MSU NAH 360 CREATION LABS

MONTANA STATE UNIVERSITY
NORM ASBJORNSON HALL
W GRANT ST
BOZEMAN, MT 59715

INDEX OF DRAWINGS

ARCHITECTURAL ABBREVIATIONS

A	A.F.F.	ABOVE FINISHED FLOOR
	OAHU.	AIR HANDLING UNIT
	ALT.	ALTERNATE
	ALUM.	ALUMINUM
	AMP.	AMPERE
	APPROX.	APPROXIMATE
	APT.	APARTMENT
	ARCH.	ARCHITECT
B	B	BELOW FINISH FLOOR
	B.O.	BOTTOM OF
	BOD	BASIS OF DESIGN
	BD.	BOARD
	BLDG.	BUILDING
	BM.	BEAM
	BOT.	BOTTOM
	BRG.	BEARING
	BSMT.	BASEMENT
	BTUH	BRITISH THERMAL UNIT PER HOUR
C	C.O.	CLEAN OUT
	CAP.	CAPACITY
	CFCI	CONTRACTOR FURNISHED, CONTRACTOR INSTALLED
	CFOI	CONTRACTOR FURNISHED, OWNER INSTALLED
	CG	CORNER GUARD
	CL	CENTERLINE
	CLG.	CEILING
	CLO.	CLOSET
	CLR.	CLEAR
	CMU	CONCRETE MASONRY UNIT
	COL.	COLUMN
	CONC.	CONCRETE
	CONST.	CONSTRUCTION
	CONT.	CONTINUOUS
	CORR.	CORRIDOR
	CPT	CARPET
	CT	CERAMIC TILE
	CW	COLD WATER
D	D.S.	DOWNSPOUT
	DBL.	DOUBLE
	DEPT.	DEPARTMENT
	DF	DRINKING FOUNTAIN
	DIA.,D.	DIAMETER
	DIAG.	DIAGONAL
	DIM.	DIMENSION
	DISP.	DISPENSER
	DIST.	DISTANCE
	DN	DOWN
	DTL.	DETAIL
	DW	DISHWASHER
E	E	EAST
	EA.	EACH
	E.I.F.S.	EXTERIOR INSULATION FINISH SYSTEM
	E.J.	EXPANSION JOINT
	ELEC.	ELECTRICAL
	ELEV.	ELEVATION
	EMERG.	EMERGENCY
	EPDM	ETHYLENE PROPYLENE DIENEMONOMER
	EPS	EXTRUDED POLYSTYRENE
	EQ.	EQUAL
	EQUIP.	EQUIPMENT
	EXIST	EXISTING
	EXT.	EXTERIOR
F	F.C.O.	FLOOR CLEAN OUT
	FD	FLOOR DRAIN
	FE	FIRE EXTINGUISHER
	FEC	FIRE EXTINGUISHER CABINET
	F.F.E.	FINISH FLOOR ELEVATION
	FIN.	FINISH
	FLR.	FLOOR
	FLUOR.	FLUORESCENT
	FT.	FOOT, FEET
	FTG.	FOOTING
	FURN.	FURNACE, FURNITURE
G	GA.	GAUGE
	GALV.	GALVANIZED
	G.C.	GENERAL CONTRACTOR
	G.C.O.	GROUND CLEAN OUT
	G.D.	GARBAGE DISPOSAL
	GFI	GROUND FAULT INTERRUPTER
	GLU-LAM	GLUE LAMINATED WOOD
	GND	GROUND
	GPM	GALLONS PER MINUTE
	GWB.	GYPSUM WALL BOARD
	G.E.J.	GUTTER EXPANSION JOINT
H	HDWR.	HARDWARE
	HM	HOLLOW METAL
	HORIZ.	HORIZONTAL
	HR.	HOUR
	HT.	HEIGHT
	HVAC	HEATING, VENTILATING, & AIR CONDITIONING
	HW	HOT WATER
I	IN.	INCHES
	INFO.	INFORMATION
	INST.	INSTALLATION
	INSUL.	INSULATION
	INT.	INTERIOR
J	JAN.	JANITOR
	JST	JOIST
	JT.	JOINT
K	K.O.	KNOCK OUT
	KIP	1000 POUNDS
	KIT.	KITCHEN
L	LAB.	LABORATORY
	LAM.	LAMINATED
	LBS.	POUNDS
	LH	LEFT HAND
M	MACH.	MACHINE
	MAINT.	MAINTENANCE
	MATL	MATERIAL
	MAX.	MAXIMUM
	MECH.	MECHANICAL
	MEZZ.	MEZZANINE
	MFR.	MANUFACTURER
	MIN.	MINIMUM
	MIR	MIRROR
	MISC.	MISCELLANEOUS
	MTL	METAL
N	N	NORTH
	N.I.C.	NOT IN CONTRACT
	N.T.S.	NOT TO SCALE
	NO.,#	NUMBER
O	OAE	OR APPROVED EQUIVALENT
	O.C.	ON CENTER
	OFOI	OWNER FURNISHED, OWNER INSTALLED
	OFCI	OWNER FURNISHED, CONTRACTOR INSTALLED
	OFF.	OFFICE
	OPNG	OPENING
	OSB	ORIENTED STRAND BOARD
	OZ.	OUNCE
P	P.C.	PRECAST
	PART.	PARTITION
	PERP.	PERPENDICULAR
	PLAM	PLASTIC LAMINATE
	PLAS.	PLASTIC
	PLY	PLYWOOD
	PR.	PAIR
	PREFAB	PREFABRICATED
	PSF	POUNDS PER SQUARE FOOT
	PSI	POUNDS PER SQUARE INCH
	PT	PAINT
	PTD	PAPER TOWEL DISPENSER
Q	QT	QUARRY TILE
R	R.	RADIUS
	R.C.P.	REFLECTED CEILING PLAN
	R.O.	ROUGH OPENING
	R.O.W.	RIGHT OF WAY
	RD	ROOF DRAIN
	REBAR	REINFORCING BAR
	RECEPT.	RECEPTION
	REFL.	REFLECTED
	REG	REGISTERED
	REINF.	REINFORCED
	REQ'D	REQUIRED
	REV.	REVISION
	RF	REFRIGERATOR
	RH	RIGHT HAND
	RM	ROOM
	RR	RESTROOM
S	S.	SEALED
	S.	SOUTH
	SAN.	SANITARY
	SC	SOLIDCORE
	SCHED	SCHEDULE
	SD	SOAP DISPENSER
	SEC.	SECOND
	SECT.	SECTION
	SHT	SHEET
	SHTG	SHEETING
	SPEC.	SPECIFICATION
	SQ.	SQUARE
	SS	STAINLESS STEEL
	STC	SOUND TRANSMISSION LEVEL
	STL	STEEL
	STRUCT.	STRUCTURAL
	SURF.	SURFACE
	SUSP.	SUSPENDED
	SVF	SHEET VINYL FLOORING
T	T&B	TOP & BOTTOM
	T&G	TONGUE & GROOVE
	TEL.	TELEPHONE
	TEMP.	TEMPORARY
	TER	TERRAZZO
	T.F.E.	TOP OF FOOTING ELEVATION
	T.O.	TOP OF FOOTING
	TPD	TOILET PAPER DISPENSER
	TV	TELEVISION
	TYP.	TYPICAL
U	U.L.	UNDERWRITER'S LABORATORY
	UNFIN.	UNFINISHED
	UNO	UNLESS NOTED OTHERWISE
	UTIL.	UTILITY
V	VAR.	VARIES
	VB	VINYLBASE
	VCT	VINYL COMPOSITION TILE
	VERT.	VERTICAL
	VEST.	VESTIBULE
W	W	WEST
	W/	WITH
	W/O	WITH OUT
	WC	WATER CLOSET
	WD	WOOD
	WH	WATER HEATER
	WT.	WEIGHT
	WP	WALL PROTECTION
	W.W.F.	WELDED WIRE FABRIC

TEAM MEMBERS

OWNER:

MONTANA STATE UNIVERSITY
W GRANT ST
BOZEMAN, MT 59715
TEL: 406.994.5470
CONTACT: JOHN SCOTT

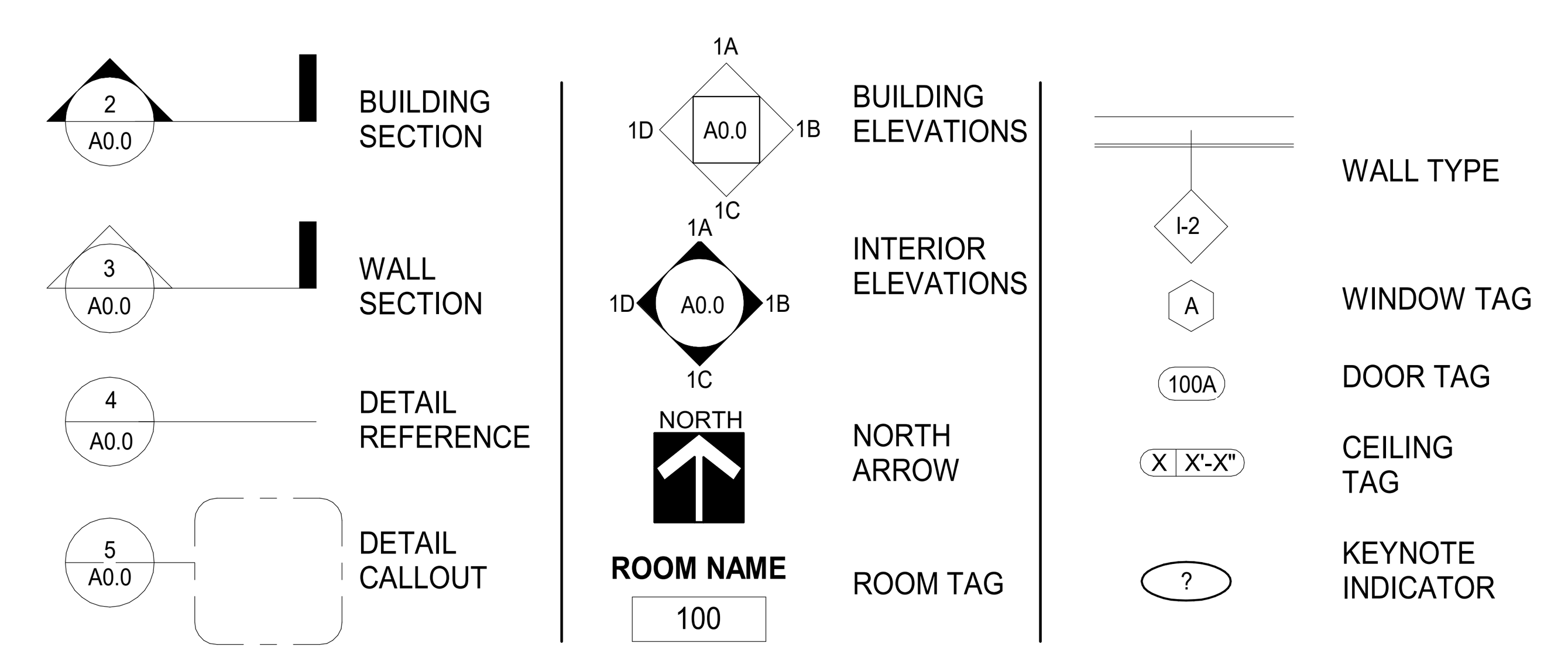
ARCHITECT:

SLATE ARCHITECTURE
1470 N. ROBERTS ST.
HELENA, MT 59601
TEL: 406.457.0360
CONTACT: SCOTT CROMWELL

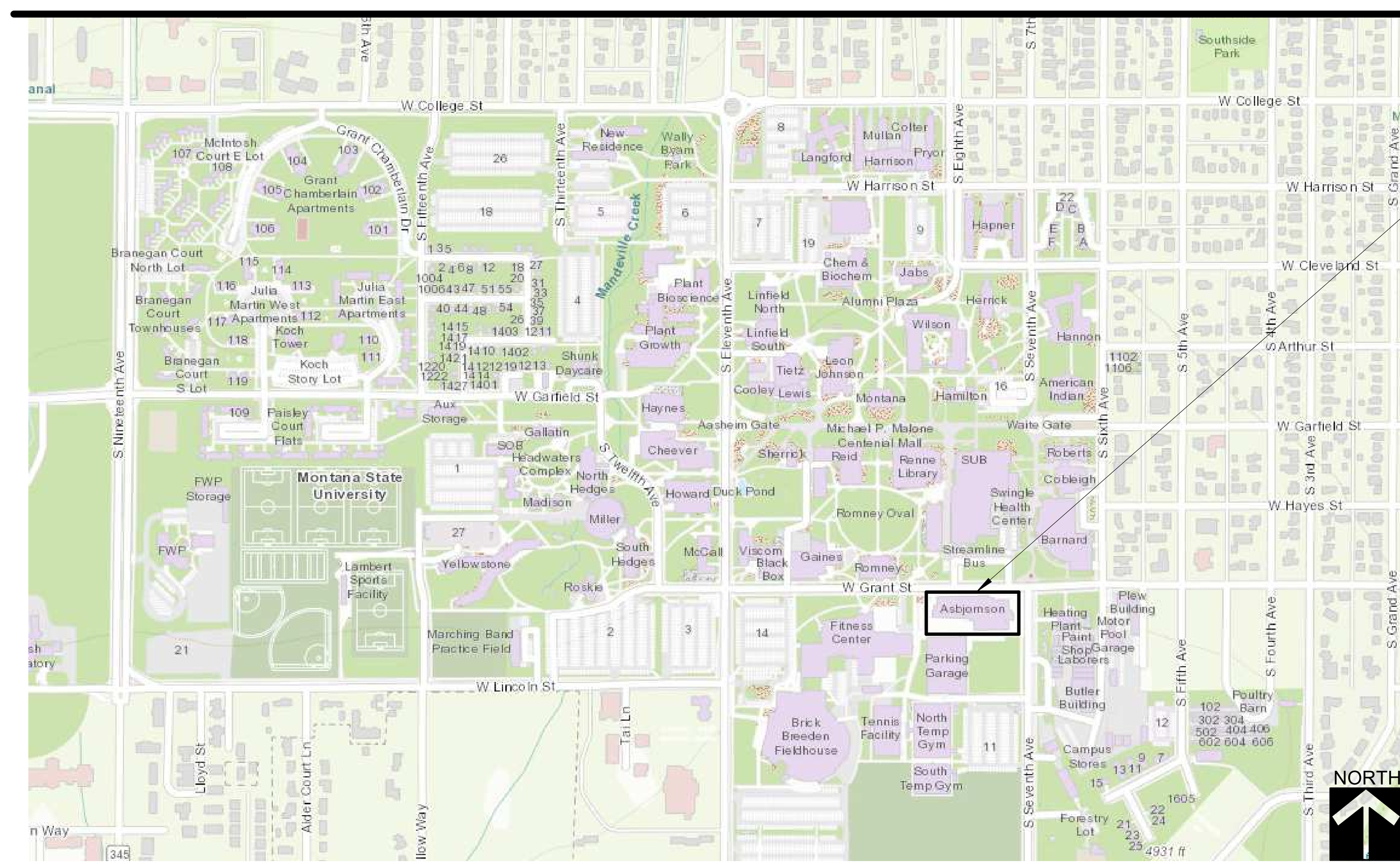
M.E.P.:

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
ASSOCIATED CONSTRUCTION ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59101
TEL: 406.245.0136
CONTACT: TODD MELING

ARCHITECTURAL GRAPHIC SYMBOLS



VICINITY MAP



PROJECT SPECIFIC NOTES

1. THE DOCUMENTS CONSIST OF THESE DRAWINGS AND SPECIFICATIONS MANUAL EXCLUSIVELY.
2. THE GENERAL CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL NEW MATERIALS (U.N.O.) AND QUALIFIED CRAFTS PERSONS TO COMPLETE THE WORK.
3. DOCUMENTS SHOW THE DESIGN INTENT OF THE PROJECT AND MAY NOT SHOW MINOR DETAILS OF PROPOSED INSTALLATIONS. THE INCLUSION OF THESE MINOR DETAILS IS IMPLIED TO PROVIDE A COMPLETE PROJECT AND ARE TO BE INCLUDED AS PART OF THE BID.
4. IT IS THE GENERAL CONTRACTORS RESPONSIBILITY TO INSPECT THE SITE AND EXISTING CONDITIONS PRIOR TO PROCEEDING WITH EACH INSTALLATION OF PART OF THE WORK. DISCREPANCIES MUST BE REPORTED TO THE ARCHITECT PRIOR TO PROCEEDING.
5. THE GENERAL CONTRACTOR IS TO COORDINATE THE INSTALLATION OF MATERIALS AND WORK OF OTHERS WHO ARE NOT SUB-CONTRACTORS TO THE G.C., YET ARE REQUIRED TO PROVIDE A COMPLETE PROJECT. AREAS OF WORK REQUIRING COORDINATION INCLUDE BUT ARE NOT LIMITED TO THOSE INDICATED AS N.I.C. IN THE CONSTRUCTION DOCUMENTS.
6. DIMENSIONS ARE SHOWN ON THE DRAWINGS. DO NOT SCALE THE DRAWINGS.
7. ALL DIMENSIONS ARE DETERMINED AS FOLLOWS: EXISTING CONSTRUCTION: FACE OF EXISTING WALL MATERIAL. NEW CONSTRUCTION: FACE OF STUD.
8. ALL HEIGHTS ARE DIMENSIONAL FROM THE TOP OF FINISHED FLOOR (A.F.F.) UNLESS NOTED OTHERWISE.
9. ALL SHOP DRAWINGS DIMENSIONS TO BE CHECKED AND VERIFIED IN THE FIELD BY THE CONTRACTOR.
10. IN THE CASE OF CONTRADICTIONS, ASSUME THE MORE COSTLY APPROACH FOR BIDDING PURPOSES. BRING ALL CONTRADICTIONS TO THE ATTENTION OF THE ARCHITECT.
11. WHERE CONDITION OF FINISH ARISES THAT NO DETAIL OR NOTE COVERS, MATCH DETAIL TO EXISTING SITUATION OF SIMILAR CONDITION
12. GENERAL CONTRACTOR SHALL BE RESPONSIBLE FOR THE COMPLETE REPAIR AND REFINISHING OF ALL HOLES OR DAMAGE ENCOUNTERED IN WORK AS A RESULT OF NECESSARY CUTTING, PATCHING, OR DEMOLITION BY ALL TRADES PERFORMING WORK.
13. GENERAL CONTRACTOR TO PROVIDE ALL REQUIRED BLOCKING, ANCHORAGES FOR ACCESSORIES, MILLWORK, GRAB BARS, MECHANICAL AND ELECTRICAL ITEMS.
14. WHERE COLUMNS AND STUD WALLS ALIGN, GYPSUM BOARD TO BE CONTINUOUS OVER COLUMNS.
15. SEAL ALL PENETRATIONS IN FLOORS, WALLS AND ROOF TIGHT AROUND DUCTS, PIPES, VENTS, SOIL-PIPES, TRAPS, ETC. CONTRACTOR TO COORDINATE.
16. ALL MECHANICAL AND ELECTRICAL LINES TO BE INSTALLED TIGHT TO STRUCTURE WHERE POSSIBLE IN ALL INSTANCES.
17. IN PAINTED OR FINISHED ROOMS, ALL HORIZONTAL AND VERTICAL PIPING AND CONDUITS SHALL BE FURRED TO MATCH ROOM FINISH AS INDICATED. WHEN DUCT WORK, PIPES, MECHANICAL UNITS, JUNCTION BOXES AND CONDUIT ARE EXPOSED IN PAINTED ROOMS, PAINT TO MATCH ADJACENT FINISH.

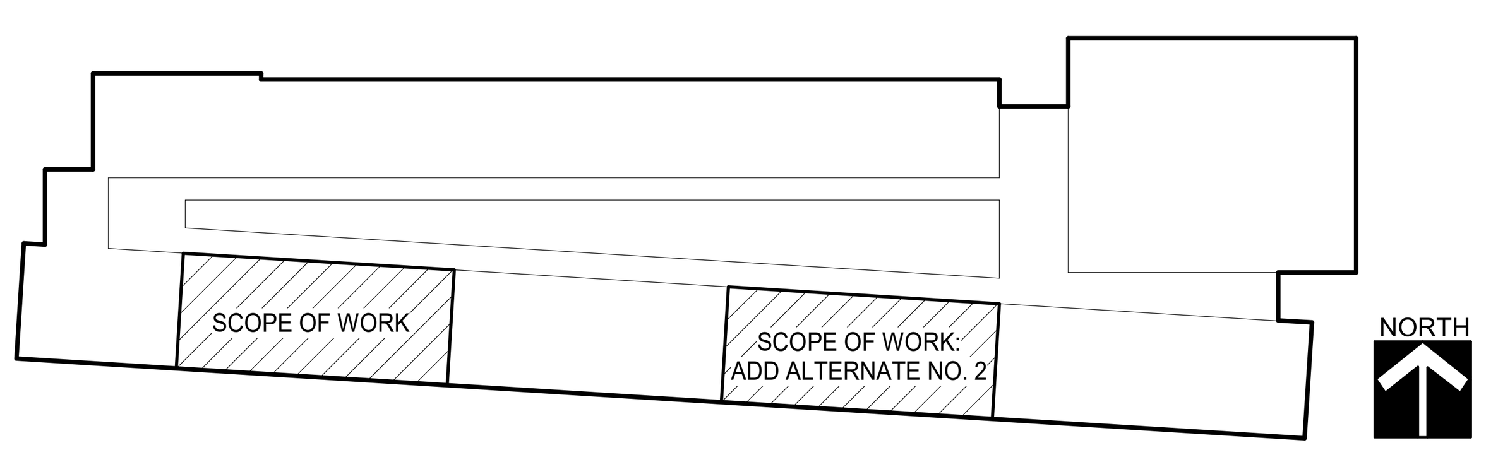
COPYRIGHT

ALTERNATE PRICING

A. ALTERNATE NO. 1 - ALTERNATING TREAD STAIR TO PENTHOUSE ROOF FROM LOWER ROOF LEVEL:
   1. BASE BID ITEM: NO WORK ON ROOF
   2. ALTERNATE ITEM: SECTION 05 5500 METAL STAIRS AND DRAWING NUMBER A240 INCLUDE ALL WORK NECESSARY TO PROVIDE AND INSTALL ALTERNATING TREAD STAIR TO PENTHOUSE ROOF FROM LOWER LEVEL ROOF.

B. ALTERNATE NO. 2 - SUSPENDED GRID CEILING IN ROOM 324
   1. BASE BID ITEM: NO WORK IN ROOM 324
   2. ALTERNATE ITEM: DRAWINGS NUMBERED A231, E311L, AND M311H INCLUDE ALL WORK NECESSARY TO RENOVATE EXISTING DUCTING AND LIGHTING TO ACCOMODATE THE NEW SUSPENDED CEILING IN ROOM 324

KEY PLAN - 3RD LEVEL & ROOF



Know what's below. Call before you dig.

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH, MVD
REVIEWED BY: SC

REV.	DESCRIPTION	DATE

LICENSED ARCHITECT
SCOTT W. CROMWELL
NO. 2551
HELENA, MT
03.07.23
STATE OF MONTANA

PPA#19-0174
SLATE#202141

SHEET TITLE
COVER SHEET

SHEET
G001

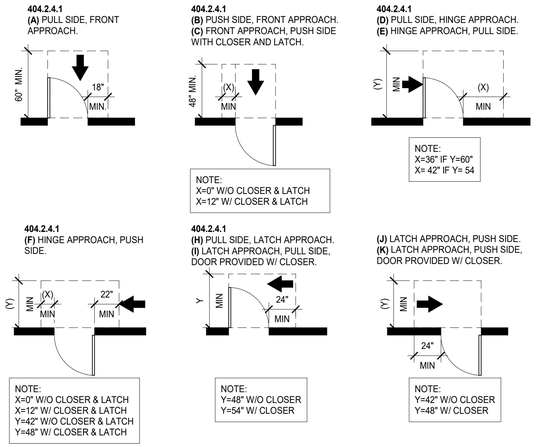
DATE
02/24/2023

Printed On: 3/10/2023 1:41:50 PM

ICC/ANSI 117.1-2017

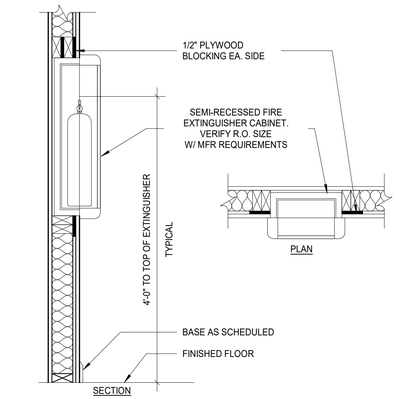
ADA 2010

ADA INFORMATION SHOWN IS IN ACCORDANCE WITH STANDARD ADA MINIMUM REQUIREMENTS. IF MATERIALS/PRODUCTS SPECIFIED OR JOB CONDITIONS DO NOT MEET THESE REQUIREMENTS, NOTIFY THE ARCHITECT.
LAST REVISED: 01/2020.



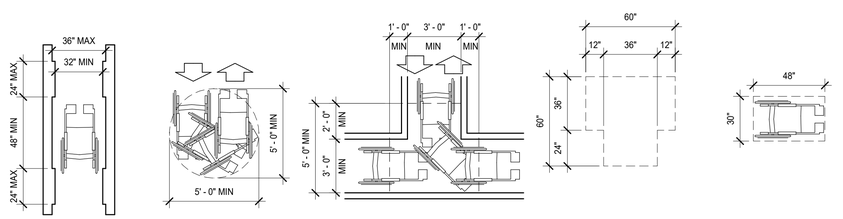
3 ADA MANEUVERING CLEARANCES

FOR REFERENCE ONLY



7 FIRE EXTINGUISHER CABINET

FOR REFERENCE ONLY



A — **403.5** CLEAR WIDTH OF AN ACCESSIBLE ROUTE.

B — **304.3.1** CIRCULAR SPACE 60" DIAMETER SPACE

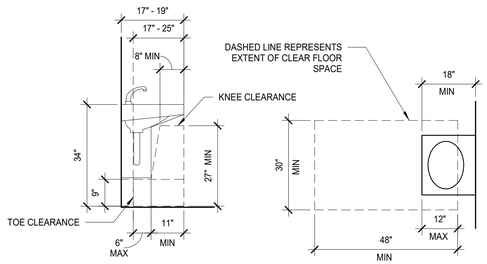
C — **304.3.2** T-SHAPED SPACE

D — **304.3.2** T-SHAPED SPACE

E — **305.3** CLEAR FLOOR SPACE

4 ADA FLOOR SPACE CLEARANCE

FOR REFERENCE ONLY



306.2 TOE CLEARANCE
306.3 KNEE CLEARANCE

11 ADA SINK CLEARANCE

FOR REFERENCE ONLY

Printed On: 3/10/2023 1:41:51 PM

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

CONSTRUCTION DRAWINGS

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH		
REVIEWED BY: SC		
REV.	DESCRIPTION	DATE

LICENSED ARCHITECT — SCOTT W. CROMWELL — NO. 2551 — HELENA, MT — STATE OF MONTANA — 02.07.23

PPA#19-0174

SLATE#202141

SHEET TITLE

ADA STANDARDS

SHEET

G002

DATE

02/24/2023

GENERAL NOTES

1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. ALL NEW WALLS ARE TO EXTEND TO DECK, UNLESS OTHERWISE NOTED.
4. WHERE FLOOR IS TRANSITIONING TO A DIFFERENT MATERIAL, INSTALL A TRANSITION STRIP.
5. DIMENSIONS ARE FROM FACE OF EXISTING WALL FINISH, OR FACE OF NEW STUD UNLESS OTHERWISE NOTES.
6. DEBRIS SHALL BE PROMPTLY REMOVED FROM THE BUILDING AND THE SITE AND DISPOSED OF IN A LEGAL MANNER. SURFACES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED IN A BROOM CLEAN CONDITION AT THE END OF EACH WORK DAY.
7. THE CONTRACTOR SHALL PROVIDE ALL DEMOLITION INCIDENTAL TO OR REQUIRED FOR NEW AND RENOVATION CONSTRUCTION WHETHER OR NOT IT IS SPECIFICALLY NOTED, INCLUDING, BUT NOT LIMITED TO, ALL OTHER WORK THAT MIGHT REASONABLY BE REQUIRED TO BE REMOVED IN PREPARATION FOR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ANY ITEMS OR SURFACES INDICATED TO REMAIN. ITEMS OR SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUB-STRATA FOR NEW FINISHES.

