Town Hall Addition NAUGATUCK, CONNECTICUT Contract No. FY24-B053

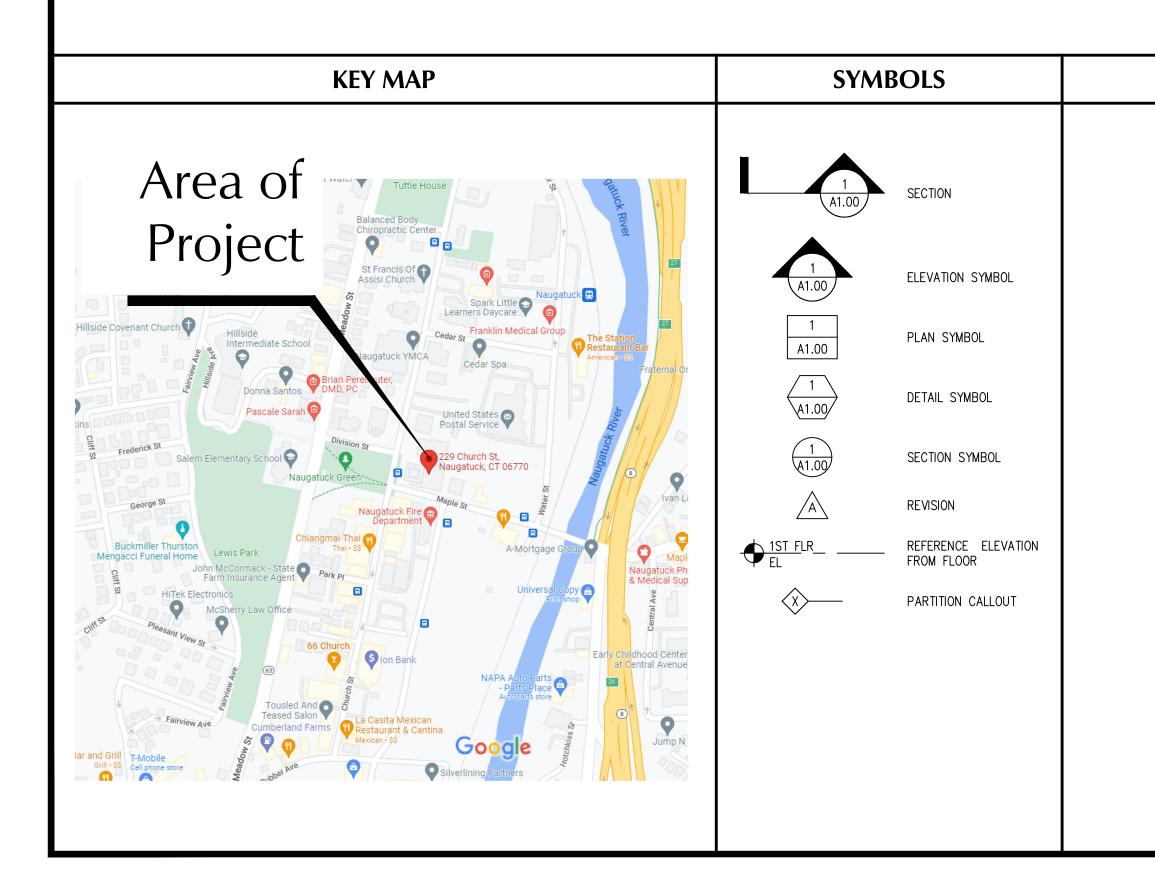
ADDENDUM NO. 1 4/11/23

Bidders and interested parties shall take note of the following information regarding the subject Invitation to Bid:

1. Revised Project Drawings:

The attached contract drawing shall replace the drawings in Appendix 1 of the Contract Documents.

James R. Stewart Director of Public Works 246 Rubber Ave. Naugatuck Ct 06770 Jstewart@naugauck-ct.gov 230-720-7072



PROPOSED TOWN HALL ADDITION

229 CHURCH STREET NAUGATUCK, CONNECTICUT PREPARED FOR

BOROUGH OF NAUGATUCK

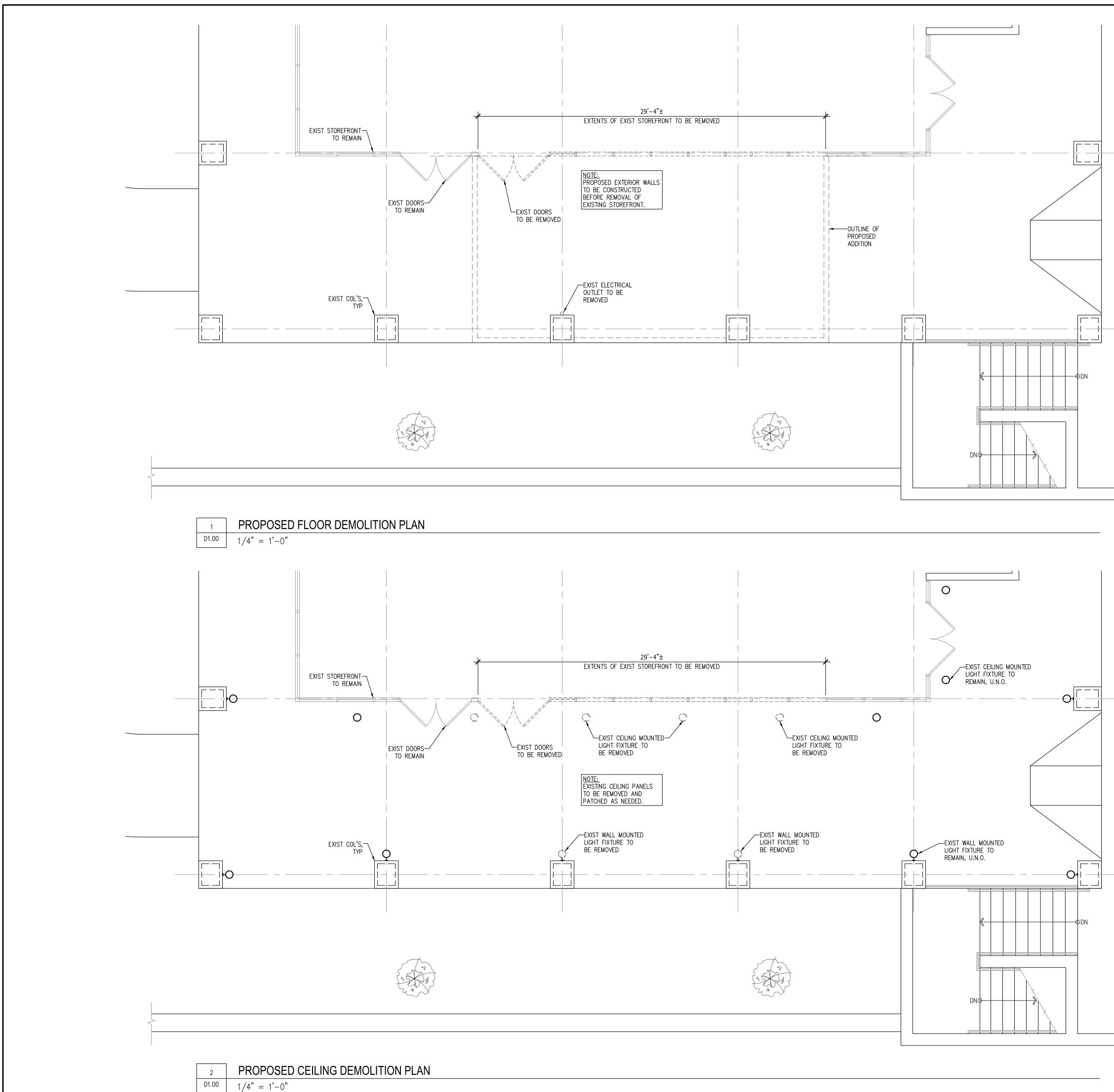
229 CHURCH STREET

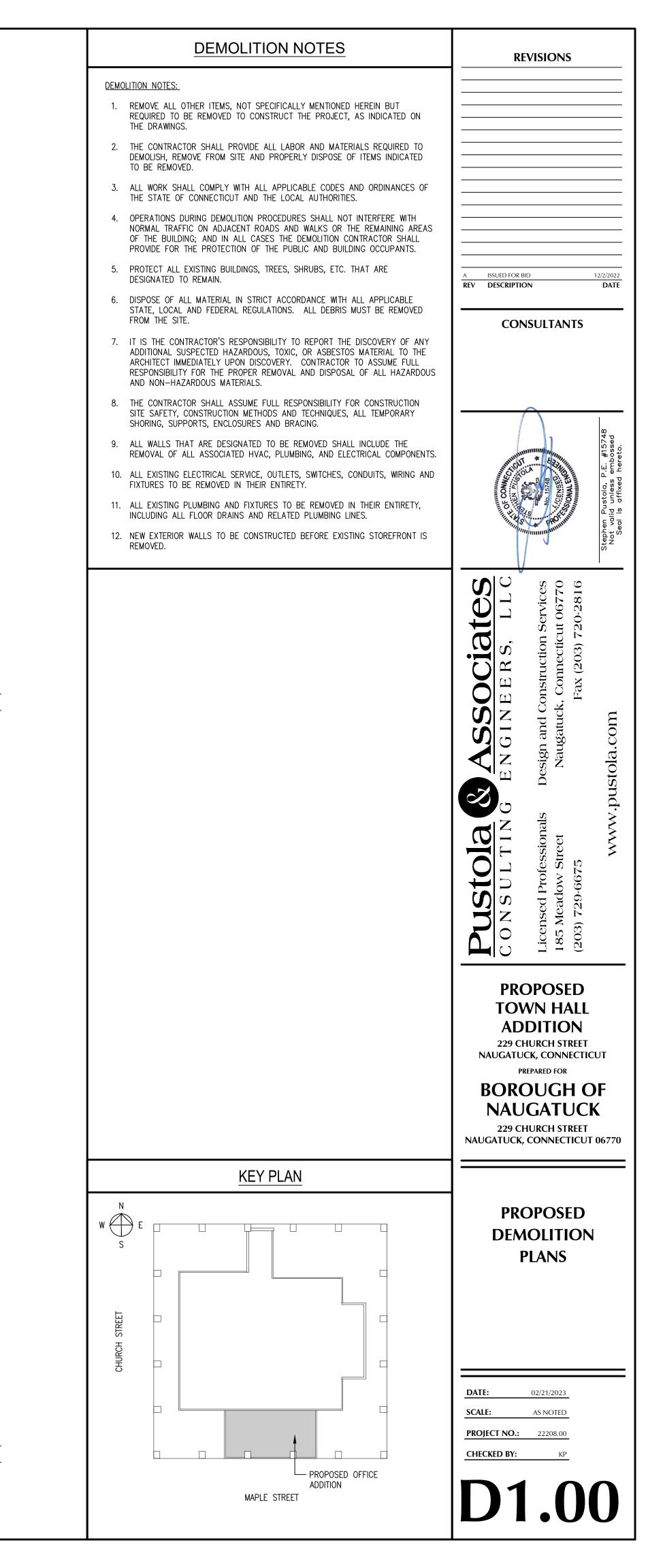
NAUGATUCK, CONNECTICUT 06770

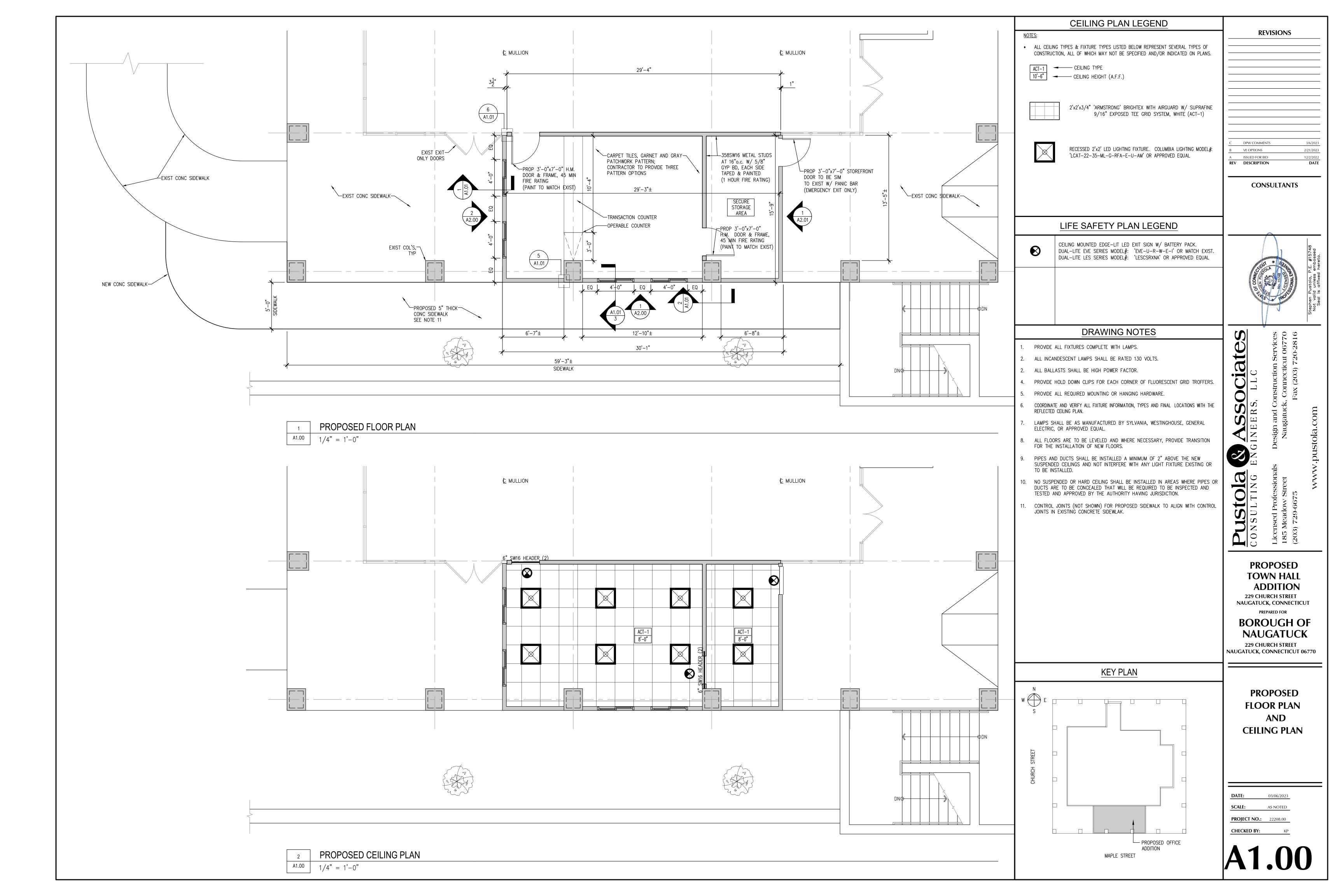
Pustola & Associates

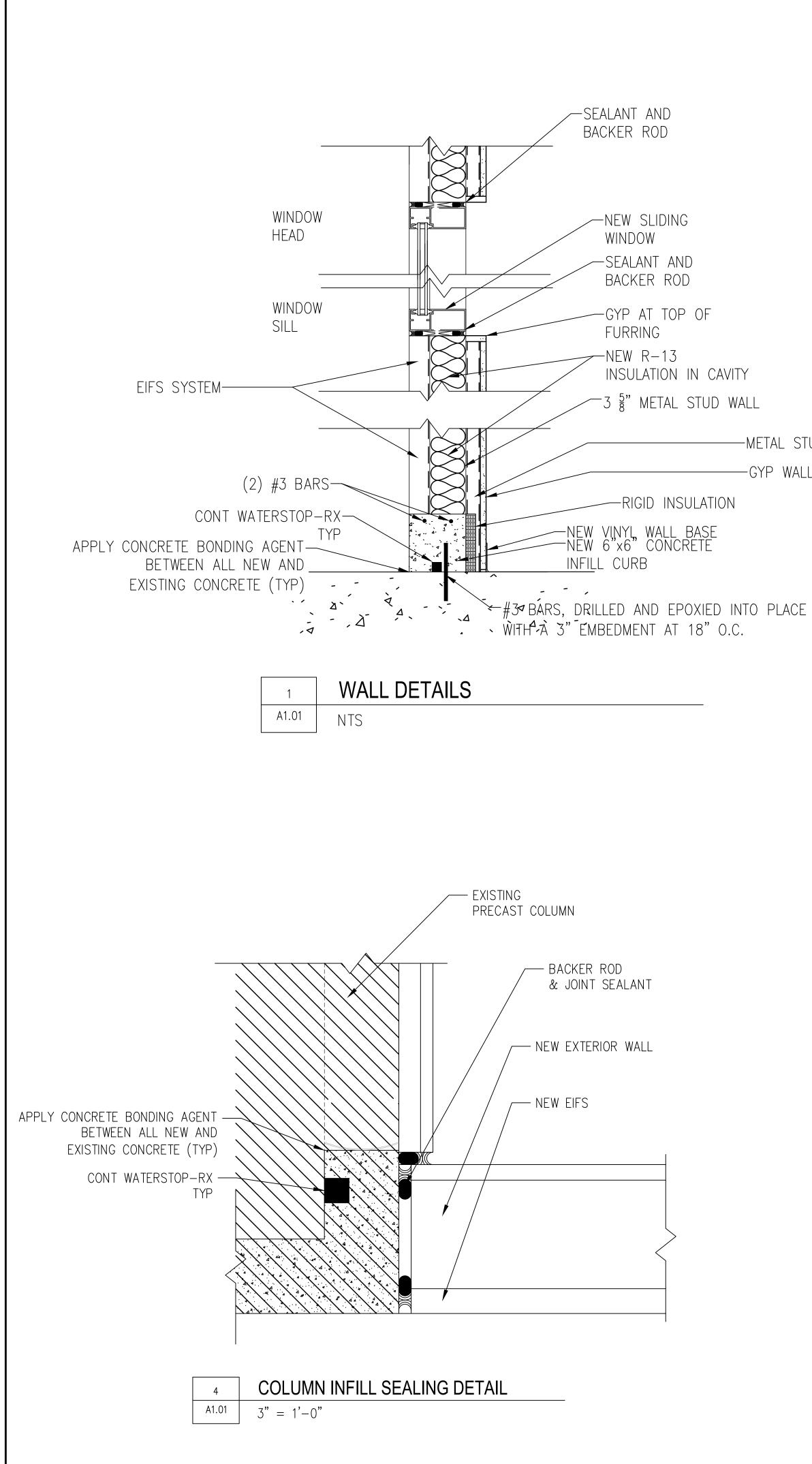
CONSULTING ENGINEERS, LLC 185 Meadow Street Naugatuck, Connecticut 06770 Ph: (203) 729-6675 Fax (203) 720-2816 WWW.pustola.com

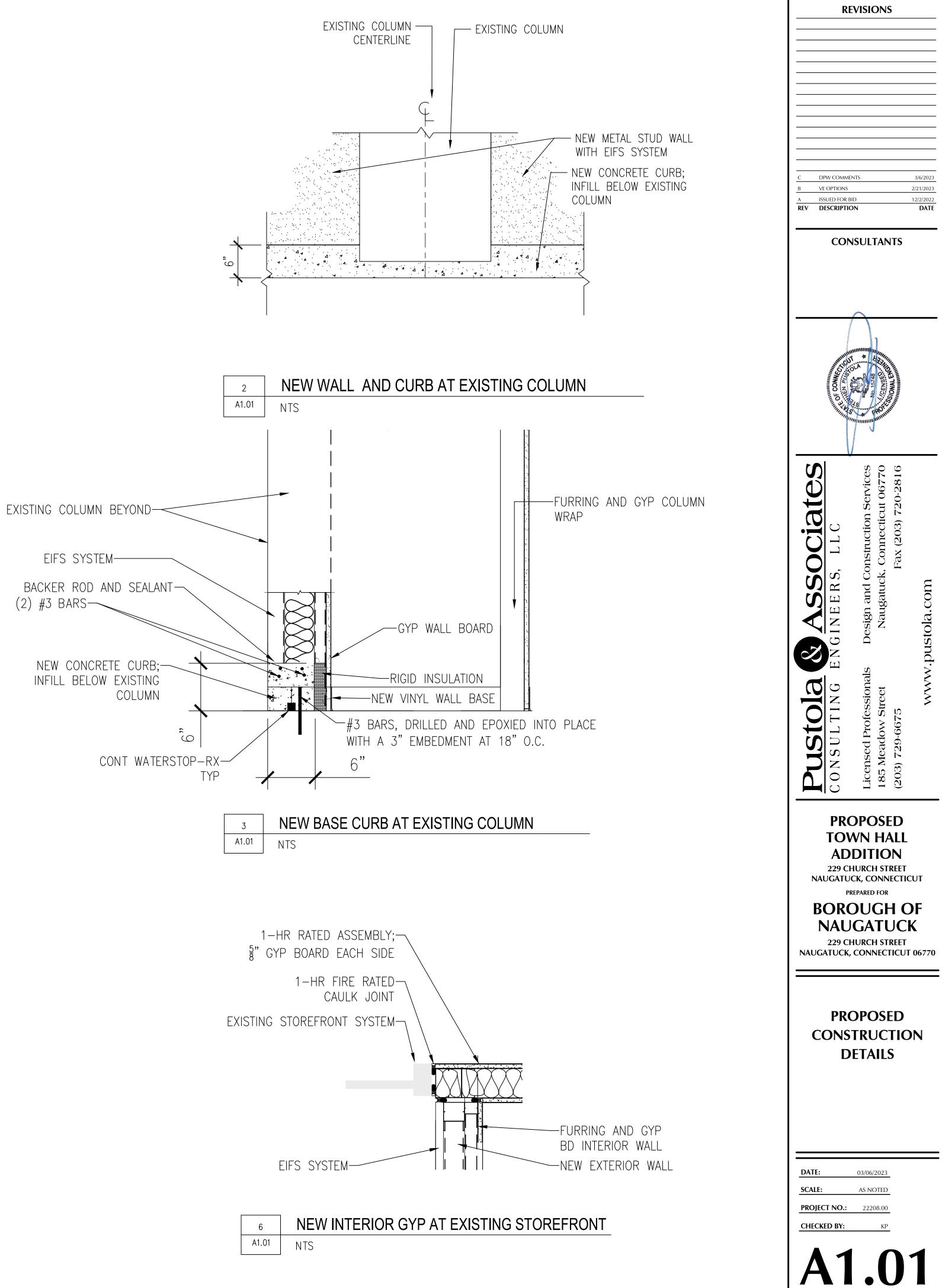
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FE	FEBRUARY 21, 2023 ISSUED O JO J HONSSI UNCHANGED Image: Constraint of the second					3/6/2023 DPW Comments				
D1.00	PROPOSED DEMOLITION P			0	0		 			
A1.00				0						
A1.01	1.01 PROPOSED CONSTRUCTION DETAILS					•	 			
A2.00	2.00 PROPOSED SOUTH & WEST EXTERIOR ELEVATIONS					•				
A2.01	A2.01 PROPOSED EAST EXTERIOR & INTERIOR WALL ELEVATIONS					•				
DA1.00	DA1.00 PROPOSED SCHEMATIC DATA CONDUIT PLAN			0	0	Ø				
\$1.00	PROPOSED FOUNDATION	PLAN		0	0	Ø				
S2.00	PROPOSED LIGHT GAUGE	METAL FRAMING DETAILS		0	0	Ø				
M.001	PROPOSED DEMOLITION P	PLANS		0	Ø	•				
M.100	MECHANICAL SPECIFICATIO	ONS		0	Ø	Ø				
E.001	ELECTRICAL NOTES AND LE	GEND		0	0	Ø				
E.100	ELECTRICAL PLAN			0	0	•				
E.200	ELECTRICAL RISER DIAGRA	M, PANEL SCHEDULES, & DETAILS		0	0					
E.300	ELECTRICAL SPECIFICATION	NS (1 OF 2)		0	0					
E.301	ELECTRICAL SPECIFICATION	NS (2 OF 2)		0	0					



