Harnett County Schools

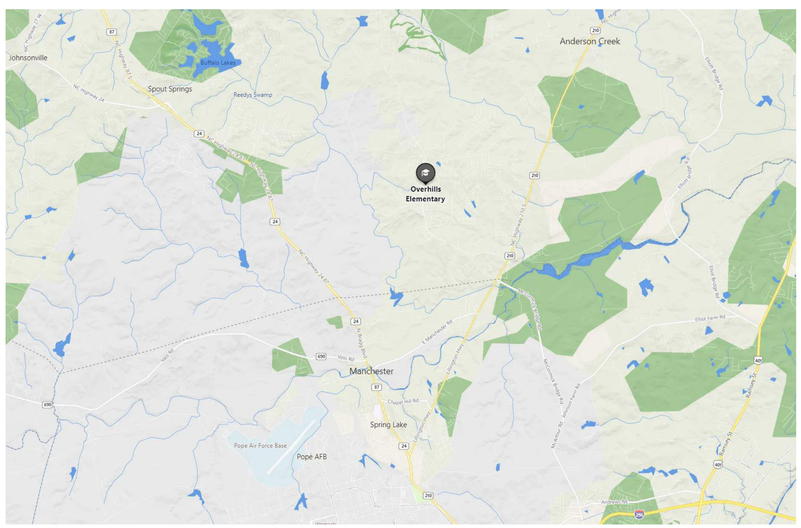
OVERHILLS ELEM. CLASSROOM ADDITION

VOLUME 2

2626 Ray Road - Spring Lake, NC 28390

RENDERING

VICINITY MAP



DRAWING INDEX

VOLUME 2A

SHEET	TITLE
GENERAL	
G000	COVER SHEET
G001	GENERAL NOTES, ABBREVIATIONS & LEGENDS
G002	BUILDING CODE SUMMARY
G003	UL ASSEMBLIES
G111	LIFE SAFETY / OCCUPANCY TABULATION PLANS
CIVIL	
C-100	GENERAL NOTES AND LEGEND
C-101	EXISTING SURVEY CONDITIONS AND DEMOLITION PLAN
C-201	SITE LAYOUT PLAN
C-301	GRADING, DRAINAGE, AND EROSION CONTROL PLAN
C-401	UTILITY PLAN
D-101	SITE AND DRAINAGE DETAILS
D-201	EROSION CONTROL DETAILS
D-301	NCG01 DETAILS
D-401	UTILITY DETAILS
D-501	WATERLINE DETAILS
STRUCTURAL	
S001	GENERAL NOTES
S010	ROOF LOADING DIAGRAMS
S020	ROOF ATTACHMENT DIAGRAM
S100	FOUNDATION PLAN
S101	SLAB PLAN
S102	MECHANICAL PLATFORM FRAMING PLAN
S103	ROOF FRAMING PLAN
S200	FOUNDATION SECTIONS
S300	TYPICAL CMU FRAMING SECTIONS
S400	TYPICAL FRAMING SECTIONS
S401	ROOF FRAMING DETAILS
ARCHITECTURAL	
A001	SITE STAGING PLAN
A100	FLOOR PLANS
A101	3D VIEWS
* A121	REFLECTED CEILING PLAN
A131	ROOF PLAN
* A201	EXTERIOR ELEVATIONS
A301	BUILDING SECTIONS
A311	EXTERIOR WALL SECTIONS
A401	INTERIOR PLANS/ELEVS MILLWORK & BATHROOM
A501	DETAILS-TYPICAL
A502	DETAILS-DOOR & WINDOW
A503	DETAILS-WALL, CEILING & ROOF
A504	DETAILS-ROOF
A505	TYP. METAL ROOF PANEL DETAILS
A601	DOOR SCHEDULE / SF ELEVATIONS
* A701	FINISH PLAN + SCHEDULE
A702	FINISH DETAILS

Grand total: 43

* DENOTES PAGES THAT SHOULD BE PRINTED IN COLOR

VOLUME 2B

SHEET	TITLE
FIRE PROTECTION	
FP1-001	FIRE PROTECTION LEGEND, DESIGN DATA AND SPECIFICATIONS
FP1-101	OVERALL FIRE PROTECTION PLAN-NEW WORK
PLUMBING	
P1-001	PLUMBING LEGEND, DESIGN DATA, AND SPECIFICATIONS
P1-002	PLUMBING SCHEDULES
P1-101	CLASSROOM ADDITION PLUMBING UNDERSLAB WASTE PLAN
P1-102	CLASSROOM ADDITION PLUMBING ABOVE GROUD WASTE & VENT PLAN
P1-103	CLASSROOM ADDITION LOFT WASTE AND VENT PLAN
P1-201	CLASSROOM ADDITION PLUMBING WATER SUPPLY PLAN
P1-401	PLUMBING RISER-WASTE & VENT
P1-402	PLUMBING RISER-WATER SUPPLY
P1-501	PLUMBING DETAILS
MECHANICAL	
M1-001	MECHANICAL LEGEND AND NOTES
M1-002	MECHANICAL SCHEDULES
M1-003	MECHANICAL CONTROL SEQUENCE OF OPERATION
M1-102	CLASSROOM ADDITION MECHANICAL PLAN - NEW WORK
M1-103	MECHANICAL LOFT MECHANICAL PLAN
M1-104	MECHANICAL LOFT MECHANICAL PIPING PLAN
M1-501	MECHANICAL DETAILS
ELECTRICAL	
E1-001	ELECTRICAL LEGEND AND NOTES
E1-002	ELECTRICAL NOTES
E1-012	OVERALL FIRST FLOOR POWER PLAN - NEW WORK
E1-111	CLASSROOM ADDITION POWER PLANS
E1-112	MECHANICAL LOFT POWER PLAN
E1-211	CLASSROOM ADDITION LIGHTING PLAN - NEW WORK
E1-212	MECHANICAL LOFT LIGHTING PLAN
E1-311	CLASSROOM ADDITION SPECIAL SYSTEMS PLAN - NEW WORK
E1-312	MECHANICAL LOFT SPECIAL SYSTEMS PLAN
E1-411	ENLARGED ELECTRICAL PLANS
E1-501	ELECTRICAL DETAILS
E1-502	ELECTRICAL DETAILS
E1-503	ELECTRICAL DETAILS
E1-601	ELECTRICAL PANEL SCHEDULES
E1-602	ELECTRICAL SCHEDULES
E1-701	ELECTRICAL DIAGRAMS
FIRE ALARM	
FA1-001	FIRE ALARM LEGEND AND NOTES
FA1-101	OVERALL FIRE ALARM PLAN - NEW WORK
FA1-111	CLASSROOM ADDITION FIRE ALARM PLAN - NEW WORK
FA1-112	MECHANICAL LOFT FIRE ALARM PLAN

Grand total: 38

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SET NUMBER:

08/15/22

BID SET

Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
VOLUME 2
2626 Ray Road - Spring Lake, NC 28390

PROJECT NUMBER: 02110.200

FIRE PROTECTION DESIGN CRITERIA

SYMBOL	OCCUPANCY	TYPE	DESIGN DENSITY (GPM/SF)	HYDRAULIC REMOTE AREA (SF)	MAX. COVERAGE PER SPRINKLER HEAD (SF)	HOSE STREAM INSIDE GPM	HOSE STREAM OUTSIDE GPM	AREAS OF COVERAGE
LH	LIGHT HAZARD	WET	0.10	1500	225	100	-	ENTIRE FACILITY, EXCEPT AS NOTED OTHERWISE
OH-1	ORDINARY HAZARD GROUP I	WET	0.15	1500	130	100	150	MECHANICAL ROOMS, STORAGE ROOMS, ELECTRICAL ROOMS, JANITORS CLOSETS, ETC.

APPLICABLE PUBLICATIONS: THE FOLLOWING PUBLICATIONS SHALL BE USED AS A REFERENCE FOR THE DESIGN OF THE FIRE PROTECTION SYSTEM ON THIS PROJECT:

1. NORTH CAROLINA STATE BUILDING CODE: FIRE PREVENTION CODE - 2018 EDITION
2. NFPA 13 - STANDARD FOR THE INSTALLATION OF SPRINKLER SYSTEMS - 2013 EDITION
3. NFPA 14 - STANDARD FOR THE INSTALLATION OF STANDPIPE AND HOSE SYSTEMS - 2013 EDITION
4. NFPA 20 - STANDARD FOR THE INSTALLATION OF CENTRIFUGAL FIRE PUMPS - 2013 EDITION
5. NFPA 24 - STANDARD FOR THE INSTALLATION OF PRIVATE FIRE SERVICE MAINS AND THEIR APPURTENANCES - 2013 EDITION

NOTES:
1. DURING DESIGN CALCULATIONS, AN ALLOWANCE SHALL BE MADE FOR A 250 GPM HOSE STREAM.

FLOW TEST DATA

DATE / TIME	LOCATION	PRESSURE STATIC (PSI)	PRESSURE RESIDUAL (PSI)	FLOW (GPM)	FLOW AT 20 PSI (GPM)
-- -- 2021	---	20	80	600	600

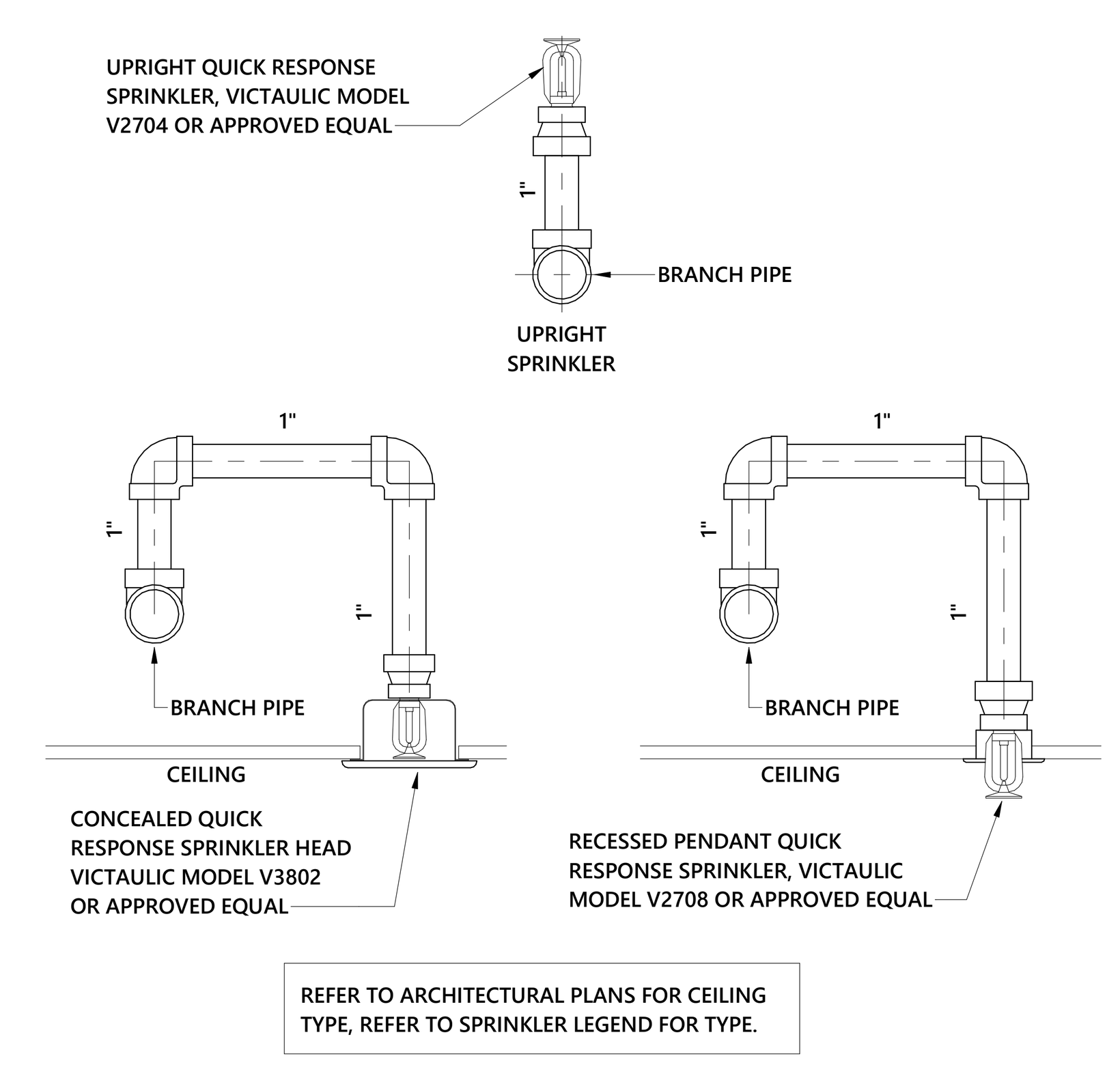
FLOW TEST PERFORMED BY: ---

SPRINKLER SCHEDULE

1. PROVIDE ADJUSTABLE CONCEALED QUICK RESPONSE PENDENT SPRINKLERS ALL LAY-IN ACOUSTICAL TILE AND GYPBOARD CEILINGS. COORDINATE COLOR OF CONCEALED SPRINKLER HEAD COVER-PLATE WITH ARCHITECT.
2. LOCATE SPRINKLERS TO AVOID OBSTRUCTIONS BY CEILING MOUNTED DEVICES. WHERE CEILING DEVICES OBSTRUCT SPRINKLER DISCHARGE, ADD ADDITIONAL SPRINKLERS SPACED AROUND THE OBSTRUCTION.
3. PROVIDE BRASS UPRIGHT QUICK RESPONSE SPRINKLERS IN EXPOSED AREAS WITH NO FINISH CEILING.
4. PROVIDE BRASS QUICK RESPONSE PENDENT SPRINKLERS WITH SHIELDS IN MECHANICAL ROOMS, ELECTRIC ROOMS, GYMNASIUMS, STORAGE ROOMS AND OTHER AREAS WHERE EXPOSED SPRINKLERS ARE SUBJECT TO DAMAGE.
5. PROVIDE RECESSED DRY STEM PENDENT SPRINKLER WITH WHITE PLATE IN AREAS SUBJECT TO FREEZING.
6. PROVIDE RECESSED SIDEWALL SPRINKLERS AS REQUIRED OR AS INDICATED.
7. PROVIDE INTERMEDIATE TEMPERATURE SPRINKLERS (175° F - 225°F ACTIVATION TEMPERATURE) IN ELEC. ROOMS, BOILER ROOMS, DATA CLOSETS AND WHEN SPRINKLER IS LOCATED WITHIN 18" OF HVAC DIFFUSER.
8. PROVIDE HIGH TEMPERATURE SPRINKLERS (250° F - 300°F ACTIVATION TEMPERATURE) IN KILN ROOMS OR OTHER AREAS SUBJECT TO HIGH TEMPERATURES.

SEISMIC NOTES

1. PROVIDE DESIGN AND INSTALLATION OF SEISMIC RESTRAINT ELEMENTS FOR THE FIRE PROTECTION SYSTEMS IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF THE 2018 NORTH CAROLINA BUILDING CODE AND ASCE 7-10, CHAPTER 13. REFER TO THE APPENDIX B ON THE ARCHITECTURAL DRAWINGS FOR THE SITE'S SEISMIC DESIGN CATEGORY.
2. PROVIDE CALCULATIONS AND PREPARE SHOP DRAWINGS FOR THE SPECIFIC METHODS OF SEISMIC RESTRAINT TO BE USED IN ACCORDANCE WITH ASCE 7-10. REQUIRED RESTRAINT DEVICES, MATERIALS, AND SUPPLEMENTARY FRAMING SHALL BE AN INTEGRAL PART OF THE DESIGN AND INCLUDED IN THE SHOP DRAWINGS. PROVIDE ISOLATORS, SEISMIC MOUNTS, RESTRAINTS, ETC. AS NECESSARY TO COMPLY WITH ALL APPLICABLE REQUIREMENTS.
3. CALCULATIONS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA WITH A MINIMUM 5 YEARS OF EXPERIENCE IN THE DESIGN AND SPECIFICATION OF SEISMIC RESTRAINT SYSTEMS.
4. SUBMIT CALCULATIONS AND SHOP DRAWINGS TO THE ARCHITECT, ENGINEER, AND LOCAL AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL.
5. COPIES OF THE APPROVED RESTRAINT SYSTEM(S) INSTALLATION MANUAL SHALL BE ON THE JOBSITE PRIOR TO INSTALLATION.
6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REQUIRED SPECIAL INSPECTIONS AND ASSOCIATED DOCUMENTATION. THE CONTRACTOR SHALL PROVIDE VERIFICATION IN WRITING OF COMPLIANCE WITH THE APPROVED SHOP DRAWINGS.
7. REVIEW AND APPROVAL OF THE SHOP DRAWINGS AND CALCULATIONS BY THE ARCHITECT/ENGINEER/ SHALL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO COMPLY WITH SEISMIC OR OTHER REQUIREMENTS OF THE 2018 NORTH CAROLINA BUILDING CODE AND ASCE 7-10.



1 TYPICAL RETURN BEND SCHEMATIC
NOT TO SCALE

FIRE PROTECTION GENERAL NOTES

1. THE INTENT OF THESE PLANS IS TO PROVIDE INFORMATION TO THE REVIEWING AUTHORITIES THAT THE BUILDING WILL BE PROTECTED BY A SPRINKLER SYSTEM.
2. ANY SPRINKLER HEAD LAYOUT INCLUDED WITH THIS SET OF PLANS IS PROVIDED FOR COORDINATION AND AS A REFERENCE ONLY, AND SHALL NOT BE CONSIDERED AN ACTUAL DESIGN OR CONSTRUCTION DOCUMENT.
3. GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT APPLY TO THE FIRE PROTECTION SCOPE OF WORK. THE FIRE PROTECTION DRAWINGS AND SPECIFICATIONS SHALL NOT BE INTERPRETED AS WAIVING OR OVERRULING ANY REQUIREMENTS EXPRESSED IN GENERAL CONDITIONS.
4. SCOPE: PROVIDE DESIGN, FABRICATION AND INSTALLATION OF A HYDRAULICALLY CALCULATED AUTOMATIC SPRINKLER SYSTEM INCLUDING ALL SERVICES, MATERIALS, LABOR AND EQUIPMENT REQUIRED FOR A COMPLETE WORKING SPRINKLER SYSTEM IN FULL COMPLIANCE WITH THE REQUIREMENTS OF THE 2013 EDITION OF NFPA 13, THE OWNER'S INSURANCE UNDERWRITER, THE 2018 NORTH CAROLINA STATE FIRE CODE AND THE LOCAL AUTHORITY HAVING JURISDICTION.
5. PERMITS: APPLY AND PAY FOR ALL NECESSARY PERMITS, FEES AND INSPECTIONS REQUIRED BY ANY PUBLIC AUTHORITY HAVING JURISDICTION. ACREAGE CHARGES, FACILITIES CHARGES AND BOND PROPERTY ASSESSMENTS ARE NOT TO BE CONSTRUED TO BE A PART OF THIS CONTRACT.
6. WARRANTY: PROVIDE A ONE YEAR WARRANTY, FROM THE DATE OF ACCEPTANCE OF WORK BY THE OWNER, FOR ALL SPRINKLER SYSTEM MATERIALS AND EQUIPMENT.
7. COORDINATE ALL SPRINKLER PIPING LOCATIONS, SPRINKLER LOCATIONS AND EQUIPMENT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES. FINAL PIPING AND EQUIPMENT LOCATIONS SHALL BE A CODE COMPLIANT INSTALLATION FOR ALL TRADES.
8. FIELD VERIFY PROPER OPERATION OF EXISTING SYSTEMS BEFORE STARTING CONSTRUCTION. NOTIFY THE ARCHITECT / ENGINEER OF RECORD OF ANY PROBLEMS OR DISCREPANCIES BETWEEN THE CONSTRUCTION DOCUMENTS AND EXISTING CONDITIONS AND/OR ANY POTENTIAL PROBLEMS OBSERVED BEFORE CONTINUING WORK IN THE EFFECTED AREAS.
9. DO NOT SCALE THE DRAWINGS, REFERENCE THE ARCHITECTURAL PLANS FOR DIMENSIONAL INFORMATION.
10. WHERE DISCREPANCIES ARE FOUND IN THE DRAWINGS AND SPECIFICATIONS THE MORE STRINGENT SHALL APPLY. CONTACT ENGINEER FOR CLARIFICATION.
11. OBTAIN A NEW FLOW TEST, LESS THAN 1 YEAR OLD, PRIOR TO STARTING THE DESIGN OF THE SPRINKLER SYSTEM. THE FLOW TEST CRITERIA SHALL INCLUDE THE STATIC PRESSURE, RESIDUAL PRESSURE, FLOW IN GPM, HORIZONTAL AND VERTICAL DISTANCE OF TEST FROM BASE OF FIRE RISER, THE NAME OF THE PERSON AND COMPANY WHOM PERFORMED THE FLOW TEST, THE TESTING COMPANY'S PHONE NUMBER, AND THE DATE AND TIME THE TEST WAS PERFORMED.
12. A SAFETY FACTOR SHALL BE INCLUDED IN THE HYDRAULIC CALCULATIONS BY REDUCING THE HYDRANT TEST STATIC PRESSURE BY 10 PSI, THE HYDRANT TEST RESIDUAL PRESSURE BY 10 PSI, AND THE HYDRANT FLOW BY 10%.
13. DESIGN AND HYDRAULICALLY CALCULATE THE SPRINKLER SYSTEM UTILIZING THE CURRENT FLOW TEST DATA. MEET ALL NFPA 13 REQUIREMENTS WHETHER OR NOT SPECIFICALLY INDICATED WITHIN THESE DOCUMENTS. TERMINATE THE HYDRAULIC CALCULATIONS AT THE CITY CONNECTION MINIMUM. INDICATE ON DRAWINGS ALL UNDERGROUND PIPE AND FITTINGS BOTH NEW AND EXISTING.
14. THE CONTRACTOR SHALL HAVE A DESIGNER ON STAFF WITH A CURRENT N.I.C.E.T. LEVEL III CERTIFICATION OR HIGHER TO PREPARE THE WORKING PLANS AND HYDRAULIC CALCULATIONS IN ACCORDANCE WITH NFPA 13 CHAPTER 23 "PLANS AND CALCULATIONS". THE N.I.C.E.T. DESIGNERS NAME, SIGNATURE AND CERTIFICATE NUMBER SHALL APPEAR ON THE WORKING DRAWINGS AND HYDRAULIC CALCULATIONS.
15. PROVIDE DESIGN AND INSTALLATION OF SEISMIC RESTRAINT ELEMENTS FOR THE FIRE PROTECTION SYSTEM(S) IN COMPLIANCE WITH THE 2013 EDITION OF NFPA 13. REFER TO THE APPENDIX B ON THE ARCHITECTURAL DRAWINGS FOR THE SITE'S SEISMIC DESIGN CATEGORY.
16. SUBMIT WORKING PLANS, HYDRAULIC CALCULATIONS AND MATERIALS DATA AND ACCESSORIES IN ELECTRONIC FORMAT (PDF) TO THE ARCHITECT / ENGINEER FOR REVIEW AND OBTAIN APPROVAL BEFORE STARTING THE INSTALLATION OF THE SPRINKLER SYSTEM.
17. THE CONTRACTOR SHALL SUBMIT WORKING PLANS AND HYDRAULIC CALCULATIONS EXPEDIENTLY TO THE AUTHORITIES HAVING JURISDICTION. APPROVAL FROM ALL AUTHORITIES HAVING JURISDICTION SHALL BE OBTAINED BEFORE STARTING THE INSTALLATION OF THE SPRINKLER SYSTEM.
18. AT THE COMPLETION OF THE PROJECT, PROVIDE TWO SETS OF RECORD DRAWINGS TO THE OWNER, CLEARLY SHOWING ANY CHANGES AND/OR MODIFICATIONS, ADDITIONS OR DELETIONS TO AND FROM THE CONSTRUCTION DOCUMENTS. THESE SETS SHALL BE REVIEWED BY THE ARCHITECT / ENGINEER BEFORE BEING TURNING OVER TO THE OWNER.

INSTALLATION REQUIREMENTS:

1. PROVIDE ALL NECESSARY OFFSETS, RISES OR DROPS IN THE PIPING AND AUXILIARY DRAINS AS REQUIRED BY ALL APPLICABLE CODES WHETHER OR NOT SHOWN ON THE PLANS.
2. CONNECT ALL SPRINKLER ALARM, TAMPER AND DETECTION SYSTEMS TO THE BUILDINGS CENTRAL FIRE ALARM SYSTEM, COORDINATE LOCATIONS AND REQUIREMENTS WITH THE ELECTRICAL CONTRACTOR.
3. BOTTOM TAKE-OFFS OF SPRINKLER BRANCHES ARE NOT ALLOWED.
4. PIPE PENETRATIONS THRU WALLS, PARTITIONS AND FLOORS SHALL BE SLEEVED. CORE DRILLING THRU WALLS AND PARTITIONS IS PERMITTED IF PERFORMED IN A NEAT CRAFTSMAN LIKE MANNER. PIPES PENETRATING THRU EXTERIOR WALLS SHALL BE SEALED WATER TIGHT. INSTALL ESCUTCHEONS IN ALL EXPOSED AREAS.
5. CONCEAL PIPING ABOVE CEILINGS OR TIGHT TO UNDERSIDE OF STRUCTURE IN EXPOSED AREAS.
6. PAINT ALL EXPOSED FIRE PROTECTION SYSTEM PIPING (IN CLOSETS, STAIRWELLS, MECHANICAL ROOMS, ETC.). COLOR TO BE SELECTED BY THE ARCHITECT.
7. SPRINKLER LOCATIONS ARE TO BE IN THE CENTER OF THE CEILING TILE USING THE REFLECTED CEILING PLANS AND AS COORDINATED WITH THE CEILING CONTRACTOR.
8. WARRANT THE SYSTEM LABOR, MATERIALS AND EQUIPMENT FOR A MINIMUM OF ONE YEAR AFTER COMPLETION AND ACCEPTANCE. PRIOR TO TURNING THE COMPLETED SYSTEM OVER TO THE OWNER, REVIEW THE INSTALLATION WITH THE ARCHITECT / ENGINEER AND REPLACE OR REPAIR ANY DEFECTIVE WORKMANSHIP, EQUIPMENT AND MATERIALS AT NO ADDITIONAL COST TO THE OWNER.

TESTING AND FLUSHING:

1. OVERHEAD SPRINKLER PIPING: TESTED FOR A PERIOD OF TWO HOURS AT A HYDROSTATIC PRESSURE OF 200 LBS. AND ALL PIPING, VALVES, HEADS,ETC. SHALL BE WATERTIGHT.
2. UNDERGROUND PIPING: TESTED FOR A PERIOD OF TWO HOURS AT A HYDROSTATIC PRESSURE OF 200 LBS. IN ACCORDANCE WITH NFPA PAMPHLET #13. LEAKAGE SHALL NOT EXCEED QUANTITIES INDICATED.

FIRE PROTECTION LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
F	F	FIRE PROTECTION SUPPLY PIPING
FDC	FDC	FIRE DEPARTMENT CONNECTION PIPING
WP	WP	WET PIPE SPRINKLER
DP	DP	DRY PIPE SPRINKLER
SP	SP	STANDPIPE PIPING
D	D	DRAIN PIPING
SZB	SZB	SPRINKLER ZONE BOUNDARY
	-	PIPING ELBOW DOWN
	-	PIPING ELBOW UP
	-	PIPING CONTINUES
	OSY	OS&Y VALVE
	-	SHUT-OFF VALVE
	BF	BUTTERFLY VALVE
	CV	CHECK VALVE
	PRV	PRESSURE REDUCING VALVE
	RPZ	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
	FDC	FIRE DEPARTMENT CONNECTION
	FHV	FIRE HOSE VALVE
	-	UPRIGHT SPRINKLER HEAD
	-	PENDANT SPRINKLER HEAD
	-	RECESSED SPRINKLER HEAD
	-	CONCEALED SPRINKLER HEAD
	-	SIDEWALL SPRINKLER HEAD
	-	EXTENDED COVERAGE SIDEWALL SPRINKLER HEAD

ADDITIONAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MFG	MANUFACTURER
AFG	ABOVE FINISHED GRADE	PSI	POUNDS PER SQUARE INCH
BAS	BUILDING AUTOMATION SYSTEM	TS	TAMPER SWITCH
BFF	BELOW FINISHED FLOOR	TYP	TYPICAL
CLG	CEILING	WMG	WATER MOTOR GONG
CONT	CONTINUATION	WC	WATER COLUMN
DN	DOWN		
FS	FLOW SWITCH	EC	ELECTRICAL CONTRACTOR
FHV	FIRE HOSE VALVE	FSC	FOOD SERVICE CONTRACTOR
GPM	GALLONS PER MINUTE	GC	GENERAL CONTRACTOR
HP	HORSE POWER	MC	MECHANICAL CONTRACTOR
INV	INVERT ELEVATION	PC	PLUMBING CONTRACTOR
KW	KILOWATT		

FIRE PROTECTION MATERIALS

1. ALL PIPING SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.
2. UNDERGROUND PIPE AND FITTINGS CLASS 50 DUCTILE IRON CONFORMING TO ANSI/AWWA C110/A21.10 AND ANSI/AWWA C111/A21.11 OR CLASS 315 PVC PIPE FOR SIZES 6" AND SMALLER CONFORMING TO ASTM-2241.
3. ABOVE GRADE PIPING: BLACK STEEL PIPING (ASTM A53, ASTM A135, OR ASTM A795) SHALL BE LISTED FOR FIRE SPRINKLER PIPING USE AND INCLUDE FM APPROVED MIC INHIBITING COATING. PIPING 2" AND SMALLER SHALL BE SCHEDULE 40 BLACK STEEL PIPE THREADED, WELDED OR ROLL GROOVED FOR MECHANICAL FITTINGS. PIPING 2-1/2" AND LARGER SHALL BE SCHEDULE 10 BLACK STEEL PIPE WELDED, OR ROLL GROOVED FOR MECHANICAL FITTINGS.
4. THREADED FITTINGS: UL-LISTED, STANDARD WEIGHT SUITABLE FOR PRESSURE UP TO 175 PSIG, CAST IRON MEETING ASTM A126 OR MALLEABLE IRON MEETING ASTM A197. THREADED CAST IRON FITTINGS SHALL MEET ANSI B16.4; FLANGED CAST IRON FITTINGS SHALL MEET ANSI B16.1. THREADED MALLEABLE IRON FITTINGS SHALL MEET ANSI B16.3.
5. GROOVED FITTINGS AND COUPLINGS: UL-LISTED, DUCTILE IRON MEETING ASTM A536, UTILIZING AN EDPM GASKET. PLAIN-END FITTINGS AND COUPLINGS, OR WELDED-SEGMENTED FITTINGS SHALL NOT BE USED. CHANGES IN PIPE DIAMETER SHALL BE MADE USING TAPERED REDUCING FITTINGS. BUSHINGS OR GROOVED-END REDUCING COUPLINGS SHALL NOT BE USED UNLESS STANDARD REDUCING FITTINGS ARE NOT REGULARLY AVAILABLE.
6. USE HOT-DIPPED GALVANIZED PIPING AND FITTINGS FOR COMPRESSED AIR PIPING, WATER MOTOR ALARM PIPING, BALL DRIP DISCHARGES AND TEST / DRAIN PIPING SUBJECT TO ALTERNATE WETTING AND DRYING.
7. PIPE HANGERS: UL-LISTED SWIVEL LOOP TYPE WITH PRE-GALVANIZED CARBON STEEL BAND, HANGER RODS SIZED PER NFPA 13, UL-LISTED STEEL OR MALLEABLE IRON BEAM CLAMPS, UL-LISTED ANCHORS. POWER DRIVEN ANCHORS SHALL NOT BE USED. REFER TO THE STRUCTURAL PLANS AND DETAILS FOR ACCEPTABLE LOCATIONS TO ATTACH HANGERS AND SUPPORTS TO THE BUILDING STRUCTURE. HANGERS SHALL NOT ATTACH TO THE ROOF DECK.
8. VALVES: OS&Y TYPE, IRON BODY BRONZE MOUNTED, DOUBLE DISC WITH PARALLEL SEATS, OR; BUTTERFLY, LUG TYPE, DUCTILE IRON BODY, STAINLESS STEEL STEM, ALUMINUM BRONZE DISC, PHENOLIC RING AND BUNA N SEAT. VALVES SHALL BE FM/UL LISTED AND APPROVED FOR FIRE PROTECTION SERVICE.
9. ESCUTCHEON PLATES: PROVIDE CHROME PLATED ESCUTCHEON PLATES WHERE PIPES PASS THROUGH FINISHED WALLS, FLOORS, OR CEILING. PROVIDE PRIME COAT PAINTED ESCUTCHEON PLATES WHERE PIPES PASS THROUGH WALLS, CEILINGS, ETC. IN UNFINISHED EXPOSED AREAS.

FIRE PROTECTION SHEET INDEX

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022

PROJECT #: 02110.200
DRAWN BY: ESD
CHECKED BY: GPK

FIRE PROTECTION LEGEND, DESIGN DATA, AND SPECIFICATIONS

FP1-001

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt
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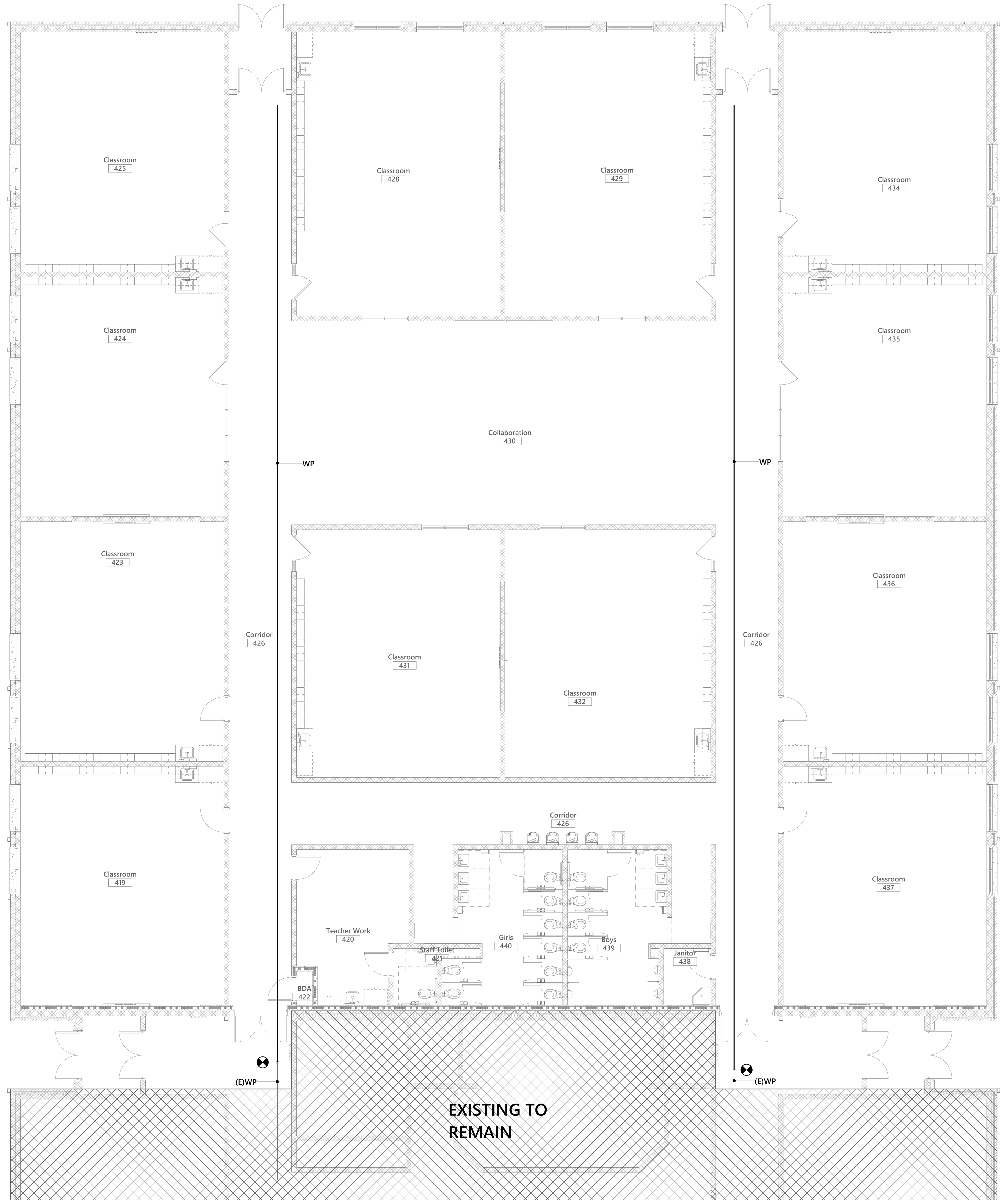

1 OVERALL FIRST FLOOR FIRE PROTECTION PLAN - NEW WORK

1/8" = 1'-0"

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NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 032219 GARY P. KOSTEN 08/15/2022

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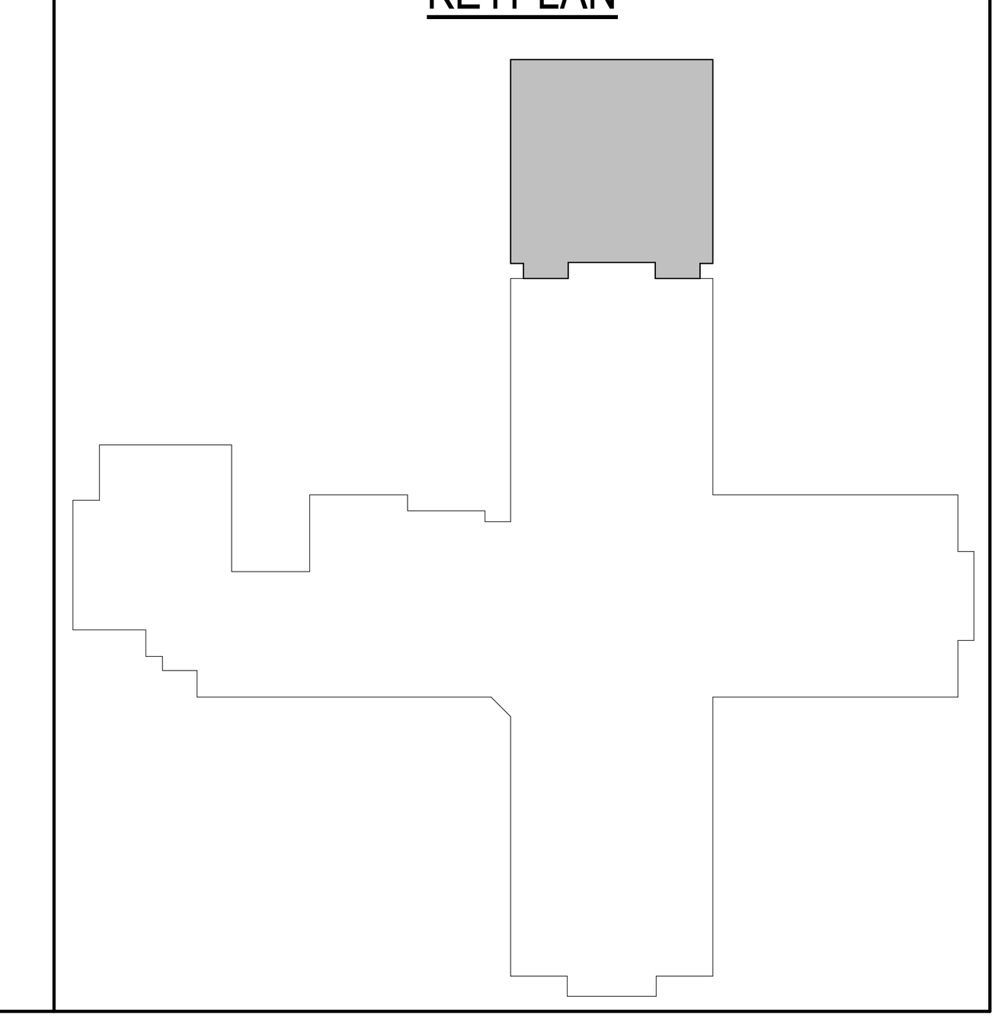
Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

KEYPLAN



ISSUE DATE:	8/15/2022
PROJECT #:	02110.200
DRAWN BY:	ESD
CHECKED BY:	GPK

OVERALL FIRE PROTECTION PLAN - NEW WORK

FP1-101

OPTIMA# 21-0269R

Sheet No. 2 of 2

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DOMESTIC WATER PIPING

1. BELOW GRADE PIPING AND JOINTS: PROVIDE TYPE 'K' SOFT ANNEALED SEAMLESS COPPER TUBING (ASTM B 88) WITH NO JOINTS FOR PIPING 2-1/2" AND SMALLER. PROVIDE DUCTILE IRON PIPE AND FITTINGS (AWWA C151, AWWA C110) WITH RUBBER GASKET JOINTS AND RODS (AWWA C111) FOR PIPING 3" AND LARGER.

2. ABOVE GRADE PIPING AND JOINTS: PROVIDE TYPE 'L' HARD DRAWN SEAMLESS COPPER TUBING (ASTM B 88) AND CAST COPPER ALLOY FITTINGS (ASME B16.18). JOINTS 2" AND SMALLER SHALL BE LEAD FREE 95-5 TIN/SILVER SOLDER JOINTS (ASTM B 32). JOINTS 2-1/2" AND LARGER SHALL BE BCUP SILVER / PHOSPHORUS / COPPER BRAZED JOINTS (AWS A5.8). ALTERNATELY PROVIDE COPPER PIPE AND FITTINGS AS SPECIFIED ABOVE EXCEPT WITH GROOVED ENDS (ASTM B 88, ASME B16.18) AND JOINTS UTILIZING GROOVED MECHANICAL COUPLINGS MEETING (ASTM F1476).

3. INSULATE PIPING ABOVE GRADE (EXCEPT EXPOSED CONNECTIONS TO PLUMBING FIXTURES) WITH GLASS FIBER INSULATION HAVING A VAPOR BARRIER AND JACKET. PIPE INSULATION SHALL HAVE A CONDUCTIVITY NOT EXCEEDING 0.27 BTUH x SQ. FT., SEE LIST BELOW FOR INSULATION THICKNESS:

   - PROVIDE 1" THICK INSULATION FOR HOT WATER & CIRCULATION PIPING SIZES 1/2" THRU 1-1/4".
   - PROVIDE 1-1/2" THICK INSULATION FOR HOT WATER & CIRCULATION PIPING SIZES 1-1/2" THRU 4".
   - PROVIDE 1/2" THICK INSULATION FOR COLD WATER PIPING SIZES 1/2" THRU 1-1/4".
   - PROVIDE 1" THICK INSULATION FOR COLD WATER PIPING SIZES 1-1/2" THRU 4".

4. PIPING INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES SHALL MEET A FLAME-SPREAD RATING OF 25 OR LESS AND A SMOKE-DEVELOPED RATING OF 50 OR LESS AS TESTED BY ASTM E84 (NFPA 255) METHOD AND SHALL BE PLENUM RATED. PROVIDE PVC INSULATION JACKET FOR EXPOSED PIPING IN MECHANICAL ROOMS. INSTALL INSULATION CONTINUOUSLY THRU FIRE RATED WALLS AND PIPE HANGERS. PROVIDE GALVANIZED STEEL SHIELD BETWEEN PIPE HANGER AND INSULATION.

5. PROVIDE A CHROME FINISH ON EXPOSED PIPING IN REST ROOMS AND OTHER FINISHED AREAS.

6. PROTECT COPPER PIPING AGAINST CONTACT WITH DISSIMILAR METALS. ALL HANGERS, SUPPORTS, ANCHORS AND CLIPS SHALL BE COPPER OR COPPER PLATED. WHERE COPPER PIPING IS CARRIED ON TRAPEZE HANGERS WITH OTHER PIPING, PROVIDE A PERMANENT ELECTROLYTIC ISOLATION MATERIAL TO PREVENT CONTACT WITH DISSIMILAR OTHER METALS.

7. PROTECT COPPER PIPING AGAINST CONTACT WITH MASONRY. WHERE COPPER IS SLEEVED THROUGH MASONRY, PROVIDE COPPER OR RED BRASS SLEEVES. WHERE COPPER MUST BE CONCEALED IN OR AGAINST MASONRY PARTITIONS, PROVIDE A HEAVY COATING OF ASPHALTIC ENAMEL ON THE COPPER PIPING AND 15# ASPHALT SATURATED FELT BETWEEN THE PIPING AND THE MASONRY PARTITION.

8. PERFORM A PRESSURE TEST ON ALL WATER PIPING. FILL PIPING WITH POTABLE WATER, CAP AND SUBJECT PIPING TO A STATIC WATER PRESSURE OF 50 PSIG ABOVE OPERATING PRESSURE, WITHOUT EXCEEDING PRESSURE RATING OF PIPING SYSTEM MATERIALS OR PRESSURIZE PIPING WITH AIR TO AT LEAST ONE-HUNDRED (100) PSI. ISOLATE TEST SOURCE AND ALLOW TO STAND FOR FOUR HOURS. LEAKS AND LOSS IN TEST PRESSURE CONSTITUTE DEFECTS THAT MUST BE REPAIRED. REPAIR LEAKS AND DEFECTS WITH NEW MATERIALS AND RETEST PIPING OR PORTION THEREOF UNTIL SATISFACTORY RESULTS ARE OBTAINED

9. STERILIZE THE DOMESTIC WATER SYSTEM IN PER THE AMERICAN WATER WORKS ASSOCIATION'S INSTRUCTIONSSPECIFICATIONS AND LOCAL HEALTH DEPARTMENT REGULATIONS.

10. BALANCE THE DOMESTIC HOT WATER CIRCULATION SYSTEM TO THE PERFORMANCE SPECIFICATIONS INDICATED ON THE PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.

SANITARY WASTE AND VENT PIPING

1. BELOW GRADE PIPING AND JOINTS: PROVIDE SERVICE WEIGHT CAST IRON HUB AND SPIGOT PIPE (ASTM A 74) WITH COMPRESSION JOINTS (CISPI HSN) AND NEOPRENE GASKETS (ASTM C 564) OR NO-HUB PIPE AND FITTINGS (CISPI 301) WITH NEOPRENE GASKET / STAINLESS STEEL CLAMP JOINTS (CISPI 310) WITH NEOPRENE GASKET / STAINLESS STEEL CLAMP JOINTS (ASTM C1540-15) OR PROVIDE SCHEDULE 40 PVC PIPE AND SOCKET FITTINGS (ASTM D 2665) WITH SOLVENT WELD JOINTS (ASTM D2855). INSTALL PLASTIC PIPE BELOW GRADE PER ASTM D2321. FOAM CORE PVC PIPING IS NOT APPROVED. NOTE: PROVIDE CAST IRON PIPING SPECIFIED ABOVE FOR ALL KITCHEN GREASE WASTE PIPING UPSTREAM OF THE GREASE INTERCEPTOR AND FOR MECHANICAL ROOM DRAIN PIPING, PVC IS NOT ACCEPTABLE IN THESE AREAS.

2. ABOVE GRADE PIPING AND JOINTS: PROVIDE SERVICE WEIGHT CAST IRON NO-HUB PIPE AND FITTINGS (CISPI 301) WITH NEOPRENE GASKET AND STAINLESS STEEL CLAMP JOINTS (CISPI 310) WITH NEOPRENE GASKET / STAINLESS STEEL CLAMP JOINTS (ASTM C1540-15) OR PROVIDE SCHEDULE 40 PVC PIPE AND SOCKET FITTINGS (ASTM D 2665) WITH SOLVENT WELD JOINTS (ASTM D2855). FOAM CORE PIPE IS NOT APPROVED. DO NOT INSTALL PVC PIPING IN RETURN AIR PLENUMS.

3. SLOPE WASTE PIPING AT 1/4" PER FOOT MINIMUM FOR PIPING 2-1/2" AND SMALLER AND 1/8" PER FOOT MINIMUM FOR PIPING 3" AND LARGER UNLESS NOTED OTHERWISE. SLOPE ALL KITCHEN GREASE WASTE PIPING AT 1/4" PER FOOT MINIMUM.

4. PROVIDE CLEAN-OUTS AT THE BASE OF WASTE STACKS AND AT EVERY TURN IN PIPING IN EXCESS OF 45° AND SPACED WITH-IN 100'-0" APART IN A LOCATION THAT PERMITS ACCESS FOR SERVICE WITHOUT DAMAGE TO THE BUILDING OR FINISHED MATERIALS.

5. PROVIDE FLOOR CLEANOUTS WITH TOPS DESIGNED TO MATCH SPECIFIC FLOOR FINISHES SUCH AS CARPET, TILE, ETC. YARD CLEANOUTS SHALL BE PROVIDED IN AN 18"x18"x6" CONCRETE PAD.

6. WHERE WASTE PIPING IS EXPOSED IN REST ROOM AREAS, PROVIDE CHROME PLATED BRASS PIPING, REMOVABLE P-TRAPS, MATCHING STOPS AND ESCUTCHEONS FOR ALL LAVATORIES.

7. WASTE AND VENT SYSTEMS SHALL BE TESTED AND PROVED WATER TIGHT UNDER A HEAD PRESSURE OF NO LESS THAN 10 FT. THIS PRESSURE SHALL BE HELD FOR A PERIOD OF NO LESS THAN 15 MINUTES.

8. WHERE MECHANICAL ROOM FLOOR DRAINS ARE INSTALLED ABOVE GRADE, PROVIDE 1"THICK GLASS FIBER INSULATION WITH VAPOR BARRIER AND JACKET ON THE FLOOR DRAIN BODY, THE ASSOCIATED P-TRAP AND HORIZONTAL DRAIN PIPING ABOVE GRADE.

9. PIPING INSULATION, JACKETS, COVERINGS, SEALERS, MASTICS AND ADHESIVES SHALL MEET A FLAME-SPREAD RATING OF 25 OR LESS AND A SMOKE-DEVELOPED RATING OF 50 OR LESS AS TESTED BY ASTM E84 (NFPA 255) METHOD. INSTALL INSULATION CONTINUOUSLY THRU FIRE RATED WALLS AND PIPE HANGERS. PROVIDE GALVANIZED STEEL SHIELD BETWEEN PIPE HANGER AND INSULATION.

SEISMIC NOTES

1. PROVIDE DESIGN AND INSTALLATION OF SEISMIC RESTRAINT ELEMENTS FOR THE PLUMBING SYSTEM(S) IN COMPLIANCE WITH ALL APPLICABLE REQUIREMENTS OF THE 2018 NORTH CAROLINA BUILDING CODE AND ASCE 7-10, CHAPTER 13. REFER TO THE APPENDIX B ON THE ARCHITECTURAL DRAWINGS FOR THE SITE'S SEISMIC DESIGN CATEGORY.

2. PROVIDE CALCULATIONS AND PREPARE SHOP DRAWINGS FOR THE SPECIFIC METHODS OF SEISMIC RESTRAINT TO BE USED IN ACCORDANCE WITH ASCE 7-10. REQUIRED RESTRAINT DEVICES, MATERIALS, AND SUPPLEMENTARY FRAMING SHALL BE AN INTEGRAL PART OF THE DESIGN AND INCLUDED IN THE SHOP DRAWINGS. PROVIDE ISOLATORS, SEISMIC MOUNTS, RESTRAINTS, ETC. AS NECESSARY TO COMPLY WITH ALL APPLICABLE REQUIREMENTS.

3. CALCULATIONS SHALL BE PREPARED BY A PROFESSIONAL ENGINEER LICENSED IN THE STATE OF NORTH CAROLINA WITH A MINIMUM 5 YEARS OF EXPERIENCE IN THE DESIGN AND SPECIFICATION OF SEISMIC RESTRAINT SYSTEMS.

4. SUBMIT CALCULATIONS AND SHOP DRAWINGS TO THE ARCHITECT, ENGINEER, AND LOCAL AUTHORITY HAVING JURISDICTION FOR REVIEW AND APPROVAL.

5. COPIES OF THE APPROVED RESTRAINT SYSTEM(S) INSTALLATION MANUAL SHALL BE ON THE JOBSITE PRIOR TO INSTALLATION.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY REQUIRED SPECIAL INSPECTIONS AND ASSOCIATED DOCUMENTATION. THE CONTRACTOR SHALL PROVIDE VERIFICATION IN WRITING OF COMPLIANCE WITH THE APPROVED SHOP DRAWINGS.

7. REVIEW AND APPROVAL OF THE SHOP DRAWINGS AND CALCULATIONS BY THE ARCHITECT/ENGINEER/ SHALL NOT RELIEVE THE CONTRACTOR OF THEIR RESPONSIBILITY TO COMPLY WITH SEISMIC OR OTHER REQUIREMENTS OF THE 2018 NORTH CAROLINA BUILDING CODE AND ASCE 7-10.

COORDINATION DRAWINGS

PER DIVISION 01 SPECIFICATIONS, THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF COORDINATION DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS AND COORDINATION DRAWINGS:

1. ALL COORDINATION DRAWINGS WILL BE PRODUCED AT 1/4" = 1'-0 SCALE.
2. COORDINATION DRAWINGS WILL BE DISTRIBUTED ON REPRODUCIBLE MATERIAL 48"X36".
3. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
4. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

CABLE TRAY COORDINATION

A MINIMUM OF 12" CLEARANCE ABOVE THE CABLE TRAY AND 36" CLEARANCE TO ACCESS THE TRAY IS REQUIRED AT ALL LOCATIONS. PLUMBING PIPING SHALL NOT BE INSTALLED IN THE CABLE TRAY, NOR BE SUPPORTED BY THE CABLE TRAY OR THE CABLE TRAY SUPPORTS. PLUMBING PIPING SHALL NOT OBSTRUCT THE TRAY AND MUST LEAVE THE TRAY ACCESSIBLE THROUGHOUT ITS ROUTING.

PLUMBING GENERAL NOTES

1. GENERAL AND SPECIAL CONDITIONS OF THE CONTRACT APPLY TO THE PLUMBING SCOPE OF WORK. THE PLUMBING DRAWINGS AND SPECIFICATIONS SHALL NOT BE INTERPRETED AS WAIVING OR OVERRULING ANY REQUIREMENTS EXPRESSED IN GENERAL CONDITIONS.

2. PLUMBING WORK SHALL BE INSTALLED IN ACCORDANCE WITH THE 2018 NORTH CAROLINA STATE PLUMBING CODE AND WITH THE REQUIREMENTS OF THE LOCAL AUTHORITY HAVING JURISDICTION.

3. SCOPE: PROVIDE ALL LABOR, MATERIAL AND EQUIPMENT REQUIRED FOR THE COMPLETION AND OPERATION OF ALL PLUMBING SYSTEMS IN ACCORDANCE WITH ALL APPLICABLE CODES.

4. PERMITS: APPLY AND PAY FOR ALL NECESSARY PERMITS, FEES AND INSPECTIONS REQUIRED BY ANY PUBLIC AUTHORITY HAVING JURISDICTION. ACREAGE CHARGES, FACILITIES CHARGES AND BOND PROPERTY ASSESSMENTS ARE NOT TO BE CONSTRUED TO BE A PART OF THIS CONTRACT.

5. WARRANT THE SYSTEM LABOR, MATERIALS AND EQUIPMENT FOR A MINIMUM OF ONE YEAR AFTER COMPLETION AND ACCEPTANCE. PRIOR TO TURNING THE COMPLETED SYSTEM OVER TO THE OWNER, REVIEW THE INSTALLATION WITH THE ARCHITECT / ENGINEER AND REPLACE OR REPAIR ANY DEFECTIVE WORKMANSHIP, EQUIPMENT AND MATERIALS AT NO ADDITIONAL COST TO THE OWNER.

6. COORDINATE ALL PLUMBING PIPING LOCATIONS, ROUGH-IN LOCATIONS AND EQUIPMENT LOCATIONS WITH OTHER TRADES TO AVOID CONFLICTS AND INTERFERENCES. FINAL PIPING AND EQUIPMENT LOCATIONS SHALL BE A CODE COMPLIANT INSTALLATION FOR ALL TRADES.

7. PLUMBING PLANS SHALL NOT BE SCALED. REFERENCE THE ARCHITECTURAL PLANS FOR DIMENSIONS OF ALL LOCATIONS OF PLUMBING FIXTURES, FLOOR DRAINS, COLUMNS, WALLS, DOORS, ETC.

8. WHERE DISCREPANCIES ARE FOUND IN THE DRAWINGS AND SPECIFICATIONS THE MORE STRINGENT SHALL APPLY. CONTACT ENGINEER FOR CLARIFICATION.

9. ALL PIPING SHALL BE MANUFACTURED IN THE UNITED STATES OF AMERICA.

10. ALL VALVES, BACKFLOW PREVENTERS, BOOSTER PUMPS, ETC. SERVING THE DOMESTIC WATER SYSTEM SHALL MEET LEAD FREE STANDARDS PER ANSI/NSF 372 AND NSF 61, ANNEX G.

11. PROVIDE COMPLETE PLUMBING FIXTURES AND EQUIPMENT. INCLUDE SUPPLIES, STOPS, VALVES, FAUCETS, DRAINS, TRAPS, TAIL PIECES, ESCUTCHEONS, ETC. AND INSTALL PER THE MANUFACTURER'S INSTALLATION INSTRUCTIONS.

12. PIPING AND SPECIALTIES SHALL BE LOCATED CONCEALED IN WALLS, PARTITIONS OR ABOVE CEILINGS UNLESS NOTED OTHERWISE. PIPING IN EXPOSED AREAS SHALL BE RUN TIGHT TO UNDERSIDE OF STRUCTURE.

13. PIPE PENETRATIONS THRU WALLS, PARTITIONS AND FLOORS SHALL BE SLEEVED. CORE DRILLING THRU WALLS AND PARTITIONS IS PERMITTED IF PERFORMED IN A NEAT CRAFTSMAN LIKE MANNER. OPENINGS THRU WALLS, PARTITIONS, AND FLOORS SHALL BE LARGE ENOUGH FOR PIPE INSULATION TO REMAIN CONTINUOUS. PIPES PENETRATING THRU EXTERIOR WALLS SHALL BE SEALED WATER TIGHT. INSTALL ESCUTCHEONS IN ALL EXPOSED AREAS.

14. PROVIDE ACCESS DOORS FOR ALL SPECIALTIES, VALVES, WATER HAMMER ARRESTORS, TRAP PRIMERS, ETC., CONCEALED BEHIND WALLS OR CEILINGS THAT REQUIRE MAINTENANCE ACCESS.

15. DO NOT INSTALL PIPING IN AREAS SUBJECT TO FREEZING TEMPERATURES. INSTALL PIPING SHOWN IN EXTERIOR WALLS ON THE CONDITIONED SIDE OF THE WALL INSULATION.

16. PIPING, VENTS, ETC. EXTENDING THROUGH EXTERIOR WALLS AND/OR THE ROOF SHALL BE FLASHED AND COUNTER FLASHED IN A WATERPROOF MANNER. COORDINATE FLASHING WITH THE GENERAL CONTRACTOR.

17. PROVIDE A CHROME FINISH FOR ALL EXPOSED PIPING IN REST ROOMS AND OTHER FINISHED AREAS.

18. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.

19. REFER TO THE STRUCTURAL PLANS AND DETAILS FOR ACCEPTABLE LOCATIONS TO ATTACH HANGERS AND SUPPORTS TO THE BUILDING STRUCTURE. HANGERS SHALL NOT ATTACH TO THE ROOF DECK.

20. PROVIDE MANUFACTURERS RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE.

21. VALVES AND OTHER PIPING ACCESSORIES REQUIRING ACCESS SHALL BE INSTALLED IN ACCESSIBLE LOCATION NO MORE THAN 18" ABOVE THE CEILING, PROVIDE OFFSETS IN PIPING AS NEEDED.

FIRE STOPPING:

1. FIRE STOP ALL PENETRATIONS, BY PIPING OR CONDUITS, OF FIRE RATED WALLS, FLOORS AND PARTITIONS. PROVIDE A DEVICE(S) OR SYSTEM(S) WHICH HAS BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814 AND INSTALL IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE A DEVICE(S) OR SYSTEM(S) WITH AN 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED. REFER TO ARCHITECTURAL PLANS FOR WALL AND FLOOR TYPES.

PIPE IDENTIFICATION:

1. PIPE IDENTIFICATION SHALL MATCH THE FACILITY'S EXISTING STANDARD. IF NO STANDARD EXISTS, THEN THE PIPE IDENTIFICATION SHALL BE IN ACCORDANCE WITH ANSI A13.1.

2. PROVIDE PIPING LABELS FOR ALL PLUMBING PIPING. PIPING LABELS SHALL BE ACRYLIC FACED, WRAP-AROUND TYPE. EACH LABEL SHALL INDICATE THE PIPING CONTENTS, DIRECTION OF FLOW AND SHALL BEAR THE MANUFACTURER'S STANDARD COLOR FOR THE SERVICE INDICATED.

SUBMITTALS:

1. PROVIDE SUBMITTALS BEARING THE CONTRACTORS REVIEW STAMP FOR ALL PLUMBING FIXTURES, PIPING, EQUIPMENT AND ACCESSORIES IN ELECTRONIC FORMAT (PDF).

2. NO PRIVATE LABELED MATERIALS WILL BE ACCEPTED AS EQUALS TO PRODUCTS SPECIFIED HEREIN.

3. THE PLUMBING CONTRACTOR IS RESPONSIBLE FOR ALL COSTS ASSOCIATED WITH SUBSTITUTIONS TO SPECIFIED PLUMBING FIXTURES AND EQUIPMENT INCLUDING BUT NOT LIMITED TO; PROVIDING MAINTENANCE ACCESS CLEARANCE, PIPING, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC. AND ANY MODIFICATIONS TO ASSOCIATED MECHANICAL, ELECTRICAL OR PLUMBING SYSTEMS REQUIRED BY THE EQUIPMENTS INSTALLATION INSTRUCTIONS. ALL COSTS ASSOCIATED WITH SUBSTITUTIONS SHALL BE INCLUDED IN THE ORIGINAL BASE BID.

PLUMBING LEGEND

SYMBOL	ABBREVIATION	DESCRIPTION
	CW	COLD WATER PIPING
	HW	HOT WATER PIPING
	HWR	HOT WATER RETURN PIPING
	TW	TEMPERED HOT WATER PIPING
	KHW	140°F KITCHEN HOT WATER PIPING
	KHR	140°F KITCHEN HOT WATER RETURN PIPING
	W	SANITARY WASTE PIPING
	V	SANITARY VENT PIPING
GW	GW	GREASE WASTE PIPING
GV	GV	GREASE VENT PIPING
CD	CD	CONDENSATE DRAIN PIPING
ESD	ESD	EMERGENCY STORM DRAIN PIPING
PD	PD	PUMP DISCHARGE (SUMP PUMP)
G	G	NATURAL GAS PIPING
D	D	DRAIN PIPING (INDIRECT)
	-	PIPING ELBOW DOWN
	-	PIPING ELBOW UP
	-	PIPING CONTINUES
	-	SHUT-OFF VALVE
	-	CHECK VALVE
	-	BALANCING VALVE
	PRV	PRESSURE REDUCING VALVE
	-	SOLENOID VALVE
	RPZ	REDUCED PRESSURE BACKFLOW PREVENTER ASSEMBLY
	-	IN-LINE PUMP
	-	PIPING REDUCER
	FCO	FLOOR CLEANOUT
	YCO	YARD CLEANOUT
	WCO	WALL CLEANOUT
	CO	PLUG CLEANOUT
	FD	FLOOR DRAIN
	FS	FLOOR SINK
	RD	ROOF DRAIN
	HB	HOSE BIBB / WALL HYDRANT
	SA-#	SHOCK ARRESTOR - SUFFIX INDICATES PDI SIZE
#	-	KITCHEN EQUIPMENT TAG
#	-	SHEET KEYNOTE

ADDITIONAL ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	MFG	MANUFACTURER
AFG	ABOVE FINISHED GRADE	PSI	POUNDS PER SQUARE INCH
AVTR	ACID VENT THRU ROOF	T&P	TEMPERATURE AND PRESSURE
BAS	BUILDING AUTOMATION SYSTEM	TW	TEMPERED WATER
BFF	BELOW FINISHED FLOOR	TYP	TYPICAL
CFH	CUBIC FEET PER HOUR	UG	UNDERGROUND
CLG	CEILING	VTR	VENT THRU ROOF
CONT	CONTINUATION	WSV	WASTE STACK VENT
DN	DOWN	WC	WATER COLUMN
GPF	GALLONS PER FLUSH		
GPM	GALLONS PER MINUTE	EC	ELECTRICAL CONTRACTOR
HP	HORSE POWER	FSC	FOOD SERVICE CONTRACTOR
INV	INVERT ELEVATION	GC	GENERAL CONTRACTOR
KW	KILOWATT	MC	MECHANICAL CONTRACTOR
MBH	1,000 BRITISH THERMAL UNIT / HOUR	PC	PLUMBING CONTRACTOR

PLUMBING SHEET INDEX

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ADDITION

Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022
PROJECT #: 02110.200
DRAWN BY: ESD
CHECKED BY: GPK

PLUMBING LEGEND, DESIGN DATA, AND SPECIFICATIONS

P1-001

Sheet No. 1 of 9

OPTIMA# 21-0269R

8/11/2022 2:50:51 PM Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt

PLUMBING SPECIALTIES SCHEDULE

SYMBOL	DESCRIPTION	CONNECTION SIZE				SPECIFICATION	REMARKS
		W	V	CW	HW		
CS-x	BALANCING VALVE, THERMOSTATIC, AUTOMATIC, SUFFIX INDICATES PIPE SIZE, SEE FLOOR PLANS	-	-	-	**	EQUIPMENT: CIRCUIT SOLVER CS SERIES, SIZES 1/2" THRU 2", NSF 61 CERTIFIED.	PROVIDE 105°F MODEL
SA-x	SHOCK ARRESTOR, SUFFIX INDICATES PDI SIZE	-	-	x	-	EQUIPMENT: SIOUX CHIEF 650 SERIES, SIZES 1/2" THRU 2", NSF 61 CERTIFIED.	SEE SHOCK ARRESTOR TABLE THIS SHEET
HB1	HOSE BIBB, INTERIOR, RECESSED, STAINLESS STEEL FACE PLATE, ANTI-SIPHON	-	-	3/4"	-	EQUIPMENT: WOODFORD B26, PROVIDE VACUUM BREAKER AND METAL LOOSE KEY FOR EACH HOSE BIBB	MOUNT 18" AFF
HB2	HOSE BIBB, EXTERIOR, EXPOSED, STAINLESS STEEL FACE PLATE, FREEZELESS, ANTI-SIPHON	-	-	3/4"	-	EQUIPMENT: ZURN Z1310-34EL, PROVIDE VACUUM BREAKER AND METAL LOOSE KEY FOR EACH HOSE BIBB	MOUNT 18" AFF
CO	PLUG CLEANOUT, CAST IRON BODY	**	-	-	-	CLEANOUT: ZURN Z-1440-BP, BRONZE PLUG	GAS / WATER TIGHT
WCO	WALL CLEANOUT, CAST IRON BODY, STAINLESS STEEL WALL PLATE	**	-	-	-	CLEANOUT: ZURN Z-1446-BP, BRONZE PLUG	GAS / WATER TIGHT
FCO	FLOOR CLEANOUT, CAST IRON BODY, NICKEL BRONZE TOP, ADJUSTABLE	**	-	-	-	CLEANOUT: ZURN ZN-1400-BP, BRONZE PLUG	GAS / WATER TIGHT, INSTALL TOP FLUSH WITH FINISHED FLOOR
YCO	YARD CLEANOUT, CAST IRON BODY, NICKEL BRONZE TOP, ADJUSTABLE, INSTALLED IN 18"x18"x6" CONCRETE PAD	**	-	-	-	CLEANOUT: ZURN ZN-1400-BP, BRONZE PLUG INSTALL IN 18"x 18"x 6" DEEP CONCRETE PAD	GAS / WATER TIGHT, INSTALL TOP FLUSH WITH FINISHED GRADE
FD1	FLOOR DRAIN, CAST IRON BODY, SQUARE NICKEL BRONZE GRATE, ADJUSTABLE, TRAP PRIMER	3"	2"	-	-	DRAIN: ZURN ZN415-SZ1-DP-P-Y	INSTALL TOP FLUSH WITH FINISHED FLOOR.
FD2	FLOOR DRAIN, CAST IRON BODY, ROUND NICKEL BRONZE GRATE, ADJUSTABLE, TRAP PRIMER	3"	2"	-	-	DRAIN: ZURN ZN415-P-Y	INSTALL TOP OF DRAIN LIP FLUSH WITH FLOOR.

NOTES:

** MATCH PIPE SIZE SHOWN ON PLANS, SEE PLANS.

APPROVED EQUALS: THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	PRODUCT TYPE:	ACCEPTED MANUFACTURERS:
	SHOCK ARRESTOR HOSE BIBBS DRAINS BACKFLOW PREVENTER	SIOUX CHIEF, PPP INC., ZURN, WATTS ZURN, WOODFORD, ZURN, J.R. SMITH ZURN, J.R. SMITH, WADE WILKINS, WATTS, APOLLO

WATER HEATER SCHEDULE

SYMBOL	DESCRIPTION	STORAGE (GAL)	GPH AT 80 °F RISE	ELECTRICAL			SPECIFICATION	NOTES
				KW	V	PH		
WH1	VERTICAL STORAGE, ELECTRIC	30	46	6	480	3	A.O. SMITH DSE-30-6	1 - 5

NOTES:
1. APPROVED MANUFACTURERS: BRADFORD WHITE, RHEEM, STATE INDUSTRIES.
2. WATER HEATER SHALL MEET OR EXCEED THE REQUIREMENTS OF THE NORTH CAROLINA ENERGEY EFFICIENCY CODE.
3. SET WATER HEATER OUTLET TEMPERATURE TO 120 °F.
4. SEE PLUMBING DETAIL SHEETS FOR INSTALLATION.
5. PROVIDE UNIT WITH FIVE (5) YEAR MANUFACTURER'S WARRANTY.

THERMAL EXPANSION TANK SCHEDULE

SYMBOL	DESCRIPTION	TOTAL VOLUME (GAL)	ACCEPTANCE VOLUME (GAL)	WEIGHT (LB)	SPECIFICATION	NOTES
ET1	EXPANSION TANK SERVING WH1 DIAPHRAGM, THERMAL EXPANSION	5.0	3.3	28.0	WESSELS TTA-12	1 - 3

NOTES:
1. APPROVED MANUFACTURERS: AMTROL, BELL & GOSSETT, WATTS, WESSELS.
2. PROVIDE WITH PRESSURE GAUGE, AIR-CHARGE FITTING, AND TANK DRAIN; PRECHARGE TO 40.0 PSI.
3. MOUNT SECURELY AND INDEPENDENTLY FROM STRUCTURE SUCH THAT THE PIPING BEARS NO WEIGHT OF THE EXPANSION TANK.

