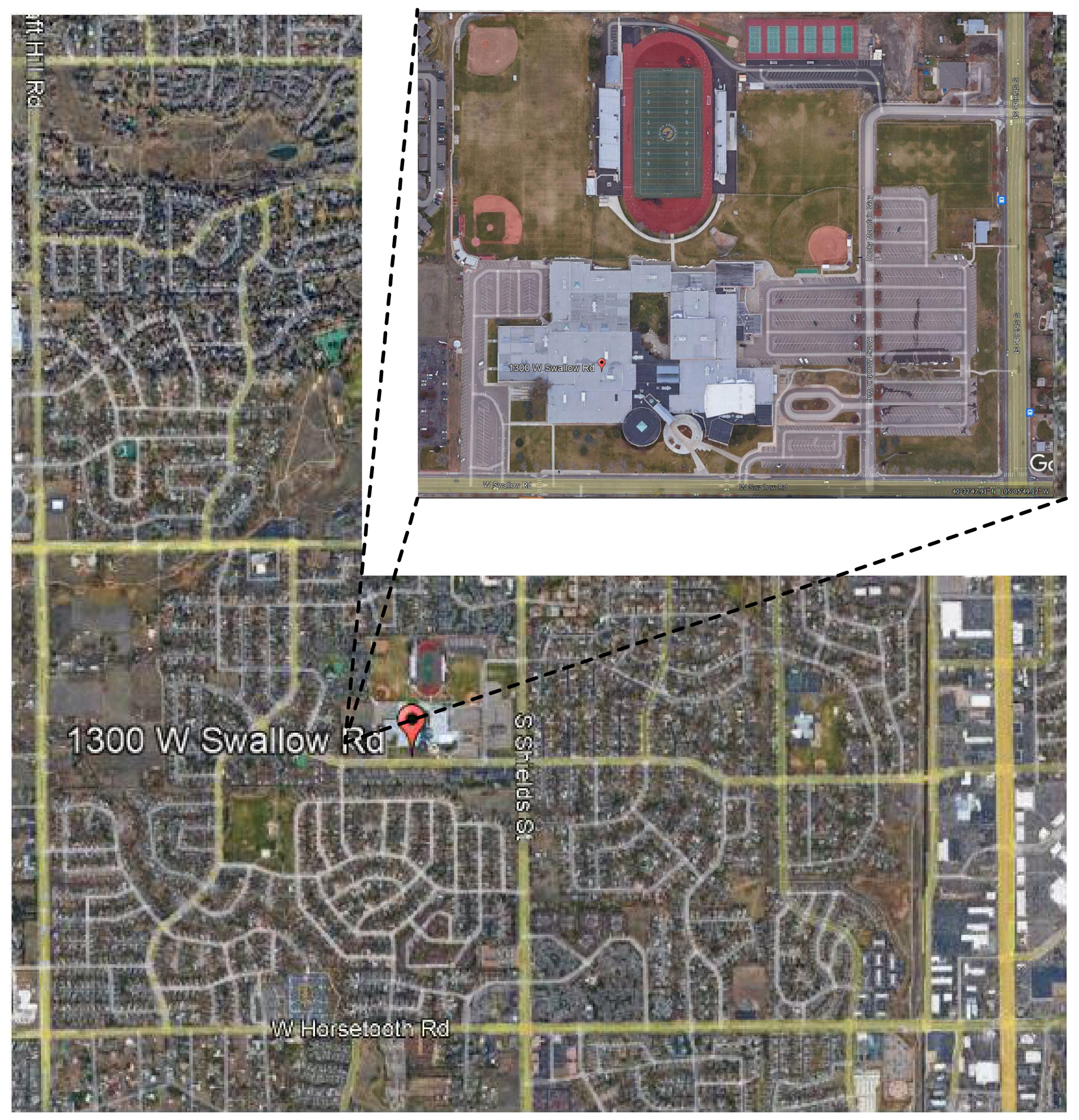
VICINITY MAP



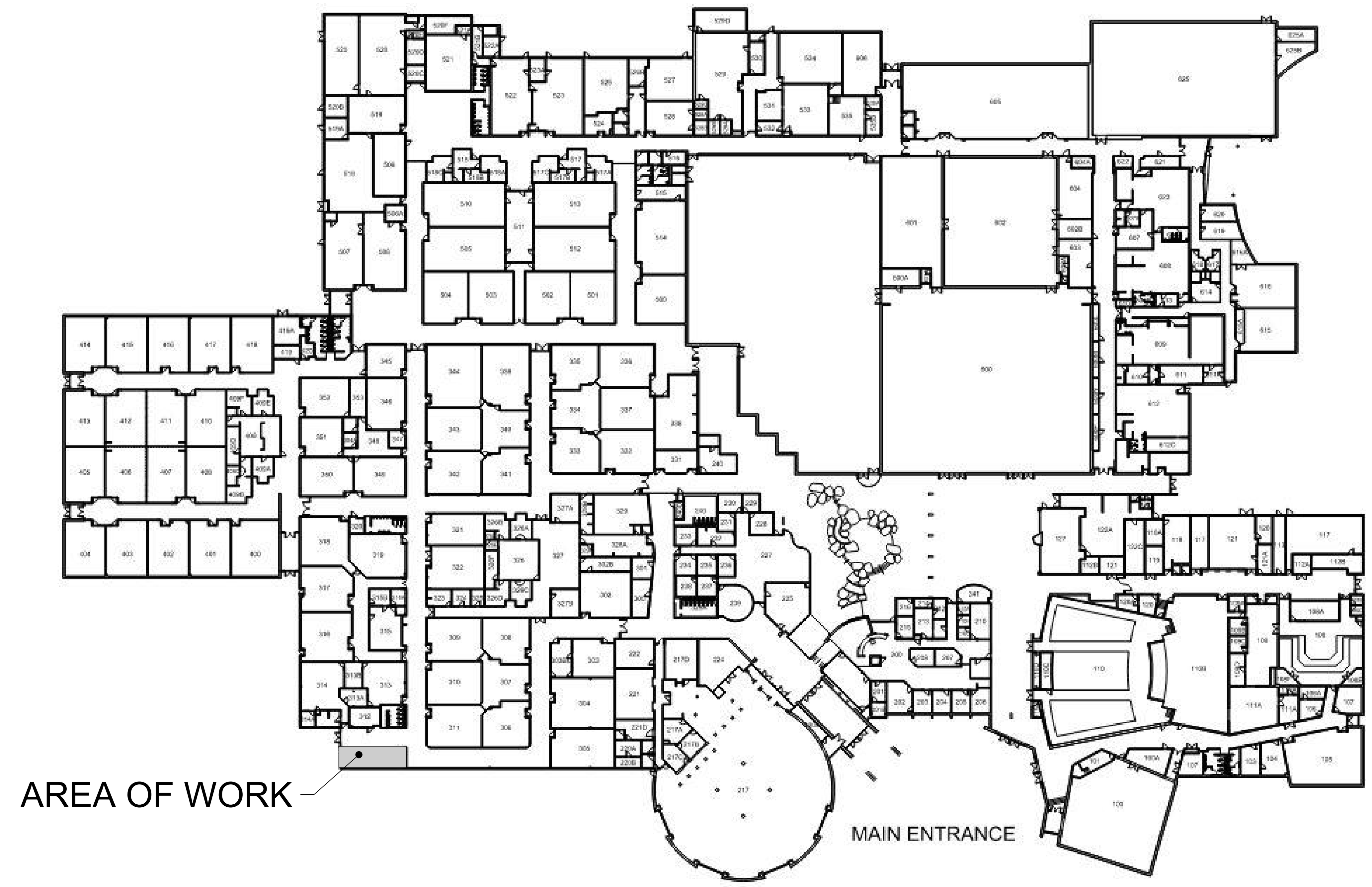
SCOPE OF WORK

RMHS was originally opened in 1973 and was expanded and renovated in 1994, 2005 and 2012. The current size of the building is +/- 290,000 square feet. Numerous smaller renovations, modifications have been processed since 2012 .
The SCOPE OF WORK contained herein includes:

- Selective demolition of a locker alcove and construction of a new office and meeting room. Exiting paths and occupant loads do not change.
- All mechanical, electrical and plumbing design and construction consultants shall be provided by the Owner.
- Project includes DEDUCT alternate for inclusion of new exterior windows to match existing adjacent.

ALTERNATES

1. GC shall provide DEDUCT alternate to Owner for review. Deduct alternate shall include all labor, material and general conditions related to the installation of new aluminum windows as detailed in associated plan sheets and details.



1 Scope of Work
1/2" = 1'-0"

226 Remington
Unit #3
Fort Collins, CO 80524

Phone: 970/224-0630
www.r4architects.com

STATE OF COLORADO
MATTHEW DAVID ... 305615
10-18-2021
LICENSED ARCHITECT

Project Directory

Pouder School District — **Owner**

2445 Laporte Avenue
Fort Collins, CO 80521
Phone: (970) 490-3465
Contact: Grey Gustafson
Email: jgarretson@psdschools.com

TBD — **General Contractor**

Address
City, State, Zip
Phone: #
Contact: -
Email: -

Larsen Structural Design — **Structural Engineer**

320 Maple St., Suite 120
Fort Collins, CO 80521
Phone: (970) 568-3355
Contact: Eric Richards
Email: eric@larsensd.com

SHEET INDEX

Sheet Index

xxxxxxx - XX/XX/XX	Sheet Number	Sheet Name
Architectural		
●	-AC	Cover Page
●	A1.0	General Notes, Partitions and Details
●	A1.1	Project Plans
●	A1.2	Window Details
Structural		
●	S1.1	Structural Plan and Details

CODE ANALYSIS

CODE USED:

2015 International Building Code (IBC)
Accessibility: ICC A117.1-2009
2015 International Existing Building Code (IEBC)
2015 International Mechanical Code (IMC)
2015 International Plumbing Code (IPC)
2015 International Energy Conservation Code (IECC)
2015 International Fuel Gas Code (IFGC)
2017 National Electrical Code (NEC)
2015 International Fire Code
*All Chapters, Sections, and Tables referenced below are for the IBC, unless noted otherwise

CODE INFO:

Building Owner:	Poudre School District
Building Occupancy:	E - Education
Building Area:	290,000 GSF +/-
Building Type:	Type II-A and II-B
Number of Stories:	1 story
Building Height:	Varies (no change)
Fire Rated Assemblies:	No Change
Fire Protection:	Sprinkled, Modified Suppression and Alarm as Deferred Submittal
Area of Work:	+/- 500 GSF.
Alteration Level:	Level 2 - Per chapter 5, section 503 - 2015 IEBC

DRAFTING SYMBOLS

1 — Drawing Number
2 A3.1 — Sheet Number
Modifier

ELEVATION TAG

1 Drawing Title — Drawing Scale
3/4" = 1' - 0" — Drawing Scale

DRAWING INDICATOR

Room Name
XXX

ROOM TAG

1 — Drawing Number
A3.1 — Sheet Number
Modifier

BUILDING/WALL SECTION

XXX

DOOR TAG

XXX

PARTITION TAG

X

SHEET KEYNOTES

ABBREVIATIONS

AB	Anchor Bolt
AC	Acoustic Ceiling
AD	Area Drain
AFF	Above Finish Floor
Alum	Aluminum
Approx	Approximate
Arch	Architectural
Asph	Ashpalt
Bd	Board
Bldg	Building
Blk	Block
Blkg	Blocking
BM	Bench mark
BR	Bumper Rail
Bttm	Bottom
Cab	Cabinet
CB	Catch Basin
CC	Center to Center
Cem	Cement
CI	Cast Iron
CJ	Control Joint
Clg	Ceiling
Clkg	Caulking
CMU	Concrete Masonry Unit
Col	Column
Conc	Concrete
Constr	Construction
Cont	Continuous
Cpt	Carpet
CT	Ceramic Tile
Cntr	Counter
Ctr	Center
Dbl	Double
Dept	Department
DF	Drinking Fountain
Dtl	Detail
Dia	Diameter
Dim	Dimension
Dim Pt	Dimension Point
Disp	Dispenser
DN	Down
DO	Door Opening
Dr	Door
Dwr	Drawer
DS	Downspout
Dwg	Drawing
E	East
Ea	Each
EJ	Expansion Joint
Elec	Electrical
Emer	Emergency
Encl	Enclosure
EP	Electrical Panle
Equip	Equipment
EWC	Electric Water Cooler
Exist	Existing
Exp	Expansion
Ext	Exterior
EW	Each Way
FBO	Furnish by Other
FBT	Furnish by Tenant
FIO	Furnish and Install by others
FF	Finish Floor
FA	Fire Alarm
FACP	Fire Alarm Control Panel
FD	Floor Drain
FON	Foundation
FE	Fire Extingquisher
FEC	Fire extingquisher cabinet
FHC	Fire hose cabinet
Fin	Finish
Flr	Floor
Flash.	Flashing
Fluor	Fluorescent
FOC	Face of Concrete
FOF	Face of finish
FOS	Face of Studs
Ft	Foot or feet
Ftg	Footing
Furr	Furring
GA	Gauge
Galv	Galvanized
GL	Glass
Gnd	Ground
GR	Grade
Gyp	Gypsum
GWB	Gypsum Wall Board
GC	General Contractor
HB	Hose Bib
HC	Hollow Core
Hdwd	Hardwood
Hdwr	Hardware
HM	Hollow Metal
Horiz	Horizontal
Hgt	Height
HWH	Hot water heater
IBO	Installation by others
IBC	Installation by contractor
ID	Inside Diameter
INS	Installation
Int	Interior
Jan	Janitor
JT	Joint
Kit	Kithen
Lab	Laboratory
Lam	Laminate
LS	Landscape
Lt	Light
Lwr	Lower
LW	Lightweight
Mas	Masonry
Matl	Material
Max	Maximum
Mech	Mechanical
Mtl	Metal
Mfr	Manufacturer
MH	Manhole
Misc	Miscellaneous
MO	Masonry Opening
N	North
NIC	Not in contract
#	Number
NO	Number
Nom	Nominal
NTS	Not to scale
OAL	Overall length
Obs	Obscure
OC	On Center
OD	Outside Diameter
OF-OI	Owner Furnish/Owner Install
OF-CI	Owner Furnish/Contracto Install
OFF	Office
Opng	Opening
Opp	Opposite
Ptd	Painted
PC	Precast
Plam	Plastic Laminate
Plas	Plaster
Plywd	Plywood
PR	Pair
PT	Pressure Treated
PTD	Paper Towel Dispenser
PTN	Partition
PTM	Paint to match
QT	Quarry Tile
R	Riser
Rad	Radius
RD	Roof Ddrain
Ref	Refrigerator
Reinf	Reinforced
Req	Required
Resil	Resilient
RM	Room
RO	Rough Opening
RDW	Redwood
Rfg	Roofing
S	South
SC	Solid Core
Sched	Schedule
SD	Dowp dispenser
Sect	Sections
Shr	Shower
Sht	Sheet
SV	Sheet Vinyl
Sim	Similar
SND	Sanitary Napkin Dispenser
Spec	Specification
Sq	Square
SS	Stainless Steel
STA	Station
Std	Standard
Stl	Steel
Stor	Storage
Strl	Structural
Susp	Suspended
Sym	Similar or Symmetrical
S&V	Stain and Varnish
STM	Stain to match
TB	Towel Bar
TOC	Top of Concrete
TOCb	Top of Curb
Tel	Telephone
Terr	Terrazzo
TH	Threshold
Vol	Volume
Wd	Wood
Wgt	Weight

Project Issuance

No.	Description	Date
1	Permit	10-18-2021

Poudre School District

RMHS Office / Mtng Addition

1300 W Swallow Rd
Fort Collins, CO 80526

Permit
10-18-2021

Door & HM Frame Types

General Hollow Metal Frame Specifications:

1. Welded hollow metal frame, 16 Ga. doors, 18 Ga. windows
2. Anchor: Provide anchors per mfg. recommendations, Wire anchors not allowed
3. Finish: Apply 1 coat of factory primer, Field Paint to match adjacent frames
4. Fire: Provide UL labels at all fire rated doors, Re: door schedule

Doors

1. Solid 1-3/4" wood doors. Match existing adjacent species and finish. Factory finish.

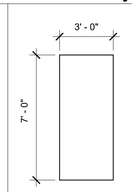
General Glazing Notes:

1. Clear tempered glazing as required.

Tempered Glazing Requirements (IBC 2406.4)

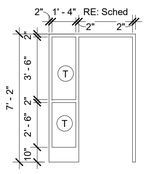
Where denoted with (T) and the following conditions

- Glazing in swinging, sliding, and bifold doors shall be tempered glazing.
- Glazing adjacent to doors in fixed or operable panels adjacent to a door where the nearest exposed edge of the glazing is within a 24-inch arc of either vertical edge of the door in a closed position and where the bottom exposed edge of the glazing is less than 60 inches above the walking surfaces shall be tempered glazing - exterior and interior conditions.
- Tempered or heat strengthened glazing shale be provide at locations where excessive heat and or thermal stress may occur or where deemed appropriate by glazing sub-contractor. All locations shale be reviewed by Architect and General Contractor prior to installation.



Type 1

Single flush-panel solid core wood. Stained to match existing



HM 1

Welded, HM 16GA frame and Tempered, insulated glazing; Automatic Dr. Bottom

Hardware Group

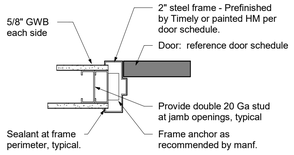
300C-B Meeting

1 ea.	Classrm Latch	ND93JDRHO626	Schlage
1 ea.	Core	Per Owner	Schlage
3 ea.	Hinge	5BB1HW	Ives
1 ea.	Seals	5050CL Hd/Jmb	NGP
1 ea.	Wall Stop	WS406CCV	Ives
1 ea.	Closer	LCN 4011 LH TBWMS Alum	LCN
1 Set.	Door Silencer	SR 64 / GRY	IVE

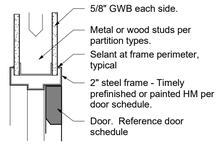
300C-A MOffice

1 ea.	Privacy Latch	ND92JDRHO626	Schlage
1 ea.	Core	Per Owner	
3 ea.	Hinge	5BB1HW	Ives
1 ea.	Seals	5050CL Hd/Jmb	NGP
1 ea.	Wall Stop	WS406CCV / 626	Ives
1 ea.	Closer	LCN 4011 LH TBWMS Alum	LCN
1 Set.	Door Silencer	SR 64 / GRY	IVE

Door Types



H.M. Door Jamb



H.M. Door Head

General Requirements

1. Refer to the Poudre School District Tech Specs available from the Owner for all specification divisions.
2. The General Contractor is responsible for checking all contract documents, field conditions and dimensions for accuracy and confirming that the work is buildable as shown before proceeding with construction. Upon finding any discrepancies the Architect shall be notified in writing prior to commencing construction.
3. The General contractor shall be responsible for notifying the Architect immediately should any discrepancies be found in the drawings and specifications.
4. All users of the drawings contained within shall review the general notes completely, it is the user's responsibility to know and adhere to these requirements.
5. Drawings and specifications are separated into disciplines for the convenience of the Architect and contractor. The separations used within the following documents are used only for convenience and reference purposes and in no way do they define or limit the scope or intent of any part of the drawings and specifications.
6. Where discrepancies exist between or within standards, specifications, and drawings, the more stringent or higher quality requirements shall apply. The precedence of the Construction Documents is in the following sequence.
   - A. Addenda and modifications to the drawings and specifications take precedence over the original construction documents.
   - B. Should there be a conflict within the specifications or on the drawings, the Architects shall decide which stipulation will provide the best installation and his decision shall be final.
   - C. Should a conflict arise between the drawings and the specifications, the written specifications shall have precedence over the drawings.
   - D. In the drawings, the precedence shall be drawings of a larger scale over those of a smaller scale, figured dimensions over scaled dimensions, and noted materials over graphic indications.
7. Typical (Typ.) means for all similar conditions throughout the project unless noted otherwise.
8. Every effort has been made to develop and coordinate the following documents between all disciplines to define the work in the most logical locations to reduce redundant information and conflicts. Scope of work in defined throughout the set of documents and specifications. The user must review and understand the construction documents in their entirety to define a scope of work.
9. All trades to comply with all applicable local, state, health, safety codes, ordinance, requirements etc. and provide acceptable materials and workmanship to current industry standards.
10. Contractor is solely and completely responsible for conditions of the job site, including safety, protection of property and the like during the performance of the work.
11. Provide facing at all thermal and sound insulation materials where exposed in a return air plenum as required.
12. Drawings and specifications shall be considered complementary and items located in any locations shall be considered as a requirement for construction. In the event of conflicting or inconsistent information the contractor shall identify the conflict and request written clarification from the Architect.
13. Mechanical, Electrical and Plumbing drawings are diagrammatic and the General Contractor shall fully coordinate the locations of all equipment with the Architectural and Structural drawings including but not limited to shafts, chases, penetrations, etc.
14. The contractor is responsible for visiting the site and becoming familiar with site access, storage opportunities, staging space, and other like means & methods prior to providing completed bid.
15. Contractors and all sub-contractors shall field verify all dimensions prior to fabrication and/or ordering of materials.
16. Prior to beginning any construction or mobilizing construction activities the contractor shall wall through, inspect and document all existing conditions in place. The contractor shall be responsible for all repairs and replacement of items damaged during construction.
17. Review the general notes on all drawing sheets for information related to the specific plans and details on those sheets.
18. At locations stated to "Align" the location of different components of construction shall be constructed to provide a flush finish surface.
19. Where labeled "Verify" the General Contractor shall review the identified item in the field prior to proceeding with work, fabrication, or ordering of materials.

Drawings and Documents

1. Do not scale drawings. Dimensions govern and large scale drawings govern over lesser scale drawings.
2. All dimensions are to: unless noted otherwise (UNO)
   - A. Face of Masonry or concrete
   - B. Face of stud
   - C. Exterior face of sheathing on exterior walls only
   - D. Face of mullion
3. Dimensions indicated clear (CLR) are to finish face and should be held.
4. The General Contractor shall be responsible for reviewing all field conditions and dimensions for accuracy. Where discrepancies are discovered notify the Architect prior to proceeding with any work.
5. All doors shall be located 4" off adjacent CMU, wood or metal stud wall unless dimensioned otherwise on the plan.

Blocking/Backing

1. The GC is responsible to coordinating all locations that require blocking/backing for proper installation. FR blocking only.
2. Refer to code review and construction type prior to installation of wood blocking/backing.
3. Items that require blocking/backing shall include but not limited to ADA grab bars, toilet & sink accessories, shleving, casework, menu boards, fixtures, art, etc.

Permits

1. The Owner shall be responsible for obtaining and paying for all the required permits. The General Contractor shall be responsible for all inspections and third party testing required by local jurisdictions and/or building department.

Shop Drawings

1. The General Contractor shall provide the Architect with a list of all anticipated shop drawings for review by the Architect and determination of required review and approvals.
2. Shop drawings shall clearly represent the items and/or materials with items proposed clearly and completely identified for review.
3. The General Contractor shall review shop drawings of shop fabricated items, building materials with specific warrantee requirements, and other shop drawings identified in approved list provided to the Architect prior to furnishing to the Architect. Shop drawings shall be submitted to the Architect for review in electronic PDF format within a single combined file.

Product substitution

1. Submission of a substitution request by the contractor shall be submitted to the Architect in written form along with ***product specifications marked and/or highlighted up with alternative material(s) being proposed of equal or higher quality.***
2. **Contractor Representation:** By making Request for Substitution, the contractor represents it has investigated proposed product and has determined that it is equal to or superior in all respects to specified product. The contractor also agrees to provide same warranty for substitution as for specified product, and, if substitutions are accepted, Contractor will coordinate installation of accepted substitute, making such changes as may be required for Work to be complete in all respects, and that contractor waives claims for additional costs related to substitution which may later become apparent. By making Substitution Request the contractor represents that, if substitution and bid are accepted, and If substituted products do not meet or exceed above requirements, whether before, during, or after incorporation into Work, Contractor shall, at no additional cost to Owner, replace substituted products with products originally specified.

General Notes
12" = 1'-0"

METAL INTERIOR PARTITION TYPES

GENERAL PARTITION NOTES

1. The typical interior partition type is 'C6-AH'. All interior partitions are C6-AH unless noted otherwise on the floor plans or interior drawings.
2. All interior partitions shall be full height to underside of floor/ceiling or roof/ceiling assemble above unless noted otherwise.
3. All interior partitions on the ground floor bearing on the 'F1' floor slab-on-grade shall include long leg metal slip track along top providing min. 1-1/2" slip connection.
4. Typical metal studs for interior partitions are 25 GA unless noted otherwise with (2) 20 GA studs @ door and window jambs minimum.
5. Confirm adequate gauge and spacing per USG Recommendations for height and appropriate deflection. Provide stud spacing at 16" OC for 3-5/8" full height partitions.
6. Provide fireblocking as required in all wall cavities per IBC requirements. Fire blocking shall occur at intervals not to exceed 10'-0" OC in all concealed wall cavities and may consist of mineral wool insulation, wood blocking or other approved material per IBC.
7. All walls denoted with an 'F' suffix are rated for fire and are required to extend full height and terminate as specified in wall assembly designation.

SOFFITS AND FRAMED CEILINGS

1. All soffits and dropped ceilings shall be framed using non-combustible, light gauge metal framing supported as required for gauge and spacing for indicated span.

WALL / CEILING BLOCKING

1. Provide fire resistance rated wood blocking or metal strap backing in partitions as needed to provide backing for wall mounted equipment, cabinets, accessories, etc. It shall be the responsibility of the GC to coordinate the required locations for backing.
2. Provide fire resistance rated wood or metal blocking within wall for proper attachment of all millwork, non-combustible soffit framing etc. Note that 1-hr floor/ceiling assemblies must continue uninterrupted past non-combustible soffits and ceilings.

Note: All wood blocking used in walls shall be fire resistance raterd per IBC 603.1

ACOUSTIC INSULATION

1. All partitions separating public/private space, unit demising walls, bathrooms, mechanical and service areas are to have acoustic treatment UNO.
   - Fill cavities between studs w/ 3" glass, mineral or cellulose insulation or per designated assembly. Seal perimeter and all penetrations w/ acoustic sealant. Note that when a partition is indicated to extend full height to the underside of the deck or floor above ("F", or "H" suffix), acoustic batts shall also extend full height. Fasten insulation to studs to prevent material settlement and/or voids

CLOSED CELL FOAM INSULATION

1. All wall penetrations in INTERIOR walls shall be spray foamed in place prior to installation of gypsum wall board. Penetrations include conduits, j-boxes, switches and other device boxes.

GYPSUM FINISH NOTES

1. All gypsum wall board shall be 5/8" UNO with texture and finish to match existing walls.
2. Use specified gypsum wall board at fire rated partitions (suffix 'F') in accordance with listed assembly
3. Install gypsum products per GA 216-07
4. Gypsum wall board finish levels 0-5 as defined by GA 214-07

TYPICAL GWB FINISH

1. Finish level 4: Provide level 4 for all partitions OR to match existing adjacent finish.

INTERIOR PARTITION SUFFIXES

The basic partition types listed or shown on the documents here are modified per the suffixes listed below.

"1F" = 1-hour Fire rated barrier per the noted assembly. Verify assembly with Architect if not shown. Minimum compliance 1-hr construction in conformance with IBC Section 707. Extend partition full height to underside of floor or roof sheathing above except at shaft enclosures that terminate at 1-hour fire rated lid. Provide fire caulking. (Note: Firesafing insulation shall be USG "thermafiber" or approved substitution, Fiberglass batt insulation is NOT acceptable as firesafing.

"2F" = 2-hour Fire rated barrier per the noted assembly. Verify assembly with Architect if not shown. Minimum compliance 1-hr construction in conformance with IBC Section 707. Extend partition full height to underside of floor or roof sheathing above. (Note: Firesafing insulation shall be USG "thermafiber" or approved substitution, Fiberglass batt insulation is NOT acceptable as firesafing.

"H" = Full height wall which is not fire rated: Extend wall full HT to underside of floor/roof deck above. Use long leg top track at underside of deck/roof with studs cut short @ not screwed to track to allow for 1" deflection. Fill flutes in metal deck w/ insulation.

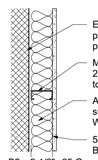
"A" = Acoustic Insulation. All partitions where denoted by Suffix 'A', wall partition is to receive Owens Corning Quietzone EcoTouch PINK Acoustic soundproofing unfaced fiberglass insulation or equal. Seal perimeter @ all penetrations w/ acoustic sealant. Note, when a partition is indicated to extend full height to the underside of the deck or floor above ("F" or "H" suffix), acoustic batts shall also extend full height. Provide foil faced batts where exposed above ceiling.

"S" = Sound Wall: Sound wall shall be used to separate the existing library from the new Sound Booth room created with this scope. See assembly. Provide acoustical sealant, T&B. Provide closed cell spray foam at all electrical boxes and wall penetrations prior to the installation of GWB. Note: Assembly meets minimum STC rating of 50.

"T" = Thermal Insulation. All partitions to have min. R-19 unfaced mineral wool batt insulation where denoted by 'T'. Fill cavities between studs w/ thermal batt insulation. Provide 6mil. polyvapor barrier. Note, when a partition is indicated to extend full height to the underside of the deck or floor above ("F" or "H" suffix), acoustic batts shall also extend full height. Provide foil faced batts where exposed above ceiling.

B'X'-'T'

Furred Wall / Chase Wall

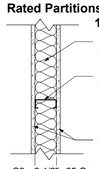


B2:	2-1/2"	25 Gauge metal stud @ 24" O.C.
B3:	3-5/8"	25 Gauge metal stud @ 24" O.C.
B6:	6"	25 Gauge metal stud @ 24" O.C.
B8:	8"	25 Gauge metal stud @ 24" O.C.

Notes:
1. Offset FOWall from existing wall per plan and detail dimensions. Brace to existing wall as necessary.
2. At exterior walls, provide R-19 unfaced mineral wool batts, friction fit between studs.
3. Provide 6 mil polyvapor barrier under GWB. Tape seams and extend to existing structure above.

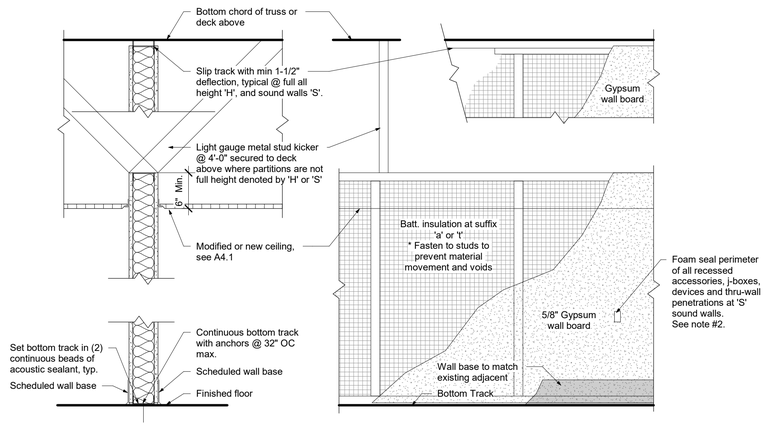
C'X'-'X'

Non-rated Common Partition
Rated Partitions (suffix 'F1' per WP 1072)



C2:	2-1/2"	25 Gauge metal stud @ 16" O.C.
C3:	3-5/8"	25 Gauge metal stud @ 16" O.C.
C6:	6"	25 Gauge metal stud @ 16" O.C.
C8:	8"	25 Gauge metal stud @ 16" O.C.

Notes:
1. Where denoted by Suffix 'A', wall partition is to receive Owens Corning Quietzone EcoTouch PINK Acoustic soundproofing unfaced fiberglass insulation or equal.
2. Where denoted by Suffix 'H', wall partition is to extend full height to underside of deck. Provide long leg track for min. 1-1/2" slip when connecting to structure and/or decking above.
3. GC shall provide gauge and spacing appropriate for height based on manufacturer span tables for L/360 and 5 lb horizontal force.



Top & Bottom of Wall Details - Partition 'C'

226 Remington
Unit #3
Fort Collins, CO 80524

Phone: 970/224-0630
www.r4architects.com

STATE OF COLORADO
MATTHEW DAVID RANKIN
305015
02-11-2020
LICENSED ARCHITECT

In Association with:

Pouder School District — **Owner**

2445 Laporte Avenue
Fort Collins, CO 80521
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r4 Architects — **Architect**

226 Remington St. Unit #3
Fort Collins, CO 80524
Phone: (970) 224-0630
Contact: Matt Rankin
Email: matt@r4architects.com

Design-Build — **MEP**

Issued

No.	Description	Date
1	Permit	10-18-2021

RMHS Office / Mtng Addition

Permit

Project No.: Project Number **Drawn by: Author**
Reviewed by: Checker

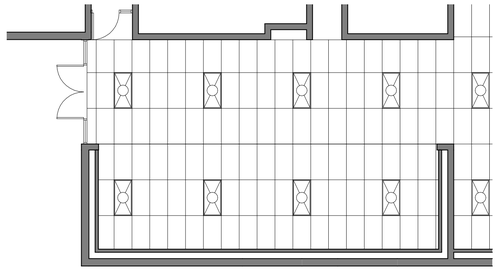
General Notes, Partitions and Details

Scale Accordingly if Reduced

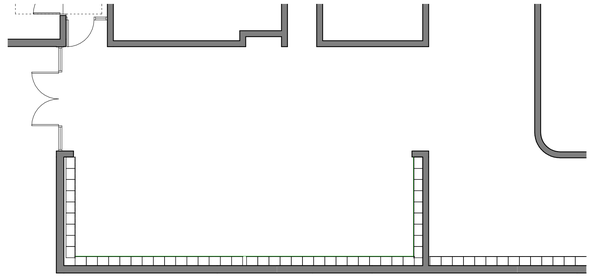
Drawing Number

A1.0

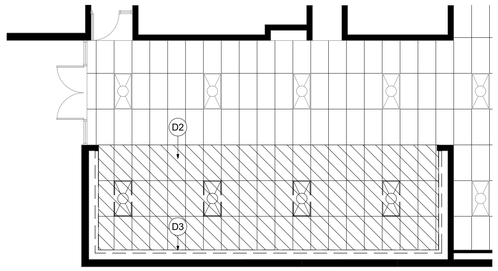
r4architects.com



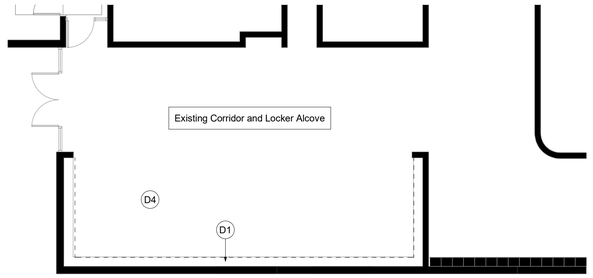
5 Existing RCP
1/8" = 1'-0"



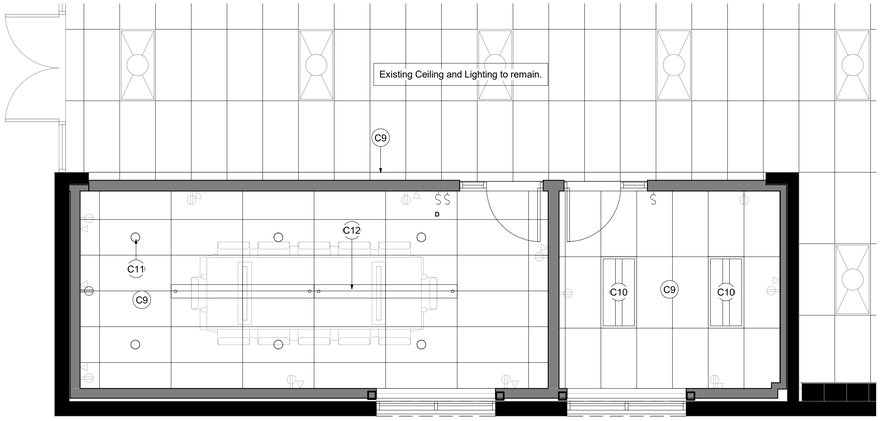
1 Existing Plan
1/8" = 1'-0"



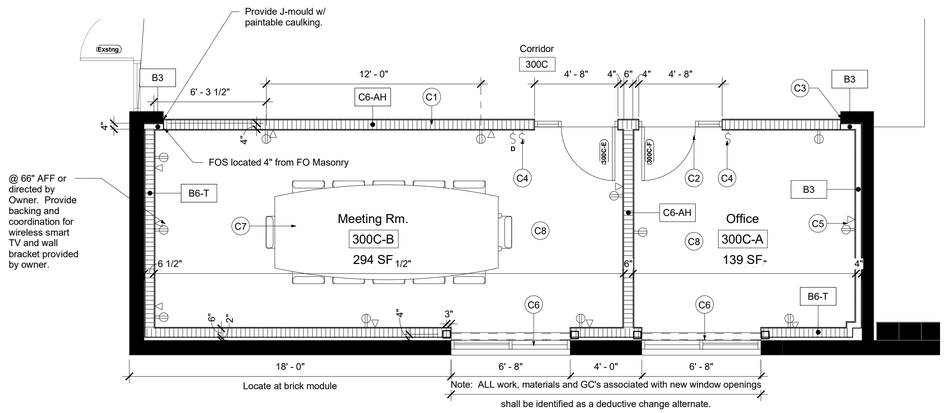
6 Demo RCP
1/8" = 1'-0"



2 Demo Plan
1/8" = 1'-0"



7 New Construction RCP
1/4" = 1'-0"



3 New Construction
1/4" = 1'-0"

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STATE OF COLORADO
MATTHEW DAVID RANKIN
305015
02-11-2020
LICENSED ARCHITECT

In Association with:

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Design-Build — **MEP**

Issued

No.	Description	Date

RMHS Office / Mtng Addition

Permit

Project No.: Project Number — Drawn by: Author
Reviewed by: Checker

Project Plans

Scale Accordingly If Reduced

Drawing Number

A1.1

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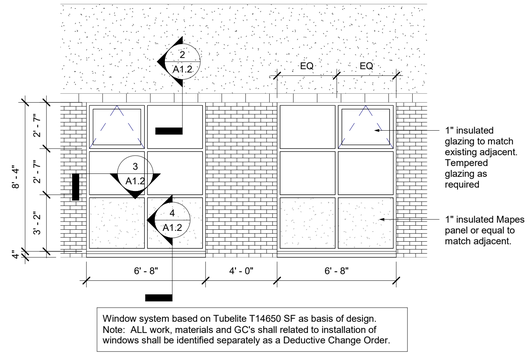
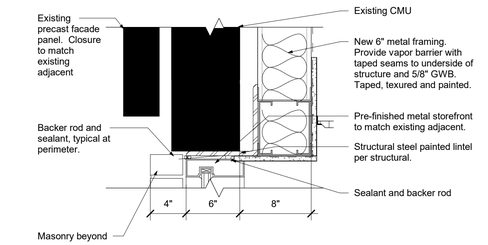
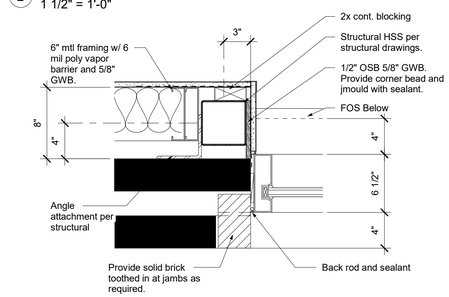


Window system based on Tubelite T14650 SF as basis of design.
Note: ALL work, materials and GC's shall related to installation of windows shall be identified separately as a Deductive Change Order.