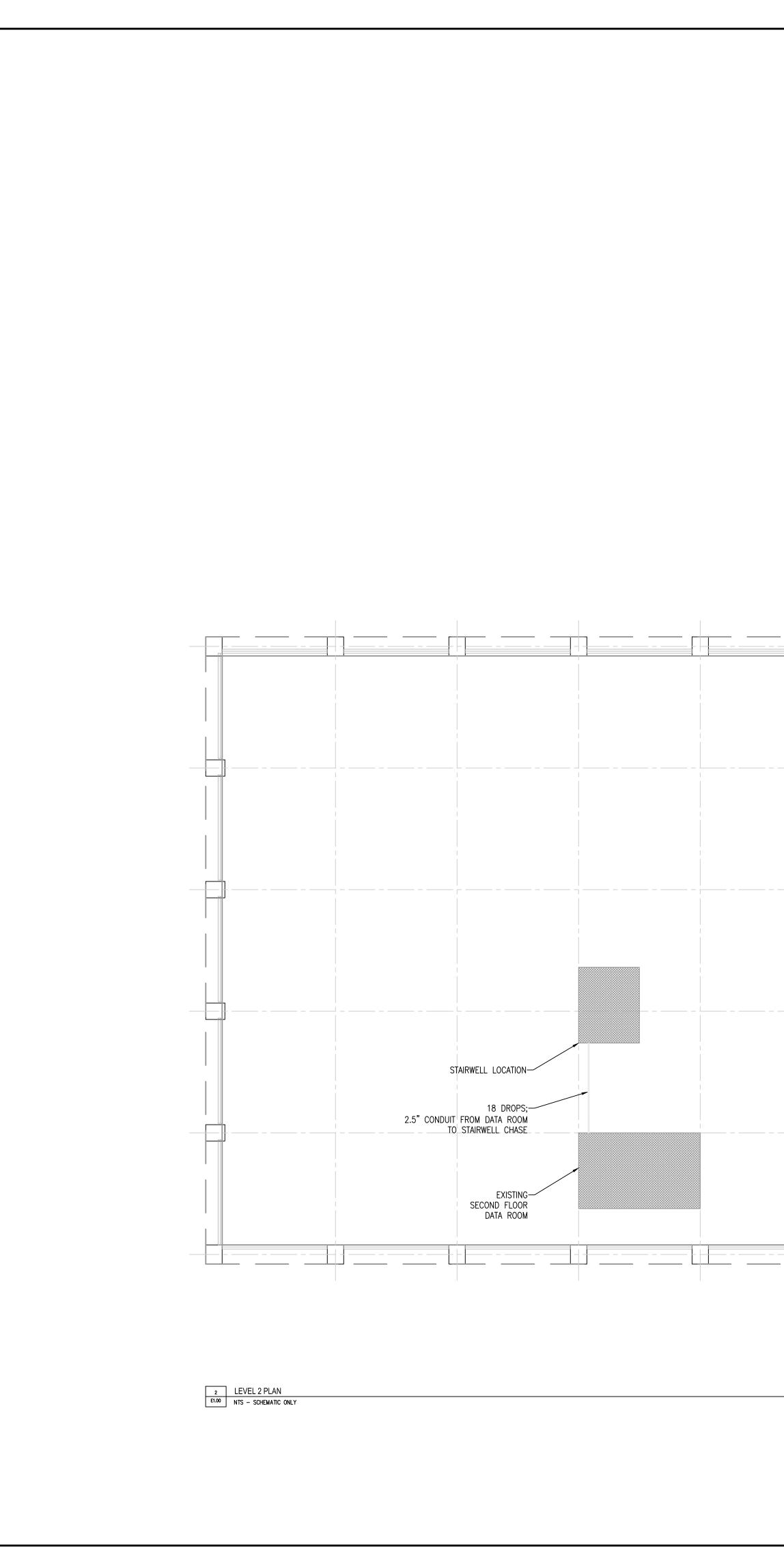


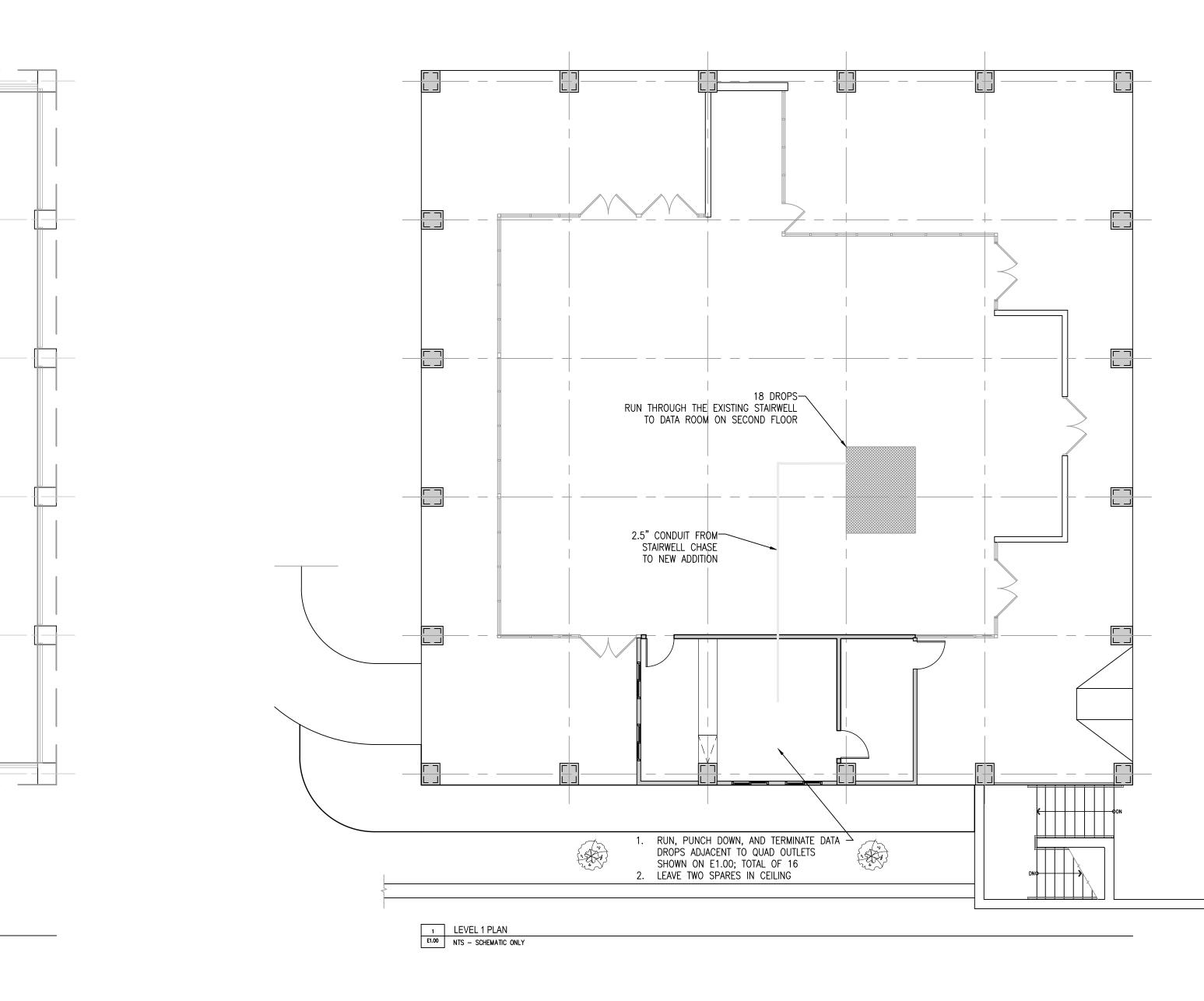


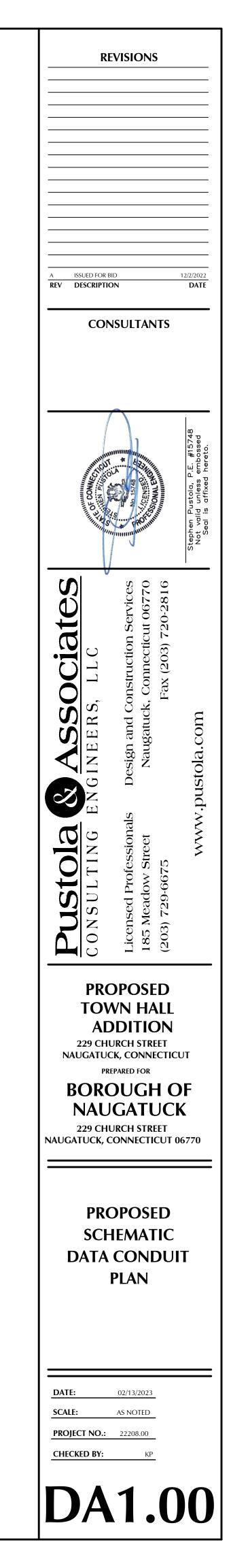




-METAL STUD FURRING -GYP WALL BOARD

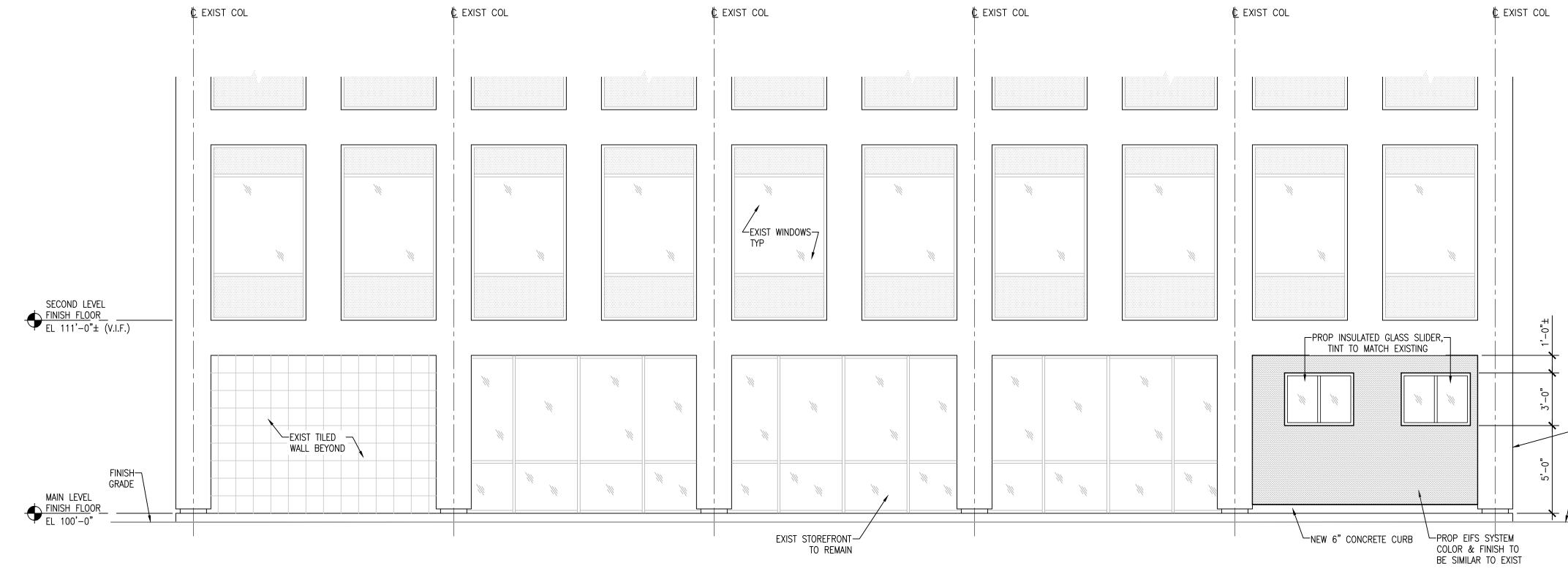






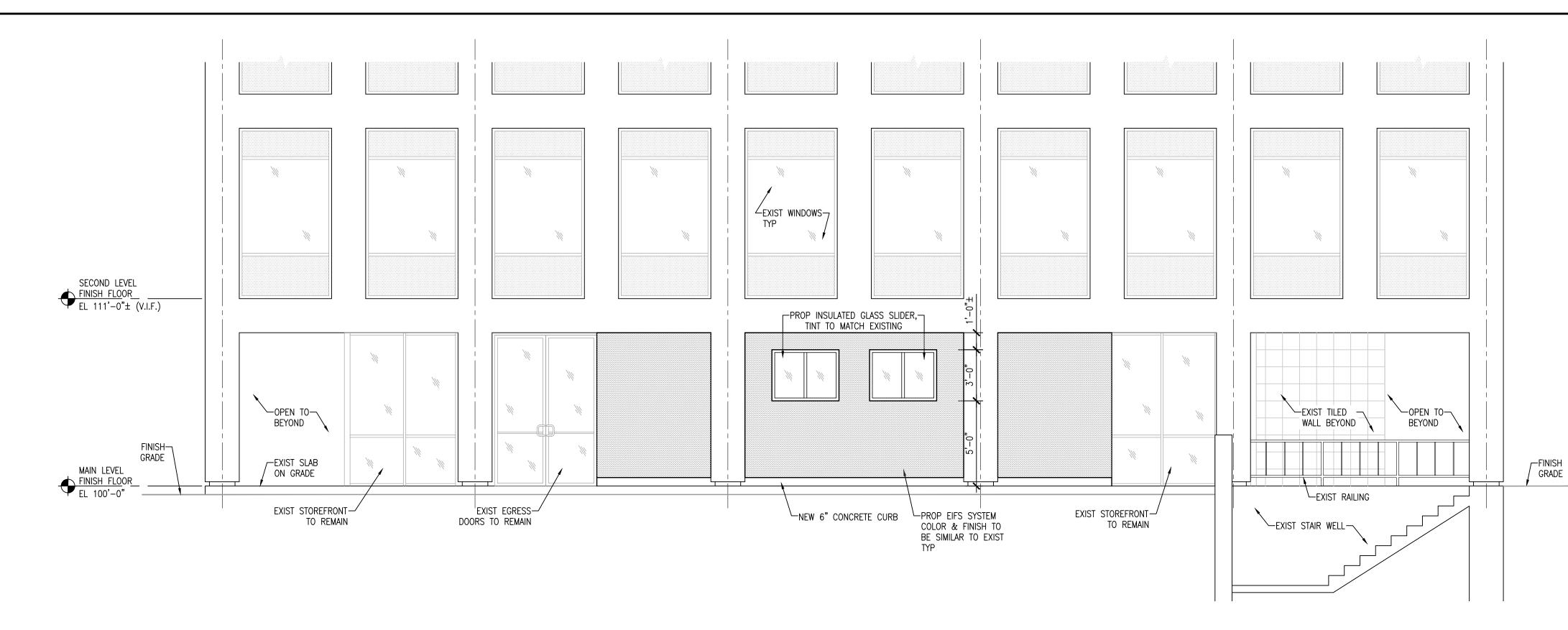


WEST ELEVATION LOOKING EAST 1/4" = 1'-0"

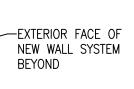




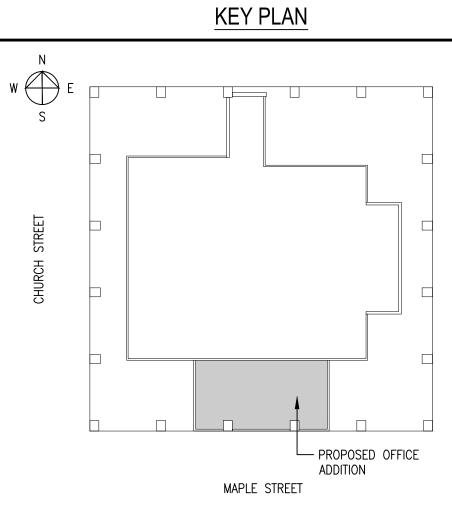
SOUTH ELEVATION LOOKING NORTH 1/4" = 1'-0"

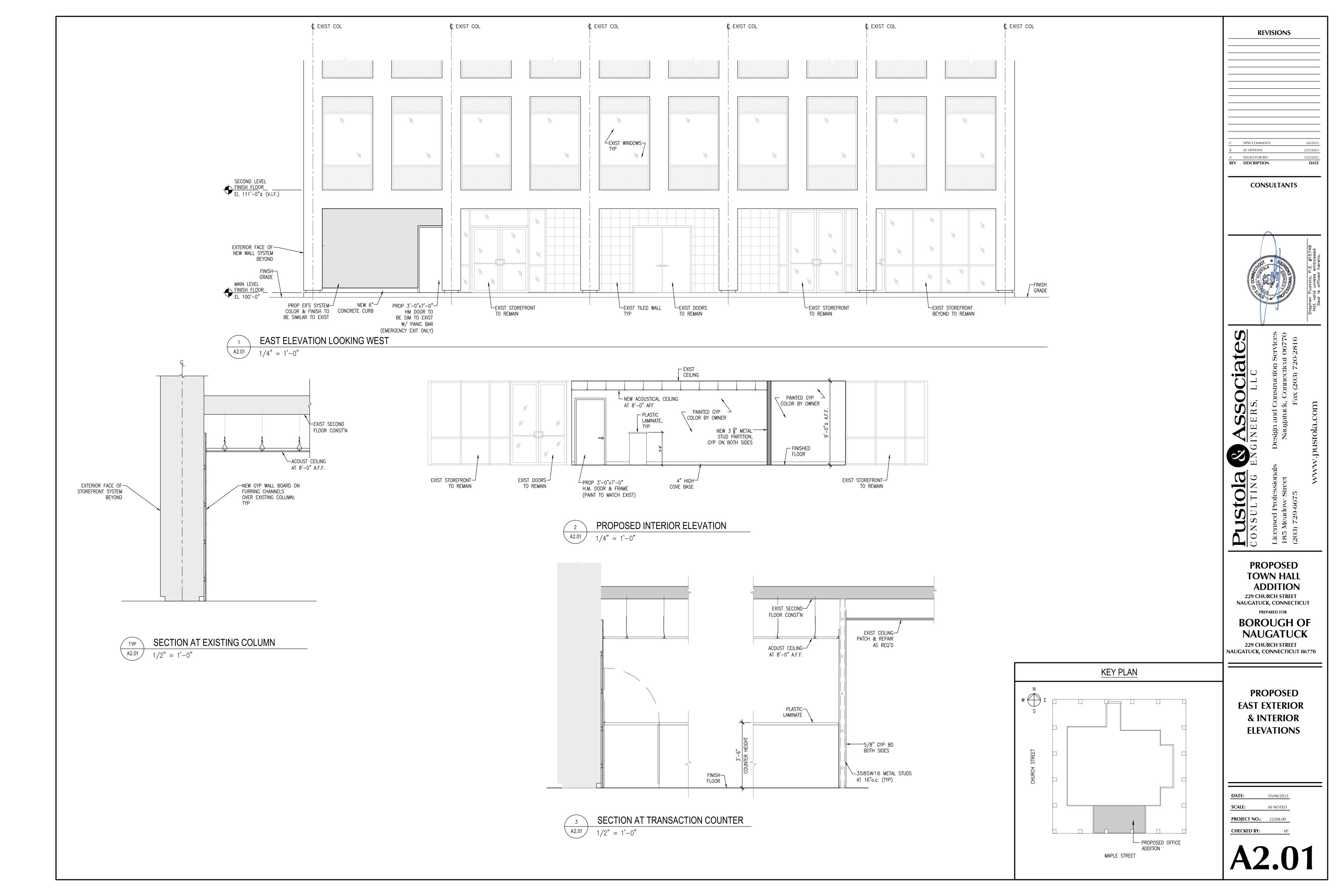


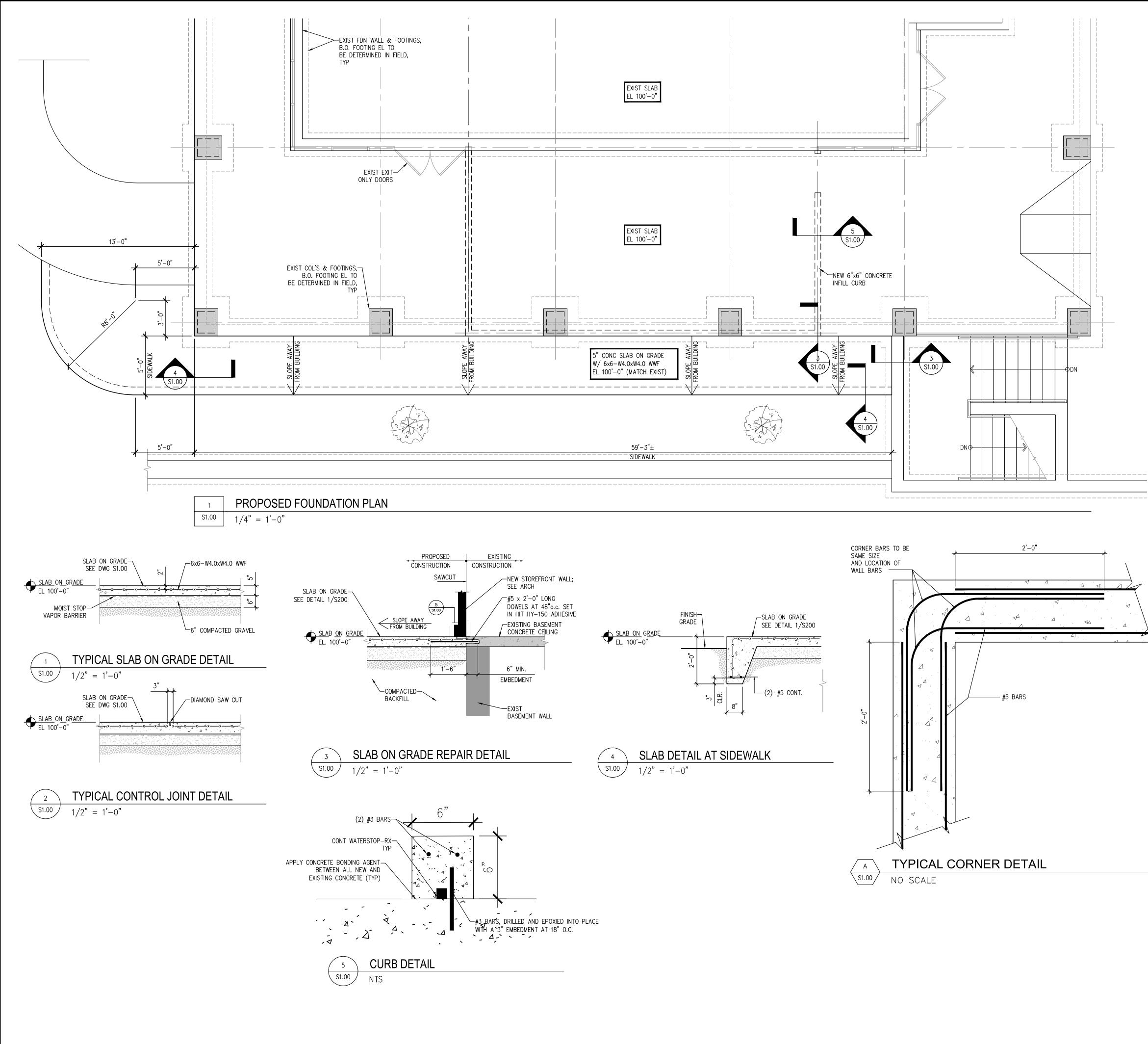




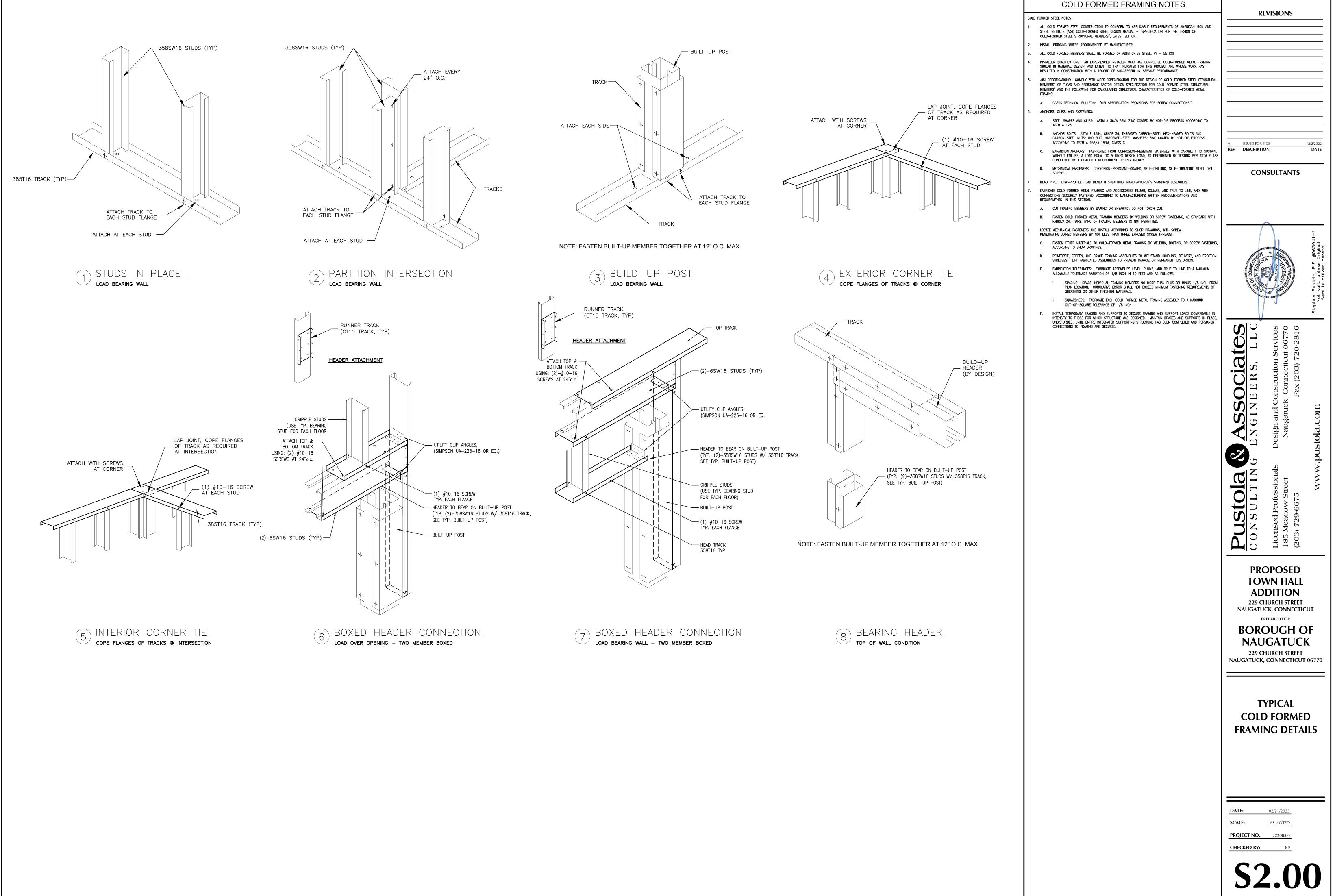
_____FINISH ______GRADE





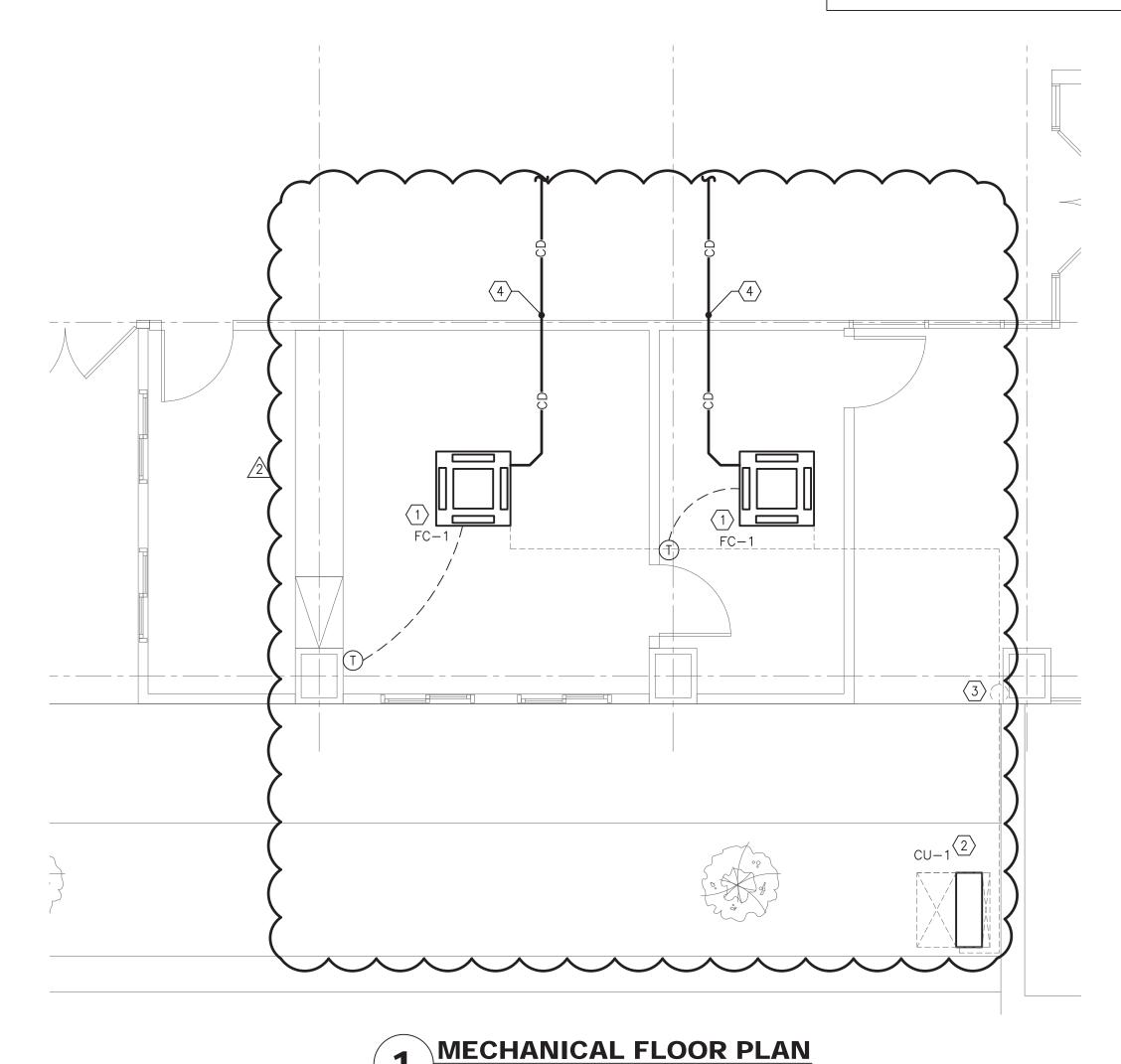


CONCRETE NOTES	REVISIONS
 ALL CONCRETE CONSTRUCTION SHALL CONFORM TO AMERICAN CONCRETE INSTITUTES "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318 – LATEST EDITION) AND SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS (ACI – LATEST EDITION). 	
 MINIMUM COMPRESSIVE STRENGTH OF CONCRETE (AT 28 DAYS) TO BE AS FOLLOWS: FOOTINGS, FOUNDATION WALLS & PIERS: 3500 PSI SLABS: 3500 PSI 	
3. WELDED WIRE FABRIC USED AS REINFORCEMENT FOR SLABS ON GRADE SHALL BE SUPPORTED BY <u>CHAIRS</u> OR <u>BOLSTERS</u> .	
 REINFORCING SHALL BE Fy = 60 ksi. CONCRETE FOUNDATION DESIGN IS BASED ON AN ASSUMED 4000 PSF SOIL BEARING 	
CAPACITY. CLIENT IS TO HIRE A GEOTECHNICAL ENGINEER TO HAVE THIS VERIFIED BEFORE CONSTRUCTION IS TO BEGIN AND NOTIFY ENGINEER OF RECORD WITH ANY DISCREPANCIES ON THIS ASSUMPTION.	
6. ALL EXPOSED INTERIOR CONCRETE SLABS TO BE SEALED.	AISSUED FOR BID12/2/2022REVDESCRIPTIONDATE
	CONSULTANTS
DRAWING NOTES	#15748 ossed
• DIMENSIONS ARE FROM FACE OF WALL TO FACE OF WALL (I.E. FACE OF GYPSUM BOARD OR MASONRY) OR FROM FACE OF EXISTING CONDITION OR FROM COLUMN	A 1574 CENSED CENSED CENSED CENSED CENSED MILLIN
CENTERLINE, UNLESS OTHERWISE NOTED. DIMENSIONS NOTED AS "CLEAR" SHALL BE FROM FINISH FACE TO FINISH FACE, (I.E. FACE OF CERAMIC TILE TO FACE OF CERAMIC TILE). VERIFY ALL EXISTING DIMENSIONS IN THE FIELD.	Stephen Pustola, P Seal is affixed
CONCRETE CONTRACTOR MUST PROVIDE & ATTACH REBAR SAFETY CAPS ON ALL EXPOSED REBAR.	Step.
 ALL SLABS TO BE ONE CONTINUOUS POUR. EXISTING FOUNDATION STRUCTURES TO BE VERIFIED IN FIELD BY CONTRACTOR. ENGINEER IS TO BE NOTIFIED IF ANY DISCREPANCIES BETWEEN FIELD CONDITIONS AND 	L C L C L C 770 816
PROPOSED DRAWINGS EXIST.	ASSOCIATES E N G I N E E R S, L L C Design and Construction Services Naugatuck, Connecticut 06770 Fax (203) 720-2816 Fax (203) 720-2816 stola.com
	R S, R S, Intection (203)
	E E E Constr Constr Fax
	G I N G I N gatuc
	E N E N Nau Nau Stola.
	T I N C
FOUNDATION PLAN LEGEND	
T.O. WALL 100'-0"TOP OF PIER OR FOUNDATION WALL EL	Pusto C O N S U L Licensed Profes 185 Meadow Si (203) 729-6675
B.O. FTG 96'-0"BOTTOM OF FOOTING EL	Llice C C C C C C C C C C C C C C C C C C C
MINIMUM DEVELOPMENT LENGTHS (in) BAR SIZE BARS IN TENSION BARS IN COMPRESSION	PROPOSED
BAR SIZEBARS IN TENSIONBARS IN COMPRESSION4191552420	TOWN HALL ADDITION
$ \begin{array}{c ccccccccccccccccccccccccccccccccccc$	229 CHURCH STREET NAUGATUCK, CONNECTICUT PREPARED FOR
8 48 30 9 54 34	BOROUGH OF
10 60 38	NAUGATUCK 229 CHURCH STREET NAUGATUCK, CONNECTICUT 06770
KEY PLAN	
	PROPOSED
	FOUNDATION PLAN
	DATE: 02/21/2023
	SCALE: AS NOTED PROJECT NO.: 22208.00
PROPOSED OFFICE	CHECKED BY: KP
ADDITION MAPLE STREET	S1.00



MECHANICAL PLAN NOTES

- (1) PROVIDE NEW CEILING CASSETTE FAN COIL FC-1. PROVIDE WITH MANUFACTURER SIMPLE WALL MOUNTED THERMOSTAT. ASSOCIATED CONDENSER CU-1 LOCATED OUTSIDE AT GRADE. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- $\langle 2 \rangle$ provide New Condenser CU-1 to serve fan Coil FC-1. Mount unit on 24" STAND FOR WINTER OPERATION. SIZE AND INSTALL REFRIGERANT PIPING PER MANUFACTURER'S INSTALLATION INSTRUCTIONS.
- (3) PROPOSED REFRIGERANT PIPE ROUTING SHOWN. ROUTE PIPING UP ALONG COLUMN TO AVOID ROUTING PIPING ACROSS WALKING PATH.
- $\langle 4 \rangle$ ROUTE 1–1/4" CONDENSATE DRAIN (CD) FROM CEILING MOUNTED FAN COIL UNIT TO EXISTING JAN CLOSET AND DISCHARGE TO EXISTING MOP SINK INDIRECTLY. COORDINATE EXACT ROUTING IN FIELD.