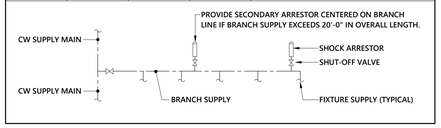
PUMP SCHEDULE

SYMBOL	DESCRIPTION	CAPACITY		ELECTRICAL DATA				SPECIFICATION	NOTES
		GPM	FT-HD	HP	V	PH	HZ		
CP1	CIRCULATION PUMP SERVING WH1 INLINE	8.0	8.0	1/6	120	1	60	BELL & GOSSETT NBF-33	1 - 4

NOTES:
1. APPROVED MANUFACTURERS: BELL & GOSSETT, GRUNDFOS, GOULDS, TACO.
2. PUMP SHALL BE BRONZE OR STAINLESS STEEL CONSTRUCTION.
3. MOUNT SECURELY FROM STRUCTURE SUCH THAT THE PIPING BEARS NO WEIGHT OF THE PUMP.
4. PROVIDE WITH AQUASTAT CONTROL WITH CONNECTION TO BUILDING AUTOMATION SYSTEM FOR TIME CLOCK OVERRIDE(S). CONTROL WIRING TO BUILDING AUTOMATION SYSTEM BY MECHANICAL CONTRACTOR.

SHOCK ARRESTOR TABLE

DRAWING SYMBOL	FIXTURE UNITS	P.D.I. WH201 DESIGNATION	ARRESTOR SIZE	REMARKS
SA-A	1 - 11	A	1/2"	INSTALL SHOCK ARRESTORS PER THE PLUMBING DRAINAGE INSTITUTE (P.D.I.) GUIDELINES. ACCEPTED MANUFACTURERS: SIOUX CHIEF, WATTS, PPP INC., ZURN
SA-B	12 - 32	B	3/4"	
SA-C	33 - 60	C	1"	
SA-D	61 - 113	D	1-1/4"	
SA-E	114 - 154	E	1-1/2"	



PLUMBING FIXTURE SCHEDULE

SYMBOL	DESCRIPTION	CONNECTION SIZE				SPECIFICATION	REMARKS
		W	V	CW	HW		
P1A	FIXTURE: TOILET: ELONGATED, WHITE VITREOUS CHINA, FLOOR MOUNTED, TOP SPUD, 1.6 GPF. FLUSH VALVE: CHROME PLATED, MANUAL, FLUSH VALVE, 1.6 GPF.	4"	2"	1"	-	FIXTURE: KOHLER "WELLCOMME" K-96053 FLUSH VALVE: SLOAN "ROYAL" 111-1.6 SEAT: CHURCH 9400SSC	
P1B	FIXTURE: TOILET: ELONGATED, WHITE VITREOUS CHINA, FLOOR MOUNTED, TOP SPUD, 1.6 GPF. FLUSH VALVE: CHROME PLATED, MANUAL, FLUSH VALVE, 1.6 GPF.	4"	2"	1"	-	FIXTURE: KOHLER "HIGHCLIFF" K-96057 FLUSH VALVE: SLOAN "ROYAL" 111-1.6 SEAT: CHURCH 9400SSC	
P2	FIXTURE: URINAL. WHITE VITREOUS CHINA, CARRIER MOUNTED, 0.5 GPF FLUSH VALVE: CHROME-PLATED, MANUAL, TOP-SPUD, FLUSH VALVE, 0.5 GPF.	2"	2"	3/4"	-	FIXTURE: KOHLER "DEXTER" K-5016 FLUSH VALVE: SLOAN "ROYAL" 186-0.5-SG	NOTE 1
P3A	FIXTURE: LAVATORY, ADA. 20"x18", VITREOUS CHINA, CARRIER MOUNTED, 4" CENTERS. FAUCET: CHROME PLATED, 4" CENTERS, VANDAL-RESISTANT HANDLES AND SPOUT, METERING FAUCET, 0.50 GPM.	2"	1-1/2"	1/2"	1/2"	FIXTURE: KOHLER "HUDSON" K-2867 FAUCET: ZURN Z86500-XL-IN-3M	NOTES 2, 4
P3B	FIXTURE: LAVATORY, ADA. 20"x18", VITREOUS CHINA, CARRIER MOUNTED, 4" CENTERS. FAUCET: CHROME-PLATED, 4" CENTERS, VANDAL-RESISTANT, LEVER HANDLES, 0.50 GPM.	2"	1-1/2"	1/2"	1/2"	FIXTURE: KOHLER "HUDSON" K-2867 FAUCET: ZURN Z81101-XL-3M	NOTES 2, 4
P4A	FIXTURE: WATER COOLER & BOTTLE FILLER, ADA. STAINLESS STEEL FINISH, SINGLE BOWL, VANDAL RESISTANT, CARRIER MOUNTED, INTEGRAL WATER FILTER, SENSOR OPERATED BOTTLE FILLER WITH AUTO SHUT-OFF.	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LZS8WSLK	NOTE 3, 5
P4B	FIXTURE: WATER COOLER. STAINLESS STEEL FINISH, SINGLE BOWL, VANDAL RESISTANT, CARRIER MOUNTED, INTEGRAL WATER FILTER.	2"	1-1/2"	1/2"	-	FIXTURE: ELKAY LZS8L	NOTE 3, 5
P5A	FIXTURE: CLASSROOM SINK. 22"x20", SINGLE BOWL, 18 GAUGE STAINLESS STEEL, COUNTER MOUNTED, SELF RIMMING, 4" CENTERS, RIGHT-HAND BUBBLER. FAUCET: 8" GOOSENECK FAUCET, WRIST BLADE HANDLES, VANDAL RESISTANT AERATOR, 1.5 GPM.	2"	1-1/2"	1/2"	1/2"	FIXTURE: JUST MFG. CRB-2022-A-GR FAUCET: ZURN Z871B4-XL-17F BUBBLER: ZURN Z83600-XL	NOTES 4
P5B	FIXTURE: WORK ROOM SINK, 22"x20", SINGLE BOWL, 18 GAUGE STAINLESS STEEL, COUNTER MOUNTED, SELF RIMMING, 4" CENTERS. FAUCET: 8" GOOSENECK FAUCET, WRIST BLADE HANDLES, VANDAL RESISTANT AERATOR, 1.5 GPM.	2"	1-1/2"	1/2"	1/2"	FIXTURE: ELKAY LRAD221955 FAUCET: ZURN Z871B4-XL-17F BUBBLER: ZURN Z83600-XL	NOTES 4
P6	FIXTURE: MOP SINK, 24"x 24"x 12", CORNER, TERRAZZO BASIN, 6" DROP FRONT WITH STAINLESS STEEL THRESHOLD CAP, 36" HIGH STAINLESS STEEL WALL GUARDS, HOSE, MOP HANGER BRACKET. FAUCET: POLISHED CHROME, 8" CENTERS, VACUUM BREAKER.	3"	2"	1/2"	1/2"	FIXTURE: FIAT TSBC6011-830AA-832AA-MSG2424 FAUCET: ZURN Z843M1-FC	

NOTES:

1. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED PLATE STYLE CARRIER EQUAL TO ZURN Z1222 SERIES. WHEN CARRIER IS LOCATED BEHIND A BLOCK WALL, PROVIDE EXTENDED STUD LENGTHS TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
2. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED, ADJUSTABLE CONCEALED ARM CARRIER EQUAL TO ZURN Z1231 SERIES. WHEN CARRIER IS LOCATED BEHIND BLOCK WALL, PROVIDE EXTENDED CONCEALED ARM SLEEVES TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
3. SEE ARCHITECTURAL PLANS FOR MOUNTING HEIGHT. PROVIDE A FLOOR MOUNTED, ADJUSTABLE CONCEALED ARM CARRIER EQUAL TO ZURN Z1225 SERIES. WHEN CARRIER IS LOCATED BEHIND BLOCK WALL, PROVIDE EXTENDED CONCEALED ARM SLEEVES TO COMPENSATE FOR THE BLOCK WALL THICKNESS.
4. PROVIDE PRE-MANUFACTURED ADA COMPLIANT INSULATION KIT FOR EXPOSED P-TRAP AND SUPPLY TRIM UNDER SINK.

APPROVED EQUALS: THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE MODEL WHICH MOST CLOSELY MATCHES THE SPECIFIED PRODUCT. PROVIDE PRODUCTS MADE BY THE MANUFACTURER'S LISTED.	PRODUCT TYPE:	ACCEPTED MANUFACTURERS:
	VITREOUS CHINA FLUSH VALVES ENAMELED CAST IRON CARRIERS STAINLESS STEEL SINKS FAUCETS WATER COOLERS SUPPLIES, STOPS HOSE BIBBS UTILITY SINKS	KOHLER, AMERICAN STANDARD, SLOAN SLOAN, ZURN, DELANEY KOHLER, AMERICAN STANDARD, ZURN ZURN, J.R. SMITH, WADE ELKAY, JUST, ADVANCE TABCO AMERICAN STANDARD, ZURN, CHICAGO ELKAY, HALSEY TAYLOR, HAWS ZURN, MCGUIRE, BRASSCRAFT ZURN, J.R. SMITH, WOODFORD FIAT, FLORESTONE, STERN WILLIAMS

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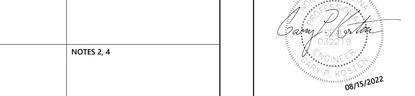

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2626 Ray Road - Spring Lake, NC 28390

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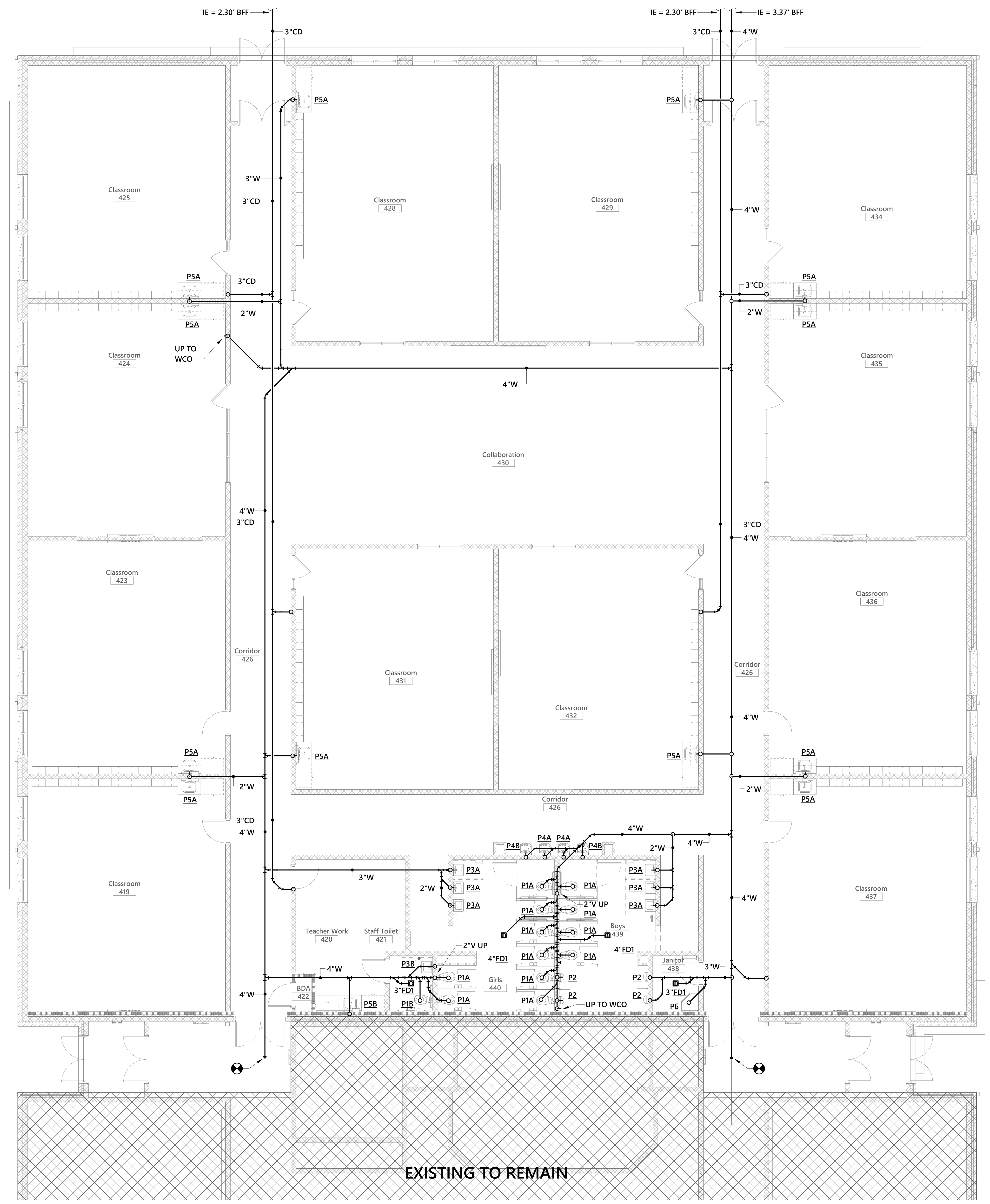
PLUMBING SCHEDULES

P1-002

Sheet No. 2 of 9

OPTIMA# 21-0269R



1 CLASSROOM ADDITION PLUMBING UNDERSLAB WASTE PLAN

1/8" = 1'-0"

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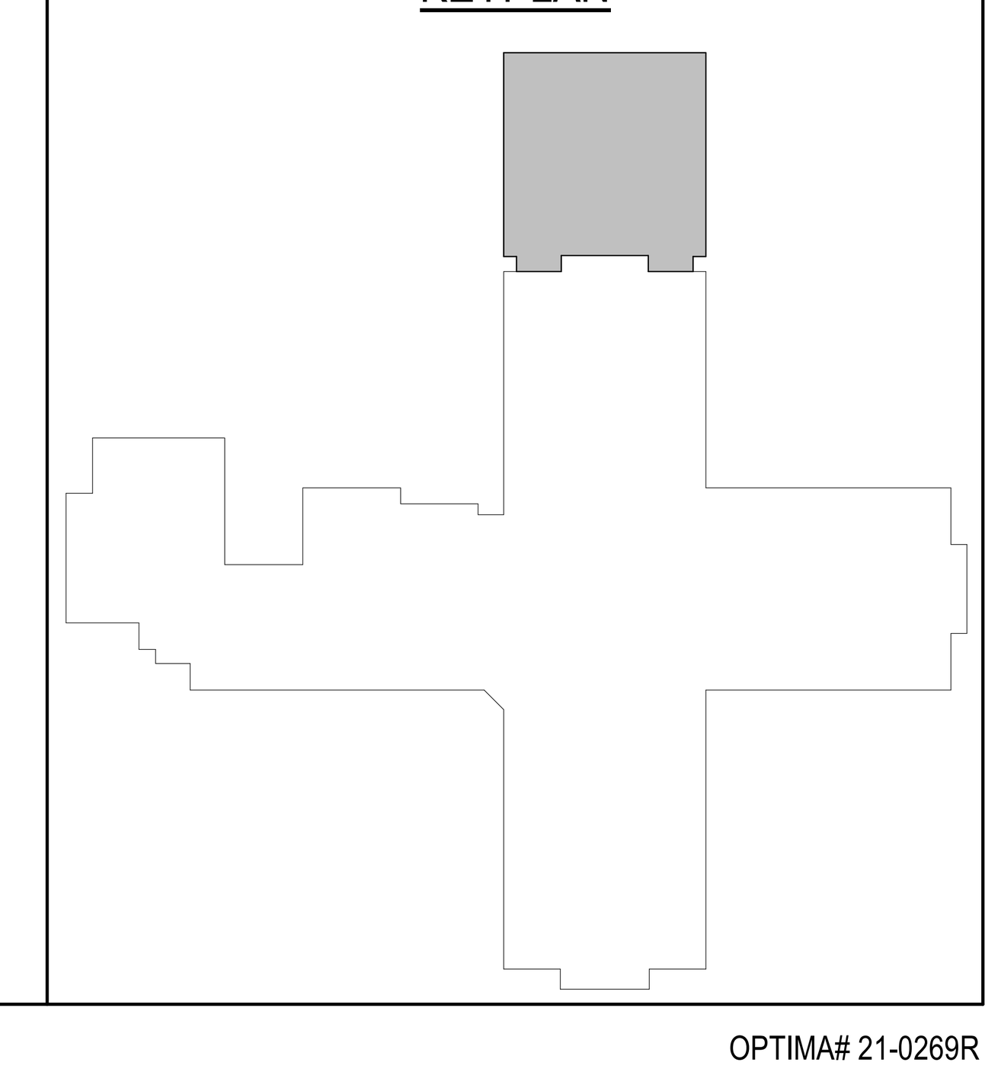
KEYPLAN



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CLASSROOM ADDITION PLUMBING UNDERSLAB WASTE PLAN

P1-101

OPTIMA# 21-0269R

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt

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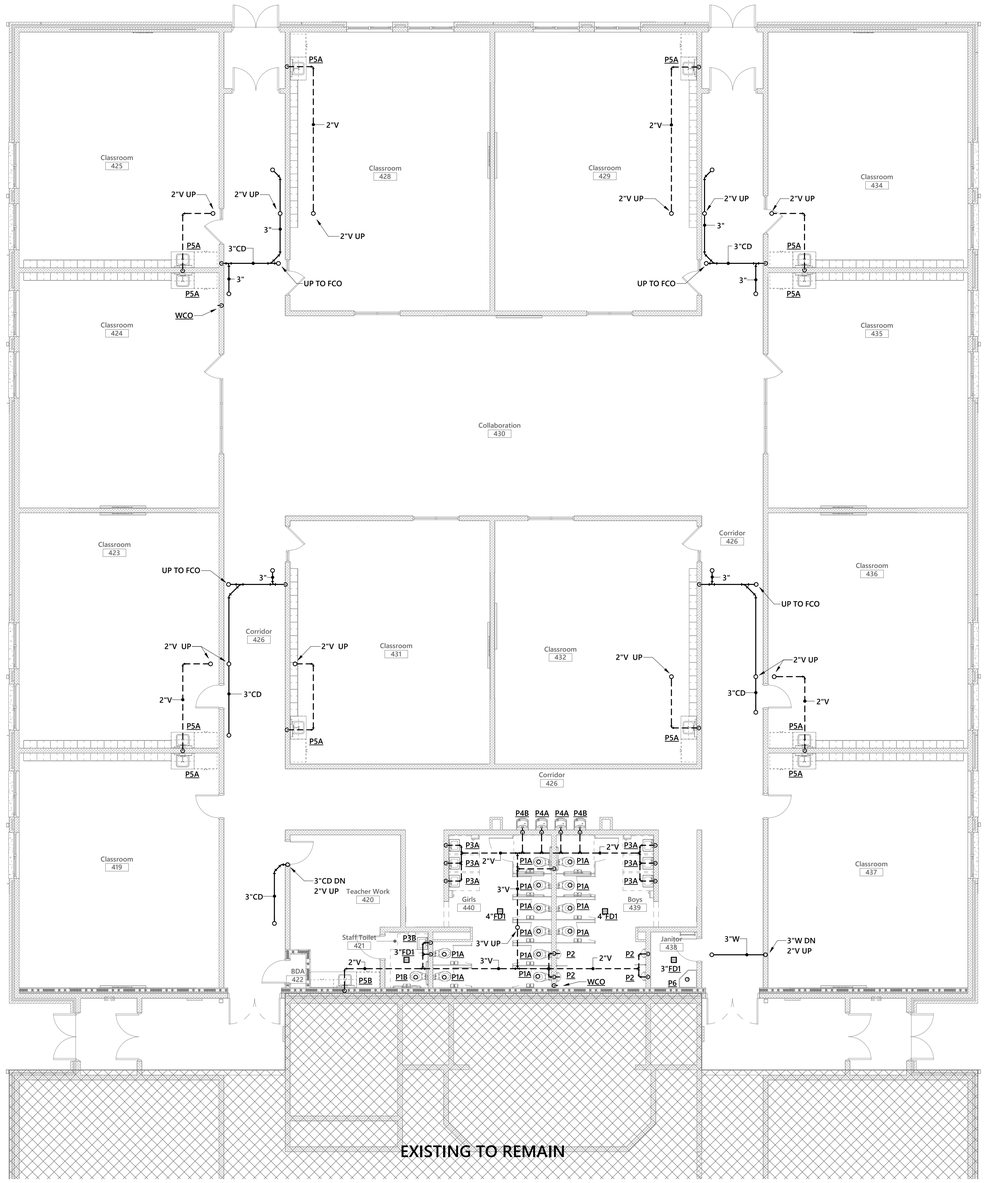
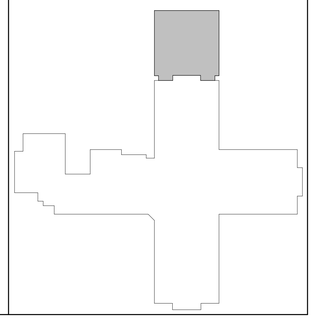


1 **CLASSROOM ADDITION PLUMBING ABOVE GRADE WASTE & VENT PLAN**
1/8" = 1'-0"

KEYPLAN



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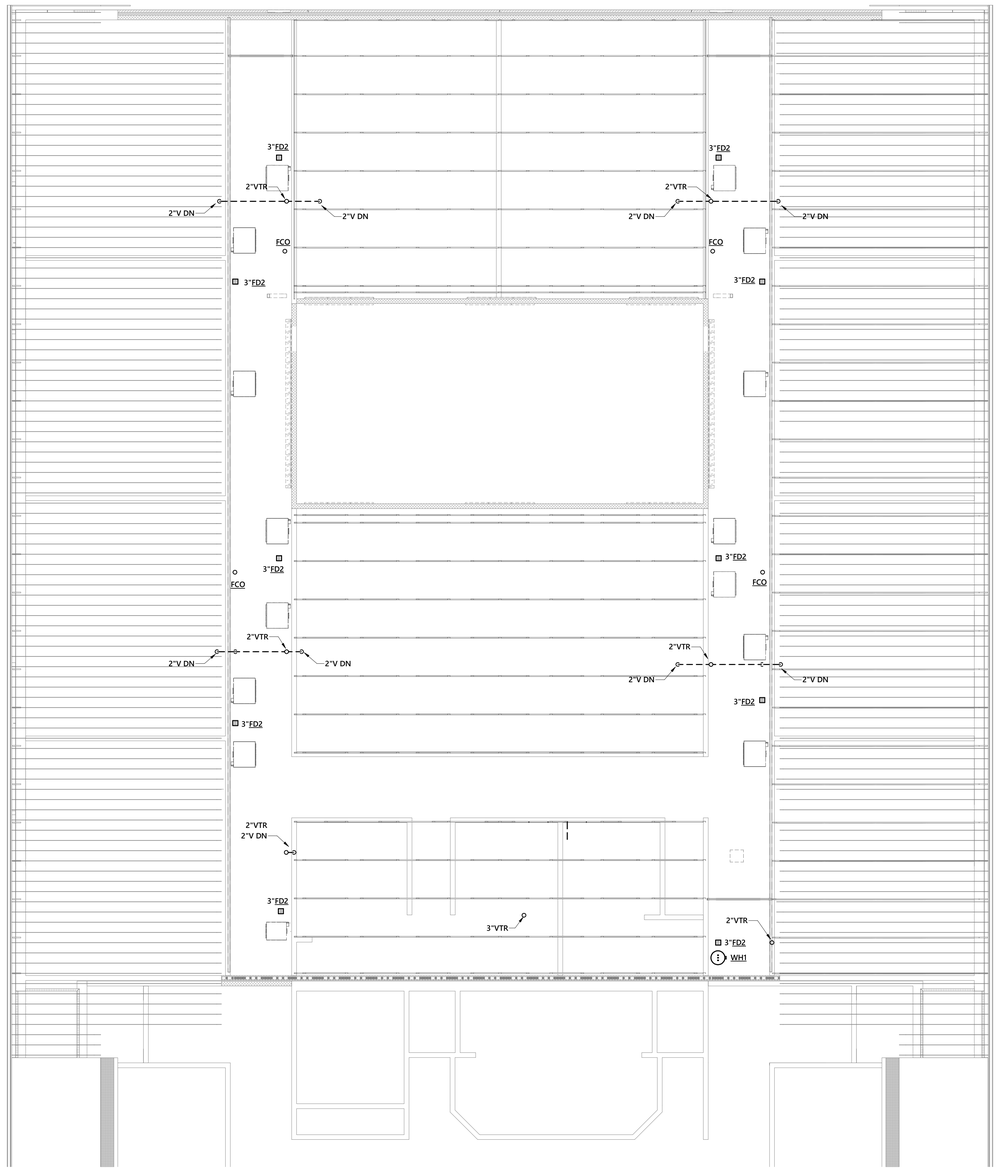
CLASSROOM ADDITION PLUMBING ABOVE GROUND WASTE & VENT PLAN

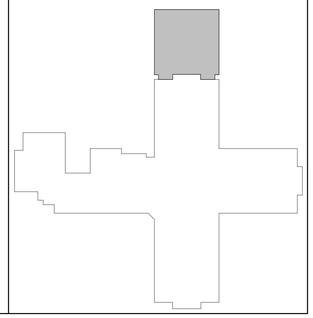
P1-102

OPTIMA# 21-0269R



1 **CLASSROOM ADDITION PLUMBING LOFT WASTE & VENT**
1/8" = 1'-0"

KEYPLAN



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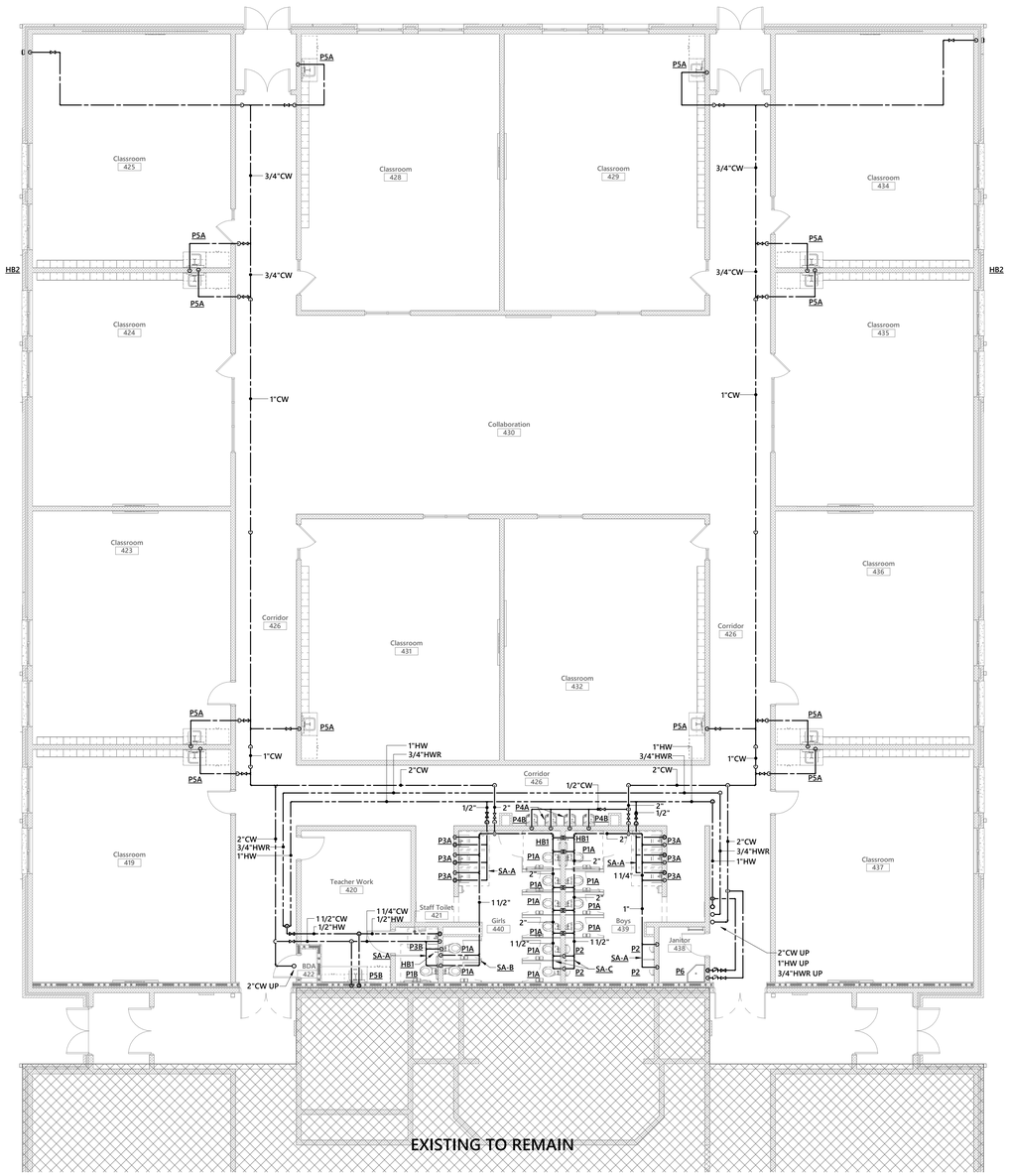
CLASSROOM ADDITION LOFT WASTE AND VENT PLAN

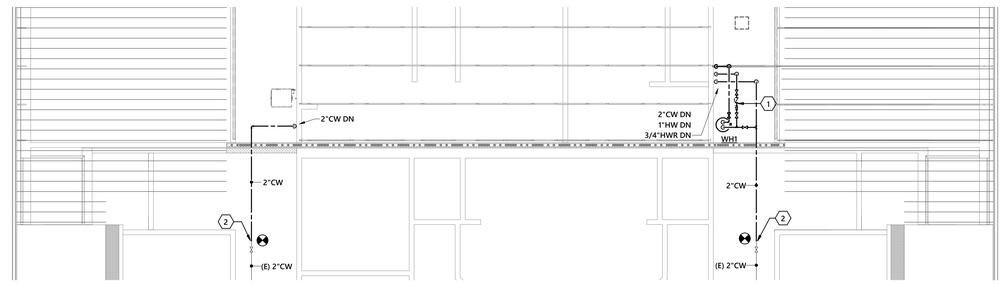
P1-103

Sheet No. 5 of 9

OPTIMA# 21-0269R



1 CLASSROOM ADDITION PLUMBING WATER SUPPLY PLAN
1/8" = 1'-0"

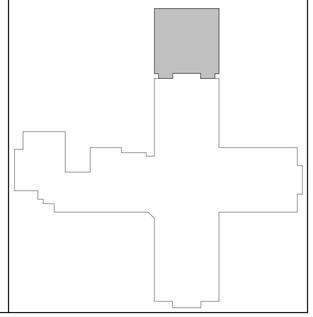


2 CLASSROOM ADDITION PLUMBING LOFT WATER SUPPLY PLAN
1/8" = 1'-0"

KEYED NOTES

1 PROVIDE HOT WATER RECIRCULATION ASSEMBLY AND SET TO 0.5 GPM.
2 CONNECT NEW 2"CW TO EXISTING 2"CW IN MECHANICAL LOFT.

KEYPLAN



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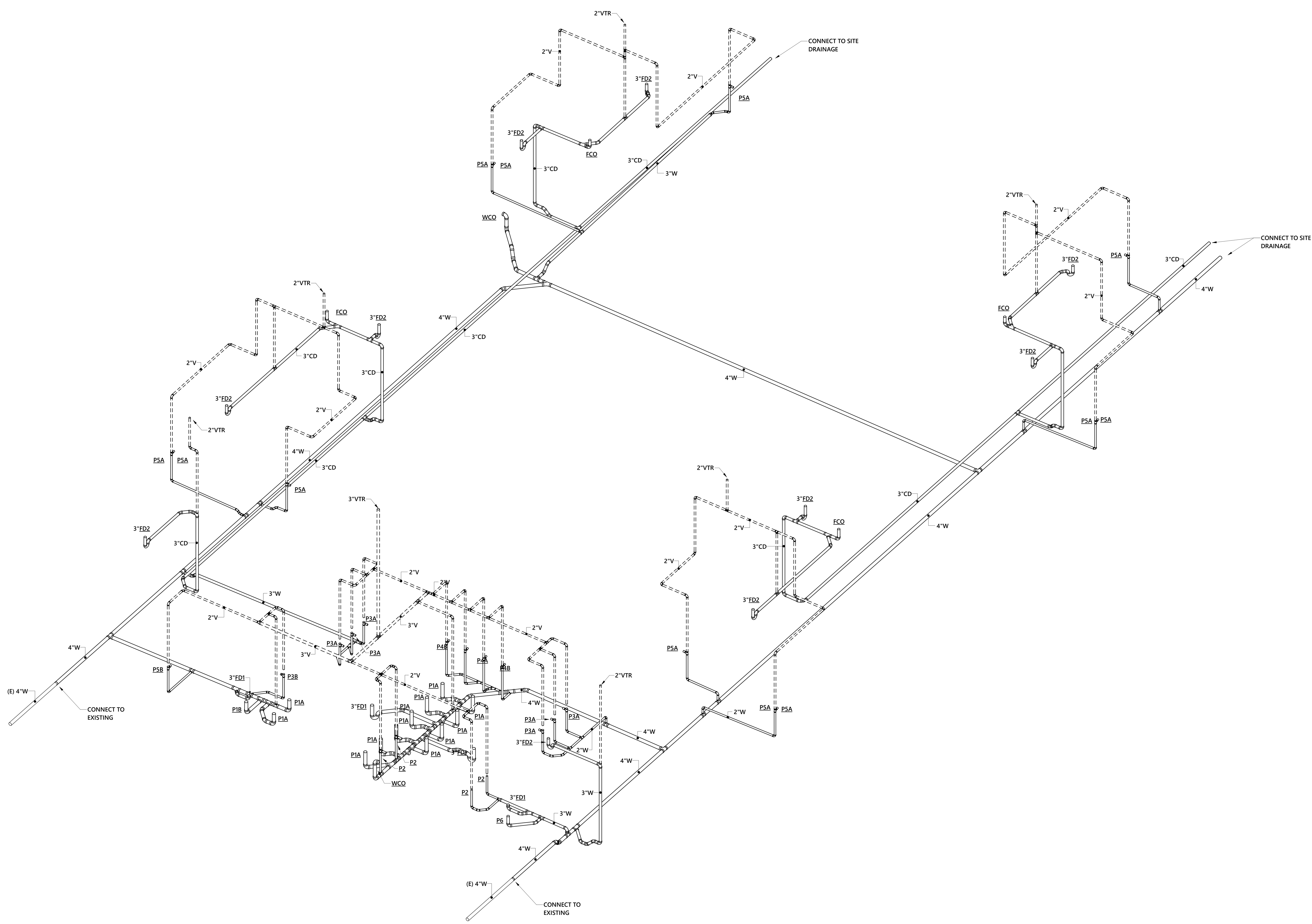
CLASSROOM ADDITION PLUMBING WATER SUPPLY PLAN

P1-201

Sheet No. 6 of 9

OPTIMA# 21-0269R



1 Plumbing Riser Diagram Waste & Vent

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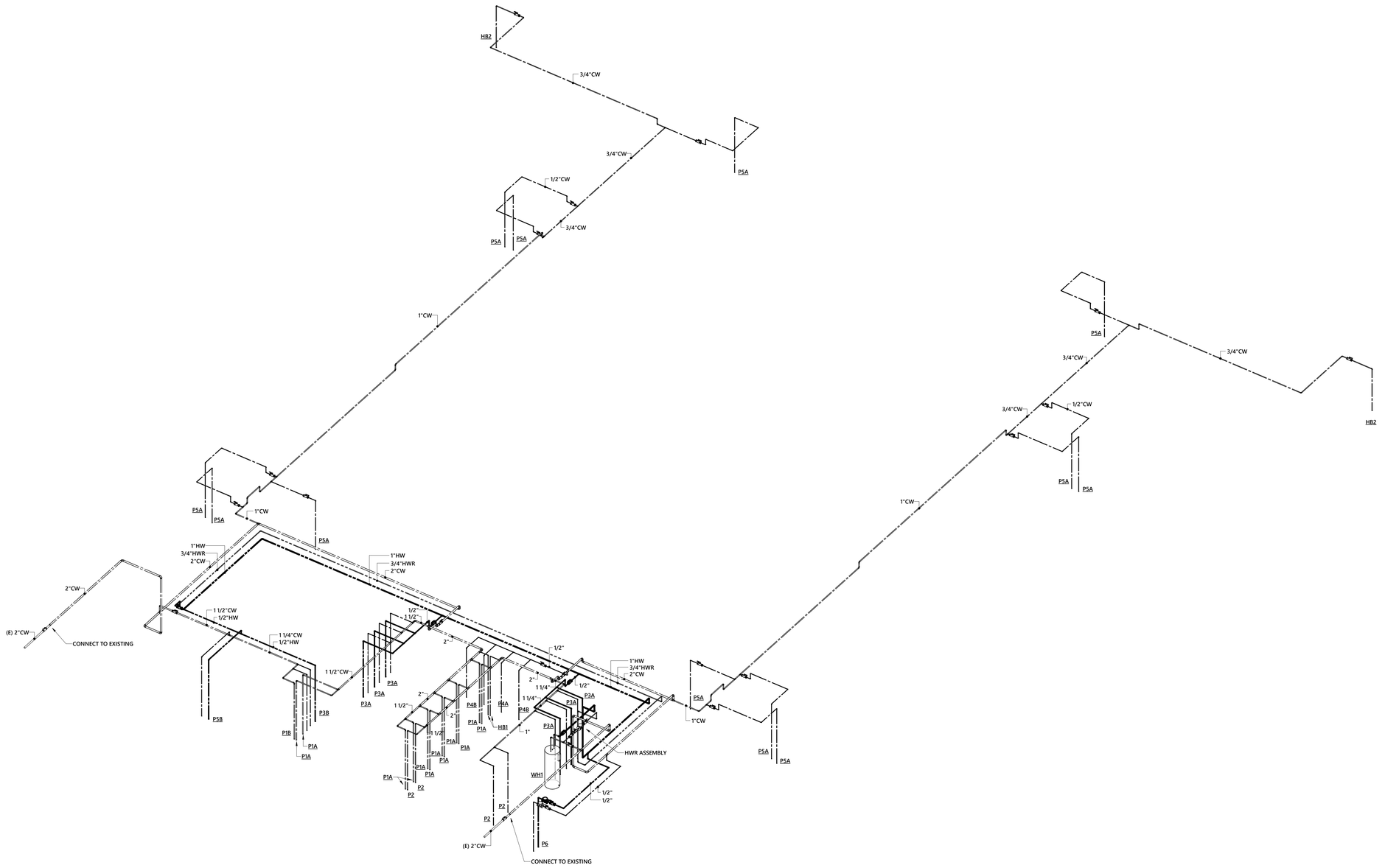
PLUMBING RISER - WASTE & VENT

P1-401

OPTIMA# 21-0269R



1 Plumbing Riser Diagram Water Supply

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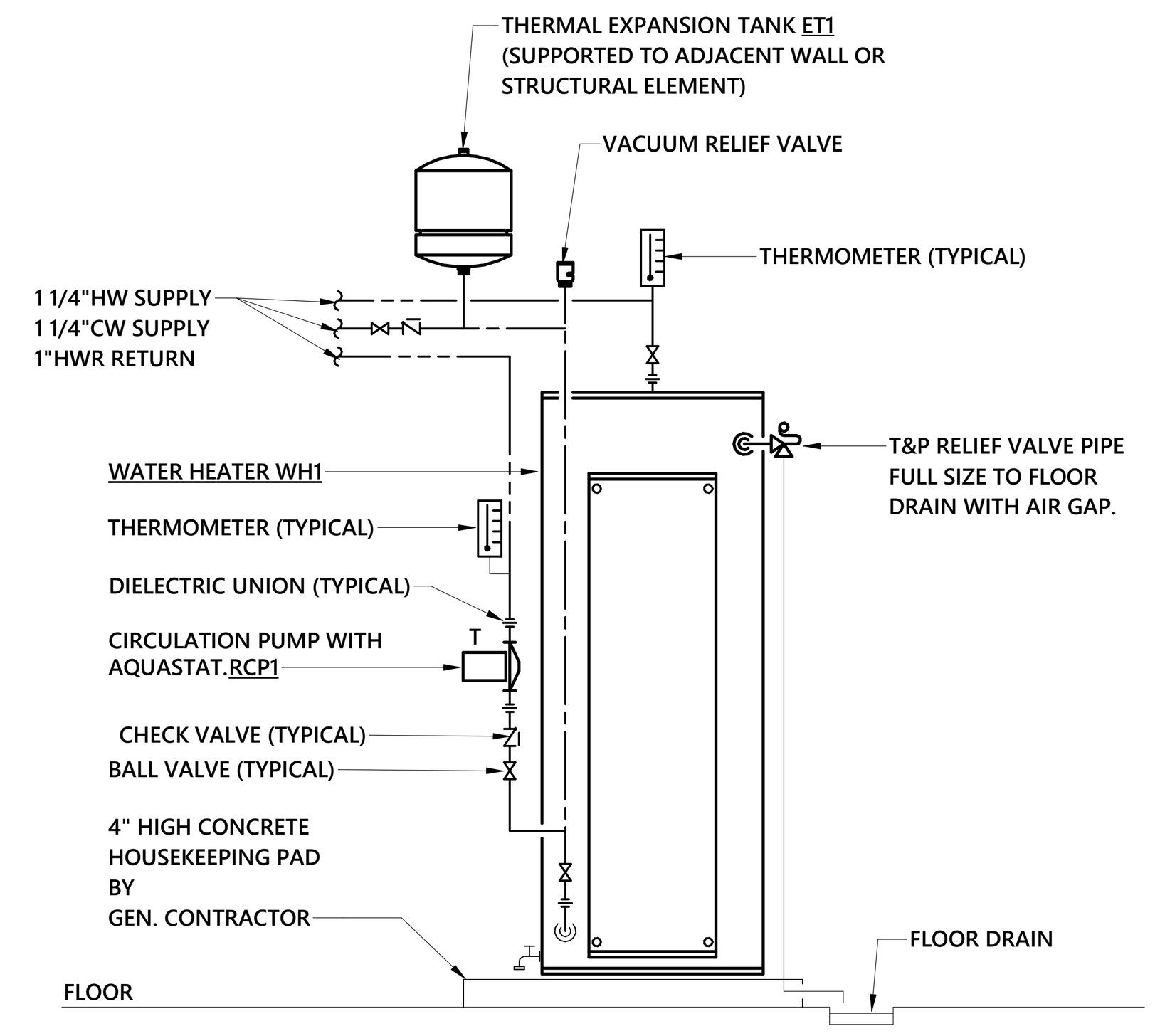
PLUMBING RISER - WATER SUPPLY

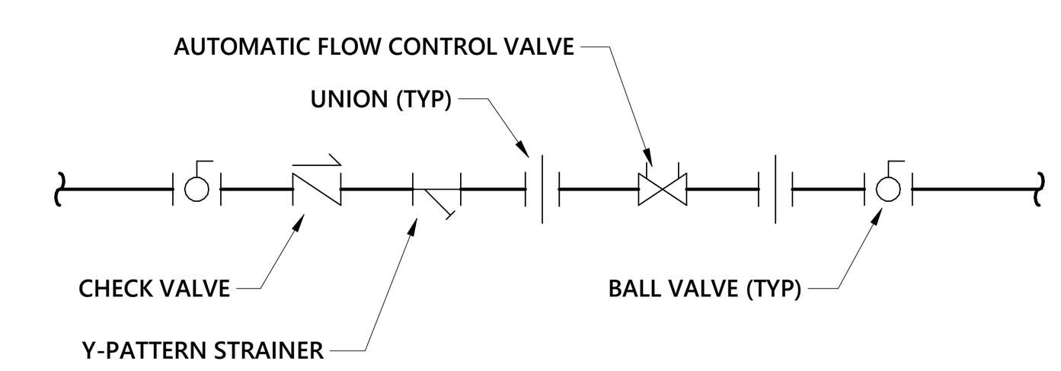
P1-402

Sheet No. 8 of 9

OPTIMA# 21-0269R

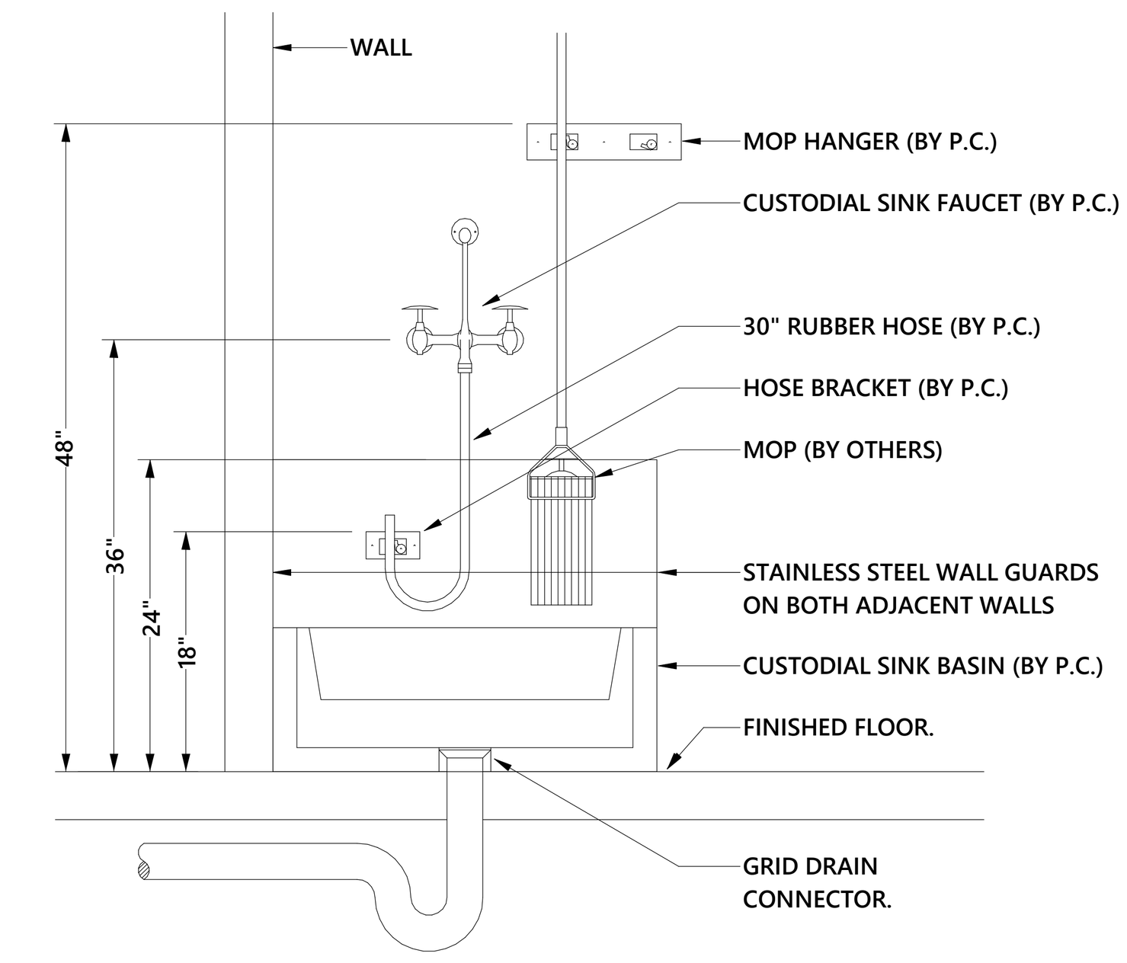


1 ELECTRIC WATER HEATER PIPING SCHEMATIC
NOT TO SCALE

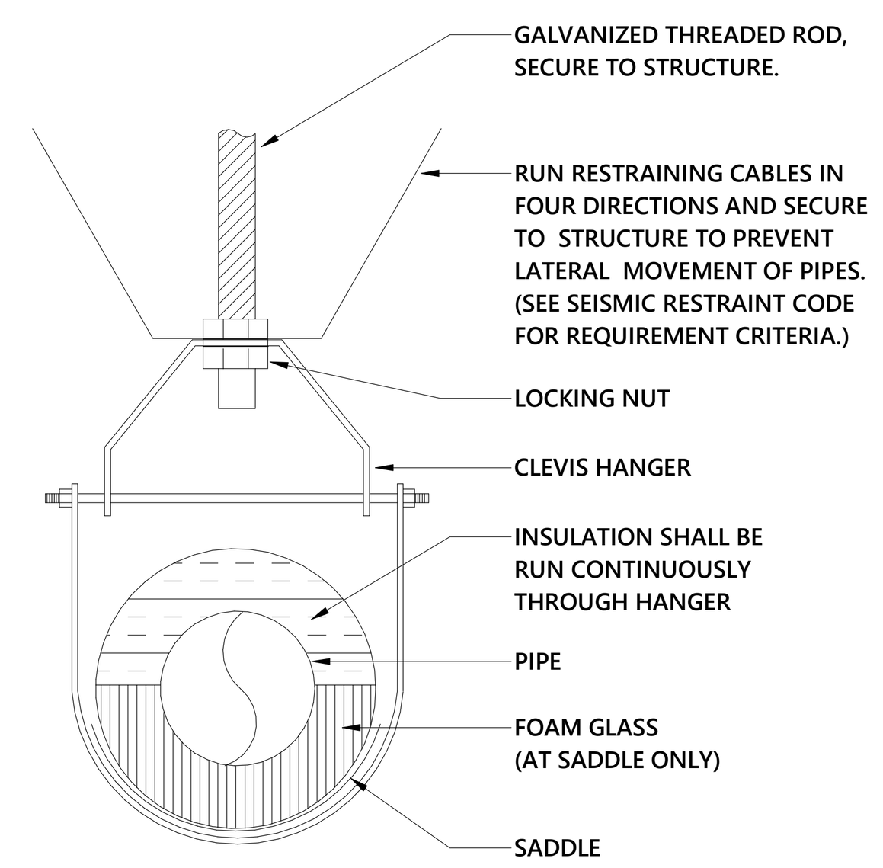


BALANCE THE DOMESTIC HOT WATER CIRCULATION SYSTEM AND PROVIDE THE ENGINEER WITH A DIGITIAL COPY OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO (2) WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING, AND BALANCING REQUIRED AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST TO THE OWNER. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT CERTIFIED TEST AND BALANCE CONTRACTOR.

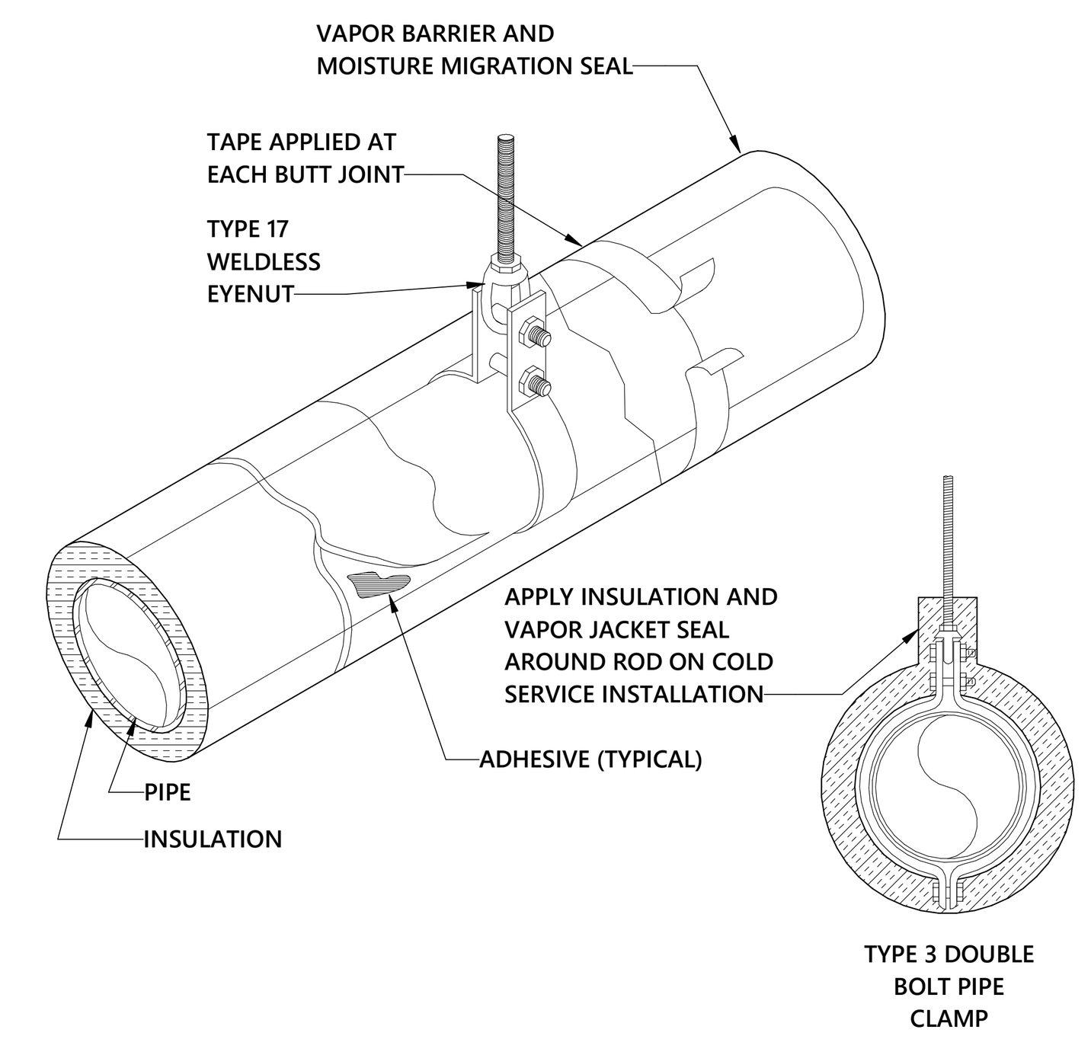
2 HOT WATER RETURN ASSEMBLY
NO SCALE



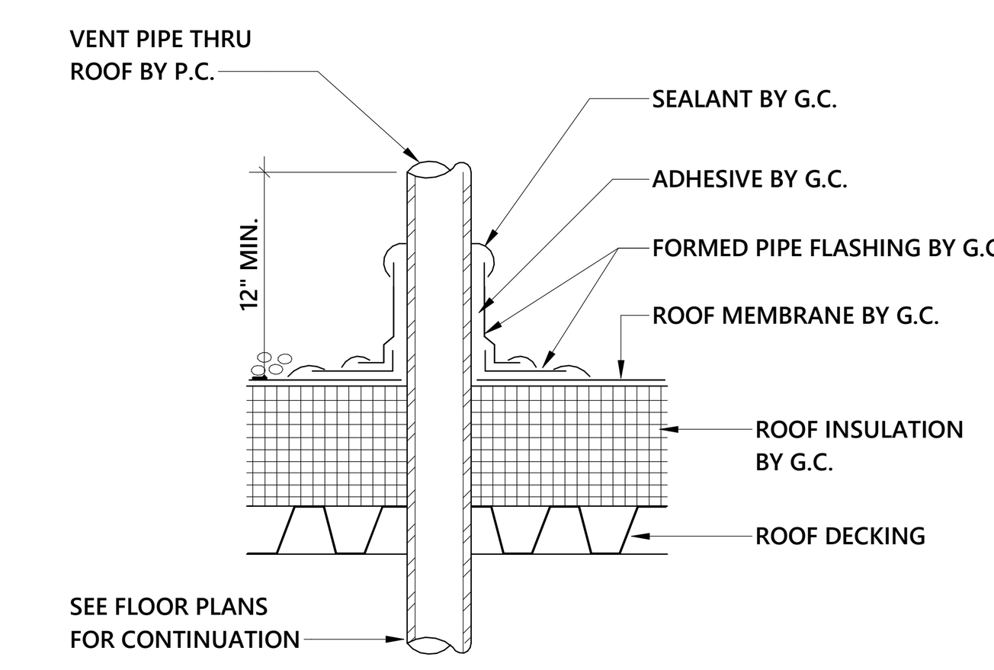
3 MOP BASIN AND ACCESSORIES
NO SCALE



4 PIPE HANGER SCHEMATIC
NOT TO SCALE



5 SUPPORT PIPE HANGER, INSULATION AND VAPOR JACKET
NOT TO SCALE



NOTE: SEE FLOOR PLANS FOR LOCATION OF PENETRATIONS

6 VENT THRU ROOF DETAIL
NOT TO SCALE

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PLUMBING DETAILS

P1-501

MECHANICAL GENERAL NOTES

SEE SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS. THESE GENERAL NOTES ARE INTENDED TO SUPPLEMENT THE SPECIFICATIONS. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY AT THE ENGINEER'S DISCRETION.

1. DO NOT SCALE DRAWINGS. SEE ARCHITECTURAL DRAWINGS AND REFLECTED CEILING PLANS FOR EXACT LOCATION OF DOORS, WINDOWS, CEILING DIFFUSERS, ETC.

2. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR. THIS INCLUDES ANY MODIFICATIONS TO ANY ASSOCIATED MECHANICAL, PLUMBING, OR ELECTRICAL SYSTEMS REQUIRED BY THIS SPECIFIC MANUFACTURER'S INSTALLATION INSTRUCTIONS.

3. ALL DUCTWORK SHALL BE GALVANIZED SHEET METAL CONSTRUCTED IN ACCORDANCE WITH THE LATEST SMACNA STANDARDS. ALL SUPPLY, RETURN AND OUTSIDE AIR DUCTWORK SHALL BE WRAPPED WITH 2" THICK DUCT WRAP WITH VAPOR BARRIER. INSULATION (INCLUDING FLEXIBLE DUCT INSULATION) SHALL HAVE A MINIMUM INSTALLED R-VALUE OF 6.0. ROOFTOP UNIT RETURN DUCTWORK AND TRANSFER DUCTS SHALL BE LINED WITH 1" THICK FIBERGLASS DUCT LINER FOR ACOUSTICAL PURPOSES. DUCT DIMENSIONS ON PLANS ARE FREE AREA SIZE.

4. ALL DUCTWORK SHALL BE SEALED PER THE REQUIREMENTS OF THE NORTH CAROLINA INTERNATIONAL MECHANICAL CODE. SEAL MEDIUM PRESSURE SUPPLY DUCTWORK FOR POSITIVE 3" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4. SEAL LOW PRESSURE SUPPLY, RETURN, OUTSIDE AIR, AND EXHAUST DUCTWORK FOR POSITIVE/NEGATIVE 2" PRESSURE CLASS, SMACNA SEAL CLASS A, SMACNA LEAKAGE CLASS 4.

5. ALL PIPING, DUCTS, VENTS, ETC., EXTENDING THROUGH WALLS AND ROOF SHALL BE FLASHED AND COUNTERFLASHED IN A WATERPROOF MANNER.

6. ALL PIPING AND DUCTWORK LOCATIONS SHALL BE COORDINATED WITH THE WORK UNDER OTHER DIVISIONS OF THE SPECIFICATIONS, TO AVOID INTERFERENCE.

7. THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TESTING AND BALANCING CONTRACTOR TO CONFIRM FILTERS ARE CLEAN, AND FREE OF DEBRIS PRIOR TO BEGINNING WORK. THE MECHANICAL CONTRACTOR SHALL REPLACE ANY DIRTY FILTERS, AS NEEDED. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.

8. UPON PROJECT COMPLETION, THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING THE OWNER INSTALLATION INFORMATION INCLUDING RECORD SUBMITTALS (WITH ANY SUBMITTAL REVIEW COMMENTS ADDRESSED) AND O&M MANUALS FOR EACH PIECE OF EQUIPMENT INCLUDING ALL SELECTED OPTIONS, THE NAME AND ADDRESS OF AT LEAST ONE SERVICE AGENCY, FULL CONTROL SYSTEM O&M AND CALIBRATION INFORMATION INCLUDING WIRING DIAGRAMS, SCHEMATICS, FULL SEQUENCE OF OPERATION, AND PROGRAMMED SETPOINTS. IN ADDITION, THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE TO HIRE A REGISTERED DESIGN PROFESSIONAL TO COMMISSION THE INSTALLED SYSTEM AND PROVIDE THE OWNER AND CODE REVIEWER A SEALED STATEMENT OF COMMISSIONING (PER 20128 NCECC APPENDIX C1).

9. PROVIDE A ONE YEAR WARRANTY FOR ALL WORK PERFORMED BEGINNING ON THE DAY THE SYSTEM IS COMPLETELY OPERATIONAL AND ACCEPTABLE BY THE OWNER.

10. PROVIDE MANUFACTURER'S RECOMMENDED CLEARANCES AROUND ALL EQUIPMENT FOR MAINTENANCE AND FILTER REMOVAL.

11. CONDENSATE DRAIN PIPING SHALL BE SCHEDULE 40 PVC PIPE AND FITTINGS. DRAINS FROM AIR HANDLING UNITS SHALL BE TRAPPED. CONDENSATE DRAINS SHALL BE INSULATED WITH 1" THICK ARMAFLEX INSULATION. MINIMUM DRAIN SIZE SHALL BE ¾". TERMINATE ROOFTOP UNIT DRAINS ON A CONCRETE SPLASHBLOCK.

12. ANY DEVICE REQUIRING A THERMOSTAT FOR CONTROL SHALL BE FURNISHED WITH A THERMOSTAT WHETHER INDICATED ON THE DRAWINGS OR NOT.

13. INSTALL THE TOP OF ALL THERMOSTATS, SENSORS, AND SWITCHES AT 4'-0" (MAXIMUM) ABOVE FINISH FLOOR. COORDINATE EXACT THERMOSTAT LOCATION WITH OWNER PRIOR TO INSTALLATION. ANY DEVICE ON A PERIMETER WALL SHALL BE MOUNTED ON A FOAM-FILLED ELECTRICAL BOX, WITH ALL GAPS BETWEEN BOX AND WALL SEALED TO PREVENT INFILTRATION.

14. CONTRACTOR SHALL LOCATE EXHAUST FANS, OUTLETS, AND GAS FLUES A MINIMUM OF 10'-0" FROM ANY OUTSIDE AIR INTAKE.

15. ALL CHILLED WATER, HOT WATER, AND CONDENSER WATER PIPING 2" AND LESS SHALL BE SCHEDULE 40 BLACK STEEL OR HARD-DRAWN TYPE-L COPPER PIPE AND FITTINGS. ALL CHILLED WATER AND HOT WATER PIPING GREATER THAN 2" SHALL BE (WELDED) SCHEDULE 40 BLACK STEEL. PROVIDE BRONZE VALVES AND FITTINGS WITH COPPER PIPING AND CAST IRON VALVES AND FITTINGS WITH SCHEDULE 40 BLACK STEEL.

16. CHILLED WATER PIPING SHALL BE INSULATED WITH 1½" THICK PHENOLIC CLOSED CELL, ASTM C1126 RIGID FOAM, 2.2 LBS. NOMINAL DENSITY, CFC FREE; ASTM C518, K-VALUE OF 0.13 AT 75° F. HOT WATER PIPING (1½" AND SMALLER) SHALL BE INSULATED WITH 1½" THICK FIBERGLASS INSULATION. HOT WATER PIPING (2" AND LARGER) SHALL BE INSULATED WITH 2" THICK FIBERGLASS INSULATION. FIBERGLASS INSULATION SHALL HAVE A K-VALUE OF 0.27 (OR LESS) AT 75°F. INSULATION SHALL HAVE A FACTORY APPLIED PRESSURIZED VAPOR BARRIER JACKET WITH PRESSURE SENSITIVE ADHESIVE SELF SEALING LAP. ALL FITTINGS SHALL HAVE PVC FITTING COVERS. ALL PIPING OUTSIDE SHALL HAVE A BITUMINOUS COATING ALUMINUM JACKET AND PVC FITTING COVERS.

17. ALL CHILLED WATER AND HOT WATER PIPING SHALL PITCH DOWN IN DIRECTION OF FLOW WITH MANUAL AIR VENTS AT ALL HIGH POINTS AND ½" RAIN VALVES AT ALL LOW POINTS.

18. PROVIDE UNIONS, FLANGES OR COUPLINGS AT CONNECTION TO ALL VALVES AND EQUIPMENT. DO NOT USE DIRECT WELDED OR THREADED CONNECTIONS TO VALVES, EQUIPMENT OR OTHER APPARATUS.

19. PROVIDE NON-CONDUCTING DIELECTRIC UNIONS WHENEVER CONNECTING DISSIMILAR METALS.

20. ALL ISOLATION VALVES, TERMINAL UNITS, CONTROLS, ETC. REQUIRING ACCESS AND SERVICE SHALL BE INSTALLED WITHIN 18" OF THE CEILING FOR SERVICE ACCESSIBILITY. LOCATIONS SHALL BE INDICATED ON THE CEILING GRID PER THE SPECIFICATIONS.

21. ALL EQUIPMENT CONCRETE PAD SIZES FOR MECHANICAL EQUIPMENT SHALL BE CONFIRMED WITH APPROVED SHOP DRAWING SUBMITTALS AND ASSOCIATED UNIT MANUFACTURER ANCHOR LOCATIONS PRIOR TO FABRICATION/INSTALLATION. THE MECHANICAL AND PLUMBING CONTRACTORS SHALL COORDINATE THE EXACT LOCATION OF MECHANICAL EQUIPMENT HOUSEKEEPING PADS WITH THE FLOOR DRAIN LOCATIONS PRIOR TO INSTALLATION OF DRAINS AT EQUIPMENT/PAD LOCATIONS.

22. DUCTWORK AND PIPING PASSING THROUGH/ABOVE ELECTRICAL ROOMS SHALL BE CLOSELY COORDINATED WITH THE ELECTRICAL CONTRACTOR. DUCTWORK OR PIPING SHALL NOT BE LOCATED ABOVE ELECTRICAL PANELS.

23. EQUIPMENT OPERATED DURING CONSTRUCTION SHALL USE FILTERED MEDIA TO PREVENT CONSTRUCTION DEBRIS FROM ENTERING COILS, DUCTWORK SYSTEMS, AIR TERMINALS ETC. AT COMPLETION OF CONSTRUCTION, MECHANICAL CONTRACTOR SHALL CLEAN ALL SYSTEMS WITH ALL CONTROL DEVICES WIDE OPEN AND REMOVE ANY REMAINING DEBRIS PRIOR TO TEST AND BALANCING. MECHANICAL CONTRACTOR SHALL REPLACE ALL FILTRATION WITH NEW FILTERS AT COMPLETION OF CONSTRUCTION. ANY DUCTWORK, AIR TERMINALS, AND/OR OTHER EQUIPMENT UPSTREAM OF FILTRATION SHALL BE CLEANED THOROUGHLY OF CONSTRUCTION DEBRIS BEFORE HANDING OVER TO OWNER.

24. PROVIDE COMBINATION FIRE/SMOKE DAMPERS WITH AN IONIZATION TYPE DUCT MOUNTED SMOKE DETECTOR IN DUCTED APPLICATIONS, OR SPOT DETECTORS IN OPENING APPLICATIONS (WITHIN 5'-0" OF THE DAMPER WITH NO AIR OUTLETS OR INLETS BETWEEN DETECTOR AND DAMPER), INSTALLED IN THE DUCT WIRED, TO CLOSE THE DAMPER UPON ACTIVATION. DUCT MOUNTED SMOKE DETECTORS AND SPOT DETECTORS SHALL BE SUPPLIED, WIRED FOR INTERFACE WITH FIRE ALARM SYSTEM AND UNIT SHUTDOWN BY THE ELECTRICAL CONTRACTOR. DETECTORS SHALL BE INSTALLED IN THE DUCT BY THE MECHANICAL CONTRACTOR.

25. THE MECHANICAL CONTRACTOR SHALL BE RESPONSIBLE FOR PROVIDING RESTRAINTS TO RESIST THE EARTHQUAKE EFFECTS ON THE MECHANICAL SYSTEMS. THE REQUIREMENTS FOR THOSE RESTRAINTS ARE FOUND IN THE LOCAL BUILDING CODE AND ASCE 7. THE ANCHORAGE OF THE MECHANICAL SYSTEMS SHALL COMPLY WITH THE REQUIREMENTS OF THE LOCAL BUILDING CODE AND ASCE 7.

26. MECHANICAL CONTRACTOR SHALL PROVIDE PRE-PRINTED COLOR-CODED PIPE LABELS WITH 1-1/2" HIGH LETTERING INDICATING SERVICE AND FLOW DIRECTION. PLASTIC PIPE LABELS UTILIZED IN A RETURN AIR PLENUM SHALL BE LISTED/APPROVED FOR USE IN A RETURN AIR PLENUM. ALL PIPING TO MATCH EXISTING FACILITIES STANDARD (IF APPLICABLE). OTHERWISE, PIPE LABELS SHALL MATCH THE FOLLOWING:
CHILLED WATER: GREEN BACKGROUND, WHITE LETTERING
HOT WATER PIPING: YELLOW BACKGROUND, BLACK LETTERING
REFRIGERANT PIPING: YELLOW BACKGROUND, BLACK LETTERING

27. ALL MECHANICAL EQUIPMENT SHALL BE U.L. LISTED AND LABELED AS A COMPLETE PACKAGE, NOT THOUGH INDIVIDUAL COMPONENTS OR PARTS. PROVIDE REQUIRED 3RD PARTY FIELD UL LISTING SERVICES AS REQUIRED TO COMPLY.

MECHANICAL DUCT SYMBOLS

SYMBOL	DESCRIPTION
16x8	SQUARE DUCT SIZE TAG (WIDTH x HEIGHT)
16/8	OVAL DUCT SIZE TAG (WIDTH / HEIGHT)
16"Ø	ROUND DUCT SIZE TAG (DIAMETER)
(E)	EXISTING DUCT TAG
	DUCT BEING DEMOLISHED
S/A	SUPPLY AIR
O/A	OUTDOOR AIR
R/A	RETURN AIR
E/A	EXHAUST AIR
L/A	RELIEF AIR
⊠	SUPPLY AIR DIFFUSER (4-WAY)
⧅	RETURN AIR GRILLE
▢ ▯	RETURN AIR GRILLE WITH SOUND BOOT
⧄	EXHAUST AIR GRILLE
⊗	POINT OF EXISTING TO NEW CONNECTION
◑	POINT OF DISCONNECT TO EXISTING CONNECTION
M.C.	MECHANICAL CONTRACTOR
E.C.	ELECTRICAL CONTRACTOR
P.C.	PLUMBING CONTRACTOR
N.I.C.	NOT IN CONTRACT
(EX)	EXISTING
AFF	ABOVE FINISHED FLOOR
DN	DOWN
UP	UP
X X	SECTION CUT REFERRING DETAIL NUMBER REFERRING SHEET NUMBER

MECHANICAL ACCESSORIES SYMBOL LEGEND

M	RECTANGULAR DUCT MOUNTED MOTOR OPERATED DAMPER, INTERLOCK WITH FAN AS INDICATED. (DAMPER BY M.C.)