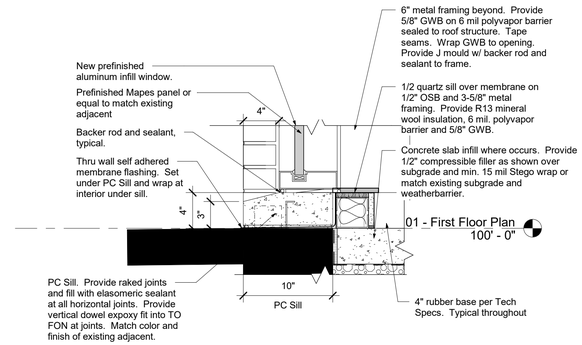
1 Window Elevation
1/4" = 1'-0"



2 Window Head
1 1/2" = 1'-0"



3 Window Jamb
1 1/2" = 1'-0"



4 Window Sill
1 1/2" = 1'-0"

01 - First Floor Plan
100' - 0"

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STATE OF COLORADO
MATTHEW DAVID RANKIN
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Design-Build — **MEP**

Issued

No.	Description	Date
1	Permit	10-18-2021

RMHS Office / Mtng Addition

Permit

Project No.: Project Number Drawn by: Author
Reviewed by: Checker

Window Details

Scale Accordingly If Reduced

Drawing Number

A1.2

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STRUCTURAL GENERAL NOTES
Project: Rocky Mountain High School Office Addition
Larsen Structural Design Job Number: 2463.4

DESIGN LOADS:

International Building Code; IBC 2021 Edition, except as noted
Risk Category: Table 1604.5 III Substantial Hazard to Human Life

Lateral:
Wind ASCE 7-16 Directional Procedure
3 Second Gust Velocity V_ult = 145 mph
Building Category Enclosed
Internal Pressure Coefficient ASCE 7-16 Table 26.13-1 GCpi= ±0.18
Exposure B

Seismic
Importance Factor: Ie ASCE 7-16 Table 1.5-2 1.25
Spectral Response Acceleration Coefficient
Short Period Ss 0.198 g SDS 0.211 g
One Second S1 0.056 g SD1 0.09 g
Soils Site Class D
Design Category Table 1613.2.5(1) & (2) = B

STRUCTURAL CONCRETE:

Design is based on "Building Code Requirements for Structural Concrete"(ACI 318-14). Concrete work shall conform to "Standard Specifications for Structural Concrete" (ACI 301-16).

Structural concrete shall have the following properties:

Intended Use	Exposure Category	f'c, (psi) 28 day	Maximum w/cm	Maximum Aggregate	Entrained Air (±1.5%)	Cement Type
Interior Slab-on-Grade	F0/S0/W0/C0	3,500	N/A	¾" Stone	N/A	I/II

Concrete mix designs shall be submitted to the engineer of record no less than 15 working days prior to the commencement of pouring. Water cement ratios shall in no case exceed 0.50. Slump of concrete shall be specified by the concrete sub-contractor to provide adequate workability and finishing of the concrete being placed.
No concrete admixture containing calcium chloride shall be permitted in any concrete.
Detailing, fabrication, and placement of reinforcing steel shall be in accordance with the "Guide to Presenting Reinforcing Steel Design Details (ACI 315R-18).
Welded wire fabric shall conform to ASTM A185. Splice welded-wire fabric by lapping one full mesh space plus 2".
Reinforcing bars shall conform to ASTM A615, Grade 60, reinforcement to be welded shall be ASTM 706 grade 60 reinforcing.
See table below for required splice lengths based on the different mix designs.
At corners and intersections, make horizontal bars continuous or provide matching corner bars. Provide standard hooks on bars terminating at a concrete face unless noted otherwise on plan.
Around openings in walls and slabs, provide 2-#5, extending 2'-0 beyond edge of opening.
In continuous members, splice top bars at mid-span and splice bottom bars over supports.
Provide intermittent shear keys at all construction joints and elsewhere as shown on the drawings.
Except as noted on the drawings, concrete protection for reinforcement in cast-in-place concrete shall be as follows:
a. Cast against and permanently exposed to earth 3"
b. Exposed to earth or weather:
#6 through #18 bars 2"
#5 bar, W31 or D31 wire, and smaller 1-1/2"
c. Not exposed to weather or in contact with ground:
Slabs, walls, joists: #11 bar and smaller 3/4"
Beams, columns:
Primary reinforcement 1-1/2"
Stirrups, ties, spirals 1-1/2"
Anchor bolts and rods for beam and column-bearing plates shall be placed with setting templates.
Permanent corrugated steel forms for concrete floor slabs shall be manufactured and erected according to the "Specifications and Code of Standard Practice" of the Steel Deck Institute.
Concrete shall not be placed until reinforcing and embedded items have been inspected by a qualified special inspector employed by the owner in accordance with IBC Section 1704.4.
Frequency of concrete testing shall be as follows:
1. A minimum of one sample from each days pour of each mix of concrete
2. A minimum of one sample for each 150 cubic yards of concrete for each mix placed each day.
3. A minimum of 5 samples total for each mix design are required. If the frequency or amount of concrete to be placed provides less than 5 total samples for a particular mix, than samples shall be obtained from five randomly selected batches or from each batch if fewer than five batches are used.
4. If fewer than 25 cubic yards total of a mix are to be installed, then no concrete testing is required provided 30 or more test results are provided showing satisfactory performance of the approved mix design.
Earth formed trenches shall not be used.

SPLICE LAP LENGTH				
SPECIFIED CONCRETE COMPRESSIVE STRENGTH [psi]	BAR DIAMETER (d_b)			
	BARS WITH >12" CONC. CAST BELOW		OTHER BARS	
	#6 AND SMALLER	#7 AND LARGER	#6 AND SMALLER	#7 AND LARGER
3,500	70 d_b	87 d_b	54 d_b	67 d_b

STRUCTURAL STEEL:

Structural steel shall be detailed, fabricated, and erected in accordance with the "Specification for Structural Steel Buildings" (AISC 360-16) and the "Code of Standard Practice for Steel Building and Bridges" (AISC 303-16), by the American Institute of Steel Construction (AISC).
Structural steel wide flange beams shall conform to ASTM A992.
Other rolled shapes, including plates, channels, and angles shall conform to ASTM A36.
Hollow structural section (HSS) tube shapes shall conform to ASTM A500, Grade B, 46 ksi yield.
Welding shall be done by a certified welder in accordance with AISC and AWS specifications and recommendations using E70- electrodes. Where not specifically noted, minimum weld shall be 3/16" fillet by length of contact edge.
All post-installed anchors shall have current International Code Council Evaluation Service (ICC-ES) reports and shall be installed in accordance with the manufacturer's requirements.
Expansion anchors shall be approved "wedge" type unless specifically noted to be "sleeve" type and shall have current ICC-ES Report.
Chemical anchors shall be approved epoxy or similar adhesive type and shall have current ICC-ES Report. Where base material is not solid, approved screen tubes shall be used.
Grout beneath column base and beam-bearing plates shall be minimum 28-day compressive strength of 7,500 psi, approved non-metallic,non-shrink, when tested in accordance with ASTM C1107 Grade B or C at a flow cone fluid consistency of 20 to 30 seconds.

LETTERS OF CONSTRUCTION COMPLIANCE:

The General Contractor shall determine from the local building official at the time the building permit is obtained whether any letters of construction compliance will be requested from the Structural Engineer.
The Contractor shall notify the engineer about all such requirements in writing before the start of construction.
One-week advance notice shall be given when requesting site visits necessary as the basis for the compliance letter.

INSPECTIONS AND REVIEWS:

All site soils related work and footing excavations prior to placing forms, as well as site drainage, shall be reviewed by the project geotechnical engineer.

Normal reviews by Local Building Department.

Notify 48 hours prior to required review.

Required special inspections per I.B.C. Section 1705 by an approved special inspector retained by owner:
* Steel: Periodic and continuous inspections of steel frame joint details. Refer to Section 1705.2 and Table 1705.2.2 of the I.B.C, and Tables N5.4-1 thru N5.4-3 and N5.6-1 thru N5.6-3 of the AISC 360-16.

Approved agencies shall provide written documentation to the building official demonstrating the competence and relevant experience or training of the special inspectors who will perform the special inspections and testing prior to and during construction as required per IBC 2018 Section 1704.2.1.

Duties and responsibilities of the special inspector shall be to observe and/or test the work assigned and outlined above for conformance with the approved construction documents. All discrepancies shall be brought to the immediate attention of the contractor for correction.

The special inspector shall furnish regular reports to the building official, the engineer and architect of record, and other designated persons. Progress reports for continuous inspection shall be furnished weekly. Individual reports of periodic inspections shall be furnished within one week of inspection dates. The reports shall note uncorrected deficiencies, correction of previously reported deficiencies, and changes to the approved construction documents authorized by engineer of record.

The special inspector shall submit a final signed report within 10 days of the final special inspection stating whether the work requiring special inspection was, to the best of the inspector's knowledge and belief, in conformance with the approved construction documents and the applicable workmanship provisions of the International Building Code.
Work not in compliance shall be noted in the report.

FIELD VERIFICATION OF EXISTING CONDITIONS:

Contractor shall thoroughly inspect and survey existing structure to verify conditions that affect the work shown on the drawings.
Contractor shall report any variations or discrepancies to the Architect before proceeding.

Contract documents have been prepared using limited site observations.
During construction, the contractor may encounter existing conditions which are not now known or are variance with project documentation (discovery). contractor shall notify the engineer of all conditions not per the contract Documents. examples include:
sizes or dimensions other than those shown.
damage or deterioration to materials or components.
conditions of instability or lack of support.
items noted as existing on the drawings but not found in the field include, but are not limited to:
Contractor shall prepare dimensional drawings of all discovered items.
Contractor shall field verify all existing structural conditions prior to submitting shop drawings.
Contractor shall make allowance for the resolution of such discoveries in the construction schedule.

STRUCTURAL ERECTION AND BRACING REQUIREMENTS:

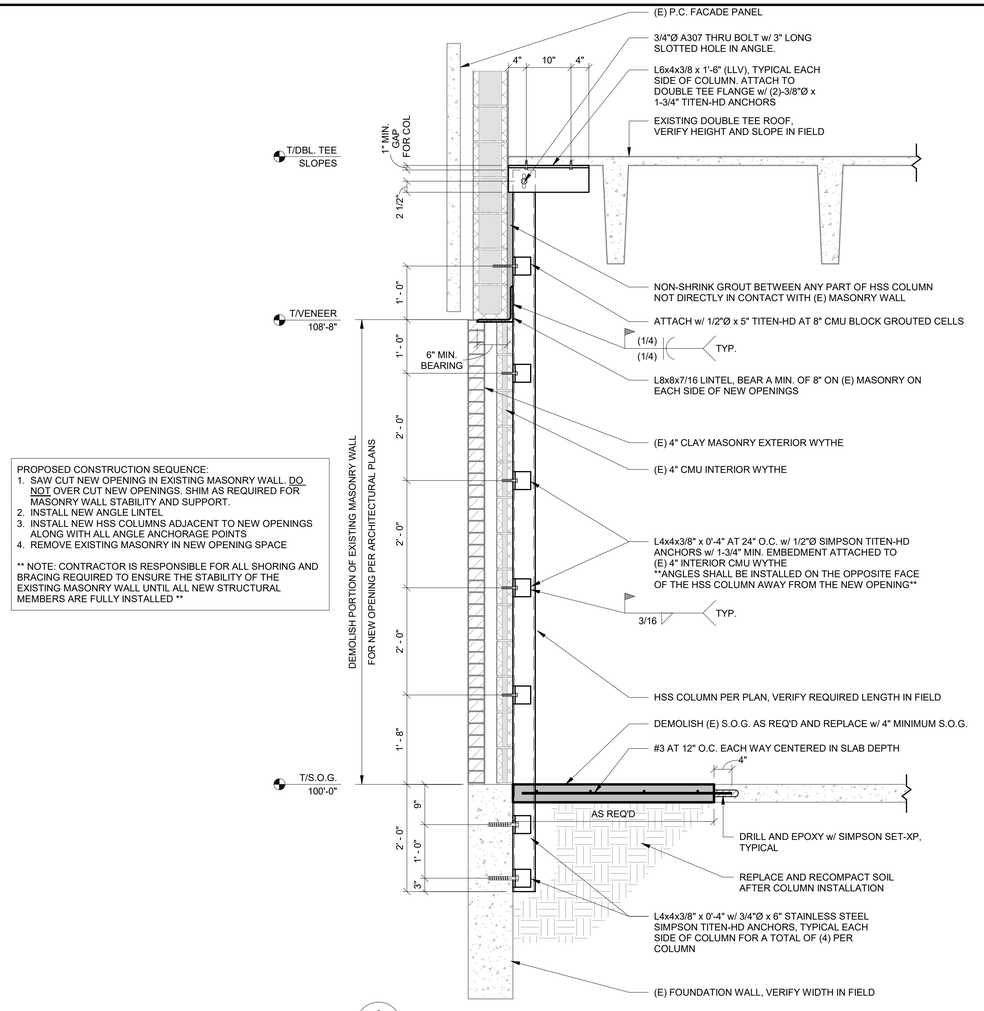
The structural drawings illustrate the completed structure with elements in their final positions, properly supported and braced.
These construction documents contain typical and representative details to assist the contractor.
Details shown apply at all similar conditions unless otherwise indicated.
Although due diligence has been applied to make the drawings as complete as possible, not every detail is illustrated, nor is every exceptional condition addressed.
All proprietary connections shall be installed in accordance with the manufacturers' recommendations.
All work shall be accomplished in a workmanlike manner and in accordance with the applicable code and local ordinances.
The general contractor is responsible for coordination of all work, including layout and dimension verification, materials coordination, shop drawing review, and the work of subcontractors.
Any discrepancies or omissions discovered in the course of the work shall be immediately reported to the architect for resolution.
Continuation of work without notification of discrepancies relieves the architect and engineer from all consequences.
Unless otherwise specifically indicated, the drawings do not describe methods of construction.
The contractor, in the proper sequence, shall perform or supervise all work necessary to achieve the final completed structure, and to protect the structure, workmen, and others during construction.
Such work shall include, but not be limited to, bracing, shoring for construction equipment, shoring for excavation, formwork, scaffolding, safety devices and programs of all kinds, support and bracing for cranes and other erection equipment.
Do not backfill against basement or retaining walls until supporting slabs and floor framing are in place and securely anchored, unless adequate bracing is provided.
Temporary bracing shall remain in place until all floors, walls, roofs and any other supporting elements are in place.
The architect and engineer bear no responsibility for the above items, and observation visits to the site do not in any way include inspection of them.

Precautionary Notes on Structural Behavior :

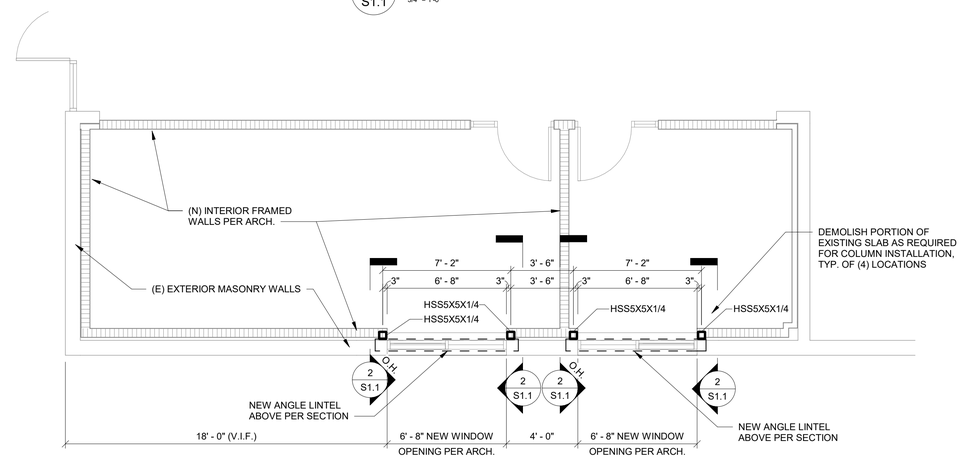
A. Interior finish detailing must accommodate the differentials in relative movement of supporting structures.
B. Roof spans are quite long, and applied loading naturally causes substantial deflection. Interior elements hung from the roof will deflect with the roof.
C. The floor is a structural slab on steel deck and will have movement during the placement of concrete during construction. The concrete deck may not be uniform across structure as a result.
D. Exterior wall assembly is hung from the edge of the building structure and is directly affected to some degree by changes in external temperature and floor or roof deflection. Finish details should allow for relative movement between elements with different support conditions.

PROPOSED CONSTRUCTION SEQUENCE:
1. SAW CUT NEW OPENING IN EXISTING MASONRY WALL. DO NOT OVER CUT NEW OPENINGS. SHIM AS REQUIRED FOR MASONRY WALL STABILITY AND SUPPORT.
2. INSTALL NEW ANGLE LINTEL
3. INSTALL NEW HSS COLUMNS ADJACENT TO NEW OPENINGS ALONG WITH ALL ANGLE ANCHORAGE POINTS
4. REMOVE EXISTING MASONRY IN NEW OPENING SPACE

** NOTE: CONTRACTOR IS RESPONSIBLE FOR ALL SHORING AND BRACING REQUIRED TO ENSURE THE STABILITY OF THE EXISTING MASONRY WALL UNTIL ALL NEW STRUCTURAL MEMBERS ARE FULLY INSTALLED **



2 / S1.1 SECTION AT NEW WALL OPENING
3/4" = 1'-0"



NORTH

1 / S1.1 FOUNDATION PLAN
1/4" = 1'-0"

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COLORADO REGISTERED BLAKE R. LARSEN 38903 PROFESSIONAL ENGINEER
10/18/2021

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Design-Build — **MEP**

Issued

No.	Description	Date
1	Permit	10/18/2021

RMHS Office / Mtng Addition

Permit

Project No.: 2463.4 Drawn by: ELR
Reviewed by: BRL

STRUCTURAL PLAN AND DETAILS

Scale Accordingly if Reduced

Drawing Number
S1.1

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HVAC & PLUMBING SYMBOL SCHEDULE

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
(#)	REFER TO PLAN NOTES	111	ROOM CALLOUT
(E)	EXISTING EQUIPMENT OR MATERIAL DESIGNATION		REVISION NUMBER
	EXISTING COMPONENT PEN WEIGHT		CONNECT NEW TO EXISTING. VERIFY EXACT LOCATION.
	DEMOLITION PEN WEIGHT - COMPONENT MAY ALSO BE SHADED		DISCONNECT FROM EXISTING. VERIFY EXACT LOCATION.
TCC	TEMPERATURE CONTROL CONTRACTOR	GC	GENERAL CONTRACTOR
EC	ELECTRICAL CONTRACTOR	MC	MECHANICAL CONTRACTOR
PC	PLUMBING CONTRACTOR	TYP. / (TYP)	TYPICAL ALL INSTANCES
UNO	UNLESS NOTED OTHERWISE	ETR	EXISTING TO REMAIN
24x12	(UP)DUCT SEC., POSITIVE PRESSURE-FIRST SIZE IS TOP DIM.(TYP.)		BALANCING DAMPER W/ MANUAL LOCKING QUADRANT
24x12	(DOWN) DUCT SECTION, POSITIVE PRESSURE		RECTANGULAR - OPPOSED BLADE / ROUND - BUTTERFLY
24x12	(UP) DUCT SECTION, NEGATIVE PRESSURE		BALANCING DAMPER W/ MOTORIZED LOCKING QUADRANT
24x12	(DOWN) DUCT SECTION, NEGATIVE PRESSURE		RECTANGULAR - OPPOSED BLADE / ROUND - BUTTERFLY
SD RD	SUPPLY DUCT DROP / RETURN DUCT DROP	18x12	DUCT SIZE, FIRST FIGURE IS SIDE SHOWN-CLEAR INSIDE DIM.
SR	SUPPLY DUCT RISER	R	DUCT CHANGE OF ELEVATION RISE(R) DROP(D)
RR	RETURN DUCT RISER		FLEXIBLE CONNECTION
	FLEXIBLE DUCT		SIDE WALL SUPPLY REGISTER
	TURNING VANES	RTU / AHU	ROOFTOP UNIT / AIR HANDLING UNIT
SA / OA	SUPPLY AIR / OUTSIDE AIR	VAV	VARIABLE AIR VOLUME UNIT
RA / EA	RETURN AIR / EXHAUST AIR	FTU / FCU	FAN POWERED TERMINAL UNIT / FAN COIL UNIT
OBD	OPPOSED BLADE DAMPER	MAU	MAKE-UP AIR UNIT
BOD	BOTTOM OF DUCT ELEVATION ABOVE FLOOR	SF	SUPPLY AIR FAN
BOS	BOTTOM OF STEEL	EF / RG	EXHAUST FAN / RETURN GRILLE
TOD	TOP OF DUCT ELEVATION ABOVE FLOOR	SR	SUPPLY REGISTER
DH	DUCT HEATER	F	FURNACE
DP	DIFFERENTIAL PRESSURE	UH	UNIT HEATER
CVR	CONSTANT VOLUME REHEAT UNIT	CRAC	COMPUTER ROOM AIR CONDITIONING UNIT
V V R	VARIABLE VOLUME REHEAT UNIT	H	HUMIDIFIER
V V T	VARIABLE VOLUME VARIABLE TEMPERATURE	VFD	VARIABLE FREQUENCY DRIVE
UV	ULTRAVIOLET STERILE CONDITIONER	FD	FIRE DAMPER IN WALL
	RADIATION DAMPER	FD	FIRE DAMPER IN FLOOR
M	MOTOR	SD	SMOKE DAMPER
T	TEMPERATURE SENSOR	FSD	COMBINATION FIRE/SMOKE DAMPER IN WALL
H	HUMIDITY SENSOR	FSD	COMBINATION FIRE/SMOKE DAMPER IN FLOOR
H	ELECTRIC OR DDC HUMIDISTAT (HSTAT)	T	ELECTRIC OR DDC THERMOSTAT (TSTAT)
H	PNEUMATIC HUMIDISTAT	T	PNEUMATIC THERMOSTAT
CWS	CHILLED WATER SUPPLY LINE (CWS)	HWS	HEATING WATER SUPPLY LINE (HWS)
CWR	CHILLED WATER RETURN LINE (CWR)	HWR	HEATING WATER RETURN LINE (HWR)
CHWS	CHILLED/HEATING WATER SUPPLY	HWRR	HEATING WATER REVERSE RETURN LINE (HWRR)
CHWR	CHILLED HOT WATER RETURN	CS	COOLING TOWER WATER SUPPLY (CS)
CWPP / CWSP	CHILLED WATER PRIMARY PUMP / SECONDARY PUMP	CR	COOLING TOWER WATER RETURN (CR)
HWPP / HWSP	HEATING WATER PRIMARY PUMP / SECONDARY PUMP	CWP	CHILLED WATER PUMP
HWP	HEATING WATER PUMP	CHWP	CHILLED/HEATING WATER PUMP
	DOUBLE CHECK BACKFLOW ASSEMBLY		BALL VALVE
	REDUCED PRESSURE ZONE BACKFLOW ASSEMBLY		CIRCUIT SETTER - CALIBRATED BALANCE VALVE
	GAS COCK / GLOBE VALVE		BUTTERFLY VALVE
	VALVE IN DROP / VALVE IN RISER		2-WAY / 3-WAY CONTROL VALVE (PNEUMATIC)
	GATE VALVE - SHUT OFF VALVE		2-WAY / 3-WAY CONTROL VALVE (ELECTRIC)
	3 PIECE BALL VALVE / HYDRAULIC VALVE		CHECK VALVE
	EMERGENCY VALVE WITH FIRE LINK		PRESSURE REDUCING VALVE (PRV) / WAFER CHECK VALVE
	STRAINER / UNION OR FLANGE CONNECTION		AUTOMATIC FLOW CONTROL VALVE
	PLUG VALVE		CALIBRATED ORIFICE PLATE FLOW METER
	SPRING HANGER / PIPE HANGER		THERMOMETER / PRESSURE GAUGE
	CAP / CAPPED OUTLET		CONCENTRIC REDUCER OR INCREASER / ECCENTRIC REDUCER
	PIPE DROP / PIPE RISE		TOP CONNECTION, 45° OR 90° / BOTTOM CONNECTION, 45° OR 90°
	DIRECTION OF FLOW / ANCHOR		SIDE CONNECTION
	DOMESTIC COLD WATER LINE (CW)		ABOVE FLOOR WASTE LINE (W)
	DOMESTIC HOT WATER LINE (HW)		BELOW FLOOR WASTE LINE (W)
	HOT WATER RECIRC LINE (HWC)		PLUMBING VENT LINE (V)
F	FIRE PROTECTION LINE (F)	RL ORL	RAIN LEADER (RL) / OVERFLOW RAIN LEADER (ORL)
CA	COMPRESSED AIR (CA)	SWS	STORM SEWER (SWS)
TW	DOMESTIC TEMPERED WATER LINE (TW)	FS UF	FUEL SUPPLY / UNUSABLE FUEL
FCW	FILTERED COLD WATER LINE (FCW)	FOS FOR	FUEL OIL SUPPLY / FUEL OIL RETURN
SCW	SOFT COLD WATER LINE (SCW)	FOG	FUEL OIL GAUGE
RO	REVERSE OSMOSIS PURE WATER SUPPLY LINE (RO)	TOP / BOP	TOP OF PIPE / BOTTOM OF PIPE ELEVATION ABOVE FLOOR
ROR	REVERSE OSMOSIS PURE WATER RETURN LINE (ROR)	RD / ORD	ROOF DRAIN / OVERFLOW ROOF DRAIN
DI	DEIONIZED PURE WATER SUPPLY (DI)	CI	CAST IRON
IW	INDUSTRIAL WASTE	VCP / PVC	VITRIFIED CLAY PIPE / POLYVINYL CHLORIDE PIPE
G	NATURAL GAS LINE (G)	WH	WALL HYDRANT
CD	COOLING COIL CONDENSATE DRAIN LINE (CD)	WH-#	WATER HEATER CALLOUT
VTR	VENT THROUGH ROOF	F/S	FILTER-SEPARATOR
FD / TD	FLOOR DRAIN / TRENCH DRAIN	FS	FLOOR SINK
CO CO	CLEANOUT (FLOOR) / 2-WAY CLEANOUT (FLOOR)	FHC	FIRE HOSE CABINET
WCO CO	WALL CLEANOUT / END OF LINE CLEANOUT	DHWP	DOMESTIC HOT WATER PUMP
P-#	PLUMBING FIXTURE CALLOUT	HR / HB	HOSE REEL / HOSE BIBB
WHA#	WATER HAMMER ARRESTOR - PDI SIZE	TMV	THERMOSTATIC MIXING VALVE
FL	FLOW LINE ELEVATION		
O2	MEDICAL OXYGEN LINE (O2)	N2O N2	NITROUS OXIDE LINE (N2O) / NITROGEN LINE (N2)
VAC	MEDICAL VACUUM LINE (VAC)	MA	MEDICAL COMPRESSED AIR LINE (MA)
LPS	LOW PRESSURE (<16psig) STEAM (LPS)	HPS	HIGH PRESSURE (>150psig) STEAM (HPS)
LPR	LOW PRESSURE (<16psig) CONDENSATE RETURN (LPR)	HPR	HIGH PRESSURE (>150psig) CONDENSATE RETURN (HPR)
MPS	MEDIUM PRESSURE (16-150psig) STEAM (MPS)	BFW	BOILER FEEDWATER (BFW)
MPR	MEDIUM PRESSURE (16-150psig) CONDENSATE RETURN (MPR)		STEAM TRAP (ST)

NOT ALL MAY BE USED ON PROJECT

GENERAL NOTES

1. VERIFY JOB SITE CONDITIONS AND DIMENSIONS BEFORE BEGINNING WORK. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS.
2. NO PIPING, DUCTWORK, ETC. SHALL PENETRATE STRUCTURAL MEMBERS.
3. PROVIDE MISCELLANEOUS CUTTING, PATCHING AND REPAIRING OF FINISHES, ROOF, WALLS, ETC., AS REQUIRED TO ACCOMMODATE THE NEW WORK.
4. G.C. IS TO PATCH ANY OPENINGS IN CORRIDORS REQUIRED TO BE CONSTRUCTED TO LIMIT THE TRANSFER OF SMOKE AND IN SMOKE BARRIERS AS REQUIRED TO MEET CODE REQUIREMENTS. SEE ARCHITECTURAL DRAWINGS FOR LOCATIONS.
5. IT IS THE CONTRACTOR'S RESPONSIBILITY TO FIELD VERIFY EXACT LOCATION, CONFIGURATION AND ROUTING OF EXISTING SYSTEMS REQUIRED TO REMAIN IN OPERATION DURING THE PROJECT TO PREVENT DAMAGE DURING DEMOLITION AND PHASING.
6. REMOVE ALL EXISTING EQUIPMENT, DUCTWORK AND PIPING THAT IS NOT REQUIRED FOR A WORKING INSTALLATION.
7. COORDINATE ALL WORK WITH OTHER TRADES PRIOR TO INSTALLATION.
8. UNLESS OTHERWISE INDICATED, INSTALL ALL SPACE THERMOSTATS AND OTHER OCCUPANT ADJUSTABLE CONTROL DEVICES SAME HEIGHT AS ADJACENT LIGHT SWITCHES, BUT IN NO CASE HIGHER THAN 48 INCHES ABOVE FINISHED FLOOR PER ADA REQUIREMENTS. COORDINATE EXACT HEIGHT WITH ARCHITECT PRIOR TO INSTALLATION.
9. ALL CUTTING AND PATCHING SHALL BE CLOSELY COORDINATED WITH THE G.C.
10. COORDINATE ROUTING OF PLUMBING, AND HVAC PIPING WITH DUCTWORK, LIGHTS, ARCHITECTURAL CEILING AND STRUCTURAL ELEMENTS. PIPING SHALL RISE AND DROP, JOG OR OFFSET AS REQUIRED TO AVOID CONFLICTS. DUCTWORK SHALL TAKE PRECEDENCE OVER ALL PIPING, EXCEPT WHERE GRADE MUST BE MAINTAINED FOR DRAINAGE. REWORK OF INSTALLED WORK TO RESOLVE CONFLICTS RISING FROM LACK OF COORDINATION SHALL NOT JUSTIFY AN INCREASE IN THE CONTRACT AMOUNT.
11. ALL DIFFUSERS ARE 4-WAY BLOW UNLESS INDICATED OTHERWISE ON THE DRAWINGS.
12. FLEXIBLE DUCTWORK IS ALLOWED ON RUNOUTS TO SUPPLY DIFFUSERS ONLY. UTILIZE ONLY ABOVE LAY-IN ACCESSIBLE CEILINGS. DO NOT INSTALL FLEX DUCT ABOVE HARD CEILINGS OR WHERE EXPOSED. A MAXIMUM LENGTH OF 6'-0" MAY BE USED AT EACH CONNECTION.
13. SEAL DUCTWORK AS CALLED OUT BELOW USING HARDCAST DT TAPE AND FTA-20 ADHESIVE OR HARDCAST AFG-1402 "FOIL GRIP" PER MANUFACTURERS INSTRUCTIONS.

TYPE OF DUCT	APPLY TO JOINTS
EXHAUST DUCT (ROUND OR RECT)	TRANSVERSE AND LONGITUDINAL
MEDIUM VELOCITY (ROUND)	TRANSVERSE AND LONGITUDINAL
MEDIUM VELOCITY (RECTANGULAR)	TRANSVERSE AND LONGITUDINAL
LOW VELOCITY SUPPLY AND RETURN (RECT)	TRANSVERSE AND LONGITUDINAL
LOW VELOCITY SUPPLY (ROUND)	TRANSVERSE AND LONGITUDINAL

14. INSTALL BALANCE DAMPER WITH STANDOFF AND LOCKING QUADRANT IN AN ACCESSIBLE LOCATION AT EACH RUNOUT TO SUPPLY DIFFUSERS, EXHAUST GRILLES, AND RETURN GRILLES WHERE AIRFLOW IS INDICATED, OR AS INDICATED OTHERWISE.
15. ALL PENETRATIONS THROUGH FIRE RATED ASSEMBLIES SHALL BE FIRE STOPPED BY THE TRADE MAKING THE PENETRATION. REFER TO ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR REQUIREMENTS.
16. COORDINATE SIZE AND LOCATION OF ACCESS DOORS IN CONSTRUCTION REQUIRED FOR ACCESS TO MECHANICAL EQUIPMENT WITH G.C.
17. ALL WORK IS TO CONFORM WITH APPLICABLE CODES AND STANDARDS.
18. DUCT SIZES SHOWN ARE ACTUAL INSIDE CLEAR DIMENSIONS. INCREASE SHEET METAL DIMENSIONS AS REQUIRED TO ACCOMMODATE DUCT LINER WHERE LINER IS SPECIFIED.
19. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LOCATION OF ALL CEILING MOUNTED AIR DISTRIBUTION DEVICES.
20. PAINT INSIDE OF DUCTWORK BLACK ANYWHERE VISIBLE THROUGH FACE OF GRILLE OR DIFFUSER.
21. TEMPERATURE CONTROLS CONTRACTOR (T.C.C.) SHALL FURNISH AND INSTALL ALL LOW VOLTAGE WIRING AND ASSOCIATED CONDUIT REQUIRED FOR MECHANICAL CONTROL SYSTEM. WIRING SHALL BE IN CONDUIT INSIDE WALLS, IN ROOMS WITH EXPOSED CEILINGS, AND ABOVE HARD CEILINGS. LINE VOLTAGE WIRING AND ASSOCIATED CONDUIT SHALL BE PROVIDED AND INSTALLED BY E.C. CONTROL SYSTEM SHALL BE INSTALLED IN ACCORDANCE WITH SPECIFICATIONS.
22. ALL CONTROL DAMPERS SHALL BE FURNISHED BY T.C.C. AND INSTALLED BY THE M.C. MOTOR OPERATORS SHALL BE FURNISHED AND INSTALLED BY THE T.C.C.
23. CONTRACTOR TO INSTALL TEMPORARY FILTERS OVER ALL RETURN AND EXHAUST GRILLES IN WORK AREA DURING CONSTRUCTION.
24. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF TEMPORARY PARTITIONS.
25. SQUARE THROAT NOT ALLOWED ON RADIUS ELBOWS.
26. MANUAL BALANCE DAMPERS AND OTHER ACCESSORIES REQUIRING ACCESS SHALL BE ACCESSIBLE VIA A STANDARD LADDER SO COMPONENTS MAY BE REPLACED, REPAIRED, OR UTILIZED WITHOUT THE NEED FOR EXTENSIVE CEILING REMOVAL, SCAFFOLDING OR A MAN LIFT. WHERE POSSIBLE NO MORE THAN 48" ABOVE THE FINISHED CEILING.