SYMBOL LEGEND

NEW WALL/ITEM/ELEMENT TO BE CONSTRUCTED, FIELD VERIFY TYPES AND CONDITIONS

EXISTING WALL/ITEM/ELEMENT TO REMAIN AND BE PROTECTED, FIELD VERIFY TYPES AND CONDITIONS

GENERAL FINISH NOTES

1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. WHERE CARPET IS TRANSITIONING TO EXISTING FLOOR FINISH THAT IS ANYTHING OTHER THAN CARPET, INSTALL A TRANSITION STRIP.

SYMBOL LEGEND

Name / 101 — ROOM NAME, ROOM NUMBER

W - X — WALLS, SEE SCHEDULE BELOW

B - X — BASE, SEE SCHEDULE BELOW

SYMBOL INDICATES GENERAL FINISHES FOR ROOM

X-X — INDICATES CHANGE IN FINISH TYPE FROM GENERAL ROOM FINISHES

NEW CORNER GUARD

F1 / W1 — F2 / W2 — FLOOR TRANSITION, WALL FINISH CHANGE

WALLS

W-1 GYPSUM BOARD; PNT-1

W-2 TOUCH UP AND PNT NEW INFILL WALLS TO MATCH EXISTING COLOR.

BASE

B-1 RESILIENT COVE BASE

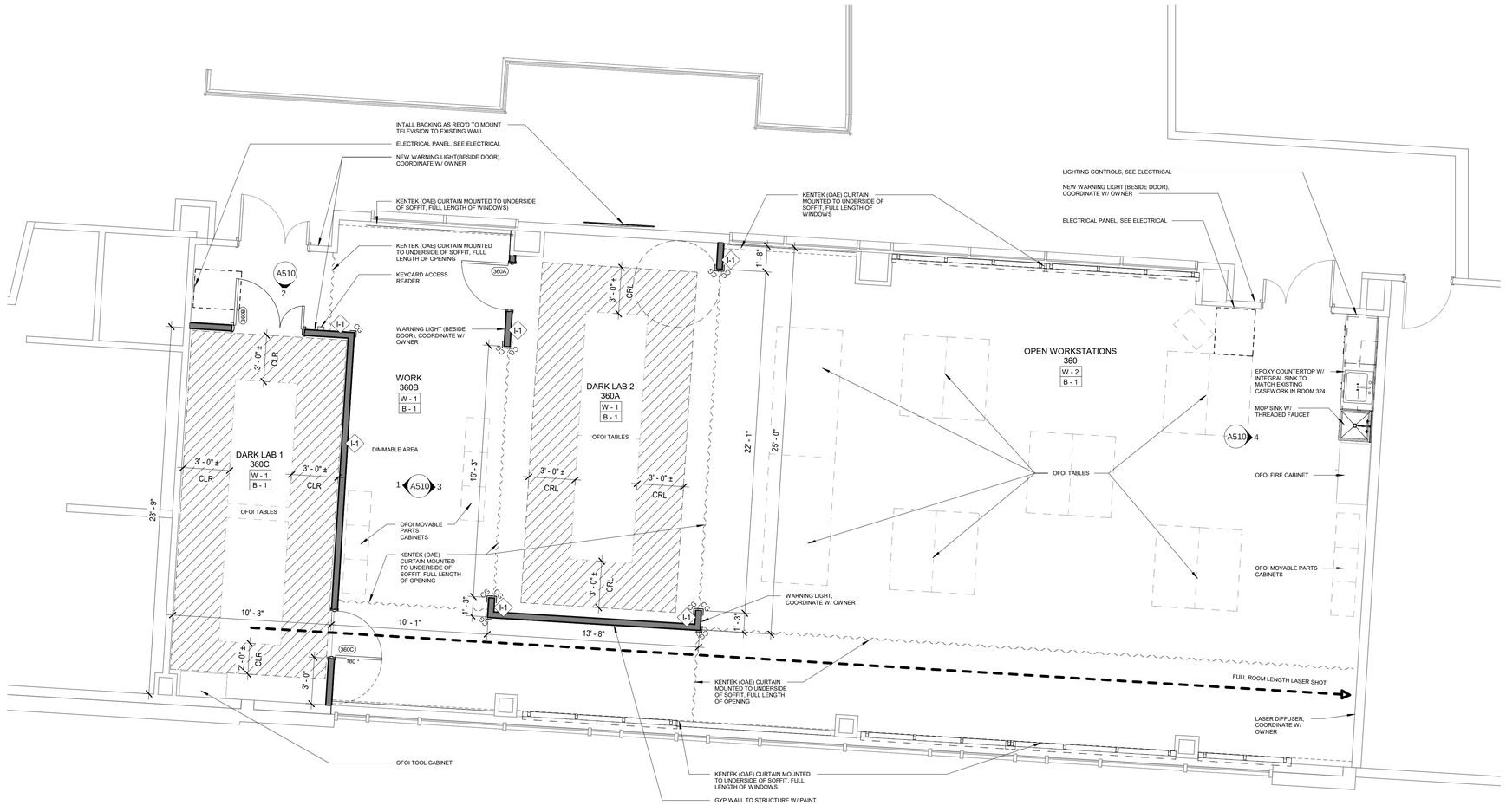
B-N/A NOT APPLICABLE

FLOORS

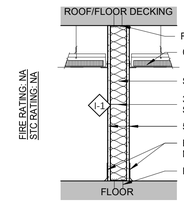
EXISTING POLISHED CONCRETE

PAINTED STRIPING

NOTE: HATCH INDICATES MATERIAL TYPE AND IS NOT A REPRESENTATION OF INDIVIDUAL MATERIAL COURSING



1 ROOM 360 CREATION LAB PLAN
1/4" = 1'-0"



METAL STUD WALL TYPES
3/4" = 1'-0"

Printed On: 3/10/2023 1:41:35 PM

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

CONSTRUCTION DRAWINGS

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH, MVD
REVIEWED BY: SC

REV.	DESCRIPTION	DATE

LICENSED ARCHITECT — SCOTT W. CROMBIE — NO. 2551 — HELENA, MT — STATE OF MONTANA — 03.07.23

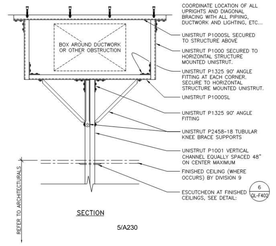
PPA#19-0174

SLATE#202141

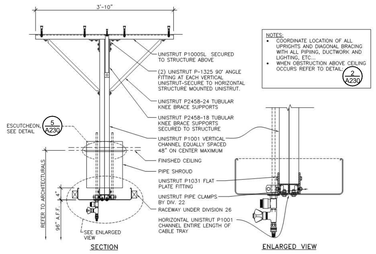
SHEET TITLE
FLOOR PLAN

SHEET
A210

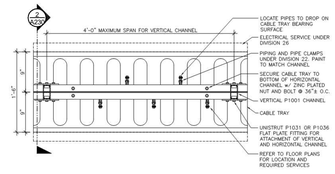
DATE
02/24/2023



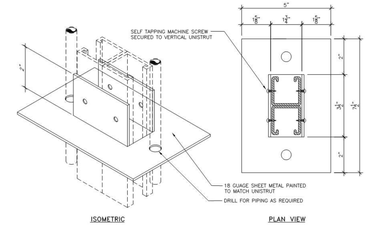
2 OVERHEAD SUPPORT W/ OBSTRUCTION
1/2" = 1'-0"



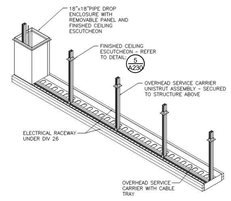
3 OVERHEAD CABLE TRAY WITH RACEWAY
1/2" = 1'-0"



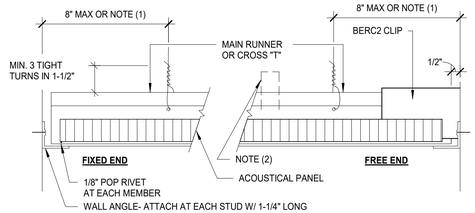
4 OVERHEAD CABLE TRAY
3/4" = 1'-0"



5 ESCUTCHEON
3" = 1'-0"

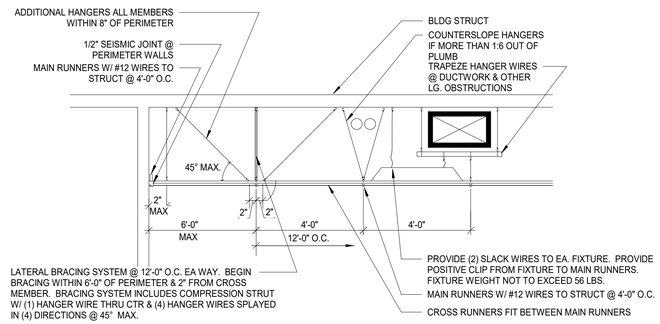


6 OVERHEAD CABLE TRAY ISOMETRIC
3/16" = 1'-0"

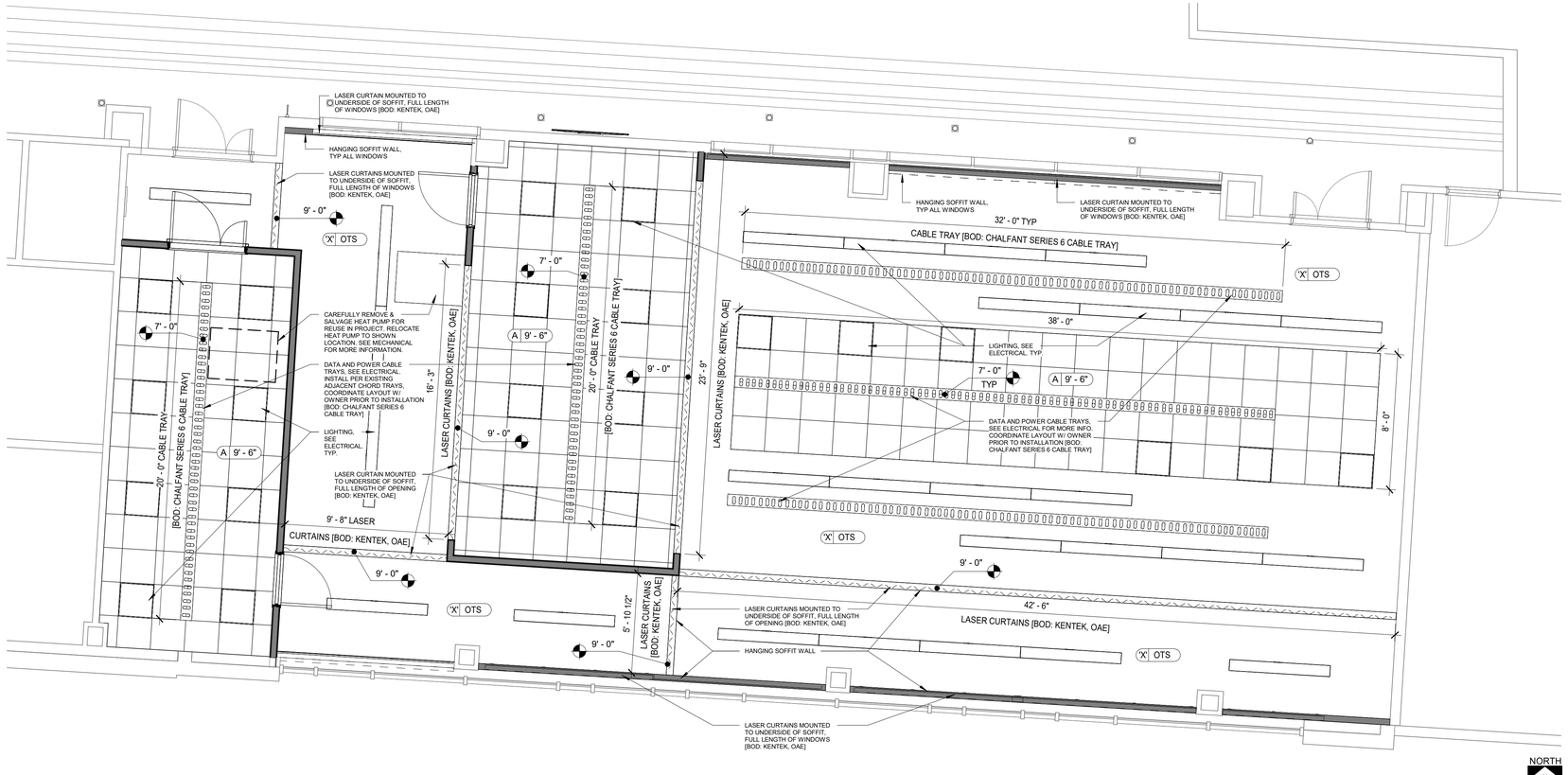


NOTE:
1. 1/4 OF THE LENGTH OF THE END RUNNER, WHICHEVER IS LEAST
2. PROVIDE SPACER @ FREE END WHERE THE FIRST RUNNER IS 12" OR MORE FROM WALL.

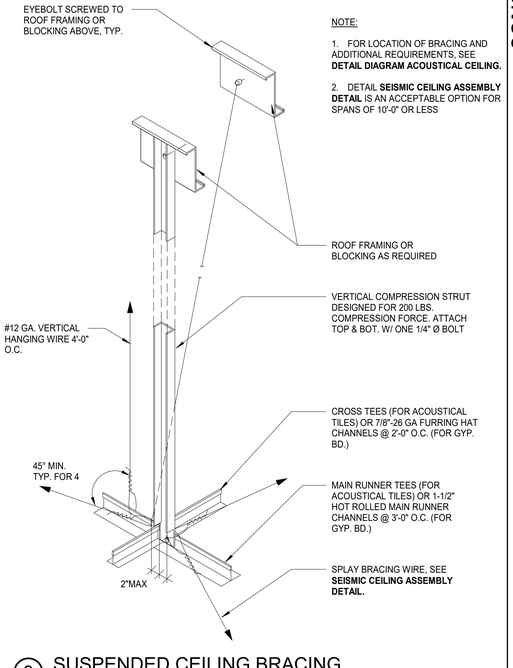
7 ACOUSTICAL CEILING DETAIL #1
3" = 1'-0"



8 SEISMIC CEILING ASSEMBLY
1 1/2" = 1'-0"



1 CREATION LAB RCP
1/4" = 1'-0"



NOTE:
1. FOR LOCATION OF BRACING AND ADDITIONAL REQUIREMENTS, SEE **DETAIL DIAGRAM ACOUSTICAL CEILING.**
2. DETAIL **SEISMIC CEILING ASSEMBLY DETAIL** IS AN ACCEPTABLE OPTION FOR SPANS OF 10'-0" OR LESS

9 SUSPENDED CEILING BRACING
3" = 1'-0"

GENERAL NOTES
1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. ALL NEW WALLS ARE TO EXTEND TO DECK, UNLESS OTHERWISE NOTED.
4. WHERE FLOOR IS TRANSITIONING TO A DIFFERENT MATERIAL, INSTALL A TRANSITION STRIP.
5. DIMENSIONS ARE FROM FACE OF EXISTING WALL FINISH, OR FACE OF NEW STUD UNLESS OTHERWISE NOTES.
6. DEBRIS SHALL BE PROMPTLY REMOVED FROM THE BUILDING AND THE SITE AND DISPOSED OF IN A LEGAL MANNER. SURFACES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED IN A BROOM CLEAN CONDITION AT THE END OF EACH WORK DAY.
7. THE CONTRACTOR SHALL PROVIDE ALL DEMOLITION INCIDENTAL TO OR REQUIRED FOR NEW AND RENOVATION CONSTRUCTION WHETHER OR NOT IT IS SPECIFICALLY NOTED, INCLUDING, BUT NOT LIMITED TO, ALL OTHER WORK THAT MIGHT REASONABLY BE REQUIRED TO BE REMOVED IN PREPARATION FOR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ANY ITEMS OR SURFACES INDICATED TO REMAIN. ITEMS OR SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUB-STRATA FOR NEW FINISHES.

SYMBOL LEGEND
NEW WALL/ITEM/ELEMENT TO BE CONSTRUCTED, FIELD VERIFY TYPES AND CONDITIONS

EXISTING WALL/ITEM/ELEMENT TO REMAIN AND BE PROTECTED, FIELD VERIFY TYPES AND CONDITIONS

CEILING TYPE LEGEND
'A'
LAY-IN ACOUSTICAL PANEL
[BOD: CERTAINTEED BQCL 224 -OR- ARMSTRONG 915]

'X'
OPEN TO EXISTING STRUCTURE AND SYSTEMS

MONTANA STATE UNIVERSITY

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH		
REVIEWED BY: SC		
REV.	DESCRIPTION	DATE

LICENSED ARCHITECT SCOTT W. CROMWELL NO. 2551 HELENA, MT STATE OF MONTANA 06.07.23

PPA#19-0174

SLATE#202141

SHEET TITLE
ROOM 360 REFLECTED CEILING PLAN

SHEET
A230

DATE
02/24/2023

Printed On: 3/10/2023 1:41:37 PM

GENERAL NOTES

1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. ALL NEW WALLS ARE TO EXTEND TO DECK, UNLESS OTHERWISE NOTED.
4. WHERE FLOOR IS TRANSITIONING TO A DIFFERENT MATERIAL, INSTALL A TRANSITION STRIP.
5. DIMENSIONS ARE FROM FACE OF EXISTING WALL FINISH, OR FACE OF NEW STUD UNLESS OTHERWISE NOTES.
6. DEBRIS SHALL BE PROMPTLY REMOVED FROM THE BUILDING AND THE SITE AND DISPOSED OF IN A LEGAL MANNER. SURFACES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED IN A BROOM CLEAN CONDITION AT THE END OF EACH WORK DAY.
7. THE CONTRACTOR SHALL PROVIDE ALL DEMOLITION INCIDENTAL TO OR REQUIRED FOR NEW AND RENOVATION CONSTRUCTION WHETHER OR NOT IT IS SPECIFICALLY NOTED, INCLUDING, BUT NOT LIMITED TO, ALL OTHER WORK THAT MIGHT REASONABLY BE REQUIRED TO BE REMOVED IN PREPARATION FOR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ANY ITEMS OR SURFACES INDICATED TO REMAIN. ITEMS OR SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUB-STRATA FOR NEW FINISHES.

SYMBOL LEGEND

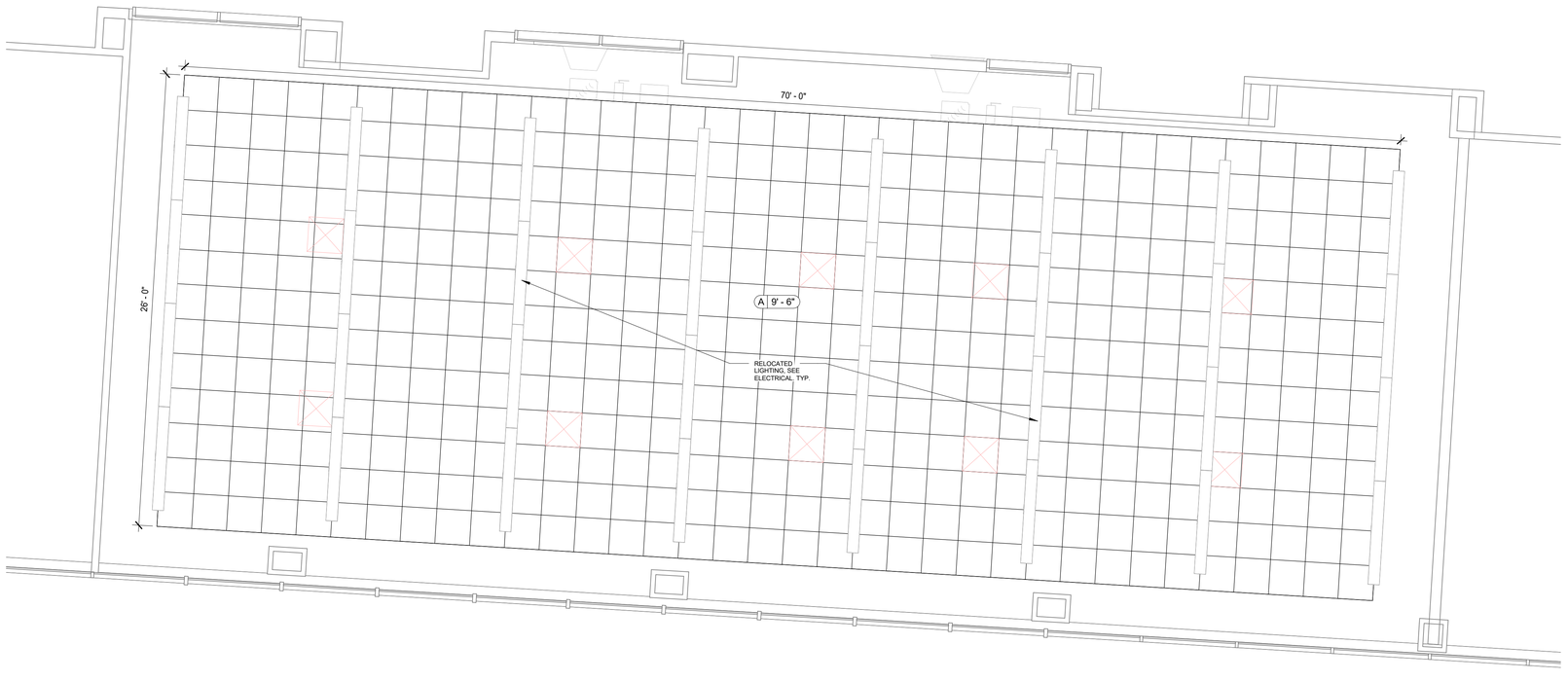
NEW WALL/ITEM/ELEMENT TO BE CONSTRUCTED, FIELD VERIFY TYPES AND CONDITIONS

EXISTING WALL/ITEM/ELEMENT TO REMAIN AND BE PROTECTED, FIELD VERIFY TYPES AND CONDITIONS

CEILING TYPE LEGEND

'A'
LAY-IN ACOUSTICAL PANEL
[BOD: CERTAINTEED BQCL 224
-OR- ARMSTRONG 915]

'X'
OPEN TO EXISTING STRUCTURE AND SYSTEMS



1 ROOM 324 REFLECTED CEILING PLAN (ADD ALTERNATE NO. 2)
1/4" = 1'-0"

Printed On: 3/10/2023 1:41:38 PM

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: Author
REVIEWED BY: Checker

REV.	DESCRIPTION	DATE

LICENSED ARCHITECT
SCOTT W. CROMWELL
NO. 2551
HELENA, MT
05-07-23
STATE OF MONTANA

PPA#19-0174

SLATE#202141

SHEET TITLE
ROOM 324 REFLECTED CEILING PLAN

SHEET
A231

DATE
02/24/2023

GENERAL NOTES

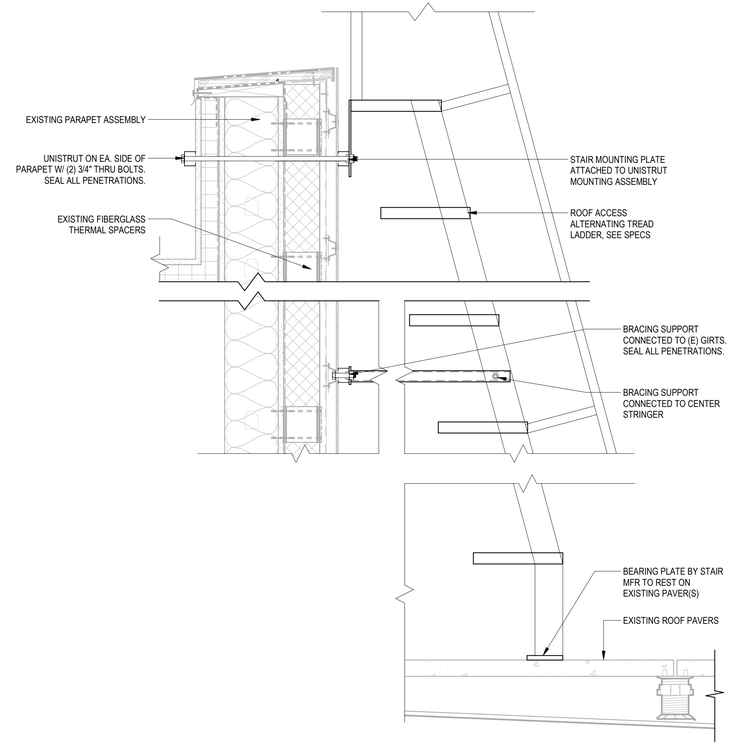
1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. ALL NEW WALLS ARE TO EXTEND TO DECK, UNLESS OTHERWISE NOTED.
4. WHERE FLOOR IS TRANSITIONING TO A DIFFERENT MATERIAL, INSTALL A TRANSITION STRIP.
5. DIMENSIONS ARE FROM FACE OF EXISTING WALL FINISH, OR FACE OF NEW STUD UNLESS OTHERWISE NOTES.
6. DEBRIS SHALL BE PROMPTLY REMOVED FROM THE BUILDING AND THE SITE AND DISPOSED OF IN A LEGAL MANNER. SURFACES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED IN A BROOM CLEAN CONDITION AT THE END OF EACH WORK DAY.
7. THE CONTRACTOR SHALL PROVIDE ALL DEMOLITION INCIDENTAL TO OR REQUIRED FOR NEW AND RENOVATION CONSTRUCTION WHETHER OR NOT IT IS SPECIFICALLY NOTED, INCLUDING, BUT NOT LIMITED TO, ALL OTHER WORK THAT MIGHT REASONABLY BE REQUIRED TO BE REMOVED IN PREPARATION FOR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ANY ITEMS OR SURFACES INDICATED TO REMAIN. ITEMS OR SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUB-STRATA FOR NEW FINISHES.