MECHANICAL PIPING SYMBOLS

SYMBOL	DESCRIPTION
	BUTTERFLY VALVE
	3-PIECE BALL VALVE
	CHECK VALVE
	STRAINER WITH BLOWDOWN VALVE WITH HOSE CONN.
	BALANCING VALVE
	B&G CIRCUIT SETTER
	UNION
	THERMOMETER
P	PRESSURE GAGE & COCK
	GAGE COCK
	FLOW SWITCH
	ECCENTRIC REDUCER
	CONCENTRIC REDUCER
⊗	STEAM TRAP, F&T
⊠	STEAM TRAP, TB
	CONTROL VALVE
	GAS COCK
	PRESSURE REDUCING/REGULATING VALVE
S	SOLENOID VALVE

MECHANICAL PIPING SYSTEMS LEGEND

CHR	CHILLED WATER RETURN
CHS	CHILLED WATER SUPPLY
HWR	HOT WATER RETURN
HWS	HOT WATER SUPPLY

COORDINATION DRAWINGS

THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA (INCLUDING CABLE TRAY) AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS FOR SHOP DRAWINGS AND COORDINATION DRAWINGS:

1, ALL SHOP AND COORDINAGION DRAWINGS WILL BE 1/4" = 1'-O" SCALE
2. DRAWINGS WILL BE ORIGINAL DRAWINGS AND NOT OVERLAYS OF THE CONTRACT/DESIGN
3. COORDINATION DRAWINGS WILL BE DRAWN ON REPRODUCIBLE MATERIAL 48'x36".
4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

ABBREVIATIONS

Ø	ROUND	LVR	LOUVER
ABV	ABOVE	LWT	LEAVING WATER TEMPERATURE
AC	AIR CONDITIONING	M/A	MIXED AIR
AD	AREA DRAIN	MAX	MAXIMUM
ADD	ADDENDUM	MBH	ONE THOUSAND BTU PER HOUR
AFF	ABOVE FINISHED FLOOR	MCF	ONE THOUSAND CUBIC FEET
AFUE	ANNUAL FUEL UTILIZATION EFFICIENCY	MD	MOTORIZED DAMPER
ALT	ALTERNATE	MECH	MECHANICAL
AP	ACCESS PANEL	MFR	MANUFACTURER
ARCH	ARCHITECT/ARCHITECTURAL	MIN	MINIMUM
BFF	BELOW FINISHED FLOOR	MISC	MISCELLANEOUS
BLW	BELOW	MTR	MOTOR
BTU	BRITISH THERMAL UNITS	MU/A	MAKE-UP/AIR
BTUH	BRITISH THERMAL UNITS PER HOUR	NC	NOISE CRITERIA
CAP	CAPACITY	NC	NORMALLY CLOSED
CB	CATCH BASIN	NIC	NOT IN CONTRACT
CFM	CUBIC FEET PER MINUTE	NO	NUMBER
CLG	CEILING	NO	NORMALLY OPEN
CO	CLEAN OUT	NTS	NOT TO SCALE
CW	COLD WATER	O	OXYGEN
D	DEGREE	O/A	OUTSIDE AIR
DB	DRY BULB	ORD	OVERFLOW ROOF DRAIN
DIA	DIAMETER	PD	PRESSURE DROP
DN	DOWN	PIV	POST INDICATOR VALVE
DW	DISTILLED WATER	PLBG	PLUMBING
EA	EACH	PRESS	PRESSURE
EAT	ENTERING AIR TEMPERATURE	PRV	PRESSURE REDUCING VALVE
ELEC	ELECTRICAL	PSI	POUNDS PER SQUARE INCH
EQUIP	EQUIPMENT	PSIG	POUNDS PER SQUARE INCH GAUGE
EWC	ELECTRIC WATER COOLER	PWR	POWER
EWT	ENTERING WATER TEMPERATURE	R	DUCT RISER
E/A	EXHAUST AIR	R/A	RETURN AIR
EXIST	EXISTING	RCP	RADIANT CEILING PANEL
F	DEGREES FAHRENHEIT	RD	ROOF DRAIN
FCO	FLOOR CLEAN OUT	REC	RECESSED
FD	FLOOR DRAIN	RED	REDUCER
FD	FIRE DAMPER	RH	RELATIVE HUMIDITY
FDV	FIRE DEPARTMENT VALVE	RL/A	RELIEF AIR
FL	FLOOR	RM	ROOM
FO	FUEL OIL	RPM	REVOLUTIONS PER MINUTE
FOV	FUEL OIL VENT	RW	RAIN WATER
FOR	FUEL OIL RETURN	SF	SQUARE FOOT
FOS	FUEL OIL SUPPLY	S/A	SUPPLY AIR
FPM	FEET PER MINUTE	SAN	SANITARY
FS	FLOOR SINK	SF	SQUARE FOOT
FT	FOOT/FEET	SD	SMOKE DAMPER
FTR	FIN TUBE RADIATION	SM	SURFACE MOUNT
GAL	GALLON	SP	STANDPIPE
GC	GENERAL CONTRACTOR	SP	STATIC PRESSURE
GPM	GALLONS PER MINUTE	STM	STEAM
GW	GREASE WASTE	T	THERMOSTAT
HB	HOSE BIB	TD	TEMPERATURE DROP
HP	HORSE POWER	TDR	TRENCH DRAIN
HTG	HEATING	TEMP	TEMPERATURE
HTR	HEATER	TYP	TYPICAL
HW	HOT WATER	UG	UNDERGROUND
HYD	HYDRANT	VAC	VACUUM
ID	INDIRECT	V	VENT
IN	INCH	VAV	VARIABLE AIR VOLUME
INV	INVERT	VENT	VENTILATION
LB	POUND	VTR	VENT THROUGH ROOF
LB/HR	POUNDS PER HOUR	W	WASTE
LAT	LEAVING AIR TEMPERATURE	WB	WET BULB
LP	LOW PRESSURE	WCO	WALL CLEAN OUT
LPG	LIQUEFIED PETROLEUM GAS	WH	WALL HYDRANT

TESTING, ADJUSTING, AND BALANCING

1. THE MECHANICAL CONTRACTOR SHALL BALANCE ALL MECHANICAL SYSTEMS TO THE PERFORMANCE SPECIFICATIONS INDICATED ON PLANS AND PROVIDE THE ENGINEER WITH THREE COPIES OF A COMPLETE TEST AND BALANCE REPORT. THE REPORT IS TO BE ISSUED A MINIMUM OF TWO WEEKS PRIOR TO PROJECT COMPLETION. THE TEST AND BALANCE REPORT WILL BE SUBJECT TO REVIEW AND APPROVAL BY THE ENGINEER. ANY ADDITIONAL TESTING, ADJUSTING AND BALANCING REQUIRED (AT ENGINEER'S REQUEST) AFTER REVIEW OF THE INITIAL REPORT SHALL BE PROVIDED AT NO ADDITIONAL COST. TEST AND BALANCE REPORT TO BE COMPLETED BY AN INDEPENDENT, CERTIFIED TEST AND BALANCE CONTRACTOR.

2. CONDUCT TESTING AND BALANCING IN ACCORDANCE WITH TECHNICAL PORTIONS OF THE AABC "NATIONAL STANDARDS FOR TESTING AND BALANCING HVAC SYSTEMS", LATEST EDITION.

3. INSTRUMENTS USED FOR BALANCING MUST HAVE BEEN CALIBRATED WITHIN A PERIOD OF SIX (6) MONTHS PRIOR TO BALANCING. SUBMIT SERIAL NUMBERS, AND DATES OF CALIBRATION OF ALL INSTRUMENTS TO BE USED PRIOR TO THE START OF WORK.

4. SET HVAC SYSTEM AIRFLOW AND WATER FLOW RATES WITHIN THE FOLLOWING TOLERANCES:

   A. SUPPLY, RETURN, AND EXHAUST FANS AND EQUIPMENT WITH FANS: MINUS 5 TO PLUS 10 PERCENT.

   B. AIR OUTLETS AND INLETS: PLUS/MINUS 10 PERCENT.

   C. HEATING-WATER FLOW RATE: 0 TO MINUS 10 PERCENT.

   D. COOLING-WATER FLOW RATE: 0 TO MINUS 5 PERCENT.

5. REFER TO SPECIFICATION SECTION 230593 AND CONTRACT DRAWINGS IN THEIR ENTIRETY FOR ADDITIONAL REQUIREMENTS.

MECHANICAL DEMOLITION NOTES

1. THE MECHANICAL CONTRACTOR SHALL VISIT SITE PRIOR TO BEGINNING WORK TO DETERMINE THE LEVEL OF DEMOLITION REQUIRED AND INCLUDE ALL NECESSARY PRICING IN THEIR BID.

2. IT IS THE MECHANICAL CONTRACTORS RESPONSIBILITY TO FIELD VERIFY ALL EXISTING DUCTWORK AND PIPING. ANY DISCREPANCIES BETWEEN EXISTING CONDITIONS AND MECHANICAL PLANS SHOULD BE BROUGHT TO THE ATTENTION OF THE MECHANICAL ENGINEER.

3. M.C. SHALL VERIFY ALL EXISTING PIPING SYSTEMS TO REMAIN ARE INSULATED WITH VAPOR BARRIER INTACT. IF ANY PORTION OF THE PIPING SYSTEM IS MISSING INSULATION OR DETERMINED DURING ANY PHASE OF THE PROJECT AS DEFECTIVE, THAT PORTION SHALL BE PROVIDED WITH NEW INSULATION. MINOR TEARS ON EXISTING PIPING MAY BE REPAIRED WITH TAPES, ADHESIVE, OR SEALANT. EXISTING PIPING SYSTEMS SHALL INCLUDE CHILLED WATER, CONDENSER WATER, HOT WATER, STEAM & STEAM CONDENSATE, REFRIGERANT, AND A/C CONDENSATE DRAIN PIPING. THE MECHANICAL CONTRACTOR SHALL MAKE PROVISIONS IN THEIR BASE BID TO COVER ALL COSTS NECESSARY ACHIEVE A CONTINUOUS VAPOR BARRIER THROUGHOUT THESE EXISTING SYSTEMS. REFER TO SPECIFICATIONS SECTION 230700/ MECHANICAL GENERAL NOTES FOR INSULATION MATERIAL REQUIREMENTS.

4. FOR ALL EXISTING HVAC EQUIPMENT AND DUCTWORK NOTED TO REMAIN AND SERVING AREA OF RENOVATION, MECHANICAL CONTRACTOR SHALL INSPECT EQUIPMENT (AND ANY ASSOCIATED CONTROLS, VALVES, DAMPERS, ETC.) TO VERIFY PROPER WORKING ORDER. MECHANICAL CONTRACTOR TO SERVICE AND CLEAN EXISTING HVAC UNITS TO ENSURE DESIGN AIRFLOW AND COOLING/HEATING CAPACITIES ARE OBTAINED. ANY EQUIPMENT FOUND TO BE INOPERABLE OR SHORT OF DESIGN CAPACITIES SHALL BE BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO PROJECT COMPLETION. PROVIDE CLEAN FILTERS IN ALL UNITS AT COMPLETION OF PROJECT. DAMAGED DUCTWORK SHALL BE REPAIRED.

2018 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - MECHANICAL SUMMARY

C401 METHOD OF COMPLIANCE

- ■ 2018 NCECC CHAPTER 4
- ☐ ASHRAE 90.1-2013 PRESCRIPTIVE
- ☐ ASHRAE 90.1-2013 PERFORMANCE
- ☐ N/A (EXISTING LIGHTING, HVAC, AND DOM. WATER HEATING SYSTEMS TO REMAIN)
- ☐ COMCHECK PROVIDED (2018 NCECC)
- ☐ COMCHECK PROVIDED (90.1-2013)
- ☐ ENERGY MODELING DATA PROVIDED

C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

- ☐ C406.2 EFFICIENT MECH EQUIPMENT
- ■ C406.3 REDUCED LTG DENSITY
- ☐ C406.4 ENHANCED LTG CONTROLS
- ☐ C406.5 ON-SITE RENEWABLE ENERGY
- ☐ C406.6 DEDICATED OA SYSTEM
- ☐ C406.7 SERVICE WATER HEATING

C301 CLIMATE ZONE

4A - HARNETT COUNTY, NORTH CAROLINA DESIGN CONDITIONS

DESIGN CONDITIONS
EXTERIOR (ASHRAE 90.1-2013 TABLE D-1)

winter dry bulb	22° F.
summer dry bulb	94° F.
summer wet bulb	76° F.

INTERIOR (2018 NCECC SECTION C302.1)

winter dry bulb	72° F.
summer dry bulb	75° F.

C403.2 HEATING & COOLING LOADS AND EQUIPMENT & SYSTEM SIZING

BUILDING HEATING LOAD	324,105 BTUH (peak)
BUILDING COOLING LOAD	444,486 BTUH (peak)
INSTALLED HEATING CAPACITY	N/A - EXISTING TO REMAIN
INSTALLED COOLING CAPACITY	N/A - EXISTING TO REMAIN

C403.2.3 & C406.2 - REQUIRED & INCREASED HVAC EQUIPMENT PERFORMANCE

SYSTEM DESCRIPTION - 4-PIPE BLOWER COILS WITH HOT WATER REHEAT AND CHILLED WATER COOLING

- ■ MINIMUM HVAC EQUIP EFFICIENCY COMPLIANCE - TABLE C403.2.3
- ☐ INCREASED HVAC EQUIP EFFICIENCY COMPLIANCE - 10% OVER TABLE C403.2.3

EQUIP TYPE	SIZE CATEGORY (BTUH)	SUBCATEGORY	C403.2.3 MINIMUM EFFICIENCY (a)	10% INCREASED EFF. (a)	DESIGN EFFIC.
TABLE C403.2.3(1) - UNITARY AIR CONDITIONERS AND CONDENSING UNITS					
AIR COND, WATER COOL	< 65,000	SPLIT SYSTEM & SINGLE PACKAGE	12.1 EER 12.3 IEER	13.3 EER 13.5 IEER	SEE SCHEDULE

C403.2.4 THRU C403.2.11

- ■ HVAC SYSTEMS ARE FULLY COMPLIANT WITH THE REQUIREMENTS FOR HVAC SYSTEM CONTROL, VENTILATION, ENERGY RECOVERY, DUCT AND PLENUM INSULATION AND SEALING, PIPING INSULATION, AND SYSTEM COMPLETION.

C403.2.12 - AIR SYSTEM DESIGN AND CONTROL

- ■ ALL FANS INSTALLED ON THE PROJECT ARE 5 HP OR LESS AND ARE EXEMPT FROM THESE REQUIREMENTS.
- ☐ FANS ABOVE 5 HP MEET THE CFM LIMITATIONS SHOWN BELOW:

OPTION 1 - FAN SYSTEM MOTOR NAMEPLATE HP - TABLE C403.2.12.1(1)

ALLOWABLE NAMEPLATE MOTOR HP	CONSTANT VOLUME MINIMUM CFM	VARIABLE VOLUME MINIMUM CFM	DESIGN CFM
7.5	6,818 CFM	5,000 CFM	SEE SCHEDULE
10	9,091 CFM	6,667 CFM	SEE SCHEDULE
15	13,636 CFM	10,000 CFM	SEE SCHEDULE
20	18,182 CFM	13,333 CFM	SEE SCHEDULE
25	22,727 CFM	16,667 CFM	SEE SCHEDULE
30	27,272 CFM	20,000 CFM	SEE SCHEDULE
40	36,364 CFM	26,667 CFM	SEE SCHEDULE
50	45,455 CFM	33,333 CFM	SEE SCHEDULE

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS).

- ■ ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.
- ☐ NOT APPLICABLE.

C408 - SYSTEM COMMISSIONING

- ☐ PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.
- ■ PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.

EQUIPMENT ABBREVIATIONS

AC	AIR CONDITIONING UNIT	EWH	ELECTRIC WATER HEATER
ACC	AIR COOLED CONDENSER	FCU	FAN COIL UNIT
ACCU	AIR COOLING CONDENSING UNIT	FP	FIRE PUMP
AHU	AIR HANDLING UNIT	GI	GREASE INTERCEPTOR
AS	AIR SEPARATOR	GRV	GRAVITY ROOF VENTILATOR
B	BOILER	HWP	HEATING WATER PUMP
CH	CHILLER	HX	HEAT EXCHANGER
CT	COOLING TOWER	HRU	HEAT RECOVERY UNIT
CUH	CABINET UNIT HEATER	PRV	POWER ROOF VENTILATOR
CWP	CONDENSER WATER PUMP	RE	RETURN/EXHAUST FAN
CHWP	CHILLED WATER PUMP	RTU	ROOFTOP UNIT
DBP	DOMESTIC WATER BOOSTER PUMP	SEP	SEWAGE EJECTOR PUMP
DC	DUCT MOUNTED COIL	SF	SUPPLY FAN
DCP	DOMESTIC WATER CIRCULATING PUMP	SP	SUMP PUMP
EF	EXHAUST FAN	UH	UNIT HEATER
EDC	ELECTRIC DUCT COIL	WH	WATER HEATER
ET	EXPANSION TANK		

COMMISSIONING NOTE - 2018 NCECC C408

THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SYSTEM COMMISSIONING PER 2018 NCECC SECTION 408. MC SHALL HIRE A REGISTERED DESIGN PROFESSIONAL (ENGINEERED SEALED IN NC OR CERTIFIED COMMISSIONING PROFESSIONAL) TO PERFORM THE COMMISSIONING DUTIES DESCRIBED IN SECTION C408, AND PROVIDE OWNER AND CODE OFFICIAL WITH A SEALED STATEMENT OF COMPLETION (APPENDIX C1). THE CONTRACTOR SHALL COORDINATE WITH COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

MECHANICAL SHEET INDEX

SHEET NUMBER	SHEET NAME
M1-001	MECHANICAL LEGEND AND NOTES
M1-002	MECHANICAL SCHEDULES
M1-003	MECHANICAL CONTROLS SEQUENCE OF OPERATION
M1-102	CLASSROOM ADDITION MECHANICAL PLAN - NEW WORK
M1-103	MECHANICAL LOFT MECHANICAL PLAN
M1-104	MECHANICAL LOFT MECHANICAL PIPING PLAN
M1-501	MECHANICAL DETAILS

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022
PROJECT #: 02110.200
DRAWN BY: TAL
CHECKED BY: GPK

MECHANICAL
LEGEND AND NOTES

M1-001

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt
8/12/2022 12:40:24 PM

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-59

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	712	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-60

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	714	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-61

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	766	19	143	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			180	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			200	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-62

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	738	19	143	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			180	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			200	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-63

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	713	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-64

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	717	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-65

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	873	22	165	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			205	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			215	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-66

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	873	22	165	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			205	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			215	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-67

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	717	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-68

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	713	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-69

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)	CALCULATED AREA E/A (CFM)
OFFICE	5	0.06	5	-	255	2	10	15	-
TOILET	-	-	-	70 PER FIXTURE	16 FIXTURES	0	0	0	1120
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			31		
				TOTAL OUTSIDE AIR PROVIDED (CFM)			50		
						TOTAL EXHAUST AIR REQUIRED (CFM)			1120
						TOTAL EXHAUST AIR PROVIDED (CFM)			1300

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-70

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	766	19	143	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			180	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			190	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-71

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	714	18	135	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			170	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			180	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-72

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	545	14	105	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			130	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			150	

VENTILATION CALCULATIONS (NCMC 2018, SECT 403): AHU-73

OCCUPANCY CLASSIFICATION	PEOPLE O/A RATE IN BREATHING ZONE (CFM/PERSON)	AREA O/A RATE IN BREATHING ZONE (CFM/SQ. FT.)	DEFAULT OCCUPANCY DENSITY (PEOPLE/1000 SQ. FT.)	EXHAUST AIRFLOW RATE (CFM/SQ. FT.)	AREA (SQ. FT.)	CALCULATED OCCUPANCY (PEOPLE)	CALCULATED PEOPLE O/A (CFM)	CALCULATED AREA O/A (CFM)
CLASSROOMS (AGES-5-8)	7.5	0	25	-	545	14	105	-
				TOTAL OUTSIDE AIR REQUIRED (PEOPLE + AREA, CFM)			130	
				TOTAL OUTSIDE AIR PROVIDED (CFM)			150	

FAN COIL UNIT SCHEDULE

				COOLING COIL									HEATING COIL								ELECTRICAL DATA				
SYMBOL	TOTAL AIRFLOW (CFM)	OUTSIDE AIRFLOW (CFM)	ESP	TOTAL CAPACITY (MBH)	SENSIBLE CAPACITY (MBH)	GPM	EWT (°F)	LWT (°F)	# ROWS	MAX. PD (FT.)	RUNOUT	TOTAL CAPACITY (MBH)	GPM	EWT (°F)	LWT (°F)	# ROWS	MAX. PD (FT.)	RUNOUT	MOTOR HP	VOLTAGE	PH	MANUFACTURER	MODEL	CONFIGURATION
AHU-59	900	180	0.50	43950	28850	8.1	44	56	6	10.0	1 1/4"	77380	4.5	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-60	1100	180	0.50	51370	34460	9.4	44	56	6	10.0	1 1/4"	86040	5.2	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-61	800	190	0.50	39950	26240	7.4	44	56	6	10.0	1 1/4"	76720	4.2	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-62	900	190	0.50	43950	28850	8.1	44	56	6	10.0	1 1/4"	77380	4.5	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-63	1150	180	0.50	53110	35750	9.7	44	56	6	10.0	1 1/4"	84490	5.4	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-64	1000	180	0.50	47790	31820	8.8	44	56	6	10.0	1 1/4"	80190	4.9	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-65	1000	215	0.50	47790	31820	8.8	44	56	6	10.0	1 1/4"	80190	4.9	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-66	1200	215	0.50	54820	37040	10.0	44	56	6	10.0	1 1/4"	86690	5.5	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-67	950	180	0.50	45830	30210	8.4	44	56	6	10.0	1 1/4"	77960	4.7	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-68	800	180	0.50	39950	39950	7.4	44	56	6	10.0	1 1/4"	76720	4.2	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-69	475	50	0.50	20870	14320	4.1	44	56	6	10.0	1"	33920	2.0	160	140	2	5.0	3/4"	0.5 hp	480	3	TRANE	BCHD018	HORIZONTAL
AHU-70	950	190	0.50	45830	30210	8.4	44	56	6	10.0	1 1/4"	77960	4.7	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-71	1150	180	0.50	53110	35750	9.7	44	56	6	10.0	1 1/4"	84490	5.4	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-72	900	150	0.50	43950	28850	8.1	44	56	6	10.0	1 1/4"	77380	4.5	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL
AHU-73	900	150	0.50	43950	25550	8.1	44	56	6	10.0	1 1/4"	77380	4.5	160	140	2	5.0	1"	1.0 hp	480	3	TRANE	BCHD036	HORIZONTAL

NOTES:

1. COOLING COIL CAPACITY IS BASED ON 80° F. D.B. AND 67° F. W.B. E.A.T.
2. HEATING COIL CAPACITY IS BASED ON 65° F. E.A.T. ALL HEATING COILS SHALL BE LOCATED IN THE REHEAT POSITION.
3. FURNISH ALL UNITS WITH: ECM MOTOR, DDC THERMOSTAT, INSULATED RETURN AIR PLENUM, STAINLESS STEEL PRIMARY DRAIN PAN, SECONDARY DRAIN PAN, MERV-13 FILTERS (SEE NOTE 6), DISCHARGE DUCT COLLAR, VIBRATION ISOLATORS.
4. MECHANICAL CONTRACTOR SHALL PROVIDE TWO SPARE FAN COIL UNIT MOTORS FOR EACH SIZE MOTOR PROVIDED. MOTORS SHALL BE DELIVERED TO OWNER AT PROJECT COMPLETION.
5. CONTROLS CONTRACTOR SHALL PROVIDE INDIVIDUAL CONTROL POWER TRANSFORMER (120V) FOR EACH UNIT. POWER WILL BE FROM FAN COIL UNIT CIRCUIT.
6. FAN COIL UNITS SHALL BE PROVIDED WITH TEMPORARY CONSTRUCTION FILTERS, REPLACED WITH MERV-13 FILTERS AT PROJECT COMPLETION.

EXHAUST FAN SCHEDULE

									ELECTRICAL DATA				
SYMBOL	LOCATION	MANUFACTURER	MODEL NO.	TYPE	CFM	APPROX. ESP	DRIVE TYPE	FAN RPM	WATTS	H.P.	VOLTAGE-PHASEØ	ACCESSORIES	CONTROL TYPE
F-29	MECHANICAL LOFT	GREENHECK	SQ-120-A	INLINE	1350	0.50	DIRECT	1546	1176	0.50	120 V-1Ø	A,B,F,G,H	5

ACCESSORIES:

A. DISCONNECT SWITCH
B. GRAVITY BACKDRAFT DAMPER
C. MOTORIZED BACKDRAFT DAMPER
D. PREFAB, ROOF CURB
E. BIRDSCREEN
F. ACOUSTICAL LINING
G. HANGING BRACKETS WITH VIBRATION ISOLATION
H. WL, WALL LOUVER DISCHARGE
I. RCC OR GRS ROOF CAP (FLAT ROOF) OR RJ ROOF CAP (PITCHED ROOF)
J. WALL MOUNTING COLLAR
K. INLET GAURD
M. 2" WASHABLE ALUMINUM FILTERS
N. MOTORSIDE FAN GUARD
O. EXHAUST GRILLE
P. U.L. 762
Q. VENTED ROOF CURB EXTENSION
R. COMBINATION KITCHEN HOOD FAN CURB
S. INTERLOCK WITH FUME HOOD
T. PROVIDE DRAIN PLUG ACCESSORY
U. ROOF SUPPORT RAILS
V. VFD

CONTROLS:

1. WALL MOUNTED THERMOSTAT (REVERSE ACTING, SET FOR 80°)
2. INTERLOCK WITH ROOM LIGHT SWITCH (FAN SHALL OPERATE WHEN LIGHT IS ON IF ANY ROOM IS SERVED BY FAN)
3. WALL MOUNTED ON/OFF SWITCH WITH IDENTIFICATION LABEL
4. WALL MOUNTED MUSHROOM PUSH BUTTON SWITCH/STARTER WITH IDENTIFICATION LABEL
5. CONTROLLED BY BUILDING AUTOMATION SYSTEM
6. CONTINUOUS OPERATION
7. CONTROLLED BY THE FACP AND FIREMAN'S MANUAL OVER-RIDE CONTROL PANEL IN FIRE COMMAND ROOM. NO MECHANICAL CONTROL POINTS REQUIRED BY M.C. FOR SMOKE CONTROL FANS

NOTES:

1. ALL FANS SHALL BE U.L. LISTED AND LABELED AND SHALL BE AMCA CERTIFIED FOR SOUND AND AIR FLOW. ALL FANS INSTALLED INSIDE, ABOVE, OR ADJACENT TO OCCUPIED SPACES SHALL HAVE A MAXIMUM 9.0 INLET SONE LEVEL.
2. ALL FANS SHALL BE SUPPLIED BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
3. MECHANICAL CONTRACTOR SHALL PROVIDE MAGNETIC STARTER WITH AUXILIARY CONTACTS AS REQUIRED.
4. PROVIDE ALL DIRECT DRIVE FANS WITH SPEED CONTROLLERS.
5. BACKDRAFT DAMPER ON ROOF SUPPLY FANS SHALL BE MOTORIZED.

HVLS FAN SCHEDULE

				ELECTRICAL DATA		
SYMBOL	LOCATION	TYPE	DRIVE	H.P.	VOLTAGE-PHASEØ	MANUFACTURER MACROAIR
HVLS-1	COLLABORATION			0.25	110 V-0Ø	MA08XL5506
HVLS-2	COLLABORATION			0.25	110 V-0Ø	MA08XL5506

NOTES:

1. ALL FANS SHALL BE U.L. LISTED AND LABELED AND SHALL BE AMCA CERTIFIED FOR SOUND AND AIR FLOW.
2. ALL FANS SHALL BE SUPPLIED BY ONE MANUFACTURER UNLESS NOTED OTHERWISE.
3. MECHANICAL CONTRACTOR SHALL PROVIDE MAGNETIC STARTER WITH AUXILIARY CONTACTS AS REQUIRED.
4. PROVIDE HVF-1 AND HVF-2 WITH: A DIGITAL WALL CONTROLLER WITH FAULT CODE ACCESS, AVD FUSED DISCONNECT, NOISE DAMPENER, INDUSTRIAL GRADE GEAR BOX, AIRFOIL RETAINERS, HUB CLIPS, SAFETY CABLES ,GRADE 8 BOLTS, FIRE DELAY, 12-YEAR LIMITED WARRANTY. COORDINATE SUPPORT REQUIREMENTS WITH MANUFACTURER. FANS SHALL SHUT-DOWN UPON SIGNAL FROM SPRINKLER MONITORING SYSTEM INDICATING WATER FLOW IN THE SPRINKLER SYSTEM. BASIS OF DESIGN: MACROAIR AIRVOLUTION-DS.

GRILLES, REGISTERS AND DIFFUSERS SCHEDULE

						NECK			INSTALLATION	OPTIONS	
SYMBOL	DESCRIPTION	MANUF.	MODEL	MATERIAL	FACE SIZE	SIZE	WIDTH	HEIGHT	BORDER TYPE	DAMPER DESCRIPTION	NOTES
A	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	12x12	4			TYPE 1 (SURFACE)	---	
B	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	6			TYPE 3 (LAY-IN)	---	
C	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	8			TYPE 3 (LAY-IN)	---	
D	PLAQUE FACE DIFFUSER	TITUS	OMNI	STEEL	24x24	10			TYPE 3 (LAY-IN)	---	
E	LOUVERED DBL. DEFL. GRILLE	TITUS	300FL	ALUMINUM	---		14	10	TYPE 1 (SURFACE)	---	
F	LOUVERED DBL. DEFL. GRILLE	TITUS	350FL	ALUMINUM	24x24		20	16	TYPE 3 (LAY-IN)	---	
G	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	8			TYPE 3 (LAY-IN)	---	
H	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	10			TYPE 3 (LAY-IN)	---	
J	PERFORATED DIFFUSER	TITUS	PAR	STEEL	24x24	14			TYPE 3 (LAY-IN)	---	

LINEAR SLOT DIFFUSER SCHEDULE

K	LINEAR SLOT DIFFUSER	Titus	FL-10	ALUMINUM	1	1	4' - 0"	Yes	6	DEFAULT	---	
L	LINEAR SLOT DIFFUSER	Titus	FL-10	ALUMINUM	1	1	4' - 0"	Yes	8	DEFAULT	---	

AIR DISTRIBUTION SCHEDULE NOTES:

1. ALL CEILING AND WALL MOUNTED DEVICES SHALL BE FURNISHED WITH AN ENAMEL BRIGHT WHITE FINISH UNLESS NOTED OTHERWISE.
2. ALL DEVICES SHALL BE FURNISHED WITH FRAMES SUITABLE FOR THE TYPE OF INSTALLATION REQUIRED.
3. ALL LINEAR DIFFUSERS IN LAY-IN CEILINGS SHALL BE FURNISHED WITH END CAPS. ALL LINEAR DIFFUSERS IN HARD CEILINGS SHALL BE FURNISHED WITH END BORDERS. ALL LINEAR SUPPLY DIFFUSERS SHALL BE PROVIDED WITH INTEGRAL AIRFLOW PATTERN ADJUSTMENT BARS FOR HORIZONTAL/VERTICAL PATTERN ADJUSTMENT AT EACH SLOT.
4. ALL DOUBLE DEFLECTION SUPPLY GRILLES SHALL HAVE DAMPER BLADES ADJUSTED TO PROVIDE AIRFLOW PATTERN INDICATED BY FLOW ARROWS ON PLANS. DAMPERS SHALL BE ADJUSTED TO A 30 DEGREE POSITION UNLESS NOTED OTHERWISE ON PLANS.

ELECTRIC WALL HEATER SCHEDULE

				MOTOR					
SYMBOL	LOCATION	CFM	KW	RPM	H.P.	VOLT	PH	MANUFACTURER (MARKEL)	ACCESSORIES
EWH-01		175	0.8	0	0.00	120 V	1	E3321TD-RP	A,B,D
EWH-01		175	0.8	0	0.00	120 V	1	E3321TD-RP	A,B,D

NOTES:

1. HEATING CAPACITY BASED ON 65° F E.A.T.
2. SEE PLANS FOR TYPE OF THERMOSTAT REQUIRED (WALL MOUNTED OR UNIT MOUNTED). UNIT HEATERS SHOWN WITHOUT THERMOSTAT INDICATED SHALL BE PROVIDED WITH A UNIT MOUNTED THERMOSTAT.
3. SET TO MAINTAIN 45°F.

ELECTRIC UNIT HEATER ACCESSORIES:

A. DISCONNECT SWITCH
B. BUILT IN THERMOSTAT
C. WALL MOUNTED THERMOSTAT
D. RECESSED WALL BOX INSTALL
E. CEILING MOUNTED BRACKETS
F. ADJUSTABLE DISCHARGE LOUVERS
G. PENCIL PROOF LOUVERS
H. CABINET FOR SURFACE MOUNTING

EQUIVALENT MANUFACTURERS LISTING

LISTING OF MANUFACTURER'S NAME DOES NOT GUARANTEE APPROVAL. ALL EQUIPMENT MUST MEET OR EXCEED QUALITY AND CAPACITIES OF SPECIFIED EQUIPMENT. FINAL APPROVAL WILL BE BASED ON EQUIPMENT SUBMITTALS. ANY MANUFACTURER NOT LISTED BUT WISHING TO BID THIS PROJECT SHALL SUBMIT A WRITTEN REQUEST A MINIMUM OF 7 DAYS PRIOR TO BID DATE OR AS INDICATED IN THE SPECIFICATIONS, PRIOR APPROVAL IS REQUIRED FOR ALL MANUFACTURERS NOT LISTED.

(ALPHABETICAL ORDER)
AIR DISTRIBUTION: CARNES, METAL*AIRE, NAILOR, PRICE, TITUS, TUTTLE & BAILEY, KRUEGER
ELECTRIC WALL/UNIT HEATERS: MARKEL, MODINE, RAYWALL, BERKO, QMARK
FANS: COOK, GREENHECK, PENN, TWIN CITY
FAN COIL UNITS: CARRIER, INTERNATIONAL, TRANE, YORK/JOHNSON, MCQUAY, TEMSPE
FIRE DAMPERS: GREENHECK, NAILOR, RUSKIN, POTTORFF, NCA, SAFE-AIRE
LOUVER: GREENHECK, RUSKIN, SAFE-AIR, POTTORFF

NOTE:
ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, PIPING, SHEET METAL, ELECTRICAL, REPLACEMENT OF SYSTEM COMPONENTS, BUILDING ALTERATIONS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED DURING CONSTRUCTION AND ALL COST WILL BE THE RESPONSIBILITY OF TH MECHANICAL CONTRACTOR.

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Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE:	8/15/2022
PROJECT #:	02110.200
DRAWN BY:	TAL
CHECKED BY:	GPK

MECHANICAL SCHEDULES

M1-002

SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL DDC CONTROL SYSTEM (BAS) SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 230900) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 230900 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY. MECHANICAL CONTRACTOR SHALL COORDINATE ALL BAS INTEGRATION REQUIREMENTS WITH EQUIPMENT VENDORS AND CONTROLS CONTRACTOR PRIOR TO PURCHASING EQUIPMENT AND PROVIDE ALL EQUIPMENT WITH COMMUNICATION/INTERFACE CARDS AS REQUIRED FOR SYSTEM INTEGRATION.

CLASSROOM 4-PIPE FAN COIL UNITS

AIR HANDLING UNITS SHALL BE STOPPED/STARTED ON A TIME OF DAY SCHEDULE THROUGH THE BAS. UPON PROOF OF AIR FLOW THRU THE SUPPLY FAN, AS SENSED BY A RESPECTIVE CURRENT SENSING RELAY, THE NORMALLY CLOSED OUTSIDE AIR DAMPER SHALL BE ENABLED.

WHILE IN THE OCCUPIED MODE, THE SUPPLY FAN SHALL OPERATE CONTINUOUSLY. WHILE IN THE UNOCCUPIED MODE, THE UNIT SUPPLY FAN SHALL CYCLE WITH HEATING AND COOLING LOADS, THE CHILLED WATER AND HOT WATER CONTROL VALVES SHALL BE CLOSED TO THE UNIT. UPON A CALL FOR HEATING OR COOLING TO MEET UNOCCUPIED SETPOINTS, THE UNIT FAN SHALL BE STARTED AND THE UNIT SHALL OPERATE AS DESCRIBED BELOW AS REQUIRED BY THE SPACE TEMPERATURE.

A TEMPERATURE SENSOR SHALL BE UTILIZED TO MAINTAIN SPACE TEMPERATURE. CHILLED WATER CONTROL VALVE SHALL MODULATE OPEN TO THE COIL ON A RISE IN TEMPERATURE ABOVE SENSOR SETPOINT. AS THE TEMPERATURE SPACE FALLS BELOW SETPOINT, CHILLED WATER CONTROL VALVE SHALL CLOSE AND HOT WATER CONTROL VALVE SHALL MODULATE OPEN TO MAINTAIN SPACE TEMPERATURE. THE TEMPERATURE SENSOR SHALL BE PROVIDED WITH AN OVERRIDE FUNCTION THAT WILL PLACE THE SYSTEM IN THE OCCUPIED MODE FOR A PERIOD OF UP TO 2 HOURS.

HUMIDITY CONTROL:
WITH SYSTEM IN OCCUPIED OR UNOCCUPIED MODE, HUMIDITY CONTROL SYSTEM SHALL BE CAPABLE OF BEING ACTIVATED. UNDER NORMAL OPERATION, UNIT SHALL CONTROLLED AS OUTLINED BELOW. PROVIDE HUMIDISTAT AS INDICATED ON PLANS, IF SPACE OR RETURN AIR HUMIDITY REACHES 65% R.H. (ADJ), ALARM SHALL BE SENT AND HUMIDITY CONTROL SEQUENCE SHALL BE ACTIVATED. AIR HANDLING UNIT CHILLED WATER CONTROL VALVE SHALL BE DRIVEN FULL OPEN. AND UNIT REHEAT COIL OR TERMINAL BOX REHEAT SHALL MODULATE TO MAINTAIN SPACE TEMPERATURE. WHEN SPACE HUMIDITY DROPS BELOW 55% R.H. (ADJ), BAS SHALL DEACTIVATE HUMIDITY CONTROL SEQUENCE. CONTROL OF UNIT SHALL REVERT BACK AS INDICATED BELOW. BOILER(S) AND ASSOCIATED PUMP(S) SHALL BE STARTED IF THE HEATING PLANT IS IDLE AT THE TIME THE HUMIDITY CONTROL SEQUENCE IS ACTIVATED.

FREEZE PROTECTION:
A FREEZE-STAT SHALL BE LOCATED UPSTREAM OF THE COOLING COIL, AND SHALL SHUT DOWN THE AHU FANS AND ALARM THE CENTRAL BAS IF THE TEMPERATURE IS BELOW 38° F. THE HOT WATER AND CHILLED WATER CONTROL VALVES AT THE AIR HANDLING UNIT SHALL OPEN FULLY. FREEZE-STAT SHALL HAVE MANUAL RESET ONLY.

THERMOSTATS & TEMPERATURE SENSORS

THERMOSTATS AND TEMPERATURE SENSORS SHALL BE PROVIDED WHERE INDICATED ON THE DRAWINGS, AND PER THE SPECIFICATIONS. THERMOSTATS TO 70°. THERMOSTATS SHALL HAVE A 3° RANGE IN WHICH THEY ARE SATISFIED (IF SET TO 70°, SATISFIED ANYWHERE BETWEEN 68.5° AND 71.5°). SLIDE BAR SHALL HAVE THE CAPABILITY TO ADJUST THE HEATING AND COOLING SETPOINTS BY 3° IN EITHER DIRECTION, BUT MAINTAIN A MINIMUM 4° SPREAD BETWEEN THE HEATING AND COOLING SETPOINT. UNOCCUPIED SETTINGS SHALL BE 85° COOLING AND 60° HEATING. ALL SETPOINTS SHALL BE VERIFIED WITH THE OWNER BEFORE PROGRAMMING, AND FULLY ADJUSTABLE THROUGH THE BAS.

WALL/UNIT HEATERS

A BUILT-IN THERMOSTAT SHALL OPERATE WALL/UNIT HEATER AND FAN TO MAINTAIN A SETPOINT OF 49° (ADJ). ONCE THE UNIT HEATER IS ENERGIZED, IT WILL RUN FOR AT LEAST FIVE MINUTES TO AVOID SHORT CYCLING. BAS DOES NOT INTERFACE WITH UNIT HEATERS.

MISC. EXHAUST FANS

PROVIDE WALL SWITCHES, WALL THERMOSTATS, INTERLOCKS, ETC. AS INDICATED ON THE FAN SCHEDULE TO CONTROL FANS AS INDICATED ON PLANS. UTILITY ROOM AND ELECTRICAL ROOM THERMOSTATS SHALL BE SET AT 85° F. (USER ADJUSTABLE, BAS REMOTE).

TOILET EXHAUST FANS

CENTRAL BAS SHALL OPERATE EXHAUST FANS ON A PROGRAMMED SCHEDULE. FANS SHALL RUN WHEN ASSOCATED ZONE IS IN THE OCCUPIED MODE, AND BE OFF WHEN ASSOCIATED ZONE IS IN THE UNOCCUPIED MODE.

INPUT/OUTPUT SUMMARY

INPUTS — ANALOG (MEASURED / CALC.)

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	TEMPERATURE	PRESSURE	RH	KW	AIR FLOW	WATER FLOW	CO2	HERTZ	RPM	VOLTS	AMPS	KWH	ENTHALPY	RUN TIME	EFFICIENCY
4-PIPE FAN COIL UNIT															
Supply Fan															
Space Temp	X														
Space RH			X												
Supply Temp	X														
Over-ride															
Setpoint Adjust															
Outside Air Damper															
Hot Water Control Valve															
Chilled Water Control Valve															
Fans															
Misc. Fans															

INPUTS — BINARY; OUTPUTS — DIGITAL / ANALOG

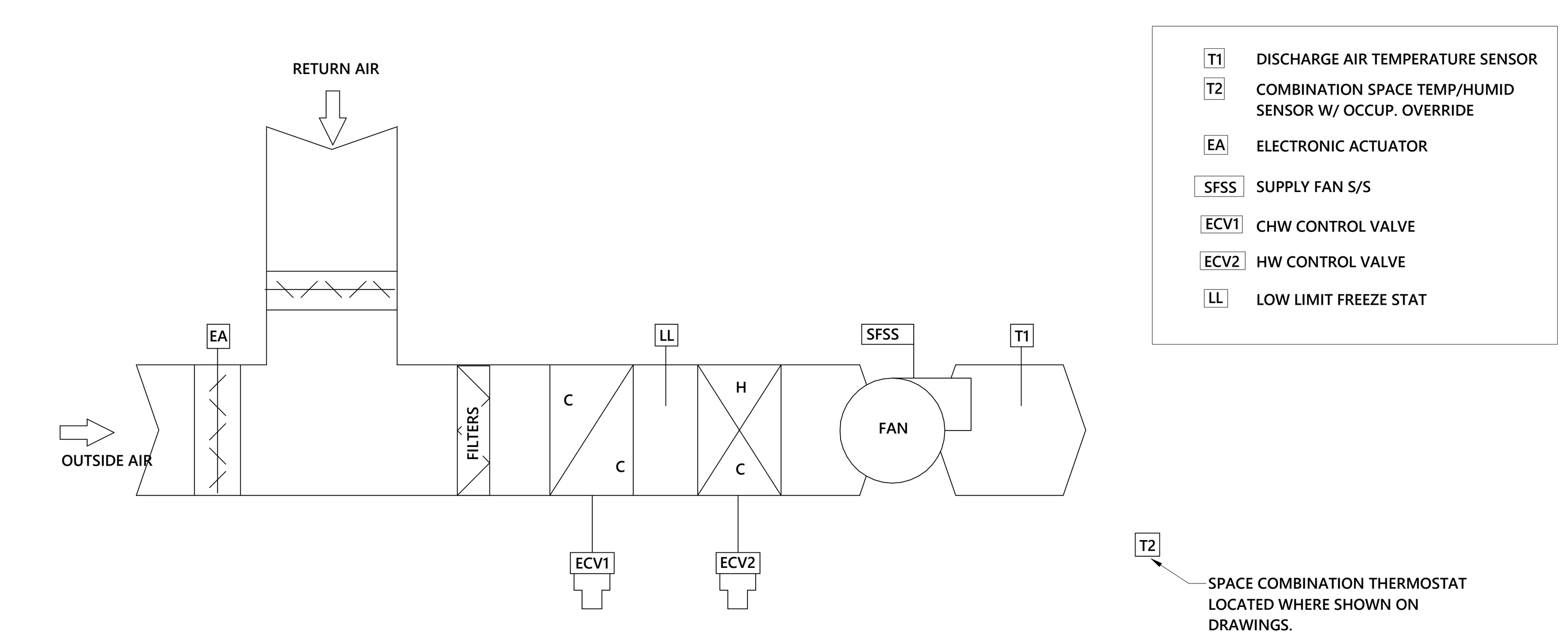
SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	STATUS	FILTER	SMOKE	FREEZE	AIR FLOW	METER	OVER-RIDE	OFF-ON	OFF-AUTO-ON	OFF-HI-LO	OPEN-CLOSE	DMPR. POS.	VALVE POS.	SETPOINT ADJ.	STEP CONTROL
4-PIPE FAN COIL UNIT															
Supply Fan	X							X							
Space Temp															
Space RH															
Supply Temp															
Over-ride							X								
Setpoint Adjust														X	
Outside Air Damper												X			
Hot Water Control Valve												X			
Chilled Water Control Valve												X			
Fans															
Misc. Fans								X							

SYSTEM FEATURES — ALARMS / PROGRAMS; GENERAL

SYSTEM, APPARATUS, OR AREA POINT DESCRIPTION	HI ANALOG	LO ANALOG	HI BINARY	LO BINARY	PROOF	TIME SCHEDULING	DEMAND LIMITING	DUTY CYCLE	START/STOP OPT.	ENTHALPY OPT.	SMOKE CNT.	TREND	ALARM INSTRUCT	MAIN. WK. ORD.	COLOR GRAPHIC	SUPPLMENT. NOTES
4-PIPE FAN COIL UNIT						X									X	
Supply Fan					X											
Space Temp																
Space RH																
Supply Temp																
Over-ride																
Setpoint Adjust																
Outside Air Damper																
Hot Water Control Valve																
Chilled Water Control Valve																
Fans															X	
Misc. Fans																SEE FAN SCHEDULE

GENERAL NOTE:

THE POINTS LIST PROVIDED IS INTENDED TO COMMUNICATE THE GENERAL DESIGN INTENT TO THE CONTROLS SUBCONTRACTOR AND IS NOT INTENDED TO BE COMPLETE. IN THE CONTROLS SUBMITTAL, THE SUBCONTRACTOR SHALL FULLY DEVELOP THE POINTS LIST FOR ALL SYSTEMS IDENTIFIED AND SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, AND ALARM POINTS. THE CONTROLS SUBCONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS FROM SETPOINTS TO PREVENT EQUIPMENT FROM SHORT CYCLING WHEN NEAR SETPOINTS. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO HAVING TO TAKE CORRECTIVE ACTIONS OR EQUIPMENT SHUTDOWNS. TRANSMITTERS SHALL INCLUDE OUT-OF-RANGE, FAIL-SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION. CONTROL CONTRACTOR SHALL SPECIFY TO FAIL DE-ENERGIZER, HOLD LAST STATE, OR DEFAULT TO A PREDETERMINED SETPOINT. THESE BASIC FEATURES THAT ARE NECESSARY AND ARE PART OF A COMPLETE CONTROLS INSTALLATION SHALL BE INCLUDED IN THE SCOPE OF SERVICES FOR DELIVERABLES AT NO ADDITIONAL COSTS TO THE OWNER.



1 FCU - FLOW/CONTROL DIAGRAM (TYPICAL)
NOT TO SCALE

CONTROL SYSTEM NOTES

1. SEE SPECIFICATIONS SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS.
2. HVAC CONTROLS FOR ADDITION PROJECT TO BE INTEGRATED IN TO SCHOOLS EXISTING BAS. ALL POINTS AND EQUIPEMENT TO BE ACCESSIBLE FROM THE EXISTING BAS FRONT END AS INDICATED WITH ADDITIONAL GRAPHICS FOR EQUIPMENT AND FLOORPLANS. EXISTING CONTROLS BY ENGINEERED CONTROLS SOLUTIONS INC. (ECS).
3. ALL CONTROL SETPOINTS SHALL BE ADJUSTABLE AND TRENDABLE BY THE USER AND MAINTENANCE DEPARTMENT. INDICATED SCHEDULES AND SETPOINTS SHOULD BE USED FOR ORIGINAL SYSTEM SET-UP. ANY CHANGES IN SETPOINT SETTINGS REQUIRED FOR INTENDED SYSTEM OPERATION SHALL BE APPROVED BY THE ENGINEER AND SHALL BE DISCREETLY INDICATED ON THE AS-BUILT DRAWINGS.
4. ELECTRICAL CONTRACTOR SHALL PROVIDE A DEDICATED 120V CIRCUIT IN A J-BOX FOR CONTROL POWER. CONTROLS CONTRACTOR SHALL EXTEND 120V POWER FROM J-BOX TO CONTROL PANELS, DAMPER ACTUATORS, TRANSFORMERS, ETC. AS REQUIRED FOR INSTALLATION OF THE CONTROL SYSTEM. ALL CONTROL TRANSFORMERS SHALL BE SEPARATELY INTERNALLY FUSED OR HAVE MANUAL RESETS.
5. CONTROLS CONTRACTOR SHALL PROVIDE A MINIMUM OF 24 HOURS OF OWNER TRAINING PROVIDED BY A FACTORY CERTIFIED REPRESENTATIVE. COORDINATE THROUGH THE MECHANICAL CONTRACTOR AND CONSTRUCTION MANAGEMENT FIRM.
6. ALL CONTROL AND POWER WIRING SHALL BE PLENUM-RATED WITH A MINIMUM FIRE SPREAD RATING OF 25 AND A MINIMUM SMOKE DEVELOPED RATING OF 50 PER ASTM E84.
7. THE SEQUENCE OF OPERATION OF OPERATION AND POINTS LIST IS INTENDED TO COMMUNICATE THE MINIMUM REQUIREMENTS AND GENERAL DESIGN INTENT TO THE CONTROLS CONTRACTOR AND IS NOT INTENDED TO BE A FULLY DEVELOPED OR COMPLETE SEQUENCE OF OPEARTION. IN THE CONTROLS SUBMITTAL THE CONTROLS CONTRACTOR SHALL FULLY DEVELOP THE SEQUENCE OF OPERATIONS FOR ALL SYSTEMS IDENTIFIED AN SHALL PRESENT ALL SETPOINTS, CONTROL PARAMETERS, TIME DELAYS, ALARM POINTS, ETC. AS REQUIRED TO COMPLY WITH THE DESIGN INTENT. THE CONTROLS CONTRACTOR SHALL INCORPORATE STANDARD FEATURES SUCH AS MINIMUM RUN TIME DELAYS AND DEAD BANDS TO PREVENT SHORT CYCLING. ALL MONITORED POINTS SHALL INCLUDE EARLY HIGH/LOW ALARM NOTIFICATIONS PRIOR TO REQUIRED CORRECTIVE ACTIONS OR UNIT SHUT-DOWNS.
   CONTROL CONTRACTOR SHALL SPECIFY IN THE CONTROL SUBMITTAL FAIL SAFE POSITION FOR OUT OF RANGE, FAIL SAFE POSITIONING FOR OPEN CIRCUITS OR LOSS OF COMMUNICATION.
8. ALARMS THROUGH THE BAS SYSTEM SHALL BE VISIBLE ON THE INDIVIDUAL GRAPHICS THEMSELVES, NOT ONLY ON THE SUMMARY PAGE.
9. LOCATE MAIN CONTROL HUBS FOR ADDITION CONTROLS IN ELECTRICAL ROOM. COORDINATE EXACT LOCATION OF PANELS WITH ALL OTHER TRADES AND BUILDING OWNER'S FACILITIES DEPARTMENT PRIOR TO INSTALLATION.

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022

PROJECT #: 02110.200
DRAWN BY: TAL
CHECKED BY: GPK

MECHANICAL CONTROLS SEQUENCE OF OPERATION

M1-003

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt
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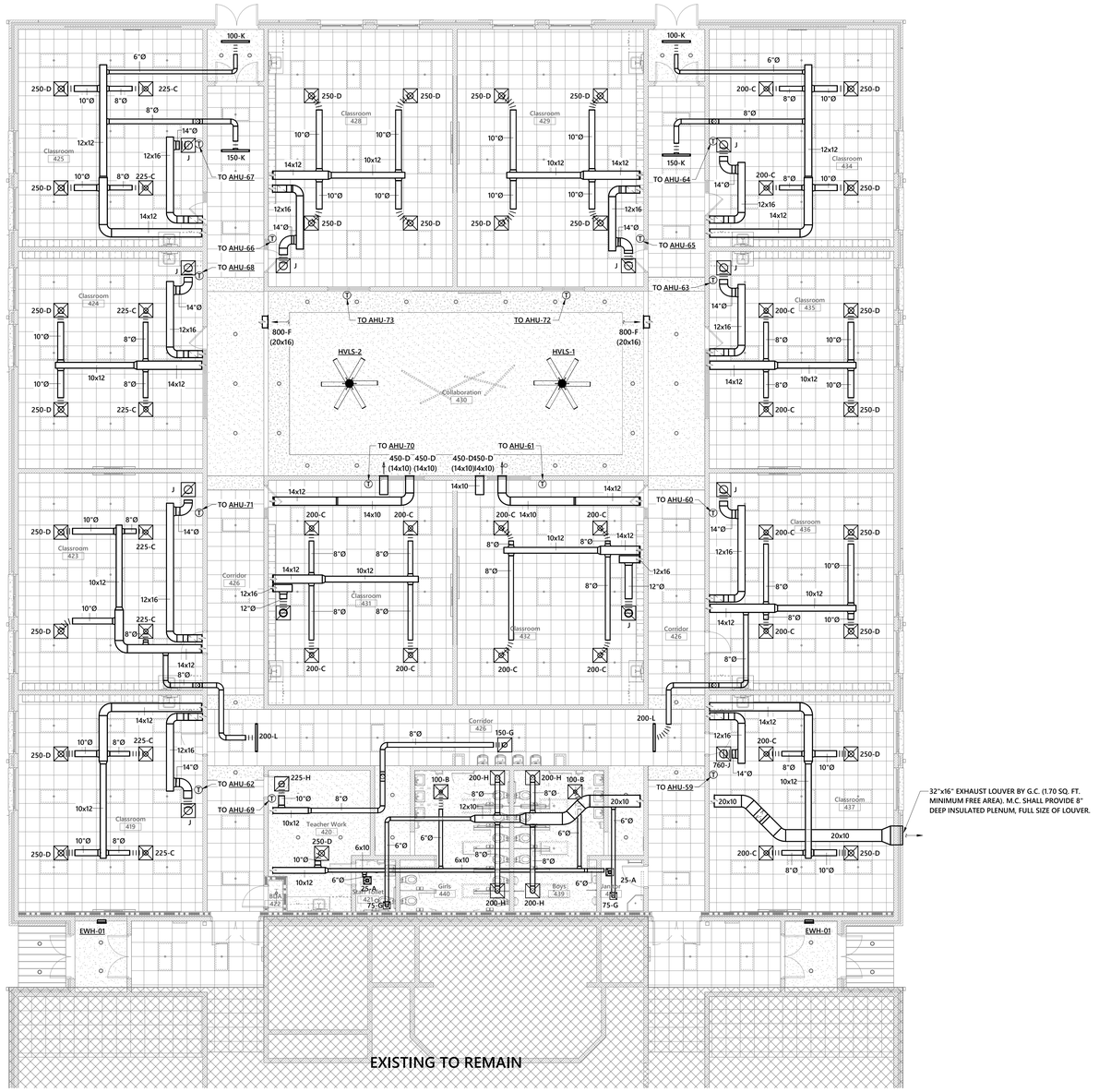

1 **CLASSROOM ADDITION MECHANICAL PLAN - NEW WORK**
1/8" = 1'-0"

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OVERHILLS ELEM. CLASSROOM ADDITION

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No.	Date	Description

ISSUE DATE: 8/15/2022
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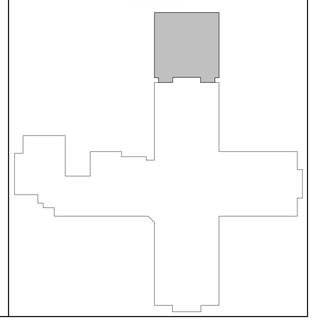
CLASSROOM ADDITION MECHANICAL PLAN - NEW WORK

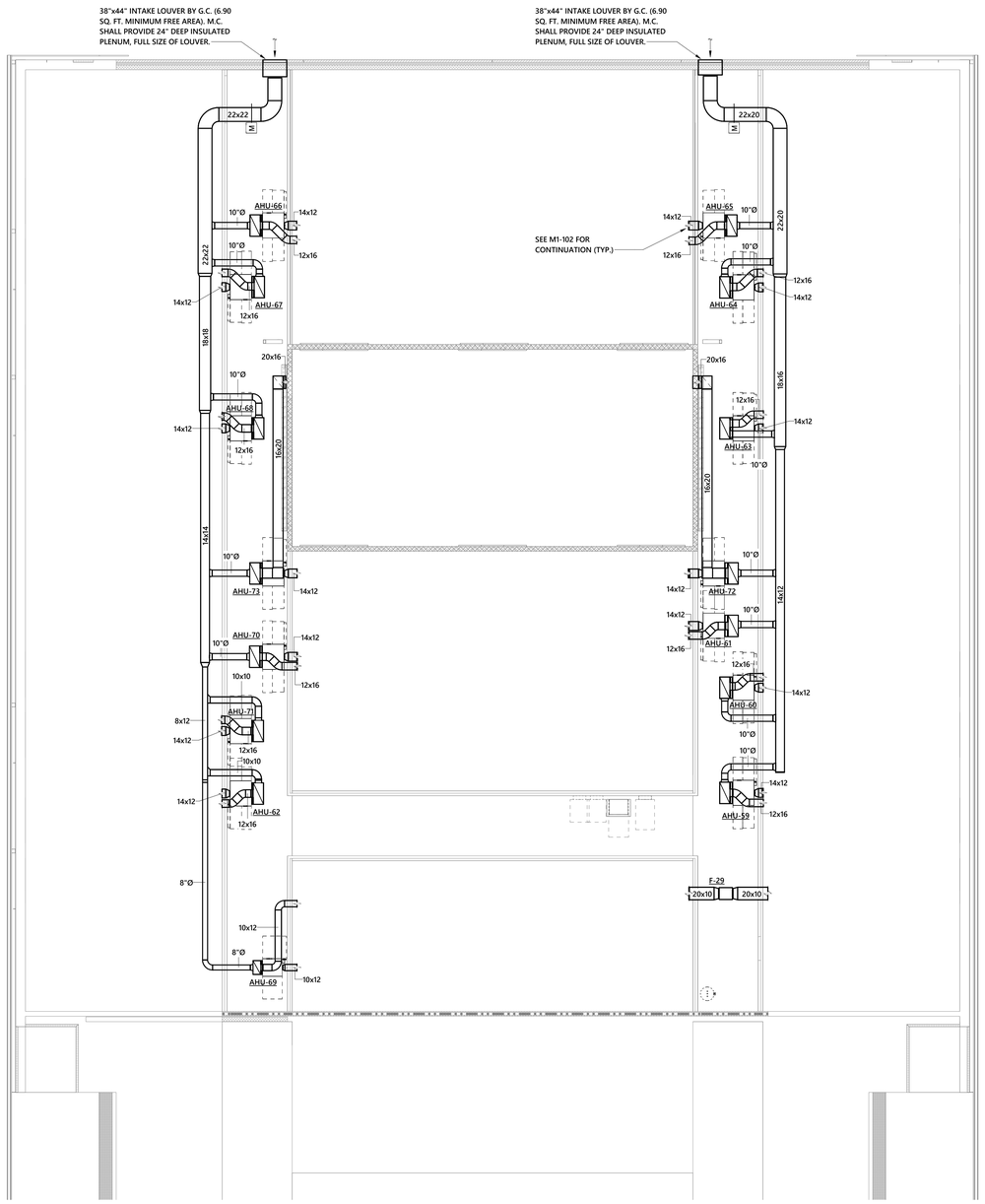
KEYPLAN



M1-102

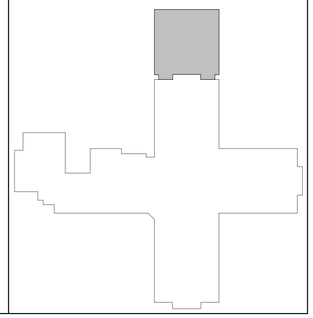
OPTIMA# 21-0269R

Sheet No. 4 of 7



1 MECHANICAL LOFT MECHANICAL PLAN
1/8" = 1'-0"

KEYPLAN



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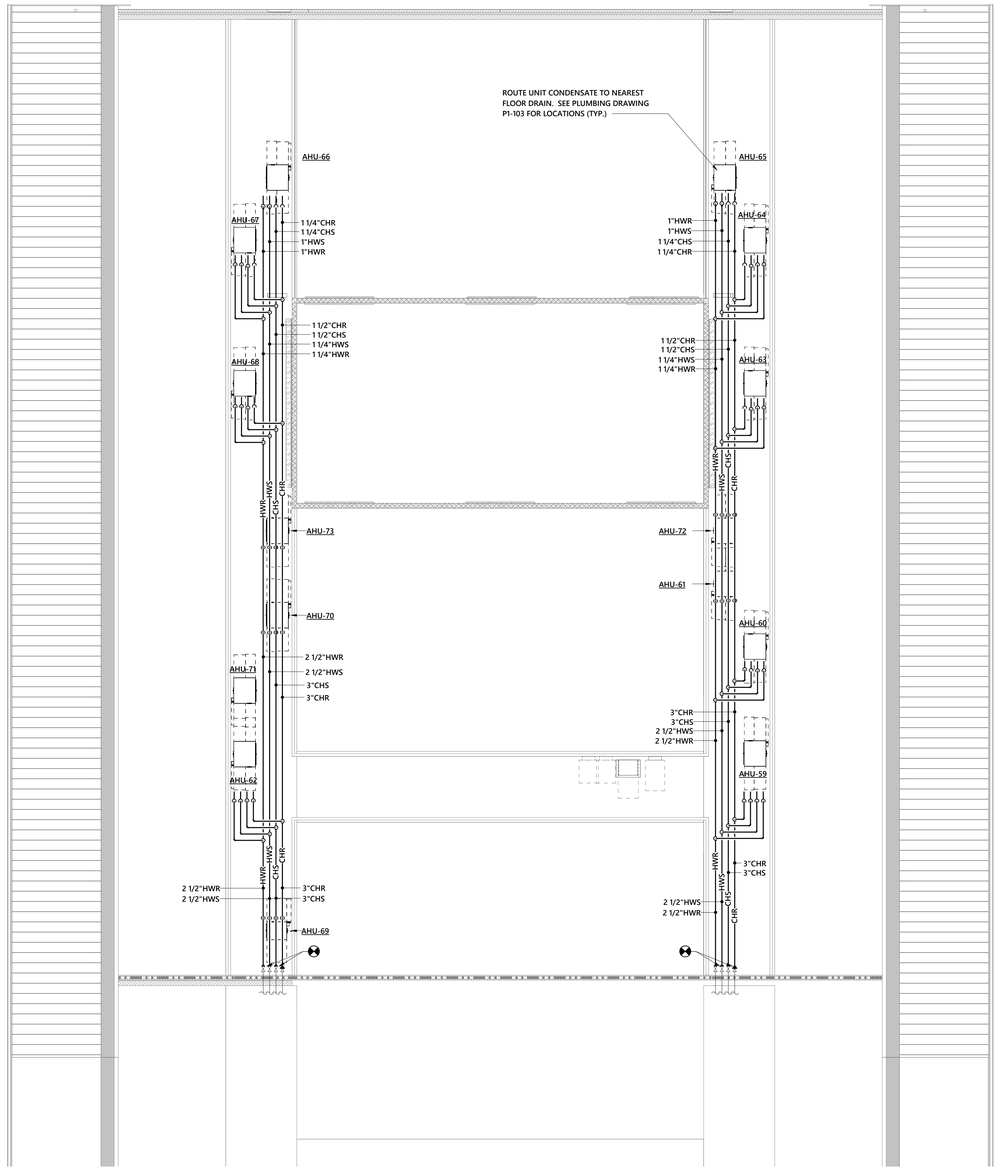
MECHANICAL LOFT MECHANICAL PLAN

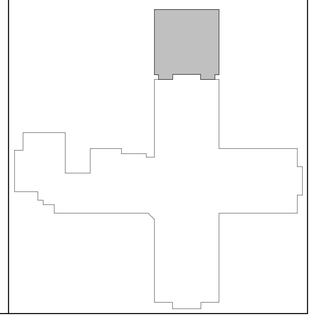
M1-103
Sheet No. 5 of 7

OPTIMA# 21-0269R



1 **MECHANICAL LOFT MECHANICAL PIPING PLAN**
1/8" = 1'-0"

KEYPLAN



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MECHANICAL LOFT MECHANICAL PIPING PLAN

M1-104

Sheet No. 6 of 7

OPTIMA# 21-0269R

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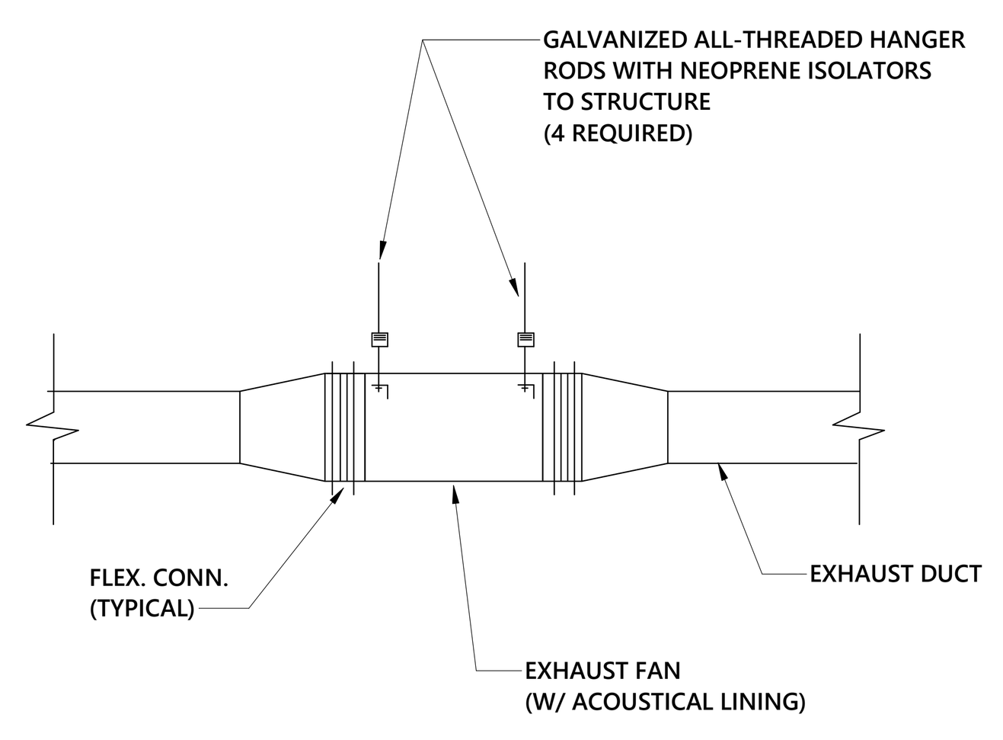
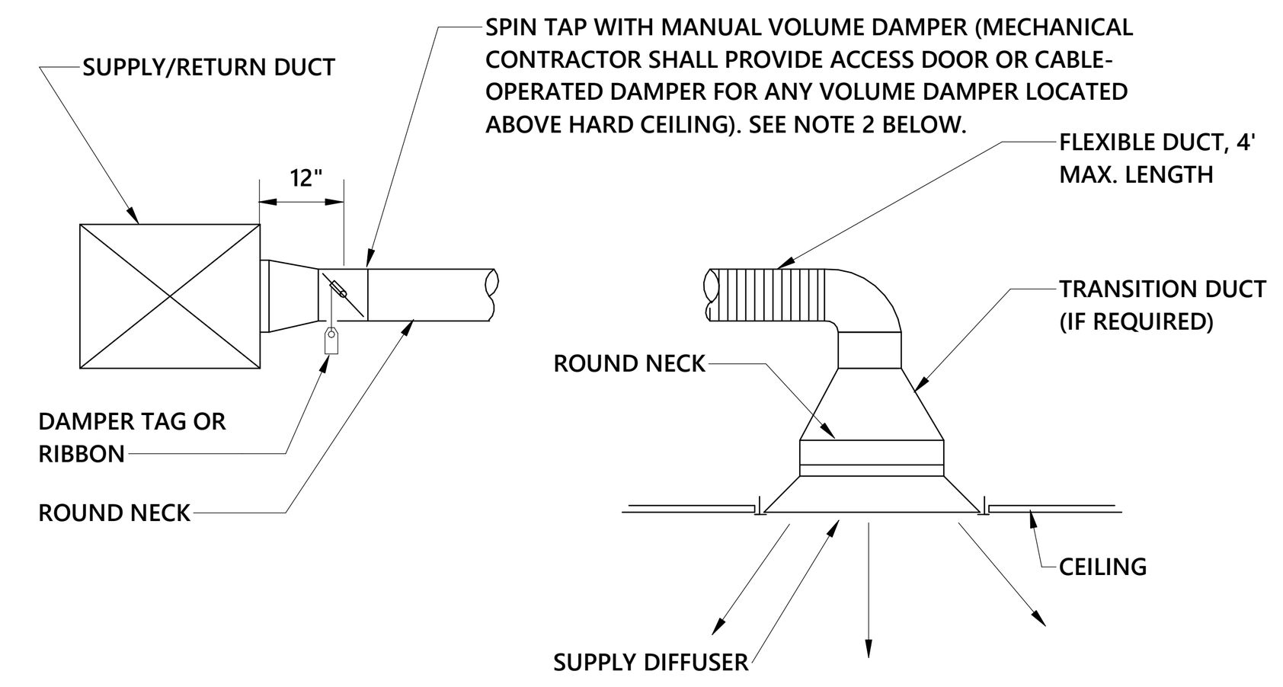


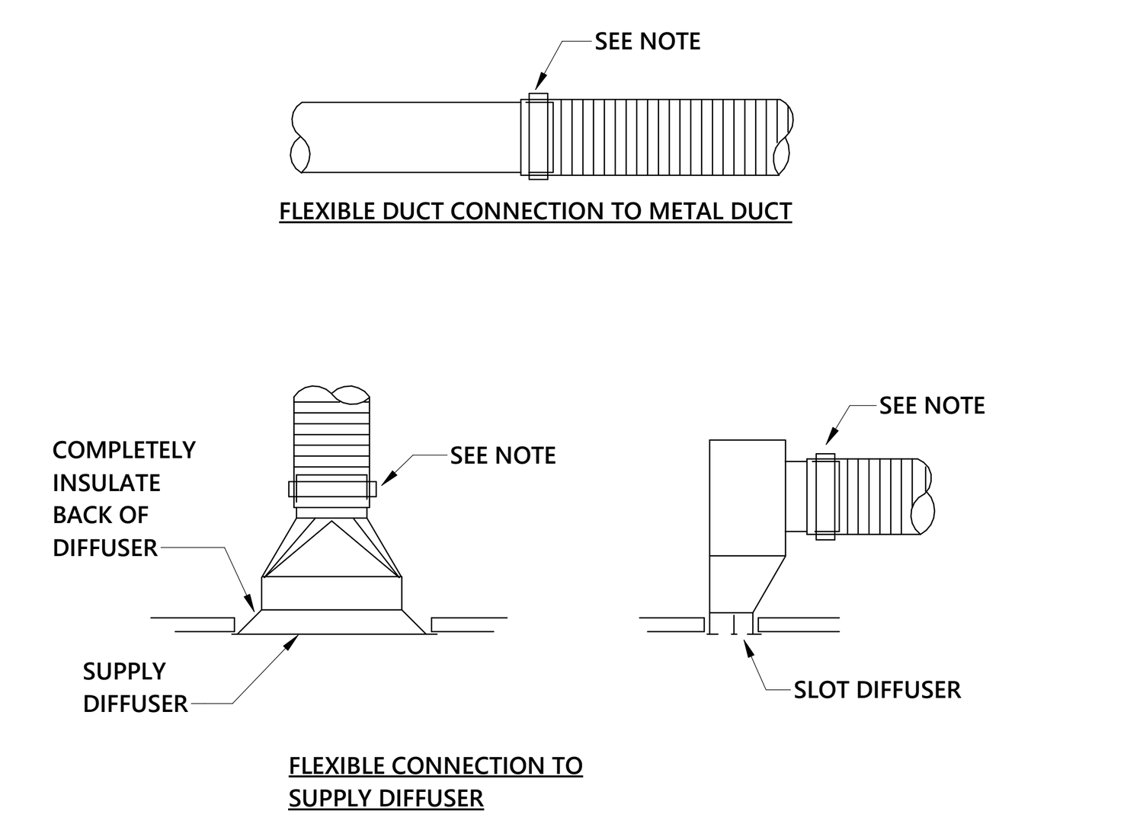
NOTES:
1. COORDINATE LOCATION OF FAN WITH OTHER TRADES TO INSURE SERVICE CLEARANCES.
2. MECHANICAL CONTRACTOR SHALL PROVIDE ACCESS DOOR IN CEILING IF REQUIRED.