PRESSURE CLASS SCHEDULE

AIR SYSTEM	PRESSURE CLASS	SEAL CLASS	LEAKAGE CLASS	
			ROUND	RECT
LOW-PRESSURE SUPPLY	2 INCH WG (500 PA)	A	6	12
RETURN AND RELIEF	2 INCH WG (500 PA)	A	6	12

HVAC DESIGN CONDITIONS

REMARKS:
FORT COLLINS, CO
ASHRAE ZONE 5B

SPACE OR AREA	OUTDOOR AIR		INDOOR HEATING °F	INDOOR COOLING °F	ELEVATION
	SUMMER DB/WB °F	WINTER DB °F			
OFFICE & CONFERENCE	90/65	5	72	72	5100

SHEET LIST

M-0.01	MECHANICAL COVER SHEET
M-0.02	MECHANICAL SPECIFICATIONS
M-1.01	MECHANICAL DEMO PLAN
M-2.01	MECHANICAL FLOOR PLAN
M-3.01	MECHANICAL DETAILS & SCHEDULES

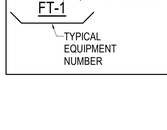
GENERAL DEMOLITION NOTES

1. VERIFY ALL EXISTING CONDITIONS PRIOR TO BEGINNING WORK. BRING ANY DISCREPANCIES FROM THE DRAWINGS AND NOTES TO THE ARCHITECT IMMEDIATELY. MINOR CHANGES IN THE SCOPE OF THE DEMOLITION WORK SHALL NOT JUSTIFY AN ADDITIONAL COST.
2. REMOVAL OF EXISTING FIXTURES AND EQUIPMENT WILL REQUIRE ISOLATING THE PIPING RISERS OR MAINS VIA SHUT-OFF VALVES. INSTALL NEW ISOLATION VALVES WHERE REQUIRED FOR COMPLETION OF WORK.
3. REMOVAL OF EXISTING PLUMBING FIXTURES AND EQUIPMENT, ETC. WILL REQUIRE CAPPING AND SEALING EXISTING MAINS OR BRANCHES AS NECESSARY AND REQUIRED TO ALLOW THE REMAINING SYSTEMS TO FULLY OPERATE WITHOUT DEGRADATION.
4. CONTRACTOR SHALL PROVIDE PROTECTIVE PLASTIC DROP CLOTHS TO PROTECT THE EXISTING OCCUPIED AREAS AND EQUIPMENT FROM DUST AND DEBRIS DURING THE CONSTRUCTION WORK, AND SHALL CLEAN THE AREAS OF ALL CONSTRUCTION DIRT DAILY, AND UPON COMPLETION OF THE WORK.
5. ALL DRAINED PIPING RISERS AND MAINS SHALL BE REFILLED WITH PROPER FLUID AND PROPERLY VENTED BY THIS CONTRACTOR, ONCE NEW WORK HAS BEEN INSTALLED.
6. COORDINATE WITH GENERAL CONTRACTOR THE REMOVAL AND REPLACEMENT OF ALL EXISTING CEILINGS, WALLS, ETC. AS REQUIRED FOR MECHANICAL DEMOLITION WORK.
7. EXISTING PIPING AND EQUIPMENT, ETC., NOT TO BE UTILIZED IN THE COMPLETED BUILDING SHALL BE DISCONTINUED OR REMOVED AS REQUIRED. ALL ENDS OF DISCONTINUED PIPING SHALL BE CAPPED IN THE NEAREST WALL, CEILING OR FLOOR SO THAT THEY ARE COMPLETELY CONCEALED. OPENINGS LEFT IN WALLS, CEILINGS, ETC., WHERE EQUIPMENT AND PIPE, ETC., ARE REMOVED AND NOT REPLACED, SHALL BE PATCHED NEATLY WITH SIMILAR MATERIAL TO ADJACENT CONSTRUCTION. REFER TO DRAWINGS DELINEATING NEW WORK FOR ADDITIONAL INFORMATION REGARDING SYSTEMS OR PORTIONS OF SYSTEMS WHERE USE IS TO BE DISCONTINUED.
8. EXISTING PIPING, FIXTURES AND EQUIPMENT THAT ARE NOT TO BE REUSED SHALL BE REMOVED AND SHALL REMAIN THE PROPERTY OF THE OWNER IF THEY WISH TO RETAIN OWNERSHIP OF SAME. IF NOT, EQUIPMENT SHALL BECOME THE PROPERTY OF THIS CONTRACTOR AND SHALL BE REMOVED FROM THE SITE AS SOON AS PRACTICAL AND DISPOSED OF IN ACCORDANCE WITH APPLICABLE LAWS AND REGULATIONS.
9. ALL CUTTING AND CHANNELING OF EXISTING BUILDING SHALL BE ACCOMPLISHED IN A NEAT AND WORKMANLIKE MANNER WITHOUT REMOVAL OF EXCESS MATERIALS. THIS CONTRACTOR SHALL PATCH AND REPLACE WITH MATERIAL SIMILAR TO ADJACENT CONSTRUCTION.
10. PORTIONS OF EXISTING SYSTEMS MAY BE SHOWN FOR CLARITY EVEN THOUGH IT MAY NOT BE NECESSARY TO MODIFY OR REVISE THEM. ALL EXISTING SYSTEMS ARE SHOWN BASED ON ORIGINAL OR REMODEL BUILDING DRAWINGS. CONTRACTOR TO VERIFY ALL EXISTING CONDITIONS.
11. ALL WORK MUST BE COORDINATED AND SCHEDULED WITH THE OWNER AND OCCUPANTS OF THIS BUILDING SO AS TO PROVIDE THE LEAST AMOUNT OF DISRUPTION OF BUILDING ACTIVITIES AS POSSIBLE. MAINTAIN CONDITIONED SPACE FOR ALL OWNER OCCUPIED AREAS DURING CONSTRUCTION.
12. ALL ACCESSIBLE ABANDONED PIPING AND DUCTWORK SHALL BE REMOVED AND PROPERLY DISPOSED OF.
13. CAP ALL EXISTING PIPING AND DUCTWORK SHOWN TO BE DISCONNECTED AND NOT REUSED AT MAIN. ALL ACCESSIBLE PIPING SHALL BE REMOVED.
14. RELOCATE EXISTING DUCTWORK, PIPING, ELECTRICAL CONDUITS, AND CABLING AS NECESSARY TO ACCOMPLISH FINAL INSTALLATION AS SHOWN. ALERT ENGINEER TO ANY MAJOR RELOCATIONS REQUIRED.

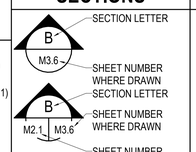
NOTE: NOT ALL MAY APPLY TO PROJECT

DRAWING SYMBOLS

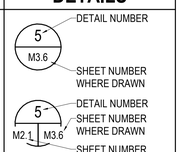
EQUIPMENT CALLOUT



SECTIONS



DETAILS



PEC
PROFESSIONAL ENGINEERING CONSULTANTS
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970-232-9558 www.pec1.com

COLORADO LICENSED
JAMES W. TYLER
55550
11/18/2021
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW
CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

MECHANICAL COVER SHEET

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY SJP
CHECKED BY JDB

M-0.01

11/16/2021 12:26:15 PM
BIM 360://210577-000 - PSD RMHS New Conference Room and Office/210577-000-MASTER MECH-R21.rvt

SECTION 200500 – COMMON WORK RESULTS FOR FIRE PROTECTION, PLUMBING, AND MECHANICAL

1.1 GENERAL CONDITIONS
- A. The General Conditions, Supplemental General Conditions, Special Conditions and General Requirements are part of this contract and shall be referred to as they apply to this section of the specifications.

1.2 EXAMINATION OF SITE
- A. Visit the site, inspect the existing conditions and check the drawings and specifications so as to be fully informed of the requirements for completion of the work. Lack of such information shall not justify an extra to the contract price.

1.3 SCOPE
- A. The Mechanical Work shall include labor, materials, and equipment to install systems as shown on plans and hereinafter specified. The installation shall include all labor, materials, tools, transportation, equipment, services and facilities, required for the complete, proper and substantial installation of all mechanical work shown on the plans, and/or outlined in these specifications. The installation shall include all materials, appliances, and apparatus not specifically mentioned herein or noted on the drawings but which are necessary to make a complete working installation of all mechanical systems.
- B. Show on prints in red ink all changes from original plans made during the installation. Return these prints to the Architect upon completion of the project.
- C. By bidding, this contractor acknowledges his understanding of the work to be done and agrees to install complete and workable systems.

1.4 CODES
- A. Execute work in compliance with all applicable Federal, State and Municipal laws, codes, ordinances, and local customs regarding the trade to perform the work.
- B. Codes shall govern in case of any direct conflict between codes and plans and specifications; except when plans and specifications require higher standards than those required by code. Variance from the plan and specifications made to comply with code must be approved by the Architect. If approved they shall be made with no increased cost to the Owner.
- C. In addition, the following published Standards and Regulations shall be adhered to as applicable to the work involved:
  - Latest issue of the Local, State, and International Building, Plumbing, Mechanical, Fire, Fuel Gas and Energy Conservation Codes.
  - Latest issue of any applicable ASHRAE Guideline
  - Latest issue of the SMACNA Handbook
  - Applicable NFPA Pamphlets
  - Applicable ANSI Standards
  - American Society of Mechanical Engineers Boiler Code
  - American Society of Mechanical Engineers Unfired Pressure Vessel Code
  - American Standards Association Code for Mechanical
  - Occupational Safety and Health Act
  - Current Editions of Uniform Building Code
  - Latest issue of the State Air Pollution Control Regulations
  - Rules of the State Boiler Inspection Department
  - Americans with Disabilities Act
  - Latest issue of the Facility Guidelines Institute (FGI) Guidelines

1.5 DEFINITIONS
- A. It shall be understood that the drawings and specifications complement one another and items specified shall also meet the criteria set forth on the drawings.
- B. Where any device or item is referred to in the singular sense (such as "the unit"), such reference applies to as many devices as are required to complete the installation as shown on the drawings.
- C. The term "work" shall mean all obligations imposed upon the Contractor by the Contract Documents.

1.6 ABBREVIATIONS
  - ADA - Americans with Disabilities Act
  - AGA - American Gas Association
  - AISI - American Iron and Steel Institute
  - AMCA - Air Moving and Conditioning Association, Inc.
  - ANSI - American National Standards Institute
  - ASHRAE - American Society of Heating, Refrigeration & Air-Conditioning Engineers, Inc.
  - ASME - American Society of Mechanical Engineers
  - ASTM - American Society for Testing and Materials
  - AWWA - American Water Works Association
  - BPVC - Boiler and Pressure Vessel Code of ASME
  - CISPI - Cast Iron Soil Pipe Institute
  - NFPA - National Fire Protection Association
  - SMACNA - Sheet Metal and Air-Conditioning Contractors National Association, Inc.
  - UL - Underwriters' Laboratories, Inc.
  - ETL - ETL Testing Laboratories, Inc.
  - OSHA - Occupational Safety and Health Administration

1.7 PERMITS
- A. Obtain and pay for all licenses and permits, fees, inspection and certificates required for the execution of this work.
- B. Pay fees and charges for connection to outside services and use of property.
- C. Deliver permits and certificates to the Architect for transmittal to the Owner.

1.8 RESPONSIBILITY
- A. This contractor will be held responsible for any and all damage to any part of the building or to the work of other contractors, as may be caused through his operation.
- B. The operation and maintenance of the New Mechanical Equipment during construction shall be the responsibility of this contractor until the acceptance of the building by the Owner.
- C. The General Contractor shall pay for all fuel cost for operation of the equipment, unless indicated otherwise in the specifications.
- D. This Contractor shall make all provisions for entry of equipment, installed under this Contract, to the installed location. This Contractor shall provide openings in existing construction if necessary. This Contractor shall do all repair necessary to restore the building to the original condition. During the period of entry of equipment and removal of trash, no disruption of the Owner's normal business shall occur.

1.9 WORK TO BE DONE BY GENERAL CONTRACTOR
- A. Build in all openings, sleeves, chases, etc., for piping, as established, furnished and set by this contractor.
- B. Mechanical Contractor shall furnish bolts, brackets, hangers, etc., required for work established and arrange for General Contractor to build into concrete structure. General Contractor shall install all factory sleeved fire dampers, furnished by Mechanical Contractor, in walls and floors.
- C. Frame around and provide openings for ductwork, louvers, roof drains, etc.
- D. Build curb or install factory curb and provide flashing for roof mounted mechanical equipment. Provide heavy steel angle support under entire perimeter of roof curb for rooftop equipment. Metal deck and roof insulation shall be installed within the roof curb area of rooftop equipment for acoustical considerations.
- E. Provide lintels over wall openings.
- F. Build concrete base for equipment furnished and set by this contractor.
- G. Provide concrete housing for sewage ejector and sump pump basins.
- H. Paint all mechanical equipment so specified. Use paint which is specified by the Architect.
- I. Do excavation, provide moisture barrier, sand and/or gravel, tie down wire, and a minimum thickness of 3" of lightweight concrete for installation of duct below grade. Mechanical Contractor shall furnish duct and set in place in preparation for concrete pour.

1.10 WORK TO BE DONE BY ELECTRICAL CONTRACTOR
- A. The Electrical Contractor shall provide all motor starters complete with auxiliary contacts where required for the function of this system unless specifically noted otherwise on the plans or in these specifications.
- B. All required line voltage wiring for the mechanical control system shall be furnished and installed by the Electrical Contractor under supervision of the Control Manufacturer's representative.
- C. Check mechanical specifications to verify wiring requirements for motor driven equipment. Provide complete wiring for the equipment including all required interlocking. Provide complete wiring for power factor correction capacitors.
- D. The Electrical Contractor shall install the power factor correction capacitors furnished by the Mechanical Contractor for equipment so specified.

1.11 ELECTRICAL REQUIREMENTS BY MECHANICAL CONTRACTOR
- A. Mechanical Contractor shall furnish all motors, motor interlocking control devices, certain magnetic starters, etc.
- B. Submittals shall include complete equipment wiring diagrams and temperature control drawings for all the equipment furnished.
- C. Submittals shall show all wiring connections, starters, auxiliary contactors, interlocking selector switches, separate control voltage power supplies, for each and every item of equipment, etc., requiring wiring.
- D. Provide one copy of Engineer approved shop drawings showing all wiring and temperature control requirements of all mechanical equipment to the Electrical Contractor.

1.12 WORKMANSHIP AND COORDINATION
- A. Make installation substantially as shown on the plans.
- B. Pipe and duct routing and equipment location shown on the drawings are schematic in nature. Make alterations in location of apparatus or piping as may be required to conform to building construction without extra charge.
- C. Equipment service clearances, per equipment manufacturers' specifications, shall be maintained from general construction. No pipe or ductwork shall be installed within these clearances. No piping, coils, or ductwork shall be installed above electrical panels, starters or switch gear, or in elevator equipment rooms.
- D. Cooperate with other contractors in their installation of work.
- E. The ductwork shall take precedence over all pipe work except where it is necessary to maintain an even grade or specific slope on the piping.
- F. Use only experienced mechanics.

1.13 MATERIALS
- A. Material and equipment shall be new, of best quality and design and free from defects. A manufacturer's nameplate affixed in a conspicuous place will be required on each major component of equipment stating manufacturer's name, address and catalog number.

1.14 MATERIALS OF APPROVED EQUAL
- A. Where items of equipment and/or materials are specifically identified herein by a manufacturer's name, model or catalog number, only such specific items may be used in the base bid, except as hereinafter provided.
- B. Unless requests for changes in base bid specifications are received and approved and noted by addendum prior to the opening of bids, the successful contractor will be held to furnish specified item.
- C. After contract is awarded, changes in specifications shall be made only as defined under "Substitution of Equipment".

1.15 SUBSTITUTION OF EQUIPMENT
- A. After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents will be approved by the Engineer only if the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other contractors, due to conditions beyond control of the contractor.
- B. Requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in form of certified quotations from suppliers of both specified and proposed equipment.
- C. The Owner shall receive all benefits of the difference in cost involved in any substitution, and the contract altered by change order to credit Owner with any savings so obtained.

1.16 SUBMITTALS
- A. Contractor shall send to the Architect for approval submittals on all equipment, accessories, and components.
- B. Submittals shall be in electronic format (PDF) and all submittals by each trade shall be submitted together as a package to be reviewed together. Incomplete submittals packages or submittals sections sent in a piecemeal manner will not be reviewed until all sections are received.
- C. Where catalog cuts are used, mark them to indicate equipment, capacities, controls, fittings, valves, sizes, etc.
- D. Reference each item to applicable specification paragraph number and plan sheet number. Reference items not appearing in base specification to applicable alternate numbers, change order numbers, letters of authorization, etc.
- E. All shop drawings shall be checked and signed by the mechanical contractor prior to submittal to the Engineer.

1.17 CUTTING AND PATCHING
- A. Notify the General Contractor in ample time, of the location of all chases, sleeves, and any other openings required in connection with the work of this contract.
- B. Cutting and patching made necessary because of failure to comply with the above shall be done by the General Contractor at the expense of the Mechanical Contractor.

1.18 TESTING
- A. Furnish testing equipment and test all piping systems under methods and conditions as specified.
- B. Test for a period of not less than 12 hours in the presence of the architect. Provide photographic evidence signed off by the GC superintendent.
- C. Make all necessary replacements and repair and repeat tests until the entire system is approved and satisfactory.
- D. Test under pressure with liquid or gas as directed or specified.
- E. Refer to TAB and piping sections for further information on duct and pipe testing.

1.19 PAINTING
- A. All painting shall be done by the General Contractor.
- B. Painting shall be for the following items: all piping, ductwork, frame work, and all equipment not furnished with factory finish, etc., in all exposed areas of the building and/or as noted on the drawings. Omit painting of piping in tunnels and in concealed areas.

1.20 LABELING
- A. Install mechanically engraved metal or plastic label at equipment, not less than 2-1/2 inches wide by 3/4 inch tall with letters between 1/4 inch and 1/2 inch tall. Utilize labels with pre-drilled holes and stainless steel rivets or self-tapping screws, or labels with contact-type permanent adhesive.
- B. Identify all service piping which is accessible for maintenance operation with semi rigid plastic markers complete with direction of flow arrows. Each marker must show approved color-coded background, proper color of legend, approved legend letter size and approved marker length. Use snap on or Type SNA markers on diameters 3/4" thru 5". Use strap-on or Type STR on diameter 6" and larger. Locate pipe markers at each valve, each branch and riser takeoff, each passage through wall or floor construction, each passage to underground and at 25 foot intervals on all horizontal pipe runs.

Pipe Diameter	Marker Size	Letter Height
3/4" thru 2"	1"x8"	3/4"
2-1/4" thru 7-7/8"	2-1/4"x13"	1-3/4"

1.21 OPERATING INSTRUCTIONS
- A. Prepare and submit to the Engineer for approval three (3) copies of operating instructions made in conjunction with Equipment Manufacturer's representative. Instruction shall contain equipment starting sequence, interlocks, controls, switches, etc. which affect the equipment operation. Place copies in maintenance instructions brochure.

1.22 MAINTENANCE INSTRUCTIONS
- A. Prepare a brochure in triplicate covering all systems and equipment furnished and installed under this contract. Each brochure shall include certified equipment drawings and/or catalog data as submitted, complete maintenance instructions, parts lists for each item of equipment, any special emergency operating instructions, all equipment warranties with starting dates identified, and a list of service organizations including addresses and telephone numbers.
- B. Brochures shall be bound in hard backed, three-ring binders with an index, sub-dividers and reinforced sheets.
- C. Label cover with the following:
  Project name and address
  Section of work covered by brochure, i.e., "Plumbing Heating, Ventilation, Air Conditioning", etc.
  Name and address of Architect, Engineer, Contractor.
  Telephone number of Contractor including night and emergency numbers.
- D. Brochures shall be submitted to the Engineer for approval and delivery to the Owner.

1.23 LOOSE EQUIPMENT
- A. All keys and special wrenches furnished with the equipment shall be kept in a safe place during construction and presented to the Owner at the completion of the project.

1.24 FINAL INSPECTION
- A. Final inspection will be made upon written request from the Mechanical Contractor after the project is completed and Test and Balance (TAB) has been complete.
- B. Furnish a workman familiar with this project to accompany the Engineer on final inspection and have available ladders, drop cords, and other equipment as required to gain access to any portion of this system.
- C. Submit TAB Report to Engineer for review at least 5 days prior to final inspection.
- D. This contractor and his principal sub-contractors shall be represented at the inspection by a person of authority responsible to demonstrate to the Engineer that his work conforms to the intent of the plans and specifications.
- E. Extra inspections made necessary by the Mechanical Contractor's failure to comply with the conditions as set forth above shall be charged to the contractor at the inspector's time both on the job and spent in travel between the office and the project site.

1.25 GUARANTEE
- A. Guarantee all work, material and equipment for a period of one year after date of final certificate of acceptance by the Architect.
- B. During the year guarantee period the mechanical contractor shall be responsible for any defects which develop in the mechanical systems. Upon notification of a defect by the Architect, (s)he shall make immediate effort to correct it and shall notify the Architect when this work is completed.
- C. Repairs and/or replacements shall be made with no cost to Owner.

SECTION 200600 – MATERIALS AND METHODS COMMON TO FIRE PROTECTION, PLUMBING, AND MECHANICAL.

1.1 PIPING SYSTEMS - GENERAL
- A. Pipe for piping systems shall be cut accurately to measurements taken on the job.
- B. Install offset connections for alignment of vertical to horizontal piping wherever required to make a true connection.
- C. Make branch connections with offsets to provide for movement with the expansion of the piping system.
- D. Install horizontal piping parallel to the building walls and partitions.
- E. Do not run piping through elevator equipment rooms, transformer vaults or other electrical equipment spaces or above electrical gear or panels.
- F. Valves, strainers, control valves, check valves and fittings shall be full size of the line they serve. Make change in pipe size noted on plans after last fitting on larger pipe. When supply pipes are larger than equipment tappings, reduce pipe size immediately prior to entry.

1.2 PIPE AND FITTINGS
- A. Each piece of pipe must be clearly labeled or stenciled with manufacturer's name, type of pipe and length, in accordance with ASTM standards. All pipe must be new. Re-processed pipe which has been cleaned and re-finished due to extended yard storage will not be accepted. All pipe must be corrosion free. Submit shop drawings on piping along with certified mill specifications.
- B. Copper tubing: seamless copper water tube conforming to ASTM Standard Specification B88.
- C. Weld in accordance with American Welding Society Code. Mitering and notching of pipe to form elbows and tees is not permitted.

1.3 HANGERS AND SUPPORTS
- A. Manufacturers: Crane - B-Line - Grinnel - Unistrut - Elcen.
- B. Use strap type pipe ring hangers on pipe up thru 3" equal to Grinnel Fig. 69 or CT-69. Use standard duty clevis hangers on piping larger than 3" equal to Grinnel Fig. 260.
- C. Use inserts or supporting members in construction above for overhead suspension. Set inserts or supporting members for hangers in form for concrete construction. Use expansion inserts only where approved by the Architect's inspector.
- D. Use heavy welded steel brackets for wall suspension. Mount brackets and wall supports on masonry walls with bolts through the wall and a suitable steel back plate on the back of the wall.
- E. Provide all surface mounted and concealed unistrut for pipe supports in all equipment rooms and above ceilings for pipe and duct mounting. Unistrut shall all be at a minimum of heavy 12 ga., 1-5/8" construction. Contractor shall insure adequate support of each unistrut section based on the load that section is to handle.
- F. Size hangers on insulated pipe 3" and smaller to fit the pipe. Use copper plated hangers for copper pipe. Size hangers on insulated pipe 4" and larger to fit the insulation, and provide pipe sleeves and high density insulation inserts as specified under "Insulation and Pipe Covering".
- G. Space hangers 8'-0" on center for steel, iron, and copper pipe up to 1".
- H. Mount piping so that all runs are parallel and evenly spaced.
- I. Two-Bolt Riser Clamps: MSS Type 8.
- J. Except as otherwise indicated, provide factory-fabricated hanger-rod attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit horizontal-piping hangers and building attachments, in accordance with MSS SP-69 and manufacturer's published product information. Use only one type by one manufacturer for each piping service. Select size of hanger-rod attachments to suit hanger rods. Provide copper-plated hanger-rod attachments for copper-piping systems.
  1. Steel Turnbuckles: MSS Type 13.
  2. Steel Clevises: MSS Type 14.
  3. Swivel Turnbuckles: MSS Type 15.
  4. Malleable Iron Sockets: MSS Type 16.
  5. Steel Weldless Eye Nuts: MSS Type 17.
- K. Except as otherwise indicated, provide factory-fabricated building attachments complying with MSS SP-58, of one of the following MSS types listed, selected by Installer to suit building substrate conditions, in accordance with MSS SP-69 and manufacturer's published product information. Select size of building attachments to suit hanger rods. Provide copper-plated building attachments for copper-piping systems.
  1. Concrete Inserts: MSS Type 18.
  2. Top Beam C-Clamps: MSS Type 19.
  3. Side Beam or Channel Clamps: MSS Type 20.
  4. Center Beam Clamps: MSS Type 21.
  5. C-Clamps: MSS Type 23.
  6. Side Beam Clamps: MSS Type 27.
  7. Malleable Beam Clamps: MSS Type 30.
  8. Steel Brackets:
  9. Light Duty: MSS Type 31.
  10. Side Beam Brackets: MSS Type 34.
- L. Shop drawings submitted without contractor's signature or approval and verification will not be approved. Quantities will not be checked or verified. It is the contractor's responsibility to provide the proper quantities required to complete the job.
- M. Portions of the work requiring a shop drawing submittal shall not begin until the shop drawing has been approved by the Engineer.
- N. Submit wiring diagrams for all mechanical equipment requiring field wiring clearly showing all required connections.
- O. Engineer's acceptance of Compliance Submittals will not relieve Contractor from his responsibility for any deviations from the requirements of the Contract Documents unless Contractor has in writing called Engineer's attention to such deviation at the time of submission and Engineer has given written approval to the specific deviation, nor shall any acceptance by Engineer relieve Contractor from responsibility for errors or omissions in Compliance Submittals.
- P. Install hangers and supports to allow controlled movement of piping systems and to permit freedom of movement. Resting of pipe in framing or structural members is not permitted.
- Q. Load Distribution: Install hangers and supports so that piping live and dead loading and stresses from movement will not be transmitted to connected equipment.
- R. Pipe Slopes: Install hangers and supports to provide indicated pipe slopes, and so that maximum pipe deflections allowed by ANSI B31 are not exceeded.
- L. Insulated Piping: Comply with the following installation requirmvents:
  1. Clamps: Attach clamps, including spacers (if any), to exterior of piping insulation.
  2. Shields: Where low-compressive-strength insulation or vapor barriers are indicated on cold or chilled water piping, install coated protective shields.
  3. Saddles: Where insulation without vapor barrier is indicated, install protection saddles.

1.4 VALVES
- A. Provide all valves required for operation, service, and maintenance of systems and equipment, i.e. shut off valves both sides of equipment, coils, etc.
- B. Where Used
  - a. Domestic and Hydronic Piping shut-off valves 2" and smaller shall be ball valves
  - b. Domestic and Hydronic Piping shut-off valves 2-1/2" and larger shall be butterfly valves.
  - c. Valves in air lines and throttling valves shall be globe valves.
  - d. Flow control valves shall be plug valves.
  - e. Steam piping shut-off valves shall be globe or gate valves. On low pressure applications, at the appliance or 2" or smaller, ball valves are acceptable, UNO.
  - f. Steam piping valves 2-1/2" and larger shall be gate valves.
- C. Ball Valves
  - a. Ball valves two inches and smaller shall have a forged bronze body with screwed pipe ends for steel pipe and sweat ends for copper pipe. Body shall be two-piece assembly full port. Hard chrome plated brass ball or stainless steel ball with full port flow, self-aligning and free floating between two Viton seats (300 psi) to provide positive seal in either direction. Stem shall be brass or stainless steel and extended 1 1/4" above the valve to clear insulation and to receive molded packing brass packing nut and handle nut. Handle shall be constructed of zinc plated steel with partial plastic coating. Valve shall be rated for 150 psig at 180°F.
- D. Check Valves
  - a. Unless a composition disc is specified, swing check valves two inches and smaller shall be bronze, regrinding, with seating angle 40 to 45 degrees. A stop plug is required as a renewable stop for the hanger, unless otherwise specified. Disc and hanger shall be separate parts, and the disc shall be free to rotate. Hanger pins shall be supported on both ends by removable side plugs.
  - b. Lift check valves two inches and smaller shall be bronze or forged steel, to suit the service.
  - c. Check valves 2 1/2 inches and larger shall be flanged, swing type, unless otherwise specified.
- E. Standard valves shall have 125 psi. working steam pressure or 200 psi. for water, oil and gas.
- F. Sweat joint valves shall be used on all copper pipe.
- G. Bronze valves with the basic saturated steam rating of 125 psi or 150 psi shall have pressure containing parts of a material having at least the physical properties of ASTM Specification B-62. Metallic seated bronze globe, angle, check and gate valves with a basic steam rating of 200 or 300 psi shall have pressure containing parts of material conforming to ASTM Specification B-61, for temperatures to 550°F.
- H. Stems of bronze and Iron Bodied Bronze Mounted valves shall be of ASTM-B-198 Class 13C (cast silicon brass), ASTM B-371, Alloy A (rolled silicon brass), or other material equally resistant to dezincification.
- I. All pressure casting shall be free of any impregnating materials.
- J. Each valve is to be given shell and seat tests by the manufacturer and will carry a permanently affixed indication that tests have been successfully completed.
- K. Insofar as possible, all valves of the same type shall be of the same manufacturer. Before purchasing any valve, contractor shall submit for approval the name of the manufacturer, the figure number which he proposes to furnish, and engineering data on each figure number, if not using those specified. The intent of this requirement is to obtain the most suitable valve for each service. Nonstandard valves will not be considered.

1.5 JOINTS
- A. Provide joints of type indicated in each piping system.
- B. Full and clean cut.
- C. Ream to the full inside diameter of the pipe with all burrs removed.
- D. Sweat joints in copper tubing - with 95-5 solder.
- E. Thread pipe in accordance with ANSI B2.1; cut threads full and clean using sharp dies. Ream threaded ends to remove burrs and restore full inside diameter. Apply pipe joint compound, or pipe joint tape (Teflon) where recommended by pipe/fitting manufacturer, on male threads at each joint and tighten joint to leave not more than 3 threads exposed.
- F. Braze copper tube-and-fitting joints where indicated, in accordance with ANSI B31.
- G. Solder copper tube-and-fitting joints where indicated, in accordance with recognized industry practice. Cut tube ends squarely, ream to full inside diameter, and clean outside of tube ends and inside of fittings. Apply solder flux to joint areas of both tubes and fittings. Insert tube full depth into fitting, and solder in manner which will draw solder full depth and circumference of joint. Wipe excess solder from joint before it hardens.
- H. Use insulating unions on HVAC and domestic water lines where steel and copper pipe are jointed.
- I. Use brass ferrules on plumbing systems where dissimilar metals are joined.

1.6 UNIONS
- A. Dielectric nipples shall be used in lieu of dieletric unions.
- B. Install wherever necessary for repair, replacement, or service of the equipment or system.

1.7 STRAINERS
- A. Provide basket or "Y" type strainers with iron bodies of same size as pipe line, removable screen inserts of not less than 22 gauge brass, perforated for a total net free area opening equal to four times the pipe area.
  - a. 2" and smaller Crane #988 1/2 - equivalent Walworth, Stockham, or Paget
  - b. 2 1/2" and larger Crane #989 1/2 - equivalent Walworth, Stockham, or Paget
- B. Use brass bodied strainers on copper pipe.

1.8 SLEEVES AND COVER PLATES
- A. Install for all pipes passing through floors, walls, or partitions. Size sleeves large enough to allow for free movement of the pipes with expansion.
- B. Sleeves for insulated pipe passing through walls or partitions: 24 gauge galvanized sheet metal with plaster bead set flush with the wall finish.
- C. Sleeves for uncovered pipe passing through walls or partitions: Galvanized steel pipe sleeves, extending outside of the wall finish as required to attach the cover plates.
- D. Provide chrome plated brass cover plates attached to the sleeves independent of the pipe on all pipes which pass through floors, walls, ceilings, and partitions in finished rooms. Beaton Corbin Co. Style 2-BC for copper tube and 13-BC for standard pipe.

1.11 THERMOMETERS
- A. Manufacturers: Ashcroft - Miljoco – Palmer Wahl – Tel-Tru – Trerice – Weiss - Winters
- B. Capacity: Full range of anticipated temperatures or as indicated on plans.
- C. Features: Industrial glass thermometer - full 9" scale opening - metal scale with etched, scribed, or inlaid lines and figures vividly contrasting with background material - red reading mercury tube - heavy rattle proof glass cover to make unit dust and moisture resistant - non-corrosive steel bulb chamber - threaded connection - swivel and lock nut.
- D. Accessories: Separable socket on all liquid or vapor sensing thermometers - union connection on all air sensing thermometers.

1.12 EQUIPMENT SUPPORTS
- A. Provide each piece of equipment or apparatus suspended from ceilings or mounted above floor level with suitable structural support, platform or carrier in accordance with best recognized practice. All such supporting or mounting means shall be furnished by respective contractor who shall arrange for their inclusion and attachment to building structure, unless otherwise indicated on plans or herein specified. Contractors shall exercise extreme care that structural members of building are not overloaded by such equipment. In all cases details of such hangers, platforms, and supports, together with total weights of mounted equipment shall be approved by Architect-Engineer.

1.16 ACCESS DOORS
- A. Where valves, traps, dampers, devices or equipment of any kind is subject to service and maintenance are installed in inaccessible concealed spaces, access doors shall be furnished by the Mechanical Contractor and installed by the General Contractor. Doors shall be 12" x 12" for handhole and 24" x 24" for manhole where required.
- B. Doors shall be:
  1. Milcor Style "K" in plastered wall or ceiling.
  2. Milcor Style "M" in masonry wall.
     - a. Doors in unfinished walls to have a rustproof prime coat finish.
     - b. Doors in tile finished walls shall be all stainless steel with satin finish.
  3. Milcor Style "DW" in drywall construction.
  4. Fire rated doors - Milcor style as described above for various types of construction except with U.L. 1 1/2 hr. "B" label.
- C. Equivalent doors as manufactured by Wade or Miami-Carey approved.

SECTION 200700 - INSULATION

1.1 PIPE COVERING
- A. Manufacturers: Johns Manville - Owens Corning - CertainTeed - Knauf.
- B. Features: All completed insulation of pipe and fittings shall have the following Underwriters Laboratories Fire Hazard Classification:
  1. Flame spread not to exceed - 25.
  2. Fuel contributed not to exceed - 50.
  3. Smoke developed not to exceed - 50.
- C. Four (4 lb.) density glass fiber insulation used for all pipe covering in this section shall have a maximum "K" factor of .23 at 75° F. mean temperature.
- D. Prepare all exposed insulated covering for painting. Apply insulation over clean dry surface. Butt all longitudinal joints tightly together. Insulate domestic hot and domestic cold water and condensate drains in their entirety. Rain leaders need not be insulated below grade.
- E. Hydronic Water Pipe
  - a. Insulate heating water supply and return piping through 1-1/2" with 1.5" thick glass fiber pipe insulation and 2" or larger with 2" thick insulation.
  - b. Insulate chilled water supply and return piping through 1-1/2" with 0.5" thick glass fiber pipe insulation and 2" or larger with 1" thick insulation.
- F. All pipe insulation to be covered with factory applied flame retardant vapor barrier jacket. Manville Micro-Lok 850 fiberglass AP-T Plus jacket or equal.
  - a. Interior concealed fittings and pipe hangers shall be insulated with flexible glass fiber to a thickness equal to the adjoining pipe insulation. Finish by spiral wrapping with white vinyl and apply a brush coat of vapor barrier mastic. Childers CP-30 or equal.
  - b. Interior exposed fittings shall be insulated with PVC fitting covers installed over flexible glass fiber inserts to a thickness equal to the adjoining pipe insulation. Manville Zeston or equal. Vapor seal all joints with Childers CP-30 or equal.