SYMBOL LEGEND

NEW WALL/ITEM/ELEMENT TO BE CONSTRUCTED, FIELD VERIFY TYPES AND CONDITIONS

EXISTING WALL/ITEM/ELEMENT TO REMAIN AND BE PROTECTED, FIELD VERIFY TYPES AND CONDITIONS

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



2 ALTERNATING TREAD CONNECTION DETAIL (ADD ALTERNATE #1)
1 1/2" = 1'-0"

Printed On: 3/10/2023 1:41:43 PM

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH
REVIEWED BY: SC

REV.	DESCRIPTION	DATE

LICENSED ARCHITECT
SCOTT W. CROMWELL
NO. 2551
HELENA, MT
05-07-23
STATE OF MONTANA

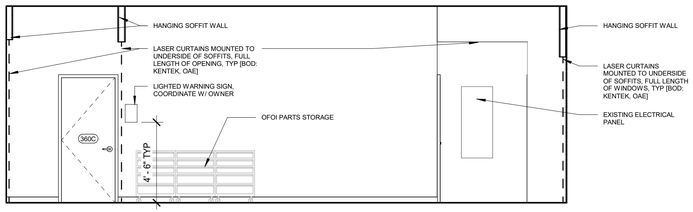
PPA#19-0174

SLATE#202141

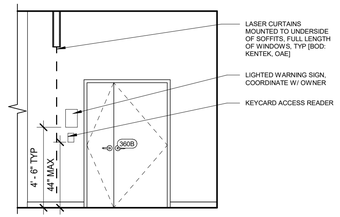
SHEET TITLE
ROOF PLAN

SHEET
A240

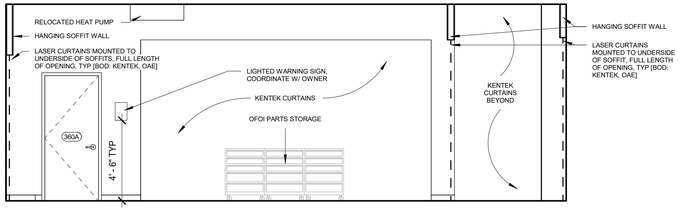
DATE
02/24/2023



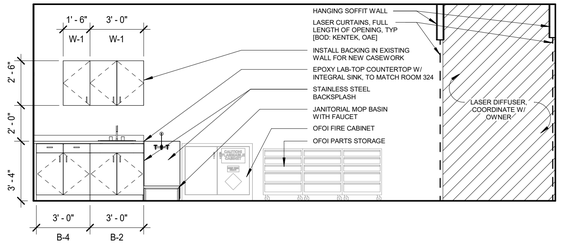
1 DARK LAB 1 EAST WALL
1/4" = 1'-0"



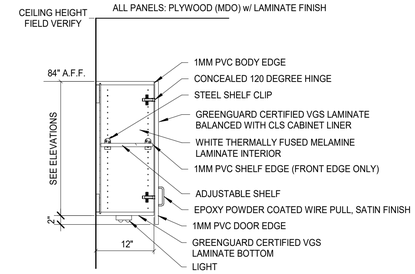
2 DARK LAB 1 NORTH WALL
1/4" = 1'-0"



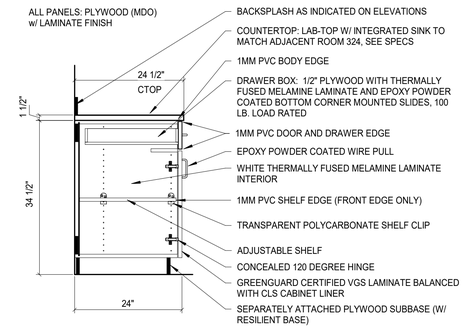
3 DARK LAB 2 WEST WALL
1/4" = 1'-0"



4 LAB 360 EAST WALL
1/4" = 1'-0"



10 W-1 (WALL CABINET TYP)
3/4" = 1'-0"



8 B-2 (DOOR DRAWER COMBO)
3/4" = 1'-0"

GENERAL NOTES

1. THE INTENT OF THE DRAWINGS IS TO PROVIDE INFORMATION FOR CONSTRUCTION. IT IS IMPORTANT FOR THE CONTRACTOR TO VERIFY FIELD DIMENSIONS AND CONDITIONS BEFORE EXECUTION OF THE WORK. CONTACT THE ARCHITECT SHOULD DISCREPANCIES EXIST.
2. CONTRACTOR AND SUBCONTRACTORS SHALL PROVIDE ALL LABOR, MATERIALS AND EQUIPMENT TO COMPLETE ALL WORK SHOWN ON PLANS, CALLED FOR IN SPECIFICATION, OR REASONABLY IMPLIED FOR A COMPLETE INSTALLATION EVEN THOUGH NEITHER SHOWN ON PLANS OR CALLED OUT IN SPECIFICATIONS.
3. ALL NEW WALLS ARE TO EXTEND TO DECK, UNLESS OTHERWISE NOTED.
4. WHERE FLOOR IS TRANSITIONING TO A DIFFERENT MATERIAL, INSTALL A TRANSITION STRIP.
5. DIMENSIONS ARE FROM FACE OF EXISTING WALL FINISH, OR FACE OF NEW STUD UNLESS OTHERWISE NOTES.
6. DEBRIS SHALL BE PROMPTLY REMOVED FROM THE BUILDING AND THE SITE AND DISPOSED OF IN A LEGAL MANNER. SURFACES IN THE CONSTRUCTION AREA SHALL BE MAINTAINED IN A BROOM CLEAN CONDITION AT THE END OF EACH WORK DAY.
7. THE CONTRACTOR SHALL PROVIDE ALL DEMOLITION INCIDENTAL TO OR REQUIRED FOR NEW AND RENOVATION CONSTRUCTION WHETHER OR NOT IT IS SPECIFICALLY NOTED, INCLUDING, BUT NOT LIMITED TO, ALL OTHER WORK THAT MIGHT REASONABLY BE REQUIRED TO BE REMOVED IN PREPARATION FOR SPECIFIED FINISHES. DEMOLITION SHALL BE PERFORMED IN A MANNER THAT WILL NOT DAMAGE ANY ITEMS OR SURFACES INDICATED TO REMAIN. ITEMS OR SURFACES SHALL BE PATCHED IF NECESSARY TO PROVIDE A SUITABLE SUB-STRATA FOR NEW FINISHES.

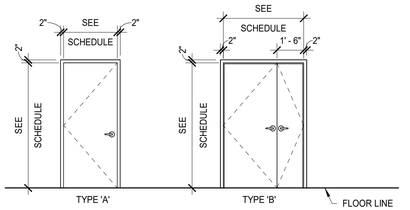
SYMBOL LEGEND

NEW WALL/ITEM/ELEMENT TO BE CONSTRUCTED, FIELD VERIFY TYPES AND CONDITIONS

EXISTING WALL/ITEM/ELEMENT TO REMAIN AND BE PROTECTED, FIELD VERIFY TYPES AND CONDITIONS

DOOR SCHEDULE

DOOR NO.	TYPE	DOOR THICKNESS	DOOR WIDTH	DOOR HEIGHT	DOOR MATERIAL	DOOR FINISH	FRAME MATERIAL	FRAME FINISH	GLAZING TYPE	HARDWARE	DETAILS (ON A5/10) HEAD	DETAILS (ON A5/10) JAMB	COMMENTS
360A	A	1 3/4"	3' - 0"	7' - 0"	HM	PNT	HM	PNT	-	H3	6	7	MATCH ADJACENT EXISTING
360B	B	1 3/4"	4' - 6"	7' - 0"	HM	PNT	HM	PNT	-	H1	6	7	MATCH ADJACENT EXISTING
360C	A	1 3/4"	3' - 0"	7' - 0"	HM	PNT	HM	PNT	-	H2	6	7	180° DOOR SWING HINGES, MATCH ADJACENT EXISTING



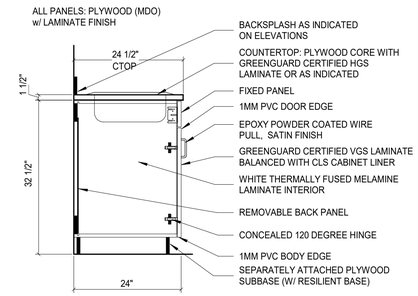
DOOR AND FRAME ELEVATION
1/4" = 1'-0"

HARDWARE SCHEDULE

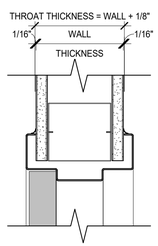
HARDWARE SET - "H1" ACCESS LEAF
- 3 PAIR HINGES
- 1 CLOSER - EXTRA HEAVY DUTY ARM W/ HOLD OPEN
- 1 CYLINDRICAL LEVER LOCKSET - STORAGE FUNCTION
- 1 KEYCARD READER, COORDINATE W/ I.T.
- 1 MANUAL FLUSH BOLT - TOP AND BOTTOM
- 2 KICKPLATE
- 2 WALLSTOPS
- 2 SETS OF SILENCERS
- 1 WARNING LIGHT

HARDWARE SET - "H2" FULL SWING STORAGE
- 1 1/2 PAIR HINGES - FULL SWING
- 1 CLOSER - EXTRA HEAVY DUTY ARM W/ HOLD OPEN, FULL SWING
- 1 CYLINDRICAL LEVER LOCKSET - STORAGE FUNCTION
- 1 WALLSTOP
- 1 SET OF SILENCERS
- 1 WARNING LIGHT

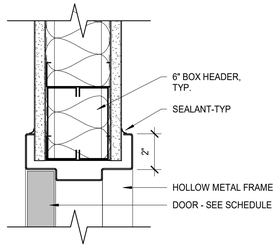
HARDWARE SET - "H3" PASSAGE
- 1 1/2 PAIR HINGES
- 1 CYLINDRICAL LEVER LOCKSET - PASSAGE FUNCTION
- 1 WALLSTOP
- 1 SET OF SILENCERS
- 1 WARNING LIGHT



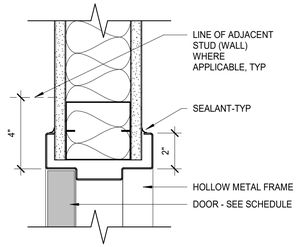
9 B-4 (SINK BASE W/ FIXED PANEL)
3/4" = 1'-0"



5 FRAME THROAT DETAIL
3" = 1'-0"



6 DOOR DETAIL - HM HEAD
3" = 1'-0"



7 DOOR DETAIL - HM JAMB
3" = 1'-0"

Printed On: 3/10/2023 1:41:45 PM

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

SLATE ARCHITECTURE, INC.
1470 N ROBERTS STREET
HELENA, MONTANA 59601
T | 406.457.0360
WWW.SLATEARCHITECTURE.COM

DRAWN BY: RH		
REVIEWED BY: SC		
REV.	DESCRIPTION	DATE

LICENSED ARCHITECT
SCOTT W. CROMWELL
NO. 3551
HELENA, MT
05-17-23
STATE OF MONTANA

PPA#19-0174

SLATE#202141

SHEET TITLE
INTERIOR ELEVATIONS & DOOR SCHEDULE

SHEET
A510

DATE
02/24/2023

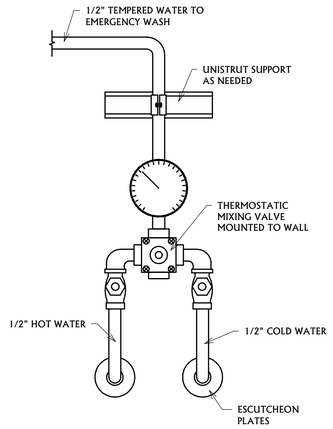
PLUMBING FIXTURE SCHEDULE

PLAN CODE	ITEM	COMPLY WITH A.D.A.	MANUF.	MODEL NUMBER	MATERIAL & FINISH	TRIM	ROUGH-IN SIZE				A.S.S.E. 1070 TMV	REMARKS
							CW	HW	SAN	VENT		
EW-1	EMERGENCY EYEWASH	●	GUARDIAN	G1799LH-L	STAINLESS STEEL	G6020 THERMOSTATIC MIXING VALVE	1/2	1/2"	--	--		PROVIDE WITH T.M.V. #G6020 INSTALLED UNDER COUNTER, THIS MIXING VALVE CONFORMS TO ANSI Z358 FOR EYEWASH TEMPERING VALVES. SEE 1/P001
MS-1	MOP SINK		ACORN	TRH-242410	TERRAZZO	MOEN COMMERCIAL #8124	3/4"	3/4"	3"	2"		SINK FAUCET SHALL HAVE VACUUM BREAKER, CHECKS, SERVICE STOPT, PAIL HOOK, TOP WALL BRACE & LEVER HANDLES.
S-1	SINK	●	SINK PER ARCH.	EPOXY DROP-IN SINK & EPOXY COUNTER TOP BY G.C.	EPOXY RESIN	ZURN #Z826U14-XL-18F	1/2"	1/2"	2"	2"	●	EPOXY RESIN SINK BY OTHERS, MOUNT TO CONFORM TO ALL A.N.S.I. & A.D.A. REQUIREMENTS, PROVIDE FAUCET WITH 1.5 gpm FLOW & NON AERATED LAMINAR FLOW OUTLET. PROVIDE ALL WASTE PIPING, TRAPS AND ACCESSORIES. SEE ARCHITECTURAL PLANS FOR CASEWORK, COUNTER AND SINK DETAILS

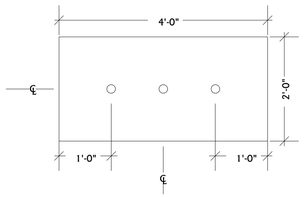
NOTES:
1. PROVIDE ALL FIXTURES WITH APPROPRIATE CARRIERS, HDPE P-TRAPS, GRID STRAINERS, QUARTER TURN BALL STOPS AND MIXING VALVES FOR A COMPLETE INSTALLATION. REFER TO ARCHITECTURAL PLANS FOR EXACT LOCATIONS AND MOUNTING HEIGHTS.
2. VERIFY FLOOR FINISH THICKNESS BEFORE SETTING ANY FIXTURE.
3. CONTRACTOR SHALL SET SENSITIVITY AND DURATION OF ELECTRONIC AND METERED DEVICES AS DIRECTED BY THE OWNER.
4. ALL LAVATORIES AND PUBLIC SINKS SHALL BE PROVIDED WITH THERMOSTATIC MIXING VALVES TO TEMPER THE HOW WATER TO 110 DEG. F., MIXING VALVE SHALL CONFORM TO ASSE 1070.
5. PROVIDE FLUSH MOUNTED LOCKABLE ACCESS PANELS AS NEEDED FOR PLUMBING ACCESSORY ACCESS. COORDINATE LOCATION WITH THE ARCHITECT AND G.C. PRIOR TO ACCESSORY AND ACCESS DOOR INSTALLATION. REFER TO ARCHITECTURAL SPECIFICATIONS FOR ACCESS DOOR REQUIREMENTS.

GENERAL PLUMBING NOTES

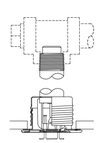
1	ALL NEW PIPING, VALVES AND FIXTURES FOR DOMESTIC WATER SERVICE SHALL COMPLY WITH THE REDUCTION OF LEAD IN DRINKING WATER ACT OF 2011 WHICH IS BEING ENFORCED AS OF JANUARY 4, 2014.
2	MECHANICAL CONTRACTOR SHALL PROVIDE FOR FIRE STOPPING OF ALL PLUMBING PENETRATIONS OF RATED WALLS AND FLOORSIA AN UL APPROVED METHOD.
3	ANY PIPING THAT IS EXPOSED TO VIEW SHALL BE JACKETED WITH A PAINTABLE PVC JACKET.



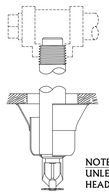
1 TMV MOUNTING DETAIL
NOT TO SCALE



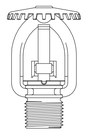
2 ACCEPTABLE LOCATIONS FOR SPRINKLER HEADS
NOT TO SCALE



3 TYPICAL CONCEALED HEAD
NOT TO SCALE



4 TYPICAL PENDANT HEAD
NOT TO SCALE



5 TYPICAL UPRIGHT HEAD
NOT TO SCALE

6 TYPICAL DRY SIDEWALL HEAD
NOT TO SCALE

PLUMBING SYMBOLS LEGEND

GENERAL PIPING

or	DIRECTION OF FLOW	or	TEE IN HORIZ. RUN
or	REDUCER FITTING	or	BRANCH TEE W/ OFFSET
	ELBOW TURNED UP	or	BRANCH TEE TURNED UP
	ELBOW TURNED DN.	or	BRANCH TEE TURNED DN.
	DROP IN HORIZ. RUN		CROSS IN HORIZ. RUN
	TEE TURNED UP		90° AND 45° ELBOWS
	TEE TURNED DN.		END CAP CONNECTION
	BELL AND SPIGOT		UNION FITTING

PIPING PHASE

	EXISTING PIPING		TEMPORARY PIPING
	NEW UNDERFLOOR PIPING		DEMOLISHED PIPING
	NEW ABOVE FLOOR PIPING		

-CW-	DOMESTIC COLD WATER	SAN	SANITARY WASTE
-HW-	DOMESTIC HOT WATER	-SD-	STORM DRAINAGE - PRIMARY
HWRC	DOMESTIC HOT WATER RECIRC.	-SD-OF-	STORM DRAINAGE - OVERFLOW
		-AW-	ACID WASTE
		-V-	VENT
		-AV-	ACID VENT

MISCELLANEOUS/MECHANICAL PIPING TYPES

-CWS-	CHILLED WATER SUPPLY	CA	COMPRESSED AIR
-CWR-	CHILLED WATER RETURN	-CD-	CONDENSATE DRAIN
-HWS-	HOT WATER SUPPLY		
-HWR-	HOT WATER RETURN		

PIPING FITTINGS, VALVES & SPECIALTIES

EXIST. FIXTURE TO REMAIN | NEW PLUMBING FIXTURE | EXIST. FIXT. TO BE REMOVED

P-1 or P1	FIXT. NUMBER - SEE SCHED.		ANGLE VALVE
or	BALL VALVE		BUTTERFLY VALVE
or	GATE VALVE		PRESS. REDUCING
or	GLOBE VALVE		2-WAY (ELECTRIC)
	PLUG VALVE		2-WAY (PNEU. MTR.)
or	CHECK VALVE		2-WAY (SOLENOID)
	SOLENOID GATE VALVE		PNEUMATIC MOTOR
	BALANCING VALVE		3-WAY (ELECTRIC)
	FLOAT VALVE		3-WAY (PNEUMATIC)
	DRAIN		3-WAY (PNEU. MTR.)
or	WALL HYDRANT OR HOSE BIBB		STRAINER
or	FLEX. CONNECTION		STRAINER W/ BLOW-OFF
T F	SENSOR (TEMP./FLOW)	VTR	VENT THRU ROOF
	TEMP. GAUGE		
	PRESSURE GAUGE		
	P.O.C. - POINT OF CONNECTION		P.O.C. - POINT OF DISCONNECTION

THIS IS A STANDARDIZED SYMBOLS LEGEND, ALL SYMBOLS SHOWN MAY NOT APPEAR ON OR WITHIN THIS SET OF CONTRACT DOCUMENTS.

PLUMBING SHEET LIST

PLUMBING ABBREVIATIONS

AFF	ABOVE FINISHED FLOOR	M.C.	MECHANICAL CONTRACTOR
APPROX	APPROXIMATE	MFG MANUF	MANUFACTURER
BFF	BELOW FINISHED FLOOR	MECH M.C.	MECHANICAL
BFP	BACKFLOW PREVENTER	PLBG P.C.	PLUMBING CONTRACTOR
C.O.T.G.	CLEAN OUT TO GRADE	TYP	TYPICAL
DWG	DRAWING	W/	WITH
F.C.O.	FLOOR CLEAN OUT	W.C.O.	WALL CLEAN OUT
G.C.	GENERAL CONTRACTOR	#	NUMBER
DWV	DOMESTIC WASTE & VENT	H2O	WATER
V.T.R	VENT THROUGH ROOF	TMV	THERMOSTATIC MIXING VALVE

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CONSTRUCTION DOCUMENTS

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: JF
REVIEWED BY: TM

REV.	DESCRIPTION	DATE

MONTANA
JASON B. SADOWSKI
No. 62689 PE
3/7/2023
REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

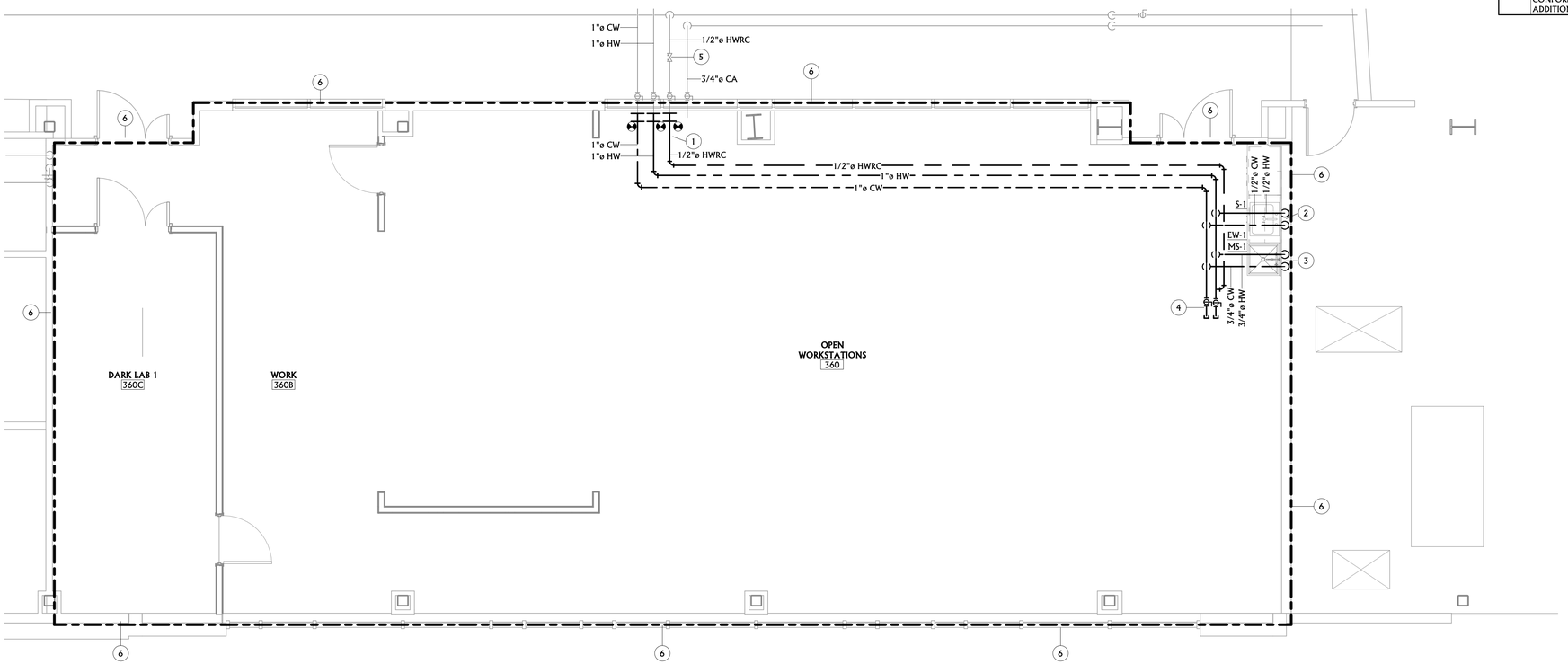
SHEET TITLE
PLUMBING COVER

SHEET
P001

DATE
3/07/2023

PLUMBING GENERAL DOMESTIC WATER NOTES	
A	GENERAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE PLUMBING EQUIPMENT AND PIPING WITH ALL OTHER TRADES AS REQUIRED. COORDINATE PLUMBING SYSTEMS WITH THE OWNER PROVIDED EQUIPMENT.
C	REFERENCE ARCHITECTURAL PLANS FOR EXACT FIXTURE LOCATIONS.
D	ALL VALVES LESS THAN 2" SHALL BE BALL VALVES UNLESS OTHERWISE NOTED.
E	INSULATION ON ALL DOMESTIC COLD WATER PIPING SHALL BE PROVIDED WITH A CONTINUOUS VAPOR BARRIER. OVERSIZE HANGERS FOR INSULATION SO NO PENETRATION OF THE VAPOR BARRIER OCCURS. PROVIDE INSERTS AND SADDLES AS REQUIRED TO PREVENT INSULATION DAMAGE FROM SUPPORTS.
F	NO DOMESTIC WATER PIPING SHALL BE ROUTED IN ANY EXTERIOR WALLS.
G	PLUMBING CONTRACTOR SHALL PROVIDE AND INSTALL WATER HAMMER ARRESTERS ON ALL BRANCH LINES SERVING FLUSH VALVE OPERATED PLUMBING FIXTURES. PROVIDE CEILING OR WALL ACCESS PANELS AS REQUIRED.
H	DRAWINGS REPRESENT GENERAL ROUTING. NOT ALL EXISTING CONDITIONS ARE SHOWN. CONTRACTOR SHALL MAKE PIPING OFFSETS AND TRANSITIONS AS NEEDED. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SIZES AND LOCATIONS PRIOR TO BIDDING AND CONSTRUCTING.
I	COORDINATE ALL PIPE PENETRATIONS WITH THE NEW AND EXISTING STRUCTURAL LAYOUTS.
J	LOCATE VALVES OVER ACCESSIBLE LOCATIONS WHERE POSSIBLE. WHERE LOCATED OVER HARD LID, PROVIDE CEILING ACCESS PANEL.

PLUMBING KEYNOTES	
1	CONNECT TO EXISTING CW/HW/HWRC PIPING AND ROUTE NEW 1" CW/HW & 1/2" HWRC INTO LAB TO SERVE NEW FIXTURES.
2	ROUTE 1/2" CW/HW DOWN TO SERVE SINK & EYEWASH.
3	ROUTE 3/4" CW/HW DOWN TO SERVE MOP SINK.
4	VALVE AND CAP CW/HW PIPING FRO POSSIBLE FUTURE CONNECTIONS.
5	VERIFY THAT BALANCING VALVE IS SET AT 0.5 GPM.
6	AREA OF WORK THIS PROJECT. RECONFIGURE SUPPRESSION SYSTEM TO ACCOMMODATE NEW PARTITIONS, CEILINGS, CURTAINS AND OTHER FIXTURES/EQUIPMENT, SYSTEM TO CONFORM TP NFPA 13. REVIEW ARCHITECTURAL PLANS FOR CURTAINS, RCP & ADDITIONAL DETAILS.