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

GENERAL NOTES

- 1. THESE DRAWINGS ARE GENERALLY DIAGRAMMATIC AND ARE INTENDED TO CONVEY THE SCOPE OF WORK AS WELL AS INDICATE GENERAL ARRANGEMENT OF EQUIPMENT, DUCTWORK AND PIPING. THE CONTRACTOR SHALL ADHERE TO THESE DRAWINGS AS CLOSELY AS POSSIBLE. HOWEVER, THE RIGHT IS RESERVED TO VARY THE RUNS OF DUCTWORK AND PIPING AND TO MAKE OFFSETS, WHERE NECESSARY, TO ACCOMMODATE CONDITIONS ARISING AT THE JOB SITE. THE CONTRACTOR SHALL PREPARE SHOP DRAWINGS TO BE SUBMITTED TO THE ENGINEER FOR APPROVAL. NO WORK SHALL BE PERFORMED PRIOR TO RECEIPT OF EQUIPMENT, DUCTWORK AND PIPING FABRICATION DRAWING APPROVAL.
- 2. ANY MATERIAL, WORK OR INCIDENTAL ACCESSORIES OR MINOR DETAILS NOT SHOWN BUT NECESSARY TO MAKE THE WORK COMPLETE IN ALL RESPECTS AND READY FOR OPERATION, EVEN IF NOT PARTICULARLY SHOWN ON THE DRAWINGS, SHALL BE PROVIDED BY THE CONTRACTOR WITHOUT ADDITIONAL EXPENSE TO THE OWNER.
- 3. DUCT SIZES SHOWN ON DRAWINGS ARE CLEAR INSIDE DIMENSIONS, WHERE ACOUSTICALLY LINED DUCT IS SPECIFIED. DUCT DIMENSIONS SHALL BE INCREASED TO ACCOMMODATE LINING.
- 4. ALL LOW PRESSURE TERMINAL BRANCH DUCTWORK (SUPPLY AND RETURN) SHALL BE PROVIDED WITH VOLUME CONTROL DAMPERS. ALL BRANCH DUCT VOLUME DAMPERS SERVING DIFFUSERS IN GYPSUM BOARD CEILINGS (OTHERWISE INACCESSIBLE) SHALL BE REMOTELY (CORD OR CABLE) OPERABLE THROUGH THE FACE OF THE DIFFUSER.
- 5. THERMOSTAT LOCATIONS SHALL BE COORDINATED WITH THE ARCHITECTURAL DRAWINGS, FINISHED PAINT COLOR TO BE SELECTED BY THE ARCHITECT. 48" ABOVE FINISHED FLOOR.
- 6. WHERE PIPING CONNECTIONS FOR EQUIPMENT SUCH AS PUMPS, AC UNITS, COIL, ECT, DIFFER FROM THE LINE SIZE PIPING. IT SHALL BE THE RESPONSIBILITY OF THE MECHANICAL CONTRACTOR TO FURNISH AND INSTALL THE NECESSARY REDUCER/EXPANDER FITTINGS TO ENABLE CONNECTION BETWEEN THE PIPING SYSTEM AND THE EQUIPMENT.
- PROVIDE ONE THERMOSTAT FOR EACH FAN COIL UNIT, ATTIC VENT AIR 7. FAN UNIT, VAV, FPB, CABINET UNIT HEATER AND ELECTRIC BASEBOARD RADIATION. THERMOSTAT LOCATIONS SHALL BE AS SHOWN ON PLANS AND/OR WHERE DIRECTED AND APPROVED BY THE ARCHITECTS AND ENGINEERS.
- 8. BORDER TYPES AND METHOD OF ATTACHMENT FOR ALL DIFFUSERS, GRILLES AND REGISTERS SHALL BE COORDINATED WITH THE ARCHITECTURAL CEILING DETAILS AND SPECIFICATIONS.
- 9. REFER TO SPECIFICATIONS FOR ACOUSTIC LINING REQUIREMENTS NOT SHOWN ON THE DRAWINGS.
- 10. ALL PIPING SHALL BE INSTALLED TIGHT TO THE BOTTOM OF STEEL AT ALL TIMES UNLESS OTHERWISE INDICATED OR REQUIRED BY FIELD CONDITIONS.
- 11. ALL PIPING OF DISSIMILAR MATERIALS SHALL HAVE DIELECTRIC FITTINGS.
- 12. ALL HVAC EQUIPMENT THAT CONTAINS A COILING COIL OR FUEL FIRED APPLIANCE WILL BE PROVIDED WITH A SECONDARY DRAIN PAN AND A MOISTURE SENSOR THAT WILL AUTOMATICALLY SHUT THE UNIT DOWN WHEN MOISTURE IS DETECTED.

ATC	AUTOMATIC TEMPERATURE CONTROL
CD-A	DIFFUSER TYPE – REFER TO SCHEDULE
BMS	BUILDING MANAGEMENT SYSTEM
BTU	BRITISH THERMAL UNITS
CC	COOLING COIL
CFM	CUBIC FEET PER MINUTE
EAT	ENTERING AIR TEMPERATURE
EF	EXHAUST FAN
FC	FAN COIL
FLA	FULL LOAD AMPS
HZ	HERTZ
KW	KILOWATT
LAT	LEAVING AIR TEMPERATURE
MBH	THOUSAND BTU PER HOUR
MCA	MINIMUM CIRCUIT AMPS
NIC	NOT IN CONTRACT
PH	PHASE
PSI	POUNDS PER SQUARE INCH
SHC	SENSIBLE COOLING (IN MBH)
TC	TOTAL COOLING (IN MBH)
TYP	TYPICAL
۷	VOLTS
VD	VOLUME DAMPER
WMS	WIRE MESH SCREEN

OTH G LOCATION QTY. LOUING HEATING OF LIGNING LIMIT MANUAL #FAND REFRIG SEER WEIGHT LOCATION WARAUNACIDAL CU-1 GRADE 1 24 MBH 26 MBH 23'F - 115'F -13'F - 70'F 1 R-410A 21.5 190 LBS 17.0 208 1 MUTSUBISHI MUTSUBISHI N NOTES: Image: Comparison of the comparison
NOTES: 1. PROVIDE WITH FACTORY WIRED NEMA 3R DISCONNECT SWITCH. 2. SIZE AND INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. 3. MOUNT UNIT ON 24" STAND AT GRADE. 4. PROVIDE WITH MANUFACTURER MSDD-50TR-E DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. FAN COIL UNITS INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF THE DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. INTERCENT OF TO TALL
1. PROVIDE WITH FACTORY WIRED NEMA 3R DISCONNECT SWITCH. 2. SIZE AND INSTALL REFRIGERANT PIPING IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS. 3. MOUNT UNIT ON 24" STAND AT GRADE. 4. PROVIDE WITH MANUFACTURER MSDD-50TR-E DISTRIBUTION PIPE FOR CONNECTION TO TWO INDOOR UNITS. FAN COIL UNITS UNIT LOCATION NOM TOTAL HEATING CFM OA SP REFRIG LECTRICAL DATA MANUFACTURER MODEL
UNIT LOCATION NOM TOTAL HEATING CFM OA SP REFRIG <u>ELECTRICAL DATA MANUFACTURER</u> QTY PASE MODEL
TAG SERVICE TONS COOLING HEATING CFM OA SP REFRIG MCA VOLTS PHASE MODEL QTY F
FC-1 CEILING 1.0 12 MBH 13 MBH 530 0 - R-410A POWERED BY MITSUBISHI 2
NOTES: 1. PROVIDE MANUFACTURER SIMPLE WALL MOUNTED THERMOSTAT.

MECHANICAL DUCTWORK SYMBOL LIST

	NEW SUPPLY DUCT
	NEW RETURN DUCT
	ACOUSTICALLY LINED DUCT
	NEW EQUIPMENT
18X12	DUCT SIZE (FIRST FIGURE INDICATES HORIZONTAL SIZE)
180-	ROUND DUCT DIAMETER
	TRANSITION FROM RECTANGULAR TO ROUND OR OVAL DUCT
2 - 000-2	FLEXIBLE CONNECTION
₽-L-V.D.	VOLUME DAMPER
\boxtimes	SUPPLY CEILING DIFFUSER
	RETURN CEILING GRILLE OR REGISTER
	SUPPLY DUCT UP
X	SUPPLY DUCT DOWN
	RETURN OR EXHAUST DUCT UP
	RETURN OR EXHAUST DUCT DOWN
`	ELBOW WITH TURNING VANES
`	RADIUS ELBOW
,,	DUCT SPLIT OR BRANCH TAKEOFF
$\overline{\mathbb{T}}$	THERMOSTAT - WALL OR DUCT MOUNTED
$\langle \mathbf{X} \rangle$	MECHANICAL PLAN NOTE TAG
\bigtriangleup	REVISION SYMBOL

ENSING UNIT SCHEDULE

NG 1	TEMP RANGE	#FANS			WEIGUT	ELECTRICAL DATA			MANUFACTURER	DEMADIZS	
G	HEATING	#COMP	REFRIG	SEER	WEIGHT	MCA	VOLTS	PHASE	MODEL	REMARKS	$\left \right\rangle$
5 ° F	-13°F - 70°F	1 1	R-410A	21.5	190 LBS	17.0	208	1	MITSUBISHI PUZ-HA24NHA1	NOTES 1-3	2

METHING OF MILENNIO MCA VOLIS PHASE MODEL QT
13 MBH 530 0 - R-410A POWERED BY MITSUBISHI 2

MECH	ANICAL DRAWING INDEX
DRAWING NO.	DRAWING TITLE
M.001	MECHANICAL NOTES, LEGEND, AND FLOOR PLAN
M.100	MECHANICAL SPECIFICATIONS

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	SULTI MUCO NO NO NO NO NO NO NO NO NO NO NO NO NO		Stephen Pustola, P.E. #15748 Not valid unless embossed
a & Associates	ENGINEERS, LLC	Design and Construction Services Naugatuck, Connecticut 06770 Eav (202) 720.2816	
Pustola 8	C O N S U L T I N G	Licensed Professionals 185 Meadow Street	
BO	TOV AD 229 (JGATUC ORC JAU 229 (DPOSEE VN HAL DITION CHURCH ST. CK, CONNECT DUGH GATUC CHURCH ST. CONNECTIC	L N TICUT OF CK
		HANIC OR PLA	
DATE: SCALE: PROJEC	T NO.:	09/27/2022 AS NOTED 22208.00	

MECHANICAL SPECIFICATIONS

<u> PART 1 – GENERAL</u>

- 1.01 GENERAL REQUIREMENTS
- A. INSTALL ALL NEW WORK IN A NEAT WORKMANLIKE MANNER READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR.
- B. CODES, PERMITS AND INSPECTIONS:
- 1. ALL WORK SHALL COMPLY WITH REQUIREMENTS OF CONNECTICUT BUILDING CODE, NAUGATUCK BUILDING DEPARTMENT, BUILDING MANAGEMENT, AND ALL AUTHORITIES HAVING JURISDICTION AND APPLICABLE NATIONAL, STATE AND LOCAL CODES, LAWS AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK SHALL BE INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS. CONTRACTOR IS TO INFORM ENGINEER OF ANY EXISTING WORK OR MATERIALS WHICH VIOLATE ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED AT THE CONTRACTOR'S EXPENSE BY THIS CONTRACTOR AND AT NO EXPENSE TO THE OWNER.
- 2. THIS CONTRACTOR SHALL OBTAIN ALL EQUIPMENT APPROVALS AS REQUIRED BY STATE AND LOCAL AUTHORITIES. PERMITS SHALL BE TURNED OVER TO OWNER AT JOB COMPLETION
- C. SITE VERIFICATION:
- 1. PRIOR TO SUBMISSION OF THE BID, THIS CONTRACTOR SHALL VISIT THE JOB SITE TO ASCERTAIN THE ACTUAL FIELD CONDITIONS AS THEY RELATE TO THE WORK INDICATED ON THE DRAWINGS AND DESCRIBED HEREIN. DISCREPANCIES, IF ANY, SHALL BE BROUGHT TO THE ENGINEER'S ATTENTION PRIOR TO SUBMISSION OF THE BID. AND IF NOT RESOLVED TO SATISFACTION, SHALL BE SUBMITTED AS A WRITTEN QUALIFICATION OF THE BID. SUBMISSION OF A BID SHALL BE EVIDENCE THAT SITE VERIFICATION HAS BEEN PERFORMED AS DESCRIBED ABOVE.
- D. CONTRACT DOCUMENTS:
- 1. PRIOR TO SUBMISSION OF A FORMAL BID, THIS CONTRACTOR SHALL REVIEW ALL DRAWINGS OF THE ENTIRE PROJECT INCLUDING GENERAL CONSTRUCTION, DEMOLITION, ARCHITECTURAL, MECHANICAL, ELECTRICAL, PLUMBING AND SPRINKLER AND SHALL INCLUDE ANY WORK REQUIRED IN THE BID WHICH IS INDICATED OR IMPLIED TO BE PERFORMED BY THIS TRADE IN OTHER SECTIONS OF THE WORK.
- 2. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF WORK AND APPROXIMATE LOCATION OF EQUIPMENT. REFER TO ARCHITECTURAL DRAWINGS FOR ALL DIMENSIONS AND COORDINATE FINAL LOCATIONS OF DIFFUSERS, GRILLES, REGISTERS, THERMOSTATS, SENSORS, SWITCHES AND ANY WALL MOUNTED DEVICES. ALL WORK SHALL BE COORDINATED WITH OTHER TRADES TO AVOID CONFLICT.
- 3. IF A CONFLICT OCCURS IN THE SPECIFICATIONS AND/OR ON THE DRAWINGS, THE MORE STRINGENT SITUATION SHALL APPLY.
- E. GUARANTEE:
- 1. ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED FOR A PERIOD OF ONE YEAR FROM DATE OF FINAL ACCEPTANCE OF THIS WORK. FINAL ACCEPTANCE SHALL BE DEFINED AS THE TIME AT WHICH THE MECHANICAL WORK IS TAKEN OVER AND ACCEPTED BY THE OWNER, AND IS UNDER CARE, CUSTODY, AND CONTROL OF THE OWNER. ENGAGE THE SERVICES OF VARIOUS MANUFACTURERS SUPPLYING THE EQUIPMENT FOR THE PROPER STARTUP AND OPERATION OF ALL SYSTEMS INSTALLED. INSTRUCT THE OWNER'S PERSONNEL IN THE PROPER OPERATION AND SERVICING OF THE SYSTEM.
- 2. THE CONTRACTOR SHALL GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN THE GUARANTEE PERIOD. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL INCLUDE RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THIS CONTRACTOR.
- 3. THIS CONTRACTOR IS RESPONSIBLE FOR THE MAINTENANCE AND OPERATION OF ALL SYSTEMS UNTIL THE FINAL ACCEPTANCE OF THE WORK.
- 4. ALL AIR CONDITIONING UNIT COMPRESSORS AND REFRIGERATION COMPONENTS SHALL HAVE A 5-YEAR WARRANTY.
- F. THE GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION AIA DOCUMENT A201, LATEST EDITION, OR AS REQUIRED BY THE ARCHITECT'S DOCUMENTS, AND/OR THE STRUCTURAL ENGINEER'S DOCUMENTS, AS APPLICABLE, ARE PART OF THIS CONTRACT.
- G. DEFINITIONS:
- 1. MECHANICAL CONTRACTOR, "THIS CONTRACTOR" THE PARTY OR PARTIES HAVE BEEN DULY AWARDED THE CONTRACT FOR AND ARE THEREBY MADE RESPONSIBLE FOR THE MECHANICAL WORK AS DESCRIBED HEREIN.
- 2. "THIS CONTRACT", "THE CONTRACT" THE AGREEMENT COVERING THE WORK TO BE PERFORMED BY THIS CONTRACTOR.
- 3. "APPROVED", "EQUAL", "SATISFACTORY", "ACCEPTED", "ACCEPTABLE", "EQUIVALENT" - SUITABLE FOR USE ON THE PROJECT. AS DETERMINED BY THE ENGINEER BASED ON DOCUMENTS PRESENTED FOR SUCH DETERMINATION.
- 4. "THESE SPECIFICATIONS", "THIS SECTION, PART, DIVISION" (OF THE SPECIFICATION) - THE DOCUMENT SPECIFYING THE WORK TO BE PERFORMED BY "THIS CONTRACTOR".
- 5. "THE MECHANICAL WORK". "THIS WORK" ALL LABOR MATERIALS. EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES, AND OTHER ITEMS REQUIRED FOR A PROPER AND COMPLETE INSTALLATION BY THE MECHANICAL CONTRACTOR.
- 6. "ARCHITECT", "ENGINEER", "OWNER'S REPRESENTATIVE" THE PARTY OR PARTIES RESPONSIBLE FOR INTERPRETING, ACCEPTING AND OTHERWISE RULING ON THE PERFORMANCE UNDER THIS CONTRACT.
- 7. "FURNISH" PURCHASE AND DELIVER TO THE PROJECT SITE COMPLETE WITH EVERY NECESSARY APPURTENANCE AND SUPPORT, ALL AS PART OF THE MECHANICAL WORK.
- 8. "INSTALL" UNLOAD AT THE DELIVERY POINT AT THE SITE AND PERFORM EVERY OPERATION NECESSARY TO ESTABLISH SECURE MOUNTING INSTALLATION AND CORRECT OPERATION AT THE PROPER LOCATION IN THE PROJECT, ALL AS PART OF THE MECHANICAL
- 9. "PROVIDE" "FURNISH" AND "INSTALL".
- 10. "NEW" MANUFACTURED WITHIN THE PAST TWO YEARS AND NEVER BEFORE USED.

- 11. "RELOCATE" MOVE EXISTING EQUIPMENT AND ALL ACCESSORIES AS REQUIRED.
- 12. "REMOVE" DISMANTLE AND CART AWAY FROM SITE INCLUDING ALL RELATED ACCESSORIES. ALL ITEMS SHALL BE LEGALLY DISPOSED OF. ALL OTHER EQUIPMENT AND OPERATIONS IN ANY WAY AFFECTED BY THE REMOVAL IS TO REMAIN IN FULL OPERATION. PROVIDE ALL NECESSARY COMPONENTS TO MAINTAIN SUCH OPERATION.
- 1.02 <u>SCOPE OF WORK</u>
- A. PROVIDE ALL LABOR, MATERIALS, EQUIPMENT, AND CONTRACTOR'S SERVICES NECESSARY FOR COMPLETE, SAFE INSTALLATION OF ALL MECHANICAL WORK. THE SCOPE OF WORK SHALL INCLUDE BUT NOT BE LIMITED TO THE FOLLOWING:
- 1. DEMOLITION AND REMOVAL OF ITEMS AS REQUIRED.
- 2. DUCTWORK AND DUCTWORK ACCESSORIES.
- 3. INSULATION OF PIPING, EQUIPMENT AND DUCTWORK.
- 4. TESTING AND BALANCING.
- 5. CUTTING AND PATCHING.
- 6. SHOP DRAWINGS.
- 7. AS-BUILT DRAWINGS.
- 8. OPERATING AND MAINTENANCE MANUALS.
- 9. FULL COORDINATION WITH OTHER TRADES.
- 10. WARRANTY AND GUARANTY.
- 11. PHASING AS REQUIRED BY OWNER, CONSTRUCTION MANAGER, GENERAL CONTRACTOR OR BUILDING MANAGEMENT.
- 12. PREMIUM TIME FOR WORK TO BE PERFORMED AFTER-HOURS AS REQUIRED BY BUILDING MANAGEMENT AND/OR OWNER. 13. FILING, PERMITS, CONTROLLED INSPECTIONS.
- 14. FULL TESTING AND STARTUP OF ALL SYSTEMS.
- B. SECURE CERTIFICATES, PAY ALL FEES AND CHARGES FOR ALL WORK INSTALLED, CERTIFYING COMPLIANCE WITH ALL AUTHORITIES. DELIVER CERTIFICATES TO OWNER FOR SIGNING BEFORE FILING
- 1.03 COORDINATION WITH BUILDING MANAGEMENT
- A. THIS CONTRACTOR IS TO OBTAIN A COPY OF THE BUILDING RULES AND REGULATIONS PRIOR TO BID SUBMISSION TO DETERMINE THE REQUIREMENTS AND THE EXTENT OF PREMIUM TIME WORK REQUIRED BY THE BUILDING.
- B. THIS CONTRACTOR IS RESPONSIBLE FOR ADHERING TO THE BUILDING OWNER'S RULES AND REGULATIONS. ANY DISCREPANCIES BETWEEN THE CONTRACT DOCUMENTS AND THE BUILDING RULES AND REGULATIONS SHALL BE SUBMITTED IN WRITING TO THE ARCHITECT/ENGINEER FOR REVIEW WITH BID SUBMISSION.
- C. COORDINATE WITH BUILDING OWNER FOR ANY SERVICE INTERRUPTION OF EXISTING SYSTEMS AND GIVE NOTICE AS REQUIRED BY BUILDING RULES AND REGULATIONS, OR CONTRACTOR TO PROVIDE A MINIMUM OF TWO (2) DAYS NOTICE PRIOR TO ANY WORK BEING PERFORMED, WHICHEVER IS THE MORE STRINGENT. CONTRACTOR IS TO PERFORM WORK ON PREMIUM TIME, IF SO DIRECTED BY BUILDING OWNER, SO AS NOT TO DISTURB EXISTING TENANTS ON OTHER FLOORS.
- 1.04 SHOP DRAWINGS
- A. SUBMIT SHOP DRAWINGS CERTIFIED BY ALL TRADES THAT COORDINATION HAS BEEN COMPLETED. SUBMIT ALL CERTIFIED EQUIPMENT CUTS WITH CONSTRUCTION WIRING DIAGRAMS AND AUTOMATIC TEMPERATURE CONTROL REQUIREMENTS. SHOP DRAWINGS SUBMISSION SHALL INCLUDE, BUT NOT BE LIMITED TO, THE FOLLOWING:
- 1. PIPING LAYOUT AND APPURTENANCES PROVIDE PIPING, VALVING, CHEMICAL TREATMENT, SHOP STANDARDS AND 1/4 SCALE PIPING LAYOUT WITH ALL VALVING.
- 2. INSULATION FOR DUCTWORK, PIPING AND EQUIPMENT.
- 3. EQUIPMENT CATALOG CUTS FOR ALL ITEMS TO BE UTILIZED ON PROJECT (FANS, PUMPS, AC UNITS, VARIABLE FREQUENCY DRIVES, VAV BOXES, ETC.).
- 4. AUTOMATIC TEMPERATURE CONTROL DIAGRAMS, DEVICES AND SEQUENCE OF OPERATION.
- 5. CERTIFIED AIR AND WATER BALANCING REPORT.
- 6. AS-BUILT DRAWINGS AT PROJECT COMPLETION OF THE INSTALLED CONDITION OF WORK.
- B. THE QUANTITY OF SHOP DRAWINGS SHALL AS A MINIMUM BE FOUR (4) COPIES OF 8-1/2" X 11" SUBMISSIONS AND FIVE (5) PRINTS OF ALL DRAWINGS. SPECIFIC JOB REQUIREMENTS MAY BE MORE STRINGENT AND CONTRACTOR IS RESPONSIBLE TO OBTAIN REQUIREMENTS FROM OWNER, CONSTRUCTION MANAGER, GENERAL CONTRACTOR OR ARCHITECT.

1.05 MAINTENANCE MANUALS

- A. SUBMIT FOUR (4) LOOSE-LEAF BOUND OPERATING AND MAINTENANCE MANUALS WITH INDEX AND INDEX TABS TO INCLUDE THE FOLLOWING:
- 1. OPERATING AND MAINTENANCE INSTRUCTIONS ON ALL SYSTEMS. 2. MANUFACTURERS= CATALOG CUTS ON ALL EQUIPMENT.
- OPERATIONS, CATALOG CUTS OF ALL DEVICES AND POINT-TO-POINT WIRING DIAGRAMS.
- 4. CERTIFIED FINAL AIR AND WATER BALANCING REPORT. 5. DUCT AND PIPING AS-BUILT DRAWINGS WITH VALVE CHART AND KEY PLAN DRAWINGS INSERTED IN BINDER.
- 6. ALL ITEMS SUBMITTED FOR REVIEW IN SHOP DRAWING SECTION.
- 1.06 ACCESS DOORS IN GENERAL CONSTRUCTION
- A. THIS CONTRACTOR SHALL SUBMIT TO THE ARCHITECT FOR APPROVAL A PLAN INDICATING THE SIZE AND LOCATION OF ALL ACCESS DOORS REQUIRED FOR OPERATION AND MAINTENANCE OF ALL CONCEALED EQUIPMENT, DEVICES, VALVES, DAMPERS AND CONTROLS. CONTRACTOR SHALL ARRANGE FOR FURNISHING AND INSTALLATION OF ALL ACCESS DOORS IN FINISHED CONSTRUCTION AND INCLUDE COSTS IN THE BID. ACCESS DOORS SHALL BE OF ADEQUATE SIZE TO PROVIDE ACCESS TO CONCEALED ITEMS FOR OPERATION AND MAINTENANCE, WITH A MINIMUM SIZE OF 18" X 18".

3. AUTOMATIC TEMPERATURE CONTROL SYSTEMS WITH SEQUENCE OF

PART 2 - PRODUCTS/APPLICATIONS

2.01 PIPING AND ACCESSORIES

- A. PROVIDE ALL PIPING, FITTINGS, VALVES, SPECIALTIES, THERMOMETERS, AND PRESSURE GAUGES REQUIRED FOR THE OPERATING AND MAXIMUM PRESSURE AND TEMPERATURE OF THE PIPING SYSTEMS.
- B. ALL PIPING SHALL BE NEW, STANDARD SIZE, FREE FROM SCALE OR RUST WITH ENDS CAPPED FOR DELIVERY AND STORAGE. EACH LENGTH OF PIPING SHALL BE PROPERLY MARKED AT THE MILL FOR PROPER IDENTIFICATION WITH NAME OR SYMBOL OF MANUFACTURER.
- C. REFER TO SCHEDULE ON DRAWING M300 FOR APPROVED PIPING MATERIALS AND FITTINGS.

