENT SYSTEMS AFTER INSTALLATION AND BEFORE SYSTEM OPERATION. ANY DAMAGE TO PART OF THE BUILDING, ITS FINISH OR FURNISHINGS, DUE TO THIS CONTRACTOR'S FAILURE TO PROPERLY CLEAN THE SYSTEM, SHALL BE REPAIRED OR REPLACED, AT HIS EXPENSE.

B. ALL PLUMBING FIXTURES SHALL BE THOROUGHLY CLEANED OF ALL PLASTER, STICKS, RUST STAINS AND OTHER FOREIGN MATTER OR DISCOLORATION, LEAVING EVERY PART IN AN ACCEPTABLE CONDITION AND READY FOR USE. SURFACES SHALL BE CLEANED, POLISHED AND LEFT BRIGHT. THE SURFACES OF ALL PUMPS, METERS, FLOOR DRAINS, CLEANOUTS, SEDIMENT BUCKETS AND OTHER EQUIPMENT SHALL BE CLEANED AND EACH ITEMS HALL BE LEFT IN A FIRST CLASS CONDITION.

C. ALL FINISHED METAL WORK SHALL BE CLEANED, POLISHED AND LEFT BRIGHT. ALL EQUIPMENT, PIPE, VALVES, DRAINS AND FITTINGS SHALL BE CLEANED OF GREASE, METAL CUTTING AND SLUDGE, WHICH MAY HAVE ACCUMULATED DURING CONSTRUCTION AND/OR TESTING.

D. THE PLUMBING CONTRACTOR SHALL REFINISH AND RESTORE TO ITS ORIGINAL CONDITION ALL PLUMBING EQUIPMENT WHICH HAS SUSTAINED DAMAGE TO THE MANUFACTURER'S PRIME AND FINISH COATS OF PAINT AND/OR ENAMEL.

E. THE ENTIRE NEW SECTION OF THE POTABLE WATER SYSTEM SHALL BE THOROUGHLY STERILIZED BY THE PLUMBING CONTRACTOR WITH A SOLUTION CONTAINING NOT LESS THAN 50 PARTS PER MILLION OF AVAILABLE CHLORINE. THE CHLORINATING MATERIALS SHALL BE EITHER LIQUID CHLORINE CONFORMING TO THE REQUIREMENTS OF THE U.S. ARMY SPEC. NO. 4-1 OR SODIUM HYPOCHLORITE SOLUTION CONFORMING TO THE REQUIREMENTS OF FED. SPEC. O-B-441, GRADE D. THE STERILIZING SOLUTION SHALL BE ALLOWED TO REMAIN IN THE SYSTEM FOR A PERIOD OF 8 HOURS, DURING WHICH TIME ALL VALVES AND FAUCETS SHALL BE OPENED AND CLOSED SEVERAL TIMES. AFTER STERILIZATION, THE SOLUTION SHALL BE FLUSHED FROM THE SYSTEM WITH CLEAN WATER UNTIL THE RESIDUAL CHLORINE CONTENT IS NOT GREATER THAN 0.2 PARTS PER MILLION. STERILIZATION SHALL BE TO THE SATISFACTION OF THE BOARD OF HEALTH. SUBMIT CERTIFICATION, IN WRITING, THAT THIS WORK HAS BEEN ACCOMPLISHED IN CONFORMANCE WITH THE ABOVE.

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CHRISTIANE Y. PERRIN
MECHANICAL
No. 39315

DATE:
10/18/2019 PERMIT

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

DRAWN BY:
PD

CHECKED BY:
PP

SHEET TITLE:
PLUMBING
SPECIFICATIONS

SHEET NUMBER:
P6

GENERAL NOTES:

1. THE E.C. SHALL COORDINATE APPLIANCE REQUIREMENTS, CENTERLINE OF OUTLETS, NEMA CONFIGURATION OF RECEPTACLES, CORDS, PLUGS AND SWITCHES WITH THE ARCHITECT AND ARCHITECTS DRAWINGS PRIOR TO INSTALLING OUTLET BOXES AND ROUGHING BRANCH CIRCUIT WIRING.

2. COORDINATE THE CENTER-LINE OF ALL OUTLET BOXES, SPECIFIC LOCATION AND ROUGH WIRING PRIOR TO INSTALLING DEVICES FOR ALL APPLIANCES AND EQUIPMENT. REFER TO THE ARCHITECTS DRAWINGS AND MANUFACTURERS SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.

3. MAIN ELECTRIC SERVICE SHALL BE MODIFIED PER THE ONE-LINE DIAGRAM AND THE PANEL SCHEDULES.

4. ALL INTERIOR WIRING RUN IN CONCEALED SPACES SHALL BE COPPER, MINIMUM #12 AWG FLEXIBLE MC CABLE OR NON METALLIC SHEATH CABLE (ROMEX) RATED 600 VOLTS, 90 DEGREE IN DRY LOCATIONS/ 75 DEGREE IN IN WET LOCATIONS, TYPE THHN/THWN.

5. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LOCATION OF LIGHTING FIXTURES, DEVICES AND EQUIPMENT.

6. WORK SHALL COORDINATE WITH THAT OF OTHER TRADES TO MINIMIZE CONFLICTS AND ELIMINATE INTERFERENCES.

7. EXACT LOCATION OF MECHANICAL, FIRE PROTECTION AND PLUMBING SYSTEM EQUIPMENT SHALL BE VERIFIED WITH THE APPROPRIATE CONTRACTOR PRIOR TO INSTALLING THE SYSTEMS.

8. THE CONTRACTOR SHALL VISIT THE SITE TO DETERMINE THE EXTENT OF WORK TO BE PERFORMED PRIOR TO BIDDING AND VERIFY ANY DIMENSIONS OF RELEVANT WORK TO BE BID.

9. ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER AND THE CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK CLEAN AND ORDERLY.

10. ALL WORK SHALL CONFORM TO THE MASS ELECTRICAL CODE, NATIONAL ELECTRIC CODE AND THE LOCAL AUTHORITIES HAVING JURISDICTION.

12. PROVIDE SLEEVES IN FLOORS, WALLS AND FOUNDATION WALLS REQUIRED TO INSTALL THE WORK SHOWN ON THE DRAWINGS.

13. OUTLET BOXES MUST HAVE A HORIZONTAL SEPARATION NOT LESS THAN 24"INCHES WHEN INSTALLED IN A FIRE RATED ASSEMBLY UNLESS AN OUTLET BOX IS LISTED FOR CLOSER SPACING OR PROTECTED BY FIRE RESISTANT " PUDDY PADS "IN ACCORDANCE WITH MANUFACTURES INSTRUCTIONS.

14. PROVIDE TAMPER RESISTANT RECEPTACLES IN ALL RESIDENTIAL AREAS SPECIFIED IN NEC SECTION 210.52 TITLED BRANCH CIRCUITS.

SUBSCRIPTS & ABBREVIATIONS

AF	ARC FAULT
AFF	ABOVE FINISHED FLOOR
AIC	AMPERES INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
CB	CIRCUIT BREAKER
CP	CONTROL PANEL
EC	ELECTRICAL CONTRACTOR
EMR	ELEVATOR MACHINE ROOM
E	EMERGENCY POWER
EWC	ELECTRIC WATER COOLER
FACP	FIRE ALARM CONTROL PANEL
GC	GENERAL CONTRACTOR
GCP	GENERATOR CONTROL PANEL
GFI	GROUND FAULT INTERRUPTER (GFCI)
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MLO	MAIN LUGS ONLY
MSB	MAIN SWITCH BOARD
NTS	NOT TO SCALE
TBD	TO BE DETERMINED
SP	SURGE PROTECTED
TC	TIME CLOCK
TP	TAMPER PROOF
TVSS	TRANSIENT VOLTAGE SURGE SUPPRESSION
UNO	UNLESS NOTED OTHERWISE
VFD	VARIABLE FREQUENCY DRIVE
W	WALL MOUNTED
WP	WEATHER PROOF
X	ABOVE COUNTER TOP

GENERAL NOTES

1. ALL WIRING AND RACEWAY SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
2. THE SIZES OF ELECTRICAL RACEWAY SHALL BE AS INDICATED ON THE CONTRACT DRAWINGS AND SHALL MEET THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.
3. ALL WIRE AND CABLE FOR CONTROL INDICATION, ALARM, SIGNAL AND COMMUNICATION SYSTEM, UNLESS OTHERWISE NOTED, SHALL BE SELECTED BY THE SYSTEM SUPPLIER FOR EACH SYSTEM.
4. MINIMUM WIRE SIZE SHALL BE #12 SOLID AWG FOR 20A LIGHTING/ RECEPTACLE BRANCH CIRCUIT; #12 AWG SOLID FOR #20A. APPLIANCE BRANCH CIRCUITS; #10 SOLID AWG FOR 30A. DRYER BRANCH CIRCUIT; #8 STRANDED AWG FOR 40 TO 50A; RANGE CIRCUIT.
5. MINIMUM WIRE SHALL BE #12 FOR BRANCH CIRCUIT RUNS UP TO 100' TO THE LAST OUTLET; OVER 100'-#10; OVER 150'-#8 AND INCREASE CONDUIT SIZE AS REQUIRED BY LOCAL ELECTRICAL CODE.
6. ALL WIRING INSTALLATION SHALL BE COLOR CODED AS PER CODE. CONDUCTORS SIZED #10 AND LOWER SHALL BE SOLID; #8 AND HIGHER STRANDED.
7. ALL WIRING DEVICES, PANEL BOARDS, DISTRIBUTION BOARDS, MOTORS, ETC., SHALL BE GROUNDED AS PER LOCAL ELECTRIC CODE.
8. ALL WORK SHALL BE INSTALLED IN FULL ACCORDANCE WITH LOCAL CODES, STATE AND LOCAL AUTHORITIES. FILE ALL PLANS, OBTAIN ALL PERMITS, PAY ALL FEES, SCHEDULE ALL INSPECTIONS, MAKE ALL TESTS AND OBTAIN ALL APPROVALS REQUIRED. THE ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRIC CODE AND LOCAL AUTHORITIES HAVING JURISDICTION. ALL COMPONENTS SHALL BE UL APPROVED AND LISTED.
9. WHERE CONFLICTS ARE FOUND BETWEEN DRAWINGS, SPECIFICATIONS, & LAWS & ORDINANCES, THE MOST STRINGENT SHALL APPLY.
10. SUBMIT FOR APPROVAL, COMPLETE SHOP DRAWINGS, LIST OF MATERIALS AND DETAILED DATA OF EQUIPMENT GIVING THE MANUFACTURERS NAME, CATALOG NUMBER, SIZE, CAPACITY AND DIMENSIONS. NO EQUIPMENT SHALL BE INSTALLED OR FABRICATED WITHOUT OBTAINING APPROVAL.
11. ALL MOTORS SHALL BE SUPPLIED WITH MOTOR STARTERS BY OTHERS UNLESS CLEARLY INDICATED OTHERWISE ON THE CONTRACT DOCUMENTS. SHORT CIRCUIT PROTECTION SHALL BE BY MCP OR FUSED DISCONNECT SWITCH AS SHOWN OR SPECIFIED.
12. MANUALLY CONTROLLED SINGLE PHASE MOTORS SHALL HAVE FULLY RATED MANUAL MOTOR STARTER SWITCHES WITH O.L. HEATERS IN EACH UNGROUNDED LEG.
13. CIRCUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. CONDUITS AND CABLES SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS.
14. CABLES/CONDUCTORS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTIONS TO MOTORS AND OTHER EQUIPMENT.
15. THE QUANTITY AND SIZE OF WIRES AND CONDUIT SHOWN ON DRAWINGS AND WIRING DIAGRAMS REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS.
16. SWITCHES SHALL BE MOUNTED 4'-0" MAX ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED. RECEPTACLES SHALL BE MOUNTED 1'-6" ABOVE FINISHED FLOOR UNLESS OTHERWISE NOTED.
17. ALL PANELBOARDS SHALL BE MOUNTED SO THAT THE DISTANCE FROM THE TOP CIRCUIT BREAKER OPERATING HANDLE TO THE FLOOR SHALL NOT EXCEED 6'-7".
18. REFER TO ARCHITECTURAL DRAWINGS FOR EXACT LIGHT FIXTURE LOCATIONS. LIGHTING FIXTURES SHALL BE MOUNTED ACCORDING TO THE MOUNTING HEIGHT GIVEN ON THE ARCHITECTURAL DRAWINGS, WITH THE DISTANCE BEING MEASURED FROM THE BOTTOM OF THE LIGHTING FIXTURE TO THE FINISHED FLOOR.
19. THE HVAC CONTROL EQUIPMENT AND MISCELLANEOUS DEVICES, OUTLET, SWITCHES, JUNCTION, PULL AND TERMINAL BOXES SHALL BE PROVIDED WITH NEMA ENCLOSURE SUITABLE TO THE ENVIRONMENT.
23. CONDUIT FOR WIRING CONCEALED IN FLOOR SLABS, OR BELOW GRADE SHALL BE 1" MINIMUM PVC.
24. CONFIRM EXACT POWER REQUIREMENTS AND CONNECTION LOCATIONS FOR ALL EQUIPMENT PRIOR TO INSTALLATION WITH PLUMBING,HVAC AND GENERAL CONTRACTOR.
25. COORDINATE THE CENTER-LINE OF ALL OUTLET BOXES, SPECIFIC LOCATION AND ROUGH WIRING PRIOR TO INSTALLING DEVICES FOR ALL APPLIANCES AND EQUIPMENT. REFER TO THE ARCHITECTS DRAWINGS AND MANUFACTURERS SPECIFICATIONS FOR SPECIFIC REQUIREMENTS.
26. WORK SHALL COORDINATE WITH THAT OF OTHER TRADES TO MINIMIZE CONFLICTS AND ELIMINATE INTERFERENCES.
27. EXACT LOCATION OF MECHANICAL, FIRE PROTECTION AND PLUMBING SYSTEM EQUIPMENT SHALL BE VERIFIED WITH THE APPROPRIATE CONTRACTOR PRIOR TO INSTALLING THE SYSTEMS.
28. ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER AND THE CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK CLEAN AND ORDERLY.
29. ALL 20A; GFCI RECEPTACLES INSTALLED OUTDOORS IN WET OR DAMP LOCATIONS SHALL BE LISTED WEATHER-RESISTANT.
30. PROVIDE RAIN-TIGHT WHILE IN USE COVERS ON ALL OUTDOOR GFCI RECEPTACLES.
31. ALL EXTERIOR DISCONNECTS ARE TO BE NEMA-3R.
32. ARC FAULT CIRCUIT INTERRUPTER PROTECTION SHALL BE PROVIDED FOR ALL 120V; SINGLE PHASE, 15A; AND 20A; BRANCH CIRCUITS SUPPLYING OUTLETS/LIGHTS INSTALLED IN UNITS. AREAS SHALL BE PROTECTED BY A LISTED ARC FAULT CIRCUIT INTERRUPTER COMBINATION TYPE, CIRCUIT BREAKER.
33. HVAC EQUIPMENT LOCATED WITHIN SIGHT OF RESPECTIVE ELECTRICAL PANEL ARE NOT REQUIRED TO HAVE A DISCONNECT.
34. WALL MOUNTED HVAC EQUIPMENT NOT WITHIN SIGHT OF RESPECTIVE ELECTRICAL PANEL SHALL HAVE A DISCONNECT SWITCH MOUNTED ADJACENT TO EQUIPMENT.