1.3 DUCT LINER (INTERNAL)
- A. Manufacturers: Johns Manville – Owens Corning - CertainTeed - Knauf.
- B. Internal Liner Thickness:
  1. Low velocity rectangular supply air ducts shall be 1" thick.
  2. Rectangular return air ducts shall be 1/2" thick.
  3. Ductwork routed in unconditioned building spaces shall have 1-1/2" thick liner.
- C. Liner shall be Type I per ASTM C 107 and have a NRC not less than 0.45 as tested per ASTM C423, with a minimum density of 2 pounds per Cu. ft. and a maximum "K" factor of 0.26 at 75°F mean temperature. The liner air stream surface coating shall contain an EPA registered, anti-microbial agent.
- D. Use mechanical fastening of Graham Welded pins, or Stick-Klips on maximum 16" centers at top sections when width exceeds 12" and on sides when height exceeds 24".
- E. Manufacturers shall print density and thickness on face of duct liner.
- F. Duct liner shall have an Underwriters Laboratories fire hazard rating with a flame spread not to exceed 25 and fuel contributed and smoke developed ratings not to exceed 50.
- G. DUCT SIZES ON DRAWINGS ARE FOR DIMENSIONS INSIDE OF LINING AND SHEET METAL SIZE SHALL BE INCREASED ACCORDINGLY.
- H. Adhesive and Application:
  - a. Adhere liner to interior sides of duct with minimum 50% coverage of fire retardant adhesive.
  - b. Apply a brush width of Foster's Fire Retardant Coating over all joints, visible cut edges, and leading edges of insulation to prevent fiber erosion.
  - c. Apply with coated side to air stream in cut to fit pieces fastened to interiors of duct with adhesive. Coat all exposed edges with adhesive.
  - d. Adhesives shall be approved and listed by Underwriters Laboratory and shall bear the U. L. Label.

1.4 DUCT WRAP INSULATION (EXTERNAL)
- A. Manufacturers: Johns Manville - CertainTeed - Owens Corning - Knauf.
- B. Insulate externally all concealed round ducts and rectangular outdoor air ducts with .75 pound minimum density fiberglass ductwrap with a Foil-scrim Kraft vapor barrier applied with outward-clinching staples. The insulation is to have a minimum installed R-value of 4.2 for 1-1/2" thick insulation and 5.6 for 2" thick insulation when compressed 25%.
- C. The duct insulation shall have Underwriters Laboratories flame spread rating not to exceed 25 - fuel contributed rating not to exceed 50 - smoke developed rating not to exceed 50.
- D. Insulation shall be continuous through partitions, coils, etc. Insulate fire damper sleeves to partitions.

1.5 DUCT INSULATION APPLICATION AND THICKNESS
- D. Duct Wrap Insulation Thickness:
  - a. Supply and Return duct located within conditioned building space shall be 1-1/2" thick.
  - b. Supply and Return duct located within unconditioned building space shall be 2" thick.

SECTION 230593 - AIR TEST AND BALANCE

1.1 SCOPE
- A. The Mechanical Contractor shall procure the services of Lawrence H Finn & Associates, Jedi Balancing or another independent firm, fully certified with the National Environmental Balancing Bureau (NEBB). The firm shall test air moving equipment and air distribution and exhaust systems and to supervise the balance and adjustment of these systems. All work shall be done under direct supervision of a qualified and licensed Heating and Ventilating Engineer. The mechanical contractor shall provide workmen of the proper trade to make adjustments to the systems as determined by the Engineer. The Contractor shall provide access as required, including any necessary scaffolding, and shall cooperate with testing laboratory personnel. All instruments used in this work shall be accurately calibrated and maintained in good working order. If requested the tests shall be conducted in the presence of the Mechanical Engineer responsible for the project and/or his representative. Air balance and testing shall not begin until the system has been completed and is in full working order. The Contractor shall put all heating, ventilating, and air conditioning systems and equipment into full operation 24 hours prior to the onset of testing and balancing and shall continue the operation of same during each working day until the completion of all test and balance work. The Contractor shall award the test and balance contract upon receipt of his contract to proceed with the air conditioning installation, to allow the Air Balance and Testing Engineer to schedule his work in cooperation with other trades involved and comply with completion date. Upon completion of the air conditioning system installation, the Air Balance and Testing Engineer shall perform the following tests, supervise adjustments and system modifications, and compile the test data as required for evaluation and approval.
- B. In addition to procuring the services of an air balancing engineer as hereinafter specified the mechanical contractor shall:
  1. Clean air filters, ductwork, coils, fans, etc. in the air system to remove all construction dust and debris.
  2. Start, lubricate and balance all fans. Change and/or adjust drive pulleys on fans to give required capacity.
  3. Supply and install all balancing dampers as required for final balancing as determined by the balancing engineer.
  4. Furnish workmen familiar with this project and of the proper trade to assist the balancing engineer in the air and water balancing. Also make available subject to request by the balancing engineer trained servicemen of the control and equipment suppliers to assist as needed during the testing of their portion of the project.
  5. Furnish plans, operating manuals, and shop drawings of all equipment installed for use by the Air and Water Balancing Agency.
  6. Have all systems in full operation a minimum of 24 hours before Balancing Engineer arrives on job.

1.2 AIR SYSTEM TEST AND BALANCE PROCEDURE
- A. Procedure:
  1. Bring all fans to design RPM.
  2. Bring air volume in each air handling system to the design air volume using pitot tube transverse method.
  3. Test and record fan motor data.
  4. Bring air diffusers and registers to design CFM.
  5. Make recommendations for system modifications and adjustments required to facilitate proper system balancing as determined by preceding test.
  6. Retest and readjust all system segments affected by system modifications.
- B. If any issues arise during the test and balance procedure that prevent it from being properly completed, bring issues to owner and engineer before submitting report to investigate.

1.3 HYDRONIC SYSTEM TEST AND BALANCE PROCEDURE
- A. Procedure:
  1. Adjust pumps to deliver total design GPM.
     - a. Measure total water flow and pump TDH.
  2. Adjust flow-measuring devices installed in mains and branches (if available) to design water flows.
  3. Adjust flow-measuring devices installed at terminals for each space to design water flows.
  4. Verify final system conditions.
  5. Verify that memory stops have been set and marked with permanent paint or marker.
- B. If any issues arise during the test and balance procedure that prevent it from being properly completed, bring issues to owner and engineer before submitting report to investigate.

1.4 DATA FILE
- A. Prepare complete data file on all equipment and devices tested indicating name plate data, design requirements and final operating conditions. Submit a PDF of the final balance report for review. Upon approval of the TAB Report, provide a copy of the revised TAB Report to the Mechanical Contractor for inclusion in the Operation and Maintenance manuals presented to the Owner.

1.5 INSTRUCTION
- A. At the completion of the balancing, review the operating and maintenance brochures as supplied by the Mechanical Contractor supplement these instructions as determined through balancing experience. Meet with owners personnel to review proper operating procedures.
- B. Warranty that the system is set in accordance with values as established by the plans and specifications.

SECTION 230800 - AIR DISTRIBUTION

1.1 DEFINITIONS
- Low Velocity Ductwork: Supply, return, make-up, and exhaust ductwork systems that are sized at 2,000 FPM or lower.
- Medium Velocity Ductwork: Supply ductwork systems sized at greater than 2,000 FPM to 3,000 FPM.
- Low Pressure Ductwork: Ductwork connected to fan systems with a 2" w.c. or less deadhead rating.
- Medium Pressure Ductwork: Ductwork connected to fan systems with greater than 2" w.c. and less than 6" w.c. deadhead rating.
- High Pressure Ductwork: Ductwork connected to fan systems with 6" w.c. or greater deadhead rating.

1.2 PERFORMANCE REQUIREMENTS
- A. Duct construction, including sheet metal thicknesses, seam and joint construction, reinforcements, and hangers and supports, shall comply with SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" and performance requirements and design criteria indicated in "Duct Schedule" Article.
- B. All work shall comply with the Mechanical Codes.
- C. Structural Performance: Duct hangers and supports[and seismic restraints] shall withstand the effects of gravity[and seismic] loads and stresses within limits and under conditions described in SMACNA's "HVAC Duct Construction Standards - Metal and Flexible" [and] [ASCE/SEI 7].
- D. Airstream Surfaces: Surfaces in contact with the airstream shall comply with requirements in ASHRAE 62.1.

1.3 SHEET METAL DUCT WORK CONSTRUCTION
- A. The work under this heading includes all sheet metal work as required to complete supply and exhaust systems including ducts, housings, ventilating hoods, exhaust hoods, louvers, dampers, grilles, diffusers, registers, access doors, access panels, etc.
- B. Duct material shall be galvanized steel unless noted otherwise on the drawings.
- C. Seal all ducts to Seal Class A per SMACNA's "HVAC Duct Construction Standards - Metal and Flexible"
- D. Make ductwork and installation in conformance with the applicable local Mechanical Code and Sheet Metal and Air Conditioning Contractors National Association, Inc. (SMACNA) HVAC Duct Construction Standards (Latest Edition) amended as follows:
  1. Seal all transverse joints, fittings, connections, and seams with Hardcast DT tape and FTA adhesive, Hardcast AFG-1402 "Foil-Grip" applied per manufacturers instructions, or brushed-on liquid based joint and seam sealant.
  2. Make all branch connections with 45° entry clinch collar.
  3. Round branch duct take-offs shall be high efficiency takeoffs (HETO), made with 45° entry clinched collar and rectangular to round transition. If damper is provided with HETO, it shall meet the requirements of the manual balance damper section below.
- E. Use square type elbows with turning vanes for changes in direction and fittings for branch ducts. Radius elbows may also be used for duct changes in direction, refer to drawings.
- F. Offset ducts to clear pipes and obstructions.
- G. Patch all duct holes air tight after installation.
- H. All round ductwork shall be a minimum of 26 gauge sheet metal or heavier as required by SMACNA and the Mechanical Code.
- J. Duct Cleaning: Clean new and existing duct system(s) before testing, adjusting, and balancing.

1.4 FLEXIBLE CONNECTIONS
- A. Duct connections to fans and where noted elsewhere on plans, shall be sound and vibration isolation flexible connections made with fire resistant, water proof heavy glass fabric with double coating of neoprene as manufactured by Ventfabrics, Inc., Ductmate Industries, Inc., Duro Dyne, Inc., or Ward Industries, Inc. Connections shall be not less than 4" long, shall have suitable metal collar frame at each end and shall be made with at least one-inch slack in material to prevent transmission of vibration.

SECTION 230923 - TEMPERATURE CONTROL SYSTEMS

1.1 CONTROLS SUMMARY
- A. Refer to detail on sheet M-3.01 for air terminal unit controls. No exceptions taken.

SECTION 232113 – HYDRONIC PIPING

1.1 HEATING WATER AND CHILLED WATER
- A. Install steel pipe with threaded joints and fittings for 2 inch and smaller, and with welded joints for 2-1/2 inch and larger.
- B. At Contractors option in lieu of black steel, install Type L, drawn copper tubing with wrought copper fittings and solder joints for 2 inch and smaller, above ground, within building.

1.2 HYDRONIC PIPE INSTALLATION
- A. Conceal all pipe installations in walls, pipe chases, utility spaces, above ceilings, below grade or floors, unless indicated to be exposed to view.
- B. Install drains at low points in mains, risers, and branch lines consisting of a tee fitting, 3/4" ball valve, and short 3/4" threaded nipple and cap.
- C. Install piping at a uniform grade of 1 inch in 40 feet upward in the direction of flow.
- D. Install unions in pipes 2 inch and smaller, adjacent to each valve, at final connections to each piece of equipment, and elsewhere as indicated. Unions are not required on flanged devices.
- E. Install nipples or flanges to join dissimilar metals, including copper coil connections with steel pipe.
- F. Install strainers on the supply side of each control valve, pressure reducing valve, pressure regulating valve, solenoid valve, inline pump, and elsewhere as indicated.
- G. Install drain valves at low points in mains, risers, branch lines, and elsewhere as required for system drainage.
- H. Install manual air vents at high points in the system, at heat transfer coils, and elsewhere as required for system air venting.

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COLORADO LICENSED
KARL M LYONS
55850
11/18/2021
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

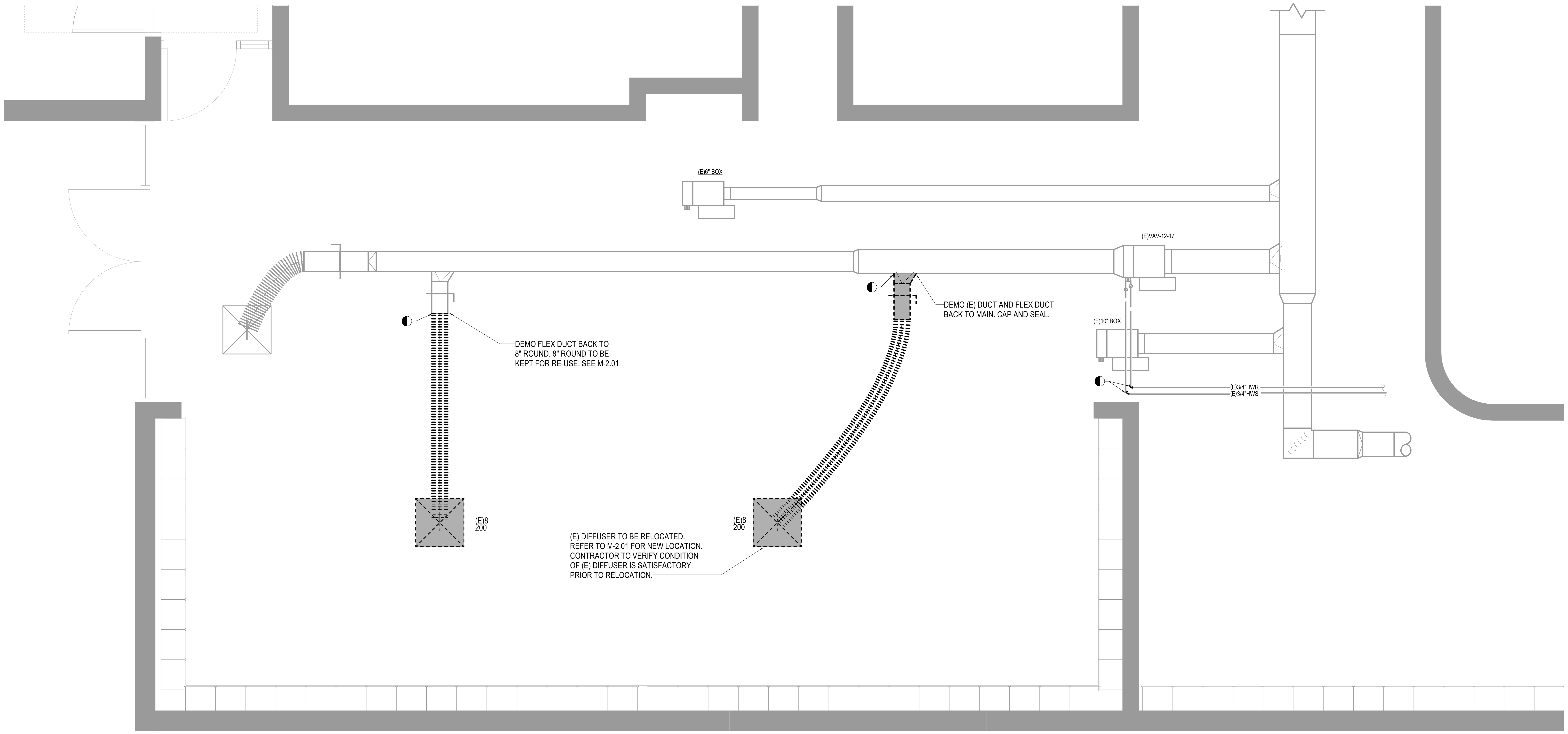
MECHANICAL SPECIFICATIONS

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY SJP
CHECKED BY JDB

M-0.02

HVAC DEMO NOTES

1. PLANS ARE SCHEMATIC IN NATURE. LAYOUT IS BASED ON BEST AVAILABLE INFORMATION. CONTRACTOR SHALL FIELD VERIFY EXISTING CONDITIONS AND DIMENSIONS. BRING ANY DISCREPANCIES FROM THE DRAWINGS AND NOTES TO THE OWNER'S REPRESENTATIVE IMMEDIATELY. MINOR CHANGES IN THE SCOPE OF THE DEMOLITION WORK SHALL NOT JUSTIFY AN ADDITIONAL COST.
2. DEMOLISH ALL DUCTWORK, PIPING, AND EQUIPMENT SHOWN SHADED, DASHED AND IN A DARK LINE WEIGHT.



1 MECHANICAL DEMOLITION PLAN - FIRST FLOOR

0' 1' 2' 3' **1/2" = 1'-0"**

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970-232-9558 www.pec1.com

COLORADO LICENSED KARL M LYONS 55850 11/18/2021 PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

MECHANICAL DEMO PLAN

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY SJP
CHECKED BY JDB

M-1.01

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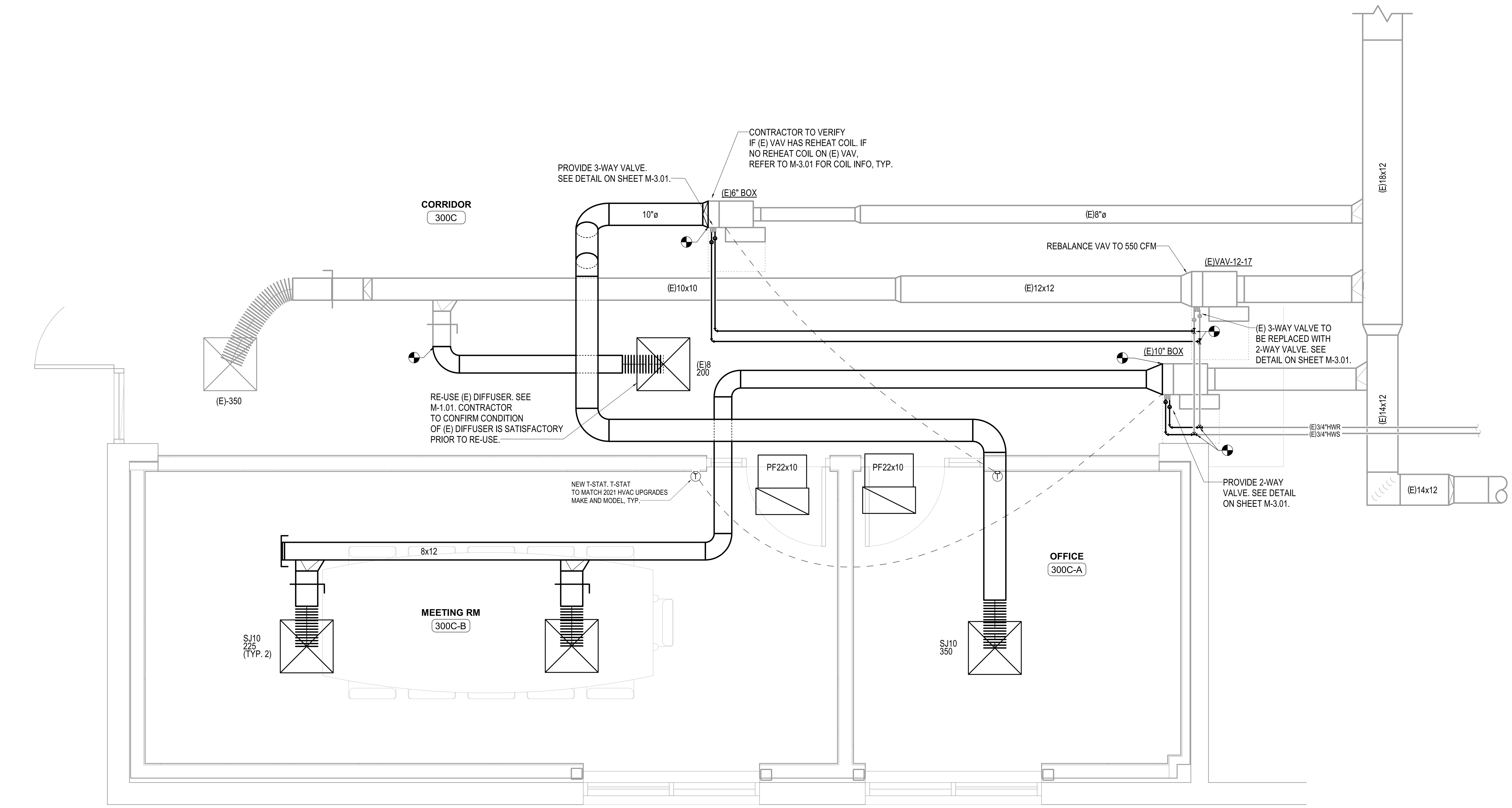
HVAC GENERAL NOTES

1. DUCT SIZES SHOWN ARE ACTUAL INSIDE CLEAR DIMENSIONS. INSULATION THICKNESS HAS NOT BEEN ACCOUNTED FOR. DUCTWORK EXPOSED TO SPACE SHALL NOT HAVE EXTERIOR INSULATION.
2. THE SPACE ABOVE THE CEILING IS BEING UTILIZED AS A RETURN AIR PLENUM. ALL RETURN GRILLES SHALL BE PROVIDED WITH SOUND BOOTS AND A DIRECT PATH TO THE AIR HANDLING SYSTEM RETURN AIR DUCT SHALL BE PROVIDED. WHERE FULL HEIGHT WALLS ARE BEING USED AND THE RETURN AIR PATH IS COMPROMISED, THE SOUND BOOT SHALL EXTEND THROUGH THE WALL OR TRANSFER DUCTS SHALL BE PROVIDED.
3. T-STATS SHALL BE LOCATED NEXT TO LIGHT SWITCH WITHIN THE ROOM SHOWN. COORDINATE WITH GC AND ELECTRICAL CONTRACTOR TO MATCH HEIGHT AND LOCATION.
4. AVOID ROUTING DUCTWORK OVER ELECTRICAL ROOMS AND ELECTRICAL PANELS. MAINTAIN N.E.C. CLEARANCES. COORDINATE ROUTING WITH ELECTRICAL CONTRACTOR.
5. ALL SUPPLY AIR BRANCHES FOR SUPPLY DIFFUSERS TO HAVE MANUAL BALANCE DAMPERS, NOT ALL SHOWN FOR CLARITY. WHERE HARD LID CEILINGS PREVENT BALANCE DAMPER ACCESS, CONFIRM WITH GRD SCHEDULE OR ENGINEER TO USE OBD'S OR REMOTE BALANCE DAMPERS.
6. ALL DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITHIN THE CEILING SPACE. UTILIZE JOIST SPACE WHERE POSSIBLE, ESPECIALLY WHEN CROSSING OTHER DUCT, PIPE AND ELECTRICAL.
7. PROVIDE FLEXIBLE DUCT AND PIPE CONNECTIONS TO ALL MOTORIZED EQUIPMENT.
8. REFER TO GRD SCHEDULE FOR DUCT CONNECTION SIZES.
9. CEILING COORDINATION OF ALL MEP SYSTEMS (LIGHTING, DUCTWORK, DIFFUSERS, ELECTRICAL, ETC.) MUST BE COMPLETED BY THE CONTRACTOR PRIOR TO THE START OF ANY NEW INSTALLATION.



1 **MECHANICAL PLAN - FIRST FLOOR**

0' 1' 2' 3'

1/2" = 1'-0"

PEC
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COLORADO LICENSED KARL M LYONS 55850 11/18/2021 PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

MECHANICAL FLOOR PLAN

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY SJP
CHECKED BY JDB

M-2.01

TERMINAL UNIT SCHEDULE

REMARKS:
1. BELOW INFORMATION IS TO BE USED ONLY FOR HYDRONIC BALANCING PURPOSES.
2. TERMINAL UNIT SHALL BE PROVIDED WITH T-STAT. T-STAT SHALL MATCH (E).
3. TCC TO CONFIRM IF EXISTING UNIT HAS POWER. IF NOT, TTC SHALL PROVIDE AND INSTALL LOW VOLTAGE WIRING BACK TO CENTRAL TRANSFORMER PROVIDED BY TCC AND INSTALLED BY EC. MAXIMUM OF 35 TERMINAL UNITS PER TRANSFORMER.

MARK	INLET SIZE	PRIMARY AIR CFM		HOT WATER COIL											REMARKS
		MIN	MAX	CFM	MBH	EAT	LAT	APD	GPM	EWT	LWT	WPD	ROWS	S & R RUNOUT	
(E)6" BOX	6"	105	350	150	2.8	55	95	0.08	0.3	200	159.3	0.06	1	3/4"	1,2,3
(E)10" BOX	10"	165	550	350	7	55	95	0.1	0.3	200	140.2	0.08	1	3/4"	1,2,3
(E)VAV-12-17	12"	165	550	165	2.3	55	95	0.1	0.3	200	151.8	0.08	1	3/4"	1

GRILLE, REGISTER, AND DIFFUSER SCHEDULE

MARK IN SCHEDULE — RW12x12-500 — CFM
CONNECTION SIZE (12x12)(RECTANGULAR) — ALT. → RW12x12 500
CALLOUT SYMBOL - RECTANGULAR NECK

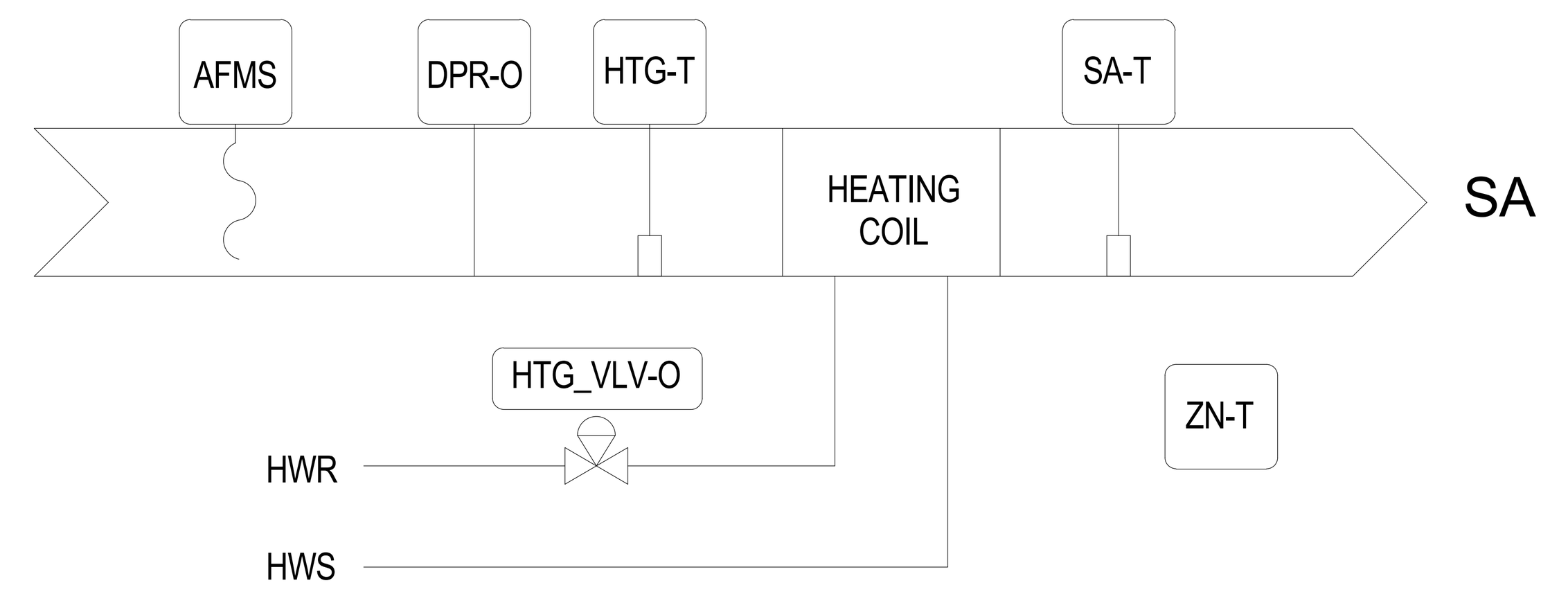
MARK IN SCHEDULE — SB10-250 — CFM
CONNECTION AND RUNOUT SIZE (10"ø) (ROUND) — ALT. → SB10 250
CALLOUT SYMBOL - ROUND NECK

MARK IN SCHEDULE (LS=SUPPLY, LR=RETURN) — LSL8-2s-200 — NUMBER OF SLOTS — CFM
CONNECTION AND RUNOUT SIZE (10"ø) (ROUND) — ALT. → LSL8-1s 250
CALLOUT SYMBOL - SLOT

FIRST LETTER IN MARK:
S = SUPPLY DIFFUSER
R = RETURN GRILLE
P = PLENUM RETURN GRILLE
E = EXHAUST GRILLE
L = SLOT DIFFUSER
M = LAMINAR FLOW SUPPLY DIFFUSER
C = SECURITY GRILLE
U = FLOOR MOUNTED SUPPLY GRILLE

NOTES:
1. PROVIDE SQUARE TO ROUND ADAPTERS AS REQUIRED TO ACCOMODATE ROUND RUNOUTS.
2. PROVIDE ALL LAY-IN GRDs WITH 24x24 LAY-IN PANEL AS REQUIRED.
3. FINISH TO BE WHITE UNLESS OTHERWISE SPECIFIED. COORDINATE AND VERIFY ALL FINISHES WITH ARCHITECT.
4. ALL SELECTIONS ARE BASED ON A MAXIMUM NC OF 25 UNLESS NOTED OTHERWISE.
5. CONTRACTOR SHALL VERIFY ALL CEILING TYPES AND ASSOCIATED BORDER TYPES.
6. MARKS USED MAY NOT BE IN SEQUENCE.
7. LOUVERED GRILLES TO HAVE FRONT BLADES PARALLEL TO LONG DIMENSION UNLESS WALL MOUNTED.
8. WALL MOUNTED LOUVERED GRILLES TO HAVE FRONT BLADES PARALLEL TO FLOOR.

MARK	TYPE	BASED ON		MOUNT	PANEL SIZE (FACE SIZE)	MATERIAL	BLADE SPACING / SLOT WIDTH	DEFLECTION	COLOR	REMARKS
		MFR	MODEL							
SJ	SUPPLY DIFFUSER	KRUEGER	PLQ	LAY-IN	24x24	ALUMINUM	--	--	PER ARCH	--
PF	RETURN GRILLE (PLENUM RETURN)	KRUEGER	6790	LAY-IN	24x12 (22x10)	ALUMINUM	--	--	PER ARCH	REFER TO SOUND TRAP DETAIL



VAV WITH REHEAT POINTS LIST

ANALOG

POINT ABBREVIATION	SYSTEM POINT DESCRIPTION	GRAPHIC SCREEN	ANIMATED POINT ON GRAPHIC	ADJUSTABLE POINT VIA GRAPHIC	INPUT: TEMPERATURE	PRESSURE	RELATIVE HUMIDITY	GPM	PERCENT	CFM	PPM	KW	KWH	BTU HR	OUTPUT: DDC (4-20 ma, 0-10 vdc)
SA-T	SUPPLY AIR TEMPERATURE	X			X										
HTG-T	PREHEAT TEMPERATURE	X			X										
HTG_VLV-O	HEATING OUTPUT	X													X
DPR-O	DAMPER PERCENT OPEN	X													X
AFMS	AIRFLOW MEASURING	X								X					
Z-T	ZONE TEMERATURE	X			X										

BINARY

POINT ABBREVIATION	INPUT: STATUS	STATUS ON/OFF	FILTER STATUS	STATUS OPEN/CLSD.	TIMED OVERRIDE	OUTPUT: STOP/START	OPEN/CLOSED	LOCK OUT	ENABLE/DISABLE	HIGH/LOW SPEED	FLOATING CONTROL
SA-T											
HTG-T											
HTG_VLV-O											
DPR-O											
AFMS											
Z-T		X									

SYSTEM FEATURE

POINT ABBREVIATION	ALARMS: HIGH OR LOW VALUE	OUT OF RANGE	STATUS DIFF. FROM CMD	FREEZE STAT TRIP	SMOKE DETECTOR TRIP	FILTER CHANGE DUE	HIGH STATIC SHUTDOWN	PROGRAMS: TREND VALUE	TREND STATUS	LEAD/LAG	ROTATIONALLY SEQUENCE
SA-T	X							X			
HTG-T								X			
HTG_VLV-O								X			
DPR-O								X			
AFMS								X			
Z-T		X						X			

GENERAL NOTES:

SEQUENCE OF OPERATIONS:

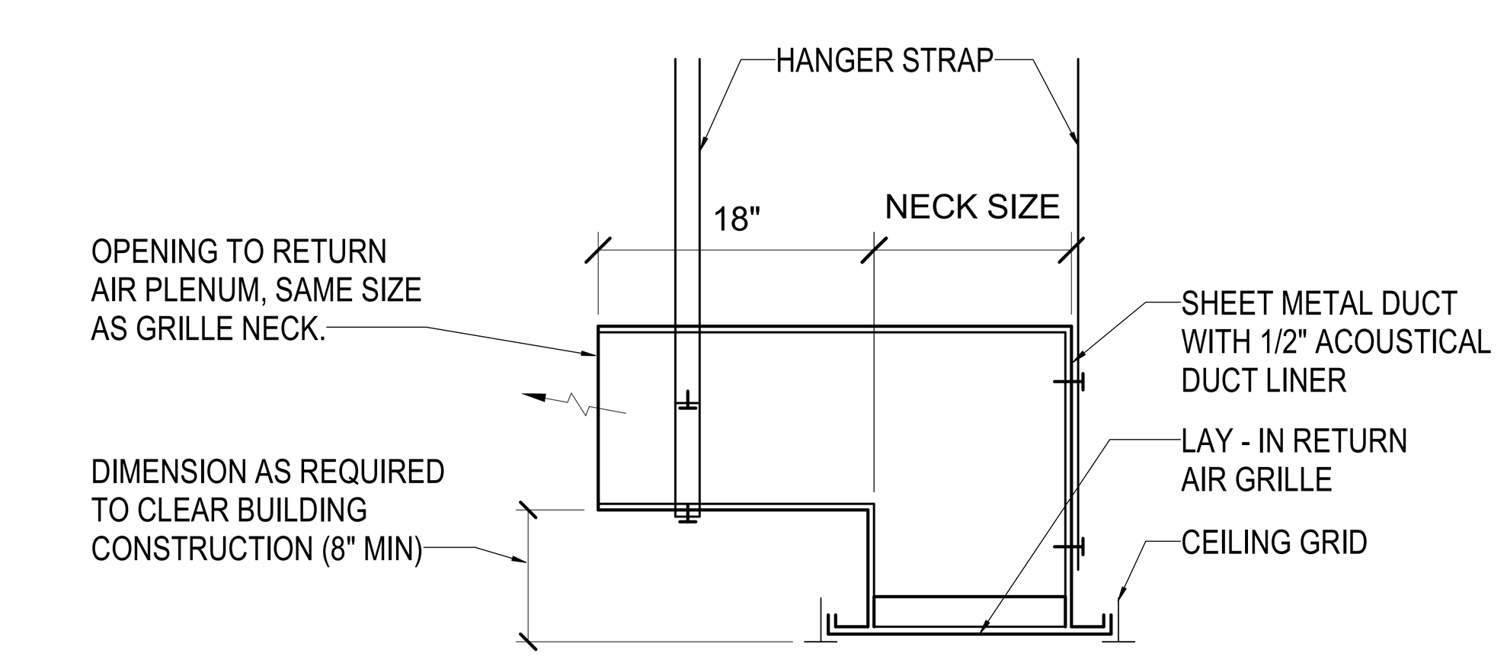
THE VAV BOX OPERATES BASED UPON AN OCCUPANCY SCHEDULE SET UP ON AT THE DDC WORKSTATION. IN ADDITION TO THIS, THE VAV BOX HAS A COMBINATION WALL-MOUNTED TEMPERATURE/OCCUPANCY SENSOR. THE OCCUPANCY SENSOR ALLOWS FOR TEMPORARY SETBACK DURING NORMAL OCCUPIED HOURS.