D. VALVES

- 1. VALVES SHALL HAVE NAME OF MANUFACTURER AND GUARANTEED WORKING PRESSURE CAST OR STAMPED ON BODIES. VALVES OF SIMILAR TYPE SHALL BE BY A SINGLE MANUFACTURER. GASKETS AND PACKINGS SHALL NOT CONTAIN ASBESTOS.
- 2. ALL VALVING AND VALVE MATERIALS SHALL BE SUITABLE FOR THE OPERATING TEST AND MAXIMUM PRESSURE AND TEMPERATURE REQUIREMENTS OF THE PIPING SYSTEM FOR WHICH THEY ARE BEING UTILIZED.
- 3. ALL SHUTOFF VALVES AND THROTTLING VALVES SHALL BE BALL VALVES.

E. REFRIGERANT SYSTEMS:

- 1. PROVIDE ALL REFRIGERANT PIPING REQUIRED FOR A COMPLETE REFRIGERATION SYSTEM, WITH ALL VALVES, FITTINGS AND SPECIALTIES NECESSARY FOR SATISFACTORY OPERATION IN ACCORDANCE WITH ASHRAE STANDARD 15 LATEST EDITION AND ALL AUTHORITIES HAVING JURISDICTION. REFRIGERATION SYSTEM SHALL INCLUDE ALL REQUIRED ITEMS FOR CHARGING, DRAINING AND PURGING THE SYSTEM.
- 2. JOINTS IN REFRIGERATION PIPING SHALL BE BRAZED. REFRIGERANT PIPING SHALL BE OF THE SIZE RECOMMENDED BY THE MANUFACTURER AND AS APPROVED BY THE ENGINEER.
- 3. HORIZONTAL PIPING OF THE COMPRESSOR SUCTION AND DISCHARGE LINES AND THE CONDENSER DISCHARGE LINES SHALL BE PITCHED A MINIMUM OF 1/2" IN 10', IN THE DIRECTION OF REFRIGERANT FLOW. EACH SUCTION GAS VERTICAL RISER SHALL BE TRAPPED AT ITS EVAPORATOR WITH A TRAP AS RECOMMENDED BY THE COMPRESSOR MANUFACTURER.
- 4. INSTALL REFRIGERANT PIPING TO PREVENT EXCESSIVE OIL FROM BEING TRAPPED IN THE SYSTEM. ANY ADDITIONAL RISERS OR EQUALIZER LINES REQUIRED BY THE MANUFACTURER OF EQUIPMENT FOR THE PROPER SYSTEM OPERATION SHALL BE INSTALLED AS PART OF THIS CONTRACT. PROVIDE A FULLY PIPED OIL SEPARATOR FOR EACH REFRIGERANT SYSTEM AS PER MANUFACTURER=S RECOMMENDATIONS.
- 5. VALVES SHALL BE DESIGNED FOR REFRIGERANT SERVICE. SHUTOFF VALVES SHALL BE BRASS PACKLESS TYPE. UNIONS, FLANGED VALVES OR FITTINGS SHALL BE PROVIDED FOR DISCONNECTING EQUIPMENT, CONTROLS, ETC., FOR MAKING REPAIRS. PIPING SHALL BE RUN IN A SINGLE LAYER, WITH EACH LINE ISOLATED FROM ANOTHER TO PREVENT RUBBING. PROVISION SHALL BE MADE FOR EXPANSION AND CONTRACTION OF PIPING. ALL PIPING PASSING THROUGH WALLS, PARTITIONS, ETC. SHALL BE FURNISHED WITH SLEEVES AS REQUIRED.
- 6. REFRIGERANT PIPING PASSING THROUGH RATED FLOORS OR DEMISING WALLS SHALL BE ENCLOSED IN A RIGID AND GAS-TIGHT CONTINUOUS FIRE-RESISTING PIPE DUCT OR SHAFT VENTED TO THE OUTSIDE, IN ACCORDANCE WITH ASHRAE STANDARD 15 LAIESI EDITION. PIPE CONDUIT SHALL BE COPPER TUBE TYPE L WITH SOLDERED FITTINGS.
- F. ALL INSTRUMENTAL (PRESSURE GAUGES AND THERMOMETERS) SHALL BE RATED FOR THE SAME PRESSURE AND TEMPERATURE AS PIPING SYSTEM AND RATED SPECIFICALLY FOR THE SAME SERVICE AS THE PIPING. PRESSURE GAUGES ARE TO BE LIQUID FILLED WITH 1% ACCURACY. SELECT GAUGES AND THERMOMETERS SO THAT THE MIDPOINT IS AT THE WORKING PRESSURE AND TEMPERATURE.
- 1. PROVIDE THERMOMETERS IN PIPING AS INDICATED ON THE DRAWINGS AND AT THE INLET AND OUTLET OF EACH HYDRONIC COIL AND PIECE OF EQUIPMENT THAT INVOLVES A DIFFERENTIAL TEMPERATURE
- 2. PROVIDE PRESSURE GAUGES IN PIPING AS INDICATED ON THE DRAWINGS AND AT SUCTION AND DISCHARGE OF EACH PUMP AND AT INLETS AND OUTLETS OF EACH HYDRONIC COIL AND PIECE OF EQUIPMENT THAT INVOLVES A DIFFERENTIAL PRESSURE.
- G. ALL PIPING TO BE VENTED AT HIGH POINTS AND PROVIDED WITH ASSOCIATED DRAIN VALVES AT LOW POINTS. PROVIDE AUTOMATIC AIR VENTS WITH GATE VALVES PIPED TO DISCHARGE TO THE NEAREST DRAIN UNLESS DRAWINGS INDICATE MANUAL AIR VENTS.
- H. PROVIDE CORE DRILLED OPENINGS WITH PIPE SLEEVES AT ALL SLAB AND SHAFT PENETRATIONS. PROVIDE FIREPROOFING AS REQUIRED TO MAINTAIN WALL, SHAFT AND SLAB FIRE RATINGS.
- I. PROVIDE WATERPROOF SLEEVES (LINK SEAL (LS TYPE) AT ALL EXTERIOR WALL, FLOOR PENETRATIONS AND AS REQUIRED OR AS NOTED ON PLANS.
- L. PROVIDE LABELING OF ALL PIPING (BOTH EXPOSED AND CONCEALED) IN ACCORDANCE WITH ANSI STANDARDS AND COLOR CODED AS PER BUILDING MANAGEMENT STANDARDS. LABELS TO BE SECURELY FASTENED TO PIPING WITH LETTERING OF SUFFICIENT SIZE FOR EASY IDENTIFICATION BY OPERATING PERSONNEL.
- M. ALL PIPING TO BE MAINTAINED AT THE HIGHEST ELEVATIONS POSSIBLE SO AS NOT TO INTERFERE WITH EXISTING OPERATIONS AND SERVICE/MAINTENANCE REQUIREMENTS.
- N. HANGERS AND SUPPORTS:
- 1. PROVIDE ALL PIPE HANGERS, HANGAR RODS SUPPORTS, INSERTS, ATTACHMENTS, CLAMPS, GUIDES, SUPPLEMENTAL STEEL AND ANCHORS AS REQUIRED TO INSTALL PIPING SYSTEM SIZED TO ACCOMMODATE THE SYSTEM LOADS. HANGERS AND SUPPORTS ARE TO BE IN ACCORDANCE WITH MSS RECOMMENDATIONS AND TO BE MANUFACTURED BY GRINNELL OR APPROVED EQUAL.
- 2. PROVIDE INSULATED PROTECTIVE SADDLES FOR INSULATED PIPING.
- 3. PIPING SHALL BE SUPPORTED IN ACCORDANCE WITH RECOMMENDATIONS OF MSS SP-69 AND ALL APPLICABLE CODES. ALL THREADED ROD IS TO BE GALVANIZED. PROVIDE 2" VERTICAL ADJUSTMENT FOR ALL HANGERS. PROVIDE ADDITIONAL SUPPORTS AT CHANGES IN DIRECTION, BRANCH PIPING OVER 5 FEET, AND CONCENTRATED LOADS DUE TO VALVES, STRAINERS AND OTHER ACCESSORIES.

- P. TESTING:
- 1. GENERAL
 - A) TESTS SHALL BE CONDUCTED AFTER COMPLETION AND ASSEMBLY OF PIPING SYSTEM, BEFORE ANY INSULATION OR PAINT IS APPLIED TO JOINTS, INCLUDING WELDS AND PRIOR TO MAKING THE SYSTEM OPERABLE. INSULATION MATERIALS INSTALLED PRIOR TO THE TESTS SHALL BE REMOVED.
 - B) THE MECHANICAL CONTRACTOR SHALL PROVIDE ALL NECESSARY TEMPORARY PIPING CONNECTIONS, TEES, VALVES, EQUIPMENT, AND LABOR TO PRESSURE TEST PIPING AND EQUIPMENT.
 - C) EQUIPMENT THAT IS NOT SUBJECTED TO THE PRESSURE TEST SHALL BE EITHER DISCONNECTED FROM THE SYSTEM OR ISOLATED BY A BLANK OR SIMILAR MEANS. VALVES MAY BE USED FOR THIS PURPOSE PROVIDED THAT VALVE CLOSURE IS SUITABLE FOR THE PROPOSED TEST PRESSURE.
- D) SUBMIT TO THE ENGINEER AND OWNER REPRESENTATIVE A RECORD OF TEST PRESSURE APPLIED TO EACH PIPING SYSTEM. 2. REFRIGERANT PIPING
- A) THE REFRIGERANT PIPING FOR TIGHTNESS AND LEAKS UNDER PRESSURE OR VACUUM. THE DURATION OF EACH TEST SHALL BE TWENTY-FOUR (24) HOURS.
- B) TEST JOINTS IN ACCORDANCE WITH ASHRAE 15-1994. THERE SHALL BE NO OBSERVABLE LEAKS OR CHANGES IN PRESSURE. IF EITHER IS OBSERVED, SEAL LEAKS, AND REPEAT TEST PROCEDURES.
- 2.02 TESTING AND BALANCING
- A. GENERAL:
- 1. TESTING AND BALANCING WORK SHALL BE PERFORMED BY AN INDEPENDENT COMPANY (NOT ASSOCIATED WITH THE HVAC CONTRACTOR), AABC CERTIFIED OR AS APPROVED BY THE ENGINEER BEFORE COMMENCEMENT OF WORK. APPROVED COMPANIES INCLUDE MERENDINO ASSOCIATES, R.H. MCDERMOTT, INTERNATIONAL TESTING AND BALANCING OR AS APPROVED BY THE ENGINEER AND BUILDING MANAGEMENT.
- 2. AFTER ALL PROJECT HVAC WORK IS COMPLETE, TESTED, AND IN FULL WORKING ORDER. THE AGENCY SHALL PERFORM THE BALANCING AND TESTING OF THE PROJECT HEATING, VENTILATING AND AIR CONDITIONING SYSTEMS.
- 3. UPON THE COMPLETION OF THE AIR CONDITIONING SYSTEM, THE BALANCING AGENCY SHALL PERFORM TESTING AND BALANCING AND COMPILE ALL TEST DATA IN A CERTIFIED REPORT AND SUBMIT FOUR (4) COPIES FOR REVIEW AND APPROVAL TO THE ENGINEER.
- 4. THE REPORT SHALL INCLUDE DESIGN AND ACTUAL READINGS FOR ALL EQUIPMENT AND LOCATION PLAN INDICATING WHERE ALL WORK HAS BEEN PERFORMED, AND METHODS OF BALANCING AND DETAILS OF INSTRUMENTS USED.
- 5. IF DISCREPANCIES EXIST IN THE REPORT THAT REQUIRE FIELD VERIFICATION, THE TESTING AND BALANCING COMPANY IN THE PRESENCE OF THE ENGINEER SHALL VISIT THE JOBSITE FOR FIELD VERIFICATION OF THE REPORT.
- . AFTER SUBMISSION OF THE FIELD VERIFIED BALANCING REPORT, THE AIR BALANCING COMPANY SHALL RETURN TO THE JOB SITE TO PERFORM TWO (2) OCCUPANT COMFORT BALANCES AS DIRECTED BY THE OWNER OR ENGINEER.
- 7. THE FINAL REPORT AFTER THE COMFORT BALANCE IS TO BE INCLUDED IN PROJECT OPERATING AND MAINTENANCE MANUAL
- 8. THE TESTING AND BALANCING AGENCY SHALL INCLUDE AS PART OF THEIR WORK AN EXTENDED WARRANTY OF 90 DAYS AFTER COMPLETION OF TEST AND BALANCE WORK. THE ENGINEER AT HIS DISCRETION DURING THE WARRANTY PERIOD MAY REQUEST A RECHECK OR RESETTING OF ANY EQUIPMENT. THE MECHANICAL CONTRACTOR AND THE BALANCING CONTRACTOR SHALL PROVIDE THE NECESSARY TECHNICIANS TO FACILITATE THIS WORK.
- 9. THE BALANCING AGENCY SHALL PERMANENTLY MARK ALL ADJUSTMENT DEVICES (VALVES, DAMPERS, ETC.) TO ENABLE THE SETTING TO BE RESTORED.

B. BALANCING

- 1. HVAC CONTRACTOR SHALL ENSURE THAT A FIRST SET OF AIR FILTERS ARE IN PLACE, WHENEVER FANS ARE RUNNING AND REPLACED WITH A NEW CLEAN SET OF FILTERS BEFORE TESTING IS COMMENCED.
- 2. TEST, ADJUST, REPLACE SHEAVES, AND BALANCE ALL EQUIPMENT AND SYSTEMS TO PROVIDE QUANTITIES INDICATED ON PLANS WITHIN PLUS OR MINUS 10 PERCENT.
- 3. TEST REPORT SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
- A) FLOW, LEAKAGE CLASS, TEMPERATURE, STATIC PRESSURE OF AIR AT ALL TRUNK DUCTS SERVING AREAS OF WORK.
- B) TEMPERATURE OF AIR LEAVING OUTLETS AT TWO (2) TYPICAL AIR OUTLETS.
- C) QUANTITY OF AIR AT EACH AIR INLET AND OUTLET AFTER BALANCING.
- D) PROVIDE FOR ALL FANS, FAN MOTOR HP, AMPS, VOLTS, FAN RPM, CFM, INLET AND DISCHARGE STATIC PRESSURE, SHEAVE POSITION.
- E) PROVIDE FOR ALL AIR CONDITIONING UNITS, SUPPLY CFM, OUTSIDE AIR CFM, RETURN AIR CFM, MIXED AIR CFM. PROVIDE OUTSIDE AIR, MIXED AIR AND SUPPLY AIR TEMPERATURES (DRY BULB - COOLING AND HEATING, WET-BULB-COOLING). INDICATE UNIT OPERATING MODE DURING TEST.
- F) CALIBRATE ALL NEW AND EXISTING TO BE REUSED TERMINAL BOXES (VAV, FAN POWERED OR DUAL DUCT)AS REQUIRED TO MEET SPECIFIED MINIMUM/MAXIMUM CFM.
- G) LISTING OF DESIGN AND ACTUAL READINGS AS WELL AS ALL MANUFACTURER'S DATA FOR EQUIPMENT.

2.03 <u>EQUIPMENT</u>

- A. PROVIDE ALL EQUIPMENT AND ACCESSORIES OF THE SIZES AND CAPACITIES AS SCHEDULED AND AS INDICATED ON THE DRAWINGS.
- B. INSTALL EQUIPMENT IN ACCORDANCE WITH APPROVED SHOP DRAWINGS, MANUFACTURER'S RECOMMENDATIONS, INSTRUCTIONS, AND ALL AUTHORITIES HAVING JURISDICTION.
- Q. PROVIDE EQUIPMENT SUPPORTS AND/OR MOUNTINGS AS INDICATED ON THE DRAWING, IN VIBRATION SPECIFICATION AND AS FOLLOWS:

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1. CEILING MOUNTED EQUIPMENT - PROVIDE SUPP APPROVED SUITABLE ANCHORS SUSPENDED DIRE BUILDING STEEL STRUCTURE.

D. EQUIPMENT SHALL BE INSTALLED WITH VIBRATION IS

- 2.04 AUTOMATIC TEMPERATURE CONTROLS
- A. GENERAL:
- 1. FURNISH AND INSTALL AS HEREIN SPECIFIED, A AUTOMATIC TEMPERATURE CONTROL SYSTEM AS OPERATION OF ALL HVAC EQUIPMENT.
- 2. ALL TEMPERATURE CONTROL SYSTEMS AND COM THIS SUBCONTRACT ARE TO BE FULLY MODULAT WHERE NOTED OTHERWISE. THE SYSTEM SHALL ALL RESPECTS INCLUDING ALL ASSOCIATED CON THERMOSTATS, CONTROL VALVES, VALVE ACTUAT OPERATORS, RELAYS, PILOT POSITIONERS, CONTR CONTROL AIR PIPING, SWITCHES, INTERLOCK WIR OR PNEUMATIC CONTROL COMPONENTS AND ASS WIRING, APPURTENANCES, ETC., TO PROVIDE THE DESCRIBED IN THESE SPECIFICATIONS AND PLAN WHETHER OR NOT SAID DEVICE RELAY, ETC. IS MENTIONED HEREAFTER.
- 3. THE SYSTEM SHALL BE SUPERVISED AND CHECK COMPLETELY IN ALL RESPECTS BY COMPETENT REGULARLY EMPLOYED BY THE MANUFACTURER.
- 4. THE CONTROL SYSTEMS SHALL BE IN ACCORDAN FOLLOWING DESCRIPTION OF SYSTEM OPERATION INFORMATION SHOWN ON THE PLANS AND AS D
- A) THE MANUFACTURER OF THE AUTOMATIC CON SHALL SUBMIT THE FOLLOWING FOR APPROVA DIAGRAM OF EACH CONTROL SYSTEM WHICH THE PROPER SEQUENCE OF OPERATION AND CONTROLS FOR ALL CYCLES. A COMPLETE THE AUTOMATIC OPERATION OF EACH SYSTEM SHOULD INCLUDE THE DUTY OF EACH THERM SWITCH, ETC., INCORPORATED IN THE CONTROL SCHEDULE AND ILLUSTRATION OF ALL CONTROL AND EQUIPMENT INCLUDING CONTROL PANELS EACH SYSTEM.

B. ELECTRIC WIRING:

- 1. ALL ELECTRICAL WORK (EXCEPT FOR MOTOR FE BETWEEN MOTORS, MOTOR CONTROLLERS, FEED CIRCUIT BREAKERS AND BUS BARS) REQUIRED TEMPERATURE CONTROL SYSTEM SHALL BE PRO CONTRACTOR. WORK SHALL INCLUDE BUT NOT TIME SWITCHES, DAMPER MOTORS, DAMPER SWIT THERMOSTATS. ELECTRIC RELAYS, E/P SWITCHES WIRING, WIRE, CONDUIT, ETC.
- 2. ALL 115 VOLT POWER REQUIRED FOR CONTROL BE PROVIDED BY THE CONTROL CONTRACTOR F ESTABLISHED BY THE ELECTRICAL CONTRACTOR.
- 3. THE CONTROL MANUFACTURER SHALL INCLUDE HIS SHOP DRAWINGS SUBMITTALS FULLY COORD ELECTRICAL CONTRACTOR'S WORK. IT SHALL BE TEMPERATURE CONTROL CONTRACTOR'S RESPONS ALL WIRING AND CONDUIT AS REQUIRED TO ACH CALLED FOR IN THESE SPECIFICATIONS, CONFOR CODES FOR MATERIAL AND INSTALLATION. THE SPECIFICATION FOR THE PROJECT'S ELECTRICAL FOLLOWED.
- 4 FURNISH & CERTIFICATE INDICATING THE METHOD COMPLIANCE WITH LOCAL CODES AS PART OF TH DRAWING SUBMITTAL.
- D. AUTOMATIC DAMPERS:
- 1. PROVIDE CONTROLS FOR ALL THE AUTOMATIC DA SPECIFIED IN THE DUCTWORK SECTION, AND SHO DRAWINGS.
- 2. AUTOMATIC DAMPERS EXPOSED TO THE ELEMENT ELECTRIC ACTUATORS WITH ALL REQUIRED ACCES
- E. CONTROL PANELS:
- 1. FURNISH AND INSTALL IN CONTROL PANELS OF WELDED ANGLE IRON BRACKETS, FOR WALL OR
- 2. DETAILS OF EACH OF THESE PANELS SHALL BE APPROVAL PRIOR TO FABRICATION. LOCATIONS ARE TO BE CONVENIENT FOR ADJUSTMENT AND SUCH LOCATIONS ARE TO BE APPROVED PRIOR
- F. SEQUENCE OF OPERATIONS:
- 1. ALL HVAC SYSTEMS SHALL BE CONTROLLED ACC POINT LIST CONTAINED IN THE SECTION OF THE AND SHALL BE STAND-ALONE. ADDITIONAL POIN PROGRAMMING NOT LISTED IN THE POINT LIST REQUIRED TO MEET THE FOLLOWING SEQUENCES SHALL BE PROVIDED.

PART 3 - EXECUTION

- 3.01 CONNECTION TO EXISTING WORK
- A. PLAN INSTALLATION OF NEW WORK AND CONNECTIO WORK TO INSURE MINIMUM INTERFERENCE WITH OPERATION OF EXISTING FACILITIES. ALL SYSTEM AFFECTING OTHER AREAS SHALL BE COORDINATED MANAGEMENT. INSTALL ISOLATION VALVES AT POINT TO THE EXISTING PIPING. INSTALL ISOLATION DAMPE TO EXISTING DUCTWORK. PROVIDE TEMPORARY DUC PIPING CONNECTIONS AS REQUIRED TO MINIMIZE SH
- B. CONNECT NEW WORK TO EXISTING WORK IN A NEAT MANNER. RESTORE EXISTING WORK DISTURBED WH NEW WORK TO ACCEPTABLE CONDITION AS DETERMIN AND BUILDING MANAGER.
- C. MAINTAIN CONTINUOUS OPERATION OF EXISTING FAC

	AMPERE	GFI	GROUND FAULT INTERRUPTIN
AFF	ABOVE FINISHED FLOOR	HP	HORSEPOWER
AHJ	AUTH. HAVING JURISDICTION	HZ	HERTZ
BLDG	BUILDING	IC	INTERRUPTING CAPACITY
С	CONDUIT	JB	JUNCTION BOX
СВ	CIRCUIT BREAKER	KVA	KILOVOLT AMPERE
СКТ	CIRCUIT	KW	KILOWATT
CLG	CEILING	LTG	LIGHTING
CLOS	CLOSET	МАХ	MAXIMUM
CO	CONDUIT ONLY	мсв	MAIN CIRCUIT BREAKER
СОММ	COMMUNICATION	MIN	MINIMUM
CONT	CONTINUATION	MLO	MAIN LUGS ONLY
CORR	CORRIDOR	MTD	MOUNTED
СР	CONDENSATE PUMP	MTG	MOUNTING
CU	COPPER	MW	MICROWAVE
DED	DEDICATED	N	NEW DEVICE
DISC	DISCONNECT	NEC	NATIONAL ELECTRICAL CODE
DN	DOWN	NTS	NOT TO SCALE
DW	DISHWASHER	OC	ON CENTER
DWG	DRAWING	Р	POLE
E	EXISTING DEVICE	РВ	PULL BOX
EC	ELECTRICAL CONTRACTOR	ø	PHASE
ELEC	ELECTRICAL	PNL	PANEL
ELEV	ELEVATOR	PWR	POWER
EMERG	EMERGENCY	R	RELOCATED DEVICE
EP	ELECTRICAL PANEL	RECEPT	RECEPTACLE
EQPT	EQUIPMENT	RM	ROOM
ER	EXISTING TO BE RELOCATED	SECT	SECTION
EXIST	EXISTING	SW	SWITCH
FA	FIRE ALARM	TELE	TELEPHONE
FBO	FURNISHED BY OTHERS	TYP	TYPICAL
FCO	FUSED CUTOUT	UON	UNLESS OTHERWISE NOTED
FDR	FEEDER	V	VOLT OR VOLTAGE
FL	FLOOR	W	WATT
G, GRD	GROUND	WM	WIREMOLD

ELECTRICAL GENERAL NOTES

- LOCAL AND NATIONAL CODES.
- APPLICATION WHERE SUCH LISTING IS APPLICABLE.
- CONDITIONS.
- INCH FROM PIPE COVERS).

- MIN
- WIRF
- STRUCTURE BY ADJUSTABLE STRAP IRONS.

- LOCATIONS WITH OTHER TRADES.
- WIRING

- RATED WALLS AS REQUIRED BY CODE.
- CONDITIONS PREVAIL.
- INDICATED CONDUCTORS.
- NEW WORK TO A MAXIMUM IMBALANCE OF 10%.
- CONTRACTOR.

- DRAWINGS AND DETAILS.

1. ALL MATERIALS AND WORKMANSHIP SHALL CONFORM TO THE NATIONAL ELECTRIC CODE (NEC), NATIONAL FIRE CODE (NFPA), STATE BUILDING CODES, CODES AND REQUIREMENTS OF THE LOCAL CITY, AND OWNERS REQUIREMENTS.

2. ALL CONDUITS AND EQUIPMENT SHALL BE INSTALLED AND GROUND IN ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF THE APPLICABLE

3. ALL MATERIAL SHALL BE UNDERWRITERS' LABORATORIES LISTED FOR ITS

4. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. FOLLOW DRAWINGS IN LAYING OUT WORK AND CHECK DRAWINGS OF OTHER TRADES TO VERIFY SPACE CONDITIONS. MAINTAIN HEADROOM AND SPACE

5. SECURE ALL SUPPORTS TO BUILDING STRUCTURE UTILIZING TOGGLE BOLTS (HOLLOW MASONRY), EXPANSION SHIELDS OR INSERTS (CONCRETE AND BRICK), MACHINE SCREWS (METAL), BEAM CLAMPS (FRAMEWORK), WOOD SCREWS (WOOD) OR PAN THRU STRAPS (METAL DECK). NAILS, RAWL PLUGS AND WOOD PLUGS ARE NOT PERMITTED. WHERE REQUIRED BY STRUCTURE, PROVIDE THRU BOLTS AND FISH PLATES. SUPPORT HORIZONTAL RUNS OF METALLIC RACEWAYS NOT MORE THAN 10 FT APART. SUPPORT RACEWAY RISERS AT EACH FLOOR LEVEL. RUN EXPOSED RACEWAYS PARALLEL WITH OR AT RIGHT ANGLES TO WALLS.

6. PASS RACEWAYS OVER WATER, STEAM OR OTHER PIPING WHEN PULL BOXES ARE NOT REQUIRED. NO RACEWAY WITHIN 3 INCHES OF STEAM OR HOT WATER PIPES OR APPLIANCES (EXCEPT PIPE CROSSINGS WHERE RACEWAY SHALL BE AT LEAST 1

7. VERIFY LOCATIONS OF OUTLETS AND SWITCHES IN FINISHED ROOMS WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISH. IN CENTERING OUTLETS AND LOCATING BOXES AND OUTLETS, ALLOW FOR OVERHEAD PIPES, DUCTS AND MECHANICAL EQUIPMENT, VARIATIONS IN FIREPROOFING AND PLASTERING, WINDOW AND DOOR TRIM, PANELING, HUNG CEILINGS AND THE LIKE.

8. NO CONDUIT SMALLER THAN 3/4", NOR WIRE SIZE SMALLER THAN NO. 12 A.W.G. FOR POWER SHALL BE USED UNLESS OTHERWISE NOTED.

9. ALL 120V BRANCH CIRCUITS GREATER THAN 100 LINEAR FEET SHALL BE #10AWG

10. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS. RACEWAYS OVER 10 FT LONG IN WHICH WIRING IS NOT INSTALLED: FURNISH FISH

11. SET BOXES SQUARE AND TRUE WITH BUILDING FINISH. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. SECURE TO BUILDING

12. PROVIDE ELECTRICAL OUTLET PLATE GASKET SEALS AT RECEPTACLES, SWITCHES, AND OTHER ELECTRICAL BOXES ON EXTERIOR WALLS AND ON INTERIOR WALLS BETWEEN CONDITIONED AND NON-CONDITIONED SPACES.

13. COVERS OF JUNCTION AND PULLBOXES SHALL BE READILY ACCESSIBLE.

14. PROVIDE PULLBOXES WHERE INDICATED, WHERE REQUIRED BY CODE AND WHEREVER NECESSARY TO FACILITATE PULLING OF WIRE. COORDINATE PULLBOX

15. PROVIDE SEPARATE RACEWAYS FOR CONDUCTORS OF NORMAL AND EMERGENCY CIRCUITS. COMMON BOXES: PROVIDE BARRIERS BETWEEN EMERGENCY AND NORMAL

16. SUPPORT PANEL, JUNCTION AND PULLBOXES INDEPENDENTLY TO BUILDING STRUCTURE WITH NO WEIGHT BEARING ON RACEWAYS.

INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS: ONLY WITH WRITTEN CONSENT OF OWNER. MAINTAIN CONTINUOUS OPERATION OF EXISTING FACILITIES. ALARM AND EMERGENCY SYSTEMS ARE NOT TO BE INTERRUPTED.