BRANCH CIRCUIT WIRING

1. ALL BRANCH CIRCUIT WIRING SHALL BE COPPER - TYPE AS LISTED IN THE SPECIFICATIONS UNLESS OTHERWISE NOTED.
2. FOR CLARITY, ALL BRANCH CIRCUIT WIRING IS NOT SHOWN, HOWEVER A COMPLETE BRANCH CIRCUIT WIRING SYSTEM IS TO BE INSTALLED IN ACCORD WITH THE DEVICES AND CIRCUIT NUMBERS SHOWN.
3. WIRING SHOWN ON DRAWINGS IS FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS
4. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. NO SHARED NEUTRALS WILL BE ALLOWED. A GREEN GROUNDING CONDUCTOR SHALL BE RUN WITH ALL CIRCUITS..
5. TYPICAL CIRCUITING

   $A\square^{b}_{P1A,33}$ - "A" DENOTES FIXTURE TYPE, "P1A,33" DENOTES PANEL & CIRCUIT NUMBER, "b" DENOTES SWITCH CONTROL. ALTERNATIVELY CIRCUITING MAY BE LOOPED

MEP COORDINATION

1. ALL ELECTRICALLY POWERED HVAC, PLUMBING AND FIRE PROTECTION EQUIPMENT SHALL BE PROVIDED WITH LOCAL DISCONNECT SWITCHES. THE SWITCHES SHALL BE PROVIDED BY THE E.C. UNLESS NOTED OTHERWISE.
2. DUCT SMOKE DETECTORS SHALL BE SUPPLIED BY THE E.C.(FIRE ALARM EQUIPMENT SUPPLIER), INSTALLED IN THE DUCTWORK BY THE HVAC CONTRACTOR AND WIRED BY THE E.C..
3. ALL MOTOR STARTERS SHALL BE FURNISHED BY THE HVAC, PLUMBING OR FIRE PROTECTION SUBCONTRACTOR (TO DIVISION 16 SPECIFICATION REQUIREMENTS), INSTALLED AND WIRED BY THE E.C. STARTERS WILL BE MAGNETIC ACROSS THE LINE (AMBIENT COMPENSATED MOTOR OVERLOAD HEATERS IN ALL CURRENT CARRYING CONDUCTORS) WITH HOA SWITCH. MANUAL TOGGLE TYPE FOR SINGLE PHASE MOTORS WHICH DO NOT REQUIRE AUTOMATIC CONTROL.
4. SPEED CONTROL: LINE VOLTAGE SPEED CONTROL SWITCHES FOR FRACTIONAL HORSEPOWER MOTORS THAT REQUIRE SPEED CONTROL SHALL BE SUPPLIED BY THE HVAC CONTRACTOR AND INSTALLED AND WIRED BY THE E.C.
5. SPEED CONTROL: VARIABLE SPEED DRIVES (VSD) SHALL BE SUPPLIED BY THE DRIVEN EQUIPMENT'S SUPPLIER, INSTALLED AND WIRED BY THE E.C.
6. THERMOSTATS ARE SHOWN ON THE MECHANICAL PLAN - PROVIDE FOR EACH THERMOSTAT PER THE LEGEND (Ⓣ SYMBOL).
7. ALL DISCONNECTS FOR MECHANICAL UNITS ARE TO BE MOUNTED SECURELY TO THE FLOOR / STRUCTURE. THE ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL UNISTRUT AND MOUNTING HARDWARE AS REQUIRED TO MOUNT THE DISCONNECTS.

NEW DEVICES ARE TO BE LOCATED ON NEW CONSTRUCTION OR EXISTING CONSTRUCTION THAT COULD EASILY ACCOMMODATE NEW CONCEALED WIRING WITH MINIMAL EFFORT. IN CERTAIN SITUATIONS IF IT'S ACCEPTABLE BY CODE AND MINIMIZES THE EFFORT, WIRING COULD BE FISHED IN EXISTING CONSTRUCTION USING METAL SHEATHED CABLE.

ALL NEW WIRING SHALL BE CONCEALED WHERE POSSIBLE. LONGER RUNS SHALL BE MADE, AS REQUIRED, TO MEET THIS REQUIREMENT.

WHERE EXISTING CONDITIONS PROHIBITS CONCEALED WIRING INSTALLATION SUCH AS A DEVICE LOCATED ON AN EXISTING CONCRETE, CMU, OR SOLD PLASTER WALL, DEVICES AND WIRING CAN BE EXPOSED SURFACE MOUNTED USING PAINTED E.M.T. OR WIREMOLD RACEWAY AND BOXES AS PRIOR APPROVED BY THE CONTRACTING OFFICER. SURFACE RACEWAY IS TO BE MINIMUM NECESSARY TO GET TO A CONCEALED SITUATION - ALL EXPOSED INSTALLATIONS SHALL BE REVIEWED AND APPROVED BY THE CONTRACTING OFFICER PRIOR TO INSTALLATION.

POWER LEGEND

SYMBOLS	DESCRIPTION
	20A, 125 VAC 2P., 3W., GROUNDING TYPE, DUPLEX RECEPTACLE. FLUSH WALL MOUNTED.
	20A, 125 VAC 2P., 3W., GROUNDING TYPE, DOUBLE DUPLEX RECEPTACLE. FLUSH WALL MOUNTED.
	RECEPTACLE, DUPLEX GFCI PROTECTED - SEE NOTES FOR METHOD OF PROTECTION. USE GFCI OUTLET STANDARD U.N.O.
X	DUPLEX GFCI RECEPTACLE MOUNTED 6" ABOVE COUNTER
WP	DUPLEX GFCI RECEPTACLE WITH WEATHER PROOF COVER/BOX
	DUPLEX RECEPTACLE TOP HALF SWITCHED
	SPECIALTY OUTLET, MATCH OUTLET TYPE TO EQUIPMENT - USE MONOPLEX OUTLET FOR BUCKET UNITS
	SURFACE PANEL - SEE RESPECTIVE SCHEDULE.
	FLUSH PANEL - SEE RESPECTIVE SCHEDULE.
	HOMERUN TO PANEL
	FUSED DISCONNECT SWITCH, FUSE SIZE TO MATCH MFR. RECOMMENDATIONS
	SAFETY SWITCH, HORSEPOWER RATED
	JUNCTION BOX
	FAN
	CONNECTION TO GROUND
Ⓣ	THERMOSTAT IN A 4" SQUARE BOX WITH SINGLE GANG PLASTER RING IN A VERTICAL ORIENTATION. DEVICE WITH A 3/4" CONDUIT WITH BUSHINGS UP TO ACCESSIBLE CEILING. PROVIDE SIMILAR RACEWAY FOR OTHER HVAC CONTROLS SUCH AS HUMIDISTATS, ETC.

LIGHTING NEW WORK PLAN GENERAL NOTES:

1. LIGHTING CONTROLS ARE TO BE INSTALLED PER MANUFACTURER'S RECOMMENDATIONS.
2. ALL LIGHT FIXTURES LOCATIONS ARE TO BE COORDINATED WITH ARCHITECTURAL/INTERIOR DESIGNER PLANS. LIGHT FIXTURE LOCATIONS ARE TO BE COORDINATED WITH DUCTWORK, EQUIPMENT, ETC.
3. CIRCUIT LEGS POWERING EXIT SIGNS AND EMERGENCY FIXTURES SHALL BE UNSWITCHED/UNCONTROLLED AND BE POWERED FROM THE LOCAL LIGHTING CIRCUIT. RUN AN EXTRA WIRING LEG AS NECESSARY. EXIT SIGN MOUNTING HEIGHTS ARE TO BE COORDINATED WITH THE CEILING HEIGHT SUCH THAT THE EXIT SIGNS ARE VISIBLE THROUGHOUT THE AREAS SERVED.
4. COORDINATE THE FINAL VOLTAGES OF ALL FIXTURES WITH THE VOLTAGE OF THE CIRCUIT INDICATED.
5. PROVIDE MULTIPLE POWER PACKS FOR SENSORS SERVING MULTIPLE ZONES. INTERCONNECT MULTIPLE SENSORS WHEN SERVING THE SAME ZONE.
6. RUN NEUTRAL WIRES TO ALL SENSOR SWITCH LOCATIONS. PROVIDE EXTRA LEGS FOR 3-WAY SWITCHING LOCATIONS.
7. REMOVED LIGHT FIXTURES ARE TO BE DISPOSED OF IN A MANNER APPROVED BY THE ENVIRONMENTAL PROTECTION AGENCY. THE ASSOCIATED WIRING IS TO BE REMOVED BACK TO THE SOURCE PANEL AND WIRING FOR THE NEW LIGHT FIXTURES ARE TO BE FED WITH NEW WIRING.
8. ALL LIGHT FIXTURE WIRING IS TO BE #12 WIRE AWG COPPER MINIMUM.
9. THE EXHAUST FANS ARE TO BE WIRED TO RUN CONTINUOUSLY AT LOW SPEED. THE WALL SWITCH (DOUBLE-LETTER) IS TO ACTIVATE THE HIGH SPEED MODE. INCLUDE RELAYS, ETC. TO WIRE PER THIS SEQUENCE OF OPERATION. COORDINATE WORK WITH THE HVAC CONTRACTOR. THE LIGHT WITHIN THE FAN IS TO BE SWITCHED WITH THE VANITY LIGHT.

LIGHTING NEW WORK PLAN KEYNOTES:

1. EXISTING LIGHT FIXTURE TO REMAIN. THIS FIXTURE WAS RECENTLY INSTALLED NEW. EXISTING CIRCUIT AND CONTROLS TO REMAIN FULLY ACTIVE.
2. EXISTING EXTERIOR LIGHT FIXTURE TO BE REPLACED IN SAME LOCATION WITH NEW FIXTURE. THE EXISTING WIRING IS TO BE REPLACED BACK TO THE BREAKER PANEL AND AND EXTRA HOT LEG IS TO BE RUN TO EACH EMERGENCY BALLAST. A NEW TORK DZS-400A TIMECLOCK IS TO BE PROVIDED AND INSTALLED ADJACENT TO THE ELECTRICAL PANEL TO CONTROL THE CIRCUIT. THE CIRCUIT IS TO BE ROUTED VIA THE TIMECLOCK. A PHOTOCELL IS TO BE PROVIDED AND INSTALLED IN SERIES WITH THE TIMECLOCK.
3. EXISTING FIXTURE TO BE REMOVED COMPLETELY. THE NEW LIGHTING SHOWN IS TO REPLACE THE EXISTING IN THIS AREA. EXISTING JUNCTION BOX IS TO BE REMOVED AND THE WALL/CEILING IS TO BE PROPERLY PATCHED AND FINISHED. TYP. OF ALL BEDROOM WALL LIGHTS (NOT ALL ARE SHOWN).
4. NEW FIXTURE IN NEW LOCATION WITH NEW CONTROLS AS INDICATED. THE EXISTING CIRCUIT SERVING THE LIGHTING IN THIS AREA IS TO BE REUSED (HOWEVER, ALL NEW WIRING IS TO BE RUN).
5. NEW FIXTURE IN EXISTING LOCATION WITH NEW CONTROLS AS INDICATED. THE EXISTING CIRCUIT SERVING THE LIGHTING IN THIS AREA IS TO BE REUSED (HOWEVER, ALL NEW WIRING IS TO BE RUN).
6. ALL BEDROOMS ARE TO HAVE CEILING FIXTURES. FIELD VERIFY EXACT BEDROOMS WITH WALL FIXTURES AND REMOVED WALL FIXTURES PER KEYNOTE #3. SURFACE CEILING FIXTURES ARE TO BE INSTALLED AS INDICATED - REUSE THE EXISTING CIRCUIT AND PROVIDE NEW WIRING BACK TO THE BREAKER PANEL. PROVIDE AND INSTALL NEW WALL SWITCHES AND WIRING. EXISTING SWITCH LOCATIONS MAY BE REUSED.
7. THE LIGHT FIXTURES ON THIS CIRCUIT ARE TO BE CONTROLLED BY THE OCCUPANCY SENSOR(S) SHOWN IN THE SAME AREA. THE WALL SWITCHES ARE TO SERVE AS MANUAL ON/OFF OVER-RIDES. ALL VACANCY SENSORS ARE TO BE PROGRAMMED FOR 15-30 MINUTES AS DIRECTED BY THE OWNER. LOWER CASE LETTERS INDICATE ZONES AND LOW-VOLTAGE WIRING IS TO BE RUN BETWEEN SENSORS THAT SERVE THE SAME ZONE. REFER TO WIRING DIAGRAM.
8. EXISTING FIXTURE / LIGHTING IN THIS BEDROOM TO REMAIN PER KEYNOTE #1.

ALL DEVICES TO REMAIN ARE TO REMAIN ACTIVE EVEN WHEN A DEVICE TO REMAIN SHARES A COMMON CIRCUIT WITH A DEVICE TO BE REMOVED.

LIGHTING FIXTURE & LAMP SCHEDULE

TYPE	MANUFACTURER	CATALOG No.	LAMP No.	LAMP TYPE	WATTS	VOLTS	REMARKS
C1	PRESCOLITE	LF4SL-DM1-4LFSL-20L-30K 9-SS-CL-WT-B24-XX	-	LED	22	120	6" CAN LIGHT ARCHITECTURAL
C2	AFX	SHAL054840L40MV	-	LED	31	120	UTILITY WRAP FIXTURE
S1	AFX	EGRF1216L30D1SN	-	LED	22	120	BEDROOM SURFACE CEILING
S2	AFX	C2F141700L30MV - 34W	-	LED	34	120	CORRIDOR SURFACE LIGHT
W1	LUMUX	DL300/LED/120/XX/(EMB) RECESS MOUNT BACKBOX	-	LED	30	120	WALL PACK - DARK SKY EM = EMERGENCY BATTERY
W2	AFX	SNV240520LAJD2SN - 27"	-	LED	26	120	VANITY LIGHT .
FAN	-	BY HVAC CONTRACTOR	-	WIRED BY E.C.	-	120	EXHAUST FAN WIRE W/LIGHTS (HIGH-SPEED) RUN EXTRA HOT LEG (LOW)
EX	DUAL-LITE	EVE-U-R-W-E-I	-	LED	-	120	THERMOPLASTIC EXIT LIGHT, W/ INTEGRAL EMERGENCY BATTERY
EM	SURELITES	APEL	-	LED	-	120	EMERGENCY FIXTURE 2-HEADED
EMEX	DUAL-LITE	EVC-U-R-W-I	-	LED	-	120	THERMOPLASTIC EXIT LIGHT, W/ EMERGENCY HEADS

LIGHTING SCHEDULE GENERAL NOTES:

ALL FIXTURES INSTALLED IN OR AROUND FIRE RATED OR IC RATED ASSEMBLIES ARE TO BE EQUIPPED WITH RATED BOXES BY TENMAT (SIZE TO SUIT FIXTURE).

MOUNTING HEIGHTS, MOUNTING OPTIONS, FINISHES AND OPTIONS ARE TO BE APPROVED AND COORDINATED WITH THE ARCHITECT PRIOR TO ORDERING THE FIXTURES.

EMERGENCY FIXTURE CHEVRONS / ARROWS TO BE SELECTED PER PLANS.

CLARIFICATION IS TO BE OBTAINED, PRIOR TO BID, REGARDING ANY QUESTIONS RELATED TO THE LIGHTING SYSTEM.

THE E.C. IS TO COMPLETE THE INSTALLATION OF ANY ADDITIONAL LIGHTING CONTROLS SUCH AS OCCUPANCY SENSORS, ETC. THAT ARE INCLUDED WITH THE FIXTURE PACKAGE.

ALL LAMPING AND FIXTURE WHIPS ARE TO BE INCLUDED.

COORDINATE ALL MOUNTING HARDWARE WITH ARCHITECT'S RCP'S, DETAILS AND ELEVATIONS, PROVIDE MOUNTING FRAMES REQUIRED FOR CEILINGS INSTALLED, GWB, RCP, ETC.

ALL EXIT LIGHTS AND EMERGENCY BATTERY UNITS SHALL BE CONNECTED TO NEAREST LOCAL BRANCH CIRCUIT SERVING AREA, UNSWITCHED WIRED AHEAD OF SWITCH LEG..