N

1 / P310H THIRD FLOOR PLUMBING DOMESTIC WATER RENOVATION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: JF
REVIEWED BY: TM

REV.	DESCRIPTION	DATE

MONTANA
TRAVIS M. SADOWSKI
No. 62689 PE
3/7/2023
REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

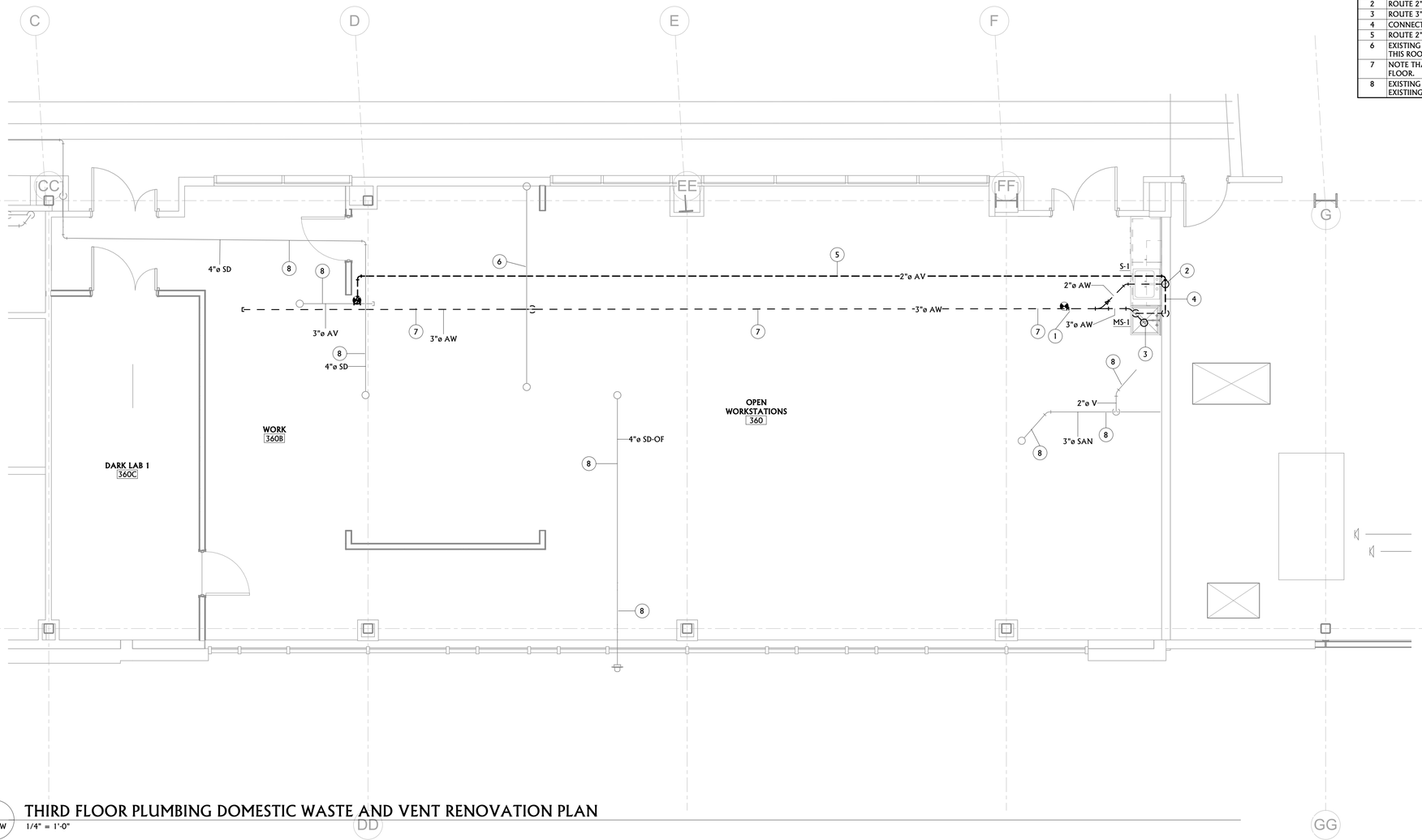
SHEET TITLE
PLUMBING DOMESTIC WATER RENOVATION PLAN

SHEET
P310H

DATE
3/07/2023

PLUMBING GENERAL DOMESTIC WASTE AND VENT NOTES	
A	GENERAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE PLUMBING EQUIPMENT AND PIPING WITH ALL OTHER TRADES AS REQUIRED. COORDINATE PLUMBING SYSTEMS WITH THE OWNER PROVIDED EQUIPMENT.
C	REFERENCE ARCHITECTURAL PLANS FOR EXACT FIXTURE LOCATIONS.
D	PROVIDE ALL FLOOR DRAINS AND FLOOR SINKS WITH TRAP PRIMERS. PROVIDE WALL ACCESS PANEL FOR TRAP PRIMER ACCESS AS REQUIRED. ACCESS PANELS SHALL BE RATED WHERE REQUIRED.
E	ALL UNDERFLOOR VENT SHALL BE MINIMUM 2".
F	PROVIDE CLEANOUTS ON ALL LINES SERVING SINK.
G	CONTRACTOR SHALL COORDINATE PIPE ROUTING AND EQUIPMENT PLACEMENT WITH THE SHEET METAL, HYDRONIC PIPING, FIRE PROTECTION, AND EXISTING SYSTEMS PRIOR TO INSTALLING. PROVIDE OFFSETS AND TRANSITIONS AS REQUIRED.
H	CONTRACTOR SHALL VERIFY ALL SANITARY AND STORM DRAINAGE INVERT ELEVATIONS PRIOR TO INITIATING ANY WORK.
I	DRAWINGS REPRESENT GENERAL ROUTING. NOT ALL EXISTING CONDITIONS ARE SHOWN. CONTRACTOR SHALL MAKE PIPING OFFSETS AND TRANSITIONS AS NEEDED. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SIZES AND LOCATIONS PRIOR TO BIDDING AND CONSTRUCTING.
J	COORDINATE ALL PIPE PENETRATIONS WITH THE EXISTING STRUCTURAL LAYOUTS.

MECHANICAL KEYNOTES	
1	ROUTE NEW 3" AW LINE FROM EXISTING PIPING.
2	ROUTE 2" AW UP TO SERVE SINK, ROUTE 2" VENT UP IN WALL.
3	ROUTE 3" AW UP TO SERVE MOP SINK, ROUTE 2" VENT OVER AND UP IN WALL.
4	CONNECT VENTS TOGETHER WITHIN WALL AT 6'-0" A.F.F.
5	ROUTE 2" ACID VENT OVER AND CONNECT TO EXISTING ACID VENT LINE AT P.O.C.
6	EXISTING VENT PIPING FOR SINK IN LAB BELOW, CONNECT NEW VENTING FROM SINKS THIS ROOM TO EXISTING PIPING.
7	NOTE THAT THIS AW PIPING IS WITHIN THE CEILING OF THE ROOM(S) ON SECOND FLOOR.
8	EXISTING ACID VENT PIPING IN CEILING SPACE, CONNECT NEW AV PIPING AND MAKE EXISTIING PIPING & ASSOCIATED V.T.R. FULLY FUNCTIONAL.



N

1 / P310W THIRD FLOOR PLUMBING DOMESTIC WASTE AND VENT RENOVATION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: JF		
REVIEWED BY: TM		
REV.	DESCRIPTION	DATE

ANTHONY B. SADOWSKI No. 62689 PE 3/7/2023 REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

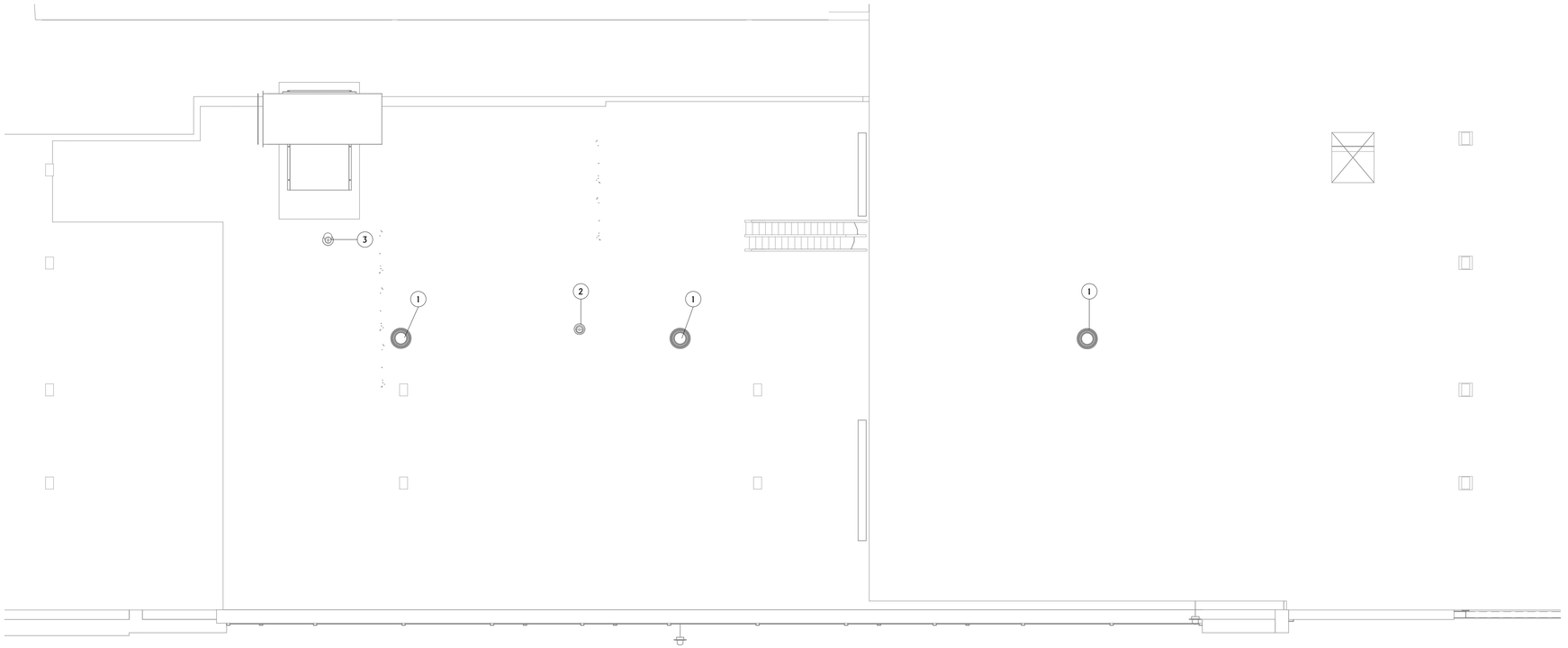
SHEET TITLE
PLUMBING DOMESTIC WASTE AND VENT RENOVATION PLAN

SHEET
P310W

DATE
3/07/2023

PLUMBING GENERAL DOMESTIC WASTE AND VENT NOTES	
A	GENERAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE PLUMBING EQUIPMENT AND PIPING WITH ALL OTHER TRADES AS REQUIRED. COORDINATE PLUMBING SYSTEMS WITH THE OWNER PROVIDED EQUIPMENT.
C	REFERENCE ARCHITECTURAL PLANS FOR EXACT FIXTURE LOCATIONS.
D	PROVIDE ALL FLOOR DRAINS AND FLOOR SINKS WITH TRAP PRIMERS. PROVIDE WALL ACCESS PANEL FOR TRAP PRIMER ACCESS AS REQUIRED. ACCESS PANELS SHALL BE RATED WHERE REQUIRED.
E	ALL UNDERFLOOR VENT SHALL BE MINIMUM 2".
F	PROVIDE CLEANOUTS ON ALL LINES SERVING SINK.
G	CONTRACTOR SHALL COORDINATE PIPE ROUTING AND EQUIPMENT PLACEMENT WITH THE SHEET METAL, HYDRONIC PIPING, FIRE PROTECTION, AND EXISTING SYSTEMS PRIOR TO INSTALLING. PROVIDE OFFSETS AND TRANSITIONS AS REQUIRED.
H	CONTRACTOR SHALL VERIFY ALL SANITARY AND STORM DRAINAGE INVERT ELEVATIONS PRIOR TO INITIATING ANY WORK.
I	DRAWINGS REPRESENT GENERAL ROUTING. NOT ALL EXISTING CONDITIONS ARE SHOWN. CONTRACTOR SHALL MAKE PIPING OFFSETS AND TRANSITIONS AS NEEDED. CONTRACTOR SHALL FIELD VERIFY ALL EXISTING SIZES AND LOCATIONS PRIOR TO BIDDING AND CONSTRUCTING.
J	COORDINATE ALL PIPE PENETRATIONS WITH THE EXISTING STRUCTURAL LAYOUTS.

PLUMBING KEYNOTES	
1	EXISTING ROOF DRAIN TO REMAIN AS IS.
2	EXISTING V.T.R. TO REMAIN AS IS
3	"DORMANT" ACID VENT V.T.R., MAKE THIS ACID VENT V.T.R. FULLY FUNCTIONAL



N

1 / P410 ROOF PLUMBING DOMESTIC WASTE AND VENT PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: JF		
REVIEWED BY: TM		
REV.	DESCRIPTION	DATE

MONTANA
Robert B. SADOWSKI
No. 62689 PE
3/7/2023
REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
ROOF PLUMBING DOMESTIC WASTE AND VENT RENOVATION PLAN

SHEET
P410

DATE
3/07/2023

VARIABLE AIR VOLUME UNIT SCHEDULE (W/ HOT WATER COIL)

PLAN CODE	MANUFACTURER	MODEL NUMBER	100% CFM	MIN. CFM (HTG)	HOT WATER COIL (35% GLYCOL)									MAX TOTAL S.P. @ 100%CFM IN. H2O	INLET SIZE (IN, 0)
					HEATING CAP (MBH)	AIR SIDE				WATER SIDE					
						CFM	EAT °F	LAT °F	#ROWS	GPM	EWT °F/LWT	P.D. FT	T.C. VALVE		
VAV 3-25	PRICE	SDV	1980	1980	79.5	1980	55	98	2	10.7	135/119	< 10'	2-WAY	0.3"	16
VAV 3-26	PRICE	SDV	445	445	17.9	445	55	98	2	2.5	135/119	< 10'	2-WAY	0.3"	9
VAV 3-27	PRICE	SDV	375	375	16.3	375	55	101	2	2.5	135/120	< 10'	2-WAY	0.3"	9

VARIABLE AIR VOLUME BOX NOTES:
1. SITE ELEVATION = 4,793 FEET.
2. ALL HOT WATER COILS ARE TO BE 2-ROW UNLESS OTHERWISE NOTED. PROVIDE VAV BOX WITH AN ACCESS DOOR.
3. VAV MINIMUM INLET PRESSURE = 1.0" WG.
4. ALL VAV BOXES SHALL HAVE 3/8" THICK CLOSED CELL INSULATION WITH EDGES OF INSULATION COMPLETELY ENCAPSULATED IN METAL TO PREVENT EROSION.
5. VAV BOX SUPPLIER TO PROVIDE FACTORY INSTALLED MULTI-POINT AVERAGING SENSORS. PROVIDE WITH HANGING BRACKETS, AND PROVIDE DUCT TRANSITIONS TO AND FROM THE BOXES AS REQUIRED. REFER TO DETAIL 2/M600 FOR ADDITIONAL INFORMATION.
6. UNLESS OTHERWISE APPROVED BY THE ENGINEER, THE TEMPERATURE CONTROL CONTRACTOR SHALL FURNISH ALL DIGITAL VAV BOX CONTROLLERS AND ACTUATORS FOR FIELD MOUNTING. MECHANICAL CONTRACTOR SHALL COORDINATE WITH THE TEMPERATURE CONTROL CONTRACTOR.
7. CONTRACTOR SHALL SIZE AUTOFLOW BALANCE VALVES TO THE NEAREST UPSIZE FLOWRATE INCREMENT FROM THE SCHEDULED HEATING HOT WATER FLOWRATE.
8. COORDINATE CONTROL ENCLOSURE LOCATION AND REHEAT COIL PIPE CONNECTION LOCATIONS WITH CONDITIONS ADJACENT TO THE RESPECTIVE VAV BOX TO MAINTAIN SERVICE ACCESS TO THE VAV BOX, CONTROL ENCLOSURE AND REHEAT COIL PIPING AND ASSOCIATED DEVICES.
9. SEE DETAIL 6/M600 FOR 2-WAY T.C. VALVE CONFIGURATION DETAIL.
10. FOR VAV BOXES WITH SCHEDULED INLET SIZES SMALLER THAN THE UNIT SIZES, THE VAV BOXES ARE PROVIDED FACTORY WITH A SMALLER INLET SIZE THAN THE UNIT SIZE.
11. INSTALL VAV BOX WITHIN 12" OF CEILING.
12. VAV BOXES ARE TO BE SELECTED WITH NC < 20.

GRILLE - REGISTER - DIFFUSER SCHEDULE

PLAN CODE	MANUF.	MODEL NUMBER	FUNCTION	FACE SIZE	NECK SIZE	MATERIAL	FINISH	CFM	VOLUME DAMPER	REMARKS
CD-8	PRICE	AMCD	CEILING DIFFUSER	24" X 24"	8"	STEEL	BAKED ENAMEL	SEE PLANS	IN DUCT	SEE NOTES AND 5/M600 FOR DETAIL.
CD-12	PRICE	AMCD	CEILING DIFFUSER	24" X 24"	12"	STEEL	BAKED ENAMEL	SEE PLANS	IN DUCT	SEE NOTES AND 5/M600 FOR DETAIL.
EG-14	PRICE	12	EXHAUST GRILLE	24" X 24"	14"	STEEL	BAKED ENAMEL	SEE PLANS	IN DUCT	SEE NOTES AND 5/M600 FOR DETAIL.
RG-10	PRICE	10	RETURN GRILLE	24" X 24"	10" X 10"	STEEL	BAKED ENAMEL	SEE PLANS	IN DUCT	SEE NOTES AND 5/M600 FOR DETAIL.
DL-1	PRICE	HCD	SUPPLY DRUM LOUVER	20" X 10"	20" X 10"	ALUMINUM	BAKED ENAMEL	SEE PLANS	OBD	SEE NOTES AND 4/M600 FOR DETAIL.

NOTES:
1. PROVIDE ALL DUCT TRANSITIONS TO AND FROM GRILLES/REGISTERS/DIFFUSERS AS REQUIRED.
2. ALL GRILLES AND REGISTERS TO BE OFF WHITE UNLESS OTHERWISE NOTED.
3. CONTRACTOR TO VERIFY EXACT BUILDING CONSTRUCTION AND CEILING TYPES AND PROVIDE THE CORRECT FRAMES FOR ALL AIR DIFFUSION PRODUCTS AS REQUIRED.
4. PROVIDE EXTENDED LINKAGE FROM HAND DAMPER TO A FLUSH CUP DAMPER REGULATOR IN ALL HARD CEILING LOCATIONS (HARD INACCESSIBLE CEILINGS). REFER TO ARCHITECTURAL REFLECTED CEILING PLANS FOR ALL TYPES OF CEILINGS
5. PROVIDE MANUAL VOLUME DAMPERS FOR CONNECTION TO ALL GRD'S.

SITE ELEVATION NOTES

1. THE BUILDING SITE IS LOCATED IN BOZEMAN, MONTANA AND IS AT APPROXIMATELY AT 5000 FEET ELEVATION ABOUT SEA LEVEL. ACCOUNT FOR THIS ELEVATION IN ALL EQUIPMENT SELECTIONS.

SEISMIC DESIGN NOTES

1. MECHANICAL SYSTEMS AND EQUIPMENT ON THIS PROJECT SHALL BE INSTALLED WITH SEISMIC RESTRAINTS IN ACCORDANCE WITH THE 2021 INTERNATIONAL BUILDING CODE AND THE LATEST EDITION OF SMACNA'S SEISMIC RESTRAINT MANUAL. SPRINKLER SYSTEMS AND EQUIPMENT SHALL BE INSTALLED WITH SEISMIC RESTRAINTS IN ACCORDANCE WITH THE LATEST EDITION OF NFPA 13.
2. THE CONTRACTOR SHALL BE RESPONSIBLE TO PROVIDE SHOP DRAWINGS AND STAMPED PROFESSIONAL STRUCTURAL ENGINEER SEISMIC RESTRAINT DRAWINGS FOR REVIEW AND APPROVAL. SUBMIT SHOP DRAWING INFORMATION ON EACH MAJOR PIECE OF EQUIPMENT AND FOR EACH MAJOR CATEGORY OF COMMONLY INSTALLED EQUIPMENT.
3. SEE SPECIFICATION SECTIONS 230548 FOR ADDITIONAL INFORMATION.

TEST AND BALANCE NOTES

1. TEST AND BALANCE ALL NEW EQUIPMENT FOR WATER AND AIRFLOWS PER SPECIFICATIONS SECTION 230593.
2. PROVIDE NEW PRE TEST AND BALANCE REPORT FOR EXISTING HEAT PUMP HP 3-16 SUPPLY FAN TO VERIFY PERFORMANCE FOR NEW VAV DISCHARGE APPLICATION. HP 3-16 SUPPLY FAN CFM TO MATCH TOTAL AND MINIMUM CFM VALUES OF VAV 3-25, 3-26, AND 3-27. (2800 CFM TOTAL, 1680 MINIMUM) SEE VAV SCHEDULE FOR REQUIRED INLET STATIC PRESSURE TO VAV BOXES TO ACCOMMODATE.
3. REBALANCE AIRFLOW OF EXISTING EXHAUST VAV BOX XVAV E-19 AND ASSOCIATED EXHAUST GRILLES.

EXPOSED DUCTWORK TREATMENT

1. ALL DUCTS EXPOSED TO SIGHT SHALL BE GALVANIZED. THE EXPOSED DUCTWORK SHALL NOT HAVE EXTERIOR INSULATION (LINED WHERE NOTED HERE OR IN DUCT CONSTRUCTION SCHEDULE).
2. ALL SUPPLY DUCTWORK EXPOSED TO VIEW SHALL BE LINED WITH R-5 MINIMUM LINER (1.5").

CONTROL NOTES

1. ELECTRICAL CONTRACTOR TO PROVIDE BOX AND CONDUIT TO ACCESSIBL CEILING SPACE FOR EACH THERMOSTAT.
2. TEMPERATURE CONTROL CONTRACTOR TO PROVIDE CUSTOM PROGRAMMING TO VCCX-2 CONTROLLER ASSOCIATED WITH HP 3-16 TO PROVIDE VAV DISCHARGE AIR CONTROL TO SERVE NEW VAV ZONE BOXES ON PLANS. SEE SEQUENCE OF OPERATIONS SPECIFICATIONS FOR ADDITIONAL INFORMATION. THERMOSTAT PREVIOUSLY SERVING HP 3-16 FOR SPACE TEMPERATURE CONTROL TO BE REUSED TO FOR VAV 3-25 SPACE SETPOINT CONTROL.
3. TEMPERATURE CONTROLS CONTRACTOR SHALL BE ELECTROCONTROLS.

GLYCOL NOTES

THE HEATING HOT WATER SYSTEM IS CHARGED WITH A 35% SOLUTION OF GLYCOL. USE THIS WATER CHEMISTRY FOR ALL EQUIPMENT HYDRONIC COIL SELECTIONS.

EXPOSED PIPE INSULATION JACKETING

1. ANY PIPING TO VIEW SHALL BE JACKETED WITH A PAINTABLE PVC JACKET.

MECHANICAL SYMBOLS LEGEND

AIR TERMINALS, EQUIPMENT & SPECIALTIES

NEW EQUIPMENT

EXISTING TO REMAIN

EXISTING EQUIP TO BE REMOVED OR RELOCATED

SUPPLY AIR TERMINAL (NEW, EXIST., DEMO.)

RETURN AIR TERMINAL (NEW, EXIST., DEMO.)

EXHAUST AIR TERMINAL (NEW, EXIST., DEMO.)

LINEAR SLOT AIR TERMINAL

PUMP

P.O.D.C. - POINT OF DISCONNECTION

P.O.C. - POINT OF CONNECTION

EQUIPMENT TAG: TYPE OF EQUIPMENT (EF); EQUIPMENT NUMBER (REFER TO SCHEDULE)

DIFFUSER/GRILLE TAG: AIR TERMINAL NUMBER (SD-1); AIR TERMINAL CFM (220) (REFER TO SCHEDULE)

WALL LOUVER

SIDEWALL AIR TERMINAL

T'STAT. (ELEC./PNEU.)

SWITCH

DUCTWORK & ACCESSORIES

NEW DUCTWORK

EXISTING DUCTWORK TO REMAIN

EXISTING DUCTWORK TO BE REMOVED

DUCT BREAK

RISE IN DUCTWORK (UP)

FALL IN DUCTWORK (DN)

FIRE DAMPER (FD)

SMOKE DAMPER (SD)

FIRE/SMOKE DAMPER (F/SD)

BACKDRAFT DAMPER (BDD)

MANUAL VOLUME DAMPER (VD)

MOTORIZED DAMPER

INSIDE CLEAR DUCT SIZE: FIRST FIGURE INDICATED IS SIDE OF DUCT SHOWN (18x12)

DUCTWORK END CAP

FLEXIBLE DUCTWORK

SQUARE ELBOW UP SUPPLY/RETURN/EXH.

SQUARE ELBOW DN SUPPLY/RETURN/EXH.

ROUND ELBOW UP SUPPLY/RETURN/EXH.

ROUND ELBOW DN SUPPLY/RETURN/EXH.

SQUARE DIFFUSERS SUPPLY/RETURN/EXH.

ROUND DIFFUSERS FULL / HALF

INDICATED AIR FLOW SUPPLY / RETURN

DUCT REDUCER

DUCTWORK SHADING

SUPPLY AIR

RETURN AIR

EXHAUST AIR

OUTSIDE AIR

EXISTING

DEMOLITION

NEW

HVAC/HYDRONIC PIPING

HWS — HOT WATER SUPPLY

HWR — HOT WATER RETURN

HPS — HEAT PUMP SUPPLY

HPR — HEAT PUMP RETURN

CD — CONDENSATE DRAIN

THIS IS A STANDARDIZED SYMBOLS LEGEND, ALL SYMBOLS SHOWN MAY NOT APPEAR ON OR WITHIN THIS SET OF CONTRACT DOCUMENTS.

DUCTWORK CONSTRUCTION SCHEDULE

INSULATED DUCTWORK INCLUDES:

- ALL INTERIOR SUPPLY DUCTWORK UNLESS LINED WITH LINER MEETING 2021 IECC DUCT INSULATION REQUIREMENTS.

UNINSULATED/UNLINED DUCTWORK INCLUDES:

- ALL INTERIOR RETURN DUCTWORK

LINED DUCTWORK INCLUDES: (LINER MUST MEET 2021 IECC DUCT INSULATION REQUIREMENTS ON SUPPLY DUCTS)

- ALL TRANSFER DUCTWORK.
- ALL INTERIOR RETURN DUCTWORK
- ALL EXPOSED SUPPLY DUCTWORK
- ALL SUPPLY15' OF HEAT PUMP SUPPLY FANS.

NOTE: INSULATED FLEXIBLE DUCTWORK MAY BE USED AT THE CONTRACTOR'S OPTION FOR A MAXIMUM OF 5 FT. LENGTH TO EACH DIFFUSER/REGISTER/ GRILLE.