18. FIRESTOPPING SHALL BE INSTALLED WHENEVER WIRING OR RACEWAYS CROSS FIRE RATED CONSTRUCTION. PUTTY PADS SHALL BE INSTALLED AT RECEPTACLES IN FIRE

19. ALL CIRCUIT NUMBERS INDICATED ON PLANS ARE FOR CLARITY ONLY, FIELD

20. ALL TERMINATION LUGS SHALL BE SIZED ACCORDINGLY TO ACCOMMODATE

21. CONTRACTOR SHALL TEST AND BALANCE ELECTRICAL PANELS ASSOCIATED WITH

22. ALL CUTTING AND PATCHING SHALL BE FULLY COORDINATED WITH THE GENERAL

23. PANEL DIRECTORIES SHALL BE UPDATED TO CONFORM TO WORK COMPLETED UNDER THIS CONTRACT. UPDATED DIRECTORIES TO BE TYPE-WRITTEN.

24. UPON COMPLETION OF THE WORK, THREE MARKED UP SETS OF "AS-BUILT" DRAWINGS SHALL BE SUBMITTED TO THE OWNER.

25. ELECTRICAL CONTRACTOR SHALL VISIT AND EXAMINE CAREFULLY THE EXISTING AREAS AFFECTED BY THIS WORK TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND WITH DIFFICULTIES THAT WILL ATTEND THE EXECUTION OF THIS WORK PRIOR TO SUBMISSION OF A PROPOSAL.

26. THE CONTRACTOR, BEFORE INSTALLING ANY OF THE WORK, SHALL SEE THAT IT DOES NOT INTERFERE WITH CLEARANCES REQUIRED FOR FINISHED COLUMNS, HUNG CEILINGS, PLASTER, PARTITIONS, WALLS, ETC., AS SHOWN IN THE ARCHITECTURAL

27. CONTRACTOR SHALL PROVIDE ARC FLASH WARNING LABELING ON ELECTRICAL EQUIPMENT AS REQUIRED BY NEC 2017 ARTICLE 110.16 AND 110.24.

ELECTRICAL DEMOLITION NOTES

- THE CONTRACTOR SHALL INCLUDE IN HIS BID ALL COSTS ASSOCIATED WITH REMOVALS AND RELOCATIONS OF ELECTRICAL WORK AS DESCRIBED IN THE SPECIFICATIONS WITH ALLOWANCES FOR EXPECTED OR UNFORSEEN DIFFICULTIES WHEN CONCEALED WORK HAS BEEN OPENED. NO CLAIMS FOR ADDITIONAL WORK ASSOCIATED WITH DEMOLITION WILL BE ACCEPTED, EXCEPT WHERE CONSIDERED JUSTIFIABLE BY THE ENGINEER.
- THE CONTRACTOR SHALL REMOVE AND/OR RELOCATE ALL EXISTING ELECTRICAL WORK WHICH INTERFERES WITH THE NEW ARCHITECTURAL AND ELECTRICAL LAYOUTS IN FULL COORDINATION WITH THE ENGINEER'S DEMOLITION PLANS. ALL SYSTEMS WHICH ARE NO LONGER REQUIRED TO FUNCTION SHALL BE DE-ENERGIZED AND DISCONNECTED AT THE SOURCE OF POWER SUPPLY.
- 3. THE CONTRACTOR SHALL PERFORM DEMOLITION AND REMOVAL WORK WITH MINIMUM INTERFERENCE WITH FUNCTIONING ELECTRICAL SYSTEMS. ALL AFFECTED SYSTEMS SHALL BE RECONNECTED AND RESTORED.
- DEMOLITION AND REMOVAL WORK SHALL BE PERFORMED IN A NEAT AND WORKMANLIKE MANNER. THE CONTRACTOR SHALL PATCH, REPAIR OR OTHERWISE RESTORE ANY DAMAGED BUILDING SURFACE TO ITS ORIGINAL CONDITION.
- 5. THE CONTRACTOR SHALL REMOVE ALL ELECTRICAL LIGHTING, RECEPTACLES SWITCHES AND OTHER DEVICES, COMPLETE WITH ASSOCIATED WIRING, CONDUITS, ETC., FROM PARTITIONS OR CEILING THAT ARE TO BE REMOVED. WHERE THE REMOVAL OF THESE ITEMS DISRUPTS EXISTING WIRING THAT IS TO REMAIN, THE CONTRACTOR SHALL INSTALL JUNCTION BOXES AND OTHER DEVICES AND PROVIDE BYPASS CONNECTIONS NECESSARY TO MAKE CIRCUITS AFFECTED CONTINUOUS AND READY FOR OPERATION. OTHERWISE, WIRING SHALL BE REMOVED BACK TO THE NEAREST ELECTRICAL JUNCTION BOX THAT IS TO REMAIN OR TO PANELBOARD.
- 6. ALL REUSED RACEWAYS WHICH BECOME EXPOSED DURING THE ALTERATION WORK SHALL BE REMOVED AND REROUTED CONCEALED BEHIND FINISHED SURFACES.
- 7. ALL UNUSED CONCEALED OUTLET BOXES OR FLOOR OUTLETS SHALL BE PROVIDED WITH MATCHING BLANK COVERS.
- 8. EXISTING PANEL DIRECTORIES AFFECTED BY THE ALTERATION WORK SHALL BE MODIFIED TO REFLECT THE BRANCH CIRCUIT WIRING CHANGES.
- 9. PORTIONS OF FEEDER RUNS TO BE REMOVED AS A RESULT OF DEMOLITION WORK, BUT WHICH ARE REQUIRED TO REMAIN ENERGIZED, SHALL BE CUT AT CONVENIENT LOCATIONS, REROUTED AND RECONNECTED. NEW FEEDER EXTENSIONS SHALL MATCH EXISTING ONES IN ALL RESPECTS, CABLE TYPE, CONDUCTOR AMPACITY, CONDUIT SIZES, ETC.
- 10. THE CONTRACTOR SHALL NOTIFY THE OWNER AT THE APPROPRIATE TIME OF THE PROJECTED DEMOLITION AND PHASING SCHEDULE SO THAT REMOVAL OR RELOCATION OF AFFECTED UTILITIES MAY BE CARRIED OUT IN COORDINATION WITH THE PROJECT REQUIREMENTS. THE CONTRACTOR SHALL FOLLOW CLOSELY THE ENGINEER'S DEMOLITION AND PHASING SCHEDULE AND PROCEED IN THE SPECIFIED SEQUENCE.
- 11. ALL EXISTING MATERIAL AND EQUIPMENT IN USABLE CONDITION, WHICH IS TO BE REMOVED UNDER THIS CONTRACT, SHALL REMAIN THE PROPERTY OF THE OWNER OR SHALL BE DISPOSED OF BY THE ELECTRICAL CONTRACTOR, AS DIRECTED BY THE OWNER.
- 12. EXISTING CONDUITS ROUTED IN SLAB AND TURNING OUT OF SLAB SHALL BE CUT BACK TO 1" INTO SLAB AND OPENING PATCHED.
- 13. ALL EXISTING UNUSED WIRING SHALL BE DISCONNECTED AT EACH END AND REMOVED.
- 14. CONTRACTOR SHALL DISCONNECT POWER TO ALL MECHANICAL EQUIPMENT BEING TAKEN OUT OF OPERATION. COORDINATE WITH MECHANICAL CONTRACTOR PRIOR TO DEMOLITION.

EI	LECTRICAL POWER LEGEND
$^{1}\Phi^{^{GFI}}_{+XX}$	NEW WALL MOUNTED 20A, 120V DUPLEX RECEPTACLE. 'GFI' – DENOTES GROUND FAULT INTERRUPTER '+XX' – DENOTES MOUNTING HEIGHT XX" AFF. '1' – DENOTES CIRCUIT NUMBER
	NEW WALL MOUNTED 20A, 120V QUADRUPLEX RECEPTACLE. 'GFI' – DENOTES GROUND FAULT INTERRUPTER '+XX' – DENOTES MOUNTING HEIGHT XX" AFF. '1' – DENOTES CIRCUIT NUMBER
V +xx	NEW WALL MOUNTED VOICE/DATA DEVICE WITH 1"C. STUBBED UP TO 6" ABOVE NEAREST ACCESSIBLE FINISH CEILING. '+XX' – DENOTES MOUNTING HEIGHT XX" AFF.
	NEW SURFACE MOUNTED ELECTRICAL PANEL.
	EXISTING SURFACE MOUNTED ELECTRICAL PANEL.
PANEL(X,X)	NEW BRANCH CIRCUIT HOMERUN TO ELECTRIC PANEL. HALF ARROWS INDICATE NUMBER OF CIRCUITS.
30/3	NEW UNFUSED DISCONNECT SWITCH 30/3 – DENOTES 30 AMP/3–POLE SWITCH

FIRE ALARM LEGEND

F	NEW	FIRE	ALARM	MANUAL	PULL	STATION;	MOUNT	⁻ AT 48	" AFF.
F	NEW AFF.		ALARM	SYSTEM	AUDIO	/VISUAL	ALARM;	MOUNT	AT 80"

ELECTRICAL LIGHTING LEGEND

- FIXTURE CONTROLLED BY SWITCH/OCCPANCY SENSOR 'a' '1' — DENOTES CIRCUIT NUMBER 'EM' — DENOTES EMERGENCY BALLAST (90 MIN.) OR EMERGENCY BATTERY BACK-UP (90 MIN.) FOR LED LIGHT FIXTURES.

REFER TO THIS DRAWING FOR LIGHTING SPECIFICATIONS FOR ALL FIXTURES. COORDINATE ALL WORK INCLUDING ALL LIGHT FIXTURE SPECIFICATIONS WITH ARCHITECTURAL DRAWINGS.



ΕM

NEW CEILING MOUNTED EDGE-LIT LED EXIT SIGN WITH BATTERY PACK. DIRECTIONAL ARROWS AS INDICATED ON PLANS. SHADED AREAS INDICATE ILLUMINATED FACE/FACES. DUAL-LITE LES SERIES MODEL#: 'LESCSRXNA' OR APPROVED EQUAL.



NEW CEILING MOUNTED OCCUPANCY SENSOR INFRARED/ULTRASONIC DUAL TECHNOLOGY. HUBBELL #'OMNI DT' OR APPROVED EQUAL. 'a' – CONTROLS LIGHTING FIXTURES DESIGNATED 'a'



 $\mathbf{\mathbf{X}}$

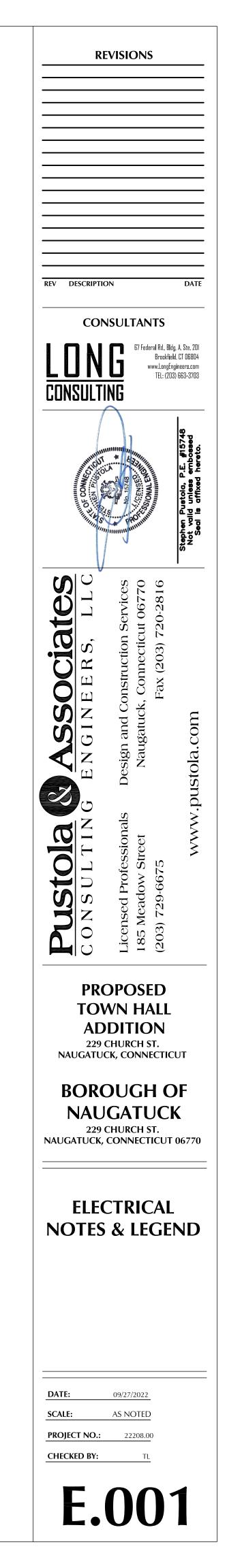
ROOMS EQUIPPED WITH A LIGHTING CONTROL ROOM CONTROLLER. 'a' — CONTROLS LIGHTING FIXTURES DESIGNATED 'a'

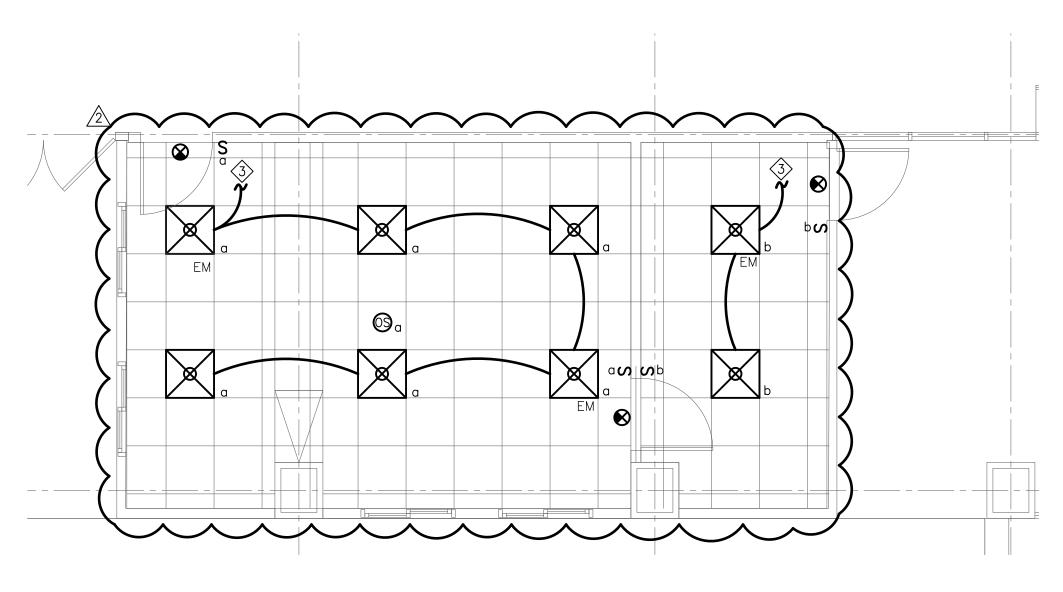
PROVIDE ROOM CONTROLLER COMPATIBLE OVERRIDE SWITCH FOR ALL

NEW CEILING MOUNTED OCCUPANCY SENSOR OVERRIDE SWITCH.

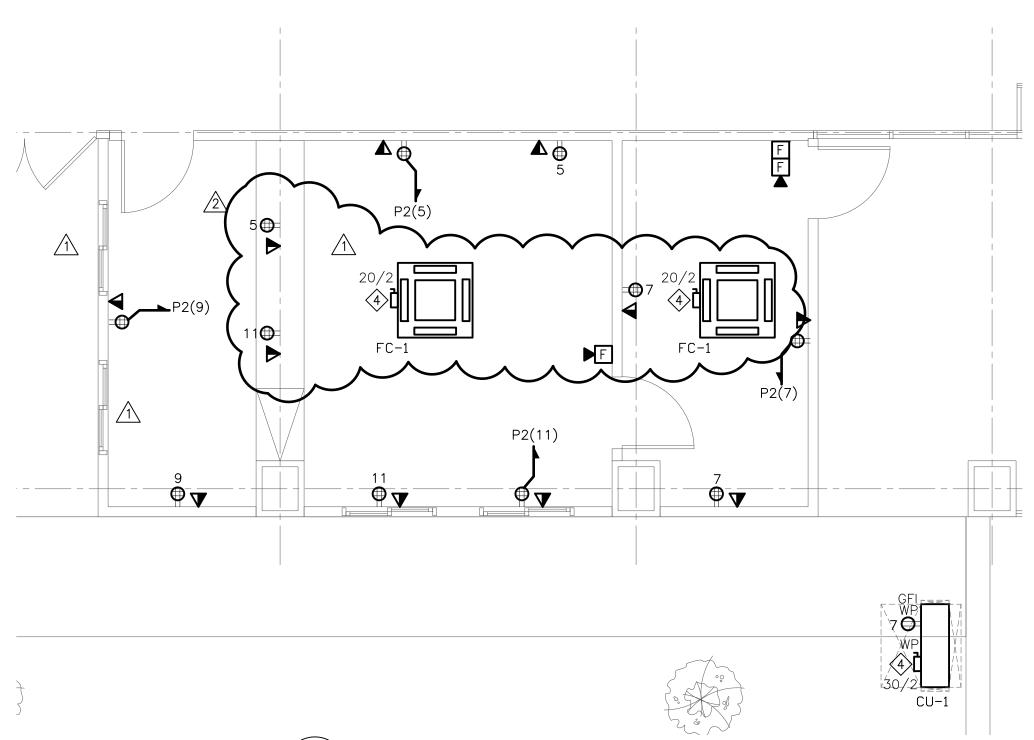
NEW RECESSED 2'X2' LED LIGHTING FIXTURE. COLUMBIA LIGHTING MODEL#: 'LCAT-22-35-ML-G-RFA-E-U-AM' OR APPROVED EQUAL.

ELEC	ELECTRICAL DRAWING INDEX					
DRAWING NO.	DRAWING TITLE					
E001	ELECTRICAL NOTES AND LEGEND					
E100	ELECTRICAL PLAN					
E200	ELECTRICAL RISER DIAGRAM, PANEL SCHEDULES, AND DETAILS					
E300	ELECTRICAL SPECIFICATIONS (1 OF 2)					
E301	ELECTRICAL SPECIFICATIONS (2 OF 2)					

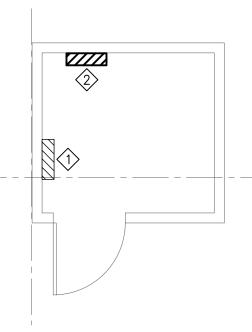




ELECTRICAL LIGHTING PLAN SCALE: 1/4" = 1'-0"

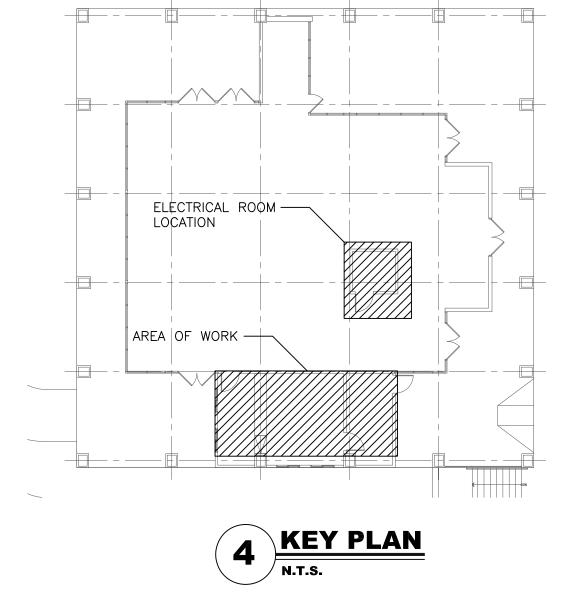


ELECTRICAL POWER PLAN 2 SCALE: 1/4" = 1'-0"









ELECTRICAL NOTES

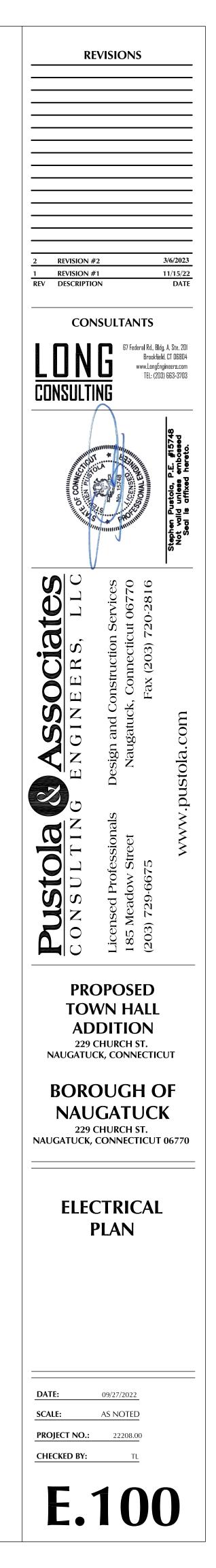
- CONTRACTOR SHALL REFER TO DRAWING E001 FOR DEMOLITION WORK AND NOTES. CONTRACTOR SHALL COORDINATE ALL DEMOLITION WORK WITH ARCHITECTURAL DRAWINGS.
- 2. CIRCUIT NUMBERS SHOWN ARE FOR REFERENCE ONLY.
- 3. CONTRACTOR SHALL CIRCUIT (2)#12+#12 GRD. IN 3/4"C. TO PANEL AND CIRCUIT INDICATED, UNLESS OTHERWISE NOTED.
- 4. CONTRACTOR SHALL REUSE EXISTING 20A, 1 POLE CIRCUIT BREAKERS FREED BY DEMOLITION IN EXISTING PANELS. PROVIDE NEW CIRCUIT BREAKERS AS REQUIRED. NEW CIRCUIT BREAKERS TO BE BOLT-ON TYPE MATCHING EXISTING TYPE & KAIC RATING.
- 5. ELECTRICAL CONTRACTOR SHALL MAINTAIN CONTINUITY OF ALL BRANCH CIRCUITING TO ELECTRICAL DEVICES TO REMAIN. ELECTRICAL CONTRACTOR SHALL EXTEND AND RECONNECT ANY BRANCH CIRCUITING THAT BECOME DISCONNECTED DUE TO DEMOLITION.
- 6. ALL LIGHTING FIXTURES OUTSIDE THE AREA OF WORK SHALL REMAIN AS IS, MAINTAIN CIRCUITS CONTINUITY AND FUNCTIONALITY.
- 7. PROVIDE ADDITIONAL UNSWITCHED BATTERY PACK POWER SENSING LEG(S) FOR ALL SWITCHED FIXTURES CONTAINING STANDBY EMERGENCY BATTERY BALLAST (EM).
- 8. ALL NEW WALL MOUNTED EMERGENCY LIGHTING UNITS, EXIT SIGNS AND COMBINATION EXIT/EM FIXTURES, SHALL BE CONNECTED TO THE 'HOT' UNSWITCHED SIDE OF THE LIGHTING CIRCUIT IN THE AREA THE FIXTURE IS COVERING.
- 9. CONTRACTOR SHALL COORDINATE EXACT LOCATION AND FREQUENCY OF ALL CEILING MOUNTED AND WALL MOUNTED VACANCY / OCCUPANCY SENSORS WITH MANUFACTURER PRIOR TO INSTALLATION. LOCATION OF SENSORS ARE DIAGRAMMATIC, CONTRACTOR SHALL LOCATE AND AIM SENSOR IN LOCATION REQUIRED FOR COMPLETE AND PROPERLY FUNCTIONING COVERAGE WITHIN RANGE OF SENSOR. PROVIDE ALL POWER RACKS, WIRE CONTROL HARDWARE AND EQUIPMENT TO PROVIDE OCCUPANCY SENSOR LIGHTING CONTROL SYSTEM. TYPICAL FOR ALL SENSORS INDICATED.
- 10. CEILING MOUNTED OR WALL MOUNTED VACANCY / OCCUPANCY SENSORS SHALL CONTROL LIGHTING IN THE ENTIRE ROOM, UNLESS OTHERWISE NOTED. LIGHTING CONTROLS IN COMMON AREAS AND COMMON CORRIDORS SHALL BE OCCUPANCY SENSORS. LIGHTING CONTROLS IN INDIVIDUAL ROOMS AND OFFICES SHALL BE VACANCY SENSORS.
- 11. ALL ELECTRICAL DEVICES SHALL BE MOUNTED 18" AFF, U.O.N.
- 12. CONTRACTOR SHALL RUN 1" EMPTY CONDUIT TO NEAREST ACCESSIBLE HUNG CEILING WITH GROMMETED END FITTING FOR TELEPHONE/DATA DEVICE LOCATION. PROVIDE DRAG LINES FOR EMPTY CONDUIT.
- 13. CONTRACTOR TO REFER TO MECHANICAL AND PLUMBING DRAWINGS FOR LOCATION AND EXACT REQUIREMENTS OF ALL MECHANICAL AND PLUMBING EQUIPMENT. CONTRACTOR TO COORDINATE ALL WORK WITH MECHANICAL AND PLUMBING CONTRACTORS AND WITH EQUIPMENT SPECIFICATIONS.

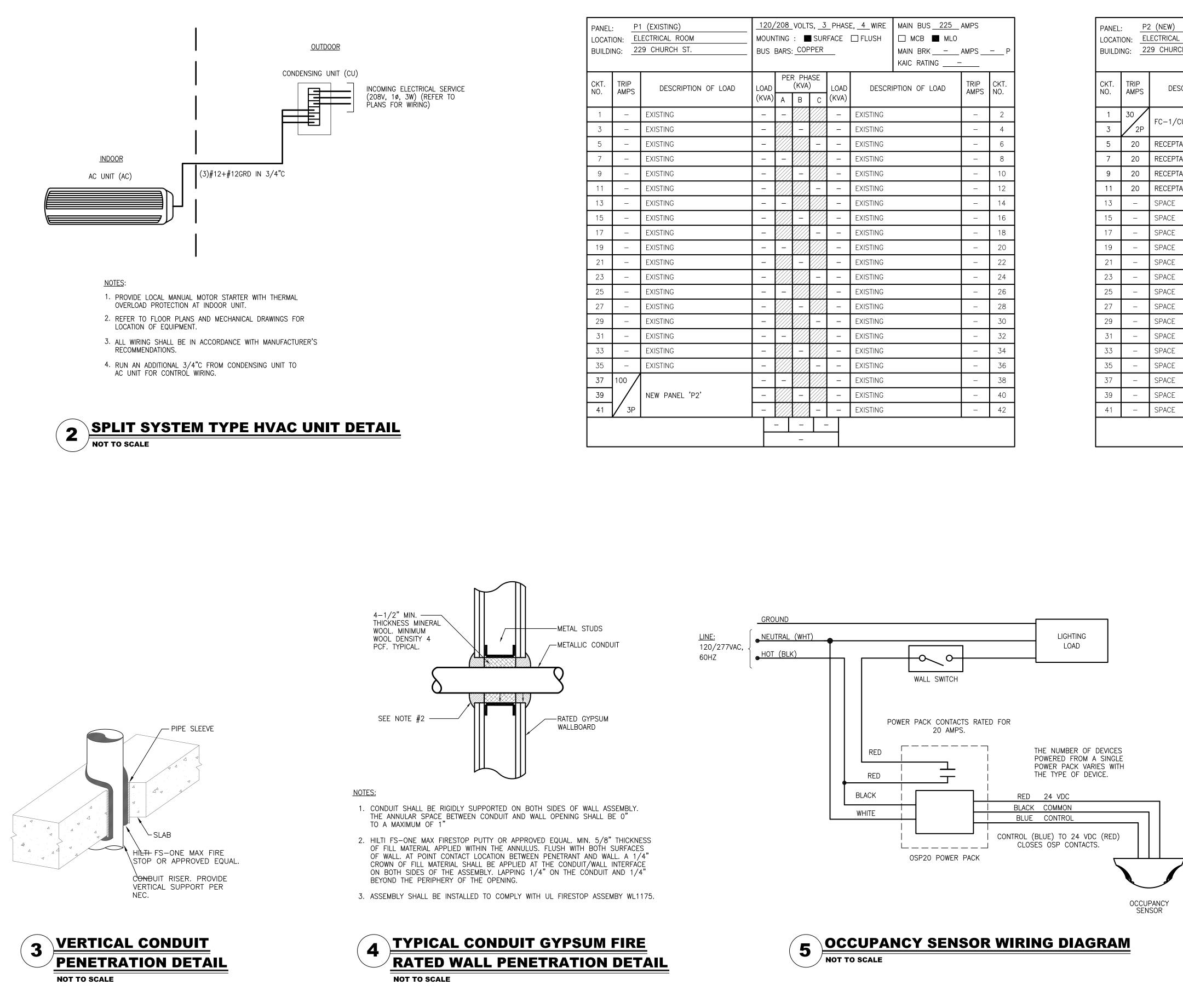
ELECTRICAL KEYNOTES

- $\langle 1 \rangle$ EXISTING PANEL 'P1' 225A, 208V, 3Ø, 4W., 42-POLE TO REMAIN. $\langle 2 \rangle$ NEW PANEL 'P2' 100A, 208V, 3ø, 4W., 42-POLE.
- CONTRACTOR SHALL CONNECT NEW LIGHTING AND SWITCHING TO THE $\langle \mathbf{3} \rangle$ EXISTING LIGHTING CIRCUIT IN THIS AREA.
- CONTRACTOR SHALL PROVIDE POWER TO NEW 'FC-1/CU-1' FROM CIRCUIT P2(1,3) BY (3)#10+#10 GRD. IN 3/4"C. PROVIDE A SEPARATE 3/4"C. BETWEEN FAN COIL UNIT 'FC-1' AND CONDENSING UNIT 'CU-1' FOR $\langle 4 \rangle$ CONTROL WIRING. REFER TO DRAWING <u>E200</u> FOR "SPLIT SYSTEM TYPE HVAC UNIT DETAIL". COORDINATE ALL WORK AND REQUIREMENTS WITH MANUFACTURER'S SPECIFICATIONS.