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CONSULTANT:
ALLIED CONSULTING ENGINEERING SERVICES
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COMMONWEALTH OF MASSACHUSETTS
Amish D. Patel
No. 48856
REGISTERED PROFESSIONAL ENGINEER
ELECTRICAL

DATE: 10/18/2019 PERMIT

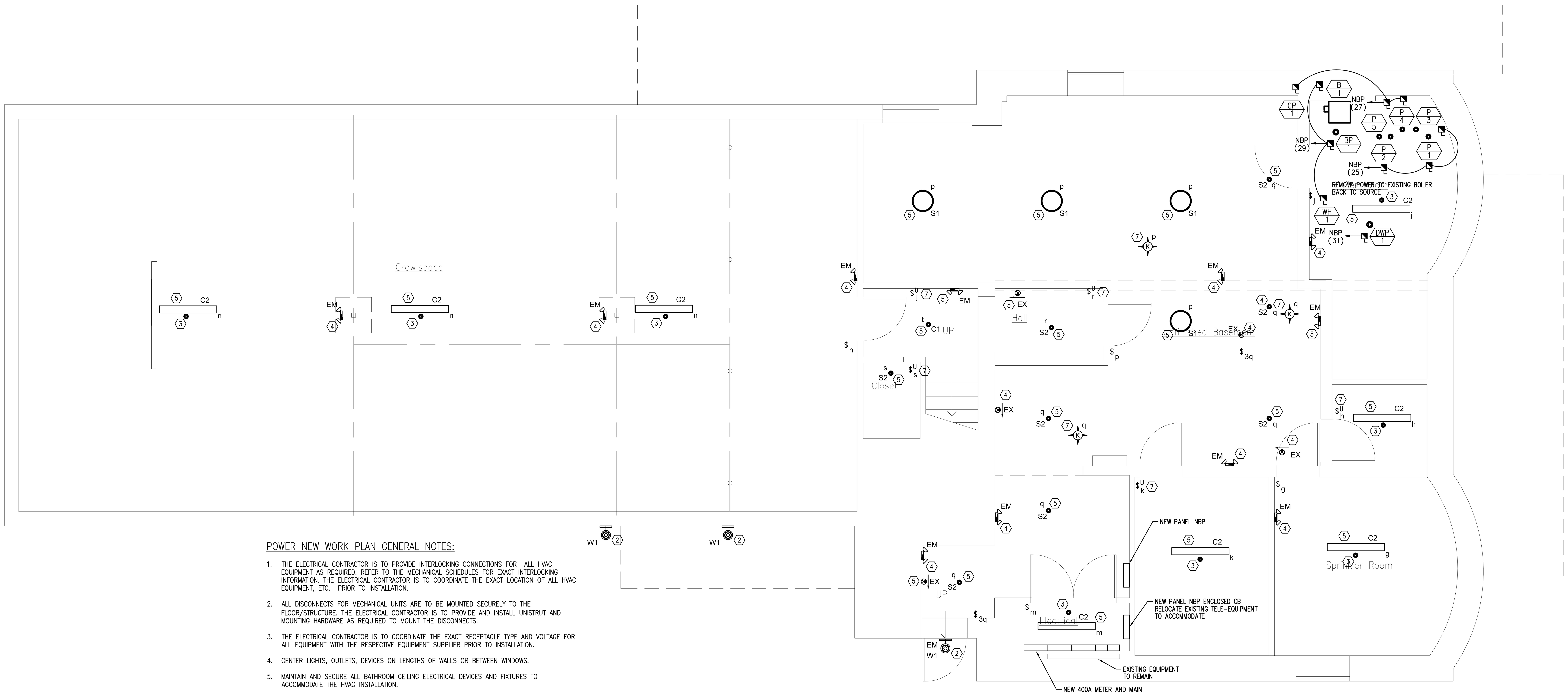
SCALE: 1/4" = 1'-0"

DRAWN BY: AP

CHECKED BY: AP

SHEET TITLE: ELECTRICAL LEGEND

SHEET NUMBER: E0



POWER NEW WORK PLAN GENERAL NOTES:

1. THE ELECTRICAL CONTRACTOR IS TO PROVIDE INTERLOCKING CONNECTIONS FOR ALL HVAC EQUIPMENT AS REQUIRED. REFER TO THE MECHANICAL SCHEDULES FOR EXACT INTERLOCKING INFORMATION. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT LOCATION OF ALL HVAC EQUIPMENT, ETC. PRIOR TO INSTALLATION.
2. ALL DISCONNECTS FOR MECHANICAL UNITS ARE TO BE MOUNTED SECURELY TO THE FLOOR/STRUCTURE. THE ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL UNISTRUT AND MOUNTING HARDWARE AS REQUIRED TO MOUNT THE DISCONNECTS.
3. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT RECEPTACLE TYPE AND VOLTAGE FOR ALL EQUIPMENT WITH THE RESPECTIVE EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
4. CENTER LIGHTS, OUTLETS, DEVICES ON LENGTHS OF WALLS OR BETWEEN WINDOWS.
5. MAINTAIN AND SECURE ALL BATHROOM CEILING ELECTRICAL DEVICES AND FIXTURES TO ACCOMMODATE THE HVAC INSTALLATION.

1 ELECTRICAL BASEMENT PLAN
1/4" = 1'-0"

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DATE: 10/18/2019 PERMIT

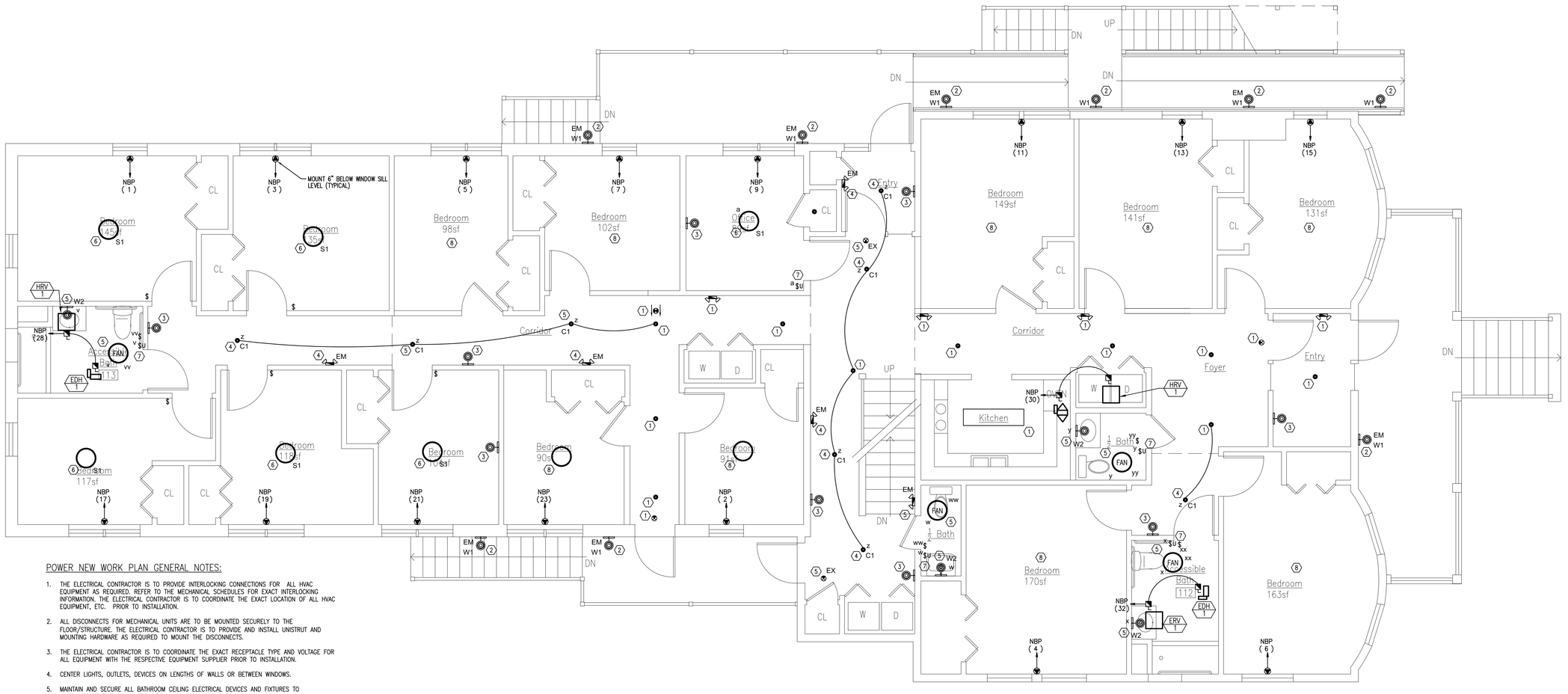
SCALE: 1/4" = 1'-0"

DRAWN BY: AP

CHECKED BY: AP

SHEET TITLE: ELECTRICAL BASEMENT PLAN

SHEET NUMBER: E1



POWER NEW WORK PLAN GENERAL NOTES:

1. THE ELECTRICAL CONTRACTOR IS TO PROVIDE INTERLOCKING CONNECTIONS FOR ALL HVAC EQUIPMENT AS REQUIRED. REFER TO THE MECHANICAL SCHEDULES FOR EXACT INTERLOCKING INFORMATION. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT LOCATION OF ALL HVAC EQUIPMENT, ETC. PRIOR TO INSTALLATION.
2. ALL DISCONNECTS FOR MECHANICAL UNITS ARE TO BE MOUNTED SECURELY TO THE FLOOR/STRUCTURE. THE ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL UNISTRUT AND MOUNTING HARDWARE AS REQUIRED TO MOUNT THE DISCONNECTS.
3. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT RECEPTACLE TYPE AND VOLTAGE FOR ALL EQUIPMENT WITH THE RESPECTIVE EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
4. CENTER LIGHTS, OUTLETS, DEVICES ON LENGTHS OF WALLS OR BETWEEN WINDOWS.
5. MAINTAIN AND SECURE ALL BATHROOM CEILING ELECTRICAL DEVICES AND FIXTURES TO ACCOMMODATE THE HVAC INSTALLATION.

1 ELECTRICAL FIRST FLOOR PLAN
1/4" = 1'-0"

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Commonwealth of Massachusetts — Jinlah D. Patel No. 40856 — Professional Engineer — Electrical

DATE: 10/18/2019 PERMIT

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

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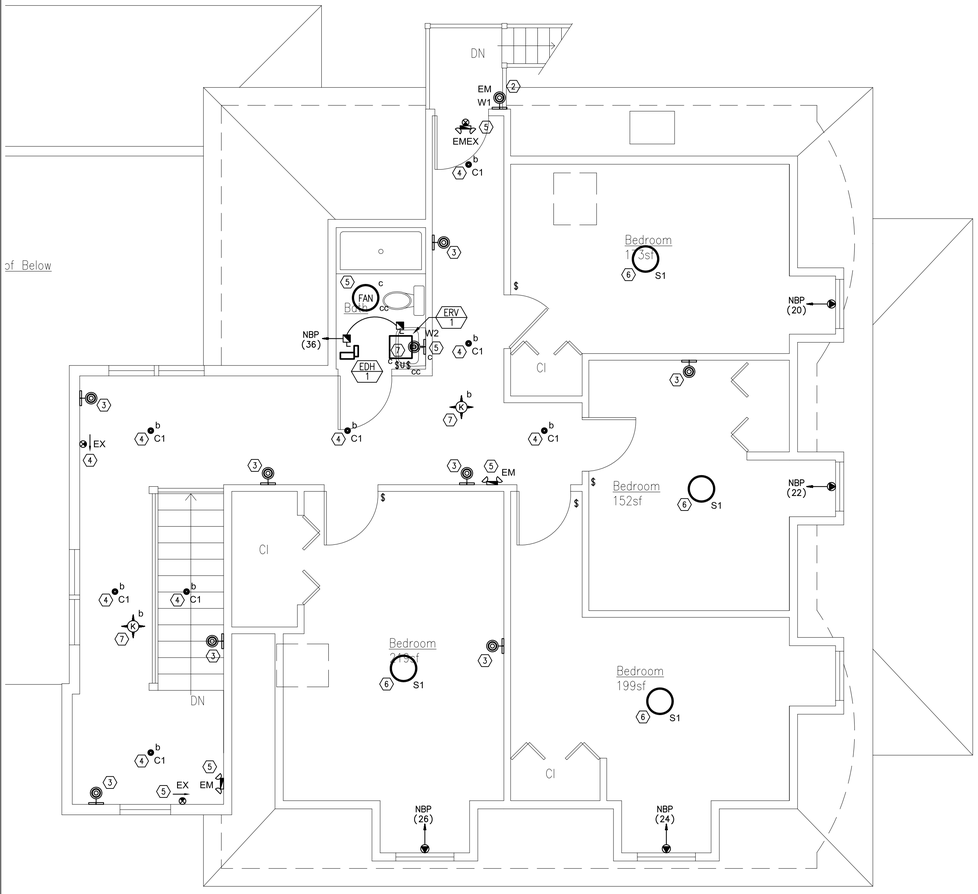
SHEET TITLE: ELECTRICAL FIRST FLOOR PLAN

SHEET NUMBER: E2

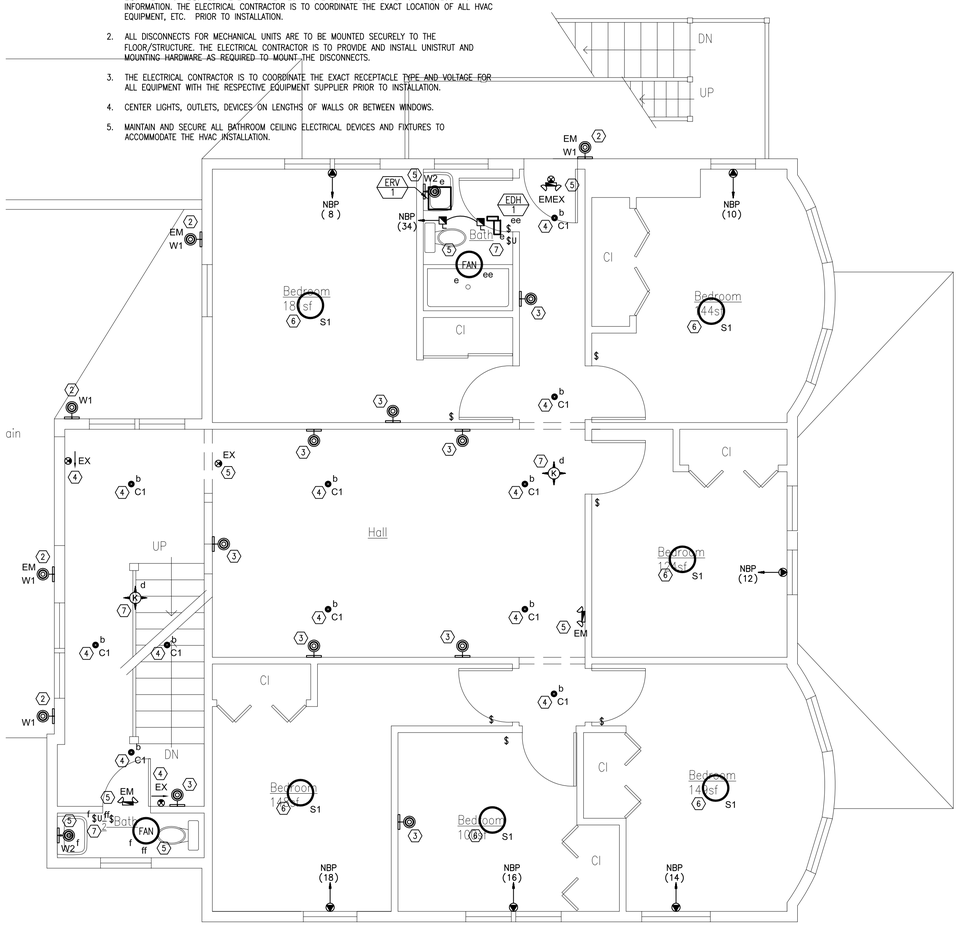


2 ELEC. ATTIC FLOOR PLAN

1/4" = 1'-0"

POWER NEW WORK PLAN GENERAL NOTES:

1. THE ELECTRICAL CONTRACTOR IS TO PROVIDE INTERLOCKING CONNECTIONS FOR ALL HVAC EQUIPMENT AS REQUIRED. REFER TO THE MECHANICAL SCHEDULES FOR EXACT INTERLOCKING INFORMATION. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT LOCATION OF ALL HVAC EQUIPMENT, ETC. PRIOR TO INSTALLATION.
2. ALL DISCONNECTS FOR MECHANICAL UNITS ARE TO BE MOUNTED SECURELY TO THE FLOOR/STRUCTURE. THE ELECTRICAL CONTRACTOR IS TO PROVIDE AND INSTALL UNISTRUT AND MOUNTING HARDWARE AS REQUIRED TO MOUNT THE DISCONNECTS.
3. THE ELECTRICAL CONTRACTOR IS TO COORDINATE THE EXACT RECEPTACLE TYPE AND VOLTAGE FOR ALL EQUIPMENT WITH THE RESPECTIVE EQUIPMENT SUPPLIER PRIOR TO INSTALLATION.
4. CENTER LIGHTS, OUTLETS, DEVICES ON LENGTHS OF WALLS OR BETWEEN WINDOWS.
5. MAINTAIN AND SECURE ALL BATHROOM CEILING ELECTRICAL DEVICES AND FIXTURES TO ACCOMMODATE THE HVAC INSTALLATION.



1 ELEC. SECOND FLOOR PLAN

1/4" = 1'-0"

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ELECTRICAL

DATE:
10/18/2019 PERMIT

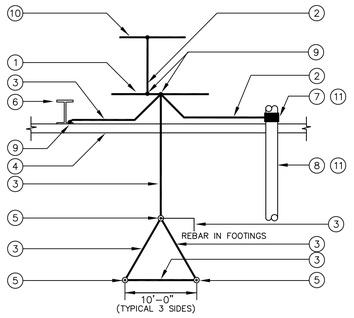
SCALE:
1/4" = 1'-0"

DRAWN BY:
AP

CHECKED BY:
AP

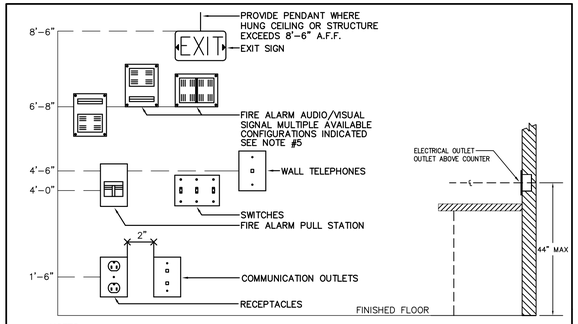
SHEET TITLE:
ELECTRICAL
SECOND & ATTIC

SHEET NUMBER:
E3



1. MAIN SWITCHBOARD GROUNDING BUS
2. #750 MCM CU, GROUNDING CONDUCTOR IN 2" C.
3. #4/0 BARE COPPER GROUNDING CONDUCTOR
4. BUILDING EXTERIOR WALL
5. 10'-0" X 3/4" COPPERWELD GROUND ROD DRIVEN WITH TOP 1'-0" BELOW GRADE
6. STRUCTURAL STEEL
7. GROUNDING CLAMP ON METALLIC PIPE
8. WATER SERVICE PIPE
9. UTILIZE EXOTHERMAL WELDING ON GROUND ROD CONNECTIONS
10. NEUTRAL BUS
11. BOND GAS PIPING

GROUND COUNTERPOISE DETAIL — N.T.S.