MECHANICAL SHEET LIST

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: GH
REVIEWED BY: TM

REV.	DESCRIPTION	DATE

MONTANA — AARON B. SADOWSKI — No. 62689 PE — 3/7/2023 — LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

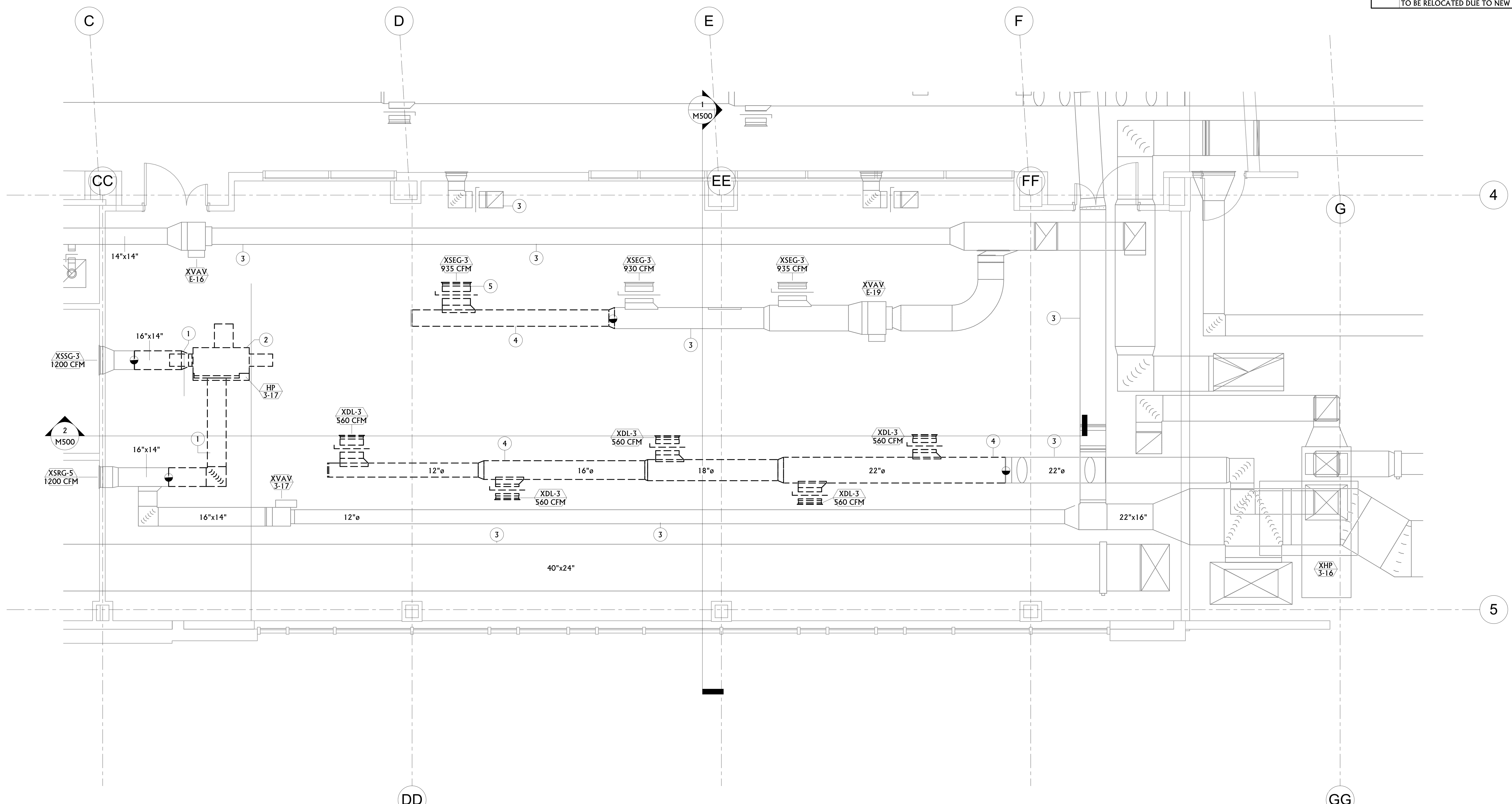
SLATE #202141

ACE #22BL5657

SHEET TITLE
MECHANICAL COVER

SHEET
M001

DATE
3/07/2023



N

1 MD310H **360 LAB MECHANICAL HVAC DEMOLITION PLAN**

1/4" = 1'-0"

MECHANICAL GENERAL DEMOLITION NOTES

A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE HVAC AND PLUMBING EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
C	THE INFORMATION SHOWN ON THIS DRAWING WAS OBTAINED FROM EXISTING DRAWINGS AND FIELD OBSERVATIONS. FIELD VERIFY ALL EXISTING CONDITIONS AND PROVIDE DEMOLITION AS REQUIRED TO ACCOMMODATE EXISTING CONSTRUCTION.
D	NOTIFY THE OWNER OF ANY SYSTEM SHUT-DOWNS AND APPROXIMATE SHUT-DOWN TIME PRIOR TO COMMENCING WITH WORK.
E	CONTRACTOR SHALL REMOVE ALL DEMOLISHED MATERIALS FROM BUILDING, UNLESS SPECIFICALLY NOTED TO BE ABANDONED IN PLACE.
F	DRAWINGS SHOW GENERAL LOCATIONS OF MATERIALS TO BE REMOVED. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXTENT OF WORK REQUIRED FOR A COMPLETE SYSTEM REMOVAL.
G	OWNER HAS FIRST RIGHT OF REFUSAL FOR ALL EQUIPMENT/MATERIAL CALLED OUT TO BE REMOVED. CONTRACTOR SHALL PRESENT ALL DEMO'D EQUIPMENT/MATERIAL TO OWNER PRIOR TO REMOVING FROM SITE.
H	DEMO ALL T-STATS AND CONTROLS ASSOCIATED WITH DEMO'D MECHANICAL EQUIPMENT.

MECHANICAL KEYNOTES

1	DEMOLISH DUCTWORK FROM EQUIPMENT BACK TO P.O.D.C. SYMBOL
2	RELOCATE HEAT PUMP 3-17. SEE REMODEL SHEETS FOR HEAT PUMP'S NEW LOCATION. MAINTAIN COIL CONNECTIONS, CONDENSATE DRAIN CONNECTION, HANGERS AND SPRING ISOLATORS, AND DUCTWORK/FLEX CONNECTIONS FOR REINSTALLATION.
3	EXISTING TO REMAIN.
4	DEMOLISH DUCTWORK/GRILLES BACK TO POINT OF DISCONNECTION SHOWN. PATCH DUCTWORK AS REQUIRED.
5	MAINTAIN EXISTING EXHAUST GRILLE TO BE REINSTALLED UPSTREAM IN MAIN DUCT RUN. SEE MECHANICAL HVAC REMODEL PLAN FOR REINSTALLATION LOCATION. GRILLE TO BE RELOCATED DUE TO NEW ROOM CONSTRUCTION IN THIS LOCATION.

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: GH		
REVIEWED BY: TM		
REV.	DESCRIPTION	DATE
△		

MONTANA
[illegible]
AARON B.
SADOWSKI
No. 62689 PE
3/7/2023
LICENSED
PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
MECHANICAL 360 LAB
HVAC DEMOLITION PLAN

SHEET
MD310H

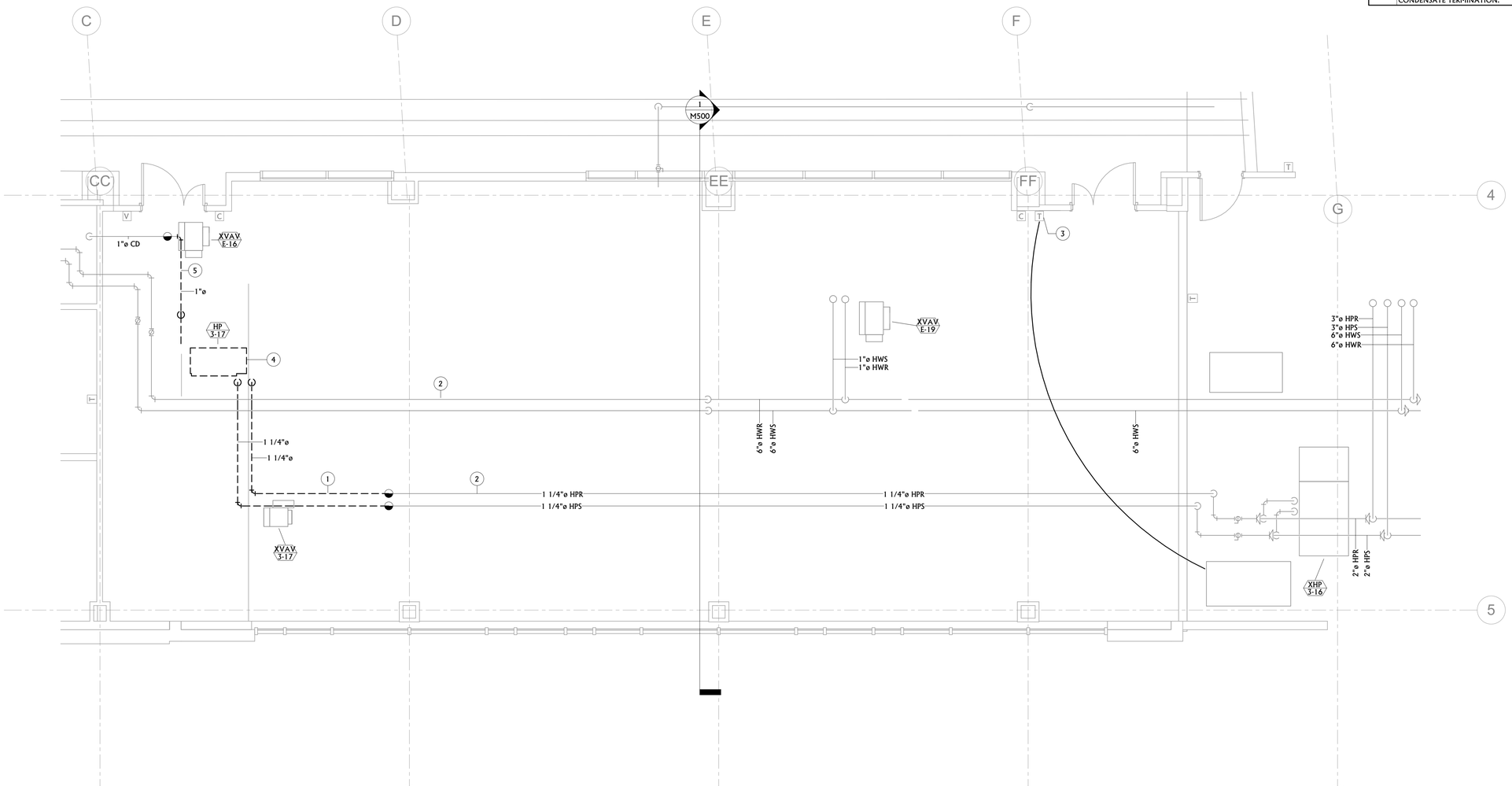
DATE
3/07/2023

MECHANICAL GENERAL DEMOLITION NOTES

A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE HVAC AND PLUMBING EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
C	THE INFORMATION SHOWN ON THIS DRAWING WAS OBTAINED FROM EXISTING DRAWINGS AND FIELD OBSERVATIONS. FIELD VERIFY ALL EXISTING CONDITIONS AND PROVIDE DEMOLITION AS REQUIRED TO ACCOMMODATE EXISTING CONSTRUCTION.
D	NOTIFY THE OWNER OF ANY SYSTEM SHUT-DOWNS AND APPROXIMATE SHUT-DOWN TIME PRIOR TO COMMENCING WITH WORK.
E	CONTRACTOR SHALL REMOVE ALL DEMOLISHED MATERIALS FROM BUILDING, UNLESS SPECIFICALLY NOTED TO BE ABANDONED IN PLACE.
F	DRAWINGS SHOW GENERAL LOCATIONS OF MATERIALS TO BE REMOVED. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXTENT OF WORK REQUIRED FOR A COMPLETE SYSTEM REMOVAL.
G	OWNER HAS FIRST RIGHT OF REFUSAL FOR ALL EQUIPMENT/MATERIAL CALLED OUT TO BE REMOVED. CONTRACTOR SHALL PRESENT ALL DEMO'D EQUIPMENT/MATERIAL TO OWNER PRIOR TO REMOVING FROM SITE.
H	DEMO ALL T-STATS AND CONTROLS ASSOCIATED WITH DEMO'D MECHANICAL EQUIPMENT.

MECHANICAL KEYNOTES

1	DEMOLISH HPS/HPR PIPING BACK TO POINT OF DISCONNECTION SHOWN.
2	EXISTING TO REMAIN.
3	THERMOSTAT/CO2 SENSOR SERVING EXISTING HEAT PUMP HP 3-16 TO BE REUTILIZED TO SERVE NEW VAV BOX VAV 3-25.
4	RELOCATE HEAT PUMP. SEE REMODEL PLAN FOR NEW LOCATION. RE-USE/RE-LOCATE ALL ACCESSORIES, CONTROL VALVES, SHUT-OFF VALVES, FLOW CONTROLS, ETC. RE-PIPE AS NEEDED.
5	DEMOLISH CONDENSATE DRAIN AS SHOWN, SEE REMODEL PLAN FOR RECONNECTION TO CONDENSATE TERMINATION.



N

1 MD310P

360 LAB MECHANICAL PIPING DEMOLITION PLAN

1/4" = 1'-0"

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: GH
REVIEWED BY: TM

REV.	DESCRIPTION	DATE

MONTANA
Robert B. SADOWSKI
No. 62689 PE
3/7/2023
REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

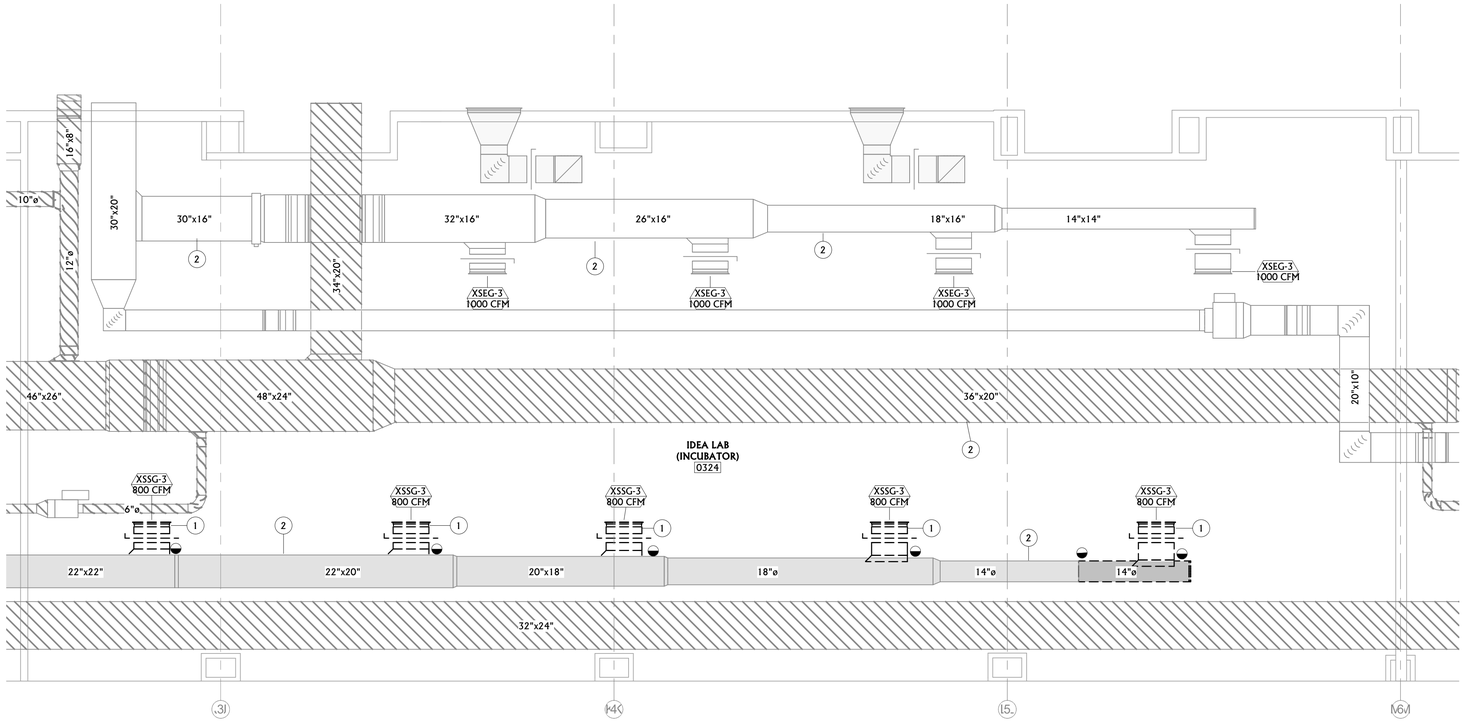
SHEET TITLE
MECHANICAL 360 LAB PIPING DEMOLITION PLAN

SHEET
MD310P

DATE
3/07/2023

MECHANICAL GENERAL DEMOLITION NOTES	
A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE HVAC AND PLUMBING EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
C	THE INFORMATION SHOWN ON THIS DRAWING WAS OBTAINED FROM EXISTING DRAWINGS AND FIELD OBSERVATIONS. FIELD VERIFY ALL EXISTING CONDITIONS AND PROVIDE DEMOLITION AS REQUIRED TO ACCOMMODATE EXISTING CONSTRUCTION.
D	NOTIFY THE OWNER OF ANY SYSTEM SHUT-DOWNS AND APPROXIMATE SHUT-DOWN TIME PRIOR TO COMMENCING WITH WORK.
E	CONTRACTOR SHALL REMOVE ALL DEMOLISHED MATERIALS FROM BUILDING, UNLESS SPECIFICALLY NOTED TO BE ABANDONED IN PLACE.
F	DRAWINGS SHOW GENERAL LOCATIONS OF MATERIALS TO BE REMOVED. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO DETERMINE THE EXTENT OF WORK REQUIRED FOR A COMPLETE SYSTEM REMOVAL.
G	OWNER HAS FIRST RIGHT OF REFUSAL FOR ALL EQUIPMENT/MATERIAL CALLED OUT TO BE REMOVED. CONTRACTOR SHALL PRESENT ALL DEMO'D EQUIPMENT/MATERIAL TO OWNER PRIOR TO REMOVING FROM SITE.
H	DEMO ALL T-STATS AND CONTROLS ASSOCIATED WITH DEMO'D MECHANICAL EQUIPMENT.

MECHANICAL KEYNOTES	
1	DEMOLISH DUCTWORK/GRILLES BACK TO POINT OF DISCONNECTION SHOWN. PATCH DUCTWORK AS REQUIRED.
2	EXISTING TO REMAIN.



N

1 MD311H

324 LAB MECHANICAL HVAC DEMOLITION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: AS
REVIEWED BY: AS

REV.	DESCRIPTION	DATE

RAMON B. SADOWSKI
No. 82689 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
MECHANICAL 324 LAB HVAC DEMOLITION PLAN

SHEET
MD311H

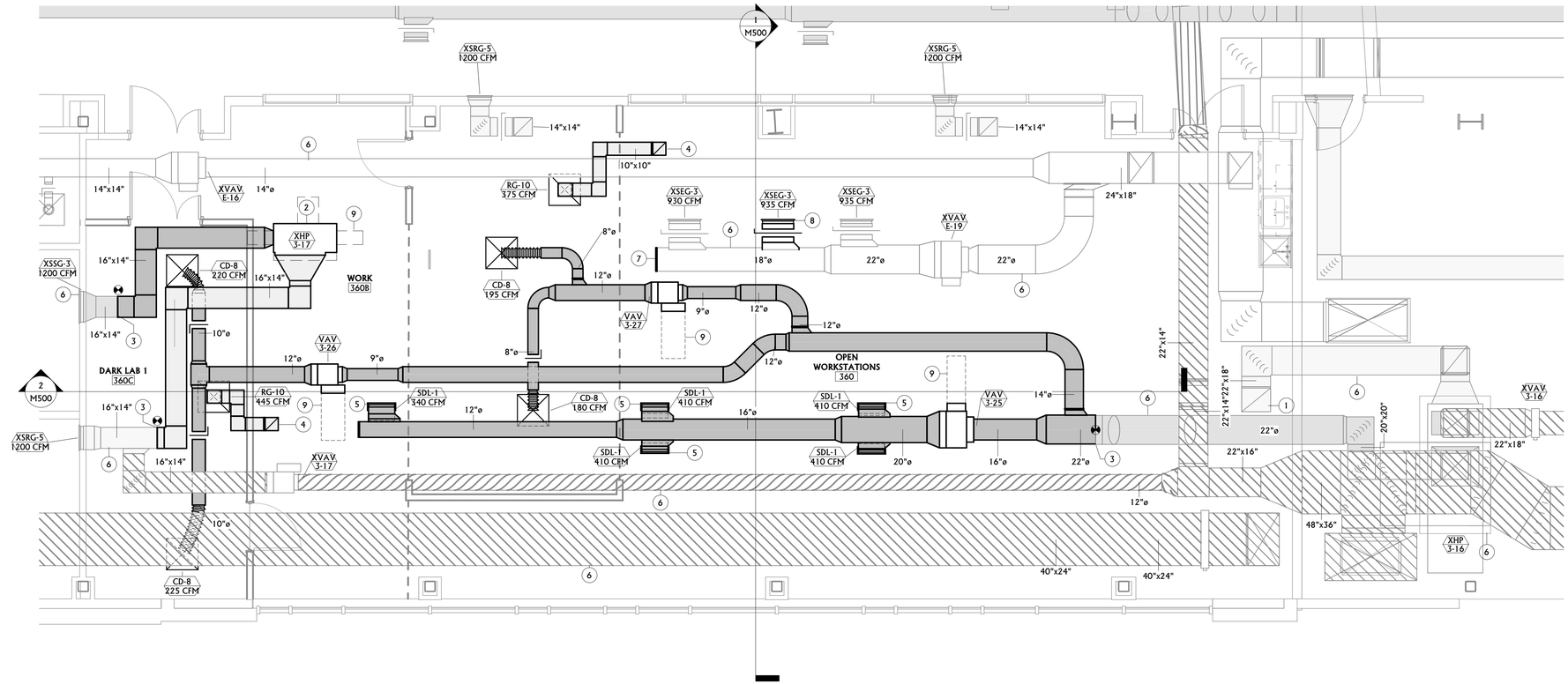
DATE
3/07/2023

MECHANICAL GENERAL NOTES

A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE EXACT LOCATION OF DIFFUSERS AND GRILLES WITH REFLECTED CEILING PLAN AND LIGHTING LAYOUT.
C	FLEX DUCT RUN OUTS SHALL BE LIMITED TO 5'-0".
D	COORDINATE HVAC AND PLUMBING EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
E	ALL CEILING DIFFUSERS TO BE 4-WAY UNLESS OTHERWISE NOTED.
F	LINE ALL SUPPLY AND RETURN DUCTS WITH 1" A.L. WITHIN 15' OF FANS.
G	ALL DUCT DIMENSIONS SHOWN ON PLANS ARE CLEAR INTERIOR DIMENSIONS.
H	PROVIDE 3' MINIMUM STRAIGHT DUCT UPSTREAM OF VAV BOXES. THIS 3'+ RUN TO MATCH VAV BOX INLET SIZE. MAINTAIN ADEQUATE VAV CLEARANCE IN INSTALLED LOCATION. COORDINATE PIPING AND DUCTWORK INSTALLATION TO ACCOMMODATE THIS.
I	MAINTAIN CODE REQUIRED CLEARANCES FOR ELECTRICAL PANELS.
J	THE HVAC SYSTEM IS USING THE CEILING SPACE AS A RETURN AIR PLENUM. ALL MATERIALS INSTALLED ABOVE CEILING TO BE PLENUM RATED.
K	CONTRACTOR SHALL COORDINATE PIPE ROUTING WITH THE DUCT, STRUCTURE, ELECTRICAL, PLUMBING, AND FIRE PROTECTION LAYOUTS.
L	ALL BRANCH RUNOUTS TO INDIVIDUAL SUPPLY AND EXHAUST GRILLES/DIFFUSERS SHALL HAVE MANUAL BALANCE DAMPERS INSTALLED.
M	PROVIDE A 45° TRANSITION OR HIGH EFFICIENCY TAKEOFF ON ALL BRANCH TAKEOFFS FROM DUCT MAIN OR BRANCH MAIN.
N	INSTALL TURNING VANES IN SUPPLY, RETURN, AND EXHAUST DUCT FITTINGS/ELBOWS GREATER THAN 30°. TRANSFER DUCTS DO NOT REQUIRE TURNING VANES.
O	MAINTAIN ADEQUATE SERVICE CLEARANCE FOR EACH HEAT PUMP. COORDINATE CONDUIT, DUCTWORK, AND PIPING TO MAINTAIN CLEAR SERVICE ACCESS. SEE HEAT PUMP DETAILS.

MECHANICAL KEYNOTES

1	EXISTING RETURN DUCT DUCT OPEN ON TOP. MAINTAIN AIR PATHWAY FOR ALL TRANSFER AIR FROM NEW VAV BOXES VAV 3-25, 3-36, 3-27 BACK TO THIS MAIN RETURN CONNECTION TO HP 3-16 IN MECHANICAL ROOM.
2	RELOCATED HEAT PUMP SERVING IT ROOM. SEE DETAIL 1/M600 FOR INSTALLATION DETAIL. RECONNECT CONTROL WIRING, CONDENSATE DRAIN, DUCTWORK, AND WATER COIL CONNECTIONS TO EXISTING CONDITIONS.
3	CONNECT NEW DUCTWORK TO EXISTING AT POINT OF CONNECTION SHOWN.
4	RETURN AIR TRANSFER FROM LABORATORY SPACE INTO MAIN CLASSROOM. PROVIDE (2) DUCT ELBOWS AND DUCT OPENING ON TOP. DUCTWORK TO BE PROVIDED WITH 1" A.L.
5	MOUNT DRUM LOUVER AT 30° BELOW HORIZONTAL AXIS. SEE 4/M600 FOR INSTALLATION DETAIL. ADJUST BLADES AS REQUIRED TO DIRECT AIRFLOW AWAY FROM CLOUD CEILING IN LAB AREA. (TYP)
6	EXISTING TO REMAIN.
7	CAP OPEN 18" DUCT END AND MATCH EXISTING DUCT TREATMENT.
8	RELOCATE EXISTING EXHAUST GRILLE TO NEW LOCATION SHOWN.
9	MAINTAIN CLEARANCES TO MECHANICAL EQUIPMENT. PROVIDE 3'-0" MINIMUM CLEARANCE.



N

1 M310H 360 LAB MECHANICAL HVAC RENOVATION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY:	GH
REVIEWED BY:	TM

REV.	DESCRIPTION	DATE

MONTANA
AARON B. SADOWSKI
No. 62689 PE
3/7/2023
REGISTERED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
MECHANICAL 360 LAB HVAC RENOVATION PLAN

SHEET
M310H

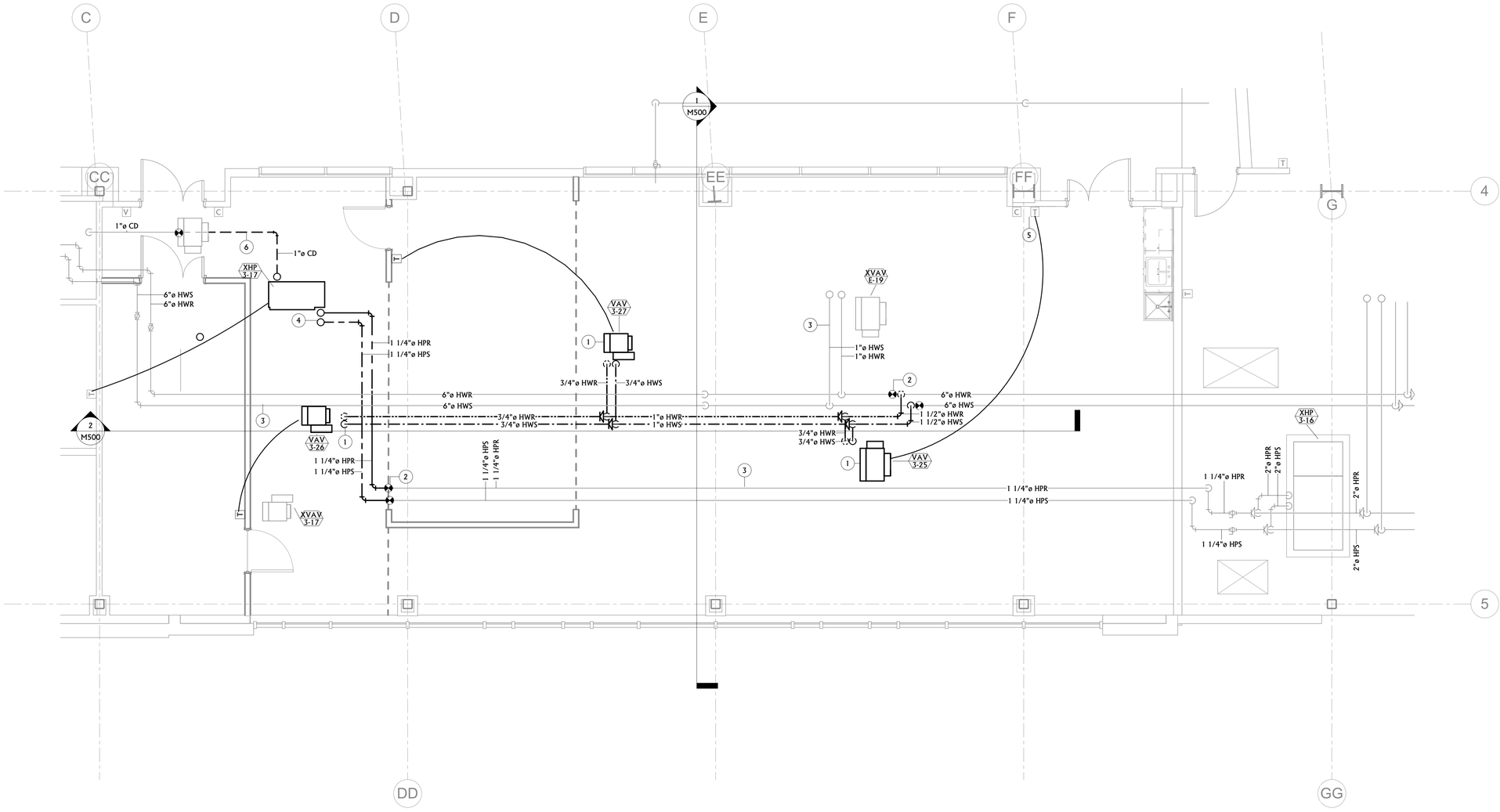
DATE
3/07/2023

MECHANICAL PIPING GENERAL NOTES

A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	THERMOSTATS TO BE LOCATED AT 48" A.F.F.
C	HYDRONIC VALVES 2" AND SMALLER TO BE BALL VALVES. HYDRONIC VALVES LARGER THAN 2" TO BE LUG STYLE BUTTERFLY VALVES.
D	LOCATE ALL VALVES ABOVE ACCESSIBLE CEILINGS OR PROVIDE ACCESS PANEL IN CEILING FOR VALVE ACCESS. ACCESS PANELS SHALL BE RATED WHERE REQUIRED.
E	COORDINATE HVAC AND PLUMBING ROUTING AND EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
F	VERIFY EXACT LOCATION OF THERMOSTATS WITH ARCHITECT PRIOR TO INSTALLATION.
G	DO NOT RUN PIPING OVER ELECTRICAL PANELS. MAINTAIN CODE REQUIRED CLEARANCES.
H	COORDINATE PIPING WITH EQUIPMENT, ELECTRICAL, AND SERVICE CLEARANCES. MAINTAIN ADEQUATE ACCESS TO ALL EQUIPMENT, INLCUDING VAV BOXES, HEAT PUMPS, ETC.