FIRE ALARM NOTES

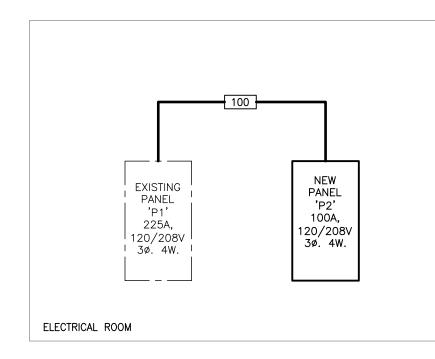
- PROVIDE NEW FIRE ALARM DEVICES AND WIRING AS INDICATED ON FLOOR PLANS AND RISER. ALL FIRE ALARM WIRING SHALL BE #14 TWISTED FOR STROBES PANEL #16 TWISTED/SHIELDED FOR SPEAKERS. (PLENUM RATED.)
- 2. CONTRACTOR SHALL EXTEND FIRE ALARM WIRING AND CONDUIT TO NEW FIRE ALARM DEVICES. ALL NEW FIRE ALARM DEVICES SHALL BE ADA COMPLIANT. ALL FIRE ALARM DEVICES IN THE AREA OF WORK SHALL BE SYNCHRONIZED. WHERE EXISTING FIRE ALARM DEVICES DO NOT HAVE SYNCHRONIZING ABILITY THE FIRE ALARM DEVICE SHALL BE REPLACED WITH NEW.
- 3. THE NEW FIRE ALARM SYSTEMS SHALL BE AN EXTENSION OF THE EXISTING BASE BUILDING FIRE ALARM SYSTEM. ALL NEW FIRE ALARM DEVICES SHALL BE COMPATIBLE WITH THE BASE BUILDING FIRE ALARM SYSTEM. COORDINATE ALL WORK WITH THE BASE BUILDING FIRE ALARM VENDOR. ALL FIRE ALARM WIRING SHALL BE CONFIRMED WITH FIRE ALARM VENDOR PRIOR TO INSTALLATION.
- 4. CONTRACTOR IS RESPONSIBLE FOR PROGRAMING/MODIFYING, UPGRADING, CONTROL MODULES, ETC. AS REQUIRED TO PROVIDE A COMPLETE AND CODE COMPLIANT SYSTEM. ELECTRICAL CONTRACTOR SHALL HIRE BUILDING FIRE ALARM VENDOR TO DO FINAL FIRE ALARM CONNECTIONS. CONTRACTOR RESPONSIBLE TO INSTALL END OF LINE RESISTOR FOR NEW DEVICES. PROVIDE CONTROL PANEL PARTS AS REQUIRED.
- 5. CONTRACTOR IS RESPONSIBLE FOR ALL FIRE ALARM PERMIT AND INSPECTION COST.
- 6. CONTRACTOR TO CONFIRM THAT EXISTING FIRE ALARM PANEL IS ADEQUATE TO HANDLE NEW FIRE ALARM STROBES. IF INADEQUATE, CONTRACTOR SHALL PROVIDE AND INSTALL A NEW STROBE INTERFACE PANEL WITH (2) STROBE CIRCUITS TO ACCOMMODATE NEW FIRE ALARM STROBES.
- 7. BUILDING FIRE ALARM SYSTEM TO REMAIN ACTIVE DURING CONSTRUCTION. ELECTRICAL CONTRACTOR SHALL NOTIFY BUILDING OWNER IF CONSTRUCTION FLOORS ARE TAKEN OFF SYSTEM. ELECTRICAL CONTRACTOR TO PAY ANY COST ASSOCIATED WITH ANY FIRE WATCH REQUIRED BY LOCAL OFFICIALS DURING THE TIME THAT SYSTEM IS OFF LINE.





LOCATION: ELECTRICAL ROOM BUILDING: 229 CHURCH ST.		BUS I				FACE	☐ MCB ■ MLO MAIN BRK <u>–</u> AMPS <u>–</u> P KAIC RATING <u>–</u>				
CKT. TRIP NO. AMPS		DESCRIPTION OF LOAD	LOAD		PER PHASE (KVA)		LOAD	DESCRIPTION OF LOAD		TRIP AMPS	CKT. NO.
			(KVA)	А	В	С	(KVA)				
1	-	EXISTING	-	_			_	EXISTING		-	2
3	_	EXISTING	-		_		_	EXISTING		-	4
5	-	EXISTING	-			_	-	EXISTING		-	6
7	-	EXISTING	-	_			-	EXISTING		-	8
9	-	EXISTING	-		_		_	EXISTING		-	10
11	-	EXISTING	-			-	-	EXISTING		-	12
13	-	EXISTING	-	-			_	EXISTING		-	14
15	-	EXISTING	-		-		-	EXISTING		-	16
17	-	EXISTING	-			-	-	EXISTING		-	18
19	-	EXISTING	-	_			-	EXISTING		-	20
21	-	EXISTING	-		-		-	EXISTING		-	22
23	_	EXISTING	-			-	-	EXISTING		_	24
25	-	EXISTING	-	_			-	EXISTING		-	26
27	-	EXISTING	-		-		-	EXISTING		-	28
29	-	EXISTING	_			-	_	EXISTING		-	30
31	_	EXISTING	-	_			_	EXISTING		-	32
33	-	EXISTING	_		-		_	EXISTING		-	34
35	_	EXISTING	_			-	_	EXISTING		-	36
37	100		_	_			_	EXISTING		-	38
39	1 /	NEW PANEL 'P2'	_		-		_	EXISTING		_	40
41	1 /3P		_			—	_	EXISTING		_	42

	ION: EL	2 (NEW) ECTRICAL ROOM 29 CHURCH ST.	-	TING	: 🔺	SUR	RFACE	E, <u>4</u> WIRE	MAIN BUS <u>100</u> ☐ MCB ■ MLC MAIN BRK <u>-</u> KAIC RATING	_ AMPS	F
CKT. NO.	TRIP AMPS	DESCRIPTION OF LOAD	LOAD PER PHASE LOAD		DESCR	IPTION OF LOAD	TRIP AMPS	CKT. NO.			
110.	/		(KVA)	А	В	С	(KVA)			7.1111 0	110.
1	30	FC-1/CU-1	_	-			_	SPACE		-	2
3	2P		-		_		_	SPACE		-	4
5	20	RECEPTACLES	-			-	_	SPACE		-	6
7	20	RECEPTACLES	-	-			_	SPACE		-	8
9	20	RECEPTACLES	-		-		—	SPACE		-	10
11	20	RECEPTACLES	-			-	-	SPACE		-	12
13	-	SPACE	-	1			-	SPACE		-	14
15	-	SPACE	-		-		-	SPACE		-	16
17	-	SPACE	-			-	-	SPACE		-	18
19	-	SPACE	-	-			-	SPACE		-	20
21	-	SPACE	-		-		-	SPACE		-	22
23	-	SPACE	-			-	-	SPACE		-	24
25	-	SPACE	-	-			-	SPACE		-	26
27	-	SPACE	-		-		-	SPACE		-	28
29	-	SPACE	-			-	-	SPACE		-	30
31	-	SPACE	-	_			-	SPACE		-	32
33	_	SPACE	_		-		-	SPACE		-	34
35	_	SPACE	_			-	_	SPACE		-	36
37	_	SPACE	-	_			-	SPACE		-	38
39	_	SPACE	_		-		-	SPACE		-	40
41	_	SPACE	_			_	_	SPACE		_	42



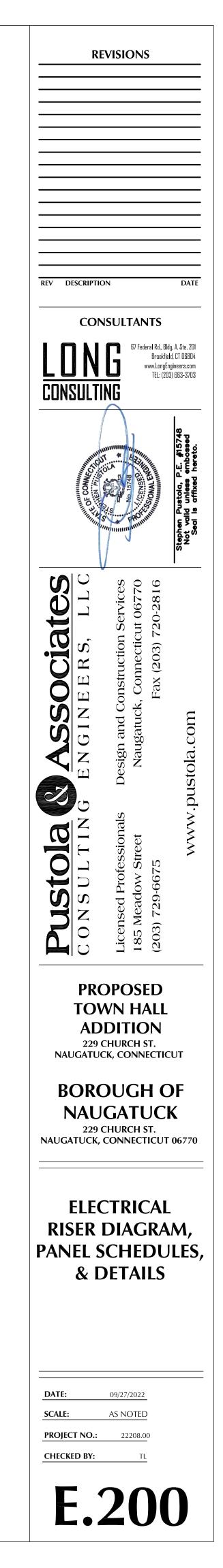


FEEDER LEGEND

100 (4)#3+#8 GRD. IN 1-1/4"C.

ALL WIRE SIZES ARE BASED ON COPPER FEEDERS UNLESS OTHERWISE SPECIFIED.

UPGRADE FEEDERS AS NEEDED FOR NO MORE THAN 3% VOLTAGE DROP.



ELECTRICAL SPECIFICATIONS

PART 1– GENERAL

1. <u>GENERAL REQUIREMENTS</u>:

- A. THE "GENERAL CONDITIONS OF THE CONTRACT FOR CONSTRUCTION," AIA DOCUMENT A201, LATEST EDITION, AND THESE SPECIFICATIONS AS APPLICABLE ARE PART OF THIS CONTRACT.
- B. ALL APPLICABLE CODES, LAWS, AND REGULATIONS GOVERNING OR RELATING TO ANY PORTION OF THIS WORK ARE HEREBY INCORPORATED INTO AND MADE A PART OF THESE SPECIFICATIONS, AND THEIR PROVISIONS SHALL BE CARRIED OUT BY THE CONTRACTOR WHO SHALL INFORM THE OWNER, PRIOR TO SUBMITTING A PROPOSAL, OF ANY WORK OR MATERIAL WHICH VIOLATES ANY OF THE ABOVE LAWS AND REGULATIONS. ANY WORK DONE BY THE CONTRACTOR CAUSING SUCH VIOLATION SHALL BE CORRECTED BY THE CONTRACTOR.
- C. ITEMS AND SERVICES NOT SHOWN ON DRAWINGS BUT MENTIONED IN SPECIFICATIONS, OR VISE VERSA, OR ITEMS AND SERVICES NECESSARY TO RENDER THE WORK COMPLETE AND READY FOR OPERATION SHALL BE PROVIDED WITHOUT ADDITIONAL COST.
- D. ALL WORK TO BE PERFORMED IN ACCORDANCE WITH THE EXISTING BASE BUILDING CONSTRUCTION STANDARDS.
- E. PRIOR TO SUBMISSION OF BID THE CONTRACTOR SHALL VISIT THE JOB SITE AND ASCERTAIN THE ACTUAL FIELD CONDITIONS AS THEY RELATE TO THE WORK AS INDICATED ON THE DRAWINGS AND DESCRIBED HEREIN.
- F. SUBMISSION OF A PROPOSAL SHALL BE CONSTRUED AS EVIDENCE THAT A CAREFUL EXAMINATION OF THE PORTIONS OF THE EXISTING BUILDING, EQUIPMENT, ETC., WHICH AFFECT THIS WORK, AND THE ACCESS TO SUCH SPACES, HAS BEEN MADE AND THAT THE CONTRACTOR IS FAMILIAR WITH EXISTING CONDITIONS AND DIFFICULTIES THAT WILL AFFECT THE EXECUTION OF THE WORK. THE CONTRACTOR IS RESPONSIBLE TO INDICATE ANY DISCREPANCIES BETWEEN THE CONTRACT DRAWINGS AND ACTUAL FIELD CONDITIONS PRIOR TO SUBMITTAL OF BID. SUBMISSION OF A PROPOSAL WILL BE CONSTRUED AS EVIDENCE THAT SUCH AN EXAMINATION HAS BEEN MADE. LATER CLAIMS SHALL NOT BE MADE FOR LABOR, EQUIPMENT OR MATERIALS REQUIRED BECAUSE OF DIFFICULTIES ENCOUNTERED WHICH COULD HAVE BEEN FORESEEN DURING SUCH AN EXAMINATION. THE ON-SITE INSPECTION SHALL VERIFY EXISTING CONDUIT (SIZES, CLEARANCES, ETC) AND CONDITIONS.
- G. INVESTIGATE EACH SPACE THOROUGHLY TO DETERMINE WHICH EQUIPMENT MUST BE MOVED. WHERE NECESSARY, EQUIPMENT SHALL BE SHIPPED FROM THE MANUFACTURER IN SECTIONS IN SIZES SUITABLE FOR MOVING THROUGH AVAILABLE RESTRICTIVE SPACES. DETERMINE FROM BUILDING OWNER AND/OR TENANT AT WHAT TIMES OF DAY EQUIPMENT MAY BE MOVED THROUGH ALL AREAS.
- H. DRAWINGS ARE DIAGRAMMATIC AND INDICATE GENERAL ARRANGEMENT OF SYSTEMS AND WORK. CONDUIT ROUTING IS SHOWN DIAGRAMMATICALLY AND DOES NOT SHOW ALL OFFSETS, DROPS AND RISES OF RUNS. THE CONTRACTOR SHALL ALLOW IN HIS PRICE FOR ROUTING OF CONDUIT TO AVOID OBSTRUCTIONS. COORDINATION WITH EXISTING SERVICES, INCLUDING THOSE OF OTHER TRADES, IS REQUIRED. MAINTAIN HEADROOM AND SPACE CONDITIONS.
- I. INSTALL WORK SO AS TO BE READILY ACCESSIBLE FOR OPERATION, MAINTENANCE AND REPAIR. MINOR DEVIATIONS FROM DRAWINGS MAY BE MADE TO ACCOMPLISH THIS, BUT CHANGES WHICH INVOLVE EXTRA COST SHALL NOT BE MADE WITHOUT APPROVAL.
- J. REMOVAL AND RELOCATION OF CERTAIN EXISTING WORK MAY BE NECESSARY FOR THE PERFORMANCE OF THE GENERAL WORK. ALL EXISTING CONDITIONS CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS. THE CONTRACTOR SHALL SURVEY THE SITE AND INCLUDE ALL CHANGES AND CHARGES IN MAKING UP THE WORK PROPOSAL.
- K. CONNECTIONS TO EXISTING WORK: INSTALL NEW WORK AND CONNECT TO EXISTING WORK WITH MINIMUM INTERFERENCE TO EXISTING FACILITIES. TEMPORARY SHUTDOWNS OF EXISTING SERVICES SHALL BE PERFORMED AT NO ADDITIONAL CHARGES, AT TIMES NOT TO NTERFERE WITH NORMAL OPERATION OF EXISTING FACILITIES AND ONLY WITH WRITTEN CONSENT OF OWNER. ALARM AND EMERGENCY SYSTEMS SHALL NOT BE INTERRUPTED. MAINTAIN ONTINUOUS OPERATION OF EXISTING FACILITIES AS REQUIRED WITH NECESSARY TEMPORARY CONNECTIONS BETWEEN NEW AND EXISTING WORK. CONNECT NEW WORK TO EXISTING WORK IN NEAT AND ACCEPTABLE MANNER. RESTORE EXISTING DISTURBED WORK TO ORIGINAL CONDITION, INCLUDING MAINTENANCE OF WIRING CONTINUITY AS REQUIRED.
- L. DISCONNECT, REMOVE AND/OR RELOCATE EXISTING MATERIAL, EQUIPMENT AND OTHER ORK AS NOTED OR REQUIRED FOR PROPER INSTALLATION OF NEW WORK.
- M. THE CONTRACTOR SHALL KEEP ALL EQUIPMENT AND MATERIALS, AND ALL PARTS OF THE BUILDING, EXTERIOR SPACES AND ADJACENT STREETS, SIDEWALKS AND PAVEMENTS, FREE FROM MATERIAL AND DEBRIS RESULTING FROM THE EXECUTION OF THIS WORK. EXCESS MATERIALS WILL NOT BE PERMITTED TO ACCUMULATE EITHER ON THE INTERIOR OR THE EXTERIOR.
- N. PROVIDE ALL NECESSARY FLASHING AND COUNTERFLASHING TO MAINTAIN THE WATERPROOFING INTEGRITY OF THE BUILDING AS REQUIRED BY THE INSTALLATION OR REMOVAL OF CONDUIT AND EQUIPMENT. PROVIDE EQUIPMENT CURBS AS REQUIRED.
- O. ALL EXISTING MATERIAL, EQUIPMENT AND CONSTRUCTION DEBRIS TO BE REMOVED UNDER THIS CONTRACT SHALL BECOME THE PROPERTY OF THE CONTRACTOR WITH THE EXCEPTION OF SPECIFIC EQUIPMENT AND APPARATUS REQUESTED BY THE BUILDING REPRESENTATIVE. ARCHITECT OR AS NOTED TO BE RELOCATED ON THE DRAWINGS. REMOVED EQUIPMENT SHALL BE PROPERLY DISPOSED OF BY THIS CONTRACTOR.
- P. THE CONTRACTOR'S PROPOSAL FOR ALL WORK SHALL BE PREDICATED ON THE PERFORMANCE OF THE WORK DURING REGULAR WORKING HOURS. WHEN SO DIRECTED, HOWEVER, THE CONTRACTOR SHALL INSTALL WORK DURING OVERTIME HOURS AND THE ADDITIONAL COST TO BE CHARGED THEREFORE SHALL BE ONLY THE "PREMIUM" PORTION OF THE WAGES PAID.
- Q. UNLESS OTHERWISE SPECIFICALLY NOTED OR SPECIFIED, INCLUDE ALL CUTTING AND PATCHING OF EXISTING FLOORS, WALLS, PARTITIONS AND OTHER MATERIALS IN THE EXISTING BUILDING. THE CONTRACTOR SHALL RESTORE THESE AREAS TO ORIGINAL CONDITION.
- R. ALL MATERIAL AND EQUIPMENT SHALL BE NEW UNLESS OTHERWISE NOTED AND SHALL BE IN ACCORDANCE WITH BUILDING STANDARDS.
- S. INSURANCE: IN ACCORDANCE WITH BUILDING REQUIREMENTS AND SHALL INCLUDE A HOLD HARMLESS CLAUSE FOR OWNER AND ENGINEER.
- T. THE FINAL ACCEPTANCE SHALL BE MADE AFTER THE CONTRACTOR HAS ADJUSTED HIS EQUIPMENT, TESTED THE VARIOUS SYSTEMS. DEMONSTRATED THAT IT FULFILLS THE REQUIREMENTS OF THE DRAWINGS AND SPECIFICATIONS AND HAS FURNISHED ALL THE REQUIRED CERTIFICATES OF INSPECTION AND APPROVAL.
- U. FINAL LOCATIONS AND MOUNTING ORIENTATIONS OF ALL SWITCHES, RECEPTACLES AND LIGHT FIXTURES SHALL BE VERIFIED WITH ARCHITECT.

V. ALL ACCESS DOOR LOCATIONS SHALL BE REVIEWED BY ARCHITECT PRIOR TO INSTALLATION.

2. <u>SCOPE OF WORK</u>:

- A. SCOPE OF WORK SHALL CONSIST OF PROVIDING LABOR, MATERIALS, EQUIPMENT, SERVICES AND FEES NECESSARY FOR COMPLETE AND SAFE INSTALLATION IN CONFORMITY WITH THE NATIONAL ELECTRICAL CODE (NEC) AND ALL OTHER APPLICABLE INDUSTRY, NATIONAL AND LOCAL CODES AND AUTHORITIES HAVING JURISDICTION, AS INDICATED ON DRAWINGS AND HEREIN SPECIFIED.
- B. THE SCOPE OF WORK SHALL INCLUDE, BUT NOT BE LIMITED TO THE FOLLOWING:
 - 1) DISCONNECTION AND REMOVAL OF ELECTRICAL EQUIPMENT AS REQUIRED FOR NEW INSTALLATION, INCLUDING ALL CONDUCTORS AND CONDUIT BACK TO THEIR SOURCE.
 - 2) PROVIDING OF LIGHT FIXTURES AND LAMPS INCLUDING EXIT AND EMERGENCY LIGHTING AND ALL ASSOCIATED COMPONENTS AND BRANCH CIRCUITING.
 - 3) PROVIDING FOR NEW RACEWAYS AND CONDUCTORS FOR LIGHTING AND POWER.
 - 4) CUTTING, CHANNELING, AND CHASING REQUIRED TO ACCOMMODATE THE ELECTRICAL INSTALLATION AND ROUGH PATCHING.
 - 5) ADDITIONS AND MODIFICATIONS TO EXISTING POWER DISTRIBUTION EQUIPMENT AND RELATED FEEDERS.
 - 6) PROVIDING OF HVAC POWER AND WIRING AND FINAL CONNECTIONS TO HVAC EQUIPMENT.
 - 7) PROVIDING OF ELECTRICAL CONDUIT, JUNCTION BOXES, PULL BOXES, ETC., REQUIRED FOR ALL ELECTRICAL AND MECHANICAL EQUIPMENT.

- 8) GROUNDING OF ALL EQUIPMENT AS REQUIRED BY THE NATIONAL ELECTRICAL CODE (NEC) AND AS SHOWN ON THE DRAWINGS.
- 9) MAINTAIN CONTINUITY OF EXISTING CIRCUITING TO ADJACENT AREAS NOT AFFECTED BY THE NEW
- 10) PROVIDING TELEPHONE/DATA AND SIGNAL EMPTY CONDUIT, JUNCTION BOXES, PULLBOXES,
- 11) PROVIDING ALL REQUIRED ADDITIONS AND MODIFICATIONS TO THE NEW/EXISTING BUILDING FIRE
- BOXES, CONTACTORS AND OTHER WIRING DEVICES INCLUDING RELATED BRANCH CIRCUIT WIRING.
- 12) PROVIDING RECEPTACLES, LIGHT SWITCHES, DISCONNECT SWITCHES, FUSES, DIMMERS, OUTLET 13) PROVIDING TEMPORARY LIGHT AND POWER DURING CONSTRUCTION.

MODIFIED, SUPPLEMENTED OR SPECIFIED HEREIN.

- D. THE CONTRACTOR SHALL FURNISH A WRITTEN GUARANTEE TO REPLACE OR REPAIR PROMPTLY AND ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED FOR ANY WORKMANSHIP AND EQUIPMENT IN WHICH DEFECTS DEVELOP WITHIN ONE YEAR FROM THE DATE OF FINAL CERTIFICATE FOR PAYMENT AND/OR FROM DATE OR ACTUAL USE OF EQUIPMENT OR OCCUPANCY OF SPACES BY OWNER INCLUDED UNDER THE VARIOUS PARTS OF THE WORK, WHICHEVER DATE IS EARLIER. THIS WORK SHALL BE DONE AS DIRECTED BY THE OWNER. THIS GUARANTEE SHALL ALSO PROVIDE THAT WHERE DEFECTS OCCUR, THE CONTRACTOR WILL ASSUME RESPONSIBILITY FOR ALL EXPENSES INCURRED IN REPAIRING AND REPLACING WORK OF OTHER TRADES AFFECTED BY DEFECTS, REPAIRS OR REPLACEMENTS IN EQUIPMENT SUPPLIED BY THE CONTRACTOR.
- E. THE CONTRACTOR SHALL GIVE NECESSARY NOTICE, FILE DRAWINGS AND SPECIFICATIONS WITH ALL DEPARTMENTS HAVING JURISDICTION, OBTAIN PERMITS OR LICENSES NECESSARY TO CARRY OUT THIS WORK AND PAY ALL FEES THEREFORE. THE CONTRACTOR SHALL ARRANGE FOR INSPECTION AND TESTS OF ANY OR ALL PARTS OF THE WORK IF SO REQUIRED BY AUTHORITIES AND PAY ALL CHARGES FOR SAME. THE CONTRACTOR SHALL PAY ALL COSTS FOR, AND FURNISH TO THE OWNER BEFORE FINAL BILLING, ALL CERTIFICATES NECESSARY AS EVIDENCE THAT THE WORK INSTALLED CONFORMS WITH ALL REGULATIONS WHERE THEY APPLY TO THIS WORK.
- 3. <u>SHOP DRAWINGS</u>:
 - A. PRIOR TO THE INSTALLATION OF ANY WORK AND PROCUREMENT OF EQUIPMENT, CONTRACTOR SHALL PROVIDE COMPLETE SETS OF COORDINATED SHOP DRAWINGS OF ALL NEW AND EXISTING EQUIPMENT, INDICATING CAPACITY, DIMENSIONS AND SEQUENCE OF OPERATION FOR WRITTEN APPROVAL BY THE ARCHITECT AND ENGINEER.
 - B. INDICATE ON EACH SHOP DRAWINGS SUBMITTED:
 - 1) PROJECT NAME AND LOCATION 2) NAME OF ARCHITECT AND ENGINEER
 - 3) ITEM IDENTIFICATION 4) APPROVAL STAMP OF PRIME CONTRACTOR
- C. SUBMISSIONS:

 - 2) SUBMISSIONS LARGER THAN 11 IN. X 17 IN.: SUBMIT TWO PRINTS TO THE ARCHITECT. THE ARCHITECT WILL FORWARD ONE PRINT TO THE ENGINEER.
 - 3) SUBMISSIONS MAY BE SUBMITTED ELECTRONICALLY IN PDF FORMAT.
- D. SUBMIT SHOP DRAWINGS FOR THE FOLLOWING ITEMS AND ASSOCIATED COMPONENTS:
- 2) CIRCUIT BREAKERS
- 3) FIRE ALARM DEVICES
- 4) LIGHTING FIXTURES AND LAMPS 5) DISCONNECT SWITCHES AND FUSES
- 6) WALL SWITCHES
- WIRING DEVICES
- A. UPON COMPLETION AND ACCEPTANCE OF WORK, CONTRACTOR SHALL FURNISH WRITTEN INSTRUCTIONS AND EQUIPMENT MANUALS AND DEMONSTRATE TO THE OWNER THE PROPER OPERATION AND MAINTENANCE OF ALL EQUIPMENT AND APPARATUS FURNISHED UNDER THIS CONTRACT.
- B. THESE INSTRUCTIONS SHALL BE TYPED ON 8-1/2 IN. X 11 IN. PAPER AND BOUND IN THREE RING BINDERS WITH CLEAR ACETATE COVERS. CONTRACTOR SHALL GIVE THREE COPIES OF THE INSTRUCTIONS TO THE OWNER AND ONE COPY TO THE ENGINEER.
- C. THE INSTRUCTION BOOKLET SHALL BEAR THE NAME, ADDRESS AND TELEPHONE NUMBER OF THE PROJECT, ARCHITECT AND ENGINEER.
- D. REPRODUCIBLE "AS-BUILT" DRAWINGS SHALL BE PROVIDED INDICATING THE AS INSTALLED CONDITIONS OF THE WORK. "AS-BUILT" DRAWINGS SHALL BE PROVIDED TO THE ARCHITECT AND/OR THE CLIENT AFTER COMPLETION OF THE INSTALLATION.

- SUCH AS "THE CONTRACTOR SHALL," "SHALL BE," "FURNISH," "PROVIDE," "A," "THE," AND "ALL" HAVE BEEN OMITTED FOR BREVITY. B. DEFINITIONS:
 - 1) "ELECTRICAL CONTRACTOR", "THE CONTRACTOR": THE PARTY OR PARTIES THAT HAVE BEEN DULY AWARDED THE CONTRACT FOR AND ARE THEREBY MADE RESPONSIBLE FOR THE ELECTRICAL WORK
 - 2) "ARCHITECT", "ENGINEER", "OWNERS REPRESENTATIVE": THE PARTY OR PARTIES RESPONSIBLE FOR INTERPRETING, ACCEPTING, AND OTHERWISE RULING ON THE PERFORMANCE UNDER THIS CONTRACT. 3) "PROVIDE": TO SUPPLY. INSTALL AND CONNECT UP COMPLETE AND READY FOR SAFE AND REGULAR OPERATION THE PARTICULAR WORK REFERRED TO UNLESS SPECIFICALLY OTHERWISE
 - NOTED.

 - RELATED ACCESSORIES.
- REQUIRED FOR PROPER AND COMPLETE INSTALLATION.
- ENCLOSURES.
- 10) "SIMILAR" OR "EQUAL": EQUAL IN MATERIALS, WEIGHT, SIZE, DESIGN AND EFFICIENCY OF SPECIFIED PRODUCT.

- 5. <u>GENERAL PROVISIONS FOR ELECTRICAL WORK</u>:
 - A. SPECIFICATIONS ARE OF SIMPLIFIED FORM AND INCLUDE INCOMPLETE SENTENCES. WORDS OR PHRASES

- AS DESCRIBED HEREIN.