4 INLINE EXHAUST FAN DETAIL
NO SCALE



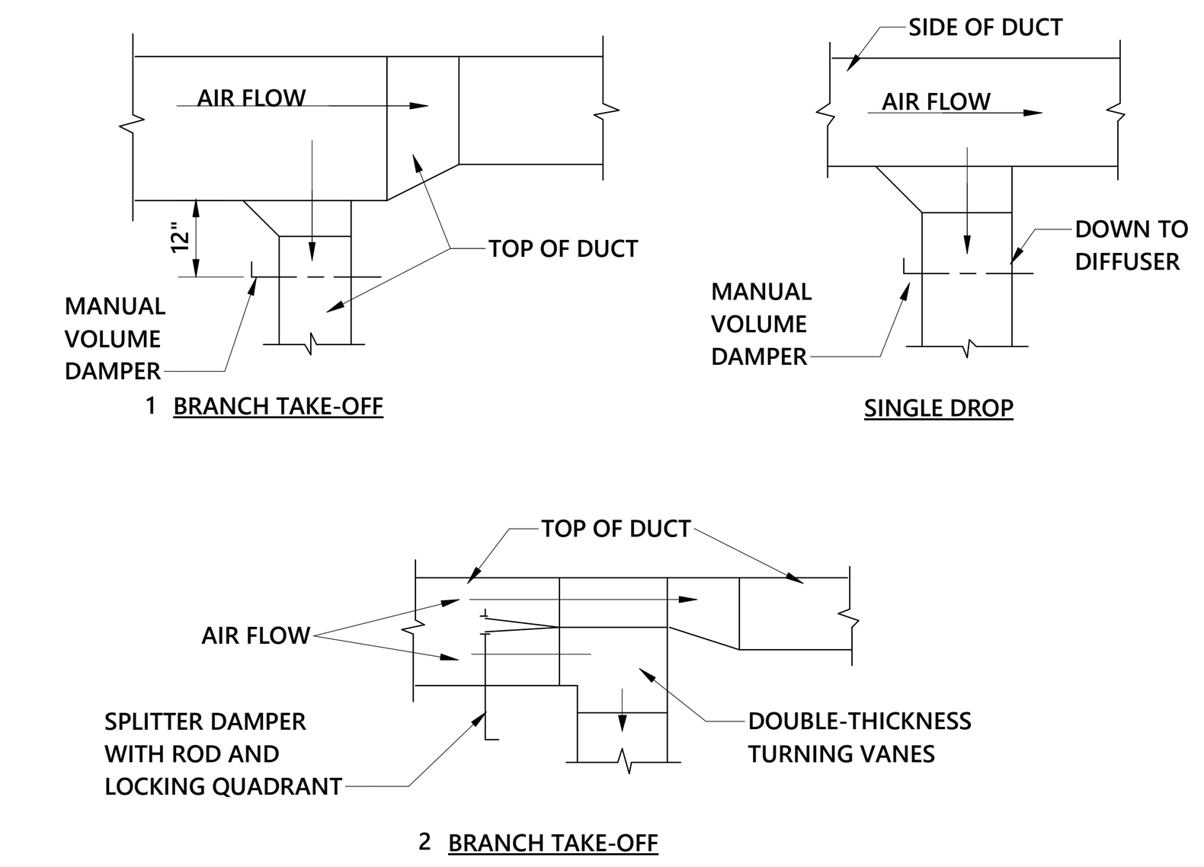
NOTE:
1. MANUAL VOLUME DAMPERS SHALL BE PROVIDED FOR ALL SUPPLY, RETURN AND GENERAL EXHAUST RUNOUTS.
2. ALL MANUAL VOLUME DAMPERS (FOR INSULATED DUCTWORKS) SHALL BE PROVIDED WITH AN ELEVATED REGULATOR (STAND-OFF) EQUAL TO DURO DYNE SEST SERIES AND FULL-LENGTH SHAFT. STAND SHALL EXTEND A MINIMUM OF 2" BEYOND DUCTWORK WITH EXTENDED TAB/SHAFT.
3. CONTRACTOR TO COORDINATE WITH ARCHITECT FOR DESIRED DAMPER ACCESS STYLE CABLE-OPERATED DAMPER ADJUSTMENT SHALL BE THROUGH AIR TERMINAL. FACE OPERATION (CONCEALED MOUNTING) OR THROUGH CEILING-MOUNTED RECESSED PORTS EQUAL TO MAT RT-CCM.

3 SPIN TAP TO ROUND NECK DIFFUSER
NOT TO SCALE



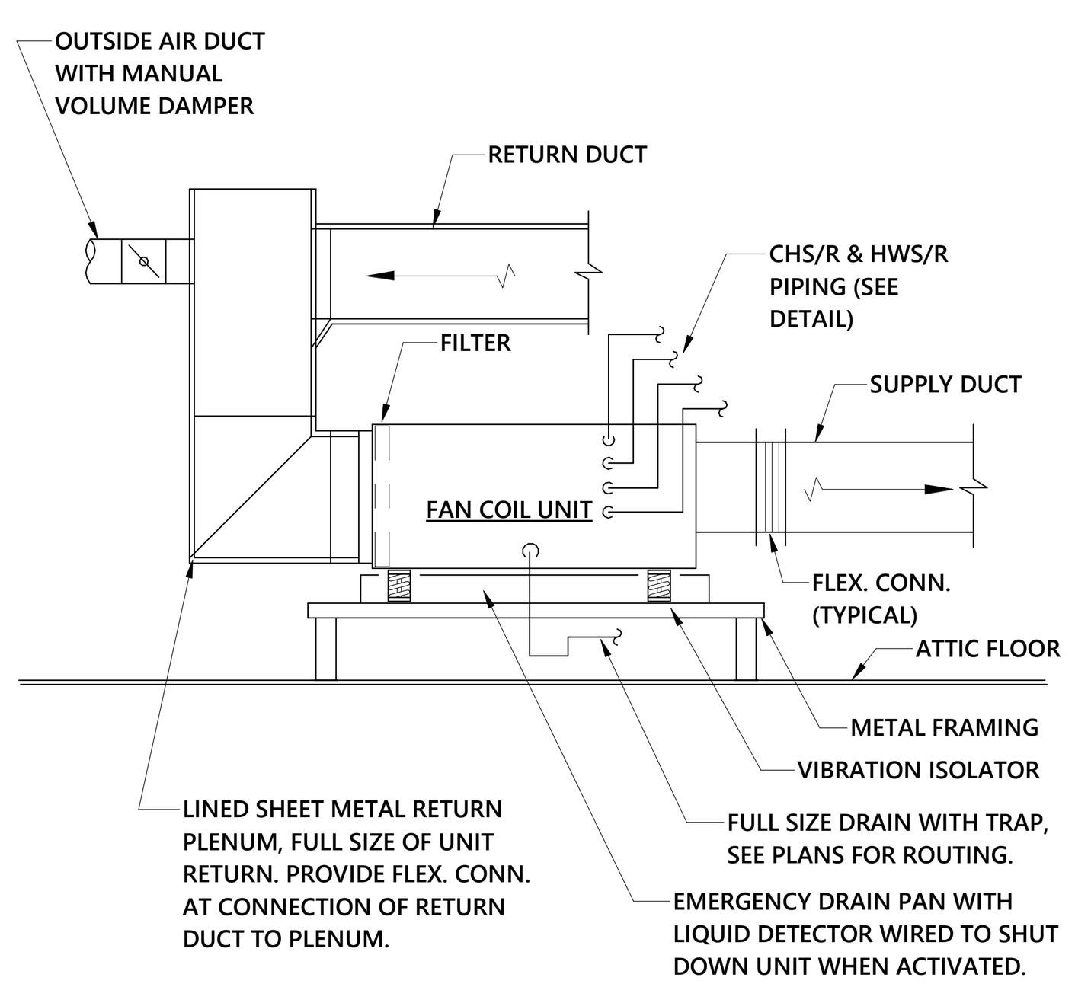
NOTE:
ALL FLEXIBLE DUCT CONNECTIONS TO SHEET METAL SHALL BE SECURED WITH APPROVED STRAP AND SEALANT.

2 FLEX CONNECTION DETAIL
NOT TO SCALE



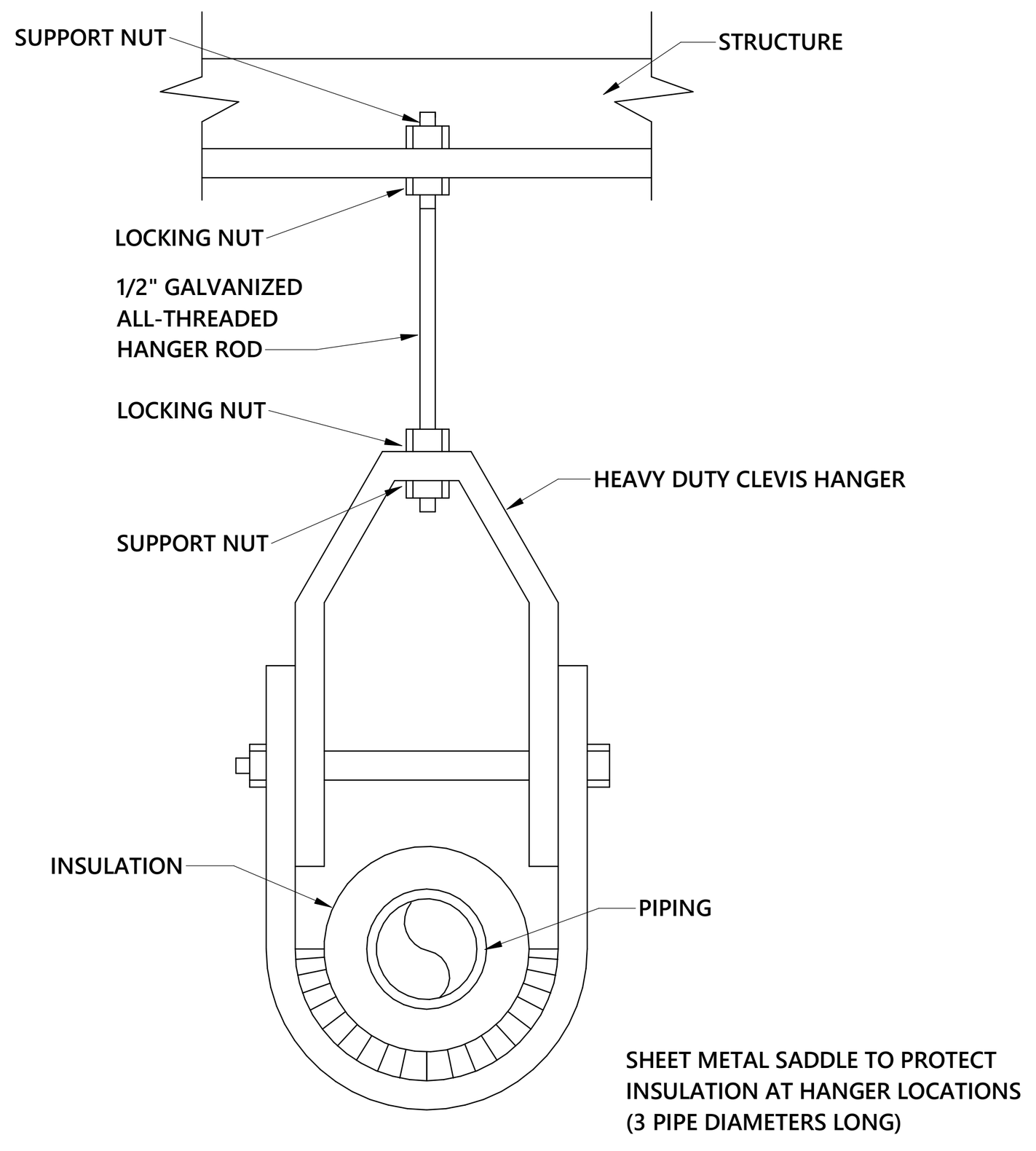
NOTE:
1. USE BRANCH TAKE-OFF 1 WHEN MAIN AND BRANCH DUCTS ARE DIFFERENT DEPTHS
2. USE BRANCH TAKE-OFF 2 WHEN MAIN AND BRANCH DUCTS ARE SAME DEPTHS
3. MANUAL VOLUME DAMPERS SHALL BE PROVIDED FOR ALL SUPPLY, RETURN AND GENERAL EXHAUST SINGLE DROP DUCT RUNS.

1 DUCTWORK DETAILS
NOT TO SCALE

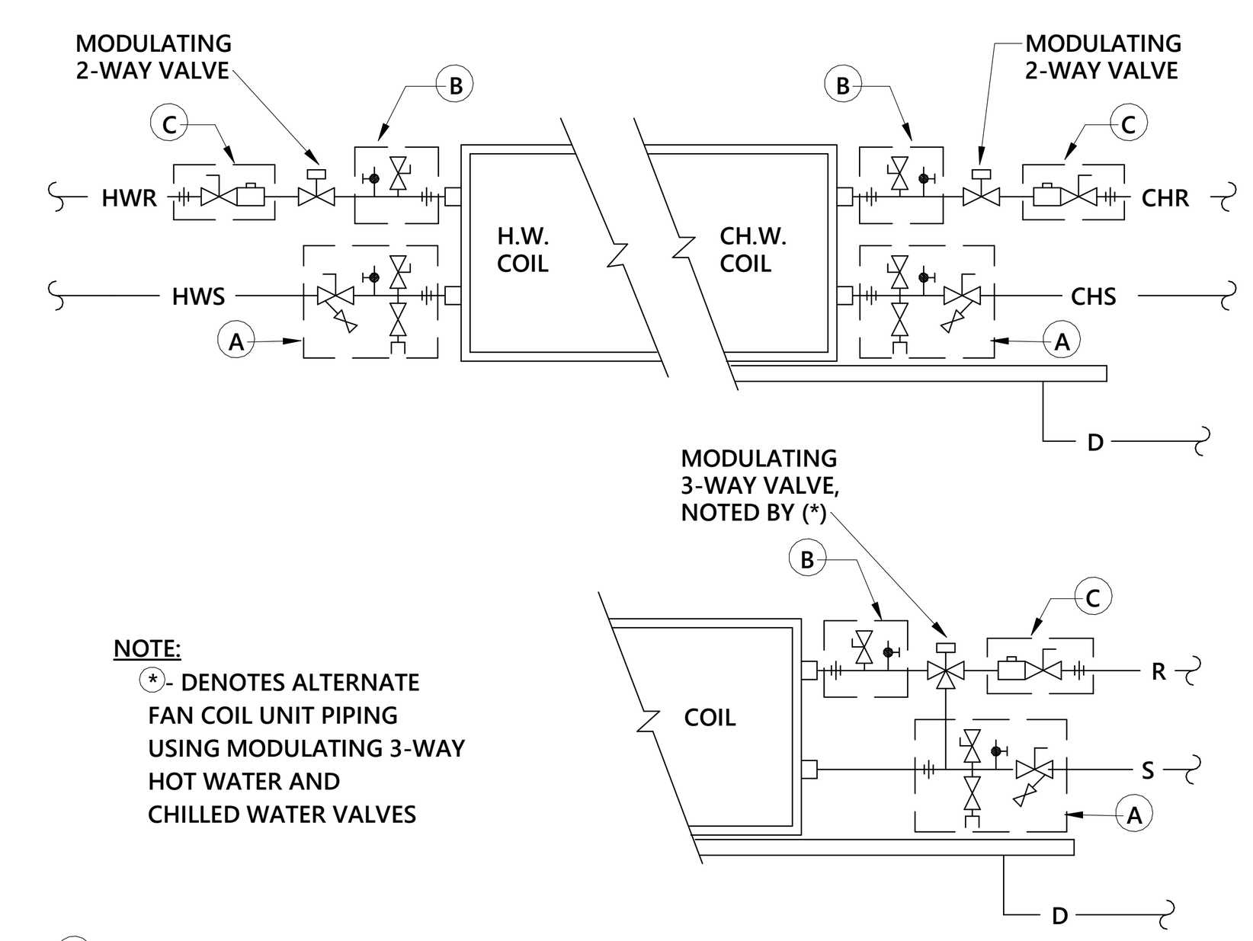


NOTE:
1. MECHANICAL CONTRACTOR SHALL COORDINATE EXACT LOCATION OF FAN COIL UNIT WITH DUCTWORK, PLUMBING, ELECTRICAL, ETC. TO MAINTAIN FILTER AND MAINTENANCE ACCESS CLEARANCES.

8 FCU - HORIZONTAL ON ATTIC FLOOR
NOT TO SCALE



7 PIPE HANGER DETAIL
NOT TO SCALE



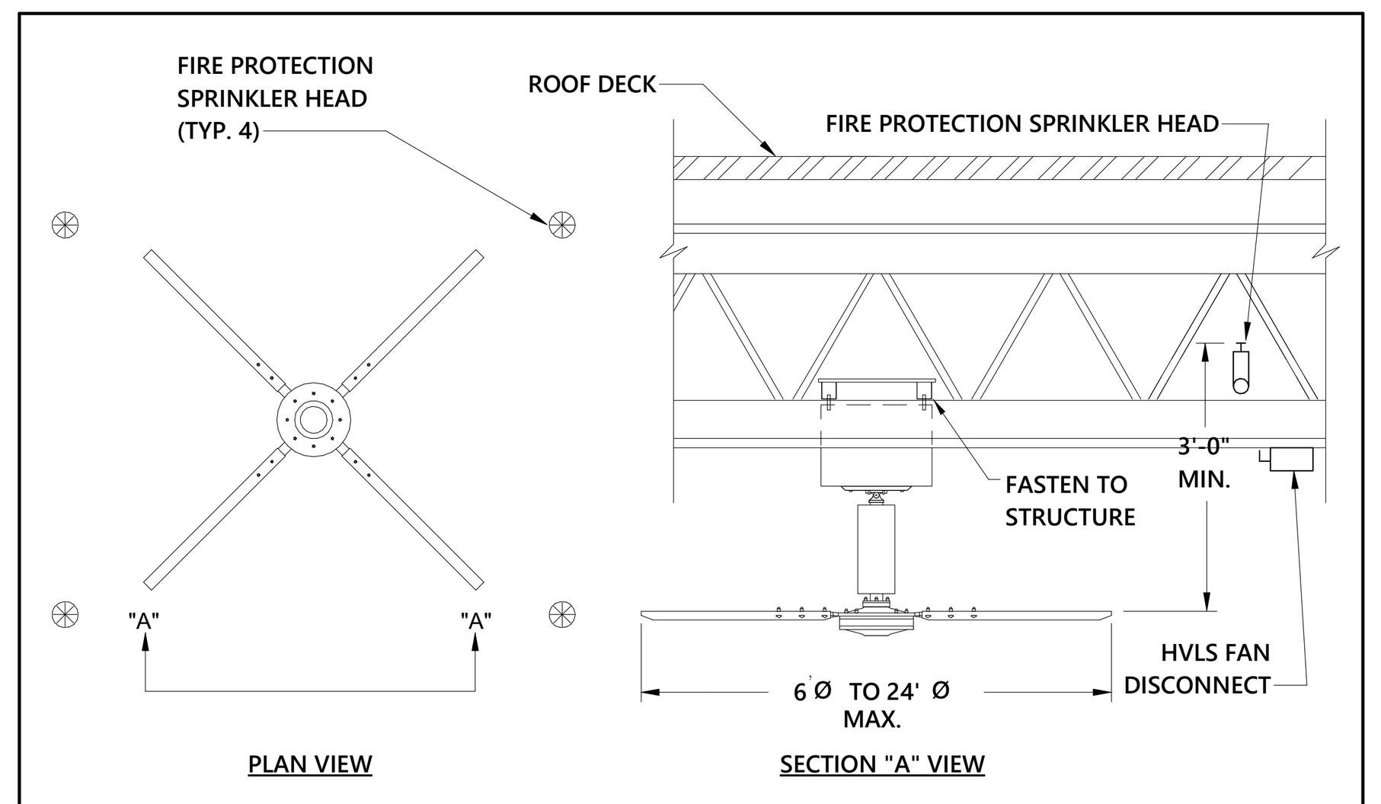
NOTE:
(*) - DENOTES ALTERNATE FAN COIL UNIT PIPING USING MODULATING 3-WAY HOT WATER AND CHILLED WATER VALVES

(A) COMBINATION Y-STRAINER, BALL VALVE, COMBINATION PRESSURE & TEMPERATURE TEST VALVES AND MANUAL AIR VENT, AND DRAIN VALVE WITH 3/4" HOSE CONNECTION, AND UNION (GRISWOLD ISOLATOR S OR EQUAL)

(B) COMBINATION PRESSURE & TEMPERATURE TEST VALVES AND MANUAL AIR VENT, AND UNION (GRISWOLD ISOLATOR U OR EQUAL)

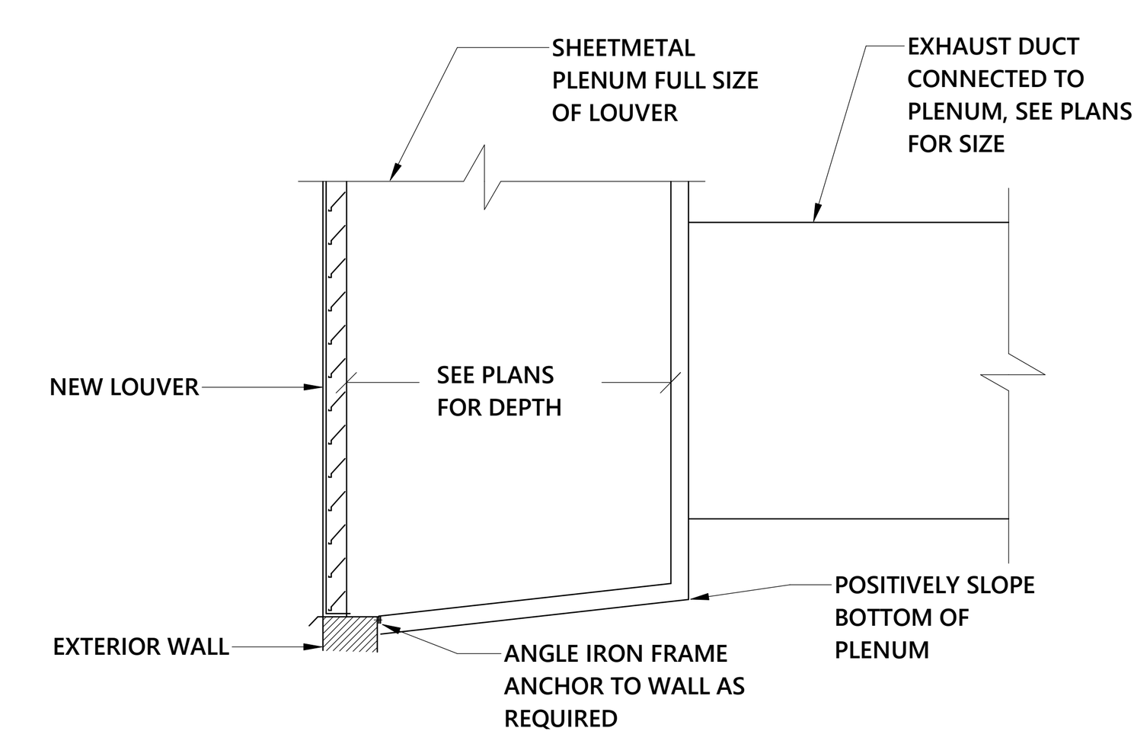
(C) AUTOMATIC CONTROL VALVE ASSEMBLY WITH BALL VALVE AND STAINLESS STEEL FLOW CONTROL CARTRIDGE, AND UNION (GRISWOLD ISOLATOR R OR EQUAL)

6 FAN COIL UNIT PIPING (4 PIPE)
NOT TO SCALE



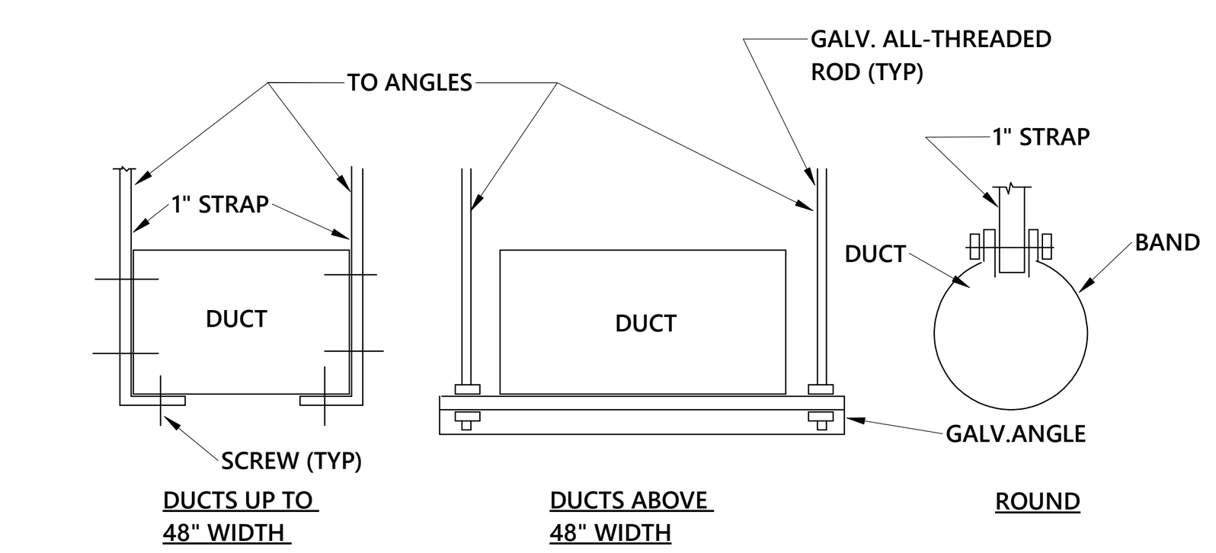
NOTES:
1. NFPA 13, 11.1.7 - HIGH VOLUME LOW SPEED (HVLS) FANS INSTALLED IN BUILDINGS EQUIPPED WITH SPRINKLERS, INCLUDING ESFR SPRINKLERS SHALL COMPLY WITH THE FOLLOWING:
   A. THE MAXIMUM FAN DIAMETER SHALL BE 24FT.
   B. THE HVLS FAN SHALL BE CENTERED APPROXIMATELY BETWEEN FOUR ADJACENT SPRINKLERS.
   C. THE VERTICAL CLEARANCE FROM THE HVLS FAN TO SPRINKLER DEFLECTOR SHALL BE MINIMUM OF 3FT.
   D. ALL HVLS FANS SHALL BE INTERLOCKED TO SHUT DOWN IMMEDIATELY UPON RECEIVING A WATER FLOW SIGNAL FROM THE ALARM SYSTEM IN ACCORDANCE WITH REQUIREMENTS OF NFPA 72.
2. EC SHALL LOCATE THE HVLS FAN DISCONNECT OUTSIDE THE FAN BLADE CLEARANCE.

5 HVLS FAN COORDINATION DETAIL
NOT TO SCALE



NOTE:
1. EXTEND SHEET METAL PLENUM TO BACKSIDE OF LOUVER

10 SHEET METAL PLENUM
NO SCALE



LOW PRESSURE DUCTWORK

NOTE:
ALL DUCTWORK AND EQUIPMENT HANGERS AND SUPPORTS MUST BE PURCHASED THRU THE METAL DECKING MANUFACTURER. HANGERS SCREWED INTO THE DECK WILL NOT BE ACCEPTABLE. COORDINATE WITH GENERAL CONTRACTOR.

9 DUCTWORK HANGER DETAILS
NO SCALE

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Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022

PROJECT #: 02110.200
DRAWN BY: TAL
CHECKED BY: GPK

MECHANICAL DETAILS

M1-501

OPTIMA# 21-0305R

8/12/2022 12:41:13 PM

2018 NORTH CAROLINA ENERGY CONSERVATION CODE

COMMERCIAL ENERGY EFFICIENCY - ELECTRICAL SUMMARY

C401 METHOD OF COMPLIANCE

- [x] 2018 NCECC CHAPTER 4
- [ ] NC SPECIFIC COMCHECK PROVIDED
- [ ] N/A BASED ON PROJECT SCOPE
- [ ] ASHRAE 90.1-2013

C406 ADDITIONAL EFFICIENCY PACKAGE OPTIONS

- [ ] C406.2 EFFICIENT MECH EQUIPMENT
- [x] C406.3 REDUCED LTG DENSITY
- [ ] C406.4 ENHANCED DIGITAL LTG CNTLS
- [ ] NOT APPLICABLE BASED ON PROJECT SCOPE
- [ ] C406.5 ON-SITE RENEWABLE ENERGY
- [ ] C406.6 DEDICATED OA SYSTEM
- [ ] C406.7 HI-EFF SERVICE WTR HTG
- [ ] C406.7.1 WTR HTG LOAD FRACTION

C405.2 - LIGHTING CONTROLS (MANDATORY REQUIREMENTS):

- [x] LIGHTING SYSTEMS ARE PROVIDED WITH CONTROLS AS REQUIRED PER SECTION C405.2, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

C405.3 - EXIT SIGNS (MANDATORY REQUIREMENTS):

- [x] INTERNALLY ILLUMINATED EXIT SIGNS DO NOT EXCEED 5 WATTS PER SIDE.
- [ ] NOT APPLICABLE

C405.4 - INTERIOR LIGHTING POWER REQUIREMENTS (PRESCRIPTIVE) (NON-EXEMPT):

- [ ] NOT APPLICABLE PER 2018 NCECC C503.1, EXCEPTION 2.G.

C405.4.1 - TOTAL CONNECTED INTERIOR LIGHTING POWER:

8,630 WATTS SPECIFIED

40 % REDUCTION OF SPECIFIED VS. ALLOWED (APPLICABLE IF C406.1.2 IS SELECTED)

C405.4.2 - TOTAL ALLOWABLE INTERIOR LIGHTING POWER:

METHOD OF COMPLIANCE:

- [x] BUILDING AREA METHOD
- [ ] SPACE-BY-SPACE METHOD

14,534 WATTS ALLOWED

C405.5.1 - EXTERIOR BUILDING LIGHTING POWER (NON-EXEMPT):

- [ ] NOT APPLICABLE

TOTAL CONNECTED EXTERIOR LIGHTING POWER:

560 WATTS SPECIFIED

TOTAL ALLOWABLE EXTERIOR LIGHTING POWER:

840 WATTS ALLOWED

C405.6 - ELECTRICAL ENERGY CONSUMPTION (DWELLING UNITS):

- [ ] SEPARATE ELECTRICAL METERING HAS BEEN PROVIDED FOR EACH DWELLING UNIT IN GROUP R-2 BUILDINGS.
- [x] NOT APPLICABLE

C405.7 - ELECTRICAL TRANSFORMERS (MANDATORY REQUIREMENTS):

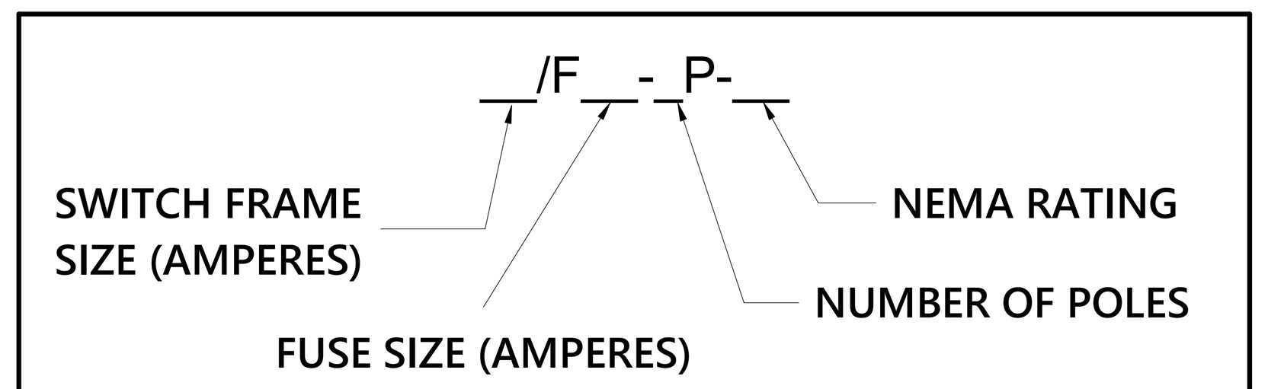
- [x] ELECTRICAL TRANSFORMERS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.7, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

C405.8 - ELECTRICAL MOTORS (MANDATORY REQUIREMENTS):

- [x] ELECTRICAL MOTORS HAVE BEEN SPECIFIED TO MEET MINIMUM EFFICIENCY REQUIREMENTS PER C405.8, EXCEPT WHERE EXEMPT.
- [ ] NOT APPLICABLE

C408 - SYSTEM COMMISSIONING:

- [x] PROJECT AREA IS LESS THAN 10,000 SQUARE FEET AND IS EXEMPT FROM THE SYSTEM COMMISSIONING REQUIREMENTS OF SECTION C408.
- [ ] PROJECT AREA IS GREATER THAN 10,000 SQUARE FEET AND REQUIRES SYSTEM COMMISSIONING PER SECTION C408.



ELECTRICAL DISCONNECT SIZE DISCRIPTION

ELECTRICAL ABBREVIATIONS LIST

Abbr.	Meaning
1P	1 POLE (2P, 3P, 4P, ETC.)
A	AMPERE
AC	ABOVE COUNTER OR AIR CONDITIONER
ACLG	ABOVE CEILING
ADO	AUTOMATIC DOOR OPENER
AF	AMP FRAME
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AFI	ARC FAULT CIRCUIT INTERRUPTER
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ALT	ALTERNATE
AMP	AMPERE
AMPL	AMPLIFIER
ANNUN	ANNUNCIATOR
APPROX	APPROXIMATELY
AQ-STAT	AQUASTAT
ARCH	ARCHITECT, ARCHITECTURAL
AS	AMP SWITCH
AT	AMP TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AUX	AUXILIARY
AV	AUDIO VISUAL
AWG	AMERICAN WIRE GAUGE
BATT	BATTERY
BD	BOARD
BLDG	BUILDING
BMS	BUILDING MANAGEMENT SYSTEM
C	CONDUIT
CAB	CABINET
CAT	CATALOG
CATV	CABLE TELEVISION
CB	CIRCUIT BREAKER
CCTV	CLOSED CIRCUIT TELEVISION
CKT	CIRCUIT
CLG	CEILING
COMB	COMBINATION
CMPR	COMPRESSOR
CONN	CONNECTION
CONST	CONSTRUCTION
CONT	CONTINUATION OR CONTINUOUS
CONTR	CONTRACTOR
CONV	CONVECTOR
CP	CIRCULATING PUMP
CRT	CATHODE-RAY TUBE
CT	CURRENT TRANSFORMER
CTR	CENTER
CU	COPPER
DCP	DOMESTIC WATER CIRCULATING PUMP
DEPT	DEPARTMENT
DET	DETAIL
DIA	DIAMETER
DISC	DISCONNECT
DIST	DISTRIBUTION
DN	DOWN
DPR	DAMPER
DS	SAFETY DISCONNECT SWITCH
DT	DOUBLE THROW
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
ELEC	ELECTRIC, ELECTRICAL
ELEV	ELEVATOR
EM	EMERGENCY
EMS	ENERGY MANAGEMENT SYSTEM
EMT	ELECTRICAL METALLIC TUBING
EP	ELECTRIC PNEUMATIC
EQUIP	EQUIPMENT
EWC	ELECTRIC WATER COOLER
EXIST	EXISTING
EXH	EXHAUST
EXP	EXPLOSION PROOF
FA	FIRE ALARM
FABP	FIRE ALARM BOOSTER POWER SUPPLY PANEL
FACP	FIRE ALARM CONTROL PANEL
FCU	FAN COIL UNIT
FIXT	FIXTURE
FLR	FLOOR
FLUOR	FLUORESCENT
FU	FUSE
FUDS	FUSED SAFETY DISCONNECT SWITCH
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GC	GENERAL CONTRACTOR
GEN	GENERATOR
GFI	GROUND FAULT CIRCUIT INTERRUPTER
GFP	GROUND FAULT PROTECTOR
GND	GROUND
GRS	GALVANIZED RIGID STEEL (CONDUIT)
GYP BD	GYPSUM BOARD
HOA	HANDS-OFF-AUTOMATIC SWITCH
HORIZ	HORIZONTAL
HP	HORSEPOWER
HPF	HIGH POWER FACTOR
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HV	HIGH VOLTAGE
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HWP	HYDRONIC WATER PUMP
IC	INTERRUPTING CAPACITY
IG	ISOLATED GROUND
IMC	INTERMEDIATE METAL CONDUIT
INCAND	INCANDESCENT
IR	INFRARED
I/W	INTERLOCK WITH
J-BOX	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT-AMPERE
KVAR	KILOVOLT-AMPERE REACTIVE
KW	KILOWATT
KWH	KILOWATT HOUR
LOC	LOCATE OR LOCATION
LT	LIGHT
LTG	LIGHTING
LTNG	LIGHTNING
LV	LOW VOLTAGE
MAX	MAXIMUM
MAG.S	MAGNETIC STARTER
M/C	MOMENTARY CONTACT
MC	MECHANICAL CONTRACTOR
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MDC	MAIN DISTRIBUTION CENTER
MDP	MAIN DISTRIBUTION PANEL
MFR	MANUFACTURER
MFS	MAIN FUSED DISCONNECT SWITCH
MH	MANHOLE
MIC	MICROPHONE
MIN	MINIMUM
MISC	MISCELLANEOUS
MLO	MAIN LUGS ONLY
MMS	MANUAL MOTOR STARTER
MOA	MULTIOUTLET ASSEMBLY
MSP	MOTOR STARTER PANELBOARD
MSBD	MAIN SWITCHBOARD
MT	MOUNT
MT.C	EMPTY CONDUIT
MTS	MANUAL TRANSFER SWITCH
MTR	MOTOR, MOTORIZED
N.C.	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURER'S ASSOCIATION
NFDS	NON-FUSED SAFETY DISCONNECT SWITCH
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
N.O.	NORMALLY OPEN
NPF	NORMAL POWER FACTOR
NTS	NOT TO SCALE
OH	OVERHEAD
OL	OVERLOADS
PA	PUBLIC ADDRESS
PB	PULL BOX OR PUSHBUTTON
PE	PNEUMATIC ELECTRIC
PED	PEDESTAL
PF	POWER FACTOR
PH	PHASE
PIV	POST INDICATING VALVE
PNL	PANEL
PP	POWER POLE
PR	PAIR
PRI	PRIMARY
PROJ	PROJECTION
PRV	POWER ROOF VENTILATOR
PT	POTENTIAL TRANSFORMER
PVC	POLYVINYL CHLORIDE (CONDUIT)
PWR	POWER
QUAN	QUANTITY
RCPT	RECEPTACLE
REQD	REQUIRED
RM	EXISTING TO REMAIN
RSC	RIGID STEEL CONDUIT
RTU	ROOF TOP UNIT
SC	SURFACE CONDUIT
SEC	SECONDARY
SHT	SHEET
SIM	SIMILAR
S/N	SOLID NEUTRAL
SPEC	SPECIFICATION
SPKR	SPEAKER
SP	SPARE
SR	SURFACE RACEWAY
SS	STAINLESS STEEL
SSW	SELECTOR SWITCH
S/S	STOP/START PUSHBUTTONS
STA	STATION
STD	STANDARD
SURF	SURFACE MOUNTED
SW	SWITCH
SWBD	SWITCHBOARD
SYM	SYMMETRICAL
SYS	SYSTEM
TEL	TELEPHONE
TEL/DATA	TELEPHONE/DATA
TERM	TERMINAL
TL	TWIST LOCK
TR	TAMPER RESISTANT
T-STAT	THERMOSTAT
TTC	TELEPHONE TERMINAL CABINET
TV	TELEVISION
TVTC	TELEVISION TERMINAL CABINET
TYP	TYPICAL
UC	UNDER COUNTER
UE	UNDERGROUND ELECTRICAL
UG	UNDERGROUND
UH	UNIT HEATER
UT	UNDERGROUND TELEPHONE
UTIL	UTILITY
UV	UNIT VENTILATOR OR ULTRAVIOLET
V	VOLT
VA	VOLT-AMPERES
VDT	VIDEO DISPLAY TERMINAL
VERT	VERTICAL
VFD	VARIABLE FREQUENCY DRIVE
VOL	VOLUME
W	WATT
W/	WITH
WG	WIRE GUARD
WH	WATER HEATER
W/O	WITHOUT
WP	WEATHERPROOF
XFMR	TRANSFORMER
XFR	TRANSFER
∠	ANGLE
@	AT
△	DELTA
'	FEET
"	INCHES
#	NUMBER
Ø	PHASE
C	CENTER LINE
P	PLATE

SYMBOL SCHEDULE POWER

SYMBOL	DESCRIPTION
	WIRING SYSTEM CONCEALED IN WALL OR CEILING. WHEN SHOWN, CROSS LINES INDICATE NUMBER OF WIRES. (GROUND WIRES ARE NOT SHOWN)
	WIRING SYSTEM CONCEALED IN OR UNDER SLAB OR UNDERGROUND. UNSWITCHED LEG OF LIGHTING CIRCUIT WHEN SHOWN ON LIGHTING PLANS
	WIRING SYSTEM LOW VOLTAGE.
	CONDUIT TURNED UP TO FLOOR ABOVE.
	CONDUIT TURNED DOWN TO FLOOR BELOW.
	BRANCH CIRCUIT HOMERUN TO PANEL.

SYMBOL SCHEDULE POWER LEGEND

	JUNCTION BOX WITH CONNECTION TO EQUIPMENT SERVED. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.
	208Y/120V THREE PHASE PANELBOARD. SEE SCHEDULE FOR MOUNTING. TOP OF PANEL AT 6'-6" AFF.
	480Y/277V THREE PHASE PANELBOARD. SEE SCHEDULE FOR MOUNTING. TOP OF PANEL AT 6'-6" AFF.
	480-208Y/120V TRANSFORMER. SEE RISER FOR SIZE. PROVIDE 4" THICK HOUSEKEEPING PAD TO EXTEND 3" ON SIDES, FRONT WITH CHAMFER EDGE AND OSHA COMPLIANT, SAFETY YELLOW, EPOXY PAINT SUITABLE FOR CONCRETE.
HD	JUNCTION BOX FOR HAND DRYER CONNECTION; SEE MOUNTING HEIGHTS DETAIL FOR EXACT HEIGHT; SEE ARCH. SHEETS FOR COORDINATION 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.
0.3 hp XX-1	CONNECTION TO MOTOR. STARTER PROVIDED BY OTHERS UNLESS OTHERWISE NOTED. NUMBER INDICATES HORSEPOWER.
0.0 hp $M	FRACTIONAL HORSEPOWER MANUAL MOTOR STARTER, WITH OVERLOAD PROTECTION
M	RECTANGULAR DUCT MOUNTED MOTOR OPERATED DAMPER, INTERLOCK WITH FAN AS INDICATED. (DAMPER BY M.C.)

ELECTRICAL FIXTURES LEGEND - COMMERCIAL

	DUPLEX RECEPTACLE, 20 AMP, 120 VOLT COOPER 5362 OR EQUAL.
GFI	GROUND FAULT RECEPTACLE. NEMA 5-20R DUPLEX. ALL RECEPTACLES INSTALLED OUTSIDE, WITHIN 6' OF A SINK OR IN A KITCHEN SHALL BE GFCI.
GFI	GROUND FAULT DUPLEX RECEPTACLE, NEMA 5-20R MOUNTED ABOVE COUNTER BACKSPLASH OR AT HEIGHT NOTED.
	QUAD RECEPTACLE. TWO NEMA 5-20R DUPLEX RECEPTACLES.
EWC	GFI NEMA 5-20R QUAD RECEPTACLE FOR ELECTRIC WATER COOLER TO BE SUPPLIED BY GROUND FAULT BREAKER. COORDINATE LOCATION WITH PLUMBING CONTRACTOR.
	QUAD RECEPTACLE. TWO NEMA 5-20R DUPLEX RECEPTACLES ABOVE COUNTER

SPECIAL SYSTEMS LEGEND

S	FLUSH-MOUNTED CEILING SPEAKER.
S	WALL-MOUNTED SPEAKER.3/4" CONDUIT TO LOCAL CABLE TRAY
S WP	EXTERIOR WEATHERPROOF SPEAKER; REFER TO DETAIL 1/ SHEET E-503 FOR REQUIREMENTS.

FLOOR BOX SYMBOL LEGEND

FB6	SIX GANG FLUSH MOUNTED FLOOR BOX WITH ACESSIBLE COVER FOR POWER AND COMMUNICATIONS. PROVIDETWO NEMA 5-20R DUPLEX RECEPTACLES AND ONE COMMUNICATIONS PLATE WITH PROVISION FOR SIX RJ45 CAT6 JACKS. EQUAL TO WIREMOLD RFB6-OG-FPBT. ARCHITECT TO SELECT FINISH. STUB FROM BOX TWO CONCEALED 1 1/2"C ROUTED TO WHICHEVER IS NEAREST, BB, J-HOOKS, OR CABLE TRAY.

Note: CONTRACTOR SHALL VERIFY WITH ARCHITECT THE FLOOR FINISH PRIOR TO ORDERING MATERIAL. PROVIDE ALL NECESSARY SHIMS, TRIM PLATES, ACCESSORIES AS REQUIRED FOR A COMPLETE INSTALLATION.

EM./LS LIGHTING FIXTURE SYMBOLS AND DEVICES

SYMBOL	DESCRIPTION
	FLUORESCENT OR LED FIXTURE WITH EMERGENCY BATTERY PACK. PROVIDE 1100 LUMEN INVERTER RATED FOR 90 MINUTE OPERATION. SEE FIXTURE SCHEDULE FOR FIXTURE TYPE, EMERGENCY DEVICE SHALL SUPPLEMENT FIXTURE.

LIGHTING FIXTURES SYMBOLS AND DEVICES LEGEND

	LED LIGHTING FIXTURE. SEE FIXTURE SCHEDULE. SUSPEND FOUR CORNERS WITH WIRE TO STRUCTURE. DO NOT ALLOW GRID ALONE TO SUPPORT FIXTURE.
	LED STRIP LIGHT FIXTURE
	RECESSED LED OR H.I.D. LIGHTING FIXTURE.
	EXIT LIGHT WITH ARROWS AND NUMBERS OF FACES AS INDICATED ON PLANS. 90 MIN BATTERY BACKUP. SEE LIGHTING FIXTURE SCHEDULE.
$3	THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, THREE WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1223, OR EQUAL BY HUBBELL, LEVITON AND PASS & SEYMOUR.
$4	FOUR WAY SWITCH, 20 AMP, 120/277 VOLT, COOPER 1224 OR EQUAL.
$K	KEY OPERATED SWITCH
$D	DIMMER SWITCH. LUTRON SERIES, OR EQUAL. VERIFY LOAD ON CIRCUIT AND MATCH DIMMER SIZE TO LOAD AND DEVICE QUANTITY. PROVIDE DOUBLE GANG J-BOX WITH SINGLE GANG TRIM PLATE. PROVIDE DIMMING SWITCH AS RECOMMENDED BY LIGHTING MANUFACTURER. MATCH SWITCH TYPE TO SOURCE (LED, FLUORESCENT, OR INCANDESCENT,) WATTAGE, AND QUANTITY.
OS DT	CEILING MOUNTED OCCUPANCY SENSOR, DUAL TECHNOLOGY. SENSOR SWITCH CM PDT 10, WATT STOPPER #DT-300, COOPER OAC-DT OR EQUAL.
$OC	WALL MOUNTED OCCUPANCY SENSOR AND SWITCH. INFRARED TECHNOLOGY WITH NEUTRAL, 120/277V RATED. WATT STOPPER #WS-250, OR EQUAL BY SENSOR SWITCH, AND LEVITON.
PC	ADDRESSABLE PHOTOCELL, EXTERIOR, MOUNT FACING NORTH.
$L1	WALL MOUNTED LOW VOLTAGE ADDRESSABLE LIGHT CONTROL WALL SWITCH ON/OFF FOR 1 ZONE OF LIGHTING. HUBBELL NXSW SERIES OR EQUAL BY ACUITY NLIGHT OR WATTSTOPPER DLM. PROVIDE ON/OFF LABELS FOR EACH BUTTON.
$P2	WALL MOUNTED LOW VOLTAGE ADDRESSABLE LIGHT CONTROL WALL SWITCH ON/OFF WITH DIMMING CONTROL FOR 2 ZONES OF LIGHTING. HUBBELL NXSW SERIES OR EQUAL BY ACUITY NLIGHT OR WATTSTOPPER DLM. PROVIDE ON/OFF LABELS FOR EACH BUTTON.
PP	CEILING MOUNTED OCCUPANCY SENSOR POWER PACK. SENSOR SWITCH PP-20, WATT STOPPER #BZ-100, COOPER SP-20, OR EQUAL.
PP NX	ADDRESSABLE ROOM CONTROLLER HUBBELL NXRC OR EQUAL BY ACUITY NLIGHT, WATTSTOPPER DLM.
PP NXD	ADDRESSABLE ROOM CONTROLLER W/ 0-10V DIMMING, HUBBEL NXRC OR EQUAL BY ACUITY NLIGHT, WATTSTOPPER DLM.

TELECOM LEGEND - ELECTRICAL

	PLYWOOD TELEPHONE BACKBOARD. SIZE AS INDICATED ON RISER.
#	DATA OUTLET ABOVE COUNTER OR HEIGHT SPECIFIED. MINIMUM 1 1/4" CONDUIT TO ABOVE NEAREST ACCESSIBLE CEILING FOR J-HOOK SYSTEM OR TO LOCAL CABLE TRAY (WITHIN 6") AS APPLICABLE WITH PULL STRING. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING. SUBSCRIPT NEXT TO OUTLET INDICATES HEIGHT OR DATA DROPS. WHERE NO HEIGHT SHOWN, MOUNT 6" ABOVE COUNTER TOP. IF CABLE QUANTITY AND SERVICE ARE NOT IDENTIFIED, THEN PATHWAY ONLY OR REFER TO TO TECHNOLOGY DRAWINGS FOR CABLE AND ACTIVATION TYPE.
	DATA OUTLET MOUNTED AT 18" AFF OR HEIGHT SPECIFIED. MINIMUM 1 1/4" CONDUIT TO ABOVE NEAREST ACCESSIBLE CEILING FOR J-HOOK SYSTEM OR TO LOCAL CABLE TRAY (WITHIN 6") AS APPLICABLE WITH PULL STRING. 4" SQUARE BOX WITH A SINGLE-GANG OPENING AND PLASTER RING.
WAP	STRUCTURE MOUNTED JUNCTION BOX FOR WIRELESS ACCESS POINT IN OPEN CEILING APPLICATIONS. 4" SQUARE BOX WITH A TWO-GANG OPENING. STUB 1" EC FROM BOX TO J-HOOKS OR CABLE TRAY ABOVE ACCESSIBLE CEILING. PROVIDE CABLING, TERMINATIONS AND FACEPLATE PER SPECIFICATIONS.
WAP	STRUCTURE MOUNTED JUNCTION BOX FOR WIRELESS ACCESS POINT ON WALL MOUNTED APPLICATIONS. 4" SQUARE BOX WITH A TWO-GANG OPENING. STUB 1" EC FROM BOX TO J-HOOKS OR CABLE TRAY ABOVE ACCESSIBLE CEILING. PROVIDE CABLING, TERMINATIONS AND FACEPLATE PER SPECIFICATIONS.
	CONDUIT SLEEVE, 4" SLEEVE UNLESS OTHERWISE NOTED. PROVIDED BY ELECTRICAL CONTRACTOR.
	CABLE TRAY - WIRE MESH 12" WIDE X 4" DEEP (8" RUNG SPACING) SUSPENDED FROM CEILING STRUCTURE UNLESS OTHERWISE NOTED CABLE TRAY SHALL BE COORDINATED WITH MECHANICAL DUCTWORK IN FIELD PRIOR TO INSTALLATION; CONTRACTOR SHALL PRODUCE COORDINATION DRAWINGS AND FIELD ADJUST AS REQUIRED TO MEET INTENT OF DRAWINGS.
TMGB	TELECOMMUNICATIONS MAIN GROUND BAR.
TGB	TELECOMMUNICATIONS GROUND BAR.

SECURITY DEVICES SYMBOL LEGEND

	CEILING MOUNTED SECURITY CAMERA LOCATION. CAMERA PROVIDED AND INSTALLED BY OTHERS. PROVIDED JUNCTION BOX AS REQUIRED BY OTHERS.
	CAMERA. WALL MOUNTED. X=WP EXTERIOR WALL MOUNTED CAMERA. REFER TO DETAIL 2 & 3/ SHEET E1-503 FOR REQUIREMENTS.
DC	DOOR CONTACT, MINIMUM 1/2" CONDUIT. PROVIDE SINGLE GANG JUNCTION BOX AND PULL STRING. SEE CARD READER DETAIL FOR ADDITIONAL REQUIREMENTS OF PATHWAYS AND CABLING
MD	SECURITY MOTION DETECTOR. CEILING MOUNTED. REFER TO SPECIFICATIONS AND DETAILS FOR DEVICES AND CABLING REQUIREMENTS. REFER TO ELECTRICAL DRAWINGS FOR JUNCTION BOX AND CONDUIT REQUIREMENTS.

EXISTING/DEMOLITION LEGEND

SYMBOL	DESCRIPTION
	HALFTONE SYMBOL INDICATES EXISTING
	DASHED SYMBOL INDICATES REMOVED

ELECTRICAL SHEET INDEX

COMMISSIONING NOTE - 2018 NCECC C408

THE MECHANICAL CONTRACTOR IS RESPONSIBLE FOR SYSTEM COMMISSIONING PER 2018 NCECC SECTION 408. MC SHALL HIRE A REGISTERED DESIGN PROFESSIONAL (ENGINEERED SEALED IN NC OR CERTIFIED COMMISSIONING PROFESSIONAL) TO PERFORM THE COMMISSIONING DUTIES DESCRIBED IN SECTION C408, AND PROVIDE OWNER AND CODE OFFICIAL WITH A SEALED STATEMENT OF COMPLETION (APPENDIX C1). THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH COMMISSIONING AGENT AND PROVIDE ALL NECESSARY TIME, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

COORDINATION DRAWINGS

THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL CONTRACTOR). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA (INCLUDING CABLE TRAY) AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO FABRICATION AND INSTALLATION OF DUCTWORK AND PIPING SYSTEMS, OR PURCHASE OF EQUIPMENT. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS FOR SHOP DRAWINGS AND COORDINATION DRAWINGS:

1, ALL SHOP AND COORDINAGION DRAWINGS WILL BE 1/4" = 1'-O" SCALE
2. DRAWINGS WILL BE ORIGINAL DRAWINGS AND NOT OVERLAYS OF THE CONTRACT/DESIGN
3. COORDINATION DRAWINGS WILL BE DRAWN ON REPRODUCIBLE MATERIAL 48'x36".
4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

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NORTH CAROLINA PROFESSIONAL SEAL 048210 ENGINEER MORGAN K. GUNTER 8/15/2022

BID SET

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Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE:	8/15/2022
PROJECT #:	02110.200
DRAWN BY:	JSD
CHECKED BY:	MKG

ELECTRICAL LEGEND AND NOTES

OPTIMA# 21-0269R

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt
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1. GENERAL:
   A. THE WORK COVERED BY THESE SPECIFICATIONS CONSISTS OF FURNISHING ALL LABOR, EQUIPMENT, MATERIALS, AND SUPPLIES AS NECESSARY FOR THE COMPLETE AND SATISFACTORY OPERATING ELECTRICAL SYSTEMS AS SHOWN ON THE PLANS.
   B. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, NFPA, STATE BUILDING CODE, AND ANY OTHER LOCAL REQUIREMENTS THAT MAY APPLY.
   C. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL ELECTRICAL PERMITS AND INSPECTION FEES.
   D. ALL MATERIALS AND EQUIPMENT SHALL BE NEW AND SHALL BE LISTED BY THE UNDERWRITER'S LABORATORIES, INC. OR BY A STATE APPROVED THIRD PARTY TESTING AGENCY FOR THE USE INTENDED WHERE A STANDARD FOR SUCH MATERIALS AND USE EXISTS. ALL ITEMS OF THE SAME TYPE AND RATING SHALL BE IDENTICAL AND OF THE SAME MANUFACTURER.
   E. CONTRACTOR SHALL SUBMIT SHOP DRAWINGS AND CATALOG DATA IN ELECTRONIC FORMAT (PDF) FOR ALL ELECTRICAL ITEMS IN THE SCOPE OF WORK, INCLUDING, BUT NOT LIMITED TO, RACEWAYS, BOXES, FITTINGS, CONDUCTORS, LUMINAIRES, LAMPS, BALLASTS, WIRING DEVICES, SAFETY SWITCHES, DISCONNECTS, TRANSFORMERS, PANELBOARDS, FIRE ALARM, TELECOMMUNICATIONS, ETC. FOR APPROVAL AS APPLICABLE FOR THE PROJECT. ONE COMPLETE SET OF APPROVED SUBMITTALS SHALL BE MAINTAINED AT THE JOB SITE.
   F. ALL COST ASSOCIATED WITH SUBSTITUTED EQUIPMENT TO COMPLY WITH THE BASIS OF DESIGN, INCLUDING PROVIDING MAINTENANCE ACCESS, CLEARANCE, CONDUIT, WIRING, REPLACEMENT OF OTHER SYSTEM COMPONENTS, BUILDING ALTERATIONS, METHODS, ETC., SHALL BE INCLUDED IN THE ORIGINAL BASE BID. NO ADDITIONAL COSTS ASSOCIATED WITH SUBSTITUTED EQUIPMENT WILL BE APPROVED AFTER BIDS HAVE BEEN ACCEPTED AND ALL COSTS WILL BE THE RESPONSIBILITY OF THE ELECTRICAL CONTRACTOR. CREDITS SHALL BE GIVEN TO THE OWNER WHERE SUCH EQUIPMENT AND METHODS RESULT IN LESS EXPENSE TO THE CONTRACTOR.
   G. ONE COMPLETE SET OF THE LATEST CONSTRUCTION PLANS OF ALL TRADES SHALL BE MAINTAINED AT THE JOB SITE. IN ADDITION, ALL ADDENDUMS, BULLETINS, AND/OR SKETCHES SHALL BE INCORPORATED INTO THE ON-SITE CONSTRUCTION PLANS AS THE JOB PROGRESSES.
   H. COMPLETELY ADEQUATE HOUSING SHALL BE PROVIDED FOR ALL MATERIALS STORED ON JOB SITE. ONLY CONDUIT MAY BE STORED OUTSIDE, BUT NOT IN CONTACT WITH THE GROUND.
   I. THE CONDUIT AND NEUTRAL SYSTEM SHALL BE GROUNDED AT THE MAIN SERVICE EQUIPMENT. GROUNDING ELECTRODE SYSTEM SHALL BE INSTALLED PER NEC 250.
   J. PROVIDE AN INTERSYSTEM BONDING TERMINATION DEVICE AT THE MAIN ELECTRICAL SERVICE PER NEC 250.94.
   K. WIRING SHALL BE TESTED FOR CONTINUITY AND GROUNDS BEFORE BEING ENERGIZED. FAULTY WIRING SHALL BE REPLACED AT NO ADDITIONAL EXPENSE TO THE OWNER.
   L. PROVIDE ALL CUTTING AND PATCHING FOR INSTALLATION OF WORK AND REPAIR ANY DAMAGE DONE.
   M. THE ELECTRICAL CONTRACTOR SHALL CONNECT ALL EQUIPMENT REQUIRING ELECTRICAL CONNECTIONS (UNLESS OTHERWISE NOTED), EXCEPT FOR CONTROL WIRING FOR EQUIPMENT NOT PROVIDED BY THE ELECTRICAL CONTRACTOR. CONTROL WIRING FOR SUCH EQUIPMENT SHALL BE PROVIDED BY THE RESPECTIVE DISCIPLINE.
   N. ALL ELECTRICAL JUNCTION BOXES, SWITCHGEAR, CABLING, VOICE/DATA OUTLETS, LOW VOLTAGE CABINETS, EMERGENCY RECEPTACLES, ETC. SHALL BE LABELED ACCORDING TO PANEL/RACK AND CIRCUIT NUMBER.
   O. UPON COMPLETION OF WORK, CONTRACTOR SHALL PRESENT ENGINEER WITH CERTIFICATE OF APPROVAL FROM LOCAL INSPECTOR AND/OR AUTHORITY HAVING JURISDICTION BEFORE WORK WILL BE APPROVED FOR FINAL PAYMENT.
   P. CONTRACTOR SHALL GUARANTEE ALL WORK AND MATERIALS FOR A PERIOD OF ONE YEAR EFFECTIVE THE DATE THE PROJECT IS ACCEPTED BY THE OWNER. ANY IMPERFECT MATERIALS OR WORKMANSHIP SHALL BE REPLACED WITHOUT ADDED COST TO THE PROJECT.
   Q. IT SHALL NOT BE THE INTENT OF ISSUED PLANS AND/OR SPECIFICATIONS TO SHOW EVERY MINOR DETAIL OF CONSTRUCTION. THE ELECTRICAL CONTRACTOR IS EXPECTED TO FURNISH AND INSTALL ALL NECESSARY ITEMS FOR A COMPLETE AND OPERATING SYSTEM.
   R. THE WORD "PROVIDE" MEANS THAT THIS CONTRACTOR SHALL FURNISH, FABRICATE, ERECT, CONNECT, AND COMPLETELY INSTALL SYSTEMS IN PROPER OPERATING CONDITION. ALL LABOR, PRODUCT OPTIONS, ACCESSORIES AND INCIDENTAL MATERIALS REQUIRED SHALL BE INCLUDED AS PART OF THIS WORK TO COMPLETE THE INSTALLATION.
   S. THE WORD "CONNECT" MEANS THAT THIS CONTRACTOR SHALL PROVIDE (SEE DEFINITION ABOVE) ALL DISCONNECTING MEANS, OVERCURRENT PROTECTION AND WIRING REQUIRED TO PLACE THE EQUIPMENT AND SYSTEMS IN PROPER OPERATING CONDITION AND TO COMPLY WITH CODE REQUIREMENTS.
   T. CONTRACTOR SHALL COORDINATE THE ROUGH-IN OF ALL OUTLET LOCATIONS WITH ARCHITECTURAL FLOOR PLANS, ELEVATIONS, AND MILLWORK SHOP DRAWINGS PRIOR TO ROUGH-IN.
   U. ELECTRICAL CONTRACTOR SHALL NOT SCALE PLANS. CONTRACTOR SHALL REFER TO ARCHITECTURAL PLANS AND ELEVATIONS FOR EXACT LOCATIONS OF ALL EQUIPMENT, UNLESS OTHERWISE NOTED.
   V. CONTRACTOR SHALL TEST ALL "LIFE SAFETY" EQUIPMENT AND SYSTEMS FOR PROPER FUNCTION AND OPERATION. UPON SUCCESSFUL COMPLETION OF TESTS, CONFIRMATION SHALL BE SENT TO THE ENGINEER OF RECORD IN THE FORM OF A LETTER STATING THE TESTS PERFORMED, THE RESULTS, AND THE DATE TESTS WERE SUCCESSFULLY COMPLETE. "LIFE SAFETY" EQUIPMENT AND SYSTEMS CONSIST OF THOSE AS SPECIFIED IN THE STATE BUILDING CODE, THE NATIONAL ELECTRICAL CODE, NFPA 101, AND ANY OTHER LOCAL REQUIREMENTS THAT MAY APPLY.
   W. IF DURING THE COURSE OF WORK, THE CONTRACTOR DISCOVERS A PROBLEM WITH THE PERFORMANCE OF THE INSTALLATION RELATIVE TO THE PLANS AND SPECIFICATIONS, THE NEC, OR OTHER CODES OR REQUIREMENTS, THE CONTRACTOR SHALL IMMEDIATELY BRING THE PROBLEM TO THE ATTENTION OF THE ARCHITECT AND/OR ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK.
   X. WHERE THERE ARE CONFLICTS BETWEEN THE PLANS AND SPECIFICATIONS, THE CONTRACTOR SHALL BRING THE ISSUE TO THE ATTENTION OF THE ENGINEER FOR RESOLUTION PRIOR TO THE EXECUTION OF THE WORK OR ORDERING ANY MATERIALS. NO ADDITIONAL COSTS SHALL BE WARRANTED WITHOUT A CHANGE TO THE PROJECT SCOPE.
   Y. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING AND PROVIDING TEMPORARY POWER AND LIGHTING FOR ALL TRADES. AT NO TIME SHALL EXISTING BUILDING POWER SYSTEMS BE UTILIZED WITHOUT WRITTEN PERMISSION FROM THE OWNER.
   Z. COORDINATE LOCATION AND REQUIREMENTS FOR ELECTRICAL SERVICE WITH THE POWER COMPANY. WHERE MORE THAN ONE SERVICE IS SUPPLIED TO A BUILDING, PROVIDE IDENTIFICATION AT EACH SERVICE PER NEC 230-2(E).
   AA. THE CONTRACTOR SHALL PROVIDE A MINIMUM TWO WEEK NOTICE FOR ANY PLANNED UTILITY OUTAGES. WRITTEN AUTHORIZATION FROM THE OWNER SHALL BE PROVIDED PRIOR TO ANY OUTAGE. ALL PLANNED UTILITY OUTAGES SHALL BE COORDINATED WITH THE OWNER TO OCCUR DURING NON-OPERATING TIMES, INCLUDING NIGHTS, WEEKENDS AND HOLIDAYS. ALL PLANNED UTILITY OUTAGES SHALL INCLUDE PROVISIONS FOR PROPER BACK-UP OF ALL LIFE-SAFETY SYSTEMS AND INCLUDE AN APPROVED FIRE-WATCH PROGRAM AS REQUIRED BY THE LOCAL FIRE MARSHALL.
   BB. EACH BIDDER SHALL VISIT THE JOB SITE PRIOR TO BIDDING TO FAMILIARIZE THEMSELVES WITH EXISTING CONDITIONS AND TO ASCERTAIN THE EXTENT OF WORK REQUIRED. FAILURE TO VISIT SITE SHALL NOT EXCUSE CONTRACTOR FROM PERFORMING REQUIRED WORK NOR SHALL IT BE AN ACCEPTABLE REASON FOR REQUESTING ADDITIONS TO THE CONTRACT.

2. RACEWAY:
   A. CONDUIT SHALL BE MANUFACTURED BY ALLIED, WHEATLAND, REPUBLIC CONDUIT, WESTERN TUBE, OR APPROVED EQUIVALENT.
   B. FOR INTERIOR WORK, CONDUIT SHALL BE ZINC COATED EMT EXCEPT WHERE NOT PERMITTED BY CODE. USE SCHEDULE 40 PVC BELOW CONCRETE SLAB, IN DUCTBANKS, AND FOR EXTERIOR WORK WHERE NOT SUBJECT TO DAMAGE. USE IMC WHERE SUBJECT TO PHYSICAL DAMAGE.
   C. EMT FITTINGS SHALL BE COMPRESSION GLAND TYPE, OF MALLEABLE STEEL. CONNECTORS SHALL HAVE INSULATED THROATS. CAST, SET SCREW, OR INDENTER TYPE FITTINGS ARE NOT ACCEPTABLE. ALL FITTINGS FOR EMT SHALL BE MADE OF STEEL.
   D. ALL RACEWAY SHALL BE RUN CONCEALED, UNLESS OTHERWISE NOTED. FISH ALL NEW OUTLETS IN EXISTING WALLS, WHERE POSSIBLE. ALL RUNS SHALL BE NEAT AND SQUARE.
   E. LOW VOLTAGE CABLING NOT SPECIFIED TO BE INSTALLED IN CONDUIT, SHALL BE INSTALLED IN A CABLE TRAY SYSTEM OR J-HOOK SYSTEM CONSISTING OF MINIMUM 2" DIAMETER HOOKS LOCATED ON 3'-0" CENTERS IN ALL ACCESSIBLE CEILINGS. WHERE THERE ARE INACCESSIBLE CEILINGS, PROVIDE CONDUIT FOR ENTIRE LENGTH OF INACCESSIBILITY.
   F. RACEWAYS USED FOR LOW VOLTAGE SYSTEMS SUCH AS TELECOMMUNICATIONS, FIRE ALARM, SECURITY, CCTV, CONTROLS, AND SIMILAR CONDUITS ABOVE THE CEILING AND BACKBOARD(S) SHALL BE PROVIDED WITH INSULATED THROAT BUSHINGS AT EACH CONDUIT TERMINATION. THESE BUSHINGS SHALL BE BE INSTALLED PRIOR TO PULLING LOW-VOLTAGE CABLES.
   G. RACEWAY PENETRATIONS THROUGH FLOOR SLABS AND FIRE-RATED WALLS SHALL BE FILLED WITH IMPERVIOUS, NON-SHRINK GROUT SUFFICIENTLY TIGHT TO PREVENT THE TRANSFER OF SMOKE, WATER, AND DUST. ROOF PENETRATIONS SHALL BE WITHIN THE EQUIPMENT ROOF CURB.
   H. SUPPORT ALL CONDUIT WITH STRAPS AND CLAMPS.
   I. ALL CONDUIT SHALL BE RUN PARALLEL OR PERPENDICULAR TO BUILDING LINES, WHETHER EXPOSED OR NOT AND SUPPORTED FROM STRUCTURE AND PROPERLY SECURED.
   J. WHERE CONDUITS PASS THROUGH A BUILDING EXPANSION JOINT, PROVIDE GALVANIZED EXPANSION FITTINGS WITH BONDING JUMPERS.
   K. MINIMUM CONDUIT SIZE SHALL BE 3/4" FOR INTERIOR WORK, 1" FOR EXTERIOR WORK.
   L. PROVIDE MINIMUM 210# TEST NYLON PULL CORD AND NYLON BUSHINGS IN ALL EMPTY RACEWAYS.
   M. LIQUID-TIGHT METAL CONDUIT SHALL ONLY BE USED FOR FINAL CONNECTIONS TO EQUIPMENT AND ALL OTHER ROTATING AND VIBRATING EQUIPMENT, MAXIMUM LENGTH OF 3'-0".
   N. FLEXIBLE METAL CONDUIT, MINIMUM SIZE 3/8", SHALL ONLY BE USED FOR FINAL CONNECTION TO LIGHTING FIXTURES, MAXIMUM LENGTH OF 6'-0".
   O. PROVIDE PULL BOXES, SUCH THAT NO SINGLE CONDUIT RUN HAS BENDS IN EXCESS OF 360°. PULL BOXES SHALL BE SUITABLE AND APPROVED FOR THE INTENDED USE. WHERE CONDUITS PASS UNDER PAVED AREAS, THEY SHALL BE RGS.
   P. ALL CONDUIT BENDS/ELBOWS EMERGING FROM UNDERGROUND SHALL BE IMC AND SHALL EXTEND A MINIMUM OF 18" BELOW GRADE.
   Q. ALL UNDERGROUND RACEWAYS SHALL BE THOROUGHLY COATED WITH TWO COATS OF ASPHALTUM BITUMASTIC.
   R. ALL CONDUITS INSTALLED UNDERGROUND OR IN CONCRETE SHALL HAVE JOINTS MADE WATERTIGHT BY USE OF POLYETRA-FLUOROETHYLENE TAPE.
   S. THE USE OF AC OR NM CABLE IS NOT PERMITTED.
   T. MC CABLE IS NOT ALLOWED, EXCEPT FOR FINAL CONNECTION TO LIGHT FIXTURES. PER NOT 2,N.