NOTES

1.) ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS

2.) DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE.

3.) ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED.

4.) REFER TO THE ARCHITECTS ELEVATION DETAILS FOR EXACT HEIGHT AND LENGTH OF SURFACE RACEWAYS.

5.) THE ENTIRE LENS OF A FIRE ALARM A/V SIGNAL OR VISUAL-ONLY SIGNAL SHALL BE LOCATED ABOVE 6'-8" A.F.F. OR 6" BELOW CEILING WHICHEVER IS LOW.

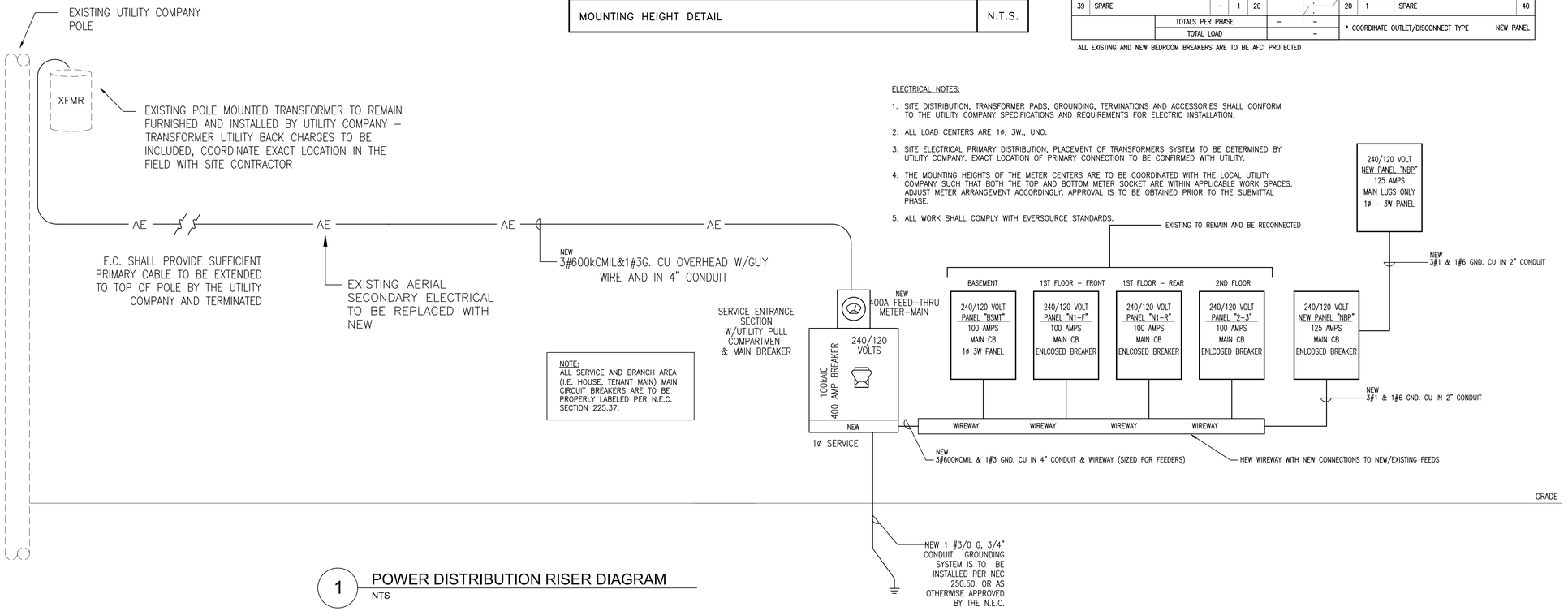
MOUNTING HEIGHT DETAIL — N.T.S.

PANEL "NBP" SCHEDULE — VOLTAGE: 240/120 VOLT - 1 PH. - 3 WIRE 125 AMP MAIN LUGS ONLY; SURFACE MTD.
REMARKS: PROVIDE WITH GROUND BAR, MINIMUM A.I.C. RATING = 22,000 AMPS SYM.

CKT NO.	LOAD DESCRIPTION	WIRE ø	BREAKER POLE	BREAKER AMP	CONN. LOAD (KVA) PH. "A"	CONN. LOAD (KVA) PH. "B"	BREAKER AMP	BREAKER POLE	WIRE ø	LOAD DESCRIPTION	CKT NO.
1	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	2
3	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	4
5	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	6
7	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	8
9	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	10
11	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	12
13	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	14
15	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	16
17	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	18
19	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	20
21	WINDOW UNIT OUTLET	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	22
23	WINDOW UNIT OUTLET	12	1	20		·	20	1	12	WINDOW UNIT OUTLET	24
25	P-1 P-2 P-3*	12	1	20	·		20	1	12	WINDOW UNIT OUTLET	26
27	P-4 P-5 CP-1*	12	1	20		·	20	1	12	ERV & EDH PAIR	28
29	BP-1 & BOILER*	12	1	20	·		20	1	12	ERV & EDH PAIR	30
31	DWP-1*	12	1	20		·	15	1	12	ERV & EDH PAIR	32
33	SPARE	·	1	20	·		20	1	12	ERV & EDH PAIR	34
35	SPARE	·	1	20		·	20	1	12	ERV & EDH PAIR	36
37	SPARE	·	1	20	·		20	1	·	SPARE	38
39	SPARE	·	1	20		·	20	1	·	SPARE	40
	TOTALS PER PHASE				–	–					
	TOTAL LOAD					–					

* COORDINATE OUTLET/DISCONNECT TYPE NEW PANEL

ALL EXISTING AND NEW BEDROOM BREAKERS ARE TO BE AFCI PROTECTED



1 POWER DISTRIBUTION RISER DIAGRAM
NTS

ELECTRICAL NOTES:

1. SITE DISTRIBUTION, TRANSFORMER PADS, GROUNDING, TERMINATIONS AND ACCESSORIES SHALL CONFORM TO THE UTILITY COMPANY SPECIFICATIONS AND REQUIREMENTS FOR ELECTRIC INSTALLATION.
2. ALL LOAD CENTERS ARE 1ø, 3W., UNO.
3. SITE ELECTRICAL PRIMARY DISTRIBUTION, PLACEMENT OF TRANSFORMERS SYSTEM TO BE DETERMINED BY UTILITY COMPANY. EXACT LOCATION OF PRIMARY CONNECTION TO BE CONFIRMED WITH UTILITY.
4. THE MOUNTING HEIGHTS OF THE METER CENTERS ARE TO BE COORDINATED WITH THE LOCAL UTILITY COMPANY SUCH THAT BOTH THE TOP AND BOTTOM METER SOCKET ARE WITHIN APPLICABLE WORK SPACES. ADJUST METER ARRANGEMENT ACCORDINGLY. APPROVAL IS TO BE OBTAINED PRIOR TO THE SUBMITTAL PHASE.
5. ALL WORK SHALL COMPLY WITH EVERSOURCE STANDARDS.

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Jeniak D. Patel No. 48856 ELECTRICAL PROFESSIONAL ENGINEER

DATE: 10/18/2019 PERMIT

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

DRAWN BY: AP

CHECKED BY: AP

SHEET TITLE: ELECTRICAL ONE-LINE & SCHEDULES

SHEET NUMBER: E4

SECTION 16100 – ELECTRICAL

PART 1 – GENERAL

1.1 RELATED DOCUMENTS

A. The General and/or Special Conditions Sections are a part of this specification and the Contractor shall consult them in detail for instructions pertaining to this work. Section 16 is sub-divided for convenience only.

1.2 SCOPE

A. Furnishing of all labor, material, equipment, supplies, and services necessary to construct and install the complete electrical systems as shown on the drawings and specified herein.

1.3 JOB CONDITIONS

A. Site Inspections: Before submitting proposals, each bidder should visit the site and fully familiarize himself with all job conditions and shall be fully informed as to the extent of his work. No consideration will be given after bid opening date for alleged misunderstanding as to the requirements of work involved in connecting to the utilities, as to requirements of materials to be furnished, or as to the extent of demolition required.

B. Existing Conditions: All utilities, existing systems, and conditions shown on the plans as existing are approximate, and the Contractor shall verify all details of the project before any work is started.

C. Scheduled Interruptions: Planned interruptions of utilities service, to any facility affected by this contract, shall be carefully coordinated and approved by the Architect at least ten (10) days in advance of the requested interruption. The Contractor shall not interrupt services until specific approval has been granted by the Architect. The request shall indicate services to be affected, date and time of interruption and duration of outage. Request for interruption of service will not be approved until all equipment and material required for the completion of that particular phase of work are on the job site. The work may have to be scheduled after normal working hours.

D. Maintaining Service: Any existing service (or operating system) which must be interrupted for any length of time shall be supplied with a temporary service as necessary for continuation of the normal operation of this facility.

E. Removal of Existing Work: Where noted or indicated on the drawings, or specified herein, existing electrical materials and equipment shall be removed from the building. All materials designated to be removed by the Contractor, not to be salvaged and given to the Owner or required to be reinstalled, including scrap, shall become the property of the Contractor, and shall be promptly removed from the site. Existing items required to be removed temporarily in order to properly install new work shall be replaced in a satisfactory manner upon completion.

1.4 TEMPORARY POWER

A. Furnish and maintain temporary wiring system for light and power for use during construction by all trades. Use solidly grounded system. Limit over-current protection to 20 amperes on No. 12 conductors. Coordinate all requirements for temporary power with the serving utility and pay for all charges incurred while furnishing power for construction. Verify whether charges for electrical power consumption are specified in Division One; if so, payment of bills for power consumption are not included under this section.

B. Accidental Interruptions: All excavation and/or remodeling work required shall be performed with care so as not to interrupt other existing services (water, gas, electrical, sewer, sprinklers, etc.). If accidental utility interruption resulting from work performed by the Contractor occurs, service shall be immediately restored to its original condition without delay, by and at the expense of the Contractor, using skilled workmen of the trade required.

1.5 CODES, PERMITS AND INSPECTIONS

A. The installation shall comply with all local, state, and federal laws and ordinances applicable to electrical installation and with the regulations of the latest published edition of the National Electrical Code (N.E.C.) where such regulations do not conflict with those laws and ordinances. The Contractor shall obtain and pay for all permits and inspection fees, and after completion of the work, shall furnish the Architect a certificate of final inspection and approval from the applicable local inspection authorities. Any charges by a utility (Power, Telephone, Cable TV, etc.) for providing service as shown shall be included in the bid and paid by the Contractor.

1.6 DRAWINGS AND SPECIFICATIONS

A. The drawings and these specifications are complimentary each to the other. What is called for by one shall be as binding as if called for by both. Where the drawings and/or specifications differ as to quantity or quality, the greater quantity or higher quality shall be provided. Omissions from the drawings and specifications of details of work which are evidently necessary to carry out the intent of the drawings and specifications, or which are customarily performed, shall not relieve the Contractor from performing such work. In any case of discrepancy in the figures or catalog numbers, the matter shall be submitted to the Architect, who shall promptly make a determination in writing. Any adjustment by the Contractor shall be at the Contractor's own risk and expense. Electrical drawings are diagrammatic only. Do not scale these drawings. All equipment shall be installed in accordance with manufacturer's recommendations and any conflicting data shall be verified before bidding.

1.7 STANDARDS OF MATERIALS AND WORKMANSHIP

A. Materials: All materials shall be new and shall be listed and approved by the Underwriters' Laboratories, Inc., in every case where a standard has been established for a particular type of material in question. All work shall be executed in a workmanlike manner and shall present a neat appearance.

B. Prior Approvals: Refer to Architectural guidelines.

C. For approval of products other than those specified, bidders shall submit to the Architect, a request in writing, at least ten (10) days prior to bid date. Requests received after this time will not be reviewed or considered regardless of cause. Requests shall clearly define and describe the product for which approval is requested. Requests shall be accompanied by manufacturer's literature, specifications, drawings, cuts, performance data, model numbers, list of references or other information necessary to completely describe the item. Approval will be in the form of an Addendum to the specifications issued to all prospective Prime Contract Bidders on record. The Addendum will indicate the additional products which are approved for this project.

F. Substitutions: Refer to Architectural guidelines.

G. Shop Drawings: The Contractor shall submit a list of items proposed for use. He shall also submit catalog data and shop drawings on proposed systems and their components, panelboards, safety switches, starters and contactors, transformers, lighting fixtures, and wiring devices. Where substitutions alter the design or space requirements, the Contractor shall defray all items of cost for the revised design and construction including costs to all allied trades involved. Data shall be submitted within ten (10) calendar days after the contract is awarded. Provide six (6) copies of shop drawings unless a greater number of copies is required by the General Conditions. Each submittal data section shall be covered with an index sheet listing Contractor, Sub-Contractor, Project Name, and an index to the enclosed submittals.

1.8 RECORDS

A. Operating and Maintenance Manuals: At completion of the work, furnish three (3) copies of written operation instructions which shall include manufacturer's descriptive bulletins, operating and maintenance manuals and parts lists of all equipment installed. Also include in such instructions, the specified size and capacity ratings of all equipment installed. Each set of instructions shall be assembled into a suitable loose-leaf type binder and presented to the Architect for delivery to the Owner.

B. Record Drawings: Maintain one extra set of black-line, white print drawings for use as Record drawings. Records shall be kept daily, using colored pencil. As the work is completed, relevant information shall be transferred to a reproducible set, and copies made to be given to the Architect.

C. Comply with the following for all work specified in Division Sixteen. As-built information shall be shown to scale, using standard symbols listed in the legend.

1.9 INTERFACE WITH OTHER CONTRACTS

A. It shall be the responsibility of the Contractor to cooperate with all other crafts working on this project. All cutting, trenching, backfill, and structural removals to permit entry of the electrical system components shall be done by this Contractor. All patching and finishing shall be done by the General Contractor.

B. It shall be the responsibility of the Electrical Contractor to coordinate, provide, and install the overcurrent protection devices, wire, and conduit as required for the specific mechanical equipment installed.

1.10 EQUIPMENT FURNISHED UNDER OTHER SECTIONS

A. The Electrical Contractor is to provide and install the required device boxes for the HVAC controls. A raceway, 3/4" conduit minimum, is to be provided and installed from the device location to the accessible space above the ceiling or as appropriate for the application. Line voltage thermostats are to be installed by the Electrical Contractor.

1.11 EQUIPMENT CONNECTIONS

A. In general, provide electrical power and control systems connections to all equipment shown on drawings. Included are wiring raceways, disconnects, starters, and other devices shown. Excluded are devices furnished integrally with the manufacturer's package and work specified in other sections of these specifications.

1.12 GROUNDING

A. A green insulated ground conductor shall be run in all branch circuit and feeder conduit with phase and/or neutral conductors. Ground conductor shall be sized per NEC or as noted on drawings. Minimum size #12 AWG. Conduit box to device strap or yoke screw connection is not sufficient. Provide an insulated grounding jumper for receptacle circuits.

B. The Electrical Contractor shall test and provide written certification of final ground system; including test method, equipment model and serial numbers, and final measurements at each point. The ground electrode system must be less than 25 ohms.

1.13 GUARANTEE AND SERVICE

A. Upon completion of all tests and acceptance, the Contractor shall furnish the Owner of a written guarantee covering the electrical work done for a period of one (1) year from date of acceptance. Guarantee includes equipment capacity and performance ratings specified without excessive noise levels. Upon notice from the Architect or the Owner, the Contractor shall, during the guarantee period, rectify and replace any defective material or workmanship and repair any damage caused thereby without additional cost.

PART 2 – PRODUCTS

2.1 GENERAL

A. All equipment and materials shall have ratings established by the recognized independent agency or laboratory. The Contractor shall apply the items used on the project within the ratings and subject to any stipulations or exceptions established by the independent agency or laboratory. Use of equipment or materials in applications beyond that certified by the agency or beyond that recommended by the manufacturer shall be cause for removal and replacement of such misapplied items.

2.2 PANELBOARDS

A. General: Furnish and install circuit breaker lighting and appliance panelboards where shown on the drawings and as indicated in the panelboards schedule. Panelboards shall comply with the following industry standard:

1. NEMA Standard PB-1

2. UL Standards: Cabinets and Boxes –UL50; Panelboards – UL 67

3. National Electric Code

B. Panelboards shall be labeled as suitable for use as service equipment in accordance with Article 408 of the National Electrical Code.