OCCUPIED MODE:
THE DDC MODULATES THE PRIMARY AIR DAMPER FROM THE MINIMUM CFM SETTING TO THE MAXIMUM COOLING CFM SETTING TO MAINTAIN THE ZONE TEMPERATURE (SVUE) AT THE OCCUPIED COOLING SET POINT (ADJ.). IF THE ZONE TEMPERATURE FALLS BELOW THE OCCUPIED HEATING SET POINT (ADJ.) THE DDC MODULATES THE PRIMARY AIR DAMPER TO THE MINIMUM HEATING CFM SETTING AND MODULATES THE HEATING COIL CONTROL VALVE (TBV#-#) TO MAINTAIN THE SET POINT.

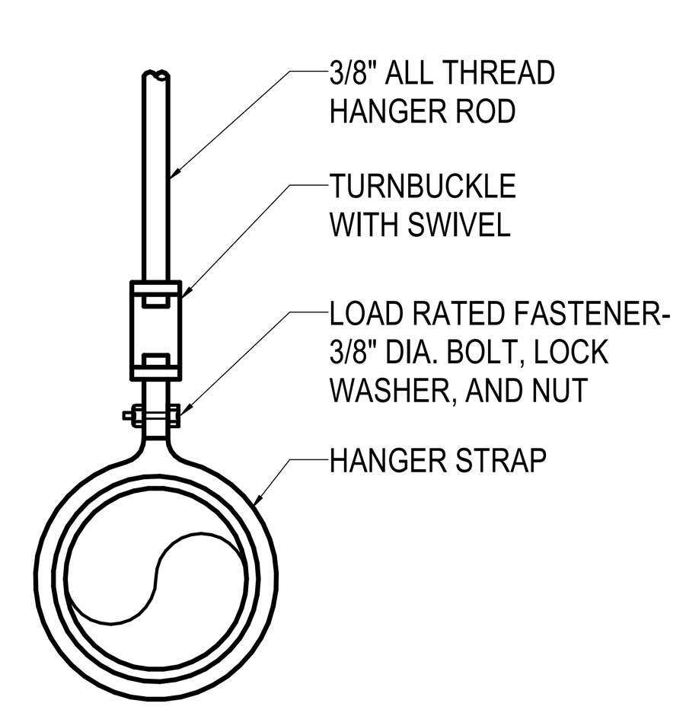
UNOCCUPIED MODE:
IF A MAJORITY OF THE ZONES ARE BELOW THE UNOCCUPIED HEATING SET POINT, THE DDC ENABLES THE ASSOCIATED AHU IN THE UNOCCUPIED MODE (SEE AHU SEQUENCE). ONCE A MAJORITY OF THE ZONES REACH THE UNOCCUPIED SET POINT THE AHU IS DISABLED.
THE CONTROLLER'S ACTION IS REVERSED AND THE PRIMARY AIR DAMPER IS MODULATED FROM THE MAXIMUM HEATING CFM SET POINT TO THE MINIMUM HEATING CFM SET POINT TO MAINTAIN THE ZONE TEMPERATURE AT THE OCCUPIED HEATING SET POINT (ADJ.).

MORNING WARM-UP:
IF A MAJORITY OF THE ZONES ARE BELOW THE OCCUPIED HEATING SET POINT, THE DDC ENABLES THE ASSOCIATED AHU IN THE MORNING WARM-UP MODE (SEE AHU SEQUENCE). ONCE THE MAJORITY OF THE ZONES REACH THE OCCUPIED HEATING SET POINT, THE UNIT ENTERS THE OCCUPIED MODE. THE CONTROLLER'S ACTION IS REVERSED AND THE PRIMARY AIR DAMPER IS MODULATED FROM THE MAXIMUM HEATING CFM SET POINT TO THE MINIMUM HEATING CFM SET POINT TO MAINTAIN THE ZONE TEMPERATURE AT THE OCCUPIED HEATING SET POINT (ADJ.).

6 TERMINAL UNIT WITH REHEAT COIL
NO SCALE



1 RETURN GRILLE SOUND TRAP DETAIL
NO SCALE

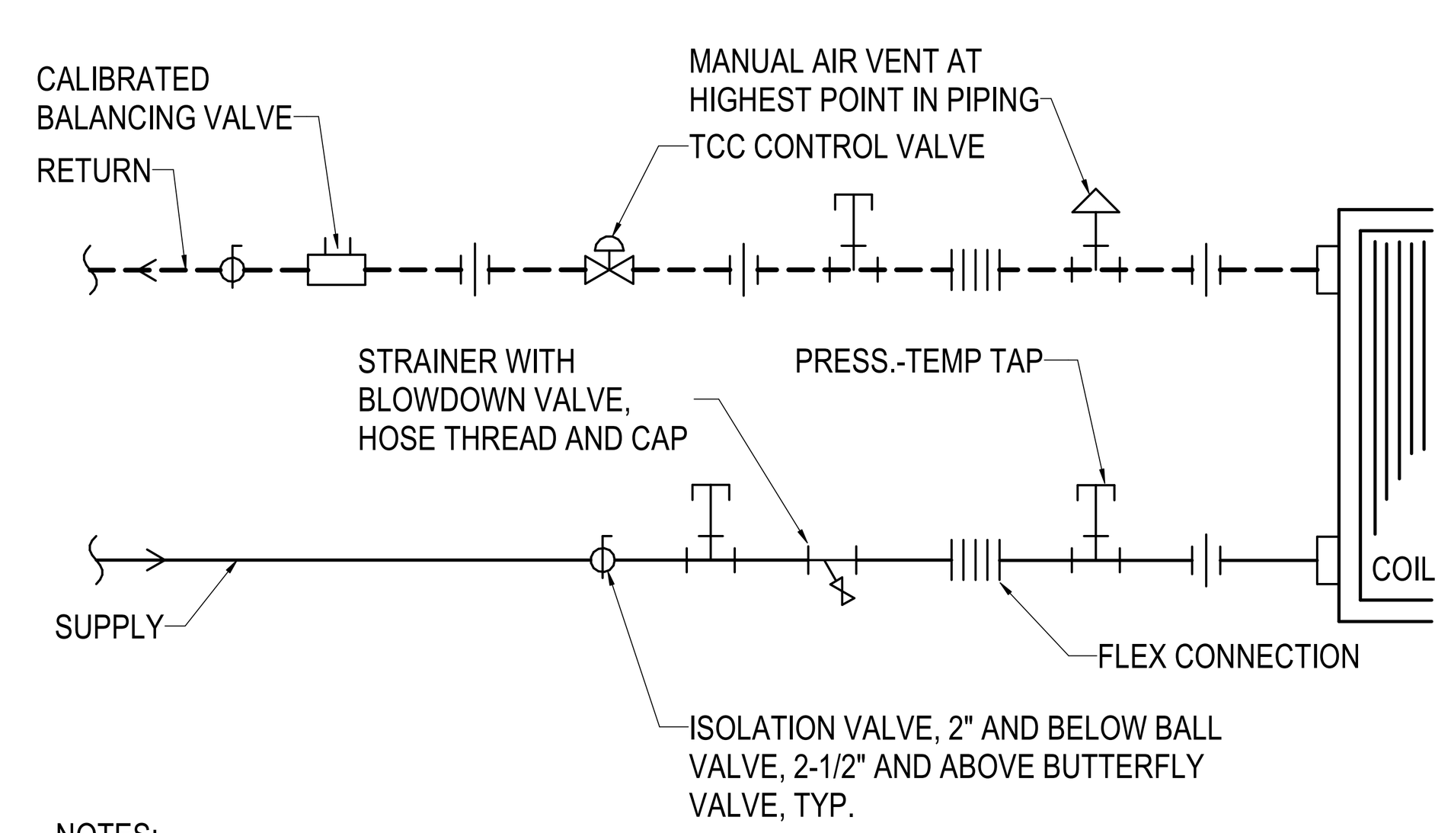


HANGER STRAP			
MAX. DUCT DIA.	DUCT	MAX. LOAD LBS.	MAX.* SPACING FT.
26"	ONE 1"x 22 GA. STRAP	260	10
36"	ONE 1"x 18 GA. STRAP	420	10
50"	ONE 1"x 16 GA. STRAP	700	10

* PROVIDE CLOSER SPACING WHERE NOTED OTHERWISE ON PLAN

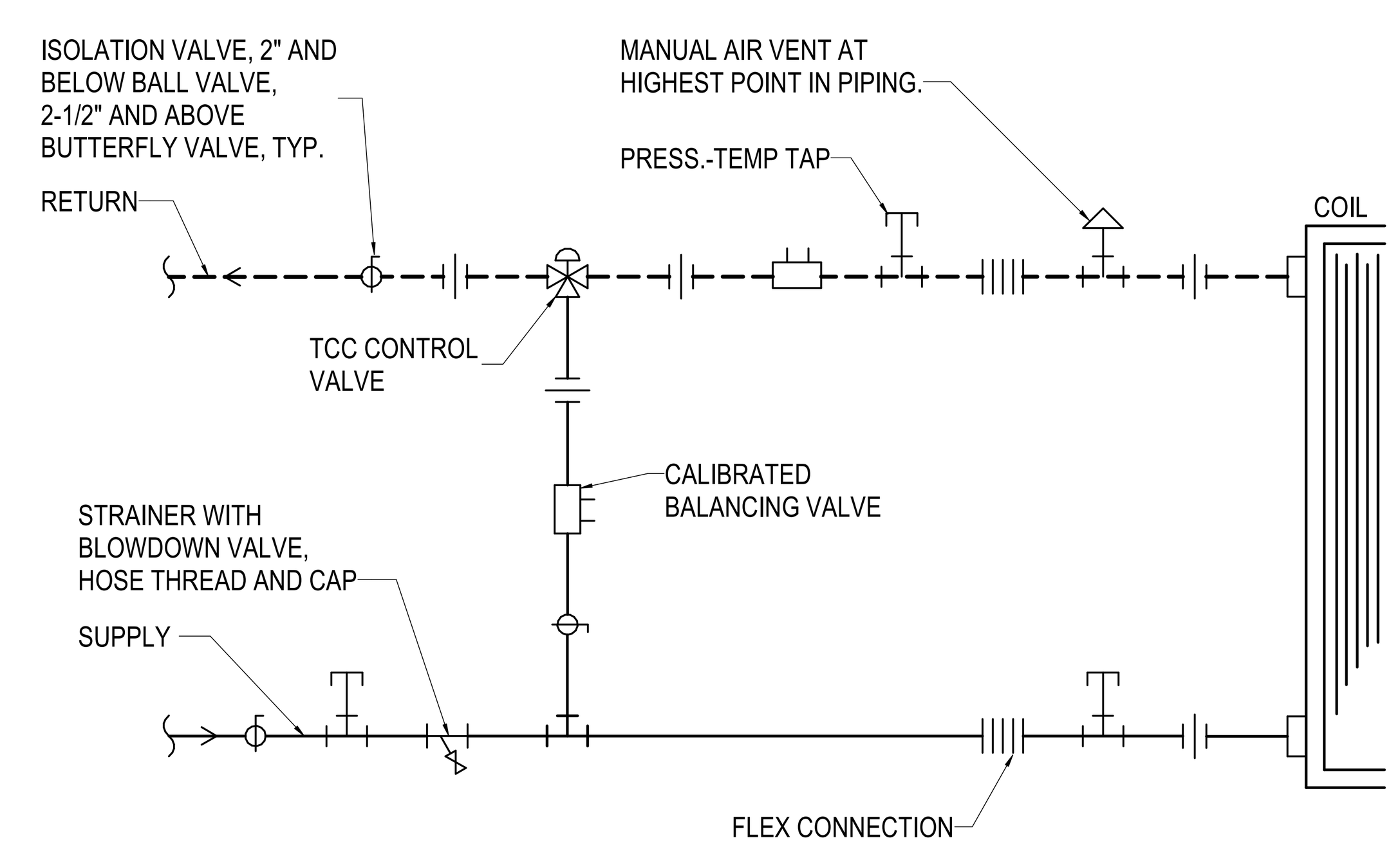
NOTES:
TABULATED DATA FROM SMACNA ALLOWS FOR DUCT REINFORCING AND INSULATION, BUT NO EXTERNAL LOAD.

2 DUCT HANGER DETAIL - ROUND
NO SCALE



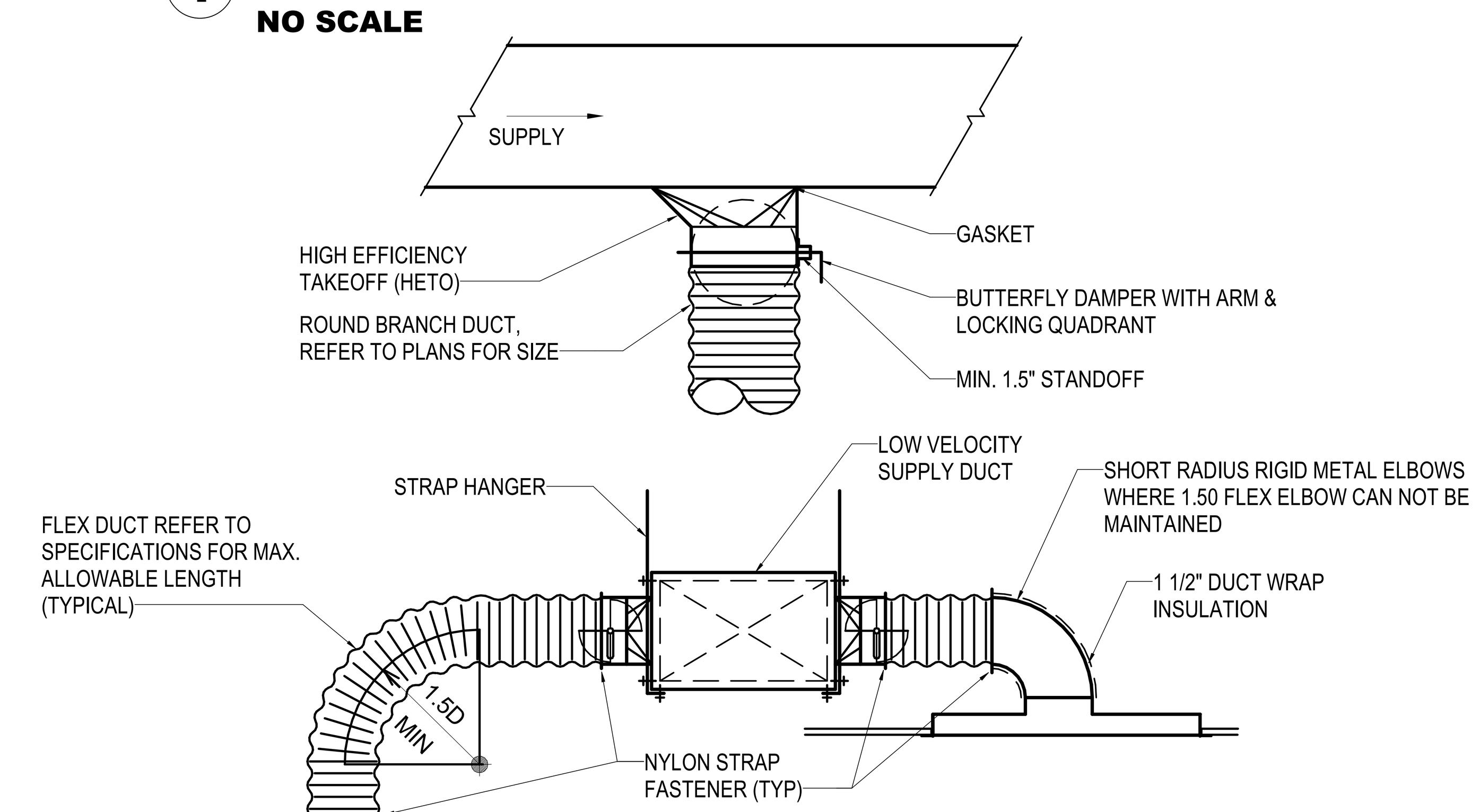
NOTES:
1. FLEXIBLE PIPE CONNECTOR REQUIRED FOR EQUIPMENT CONTAINING FANS OR COMPRESSORS, BUT NOT REQUIRED FOR EQUIPMENT SUCH AS DUCT COILS. BRAIDED STAINLESS OR COPPER ONLY, NO RUBBER ALLOWED. MAX LENGTH OF 6 INCHES.
2. PIPE ALL MULTI-ROW COILS FOR COUNTERFLOW (WATER ENTERS MOST DOWNSTREAM COIL, LEAVES MOST UPSTREAM COIL).
3. REFER TO CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
4. 2-WAY VALVE NORMALLY OPEN FOR HEATING AND NORMALLY CLOSED FOR COOLING.
5. CONFIRM SUPPLY AND RETURN CONNECTION LOCATIONS WITH EQUIPMENT MANUFACTURER PRIOR TO INSTALLATION.
6. MEET MANUFACTURER'S REQUIREMENTS FOR ACTUATOR CLEARANCES AND STEM ORIENTATION.
7. COORDINATE PIPING LOCATION WITH EQUIPMENT ACCESS DOORS, ELECTRICAL JUNCTION BOXES AND DRAIN PIPING.

4 COIL PIPING DETAIL - TERMINAL UNIT-2-WAY
NO SCALE



NOTES:
1. COIL PIPING AND CONTROL VALVE TYPE FOR DIVERTING FLOW.
2. FLEXIBLE PIPE CONNECTOR REQ'D FOR EQUIPMENT CONTAINING FANS OR COMPRESSORS, BUT NOT REQ'D FOR EQUIPMENT SUCH AS DUCT COILS. BRAIDED STAINLESS OR COPPER ONLY, NO RUBBER ALLOWED. MAX LENGTH OF 6 INCHES.
3. PIPE ALL MULTI-ROW COILS FOR COUNTERFLOW (WATER ENTERS MOST DOWNSTREAM COIL, LEAVES MOST UPSTREAM COIL).
4. REFER TO CONTROLS DRAWINGS FOR ADDITIONAL INFORMATION.
5. 2-WAY VALVE NORMALLY OPEN FOR HEATING AND NORMALLY CLOSED FOR COOLING.
6. CONFIRM SUPPLY AND RETURN CONNECTION LOCATIONS WITH EQUIPMENT MANUFACTURER'S LITERATURE PRIOR TO INSTALLATION.
7. MEET MANUFACTURERS REQUIREMENTS FOR ACTUATOR CLEARANCES AND STEM ORIENTATION.
8. COORDINATE PIPING LOCATION WITH EQUIPMENT ACCESS DOORS, ELECTRICAL JUNCTION BOXES AND DRAIN PIPING.

5 TERMINAL UNIT COIL PIPING - 3-WAY
NO SCALE



3 DIFFUSER INSTALLATION DETAIL
NO SCALE

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COLORADO LICENSED
KARL M LYONS
55850
11/18/2021
PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE, FORT COLLINS, CO 80521

MECHANICAL DETAILS & SCHEDULES

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY SJP
CHECKED BY JDB
M-3.01

GENERAL NOTES

1. ALL ELECTRICAL WORK SHALL COMPLY WITH THE LATEST EDITION OF THE NATIONAL ELECTRICAL CODE (NEC) & THE AMERICANS WITH DISABILITIES ACT (ADA).
2. REFER TO RELATED ARCHITECTURAL, MECHANICAL, STRUCTURAL, AND CIVIL DRAWINGS FOR RELATED INFORMATION.
3. REFER TO THE SPECIFICATIONS FOR DATA NOT ON THE DRAWINGS.
4. E.C. SHALL REFER TO MECHANICAL DRAWINGS AND SPECIFICATIONS FOR THE REQUIREMENTS ASSOCIATED WITH WIRING AND CONNECTION OF INTERLOCKING AND CONTROLS OF MECHANICAL UNITS AND THERMOSTAT LOCATIONS.
5. COORDINATE OUTLET BOX LOCATIONS WITH MASONRY TO MINIMIZE CUTTING OF BRICK OR BLOCK.
6. ALL MOUNTING HEIGHTS TO CENTERLINE OF ITEM UNLESS OTHERWISE NOTED. VERIFY ALL OUTLET LOCATIONS ON THE JOB PRIOR TO ROUGH-IN.
7. CONDUIT RUN W/CONDUCTORS AS INDICATED & GROUND WIRE SIZED PER N.E.C. 250.122. CONDUIT SIZE AS REQUIRED.
8. WHEN INCREASED CONDUCTOR SIZES ARE SHOWN ON THE PLANS, THE LARGER CONDUCTOR SIZE SHALL BE USED THROUGHOUT THE LENGTH OF THE CIRCUIT, INCLUDING NEUTRAL AND GROUND.
9. "CT" INDICATED ADJACENT TO DEVICE INDICATES DEVICE MOUNTED ABOVE BACKSPLASH OF COUNTER TOP. VERIFY EXACT HEIGHT WITH ARCHITECTURAL PLANS AND ELEVATIONS.
10. BRANCH CIRCUITS ARE INDICATED AS ONE CIRCUIT HOME RUNS WITH INDIVIDUAL NEUTRALS. A MAXIMUM OF THREE CIRCUITS (MAXIMUM OF THREE PHASE CONDUCTORS) MAY BE GROUPED IN A SINGLE CONDUIT. WHERE MULTIPLE CIRCUITS ARE LOCATED IN THE SAME RACEWAY, JUNCTION BOX OR ENCLOSURE, NEUTRALS SHALL BE MARKED OR LABELED TO INDICATE WHICH CIRCUIT THEY ARE ASSOCIATED WITH. SEE SPECIFICATION SECTION "LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES" FOR ADDITIONAL INFORMATION.
11. JUNCTION BOX OR RECEPTACLE FOR DRINKING FOUNTAINS SHALL BE LOCATED BEHIND THE EQUIPMENT SKIRT UNLESS OTHERWISE NOTED. COORDINATE CONNECTION TYPE AND LOCATION WITH EQUIPMENT PROVIDED.
12. LABEL THE FRONT OF EACH RECEPTACLE COVERPLATE WITH PANEL DESIGNATION AND CIRCUIT NUMBER USING CLEAR THERMAL TRANSFER (ELECTRONIC DYMO) LABELS WITH 1/8" HIGH BLACK LETTERS (OR CONTRASTING COLOR IF COVERPLATES ARE BLACK OR BROWN). LABELS SHALL BE SUITABLE FOR INDOOR/OUTDOOR USE. LABEL THE BACK OF EACH LIGHT SWITCH COVERPLATE WITH PANEL DESIGNATION AND CIRCUIT NUMBER USING A FINE BLACK PERMANENT MARKER.
13. PROVIDE 18" LONG (MIN.) CONDUIT SLEEVES THRU ALL WALLS WHERE CABLES ARE INDICATED OR REQUIRED TO PASS THRU WALLS. PROVIDE BUSHINGS ON BOTH ENDS. SIZE CONDUIT FOR CABLES INSTALLED. AT CABLE TRAYS, PROVIDE ONE 4" CONDUIT SLEEVE FOR EACH 4" WIDTH OF CABLE TRAY. MAXIMUMS SHALL BE:
    1"C. = 10 CABLES
    2 1/2"C. = 20 CABLES
    3"C. = 30 CABLES
    4"C. = 50 CABLES
14. LOCATE CABLE TRAYS 6" ABOVE CEILING. OFFSET TRAY UP AND OVER LIGHT FIXTURES AND DUCTWORK (FIELD VERIFY AND PROVIDE AS REQUIRED). IF PHYSICALLY IMPOSSIBLE TO RUN CABLE TRAY UP AND OVER, THEN PROVIDE CABLE SUPPORT HOOKS FROM STRUCTURE ABOVE, SIZED AND RATED FOR INSTALLED CABLES PLUS 25% SPARE.
15. PROVIDE DIMMER PER THE SPECIFICATIONS. COORDINATE DIMMER TYPE AND WIRING WITH ASSOCIATED LIGHT FIXTURE DIMMING REQUIREMENTS (I.E. 3-WIRE, O-10V, ELECTRONIC OR MAGNETIC LOW VOLTAGE, ETC.) OR WITH LIGHTING CONTROL SYSTEM PROPRIETARY REQUIREMENTS (I.E. LUTRON, nLIGHT, DALI, ETC.) AS NECESSARY. 3-WIRE DIMMERS SHALL BE PROVIDED WITH A DEDICATED NEUTRAL FOR EACH CONTROL ZONE. 0-10V DIMMERS SHALL BE PROVIDED WITH DIM/ON/OFF CONTROL. COORDINATE PHASE CONTROL OF LED DRIVERS (I.E. REVERSE PHASE, FORWARD PHASE, ETC.) WITH LIGHT FIXTURE MANUFACTURER'S RECOMMENDATIONS. LOW VOLTAGE CONTROL WIRING IS NOT SHOWN ON PLANS FOR CLARITY, BUT SHALL BE PROVIDED AS REQUIRED.

COMMUNICATION / DATA

T1. EACH DATA, TELEPHONE, VIDEO, OR OTHER SYSTEMS OUTLET REQUIRES 1"C. WITH PULL ROPE STUBBED 6" ABOVE NEAREST ACCESSIBLE CEILING UNLESS OTHERWISE NOTED ON PLANS. CONDUITS STUBBED UP ABOVE CEILINGS SHALL BE TURNED OUT 90 DEGREES. PROVIDE INSULATED BUSHINGS ON ALL CONDUITS. LABEL CONDUIT TO IDENTIFY ITS INTENDED USE (I.E. TELEPHONE, DATA, ETC.).

FIRE ALARM

F1. THE FIRE ALARM SYSTEM SHOWN HAS BEEN DESIGNED PER THE REQUIREMENTS OF NFPA 72, 2013 EDITION. DEVICES SHOWN INDICATE DESIGN INTENT AND SHALL BE THE MINIMUM PROVIDED. SYSTEM SUPPLIER SHALL PROVIDE ANY ADDITIONAL CODE REQUIRED DEVICES OR DEVICES REQUIRED BY THE AUTHORITY HAVING JURISDICTION.
F2. FIELD VERIFY LOCATIONS OF AREA SMOKE DETECTORS AND HEAT DETECTORS. DO NOT LOCATE WITHIN 36" OF A HVAC DIFFUSER (SUPPLY OR RETURN), IN A DIRECT AIR FLOW, WITHIN 36" OF A SPRINKLER HEAD, OR WITHIN 36" OF THE TIP OF A CEILING FAN BLADE. SMOKE DETECTORS FOR DOOR RELEASE SHALL BE LOCATED ON THE CENTER LINE OF THE DOOR AND A MAXIMUM OF 5 FEET FROM THE DOOR. THE MINIMUM DISTANCE FROM THE DOOR IS THE DEPTH OF THE WALL SECTION ABOVE THE DOOR, BUT NOT LESS THAN 12".
F3. FAN SHUTDOWN RELAY WIRING SHALL BE LOCATED WITHIN 3 FEET OF THE FAN CONTROLS AND THE WIRING TO THE RELAY SHALL BE MONITORED.
F4. LABEL REMOTE ALARM INDICATOR FOR DUCT MOUNTED SMOKE DETECTORS (I.E. RTU-=1 SUPPLY, RTU-2 RETURN, FIRE/SMOKE DAMPER, ETC.). DUCT DETECTORS SHOULD BE LOCATED IN THE AREA BETWEEN 6 AND 10 DUCT EQUIVALENT DIAMETERS OF STRAIGHT, UNITERRUPTED DUCTWORK. DUCT DETECTORS FOR FIRE/SMOKE DAMPERS SHOULD BE LOCATED BETWEEN THE LAST INLET OR OUTLET UPSTREAM OF THE DAMPER AND THE FIRST INLET OR OUTLET DOWNSTREAM OF THE DAMPER.
F5. PROVIDE 120V POWER AND FUSTAT FOR EACH FIRE/SMOKE DAMPER. INTERLOCK WITH FIRE ALARM CONTROL PANEL TO CLOSE THE FIRE/SMOKE DAMPER UPON ANY ALARM AT THE FIRE ALARM CONTROL PANEL AND TO SHUTDOWN THE ASSOCIATED MECHANICAL UNIT.

SYMBOL LIST

SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING
	ABBREVIATIONS				
NL	NIGHT LIGHT - WIRE AHEAD OF CONTROLS		AFF	ABOVE FINISHED FLOOR	
			AFG	ABOVE FINISHED GRADE	
EM	ON EMERGENCY POWER		DF	DRINKING FOUNTAIN - SEE GENERAL NOTE 11	
WP	WEATHERPROOF				
CT	COUNTERTOP (SEE GEN. NOTE 9)		GAP	GENERATOR ANNUNCIATOR PANEL	
UON	UNLESS OTHERWISE NOTED				
W	WALL				
	CONDUIT AND WIRING				
	EMERGENCY CIRCUIT	CLG/WALL		CONDUIT HOME RUN, 1 CIRCUIT. 2#12 & 1#12 GRD. - 1/2"C.	CLG/WALL
	MASTER/SLAVE FIXTURE WHIP	CEILING			
	LOW VOLTAGE WIRING	CLG/WALL		CONDUIT HOME RUN, 2 CIRCUITS. 4#12 & 1#12 GRD. - 1/2"C.	CLG/WALL
	CDT RUN 2#12 & 1#12 GRD.- 1/2"C. OR CDT RUN AS NOTED ON PLAN	CLG/WALL		CONDUIT HOME RUN, 3 CIRCUITS. 6#12 & 1#12 GRD. - 1/2"C.	CLG/WALL
	CDT RUN 2#12 & 1#12 GRD.- 3/4"C. OR CDT RUN AS NOTED ON PLAN	EARTH/ FLOOR		CONDUIT HOME RUN, 2 CIRCUITS	CLG/WALL
#10	CONDUIT HOME RUN, 1 CIRCUIT. 2#10 & 1#10 GRD. (GEN. NOTES 7 & 8)	CLG/WALL		PHASE CONDUCTORS/ NEUTRAL CONDUCTOR (#12 UON)	
	CONDUIT RUN PARTIAL CIRCUIT. 2#12 & 1#12 GRD. - 1/2"C.	CLG/WALL		SWITCH LEGS (#12 UON) GROUND CONDUCTOR (#12 UON)	
	MISC. EQUIPMENT CONNECTION				
	CONDUIT SEAL OFF				
	LIGHTING, SWITCHES AND SENSORS				
A	LIGHT FIXTURE & FIXTURE LETTER	CLG SURF/ RECESSED	$ $2 $3 $4	SWITCHES (1-POLE, 2-POLE, 3-WAY, 4-WAY)	46" AFF
A	STRIP LIGHT FIXTURE & FIXT LETTER	CEILING	$K $P $T	SWITCHES (KEYED, PILOT, TIMER)	46" AFF
A A A A A	LIGHT FIXTURE & FIXTURE LETTER	CLG SURF/ RECESSED	a, b, c	INDICATES SWITCHING SCHEME	
			M	1 RELAY OCCUPANCY SENSOR SW	46" AFF
A	LIGHT FIXTURE & FIXTURE LETTER	WALL	2M	2 RELAY OCCUPANCY SENSOR SW	46" AFF
A	EXIT SIGN (SHADING DENOTES EXIT FACE SIDE)	CEIL/WALL	1D	1 RELAY OCCUPANCY SENSOR/ DIMMER SWITCH (GEN NOTE 15)	46" AFF
A	LIGHT FIXTURE & FIXTURE LETTER	WALL	D	DIMMER SWITCH (GEN NOTE 15)	46" AFF
A A A A	FIXTURE WITH SHADED LAMP(S) ON EMERGENCY POWER	CLG SURF/ RECESSED	Ṡ	LOW VOLTAGE SWITCH	46" AFF
			Ṡ 1	ON/OFF SWITCH	46" AFF
A A	EMERGENCY BATTERY LIGHT FIXT	CEIL/WALL	Ṡ 2	ON/OFF/0-10V DIMMING SWITCH	46" AFF
A	COMB EXIT SIGN/EM BATTERY LIGHT	WALL	Ṡ 3	DUAL TECH ON/OFF SENSOR	46" AFF
A A	LIGHT FIXTURE & FIXTURE LETTER	POLE	Ṡ 4	16-SCENE WALL CONTROLLER	46" AFF
A A A T A A	LIGHTING TRACK, TRACK FIXTURES, & FIXTURE LETTERS	CEILING	Ṡ 5	DUAL TECH ON/OFF/0-10V DIM SW	46" AFF
				OCCUPANCY SENSOR	CLG/WALL
PC	PHOTOCELL		LP	LIGHTING CONTROL POWER PACK	
			EP	UL-924 LISTED POWER PACK	
			AV	AV SYSTEM/LIGHTING INTERFACE	
			DS	DAYLIGHT SENSOR	CEILING
	POWER				
	SINGLE GROUNDED RECEPTACLE	18" AFF	A	BRANCH CIRCUIT PANEL AND PANEL DESIGNATION	72" TO TOP
	DUPLEX GROUNDED RECEPTACLE	18" AFF			
	DUPLEX GROUNDED RECEPTACLE	CEILING		ELECTRICAL DISTRIBUTION EQUIP	
	DOUBLE DUPLEX GROUNDED REC	18" AFF	X-X X-X	EQUIPMENT - SEE EQUIPMENT CONNECTION SCHEDULE	
	GROUND FAULT DUPLEX REC	18" AFF			
	GRD FAULT DOUBLE DUPLEX REC	18" AFF		CONDUIT SLEEVE (GEN NOTE 13)	
	DUPLEX GRD REC BOTTOM SWITCHD	18" AFF		CABLE TRAY (GEN NOTE 14)	
	TAMPER-PROOF DUPLEX REC	18" AFF	M	MOTOR	
	TAMPER-PROOF GFCI DUPLEX REC	18" AFF		DISCONNECT SWITCH	
			$M	MANUAL STARTER	
A A	SPECIAL OUTLET (SEE SCHEDULE OR AS NOTED)	FLOOR/WALL		CIRCUIT BREAKER	
				STARTER OR ATS (AS NOTED)	
	SPECIAL DEVICE (AS NOTED)			COMBINATION STARTER/DISC	
2	FEEDER DESIGNATION		R	RELAY	
1J	JUNCTION BOX - 1-GANG			PUSHBUTTON (1-BUTTON, 2-BUTTON)	46" AFF
J	JUNCTION BOX - 2-GANG		T	BOX MOUNTED TRANSFORMER	
F	FUSTAT BUSS #SSY		C	CONTACTOR	
TS	THERMOSTAT/TEMP SENSOR	46" AFF		METER	
P	PLUG LOAD SENSOR	CEILING		PLUGMOLD SURFACE RACEWAY	WALL
H	HANDICAP DOOR PUSHBUTTON	36" AFF		BUSDUCT PLUG	

- - - SYMBOL LIST IS FOR REFERENCE ONLY. ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT. - - -

SYMBOL LIST

SYMBOL	DESCRIPTION	MOUNTING	SYMBOL	DESCRIPTION	MOUNTING
	COMMUNICATION / DATA				
	1-DATA OUTLET & JACK (GEN NOTE T1)	18"AFF		2-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF
	1-VOICE OUTLET & JACK (GEN NOTE T1)	18"AFF		3-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF
	1-VOICE/1-DATA OUTLET & JACKS (GEN NOTE T1)	18"AFF		4-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF
	1-VOICE/2-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF		2-VOICE/2-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF
	CABLE TV OR VIDEO OUTLET & CONNECTOR (GEN NOTE T1)	18"AFF		1-VOICE/3-DATA OUTLETS & JACKS (GEN NOTE T1)	18"AFF
	FIRE ALARM				
'FACP'	FIRE ALARM CONTROL PANEL	WALL	'FAAP'	FIRE ALARM REMOTE ANNUNCIATOR	WALL
	FIRE ALARM MANUAL STATION	46"AFF		FIRE ALARM SPEAKER	WALL
	FIRE ALARM HORN	BOTTOM 80"		COMB FA SPEAKER & VISUAL SIGNAL	BOTTOM 80"
	FIRE ALARM VISUAL SIGNAL	BOTTOM 80"		COMB FA HORN & VISUAL SIGNAL	CEILING
	COMB. F.A. HORN & VISUAL SIGNAL	BOTTOM 80"		FIRE ALARM VISUAL SIGNAL	CEILING
CH	CHIME	WALL	C	FIRE ALARM CONTROL MODULE	
	FIRE SPRINKLER ALARM BELL	WALL	M	FIRE ALARM MONITOR MODULE	
R	F.A. RELAY (GEN NOTE F3)		P	FIRE SPRINKLER PRESSURE SWITCH	
	IONIZATION AREA SMOKE DETECTOR (GEN NOTE F2)			FIRE ALARM SPEAKER	CEILING
				FIRE ALARM SPEAKER	WALL
	PHOTO ELECTRIC AREA SMOKE DETECTOR (GEN NOTE F2)		H	HEAT DETECTOR (GEN NOTE F2)	
			T	FIRE SPRINKLER TAMPER SWITCH	SPRKLR RSR
	DUCT SMOKE DETECTOR (GEN NOTE F4)	DUCTWORK	W	FIRE SPRINKLER WATER FLOW SW	SPRKLR RSR
			DH	ELECTROMAGNETIC DOOR HOLDER	WALL
FSD	DUCT SMOKE DETECTOR & FIRE/ SMOKE DAMPER (GEN NOTES F4 & F5)	DUCTWORK			
	ONE-LINE				
LSIG GFI ST K	CIRCUIT BREAKER ACCESSORIES: LSIG = LONG TIME, SHORT TIME, INSTANTANEOUS, GROUND FAULT GFI = GROUND FAULT ST = SHUNT TRIP K = KIRK KEY INTERLOCK		# A A 2P	FUSIBLE SWITCH (CIRCUIT NUMBER / SWITCH SIZE / FUSE SIZE / # OF POLES) (# OF POLES IF OTHER THAN 3)	
G	INDICATOR LIGHT(G=GREEN, R=RED)		# A A 2P '1'	STARTER WITH FUSIBLE SWITCH (CIRCUIT NUMBER / SWITCH SIZE / FUSE SIZE / # OF POLES / STARTER SIZE) (# OF POLES IF OTHER THAN 3)	
	CONTACTS (N.O., N.C.)				
	FUSE				
	CIRCUIT BREAKER		# A 2P # AF AT 2P	CIRCUIT BREAKER (MOLDED CASE NON-ADJUSTABLE TRIP / ADJUSTABLE TRIP) (CIRCUIT NUMBER / TRIP SIZE / # OF POLES) (FRAME SIZE / TRIP SIZE) (# OF POLES IF OTHER THAN 3)	
	OVERLOADS				
	DRAWOUT CONTACTS				
	DISCONNECT SWITCH (SEE EQUIP CONN SCHED) (VOLTAGE / SWITCH SIZE / FUSE SIZE / # OF POLES - NOTED IF EQUIPMENT NOT SCHEDULED)			3Ø TRANSFORMER (DELTA PRIMARY / WYE SECONDARY)	
	STARTER (SEE EQUIP CONN SCHED) (VOLTAGE / STARTER SIZE / # OF POLES - NOTED IF EQUIPMENT NOT SCHEDULED)			1Ø TRANSFORMER	
			PANEL SPD	PANELBOARD (BUILT-IN SPD)	
	GROUND CONNECTION				
	LIGHTNING ARRESTOR		N E ATS	TRANSFER SWITCH (ATS = AUTOMATIC, MTS = MANUAL) (AMP SIZE / VOLTAGE / POLES / AIC RATING / NEMA RATING) (NEMA RATING IF OTHER THAN NEMA-1)	
1	FEEDER DESIGNATION				
SPD	SURGE PROTECTIVE DEVICE				
M M	METER (UTILITY / PANEL MOUNTED)				
HP KW	EQUIPMENT (SINGLE MOTOR / MULTI-MOTOR OR OTHER TYPE AS NOTED)		'1' RV AT	MOTOR STARTER [SINGLE SPEED ACROSS-THE-LINE (UON)] (NEMA SIZE / RV AT= REDUCED VOLTAGE / AUTO-TRANSFORMER / SS = SOLID STATE)	
VFD	VARIABLE FREQUENCY DRIVE (HP SIZE IF NOT SCHEDULED)				

PEN WEIGHT LEGEND

ALL DEVICES, LIGHT FIXTURES, ETC., DRAWN IN DARK SOLID LINES ARE NEW TO BE INSTALLED		ALL DEVICES, LIGHT FIXTURES, ETC., DRAWN IN DARK DASHED LINES ARE EXISTING TO BE REMOVED	
	NEW DUPLEX GROUNDED RECEPTACLE		DUPLEX GROUNDED REC TO BE REMOVED
	NEW LIGHT FIXTURE		LIGHT FIXTURE TO BE REMOVED
ALL DEVICES, LIGHT FIXTURES, ETC., DRAWN IN HALFTONE SOLID LINES ARE EXISTING TO REMAIN		ALL DEVICES, LIGHT FIXTURES, ETC., DRAWN IN LIGHT DASHED LINES ARE EXISTING TO BE RELOCATED	
	EXISTING DUPLEX GROUNDED REC TO REMAIN		DUPLEX GROUNDED REC TO BE RELOCATED
	EXISTING LIGHT FIXTURE TO REMAIN		LIGHT FIXTURE TO BE RELOCATED

- - - SYMBOL LIST IS FOR REFERENCE ONLY. ALL SYMBOLS MAY NOT BE USED ON THIS PROJECT. - - -

SPECIAL OUTLETS

MARK	DESCRIPTION
P	POKE-THRU FLOORBOX LOCATION: PROVIDE WIREMOLD 6ATC SERIES POKE-THRU DEVICE. PROVIDE WITH (2) DUPLEX RECEPTACLES AND SPACE FOR TELECOM. PROVIDE ALL NECESSARY ACCESSORIES FOR A COMPLETE INSTALLATION AND FINISH TO BE CONFIRMED DURING SUBMITTALS.
TV	TV/FLAT PANEL LOCATION: PROVIDE FSR#PWB-200 RECESSED WALL BOX. PROVIDE (1) 20A 125V DUPLEX GROUNDED RECEPTACLE AND (2) DATA OUTLETS. SEE DETAIL 4/E-3.01 FOR ADDITIONAL INFORMATION. COORDINATE ANY A/V CONNECTION REQUIREMENTS WITH OWNER. PROVIDE MATCHING COVERPLATE AND ALL ASSOCIATED MOUNTING HARDWARE. COORDINATE MOUNTING LOCATION SUCH THAT WALL BOX IS COMPLETELY HIDDEN BEHIND FLAT PANEL DISPLAY AND DOES NOT INTERFERE WITH WALL-MOUNT BRACKET. MOUNT 66" AFF OR DIRECTED BY OWNER.