3. OUTLET BOXES:
   A. JUNCTION AND PULL BOXES SHALL BE CODE GAUGE GALVANIZED STEEL. ACCEPTED MANUFACTURERS SHALL BE STEEL CITY (THOMAS & BETTS), RACO, CROUSE-HINDS, APPLETON (EMERSON), OR APPROVED EQUIVALENT.
   B. OUTLET BOXES SHALL NOT BE MOUNTED BACK TO BACK IN COMMON WALLS.
   C. ATTACH EMT WITH CONNECTORS HAVING INSULATED THROAT.
   D. ATTACH BOXES TO STUD WORK USING CADDY BAR STRAPS THAT CONNECT TO TWO ADJACENT STUDS TO PREVENT TWISTING OF BOX IN WALL.
   E. ALL OUTLET BOXES (INCLUDING TELEPHONE, CABLE TV, AND COMPUTER) SHALL HAVE COVER PLATES, BLANK IF NOT USED.
   F. ALL EXTERIOR BOXES SHALL BE WATER-TIGHT.

4. CONDUCTORS:
   A. CONDUCTORS SHALL BE MANUFACTURED BY SOUTHWIRE (SIMPULL), ENCORE (SUPERSLICK), UNITED COPPER (SLK), CERRO (SLP), OR APPROVED EQUAL, "PRE-LUBRICATED" BY THE MANUFACTURER.
   B. ALL CONDUCTORS SHALL BE COPPER, RATED 75° C WET/DRY EXCEPT WHERE OTHERWISE NOTED OR REQUIRED BY U.L. OR OTHER CODES. ALUMINUM CONDUCTOR MAY ONLY BE UTILIZED WHERE NOTED IN THE DRAWINGS.
   C. ALL CONDUCTORS SHALL BE SINGLE INSULATED CONDUCTOR, THHN/THWN-2. SIZES #10 AWG AND SMALLER SHALL BE SOLID, SIZES #8 AWG AND LARGER SHALL BE STRANDED.
   D. BRANCH CIRCUITS SHALL NOT BE SMALLER THAN #12 AWG. CONTROL WIRING MAY BE #14 AWG.
   E. CONDUCTORS SHALL BE COLOR CODED BLACK/RED/BLUE FOR 120/208 VOLT SYSTEMS FOR A, B, AND C PHASES, RESPECTIVELY. NEUTRAL SHALL BE WHITE FOR 120/208 VOLT SYSTEMS. GROUND CONDUCTOR SHALL BE GREEN ON ALL SYSTEMS. ALL CONDUCTOR SIZES SHALL HAVE COLOR-CODED INSULATION. THE USE OF COLORED TAPE ON LARGER WIRE SIZES SHALL NOT BE ALLOWED.
   F. INSULATION SHALL BE DUAL RATED TYPE THHN/THWN-2 FOR FEEDERS AND BRANCH CIRCUITS. FIXTURE TAPS SHALL BE #12 THHN/THWN-2 IN FLEX WITH GREEN #12 AWG GROUNDING CONDUCTOR.
   G. ALL CONDUCTORS SHALL BE IN CONDUIT.
   H. WIRING TO LIGHTING FIXTURES SHALL BE AS REQUIRED BY UL LABEL.
   I. MULTI-WIRE BRANCH CIRCUITS SHALL NOT BE ALLOWED.
   J. JOINTS IN #10 AWG AND SMALLER SHALL BE MADE UP WITH CRIMPED CONNECTORS WITH INSULATING CAPS (NO TAPE) OR WIRENUTS (MAXIMUM OF 3 CONDUCTORS UNDER ANY CONNECTOR OR WIRENUT). LARGER WIRE SHALL USE SPLIT BOLTS OR BOLTED CLAMPS.
   K. ALL WIRING LUGS THROUGHOUT THE PROJECT, INCLUDING, BUT NOT LIMITED TO, BREAKERS, PANELBOARD/SWITCHBOARD LUGS, SAFETY SWITCH LUGS, MOTOR STARTER LUGS, TRANSFORMERS LUGS, WIRING DEVICE TERMINALS, AND ALL EQUIPMENT LUGS/TERMINALS SHALL BE RATED FOR USE WITH 75 DEGREE INSULATED CONDUCTORS AT THEIR 75 DEGREE AMPACITY AND SHALL BE SIZED AND SELECTED TO MATCH THE CONDUCTOR SIZE AND MATERIAL.
   L. CIRCUIT JOINTS SHALL NOT BE MADE ON DEVICE TERMINALS.
   M. WIRE WITHIN PANELBOARDS SHALL BE NEATLY TRAINED, SQUARED, BUNCHED, AND TAGGED.
   N. ALL SYSTEM FURNITURE CONNECTIONS SHALL COMPLY WITH NEC 605.
   O. GROUND ALL EQUIPMENT PER NEC ARTICLE 250. BOND WHERE CONDUITS ENTER ENCLOSURES THROUGH CONCENTRIC KNOCKOUTS. ALL FLEX, INCLUDING FIXTURE TAPS, SHALL INCLUDE GREEN GROUNDING CONDUCTOR, #12 AWG MINIMUM. PROVIDE GREEN INSULATED EQUIPMENT GROUNDING CONDUCTOR IN EACH CONDUIT AND FOR EACH CIRCUIT, SIZED PER NEC 250-122.
   P. ALL CONDUCTORS INSTALLED IN VERTICAL RACEWAYS SHALL BE SUPPORTED AT INTERVALS AS REQUIRED PER NEC 300-19.
   Q. THE ELECTRICAL CONTRACTOR SHALL FOLLOW AND APPLY THE TABLE BELOW, REGARDLESS WHAT THE PANEL SCHEDULE INDICATES, FOR SIZING ALL 120V, 20 AMP BRANCH CIRCUITS (COPPER CONDUCTORS) TO ALLOW A MAXIMUM OF 3% VOLTAGE DROP FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE ON THE BRANCH CIRCUIT AND ACHIEVE A MAXIMUM OF 5% VOLTAGE DROP ACROSS THE ENTIRE BRANCH CIRCUIT:

VOLTAGE	CONDUCTOR LENGTH *	BRANCH CIRCUIT
120	0' - 50'	#12
120	51' - 90'	#10
120	91' - 140'	#8
120	141' - 255'	#6
277	0' - 125'	#12
277	126' - 200'	#10
277	201' - 330'	#8
277	331' - 525'	#6

* - THE LENGTH IS MEASURED FROM THE CIRCUIT BREAKER TO THE FIRST DEVICE WHICH THE BRANCH CIRCUIT SERVES. WHERE THE DISTANCE EXCEEDS ABOVE, CONSULT WITH THE ENGINEER.

5. WIRING DEVICES:
   A. WIRING DEVICES SHALL BE SPECIFICATION GRADE, MINIMUM, EQUAL TO COOPER QUALITY INDICATED BELOW OR AS MANUFACTURED BY HUBBELL, LEGRAND-PASS & SEYMOUR, LEVITON, OR APPROVED EQUAL, UNLESS OTHERWISE NOTED:

SWITCHES (120V) SHALL BE AS FOLLOWS:

SINGLE-POLE 20 AMP	SEE SPECIFICATIONS
THREE-WAY 20 AMP	SEE SPECIFICATIONS
FOUR-WAY 20 AMP	SEE SPECIFICATIONS
SINGLE-POLE-KEY 20 AMP	SEE SPECIFICATIONS

DUPLEX RECEPTACLES SHALL HAVE A NYLON FACE AND SHALL BE AS FOLLOWS:

20 AMP DUPLEX	SEE SPECIFICATIONS
20 AMP DUPLEX GFCI	SEE SPECIFICATIONS
20 AMP DUPLEX TAMPER	SEE SPECIFICATIONS
20 AMP DUPLEX GFCI-TAMPER	SEE SPECIFICATIONS

THE PART NUMBERS ABOVE ARE FOR WIRING DEVICE TYPE ONLY. SEE BELOW FOR WIRING DEVICE COLOR AND PLATE MATERIAL/COLOR.

   B. SEE MOUNTING HEIGHT ELEVATION DETAIL FOR STANDARD MOUNTING HEIGHTS OF ALL DEVICES, UNLESS OTHERWISE NOTED.
   C. THE COLOR OF ALL WIRING DEVICES (SWITCHES AND RECEPTACLES) SHALL BE AS DIRECTED BY THE ARCHITECT, UNLESS OTHERWISE NOTED. ALL COVER PLATES SHALL BE 302 STAINLESS STEEL. COVER PLATES IN MASONRY WALLS SHALL BE OVERSIZE TYPE.
   D. EACH DUPLEX RECEPTACLE INDICATED TO BE ON A DEDICATED CIRCUIT SHALL BE 20 AMP TYPE.
   E. ADJACENT DEVICES SHALL HAVE A COMMON WALL PLATE.
   F. WEATHERPROOF COVERS SHALL BE "WHILE-IN-USE" SO PLUGS MAY BE INSTALLED WITHOUT COMPROMISING THE WP FUNCTION. COOPER #WIU-2 DOUBLE-GANG WITH CLEAR COVER OR APPROVED EQUAL.
   G. A MAXIMUM OF 10 GENERAL PURPOSE RECEPTACLES SHALL BE ON EACH BRANCH CIRCUIT.
   H. ALL WALL MOUNTED OCCUPANCY/VACANCY SENSORS/SWITCHES SHALL BE INSTALLED WITH AN EQUIPMENT GROUNDING CONDUCTOR.
   I. GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION FOR PERSONNEL SHALL BE PROVIDED FOR ALL LOCATIONS PER NEC 210.8, INSTALLED IN A READILY ACCESSIBLE LOCATION. WHERE A DEVICE LOCATION IS NOT ACCESSIBLE, THE GFCI PROTECTION SHALL BE PROVIDED WITH THE BREAKER SERVING THE DEVICE.
   J. ALL GFCI RECEPTACLES SHALL HAVE AUTO-MONITORING / SELF-TEST FUNCTION AND REVERSE LINE-LOAD MISFIRE FUNCTION AND MEET ALL REQUIREMENTS OF UL 943 (LATEST EDITION).
   K. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING DWELLING UNITS, DETACHED GARAGES AND ACCESORY BUILDINGS TO DWELLING UNITS, COMMON AREAS OF MULTIFAMILY DWELLING UNITS, GUEST ROOMS/GUEST SUITES/COMMON AREAS OF HOTELS AND MOTELS, CHILD-CARE FACILITIES, PRESCHOOL AND EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE IN CLINICS/MEDICAL/DENTAL OFFICES AND OUTPATIENT FACILITIES, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUMS/SKATING RINKS/AUDITORIUMS, DORMITORIES/STUDENT HOUSING, AND ASSISTED LIVING FACILTIES.

6. SUPPORTS:
   A. ALL EQUIPMENT SHALL BE ADEQUATELY SUPPORTED FROM STRUCTURE.
   B. INSERTS IN MASONRY SHALL BE LEAD OR FIBER IN DRILLED HOLES, OR CAST IN PLACE.
   C. NAILS OR POWDER ACTUATED FASTENERS SHALL NOT BE USED.
   D. EMT/IMC/RGS SUPPORTS SHALL BE A MAXIMUM OF 8'-0" APART AND A MAXIMUM OF 3'-0" FROM BOXES.
   E. LIGHTING FIXTURES MOUNTED IN OR ON CEILING SHALL BE SUPPORTED FROM STRUCTURE VIA 12 GAUGE STEEL WIRE. PROVIDE A MINIMUM OF FOUR WIRES, ONE ATTACHED TO EACH CORNER OF LAY-IN FIXTURES. RECESSED DOWNLIGHT FIXTURES SHALL BE SUPPORTED THE SAME. DO NOT SUPPORT RACEWAY OR FIXTURES FROM CEILING GRID OR DUCT WORK. USE U.L. LISTED GRID CLIPS ON ALL LAY-IN FIXTURES.

7. PAINTING:
   A. SUITABLE FINISH COAT SHALL BE PROVIDED FOR ALL EQUIPMENT. PANEL TUBS, COVERS, ETC. SHALL BE PRIMED AND ENAMELED TO BLEND WITH ADJACENT SURFACES, OR SHALL BE MANUFACTURER'S STANDARD COLOR BAKED ENAMEL FINISH, OR AS DIRECTED BY THE ARCHITECT.
   B. CONTRACTOR TO PAINT WHERE EXISTING EXPOSED PANELBOARDS, SURFACE RACEWAY, SURFACE BOXES, ETC. HAVE BEEN REMOVED DURING THE DEMOLITION PHASE, EITHER FOR TEMPORARY WORK OR PERMANENTLY.

8. TELECOMMUNICATIONS:
   A. FURNISH A COMPLETE TELEPHONE CONDUIT SYSTEM AS INDICATED ON THE DRAWINGS.
   B. TELECOMMUNICATION OUTLETS SHALL CONSIST OF A 4" SQUARE DEEP BOX WITH SINGLE GANG PLASTER RING. PROVIDE BLANK PLATE WITH KNOCKOUTS FOR OUTLETS, AS PERMANENT COVERS WILL BE PROVIDED BY A SEPARATE INSTALLER.
   C. PROVIDE MINIMUM 1" RACEWAY, UNLESS OTHERWISE NOTED, FROM EACH BOX TO ABOVE NEAREST ACCESSIBLE CEILING SPACE FOR J-HOOK SYSTEM OR TO CABLE TRAY AS APPLICABLE. PROVIDE MINIMUM 210# TEST NYLON PULL CORD AND NYLON BUSHINGS IN ALL EMPTY RACEWAYS.
   D. PROVIDE RACEWAYS FOR ALL EXTERIOR AND/OR EXPOSED LOCATIONS.
   E. PROVIDE GROUNDING FOR ALL TELEPHONE/DATA SYSTEMS AND EQUIPMENT PER REQUIREMENTS AND SPECIFICATIONS PROVIDED BY THE OWNERS DESIGNATED VENDOR.
   F. ALL LOW-VOLTAGE CABLING SHALL BE PLENUM-RATED.
   G. CONTRACTOR SHALL FURNISH AND INSTALL A #6 AWG GREEN INSULATED COPPER WIRE IN CONDUIT FROM THE MAIN ELECTRICAL GROUNDING BAR TO TELECOMMUNICATIONS GROUNDING BUS BAR.
   H. PROVIDE MOUNTING BACKBOARDS FOR COMMUNICATIONS EQUIPMENT. BACKBOARDS SHALL BE OF 3/4" TYPE AC, EXTERIOR PLYWOOD, PAINTED BOTH SIDES AND ALL EDGES WITH 2 COATS OF GRAY FLAME RETARDANT PAINT.

9. LIGHTING FIXTURES:
   A. TYPES AND MANUFACTURERS ARE SCHEDULED ON THE PLANS. EQUIVALENT FIXTURES BY OTHERS MAY BE SUBMITTED ONLY AS INDICATED ON THE PLANS AND ARE SUBJECT TO THE APPROVAL OF THE OWNER AND ENGINEER.
   B. ALL FIXTURES SHALL BE U.L. LISTED AND LABELED.
   C. DRIVERS SHALL BE AS INDICATED IN THE LIGHTING FIXTURE SCHEDULE OR AS OTHERWISE NOTED.
   D. ALL FIXTURES SHALL BE PROVIDED FOR PROPER VOLTAGE BASED ON THE CIRCUIT ASSIGNMENT INDICATED ON THE PLANS.
   E. CATALOG NUMBERS ARE FOR GENERAL IDENTIFICATION OF FIXTURES ONLY. ALL RELATED PARTS, SUCH AS PLASTER RINGS, JUNCTION BOXES, LOUVERS, SHIELDS, MOUNTING STEMS, CANOPIES, CONNECTORS, STRAPS, NIPPLES, HARDWARE, ACCESSORIES, ETC., TO FIT THEM PROPERLY TO THE CONSTRUCTION, SHALL BE FURNISHED AND INSTALLED BY THIS CONTRACTOR. CONTRACTOR SHALL PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL AS SPECIFIED IN ARCHITECTURAL FINISH SCHEDULES REGARDLESS OF CATALOG NUMBER GIVEN.
   F. ALL FIXTURES SHALL BE GROUNDED PER THE NEC.
   G. FIXTURES CONNECTED WITH FLEX TO THE RIGID RACEWAY PORTION OF THE WIRING SYSTEM SHALL CARRY A GREEN BONDING JUMPER WITHIN THE FLEX. THE JUMPER SHALL BE FASTENED TO BOTH THE FIXTURE AND THE RACEWAY SYSTEM WITH A STEEL CITY "G" CLIP OR APPROVED EQUIVALENT. PHASE AND GROUND CONDUCTORS RUN IN FLEX SHALL BE #12 AWG MINIMUM. MAXIMUM FLEX LENGTH SHALL BE 6'-0".
   H. MOUNT ALL FIXTURES PLUMB AND SQUARE WITH ROWS ALIGNED.
   I. SEE ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF FIXTURES.
   J. CONTRACTOR SHALL COORDINATE FIXTURE TYPE AND TRIM WITH CEILING CONSTRUCTION AND ADJUST ACCORDINGLY WITHOUT ADDITIONAL EXPENSE.
   K. ALL LIGHTING FIXTURES SHALL BE THERMALLY PROTECTED PER THE NEC.
   L. FIXTURES IN CONTACT WITH INSULATION SHALL BE IC RATED.

10. LIGHTING CONTROLS:
   A. FURNISH AND INSTALL WHERE SHOWN AN ELECTRONIC TIME CONTROLLER AS MANUFACTURED BY TORK (NSI), PARAGON, INTERMATIC, OR APPROVED EQUAL. CONTACTS SHALL BE SPST OR AS INDICATED, RATED 120V AT 20A BALLAST LOAD, AND MINIMUM 30,000 SWITCHING CYCLES. PROVIDE WITH THE NUMBER OF CHANNELS INDICATED (MINIMUM 2 CHANNELS) OR AS REQUIRED TO MEET THE INTENT OF THE DRAWINGS. EACH CHANNEL SHALL BE INDIVIDUALLY PROGRAMMABLE WITH 128 ON-OFF OPERATIONS PER WEEK PLUS FOUR SEASONAL SCHEDULES TO MODIFY THE BASIC PROGRAM AND A HOLIDAY SCHEDULE THAT OVERRIDES THE WEEKLY OPERATION. THE CONTROLLER SHALL BE PROVIDED WITH A PHOTOELECTRIC SENSOR, ASTRONOMIC DIAL, AND A BATTERY BACKED-UP, NON-VOLITILE MEMORY FOR SCHEDULES AND TIME CLOCK.
   B. LIGHTING CONTACTORS SHALL SWITCH LOADS AT THE VOLTAGE AND AMPERE RATING INDICATED AND SHALL HAVE THE NUMBER OF POLES INDICATED ON THE DRAWINGS OR AS REQUIRED. THE CONTACTOR AND CONTACTS SHALL BE CONTINUOUSLY RATED FOR THE LOAD SERVED, INCLUDING TUNGSTEN FILAMENT, INDUCTIVE, AND HIGH-INRUSH BALLAST LOADS.
   C. ALL LIGHTING CONTACTORS SHALL BE ELECTRICALLY HELD AND BE INSTALLED IN A NEMA 1 ENCLOSURE, UNLESS OTHERWISE NOTED.

11. EQUIPMENT IDENTIFICATION:
   A. PROVIDE ENGRAVED PHENOLIC NAMEPLATES FOR ALL ELECTRICAL EQUIPMENT SUPPLIED FOR THE PROJECT, INCLUDING BUT NOT LIMITED TO, WIRING TROUGHS, SAFETY SWITCHES, DISCONNECTS, TRANSFORMERS, PANELBOARDS, SWITCHBOARDS, SWITCHGEARS, MOTOR CONTROL CENTERS (MCC), BUSWAYS, GENERATORS, AUTOMATIC TRANSFER SWITCHES (ATS), UNINTERRUPTIBLE POWER SUPPLY (UPS), POWER DISTRIBUTION UNITS (PDU), FLOOR/REMOTE DISTRIBUTION CABINETS (FDC/RDC), STATIC TRANSFER SWITCHES (STS), ETC. NAMEPLATE SHALL INDICATE THE DEVICE NAME, SYSTEM VOLTAGE (VOLTAGE/PHASE/WIRE), AND UPSTREAM DEVICE AND CIRCUIT. PROVIDE NAMEPLATES FOR CIRCUIT BREAKERS IN SWITCHGEARS, SWITCHBOARDS AND DISTRIBUTION PANELS.
   B. NAMEPLATE COLORS SHALL BE AS FOLLOWS:

120/208V EQUIPMENT	BLUE SURFACE WITH WHITE CORE
277/480 EQUIPMENT	BLACK SURFACE WITH WHITE CORE
FIRE ALARM SYSTEMS	BRIGHT RED SURFACE WITH WHITE CORE
SECURITY SYSTEMS	BURGUNDY SURFACE WITH WHITE CORE
TELEPHONE SYSTEMS	ORANGE SURFACE WITH WHITE CORE
DATA SYSTEMS	BROWN SURFACE WITH WHITE CORE

   C. NAMEPLATES UP TO 8 SQUARE INCHES SHALL NOT BE LESS THAN 1/16" THICK. NAMEPLATES LARGER THAN 8 SQUARE INCHES SHALL NOT LESS THAN 1/8" THICK.
   D. LETTERING HEIGHT SHALL BE 1/2" MINIMUM.
   E. NAMEPLATES SHALL BE ATTACHED WITH SELF-DRILLING/SELF-TAPPING SCREWS, EXCEPT RIVETS SHALL BE USED WHERE END OF SCREW IS NOT PROTECTED. QUANTITY AS FOLLOWS:

UP TO 5 SQUARE INCHES:	2 SCREWS
5 TO 12 SQUARE INCHES:	4 SCREWS
ABOVE 12 SQUARE INCHES:	6 SCREWS

12. DISCONNECTS:
   A. DISCONNECT SWITCHES SHALL BE HEAVY-DUTY TYPE IN NEMA 1 ENCLOSURES, UNLESS OTHERWISE NOTED, FUSED OR NON-FUSED AS INDICATED. SWITCHES SHALL HAVE REJECTION-TYPE FUSE CLIPS. SWITCHES SHALL BE BY EATON, SQUARE-D, GENERAL ELECTRIC, OR APPROVED EQUAL. WHERE FED FROM A LOAD CENTER, GENERAL-DUTY SWITCHES SHALL BE PERMITTED.
   B. FUSES LESS THAN 60A SHALL BE CLASS RK5, DUAL-ELEMENT, TIME-DELAY WITH INDICATION
   C. FUSES GREATER THAN 60A SHALL BE CLASS J, DUAL-ELEMENT, TIME-DELAY WITH INDICATION.
   D. A SET OF 3 SPARE FUSES OF EACH SIZE AND TYPE SHALL BE FURNISHED TO THE OWNER

13. PANELBOARDS:
   A. PANELBOARDS SHALL BE PROVIDED AS MANUFACTURED BY EATON, SQUARE-D, GENERAL ELECTRIC, OR APPROVED EQUAL. ALL NEW EQUIPMENT FOR THE PROJECT SHALL BE BY THE SAME MANUFACTURER. LOAD CENTER TYPE PANELBOARDS SHALL BE USED WHERE THE PANELBOARD SERVES A DWELLING UNIT.
   B. ALL BUSSING, INCLUDING NEUTRAL AND GROUND, SHALL BE COPPER.
   C. ALL BREAKERS SHALL BE AUTOMATIC THERMAL-MAGNETIC TYPE MOLDED CASE BOLT-ON TYPE, CALIBRATED FOR 40 DEGREE C, OR AMBIENT COMPENSATION, UNLESS OTHERWISE NOTED.
   D. PANELS SHALL BE FULLY RATED (AIC). NO SERIES AIC RATINGS ARE ALLOWED.
   E. PANELS SHALL HAVE FULL SIZE EQUIPMENT GROUNDING BARS AND NEUTRAL BARS, EXCEPT WHERE INDICATED TO BE 200%.
   F. ALL PANELBOARD AND BREAKER LUGS SHALL BE SIZED AND RATED PER THE CONDUCTOR SIZE AND MATERIAL.
   G. LIGHTING AND APPLIANCE PANELS (100A-600A) SHALL HAVE FRONT ACCESSIBLE HINGED DOOR-IN-DOOR COVERS WITH DEAD FRONT, SHALL BE 20" WIDE MINIMUM WITH MINIMUM 4" WIDE WIRING GUTTERS.
   H. DISTRIBUTION PANELS (600A-1200A) SHALL HAVE FRONT ACCESSIBLE DEAD FRONT COVERS.
   I. PROVIDE HANDLE LOCK-ON DEVICES FOR ALL CIRCUIT BREAKERS CONNECTED TO EMERGENCY, EXIT, NIGHT LIGHTING, FIRE ALARM, TELEPHONE BOARDS, AND SECURITY SYSTEMS.
   J. BREAKERS USED FOR SWITCHING SHALL BE SWITCHING DUTY (SWD) RATED.
   K. BREAKERS USED FOR HEATING, AIR-CONDITIONING AND/OR REFRIGERATION SHALL BE HACR RATED.
   L. GROUND-FAULT CIRCUIT-INTERRUPTER (GFCI) PROTECTION FOR PERSONNEL SHALL BE PROVIDED FOR ALL LOCATIONS PER NEC 210.8, INSTALLED IN A READILY ACCESSIBLE LOCATION. WHERE A DEVICE LOCATION IS NOT ACCESSIBLE, THE GFCI PROTECTION SHALL BE PROVIDED WITH THE BREAKER SERVING THE DEVICE.
   M. ALL OVERCURRENT DEVICES WHICH COMPRISE THE EMERGENCY SYSTEM OR LEGALLY REQUIRED STANDBY SYSTEM SHALL BE SELECTIVELY COORDINATED. THE ELECTRICAL CONTRACTOR SHALL PROVIDE MANUFACTURER DOCUMENTATION INDICATING COMPLIANCE WITH THE SELECTIVE COORDINATION REQUIREMENTS PER THE NEC.
   O. ALL PANELBOARDS SHALL HAVE METAL DIRECTORY FRAME. FOR EACH PANELBOARD, PROVIDE TYPED CIRCUIT DIRECTORY PER NEC 408.4. SPARE CIRCUIT BREAKERS SHALL BE LABELED SPARE AND IN THE OFF POSITION.
   P. ALL CIRCUIT BREAKERS RATED 1200A OR HIGHER, OR CAPABLE OF BEING RATED 1200A OR HIGHER (I.E. ADJUSTABLE LONG-TIME PICKUP OR REPLACEABLE TRIP/RATING PLUG), SHALL BE PROVIDED WITH AN ENERGY-REDUCING MAINTENANCE SWITCH WITH LOCAL STATUS INDICATOR PER NEC 240.87(B).
   Q. ALL GROUNDING TERMINAL BUSSES OF PANELBOARDS SERVING THE SAME PATIENT VICINITY SHALL BE BONDED TOGETHER WITH 1#10 AWG GREEN INSULATED COPPER GROUNDING CONDUCTOR. THE CONDUCTOR SHALL BE CONTINUOUS EXCEPT THAT IT MAY BE BROKEN AT THE PANELBOARD GROUND BAR IN ORDER TO TERMINATE.

14. FIRE STOPPING:
   A. ALL PENETRATIONS OF RATED ASSEMBLIES SHALL BE SEALED WITH RATED MATERIALS MEETING ASTM E-814.
   B. PROVIDE FIRESTOPPING DEVICE(S) OR SYSTEM(S) WHICH HAVE BEEN TESTED AND LISTED AS COMPLYING WITH ASTM E-814. INSTALL THE DEVICE(S) OR SYSTEM(S) IN ACCORDANCE WITH THE CONDITIONS OF THEIR LISTING. PROVIDE THE APPROPRIATE DEVICE(S) OR SYSTEM(S) WITH AN 'F' RATING EQUAL TO THE RATING OF THE ASSEMBLY BEING PENETRATED.
   C. DEVICE(S) AND/OR SYSTEM(S) SHALL BE BY HILTI, 3M OR EQUIVALENT.

15. SEISMIC:
   A. THE ELECTRICAL CONTRACTOR SHALL BE FULLY RESPONSIBLE FOR PROVIDING SEISMIC SUPPORT AND BRACING OF ELECTRICAL COMPONENTS TO RESIST THE EFFECTS OF EARTHQUAKES ON THE ELECTRICAL SYSTEM AS WELL AS ANY REQUIRED SPECIAL INSPECTIONS BASED ON THE SPECIFIC GEOGRAPHIC LOCATION AS REQUIRED. THE SEISMIC RESTRAINTS AND SPECIAL INSPECTIONS SHALL MEET ALL APPLICABLE STATE AND LOCAL BUILDING CODE REQUIREMENTS AS WELL AS ASCE-7 REQUIREMENTS.

16. ELECTRICAL COORDINATION WITH OTHER TRADES:
   A. THE ELECTRICAL CONTRACTOR SHALL CONNECT AND/OR PROVIDE FINAL CONNECTIONS TO ALL EQUIPMENT SUPPLIED BY OTHERS APPLICABLE TO THE PROJECT, INCLUDING BUT NOT LIMITED TO, MECHANICAL, PLUMBING, FIRE PROTECTION AND SUPPRESSION, OWNER FURNISHED, KITCHEN, LABORATORY, ETC. UNLESS OTHERWISE NOTED.
   B. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONNECTIONS PRIOR TO ROUGH-IN USING APPROVED CATALOG SHEETS AND SHOP DRAWINGS.
   C. THE ELECTRICAL CONTRACTOR SHALL PROVIDE AND INSTALL ALL MANUAL MOTOR STARTER SWITCHES, DISCONNECT SWITCHES, RECEPTACLES, ETC. TO MECHANICAL AND PLUMBING EQUIPMENT. ALL STARTERS, OTHER THAN MANUAL STARTER SWITCHES, SHALL BE PROVIDED BY OTHERS, BUT INSTALLED BY THE ELECTRICAL CONTRACTOR.
   D. ALL DISCONNECT SWITCHES AND FUSE SIZES SHALL BE COORDINATED WITH SHOP DRAWINGS PRIOR TO ORDERING OR INSTALLING. ANY EQUIPMENT INSTALLED INCORRECTLY BECAUSE OF LACK OF COORDINATION WILL BE REMOVED AND INSTALLED CORRECTLY AT THE EXPENSE OF THE ELECTRICAL CONTRACTOR.
   E. THE ELECTRICAL CONTRACTOR SHALL COORDINATE ALL CONDUIT RUNS AND LIGHT FIXTURE LOCATIONS ABOVE THE CEILING WITH OTHER TRADES PRIOR TO INSTALLATION.
   F. ALL DUCT SMOKE DETECTORS SHALL BE PROVIDED AND CONNECTED BY THE ELECTRICAL CONTRACTOR, BUT INSTALLED BY THE MECHANICAL CONTRACTOR.
   G. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY OUTLETS FOR HEAT TAPE CONNECTIONS FOR MECHANICAL SYSTEMS. PROVIDE CLASS B (30mA) GFCI PROTECTION ON THE BREAKER SUPPLYING THE HEAT TAPE.
   H. THE ELECTRICAL CONTRACTOR SHALL PROVIDE 120V POWER AT EACH HVAC UNIT HAVING A CONTROLS POWER SUPPLY. CIRCUIT(S) SHALL BE DEDICATED 20A SERVING A MAXIMUM OF 10 HVAC UNITS PER CIRCUIT. COORDINATE ALL LOCATIONS WITH THE MECHANICAL CONTRACTOR.

17. DEMOLITION NOTES:
   A. PARTIAL AND TOTAL DEMOLITION OF PORTIONS SHALL BE PERFORMED ALONG WITH ALL NECESSARY MODIFICATIONS TO THAT PORTION OF THE EXISTING BUILDING WHICH SHALL REMAIN SO THAT IT CONTINUES TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION.
   B. WHERE INCLUDED AS PART OF THE CONTRACT DOCUMENTS, THE DRAWINGS INDICATE THE GENERAL AREAS OF WORK INVOLVED. HOWEVER, THE ELECTRICAL CONTRACTOR SHALL PERFORM WORK OUTSIDE THOSE AREAS SHOWN AS IS NECESSARY TO COMPLY WITH THE INTENT OF THIS SECTION.
   C. THE ELECTRICAL CONTRACTOR SHALL FAMILIARIZE THEMSELVES WITH THE EXISTING BUILDING AND WITH THE WORK OF ALL OTHER TRADES AND INCLUDE ALL WORK NECESSARY TO COMPLY WITH THE INTENT OF THE DEMOLITION.
   D. IT SHALL BE UNDERSTOOD THAT FIELD CONDITIONS MAY BE ENCOUNTERED DURING THE EXECUTION OF THIS CONTRACT WHICH WILL REQUIRE EXTENSION OR RELOCATION OF EXISTING SYSTEMS OR EQUIPMENT WHICH ARE NOT SPECIFICALLY SHOWN ON THE DRAWINGS, BUT WHICH ARE REQUIRED TO MEET THE STATED INTENT THAT THE BUILDING CONTINUE TO FUNCTION UNAFFECTED BY THE DEMOLITION AND ASSOCIATED NEW CONSTRUCTION. THE ELECTRICAL CONTRACTOR SHALL INCLUDE SUCH WORK AS WOULD NORMALLY BE EXPECTED IN AN EXISTING BUILDING OF THIS AGE AND TYPE.
   E. THE ELECTRICAL CONTRACTOR SHALL PROVIDE ALL TOOLS, EQUIPMENT, LABOR, ETC. IN ORDER TO ACCOMPLISH THE DEMOLITION PORTION OF THE PROJECT.
   F. THE DEMOLITION OF CERTAIN AREAS OF THE EXISTING BUILDING SHALL BE PERFORMED BY THE GENERAL CONTRACTOR. IT SHALL BE THE ELECTRICAL CONTRACTOR'S RESPONSIBILITY TO COORDINATE WITH THE GENERAL CONTRACTOR TO DIFFERENTIATE THE SCOPE OF WORK BETWEEN SEPARATE TRADES.
   G. THE ELECTRICAL CONTRACTOR SHALL INCLUDE COORDINATION WITH THE GENERAL CONTRACTOR AND SUCH DEMOLITION OF THE EXISTING ELECTRICAL SYSTEMS AS IS NECESSARY SO THAT THE DEMOLITION WORK OF THE GENERAL CONTRACTOR SHALL NOT DAMAGE THOSE PORTIONS OF THE ELECTRICAL SYSTEMS WHICH ARE TO REMAIN IN SERVICE, ARE TO BE REUSED, OR ARE TO BECOME THE PROPERTY OF THE OWNER.
   H. TURN OVER TO OWNER, UPON REQUEST OR AS NOTED, ITEMS SHOWN AS BEING REMOVED AND NOT REINSTALLED. ITEMS NOT DIRECTED OR REQUESTED TO BE TURNED OVER TO THE OWNER SHALL BE DISPOSED OF BY THE ELECTRICAL CONTRACTOR.
   I. EQUIPMENT OR MATERIALS WHICH ARE TO BE REUSED OR TURNED OVER TO THE OWNER SHALL BE CAREFULLY REMOVED, CLEANED, AND STORED IN A CLEAN AND DRY AREA. SHOULD THE ELECTRICAL CONTRACTOR ENCOUNTER SUCH EQUIPMENT WHICH IS NOT IN SATISFACTORY CONDITION FOR REUSE AND NOT IN WORKING ORDER, THE ELECTRICAL CONTRACTOR SHALL NOTIFY THE ARCHITECT/ENGINEER IMMEDIATELY.
   J. DISCONNECT ELECTRICAL SERVICES TO ALL EQUIPMENT REQUIRING REMOVAL. CONDUIT SHALL BE REMOVED BACK TO THE POINT WHERE IT WILL BE CONCEALED AT THE COMPLETION OF THIS CONTRACT. WIRE AND CABLE SHALL BE REMOVED BACK TO THE FIRST OUTLET BOX, CABINET, OR TERMINATION POINT WHICH IS TO REMAIN. CIRCUITS WHICH ARE NOT REUSED SHALL BE REMOVED BACK TO THE SOURCE IN THEIR ENTIRETY.
   K. REMOVE AND REINSTALL CEILINGS IN THE EXISTING BUILDING AS REQUIRED FOR THE WORK. COORDINATE WITH THE GENERAL CONTRACTOR. IN SUCH AREAS, REMOVE AND REINSTALL ALL ELECTRICAL DEVICES WHICH ARE TO REMAIN IN OR ON THE CEILING.
   L. WHERE NEW CEILINGS CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED TO CLEAR THE NEW CONSTRUCTION.
   M. WHERE NEW WALL OR FLOOR FINISHES CONFLICT WITH EXISTING ELECTRICAL WORK WHICH IS TO REMAIN, RELOCATE THE ELECTRICAL WORK INVOLVED OR PROVIDE BOX EXTENSIONS OR SIMILAR DEVICES AND REINSTALL ON THE NEW FINISH.
   N. WHERE EXISTING BRANCH CIRCUITS AND SYSTEMS ARE INTERRUPTED BY NEW WORK OR SYSTEMS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, ETC.), EXTEND AND RECONNECT THOSE EXECUTION OF THIS CONTRACT, PROVIDE TEMPORARY CONNECTIONS UNTIL FINAL CONNECTIONS ARE COMPLETE.

18. COORDINATION DRAWINGS:
   A. THE MECHANICAL CONTRACTOR SHALL ORGANIZE COORDINATION MEETINGS TO DEVELOP A SET OF DRAWINGS WITH ALL CONTRACTORS (ELECTRICAL, MECHANICAL, PLUMBING, FIRE PROTECTION, IT/DATA, SECURITY AND GENERAL). THE MECHANICAL CONTRACTOR WILL HAVE THE LEAD RESPONSIBILITY FOR THE COORDINATION DRAWINGS. THE MECHANICAL CONTRACTOR SHALL PRODUCE THE ORIGINAL DRAWINGS AND FORWARD THE DRAWINGS TO EACH OF THE OTHER CONTRACTORS FOR THEM TO ADD THEIR SYSTEMS TO THIS SET OF COORDINATION DRAWINGS. THE CONTRACTORS WILL DEVELOP THE DRAWINGS IN THIS ORDER: MECHANICAL, FIRE PROTECTION, PLUMBING, ELECTRICAL, IT/DATA (INCLUDING CABLE TRAY), SECURITY, AND GENERAL. THIS SHALL ALSO BE THE ORDER OF PRECEDENCE FOR INSTALLATION OF SYSTEMS. ANY RELOCATION OF SYSTEM ROUTINGS WILL BE FOUND IN THE COORDINATION PHASE AND NOTICED BY EACH OF THE CONTRACTORS. THESE DRAWINGS, WHEN COMPLETED, SHALL BE SIGNED OFF BY ALL OF THE ABOVE LISTED PARTIES. DRAWINGS SHALL BE COMPLETED PRIOR TO PURCHASE, FABRICATION OR INSTALLATION OF EQUIPMENT AND/OR SYSTEMS. THE FOLLOWING ITEMS REPRESENT THE MINIMUM REQUIREMENTS FOR SHOP DRAWINGS AND COORDINATION DRAWINGS:
      1. ALL SHOP AND COORDINATION DRAWINGS WILL BE 1/4"=1'-0" SCALE.
      2. DRAWINGS WILL BE ORIGINAL DRAWINGS AND NOT OVERLAYS OF THE CONTRACT/DESIGN DRAWINGS.
      3. COORDINATION DRAWINGS WILL BE DRAWN ON REPRODUCIBLE MATERIAL 48"x36".
      4. COORDINATION DRAWINGS ARE NOT SHOP DRAWINGS AND ARE REQUIRED IN ADDITION TO SHOP DRAWINGS.
      5. ONCE THE COMPLETE COORDINATION DRAWINGS HAVE BEEN COMPILED, THE MECHANICAL CONTRACTOR WILL DISTRIBUTE ONE SIGNED SET TO EACH OF THE FOLLOWING CONTRACTORS: ELECTRICAL, PLUMBING, FIRE PROTECTION, IT/DATA, AND GENERAL. ADDITIONAL SETS WILL BE SENT TO THE OWNER, ARCHITECT, AND ENGINEER.

19. TESTING AND DOCUMENTATION:
   A. TESTING AND DOCUMENTATION SHALL BE PROVIDED AS FOLLOWS:
      1. GFCI EQUIPPED BREAKERS SHALL BE PERFORMANCE TESTED.
      2. LIGHTING CONTROL SYSTEMS SHALL BE TESTED FOR PROPER OPERATION OF SETPOINTS.

20. COMMISSIONING:
   A. THE ELECTRICAL CONTRACTOR SHALL BE RESPONSIBLE FOR EQUIPMENT/SYSTEM START-UP AND TESTING. THE ELECTRICAL CONTRACTOR SHALL ALSO BE RESPONSIBLE FOR EQUIPMENT/SYSTEM COMMISSIONING AS DIRECTED BY THE COMMISSIONING AUTHORITY (CxA). THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH THE COMMISSIONING AUTHORITY AND PROVIDE ALL NECESSARY TIME, EQUIPMENT, MATERIALS, AND PROCEDURES REQUIRED FOR A FULLY COMMISSIONED PROJECT.

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ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 8/15/2022
PROJECT #: 02110.200
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL NOTES

E-002

Sheet No. 2 of 16

1 OVERALL FIRST FLOOR POWER PLAN - NEW WORK

1/16" = 1'-0"

GENERAL NOTES

A. REFER TO DRAWING E-000 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
B. REFER TO ARCHITECTURAL DRAWINGS INCLUDING BUT NOT LIMITED TO, MOUNTING NOTES, MOUNTING DETAILS AND EXACT LOCATIONS OF ALL DEVICES.
C. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS NOTED OTHERWISE, WITH NO EXPOSED CONDUIT.
D. BACK TO BACK BOX INSTALLATION SHALL NOT BE ALLOWED. WHERE DEVICES ARE SHOWN BACK TO BACK, DEVICE SHALL BE OFFSET 3".
E. TYPICAL CLASSROOM IS SHOWS AND SHALL BE ROTATED, MIRRORED, ETC. TO FIT EACH RESPECTIVE CLASSROOM IN A SIMILAR MANNER.
F. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING ELEMENTARY EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUM/AUDITORIUMS.
G. RECEPTACLE AND DATA OUTLETS SHALL NOT BE MOUNTED IN TRIM OF WINDOWS. LOCATE WHERE FULL WALL IS AVAILABLE.

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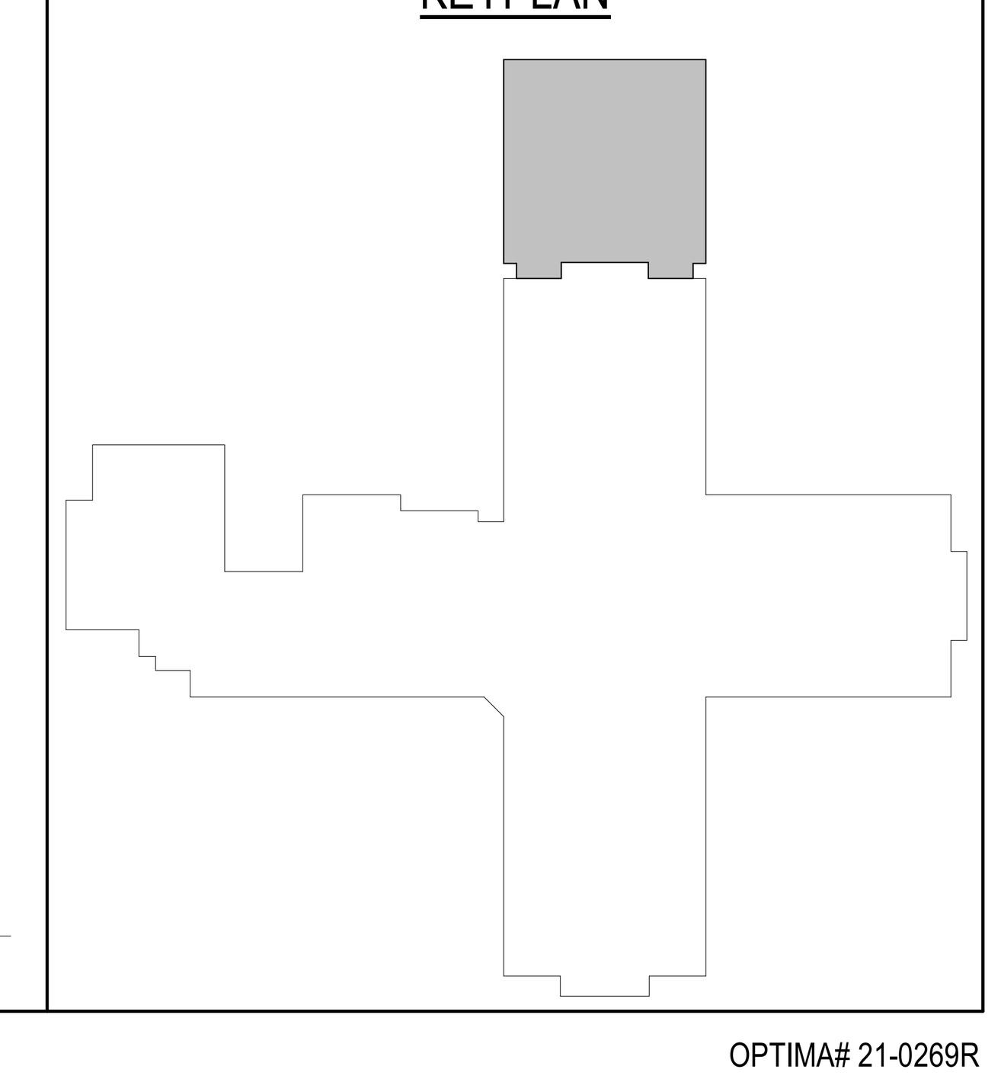
KEYPLAN



No.	Date	Description

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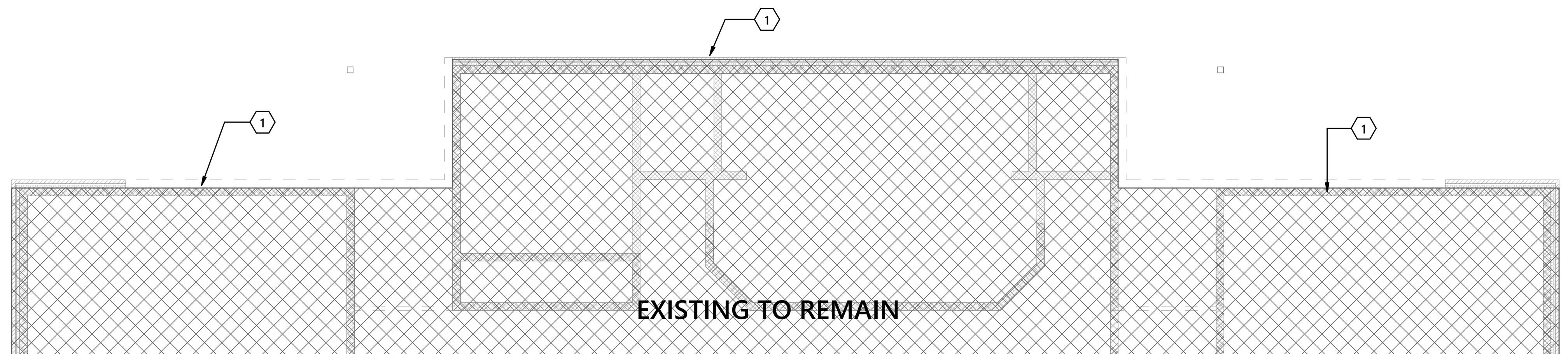
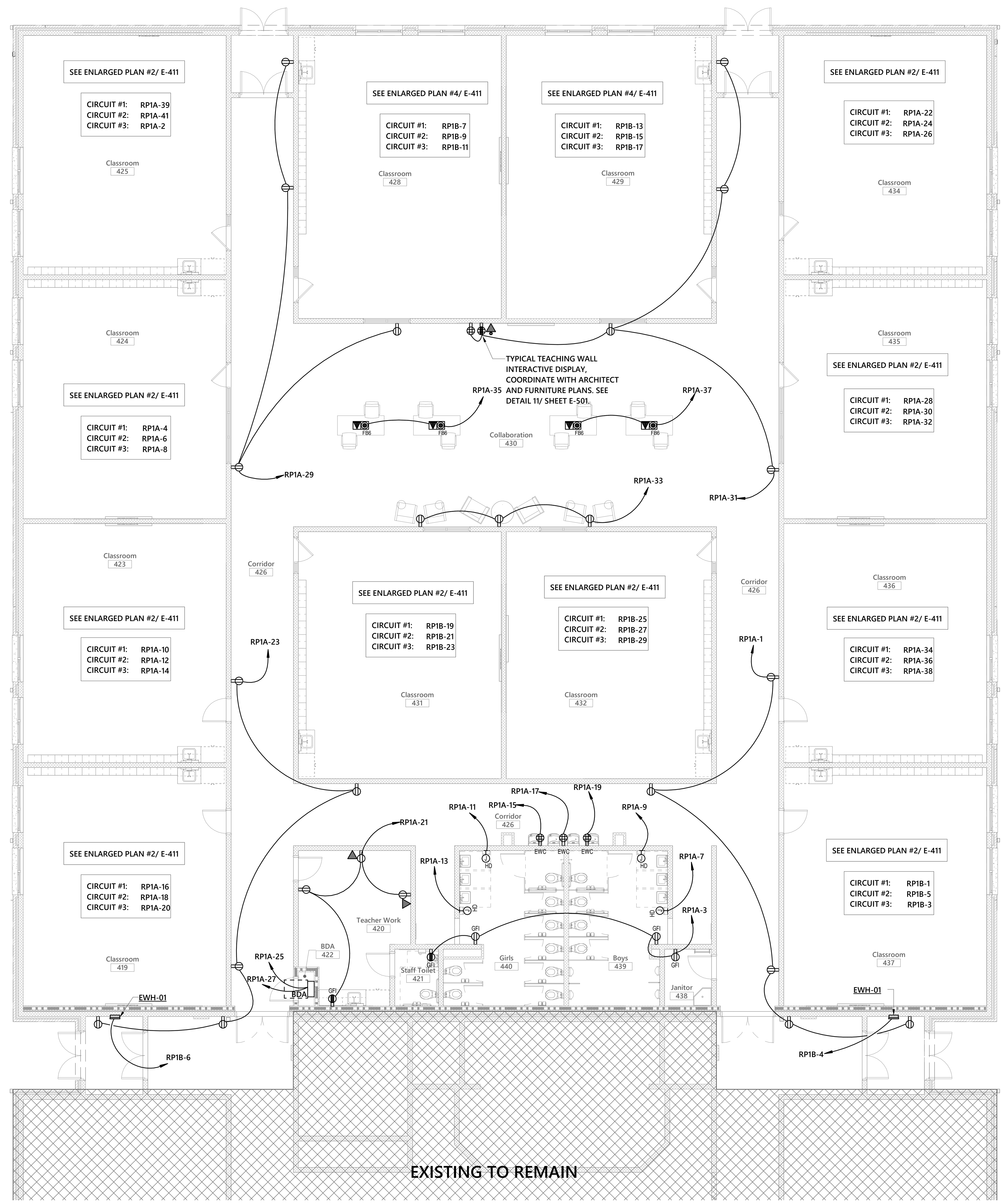
OVERALL FIRST FLOOR POWER PLAN - NEW WORK

E-012



1 CLASSROOM ADDITION POWER PLAN - DEMOLITION
1/8" = 1'-0"



2 CLASSROOM ADDITION POWER PLAN - NEW WORK
1/8" = 1'-0"

GENERAL NOTES

A. REFER TO DRAWING E-001 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
B. SWITCHBOARDS, PANELBOARDS, METER SOCKET ENCLOSURES AND MOTOR CONTROL CENTERS SHALL BE FIELD MARKED TO WARN QUALIFIED PERSONS OF POTENTIAL ELECTRIC ARC FLASH HAZARDS. THE MARKING SHALL BE LOCATED SO AS TO BE CLEARLY VISIBLE TO QUALIFIED PERSONS BEFORE EXAMINATION, ADJUSTMENT, SERVICING, OR MAINTENANCE OF THE EQUIPMENT.
C. FOR ALL RELOCATED MECHANICAL EQUIPMENT, RELOCATE ASSOCIATED ELECTRICAL CONNECTIONS AND EXTEND FEEDERS AS REQUIRED TO NEW EQUIPMENT LOCATIONS. SEE NEW WORK PLAN FOR NEW LOCATIONS.
D. DASHED ARCHITECTURAL LINES INDICATE DEMOLITION. DISCONNECT AND REMOVE EXISTING ELECTRICAL DEVICES IN WALLS AND CEILINGS. TYPICAL IN ALL AREAS UNLESS OTHERWISE NOTED. COORDINATE WITH OTHER TRADES AS REQUIRED TO FACILITATE COMPLETE DEMOLITION.
E. CONTRACTOR SHALL MAKE SURE TO MAINTAIN CONTINUITY OF ELECTRICAL DEVICES THAT ARE OUTSIDE AREA OF WORK THAT ARE INTENDED TO REMAIN ENERGIZED.
F. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHT FIXTURES TO REMAIN.
G. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL FIRE ALARM DEVICES TO REMAIN.
H. REFER TO ARCHITECTURAL DRAWINGS INCLUDING BUT NOT LIMITED TO, MOUNTING NOTES, MOUNTING DETAILS AND EXACT LOCATIONS OF ALL DEVICES.
I. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS NOTED OTHERWISE, WITH NO EXPOSED CONDUIT.
J. BACK TO BACK BOX INSTALLATION SHALL NOT BE ALLOWED. WHERE DEVICES ARE SHOWN BACK TO BACK, DEVICE SHALL BE OFFSET 3".
K. TYPICAL CLASSROOM IS SHOWN AND SHALL BE ROTATED, MIRRORED, ETC. TO FIT EACH RESPECTIVE CLASSROOM IN A SIMILAR MANNER.
L. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING ELEMENTARY EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUM/AUDITORIUMS.
M. RECEPTACLE AND DATA OUTLETS SHALL NOT BE MOUNTED IN TRIM OF WINDOWS. LOCATE WHERE FULL WALL IS AVAILABLE.
N. HATCHED AREAS ARE NOT IN SCOPE OF WORK.

KEYED NOTES

1 REMOVE EXISTING EXTERIOR LIGHTING AND ELECTRICAL DEVICES ON THIS WALL. REMOVE ASSOCIATED CONDUIT AND CONDUCTORS BACK TO SOURCE.

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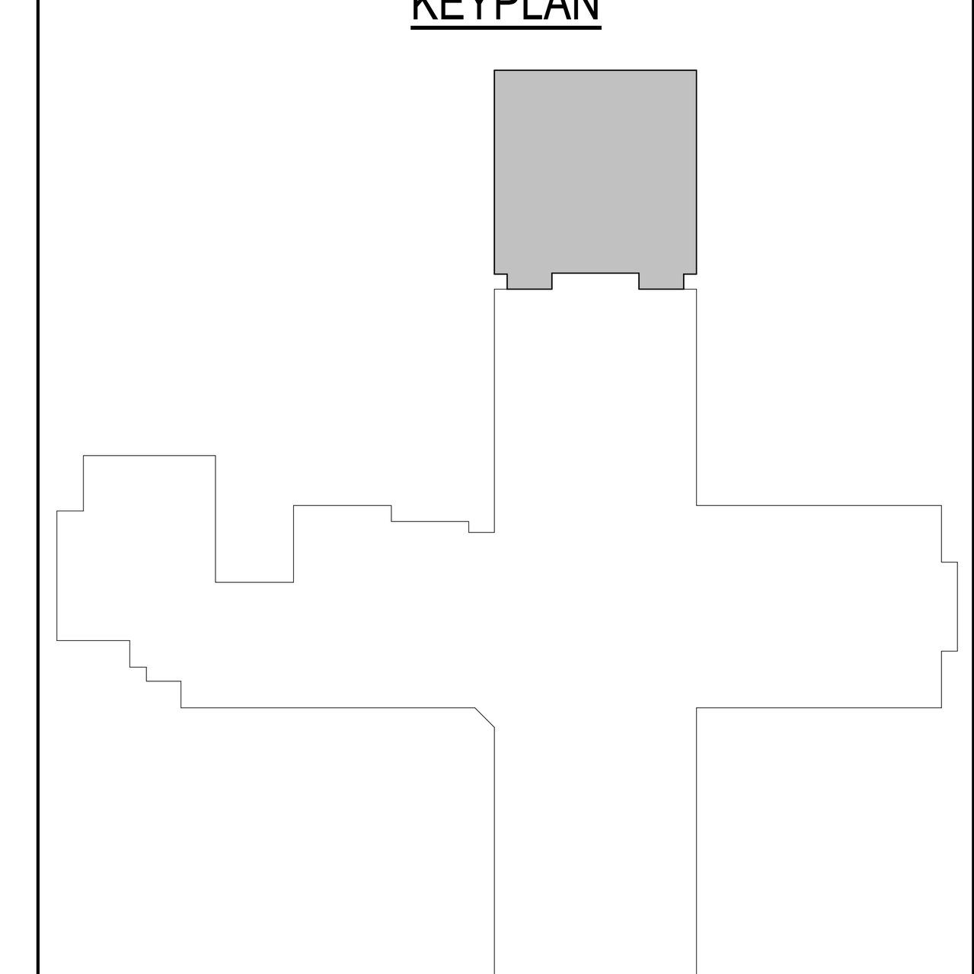
KEYPLAN



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PROJECT #:	02110.200
DRAWN BY:	JSD
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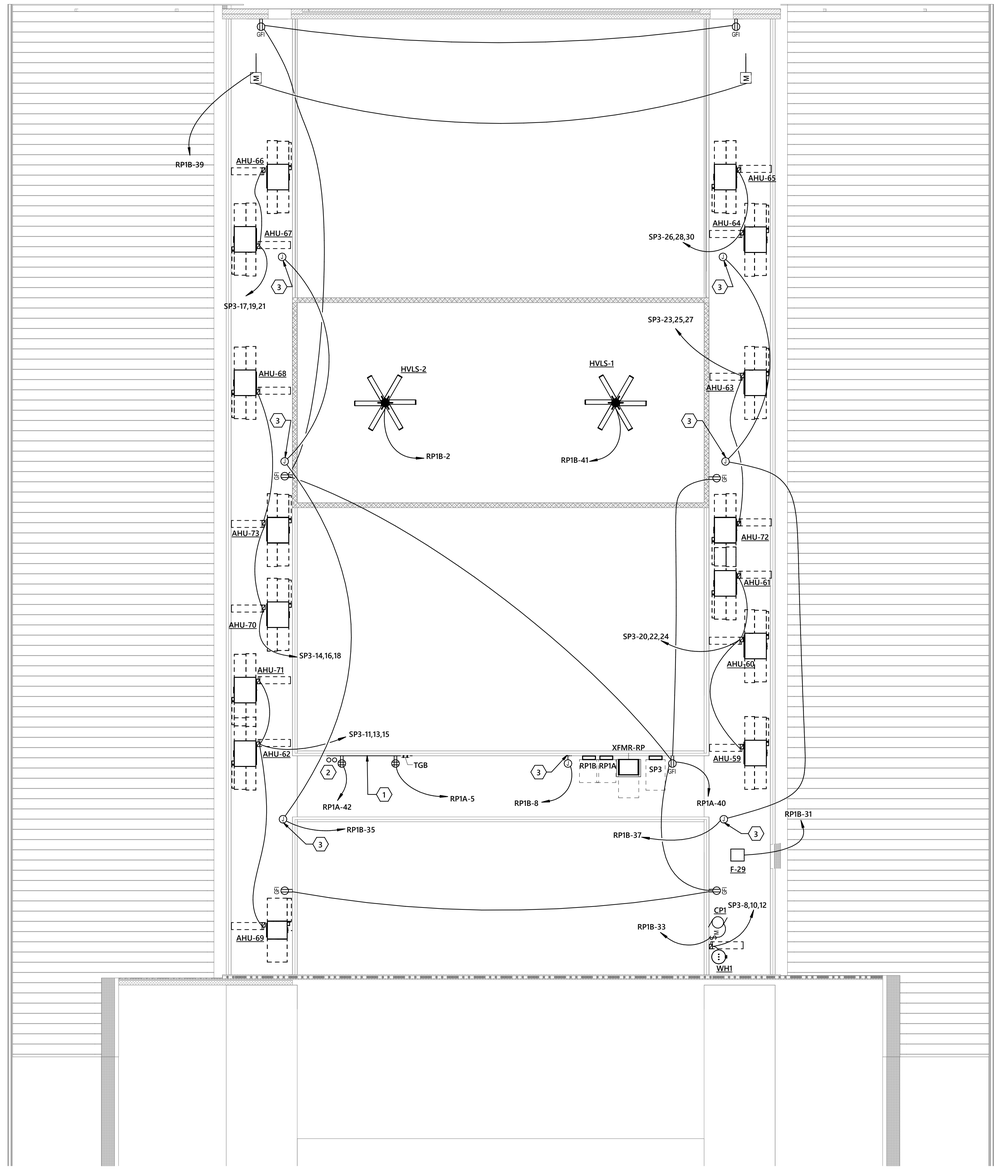
CLASSROOM ADDITION POWER PLANS

E-111



1 **MECHANICAL LOFT POWER PLAN**
1/8" = 1'-0"

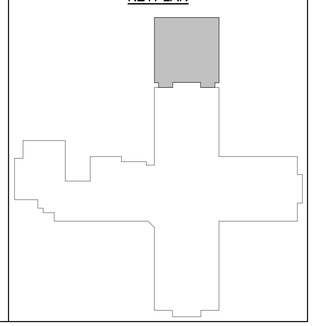
GENERAL NOTES

A. REFER TO DRAWING E-000 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
B. REFER TO ARCHITECTURAL DRAWINGS INCLUDING BUT NOT LIMITED TO, MOUNTING NOTES, MOUNTING DETAILS AND EXACT LOCATIONS OF ALL DEVICES.
C. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS NOTED OTHERWISE, WITH NO EXPOSED CONDUIT.
D. BACK TO BACK BOX INSTALLATION SHALL NOT BE ALLOWED. WHERE DEVICES ARE SHOWN BACK TO BACK, DEVICE SHALL BE OFFSET 3".
E. TYPICAL CLASSROOM IS SHOWS AND SHALL BE ROTATED, MIRRORED, ETC. TO FIT EACH RESPECTIVE CLASSROOM IN A SIMILAR MANNER.
F. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING ELEMENTARY EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUM/AUDITORIUMS.
G. RECEPTACLE AND DATA OUTLETS SHALL NOT BE MOUNTED IN TRIM OF WINDOWS. LOCATE WHERE FULL WALL IS AVAILABLE.

KEYED NOTES

1 PROVIDE 3/4" FIRE RETARDANT PLYWOOD BACKBOARD FROM FLOOR TO CEILING INSTALLED VERTICALLY STARTING AT 6"AFF. PAINT WITH TWO COATS OF COLOR WHITE FIRE RETARDANT PAINT.
2 ROUTE (2) 4" TO CABLE TRAY BELOW. STUB 6" ABOVE SLAB AT MECHANICAL PLATFORM.
3 PROVIDE 120V CONNECTION FOR MECHANICAL CONTROLS. COORDINATE WITH MECHANICAL CONTROLS CONTRACTOR PRIOR TO ROUGH-IN.

KEYPLAN



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8/15/2022

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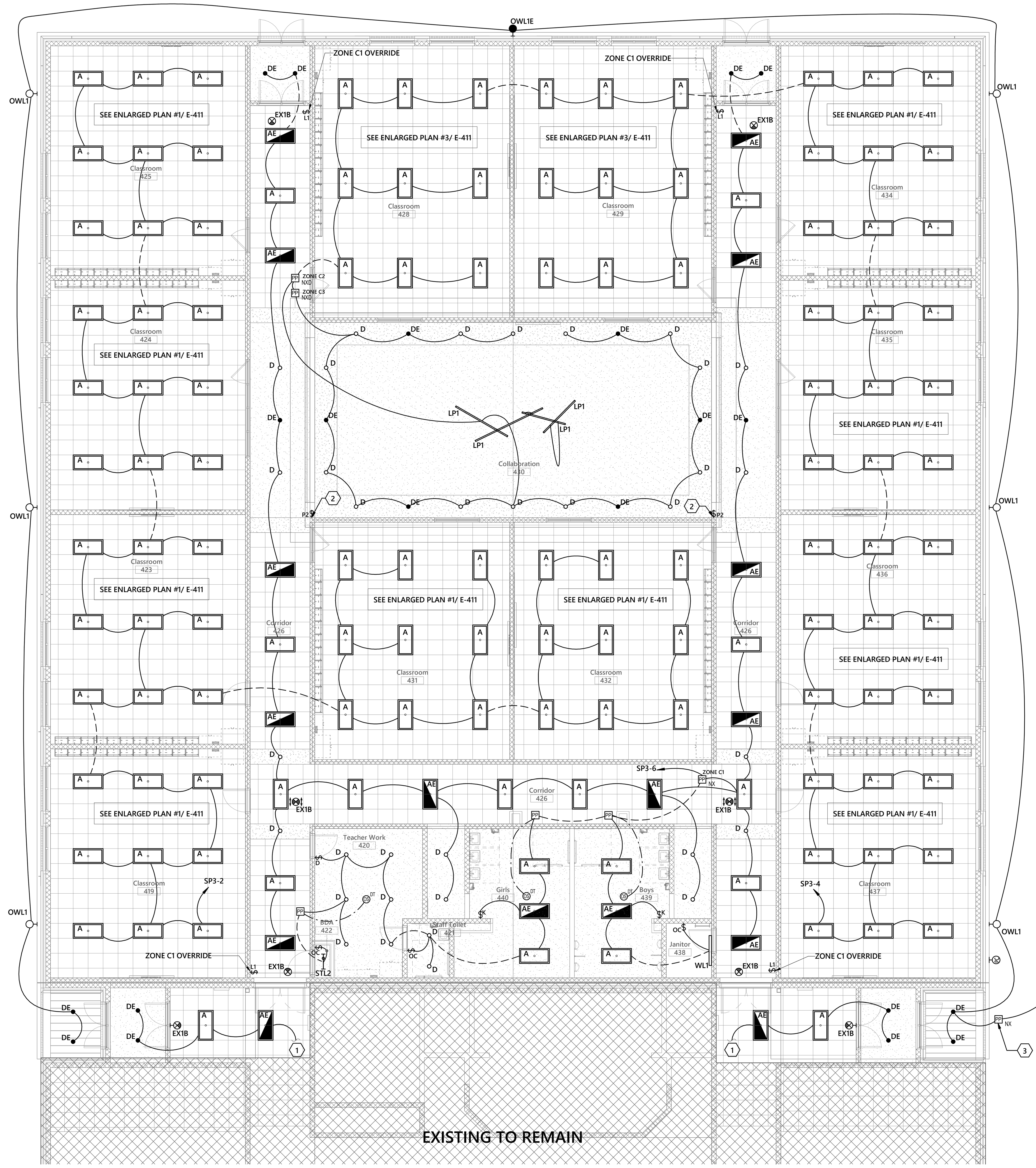
MECHANICAL LOFT POWER PLAN

E-112

OPTIMA# 21-0269R

Sheet No. 5 of 16



1 CLASSROOM ADDITION LIGHTING PLAN - NEW WORK

1/8" = 1'-0"

GENERAL NOTES

A. ALL RECESSED LIGHTING FIXTURES IN LAY-IN CEILING SHALL BE INSTALLED WITH 6'-0" LONG FLEXIBLE METAL CONDUIT.
B. SEE ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHTS OF EXTERIOR LIGHTING FIXTURES.
C. CONNECT EMERGENCY EXIT SIGNS AND THE UNSWITCHED INPUT OF BATTERY PACKS TO LOCAL LIGHTING CIRCUIT, AHEAD OF SWITCHING.
D. CONTRACTOR SHALL MAKE SURE TO MAINTAIN CONTINUITY OF ELECTRICAL DEVICES THAT ARE OUTSIDE AREA OF WORK THAT ARE INTENDED TO REMAIN ENERGIZED.
E. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHT FIXTURES TO REMAIN.
F. HATCHED AREAS ARE NOT IN SCOPE OF WORK.

KEYED NOTES

1 CONNECT TO EXISTING 277V LIGHTING CIRCUIT AND CONTROLS SERVING THIS AREA. TOTAL LOAD ON EXISTING CIRCUIT SHALL NOT EXCEED 4400 WATTS.
2 2 ZONE OVERRIDE SWITCH. DIMMING CONTROL FOR ZONES C2 & C3 IN COLLABORATION 430.
3 LOCATE POWER PACK ADJACENT TO PANEL 'SP3'.