MECHANICAL KEYNOTES

1	SEE 2/M600 AND 6/M600 FOR VAV BOX INSTALLATION AND HOT WATER COIL CONNECTION DETAILS.
2	CONNECT NEW PIPING AT POINT OF CONNECTION SHOWN.
3	EXISTING TO REMAIN.
4	RELOCATED HEAT PUMP HP 3-17. RECONNECT 1-1/4" HPS/HPR PIPING TO UNIT WITH EXISTING ACCESSORIES. RECONNECT CONDENSATE DRAIN CONNECTION FOR CONTINUATION TO TERMINATION.
5	REUSE EXISTING THERMOSTAT/CO2 SENSOR IN SPACE AND TIE INTO NEW VAV BOX VAV 3-25. T.C. CONTRACTOR TO MODIFY CONTROLS SCHEME TO HEAT PUMP 3-16 IN MECHANICAL ROOM PER SEQUENCE OF OPERATIONS.
6	PROVIDE NEW 1" CONDENSATE DRAIN CONNECTION FROM HEAT PUMP, MAINTAIN AND RESUSE CONDENSATE TRAP IF ACCEPTABLE, OTHERWISE REPLACE. CONNECT AT P.O.C. SHOWN TO TERMINATION.



N

1 M310P

360 LAB MECHANICAL PIPING RENOVATION PLAN

1/4" = 1'-0"

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: GH
REVIEWED BY: TM

REV.	DESCRIPTION	DATE

MONTANA
AARON B. SADOWSKI
No. 62689 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

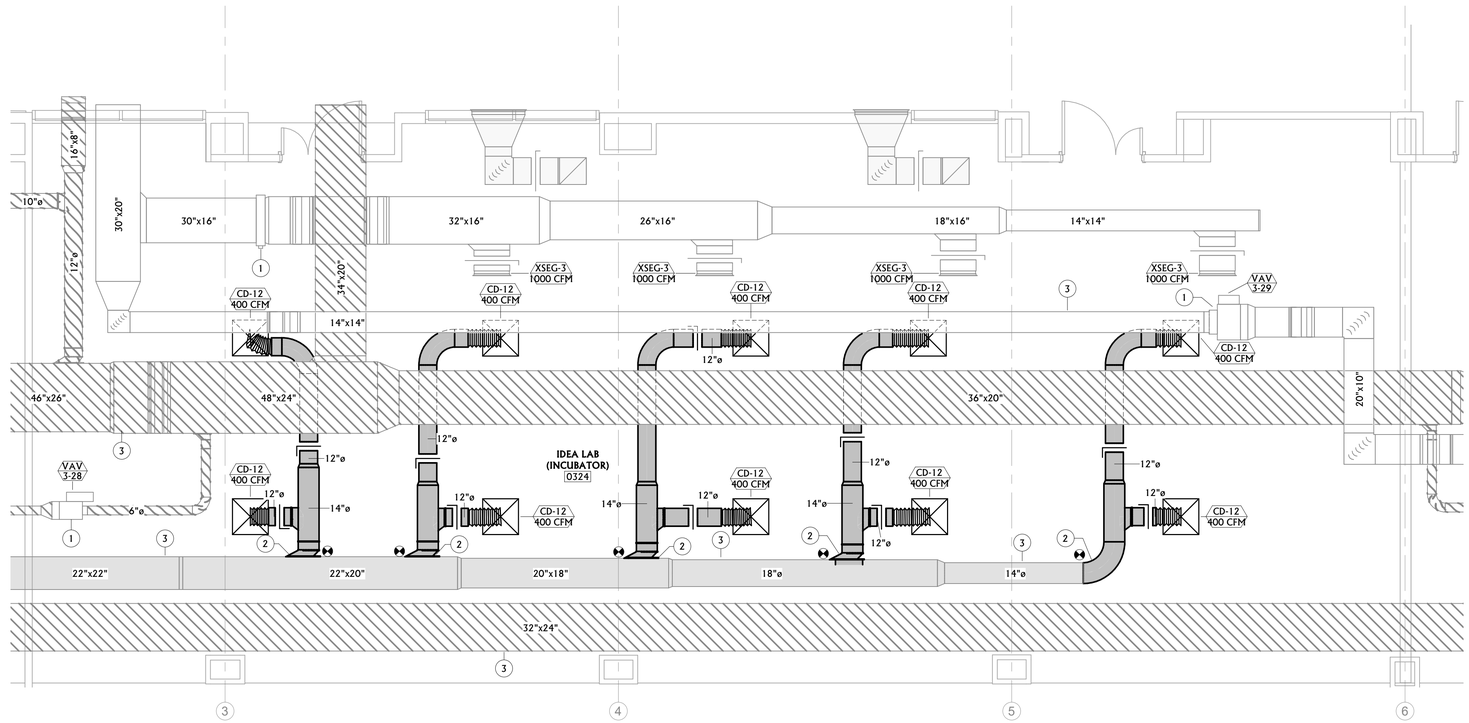
SHEET TITLE
MECHANICAL 360 LAB PIPING RENOVATION PLAN

SHEET
M310P

DATE
3/07/2023

MECHANICAL GENERAL NOTES	
A	MECHANICAL CONTRACTOR SHALL CUT ALL FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO PERFORM THE WORK DEPICTED IN THESE CONTRACT DOCUMENTS AND SPECIFICATIONS. GENERAL CONTRACTOR SHALL PATCH ALL ASSOCIATED FLOORS, WALLS, CEILINGS, AND ROOF AS REQUIRED TO THE SATISFACTION OF THE ARCHITECT/ENGINEER.
B	COORDINATE EXACT LOCATION OF DIFFUSERS AND GRILLES WITH REFLECTED CEILING PLAN AND LIGHTING LAYOUT.
C	FLEX DUCT RUN OUTS SHALL BE LIMITED TO 5'-0".
D	COORDINATE HVAC AND PLUMBING EQUIPMENT WITH ALL OTHER TRADES AS REQUIRED.
E	ALL CEILING DIFFUSERS TO BE 4-WAY UNLESS OTHERWISE NOTED.
F	LINE ALL SUPPLY AND RETURN DUCTS WITH 1" A.L. WITHIN 15' OF FANS.
G	ALL DUCT DIMENSIONS SHOWN ON PLANS ARE CLEAR INTERIOR DIMENSIONS.
H	PROVIDE 3' MINIMUM STRAIGHT DUCT UPSTREAM OF VAV BOXES. THIS 3'+ RUN TO MATCH VAV BOX INLET SIZE. MAINTAIN ADEQUATE VAV CLEARANCE IN INSTALLED LOCATION. COORDINATE PIPING AND DUCTWORK INSTALLATION TO ACCOMMODATE THIS.
I	MAINTAIN CODE REQUIRED CLEARANCES FOR ELECTRICAL PANELS.
J	THE HVAC SYSTEM IS USING THE CEILING SPACE AS A RETURN AIR PLENUM. ALL MATERIALS INSTALLED ABOVE CEILING TO BE PLENUM RATED.
K	CONTRACTOR SHALL COORDINATE PIPE ROUTING WITH THE DUCT, STRUCTURE, ELECTRICAL, PLUMBING, AND FIRE PROTECTION LAYOUTS.
L	ALL BRANCH RUNOUTS TO INDIVIDUAL SUPPLY AND EXHAUST GRILLES/DIFFUSERS SHALL HAVE MANUAL BALANCE DAMPERS INSTALLED.
M	PROVIDE A 45° TRANSITION OR HIGH EFFICIENCY TAKEOFF ON ALL BRANCH TAKEOFFS FROM DUCT MAIN OR BRANCH MAIN.
N	INSTALL TURNING VANES IN SUPPLY, RETURN, AND EXHAUST DUCT FITTINGS/ELBOWS GREATER THAN 30°. TRANSFER DUCTS DO NOT REQUIRE TURNING VANES.
O	MAINTAIN ADEQUATE SERVICE CLEARANCE FOR EACH HEAT PUMP. COORDINATE CONDUIT, DUCTWORK, AND PIPING TO MAINTAIN CLEAR SERVICE ACCESS. SEE HEAT PUMP DETAILS.

MECHANICAL KEYNOTES	
1	LABEL GRID AT LOCATION OF MECHANICAL EQUIPMENT ABOVE CEILING WITH PHENOLIC LABEL.
2	CONNECT NEW DUCTWORK TO EXISTING AT POINT OF CONNECTION SHOWN.
3	EXISTING TO REMAIN.



N

1 M311H

MECHANICAL 324 LAB HVAC RENOVATION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: **Author**
REVIEWED BY **Checker**

REV.	DESCRIPTION	DATE

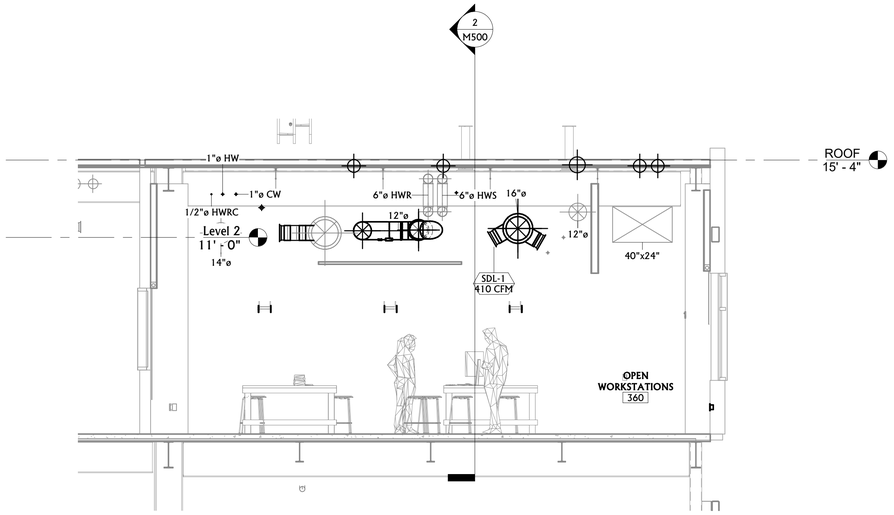
STATE OF MONTANA
AARON B. SADOWSKI
No. 82689 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

SHEET TITLE
MECHANICAL 324 LAB
HVAC REMODEL PLAN

SHEET
M311H

DATE
3/07/2023

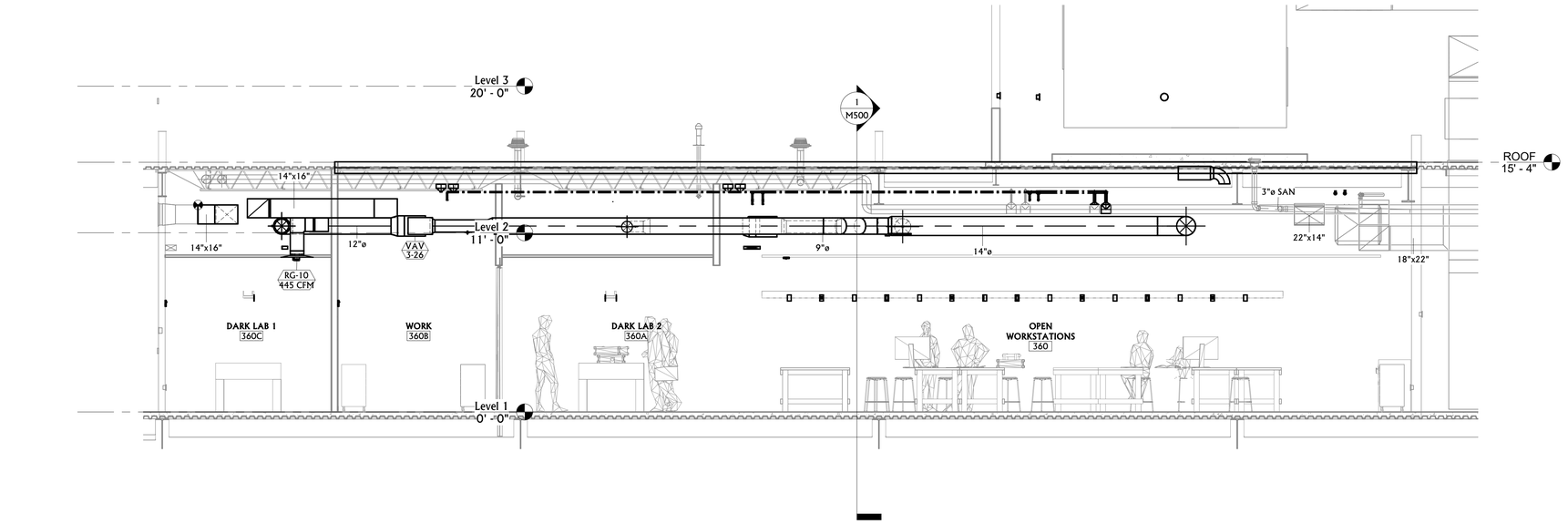


N

1
M500

NORTH-SOUTH BUILDING SECTION

1/4" = 1'-0"



N

2
M500

EAST-WEST BUILDING SECTION

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY:	GH	
REVIEWED BY:	TM	
REV.	DESCRIPTION	DATE

MONTANA
JASON B. SADOWSKI
No. 62689 PE
3/7/2023
PROFESSIONAL ENGINEER

PPA#19-0174

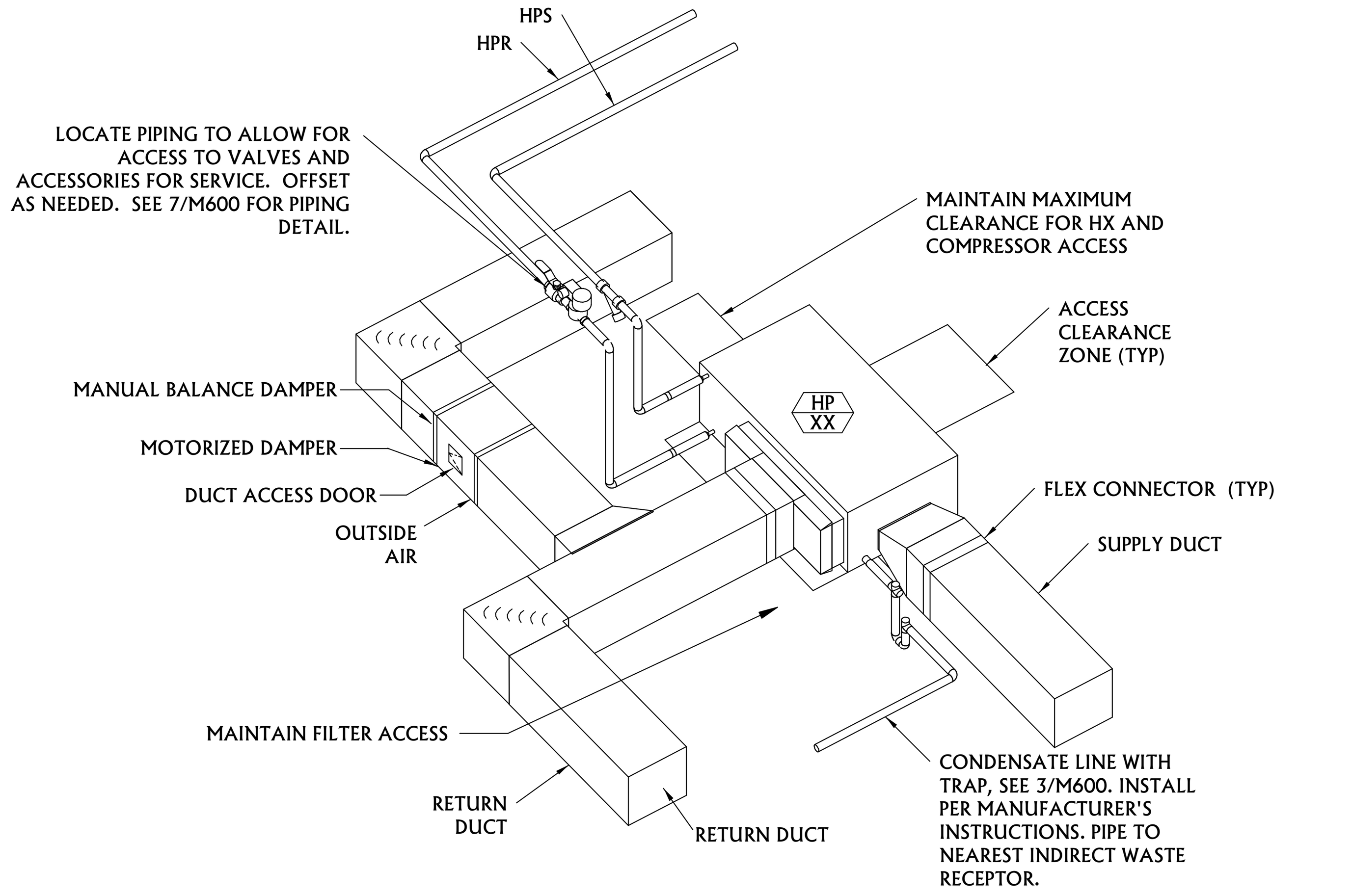
SLATE #202141

ACE #22BL5657

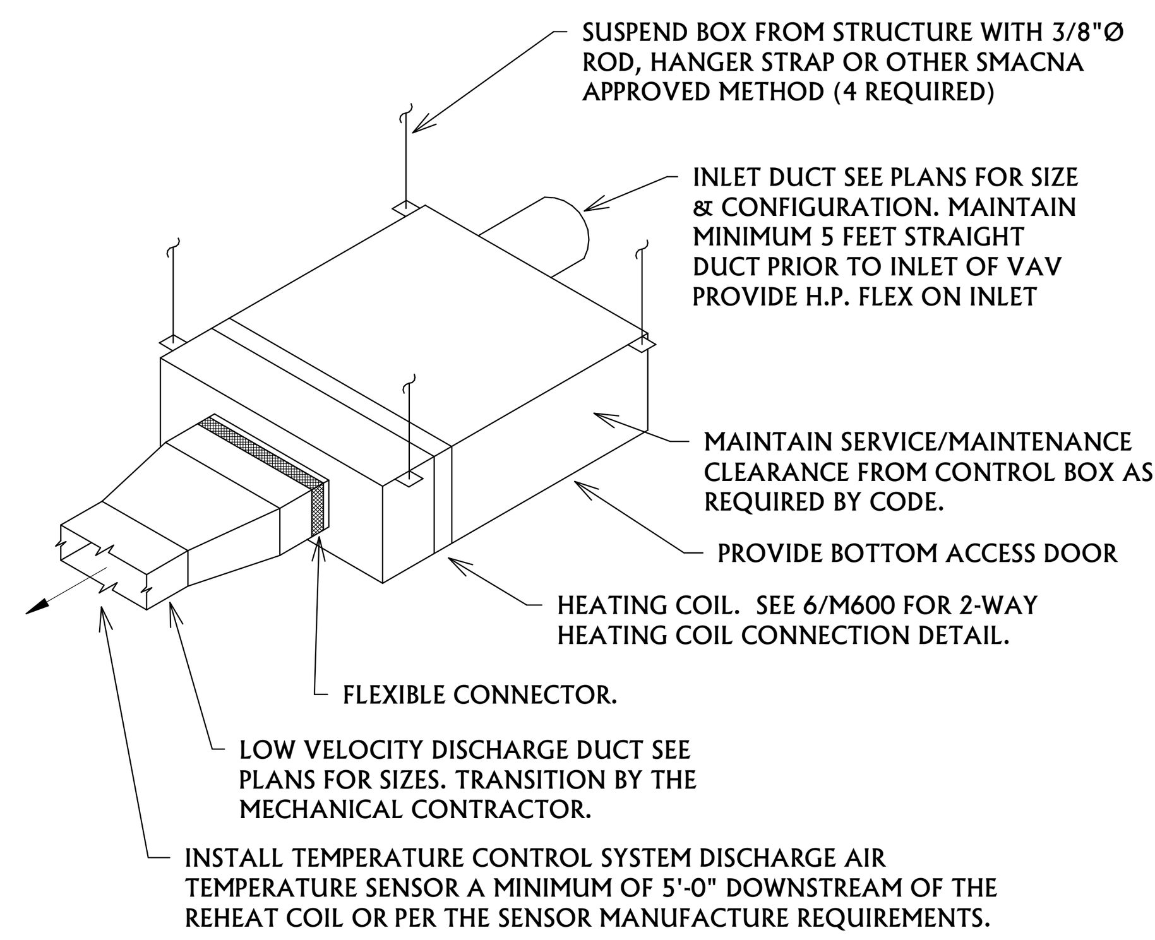
SHEET TITLE
MECHANICAL SECTIONS

SHEET
M500

DATE
3/07/2023



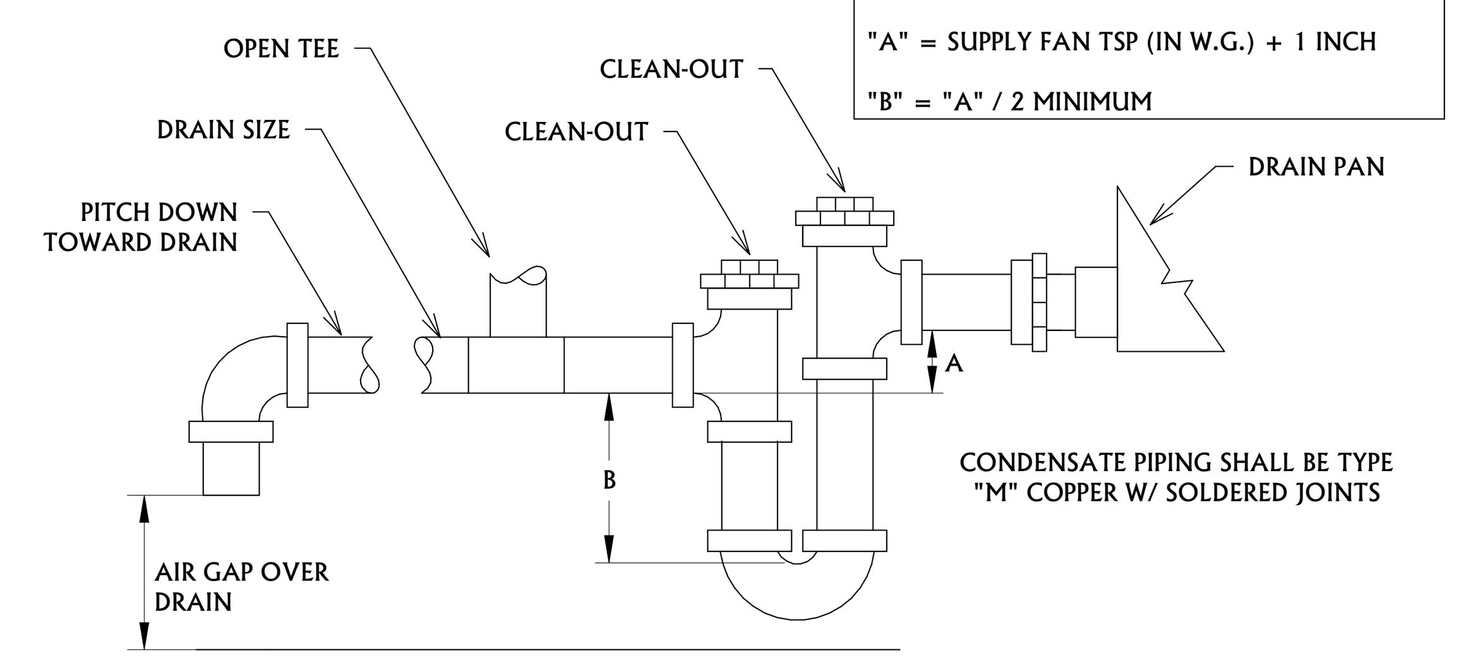
1 HORIZONTAL HEAT PUMP DETAIL - RELOCATED HP 3-17
NOT TO SCALE



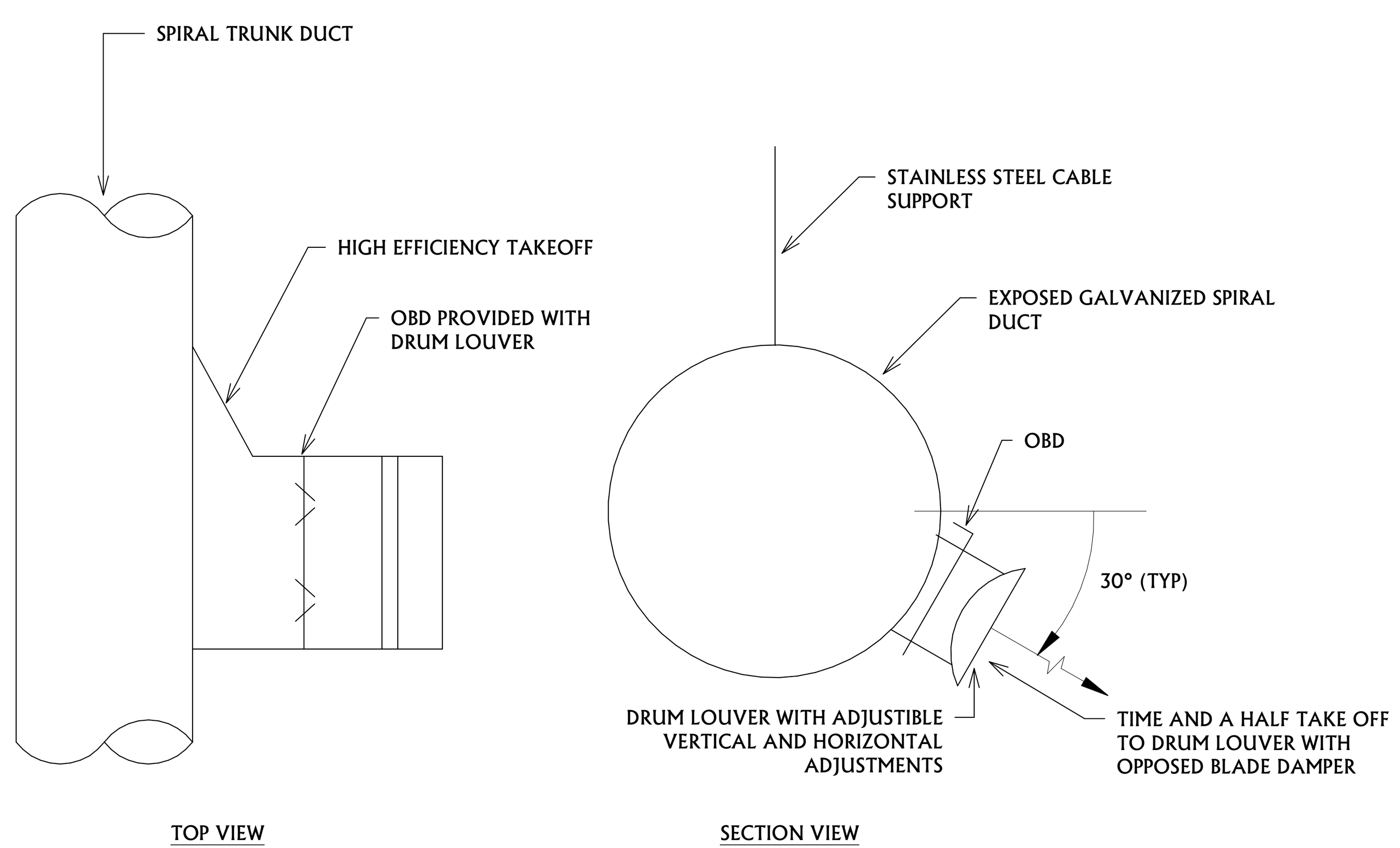
HIGH VELOCITY DUCT SEE PLANS FOR SIZE & CONFIGURATION. MAINTAIN 1-1/2 TO 3 DUCT DIAMETERS OF STRAIGHT DUCT UPSTREAM OF THE VAV BOX. STRAIGHT DUCT SHALL BE THE SAME SIZE AS THE VAV INLET CONNECTION. TRANSITION TO THE RESPECTIVE DUCT SIZE SHOWN ON THE MECHANICAL DRAWINGS AND CONNECT TO THE RESPECTIVE SUPPLY DUCT BRANCH MAIN.