- 4) "INSTALL": TO ERECT, MOUNT AND CONNECT COMPLETE WITH RELATED ACCESSORIES.
- 5) "FURNISH" OR "SUPPLY: TO PURCHASE, PROCURE, ACQUIRE AND DELIVER COMPLETE WITH
- 6) "WORK": LABOR, MATERIALS, EQUIPMENT, APPARATUS, CONTROLS, ACCESSORIES AND OTHER ITEMS
- 7) "WIRING": RACEWAY, FITTINGS, WIRE, BOXES AND RELATED ITEMS.
- 8) "CONCEALED": EMBEDDED IN MASONRY OR OTHER CONSTRUCTION, INSTALLED IN FURRED SPACES, WITHIN DOUBLE PARTITIONS OR HUNG CEILINGS, IN TRENCHES, IN CRAWL SPACES, OR IN

SLEEVES, AND FISHWIRES.

ALARM SYSTEM.

C. ALL DRAWINGS, PLANS, DETAILS, SPECIFICATIONS AND SPECIFICATION ADDENDA ARE MADE PART OF THIS CONTRACT AND SHALL APPLY TO ALL WORK UNDER THE CONTRACT UNLESS OTHERWISE AMENDED,

- 1) SUBMISSIONS 11 IN. X 17 IN. OR SMALLER: IF THE SUBMISSION IS A CATALOG CUT, THEN THE
- CONTRACTOR SHALL SUBMIT ONE ORIGINAL AND TWO COPIES. OTHERWISE, HE SHALL SUBMIT THREE COPIES. THE ARCHITECT WILL FORWARD THE ORIGINAL AND ONE COPY (TWO COPIES WHEN NO ORIGINAL IS RECEIVED) TO THE ENGINEER. ALL CATALOG CUTS SHALL BE COMPLETE.
- 1) PANELBOARDS (INCLUDING DIMENSIONS, SCHEDULES, AND CATALOG CUTS).

4. AS-BUILT DRAWINGS AND EQUIPMENT OPERATIONAL INSTRUCTIONS:

9) "EXPOSED": NOT INSTALLED UNDERGROUND OR "CONCEALED" AS DEFINED ABOVE.

- C. TEMPORARY LIGHT AND POWER: PROVIDE TEMPORARY LIGHT AND POWER SYSTEMS AT EARLIEST POSSIBLE DATE WITHIN THE CONSTRUCTION AREAS FOR THE REQUIREMENTS OF ALL TRADES AS HEREIN DESCRIBED. EXTEND SYSTEMS TO NEW CONSTRUCTION AS SOON AS PHYSICALLY POSSIBLE. MAINTAIN SYSTEM DURING WORKING HOURS OF ALL TRADES. COST OF ENERGY WILL BE PAID FOR BY OWNER. PROVIDE ALL REQUIRED MAINTENANCE, INCLUDING LAMPS AND SOCKETS.
- D. QUALITY ASSURANCE:
 - 1) QUALITY AND GAUGE OF MATERIALS: NEW, BEST OF THEIR RESPECTIVE KINDS, FREE FROM DEFECTS AND LISTED BY UNDERWRITERS LABORATORIES, INC., OR OTHER NATIONALLY APPROVED TESTING AGENCY AND BEARING THEIR LABEL. MATERIALS AND EQUIPMENT OF SIMILAR APPLICATION SHALL BE OF SAME MANUFACTURER, EXCEPT AS NOTED.
 - 2) GUARANTEE: ALL MATERIALS AND WORKMANSHIP SHALL BE GUARANTEED AS DEFINED IN PART 1 PARAGRAPH 2.D.
 - 3) HEIGHTS OF OUTLETS:

I)	FROM FINISHED FLOOR TO CENTER	LINE OF OUTLETS FOR:
-	RECEPTACLES AND TELEPHONES:	1 FT.—6 IN. (U.O.N.)
	WALL SWITCHES:	4 FT0 IN.
	WALL FIXTURES:	7 FT0 IN.
	MOTOR CONTROLS:	5 FT0 IN.
	FIRE ALARM STROBE LIGHTS: 6 FT	8 IN. OR 6 IN. BELOW CEILING
		(WHICHEVER IS LOWER)
	GONGS AND HORNS:	7 FT6 IN.
	FIRE ALARM PULL STATIONS:	

- b) EXCEPTIONS: AT JUNCTION OF DIFFERENT WALL FINISH MATERIALS, ON MOLDING OR BREAK IN WALL SURFACE, IN VIOLATION OF CODE, OR AS NOTED OR DIRECTED.
- PART 2- PRODUCTS/APPLICATION
- 1. LOW-VOLTAGE DISTRIBUTION EQUIPMENT:
 - A. PROVIDE COMPLETE EQUIPMENT INCLUDING: SWITCHES, FUSES, CIRCUIT BREAKERS, PANELS AND TRANSFORMERS.
- B. ALL EQUIPMENT SHALL CONFORM TO NEMA, ANSI AND IEEE STANDARDS
- 2. <u>APPROVED MANUFACTURERS</u>:
 - A. DISCONNECT SWITCHES: SQUARE D, GE, EATON, SIEMENS
 - CIRCUIT BREAKERS: SQUARE D, GE, EATON, SIEMENS (MATCH BUILDING STANDARD) RACEWAYS:
 - NATIONAL WIRE PRODUCTS, WHEATLAND, REPUBLIC ROME PHELPS DODGE, GENERAL CABLE, SIMPLEX, SOUTHWIRE
 - WIRE/CABLE: RECEPTACLES: HUBBELL, LEVITON
 - LIGHT SWITCHES: HUBBELL, LEVITON OCCUPANCY SENSORS: HUBBELL, LUTRON
 - H. EXIT SIGNS: DUAL-LITE, ATLITE, LIGHT ALARM (MATCH BUILDING STANDARD)
- 3. <u>WIRING DEVICES</u>:
- A. PROVIDE COMPLETE MATERIAL AND ACCESSORIES AS NOTED.
- B. LOCAL WALL SWITCHES SHALL BE SPECIFICATION GRADE, TOGGLE, QUIET TYPE, RATED 20 AMP, 120/277 VOLT, AC. SIMILAR TO HUBBELL NOS. 1221 (SINGLE POLE), 1222 (DOUBLE POLE), 1223 (3-WAY) AND 1224 (4-WAY).
- C. DIMMERS SHALL BE RATED AT VOLTAGE COMPATIBLE WITH FIXTURE, WATTAGE SIZE AS REQUIRED. WHERE DIMMER SWITCHES ARE LOCATED NEXT TO SINGLE POLE OR VARIABLE SPEED TYPE SWITCHES. THE SINGLE POLE/VARIABLE SPEED SWITCHES SHALL MATCH THE DIMMING SWITCH STYLE. DIMMERS, WHERE GANGED TOGETHER, SHALL BE PROPERLY DERATED BASED ON MANUFACTURERS RECOMMENDATIONS. FINS OF DIMMERS SHALL NOT BE REMOVED IN MULTIGANG INSTALLATIONS. PROVIDE OVER-SIZED JUNCTION BOX FOR MOUNTING OF WALL DIMMERS.
- D. INSERTION RECEPTACLES SHALL BE SPECIFICATION GRADE DUPLEX CONVENIENCE 125 VOLTS, 2 POLE, 3 WIRE, U GROUND SLOT. GROUNDED, EXCEPT AS NOTED. MEETING NEMA STANDARDS, PUBLICATION WD-1-1971. SIMILAR TO HUBBELL NOS. 5362 (20 AMP) AND 5262 (15 AMP).
- 1) SINGLE, EXCEPT AS NOTED: 20 AMP STRAIGHT BLADE, SIMILAR TO HUBBELL NO. 5361. 125 VOLT, 2 POLE, 3 WIRE, GROUNDED.
- 2) SPECIAL USE: NONINTERCHANGEABLE TYPES AND RATINGS.
- 3) GROUND FAULT INTERRUPTER RECEPTACLES: FEED-THRU TYPE. SIMILAR TO HUBBELL NOS. GF5362 (20 AMP) AND GF5262 (15 AMP).
- 4) CLOCKS: SINGLE REGRESSED RECEPTACLE, 5 WIRE, SIMILAR TO HUBBELL NO. 5708.
- E. DEVICE PLATES: SEE ARCHITECT FOR TYPE. FOR RECEPTACLES WITH OTHER THAN 120 VOLT, INSCRIBE
- VOLTAGE AVAILABLE.
- F. ALL SWITCHES AND RECEPTACLES TO BE WHITE UNLESS OTHERWISE SPECIFIED BY ARCHITECT.
- G. MOUNTING ORIENTATION OF DEVICES (HORIZONTAL OR VERTICAL) TO BE COORDINATED WITH ARCHITECT.
- H. MULTIPLE DEVICES AT A COMMON LOCATION SHALL BE INSTALLED IN A COMMON MULTI-GANG BOX WITH A SINGLE COMMON FACEPLATE. DERATE DIMMER SWITCHES PER MANUFACTURER'S REQUIREMENTS WHEN GANGED.
- 4. <u>RACEWAYS</u>:
 - A. PROVIDE RACEWAYS ONLY AS HERE-IN SPECIFIED, EXCEPT AS NOTED. RACEWAYS SHALL BE RUN CONCEALED, EXCEPT AS NOTED.
- B. PROVIDE RACEWAY SUPPORT UTILIZING CEILING TRAPEZE, STRAP HANGERS, OR WALL BRACKETS. PROVIDE U-BOLTS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND CONNECTED TO ACCEPTABLE SUPPORTS. PROVIDE RISER CLAMPS AT EACH FLOOR LEVEL OF RISER RACEWAYS AND RESTING ON SLAB. FOR THROUGH-THE-FLOOR SYSTEMS, UTILIZE AN ASSEMBLY SIMILAR TO HUBBELL FIRE RATED POKE-THROUGH FLOOR BOX SYSTEM. FOR ABOVE FLOOR FITTINGS TELEPHONE SHALL BE BUSHED HOLE AND POWER SHALL BE DUPLEX RECEPTACLE OR OTHER AS NOTED. PROVIDE SEPARATION BARRIER BETWEEN POWER AND TELEPHONE COMPARTMENTS. PROVIDE JUNCTION BOX ON UNDERSIDE OF FLOOR. PACK FITTING TO RESTORE FIRE RATING OF FLOOR.
- C. SECURE ALL RACEWAYS TO SUPPORTS WITH PIPE STRAPS OR U-BOLTS. SPACING OF SUPPORTS SHALL BE A MINIMUM OF 10 FT ON CENTER FOR METALLIC RACEWAY AND AS REQUIRED FOR NONMETALLIC RACEWAY. SPACING SHALL BE 5 FT ON CENTER FOR WIREWAYS AND PER CODE AND AS NOTED FOR OTHERS. MOUNT SUPPORTS TO STRUCTURE MASONRY WITH TOGGLE BOLTS ON HOLLOW MASONRY, EXPANSION SHIELDS OR INSERTS IN CONCRETE AND BRICK, MACHINE SCREWS ON METAL, BEAM CLAMPS ON FRAMEWORK, WOOD SCREWS ON WOOD, AND PAN THROUGH STRAPS IN METAL DECK. NAILS, RAWL PLUGS OR WOOD PLUGS SHALL NOT BE PERMITTED. WHERE REQUIRED BY STRUCTURE, FURNISH THROUGH BOLTS AND FISHPLATES.
- D. EXPOSED RACEWAYS SHALL BE RUN PARALLEL WITH OR AT RIGHT ANGLES TO WALLS. PROVIDE CLEARANCE WITH WATER, STEAM OR OTHER PIPING (MINIMUM 3 IN. SEPARATION FROM STEAM AND HOT WATER PIPES, EXCEPT 1 IN. FROM PIPE COVER AT CROSSINGS AND 18 IN. FOR PARALLEL RUNS). FOR HUNG CEILING OUTLETS. RUN IN HUNG CEILING AND CONNECT TO CEILING SUPPORT CHANNELS. IN MASONRY AND POURED CONCRETE, RUN VERTICALLY ONLY.
- E. MAINTAIN GROUNDING CONTINUITY OF INTERRUPTED METALLIC RACEWAYS WITH GROUND CONDUCTOR, AND IN FLEXIBLE CONDUIT FOR FEEDERS AND MOTOR TERMINALCONNECTIONS.
- F. EMPTY RACEWAYS OVER 10 FT LONG: PROVIDE FISH OR PULL WIRE, GALVANIZED OR NYLON ROPE.
- G. PROVIDE RACEWAYS COMPLETE WITH BOXES, FITTINGS, AND ACCESSORIES.CONDUIT OR TUBING SIZES REFERRED TO IN SPECIFICATIONS AND ON DRAWINGS ARE NOMINAL DIAMETERS. MINIMUM DIAMETER SHALL BE 3/4 IN.

- H. ALL WIRES TO BE RUN IN CONDUIT. METAL CLAD (TYPE MC) MAY BE USED FOR CONCEALED BRANCH CIRCUITRY IN TENANTS SPACE ONLY WHEN APPROVED BY BUILDING MANAGEMENT AND WHERE PERMITTED BY CODE. EMT SHALL BE USED OUTSIDE TENANT SPACE AND IN BUILDING CLOSETS. RIGID STEEL CONDUIT SHALL BE PERMITTED FOR FEEDERS AND BRANCH CIRCUITS. PAINT MALE
- THREADS OF FIELD-THREADED CONDUIT WITH GRAPHITE-BASE PIPE COMPOUND AND BUTT CONDUIT ENDS. TOUCH UP MARRED SURFACES AND FIELD-CUT THREADS, CRCCOLD GALVANIZED.
- J. ELECTROMETALLIC TUBING (EMT) SHALL BE PERMITTED FOR BRANCH CIRCUITS ONLY IN DRY LOCATIONS, DRY WALLS, HUNG CEILINGS, HOLLOW BLOCK WALLS AND FURRED SPACES. EMT SHALL NOT BE PERMITTED IN RAISED FLOORS.
- K. CUT CONDUIT ENDS SQUARE. REAM SMOOTH. PAINT MALE THREADS OF FIELD THREADED RACEWAYS WITH GRAPHITE BASE PIPE COMPOUND. DRAW UP TIGHT WITH RACEWAY COUPLING.
- L. CONDUIT FOR INTERIOR BRANCH CIRCUITS SHALL BE THIN WALL TUBING (EMT), SIZED PER DRAWING, 3/4" MINIMUM.
- M. ELECTROMETALLIC TUBING (EMT): THIN WALL PIPE, GALVANIZED, THREADLESS. GALVANIZED RIGID STEEL ELBOWS, 2 IN. OR LARGER.
- N. RIGID METAL CONDUIT: INDUSTRY STANDARD STEEL CONDUIT (3/4" MIN., 4" MAX.)
- O. THREADED FITTINGS SHALL BE USED WITH RIGID CONDUIT. DOUBLE SET SCREW FITTINGS SHALL BE USED WITH EMT.
- P. FLEXIBLE STEEL CONDUIT: CONTINUOUS SINGLE STRIP, GALVANIZED, GROUNDING TYPE.
- Q. FLEXIBLE STEEL CONDUIT MAY BE USED ONLY FOR:
 - 1) SHORT CONNECTIONS WHERE RIGID CONDUIT IS IMPRACTICABLE.
 - 2) FROM OUTLET BOX TO RECESSED LIGHTING FIXTURE: MINIMUM 4 FT LENGTHS, MAXIMUM 6 FT. LENGTHS.
 - 3) FOR FINAL CONNECTION TO MOTOR TERMINAL BOX, TRANSFORMERS AND OTHER VIBRATING EQUIPMENT: WITH POLYVINYL SHEATHING AND GROUND CONDUCTOR. MINIMUM LENGTH 18 IN. WITH SLACK. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END.
 - 4) FOR EXPANSION JOINT CROSSINGS. CROSS AT RIGHT ANGLES AND ANCHOR ENDS. CONNECT GROUND CONDUCTOR TO ENCLOSURE OR RACEWAY AT EACH END.
- R. EXPANSION FITTINGS: INSTALL AT RIGHT ANGLES WITH CLIP CENTERED IN EXPANSION JOINT. PROVIDE LENGTH OF RUNS IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS. PRESET FITTINGS SHALL ALLOW FOR TEMPERATURE VARIATION.
- S. FLEXIBLE METALLIC CONDUIT: ANGLE WEDGE TYPE WITH INSULATED THROAT.
- T. BUSHINGS: METALLIC INSULATED TYPE.
- U. WIREWAYS: WIRE SHALL BE AS NOTED, MINIMUM NO. 16 GAUGE STEEL WITH GROUND CONTINUITY. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- V. SURFACE METAL RACEWAY: SIZE AS NOTED. BASE 0.04 IN., COVER 0.25 IN. MATERIAL SHALL BE STEEL. FINISH SHALL BE BAKED ENAMEL. COVERS SHALL BE SCREW-ON.
- W. RACEWAYS PASSING THROUGH FIRE-RATED CONSTRUCTION, ALL OPENINGS TO BE SEALED WITH FIRE SEALANT AS REQUIRED TO MAINTAIN THE EXISTING FIRE RATING.
- X. INSTALL ACCESSIBLE JUNCTION AND PULLBOXES CLEAR OF OTHER TRADES AND SUPPORTED FROM BUILDING STRUCTURE INDEPENDENT OF CONDUIT.
- Y. PERFORM CONTINUITY TESTS OF RESISTANCE OF FEEDER CONDUITS FROM SERVICE TO POINT OF FINAL DISTRIBUTION USING ONE CONDUCTOR RETURN. MAXIMUM RESISTANCE SHALL BE 25 OHMS.
- 5. <u>PULL BOXES, PANEL BOXES, AND OUTLET BOXES</u>:
 - A. OUTLET BOXES: EXCEPT AS OTHERWISE REQUIRED BY CONSTRUCTION, DEVICES OR WIRING, BOXES SHALL BE STAMPED STEEL, 4 IN. SQUARE OR OCTAGON FOR FIXTURES. BOXES ABOVE CEILING SHALL BE 1-1/2 IN. DEEP. BOXES IN CEILING OR SLAB SHALL BE 3 IN. DEEP. BOXES IN WALL FOR FIXTURES SHALL BE 2-3/4 IN. DEEP. BOXES IN WALL FOR RECEPTACLES AND SWITCHES SHALL BE 1-1/2 IN. DEEP. FURNISH WITH RAISED COVERS AND FIXTURE STUDS WHERE REQUIRED. WITHOUT FIXTURE OR DEVICE: FURNISH BLANK COVER. OFFSET BACK-TO-BACK OUTLETS WITH MINIMUM 6 IN. SEPARATION
 - B. JUNCTION AND PULL BOXES: GALVANIZED SHEET STEEL WITH SCREW-ON COVERS, EXCEPT AS NOTED. FURNISH WITH INSULATED SUPPORTS FOR CABLES. LOCATIONS SHALL BE AS NOTED OR REQUIRED AND ACCESSIBLE. PROVIDE BARRIERS IN NEW AND RENOVATED BOXES BETWEEN EMERGENCY AND NORMAL WIRING. FLOOR BOXES SHALL BE SUITABLE FOR CONDUIT AND DEVICES NOTED. RAISED OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH ABOVE FLOOR FITTING. TELEPHONE: BUSHED HOLE. POWER: DUPLEX RECEPTACLE OR OTHER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY. FLUSH OUTLETS SHALL BE HUBBELL #B2414 SERIES WITH FLUSH FLOOR FITTING FOR TELEPHONE AND FLUSH DUAL FLAP COVER WITH DUPLEX RECEPTACLE FOR POWER AS NOTED. INCREASE SIZE TO SUIT AS NECESSARY.
 - C. ERECT WALL AND SWITCH OUTLETS IN ADVANCE OF FURRING AND FIREPROOFING. OUTLET BOXES SHALL BE SET SQUARE AND TRUE WITH BUILDING FINISH. SECURE TO BUILDING STRUCTURE BY ADJUSTABLE STRAP IRON OR GROUT IN WITH MASONRY. VERIFY OUTLET LOCATIONS IN FINISHED SPACES WITH ARCHITECTURAL DRAWINGS OF INTERIOR DETAILS AND FINISHES. PROVIDE BARRIERS BETWEEN SWITCHES CONNECTED TO DIFFERENT PHASES FOR VOLTAGES EXCEEDING 150 VOLTS TO GROUND.
 - D. PANEL, JUNCTION AND PULL BOXES SHALL BE LOCATED CLEAR OF OTHER TRADES. CONCEAL JUNCTION AND PULL BOXES IN FINISHED SPACES. WHERE NECESSARY, REROUTE RACEWAYS OR MAKE OTHER ARRANGEMENTS FOR CONCEALMENT. BOXES SHALL BE ACCESSIBLE. SUPPORT BOXES FROM BUILDING STRUCTURE, INDEPENDENT OF CONDUIT. PROVIDE FLOOR-TO-CEILING CHANNELS FOR MOUNTING ON DRYWALL AND LIGHTWEIGHT CONSTRUCTION. OUTLET BOXES FOR FIXTURES RECESSED IN HUNG CEILINGS SHALL BE ACCESSIBLE THROUGH OPENING CREATED BY REMOVAL OF FIXTURE. SECURE TO BLACK IRON SUPPORT. MOTOR TERMINAL BOXES: COORDINATE WITH MOTOR BRANCH CIRCUIT CONDUIT AND WIRING; ADD BOX VOLUME WHERE REQUIRED.
 - E. PROVIDE PULL BOXES AND JUNCTION BOXES IN LONG STRAIGHT RUNS OF RACEWAY TO ASSURE THAT CABLES ARE NOT DAMAGED WHEN THEY ARE PULLED, TO FULFILL REQUIREMENTS AS TO THE NUMBER OF BENDS PERMITTED IN RACEWAY BETWEEN CABLE ACCESS POINTS, THE ACCESSIBILITY OF CABLE JOINTS AND SPLICES, AND THE APPLICATION OF CABLE SUPPORTS.
 - F. PULLBOXES AND JUNCTION BOXES SHALL BE SIZED SO THAT THE MINIMUM BENDING RADIUS CRITERIA SPECIFIED FOR THE WIRES AND CABLE ARE MAINTAINED.
 - G. USE WEATHERPROOF BOXES, JUNCTION BOXES AND DEVICES FOR ALL REQUIRED WEATHERPROOF INSTALLATION.
 - H. OUTLET BOXES SHALL BE PROVIDED FOR ALL LOW VOLTAGE DEVICES (I.E. TELEPHONE/DATA, SECURITY, FIRE ALARM, ETC.) COORDINATE BOX SIZE AND DEPTH WITH RESPECTIVE VENDOR.
- 6. <u>WIRES AND CABLES</u>:
- A. PROVIDE WIRE AND CABLE COMPLETE WITH ACCESSORIES. SIZE REFERENCE SHALL BE AWG EXCEPT AS NOTED.
- B. CONDUCTORS SHALL BE COPPER, ASTM STANDARD SOLID (NO. 10 AND SMALLER) OR STRANDED (NO. 8 AND LARGER). GENERAL USE CABLING SHALL BE NO. 12 MINIMUM. AT 120 VOLTS AND OVER 100 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM. AT 265 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 10 MINIMUM.
- C. CONTROL AND ALARM CABLING, EXCEPT AS NOTED, SHALL BE NO. 14 MINIMUM. AT 120 VOLTS AND OVER 200 FT CIRCUIT LENGTH PROVIDE NO. 12 MINIMUM.
- D. OTHER VOLTAGES AND PHASES: ADJUST CABLE SIZING AS REQUIRED TO MAINTAIN VOLTAGE DROP. INCREASE RACEWAY SIZES FOR LARGER WIRE AS REQUIRED.
- E. INSULATION SHALL BE RUBBER AND THERMOPLASTIC MEETING ASTM AND IPCEA STANDARDS. TYPE THHN OR THWN SHALL BE UTILIZED FOR FEEDERS AND BRANCH CIRCUITS EXCEPT AS NOTED. TYPE SFF-2 SHALL BE UTILIZED FOR BRANCH CIRCUITS LOCATED IN WIRING CHANNELS OF CONTINUOUS FLUORESCENT FIXTURES AND IN AMBIENT TEMPERATURES OVER 90 DEG C. FOR UNGROUNDED ISOLATED BRANCH CIRCUITS PROVIDE CROSS-LINKED POLYETHYLENE INSULATION (TYPE XHHW).

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CONNECTION DATE	A 15-10 10-10	Stephen Pustola, P.E. #15748 Not valid unless embossed
ASSOCIATES ENGINEERS, LLC	Design and Construction Services Naugatuck, Connecticut 06770 Fax (203) 720-2816	www.pustola.com
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ELECTRICAL SPECIFICATIONS (CONT'D)

- THE USE OF MC.
- G. COLOR CODING SHALL BE AS FOLLOWS:
- - H. PROVIDE FLAMEPROOF LINEN OR FIBER TAGS IN ACCESSIBLE LOCATIONS FOR FEEDERS INDICATE FEEDER
 - BUS BARS: USE ANTISEIZE COMPOUND ON TANG.

 - FOR WIRE IN RISER CONDUITS AS REQUIRED BY CODE.
- 7. <u>GROUNDING</u>:
- D. USE AN INTERNAL BONDING CONDUCTOR WHERE FLEXIBLE METALLIC CONDUITS ARE INSTALLED.
- E. GROUND MOTORS FROM GROUNDING BUSHING IN THE STARTER TO THE MOTOR FRAME.
- APPROVED GROUNDING TERMINAL.

- 18. LIGHTING FIXTURES:
- HARDWARE, AND ACCESSORIES.
- DETAILS.
- D. ALL FIXTURES SHALL BE FREE OF LIGHTING LEAKS BELOW CEILING.
- SUITABLE TO BE CONNECTED TO 120V OR 277V LIGHTING.
- BE COMPATIBLE WITH THE DIMMING SPECIFIED.
- SWITCH INSTALLED IS COORDINATED WITH FIXTURE TYPE.
- H. ALL RECESSED FIXTURES SHALL BE SET FLUSH INTO ACOUSTIC TILE CEILINGS. 19. OCCUPANCY SENSORS:
 - SENSOR CONTROL SYSTEM, AS DESCRIBED HEREIN.

 - TO PREVENT INTERFERENCE (CROSS TALK) BETWEEN SENSORS.
 - D. SENSORS SHALL HAVE THE FOLLOWING FUNCTIONS:

 - TO ACTIVATE AN INDEPENDENT FUNCTION.
 - ABOVE WHICH THE SENSOR WILL NOT TURN THE LIGHTS ON.
 - COVFRAGE.
 - A CHANGE IN PATTERN OF REFLECTED ULTRASONIC ENERGY.

F. METAL CLAD (TYPE MC) MAY BE USED FOR CONCEALED BRANCH CIRCUITRY IN TENANTS SPACE ONLY WHEN APPROVED BY BUILDING MANAGEMENT AND WHERE PERMITTED BY CODE. EMT SHALL BE USED OUTSIDE TENANT SPACE AND IN BUILDING CLOSETS. STATE IN PROPOSAL THAT PRICE IS BASED UPON

1) 120/208 VOLT SYSTEM: BLACK FOR A PHASE, RED FOR B PHASE, BLUE FOR C PHASE.

2) NEUTRAL WIRE SHALL UTILIZE WHITE OUTER COVERING THROUGHOUT.

3) EQUIPMENT GROUND WIRE SHALL UTILIZE GREEN OUTER COVERING THROUGHOUT.

4) WHERE COLOR-CODED CABLE IS NOT AVAILABLE, CERTIFY IN WRITING AND REQUEST PERMISSION TO OVERLAP CONDUCTORS WITH 6 IN. COLOR TAPING IN ACCESSIBLE LOCATIONS.

NUMBER, SIZE, PHASE AND POINTS OF ORIGIN AND TERMINATIONS. FOR CONTROL AND ALARM WIRING INDICATE TYPE (CONTROL OR ALARM), SIZE OF WIRE, AND POINTS OF ORIGIN AND TERMINATIONS.

I. TERMINATIONS, SPLICES AND TAPS UNDER 600 VOLTS: COPPER CONDUCTORS NO. 10 AND SMALLER SHALL UTILIZE COMPRESSION-TYPE OF TWIST-ON SPRING-LOADED CONNECTORS AND CLEAR NYLON-INSULATED COVERING. COPPER CONDUCTORS NO. 8 AND LARGER SHALL UTILIZE MECHANICAL BOLTED PRESSURE OR HYDRAULIC COMPRESSION TYPE USING MANUFACTURER'S RECOMMENDED TOOLING. CABLE LUGS AND CONNECTORS SHALL UTILIZE COMPRESSION TYPE OF SAME METAL AS CONDUCTOR. PROVIDE TO MATCH CABLE, WITH MARKING INDICATING SIZE AND TYPE. COPPER LUG CONNECTIONS TO

J. NOT MORE THAN 3 LIGHTING OR CONVENIENCE OUTLET CIRCUITS SHALL BE INSTALLED IN ONE CONDUIT UNLESS OTHERWISE INDICATED. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32 DEG F. PROVIDE THERMOPLASTIC WIRES SHALL NOT BE INSTALLED IN COMPUTER AREA RAISED FLOORS.