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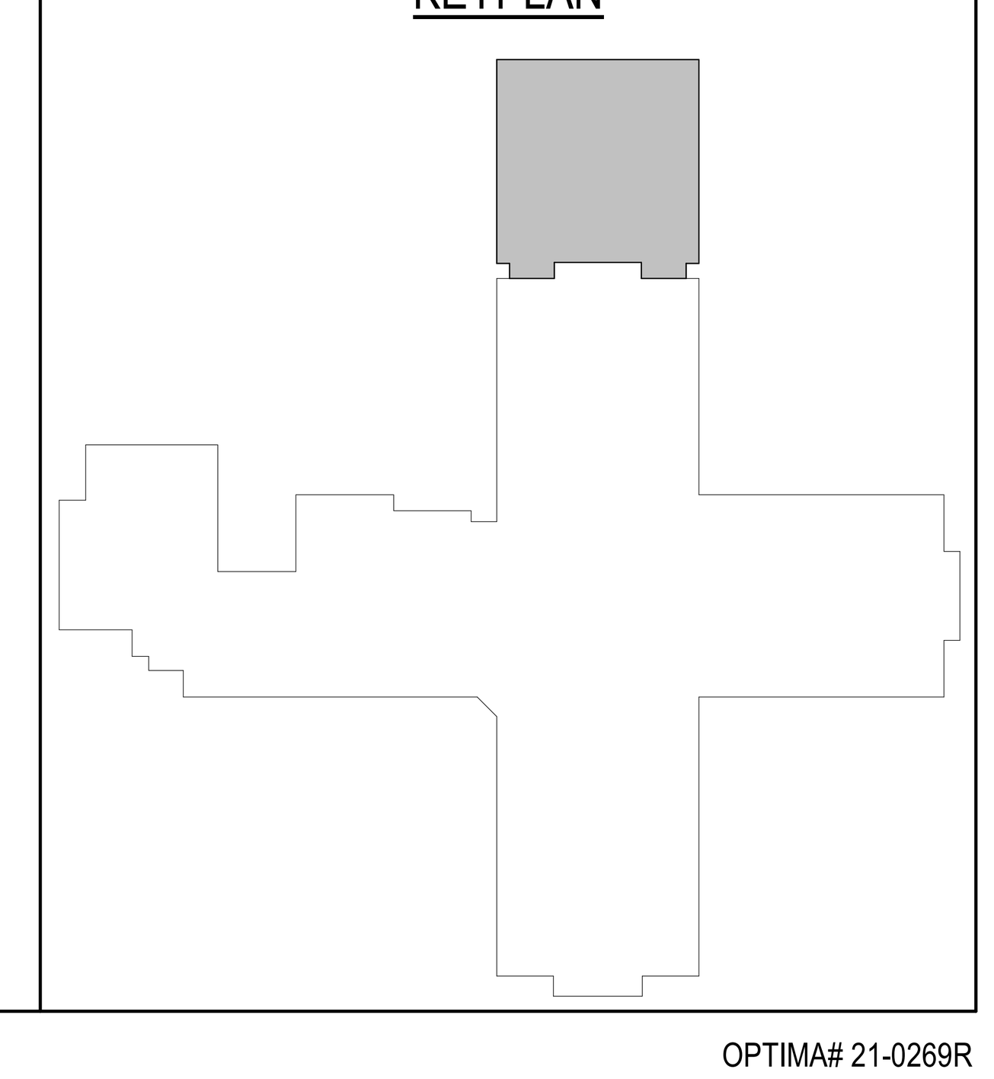
KEYPLAN



No.	Date	Description

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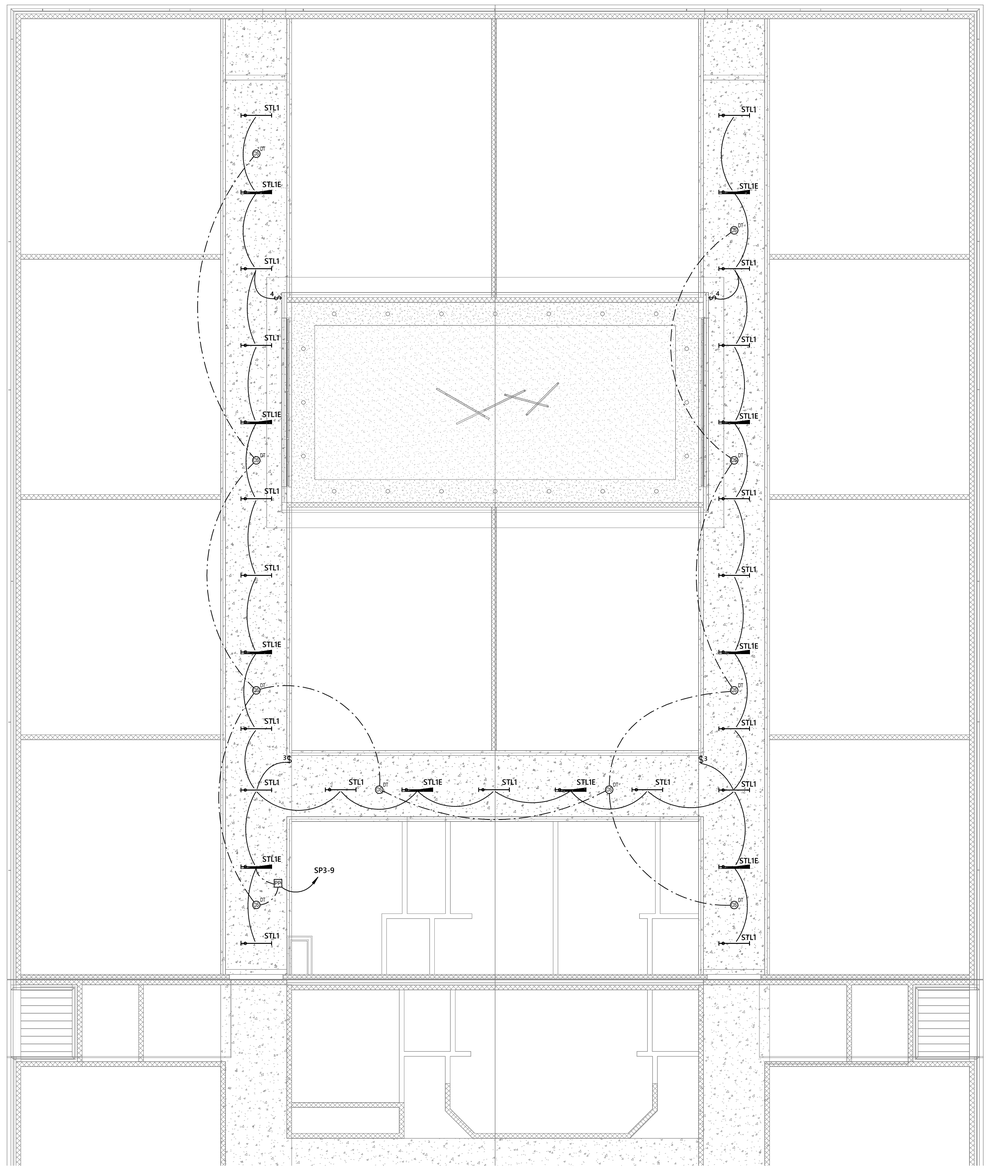
CLASSROOM ADDITION LIGHTING PLAN - NEW WORK

E-211

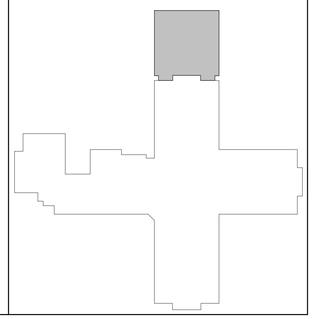


1 MECHANICAL LOFT LIGHTING PLAN
1/8" = 1'-0"

GENERAL NOTES

A. ALL RECESSED LIGHTING FIXTURES IN LAY-IN CEILING SHALL BE INSTALLED WITH 6'-0" LONG FLEXIBLE METAL CONDUIT.
B. SEE ARCHITECTURAL EXTERIOR ELEVATIONS FOR MOUNTING HEIGHTS OF EXTERIOR LIGHTING FIXTURES.
C. CONNECT EMERGENCY EXIT SIGNS AND THE UNSWITCHED INPUT OF BATTERY PACKS TO LOCAL LIGHTING CIRCUIT, AHEAD OF SWITCHING.
D. CONTRACTOR SHALL MAKE SURE TO MAINTAIN CONTINUITY OF ELECTRICAL DEVICES THAT ARE OUTSIDE AREA OF WORK THAT ARE INTENDED TO REMAIN ENERGIZED.
E. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL EXISTING LIGHT FIXTURES TO REMAIN.
F. HATCHED AREAS ARE NOT IN SCOPE OF WORK.

KEYPLAN



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MECHANICAL LOFT LIGHTING PLAN

E-212

Sheet No. 7 of 16

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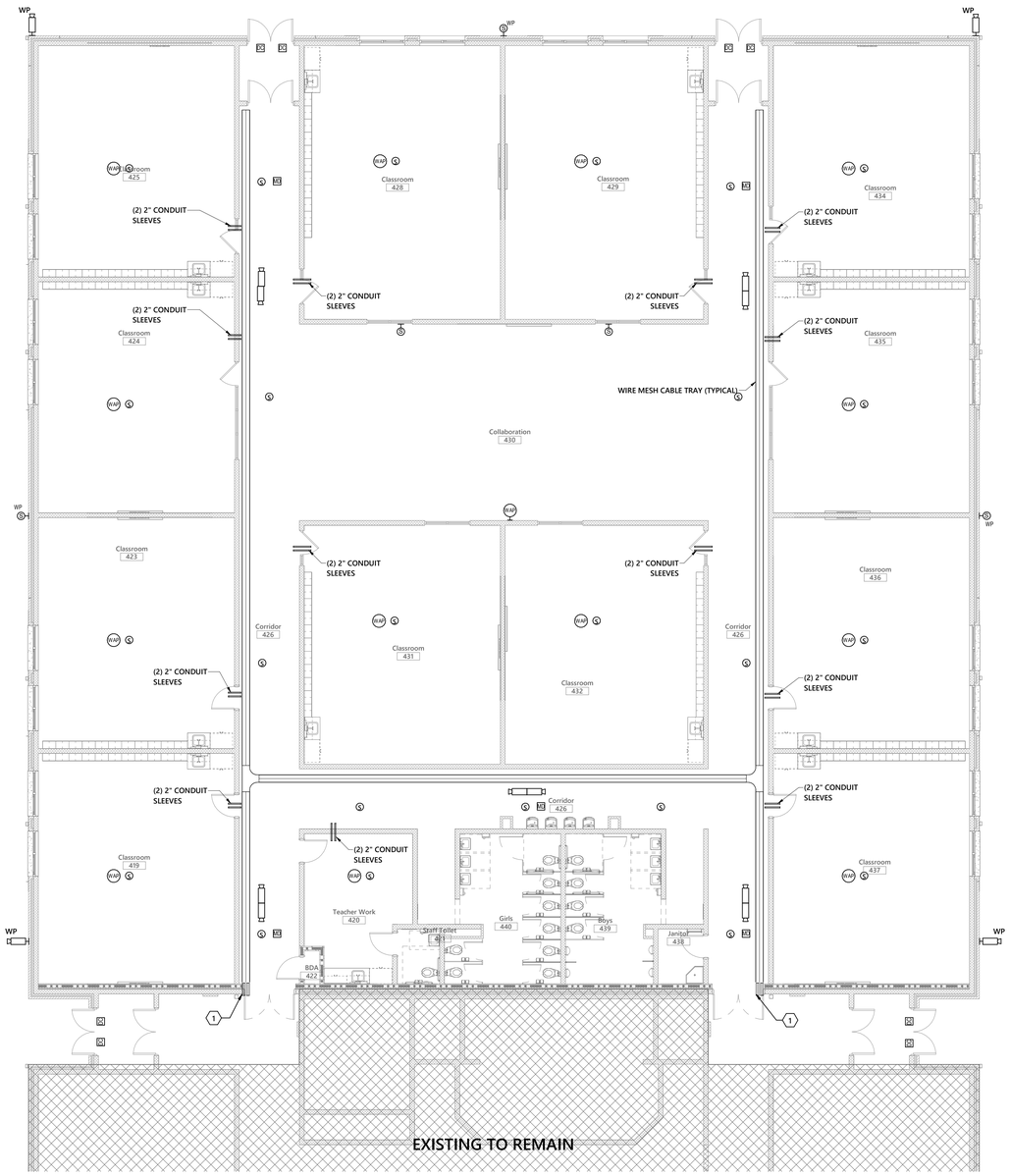


1 CLASSROOM ADDITION SPECIAL SYSTEMS PLAN - NEW WORK
1/8" = 1'-0"

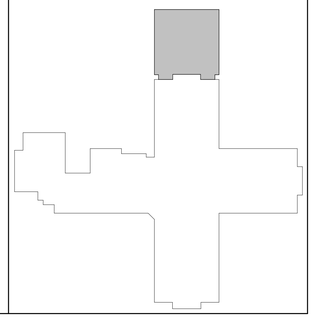
GENERAL NOTES

A. MAINTAIN CONTINUITY OF BRANCH CIRCUITRY ASSOCIATED WITH ALL FIRE ALARM DEVICES TO REMAIN.
B. HATCHED AREAS ARE NOT IN SCOPE OF WORK.

KEYED NOTES

1 PROVIDE (2) 4" X 4" EZ-PATH FIRE RATED PATHWAYS THROUGH FIRE WALL. PROVIDE GROUNDING BUSHING FOR ALL PATHWAYS AND CONNECT TO GROUND BUS BAR WITH #6 AWG CONDUCTOR.

KEYPLAN



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CLASSROOM ADDITION SPECIAL SYSTEMS PLAN - NEW WORK

E-311

OPTIMA# 21-0269R

Sheet No. 8 of 16

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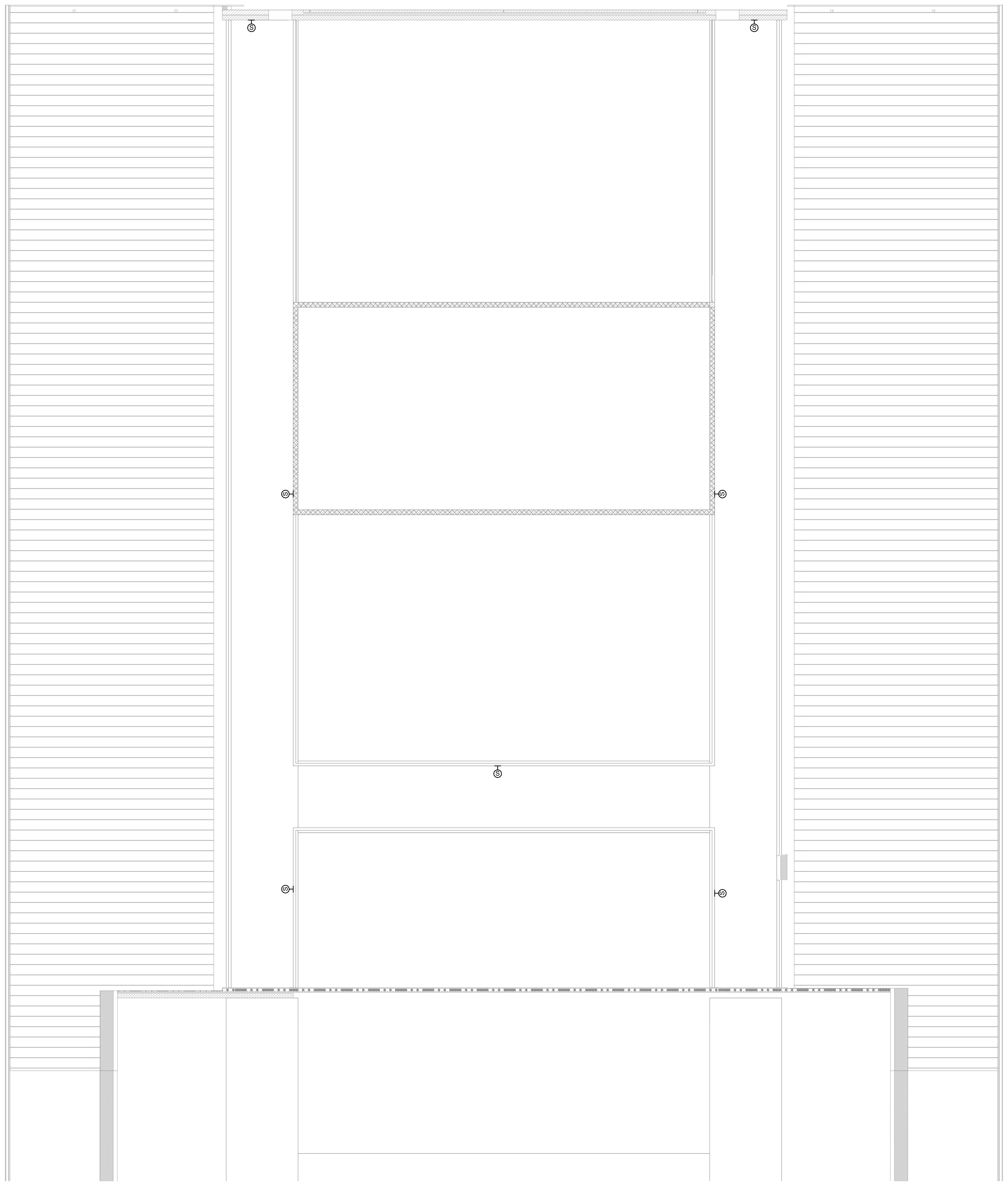
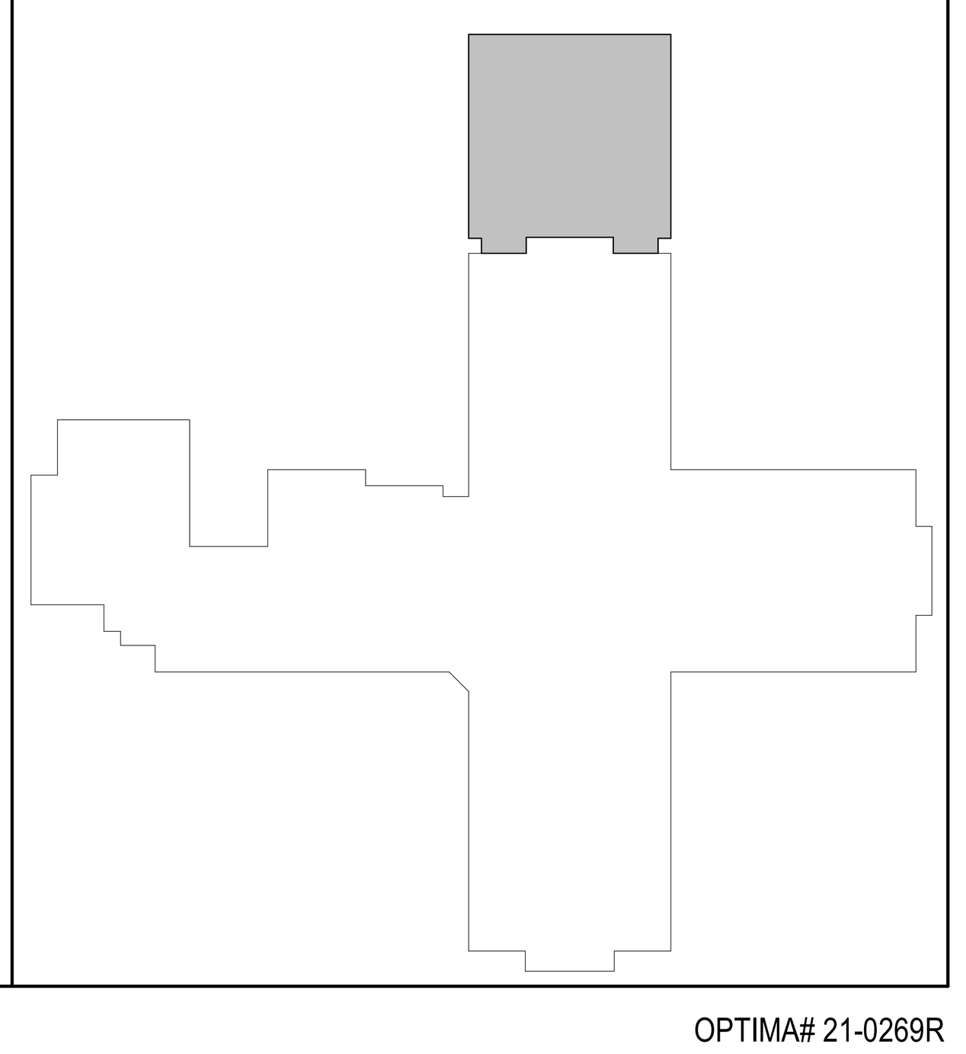


1 MECHANICAL LOFT SPECIAL SYSTEMS PLAN
1/8" = 1'-0"

KEYPLAN



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MECHANICAL LOFT SPECIAL SYSTEMS PLAN

E-312

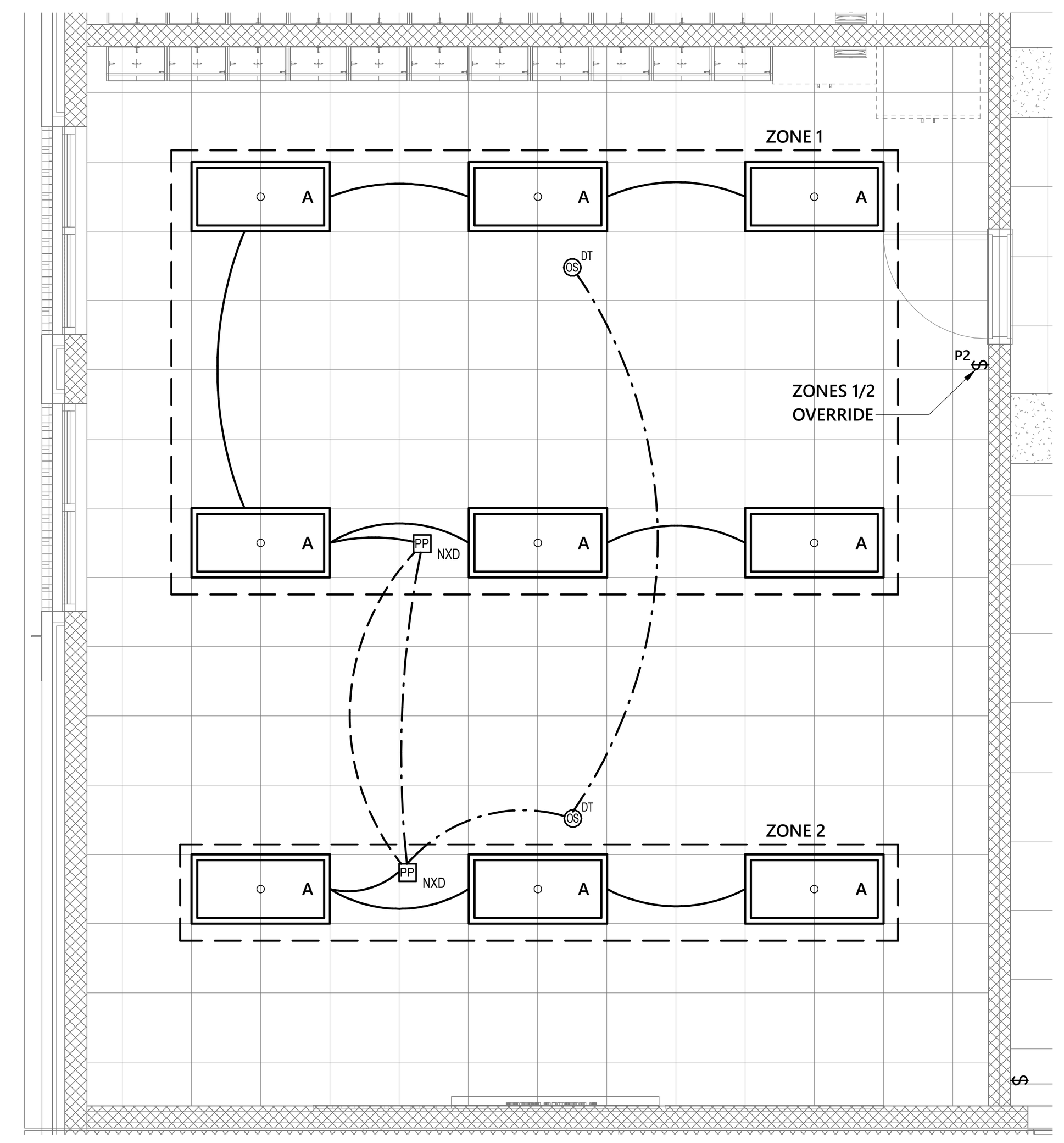
OPTIMA# 21-0269R

Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt
8/11/2022 9:59:48 AM

E	D	C	B	A

GENERAL NOTES

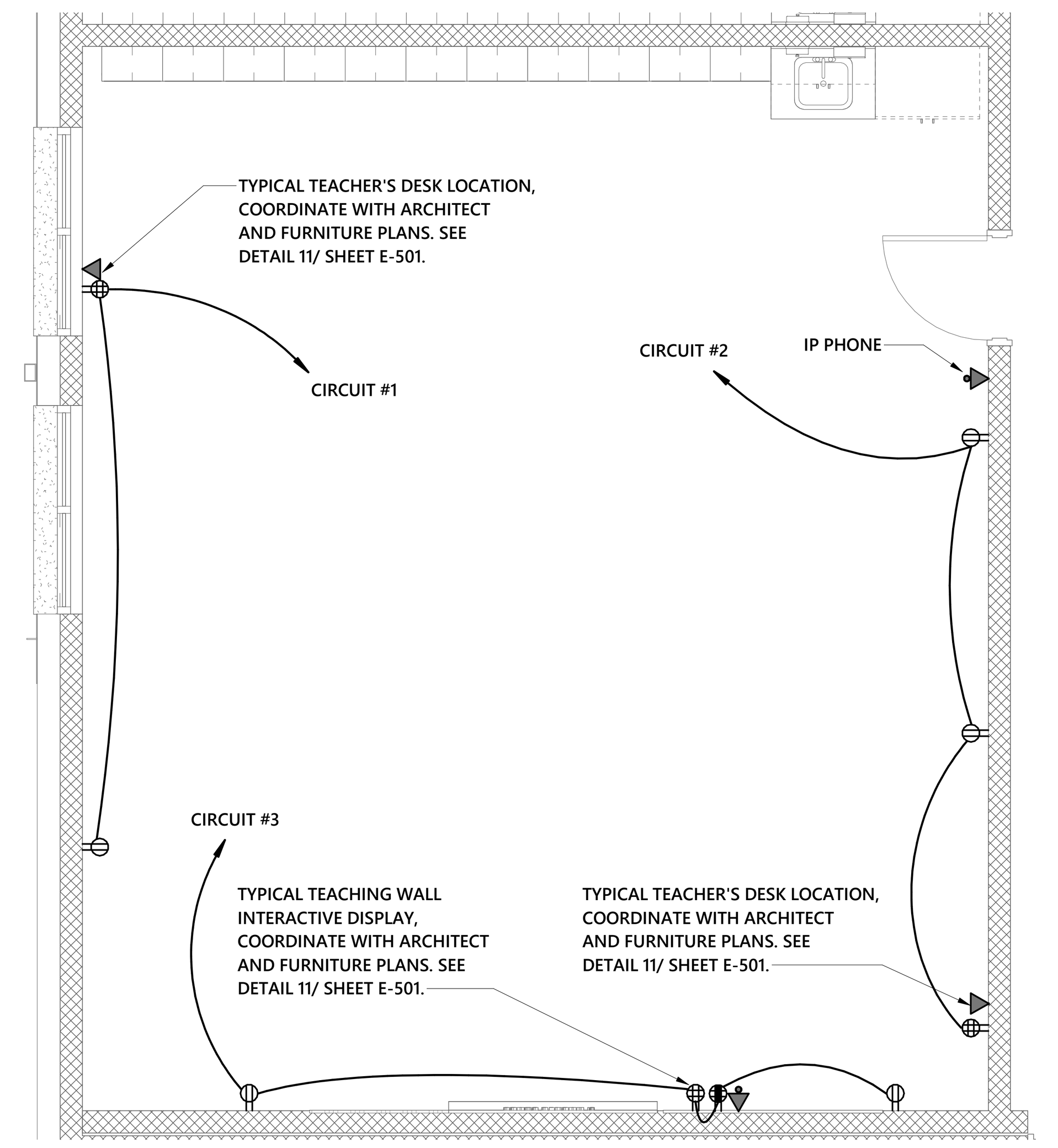
A. REFER TO DRAWING E-000 FOR LEGEND, SYMBOLS AND GENERAL NOTES.
B. REFER TO ARCHITECTURAL DRAWINGS INCLUDING BUT NOT LIMITED TO, MOUNTING NOTES, MOUNTING DETAILS AND EXACT LOCATIONS OF ALL DEVICES.
C. ALL DEVICES SHALL BE FLUSH MOUNTED, UNLESS NOTED OTHERWISE, WITH NO EXPOSED CONDUIT.
D. BACK TO BACK BOX INSTALLATION SHALL NOT BE ALLOWED. WHERE DEVICES ARE SHOWN BACK TO BACK, DEVICE SHALL BE OFFSET 3".
E. TYPICAL CLASSROOM IS SHOWS AND SHALL BE ROTATED, MIRRORED, ETC. TO FIT EACH RESPECTIVE CLASSROOM IN A SIMILAR MANNER.
F. TAMPER-RESISTANT RECEPTACLES SHALL BE PROVIDED FOR ALL AREAS PER NEC 406.12, INCLUDING ELEMENTARY EDUCATION FACILITIES, BUSINESS OFFICES/CORRIDORS/WAITING ROOMS AND THE LIKE, ASSEMBLY OCCUPANCIES INCLUDING PLACES OF AWAITING TRANSPORTATION/GYMNASIUM/AUDITORIUMS.
G. RECEPTACLE AND DATA OUTLETS SHALL NOT BE MOUNTED IN TRIM OF WINDOWS. LOCATE WHERE FULL WALL IS AVAILABLE.



GENERAL NOTES:

1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

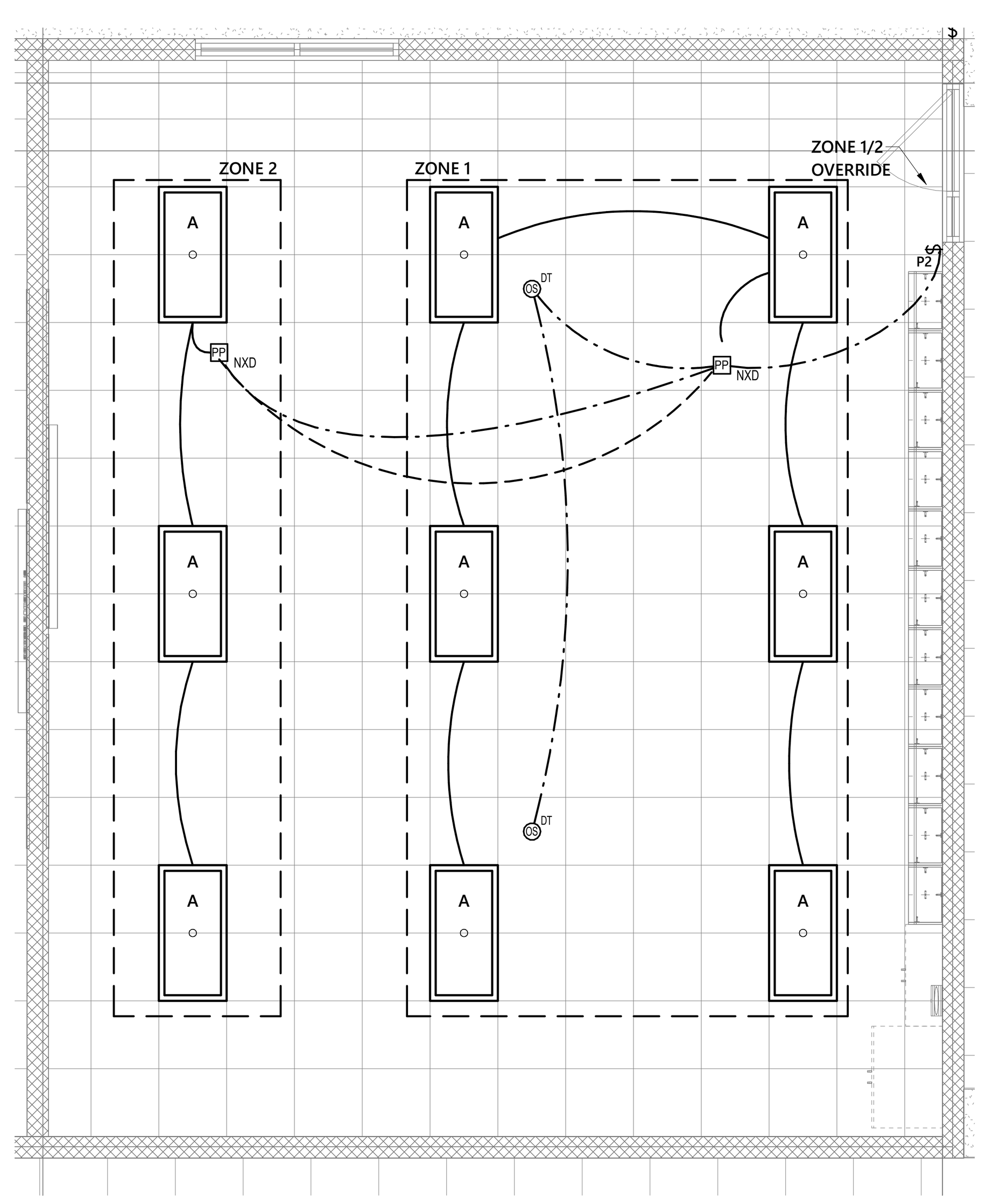
1 ENLARGED TYPICAL CLASSROOM PLAN 1 - LIGHTING
1/4" = 1'-0"



GENERAL NOTES:

1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

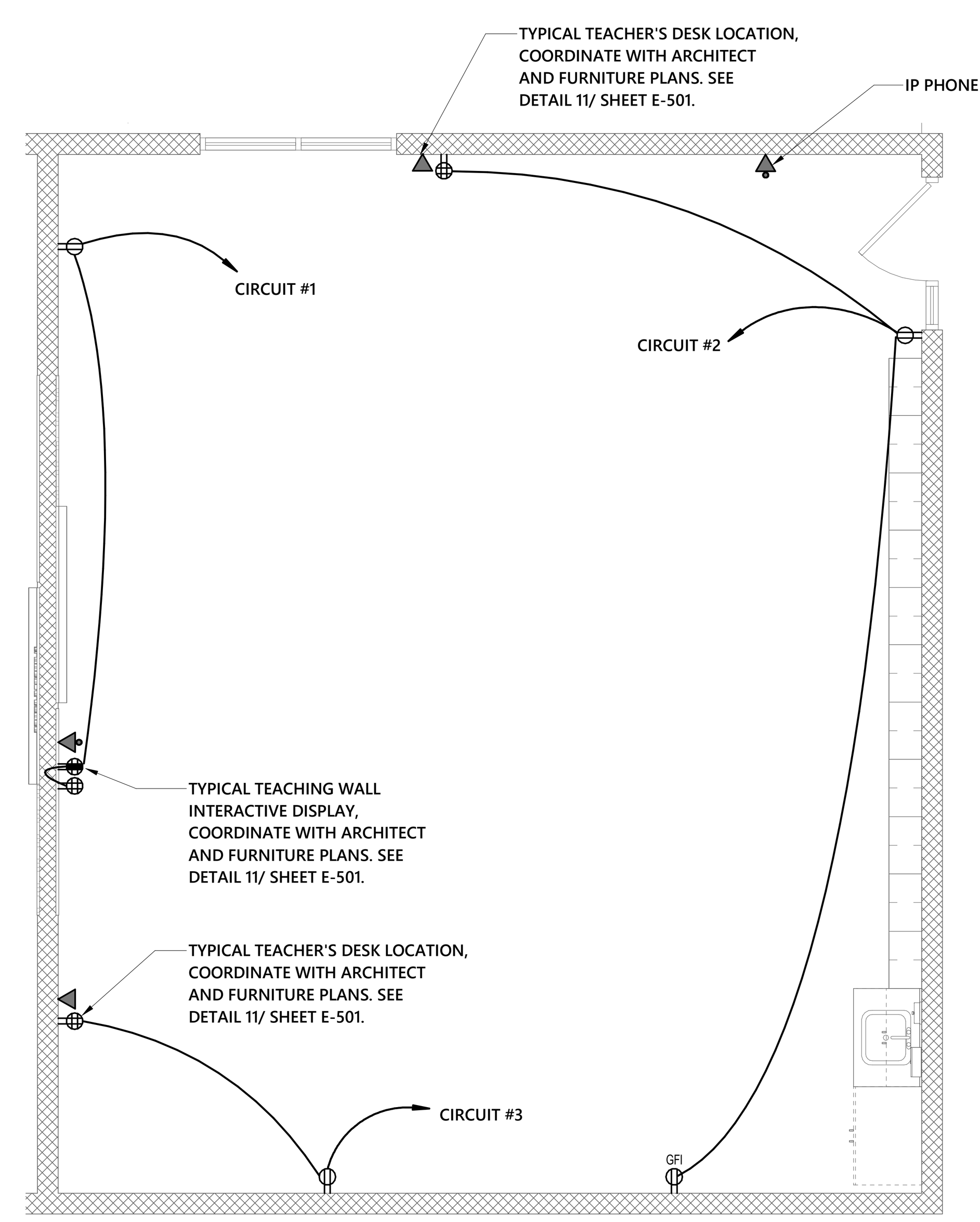
2 ENLARGED TYPICAL CLASSROOM PLAN 1 - POWER
1/4" = 1'-0"



GENERAL NOTES:

1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

3 ENLARGED TYPICAL CLASSROOM PLAN 2 - LIGHTING
1/4" = 1'-0"



GENERAL NOTES:

1. SEE FLOOR PLANS FOR CIRCUIT DESIGNATIONS.
2. SEE MANUFACTURER SUBMITTED DRAWINGS FOR EXACT DEVICE AND CABLING LAYOUTS.

4 ENLARGED TYPICAL CLASSROOM PLAN 2 - POWER
1/4" = 1'-0"

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ENLARGED ELECTRICAL PLANS

E-411

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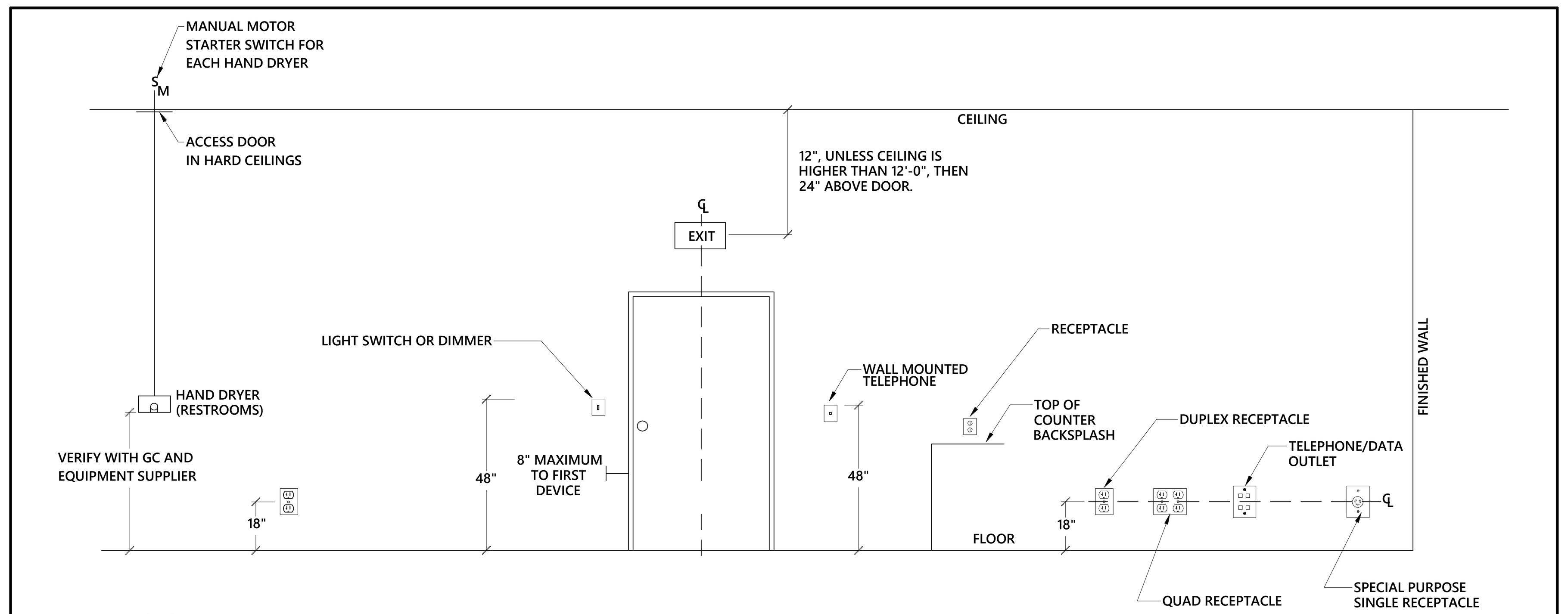
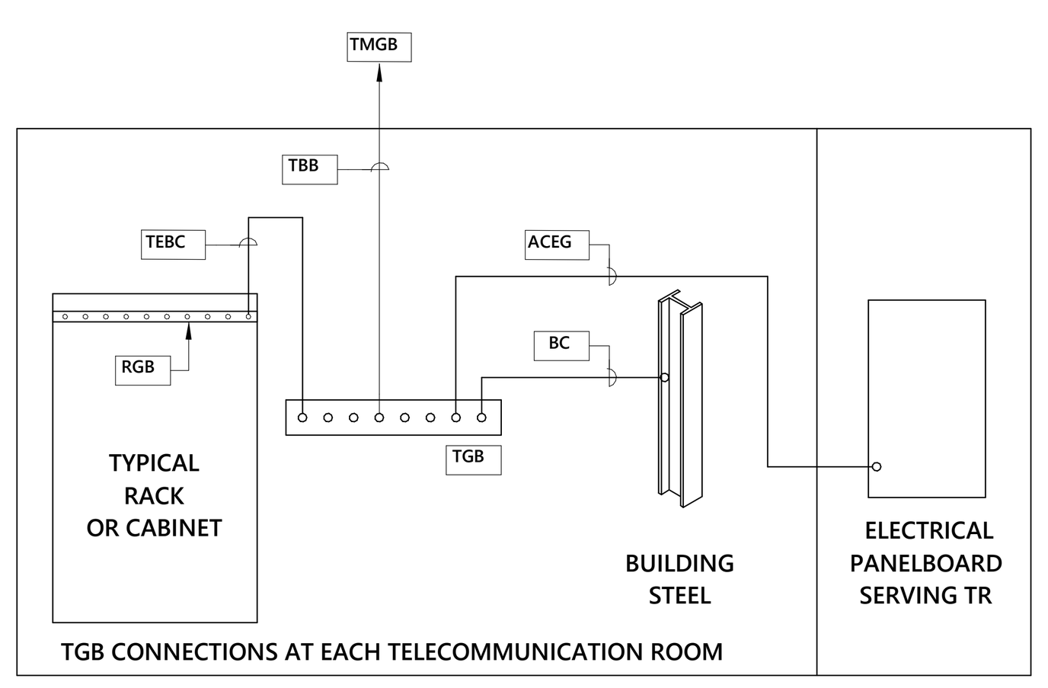


NOTES:
1. LOCATIONS WHERE TV MOUNT IS BACK TO BACK ON SAME WALL, AN OFFSET OF 8-12" WILL BE NEEDED FOR INSTALLATION OF JACK/RECEPTACLE.
2. DEVICES ABOVE COUNTER TOPS SHALL BE A MAXIMUM OF 48" TO TOP OF DEVICE.
3. DEVICES NEXT TO DOOR EXIT SHALL BE WITHIN 8" (MAXIMUM) TYPICAL OF DOOR UNLESS OBSTACLES SUCH AS SIDELITES, ETC.

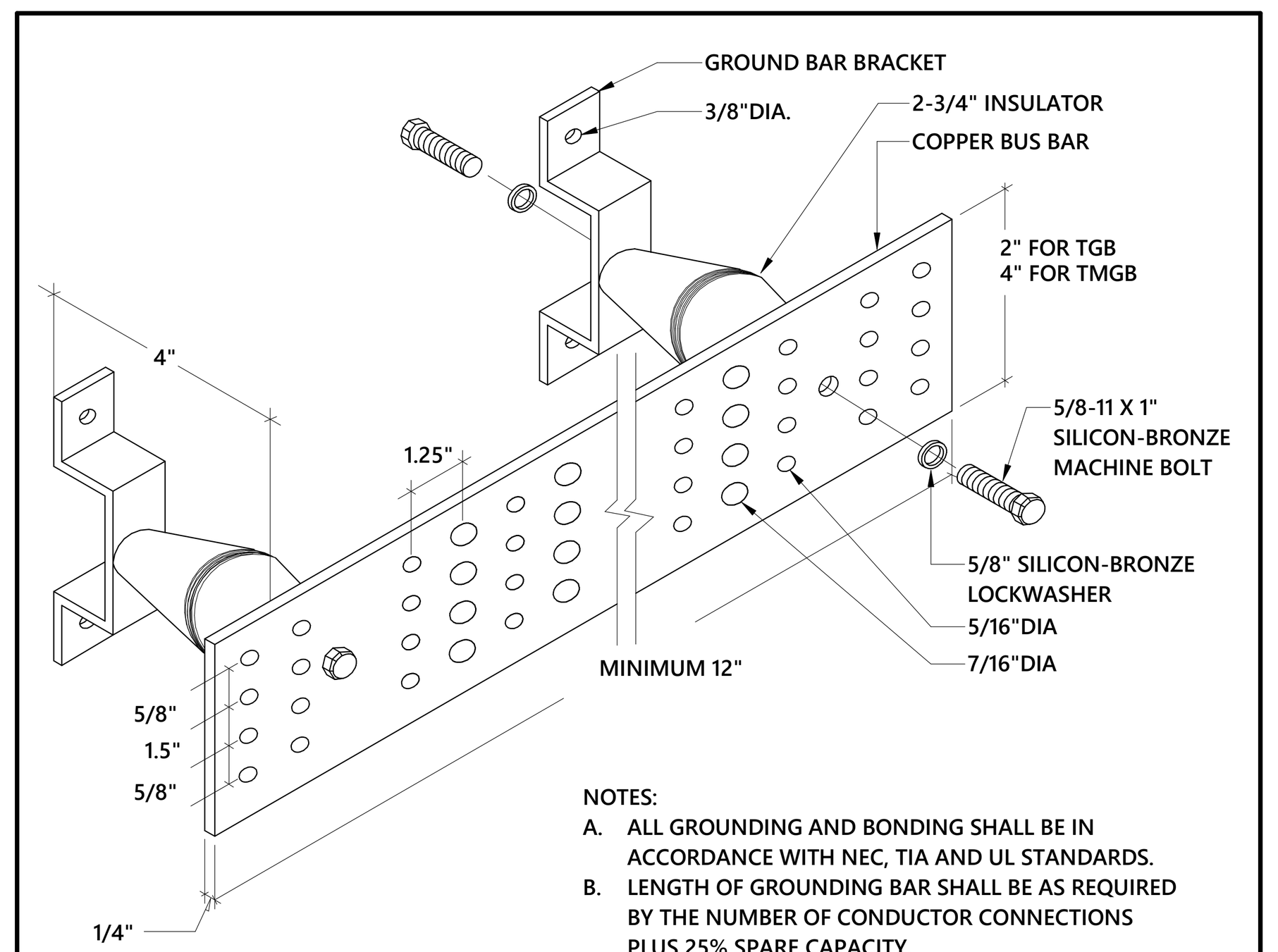
1 **MOUNTING HEIGHTS OF DEVICES - ELEVATION**
NOT TO SCALE



TELECOMMUNICATIONS GROUNDING LEGEND
A. ALL CONDUCTORS SHALL BE GREEN INSULATED OR BARE STRANDED ALL-COPPER CONDUCTORS
B. INSTALLATION SHALL BE PER ANSI/TIA-607-B STANDARDS

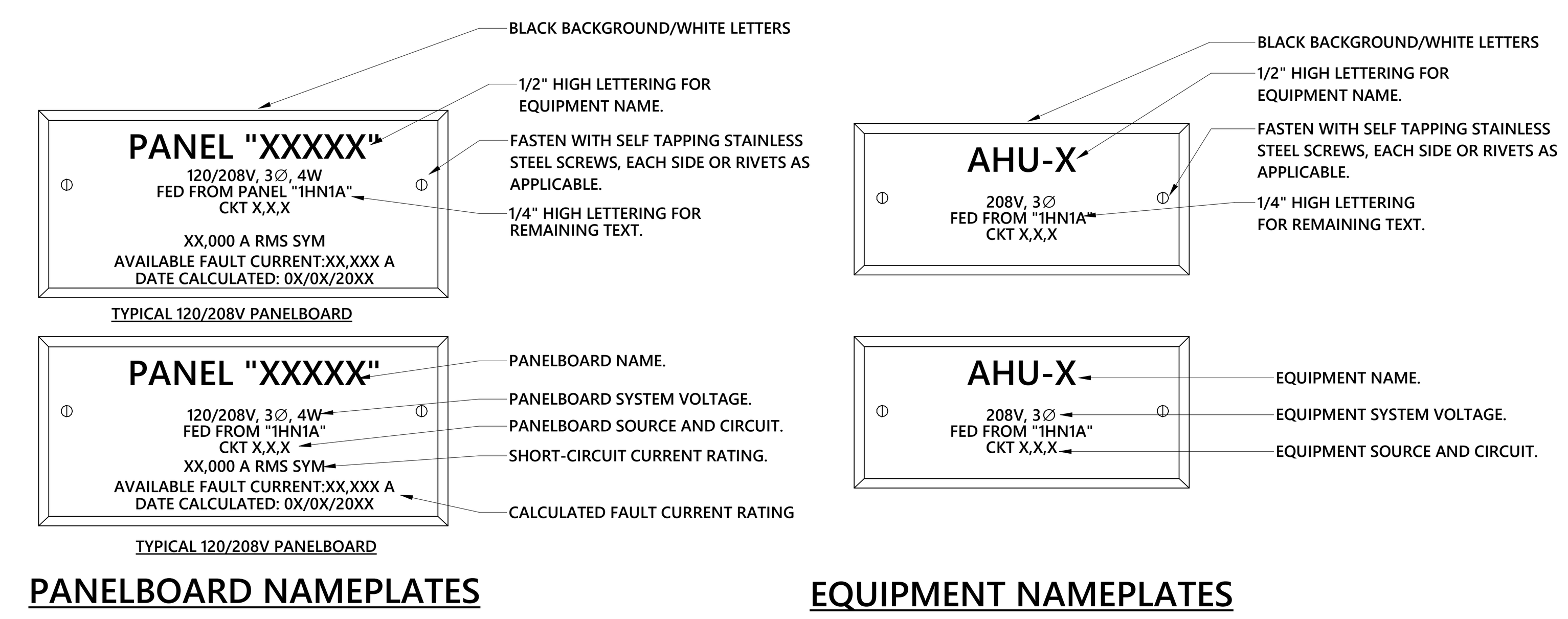
TMGB TELECOMMUNICATIONS MAIN GROUND BAR MOUNTED ON BACKBOARD. BY ELECTRICAL CONTRACTOR.
TGB TELECOMMUNICATIONS GROUND BAR MOUNTED ON BACKBOARD. BY ELECTRICAL CONTRACTOR.
TBB TELECOMMUNICATIONS BONDING BACKBONE. MINIMUM #3/0 AWG GROUND IN 3/4" CONDUIT. BY ELECTRICAL CONTRACTOR.
RGB RACK GROUNDING BUSBAR MOUNTED IN EACH RACK AND/OR CABINET. BY DIVISION 27 CONTRACTOR.
TEBC TELECOMMUNICATIONS EQUIPMENT BONDING CONDUCTOR. MINIMUM #6 AWG GROUND. BY ELECTRICAL CONTRACTOR.
BC BONDING CONDUCTOR. MINIMUM #6 AWG GROUND. BY ELECTRICAL CONTRACTOR.
ACEG ALTERNATING CURRENT EQUIPMENT GROUND. MINIMUM #6 AWG GROUND. BY ELECTRICAL CONTRACTOR.

4 **TYPICAL TELECOMMUNICATIONS GROUND BAR CONNECTIONS FOR TELECOMMUNICATIONS ROOM**
NO SCALE



NOTES:
A. ALL GROUNDING AND BONDING SHALL BE IN ACCORDANCE WITH NEC, TIA AND UL STANDARDS.
B. LENGTH OF GROUNDING BAR SHALL BE AS REQUIRED BY THE NUMBER OF CONDUCTOR CONNECTIONS PLUS 25% SPARE CAPACITY.
C. GROUND BARS OVER 20" IN LENGTH REQUIRE AT LEAST ONE ADDITIONAL INSULATOR SUPPORT.
D. MOUNT GROUND BAR AT 6'-8" AFF UNLESS OTHERWISE DIRECTED BY OWNER.

3 **TELECOMMUNICATIONS GROUNDING BAR DETAIL**
NO SCALE

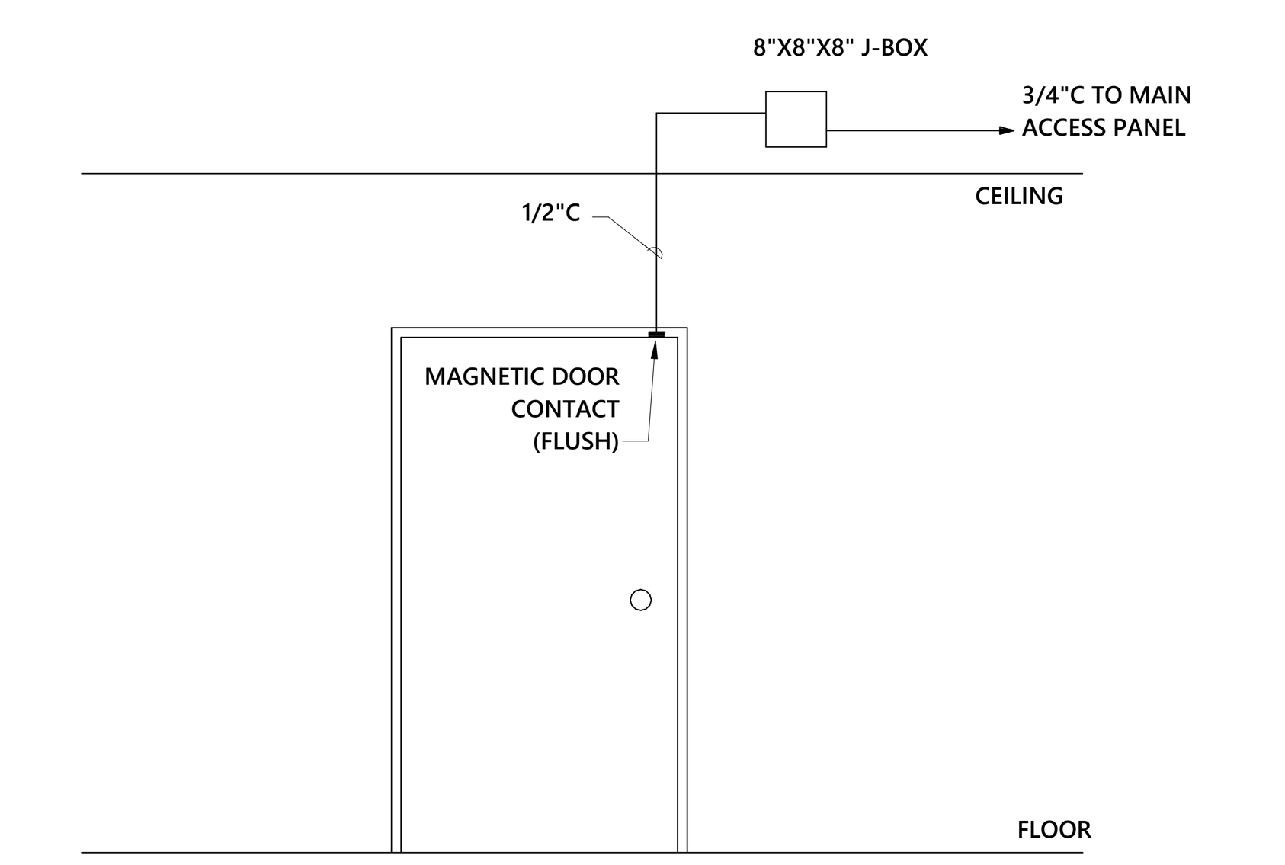


PANELBOARD NAMEPLATES

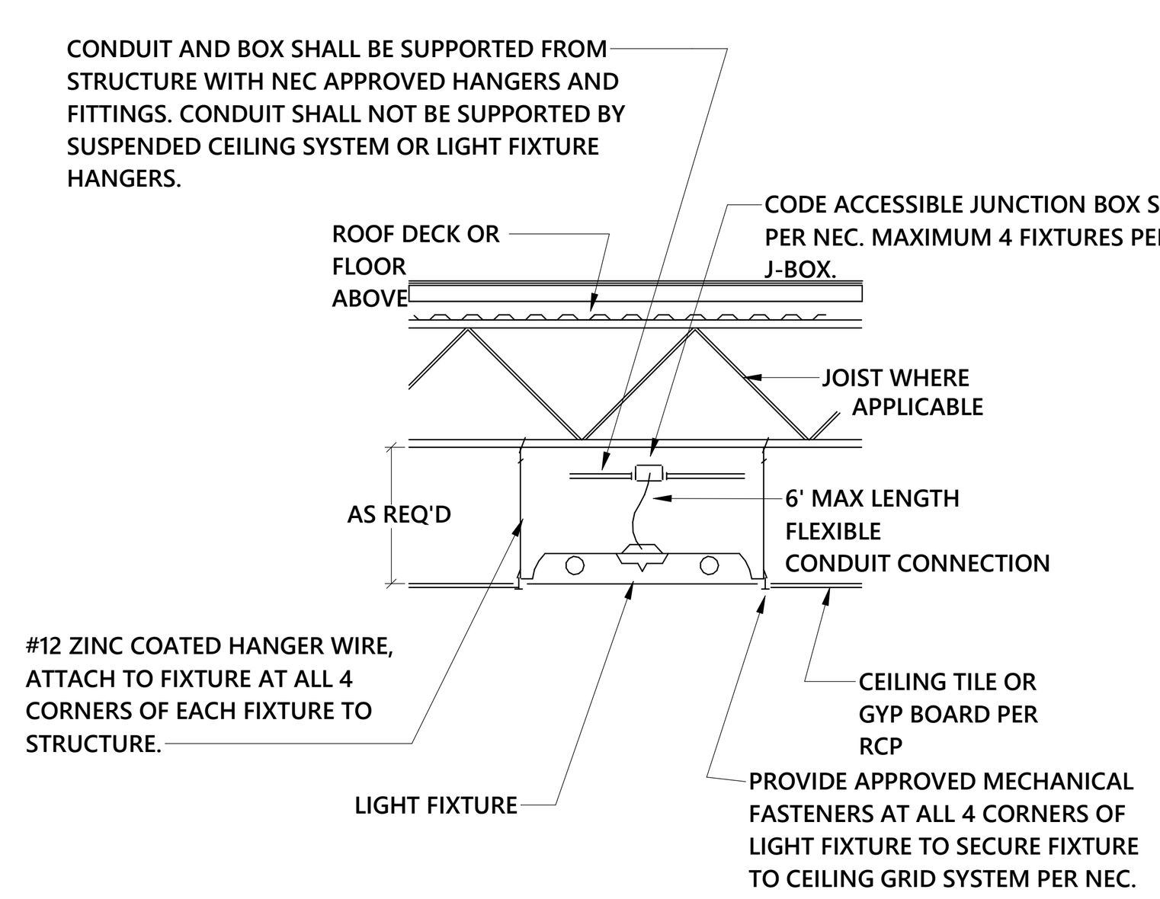
EQUIPMENT NAMEPLATES

NOTES:
1. SEE SPECIFICATIONS FOR ADDITIONAL REQUIREMENTS, COLORS, ETC.
2. PROVIDE SHORT-CIRCUIT CURRENT RATING AND AVAILABLE FAULT CURRENT ON EACH NON-DWELLING SERVICE EQUIPMENT NAMEPLATE.

2 **TYPICAL NAMEPLATE DIAGRAM**
NOT TO SCALE

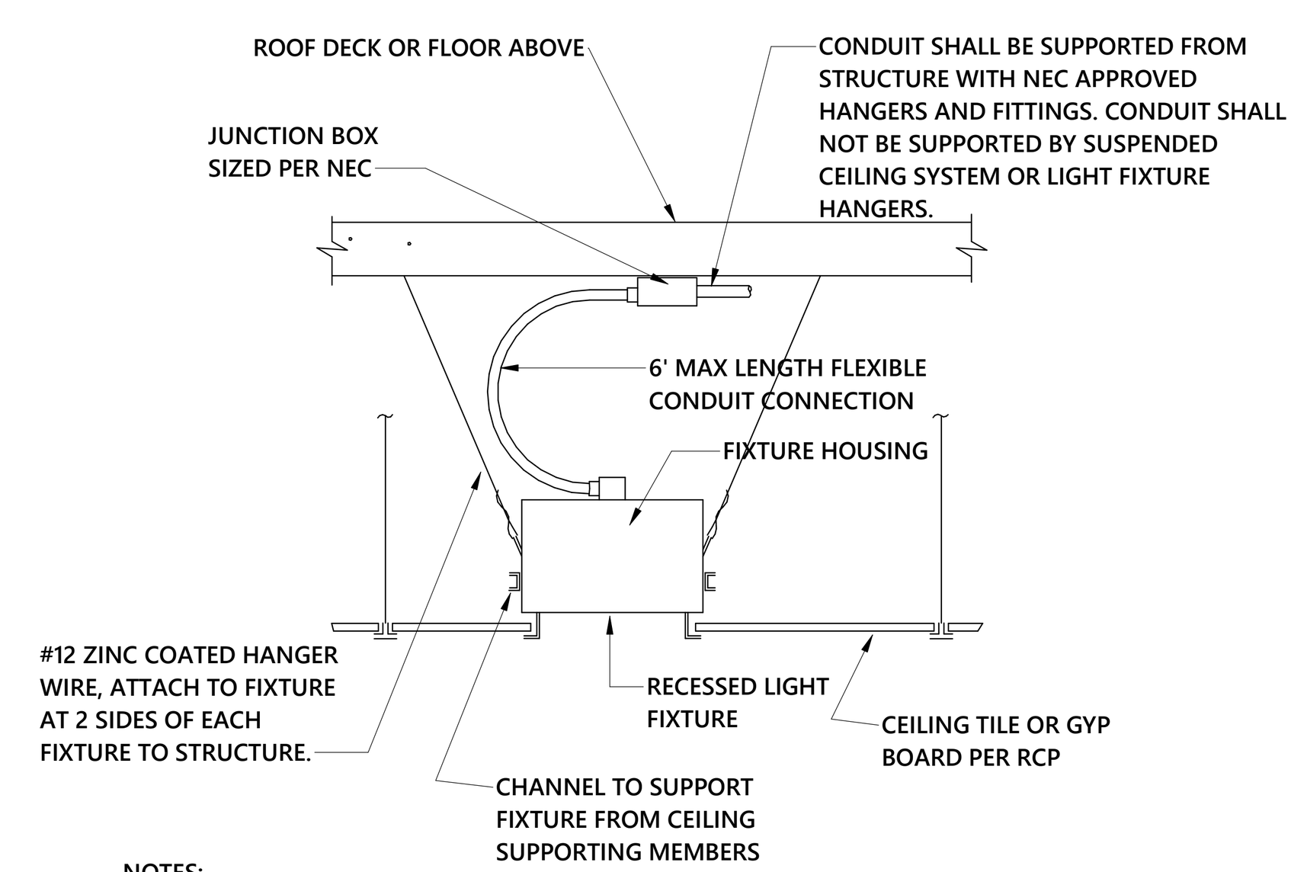


10 **DOOR CONTACT ONLY**
NOT TO SCALE



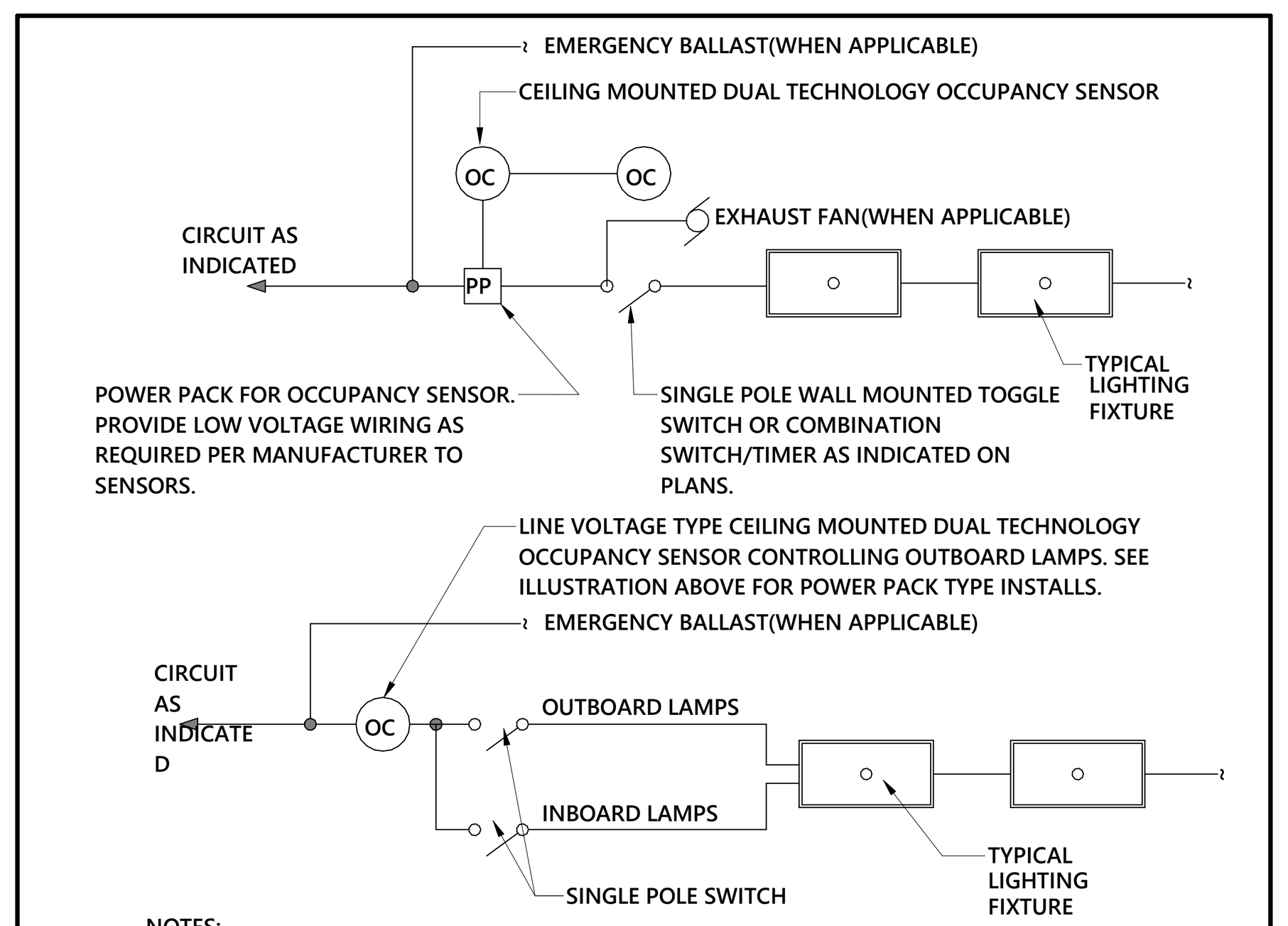
NOTES:
1. WHERE ROOF DECKING IS THE IS THE ALLOWABLE SUPPORT STRUCTURE, AND PATHWAY SYSTEM IS NOT IMC OR RMC, THE MINIMUM DISTANCE FROM ROOF DECKING SHALL BE 1.5" FOR ALL BOXES AND CONDUIT.

9 **TYPICAL LAY-IN FIXTURE DIAGRAM**
NOT TO SCALE



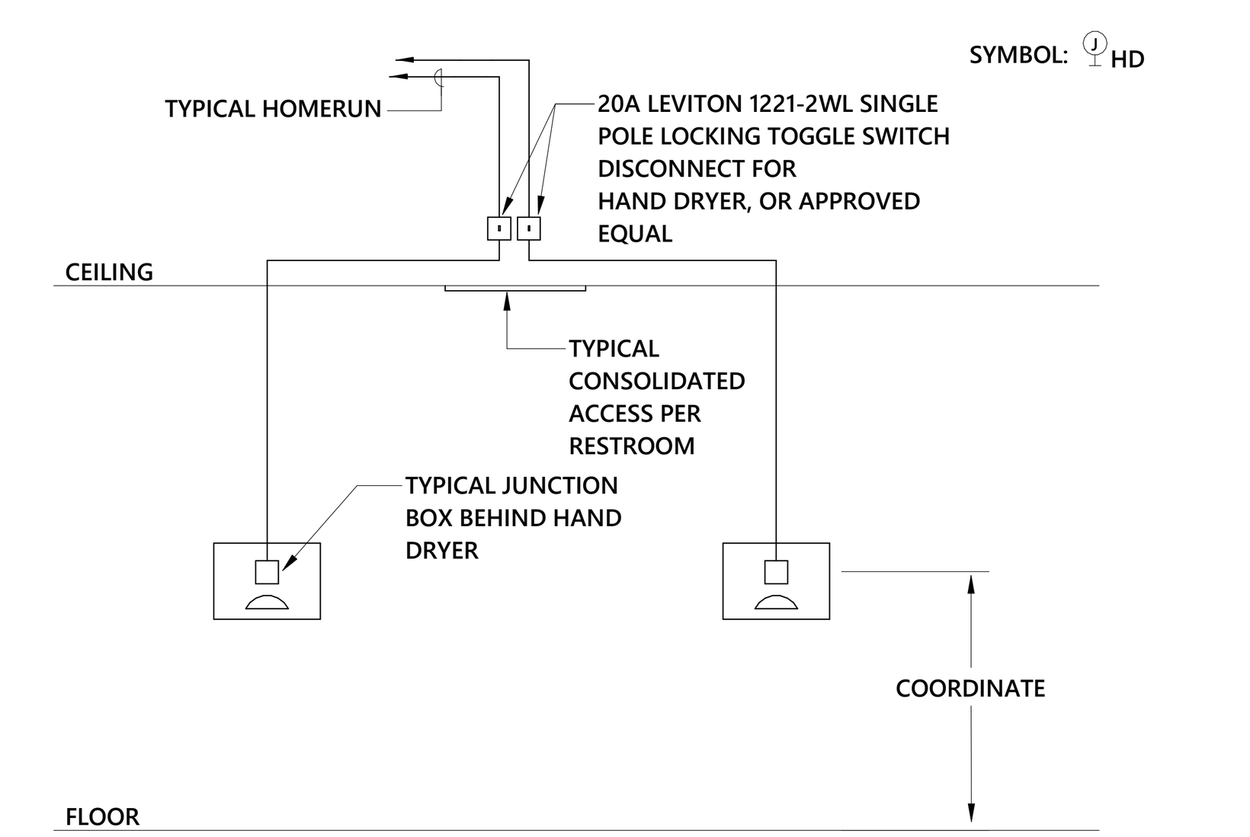
NOTES:
1. WHERE ROOF DECKING IS THE IS THE ALLOWABLE SUPPORT STRUCTURE, AND PATHWAY SYSTEM IS NOT IMC OR RMC, THE MINIMUM DISTANCE FROM ROOF DECKING SHALL BE 1.5" FOR ALL BOXES AND CONDUIT.