C. Box: The panel box shall not be less than 20 inches wide and fabricated from galvanized or galvanneal steel. Box shall have adjustment screws to provide easy alignment for flush mounted applications. Removable end walls to be blank with no KO's. Panelboard box is to have separate UL label and minimum wire bending and gutter requirements to meet the NEC and UL standards. Wiring gutters shall be completely free of any part of trim clamp to prevent damaging wire insulation.

D. Interior Type S3: All interiors shall be completely factory assembled. The design of the interior should permit replacement of circuit breakers without disturbing adjacent units and without machine drilling or tapping. Bus bars and breaker branch bus shall be of 98% conductivity copper. Bus sequence shall start at the top left phase bus of the interior for both top and bottom fed panels. Panelboard bus structure and main breaker or main lugs shall have current ratings as shown on the plans or as indicated in panel schedule. Such ratings shall be established by heat rise test in accordance with Standard UL 67. Bus bars shall be supported by glass filled polyester type insulators. All bolts used to connect current carrying parts together shall be case hardened, thread-forming type and be accessible for tightening from the front of the panel. Provide an individual circuit number button with an embossed number next to each breaker or provision. Stick on numbers are unacceptable.

E. Dead front to be provided with flange for easy attachment of trim. Incoming cable lugs shall be grouped at one end to separate them from the load side cables. Neutral bussing shall have a lug for each outgoing branch requiring a neutral connection. For easy wiring and shortest cable run possible, load side neutral connection lugs to be split with each side taking 50% of load neutral connections. The interior shall be provided with wing nuts for securing to box without tools.

F. All computer isolation panels shall have 200% neutral bus.

G. Fas-Latch Trim: The panel trim shall be surface or flush as indicated on the drawings. It shall be fabricated from cold rolled steel, painted with an ANSI-61 light gray finish and equipped with concealed hinges, flush lock and a holder for circuit directory card. Trim shall have two separate supports designed to engage the box flange to stabilize and secure the trim during installation. Trim screws to be located behind the lockable door for tamper resistance. No external screws on trims will be allowed. Trims shall be hinged to box.

H. Description: The panelboards shall be Sentron type for use on systems as indicated on each panelboard schedule. The panelboard enclosures shall be NEMA Type 1 construction for top or bottom cable entrance and suitable for surface or flush mounting unless otherwise noted on panelboard schedules. Panels shall be interchanged from top or bottom feeds.

I. Short circuit rating shall be as indicated on panel schedule.

J. Provide main lug only or main circuit breaker panel boards as shown on panelboard schedules. Also provide branch and subfeed circuit breakers of the quantity, trip rating and number of poles as shown on schedules. All panels shall accept additional feed thru lugs or subfeed breaker without modification to bus.

K. Molded case circuit breakers shall be thermal magnetic, quick make, quick break, trip free. Multi-pole breakers shall be common trip. All breakers shall be equipped with antiturn solderless, pressure type connectors. All provisions shall be located at the bottom of the panelboard and be fully bussed complete with all necessary mounting hardware less the breaker. No plug in breakers will be allowed.

L. All panels shall be fully rated. No series rating of breakers is acceptable.

M. Provide subfeed lugs, feed through lugs, handle blocking devices, pad locking devices, shunt trips and ground bus bars as shown on schedules.

N. Panelboards shall be manufactured by Siemens, General Electric or Square D or prior approved.

2.3 NAMEPLATES

A. Each new panel shall have an external micarta engraved nameplate. Disconnect switches, starters or similar devices shall have a micarta engraved nameplate mechanically affixed (no glue) indicating the load served and the location, such as "A/C 2" or "A/C 3 above ceiling". Letters shall be 1/4" black on a white background. Panels shall be designated in this manner.

"Panel A
120/208 Volts
3 Phase, 4 Wire"

2.4 DIRECTORIES

A. For panelboards, install typewritten directories, listing each branch circuit, identifying space and equipment it controls. Label panels, disconnect switches, pushbuttons, motor starters, and time clocks with identification shown on plans using engraved nameplates, identify main and switches ahead of mains, noting equipment they serve.

2.5 DISCONNECT SWITCHES

A. Furnish heavy duty disconnect switches. Switches shall be a product of the same manufacturer as panelboards, using a quick-make, quick-break mechanism. Enclosure shall be Nema Type conforming to area in which it is installed. Shop drawings include manufacturer's catalog data and physical dimensions for each size switch.

2.6 FUSES

A. Furnish fuses for fusible equipment. Supply one (1) set of 3-spare fuses for each size used. Provide spare fuse cabinet. Fuses specified are coordinated and shall be manufactured by Bussman. Chase-Shawmut and Little Fuse will be approved provided shop drawing submittal demonstrates selective coordination.

B. Motor circuit fuses shall be Fusestrons rated between 125% and 150% of name plate rating.

2.7 RACEWAY AND FITTINGS

A. Conduit Systems: Acceptable types of conduit (MC cable is permitted):

1. Hot dipped galvanized rigid steel (GRS)

2. Electrical Metallic Tubing (EMT)

5. Flexible Metallic Conduit (1/2" min. trade size) (FLEX)

6. Liquid Tight Flexible Metallic Conduit (1/2" min. trade size) (LQFLEX)

B. Conduits used for connection to recessed lighting fixtures shall be FLEX. Conduits for connection to motors or vibrating equipment shall be LQFLEX not less than 18" long and not over 60" long. All flexible conduits are to be secured at a minimum of every three feet using approved methods.

C. Conduits run concealed in the hollow space of non-masonry wall or above suspended ceilings shall be EMT. Exposed conduits shall be run at right angles to or parallel with building lines and exposed structure. In all cases, conduit runs shall be grouped together where possible and shall be supported from the building structure, not from any suspended ceiling support system, mechanical equipment or ductwork.

D. All EMT connectors and couplings are to be steel set screw type. All EMT connectors are to be insulated bushing type.

E. All conduit bends are to be made with a device made for the application. All conduit runs are to be parallel or perpendicular to the building structure. Conduit offsets are to be utilized at junction boxes and device boxes and a strap placed on conduit at the point nearest the box for support.

F. Support raceways securely with pipe straps, wall brackets, conduit hangers or ceiling trapeze. Fastenings shall be by wood screws or screw type nails to wood, by toggle bolts to concrete block, expansion bolts on concrete or brick, and beam clamp types on steel or bar joists. Raceways shall not be fastened to suspended ceiling supports but must have independent support from the structure. Supporting devices shall be of materials having corrosion protection at least equal to the raceway. A support shall be provided as close as practical to, and not exceeding 18" from an unsupported box or from change of direction. In horizontal runs, this support may be omitted if the box is independently supported and the box connection is not made with chase nipple or threadless box connector. In vertical runs, load produced by weight of the raceway and conductors shall not be carried by the raceway terminal, but must be carried entirely by conduit supports. Install conduit supports in strict accordance with the following table, except as required by support for boxes and changes in direction:

MAXIMUM SUPPORT TRADE SIZE	LOCATION OF RUNS	SPACING
1/2, 3/4	Exposed, Horizontal	7 feet
1 and larger	Exposed, Horizontal	10 feet
All sizes	Concealed, Horizontal	10 feet
1/2, 3/4	Exposed, Vertical	7 feet
1, 1-1/4	Exposed, Vertical	8 feet
1-1/2 and larger	Exposed, Vertical	10 feet
All sizes	Concealed, Vertical	10 feet

G. For conduit runs that are not sized on drawings, the maximum conduit fill shall be computed using the requirements for Type THW conductors although the actual wiring is with Type THWN or other type of conductors having smaller cross-sections. This requirement is made to provide spare conduit capacity.

H. Install all required sleeves for conduits passing through concrete slabs. Fire proof space between conduit and sleeve after installation using of mineral wool as required. All fire wall penetrations are to be sealed with a U. L. approved method. Any penetrations of the roof membrane must be sealed by a certified roofing contractor using an approved method.

I. Conductors: All conductors shall be installed in conduit. Conductors for building wiring shall have THHN/THWN, 600 volt insulation and shall be soft-drawn copper of standard American Wire Gauge (AWG) size. Minimum size shall be No. 12. All wire No. 8 and larger shall be stranded. All branch circuits No. 10 and smaller shall be wired with color-coded wire with the same color used for a system throughout the building. Power feeders and branch circuits larger than No. 10 shall either be fully color coded or shall have black insulation and be similarly color coded with tape or paint in all junction boxes and panels. Where tape or paint is used to identify conductors, apply at all terminations, junction boxes, pull boxes and wireways. Apply tape, butt lapped, or paint for a minimum distance of 2" and, where applied to ends of conductors, start at cut end of the conductor insulation. Tape shall not cover manufacturers conductors shall be color coded or labeled as necessary for clear identification. Color coding of all conductors shall be as follows:

Grounding	Bare or Green
120/208 Volt System –	
Phase Conductors:	NA–Black, NB–Red, NC–Blue
Neutral:	White

J. All circuits are to be run with a neutral conductor: No shared neutral conductors are allowed.

2.8 JUNCTION AND PULL BOXES

A. Junction and pull boxes shall meet requirements of National Electrical Code. Standard manufactured boxes shall be listed by Underwriters' Laboratories, Inc. Where custom designed and fabricated boxes are needed, they shall meet the construction standards of Underwriters' Laboratories, Inc. and the N.E.C.

B. Junction and pull boxes shall be installed where required by National Electrical Code and where necessary to facilitate pulling of wire or cable. Considerations are sizes of wire and cable, number of bends in raceway, and conductor support requirements in vertical raceways. Maximum distance between terminations at junction or pull boxes, cabinets, or other points of termination shall not exceed 250 feet for straight horizontal runs. This length shall be decreased 50 feet for each 90 degree bend. All junction boxes shall be independently and rigidly supported from the building structure.

C. Junction box for Fire Alarm shall be painted red. Junction boxes for low voltage controls, communication, technology, etc. shall be permanently marked indicating use.

2.9 OUTLETS

A. Outlet boxes shall be one piece or projection welded, galvanized stamped steel for gang sizes required. Where several devices are located on drawings in the same general location, use multi-gang boxes. Sectional boxes are not acceptable. Boxes shall be sized in accordance with National Electrical Code. Boxes required for communications systems, mechanical control devices, etc., shall be installed under this section of the specifications. Verify outlet box locations and sizes required for systems other than electrical power from shop and manufacturer's drawings, and install outlets as per those requirements.

B. Boxes for wall and ceiling outlets shall finish flush and straight. Wall outlets in exposed concrete block, masonry, and tile walls shall be installed with extra deep square corner boxes or with standard boxes and square cornered tile wall covers so that conduit offsets are not required. Openings in concrete blocks or masonry walls shall be saw cut with an opening tolerance of 1/8" on all sides, the opening shall have bottom of box at nearest masonry joint to dimension indicated. For other wall finishes, boxes shall be installed with plaster or device type covers as required. No outlets shall be installed back-to-back. Where outlets occur in stud walls back to back on opposite sides, they shall be isolated by a solid stud between them or shall have a 24" separation. For boxes installed in a fire rated barrier, a U.L. approved putty pad shall be installed as required.

2.10 WIRING DEVICES

Colors: Wiring device and plate colors shall be white.

C. Receptacles: Duplex receptacles shall be specification grade, 20 amps, 125 volts with grounding terminal. The receptacles are to be rigidly secured independent of device plate and such that the device plate secures to the device as the design specifies.

D. Switches: Standard flush tumbler switches shall be specification grade, 20 amps, 120/277 volts A-C only, single pole, three-way or four-way as shown, single throw with screw terminals arranged for side wiring. The switches are to be rigidly secured independent of device plate and such that the device plate secures to the device as the design specifies.

E. Device Plates: Shall be of the specification grade high impact resistant, plastic plates. The nominal thickness is to be .070".

F. Ground Fault Receptacles: Furnish and install receptacles with ground fault circuit interrupters as indicated on plans. Receptacles shall be NEMA 5-20R configuration with 120V ac 20 amperes circuit rating. All receptacles shall be such depth as to permit mounting in outlet boxes 1-1/2" or greater in depth without the use of spacers. Units shall have line and load terminals such that connection to load terminals will provide ground fault protection for other receptacles. All receptacles shall accept standard duplex wall plates. All receptacles shall be noise suppressed and shall be UL listed. Any device located within 76' of a source of water is to be GFCI protected.

G. All devices are to be installed such that devices do not move when in normal use. The device plate shall not be used to secure device in place.

2.11 LIGHTING FIXTURES

A. Provide wired, cleaned, and with lamps specified, all fixtures designated on drawings. Contractor shall verify the ceiling construction for correct trim and support arrangement of lighting fixtures; corrosion resistant plaster frames are required in plaster ceilings. Shop drawing submittals shall consist of properly identified copies of manufacturer's catalog pages showing all features and accessories specified.

B. Secure mounting and support of all lighting fixtures shall be accomplished under this section of the specifications. Fluorescent fixtures shall be supported by additional wires on all four corners. All fixtures, including exit, emergency, cans etc. are to be independently supported from building structure. Grid clips on fluorescent fixtures are to be engaged. Where necessary, additional ceiling hanger wires shall be provided for fixture support. Flexible connections to fixture shall not exceed 5 feet in length. Fixtures shall be solidly grounded to raceway system.

C. In areas where the reflected ceiling plan is shown, all work shall be in conformance with this plan. If the ceiling grid is installed other than shown on the electrical plan, it shall be the responsibility of the installer of the lighting fixtures to call this fact immediately to the attention of the Architect and Contractor, and work shall not proceed until Architect's decision in the matter is obtained.

D. Fluorescent ballasts shall be electronic, sound rated, high power factor, energy-saving type. Where local ordinances require the fusing of fluorescent lamp ballasts, provide factory installed and sized buss in-line fuses (Type GLR with HLR fuse holder). Use of low power factor ballasts is permissible only when specifically scheduled on drawings.

E. All lamps shall be the product of one manufacturer and shall be as manufactured by General Electric or Sylvania.

2.12 DATA/TELEPHONE SYSTEM

A. The Contractor shall furnish and install emt, EMT, boxes, etc. as appropriate, for telephone/data cables. All turns shall be made with no more than two (2) bends to a run. All telecomm conduit is to have bushings provided at both terminated ends. Include all cabling fully wired, terminate, tested and certified.

2.13 PRODUCT DELIVERY, STORAGE AND HANDLING

A. Protections: Take necessary precautions to protect all material, equipment, apparatus, and work from damage. Failure to do so to the satisfaction of the Architect will be sufficient cause for the rejection of the material, equipment, or work in question. Contractor is responsible for the safety and good condition of the materials installed until final acceptance by the Owner.

B. Cleaning: Conduit openings shall be capped or plugged during installation. Fixtures and equipment shall be tightly covered and protected against dirt, moisture, chemical, and mechanical injury. At the completion of the work, the fixtures, material and equipment shall be thoroughly cleaned and delivered in condition satisfactory to the Architect.

PART 3 – EXECUTION

3.1 PAINTING

A. Contractor shall touch-up or refinish all items of electrical equipment furnished with a factory finish coat of paint and which may have been damaged regardless of cause.

3.2 TESTING AND BALANCING

A. Balance all single-phase loads connected to all panelboards to ensure an approximate equal division on these loads on main power supply serving building. All tests shall be made in accordance with the latest standards of the IEEE and the NEC. The installation shall be tested for performance, grounds and insulation resistance. "Megger" type instruments shall be used. Contractor shall perform circuit continuity and operational tests on all equipment furnished or connected by Contractor. The tests shall be made prior to final inspection. The Contractor shall provide all testing equipment and all costs shall be borne by him. Written reports shall be made of all tests. These reports shall be turned over to the Architect at time of final inspection. All faults shall be corrected immediately.

3.3 CLEANING UP

A. The Contractor shall remove all oil, grease, or other stains resulting from his work performed in the building or the exterior thereof.

3.4 WARRANTY AND MAINTENANCE

A. The Electrical Systems and associated materials shall be covered by the warranty for a period of one year. All materials, installation, and workmanship shall be warranted during the warranty period. That is, any item will be repaired at no charge for any defects for one year after the date of acceptance.