2 VAV BOX WITH HOT WATER REHEAT DETAIL
NOT TO SCALE

NOTE:
"A" = SUPPLY FAN TSP (IN W.G.) + 1 INCH
"B" = "A" / 2 MINIMUM



3 CONDENSATE DRAIN TRAP DETAIL
NOT TO SCALE

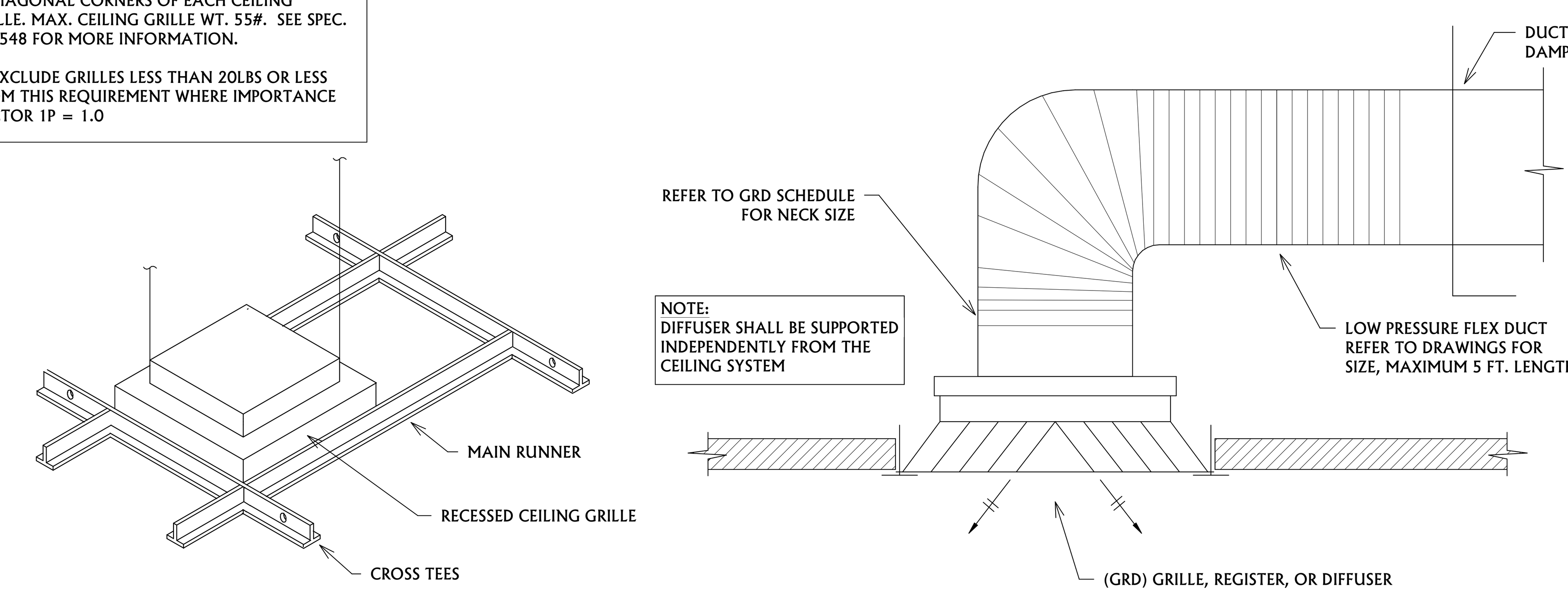


4 EXPOSED SUPPLY DUCT DRUM LOUVER DETAIL
NOT TO SCALE

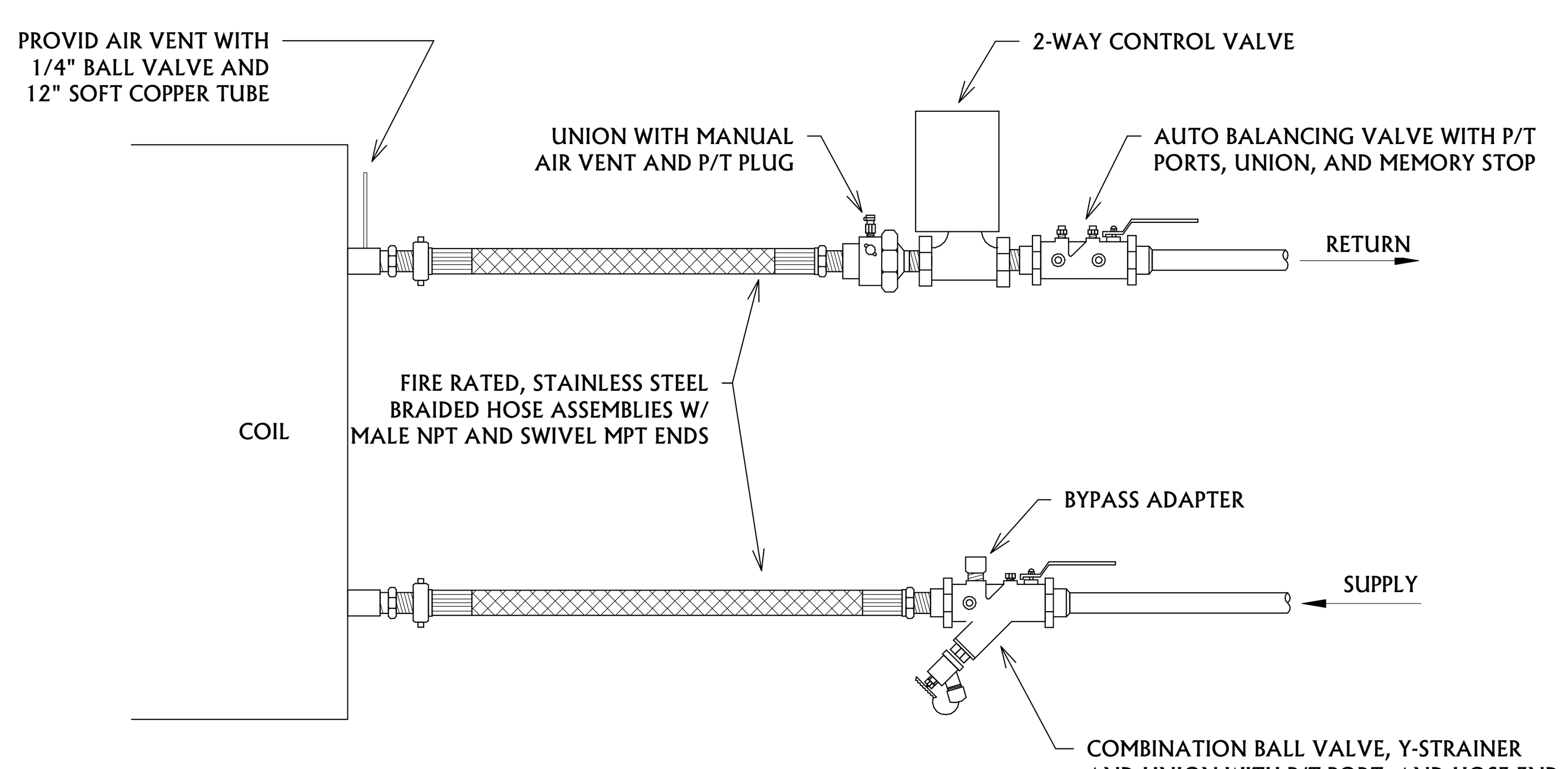
NOTES:

1) CONNECT 2 NO. 12 GA. GRILLE SUPPORT WIRES @ DIAGONAL CORNERS OF EACH CEILING GRILLE. MAX. CEILING GRILLE WT. 55#. SEE SPEC. 230548 FOR MORE INFORMATION.

2) EXCLUDE GRILLES LESS THAN 20LBS OR LESS FROM THIS REQUIREMENT WHERE IMPORTANCE FACTOR 1P = 1.0

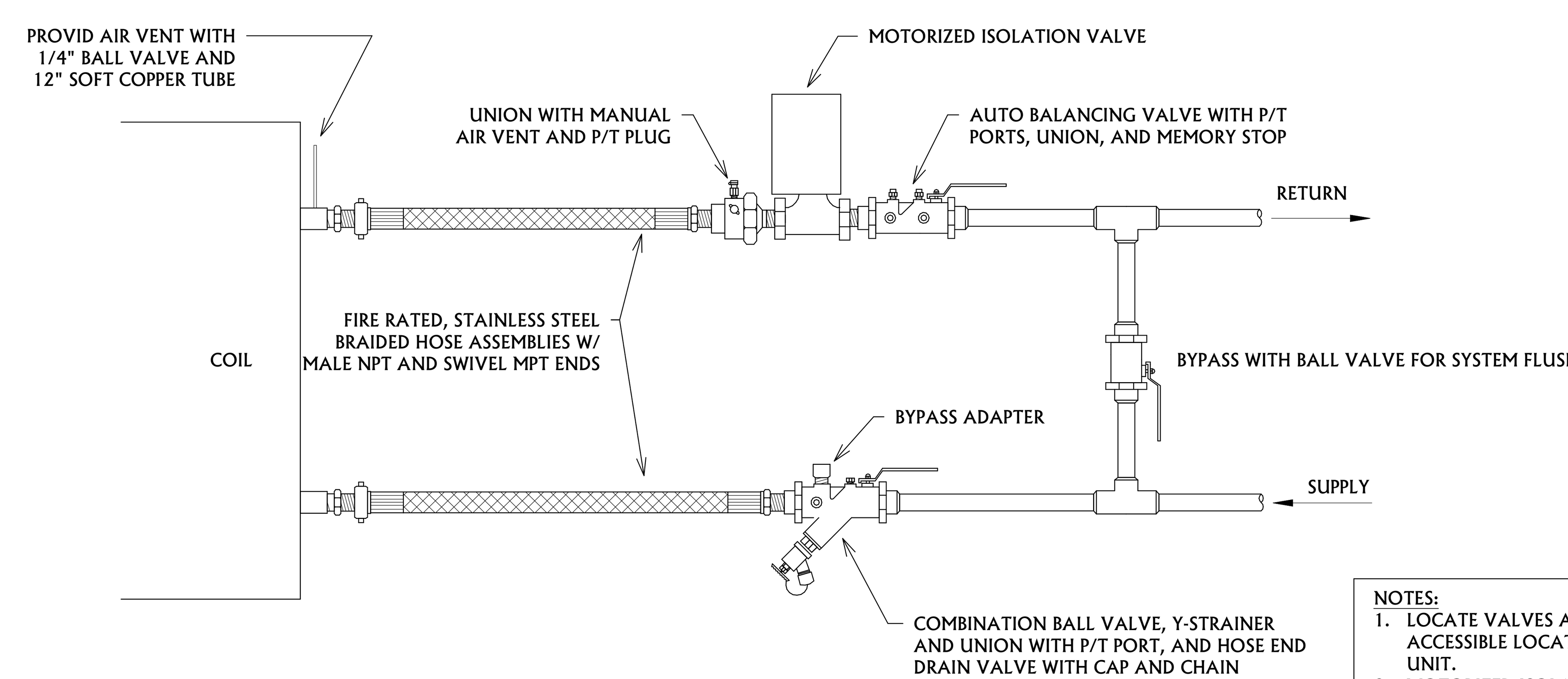


5 CEILING GRILLE DETAILS
NOT TO SCALE



NOTE:
CONTRACTOR HAS THE OPTION TO HARD PIPE THE VAV COIL OR PROVIDE A FLEXIBLE PIPE CONNECTOR AS SHOWN IN THE DETAIL. CONTRACTOR SHALL UTILIZE THE SAME CONNECTION METHOD FOR ALL VAV'S IN THE PROJECT.

6 2-WAY HEATING COIL DETAIL
NOT TO SCALE



NOTES:
1. LOCATE VALVES AND ACCESSORIES IN AN ACCESSIBLE LOCATION. OFTEN THAT IS REMOTE FROM UNIT.
2. MOTORIZED ISOLATION VALVE FOR HPS/HPR IS TO BE FACTORY SUPPLIED AND FIELD INSTALLED PER MANUFACTURER'S INSTRUCTIONS.

7 2-WAY HEAT PUMP COIL CONNECTION DETAIL
NOT TO SCALE

CONSTRUCTION DRAWINGS

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: GH
REVIEWED BY: TM

REV.	DESCRIPTION	DATE
△		

MONTANA
AARON B. SADOWSKI
No. 62689 PE
3/7/2023
LICENSED
PROFESSIONAL ENGINEER
[illegible]

PPA#19-0174
SLATE #202141
ACE #22BL5657

SHEET TITLE
MECHANICAL DETAILS I

SHEET
M600

DATE
3/07/2023

ELECTRICAL LEGEND

FIRE ALARM DEVICES

ROUGH-IN ONLY, COORDINATE DEVICE INSTALLATION WITH OWNER FIRE ALARM CONTRACTOR

F	AUDIO/VISUAL HORN/STOBE DEVICE
F	VISUAL STROBE DEVICE

COMMUNICATION DEVICES

ROUGH-IN ONLY, CABLING BY OWNER IT

TV TV	DATA ROUGH-IN OICE/ DATA DEVICE JACKS, BOX INDICATES FLOOR MOUNTING

SECURITY SYSTEM DEVICES

ROUGH-IN ONLY, CABLING BY OWNER SECURITY

KP	KEY PAD
CR	CARD READER
DS	DOOR POSITION SENSOR

MISCELLANEOUS LEGEND

W/	WITH	AFF	ABOVE FINISHED FLOOR
AC	ABOVE COUNTER	AFG	ABOVE FINISHED GRADE
EC	ELECTRICAL CONTRACTOR	WM	WIRE MOLD
(E)	EXISTING	GC	GENERAL CONTRACTOR
(R)	RELOCATED	GND	GROUND
(N)	NEW DEVICE	UG	UNDER GROUND
C	CONDUIT	BOD	BOTTOM OF DEVICE
BFG	BELOW FINISHED GRADE	TOD	TOP OF DEVICE
UC	UNDER COUNTER	COD	CENTER OF DEVICE
WP	WEATHER PROOF	BOF	BOTTOM OF FIXTURE
MC	MECHANICAL CONTRACTOR	PC	PLUMBING CONTRACTOR

1	REFER TO ELECTRICAL NOTES
	HOMERUN TO ELECTRICAL PANEL
	NORMAL CIRCUIT CONCEALED IN WALL OR EXPOSED
	UNDERGROUND OR BURIED CIRCUIT

POWER DEVICES

$	SINGLE POLE SWITCH, SUBSCRIPT INDICATES TYPE: P PILOT LIGHT 2 2 POLE MC MOMENTARY CONTACT 3 3-WAY 4 4-WAY K KEYED D DIMMER LV LOW VOLTAGE T TIMER, 1 HOUR TIMER, MOTOR RATED FOR EXHAUST FANS OS OCCUPANCY SENSOR
	DUPLEX RECEPTACLE SUBSCRIPT INDICATES TYPE: WP WEATHERPROOF GFCI GROUND FAULT CIRCUIT INTERRUPTER AC ABOVE COUNTER IG ISOLATED GROUND TR TAMPER RESISTANT WR WEATHER RESISTANT FILLED CENTER INDICATES GFCI DEVICE
	DOUBLE DUPLEX RECEPTACLE, SUBSCRIPT ABOVE INDICATE TYPE
	DUPLEX RECEPTACLE, CEILING MOUNTED. DEVICE AND COVER SHALL MATCH CEILING FINISH
	SWITCHED DUPLEX RECEPTACLE, BOX INDICATES DEVICE LOCATED IN FLOOR BOX
	MUSHROOM HEAD PUSH BUTTON
OS	CORNER WALL MOUNTED OCCUPANCY SENSOR
OS	CEILING MOUNTED OCCUPANCY SENSOR
PP P	OCCUPANCY SENSOR POWER PACK, BOX INDICATES WALL MOUNTING
	SPECIAL PURPOSE CONNECTION, BRACKET INDICATES WALL MOUNTING, BOX INDICATES FLOOR MOUNTING
	JUNCTION BOX, BRACKET INDICATES WALL MOUNTING, BOX INDICATES FLOOR MOUNTING
R	RELAY
	ELECTRICAL PANEL - ALL PANELS ARE EXISTING WITH SPARE CONDUITS

LIGHTING DEVICES

	LAY-IN OR RECESSED LIGHTING FIXTURE
	DIRECT/ INDIRECT LIGHTING PENDANT MOUNTED FIXTURE.

ELECTRICAL ABBREVIATIONS

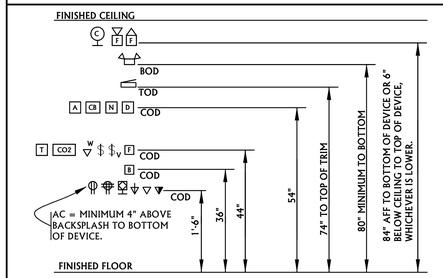
A	AMP(S)
ACCU	AIR CONDITIONING CONDENSING UNIT
ACU	AIR CONDITIONING UNIT
ADJ	ADJUSTABLE
ADMIN	ADMINISTRATION
AFF	ABOVE FINISH FLOOR
AHU	AIR HANDLING UNIT
AL	ALUMINUM
AMP	AMPERE(S)
APPL	APPLIANCE
APPROX	APPROXIMATE
ATS	AUTOMATIC TRANSFER SWITCH
BLDG	BUILDING
BRK	BREAKER
BTU/HR	BRITISH THERMAL UNIT/HOUR
C	CONDUIT
CB	CIRCUIT BREAKER
CCT	CIRCUIT
CCTV	CLOSED CIRCUIT TELEVISION
CUH	CABINET UNIT HEATER
CFM	CUBIC FEET PER MINUTE
COM	COMMUNICATION
COMM	COMMISSARY
COMP	COMPRESSOR
COND	CONDENSER
CONTR	CONTRACTOR
CU	COPPER
CTV	CABLE TELEVISION
CW	COOL WHITE
CWP	COLD WATER PUMP
DIA	DIAMETER
DISC	DISCONNECT
DPS	DOOR POWER SUPPLY
DWG	DRAWING
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
ELEC	ELECTRIC
EMD	ESTIMATED MAXIMUM DEMAND
EMER	EMERGENCY
ENGR	ENGINEER
ETC	ETCETERA
EWC	ELECTRIC WATER COOLER
EXT	EXTERIOR
FA	FIRE ALARM
FAC	FACILITY
FACP	FIRE ALARM CONTROL PANEL
FIX	FIXTURE
FLA	FULL LOAD AMPS
FT	FOOT
GC	GENERAL CONTRACTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
HID	HIGH INTENSITY DISCHARGE
HT	HEIGHT
HTRS	HEATERS
HW	HOT WATER
HWH	HOT WATER HEATER
HWP	HOT WATER PUMP
HZ	HERTZ
INC	INCORPORATED
J-BOX	JUNCTION BOX
KHZ	KILOHERTZ
KIT	KITCHEN
KVA	KILIVOLT AMPERE(S)
KW	KILOWATT(S)
LTS	LIGHTS
LW	LIGHT WHITE
MC	MECHANICAL CONTRACTOR
MCA	MINIMUM CIRCUIT AMPS
MOC	MOMENTARY CONTACT
MCB	MAIN CIRCUIT BREAKER
MDP	MAIN DISTRIBUTION PANEL
MECH	MECHANICAL
MIN	MINIMUM
MOCP	MAXIMUM OVERCURRENT PROTECTION
MLO	MAIN LUGS ONLY
MP	MAIN PANEL
MTD	MOUNTED
MFA	MINIMUM FEEDER AMPACITY
MFG	MANUFACTURER
NIC	NOT IN CONTRACT
NO	NUMBER
OCP	OVER CURRENT PROTECTION
OFF	OFFICE
OH	OVERHEAD
P	PHASE
PNL	PANEL
PREP	PREPARATION
PROD	PRODUCE
P/I	PROVIDE & INSTALL
RA	REMOTE ANNUNCIATOR
RAF	RETURN AIR FAN
RECP	RECEPTACLE
RECPTS	RECEPTACLES
REF	REFRIGERATOR
REFR	REFRIGERANT
REQD	REQUIRED
RM	ROOM
RMS	ROOM(S)
RR	RESTROOMS
RS	RAPID START
SDP	SUB DISTRIBUTION PANEL
SER	SERVICE
SF	SUPPLY FAN
SHT	SHEET
SN	SOLID NEUTRAL
SP	SWITCH, PILOT
SPECS	SPECIFICATIONS
SPST	SWITCH, SINGLE POLE-SINGLE THROW
STD	STANDARD
STL	STEEL
STOR	STORAGE
SW	SWITCH
TBD	TELEPHONE BACK BOARD
TV	TELEVISION
TYP	TYPICAL
UG	UNDERGROUND
UGE	UNDERGROUND ELECTRICAL
UGT	UNDERGROUND TELEPHONE
UH	UNIT HEATER
V	VOLT(S)
VA	VOLT AMPERES
VEST	VESTIBULE
W	WIRE
W	WATT(S)
W/	WITH
WM	WATT MISER
XFMR	TRANSFORMER

LUMINAIRE SCHEDULE

MARK	MANUFATURER			MOUNTING		ELECTRICAL		PERFORMANCE DATA						FINISH	DESCRIPTION:
	MAKE	SERIES	MODEL NUMBER	STYLE	TO BOTTOM	VOLTS	WATTS	MIN DELIVERD LUMENS	MIN EFFICACY	DIMMING	UP/DN	COLOR	MIN CRI		
A4	CURRENT	COLUMBIA	LCAT22 9 40 HL G EDD ULCAT22 9 40 HL G EDD U	RECESSED	CEILING	277V	29	3423	118	0-100%	0%/100%	4000K	90	WHITE	2X2 LED TROFFER
P9	CURRENT	LITECONTROL	4L-P-ID-STD-8'-08-SOF-C1-40K9-1050/D075-D01-1 C-UNV-FA2-W3	SUSPENDED	9'-6" AFF	277V	79	10000	126	1%	500LM/750LM	4000K	90	MATTE WHITE	8' LINEAR DIRECT/ INDIRECT FIXTURE, 3.5" SQUARE BODY, FLAT END CAP AND AIRCRAFT CABLE SUSPENSION

LIGHTING NOTES:
1. ALL LIGHT FIXTURES MUST BE *DLC LISTED*, NO EXCEPTIONS. IF FIXTURE IS NOT DLC LISTED DO NOT SUBMIT FOR APPROVAL, SHOULD PRODUCT BE SUBMITTED AS BEING LISTED AND FOUND LATER TO NOT BE ON DLC LIST THE LIGHTING REP SHALL PROVIDE A LISTED DEVICE TO MEET PROJECT REQUIREMENT AND IN TIME FRAME TO NOT IMPEDE PROJECT PROGRESS OR COST.
2. ARCHITECT TO VERIFY ALL FINISHES PRIOR TO FINAL APPROVAL.

INTERIOR MOUNTING HEIGHTS



ELECTRICAL SHEET LIST

Sheet Number	Sheet Name
E001	ELECTRICAL COVER
E002	ELECTRICAL SCHEDULES
ED310	ELECTRICAL DEMOLITION PLAN
E310P	POWER AND SPECIAL SYSTEMS RENOVATION PLAN
E310L	LIGHTING RENOVATION PLAN
E311L	324 LIGHTING REMODEL PLAN
E600	ELECTRICAL DETAILS
E601	ELECTRICAL DETAILS

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY:	DS	
REVIEWED BY:	CG	
REV.	DESCRIPTION	DATE

MONTANA
CHRISTOPHER B. GREEN
No. 20308 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
ELECTRICAL COVER

SHEET
E001

DATE
3/7/2023

EXISTING Panel: 3L5

Location: LAB 360
Supply From:
Mounting: Recessed
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Main Rating: 225 A
Buss Rating: 225 A

Notes:
EXISTING ABB/GE PANEL, PROVIDE NEW BREAKERS FOR ALL NEW LOADS, MATCH AIC, MOUNTING STYLE, AND POLES.

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	EXISTING RECEPTACLES	20 A	1	0	360					1	20 A	MOTORIZED SHADES	2
3	EXISTING RECEPTACLES	20 A	1			0	720			1	20 A	MOTORIZED SHADES	4
5	EXISTING RECEPTACLES	20 A	1					0	180	1	20 A	RECEPTS LAB 360	6
7	RECEPTS LAB 360	20 A	1	180	180					1	20 A	RECEPTS LAB 360	8
9	RECEPTS LAB 360	20 A	1			360	360			1	20 A	RECEPTS LAB 360	10
11	RECEPTS LAB 360	20 A	1					360	360	1	20 A	RECEPTS LAB 360	12
13	RECEPTS LAB 360	20 A	1	360	360					1	20 A	RECEPTS LAB 360	14
15	RECEPTS LAB 360	20 A	1			360	360			1	20 A	RECEPTS LAB 360	16
17	RECEPTS LAB 360	20 A	1					360	360	1	20 A	RECEPTS LAB 360	18
19	RECEPTS LAB 360	20 A	1	360	360					1	20 A	RECEPTS LAB 360	20
21	RECEPTS LAB 360	20 A	1			360	360			1	20 A	RECEPTS LAB 360	22
23	RECEPTS LAB 360	20 A	1					360	360	1	20 A	RECEPTS LAB 360	24
25	RECEPTS LAB 360	20 A	1	360	360					1	20 A	RECEPTS LAB 360	26
27	RECEPTS LAB 360	20 A	1			360	360			1	20 A	RECEPTS LAB 360	28
29	RECEPTS LAB 360	20 A	1					360	360	1	20 A	RECEPTS LAB 360	30
31	RECEPTS LAB 360	20 A	1	360									32
33	RECEPTS LAB 360	20 A	1			360							34
35													36
37													38
39													40
41													42
			Total Load:	3240 VA		3960 VA		3060 VA					
			Total Amps:	27 A		33 A		26 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	0 VA	0.00%	0 VA		
RECEPTS	9180 VA	100.00%	9180 VA	**Total Conn. Load:**	10260 VA
MOTORS	1080 VA	102.78%	1110 VA	**Total Est. Demand:**	10290 VA
				Total Conn.:	28 A
				Total Est. Demand:	29 A

Notes:

EXISTING Panel: 3L4

Location: WORK 360B
Supply From:
Mounting: Recessed
Enclosure: Type 1

Volts: 120/208 Wye
Phases: 3
Wires: 4

A.I.C. Rating: 22,000
Mains Type: MCB
Main Rating: 225 A
Buss Rating: 225 A

Notes:
EXISTING ABB/GE PANEL, PROVIDE NEW BREAKERS FOR ALL NEW LOADS, MATCH AIC, MOUNTING STYLE, AND POLES.