8 **TYPICAL RECESSED DOWN LIGHT FIXTURE INSTALLATION DIAGRAM**
NOT TO SCALE



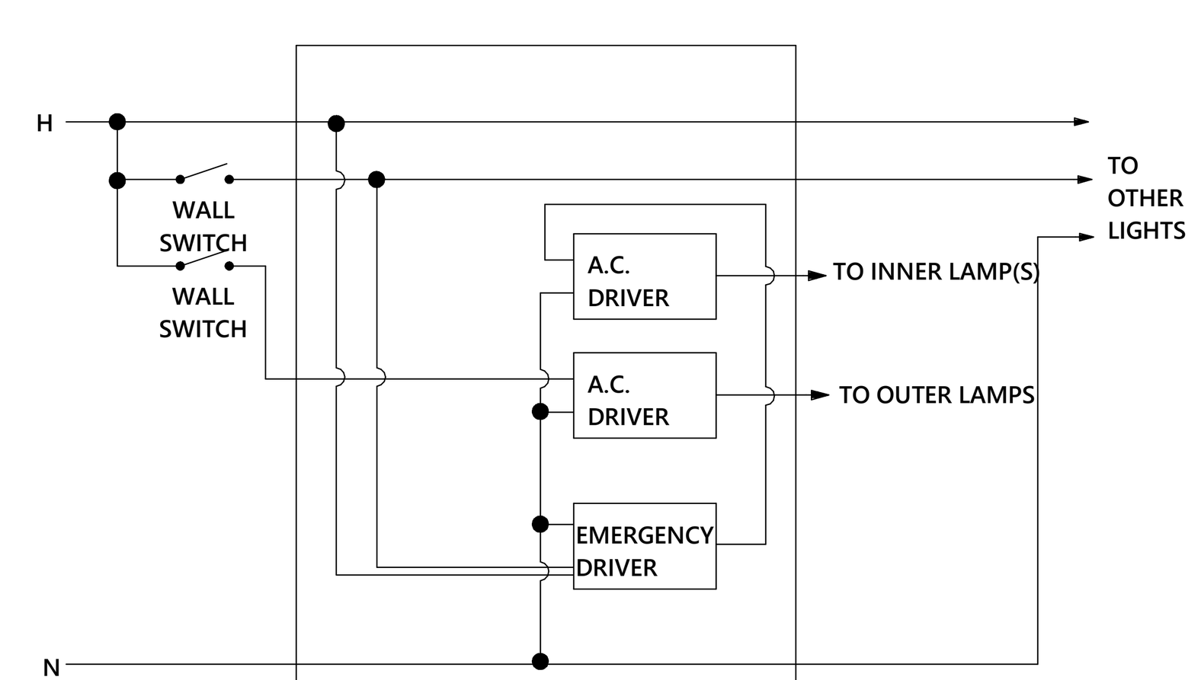
NOTES:
1. OCCUPANCY SENSORS SHALL BE SET TO TIME OUT AFTER 15 MINUTES AND THE TRIM POTENTIOMETER IS SET TO 90% FOR SENSITIVITY.
2. OCCUPANCY SENSORS SHALL BE PLACED AS TO NOT FUNCTION UPON SOMEONE JUST PASSING BY THE ROOM DOOR BUT BY ACTUALLY ENTERING THE ROOM IN AS MUCH AS POSSIBLE.

7 **TYPICAL CEILING MOUNTED OCCUPANCY SENSOR WIRING DIAGRAMS**
NOT TO SCALE

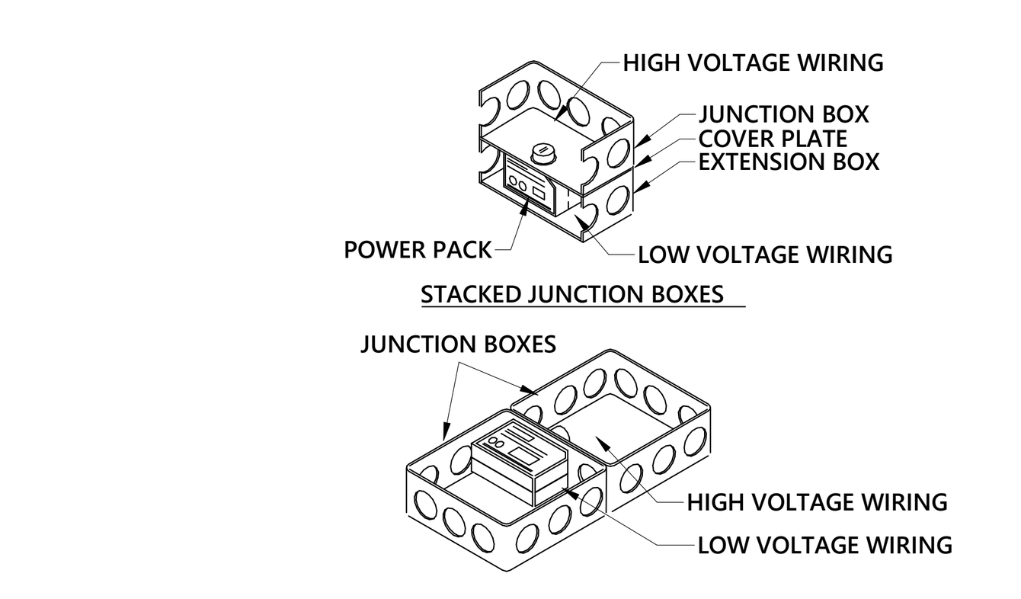


NOTES:
1. MOUNT TOGGLE SWITCHES WITHIN 8" OF ACCESS/LAY-IN TILE. LEAVE ROOM FOR FLOOR TILE/ACCESS PANEL MOVEMENT.
2. PROVIDE ACCESS PANEL FOR NON-ACCESSIBLE CEILING TYPES. COORDINATE WITH G.C. FOR TYPE (MATCH PROJECT ACCESS PANEL TYPES WHEN PROVIDED.) COORDINATE EXACT LOCATION WITH ARCHITECT IN FIELD PRIOR TO CONDUIT ROUGH-IN.
3. TOGGLE SWITCHES TO BE CONSOLIDATED INTO ONE ACCESS LOCATION.3. TOGGLE SWITCHES TO BE CONSOLIDATED INTO ONE ACCESS LOCATION.
4. SEE PLANS FOR HAND DRYER QUANTITIES AND LOCATIONS.SEE PLANS FOR HAND DRYER QUANTITIES AND LOCATIONS.
5. HAND DRYER HEIGHTS AND ASSOCIATED JUNCTION BOXES ARE TO BE COORDINATED WITH ARCHITECTURAL ELEVATIONS.

5 **HAND DRYER LAYOUT DETAIL**
NO SCALE



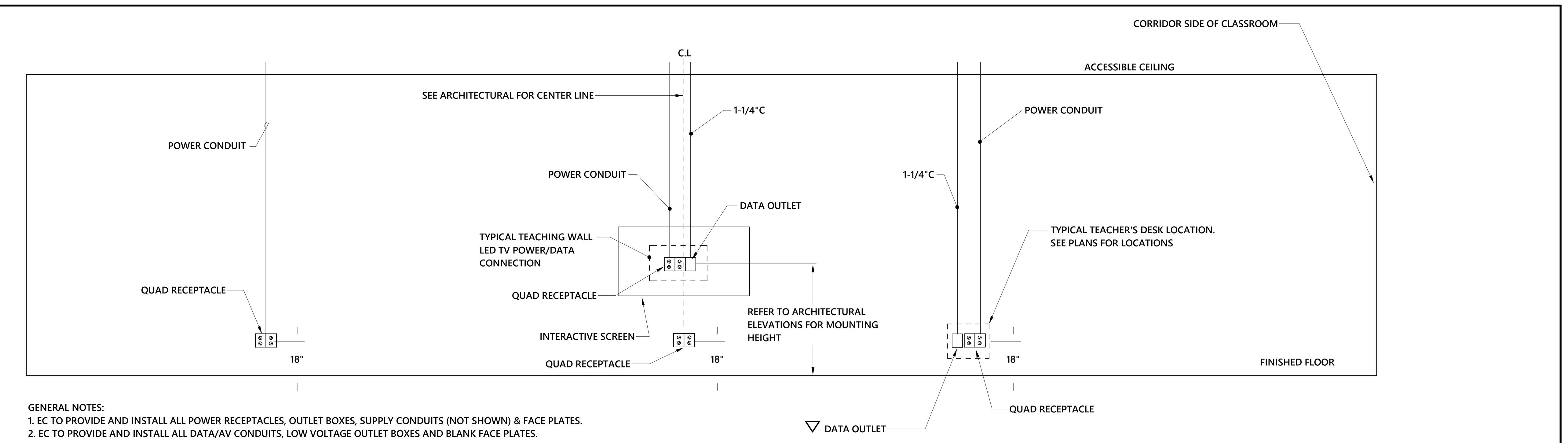
6 **SWITCHED EMERGENCY LIGHTING WIRING**
NOT TO SCALE



NOTE:
DO NOT MOUNT POWER PACKS CLOSER THAN 6-12 INCHES FROM SENSOR. PROVIDE DOUBLE STACKED JUNCTION BOX FOR MAXIMUM VENTILATION OF POWER PACK. PROVIDE BLANK COVER. WHERE PERMITTED BY CODE AND AHJ, LEAVE (2) OPENINGS IN CONDUIT KNOCKOUT FOR VENTING OF POWER PACK. VERIFY WITH AHJ PRIOR TO KNOCKOUT REMOVAL.

POWER PACK INSTALLED IN J-BOX

12 **POWER PACK INSTALLATION**
NOT TO SCALE



GENERAL NOTES:
1. EC TO PROVIDE AND INSTALL ALL POWER RECEPTACLES, OUTLET BOXES, SUPPLY CONDUITS (NOT SHOWN) & FACE PLATES.
2. EC TO PROVIDE AND INSTALL ALL DATA/AV CONDUITS, LOW VOLTAGE OUTLET BOXES AND BLANK FACE PLATES.
3. DATA CONDUIT SHALL ROUTE TO 6" ABOVE ACCESSIBLE CEILING AND HAVE A BUSHING.
4. INTERACTIVE LED TV BY OTHERS.
5. "DATA" OUTLETS ARE DOUBLE GANG BOXES WITH SINGLE GANG MUD RINGS. STRUCTURED CABLING CONTRACTOR SHALL PROVIDE (2) DROPS AT EACH LOCATION.
6. DO NOT INSTALL BACKBOXES BACK TO BACK. WHERE BACK TO BACK INSTALLATIONS ARE SHOWN, OFF SET EACH INSTRUCTIONAL WALL.

11 **INSTRUCTIONAL WALL ELEVATION**
NO SCALE

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

ENERGY STAR PARTNER

No.	Date	Description

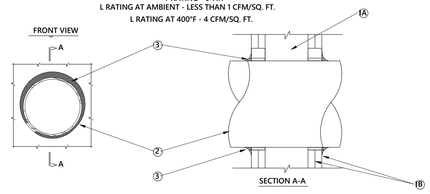
ISSUE DATE: 8/15/2022
PROJECT #: 02110.200
DRAWN BY: JSD
CHECKED BY: MKG

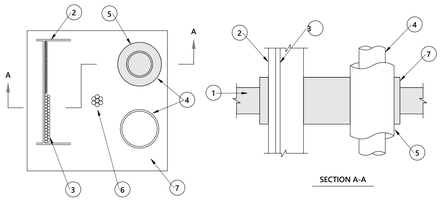
ELECTRICAL DETAILS

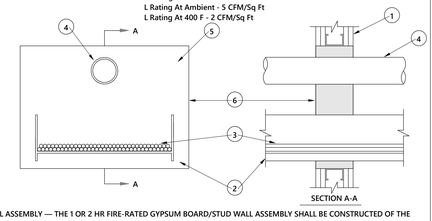
E-501

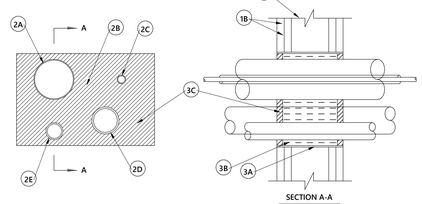
OPTIMA # 21-0266R

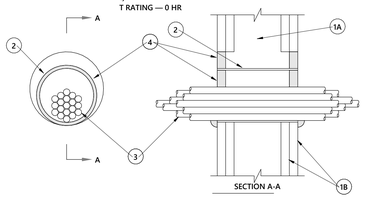
Autodesk Docs://HCS Overhills ES Addition/21-0266R_Overhills ES Classroom Addition_MEPFP_R22.rvt
8/11/2022 9:59:53 AM

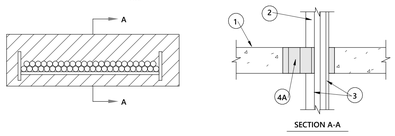












U.L. SYSTEM NO. W-L-1085
F RATING - 1-HR OR 2-HR (SEE ITEM 1B)
T RATING - 0-HR
L RATING AT AMBIENT - LESS THAN 1 CFM/SQ. FT.
L RATING AT 400°F - 4 CFM/SQ. FT.

1. WALL ASSEMBLY - THE 1 OR 2 HR FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:

A. STUDS - WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC.

B. GYPSUM BOARD* - 5/8 IN. THICK, 4 FT WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM WALLBOARD TYPE, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX DIA OF OPENING IS 13-1/4 IN.

DIA OF CIRCULAR OPENING CUT THROUGH GYPSUM WALLBOARD OF EACH SIDE OF WALL ASSEMBLY TO BE MIN 1/4 IN. TO MAX 1/2 IN. LARGER THAN OUTSIDE DIA OF THROUGH PENETRANT (ITEM 2). THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.

2. THROUGH PENETRANTS - ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE ANNUIAR SPACE BETWEEN THE THROUGH-PENETRANT AND THE PERIPHERY OF THE OPENING SHALL BE MIN 0 IN. TO MAX 1/4 IN. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:

A. STEEL PIPE - NOM 12 IN. DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE - NOM 12 IN. DIA (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. CONDUIT - NOM 6 IN. DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR STEEL CONDUIT.
D. COPPER TUBING - NOM 5 IN. DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. COPPER TUBING - NOM 6 IN. DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.

3. FILL, VOID, OR CAVITY MATERIAL* - SEALANT - FILL MATERIAL TO BE FORCED INTO THE ANNULUS TO MAXIMUM EXTENT POSSIBLE. ADDITIONAL FILL MATERIAL TO BE INSTALLED SUCH THAT A MIN 1/2 IN. CROWN IS FORMED AROUND THE PENETRATING ITEM AND LAPPING 1/4 IN. BEYOND THE PERIPHERY OF THE OPENING.

HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC - FS-ONE SEALANT
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. C-AJ-8056
F Rating -- 3 Hr
T Rating -- 0 Hr
L Rating At Ambient -- 5 CFM/sq ft
L Rating At 400 F -- 2 CFM/sq ft

1. FLOOR OR WALL ASSEMBLY -- 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING IS 1296 IN. SQ WITH MAX DIMENSION OF 36 IN. SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. CABLE TRAY* -- MAX 18 IN. WIDE BY MAX 6 IN. DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.060 IN. THICK ALUMINUM OR STEEL AND WITH 1-1/2 IN. WIDE BY 1 IN. CHANNEL SHAPE RUNGS SPACED 9 IN. OC OR A 0.029 IN. THICK STEEL SOLID BACK, RESPECTIVELY. ONE CABLE TRAY TO BE INSTALLED IN THE OPENING. THE MAX ANNULAR SPACE BETWEEN THE CABLE TRAYS IS 9 IN. AND BETWEEN THE PERIPHERY OF THE OPENING SHALL BE MIN 1-1/2 IN. TO MAX 4-1/2 IN. CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES -- AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 30 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY BASED ON A MAX 3 IN. CABLE LOADING DEPTH WITHIN THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR OR FIBER OPTIC CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 300 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 1/C, 350 KCMIL WITH CROSS-LINKED POLYETHYLENE (XLPE) INSULATION AND JACKET.
D. 1/C, 500 KCMIL WITH THERMO PLASTIC INSULATION AND POLYVINYL CHLORIDE (PVC) JACKET.
E. TWENTY FOUR FIBER OPTIC CABLE WITH PVC SUB UNIT AND JACKET.
4. THROUGH-PENETRANTS -- ONE OR MORE PIPE, CONDUIT OR TUBE TO BE INSTALLED WITHIN THE OPENING. THE TOTAL NUMBER OF THROUGH-PENETRANTS IS DEPENDENT ON THE SIZE OF THE OPENING AND TYPES AND SIZES OF THE PENETRANTS. ANY COMBINATION OF THE PENETRANTS DESCRIBED BELOW MAY BE USED PROVIDED THAT THE FOLLOWING PARAMETERS RELATIVE TO THE ANNULAR SPACES AND THE SPACING BETWEEN THE PIPES ARE MAINTAINED. THE SPACE BETWEEN PIPES, CONDUITS OR TUBING AND BETWEEN THE PERIPHERY
OF THE OPENING AND THE PIPES OR CONDUITS SHALL BE MIN 1 IN. TO MAX 4-1/2 IN. PIPE, CONDUIT OR TUBE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
A. NOM 6 IN. DIA (OR SMALLER) RIGID GALV STEEL CONDUIT.
B. NOM 4 IN. DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING.
C. NOM 4 IN. DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
D. NOM 4 IN. DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.
E. NOM 6 IN. DIA (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
F. NOM 6 IN. DIA (OR SMALLER) CAST OR DUCTILE IRON PIPE.
5. PIPE COVERING -- NOM 1-1/2 IN. THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT.
SEE PIPE AND EQUIPMENT COVERING AND MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 MAY BE USED.
6. CABLES -- MAX 2 IN. DIA TIGHT BUNDLE OF CABLES CENTERED IN OPENING AND RIGIDLY SUPPORTED ON BOTH SURFACES OF FLOOR AND WALL. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 25 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 2/C NO. 10 AWG WITH PVC INSULATION AND JACKET.
D. 3/C NO. 8 AWG ALUMINUM CLAD CABLE WITH CROSS-LINKED POLYETHYLENE (XLPE) INSULATION AND PVC JACKET.
E. TYPE RC - 62 A/U COAXIAL CABLE WITH AIR CORE AND PVC JACKET.
F. 24 FIBER OPTIC CABLE WITH PVC SUB UNIT AND OUTER JACKET.
7. FIRESTOP SYSTEM -- THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* -- FIRE BLOCKS INSTALLED WITH LONG DIMENSION PASSED THROUGH THE OPENING EXTENDING MIN 1-1/2 IN. FROM EACH SURFACE. BLOCKS TO COMPLETELY FILL THE ENTIRE OPENING.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* -- FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES AND BETWEEN CABLES AND CABLE TRAYS TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE SEALANT
C. WIRE MESH (NOT SHOWN) -- WHEN THE ANNULAR SPACE EXCEEDS 4-1/2 IN. TO THE PERIPHERY, A NOM 2 IN. SQ WIRE FENCING SHALL BE USED TO KEEP THE FIRE BLOCKS IN PLACE. THE WIRE FENCING IS FABRICATED FROM MIN NO. 16 SWG (0.060 IN.) GALV STEEL WIRE. THE WIRE IS CUT TO FIT THE CONTOUR OF THE PENETRATING ITEM WITH A MIN 3 IN. LAP BEYOND THE PERIPHERY OF THE OPENING. WIRE FENCING SECURED TO TOP SURFACE OF FLOOR AND BOTH SURFACES OF WALL ASSEMBLY BY MEANS OF 1/4 IN. DIA BY 1 IN. LONG CONCRETE ANCHORS AND 1/4 IN. BY 1-1/2 IN. DIA FENDER WASHERS SPACED MAX 8 IN. OC.
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. W-L-8013
F Ratings - 1 and 2 Hr (See Item 1)
T Rating - 0 Hr
L Rating At Ambient - 5 CFM/Sq Ft
L Rating At 400 F - 2 CFM/Sq Ft

1. WALL ASSEMBLY — THE 1 OR 2 HR FIRE-RATED GYPSUM BOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS — WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 IN. (51 MM) BY 4 IN. (102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 2-1/2 IN. (64 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC. ADDITIONAL STUDS INSTALLED TO COMPLETELY FRAME THE OPENING.
B. GYPSUM BOARD* — 5/8 IN. (16 MM) THICK, 4 FT (1219 MM) WIDE WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX AREA OF OPENING IS 352 SQ IN. (2271 SQ CM) WITH MAX DIMENSION OF 22 IN. (559 MM) WIDE. THE HOURLY F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE HOURLY FIRE RATING OF THE WALL ASSEMBLY IN WHICH IT IS INSTALLED.
2. CABLE TRAY* — MAX 18 IN. (457 MM) WIDE BY MAX 6 IN. (152 MM) DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.065 IN. (1.65 MM) THICK ALUMINUM OR 0.060 IN. (1.52 MM) THICK STEEL AND WITH 1-1/2 IN. (38 MM) WIDE BY 1 IN. (25 MM) CHANNEL SHAPE RUNGS SPACED 9 IN. (229 MM) OC OR A 0.029 IN. (0.74 MM) THICK STEEL SOLID BACK, RESPECTIVELY. ONE CABLE TRAY TO BE INSTALLED IN THE OPENING. THE MAX ANNULAR SPACE BETWEEN THE CABLE TRAY AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1 IN. (25 MM) TO MAX 7 IN. (178 MM) CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES — AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 30 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND PVC JACKET.
B. 100 PAIR - NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 1/C, 750 KCMIL (OR SMALLER) WITH PVC INSULATION AND JACKET.
4. THROUGH-PENETRANTS — ONE OR MORE PIPE OR TUBE TO BE INSTALLED WITHIN THE OPENING. THE TOTAL NUMBER OF THROUGH-PENETRANTS IS DEPENDENT ON THE SIZE OF THE OPENING AND TYPES AND SIZES OF THE PENETRANTS. ANY COMBINATION OF THE PENETRANTS DESCRIBED BELOW MAY BE USED PROVIDED THAT THE FOLLOWING PARAMETERS RELATIVE TO THE ANNULAR SPACES AND THE SPACING BETWEEN THE PIPES ARE MAINTAINED. THE SPACE BETWEEN THE PIPE OR TUBE AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1-1/2 IN. (38 MM) TO MAX 9-1/4 IN. (235 MM). PIPE OR TUBE TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF NON-METALLIC OR METALLIC PIPES, OR TUBES MAY BE USED:
A. POLYVINYL CHLORIDE (PVC) PIPE — MAX 3 IN. (76 MM) DIA SCHEDULE 40 SOLID CORE PVC PIPE (OR SMALLER) FOR USE IN CLOSED (PROCESS OR SUPPLY) OR VENTED (DRAIN, WASTE OR VENT) PIPING SYSTEM.
B. STEEL PIPE — NOM 6 IN. (152 MM) DIA (OR SMALLER) SCHEDULE 40 (OR HEAVIER) STEEL PIPE.
C. CONDUIT — NOM 4 IN. (102 MM) DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING OR 6 IN. (152 MM) DIA STEEL CONDUIT.
D. COPPER PIPE — NOM 4 IN. (102 MM) DIA (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
E. COPPER TUBE — NOM 4 IN. (102 MM) DIA (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBE.
4A. PIPE COVERING — (NOT SHOWN) NOM 1-1/2 IN. (38 MM) THICK HOLLOW CYLINDRICAL HEAVY DENSITY (MIN 3.5 PCF) (56KG/M3) GLASS FIBER UNITS JACKETED ON THE OUTSIDE WITH AN ALL SERVICE JACKET. LONGITUDINAL JOINTS SEALED WITH METAL FASTENERS OR FACTORY APPLIED SELF-SEALING LAP TAPE. TRANSVERSE JOINTS SECURED WITH METAL FASTENERS OR WITH BUTT TAPE SUPPLIED WITH THE PRODUCT. SEE PIPE AND EQUIPMENT COVERING AND MATERIALS (BRGU) CATEGORY IN THE BUILDING MATERIALS DIRECTORY FOR NAMES OF MANUFACTURERS. ANY PIPE COVERING MATERIAL MEETING THE ABOVE SPECIFICATIONS AND BEARING THE UL CLASSIFICATION MARKING WITH A FLAME SPREAD INDEX OF 25 OR LESS AND A SMOKE DEVELOPED INDEX OF 50 MAY BE USED.
5. CABLES — MAX 1-1/2 IN. (38 MM) DIA TIGHT BUNDLE OF CABLES INSTALLED WITHIN THE OPENING AND RIGIDLY SUPPORTED ON BOTH SURFACES OF WALL. THE SPACE BETWEEN THE CABLES AND PERIPHERY OF THE OPENING SHALL RANGE FROM 1-3/16 IN. (30.2 MM) MIN TO A MAX OF 1-1/2 IN. (38 MM). ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF CABLES MAY BE USED:
A. 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
B. 25 PAIR — NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. TYPE R GU/59 COAXIAL CABLE WITH PVC OUTER JACKET.
D. 24 FIBER OPTIC CABLE WITH PVC SUB UNIT AND OUTER JACKET.
6. FIRESTOP SYSTEM — THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* FIRE BLOCKS FOR WALLS INCORPORATING MAX 3-5/8 IN. (92 MM) STEEL STUDS OR MAX 2 (51 MM) BY 4 IN. (102 MM) WOOD STUDS, FIRE BLOCK INSTALLED WITH 5 IN. (127 MM) DIMENSION PROJECTING THROUGH AND CENTERED IN OPENING. FOR WALLS CONSTRUCTED OF LARGER STEEL OR WOOD STUDS, FIRE BLOCK INSTALLED WITH LONG DIMENSION PASSING THROUGH AND CENTERED IN OPENING. BLOCKS MAY OR MAY NOT BE CUT FLUSH WITH BOTH SURFACES OF WALL. WHEN MULTIPLE LAYERS OF GYPSUM BOARD ARE USED, BLOCKS MAY BE RECESSED 1/2 IN. (13 MM) FROM SURFACE OF WALL. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS 657 FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* — SEALANT OR PUTTY - FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES, BETWEEN CABLES AND CABLE TRAYS, AROUND EACH PENETRANT AND WHERE OBVIOUS VOIDS ARE OBSERVED TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION. HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — FS-ONE SEALANT, CP 618 PUTTY STICK OR CP620 FIRE FOAM *BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

System No. W-L-8004
F Rating - 2 Hr
T Rating - 1/4 Hr

1. WALL ASSEMBLY THE FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300 OR U400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. LUMBER SPACED 16 IN. OC. STEEL STUDS TO BE MIN 2-1/2 IN. WIDE AND SPACED MAX 24 IN. OC. ADDITIONAL FRAMING (NOT SHOWN) MAY BE INSTALLED AROUND THE PERIMETER OF THE OPENING IN LIEU OF THE STEEL WIRE MESH (ITEM NO. 3A).
B. GYPSUM BOARD* TWO LAYERS OF NOM 5/8 IN. THICK GYPSUM WALLBOARD, AS SPECIFIED IN THE INDIVIDUAL WALL AND PARTITION DESIGN. MAX AREA OF OPENING IS 96 SQ IN. WITH MAX DIMENSION OF 12 IN. MAX WIDTH OF OPENING IN WOOD STUD WALLS IS LIMITED TO 12 IN.
2. THROUGH PENETRANTS THE FOLLOWING TYPES AND SIZES OF PIPES, CONDUITS, TUBING OR CABLES MAY BE USED:
A. NOM 3 IN. DIA (OR SMALLER) ELECTRICAL METALLIC TUBING (EMT).
B. MAX 25 PAIR -- NO. 24 AWG (OR SMALLER) TELEPHONE CABLE WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
C. MAX 3/C WITH GROUND -- NO. 10 AWG (OR SMALLER) TYPE NM CABLE WITH PVC INSULATION AND JACKET.
D. NOM 2 IN. DIA (OR SMALLER) SCHEDULE 40 PVC PIPE FOR USE IN CLOSED (PROCESS OR SUPPLY) PIPING SYSTEMS ONLY.
E. MAX 300 KCMIL (OR SMALLER) POWER CABLE WITH PVC INSULATION AND NYLON JACKET. THE THROUGH PENETRATING ITEMS TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY AND LOCATED AS SHOWN IN THE TABLE BELOW:

ITEM NO.	MAX DISTANCE BETWEEN ADJACENT PEN. ITEM IN.	MIN DISTANCE BETWEEN ADJACENT PEN. ITEM IN.	MAX DISTANCE FROM THROUGH OPENING IN.	MIN DISTANCE FROM THROUGH OPENING IN.
2A	7-7/16	1-11/16	7-7/16	1/2
2B	7-7/16	1-11/16	7-7/16	1/2
2C	7-7/16	1-11/16	7-7/16	1/2
2D	7-7/16	1-11/16	7-7/16	1/2
2E	7-7/16	1-11/16	7-7/16	1-1/2

3. FIRESTOP SYSTEM THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. STEEL WIRE MESH NO. 8 STEEL WIRE MESH HAVING A MIN 1 IN. LAP ALONG THE LONGITUDINAL SEAM. LENGTH OF STEEL WIRE MESH TO BE 4-3/4 IN., CENTERED AND FORMED TO FIT PERIPHERY OF THROUGH OPENING. STEEL WIRE MESH IS NOT REQUIRED WHEN ADDITIONAL FRAMING MEMBERS (ITEM NO. 1A) ARE USED.
B. PACKING MATERIAL MIN 4.0 IN. THICKNESS OF MIN 3.5 PCF MINERAL WOOL BATT INSULATION FIRMLY PACKED INTO OPENING AS A PERMANENT FORM. PACKING MATERIAL TO BE RECESSED FROM BOTH SURFACES OF WALL AS REQUIRED TO ACCOMMODATE THE REQUIRED THICKNESS OF FILL MATERIAL.
C. FILL, VOID OR CAVITY MATERIAL* - SEALANT MIN 1/2 IN. THICKNESS OF FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH BOTH SURFACES OF WALL.
HILTI CONSTRUCTION CHEMICALS, DIV OF
HILTI INC - FS-ONE SEALANT
*BEARING THE UL CLASSIFICATION MARKING

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. W-L-3065
F RATINGS — 1 AND 2 HR (SEE ITEM 1)
T RATING — 0 HR

1. WALL ASSEMBLY — THE 1 OR 2 FIRE-RATED GYPSUM WALLBOARD/STUD WALL ASSEMBLY SHALL BE CONSTRUCTED OF THE MATERIALS AND IN THE MANNER SPECIFIED IN THE INDIVIDUAL U300, U400 OR V400 SERIES WALL AND PARTITION DESIGNS IN THE UL FIRE RESISTANCE DIRECTORY AND SHALL INCLUDE THE FOLLOWING CONSTRUCTION FEATURES:
A. STUDS — WALL FRAMING MAY CONSIST OF EITHER WOOD STUDS OR STEEL CHANNEL STUDS. WOOD STUDS TO CONSIST OF NOM 2 BY 4 IN. (51 BY 102 MM) LUMBER SPACED 16 IN. (406 MM) OC. STEEL STUDS TO BE MIN 2-1/2 IN. (64 MM) WIDE AND SPACED MAX 24 IN. (610 MM) OC.
B. GYPSUM BOARD* — NOM 5/8 IN. (16 MM) THICK GYPSUM BOARD, WITH SQUARE OR TAPERED EDGES. THE GYPSUM BOARD TYPE, THICKNESS, NUMBER OF LAYERS, FASTENER TYPE AND SHEET ORIENTATION SHALL BE AS SPECIFIED IN THE INDIVIDUAL U300, U400 OR V400 SERIES DESIGN IN THE UL FIRE RESISTANCE DIRECTORY. MAX DIA OF OPENING IS 5-1/2 IN. (138 MM) WHEN SLEEVE (ITEM 2) IS EMPLOYED. MAX DIA OF OPENING IS 4 IN. (102 MM) WHEN SLEEVE (ITEM 2) IS NOT EMPLOYED.
THE F RATING OF THE FIRESTOP SYSTEM IS EQUAL TO THE FIRE RATING OF THE WALL ASSEMBLY.
2. METALLIC SLEEVE — (OPTIONAL) - NOM 4 IN. (102 MM) DIA (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR SCHEDULE 5 (OR HEAVIER) STEEL PIPE OR MIN 0.016 IN. THICK (0.41 MM, NO. 28 GA) GALV STEEL SLEEVE INSTALLED FLUSH WITH WALL SURFACES. THE ANNULAR SPACE BETWEEN STEEL SLEEVE AND PERIPHERY OF OPENING SHALL BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25MM). WHEN SCHEDULE 5 STEEL PIPE OR EMT IS USED, SLEEVE MAY EXTEND UP TO 18 IN. (457 MM) BEYOND THE WALL SURFACES.
3. CABLES — AGGREGATE CROSS-SECTIONAL AREA OF CABLE IN OPENING TO BE MAX 45 PERCENT OF THE CROSS-SECTIONAL AREA OF THE OPENING. THE ANNULAR SPACE BETWEEN THE CABLE BUNDLE AND THE PERIPHERY OF THE OPENING TO BE MIN 0 IN. (0 MM, POINT CONTACT) TO MAX 1 IN. (25 MM) CABLES TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF THE WALL ASSEMBLY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR CABLES MAY BE USED:
A. MAX 7/C NO. 12 AWG WITH POLYVINYL CHLORIDE (PVC) INSULATION AND JACKET.
B. MAX 25 PAIR NO. 24 AWG TELEPHONE CABLE WITH PVC INSULATION AND JACKET.
B1. MAX 4 PR NO. 22 AWG CAT 5 OR CAT 6 COMPUTER CABLES.
C. TYPE RG/U COAXIAL CABLE WITH POLYETHYLENE (PE) INSULATION AND PVC JACKET HAVING A MAX OUTSIDE DIAMETER OF ½ IN. (13 MM).
C1. MAX RG 6/U COAXIAL CABLE WITH FLUORINATED ETHYLENE INSULATION AND JACKETING.
D. MULTIPLE FIBER OPTICAL COMMUNICATION CABLE JACKETED WITH PVC AND HAVING A MAX OD OF 5/8 IN. (16 MM).
E. THROUGH PENETRATING PRODUCTS*— MAX THREE COPPER CONDUCTOR NO. 8 AWG . METAL-CLAD CABLE+. AFC CABLE SYSTEMS INC
F. MAX 3/C (WITH GROUND)(OR SMALLER) NO. 8 AWG COPPER CONDUCTOR CABLE WITH PVC INSULATION AND JACKETING.
G. MAX 3/4 IN. (19 MM) DIA COPPER GROUND CABLE WITH OR WITHOUT A PVC JACKET.
H. FIRE RESISTIVE CABLES* - MAX 1-1/4 IN. (32 MM) DIA SINGLE CONDUCTOR OR MULTI CONDUCTOR TYPE MI CABLE. A MIN 1/8 IN. (3 MM) SEPARATION SHALL BE MAINTAINED BETWEEN MI CABLES AND ANY OTHER TYPES OF CABLE.
I. MAX 4/C WITH GROUND 300KCMIL (OR SMALLER) ALUMINUM SER CABLE WITH PVC INSULATION AND JACKET.
J. THROUGH PENETRATING PRODUCT* - ANY CABLES, METAL-CLAD CABLE+ OR ARMORED CABLE+ CURRENTLY CLASSIFIED UNDER THE THROUGH PENETRATING PRODUCTS CATEGORY.
SEE THROUGH PENETRATING PRODUCT (XHLY) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
4. FILL, VOID OR CAVITY MATERIAL*— SEALANT OR PUTTY — FILL MATERIAL APPLIED WITHIN THE ANNULUS, FLUSH WITH EACH END OF THE STEEL SLEEVE OR WALL SURFACE. FILL MATERIAL INSTALLED SYMMETRICALLY ON BOTH SIDES OF THE WALL. A MIN 5/8 IN. (16 MM) THICKNESS OF SEALANT IS REQUIRED FOR THE 1 OR 2 HR F RATING . AN ADDITIONAL 1/2 IN. (13 MM) DIA BEAD OF FILL MATERIAL SHALL BE APPLIED AROUND THE PERIMETER OF SLEEVE ON BOTH SIDES OF THE WALL WHEN SLEEVE EXTENDS BEYOND SURFACE OF WALL.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC — CP601S, CP606, FS-ONE SEALANTS OR CP618 PUTTY
*BEARING THE UL CLASSIFICATION MARK
+BEARING THE UL LISTING MARK

HILTI FIRESTOP SYSTEMS
DRAWING ORIGINATION DATE: 03-21, 2011

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. C-AJ-4035
F RATING - 3 HR.
T RATING = 0 HR.

1. FLOOR OR WALL ASSEMBLY MIN 4-1/2 IN. THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX AREA OF OPENING IS 270 SQ IN WITH MAX DIMENSION OF 30 IN.
SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. CABLE TRAY* MAX 24 IN. WIDE BY MAX 4 IN. DEEP OPEN-LADDER OR SOLID-BACK CABLE TRAY WITH CHANNEL-SHAPED SIDE RAILS FORMED OF 0.10 IN. THICK ALUMINUM OR 0.060 IN. THICK GALV STEEL AND WITH 1-1/2 IN. WIDE BY 1 IN. CHANNEL SHAPE RUNGS SPACED 9 IN. OC OR A 0.029 IN. THICK STEEL SOLID BACK, RESPECTIVELY. THE ANNULAR SPACE BETWEEN THE CABLE TRAY AND THE PERIPHERY OF THE OPENING SHALL BE MIN 1 IN. TO MAX 4 IN. CABLE TRAY TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF FLOOR OR WALL ASSEMBLY.
3. CABLES AGGREGATE CROSS-SECTIONAL AREA OF CABLES IN CABLE TRAY TO BE MAX 40 PERCENT OF THE CROSS-SECTIONAL AREA OF THE CABLE TRAY. ANY COMBINATION OF THE FOLLOWING TYPES AND SIZES OF COPPER CONDUCTOR OR FIBER OPTIC CABLES MAY BE USED:
A. 1/C, 500 KCMIL WITH THERMOPLASTIC INSULATION AND PVC JACKET.
B. 300 PAIR -- NO. 24 AWG CABLE WITH PVC INSULATION AND JACKET.
C. 24 FIBEROPTIC CABLE WITH PVC SUBUNIT AND JACKET.
D. THREE 1/C NO. 12 AWG WIRE, INSULATED WITH POLYVINYL CHLORIDE, IN A NOMINAL 3/4 IN. FLEXIBLE METAL CONDUIT.
4. FIRESTOP SYSTEM THE FIRESTOP SYSTEM SHALL CONSIST OF THE FOLLOWING:
A. FILL, VOID OR CAVITY MATERIAL* FIRE BLOCKS INSTALLED WITH THE LONG DIMENSION PLACED HORIZONTALLY WITHIN THE OPENING, FLUSH WITH BOTTOM OF FLOOR ASSEMBLIES. BLOCKS TO COMPLETELY FILL THE ENTIRE WIDTH OF OPENING OF WALL ASSEMBLIES.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-FIRE BLOCK
B. FILL, VOID OR CAVITY MATERIAL* -SEALANT ON PUTTY- NOT SHOWN FILL MATERIAL TO BE FORCED INTO INTERSTICES OF CABLES AND BETWEEN CABLES AND CABLE TRAYS TO MAX EXTENT POSSIBLE ON BOTH SURFACES OF THE PENETRATION.
HILTI CONSTRUCTION CHEMICALS, DIV OF HILTI INC -- FS-ONE SEALANT OR CP618 FIRESTOP PUTTY STICK (NOTE: L RATING ONLY WHEN FS-ONE SEALANT IS USED)
*BEARING THE UL CLASSIFICATION MARK

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

REPRODUCED BY HILTI, INC. COURTESY OF UNDERWRITERS LABORATORIES, INC.

SYSTEM NO. W-J-1088

ANSI/UL1479 (ASTM E814)	CAN/ULC S115
F RATING - 1 AND 2 HR (SEE ITEM 3)	F RATING - 1 AND 2 HR (SEE ITEM 3)
T RATING - 0 HR	FT RATING - 0 HR
	FH RATING - 1 AND 2 HR (SEE ITEM 3)
	FTH RATING - 0 HR

1. WALL ASSEMBLY — MIN 3-3/4 IN. (95 MM) THICK REINFORCED LIGHTWEIGHT OR NORMAL WEIGHT (100-150 PCF OR 1600-2400 KG/M3) CONCRETE. WALL MAY ALSO BE CONSTRUCTED OF ANY UL CLASSIFIED CONCRETE BLOCKS*. MAX DIAMETER OF OPENING 10-1/2 IN. (267 MM). SEE CONCRETE BLOCKS (CAZT) CATEGORY IN THE FIRE RESISTANCE DIRECTORY FOR NAMES OF MANUFACTURERS.
2. THROUGH-PENETRANTS — ONE METALLIC PIPE, CONDUIT OR TUBING TO BE INSTALLED EITHER CONCENTRICALLY OR ECCENTRICALLY WITHIN THE FIRESTOP SYSTEM. AN ANNULAR SPACE OF MIN 1/4 IN. TO MAX 1-5/8 IN. (41 MM) IS REQUIRED WITHIN FIRESTOP SYSTEM. PIPE, CONDUIT OR TUBING TO BE RIGIDLY SUPPORTED ON BOTH SIDES OF WALL ASSEMBLY. THE FOLLOWING TYPES AND SIZES OF METALLIC PIPES, CONDUITS OR TUBING MAY BE USED:
A. STEEL PIPE — NOM 8 IN. (203 MM) DIAM (OR SMALLER) SCHEDULE 10 (OR HEAVIER) STEEL PIPE.
B. IRON PIPE — NOM 8 IN. (203 MM) DIAM (OR SMALLER) CAST OR DUCTILE IRON PIPE.
C. CONDUIT — NOM 4 IN. (102 MM) DIAM (OR SMALLER) STEEL ELECTRICAL METALLIC TUBING (EMT) OR 6 IN. DIAM STEEL CONDUIT.
D. COPPER TUBING — NOM 4 IN. (102 MM) DIAM (OR SMALLER) TYPE L (OR HEAVIER) COPPER TUBING.
E. COPPER PIPE — NOM 4 IN. (102 MM) DIAM (OR SMALLER) REGULAR (OR HEAVIER) COPPER PIPE.
F. FLEXIBLE STEEL CONDUIT+ — NOM 2 IN. (51 MM) DIAM (OR SMALLER) FLEXIBLE STEEL CONDUIT.
SEE FLEXIBLE METAL CONDUIT (DXUZ) CATEGORY IN THE ELECTRICAL CONSTRUCTION EQUIPMENT DIRECTORY FOR NAMES OF MANUFACTURERS.

HILTI FIRESTOP SYSTEMS

CLASSIFIED C UL US

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

ENERGY STAR PARTNER

No.	Date	Description

ISSUE DATE: 8/15/2022

PROJECT #: 02110.200
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL DETAILS

E-502

Sheet No. 12 of 16

Autodesk Docs://HCS Overhills ES Addition/21-0266R_Overhills ES Classroom Addition_MEPFP_R22.rvt

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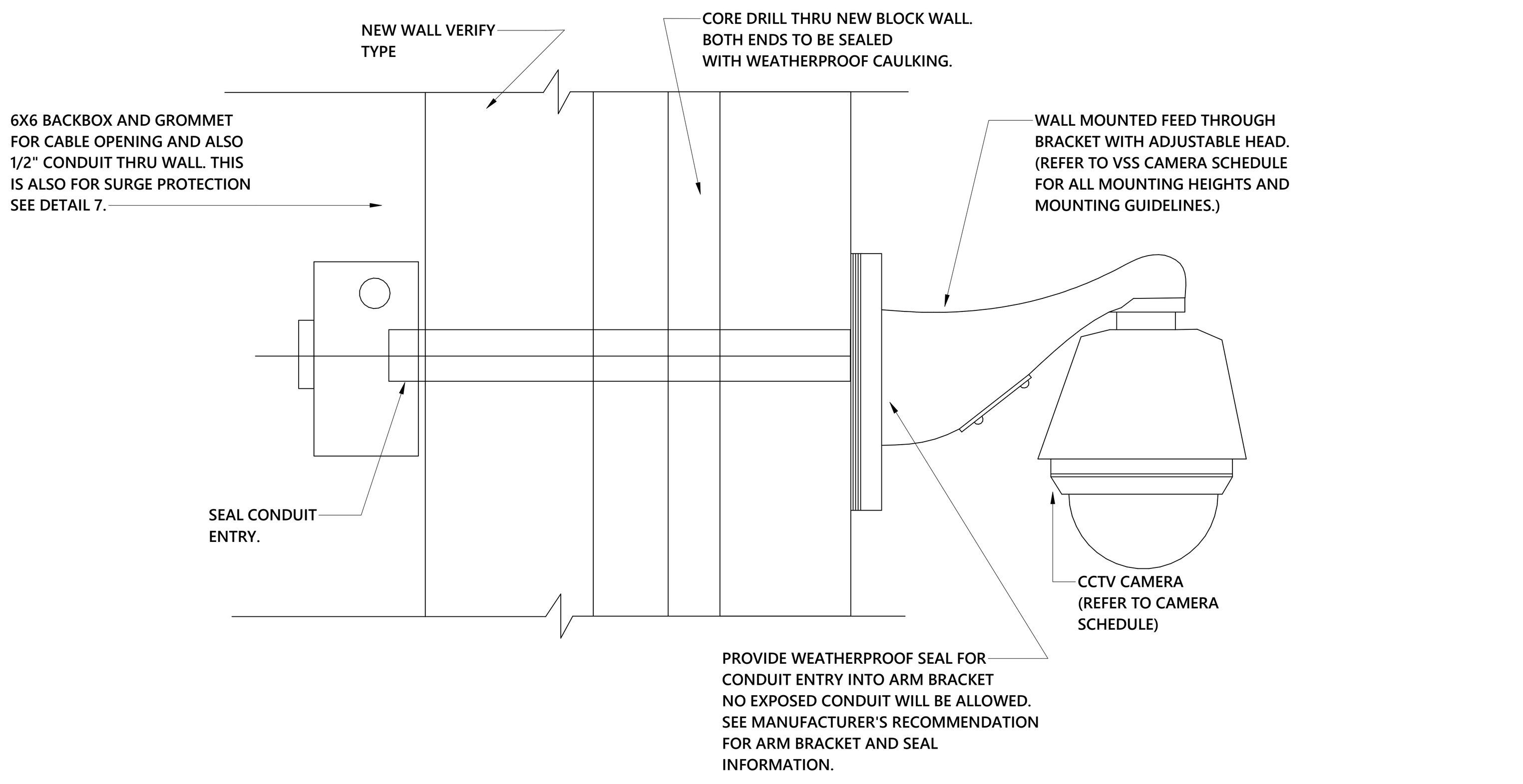
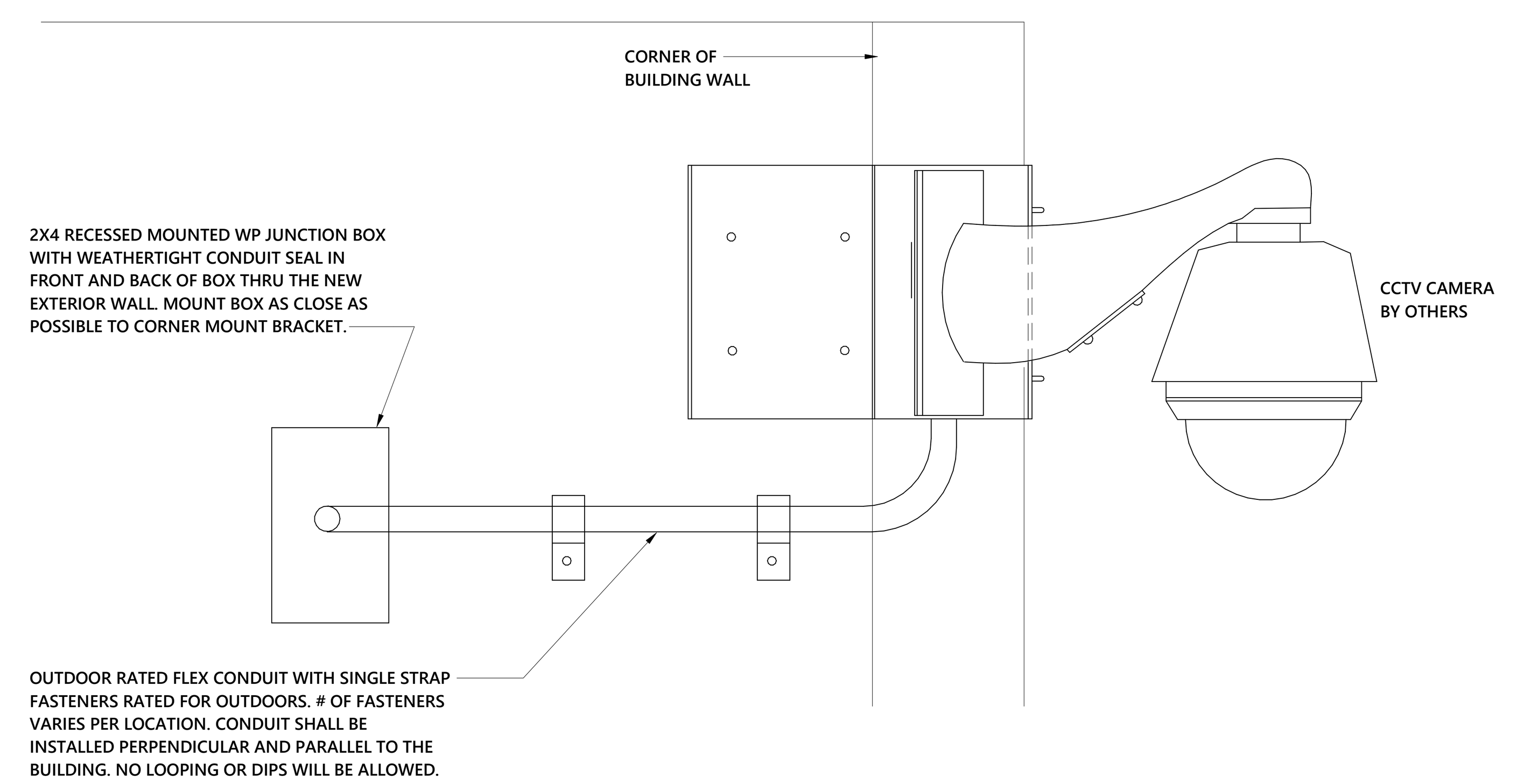
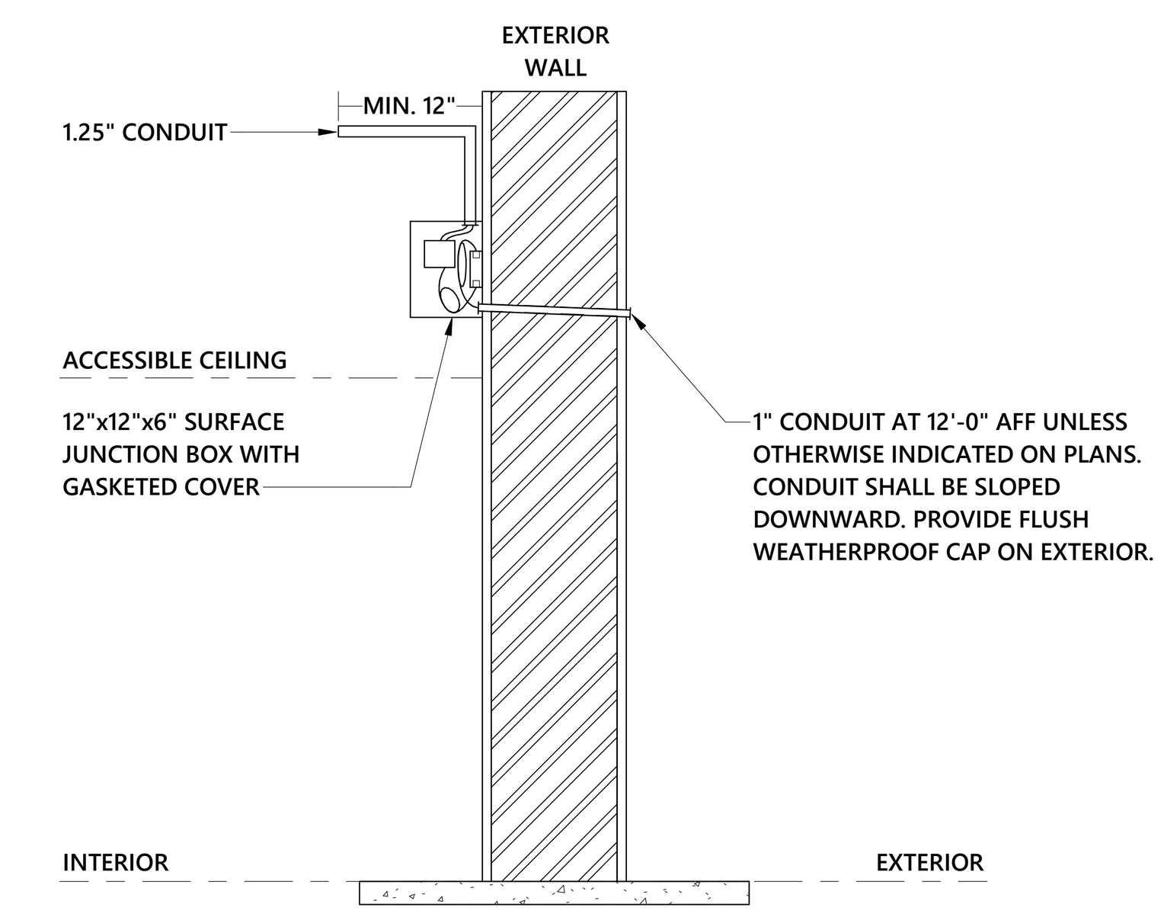


3 CAMERA MOUNT EXTERIOR WALL
NO SCALE



2 CAMERA MOUNTING FOR EXTERIOR CORNER MOUNT
NO SCALE



GENERAL NOTES:

A. SURFACE JUNCTION BOX SHALL BE LOCATED ABOVE ACCESSIBLE CEILING SPACE.
B. ALL DEVICES SHALL BE SECURED INSIDE JUNCTION BOX.

1 EXTERIOR NETWORK DEVICE DETAIL (ACCESSIBLE CEILING)
NOT TO SCALE

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Harnett County Schools
OVERHILLS ELEM. CLASSROOM ADDITION
2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE:	8/15/2022
PROJECT #:	02110.200
DRAWN BY:	JSD
CHECKED BY:	MKG

ELECTRICAL DETAILS

E-503

OPTIMA# 21-0305R

8/11/2022 9:59:55 AM
Autodesk Docs://HCS Overhills ES Addition/21-0269R_Overhills ES Classroom Addition_MEPFP_R22.rvt

VOLTAGE: 480Y/277 3Ø					**PANEL: SP3**							**FED FROM:** MDP					
MOUNTING: SURFACE					**MAIN TYPE:** MLO							**MFR:** SQUARE D					
ENCLOSURE: NEMA1					**PHASE:** 3							**TYPE:** I-LINE					
MAIN: 150 A					**WIRE:** 4							**AIC:** 42 KAIC					
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A		B		C		Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
F	XFMR-RP	NOTE 7	70 A	1	3	20.92	2.18					1	2	20 A	12	CLASSROOM LIGHTS	L
				3				17.57	3.10			1	4	20 A	12	CLASSROOM LIGHTS	L
				5						17.41	2.24	1	6	20 A	12	CORRIDOR LIGHTS	L
LI...	LIGHTING - EXTERIOR	12	20 A	7	1	0.48	2.00					3	8	15 A	NOTE 8	WH1	WH
L	MECH. PLATFORM LTS	12	20 A	9	1			1.18	2.00				10				
M	AHU-62,69,71	NOTE 8	20 A	11	3					1.12	2.00		12				
				13		1.12	1.68					3	14	20 A	NOTE 8	AHU-68,79,73	M
				15				1.12	1.68				16				
M	AHU-66,67	NOTE 8	20 A	17	3					1.12	1.68		18				
				19		1.12	1.68					3	20	20 A	NOTE 8	AHU-59,60,61	M
				21				1.12	1.68				22				
M	AHU-63,72	NOTE 8	20 A	23	3					1.12	1.68		24				
				25		1.12	1.12					3	26	20 A	NOTE 8	AHU-64,65	M
				27				1.12	1.12				28				
	SPACE ONLY	-	--	29	1					--	1.12		30				
	SPACE ONLY	-	--	31	1	--	--					1	32	--	-	SPACE ONLY	
	SPACE ONLY	-	--	33	1			--	--			1	34	--	-	SPACE ONLY	
	SPACE ONLY	-	--	35	1					--	--	1	36	--	-	SPACE ONLY	
	SPACE ONLY	-	--	37	1	--	--					1	38	--	-	SPACE ONLY	
	SPACE ONLY	-	--	39	1			--	--			1	40	--	-	SPACE ONLY	
	SPACE ONLY	-	--	41	1					--	--	1	42	--	-	SPACE ONLY	

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	8.63 kVA	125.00%	10.78 kVA
LE	LIGHTING - EXTERIOR	0.56 kVA	125.00%	0.69 kVA
H	HEATING	1.50 kVA	100.00%	1.50 kVA
C	COOLING	0.00 kVA	0.00%	0.00 kVA
V	VENTILATION	2.58 kVA	100.00%	2.58 kVA
M	MOTORS	29.52 kVA	105.08%	31.02 kVA
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA
R	RECEPTACLES	43.02 kVA	61.62%	26.51 kVA
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA
MI	MISC.	8.80 kVA	100.00%	8.80 kVA
S	Spare	0.00 kVA	0.00%	0.00 kVA
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA

TOTAL KVA...	94.60 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	81.88 kVA	121.9 A	115.6 A	106.5 A
TOTAL AMP....	114 A			
TOTAL AMP. (DEMAND):	98 A			

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. SEE RISER DIAGRAM/ SHEET E-701 FOR WIRE AND CONDUIT SIZE.
8. REFER TO MECHANICAL SCHEDULES/ SHEET E-602 FOR WIRE SIZE.

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)

F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

VOLTAGE: 208Y/120 3Ø					**PANEL: RP1A**							**FED FROM:** XFMR-RP					
MOUNTING: SURFACE					**MAIN TYPE:** MCB							**MFR:** SQUARE D					
ENCLOSURE: NEMA1					**PHASE:** 3							**TYPE:** NQ					
MAIN: 150 A					**WIRE:** 4							**AIC:** 10 KAIC					
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A		B		C		Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	CORRIDOR REC.	12	20 A	1	1	0.90	1.08					1	2	20 A	12	CLASSROOM REC.	R
R	RESTROOM REC.	12	20 A	3	1			0.72	0.90			1	4	20 A	12	CLASSROOM REC.	R
R	TELECOM REC.	12	20 A	5	1					0.36	0.90	1	6	20 A	12	CLASSROOM REC.	R
MS	HAND DRYER (NOTE 9)	12	20 A	7	1	1.00	1.08					1	8	20 A	12	CLASSROOM REC.	R
MS	HAND DRYER (NOTE 9)	12	20 A	9	1			1.00	0.90			1	10	20 A	12	CLASSROOM REC.	R
MS	HAND DRYER (NOTE 9)	12	20 A	11	1					1.00	0.90	1	12	20 A	12	CLASSROOM REC.	R
MS	HAND DRYER (NOTE 9)	12	20 A	13	1	1.00	1.08					1	14	20 A	12	CLASSROOM REC.	R
MS	EWC (NOTE 9)	12	20 A	15	1			0.50	0.90			1	16	20 A	12	CLASSROOM REC.	R
MS	EWC (NOTE 9)	12	20 A	17	1					0.50	0.90	1	18	20 A	12	CLASSROOM REC.	R
MS	EWC (NOTE 9)	12	20 A	19	1	0.50	1.08					1	20	20 A	12	CLASSROOM REC.	R
R	TEACHER WORK REC.	12	20 A	21	1			0.72	0.90			1	22	20 A	12	CLASSROOM REC.	R
R	CORRIDOR REC.	12	20 A	23	1					0.90	0.90	1	24	20 A	12	CLASSROOM REC.	R
MS	BDA	12	20 A	25	1	0.50	1.08					1	26	20 A	12	CLASSROOM REC.	R
MS	BDA	12	20 A	27	1			0.50	0.90			1	28	20 A	12	CLASSROOM REC.	R
R	CORRIDOR REC.	12	20 A	29	1					0.72	0.90	1	30	20 A	12	CLASSROOM REC.	R
R	CORRIDOR REC.	12	20 A	31	1	1.26	1.08					1	32	20 A	12	CLASSROOM REC.	R
R	COLLABORATION REC.	12	20 A	33	1			0.54	0.90			1	34	20 A	12	CLASSROOM REC.	R
R	COLLABORATION FLOOR BOXES	12	20 A	35	1					0.72	0.90	1	36	20 A	12	CLASSROOM REC.	R
R	COLLABORATION FLOOR BOXES	12	20 A	37	1	0.72	1.08					1	38	20 A	12	CLASSROOM REC.	R
R	CLASSROOM REC.	12	20 A	39	1			0.90	1.26			1	40	20 A	12	RECEPTACLES	R...
R	CLASSROOM REC.	12	20 A	41	1					0.90	0.36	1	42	20 A	12	TELECOM REC.	R

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA
H	HEATING	1.50 kVA	100.00%	1.50 kVA
C	COOLING	0.00 kVA	0.00%	0.00 kVA
V	VENTILATION	2.58 kVA	100.00%	2.58 kVA
M	MOTORS	0.00 kVA	0.00%	0.00 kVA
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA
R	RECEPTACLES	43.02 kVA	61.62%	26.51 kVA
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA
MI	MISC.	8.80 kVA	100.00%	8.80 kVA
S	Spare	0.00 kVA	0.00%	0.00 kVA
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA

TOTAL KVA...	55.90 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	39.39 kVA	174.5 A	146.6 A	145.1 A
TOTAL AMP....	155 A			
TOTAL AMP. (DEMAND):	109 A			

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. PROVIDE FEED-THRU LUGS.
8. LOAD TOTAL INCLUDES FEED-THRU SECTIONS.
9. PROVIDE CLASS A GFI (6mA PERSONNEL) BRKR (250' MAX).

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)

F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

VOLTAGE: 208Y/120 3Ø					**PANEL: RP1B**							**FED FROM:** RP1A					
MOUNTING: SURFACE					**MAIN TYPE:** MLO							**MFR:** SQUARE D					
ENCLOSURE: NEMA1					**PHASE:** 3							**TYPE:** NQ					
MAIN: 150 A					**WIRE:** 4							**AIC:** 10 KAIC					
LC Abbr	Load Served	Wire	Trip	Ckt No	Pole	A		B		C		Pole	Ckt No	Trip	Wire	Load Served	LC Abbr
R	CLASSROOM REC.	12	20 A	1	1	0.90	0.70					1	2	20 A	12	HVLS-2 (NOTE 7)	V
R	CLASSROOM REC.	12	20 A	3	1			1.08	0.75			1	4	15 A	12	EWH-01 (NOTE 8)	H
R	CLASSROOM REC.	12	20 A	5	1					0.90	0.75	1	6	15 A	12	EWH-01 (NOTE 8)	H
R	CLASSROOM REC.	12	20 A	7	1	0.90	0.50					1	8	20 A	12	BAS CONTROL PANEL	MS
R	CLASSROOM REC.	12	20 A	9	1			0.90	0.00			1	10	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	11	1					0.90	0.00	1	12	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	13	1	0.90	0.00					1	14	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	15	1			0.90	0.00			1	16	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	17	1					0.90	0.00	1	18	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	19	1	0.90	0.00					1	20	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	21	1			0.90	0.00			1	22	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	23	1					0.90	0.00	1	24	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	25	1	0.90	0.00					1	26	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	27	1			0.90	0.00			1	28	20 A	-	SPARE	Sp...
R	CLASSROOM REC.	12	20 A	29	1					0.90	0.00	1	30	20 A	-	SPARE	Sp...
M	F-29 (NOTE 7)		15 A	31	1	1.18	0.00					1	32	20 A	-	SPARE	Sp...
M	CP1 (NOTE 7)		15 A	33	1			0.20	0.00			1	34	20 A	-	SPARE	Sp...
MS	MECHANICAL CONTROLS	12	20 A	35	1					0.60	0.00	1	36	20 A	-	SPARE	Sp...
MS	MECHANICAL CONTROLS	12	20 A	37	1	0.60	0.00					1	38	20 A	-	SPARE	Sp...
MS	MOTORIZED DAMPERS	12	20 A	39	1			0.40	0.00			1	40	20 A	-	SPARE	Sp...
V...	HVLS-1 (NOTE 7)	12	20 A	41	1					0.70	0.00	1	42	20 A	-	SPARE	Sp...

	LOAD	Connected Load	Demand Factor	Estimated Demand
L	LIGHTS	0.00 kVA	0.00%	0.00 kVA
LE	LIGHTING - EXTERIOR	0.00 kVA	0.00%	0.00 kVA
H	HEATING	1.50 kVA	100.00%	1.50 kVA
C	COOLING	0.00 kVA	0.00%	0.00 kVA
V	VENTILATION	2.58 kVA	100.00%	2.58 kVA
M	MOTORS	0.00 kVA	0.00%	0.00 kVA
K	KITCHEN	0.00 kVA	0.00%	0.00 kVA
R	RECEPTACLES	13.68 kVA	86.55%	11.84 kVA
WH	WATER HEATER	0.00 kVA	0.00%	0.00 kVA
MI	MISC.	2.30 kVA	100.00%	2.30 kVA
S	Spare	0.00 kVA	0.00%	0.00 kVA
E	ELEVATOR	0.00 kVA	0.00%	0.00 kVA
LD	LAUNDRY	0.00 kVA	0.00%	0.00 kVA

TOTAL KVA...	20.06 kVA	TOTAL PER PHASE: (CONNECTED)		
TOTAL KVA (DEMAND):	18.22 kVA	63.0 A	50.3 A	55.3 A
TOTAL AMP....	56 A			
TOTAL AMP. (DEMAND):	51 A			

NOTES:
1. BREAKER FRAME SHALL BE AS REQ'D PER PANEL AIC RATING.
2. SHALL BE FULLY RATED - SERIES RATINGS NOT ALLOWED.
3. ALL BUSSING, INCL GND AND NEUTRAL, SHALL BE COPPER.
4. ALL INCOMING PANEL & BRKR LUGS SHALL MATCH FEEDERS.
5. PROVIDE HINGED DOOR-IN-DOOR WITH OUTER DOOR LOCK.
6. PROVIDE METAL DIRECTORY FRAME.
7. REFER TO MECHANICAL SCHEDULES/ SHEET E-602 FOR WIRE SIZE.

LOAD CLASSIFICATION ABBREVIATIONS (CONT.)

F - FEEDER FOR DOWN STREAM PANEL. LOADS ARE INCLUDED IN THE PANEL LOAD SUMMARY.

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8/15/2022

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Harnett County Schools

OVERHILLS ELEM. CLASSROOM ADDITION

2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022

PROJECT #: 02110.200
DRAWN BY: JSD
CHECKED BY: MKG

ELECTRICAL PANEL SCHEDULES

E-601

LIGHTING SEQUENCE OF OPERATION

A COMPLETE AND OPERATIONAL LIGHTING CONTROL SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH THE SPECIFICATIONS (SECTION 260923 AND 260943) AND AS INTENDED ON THESE PLANS. ALL CONTROL POINTS AND EQUIPMENT SEQUENCES OF OPERATION LISTED IN SPECIFICATION SECTION 260923 SHALL BE CONSIDERED IN ADDITION TO THOSE LISTED HERE. IN THE EVENT THAT THE VERBIAGE IS IN CONFLICT OR CONTRADICTS THE REQUIREMENTS LISTED HERE, THE QUESTION SHALL BE ASKED PRIOR TO BIDDING OR THE MORE STRINGENT SHALL APPLY.

SYSTEM DESCRIPTION:
LIGHTING CONTROLS ARE BASED ON ETHERNET CONNECTED DEVICES THAT HAVE INDIVIDUAL ADDRESS LOCATIONS FOR PROGRAMMING AND CONTROL. INDEPENDENT OF THE ETHERNET BASED CONTROLS ARE STAND ALONE OCCUPANCY SENSORS. THESE SHALL BE INDEPENDENT AND NOT TIED INTO THE BAS/SYSTEM SOFTWARE.

SENSORS
1. CEILING MOUNTED OCCUPANCY AND VACANCY SENSORS SHALL OPERATE AS PART OF THE ETHERNET BASED SYSTEM AND AS STAND ALONE CONTROLS AS SHOWN ON THE PLANS.
2. WALL MOUNTED NON SWITCH TYPE OCCUPANCY/VACANCY SENSORS SHALL OPERATE AS PART OF THE ETHERNET BASED SYSTEM.
3. ALL OCCUPANCY SENSORS SHALL BE PROGRAMMED FOR AUTOMATIC ON (FULL LEVELS) AND AUTOMATIC OFF.
4. ALL VACANCY SENSORS SHALL BE PROGRAMMED FOR MANUAL ON AND AUTOMATIC OFF.
5. LARGE PUBLIC SPACES SHALL BE OCCUPANCY BASED WHERE PROVIDED WITH A SENSOR.

TIMER SETTINGS:
A. WALL SWITCH PASSIVE INFRARED: 2 MINUTES FOR INDIVIDUAL RESTROOMS AND STORAGE ROOMS.
B. CLASSROOMS VACANCY: 15 MINUTES.
C. WALL SWITCH VACANCY SENSORS OFFICES: 5 MINUTES.
D. OTHER SPACES NOT LISTED: 30 MINS.

BAS INTEGRATION:
A. EXTERIOR LIGHTING ZONES, TIME SCHEDULE AND PHOTOCELL CONTROL.
B. INTERIOR LIGHTING:
- CORRIDORS
- CLASSROOMS
- OFFICES

COMMISSIONING AND COORDINATION OF BAS:
1. BAS CONTROL SHALL BE THE PRIORITY SYSTEM WITH LOCAL OVERRIDES.
2. LIGHTING SYSTEM SHALL ALSO BE INDEPENDENTLY CONTROLLED BY A SOFTWARE BASED SYSTEM.
3. LIGHTING SYSTEM IS CONNECTED TO THE BAS VIA BACNET PROTOCOL OR EQUAL. COORDINATE LANGUAGE REQUIREMENTS WITH MECHANICAL CONTROLS CONTRACTOR SUPPLYING BUILDING AUTOMATION SYSTEM.