END OF SECTION 16100

ELECTRICAL DEMOLITION GENERAL NOTES:

1. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR SECURING ALL EXISTING TO REMAIN WORK PRIOR TO DEMOLITION. THE ELECTRICAL CONTRACTOR IS RESPONSIBLE FOR DAMAGE CAUSED TO SUCH MATERIALS DURING THE CONSTRUCTION PHASE.
2. ALL UNUSED WALL BOXES (LEFT FROM SWITCHES REMOVED, RECEPTACLES, ETC.) ARE TO BE REMOVED.
3. ALL EXISTING PANELS ARE TO REMAIN UNLESS OTHERWISE SPECIFICALLY NOTED.
4. ALL HOLES LEFT BY REMOVED FIXTURES, ETC. ON EXISTING-TO-REMAIN WALLS ARE TO BE FILLED AND FINISHED TO MATCH NEW/EXISTING CONDITIONS BY THE GENERAL CONTRACTOR.
5. EXACT LOCATIONS FOR EXISTING LIGHT FIXTURES, DEVICES, AND BOXES ARE TO BE FIELD VERIFIED PRIOR TO BID. ALL ITEMS TO BE DEMOLISHED ARE NOT NECESSARILY SHOWN ON THIS PLAN.
6. EXACT EXISTING PANEL LOCATIONS ARE TO BE FIELD VERIFIED PRIOR TO BID.
7. THE PHASING OF ALL WORK IS TO BE COORDINATED WITH OTHER CONTRACTORS (GENERAL, MECHANICAL, ETC.) PRIOR TO PROJECT COMMENCEMENT.
8. ALL UNUSED / ABANDONED ELECTRICAL WORK SHALL BE COMPLETELY REMOVED AS PART OF THE SCOPE.
9. COORDINATE ITEMS TO BE SALVAGED WITH THE OWNER PRIOR TO DEMOLITION.
10. ALL PENETRATIONS (NEW AND EXISTING) OF THE FIRE RATED BARRIERS SHALL BE FIRE STOPPED USING U.L. APPROVED METHODS AND MATERIALS.
11. ELECTRICAL CONTRACTOR SHALL VISIT THE SITE PRIOR TO BID AND PERFORM A WALK-THROUGH TO FAMILIARIZE THEMSELVES WITH ALL EXISTING CONDITIONS AND APPLICABLE SCOPE OF WORK. QUESTIONS REGARDING SCOPE SHALL BE SUBMITTED PRIOR TO BID FOR CLARIFICATION.
12. SAFE DISCONNECTION OF ELECTRICAL UTILITIES IS TO BE PERFORMED BY THE ELECTRICAL CONTRACTOR FOR WORK IN THIS AREA.

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ROXBURY, MA

Commonwealth
Land Trust
1059 Tremont St.
Roxbury, MA 02120

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ph 508.653.5223 fax 508.650.4849

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Commonwealth of Massachusetts
Arnish D. Patel
No. 48856
Registered Professional Engineer
ELECTRICAL

DATE:
10/18/2019 PERMIT

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

DRAWN BY:
AP

CHECKED BY:
AP

SHEET TITLE:
ELECTRICAL SPECIFICATIONS

SHEET NUMBER:
E5

GENERAL NOTES

1. ALL WIRING AND RACEWAY SHALL BE CONCEALED UNLESS OTHERWISE NOTED.
2. THE SIZES OF ELECTRICAL RACEWAY SHALL BE AS INDICATED ON THE CONTRACT DRAWINGS AND SHALL MEET THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.
3. ALL WIRE AND CABLE FOR CONTROL INDICATION, ALARM, SIGNAL AND COMMUNICATION SYSTEM, UNLESS OTHERWISE NOTED, SHALL BE SELECTED BY THE SYSTEM SUPPLIER FOR EACH SYSTEM.
4. MINIMUM WIRE SIZE SHALL BE #12 SOLID AWG FOR 20A LIGHTING/ RECEPTACLE BRANCH CIRCUIT; #12 AWG SOLID FOR #20A. APPLIANCE BRANCH CIRCUITS; #10 SOLID AWG FOR 30A. DRYER BRANCH CIRCUIT; #8 STRANDED AWG FOR 40 TO 50A; RANGE CIRCUIT.
5. MINIMUM WIRE SHALL BE #12 FOR BRANCH CIRCUIT RUNS UP TO 100' TO THE LAST OUTLET; OVER 100'–#10; OVER 150'–#8 AND INCREASE CONDUIT SIZE AS REQUIRED BY LOCAL ELECTRICAL CODE.
6. ALL WIRING INSTALLATION SHALL BE COLOR CODED AS PER CODE. CONDUCTORS SIZED #10 AND LOWER SHALL BE SOLID; #8 AND HIGHER STRANDED.
7. ALL WORK SHALL BE INSTALLED IN FULL ACCORDANCE WITH LOCAL CODES, STATE AND LOCAL AUTHORITIES. FILE ALL PLANS, OBTAIN ALL PERMITS, PAY ALL FEES, SCHEDULE ALL INSPECTIONS, MAKE ALL TESTS AND OBTAIN ALL APPROVALS REQUIRED. THE ELECTRICAL WORK SHALL BE PERFORMED IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRIC CODE AND LOCAL AUTHORITIES HAVING JURISDICTION. ALL COMPONENTS SHALL BE UL APPROVED AND LISTED.
8. WHERE CONFLICTS ARE FOUND BETWEEN DRAWINGS, SPECIFICATIONS, & LAWS & ORDINANCES, THE MOST STRINGENT SHALL APPLY.
9. CIRCUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH EQUIPMENT AND STRUCTURAL CONDITIONS. CONDUITS AND CABLES SHALL BE INSTALLED PARALLEL TO BEAMS AND WALLS.
10. THE QUANTITY AND SIZE OF WIRES AND CONDUIT SHOWN ON DRAWINGS AND WIRING DIAGRAMS REPRESENT A SUGGESTED ARRANGEMENT BASED UPON SELECTED STANDARD COMPONENTS OF ELECTRICAL EQUIPMENT. MODIFICATIONS ACCEPTABLE TO THE ENGINEER MAY BE MADE BY THE CONTRACTOR TO ACCOMMODATE EQUIPMENT ACTUALLY PURCHASED. THE BASIC SEQUENCE AND METHOD OF CONTROL MUST BE MAINTAINED AS INDICATED ON THE DRAWINGS.
11. CONFIRM EXACT POWER REQUIREMENTS AND CONNECTION LOCATIONS FOR ALL EQUIPMENT PRIOR TO INSTALLATION WITH PLUMBING,HVAC AND GENERAL CONTRACTOR.
12. COORDINATE THE CENTER–LINE OF ALL OUTLET BOXES, SPECIFIC LOCATION AND ROUGH WIRING PRIOR TO INSTALLING DEVICES FOR ALL FIRE ALARM DEVICES AND EQUIPMENT. REFER TO THE ARCHITECTS DRAWINGS AND MANUFACTURERS SPECIFICATIONS FOR SPECIFIC REQUIREMENTS. ALL DEVICE LOCATIONS ARE TO BE APPROVED BY THE OWNER / ARCHITECT IN–FIELD PRIOR TO ROUGH–IN.
13. WORK SHALL COORDINATE WITH THAT OF OTHER TRADES TO MINIMIZE CONFLICTS AND ELIMINATE INTERFERENCES.
14. EXACT LOCATION OF MECHANICAL, FIRE PROTECTION AND PLUMBING SYSTEM EQUIPMENT SHALL BE VERIFIED WITH THE APPROPRIATE CONTRACTOR PRIOR TO INSTALLING THE SYSTEMS.
15. ALL WORK SHALL BE DONE IN A NEAT AND WORKMANLIKE MANNER AND THE CONTRACTOR SHALL KEEP HIS PORTION OF THE WORK CLEAN AND ORDERLY.

NEW DEVICES ARE TO BE LOCATED ON NEW CONSTRUCTION OR EXISTING CONSTRUCTION THAT COULD EASILY ACCOMMODATE NEW CONCEALED WIRING WITH MINIMAL EFFORT. IN CERTAIN SITUATIONS IF IT'S ACCEPTABLE BY CODE AND MINIMIZES THE EFFORT, WIRING COULD BE FISHED IN EXISTING CONSTRUCTION USING METAL SHEATHED CABLE.

ALL NEW WIRING SHALL BE CONCEALED WHERE POSSIBLE. LONGER RUNS SHALL BE MADE, AS REQUIRED, TO MEET THIS REQUIREMENT.

WHERE EXISTING CONDITIONS PROHIBITS CONCEALED WIRING INSTALLATION SUCH AS A DEVICE LOCATED ON AN EXISTING CONCRETE, CMU, OR SOLD PLASTER WALL, DEVICES AND WIRING CAN BE EXPOSED SURFACE MOUNTED USING WIREMOLD RACEWAY AND BOXES. SURFACE RACEWAY IS TO BE MINIMUM NECESSARY TO GET TO A CONCEALED SITUATION –ALL EXPOSED INSTALLATIONS SHALL BE REVIEWED AND APPROVED BY THE ARCHITECT PRIOR TO INSTALLATION.

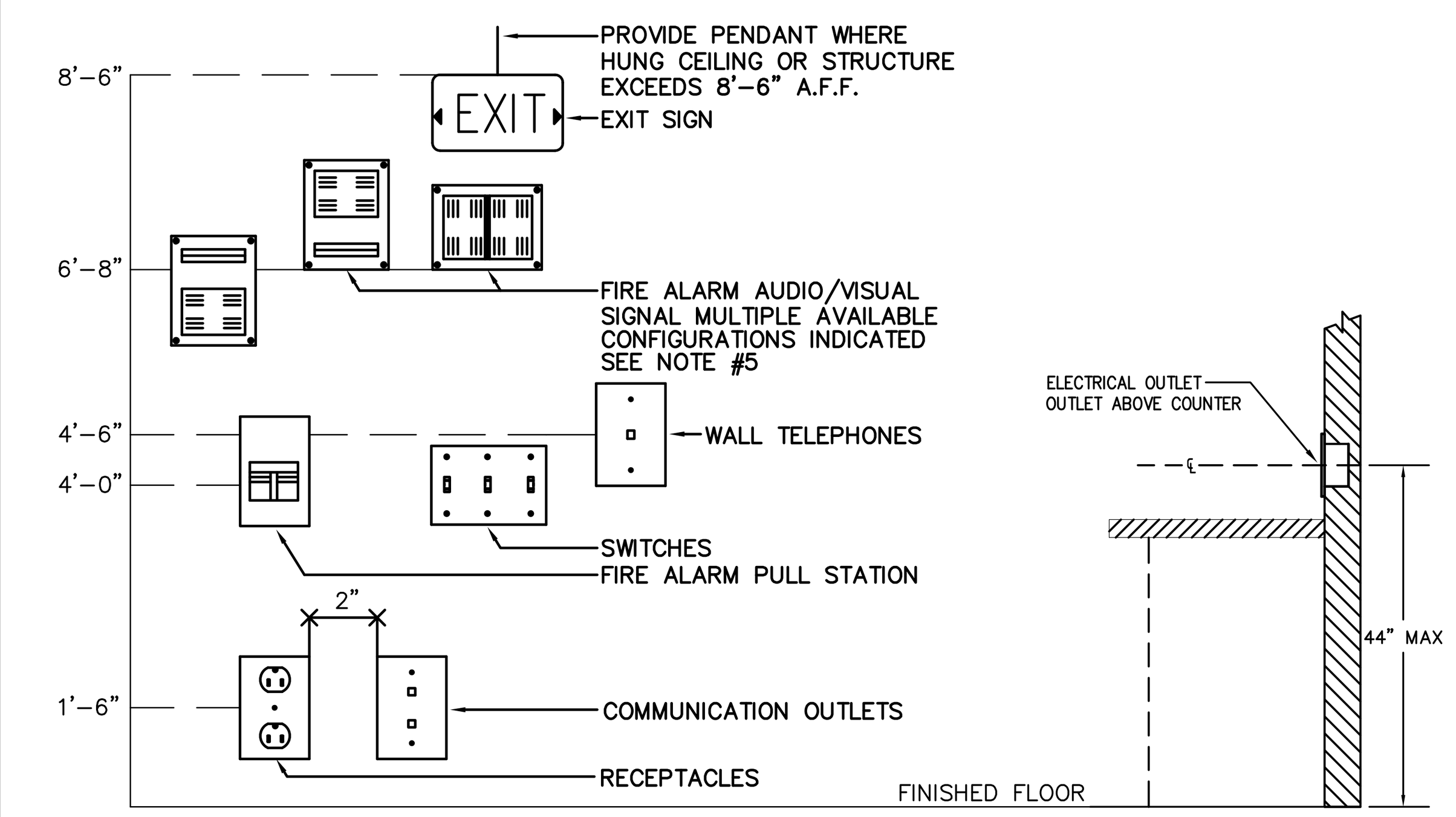
BRANCH CIRCUIT WIRING

1. ALL BRANCH CIRCUIT WIRING SHALL BE COPPER – TYPE AS LISTED IN THE SPECIFICATIONS UNLESS OTHERWISE NOTED.
2. FOR CLARITY, ALL BRANCH CIRCUIT WIRING IS NOT SHOWN, HOWEVER A COMPLETE BRANCH CIRCUIT WIRING SYSTEM IS TO BE INSTALLED IN ACCORD WITH THE DEVICES AND CIRCUIT NUMBERS SHOWN.
3. WIRING SHOWN ON DRAWINGS IS FOR SPECIFIC ROUTES OR SPECIAL CONDITIONS
4. ALL BRANCH CIRCUITS SHALL HAVE DEDICATED NEUTRALS. NO SHARED NEUTRALS WILL BE ALLOWED. A GREEN GROUNDING CONDUCTOR SHALL BE RUN WITH ALL CIRCUITS..
5. TYPICAL CIRCUITING
   A b P1A,33 – "A" DENOTES FIXTURE TYPE,
   "P1A,33" DENOTES PANEL & CIRCUIT NUMBER,
   "b" DENOTES SWITCH CONTROL
   ALTERNATIVELY CIRCUITING MAY BE LOOPED

SEQUENCE OF OPERATION

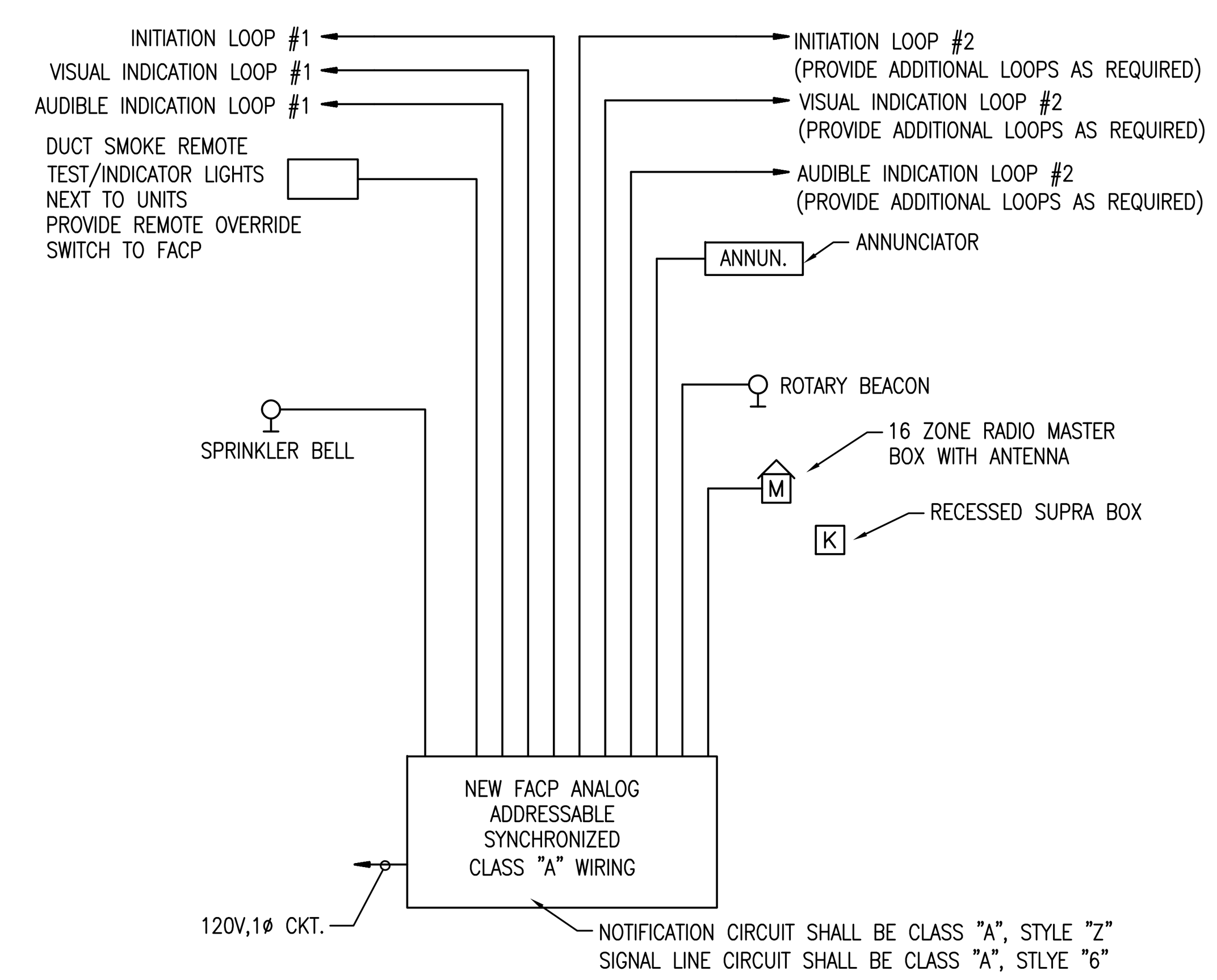
	ALARM	SUPERVISORY	TROUBLE	ACTIVATES NOTIFICATION SIGNAL	DISPLAY SIGNALS TO ANNUNCIATOR	TRANSMIT SIGNALS TO UL CENTRAL STATION	MASTER BOX TO TRANSMIT ALARM TO FIRE DEPTARTMENT	ACTIVATES INDIVIDUAL GUEST ROOM NOTIF-CATION SIGNAL
AC FAIL / BATTERY FAIL AT CONTROL PANEL			●		●	●		
GROUND FAULT			●		●	●		
HEAT DETECTOR	●			●	●	●	●	●
MANUAL PULL STATION	●			●	●	●	●	●
POWER SUPPLY OFF NORMAL			●		●	●		
SMOKE DETECTOR	●			●	●	●	●	●

MOUNTING HEIGHT DETAIL



NOTES

1.) ALL MOUNTING HEIGHTS SHALL BE MEASURED FROM FINISHED FLOOR TO CENTERLINE OF DEVICE EXCEPT EXIT SIGNS
2.) DEVICES SHALL BE INSTALLED ON A COMMON VERTICAL CENTERLINE WHEREVER POSSIBLE.
3.) ALL DEVICES SHALL BE INSTALLED AT MOUNTING HEIGHTS AS INDICATED ON THIS DETAIL UNLESS OTHERWISE NOTED.
4.) REFER TO THE ARCHITECTS ELEVATION DETAILS FOR EXACT HEIGHT AND LENGTH OF SURFACE RACEWAYS.
5.) THE ENTIRE LENS OF A FIRE ALARM A/V SIGNAL OR VISUAL–ONLY SIGNAL SHALL BE LOCATED ABOVE 6'–8" A.F.F. OR 6" BELOW CEILING WHICHEVER IS LOW.