ELECTRICAL SHEET INDEX

SHEET NO.	SHEET TITLE
E-0.01	ELECTRICAL GENERAL NOTES AND SYMBOLS
E-0.02	ELECTRICAL SPECIFICATIONS
E-1.01	ELECTRICAL DEMOLITION PLAN
E-2.01	ELECTRICAL PLANS
E-3.01	ELECTRICAL DETAILS & SCHEDULES

PEC
PROFESSIONAL ENGINEERING CONSULTANTS
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COLORADO LICENSED 55910 11/18/2021 PROFESSIONAL ENGINEER

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

ELECTRICAL GENERAL NOTES AND SYMBOLS

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY TLP
CHECKED BY ACR

E-0.01

DIVISION 26 - ELECTRICAL

SECTION 260500 - BASIC METHODS AND REQUIREMENTS (ELECTRICAL)

PART 1 - GENERAL

1.1 GENERAL CONDITIONS
A. The General Conditions, Supplementary General Conditions, General Requirements, and Special Conditions shall be and are hereby made a part of this Section of the specifications.

1.2 SCOPE
A. The Electrical work shall include all labor, materials, tools, transportation,equipment, services and facilities, required for the complete, proper and substantial installation of all electrical work shown on the plans, and/or outlined in these specifications. The Installation shall include all materials, appliances, and apparatus not specifically mentioned herein or noted on the drawings but which are necessary to make a complete working installation of all electrical systems.
B. All of the electrical related work required for this project (unless specified otherwise) is a part of the Electrical Contract price and is not necessarily specified under this division of the specifications or shown on the electrical drawings. Therefore, all divisions of the specifications and all drawings shall be consulted.
C. The drawings showing the layout of the work indicate the approximate locations of outlets, apparatus, and equipment. The drawings are schematic only and are not intended to show the exact routing of conduits, etc. The final determination as to the routing shall be governed by structural conditions and other obstructions. This shall not be construed to mean the design of the system may be changed. It merely refers to the exact run of a raceway between given points. The Contractor shall consult all contract drawings which may affect the location of any outlet, apparatus or equipment to avoid possible interference and permit full coordination of all work. The right to make any reasonable change (within 6"-0") in the location of apparatus, outlets, and equipment up to the time of roughing-in is reserved by the Architect without involving any additional expense to the Owner.

1.3 MIMIMUM REQUIREMENTS
A. Codes, Rules, and Regulations: Execute all work under the latest rules and regulations of the National Electrical Code Standard of the National Board of Fire Underwriters and with all laws, regulations and ordinances of the County, State, City, and the Utility Company.
B. Codes shall govern in case of any direct conflict between codes and plans and specifications; except when plans and specifications require higher standards than those required by code. Variance from the plan and specifications made to comply with code must be approved by the Architect. If approved they shall be made with no increased cost to the Owner.

1.4 EXAMINATION OF SITE
A. Visit the site, inspect the existing conditions and check the drawings and specifications so as to be fully informed of the requirements for completion of the work.
B. Lack of such information shall not justify an extra to the contract price.
C. Existing systems and conditions shown on drawings for existing buildings are to be noted "for guidance only". The Electrical Contractor shall field check all existing conditions prior to bidding and is to include in his bid an allowance for extension, removal and/or relocation of existing conduits, wires, devices, fixtures, or other equipment as indicated on the plans or as required to coordinate and adapt new and existing electrical system to all other work.

1.5 PERMITS
A. Obtain and pay for all licenses and permits, fees, inspection and certificates required for the execution of this work.
B. Pay fees and charges for connection to outside services and use of property.
C. Deliver permits and certificates to the Architect to be transmitted to the Owner.

1.6 SERVICES
A. This Contractor shall pay for all expenses, deposits, reimbursements, etc., required by the local rules and codes for the service to the building, complete and ready for use. See plot plan.
B. Consult Utility Company for their requirements and for coordinating with their installation. This Contractor shall bear all expense involved for the complete installation of the electrical service (both temporary and permanent) to the building ready for operation, except as specifically excluded on the plans. Expense shall also include guard posts around transformer and pedestals per Utility Company Standards.
C. This Contractor shall consult all local departments to verify requirements and bid installation of service in accordance with local codes and Utility company rules and regulations.
D. This Contractor shall bear all expense involved for the complete telephone service conduit installation and pull wire ready for cable installation. Verify complete installation with the local telephone company and bid installation to comply with their requirements.
E. System outages shall be permitted only at times approved by Owner in writing. Work which could result in an accidental outage (beyond branch circuits) shall be performed with the Owner's maintenance personnel advised of such work.

1.7 RESPONSIBILITY AND EQUIPMENT PROTECTION
A. This Contractor will be held responsible for any and all damage to any part of the building or to the work of other contractors, as may be caused through his operation.
B. Any mutilation of building finishes or equipment initiated by electrical construction shall be properly corrected by the respective finishing contractor and paid for by the Electrical Contractor.
C. During installation, equipment, controls, controllers, circuit protective devices, and other like items, shall be protected against entry of foreign matter and be vacuum cleaned both inside and outside before testing, operating and painting.
D. The operation of the temporary power and the permanent electrical system shall be the responsibility of this Contractor until acceptance of the building by the Owner.

1.8 WORK TO BE DONE BY GENERAL CONTRACTOR
A. Build in all openings sleeves, chases etc., for conduit and equipment as established, furnished and set by this Contractor. He shall seal or grout all openings after this Contractor has installed his conduits.
B. Build in bolts, brackets, hangers etc. for work established, furnished and set by this Contractor.
C. Do all concrete work required for equipment furnished and set by this Contractor, including clean up pads under electrical gear, fixture bases, etc.
D. All painting of Electrical equipment installed in finished areas shall be done by the General Contractor. Painting will not be required on receptacles, switches, circuit breakers etc. All fixtures and exterior poles specified to be factory-primed shall be painted by General Contractor.
E. Provide fireproofing above fixture per U.L. requirements where fixtures are located in fire rated ceilings.
F. Pay all utility costs for operation of electrical system during construction until acceptance of building by the Owner.

1.9 WORK DONE BY THE MECHANICAL CONTRACTOR
A. The Mechanical Contractor shall furnish wiring diagrams and temperature control drawings of all equipment furnished to the Electrical Contractor. Catalog information is unacceptable, provide point to point drawings.
B. The Mechanical Contractor shall furnish and install all control equipment requiring connections to air, water, steam, etc., such as pneumatic electric relays, remote bulb temperature controls, solenoid valves, aquastats and pressure controls.
C. The Mechanical Contractor shall reimburse the Electrical Contractor for any changes in system design i.e; control or equipment which effects the Electrical Contractor.

1.10 WORKMANSHIP AND COORDINATION
A. Make installation substantially as shown on the plans.
B. Make alterations in location of apparatus or conduit as may be required to conform to building construction without extra charge.
C. Mechanical equipment service clearances and electrical apparatus service clearances as specified in their respective manufacturer's product data shall be maintained free from conduit.
D. Cooperate with other contractors in their installation of work.
E. Complete the installation in a workmanlike manner, completely connected and ready to give proper and continuous service.
F. Use only experienced licensed electricians.

1.11 CUTTING AND PATCHING
A. Notify the General Contractor in ample time, of the location of all chases, sleeves, and any other openings required in connection with the work of this contract.
B. Cutting and patching made necessary because of failure to comply with the above shall be done by the General Contractor at the expense of the Electrical Contractor.
C. When it is necessary for the Electrical Contractor to cut building materials to install his work, it shall be done in a neat and workmanlike manner meeting with the approval of the Architect.
D. Holes through concrete shall be carefully done with a "Concrete Termite" drill. A Star drill or Air Hammer will not be permitted. Structural members shall not be cut without approval from the Architect.
E. Any penetrations thru roof shall be made with "Stoneman" flashing connections as manufactured by Stoneman Engineering and Manufacturing Co., Inglewood, California.
F. Any penetrations made in exterior or basement foundation walls shall be sealed with Thunderline "Link-Seal" connections, as manufactured by Thunderline Corporation, Wayne, Michigan.

1.12 MANUFACTURER'S INSTRUCTIONS
A. Apply, install, connect, erect, use, clean, and condition articles, materials and equipment as directed by the manufacturer.

1.13 CEILING TILE MOUNTED DEVICES
A. Provide separate support for all devices mounted in or to lay-in ceiling tile. Ceiling tile shall not be used to support any device.

1.14 EQUIPMENT INSTALLATION AND REQUIREMENTS:
A. Equipment location shall be as close as practical to locations shown on the drawings.
B. Working spaces shall not be less than specified in the National Electrical Code for all voltages specified.
C. Inaccessible Equipment:
1. Where the Engineer determines that the Contractor has installed equipment without proper clearances or not conveniently accessible for operation and maintenance, equipment shall be removed and reinstalled as directed at no additional cost to the Owner. Install access panels as approved by the Architect to provide access to all equipment, J-boxes, and outlets located in non-accessible spaces. Panels shall be flush, locking type with a fire rating equal to the ceiling system.
2. "Conveniently accessible" is defined as being capable of being reached without the use of ladders, or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping, and ductwork.

1.15 EQUIPMENT CONNECTIONS, CONTROLS AND INSTRUMENTATION
A. General: The following applies to all Electrical Power and Control Connections for all equipment requiring electrical installation work provided by others.
B. The Electrical Contractor shall furnish, install and connect all wiring, conduit, boxes, toggle switches, thermal switches, disconnect switches, remote pushbutton stations not included in magnetic starters, etc., for all equipment requiring electrical power that is either furnished or specified by other Contractors and/or the Owner, shown on drawings or listed below. The Electrical Contractor shall receive, install and connect all starters, controllers, variable frequency drives, over current devices, capacitors, power factor correction devices, transformers, alarms, bells, horns, relays, remote switches for equipment supplied by others (i.e. starters or capacitors or power factor correction devices for Mechanical Equip., etc.).
C. In general, all major equipment will be specified to be factory prewired with only service and interconnecting required at the site by the Electrical Contractor; however, all divisions of the specification shall be reviewed to verify whether the equipment is specified to be factory prewired and if not, then it shall be the responsibility of the Electrical Contractor to provide the complete wiring of the equipment in accordance with wiring diagrams provided by other Contractors and/or Owner to the Electrical Contractor. All interconnecting of equipment shall be by the Electrical Contractor.
D. All line voltage wiring and connections required to control the equipment are a part of this section. All wiring shall be in conduit. Low voltage control wiring shall be in conduit. Conduit system, wiring and terminations of low voltage control wiring shall be the responsibility of the Temperature Controls Contractor.
E. The Electrical Contractor shall provide 120 volt control power supply; #12 gauge CU. THWN in 1/2"-inch C. minimum at all points required by controls, and instrumentation and sprinkler risers. Circuit to the nearest 120 volt panel. Use spare 20 Amp. breakers. Each control panel shall be on a separate circuit unless otherwise indicated. If the controlled equipment is fed from the emergency system, then the control power supply must feed from the emergency system.
F. The Contractor shall be familiar with the equipment to be furnished by the other Contractors and/or the Owner in connection with this work and provisions for such connections and work shall be included in the Contractor's price. In no case will extra remuneration be allowed for such work.
G. Connections to all equipment have been designed from units as specified on the drawings or in the specifications. In the event equipment differs on approved shop drawings it shall be the responsibility of the supplying Contractor to coordinate electrical connections to the units and reimburse Electrical Contractor for any changes in system design. These changes shall not involve additional cost to the Owner.
H. Review all plans and specifications to verify all equipment connections that are required by Mechanical and/or other contractors. Although the electrical drawings will show equipment connection requirements, it is the Electrical Contractors responsibility to connect all equipment furnished by other Contractors at no extra cost to the Owner even if this equipment connection is not shown on the electrical drawings. Coordinate all required connections not shown on the electrical drawings with the Engineer.

1.16 NAMEPLATES
A. General: The following items shall be equipped with nameplates:
1. Disconnect Switches (fused or nonfused), switchgear, switchboards, panelboards, separately mounted circuit breakers, contactors and relays.
2. Special Electrical Systems (JCI Controls, etc.) shall be so identified at junction and pull boxes, terminal cabinet and equipment racks.
B. Inscription: Nameplates shall adequately describe the function or use of the particular equipment involved. Nameplates for panelboards and switchboards shall include the panel designation, voltage, phase, and A.I.C. rating of the supply (See Schedules). For example, "Panel A" 120/208 V, 3-Phase, 4-Wire, 10,000 A.I.C.". The name used for a machine nameplate shall be the same as the one used on the machine's motor starter, disconnect and P.B. station nameplates. Nameplates for fused switches and panels shall also indicate fuse type and size.
C. Construction:Nameplates shall be laminated phenolic plastic white front and back with black core.
D. Lettering shall be engraved through front layer to form 1/4-inch white characters (1/2" white letters for distribution panel and switchboard names). Branch switch labels shall be 1/4-inch letters. Nameplates shall be securely fastened to the equipment to be identified, with No. 4 Phillips, round head, cadmium plated, steel self tapping screws or nickel plated brass bolts. Motor nameplate may be nonferrous metal not less than 0.03 inches thick, die stamped. In lieu of separate plastic nameplates, engraving directly on device plates is acceptable. Letters engraved thus, shall be filled with contrasting enamel. All nameplates and their installation are part of this work. Free hand lettering or dymo label marker will not be acceptable.

1.17 MATERIALS
A. Materials and equipment furnished shall be new, of best quality and design, free from defects, of current production by manufacturers regularly engaged in the manufacture of such items for at least 3 years, for which replacement parts should be available. All items used on this project shall be free of asbestos, PCB, and mercury material. A manufacturer's nameplate affixed in a conspicuous place will be required on each major component of equipment stating manufacturer's name, address and catalog number.
B. All material and equipment shall be listed, labeled or certified by Underwriter's Laboratories, Inc., where such standards have been issued. Equipment and material which are not covered by UL Standards will be accepted provided equipment and material is listed, labeled, certified or otherwise determined to meet safety requirements of a nationally recognized testing laboratory.
C. Where items of equipment and/or materials are specifically identified herein by a manufacturer's name, model or catalog number, only such specific items may be used in the base bid, except as hereinafter provided.
D. Unless requests for changes in base bid specifications are received and approved and noted by written addendum prior to the opening of bids, the successful contractor will be held to furnish specified items.
E. After contract is awarded, changes in specifications shall be made only as defined under "Substitution of Equipment"

1.18 SUBSTITUTION OF EQUIPMENT
A. After execution of the contract, substitution of equipment of makes other than those specifically named in the contract documents may be approved by the Engineer only if the equipment named in the specifications cannot be delivered to the job in time to complete the work in proper sequence to work of other Contractors, due to conditions beyond control of the contractor.
B. Requests for substitutions must be accompanied by documentary proof of equality or difference in price and delivery, if any, in form of certified quotations from suppliers of both specified and proposed equipment.
C. The Owner shall receive all benefits of the difference in cost involved in any substitution, and the contract altered by change order to credit Owner with any savings so obtained.

1.19 SUBMITTALS
A. The Engineer's approval shall be obtained for all equipment and material before delivery to the job site. Delivery, storage or installation of equipment or material which has not had prior approval will not be permitted at the job site.
B. All submittals shall be submitted electronically and include adequate descriptive literature, catalog cuts, shop drawings and other data necessary for the Engineer to ascertain that the proposed equipment and materials comply with specification requirements. Catalog cuts submitted for approval shall be legible and clearly identify equipment being submitted.
C. Submittals shall be complete and submitted together for each section. Individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assemble as a whole. Partial submittals will not be considered for approval.
D. Mark the submittals, "SUBMITTED UNDER SECTION_______". Mark out all statements on sheets that do not apply otherwise. The Engineer may select options and equipment not originally specified. All options that are not marked out will be assumed that the Contractor will furnish the same.
E. Mark catalog cuts to indicate equipment, capacities, finishes, sizes, etc. Each individual item shall have its own sheet provided for approval. (Example: Separate sheets for each panelboard.)
F. All shop drawings shall be checked and signed by this contractor and general contractor prior to submittal to the Architect/Engineer.
G. Shop drawings submitted without Contractor's signatures or approval and verification will not be approved.
H. The submittals shall include the following:
1. Information that confirms compliance with contract requirements. Include the manufacturer's name, model or catalog numbers, catalog information, technical data sheets, shop drawings, pictures, nameplate data and test reports as required.
2. Elementary and interconnection wiring diagrams for communication and signal systems, control system and equipment assemblies. All terminal points and wiring shall be identified on wiring diagrams.
3. Quantities of materials will not be verified by the Architect or Engineer. Approval stamp on shop drawings does not constitute approval of quantities listed on shop drawings.
I. Shop drawings shall be submitted on wire, cables, devices, lighting fixtures (including distribution curves), lighting controls, panelboards, disconnects, transformers, low-voltage systems, etc.
J. Submittals for low-voltage systems (fire alarm) shall include complete riser diagrams showing all conductors and conduit sizes.
K. Engineer's acceptance of Compliance Submittals will not relieve the Contractor from his responsibility for any deviations from the requirements of the contract documents, unless Contractor has in writing called Engineer's attention to such deviation at the time of submission and the Engineer has given written approval to the specific deviation; nor shall any acceptance by Engineer relieve Contractor from responsibility for errors or omissions in Compliance Submittals.

1.20 ELECTRICAL WORK COMPLETION
A. Before requesting final inspection the following work must be completed.
B. Operating Instructions:
1. The Contractor shall submit along with the shop drawings of the equipment, three (3) copies of operating instructions for all items. Instructions shall be prepared by the manufacturer of the equipment.
2. After the operating instructions have been approved by the Architect, the Contractor shall include the three (3) copies in maintenance instructions brochures.
3. The Contractor shall also obtain all manufacturer's instructions, manuals, and one complete set of drawings and turn these over to the Architect at the completion of the project.
4. The Contractor shall keep in a safe place, all keys and special wrenches furnished with equipment under this contract and shall give same to the Engineer at the completion of the project.
5. The Contractor shall prepare a complete brochure, in triplicate, covering all systems and equipment furnished and installed under this Contract. Brochures shall be submitted to the Archtitect for approval and delivery to the Owner. The cost of this brochure shall be included in the contract cost. Brochures shall contain the following:
a. Certified equipment drawings and/or catalog data clearly marked for equipment furnished as required for approval submission under detailed section of the specifications.
b. Complete operating and maintenance instructions for each item of equipment.
c. Complete part list for each equipment item.
d. Any special emergency operating instructions or a list of service organizations (including addresses and telephone numbers) capable of rendering emergency service to the various parts of the system.
6. Brochures shall be bound in hard backed three ring binders with an index, subdividers and reinforced sheets.
a. Project name and address.
b. Section of work covered by brochure, i.e. "Electrical Work".
c. Name and address of Architect., Engineer, and Contractor.
d. Telephone number of Contractor, including night or emergency number.
7. In addition to these written instructions, each respective contractor shall fully and carefully instruct the Owner, or the Owner's representatives, as to the proper operation, care and maintenance of each system and its equipment.

1.21 TESTING AND ADJUSTMENT
A. Check test and adjust the mechanisms of all electrical equipment as required for optimum performance.
B. Perform tests for insulation resistance in accordance with the requirements of the National Electrical Code and insure that all circuits are free from short circuits.
C. Keep a calibrated voltmeter and ammeter available at all times and provide service for test readings when and as required up until the project is accepted by the Owner.

1.22 AS-BUILT DRAWINGS
A. Show on blue line prints in red ink all changes from original plans made during the installation. Return two (2) sets of red marked drawings, specifications and addenda, as set forth in the General Conditions, to the Architect upon completion of the Project.

1.23 FINAL INSPECTION
A. Final inspection will be made upon written request from the General Contractor after the project is completed; in accordance with the Supplementary General Conditions.
B. Furnish a workman familiar with this project to accompany the Engineer on final inspection and have available ladders, drop cords, and other equipment as required to gain access to any portion of this system.
C. This Contractor and principal subcontractors shall be represented at the inspection by a person of authority responsible to demonstrate to the Engineer that the work conforms to the intent of the plans and specifications.
D. Extra inspections made necessary by the Electrical Contractor's failure to comply with the conditions as set forth above shall be charged to the contractor for the inspector's time both on the job and spent in travel between the office and the project site.

1.24 GUARANTEE
A. Guarantee all work, material and equipment for a period of one year after date of substantial completion.
B. During the year guarantee period the Electrical Contractor shall be responsible for any defects which develop in the electrical systems. Upon notification of a defect by the General Contractor, the Electrical Contractor shall make immediate effort to correct it and shall notify the Architect when this work is completed. This guarantee does not include ordinary lamp failure.
C. Repairs and/or replacements shall be made with no cost to Owner.

END OF SECTION 260500

SECTION 261000 - BASIC MATERIALS

1.1 CONDUIT
A. Materials:
1. Rigid conduit shall be standard size, hot dip galvanized conduit as manufactured by the Republic, Allied Tube, LTV, or equal. Rigid steel conduits and intermediate metal conduits shall be provided with threaded fittings and couplings. A ground wire, sized per N.E.C. Section 250.122 shall be pulled in all conduits containing phase conductor(s).
2. EMT tubing shall be Allied, Republic, LTV, or equal with U.L. approved National Electric Code type fittings. Indenter type fittings shall not be used. A ground wire sized per N.E.C. Section 250.122 shall be pulled in each conduit containing phase conductor(s).
3. All conduit exposed to physical abuse (i.e. industrial locations), installed in wet locations, in slabs, below grade or exposed exterior to the building, shall be rigid steel or intermediate metal conduit (IMC).
4. EMT conduit may be used where code permits except as outlined above.
5. Separate ground conductor sized per N.E.C. Section 250.122 shall be installed in all flexible conduits.
6. Liquid-tight flexible metal conduit: Flexible galvanized steel tubing covered with extruded liquid-tight jacket of polyvinyl chloride (PVC). Provide conduit with a continuous copper bonding conductor spiral between the convolutions. Provide steel or malleable iron fittings. Connectors shall have insulated throats.
7. U. L. approved Schedule 40 P.V.C. conduit may be used where feeders or branch circuits are to be run in earth or slabs (3/4" minimum). Use all steel ells and risers with PVC coating approved for underground use. Use conduit adapters when converting from P.V.C. to steel conduit. Use plastic spacers when more than one conduit is installed together. See Drawings for areas requiring concrete encasement. All P.V.C. conduits shall be provided with separate ground conductor sized per N.E.C. Section 250.122.
8. Metal Clad Cable may be utilized in concealed locations for branch circuit wiring from junction boxes to fixtures and wiring devices. All home runs shall be in conduit.
a. The use and installation of Metal Clad Cable shall conform to N.E.C. Article 330, state and local codes and this specification. In all cases, the most restrictive requirements shall govern.
b. Metal Clad Cable shall be supported at intervals not exceeding 6 feet and within 12 inches of every box, cabinet, fitting or other cable termination. Comply with additional requirements of N.E.C. Section 330.30.
B. Bushings And Locknuts:
1. Bushings for terminating conduits smaller than 1-1/4-inches are to have flared bottom and ribbed sides, with smooth upper edges to prevent injury to cable insulation.
2. Install insulated type bushings for terminating conduits 1-1/4-inches and larger. Bushings are to have flared bottom and ribbed sides. Upper edge to have phenolic insulating ring molded into bushing.
3. Where required, bushings of standard or insulated type shall have screw type grounding terminal.
C. Conduit Installation:
1. All conduit work shall be installed concealed in walls, floor and roof construction or concealed within furred spaces or above ceilings. In equipment or mechanical rooms exposed work shall include feeders and connections to equipment unless noted otherwise.
2. All exposed conduits (where approved by the Engineer) shall be routed parallel or perpendicular to building elements.
3. Conduit shall be installed to the requirements of the structure and to requirements of all the other work on the project. Conduit shall be installed to clear all openings, depressions, pipes, ducts, reinforcing steel, etc. Conduit set in forms for concrete structure shall be installed in a manner that installation will not affect the strength of the structure as determined by the Structural Engineer. Maximum size of conduit in concrete slab is 1-1/4-inches trade size.
4. Conduit shall be installed continuous between connections to outlets, boxes and cabinets with a minimum possible number of bends and not more than the equivalent of 4-90 degree bends between connections. Bends shall be smooth and even and shall be made without flattening conduit or flaking enamel. Radius of bends shall be as long as possible and never shorter than the corresponding trade elbow. Long radius elbows shall be used where necessary.
5. Conduits shall be securely fastened in place with approved straps, hangers, and supports as required. See Specification Section entitled SUPPORTING DEVICES for conduit support requirements.
6. Conduit shall be reamed before installation and all conduit shall be thoroughly cleaned before installation and kept clean after installation. Openings and boxes shall be plugged or covered as required to keep conduit clean during construction and all conduit shall be fished clear of obstructions before the pulling of wires. All conduit shall be as sized above and shall not be smaller than code requirements.
7. All work shall be protected against damage during construction and any work damaged or moved out of line after roughing-in shall be repaired and reset to the approval of the Architect without additional cost to the Owner.
8. Conduit terminations at panelboards, switchboards, motor control equipment, junction boxes, etc., shall be aligned and installed true and plumb. Wood or steel bucks or templates shall be used where required.
9. Install sleeves and sleeve seals at exterior floor, exterior wall, and roof conduit penetrations and completely seal clearances around the conduit and sleeve and make watertight.
10. Rooftop raceways or cables shall be supported up off the surface of the roof with a polymeric rooftop support equal to Caddy Pyramid series. Supports shall be non-penetrating and shall be designed to prevent damage to the roofing materials. Wood supports are not allowed.
11. Where conduits cross construction expansion joints, contractor shall provide Appleton XJ expansion couplings or equal with copper bonding jumpers.
12. Use flexible metal conduit (Type FMC) for connections to motors and other electrical equipment subject to movement, vibration, misalignment, cramped quarters, or noise transmission. Provide liquid-tight flexible metal conduit Type (LFMC) for installation in exterior locations, kitchens, moisture or humidity laden atmosphere, corrosive atmosphere, water or spray wash-down operations, etc.

1.2 WIRES AND CABLES
A. Southwire, General Cable, Allied or equal code gauge wire, finished with fadeless color solution for National Electric Code system of color coding and bearing Underwriter's label. Wires shall be soft annealed stranded copper with properties conforming to the National Electric Code requirements. No. 8 gauge and larger shall be stranded. No. 10 gauge and smaller shall be solid.
B. At the contractor's option, aluminum conductors may be utilized for service entrance or feeders, size #1/0 AWG and larger. All conductors for mechanical equipment shall be copper. Increase conduit size and equipment lug size to facilitate feeders. Ratings for aluminum conductors shall be identical to or greater than the copper conductor ratings shown.
1. Aluminum conductors shall be provided with termination lugs and splicing sleeves, hereinafter called connectors. They shall be of the compression type installed on the conductors by dies exerting circumferential hydraulic compression or crimp action with a hydraulic tool capable of a minimum compression of 10,000 lbs. per sq. in. The finished installation of the connector shall be so that connector and wire are compressed to almost one solid mass over 80 percent of the total length of the mating surface of the connector. An aluminum oxide inhibiting compound shall be used on all mating surfaces in strict accordance with the Manufacturer's written instructions.
C. Wire smaller than No. 12 gauge shall not be used unless specifically called for.
D. All feeder conductors shall be the same size and type and be continuous from overcurrent device to panel.
E. Wires for general use within the building shall be Type THWN, XHHW, or combination THHN/THWN except where called for on the drawings. Type THW may be used for #6 AWG and larger sizes. All conductor sizes must be as specified on drawings regardless of insulation type. Wires for other than general use shall be as hereinafter specified for specific services.
F. A ground wire sized per N.E.C. Section 250.122 shall be installed in each conduit containing phase conductors.
G. All control wiring shall be copper, solid or stranded, #l4 ga. or larger depending upon current requirements. Insulation Type for 90 degree C. Where stranded conductors are used provide with spade type insulated copper terminals.
H. See riser diagrams and/or other sections of the Specifications for types and ratings for sound, fire alarm, control and other special cables.
I. All conductors shall be identified at all termination points and in all pull and junction boxes by the following method of color coding. Means of identification shall be permanently posted at each branch circuit panel with a nameplate identifying color coding where more than one nominal voltage system is in the same building.

208Y/120 volt system:	480Y/277 volt system:
Phase A - Black	Phase A - Brown
Phase B - Red	Phase B - Orange
Phase C - Blue	Phase C - Yellow
Neutral - White	Neutral - Gray
Ground - Green	Ground - Green

J. All conductors size #8 Awg and smaller shall have colored insulation. Where conductors with black insulation are used for the larger wire sizes (#6 Awg and larger) color coding shall be provided with two layers-one half lapped of No. 35 colored Scotch Vinyl electrical tape. Where any conductor is or can be supplied from an emergency system the Contractor shall mark each conductor with an additional two layers-one half lapped of Purple colored Scotch Vinyl Electrical tape.
K. Individual neutrals shall be provided for each circuit. Multi-wire branch circuits (i.e. Two or more phase sharing a neutral conductor) shall not be allowed, unless specifically noted or shown on the plans. Where multi-wire branch circuits are shown or noted on the plans, provide a disconnecting means that will simultaneously disconnect all phase conductors at the panel where the branch circuit originates.

1.3 FIRE BARRIER PENETRATION SEALS
A. Manufacturer: Subject to compliance with requirements, provide fire barrier penetration seals shall be equal to Electro Products Div./3M.
B. Provide seals for any opening through fire-rated walls, floors or ceilings used as passage for components such as conduits or cables.
1. Cracks, Voids or Holes Up to 4-inches Diameter: Use putty or caulking, one-piece intumescent elastomer, non-corrosive to metal, compatible with synthetic cable jackets, and capable of expanding 10 times when exposed to flame or heat, UL-listed.
2. Openings 4-inches or Greater and Conduit Sleeves Thru Floors at Telephone Terminal Boards: Use sealing system capable of passing 3-hour fire test in accordance with ASTM E-814, consisting of wall wrap or liner, partitions, and end caps capable of expanding when exposed to temperatures of 250 to 350 degrees F (121 to 177°C), UL-listed. KBS "Sealbags" manufactured by P-W Industries will be acceptable.
C. Execution: Fill entire opening with sealing compound. Adhere to manufacturer's installation instructions. All fire barrier seals shall meet the rating of the wall.

1.4 WIRE CONNECTIONS
A. All wires shall be run in conduit, shall be continuous between outlets and boxes (with no splices or taps in conduits). Splices and taps for #6 and larger conductors shall be with block type with insulating jacket or split bolt connectors, covered and completely insulated with a minimum of three half-lapped layers of Scotch No. 33+ (105°C) plastic electrical tape or by approved insulated fastener. All splices and taps having irregular surfaces shall be properly padded with Scotchfil putty before application of insulating plastic tape. Scotchlok electrical pre-insulated spring pressure connectors or equal may be used for up to #8 conductors. Connectors shall be installed so that all wires are properly insulated.

1.5 PULL AND JUNCTION BOXES
A. Pull and junction boxes shall be code gauge steel boxes with hinged, bolted or screwed covers. Boxes shall be flush or surface mounted as shown or required.
B. Junction and pull box shall be installed where shown on drawings and additional boxes shall be installed if required for pulling of wire provided location and installation is approved by the Architect. All boxes shall be code construction with screw type cover and shall be installed in accessible locations.