K. LEAVE WIRES WITH SUFFICIENT SLACK TO PERMIT MAKING FINAL CONNECTIONS.

L. PERFORM CONTINUITY AND INSULATION TESTS. MEGGER TEST 100 PERCENT OF FEEDERS, 10 PERCENT OF BRANCH CIRCUITS AND ALL MOTOR BRANCH CIRCUITS OVER 25 HP. PERFORM TESTS PRIOR TO CONNECTING EQUIPMENT AND IN PRESENCE OF AUTHORIZED REPRESENTATIVES. SUBMIT WRITTEN REPORT OF RESULTS. CORRECT OR REPLACE CABLE TESTING BELOW MANUFACTURER'S STANDARDS.

M. PULL NO THERMOPLASTIC WIRES AT TEMPERATURES LOWER THAN 32°F (0C). PROVIDE CABLE SUPPORTS

A. THE ENTIRE ELECTRICAL INSTALLATION SHALL BE GROUNDED TO PROVIDE AN ELECTRICALLY GROUNDING PATH TO THE GROUNDING ELECTRODE IN A CODE APPROVED MANNER.

B. METAL RACEWAYS, METAL ENCLOSURES OF ELECTICAL DEVICES AND EQUIPMENT, LIGHTING FIXTURES AND OTHER EQUIPMENT SHALL BE COMPLETELY GROUNDED.

C. PROPER HARDWARE REQUIRED FOR COMPLETE GROUNDING SYSTEM SHALL BE INSTALLED BY THE CONTRACTOR. USE EXOTHERMIC WELDING PROCESS FOR INACCESSABLE CONNECTIONS.

F. GROUNDING CONDUCTOR SHALL BE RUN WITH THE CIRCUIT CONDUCTORS AND TERMINATED TO AN

G. PROVIDE SUPPLEMENTARY GROUND BONDING WHERE METALLIC CONDUITS TERMINATE AT METAL CLAD EQUIPMENT (OR AT THE METAL PULL BOX OF EQUIPMENT) FOR WHICH A GROUND BUS IS SPECIFIED WITH A BUSHING OF THE GROUNDING TYPE CONNECTED INDIVIDUALLY TO GROUND BUS.

H. ALL GROUND WIRES SHALL BE SUITABLY PROTECTED FROM MECHANICAL INJURY.

I. CONTRACTOR SHALL PROVIDE ALL REQUIRED GROUNDING AND BONDING FOR ALL NEW I.T. RACKS.

A. COORDINATE ALL WORK INCLUDING ALL LIGHT FIXTURE SPECIFICATIONS WITH ARCHITECTURAL DRAWINGS.

B. PROVIDE FIXTURES ("LUMINARIES"), COMPONENTS AND LAMPS. FIXTURES SHALL BE COMPLETELY FACTORY ASSEMBLED, WIRED AND EQUIPPED WITH ALL NECESSARY SOCKETS, BALLASTS, SUPPORTING

C. ALL LIGHTING FIXTURE MOUNTING HARDWARE SHALL MATCH AND BE COORDINATED WITH THE NEW CEILING SYSTEM TYPE. ALL FIXTURES SHALL BE EQUIPPED WITH "EARTHQUAKE" CLIPS. ALL LIGHTING FIXTURES SHALL BE INSTALLED WITH SEISMIC BRACING AS INDICATED ON ARCHITECTURAL CEILING

E. FLUORESCENT BALLAST SHALL BE UL'S CLASS "P" AND SHALL CONFORM TO ANSI AND UL SPECIFICATIONS WITH LABELS OF APPROVAL BY UL AND CERTIFICATION BY C.B.M. BALLASTS SHALL COMPLY WITH THE STATE ENERGY CODE. BALLASTS FOR FLUORESCENT LAMPS SHALL BE OF THE ENERGY SAVING SUPER LOW HEAT DESIGN WITH HIGH POWER FACTOR (0.9 MINIMUM) AND A HIGH BALLAST FACTOR (0.95 MINIMUM). ALL BALLASTS SHALL BE SUPPLIED AS UNIVERSAL VOLTAGE,

F. WHERE DIMMING OF FLUORESCENT FIXTURES IS REQUIRED. THE ELECTRONIC BALLAST INSTALLED MUST

G. WHERE DIMMING OF LOW VOLTAGE FIXTURES IS REQUIRED, THE STEP DOWN VOLTAGE TRANSFORMER SHALL BE ELECTRONIC (OR MAGNETIC) AS NOTED BY THE LIGHTING DESIGNER/ARCHITECT SCHEDULE. CONTRACTOR WILL BE RESPONSIBLE FOR REVIEWING FIXTURE SPECIFICATION AND ENSURING DIMMER

A. CONTRACTOR'S WORK SHALL INCLUDE ALL LABOR, MATERIALS, TOOLS, APPLIANCES, CONTROL HARDWARE, SENSORS, WIRE, JUNCTION BOXES, AND EQUIPMENT NECESSARY FOR A COMPLETELY OPERATIONAL

B. ALL SENSORS SHALL BE EITHER SELF-CONTAINED OR INSTALLED AS OF OTHER SPECIFIED SYSTEMS OF THE DUAL TECHNOLOGY TYPE PROVIDING VOLUMETRIC COVERAGE WITH THE DETECTION AREA. SENSORS SHALL BE SOLID-STATE DESIGN AND BE DESIGNED FOR ENERGY CONSERVATION.

C. SENSORS LOCATED IN ADJACENT ROOMS OR SPACES, OR SENSORS CONTROLLING DIFFERENT LIGHTING FIXTURES OR ZONES WITHIN THE SAME ROOM, SHALL OPERATE AT DIFFERENT FREQUENCIES IN ORDER

1) TIMED DELAY FOR TURNING LIGHTS OFF: ADJUSTABLE OVER A RANGE OF 1 TO 30 MINUTES.

2) MANUAL OVERRIDE SWITCH: TURNS LIGHTS OFF MANUALLY REGARDLESS OF TIMED DELAY. 3) ISOLATED RELAY CONTACT: OPERATES ON DETECTION OF OCCUPANCY OR VACANCY, AS INDICATED,

4) AMBIENT LIGHT LEVEL SENSOR: ADJUSTABLE FOR SETTING A LEVEL OF AMBIENT ILLUMINATION

E. INFRARED SENSORS: DETECTS OCCUPANCY BY A COMBINATION OF HEAT AND MOVEMENT IN ZONE

F. ULTRASONIC SENSORS: EMITS A BEAM OF ULTRASONIC ENERGY AND DETECTS OCCUPANCY BY A SENSING

G. DUAL TECHNOLOGY SENSORS: USES A COMBINATION OF INFRARED AND ULTRASONIC DETECTION METHODS TO DISTINGUISH BETWEEN OCCUPIED AND UNOCCUPIED CONDITIONS FOR THE AREA COVERED.

- H. ALL OCCUPANCY SENSORS SHALL BE SET AT FULL SENSITIVITY AND MAXIMUM FOOT CANDLES. COVERAGE SHALL REMAIN CONSTANT AFTER SENSITIVITY CONTROL HAS BEEN SET. SENSOR TIME DELAY SHALL BE SET.
- I. FOR ADDITIONAL INFORMATION, INCLUDING MOUNTING REQUIREMENTS AND WIRING DIAGRAMS, REFER TO MANUFACTURER'S TECHNICAL LITERATURE AND DETAILS ON DRAWINGS.
- J. SENSORS TO BE PROVIDED WITH MASKING TAPE FOR INFRARED COMPONENTS TO PREVENT FALSE TRIPPING OUTSIDE THE COVERAGE AREA.
- K. BEFORE TENANT MOVE-IN DATE AND TURN OVER OF THE PROJECT, THE ELECTRICAL CONTRACTOR SHALL COORDINATE WITH SENSOR TECHNICAL REPRESENTATIVE TO FIELD ADJUST SENSOR SENSITIVITY AND LOCATION TO ENCOMPASS ENTIRE ROOM OR AREA WITHOUT NUISANCE TRIPPING FROM ADJACENT AREAS.
- L. OCCUPANCY SENSORS SHALL DERIVE POWER FROM LIGHTING CIRCUIT SERVING LIGHT FIXTURES IT CONTROLS.

10. <u>SELF-POWERED EXIT SIGNS</u>:

- A. FURNISH AND INSTALL SELF-POWERED EXIT SIGNS COMPLETE WITH INTEGRAL BATTERY/CHARGER CAPABLE OF OPERATING THE SIGN FOR 90 MINUTES IN THE EVENT OF A POWER FAILURE.
- B. UNIT TO HAVE SEALED NICKEL CADMIUM BATTERY, LED ILLUMINATORS, TEST BUTTON, AND INDICATING
- C. BATTERY/CHARGER PACK SHALL BE MOUNTED ABOVE THE SIGN. CEILING MOUNTED SIGNS SHALL BE ARRANGED SO THAT THE PACK IS RECESSED ABOVE THE CEILING. WALL MOUNTED SIGNS SHALL HAVE CONCEALED BATTERY PACKS.
- D. EXIT SIGNS SHALL MATCH BUILDING STANDARD OR BE MANUFACTURED BY DUAL-LITE, ATLITE, LIGHT ALARMS, OR APPROVED EQUAL.
- 11. PANELBOARDS:
 - A. DISTRIBUTION PANELS: SWITCHING UNITS SHALL BE 3 PHASE, 4 WIRE CIRCUIT-BREAKER TYPE UNLESS OTHERWISE NOTED ON PANEL SCHEDULES. BUS BARS SHALL BE HARD DRAWN COPPER, MINIMUM 98% CONDUCTIVITY, SILVER OR TIN-PLATED JOINTS. CABINETS SHALL BE GALVANIZED SHEET STEEL BACK BOX, WITH DOOR AND TRIM AND LAPPED AND WELDED CORNERS. HARDWARE SHALL BE CHROME-PLATED WITH FLUSH LOCK/LATCH HANDLE ASSEMBLY (UP TO 48 IN. HIGH DOORS) OR VAULT HANDLE, LOCK AND 3-POINT CATCH (LARGER THAN 48 IN. HIGH DOORS). HINGES SHALL BE SEMI-CONCEALED, 5-KNUCKLE STEEL WITH NONFERROUS PINS, 180-DEG OPENING, LOCATED A MAXIMUM 26 IN. ON CENTERS. MINIMUM GUTTER SPACES FOR LIGHTING PANELS SHALL BE 5-3/4 IN. SIDES, TOP AND BOTTOM. DIRECTORY HOLDER SHALL BE METAL FRAME WITH CLEAR PLASTIC, TRANSPARENT COVER. A TYPEWRITTEN LIST INDICATING FEEDER CABLE AND CONDUIT SIZE, CIRCUIT NUMBERS, OUTLETS SUPPLIED AND THEIR LOCATIONS SHALL BE PROVIDED.
 - B. PROVIDE CODE GAUGE STEEL DOORS FOR ALL PANELBOARD BOXES. FRONT COVER SHALL BE A "DOOR WITHIN A DOOR" TYPE. THE OUTER DOOR (TRIM) SHALL ALLOW ACCESS TO ENTIRE PANELBOARD BOX INCLUDING GUTTER SPACES. OUTER DOOR (TRIM) SHALL BE ATTACHED DIRECTLY TO BOX BY A FULL LENGTH PIANO HINGE. THE INNER DOOR SHALL ALLOW ACCESS TO CIRCUIT BREAKERS ONLY. PROVIDE LOCK AND SET OF KEYS FOR INNER DOOR PER PANELBOARD.
 - C. PROVIDE A COPPER EQUIPMENT GROUND BAR IN EACH PANEL, AND A COPPER ISOLATED GROUND BAR IN NOTED PANELS.
 - D. PANELS SHALL BE PROVIDED WITH NEUTRAL BARS SIZED AT 200% OF THE PHASE BUS BARS.
 - E. PHASE LEGS OF ALL PANELS SHALL BE BALANCED AT SUPPLY POINT TO WITHIN 10% AFTER ALL CIRCUITS ARE WIRED AND LOADS CONNECTED. ANY PANEL FOUND WITH UNBALANCED LOADS SHALL HAVE ITS CIRCUITS REARRANGED AS REQUIRED TO BALANCE PHASE LEGS.
 - F. PROVIDE MULTI-CABLE LUGS WHERE REQUIRED. DOUBLE LUGGING SHALL NOT BE PERMITTED.
 - G. MOUNTING HEIGHT SHALL BE A MAXIMUM OF 6 FT.-6 IN. FROM FLOOR TO TOP OF SWITCH UNIT.
 - H. UPDATE DIRECTORIES ON EXISTING PANELBOARDS WHERE CIRCUITING HAS CHANGED.
 - I. PANELS SHALL HAVE ENGRAVED WHITE CORE, BLACK LAMICOID NAMEPLATE AFFIXED WITH EPOXY CEMENT.
- 12. CIRCUIT BREAKERS:
 - A. CIRCUIT BREAKERS: MOLDED CASE BREAKERS SHALL BE THERMAL-MAGNETIC. QUICK-MAKE. QUICK-BREAK, BOLT-ON TYPE, MANUALLY OPERATED WITH INSULATED TRIP-FREE HANDLE. MULTI-POLE TYPE BREAKERS SHALL CONTAIN INTERNAL TRIP BAR. TERMINALS SHALL BE SUITABLE FOR COPPER OR ALUMINUM CABLE. FURNISH AUXILIARY DEVICES WHERE REQUIRED FOR SHUNT-TRIPPING, OPEN AND CLOSE MOTOR OPERATOR AND ALARM INDICATION. ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1. EXCEPT AS NOTED. FRAMES, IC AND INTERCHANGEABLE TRIPS SHALL BE AS FOLLOWS:
 - 1) MINIMUM SHORT CIRCUIT RATING OF 10,000 AMPERES SYMMETRICAL FOR 120/208V PANELS OR HIGHER WHERE NOTED.
 - 2) MINIMUM SHORT CIRCUIT RATING OF 14,000 AMPERES SYMMETRICAL FOR 277/480V PANELS OR HIGHER WHERE NOTED.
 - B. FOR PANELBOARD APPLICATIONS, CIRCUIT BREAKERS SHALL BE BOLTED TO THE PANELBOARD BUS BARS. WHERE CIRCUIT BREAKERS ARE INSTALLED IN EXISTING PANELBOARDS, BREAKERS SHALL BE OF THE SAME MANUFACTURER AND INTERRUPTING RATING. BREAKERS SHALL BE COMPATIBLE WITH EXISTING PANEL BOARD.
 - C. MULTIWIRE BRANCH CIRCUITS SUPPLYING POWER TO MORE THAN ONE DEVICE OR EQUIPMENT SHALL BE PROVIDED WITH A MEANS TO DISCONNECT SIMULTANEOUSLY ALL UNGROUNDED CONDUCTORS AT THE PANELBOARD WHERE THE BRANCH CIRCUIT ORIGINATES. COORDINATE WITH LOCAL AUTHORITY HAVING JURISDICTION THE MEANS REQUIRED TO MEET NEC SECTION 210.4(B).
- D. TESTS: OPEN AND CLOSE LOAD BREAK SWITCHING DEVICES UNDER LOAD.
- 13. DISCONNECT SWITCHES:
 - A. DISCONNECT SWITCHES SHALL BE FUSED OR NONFUSED AS NOTED. VOLTAGE SHALL BE AS REQUIRED. SWITCHES SHALL BE HEAVY DUTY, EXCEPT AS NOTED, AND HORSEPOWER RATED FOR MOTOR LOADS. TOGGLE TYPE SWITCHES SHALL BE NONFUSED, LOAD BREAK, HAVING MAXIMUM RATINGS OF 20 AMP AT 600 VOLTS AND 30 AMP AT 240 VOLTS. KNIFE-BLADE TYPE SWITCHES SHALL BE LOAD BREAK, QUICK-MAKE QUICK-BREAK, UL CLASS R UP TO 600 AMP. MAXIMUM RATING EXCEPT AS NOTED SHALL BE 800 AMP. ARC QUENCHERS SHALL BE PROVIDED. SWITCHES SHALL BE SIMILAR TO GENERAL ELECTRIC QMR. ALL SWITCH ENCLOSURES SHALL BE DEAD FRONT, NEMA TYPE 1, EXCEPT AS NOTED.
 - B. OUTDOOR DISCONNECT SWITCHES SHALL BE SIMILAR TO INDOOR, EXCEPT LISTED FOR OUTDOOR APPLICATIONS (NEMA 3R OR 4, AS REQUIRED).
- 14. TELEPHONE AND DATA EMPTY CONDUIT SYSTEM:
- A. PROVIDE LABOR, MATERIALS, AND SERVICES FOR A COMPLETE AND SAFE INSTALLATION IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND ALL APPLICABLE CODES AND AUTHORITIES HAVING JURISDICTION FOR THE SYSTEM INCLUDING THE FOLLOWING: CONDUIT, PULL BOXES, OUTLET BOXES, AND SLEEVES.
- B. PROVIDE MINIMUM 2" DEEP 2 GANGED OUTLET BOXES. DEVICES BY OTHERS.
- C. CONDUIT SHALL BE 3/4" IN. MINIMUM. FURNISH EMPTY CONDUIT FROM OUTLET TO NEAREST ACCESSIBLE HUNG CEILING.
- D. ALL RACEWAYS SHALL BE EMT WITH BUSHED TERMINATIONS AT HUNG CEILING WITH (NYLON CORD).
- E. EQUIPMENT TO CONFORM TO THE REQUIREMENTS OF TELEPHONE COMPANY.
- 15. FIRE ALARM SYSTEM:
 - A. CONTRACTOR SHALL PROVIDE A COMPLETE OPERATIONAL FIRE ALARM SYSTEM FOR THE WORK AREA(S), INCLUDING INTERTIES TO THE EXISTING BUILDING FIRE ALARM SYSTEM, FOR ALL NEW FIRE ALARM WORK, INCLUDING:
 - 1) FIRE ALARM SPEAKER/STROBE OR HORN/STROBE DEVICES
 - 2) FIRE ALARM STROBE DEVICES
 - 3) FIRE ALARM PULL STATIONS

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- 4) SMOKE DETECTORS 5) HEAT DETECTORS
- B. CONTRACTOR SHALL ALSO INCLUDE ALL COMPONENTS TO UPGRADE THE EXISTING BASE BUILDING SYSTEM EXPANSION INCLUDING, BUT NOT LIMITED TO, RELAY CARDS, STROBE CONTROL PANELS, AMPLIFIERS, ETC.
- C. CONTRACTOR TO OBTAIN THE SERVICES OF THE BASE BUILDING FIRE ALARM VENDOR TO DEVELO DESIGN A CODE COMPLIANT, FULLY FUNCTIONAL FIRE ALARM SYSTEM. ALL WORK TO BE DONE COORDINATION WITH BASE BUILDING FIRE ALARM VENDOR AND BUILDING MANAGEMENT.
- D. ALL EQUIPMENT SHALL MEET REQUIREMENTS OF NFPA 72, ALL APPLICABLE CODES, AND LOCAL AND BE INSTALLED AND CONNECTED IN ACCORDANCE WITH THE MANUFACTURER'S RECOMMENDAT AND INSTRUCTIONS. ALL FINAL CONNECTIONS TO BE MADE BY THIS CONTRACTOR WITH THE APPR AND SUPERVISION OF THE BUILDING OWNER AND FIRE ALARM SYSTEM VENDOR.
- E. ALL COST ASSOCIATED WITH CONNECTIONS AND REPROGRAMMING OF THE EXISTING FIRE ALARM TO BE PAID BY THIS CONTRACTOR.
- F. BUILDING FIRE ALARM SYSTEM INTEGRITY SHALL BE MAINTAINED AT ALL TIMES (BEFORE, DURING, AFTER DEMOLITION AND/OR CONSTRUCTION. IT IS THIS CONTRACTOR'S RESPONSIBILITY TO MAINT OPERATION OF ALL EXISTING FIRE ALARM DEVICES AT ALL TIMES.
- G. ELECTRICAL CONTRACTOR SHALL CONFIRM THAT ALL EXISTING WIRING ON TENANT FLOOR IS COMP WITH LATEST FIRE ALARM STANDARDS AND BUILDING REQUIREMENTS. IF WIRING DOES NOT MEET STANDARDS AND BUILDING REQUIREMENTS ALL WIRING SHALL BE REPLACED AS PART OF THIS P
- H. ALL FIRE ALARM DEVICES ARE TO BE FULLY COMPATIBLE WITH THE EXISTING BUILDING ADDRESS FIRE ALARM SYSTEM.
- I. INSTALLATION SHOULD BE THOROUGHLY TESTED WITH THE INSTALLER AND BUILDING PERSONNEL ANY FINAL INSPECTION IS SCHEDULED.
- J. SUBMISSION OF BID ACKNOWLEDGES THAT CONTRACTOR HAS CONTACTED THE BASE BUILDING VE AND HAS INCLUDED ALL COMPONENTS FOR A CODE COMPLIANT SYSTEM. ADDITIONAL CLAIMS FO CHANGES IN VENDOR SCOPE OR ADDITIONAL DEVICES/COMPONENTS, UNLESS INITIATED BY TENAN NOT BE ACCEPTED.
- K. ALL AUDIO VISUAL WALL MOUNTED FIRE ALARM DEVICES SHALL BE WHITE WITH WHITE FACE PLAT RED LETTERING UNLESS OTHERWISE DIRECTED BY ARCHITECT.
- 16. <u>SECURITY SYSTEM</u>:
 - A. CONTRACTOR SHALL FURNISH OUTLET BOXES AND EMPTY CONDUITS REQUIRED FOR INSTALLATION SECURITY SYSTEM HARDWARE AND CABLING.
 - B. CONTRACTOR SHALL REFER TO SECURITY DRAWINGS OR DETAILS ON THESE DRAWINGS FOR ALL REQUIREMENTS FOR SECURITY HARDWARE AND CABLING.

PART 3- EXECUTION

1. <u>GENERAL</u>:

- A. PERFORM THE WORK AT SUCH TIME AND IN SUCH MANNER AS TO MINIMIZE INTERFERENCE WITH BUILDING'S NORMAL OPERATION. NOTIFY BUILDING MANAGEMENT REPRESENTATIVES IN ADVANCE TIME A SERVICE OUTAGE OR INTERRUPTION WILL BE REQUIRED. SCHEDULE SUCH SERVICE OUTA INTERRUPTION ONLY AFTER HAVING RECEIVING APPROVAL OF DATE, HOUR, AND TIME INTERVAL I THEREOF. SCHEDULE OF WORK AS DIRECTED SHALL BE FOLLOWED AS CLOSELY AS POSSIBLE.
- B. COORDINATE WITH THE BUILDING OWNER FOR ANY SERVICE INTERRUPTION OF EXISTING SYSTEMS GIVE NOTICE AS REQUIRED BY BUILDING RULES AND REGULATIONS OR A MINIMUM OF FIVE (5) PRIOR TO ANY WORK, WHICHEVER IS MORE STRINGENT. CONTRACTOR IS TO PERFORM WORK O PREMIUM TIME SO AS TO NOT DISTURB EXISTING TENANTS ON OTHER FLOORS.
- C. OPENINGS AROUND ELECTRICAL PENETRATIONS THROUGH FIRE RESISTANCE RATED WALLS, PARTIT FLOORS, OR CEILINGS SHALL BE FIRE STOPPED USING APPROVED METHODS. SEALANT SHALL BE FOR 3 HOURS. TELECOMMUNICATION CONTRACTOR SHALL BE RESPONSIBLE FOR INSTALLING FIRE STOPPING IN 'IT' CONDUITS/SLEEVES/PENETRATIONS AFTER 'IT' WIRES ARE PULLED.
- D. MAINTAIN GROUND CONTINUITY THROUGHOUT ALL SYSTEMS.
- E. MAINTAIN CONTINUITY AND PROTECT ALL EXISTING CIRCUITS TO REMAIN SERVING EQUIPMENT WITH BASE BUILDING CORE AREAS OR OTHER TENANT AREAS AFFECTED BY THE ALTERATION WORK. WHENEVER IT IS REQUIRED THAT AN EXISTING CIRCUIT BE MODIFIED, REVISED, DISCONNECTED, REMOVED IT SHALL BE UNDERSTOOD THAT THE CIRCUIT SHALL BE RECONNECTED AND SERVICE RE-ESTABLISHED IN THE REMAINING PORTION OF THE CIRCUIT AFFECTED BY THE ALTERATION.
- F. PRIOR TO ANY CHASING, CHOPPING, OR CORE DRILLING BEING PERFORMED, THE CONTRACTOR FIELD INVESTIGATE CONDITIONS AND COORDINATE WITH ALL APPROPRIATE TRADES TO ENSURE THAT WILL BE IN HARMONY WITH OTHER WORK AND NOT AFFECT ANY EXISTING BUILDING SYSTEMS. SLABS IF REQUIRED. THIS WORK MUST BE APPROVED BY BUILDING MANAGEMENT PRIOR TO PROCEEDING. ALL CORING/CHASING SHALL BE DONE ON OVERTIME.
- G. FOR TEMPORARY POWER, FURNISH AND INSTALL WIRING FOR ADEQUATE LIGHT AND SMALL TOOLS FOR THE PROJECT. THIS SHALL INCLUDE STRINGERS, LAMPS, OUTLETS, BREAKERS, AND FUSING IS NECESSARY. ALL TEMPORARY WIRING SHALL BE REMOVED FROM SPACE AT COMPLETION OF
- H. WHEN USING TEMPORARY LIGHTING, THE CONTRACTOR SHALL CLEARLY LABEL PANELS AND BREAK USED FOR LIGHTING. LOCATION OF PANELS TO BE SHOWN ON FLOOR PLAN POSTED AT ENTRAN WORK AREA. PROPER TEMPORARY LIGHTING AND POWER MUST BE INSTALLED AND MAINTAINED WORK AREAS. CONNECTIONS TO EXISTING STAIRWELL AND EXIT LIGHT SYSTEMS ARE NOT PERMIT TEMPORARY LIGHT STREAMERS, WHERE SPLICED, ARE TO HAVE COMPRESSION FITTINGS OR BE SOLDERED.
- I. THE CONTRACTOR SHALL CUT BACK TO THE FLOOR, WALL OR CEILING, REMOVE WIRING AND PLU ENDS OF CONCEALED CONDUITS MADE OBSOLETE BY THIS ALTERATION. EXPOSED CONDUITS, WIR OUTLET BOXES, PULL BOXES, HANGERS, ETC. MADE OBSOLETE BY THE ALTERATION WORK SHALL REMOVED, UNLESS OTHERWISE NOTED.
- J. IT IS POSSIBLE THAT THERE WILL BE CERTAIN REMOVALS AND RELOCATIONS OF THE EXISTING ELECTRICAL INSTALLATION NECESSARY FOR THE SATISFACTORY PERFORMANCE OF THE WORK. CHANGES CANNOT BE COMPLETELY DETAILED ON THE DRAWINGS, BUT MUST BE CONSIDERED BY CONTRACTOR WHILE REVIEWING THE EXISTING CONDITIONS AT THE SITE AND PREPARING THE PRO

2. <u>IDENTIFICATION AND LABELING</u>:

- A. ALL PANELBOARDS, CONTROL PANELS, DISCONNECT SWITCHES, ENCLOSED CIRCUIT BREAKERS, TRANSFORMERS, CABINETS, ATS'S, UPS'S, AND THE LIKE SPECIFIED HEREIN SHALL BE CLEARLY IDENTIFIED WITH THE EQUIPMENT DESIGNATION AND VOLTAGE RATING. IDENTIFICATION SHALL BE ENGRAVED WHITE CORE, BLACK LAMICOID NAMEPLATE WITH 3/4 IN. LETTERING AFFIXED WITH EPO CEMENT.
- B. JUNCTION BOXES, SPLICE BOXES, ETC., SHALL BE IDENTIFIED WITH PANEL AND CIRCUIT NUMBER CIRCUITS CONTAINED THEREIN. FACEPLATE OF SWITCHES FOR EQUIPMENT SUCH AS MOTORIZED SCREENS, ETC., SHALL BE IDENTIFIED WITH THE NAME OF THE DEVICE CONTROLLED. IDENTIFICATION SHALL BE INDELIBLE MARKER IN CONCEALED LOCATIONS AND ADHESIVE ('P' TOUCH TYPE) LABEL EXPOSED LOCATIONS. EMERGENCY DEVICES SHALL BE IDENTIFIED IN RED.
- C. EMPTY CONDUITS SHALL BE IDENTIFIED WITH TAGS AT BOTH ENDS INDICATING THE LOCATION OF TERMINATION OF THE OPPOSITE END.
- D. FIRE ALARM SYSTEM JUNCTION BOXES SHALL BE PAINTED FIRE DEPARTMENT RED. APPROVED IDENTIFICATION CARDS SHALL BE FURNISHED ADJACENT TO ALL CONTROL PANELS AND MANUAL
- E. CABLE TAGS: TAG EACH CONDUCTOR PASSING THROUGH SPLICE OR PULLBOX WITH A WHITE L INDICATING POINT OF ORIGIN AND TERMINATION OF THE CIRCUIT.