NOTES:

1. PROVIDE ADDRESS MODULES FOR ALL FLOW & TAMPER SWITCHES.
2. SEE FLOOR PLANS FOR DETECTOR TYPES AND LOCATIONS AND QUANTITIES.
3. SEE SPRINKLER DRAWINGS FOR FLOW/TAMPER SWITCH LOCATIONS & QUANTITIES.
4. CARRY MINIMUM OF (1) FLOW AND (4) TAMPER SWITCH AT SPRINKLER SERVICE LOCATION AND (1) FLOW/TAMPER SWITCH PER FLOOR PER STAIR.
5. PROVIDE MONITOR MODULES FOR ALL DETECTORS LOCATED IN COLD AREAS.
6. PROVIDE ISOLATION MODULE MINIMUM ONE PER FLOOR.
7. PROVIDE TIER II SHOP DRAWINGS, BATTERY CALCULATIONS AND ONE LINE WIRING DIAGRAM.
8. PROVIDE BATTERY CALCULATIONS AND ONE LINE WIRING DIAGRAM.
9. PROVIDE TEST CERTIFICATE FROM UL LISTED ALARM COMPANY.

SEQUENCE OF OPERATIONS:

1. UPON ACTIVATION OF ANY FIRE DETECTOR, MANUAL PULL STATION OR DUCT FLOW SWITCH:
   a. FIRE ALARM PANEL WILL TRIP AND CALL FIRE DEPARTMENT.
   b ALL AUDIO DEVICES WILL INITIATE ALARM SIGNAL TO ALERT ALL OCCUPANTS FOR ALARM CONDITION IN THE BUILDING FOR FULL EVACUATION.
   c. ALL VISUAL DEVICES WILL ACTIVATE, THEY SHALL BE SYNCHRONIZED TYPE.

REFER TO SPECS FOR FULL SEQUENCE.

APPLICABLE CODE: ALL WORK SHALL COMPLY WITH CMR 780 8TH EDITION.
REFER TO THE FIRE PROTECTION SYSTEM NARRATIVES – THESE SHALL BE AN INTEGRAL PART OF THE CONTRACT DOCUMENTS AND ARE TO BE INCORPORATED INTO THE DESIGN.

FIRE ALARM SYSTEM RISER DIAGRAM — N.T.S.

FIRE ALARM LEGEND

SYMBOLS	DESCRIPTION
K	KNOX BOX
M	MASTER BOX
ANN	ADDRESSABLE INTELLIGENT FIRE ALARM REMOTE ANNUNCIATOR PANEL. LOCATE PER FIRE MARSHALL – LOCATIONS SHOWN ON PLAN FOR REFERENCE ONLY.
FACP	ADDRESSABLE INTELLIGENT FIRE ALARM SYSTEM CONTROL PANEL – WITH 2 LINE DIALER CONNECTED TO TELEPHONE BACKBOARD.
P	FIRE ALARM SYSTEM ADDRESSABLE PULL STATION – SEMI FLUSH MOUNTED; USE CONVENTIONAL DEVICE IN UNHEATED AREAS WITH MONITOR MODULE LOCATED IN HEATED AREA.
	ADDRESSABLE INTELLIGENT CEILING MOUNTED FIRE ALARM SYSTEM PHOTOELECTRIC TYPE SMOKE DETECTOR WITH BASE.
ER	SMOKE DETECTOR, ELEVATOR RECALL
"RRS"	FIRE DEPARTMENT APPROVED RADIO REPEATER SYSTEM.
DS	DUCT SMOKE DETECTOR
	SYSTEM HEAT DETECTOR, RATE OF RISE
DH	DOOR HOLD–OPEN STRIKE CONNECTION BY THE ELECTRICAL CONTRACTOR – PER MANUFACTURER'S RECOMMENDATIONS. DOOR STRIKE BY THE G.C. TIE TO INTERCOM AND FACP PANELS
CM	FIRE ALARM SYSTEM CONTROL MODULE – MOUNTED AT EQUIPMENT.
MM	FIRE ALARM SYSTEM MONITOR MODULE – MOUNTED AT EQUIPMENT.
CO	CARBON MONOXIDE DETECTOR – SYSTEM / LOCAL PER LOCATION. ALARMS ASSOCIATED WITH CO DETECTORS ARE TO HAVE A DISTINCT TONE, CONNECT NEW CO DETECTORS TO FACP TO INDICATE SUPERVISORY SIGNAL UPON DETECTION
B	EXTERIOR STROBE
110 S	FIRE ALARM SYSTEM STROBE SEMI FLUSH WALL MOUNTED. CANDELA RATING AS INDICATED.
110 H	FIRE ALARM SYSTEM STROBE/HORN DEVICE SEMI FLUSH WALL MOUNTED. CANDELA RATING AS INDICATED.
M	FIRE ALARM SYSTEM MINI–HORN DEVICE SEMI FLUSH WALL MOUNTED. PRE–WIRED FOR FUTURE AUDIO–VIDUAL DEVICE. LOW–FREQUENCY TYPE.
LS	SMOKE DETECTOR 115V AC WITH SOUNDER BASE WITH BATTERY BACKUP. DEVICES SHOWN ADJACENT TO A "CO" ARE TO BE COMBINATION SMOKE/CO TYPE.
FS	SPRINKLER SYSTEM FLOW SWITCH. FURNISHED BY FIRE ALARM SYSTEM SUPPLIER, INSTALLED BY FIRE PROTECTION (SPRINKLER) SYSTEM CONTRACTOR, AND CONNECTED TO FIRE ALARM SYSTEM CONTROL PANEL BY FIRE ALARM SYSTEM CONTRACTOR.
TS	TAMPER SWITCH – SAME NOTES APPLY AS THE FLOW SWITCH.

NOTES:

1. NEW FIRE ALARM SYSTEM NOTIFICATION DEVICES SHALL BE HORN/STROBES CONNECTED TO NEW FIRE ALARM CONTROL PANEL. NEW FIRE ALARM SYSTEM SHALL BE ADDRESSABLE AND NON–PROPRIETARY.
2. FOR THE EXTERIOR FIRE ALARM SYSTEM STROBE/BEACON AND KNOX BOX – VERIFY LOCATION WITH BOSTON FIRE DEPARTMENT.

ALLIED CONSULTING ENGINEERING SERVICES

Fire Protection Systems Narrative Report

This document addresses the specific fire alarm system aspects of the renovation of an existing building located at 123 Crawford Street, Boston, Massachusetts and generally addresses the site access conditions.

1. Basis of Design, Sequence of Operation and Testing Criteria

A) Basis of Design

1) Building description
   a) Existing building is 3-story, residential plus basement.
   b) Use Group R1
   c) Construction type - V

2) Applicable Laws, Regulations and Standards
   a) Boston Fire Department
   b) The Massachusetts General Laws (Chapter 148: Fire Prevention)
   c) The International Building Code 2015 with amendments in the Massachusetts State Building Code (9th Edition - 780 CMR Chapter 4 and 9)
      1) International Building Code
   d) Board of Fire Prevention and Regulation (527 CMR Chapter 24: Fire Warning Systems Installed in Buildings within the Commonwealth of Massachusetts)
   e) NFPA 72
   f) NFPA 13

3) Sprinkler system
   a) The existing building is currently fully sprinklered in accordance with the requirements of NFPA 13 meeting the requirements of 906.2.1
   b) The renovation includes relocating and installing new sprinkler heads to provide proper coverage for the new partition layout. Sprinkler spacing and positioning shall be applied in accordance with NFPA 13 (2013) and the sprinkler listings throughout the building.
   c) The fire service is protected by a UL listed double check assembly located in the basement and complies with the requirements of the MDC, the Boston Water and Sewer Commission and the Boston Fire department.
   d) The system is monitored by an alarm valve located in the. The flow switches and tamper switches are connected to the Fire Alarm Control Panel.
   e) See sprinkler system drawings for sprinkler types and locations.

4) Fire Protective Signaling System
   a) The design of the fire alarm system shall be based on engineering criteria as defined by the Massachusetts Building Code, CMR 780, and NFPA 72.
   b) The fire alarm system shall be completely new and fully addressable.
   c) The fire alarm system shall be powered by the building power supply and fully supported by a secondary battery supply capable of supporting 60 hours of full supervisory operation followed by 15 minutes of alarm.

   d) The building shall have a dedicated fire alarm control panel, audible/visual circuits, SLC loop, and output control functions.
   e) Fire alarm activity will annunciate at the FACP located in the ground floor lobby.
   f) The building shall be protected by a fire alarm system in all occupied areas.
      1) The audible/visible notification appliances shall have a sound level of at least 15 dBA above the average ambient sound level, or 5 dBA above the maximum sound level having a duration of at least 60 seconds. The horns shall be rated at not less than 85 dBA. All audible/visible notification appliances are to be mounted 80 inches above the finished floor.
      2) System type smoke detector will be located in the vicinity to the fire alarm control panel.
   g) All sprinkler flow and tamper switches shall be connected to the fire alarm control panel. The flow switch shall be equipped with a time-delay retarding device.
   h) Each initiating device shall have full analog detection capabilities and will identify its exact location.
      1) Apartments units will have 120V hardwired multi-station smoke alarms in each bedroom and outside the bedroom. Alarms outside bedroom doors shall also have CO detection.
      2) Mini-horns shall be tied to the fire alarm system and produce a 520Hz alarm with a square wave output per NFPA 72.
   i) A red light/beacons shall be mounted on the building exterior at the main entrance at FA Annunciator panel in ground floor lobby.
   j) The new fire alarm control panel (FACP) shall provide fire department notification by an approved central station via a digital dialer.

B) Sequence of Operation
   1) The operation of a manual station or activation of any automatic alarm initiating device (system smoke, system heat detector, water flow) shall initiate a system-wide response according to established response procedures and as follows:
      a) Initiate the transmission of the alarm directly to the Municipal Fire Station via a connection to an approved Central Monitoring Station.
      b) All audible alarm indicating appliances shall sound a synchronized three-pulse temporal pattern in accordance with NFPA 72 until silenced by an alarm silence switch at the control panel.
      c) Upon activation of the evacuation tone, all visual signals shall activate throughout the evacuation area. Visual notification shall be synchronized in accordance with applicable code requirements and NFPA 72 guidelines.
      d) Flash an alarm LED and sound an audible signal at the FACP and remote annunciators. Upon Acknowledgment, the alarm LED shall light steadily and the audible shall silence. Subsequent alarms shall re-initiate this sequence.
      e) Visually indicate the alarm initiating device type and location via the LCD display at the FACP.
      f) All system events shall be stored in an event history file, print out on optional system event printer.
      g) Activate the exterior weatherproof beacon.
   2) The operation of any tamper switch or activation of other device designated to initiate a system Supervisory condition shall cause the following to occur:
      a) Flash a Supervisory LED and sound an audible tone at the FACP. Upon Acknowledgment, the LED shall light steadily and the audible shall silence. Subsequent Supervisory conditions shall re-initiate this sequence.
      b) Initiate the transmission of the alarm directly to the Municipal Fire Station via a connection to an approved Central Monitoring Station.

      c) Visually indicate the device type and location via the LCD display located at the FACP and remote annunciators.
      d) Visually annunciate the type of initiating device and its zone, floor or area as required on the remote annunciators. In addition, a Supervisory LED and an audible tone will sound. Upon Acknowledgment, the LED shall light steadily and the audible shall silence. Subsequent Supervisory conditions shall re-initiate this sequence.
      e) Record the event in the event history log and print a record of the event on the optional system printer.
   3) In the event of any System Trouble condition such as a device removed, loss of AC Power or wiring fault, a system Trouble condition shall occur as follows:
      a) Flash a Trouble LED and sound an audible tone at the FACP. Upon Acknowledgment, the LED shall light steadily and the audible shall silence. Subsequent Trouble conditions shall re-initiate this sequence.
      b) Initiate reporting of the event to the fire department by an approved central station via a digital dialer.
      c) Visually indicate the device type and location via the LCD display located at the FACP.
      d) Visually annunciate the type of initiating device and its zone, floor or area as required on the FACP and remote annunciators. In addition, a Trouble LED and an audible tone will sound. Upon Acknowledgment, the LED shall light steadily and the audible shall silence. Subsequent Trouble conditions shall re-initiate this sequence.
      e) Record the event in the event history log and print a record of the event on the system printer where applicable. All restorations shall likewise be recorded.
   4) Non ADA tenant spaces are protected by 120V interconnected smoke alarms with 9V battery back-up. When an alarm senses products of combustion, the following shall occur:
      a) All smoke alarms within the unit shall sound a synchronized three-pulse temporal pattern in accordance with NFPA 72.
      b) The LED at the unit shall flash rapidly.
      c) LED shall flash and the alarms shall sound until the air is cleared.

C) Testing Criteria
   1) General
      a) The contractor shall be responsible for the coordination of all required acceptance testing and shall schedule a meeting with the fire inspector for review and verification at least five days in advance of the test acceptance date.
      b) All fire protection systems applicable to the building shall be pre-tested for proper operation.
      c) The fire protection systems shall be tested as a system with all equipment ready for operation.
      d) The following personnel shall be on site on the day of the test with one set of the individual as-built drawings of the specific fire protection systems:
         (i) General contractor
         (ii) Fire protection engineer or P.E.
         (iii) Sprinkler contractor
         (iv) Fire alarm contractor
      e) The Fire Department shall direct and witness all testing.
      f) The following tests shall be performed with all equipment and devices to be tested:
         (i) Sprinkler flow, inspector's test valve
         (ii) Tamper switches
         (iii) Main drain

         (iv) Fire alarm system including: each device, wiring supervision, wiring connection. Proper mounting of equipment, notification appliance, related control features, central station connection shall be checked.
         (v) Verification of fire stopping
         (vi) Fire extinguisher placement
         (vii) Verification of equipment function signs, charts, tags
         (viii) Verification of lock box, with keys to all building access doors and equipment rooms.
   2) Fire Protective Signaling System
      a) All fire protection systems shall be tested with all equipment ready for operation. The following tests shall be performed with all equipment and devices to be tested:
         (i) Control Equipment
         (ii) Batteries
         (iii) Control Panel Trouble Signals
         (iv) Conductors
         (v) Initiating Devices
         (vi) Alarm Notification Devices

2. Building and Site Access
   A) The primary emergency vehicle access point is along Crawford Street.
   B) There are additional entrances on the west and east sides.
   C) See the site and architectural plans for details

3. Fire Hydrants
   A) See Site Drawings

4. Type, description and design layout of the fire protective signaling system
   A) All supervisory and trouble signals are to be relayed to the FACP.

5. Fire protection system equipment room location
   A) The fire alarm control panel (FACP) is located in the ground floor level.