1.6 OUTLET BOXES
A. All electrical service outlets, including plug receptacles, lamp receptacles, lighting fixtures and switches shall be provided with Steel City, Appleton, or RACO 4-inches square, code gauge steel knockout boxes, galvanized or sherardized and of required depth for service and appliances. Boxes installed in plaster finish shall have code gauge galvanized raised covers set to plaster ground with outside edge flush with plaster finish. Covers shall be selected with proper openings for devices installed in box. Boxes installed in concrete and boxes larger than 2 gang may be masonry type boxes. All outlet boxes in walls, partitions, and ceilings shall be flush mounted unless specifically noted otherwise on the drawings, or as approved by the Engineer.
B. Sectional boxes shall not be used except where directed and approved by the Architect for installation in unplastered tile walls and provided conduit connections are installed concealed in walls.
C. Where lighting fixtures and appliance outlets are to be mounted on concrete or on plaster finish on concrete, outlet boxes shall be installed in forms of exact dimensions from bench marks, columns, walls or floors. Where lighting fixtures and appliances outlets are to be mounted on masonry walls and/or plastered furring or other Finish, outlet boxes shall be roughed in to general location before installation of walls and furring and shall be reset to exact dimensions before walls and furring are constructed. All outlet boxes shall be set true to horizontal and vertical lines parallel to walls, floors and ceilings and true to finish lines. All boxes shall be secured to ceilings or walls so all installation are solidly mounted. Boxes mounted to wall studs shall be secured to a horizontal box mounting bracket equal to B-Line Series #BB2 or #BB26. Metal stud clips with farside box supports are not acceptable.
D. Furnish and install plaster rings for all boxes installed in plastered ceilings and walls. Verify construction with general construction plans.
E. Boxes for exterior exposed work (where approved by the Engineer) shall be Appleton or Crouse-Hinds Type FS or FSC for shallow devices and Type FD or FDC for deep devices. Boxes for ceiling mounted light fixtures shall have approved no-bolt fixture studs. Boxes used as junction boxes shall have beveled edge flat steel blank cover.
F. Where outlet boxes are mounted exposed in unfinished areas, (where approved by the Engineer) surface mounted boxes shall be 4-inches square, have rounded corners and 1/2 inch raised steel cover plates.
G. Location of outlets on small drawings is approximate and exact dimensions for location of outlets shall be as taken from large scale plans and details on drawings or as directed by the Architect/Engineer. Outlets shall be located generally from column centers and finished wall lines or to center or joints of wall panels. Ceiling outlets shall be installed at elevation of suspended ceilings and connected to outlets in ceiling or slab above. Where necessary to fit and center with panel or ceilings and wall spaces, the Contractor must at his own expense shift the lighting outlets or other outlets as required by the Architect.
H. Boxes for switches at or near doors shall be installed on the side opposite the hinge. Verify door swing direction prior to rough-in.
I. To prevent sound from traveling through walls, electrical devices from different rooms shall not be mounted in the same stud place. Through-wall boxes shall not be used. In fire rated walls or partitions, outlet boxes on opposite sides of walls or partitions shall be separated by a horizontal distance of 24-inches. Outlet boxes larger than 4-inches square shall not be installed in fire rated walls or partitions. Verify location of fire rated walls or partitions with Architectural drawings prior to rough-in.
J. It shall be the duty of this Contractor to examine the plaster, painting, and other finishes before making his installation to make sure that these accessories, when installed, will fit and cover properly and leave no open or unfinished surface showing. He shall refuse to complete his installation where faulty work on the part of others is found, and he shall promptly report the trouble to the Architect.

1.7 WALL SWITCHES
A. Wall switches in general, used to control lighting, shall be quiet operating, listed by U.L. and conform to NEMA standards as well as the latest Federal Specification W-S-896e.
B. Switches shall be single pole, two-pole, three-way, four-way, keyed, or with pilot light as called for on the drawings. Groups of switches shall be under one gangplate. Where switches are in fire rated walls. groups of switches shall be maximum of two (2) gangs under one cover plate.
C. Switches shall be 20A., 125V., 277V. unless specified otherwise.
D. LIST OF ACCEPTABLE SWITCH MANUFACTURERS:

Mfgr:	Switch:	Key Switch:	Pilot Light Switch:
P&S	PS20AC Series	PS20AC-I Series	PS20AC-CPL Series
Hubbell	HBL1220 Series	HBL1220-L Series	1120-PL Series
Leviton	1220 Series	1220-L Series	1220-PLR Series
Bryant	4900 Series	4900L Series	4900PLR Series
Cooper	1220 Series	AH1990L Series	AH1990PL Series

E. Pilot light switches shall be illuminated toggle switch lighted red in "on" position. Key switches shall be master keyed.
F. Provide barriers between 277V. switches and between 277V. and 120V. switches installed in a common outlet box.
G. Color of switches/dimmers as selected by the Architect. Verify colors prior to ordering.

1.8 RECEPTACLES
A. Convenience duplex receptacles shall be grounded twin outlet receptacle rated 20 amperes at 125 volts.
B. Where receptacles are indicated on the drawings as "WP" (weatherproof), provide weather resistant GFCI grounded duplex receptacle with "In-Use" extra-duty metallic weatherproof cover. Hubbell #WP26E or equal by Taymac or Red Dot.
C. Receptacle body shall be formed of high-impact thermoplastic or urea with nylon face and receptacle contacts shall be Bronze. Certification that receptacle meets or exceeds N.E.M.A. Standards shall be submitted to the Engineer for approval.
D. All 120V and 250V receptacles rated 50A or less located in bathrooms, kitchens, within 6 feet of a sink, exterior locations, elevator machine rooms, elevator pits, garages, per NFPA 70 and as located on the plans shall be ground fault circuit interrupters (GFCI) for personnel protection (Class A) with 5ma trip. Feed through GFCI receptacles or GFCI breakers may be used to protect other receptacles in the same room and on the same circuit if wired per the manufacturer's recommendations. Prior to final inspection, perform ground fault test on each protected receptacle and submit list of all receptacles tested with results to the Engineer. Label receptacles that are GFCI protected by another feed through GFCI receptacle or by GFCI breaker "GFCI protected". Where receptacles aren't readily accessible, then GFCI protection shall be provided integral with the associated circuit breaker.
E. LIST OF ACCEPTABLE RECEPTACLE MANUFACTURERS:

Mfgr:	Duplex:	GFCI Duplex:	GFCI WR Duplex:
P&S	5362	2097	2097TRWR
Hubbell	5352A	GFRST20	GFWRST20
Levition	5352	G5362-WT	G5362-WT
Bryant	BRY 5362	---	---
Cooper	5352	---	---

F. Install receptacles to clear all cabinets, equipment, etc.
G. Color of receptacles as selected by the Architect. Verify colors prior to ordering.
H. Provide duplex receptacle on separate circuit beside each telephone terminal board location and other communications equipment requiring 120V. power.
I. Provide tamper resistant receptacles for all 15A and 20A nonlocking type receptacles rated 125V and 250V as required per N.E.C. Section 406.12.

1.9 WALL PLATES
A. Wall plates shall be flexible (non-breakable) nylon unless noted otherwise. Wall plates in industrial areas, gymnasiums, maintenance areas, warehouses and other high abuse areas shall be stainless steel. Plates shall be set plumb and parallel with the wall.
B. Color of wall plates as selected by the Architect. Verify colors prior to ordering.

1.10 FUSTATS
A. 120V motor loads up to 1/2 HP: Shall be Bussmann "SSY" with Edison-base fuse holder and integral toggle switch. Where located in damp or wet locations, provide weatherproof unit equal to Bussmann #SSN.
B. 120V motor loads, 3/4 HP: Shall consist of horsepower rated Edison-base fuse holder and separately mounted 30A. 1P. 120V. horsepower rated toggle switch adjacent to fuse holder.
C. 120V motor loads, 1 HP or 277V motor loads: Shall consist of horsepower and voltage rated manual motor starter switch and a horsepower and voltage rated fuse holder designed to hold a time-delay Class CC rejection-type fuse.
D. Mount fustats in housings of equipment served. Fuses for motors shall be sized based on 125 percent of manufacturer's nameplate full load amperage unless otherwise indicated on drawings.

1.11 TOGGLE TYPE SWITCHES
A. Provide/install toggle type switches voltage and horsepower rated for the load served 20 Amp and/or 30 Amp for all small 3 phase mechanical equipment as indicated and under all exterior mounted fan hoods.

1.12 SUPPORTING DEVICES
A. Conduits shall be supported at intervals not greater than 10 ft., within 3 ft. of any bend and every outlet or junction box. This shall apply on vertical runs as well as horizontal runs.
B. All supports for conduits shall be independent from other trades unless noted otherwise on drawings or written approval by the Engineer. Contractor shall work with other trades where a common support structure is provided and has been approved by Engineer.
C. Plastic or wood anchors of any type shall not be used.
D. Multiple Runs
1. Where a number of conduits are to be run exposed and parallel, one with another, they shall be grouped and supported by trapeze hangers.
2. Hanger rods shall be fastened to structural steel members with suitable beam clamps or to concrete inserts set flush with surface. A reinforcing rod shall be installed through the openings provided in the concrete inserts.
3. Inserts shall be Grinnell Fixture 282, Code Devices, Inc., No. 1 or equal.
4. Beam clamps or clips shall be suitable for structural members and conditions.
5. Rods shall be steel 3/8-inches dia. minimum or approved by the Engineer.
6. Trapeze hangers shall be Unistrut P-1000 Series or equal.
7. Each conduit shall be clamped to the trapeze hanger with conduit clamps. Clamps for rigid conduit shall be Unistrut No. P-1111 through P-1124 or equal. Clamps for electrical metallic tubing shall be Unistrut No. P-1426 through P-1431 or equal.
E. Single Runs
1. Where conduits are run individually, they shall be supported by approved pipe straps, or clips secured by adequate means. The use of perforated strap will not be permitted.
2. Conduits installed exposed on the surface in damp locations or in refrigerated areas shall be provided with clamp backs under each conduit clamp to prevent accumulation of moisture around the conduits.
3. Conduits installed in open web joists shall be supported with manufactured support clips approved for the purpose. Wire wrapped around conduits will not be approved for conduit support. Conduit will not be supported from ceiling suspension wires, except that flexible connections to light fixtures in suspended ceilings may be supported from ceiling support wires with approved bat-wing clips if the ceiling installer verifies that the hangers are designed to support the additional load.

1.13 LOW VOLTAGE SYSTEMS
A. These specifications include the furnishing of all labor, and materials necessary for the complete installation of a system of conduits, outlets, and boards for use by the System Suppliers.
B. This installation must be done according to the requirements of the System Suppliers and the general specifications covering "Light and Power" herewith.
C. Provide and install nylon pull wires in all low voltage conduits. All conduit ends shall be equipped with non-metallic insulated bushings.
D. Provide and install pull boxes at all locations as required by the System Suppliers.
E. Provide and install conduit sleeves thru floors and walls as required by the System Suppliers.
F. Provide a main service conduit sized as indicated on drawings or as required by each system provider. Each outlet location requires 1-inch empty conduit with pull wire unless noted otherwise. Conduits shall be stubbed into accessible ceiling void. Verify conditions of job prior to rough-in. All cables shall be plenum rated.
G. All 2, 3 and 4-inch conduits within buildings shall include pull boxes after every two 90 degree bends. Size per N.E.C. Article 370.
H. All wall outlets shall be installed with standard square box plates. Jacks shall be furnished by System Suppliers, or as directed. Outlet boxes not used shall be provided with blank covers.
I. All empty conduits located in equipment closets or on backboards shall be sealed with a standard non-hardening duct seal compound to prevent the entrance of moisture and gases and to meet fire resistance requirements.
J. Backboards shall be provided for each telephone terminal board. Backboards shall be 3/4" thick AC grade plywood (C grade side toward wall), 8' tall with width as required for installation. Plywood shall be painted with two coats of high fire resistant, non conductive white paint to match fire rating of the wall.

END OF SECTION 261000

SECTION 265000 - LIGHTING

1.1 GENERAL
A. This work shall include all lighting fixtures as specified in the schedule and lamps for all fixtures as specified. Fixtures shall be completely free of defects, dents, rust or chipped surfaces. No cracked, broken, or chipped lenses will be acceptable. Fixtures shall be furnished complete including hickeys, suspension nipples, and all other material and equipment as required for hanging fixtures in accordance with U.L. and NEC requirements. This Contractor shall furnish and install lamps for all fixtures and shall wipe fixtures and lamps before and after installation. Fixtures that are cracked, broken, chipped, rusted, dented or otherwise damaged, shall be replaced at no extra cost to the Owner. All recessed mounted fixtures shall be mounted with the trim flush to the ceiling, free of gaps or cracks.
B. Electrical Contractor shall verify exact ceiling type in all areas with Architectural room finish schedule for exact fixture mounting (i.e. grid or flange type mounting) prior to ordering of fixtures. Electrical Contractor shall verify ceiling construction in all areas and provide appropriate mounting hardware for installation of lighting fixtures. All surface mounted fixtures shall be supported independent from ceiling system and shall be securely mounted. Lay-in fixtures shall be supported directly from structure, unless ceiling system has been designed for support of such fixtures.
C. Framing members of suspended ceiling systems used to support fixtures shall be securely fastened to each other and shall be securely attached to the building structure at appropriate intervals. Fixtures shall be securely fastened to the ceiling, framing member by mechanical means, such as bolts, screws, or rivets. Clips identified for use with the type of ceiling framing member(s) and fixture(s) shall also be permitted.
D. General Contractor shall provide fireproofing around recessed fixtures installed in fire rated ceiling per U.L. requirements. Electrical Contractor shall coordinate.
E. Connection to all fixtures mounted in lay-in ceilings shall be as follows. Provide J-Box on structure above fixtures for connections. Install UL listed 1/2-inches flexible conduit whip down to each fixture. Each whip shall be field cut to length to allow fixture to be relocated 4-feet-0-inches in any direction. Whips shall include 2 or 3 #12 Cu. THWN conductors (numbers as indicated) and a #12 ground. Fixtures supplied with UL listed whip shall be supplied with ground conductors. Tandem fluorescent fixtures shall have a factory supplied UL listed whip with conductors as required to interconnect fixtures. Length shall allow mounting fixtures 12-feet-0-inches on center in any direction.
F. Fixture lenses shall be 100 percent virgin acrylic and a minimum of 0.125 inch thick. Styrene lenses shall not be provided for any fixture lenses.
G. All fixtures (housing, door, etc.) shall be provided with factory applied baked enamel finish applied after final fabrication unless specifically noted otherwise on the lighting fixture schedule.

1.2 LED FIXTURES AND DRIVERS
A. LED modules shall include the following features unless otherwise indicated:
1. Comply with IES LM-79, LM-80, LM-82 and TM-21 requirements.
2. Minimum CRI 80
3. Minimum Rated Life: IES L70 = 50,000 hours.
4. LED chips shall be wired so that failure of one chip does not prohibit operation of the remainder of the chip array.
5. Output lumens and color temperature as noted on LIGHTING FIXTURE SCHEDULE.
B. Each luminaire type shall be binned within a three-step MacAdam Ellipse to ensure color consistency among luminaires.
C. LED driver general requirements: Unless otherwise indicated, driver features shall meet the following requirements:
1. Voltage Range: +/- 10 percent of rated input.
2. Total Harmonic Distortion Rating: ≤ 20 percent.
3. Power Factor: ≥ 95 Percent.
4. UL Class 2 output.
5. Line Frequency: 60 Hz.
6. Inrush Current: Per NEMA 410.
7. Ambient Temperature Range: 0°C to 25°C.
8. Maximum Case Temperature: 90°C.
9. Sound Rating: Class A or better.
10. Integral Short Circuit, Open Circuit, and Overload Protection: IEEE C82.41.2
11. Electromagnetic Compliance: FCC Title 47, Park 15, Class A.

1.3 ACCESSORIES
A. Provide thermal switches on all recessed fixtures as required by N.E.C..
B. When emergency battery power packs are optional to the specified exit signs and emergency fixtures and are not included in the model number in the light fixture schedule, the emergency battery power packs shall be included as part of the specified fixture when they are not connected to an emergency generator system. Verify on drawings.

1.4 LIGHTING CONTROL EQUIPMENT
A. Occupancy Sensors
1. Line Voltage Wall Switch Sensor - Provide dual technology sensor for 900sq of coverage. Sensor Switch WSX series or approved equal.
2. Line Voltage Wall Switch Sensor with Dimming - Provide dual technology sensor for 900sq of coverage and 0-10V dimming control. Sensor Switch WSX-D series or approved equal.
3. Ceiling Mount Low Voltage Sensor - Provide dual technology sensor with coverage and/or quantity as required by space. Sensor switch CM-PDT series or approved equal.
4. Relay/Power Pack: Dry contacts rated for 20A ballast load at 120V and 277V ac, for 13A tungsten at 120V ac, and for 1 hp at 120-V ac. Power supply to sensor shall be 24V dc, 150mA, Class 2 power source as defined by NFPA 70.

END OF SECTION 265000

DIVISION 28 - ELECTRONIC SAFETY AND SECURITY

SECTION 283111 - FIRE ALARM SYSTEM

1.1 FIRE ALARM SYSTEM (DESIGN/BUILD)

A. The Fire Alarm System shall be designed and installed by the Design/Build Conctractor. Tie into the existing fire alarm system and provide a complete automatic fire alarm system for new/remodeled tenant spaces. Provide all necessary devices and accessories as required to expand/modify the existing fire alarm system to accommodate the new work. Assume additional power supplies will be required for additional notification devices. All equipment and components shall be new and the same manufacturer of the existing fire alarm system.
B. Fire Alarm systems shall comply with requirements of NFPA 70, 72, (including appendices) 90A, 101 for local building systems except as modified and supplemented by this specification. This is a performance specification. The devices shown on the drawings indicate design intent and shall be the minimum provided. Provide all other devices as required by other governing laws, codes, standards, and local inspectors. Alarm shall achieve minimum of 80db throughout occupiable spaces and meet ADA requirements.
C. Secure all necessary approvals for a complete fire alarm system acceptable to the Fire Rating Bureau and Fire Marshall/District Having Jurisdiction, and in accordance with the standards set forth in these specifications.
D. Provide shop drawings showing equipment and device locations and connecting wiring of entire fire alarm system. Include wiring diagrams, panel layout drawings, and descriptive literature of all components. All equipment and devices shall be listed by the Underwriters Laboratories, Inc. Include full design calculations with shop drawings prepared, reviewed, and sealed by a registered engineer or NICET Class III Certified Technician. Upon completion of project, provide to the Owner as built system plans and 3 sets of system operation and maintenance manuals.
E. Provide the service of a competent, NICET certified, factory-trained engineer or technician authorized by the manufacturer of the fire alarm equipment to technically supervise and participate during all of the adjustments and tests for the system.
F. Contractor shall furnish and install all wiring, conduit, junction boxes, and outlet boxes required for the installation of a complete system. All wiring shall be installed in metallic conduit, shall be color coded throughout and shall test free and clear of opens, grounds, and shorts between conductors. All wiring shall be in conformance with Article 760 of the National Electric Code.
G. Perform each electrical test and visual and mechanical inspection listed in NFPA 72. Certify compliance with test parameters.

END OF SECTION 283111

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COLORADO LICENSED PROFESSIONAL ENGINEER 55910 11/18/2021

REVISIONS

No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

ELECTRICAL SPECIFICATIONS

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY TLP
CHECKED BY ACR

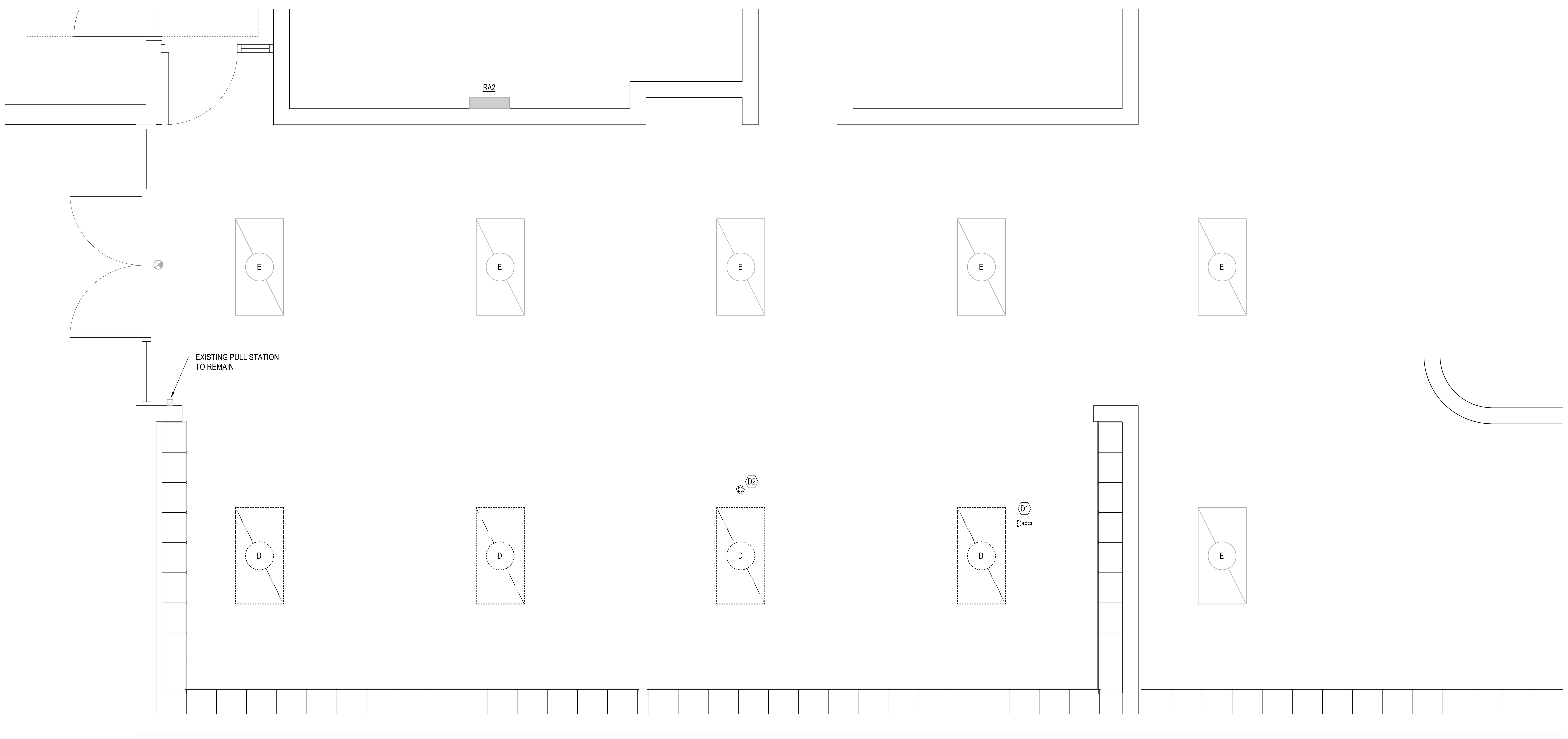
E-0.02

DEMOLITION PLAN NOTES:

1. DEMOLITION PLANS SHOW THE GENERAL EXTENT OF THE ELECTRICAL DEMOLITION WORK. THE ELECTRICAL CONTRACTOR SHALL DISCONNECT ELECTRICAL SERVICES TO ALL EQUIPMENT BEING REMOVED, SEE MECHANICAL PLANS. OWNER SHALL HAVE THE OPTION TO RETAIN REUSABLE ITEMS, SUCH AS COVERPLATES, RECEPTACLES, LIGHTS, PANELS, ETC. NOT BEING USED IN THE FINISHED WORK. COORDINATE WITH OWNER PRIOR TO STARTING DEMOLITION. PROPERLY AND LEGALLY DISPOSE OF ALL EQUIPMENT AND MATERIALS BEING REMOVED.
2. REMOVE ALL CONDUIT LEFT EXPOSED BY REMOVAL OF WALLS AND CEILINGS IN REMODELED AREAS. PLUG BOTH ENDS OF REMAINING CONDUIT IN WALL OR FLOOR WHERE CUT.
3. ELECTRICAL OUTLETS, ETC. POSSIBLY CONCEALED BY STORAGE SHELVING, CASEWORK, FURNITURE, ETC. ARE NOT SHOWN AND MAY REQUIRE REMOVAL.
4. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR PATCHING ALL OPENINGS IN EXISTING CONSTRUCTION AFTER REMOVAL OF EQUIPMENT, RACEWAY SYSTEMS, OUTLET BOXES, ETC.
5. WHERE EQUIPMENT AND OTHER DEVICES ARE BEING REMOVED, THE CIRCUITING SHALL BE REMOVED, IF POSSIBLE, BACK TO POINT OF SUPPLY. WHERE REQUIRED, CIRCUITING SHALL BE EXTENDED TO MAINTAIN CONTINUITY OF THE CIRCUIT OR OPERATION OF THE SYSTEM.
6. ALL DEVICES SHOWN DASHED ON THE DEMOLITION PLAN(S) SHALL BE REMOVED, UNLESS NOTED OTHERWISE.
7. PROVIDE MATCHING BLANK COVERPLATES WHERE DEVICES ARE BEING REMOVED FROM FLUSH-MOUNTED OUTLET BOXES IN EXISTING WALLS TO REMAIN.
8. FIELD VERIFY ALL EXISTING CONDITIONS AND DIMENSIONS PRIOR TO BEGINNING WORK.

KEYED NOTES

D1	CEILING MOUNTED CAMERA TO BE REMOVED, PRESERVED FOR RELOCATION TO CORRIDOR TO THE NORTH. COORDINATE WITH OWNER FOR EXACT LOCATION AND REQUIREMENTS.
D2	CEILING MOUNTED SPEAKER TO BE REMOVED, PRESERVED FOR RELOCATION TO CORRIDOR TO THE NORTH. COORDINATE WITH OWNER FOR EXACT LOCATION AND REQUIREMENTS.



A ELECTRICAL DEMOLITION PLAN - 1ST FLOOR

0' 1' 2' 3' 1/2" = 1'-0"

N

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COLORADO LICENSED 55910 11/18/2021 PROFESSIONAL ENGINEER

REVISIONS

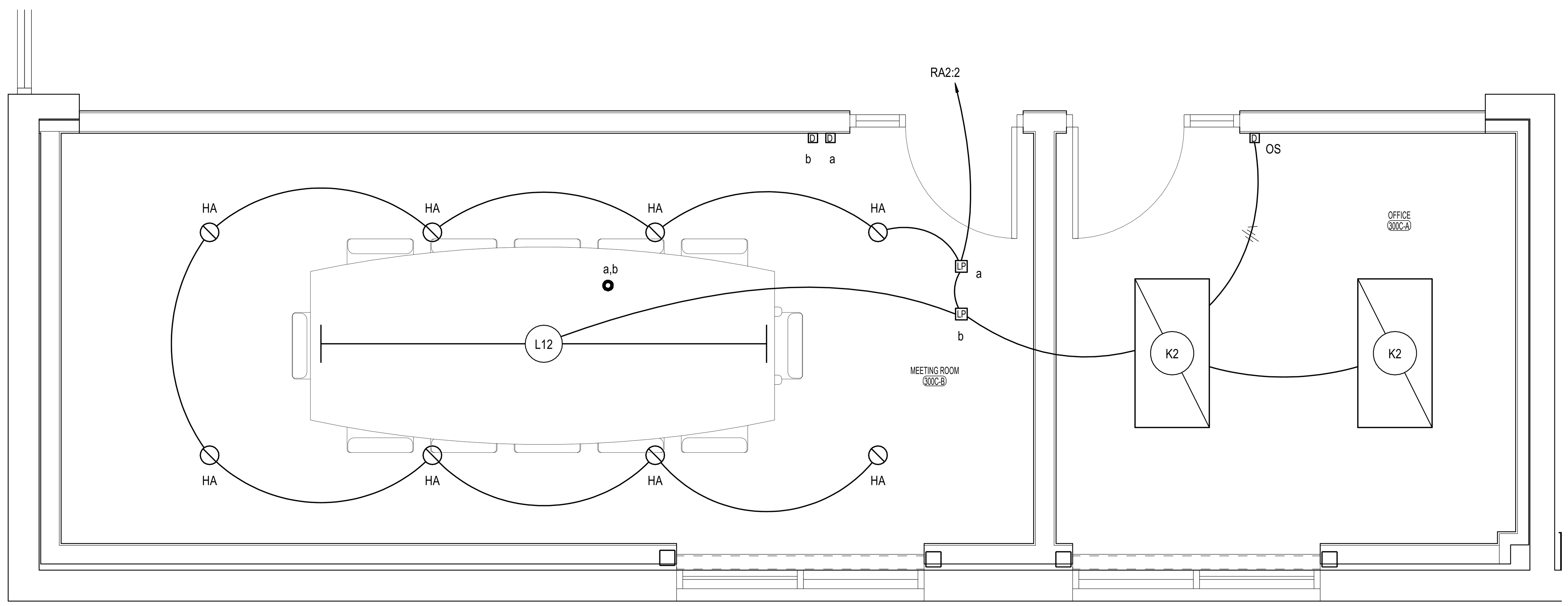
No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
FORT COLLINS, CO 80521

ELECTRICAL DEMOLITION PLAN

JOB NO.210577-000
DATE 11/18/2021
DRAWN BY TLP
CHECKED BY ACR

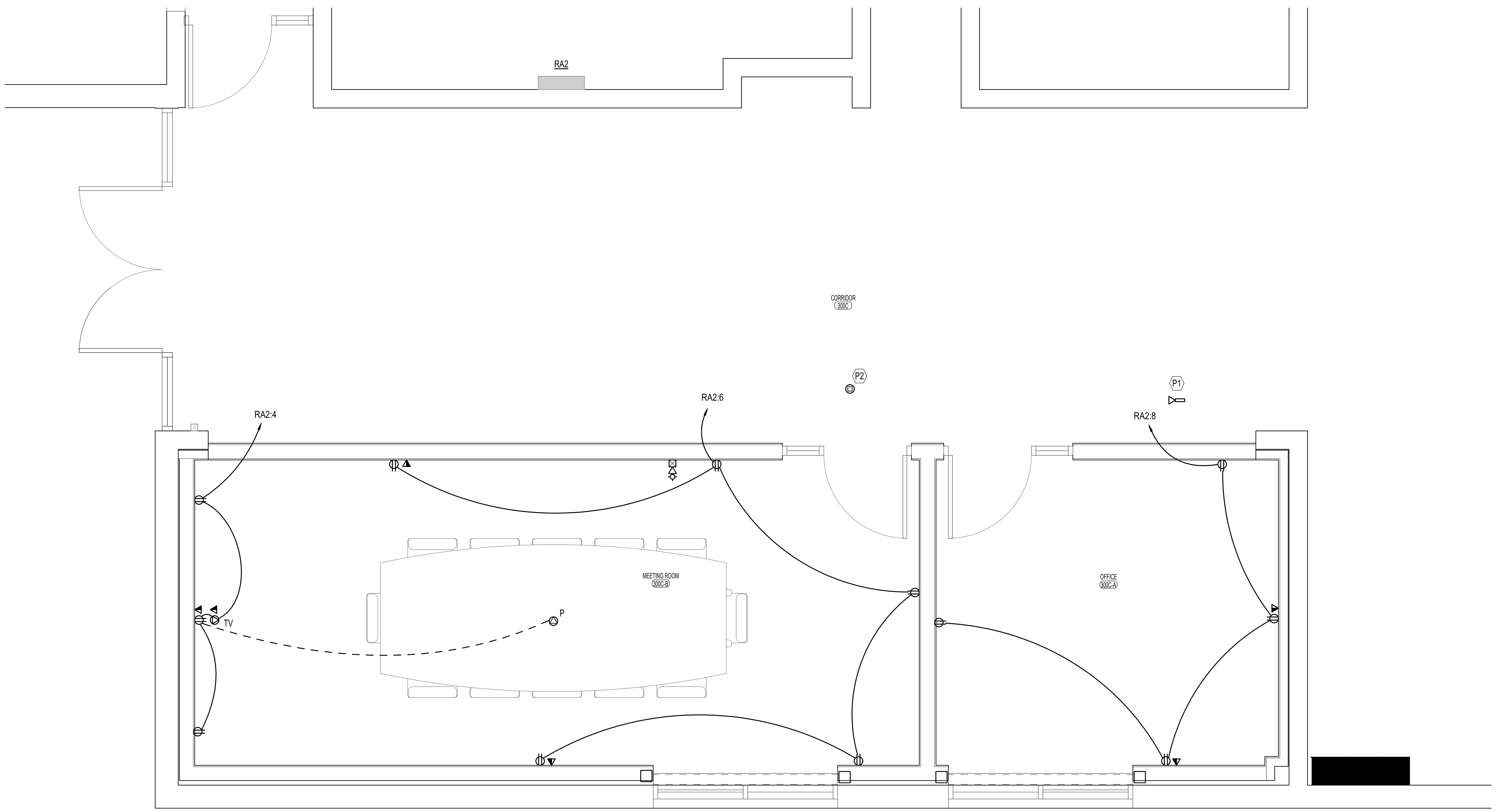
E-1.01



A **LIGHTING PLAN - 1ST FLOOR**

0' 1' 2' 3' **1/2" = 1'-0"**

N



B **POWER & SYSTEMS PLAN - 1ST FLOOR**

0' 2' 4' 6' **1/2" = 1'-0"**

N

ELECTRICAL PLAN NOTES:

1. BRANCH CIRCUITS ARE INDICATED AS ONE CIRCUIT HOME RUNS WITH INDIVIDUAL NEUTRALS. A MAXIMUM OF THREE CIRCUITS (MAXIMUM OF THREE PHASE CONDUCTORS) MAY BE GROUPED IN A SINGLE CONDUIT. WHERE MULTIPLE CIRCUITS ARE LOCATED IN THE SAME RACEWAY, JUNCTION BOX OR ENCLOSURE, NEUTRALS SHALL BE MARKED OR LABELED TO INDICATE WHICH CIRCUIT THEY ARE ASSOCIATED WITH.
2. A GROUND CONDUCTOR SIZED PER N.E.C. ARTICLE 250 IS REQUIRED IN ALL CONDUITS.
3. REFER TO THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS FOR LOCATIONS OF FIRE RATED WALLS AND CEILINGS AND THE ASSOCIATED U.L. ASSEMBLY NUMBERS.
4. FOR ALL PENETRATIONS IN FIRE RATED WALLS AND CEILINGS, PROVIDE AN ASTM E814 COMPLIANT, U.L. LISTED THROUGH PENETRATION FIRE STOPPING SYSTEM THAT IS SPECIFIC TO THE WALL OR CEILING CONSTRUCTION ASSEMBLY. INSTALL SYSTEM IN STRICT COMPLIANCE WITH THE U.L. ASSEMBLY INDICATED IN THE ARCHITECTURAL DRAWINGS AND SPECIFICATIONS.
5. ALL PIPING, CONDUIT, AND OUTLET BOXES (ELECTRIC, TELEPHONE, COMPUTER, ETC.) IN FIRE RATED WALLS OR CEILINGS SHALL BE CONSTRUCTED OF NON-COMBUSTIBLE MATERIAL.
6. OUTLET BOXES (ELECTRIC, TELEPHONE, COMPUTER, ETC.) ON OPPOSITE SIDES OF FIRE RATED WALLS SHALL BE SEPARATED BY A HORIZONTAL DISTANCE OF 24 INCHES OR PROTECTED BY OTHER MEANS ALLOWED BY THE SPECIFIC U.L. ASSEMBLY.
7. REFER TO ARCHITECTURAL DRAWINGS FOR LOCATIONS OF STC RATED WALLS. OUTLET BOXES (ELECTRIC, TELEPHONE, COMPUTER, ETC.) ON OPPOSITE SIDES OF STC RATED WALLS SHALL BE LIMITED TO TWO OUTLET BOXES PER STUD SPACE AND COVERED WITH "PUTTY PAD" TYPE MOLDABLE FIRE BARRIER.
8. FIELD VERIFY THE EXACT LOCATION OF ALL FLOOR BOXES AND POKE THROUGHS WITH ARCHITECT PRIOR TO ROUGH-IN.
9. REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR EXACT LIGHT FIXTURE LOCATIONS. VERIFY ALL DISCREPANCIES WITH ARCHITECT PRIOR TO ROUGH-IN.

KEYED NOTES

P1 APPROXIMATE RELOCATED CEILING CAMERA LOCATION, SHOWN FOR REFERENCE ONLY. COORDINATE EXACT RELOCATION REQUIREMENTS WITH OWNER.

P2 APPROXIMATE RELOCATED CEILING SPEAKER LOCATION, SHOWN FOR REFERENCE ONLY. COORDINATE EXACT RELOCATION REQUIREMENTS WITH OWNER.