LIGHTING COORDINATION AND QUALITY CONTROL:
1. ELECTRICAL CONTRACTOR SHALL HAVE A PRE-CONSTRUCTION MEETING WITH CONTROLS SUPPLIER PRIOR TO CONDUIT ROUGH-IN TO VERIFY BOXES, CONDUIT PATHS, AND GENERAL LIGHTING CONTROL STRATEGY FOR INSTALLATION.
2. ELECTRICAL CONTRACTOR SHALL HAVE A POST-SUBMITTAL MEETING WITH CONTROLS SUPPLIER TO IDENTIFY LINE AND LOW VOLTAGE ROUTING, INTENT OF LIGHTING CONTROL DESIGN, AND GENERAL CONSTRUCTION STRATEGIES.

EXTERIOR LIGHTING CONTROL:
A. EXTERIOR LIGHTING CONTROL IS VIA SCHEDULED TIME CONTROL AND PHOTOCELL.

OTHER SYSTEM INTEGRATION:
1. UPON A FIRE ALARM EVENT, ALL CORRIDOR ZONES SHALL SWEEP ON.

TIME SCHEDULES:
A. TIME SCHEDULES ARE TO BE DETERMINED BY THE OWNER. THIS SHALL BE COORDINATED AND DIRECTED BY OWNER AND INPUT BY THE LIGHTING PROGRAMMER AND THE BAS PROGRAMMER. SEE THE BELOW INITIAL SETTING UNTIL OWNER HAS GIVEN INPUT.
B. INITIAL TIME SCHEDULES SHALL BE:
MONDAY - FRIDAY: 6AM ON, 7 PM OFF
SATURDAY 8AM ON, 4 PM OFF
SUNDAY: OFF

INDIVIDUAL AREAS INTENT OF CONTROL:
- MAIN CORRIDORS/HALLWAYS: TIME SCHEDULE ZONED. MANUAL LOW VOLTAGE OVERRIDE IN LOCAL CORRIDOR. CORRIDOR SWITCHES SHALL BE LOCKED OUT (PUBLIC AREAS) DURING "NORMAL OPERATING HOURS."
- GROUP RESTROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)OCCUPANCY SENSORS SHALL OPERATE NORMAL AND EMERGENCY FIXTURES IN THIS AREA.
- INDIVIDUAL RESTROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)
- UTILITY ROOMS, ETC.: ON/OFF WALL SWITCH OCCUPANCY SENSORS WITH MANUAL OVERRIDE FOR PERSONNEL SAFETY. SEE PLANS
- STORAGE ROOMS: ON/OFF WALL SWITCH VACANCY SENSORS (PASSIVE INFRARED.)
- CLASSROOMS: 2 ZONES. ZONE ONE IS ON/OFF WITH FULL DIMMING, ZONE TWO IS ON/OFF WITH FULL DIMMING. ZONES WORK INDEPENDENTLY OF EACH OTHER.

LIGHTING SYSTEM NOTES:
1. SYSTEM ARCHITECTURE SHALL BE DESIGNED BY RESPECTIVE CONTROLS PROVIDER.
2. SYSTEM IS BASED ON NX DISTRIBUTED INTELLIGENCE, BY HUBBELL. ALL ALTERNATE MANUFACTURERS SHALL PROVIDE EQUIPMENT TO MEET THE DESIGN INTENT. (GRAPHIC WALL PODS FOR EXAMPLE.) APPROVED EQUALS: WATTSTOPPER DLM, COOPER GREENGATE, OR ACUITY NLIGHT.
3. SEE VENDOR DRAWINGS/DETAILS FOR ALL 0-10V DIMMING WIRING.
4. PROVIDE DEVICE LAYOUT AS PART OF LIGHTING CONTROL SUBMITTAL. INCLUDE ALL DEVICE LOCATIONS, CABLING, EQUIPMENT, ETC.

FIXTURE NOTES:
A. ARCHITECT TO APPROVE ALL EXTERIOR FIXTURE LOCATIONS. E.C. TO MARK OFF LOCATIONS WITH TEMPORARY "CHALK" OUTLINE AND PLAN FOR ARCHITECT ON-SITE APPROVAL OF LOCATIONS BEFORE INSTALLATION. E.C. TO CONTACT ARCHITECT WITH (1) WEEK PRIOR NOTICE.

LIGHTING FIXTURE SCHEDULE

D	6" RECESSED LED DOWNLIGHT	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	25 W	UNIV	GOTHAM PATHWAY JUNO SPECTRUM	EVO 20 6AR LS MVOLT 6VLED 2000 INDY L6 20 U G2 L600P SGE6LEDGI 20W MD	6" APERATURE MINIMUM 2000 LUMEN PACKAGE MINIMUM 10% DIMMING CLEAR SEMI-SPECULAR WET LOCATION LISTED
DE	SAME AS TYPE 'D' EXCEPT PROVIDE WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	25 W	UNIV	GOTHAM PATHWAY JUNO SPECTRUM	EVO 20 6AR LS MVOLT 6VLED 2000 INDY L6 20 U G2 L600P SGE6LEDGI 20W MD	6" APERATURE MINIMUM 2000 LUMEN PACKAGE MINIMUM 10% DIMMING CLEAR SEMI-SPECULAR WET LOCATION LISTED PROVIDE WITH 90 MINUTE BATTERY BACKUP
EX1B	CLEAR EDGE-LIT EXIT SIGN	LED	INTEGRAL LED DRIVER	5 W	UNIV	LITHONIA HUBBELL JUNO PHILLIPS	LRP 1RMR/RC 120/277 DUAL LITE NAVILITE CHLORIDE	NICKEL CADMIUM BATTERY EXIT SIGN 90 MINUTE OPERATION; RED TEST SWITCH PROVIDED UL LISTED FOR DAMP LOCATIONS
LP1	DECORATIVE LINEAR PENDANT FIXTURE	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	<varies>	UNIV	SCOTT ARCHITECTURAL LIGHTING SPI LIGHTING VISA LIGHTING	S274_+L_+_+_+ APPROVED EQUAL APPROVED EQUAL	SEE PLANS FOR LENGTHS. COORDINATE MOUNTING HEIGHT AND FINISH WITH ARCHITECT. SWIVEL MOUNT. 1200 LUMENS/FT. 12W/FT
OWL1	WALL PACK TRAPEZOID LED	2-MODULE LED	INTEGRAL LED DRIVERS (2)	47 W	277V	LITHONIA HUBBELL JUNO COOPER PHILLIPS	WDGE3 LED P1 __ RFT MVOLT APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	COLOR CHOSEN BY ARCHITECT MINIMUM 6000 LUMENS WET LOCATION LISTED
OWL1E	SAME AS TYPE 'OWL1' EXCEPT PROVIDE WITH 90 MINUTE BATTERY BACKUP	2-MODULE LED	INTEGRAL LED DRIVERS (2)	47 W	277V	LITHONIA HUBBELL JUNO COOPER PHILLIPS	WDGE3 LED P1 __ RFT MVOLT E20WC APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	COLOR CHOSEN BY ARCHITECT MINIMUM 6000 LUMENS WET LOCATION LISTED BATTERY PACK SHALL BE RATED FOR 20W.
STL1	4 FT. LED STRIP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	UNIV	LITHONIA COLUMBIA CREE DAY-BRITE	CLX LED L48 5000LM SEF FDL MVOLT GZ10 80CRI APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	PROVIDE CHAIN FOR PENDANT MOUNTING PROVIDE WIRE GUARD 4000 MINIMUM LUMENS LENSED
STL1E	SAME AS TYPE 'STL1' EXCEPT PROVIDED WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	UNIV	LITHONIA COLUMBIA CREE DAY-BRITE	CLX LED L48 5000LM SEF FDL MVOLT GZ10 80CRI APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	PROVIDE CHAIN FOR PENDANT MOUNTING PROVIDE WIRE GUARD 4000 MINIMUM LUMENS LENSED PROVIDE WITH 10W CONSTANT POWER EMERGENCY DRIVER
STL2	2 FT. LED STRIP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	32 W	UNIV	LITHONIA COLUMBIA CREE DAY-BRITE	CLX LED L24 2500LM SEF FDL MVOLT GZ10 80CRI APPROVED EQUAL APPROVED EQUAL APPROVED EQUAL	PROVIDE CHAIN FOR PENDANT MOUNTING PROVIDE WIRE GUARD 2500 MINIMUM LUMENS LENSED
WL1	4 FT. LED WALL MOUNT STRIP	LED	INTEGRAL LED DRIVER	40 W	UNIV	LITHONIA H.E. WILLIAMS COOPER	BLPW4 40L ADSM GZ10 LP840 39-4-L40/840-A-DIM-UNV 4SSWLED-40SL-LW-UNV-L840-CD1-U	DLC LISTED. MINIMUM 4000 LUMENS.

LIGHTING FIXTURE SCHEDULE - PREFERRED BRAND ALT.

A	2X4 LED FLAT PANEL	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	UNIV	PREFERRED BRAND ALTERNATE: LITHONIA WILLIAMS CORONET	CPX 2X4 4000LM MIN10 APPROVED EQUAL APPROVED EQUAL	4000 MINIMUM LUMENS UL LISTED DAMP LOCATIONS PROVIDE FLANGE KIT FOR GYPSUM BOARD CEILINGS
AE	SAME AS TYPE 'A' EXCEPT PROVIDED WITH 90 MINUTE BATTERY BACKUP	LED	INTEGRAL LED DRIVER (STANDARD 0-10V DIMMING)	40 W	UNIV	PREFERRED BRAND ALTERNATE: LITHONIA WILLIAMS CORONET	CPX 2X4 4000LM MIN10 E10WLCP APPROVED EQUAL APPROVED EQUAL	4000 MINIMUM LUMENS UL LISTED DAMP LOCATIONS PROVIDE FLANGE KIT FOR GYPSUM BOARD CEILINGS PROVIDE WITH 10W CONSTANT POWER EMERGENCY DRIVER

LIGHTING FIXTURE NOTES

1. LIGHTING FIXTURES, AS SPECIFIED, HAVE BEEN SO SELECTED TO ACHIEVE REQUIRED/DESIRED FOOT CANDLE LEVELS OF ILLUMINATION IN THEIR RESPECTIVE AREA, HENCE SPECIFIC FIXTURE CHARACTERISTICS WHICH MAY CREATE PARTICULAR ILLUMINATION RESULTS ARE ESSENTIAL. ANY DEVIATIONS FROM SPECIFIED FIXTURES SHALL DEEM THE SUBMITTING AGENT AND CONTRACTOR RESPONSIBLE IN PROVING SUCH DEVIATION WILL PROVIDE THE EXACT LIGHTING RESULT IN DUPLICATION TO THE DESIGN HEREIN.
2. SUBSTITUTIONS APPROVED BY THE ENGINEER PREVIOUS TO BID ARE ACCEPTABLE AS LONG AS THEY ARE EQUAL TO FIXTURE SPECIFIED. UNLESS OTHERWISE NOTED. THIS INCLUDES LENS, COLORS, REFLECTORS, PHOTOMETRICS, HOUSING MATERIALS, FINISHES, ETC. ANY SUBSTITUTIONS SHALL BE SUBMITTED TO THE ENGINEER WITH COMPLETE CUT SHEETS FOR APPROVAL 10 WORKING DAYS PRIOR TO BID. SUBSTITUTE FIXTURES SHALL BE PRICED WITH THE SPECIFIED FIXTURE AND LISTED SEPARATELY FOR THE ENGINEER AND OWNER TO MAKE AN INFORMED DECISION.
3. CONTRACTOR SHALL PROVIDE SUITABLE TRIM AND APPURTENANCES TO MOUNT FIXTURES IN TYPE OF CEILING OR WALL AS SPECIFIED IN ARCHITECTURAL FINISH SCHEDULES REGARDLESS OF CATALOG NUMBER GIVEN. ONTRACTOR SHALL VERIFY TYPE OF CEILING OR WALL BY REVIEWING ARCHITECTURAL FINISH SCHEDULES PRIOR TO ORDERING FIXTURES.
4. CONFIRM FINAL FIXTURE LOCATIONS WITH ARCHITECTURAL REFLECTED CEILING PLANS AND ELEVATIONS.
5. PROVIDE LOW TEMPERATURE (0 DEGREE F) DRIVER FOR ANY FIXTURE INSTALLED ON EXTERIOR OR OTHER AREAS SUBJECT TO LOW TEMPERATURES.
6. DURING THE BIDDING PROCESS, THE CONTRACTOR SHALL INFORM ARCHITECT AND ENGINEER OF ANY DELIVERY OR SCHEDULING ISSUES THAT MAY IMPACT THE PROJECT CRITICAL PATH SCHEDULING. CONTRACTORS SHOULD CONFIRM AND EXPECT AN 8 TO 10 WEEK DELIVERY UNLESS SELECTED FIXTURES ARE CONSIDERED TO BE A 'QUICK SHIP' PRODUCT.
7. NO FIXTURE SUBSTITUTIONS WILL BE CONSIDERED DUE TO LACK OF COORDINATION OF DELIVERY DATES AND CONSTRUCTION SCHEDULE AFTER TIME OF BID.
8. ALL MATERIAL EXPEDITING EXPENSES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
9. ANY FIXTURES BEING INSTALLED IN CEILING, INDICATED BY THE ARCHITECT AS HAVING INSULATION IN CONTACT WITH THE CEILING SURFACE, SHALL BE IC RATED AND LABELED SUCH FROM THE MANUFACTURER.
10. ACCEPTABLE DRIVER MANUFACTURERS FOR SUBMISSION ARE OSRAM/SYLVANIA, ADVANCE, GE, PHILLIPS OR UNIVERSAL TRIAD PROVIDED THEY MEET INTENDED CRITERIA AS LISTED IN THIS SCHEDULE AND PROJECT SPECIFICATIONS.
11. SUPPORT RECESSED TROFFERS AT ALL FOUR CORNERS FROM STRUCTURE. CEILING GRID SUPPORT IS NOT ACCEPTABLE.
12. COMPLETELY EXAMINE LIGHTING PLANS TO COORDINATE SWITCHING, DIMMING AND ANY SPECIAL DRIVER CONTROLS THAT MAY BE PART OF THE DESIGN INTENT.
13. COORDINATE CLOSELY FIXTURES CONTROLLED VIA AUTOMATIC OR DIMMING CONTROLS TO ASSURE FIXTURE APPENDAGES ARE ORDERED PROPERLY TO MEET DESIGN INTENT.
14. CONTRACTOR SHALL FURNISH A COMPLETE SET OF PLANS TO HIS SUPPLIER TO ASSURE LIGHTING PACKAGE IS COMPLETE.
15. PROVIDE DIMMING DRIVER/MODULE FOR FIXTURES INDICATED ON PLANS AS BEING CONTROLLED VIA DIMMING DEVICE.
16. ELECTRICAL VALUE ENGINEERING SHALL BE BILLED AT AN HOURLY RATE BY ENGINEERING FOR SUBMITTAL REVIEWS.
17. ANY FIXTURES BEING DIMMED THAT WILL REQUIRE SPECIAL LEVELS OF DIMMING SHALL HAVE THIS REQUIREMENT BROUGHT TO THE ATTENTION OF THE ENGINEER PRIOR TO ISSUE OF FINAL PLANS. WITHOUT SPECIFIC REQUIREMENTS, ENGINEER SHALL UTILIZE BEST JUDGEMENT AND LATER CHANGES WILL BE AT THE EXPENSE OF THE OWNER. LIGHTING FIXTURE NOTES
18. THE COLOR TEMPERATURE OF ALL INTERIOR FIXTURES SHALL BE 4000K. THE COLOR TEMPERATURE OF ALL EXTERIOR FIXTURES SHALL BE 4000K.
19. COORDINATE THE MOUNTING HEIGHT OF ALL PENDANT MOUNTED FIXTURES WITH ARCHITECT.

WATER HEATER SCHEDULE

SYMBOL	DESCRIPTION	STORAGE (GAL)	GPH AT 80 °F RISE	ELECTRICAL				
				kW	V	PH	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
WH1	VERTICAL STORAGE, ELECTRIC	30	46	6	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.

PUMP SCHEDULE

SYMBOL	DESCRIPTION	ELECTRICAL DATA					
		HP	V	PH	HZ	DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
CP1	CIRCULATION PUMP SERVING WH1 INLINE	1/6	120	1	60	MOTOR RATED SWITCH	2#12,1#12G., 3/4"C.

EXHAUST FAN SCHEDULE

SYMBOL	LOCATION	ELECTRICAL DATA			DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
		WATTS	H.P.	VOLTAGE-PHASEØ		
F-29	MECHANICAL LOFT	1176	0.50	120 V-1Ø	PROVIDED BY MC	2#12,1#12G., 3/4"C.

HVLS FAN SCHEDULE

SYMBOL	ELECTRICAL DATA		DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
	H.P.	VOLTAGE-PHASEØ		
HVLS-1	0.25	110 V-0Ø	MOTOR RATED SWITCH	2#10,1#10G., 3/4"C.
HVLS-2	0.25	110 V-0Ø	MOTOR RATED SWITCH	2#10,1#10G., 3/4"C.

FAN COIL UNIT SCHEDULE

SYMBOL	MOTOR HP	ELECTRICAL DATA		DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
		VOLTAGE	PH		
AHU-59	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-60	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-61	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-62	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-63	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-64	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-65	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-66	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-67	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-68	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-69	0.5 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-70	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-71	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-72	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.
AHU-73	1.0 hp	480	3	30A/F15A-3P-1	4#12,1#12G., 3/4"C.

ELECTRIC WALL HEATER SCHEDULE

SYMBOL	KW	MOTOR		DISCONNECT SIZE	CONDUIT AND CONDUCTOR SIZE
		VOLT	PH		
EWH-01	0.8	120 V	1	PROVIDED BY MC	2#12,1#12G., 3/4"C.
EWH-01	0.8	120 V	1	PROVIDED BY MC	2#12,1#12G., 3/4"C.

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2626 Ray Road - Spring Lake, NC 28390

No.	Date	Description

ISSUE DATE: 8/15/2022
PROJECT #: 02110.200
DRAWN BY: JSD
CHECKED BY: MKG

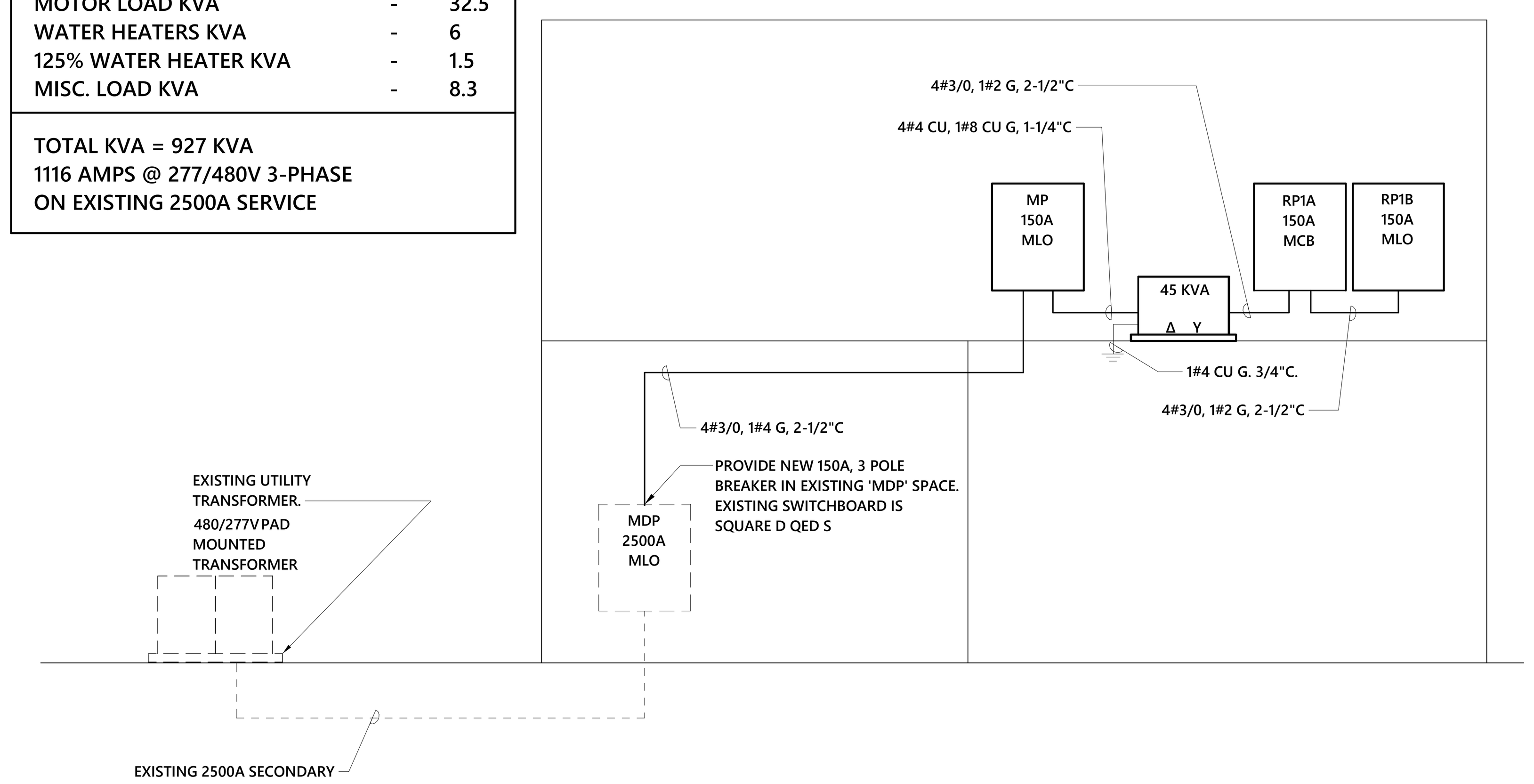
ELECTRICAL SCHEDULES

E-602

MDP LOAD SUMMARY

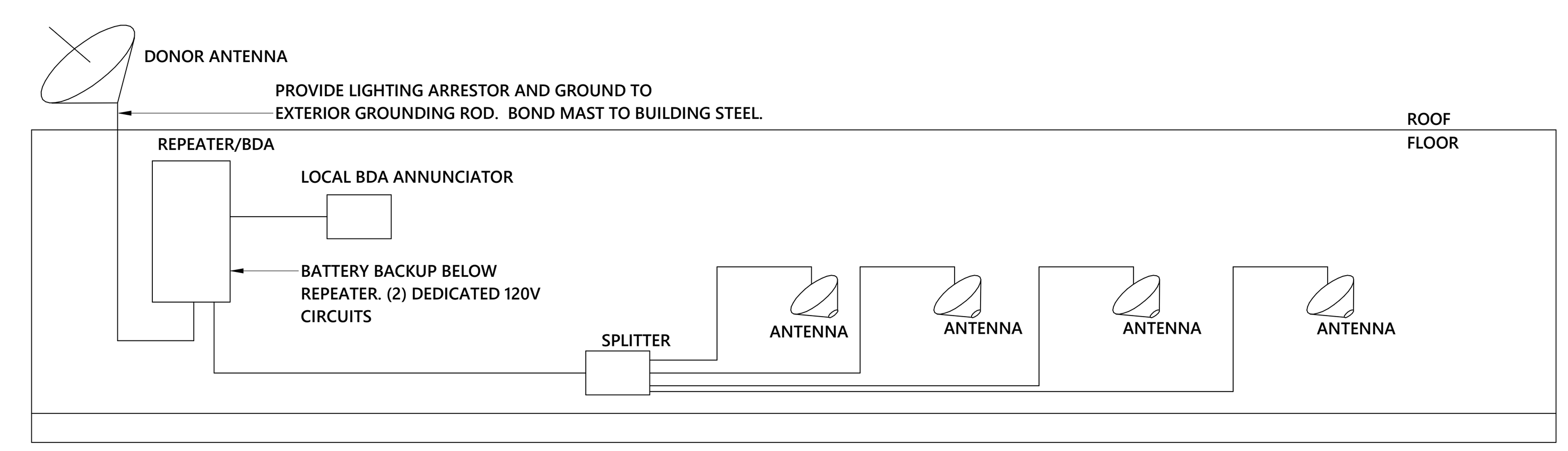
EXISTING PK LOAD PER UTILITY KVA	-	743
LIGHTING KVA	-	9.2
RECEPTACLES 1ST 10 KVA	-	10
REMAINDER RECEPTS @ 50% KVA	-	16.5
MOTOR LOAD KVA	-	32.5
WATER HEATERS KVA	-	6
125% WATER HEATER KVA	-	1.5
MISC. LOAD KVA	-	8.3

TOTAL KVA = 927 KVA
1116 AMPS @ 277/480V 3-PHASE
ON EXISTING 2500A SERVICE



NOTES:
1. PROVIDE 4" HIGH FORMED CONCRETE HOUSEKEEPING PAD FOR ALL FLOOR MOUNTED ELECTRICAL GEAR.
2. ELECTRICAL FEEDERS SIZES SHOWN ON RISER ARE SIZED ALUMINUM MATERIAL, UNLESS NOTED OTHERWISE.
3. DASHED ITEMS ARE EXISTING TO REMAIN.

1 POWER RISER DIAGRAM
NOT TO SCALE



2 EMERGENCY RESPONDER SYSTEM BOOSTING RISER
NO SCALE

SYSTEM NOTES

NOTES:
1. SYSTEM IS BASED ON 800Mhz. COORDINATE WITH LOCAL EMERGENCY RESPONDERS FOR NECESSARY FREQUENCY RFEQUIRED
2. SEE SPECIFICATIONS FOR ALL EQUIPMENT AND CABLING REQUIREMENTS.
3. ALL CABLING TO BE INSTALLED IN 1 1/2" CONDUIT.
4. SYSTEM BASED ON DESIGN FROM HARRIS COMMUNICATIONS. SEE SPECIFICATIONS FOR REQUIREMENTS AND EQUALS.
5. PROVIDE BATTERY BACK UP (5 MINS.) FOR MOMENTARY LOSS OF POWER. MAIN SYSTEM IS GENERATOR BACKED UP. NON GENERATOR BACKED UP SYSTEMS SHALL HAVE A MINIMUM BATTERY BACKUP OF 24 HOURS.
6. SEE SPECIFICATIONS FOR CABLING REQUIREMENTS.
7. SYSTEM SUPPLIER SHALL PROVIDE A SYSTEM SURVEY REPORT PRIOR TO PROVIDING THE SYSTEM. THIS SHALL BE CONSIDERED BASE BID FOR THE PROJECT. SIGNAL SURVEY REPORT SHALL BE TAKEN TO THE LOCAL FIRE CODE OFFICIAL AND THE LOCAL FIRE CODE OFFICIAL SHALL DETERMINE IF THE SYSTEM NEEDS TO BE INSTALLED. SIGNAL STRENGTH MEASUREMENTS SHALL BE MEASURED IN 95% OF ALL AREAS ON EACH FLOOR (100% OF ALL EGRESS AND CRITICAL AREAS). A MINIMUM SIGNAL STRENGTH OF -95dBM IS REQUIRED.
8. PROVIDE A DEDUCTIVE ALTERNATE FOR THE EMERGENCY RESPONDER SYSTEM INCLUDING ALL DEVICES, CABLING, CONDUIT, AND EQUIPMENT. SUBMITTAL AND SURVEY REPORT SHALL BE CONSIDERED BASE BID.
9. SEE PLANS FOR MINIMUM LOCATIONS. BASED ON SURVEY REPORT, DEVICES SHALL BE LOCATED TO MAXIMIZE BOOSTING SIGNAL. LOCATIONS SHALL BE COORDINATED WITH GENERAL CONTRACTOR.
10. LOCAL ANNUNCIATOR SHALL PROVIDE VISUAL AND LABELED IDENTIFICATION OF:
    A. NORMAL AC POWER.
    B. SIGNAL BOOSTER TROUBLE.
    C. LOSS OF NORMAL AC POWER.
    D. FAILURE OF BATTERY CHARGER.
    E. LOW-BATTERY CAPACITY.
    F. ANTENNA FAILURE.
11. PROVIDE FIRE ALARM PANEL CONNECTION (SUPERVISORY SIGNALS). COORDINATE REQUIRED CONNECTIONS WITH FIRE ALARM CONTRACTOR:
    A. DONOR ANTENNA MALFUNCTION.
    B. BDA FAILURE.
    C. LOW BATTERY CAPACITY.
    D. LOSS OF NORMAL AC POWER.
    E. FAILURE OF BATTERY CHARGER.

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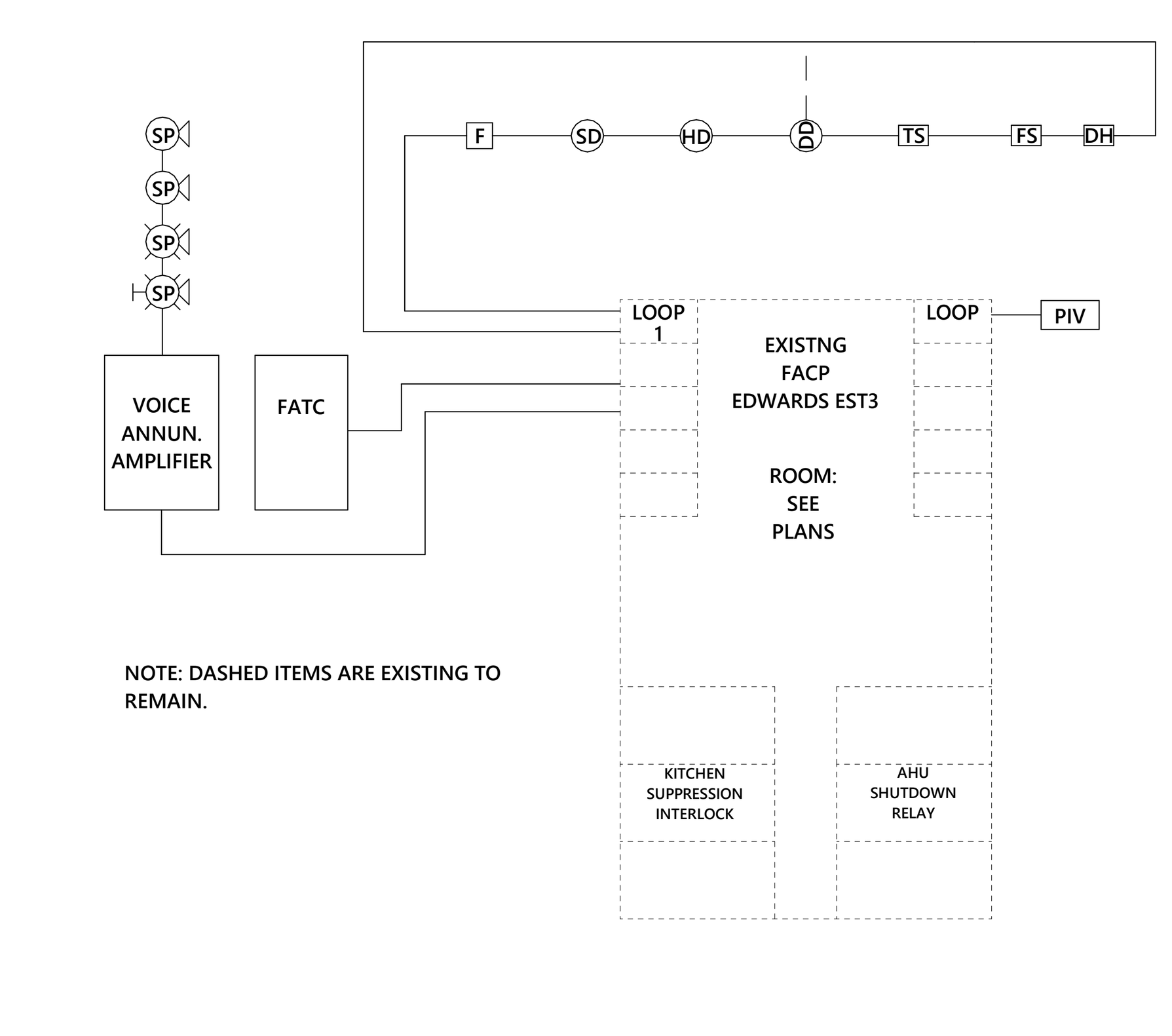
ELECTRICAL DIAGRAMS

E-701



FIRE ALARM NOTES

1. EXISTING FACP IS FULLY ANALOG ADDRESSABLE.
2. EXISTING FACP HAS A MINIMUM 24HR. BATTERY BACKUP.
3. EXSTING FACP IS CONNECTED TO A UL APPROVED CENTRAL STATION.
4. ZONE PER NFPA 72, 2013 AND MANUFACTURER'S RECOMMENDATIONS WITH NO ONE ZONE EXCEEDING 15,000 S.F. PER FLOOR.
5. COORDINATE QUANTITY AND LOCATIONS OF DEVICES WITH CONTRACT DRAWINGS.
6. LOCATE SMOKE DETECTOR WITHIN 5' OF THE MAGNETIC HOLD OPEN DOORS. (TYPICAL)
7. LOCATE FIRE ALARM PULL STATION WITHIN 5' OF THE EXIT DOOR.
8. LOCATE SMOKE/HEAT DETECTOR WITHIN 5' OF THE FA EQUIPMENT (FACP, FATC).
9. LOCATION OF CEILING MOUNTED SMOKE/HEAT DETECTOR SHALL BE FIELD COORDINATED PRIOR TO ROUGH IN. THE DETECTOR SHALL BE A MINIMUM OF 2' AWAY FROM LIGHT FIXTURE AND A MINIMUM OF 3' AWAY FROM AIR DISTRIBUTION DEVICES.
10. AUTOMATIC DOOR CLOSING SHALL BE ACCOMPLISHED BY THE ACTIVATION OF THE LOCAL SMOKE DETECTORS AT THAT DOOR. SMOKE DETECTOR ACTIVATION SHALL ALERT THE BUILDING FIRE ALARM SYSTEM. THE FIRE ALARM SYSTEM SHALL CAUSE ALL HOLD OPEN DOORS TO CLOSE UPON ALARM ACTIVATION IN THE BUILDING.
11. ACTIVATION OF AN ALARM ZONE SHALL CAUSE ALL AIR HANDLING EQUIPMENT TO SHUT DOWN (ALL DAMPERS, AIR HANDLERS AND EXHAUST FANS MUST STOP).
12. ACTIVATION OF KITCHEN HOOD SUPPRESSION SYSTEM PROVIDES SIGNAL TO FACP WHICH IN TURN ACTIVATES ALL ANNUNCIATING ZONES & CUTS OFF AHU SUPPLY AIR.
13. ELECTRICAL CONTRACTOR SHALL COORDINATE EXACT LOCATIONS OF ALL FLOW, PRESSURE, & TAMPER SWITCHES WITH FIRE PROTECTION CONTRACTOR PRIOR TO INSTALLATION.
14. ALL VISUAL DEVICES WITHIN THE SAME AREA SHALL BE SYNCHRONIZED. IT SHALL BE A THREE BEAT TEMPORAL PATTERN.
15. ALL FIRE ALARM WIRING SHALL BE IN CONDUIT.
16. PROVIDE MULTI-TEMPORAL SOUNDING CAPABILITY AT ALL AUDIO DEVICES FOR EMERGENCY NOTIFICATION FOR NON VOICE SYSTEMS COMPONENTS.
17. THE FIRE ALARM SYSTEM MANUFACTURER SHALL PROVIDE NOTIFICATION APPLIANCE CIRCUIT (NAC) POWER EXTENDERS AS REQUIRED.
18. THE DUCT SMOKE DETECTORS SHALL COMPLY WITH IFC 907.12.
19. THE CIRCUIT FEEDING THE FIRE ALARM PANEL IS DEDICATED FOR THE FIRE ALARM ONLY. BREAKER SHALL BE PROVIDED WITH A LABEL "FIRE ALARM CIRCUIT" AND SHALL BE RED.
20. PROVIDE REMOTE LIGHT FOR DUCT SMOKE DETECTOR ON CEILING WHERE UNIT IS ABOVE CEILING.
21. CONTRACTOR RESPONSIBLE FOR SHOP DRAWINGS AS REQUIRED BY LOCAL AHJ.
22. DUCT DETECTORS SHALL BE VERIFIED WITH THE MECHANICAL DRAWINGS FOR QUANTITY AND LOCATION. TOTAL QUANTITY MINIMUM SHALL BE BASED ON BOTH MECHANICAL SCHEDULES AND MECHANICAL PLAN LOCATIONS AND ELECTRICAL PLANS. WHEN DEVICE QUANTITIES (ELECTRICAL VS. MECHANICAL) ARE IN CONFLICT, PROVIDE THE GREATER QUANTITY OF DETECTORS.

1 FIRE ALARM RISER DIAGRAM
NOT TO SCALE

FIRE ALARM SPECIFICATIONS

A. SYSTEM SHALL BE A CENTRALIZED, ANALOG, ADDRESSABLE, FULLY ELECTRONICALLY SUPERVISED (INCLUDING AUXILIARY SYSTEMS INTERCONNECT WIRING) SYSTEM LISTED BY UL IN COMPLIANCE WITH ALL APPLICABLE NFPA 72 AND OTHER STANDARDS AS WELL AS THE AMERICAN'S WITH DISABILITIES ACT (ADA). ALL FINAL CONNECTIONS, TESTING AND ADJUSTMENTS SHALL BE PERFORMED BY OR UNDER DIRECT SUPERVISION OF AN AUTHORIZED FACTORY REPRESENTATIVE. SYSTEM SHALL BE SIMPLEX, NOTIFIER, SIEMENS, OR APPROVED EQUAL AS ACCEPTED BY THE ENGINEER. SYSTEM SHALL HAVE A 24HR MINIMUM BATTERY BACKUP.
B. INITIATING DEVICE ACTIVATION SHALL CAUSE OPERATION OF THE PROPER ALARM CIRCUIT IN THE CONTROL PANEL, AND OPERATE ALL AUDIBLE AND VISUAL INDICATING ALARMS. ALL AIR HANDLING UNITS SHALL BE STOPPED UPON ANY ALARM INPUT. EACH AIR HANDLER UNIT SHALL BE PROVIDED WITH A SYSTEM CONTROLLED RELAY TO EFFECT SHUTDOWN. ALL ALARM DEVICES AND LAMPS SHALL CONTINUE TO OPERATE UNTIL THE INITIATING DEVICE IS RESET. SUBSEQUENT ALARMS SHALL RESOUND THE SYSTEM. AN AUDIBLE AND VISUAL SIGNAL SHALL INDICATE SYSTEM TROUBLE. THE CONTROL PANEL SHALL PROVIDE FOR ACTIVATING A UL LISTED CENTRAL STATION SIGNAL FOR NOTIFYING THE FIRE DEPARTMENT.
C. MANUAL STATIONS SHALL BE NON-CODED, WITH DUAL-ACTION PULL AND KEY TYPE RESET, SEMI-FLUSH MOUNTED. COMBINATION LIGHT AND HORN SIGNALS SHALL BE FLUSH MOUNTED. WIRING SHALL BE IN CONDUIT AS PREVIOUSLY SPECIFIED, #14 AWG MINIMUM, THHN. ALL J-BOXES USED FOR THE FIRE ALARM SYSTEM SHALL BE PAINTED RED.
D. SPRINKLER SYSTEM TAMPER SWITCHES SHALL BE CONNECTED INTO A COMMON ZONE WHICH SHALL DISTINGUISH BETWEEN A CONDUIT FAULT AND A CLOSED VALVE. A CLOSED VALVE SHALL BE INDICATED AS AN ALARM CONDITION, BUT WILL NOT ACTIVATE THE AUDIO-VISUAL DEVICES AND SHALL CAUSE A SUPERVISORY SIGNAL TO BE TRANSMITTED TO THE FIRE DEPARTMENT.
E. CONDUCTORS SHALL BE PLENUM-RATED AND INSTALLED IN CONDUIT AND INSTALLED IN COMPLIANCE WITH NFPA 70, ARTICLE 760; IN ADDITION TO WIRING METHODS 300.4.
F. ALL FIRE ALARM WIRING SHALL BE CLASS B.
G. PROVIDE ALL REQUIRED MODULES, POWER EXTENDERS, PROGRAMMING, ETC. FOR A COMPLETE AND OPERATIONAL SYSTEM.
H. SUBMIT FIRE ALARM SHOP DRAWINGS CONSISTING OF PRODUCT DATA, TO THE ENGINEER AND FOR APPROVAL.
I. FILL OUT NFPA 72 CERTIFICATION REPORT AND SUBMIT TO ENGINEER AND AUTHORITY HAVING JURISDICTION.
J. WARRANTY - ALL WORK PERFORMED AND ALL MATERIALS AND EQUIPMENT FURNISHED UNDER THIS CONTRACT SHALL BE FREE FROM DEFECTS AND SHALL REMAIN SO FOR A PERIOD OF AT LEAST TWO (2) YEARS FROM THE DATE OF ACCEPTANCE BY THE PROFESSIONAL ENGINEER AND/OR OWNER. THE FULL COST OF MAINTENANCE, LABOR, AND MATERIALS REQUIRED TO CORRECT ANY DEFECT DURING THIS TWO YEAR PERIOD SHALL BE IMMEDIATELY CORRECTED AT NO ADDITIONAL COST TO THE OWNER. ANY DEFECTS THAT RENDER THE SYSTEM INOPERATIVE SHALL BE REPAIRED WITHIN 24 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR. OTHER DEFECTS SHALL BE REPAIRED WITHIN 48 HOURS OF THE OWNER NOTIFYING THE CONTRACTOR.
K. AUDIBLE DEVICES WITHIN SLEEPING ROOMS SHALL PROVIDE A SQUARE WAVE 520HZ TONE COMPATIBLE WITH NFPA 72 18.4.5.3.

NFPA FIRE ALARM LEGEND

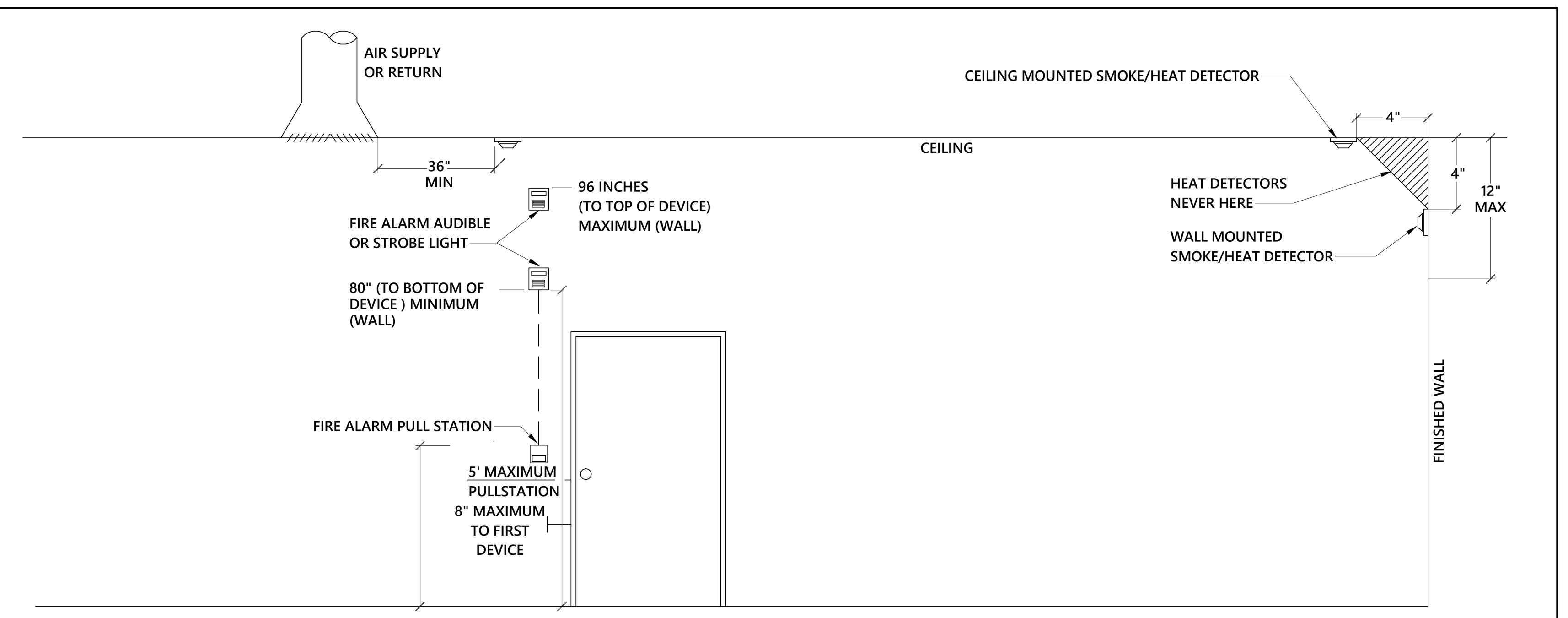
Symbol	Description
FACP	FIRE ALARM CONTROL PANEL
NAC	NOTIFICATION APPLIANCE CIRCUIT POWER EXTENDER
BDA	BI-DIRECTIONAL AMPLIFIER SYSTEM
15cd	FIRE ALARM HORN W/STROBE (CANDELAS), WHITE FINISH
15cd	FIRE ALARM HORN W/STROBE (CANDELAS), WHITE FINISH
	FIRE ALARM AUDIBLE ONLY, WHITE FINISH
ACM	ADDRESSABLE CONTROL MONITOR
	SMOKE DETECTOR/SENSOR (DEFAULT PHOTOELECTRIC TYPE)
X	HEAT DETECTOR/SENSOR. X=TYPE
F	F.A. PULLSTATION (TYPE DENOTED)

**Note: AUDIBLE DEVICES WITHIN SLEEPING ROOMS SHALL BE SUBJECT TO LOW FREQUENCY REQUIREMENTS. A SQUARE WAVE 520HZ TONE COMPATIBLE WITH NFPA 72 18.4.5.3. COORDINATE WITH LOCAL CODES AND REQUIREMENTS.

FIRE ALARM SHEET INDEX

SHEET NUMBER	SHEET NAME
FA-001	FIRE ALARM LEGEND AND NOTES
FA-101	OVERALL FIRE ALARM PLAN - NEW WORK
FA-111	CLASSROOM ADDITION FIRE ALARM PLAN - NEW WORK
FA-112	MECHANICAL LOFT FIRE ALARM PLAN

FIRE ALARM SYSTEM MATRIX											BUILDING SYSTEM OUTPUTS								CENTRAL COMM		
	ACTIVATE COMMON ALARM SIGNAL INDICATOR	ACTIVATE AUDIBLE ALARM SIGNAL	ACTIVATE COMMON SUPERVISORY SIGNAL INDICATOR	ACTIVATE AUDIBLE SUPERVISORY INDICATOR	ACTIVATE COMMON TROUBLE SIGNAL INDICATOR	ACTIVATE AUDIBLE TROUBLE SIGNAL	ACTIVATE GENERAL EVACUATION SIGNAL	DISPLAY CHANGE OF STATUS	ACTIVATE EXTERNAL HORNS/STROBES	TRANSMIT FIRE ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION	RETURN ELEVATOR TO ALTERNATE FLOOR	RETURN ELEVATOR TO FIRST FLOOR	SHUNT TRIP AFTER ELEV. REACHES DESIGNATED FLOOR	SHUT DOWN RESPECTIVE HVAC	SHOW CHANGE OF STATUS ON ANNUNCIATOR	SHOW CHANGE OF STATUS ON CENTRAL PANEL	TRANSMIT FIRE ALARM SIGNAL TO CENTRAL STATION	TRANSMIT SUPERVISORY SIGNAL TO CENTRAL STATION	TRANSMIT TROUBLE SIGNAL TO CENTRAL STATION
MANUAL FIRE ALARM PULL BOXES	X	X					X	X	X	X							X	X	X		
BUILDING SMOKE DETECTOR	X	X					X	X	X	X							X	X	X		
DUCT SMOKE DETECTOR			X	X				X			X					X	X	X		X	
SPRINKLER WATER FLOW	X	X					X	X	X	X							X	X	X		
SPRINKLER TAMPER			X	X				X			X						X	X		X	
1ST FLOOR ELEV. LOBBY SMOKE DET.	X	X					X	X	X	X			X				X	X	X		
UPPER FLR. ELEV. LOBBY SMOKE DET.	X	X					X	X	X	X				X			X	X	X		
HOOD SUPPRESSION SYSTEM	X	X					X	X	X	X							X	X	X		
NOTIFICATION DEVICE SHORT CIRCUIT					X	X		X				X					X	X			
OPEN CIRCUIT					X	X		X				X					X	X			X
GROUND FAULT					X	X		X				X					X	X			X
FIRE ALARM A.C. POWER FAILURE					X	X		X				X					X	X			X
FIRE ALARM SYSTEM LOW BATTERY					X			X				X					X	X			X
BDA SYSTEM			X					X			X						X	X			X



NOTES:
1. LOCATIONS WHERE TV MOUNT IS BACK TO BACK ON SAME WALL, AN OFFSET OF 8-12" WILL BE NEEDED FOR INSTALLATION OF JACK/RECEPTACLE.
2. DEVICES ABOVE COUNTER TOPS SHALL BE A MAXIMUM OF 48" TO TOP OF DEVICE.
3. DEVICES NEXT TO DOOR EXIT SHALL BE WITHIN 8" (MAXIMUM) TYPICAL OF DOOR UNLESS OBSTACLES SUCH AS SIDELITES, ETC.
4. LOW EXIT SIGN AS INDICATED ON PLANS. PER IBC 1011.2.
5. DEVICES REQUIRED TO BE ADA ACCESSIBLE SHALL BE INSTALLED PER ANSI A117.1.

2 MOUNTING HEIGHTS OF DEVICES - ELEVATION
NOT TO SCALE

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PROJECT #: 02110.200
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FIRE ALARM
LEGEND AND NOTES

FA-001

OPTIMA# 21-0305R

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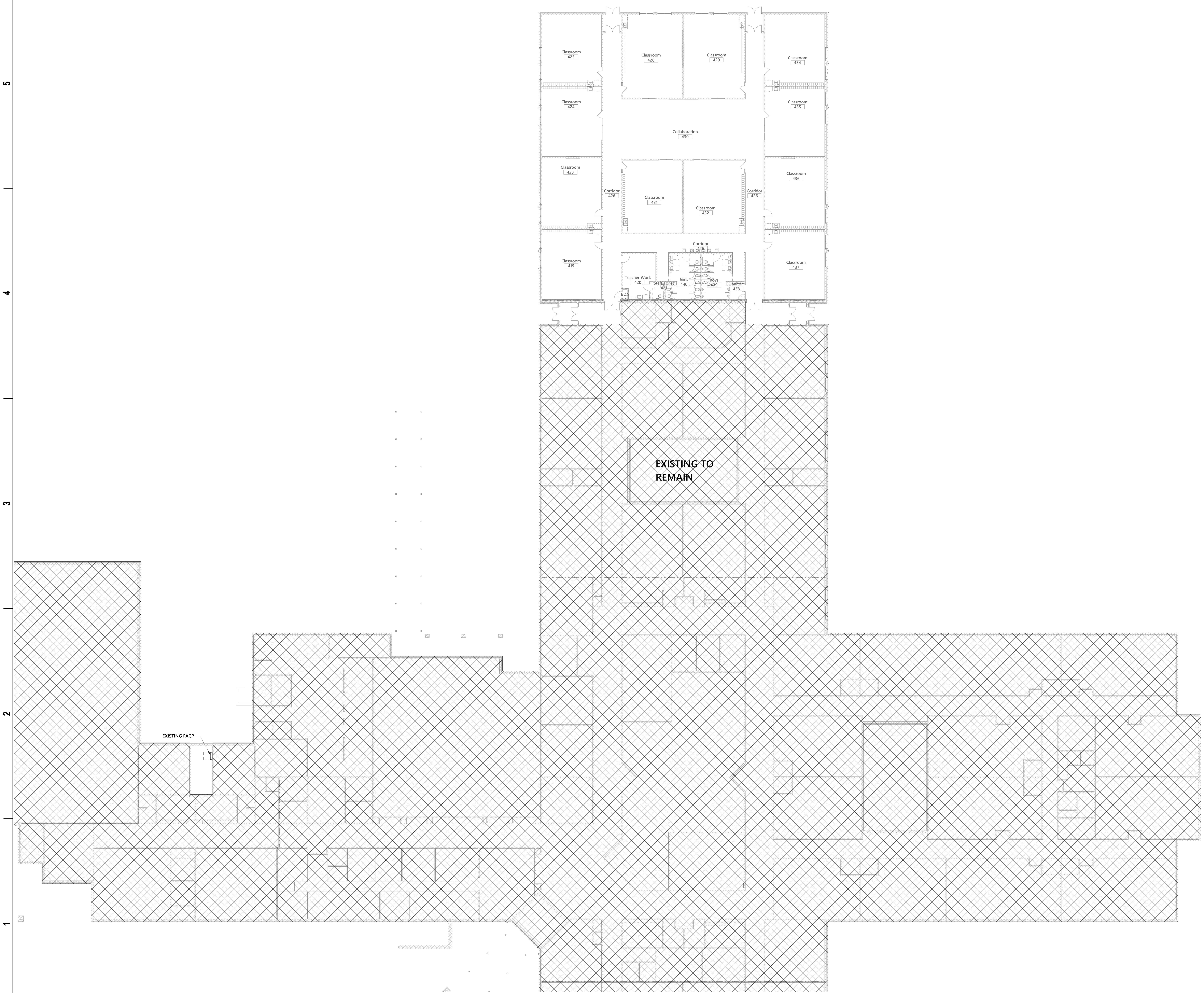
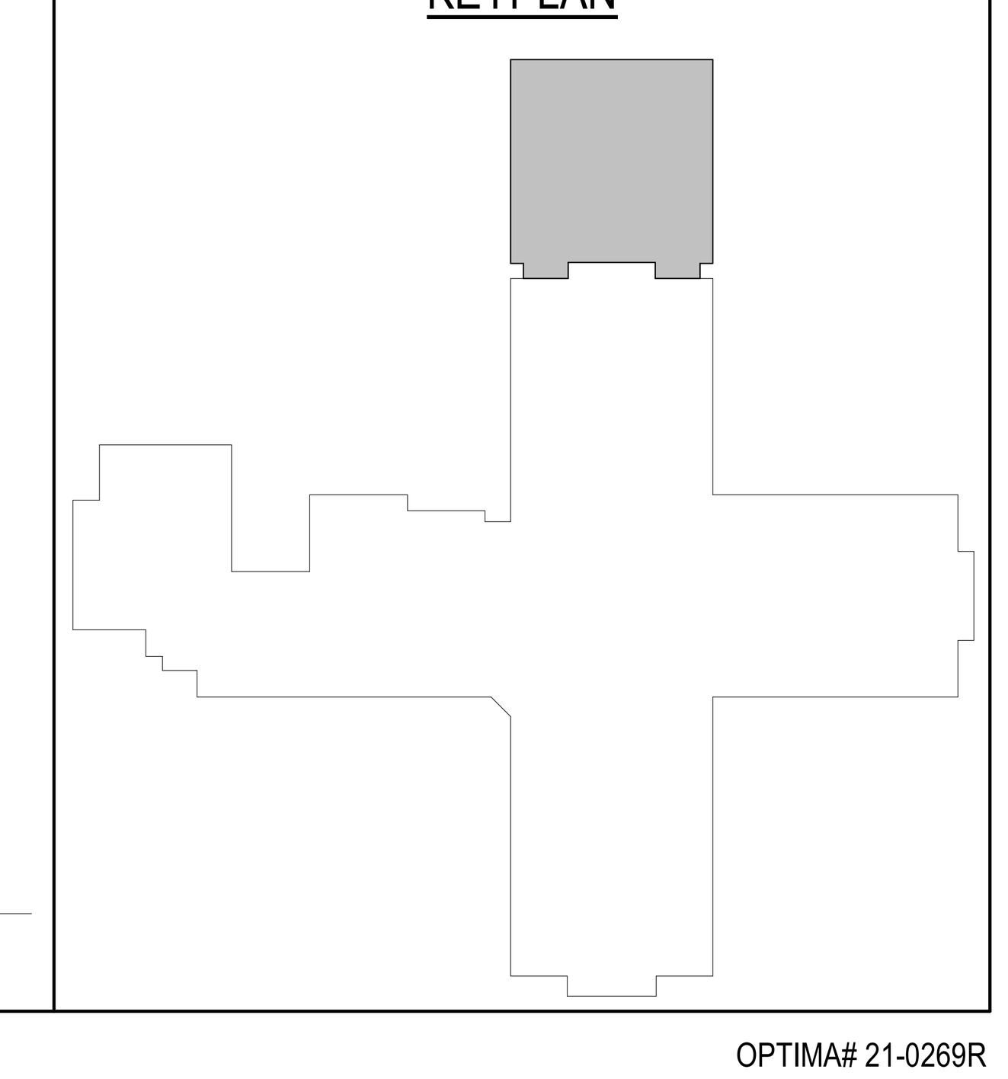


1 OVERALL FIRST FLOOR FIRE ALARM PLAN - NEW WORK
1/16" = 1'-0"

KEYPLAN



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OVERALL FIRE ALARM PLAN - NEW WORK

FA-101

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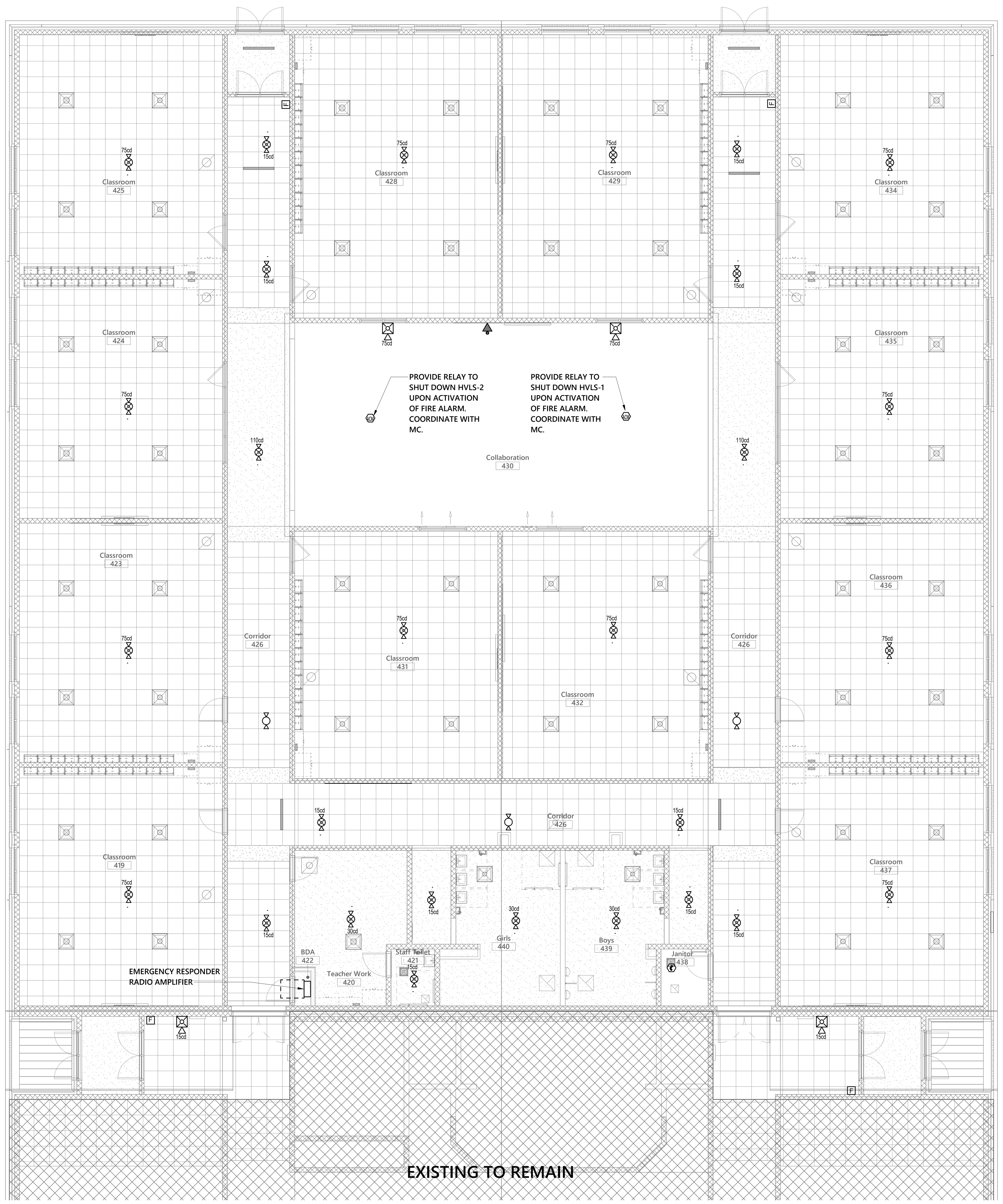

1 CLASSROOM ADDITION FIRE ALARM PLAN - NEW WORK

1/8" = 1'-0"

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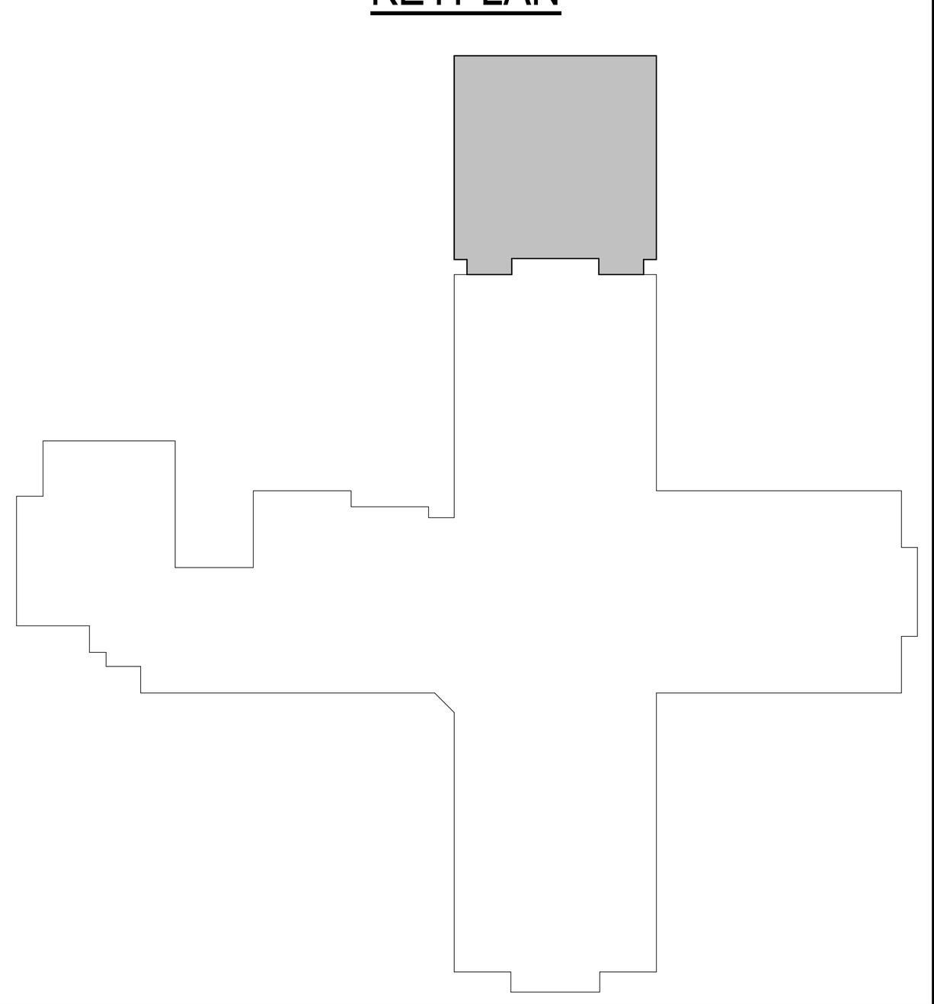

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CLASSROOM ADDITION FIRE ALARM PLAN - NEW WORK

FA-111

E | D | C | B | A

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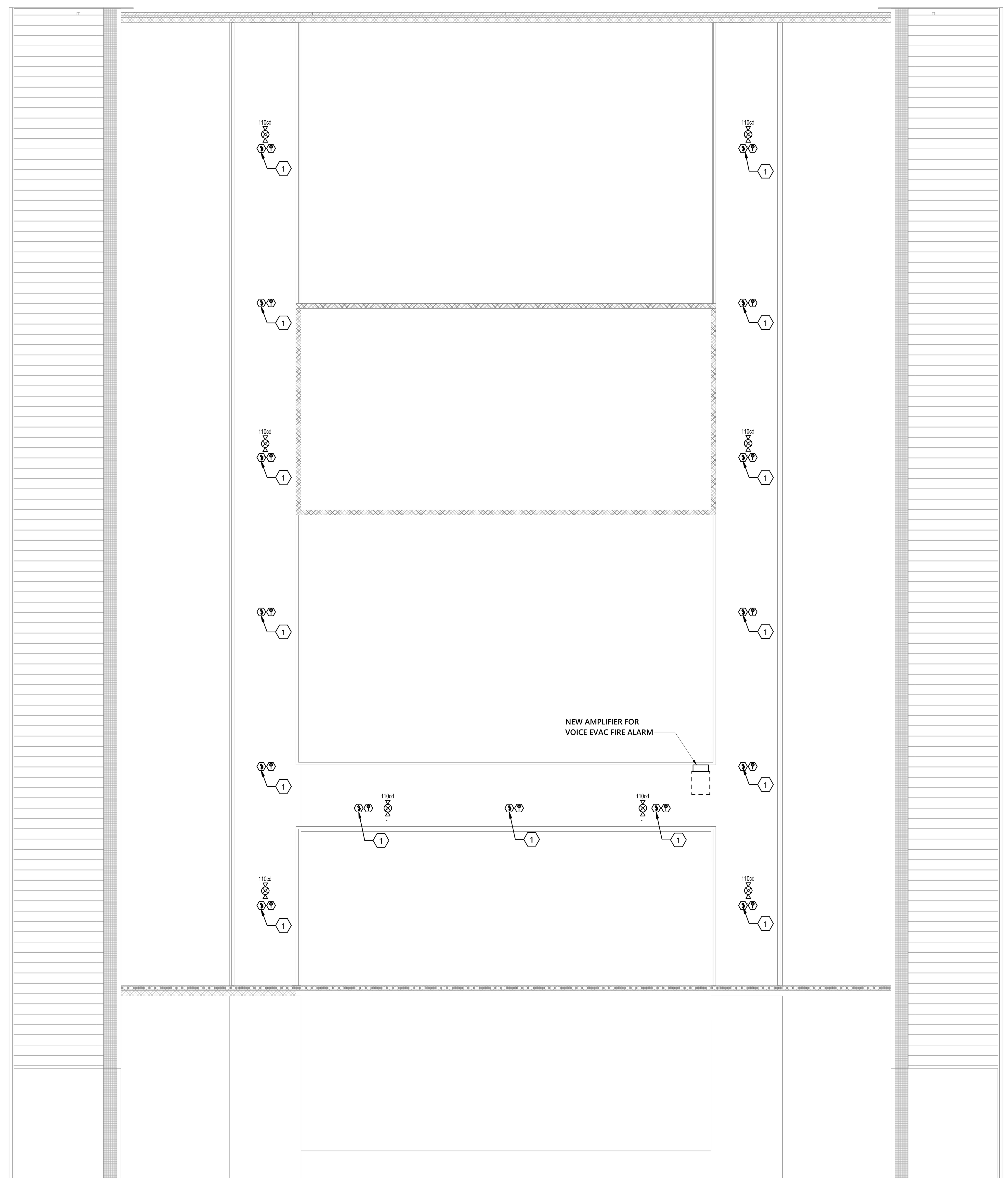

1 MECHANICAL LOFT FIRE ALARM PLAN
1/8" = 1'-0"

KEYED NOTES

1 PROVIDE COMBINATION SMOKE AND HEAT DETECTOR.

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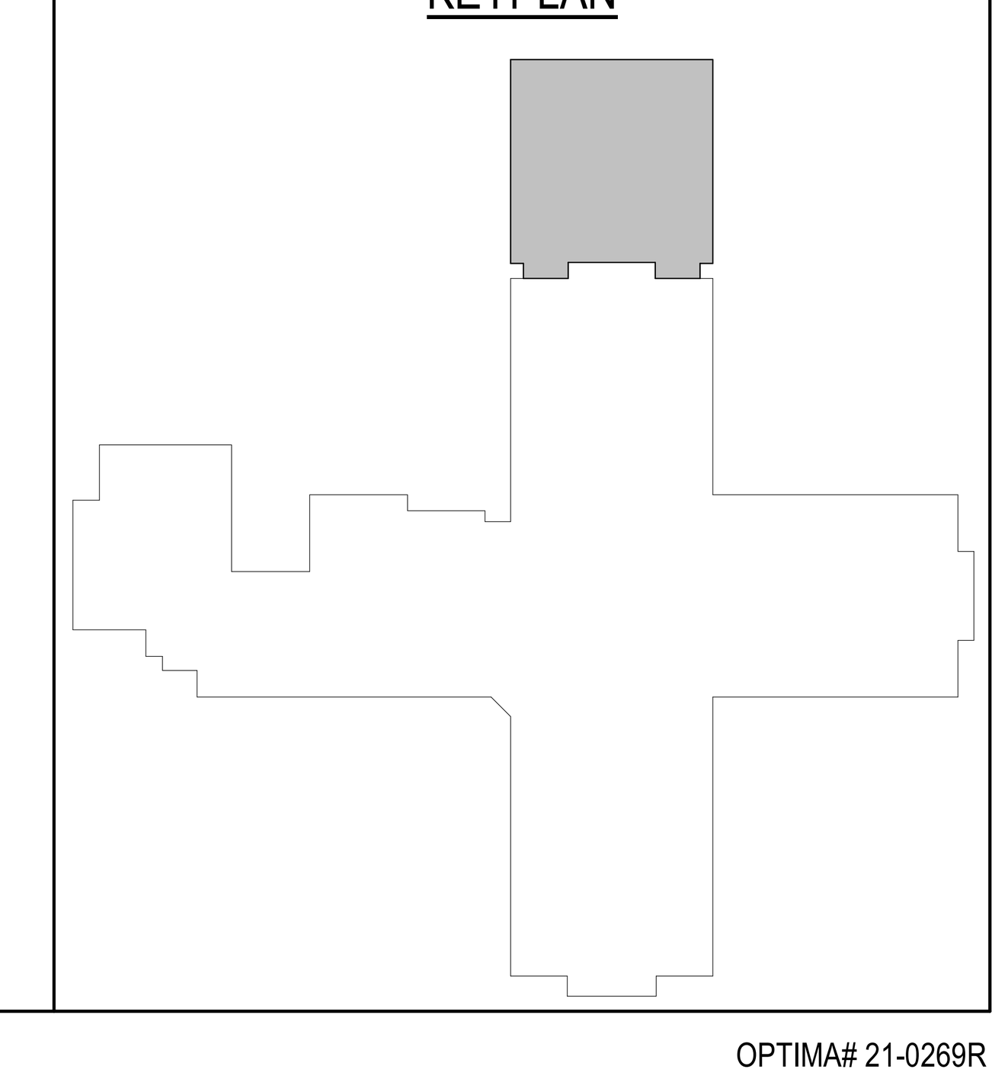

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MECHANICAL LOFT FIRE ALARM PLAN

FA-112