6. Type, description and design layout of the fire protective signaling system
   A) Fully addressable fire alarm system with digital dialer. See fire alarm drawings.
   B) All supervisory and trouble signals are to be relayed to the fire department by an approved central station via a digital dialer.

7. Fire protective signaling system control equipment
   A) Addressable fire alarm control panel.

8. Fire protection system alarm/supervisory signal transmission method and location.
   A) The system shall be a true 100% Class "A" independently supervised signaling line circuit. There shall be independently supervised and independently protected indicating appliance circuits for alarm horns and flashing alarm lamps. Disarrangement conditions of any circuit shall not affect the operation of other circuits. The system shall be installed in accordance with the requirements of NFPA 72 and the Massachusetts State Building Code, 780 CMR. The system shall have provision for central station service that monitors all trouble, supervisory and alarm signals.

9. Type and location of any carbon monoxide protection
   A) Each resident unit shall have 120V carbon monoxide detectors within 10 feet of bedroom doors.

END OF NARRATIVE

SRO Housing
123 Crawford Street
ROXBURY, MA

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Roxbury, MA 02120

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COMMONWEALTH OF MASSACHUSETTS — Amish D. Patel No. 48856 — ELECTRICAL — PROFESSIONAL ENGINEER

DATE: 10/18/2019 PERMIT

SCALE: 1/4" = 1'–0"

DRAWN BY: AP

CHECKED BY: AP

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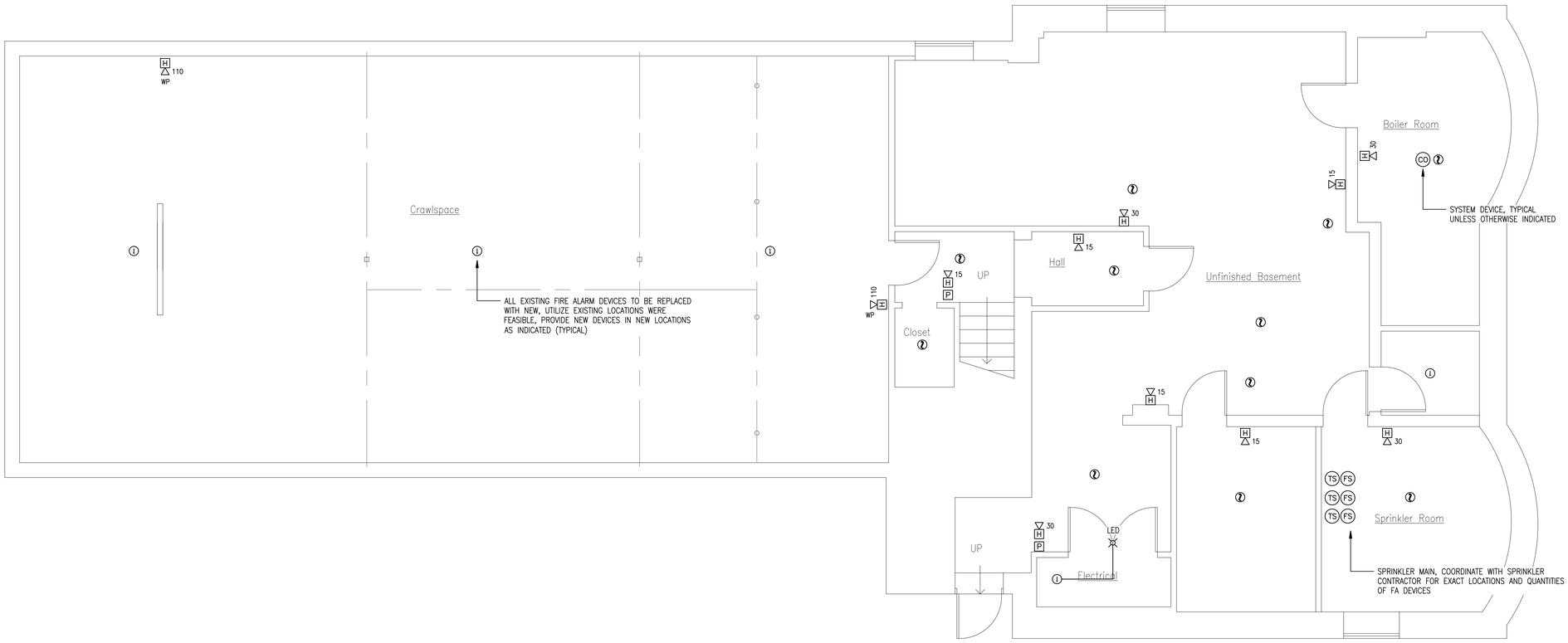
SHEET NUMBER: FA0



1 FA BASEMENT PLAN
1/4" = 1'-0"

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COMMONWEALTH OF MASSACHUSETTS
Amish D. Patel
No. 48856
REGISTERED PROFESSIONAL ELECTRICAL ENGINEER

DATE:
10/18/2019 PERMIT

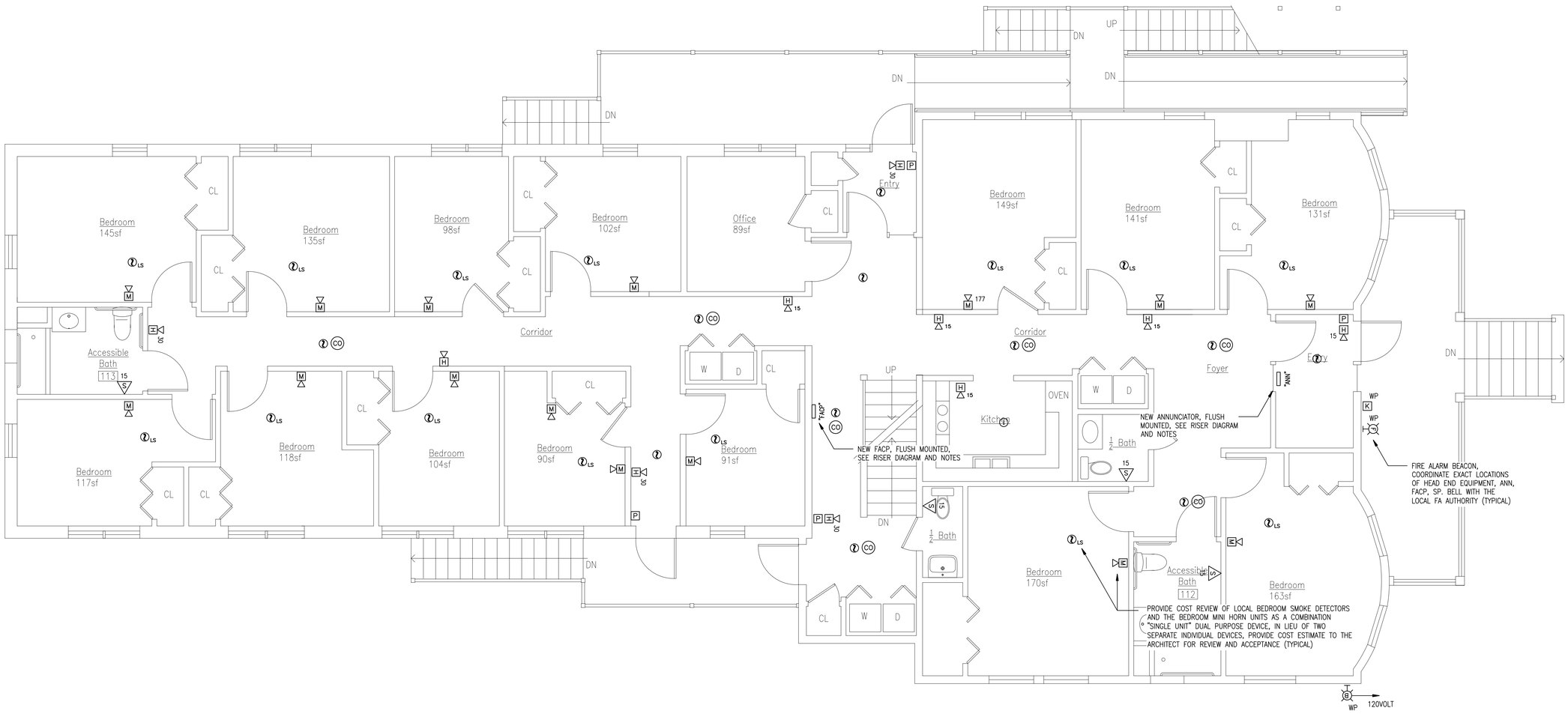
SCALE:
1/4" = 1'-0"

DRAWN BY:
AP

CHECKED BY:
AP

SHEET TITLE:
FIRE ALARM SYSTEM
BASEMENT PLAN

SHEET NUMBER:
FA1



1 FA FIRST FLOOR PLAN
1/4" = 1'-0"

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Commonwealth of Massachusetts — Amish D. Patel No. 48856 — Professional Engineer — Electrical

DATE: 10/18/2019 PERMIT

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

DRAWN BY: AP

CHECKED BY: AP

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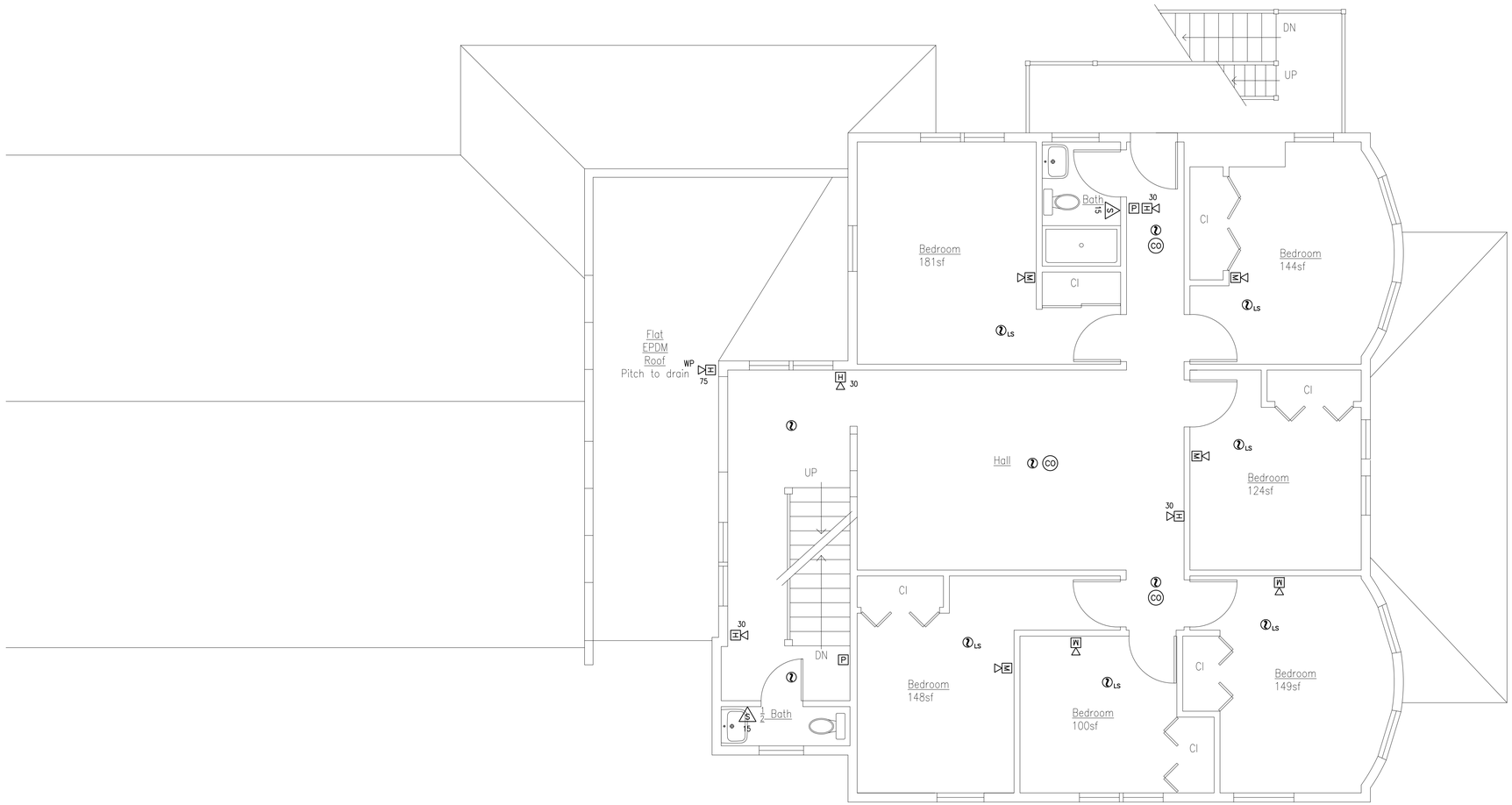
SHEET NUMBER: FA2



1 FA SECOND FLOOR PLAN
1/4" = 1'-0"

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Electrical

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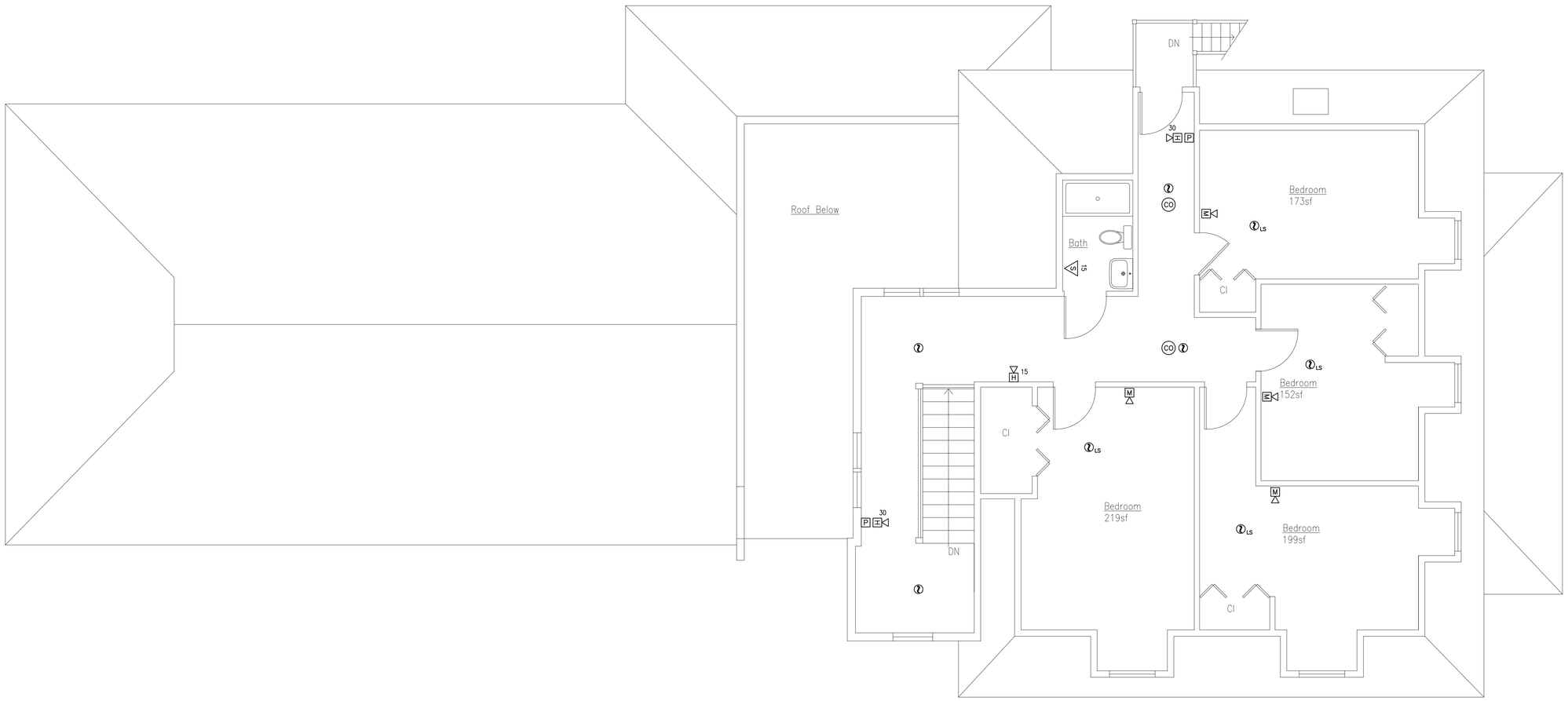
SCALE:
1/4" = 1'-0"

DRAWN BY:
AP

CHECKED BY:
AP

SHEET TITLE:
FIRE ALARM SYSTEM
SECOND FLOOR PLAN

SHEET NUMBER:
FA3



1 FA ATTIC FLOOR PLAN
1/4" = 1'-0"

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

DRAWN BY:
AP

CHECKED BY:
AP

SHEET TITLE:
FIRE ALARM SYSTEM
ATTIC FLOOR PLAN

SHEET NUMBER:
FA4