LIGHTING CONTROL NOTES

LIGHTING CONTROLS BASED ON N-LIGHT CONTROLS BY ACUITY UNLESS OTHERWISE NOTED. A POWER PACK SHALL BE PROVIDED FOR EACH FIXTURE ZONE TO CONTROL FIXTURES ON/OFF AND WITH 0-10V DIMMING (WHERE APPLICABLE). DEVICES SUCH AS SWITCHES/DIMMERS, OCCUPANCY SENSORS, DAYLIGHTS SENSORS, ETC WILL BE CONNECTED VIA CAT-5E CABLE TO NEARBY POWER PACKS.

FIXTURES SHALL BE CONTROLLED IN EACH AREA IN THE FOLLOWING MANNER:

MEETING ROOM: CONTROL BY LOW-VOLTAGE CEILING OCCUPANCY SENSOR WITH LOW-VOLTAGE WALL SWITCHES WITH DIMMING.

OFFICE: CONTROL WITH LINE-VOLTAGE WALL MOUNTED OCCUPANCY SWITCH WITH DIMMING.

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COLORADO LICENSED
55910
11/18/2021
PROFESSIONAL ENGINEER

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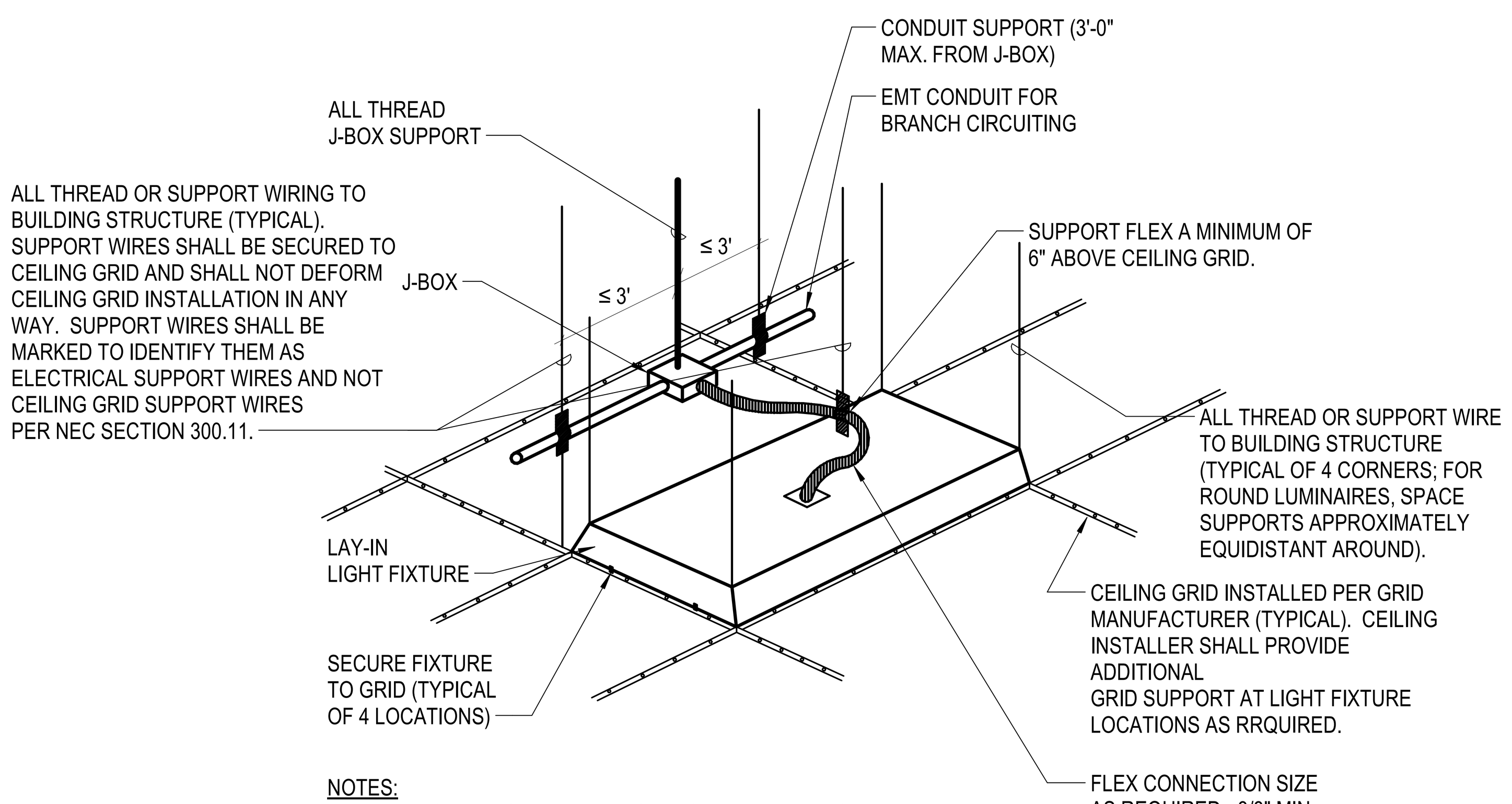
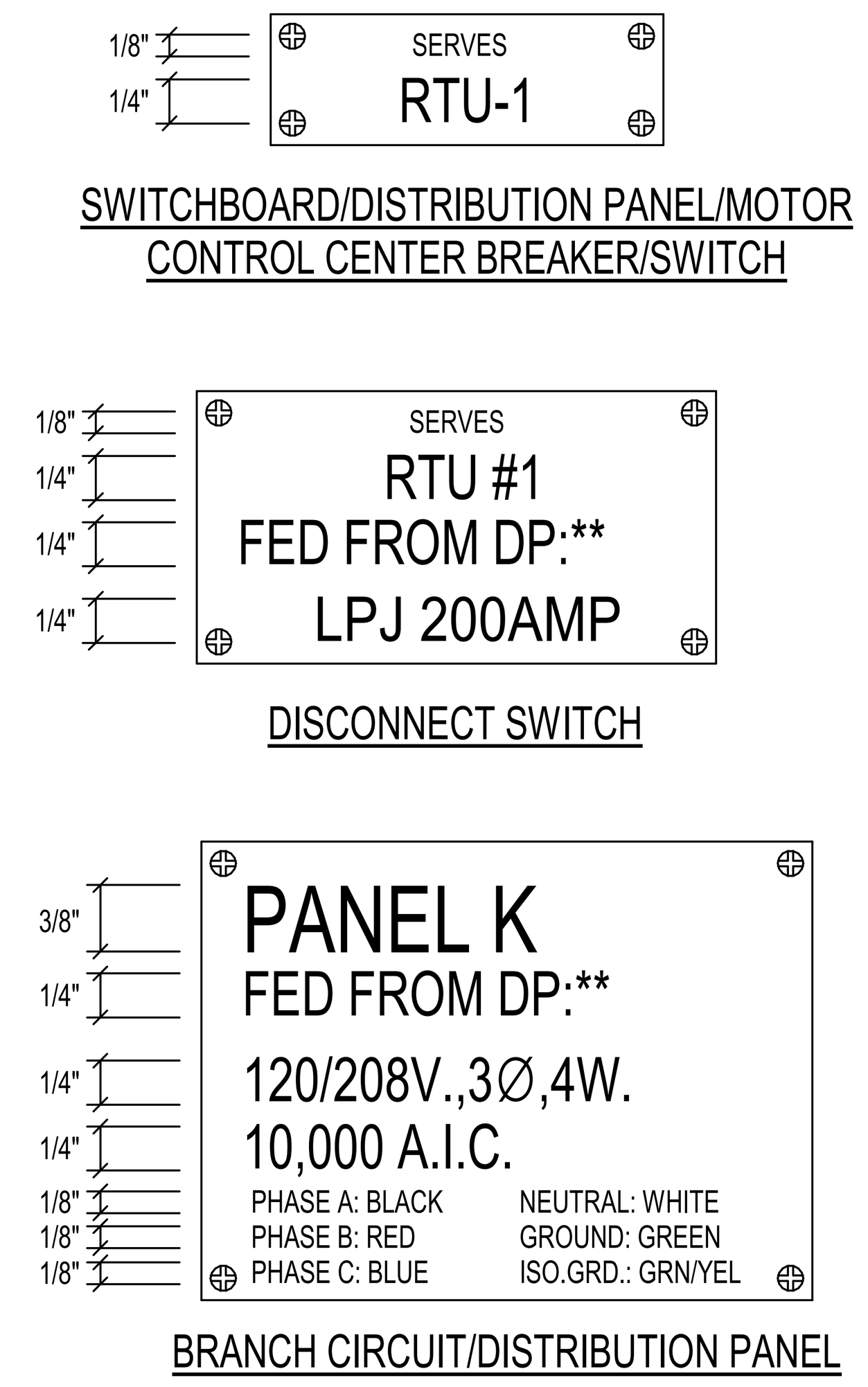


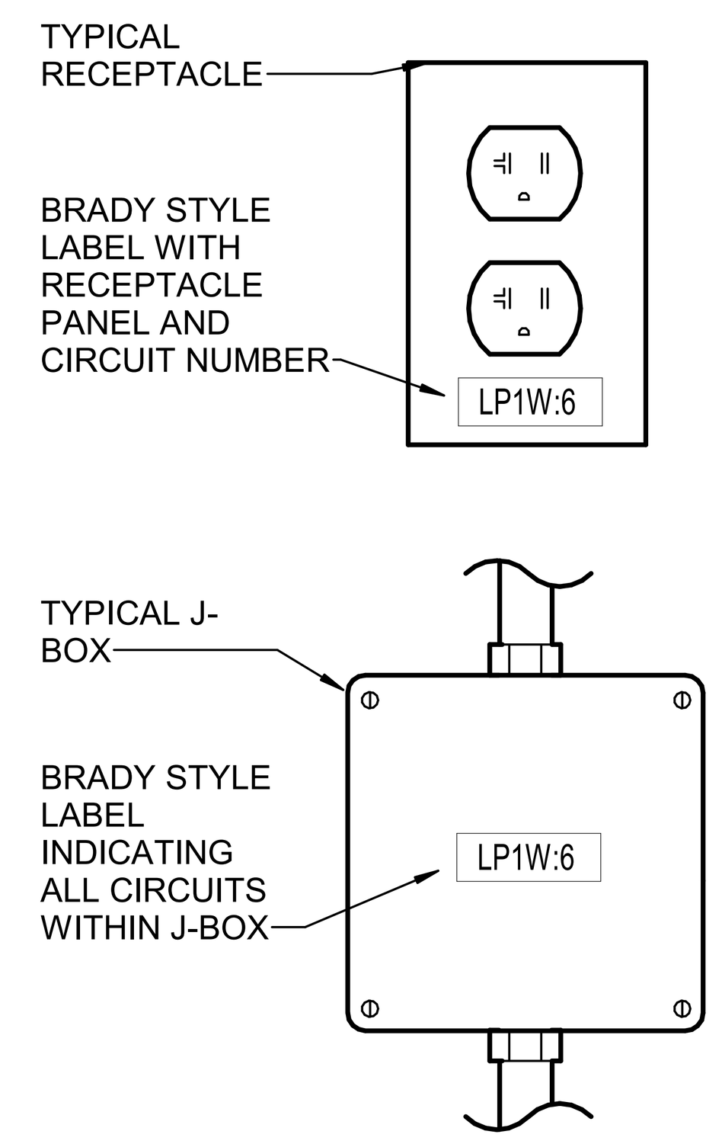
NOTES:

1. ADDITIONAL LIGHT FIXTURE SUPPORT MAY BE REQUIRED DUE TO POTENTIAL SEISMIC CONDITIONS, BUILDING OCCUPANCY, AND FIXTURE TYPE. REFER TO THE SPECIFICATIONS.
2. MOUNTING AND CONNECTION OF RECESSED CAN LIGHTS SHALL UTILIZE BAR HANGERS SECURED TO GRID.

3 TYPICAL LAY-IN FIXTURE INSTALLATION

N0 SCALE





1 TYPICAL NAME PLATES AND LABELS

N0 SCALE

① **EXIST. PANEL: RA2**

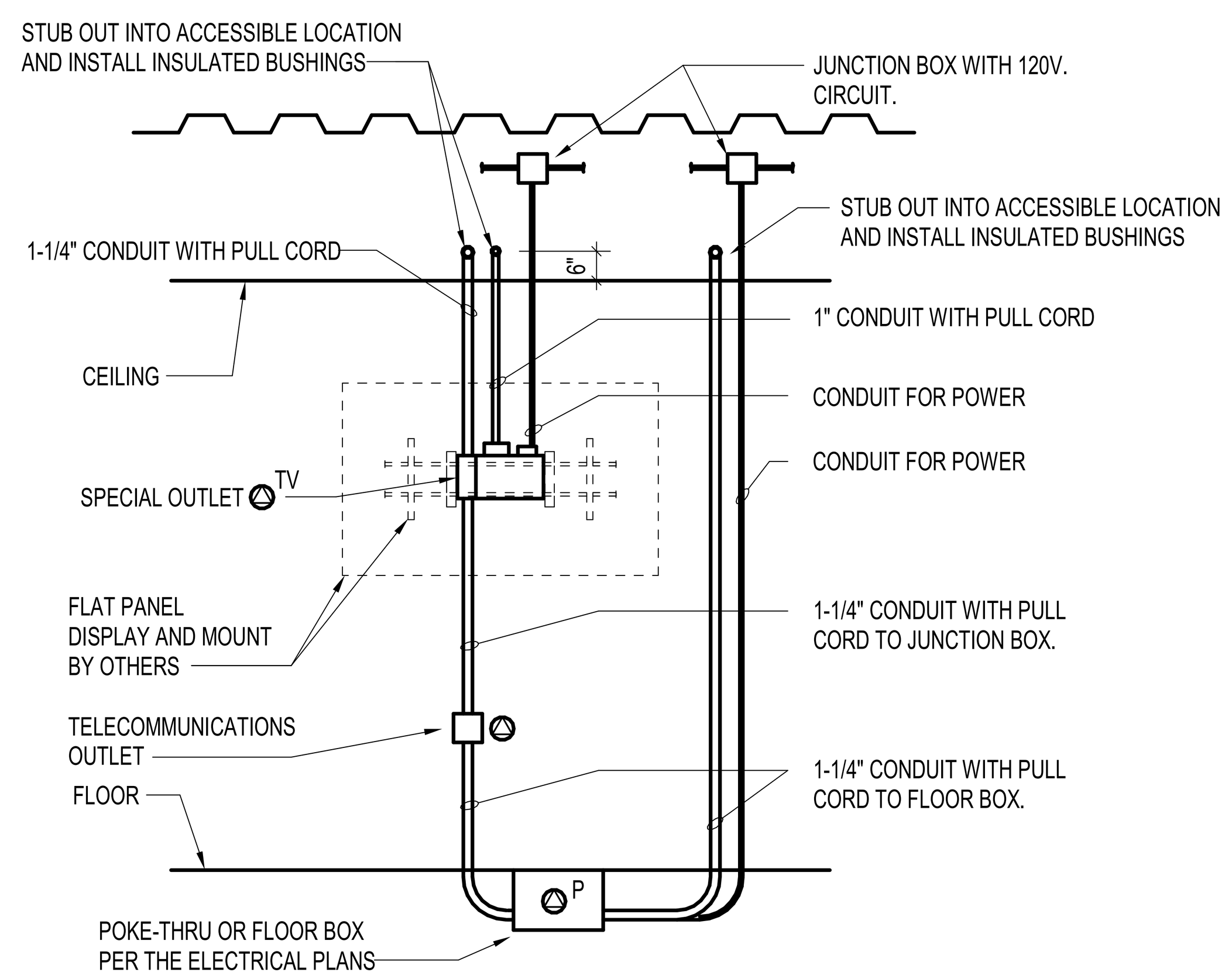
GE NLAB W/GRD. BUS

208Y/120 VOLTS, 3 PHASE, 4 WIRE
100 AMP MLO, SURFACE MTD.
10000 AIC LABELED

CIRC NO.	LOAD V. A.	LOAD TYPE	LOAD DESCRIPTION	P.	AMP SIZE	PHASE	AMP SIZE	P.	LOAD DESCRIPTION	LOAD TYPE	LOAD V. A.	CIRC NO.	
1			SPARE	1	20	A	20	1	LTG- MEETING RM, OFFICE 300C	LGHT	250	2	②
3			SPARE	1	20	B	20	1	RECS - MEETING RM 300C-B	RCPT	1200	4	②
5	500	POWR	P-6 IN AH-6	1	20	C	20	1	RECS - MEETING RM 300C-B	RCPT	1000	6	②
7			SPARE	1	20	A	20	1	RECS - OFFICE 300C-A	RCPT	800	8	②
9			SPARE	1	20	B	20	1	SPARE			10	
11			SPARE	1	20	C	20	1	SPARE			12	
13	800	RCPT	RECEPT RM 310	1	20	A	20	1	SPARE			14	
15	800	RCPT	RECEPT RM 316-318	1	20	B	20	1	BATHROOM WP RECEPT	RCPT	200	16	
17	500	POWR	EXH FAN 9,10 P-5 IN AH-5	1	20	C	20	1	SPARE			18	
19			SPARE	1	20	A	20	1	ADA			20	
21			SPACE	1		B	20	1	RECEPT RM 312	RCPT	800	22	
23			SPACE	1		C		1	SPACE			24	
25			SPACE	1		A		1	SPACE			26	
27			SPACE	1		B		1	SPACE			28	
29			SPACE	1		C		1	SPACE			30	

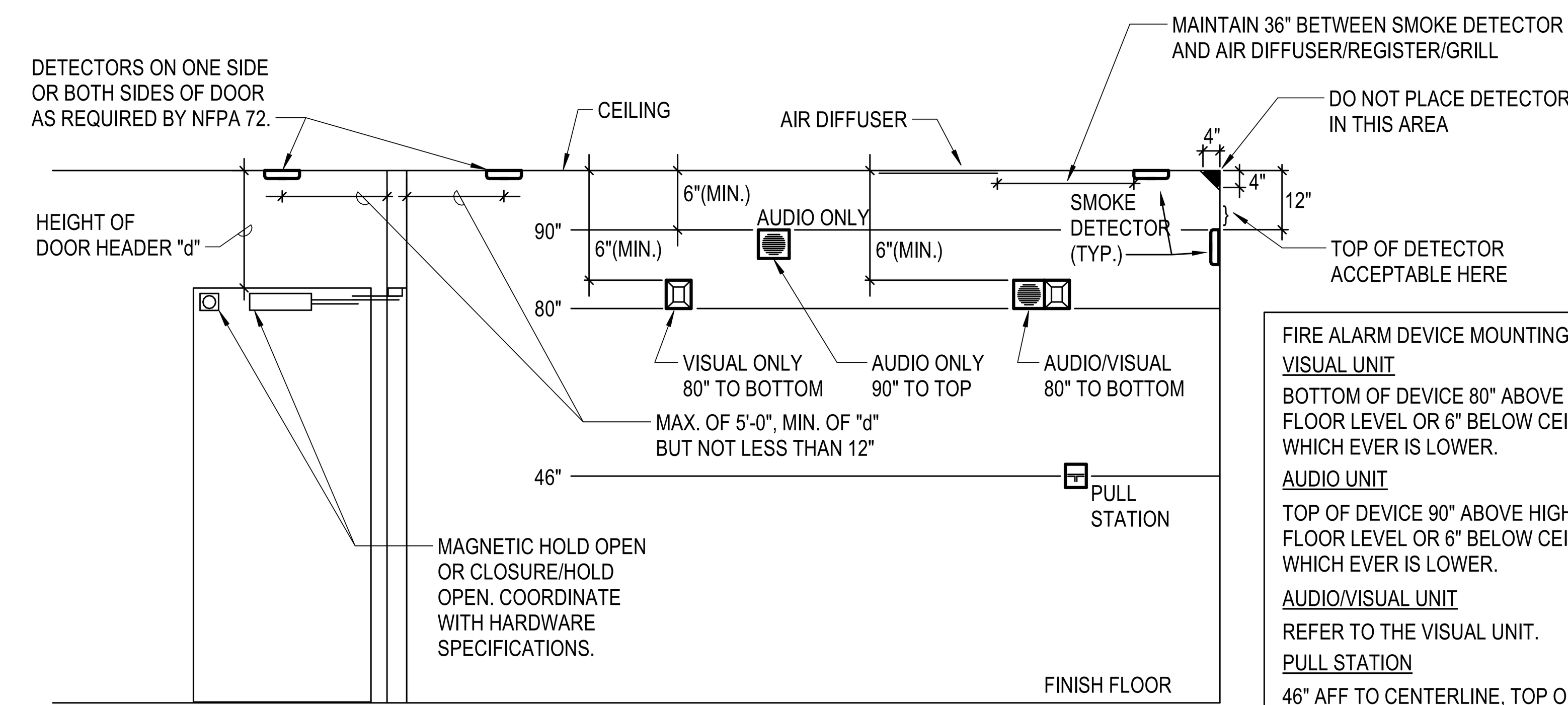
① EXISTING CIRCUIT BREAKERS AND LOADS TO REMAIN UNLESS OTHERWISE NOTED.
② CONNECT TO EXISTING SPARE CIRCUIT BREAKER. UPDATE CIRCUIT DIRECTORY.

EXIST. PANEL: RA2	CONNECTED KVA: PH-A	PH-B	PH-C	TOTAL	DEMAND FACTOR	KVA	CONT. FACT	SIZING AMPS: TOTAL	PH-A	PH-B	PH-C
Lighting	0.2	0.0	0.0	0.2	1	0.2	1.25	0.9	2.6	0.0	0.0
Receptacle	1.6	3.2	0.8	5.6	1	5.6	1	15.5	13.3	26.7	6.7
Power	0.0	0.0	1.0	1.0	1	1.0	1	2.8	0.0	0.0	8.3
Spare					0.2	1.4	1	3.8	3.8	3.8	3.8
TOTAL KVA:	1.8	3.2	1.8	6.8		8.2	TOTAL AMPS:		PH-A	PH-B	PH-C
TOTAL AMPS:	15.4	26.7	15.0	19.0				23.0	19.7	30.5	18.8



4 FSR WALL BOX

N0 SCALE



FIRE ALARM DEVICE MOUNTING CRITERIA

VISUAL UNIT

BOTTOM OF DEVICE 80" ABOVE HIGHEST FLOOR LEVEL OR 6" BELOW CEILING WHICH EVER IS LOWER.

AUDIO UNIT

TOP OF DEVICE 90" ABOVE HIGHEST FLOOR LEVEL OR 6" BELOW CEILING WHICH EVER IS LOWER.

AUDIO/VISUAL UNIT

REFER TO THE VISUAL UNIT.

PULL STATION

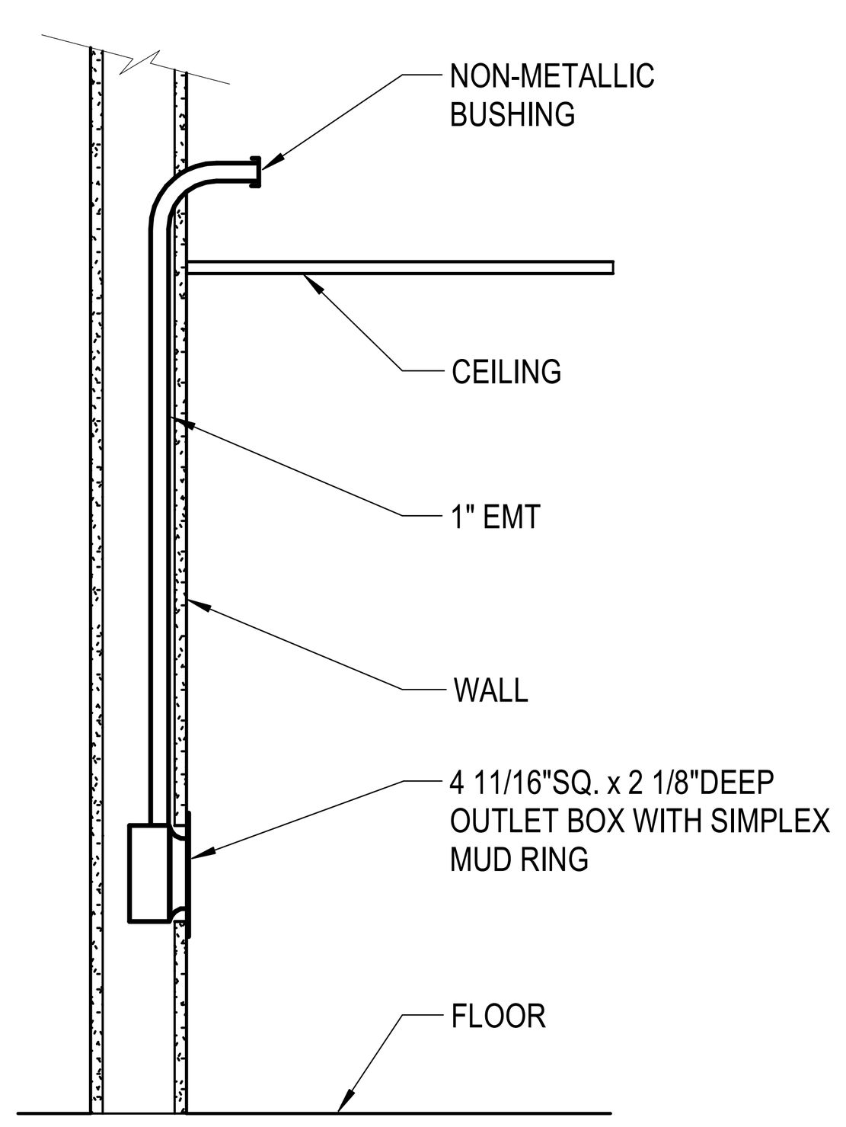
46" AFF TO CENTERLINE, TOP OF DEVICE SHALL NOT BE MORE THAN 48" AFF

GENERAL NOTE

THESE GUIDELINES SHALL BE USED UNLESS MOUNTING HEIGHTS HAVE BEEN SPECIFIED OTHERWISE ON THE DRAWINGS.

2 F.A. DEVICE MOUNTING DETAIL

N0 SCALE



5 DATACOM OUTLET DETAIL

N0 SCALE

(1)(2)(3)(4)

LIGHTING FIXTURE SCHEDULE

(P.E.C. - FT. COLLINS)

1. GENERAL CONTRACTOR SHALL PROVIDE FIREPROOFING AROUND RECESSED FIXTURES INSTALLED IN FIRE RATED CEILING PER U.L. REQUIREMENTS. ELECTRICAL CONTRACTOR WILL COORDINATE.
2. MANUFACTURERS LISTED IN THIS SCHEDULE OR APPROVED BY WRITTEN ADDENDUM WILL BE THE ONLY APPROVED MANUFACTURERS TO BID THE LIGHTING FIXTURES FOR THIS PROJECT. CONTRACTORS AND SUPPLIERS USING PRICING FROM MANUFACTURERS NOT LISTED ON SCHEDULE OR BY ADDENDUM DO SO AT THEIR OWN RSK.
3. LIGHT FIXTURE SELECTIONS ARE BASED ON THE MANUFACTURER IN THE LEFT MOST COLUMN AS LISTED IN THE SCHEDULE. FIXTURES APPROVED AS EQUALS IN THIS SCHEDULE OR BY ADDENDUM SHALL BE EQUAL TO THE UNIT SPECIFIED IN THE LEFT MOST COLUMN, IE: SPRING LOADED LATCHES, POST PAINTED FINISH, PHOTOMETRICS.
4. ALL LIGHT FIXTURES SHALL BE SECURED TO THE CEILING FRAMING SYSTEM BY MECHANICAL MEANS (SUCH AS BOLTS, SCREWS, OR RIVETS) OR BY CLIPS IDENTIFIED FOR USE WITH THE TYPE OF CEILING FRAMING MEMBER AND LIGHT FIXTURE.
5. LIGHT FIXTURES SHALL BE PROVIDED WITH 0-10V DIMMING DRIVERS. DRIVERS SHALL BE CAPABLE OF DIMMING TO A MINIMUM OF 10% TOTAL LIGHT OUTPUT. LED DRIVERS SHALL HAVE A DISCONNECTING MEANS MEETING THE REQUIREMENTS OF NEC SECTION 410.130(G), EXCEPT FOR THOSE INSTALLED IN CORD AND PLUG CONNECTED FIXTURES. WHERE APPLICABLE, WHEN DIMMING SWITCHES ARE NOT PROVIDED AS PART OF THE DESIGN, CONTRACTOR SHALL CAP OFF THE 0-10V DIMMING WIRES FOR FUTURE EXTENSION BY THE OWNER.
6. PROVIDE ARROWS AND FACES AS INDICATED ON THE DRAWINGS.
7. TO COMPLY WITH NEC SECTION 410.130(G), ALL EXISTING OR RELOCATED LIGHT FIXTURES WITHOUT A BALLAST OR DRIVER DISCONNECTING MEANS SHALL HAVE A BALLAST OR DRIVER DISCONNECTING MEANS INSTALLED UNDER ANY OF THE FOLLOWING CONDITIONS:
   a. WHEN AN EXISTING BALLAST OR DRIVER IS REPLACED.
   b. WHEN AN EXISTING LIGHT FIXTURE IS RELOCATED.
   c. WHEN AN EXISTING LIGHT FIXTURE IS RECIRCUITED.

MARK	DESCRIPTION	MANUFACTURER 1 CATALOG NUMBER	LIGHT SOURCE #	TYPE	WATTS	VOLTS	LENS/LOUVER/FINISH	DIMENSIONS W	L	D	REF. NOTE	REMARKS
D	2X4 TROFFER TO BE REMOVED		2	T8 FLUORESCENT	64			2.0	4.0	0.33		
E	EXISTING 2X4 TROFFER TO REMAIN		2	T8 FLUORESCENT	64			2.0	4.0	0.33		
HA	6" RECESSED DOWNLIGHT W/LENS	HALO COMMERCIAL PR6-10-D0110/PR6M-MD-8FS-MW	1	LED	12	UNV	SEMI-CLEAR	1.17	1.32	0.63	5	1000LM; 3500K; 80CRI
K2	2X4 FLAT PANEL	METALUX 24 FP4735C	1	LED	40	UNV	ACRYLIC	2.0	4.0	0.33	5	4700LM; 3500K; 85CRI
L12	12' SUSPENDED LINEAR DIRECT/INDIRECT	CORELITE CTA-F-7525-40L-935-1-D-UNV-STD-XX-AC-48"-UM-12	1	LED	83	UNV	ACRYLIC	0.23	12	0.17	5	12000LM; 3500K; 80CRI

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COLORADO LICENSED
TAYLOR LEE PAVRIK
55910
11/18/2021
PROFESSIONAL ENGINEER

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No.	Date	Description

PSD ROCKY MOUNTAIN HS NEW CONFERENCE AND OFFICE
2407 LA PORTE AVENUE,
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ELECTRICAL DETAILS & SCHEDULES

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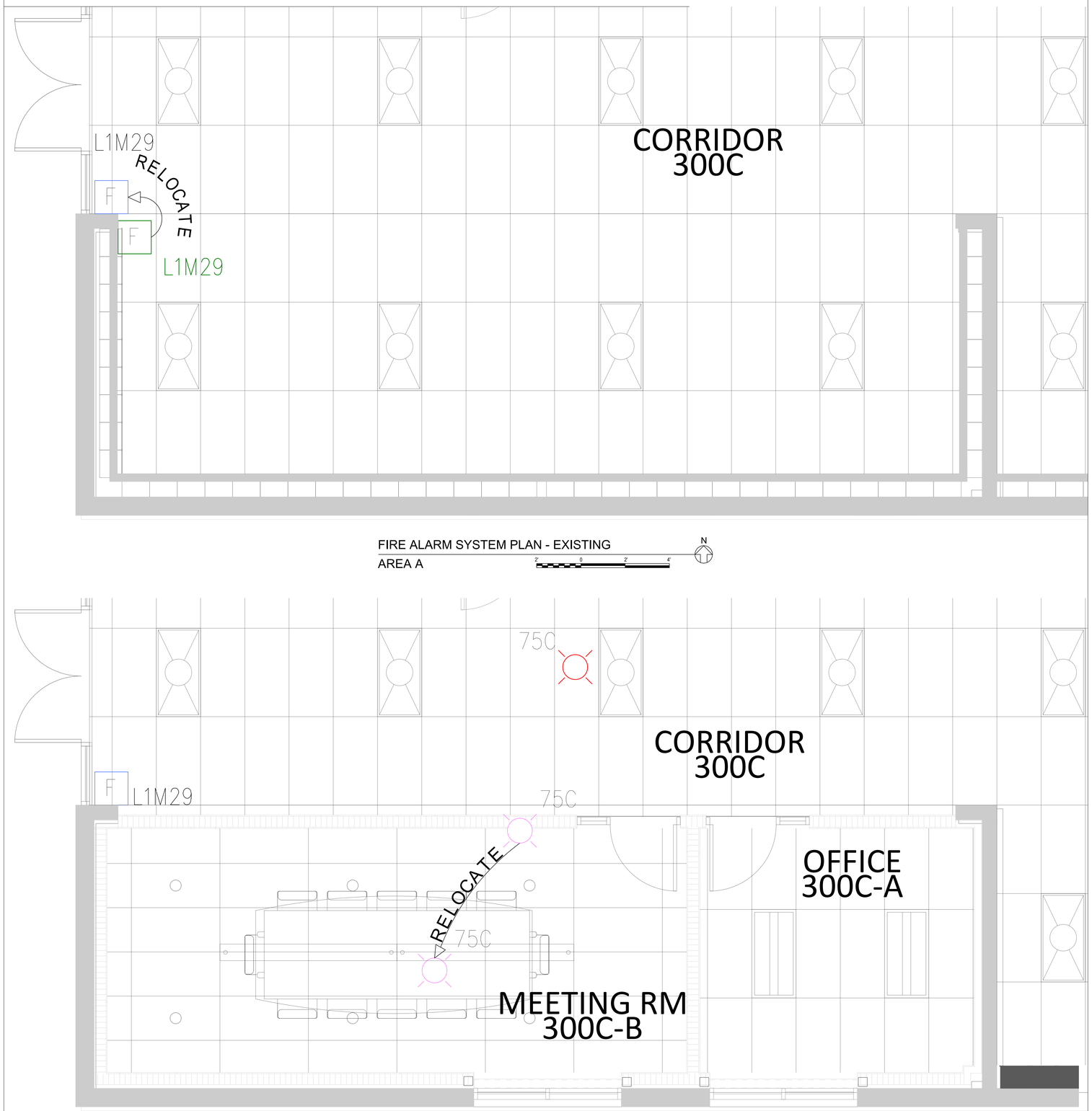
SCOPE OF WORK

NOTE: SCOPE OF WORK SHALL BE COORDINATED WITH CONCURRENT FIRE ALARM UPGRADE PROJECT.

1. RELOCATE EXISTING PULL STATION AS SHOWN.
2. RELOCATE EXISTING STROBE AS SHOWN.
3. PROVIDE ADDITIONAL STROBE (75CD) LOCATED IN THE CORRIDOR.
4. INCORPORATE NEW FLOOR PLANS AND PROVIDE UPDATED GRAPHIC MAP AND SHOP DRAWINGS.



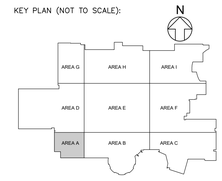
FIRE ALARM SYSTEM PLAN - EXISTING
AREA A

FIRE ALARM SYSTEM PLAN - NEW CONSTRUCTION
AREA A

FIRE ALARM SYSTEM DEVICE LEGEND

DEVICE	DESCRIPTION
75C	STROBE, CEILING MOUNT - COORDINATE WITH FA UPGRADE
75C	NEW STROBE, CEILING MOUNT - COORDINATE WITH FA UPGRADE
F	EXISTING MANUAL PULL STATION

KEY PLAN (NOT TO SCALE):



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POUDRE SCHOOL DISTRICT
NORTHERN COLORADO

ISSUES & REVISIONS:

NO.: DATE: BY:
DESCRIPTION:
NO.: DATE: BY:
DESCRIPTION:
NO.: DATE: BY:
DESCRIPTION:

DESCRIPTION:
BID DOCUMENTS

DATE: **JAN 28, 2022**
SCALE: **1/2"=1'-0"**
PAPER: **30 x 42**
PROJECT MANAGER: **JASON LEE**
PROJECT NO.: **22011-5E**
DRAWN BY: **TGS**
DRAWING FILE: **ROCKY MOUNTAIN HS FA TLH**

OWNER:
POUDRE SCHOOL DISTRICT
2407 LAPORTE AVENUE
FORT COLLINS, CO 80521

PROJECT:
ROCKY MOUNTAIN HIGH SCHOOL
1300 WEST SWALLOW RD,
FORT COLLINS, CO 80526

SHEET TITLE:
FIRE ALARM PLAN - OFFICE REMODEL

SHEET NAME:
RM.FA101A