CKT	Circuit Description	Trip	Poles	A		B		C		Poles	Trip	Circuit Description	CKT
1	RECEPTS DARK LAB 360C	20 A	1	360	660					1	15 A	RECEPTS WORK 360B	2
3	RECEPTS DARK LAB 360C	20 A	1			540	540			1	20 A	RECEPTS ROOMS 360, 360B	4
5	RECEPTS DARK LAB 360C	20 A	1					540	360	1	20 A	RECEPTS LASER LAB 360A	6
7	RECEPTS CORD REEL DARK LAB 360C	20 A	1	360	360					1	20 A	RECEPTS LASER LAB 360A	8
9	RECEPTS CORD REEL DARK LAB 360C	20 A	1			360	360			1	20 A	RECEPTS LASER LAB 360A	10
11	RECEPTS CORD REEL DARK LAB 360C	20 A	1					180	180	1	20 A	RECEPTS LASER LAB 360A	12
13	RECEPTS LASER LAB 360A	20 A	1	360	360					1	20 A	RECEPTS LASER LAB 360A	14
15	RECEPTS LASER LAB 360A	20 A	1			360	360			1	20 A	RECEPTS DARK LAB 360C	16
17	RECEPTS LASER LAB 360A	20 A	1					180	360	1	20 A	RECEPTS DARK LAB 360C	18
19					180					1	20 A	RECEPTS DARK LAB 360C	20
21													22
23													24
25													26
27													28
29													30
31													32
33													34
35													36
37													38
39													40
41													42
			Total Load:	2640 VA		2520 VA		1800 VA					
			Total Amps:	23 A		22 A		15 A					

Legend:

Load Classification	Connected Load	Demand Factor	Estimated Demand	Panel Totals	
Other	0 VA	0.00%	0 VA		
RECEPTS	6840 VA	100.00%	6840 VA	**Total Conn. Load:**	6960 VA
MOTORS	120 VA	125.00%	150 VA	**Total Est. Demand:**	6990 VA
				Total Conn.:	19 A
				Total Est. Demand:	19 A

Notes:

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: **Author**
REVIEWED BY **Checker**

REV.	DESCRIPTION	DATE

MONTANA
CHRISTOPHER B. GREEN
No. 20308 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

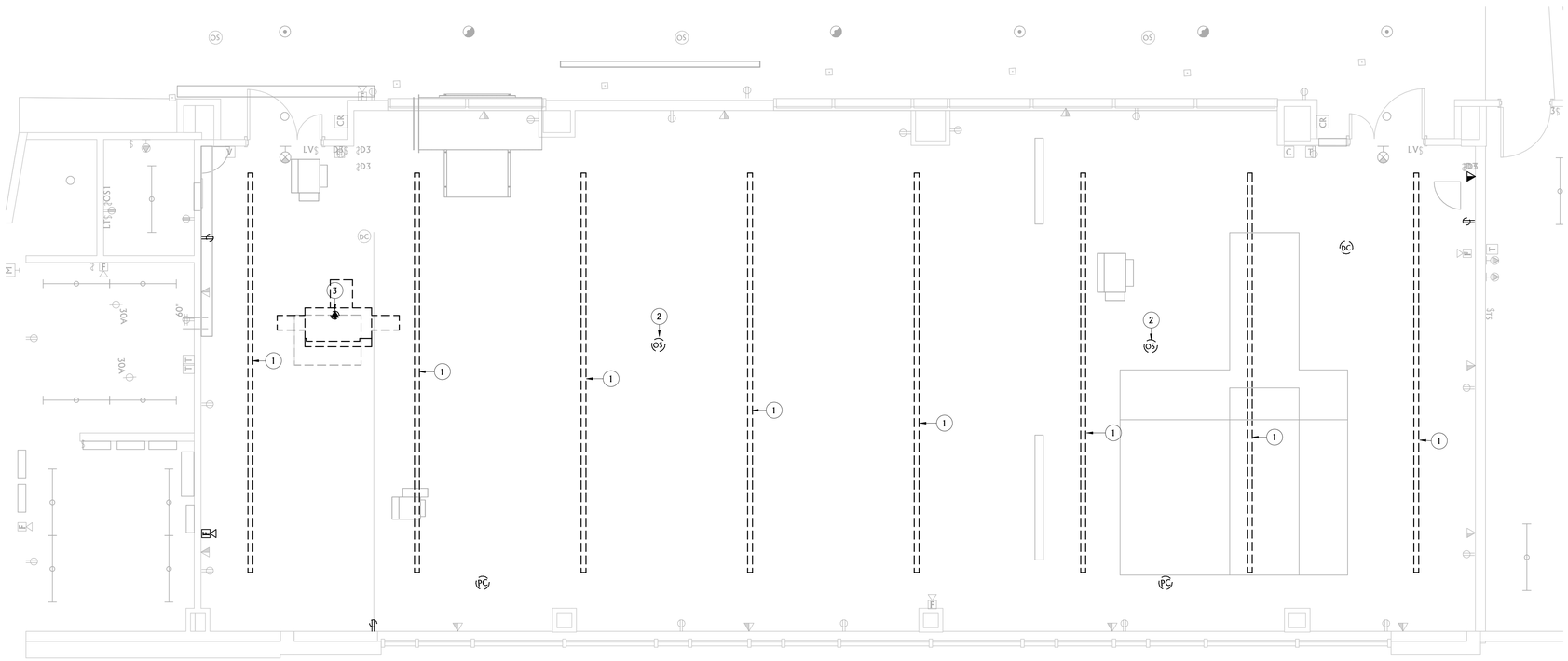
SHEET TITLE
ELECTRICAL SCHEDULES

SHEET
E002

DATE
3/7/2023

ELECTRICAL GENERAL DEMOLITION NOTES	
A	ELECTRICAL CONTRACTOR SHALL REMOVE ALL ELECTRICAL DEVICES IN AREAS OF THIS FACILITY AFFECTED BY REMODEL WORK INCLUDING BUT NOT LIMITED TO: JUNCTION BOXES, OUTLETS, LIGHTS, CABLE, CONDUIT AND WIRE. ALL DEVICES MAY NOT BE SHOWN ON THIS SHEET AND SITE INVESTIGATION IS REQUIRED FOR EXACT QUANTITIES. CONFIRM DEMOLITION SCOPE WITH GENERAL CONTRACTOR AT PRE-BID WALK AND RECYCLE WHERE FEASIBLE. DISPOSE OF ALL FLUORESCENT LAMPS AND BALLASTS IN A LEGAL AND ENVIRONMENTALLY FRIENDLY MANNER. PROVIDE PROPER DISPOSAL DOCUMENTATION STATING ITEMS DISPOSED OF AND QUANTITY TO OWNER FOR RETENTION.
B	EXISTING CONDUITS STUBBED THROUGH THE FLOOR THAT ARE NOT REUSED OR ARE ABANDONED SHALL BE CUT AT THE FLOOR SURFACE, GROUND FLUSH AND FILLED WITH GROUT. FLOOR FINISH SHALL MATCH THAT OF EXISTING.
C	DEVICES SHOWN ARE BASED ON EXISTING PLANS AND LIMITED VISUAL FIELD OBSERVATIONS AND ARE ONLY INTENDED TO CONVEY SCOPE. DEMO OR MODIFY ALL EXISTING ELECTRICAL INSTALLATIONS AS REQUIRED TO SUPPORT PROJECT. FIELD VERIFY ALL CONDITIONS PRIOR TO BIDDING.
D	ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH NEC, STATE AND LOCAL BUILDING CODE.
E	RETURN ANY USABLE/ SALVAGEABLE ELECTRICAL DEVICES TO OWNER INCLUDING BUT NOT LIMITED TO: LIGHT FIXTURES, ELECTRICAL HEATERS, PANELS, CIRCUIT BREAKERS ETC. CONFIRM WITH OWNER ITEMS THAT ARE DESIRABLE FOR RETENTION.
F	ALL DASHED ITEMS ON DEMOLITION PLANS ARE TO BE REMOVED UNLESS NOTED OTHERWISE. SOLID ITEMS ARE TO REMAIN OR TO BE RELOCATED AS NOTED. NOTE - ITEMS SHOWN IN THE DEMOLITION PLANS ARE BASED ON "EXISTING DRAWINGS". ADDITIONAL ELECTRICAL ITEMS MAY BE ENCOUNTERED THAT ARE NOT SHOWN - ALL GENERAL ELECTRICAL ITEMS IN THE AREA OF REMODEL ARE TO BE REMOVED THAT ARE AFFECTED BY REMODEL. VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING.
G	ANY WORK THAT REQUIRES POWER DISRUPTIONS SHALL BE SCHEDULED AND APPROVED BY THE OWNER. ALL WORK SHALL BE PERFORMED WITH NO DISRUPTION OF THE OWNER'S BUSINESS.
H	DISCONNECT AND REMOVE ALL ELECTRICAL FROM MECHANICAL EQUIPMENT SHOWN TO BE DEMOLISHED. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
I	SOME DEVICES AND SYSTEMS THAT ARE NOT REMOVED MAY BE AFFECTED BY DEMOLITION AND CONSTRUCTION. PROVIDE ALL LABOR AND MATERIALS REQUIRED TO MAINTAIN OR RESTORE CONTINUITY AND FUNCTION OF ALL EXISTING DEVICES AND SYSTEMS THAT ARE NOT REMOVED BUT ARE AFFECTED BY DEMO OR CONSTRUCTION WORK.
J	REMOVE ALL ABANDONED WIRE, RACEWAY AND CABLING IN THE PROJECT AREA.
K	PROVIDE UPDATED, TYPEWRITTEN DIRECTORIES FOR ALL EXISTING PANELS AFFECTED BY DEMOLITION WORK. LABEL ALL CIRCUIT BREAKERS THAT HAVE THEIR ENTIRE LOAD REMOVED AS 'SPARE'.
L	MAINTAIN OR RESTORE FUNCTIONALITY TO ALL SYSTEMS THAT ARE AFFECTED BY PROJECT PHASING. CONTRACTOR SHALL PROVIDE ALL WORK TO MAINTAIN, CONNECT, RECONNECT, MODIFY OR RESTORE THE FUNCTION OF ALL SYSTEMS THAT ARE AFFECTED IN ANY WAY BY PROJECT PHASING. PROVIDE ALL WORK FOR TEMPORARY CONNECTIONS OR SYSTEM MODIFICATIONS REQUIRED TO ACCOMMODATE PROJECT PHASING. REFER TO ARCHITECTURAL FOR PHASING INFORMATION.
M	ALL PANELS TO REMAIN IN SERVICE UNTIL NEW SERVICE AND DISTRIBUTION SYSTEM IS COMPLETE. CONNECT ALL LOADS REMAINING AFTER DEMO IS COMPLETE TO NEW PANELS. MODIFY AND EXTEND WIRING AS REQUIRED.

ELECTRICAL KEYNOTES	
1	DISCONNECT EXISTING LIGHT FIXTURE AND CAREFULLY RETAIN IN SAFE LOCATION ON SITE FOR REINSTALLATION IN NEW LOCATION. RETAIN EXISTING CIRCUIT AND SWITCHING AND PREPARE TO EXTEND TO NEW LOCATIONS.
2	DISCONNECT EXISTING OCCUPANCY SENSOR AND RETAIN FOR REINSTALLATION IN NEW LOCATION.
3	DISCONNECT POWER TO EXISTING HEATPUMP BEING MOVED AND RETAIN CIRCUIT FOR REUSE. PREPARE CIRCUIT TO EXTEND TO NEW HEATPUMP LOCATION. REUSE EXISTING STARTERS, DISCONNECTS, ETC IN NEW LOCATION.



N

1 / ED310 THIRD FLOOR ELECTRICAL POWER AND SPECIAL SYSTEMS DEMOLITION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATES • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: DS
REVIEWED BY: CG

REV.	DESCRIPTION	DATE

CHRISTOPHER B. GREEN No. 20308 PE 3/7/2023 LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

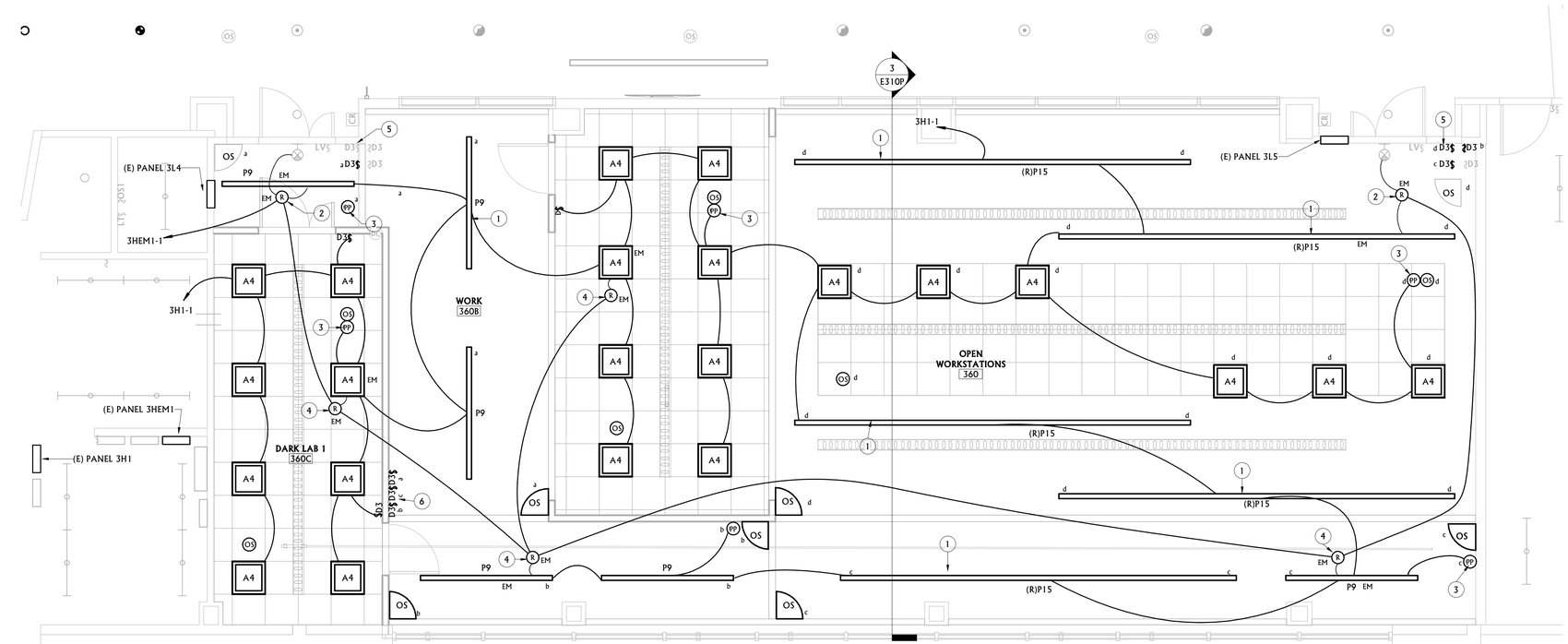
SHEET TITLE
ELECTRICAL DEMOLITION PLAN

SHEET
ED310

DATE
3/7/2023

LIGHTING GENERAL NOTES	
A	WHEN LIGHT SWITCHES ARE SHOWN LOCATED ON THE WALL THAT IS COMMON WITH THE END OF THE DOOR SWING INTO A SPACE. DO NOT LOCATE THE SWITCHES BEHIND THE DOOR, BUT RATHER A MINIMUM OF 6" FROM THE END OF THE SWING. VERIFY EXACT DOOR SWING PRIOR TO ROUGH-IN.
B	ALL CABLING LOCATED WITHIN THE CEILING SPACE SHALL BE PLENUM RATED UNLESS IT IS COMPLETELY INSTALLED IN CONDUIT. THIS INCLUDES, BUT IS NOT LIMITED TO: OCCUPANCY SENSOR/ LIGHTING CONTROL CABLING. ALL FIRE ALARM CABLING SHALL BE IN A FULL CONDUIT SYSTEM, NO EXCEPTIONS.
C	OCCUPANCY SENSORS SHALL BE SET FOR A 30 MINUTE TIME OUT DELAY. OFFICES SHALL BE SET FOR 15 MINUTE DELAY AND REST ROOMS SHALL BE SET FOR 20 MINUTE DELAY.
D	NOT ALL CIRCUITRY IS SHOWN FROM SWITCHES TO EACH CONTROLLED LIGHT FIXTURE(S). EC SHALL MATCH SWITCH SUBSCRIPT TO ASSOCIATED LIGHT FIXTURE(S) AND CONNECT COMPLETE.
E	PROVIDE ALL LOW VOLTAGE WIRING REQUIRED TO CONNECT OCCUPANCY SENSORS IN A SPACE TO THE POWER PACK ASSOCIATED WITH AN INDIVIDUAL AREA. WIRING NOT SHOWN FOR DRAWING CLARITY.
F	WHERE MULTIPLE OCCUPANCY SENSORS ARE IN A SINGLE ROOM, CONNECT SO THAT ANY SENSOR TURNS ALL LIGHTS ON.
G	EC SHALL PROVIDE A COMPLETE WIRING SYSTEM CONSISTING OF PROPER QUANTITY OF SWITCH LEGS, NEUTRALS AND HOT CIRCUITS FOR A FUNCTIONAL INSTALLATION.
H	EXISTING LIGHTING CONTROL SYSTEMS IS WATTSTOPPER, PROVIDE WATTSTOPPER DEVICES AND CONTROLS FOR NEW DEVICES.

ELECTRICAL KEYNOTES	
1	RELOCATE EXISTING LIGHT FIXTURE TO NEW LOCATION. PROVIDE NEW PENDANT CABLE IF NECESSARY, PROVIDE UNISTRUT SUPPORTS BELOW DUCTWORK, PIPING, ETC AS REQUIRED. CIRCUIT AS SHOWN. EXISTING FIXTURES ARE CONTROLLED WITH TWO SWITCHING CIRCUITS, THESE ARE TO BE COMBINED WHERE SHOWN. RECONFIGURE SWITCHING AS SHOWN.
2	REUSE EXISTING EMERGENCY RELAY AND EMERGENCY CIRCUIT.
3	PROVIDE ADDITIONAL POWER PACKS AS REQUIRED, REUSE EXISTING WHENEVER POSSIBLE.
4	PROVIDE EMERGENCY RELAYS AS NEEDED, REUSE EXISTING WHENEVER POSSIBLE.
5	REPROGRAM EXISTING SWITCHES/POWER PACKS WITH THE SWITCHING SHOWN.
6	PROVIDE ADDITIONAL SWITCHES, THESE MAYBE COMBINED INTO ONE WALL STATION.



N

1 / E310L THIRD FLOOR LIGHTING RENOVATION PLAN

1/4" = 1'-0"

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: DS
REVIEWED BY: CG

REV.	DESCRIPTION	DATE

CHRISTOPHER B. GREEN No. 20308 PE 3/7/2023 LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

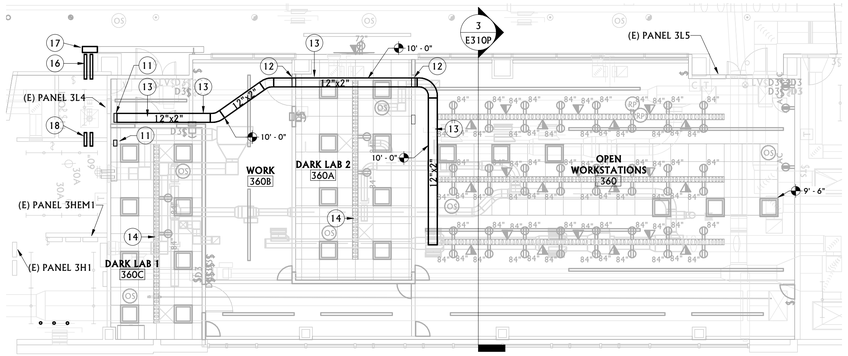
SLATE #202141

ACE #22BL5657

SHEET TITLE
LIGHTING RENOVATION PLAN

SHEET
E310L

DATE
3/7/2023

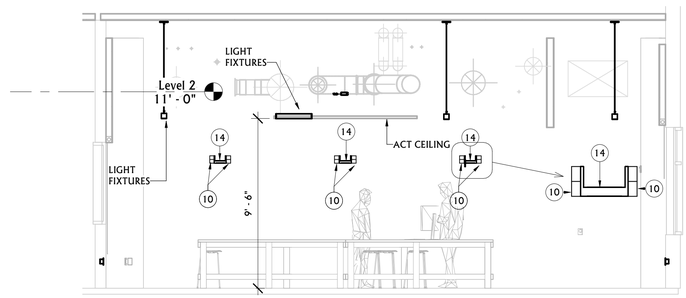


N

2 E310P

THIRD FLOOR CABLE TRAY

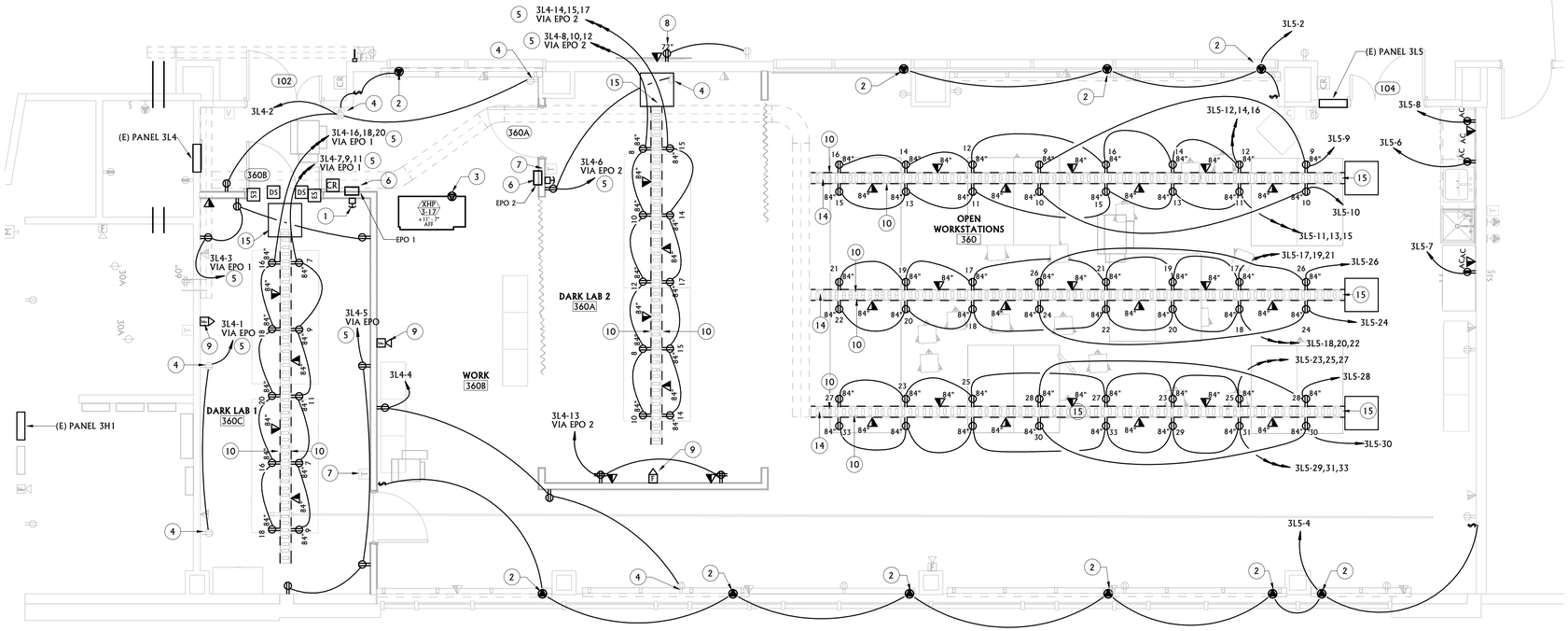
1/8" = 1'-0"



3 E310P

SECTION

1/4" = 1'-0"



N

1 E310P

THIRD FLOOR ELECTRICAL POWER AND SPECIAL SYSTEMS RENOVATION PLAN

1/4" = 1'-0"

ELECTRICAL POWER GENERAL NOTES

A	REFER TO ARCHITECTURAL PLANS FOR ADDITIONAL INFORMATION ON DEVICE LOCATIONS, DIMENSIONS, ETC. CAREFULLY EXAMINE ARCHITECTURAL FLOOR PLANS, CEILING PLANS, ELEVATIONS, ETC. FOR INFORMATION THAT AFFECTS ELECTRICAL WORK. NOTIFY ARCHITECT/ENGINEER IMMEDIATELY OF ANY DISCREPANCIES BETWEEN ARCHITECTURAL AND ELECTRICAL PLANS.
B	ALL DARK ITEMS ARE NEW, UNLESS NOTED OTHERWISE. ALL SHADED ITEMS ARE EXISTING TO REMAIN.
C	ALL ITEMS DENOTED WITH AN (R) ARE RELOCATED OR REINSTALLED. ALL ITEMS DENOTED WITH AN (E) ARE EXISTING TO REMAIN.
D	EC SHALL COORDINATE EXACT FLOOR BOX LOCATION WITH ARCHITECTURAL FURNITURE PACKAGE PRIOR TO SETTING OF ANY BOXES, UNLESS SPECIFICALLY DIMENSIONED IN THE PLAN. SEE ARCHITECTURAL FURNITURE PLAN FOR DETAILS.
E	CONNECT ALL DEVICES TO EXISTING CIRCUITS SERVING THE AREA UNLESS NOTED OTHERWISE. VERIFY EXISTING LOAD PRIOR TO CONNECTING ADDITIONAL DEVICES.
F	CONNECT ALL FIRE ALARM DEVICES TO EXISTING FIRE ALARM SYSTEM.
G	CONNECT ALL SPEAKERS TO EXISTING OVERHEAD PAGING SYSTEM.
H	FIRE SEAL ALL PENETRATIONS IN FIRE RATED WALLS. COORDINATE WITH ARCHITECTURAL FOR LOCATIONS.
I	ALL CIRCUITS SHOWN ARE TO EXISTING PANELS. EC TO PROVIDE 20A, 1P BREAKERS FOR EACH. USE EXISTING CONDUIT STUBOUTS FROM EXISTING FLUSH MOUNT PANELS.

ELECTRICAL KEYNOTES

1	EMERGENCY POWER OFF SWITCH. SEE DETAIL 4/E600.
2	PROVIDE POWER CONNECTION TO MOTORIZED SHADES. MOTORIZED SHADES FURNISHED BY G.C., COORDINATE WITH SHOP DRAWINGS PRIOR TO ROUGH-IN. PROVIDE ALL CONDUCTORS, LOW VOLT CABLE, J-BOXES, CONDUIT, ETC TO MAKE COMPLETE.
3	RECONNECT CIRCUIT RETAINED AT DEMO. PROVIDE ALL CONDUCTORS, CONDUITS, J-BOXES TO MAKE COMPLETE.
4	RE-CIRCUIT EXISTING CIRCUITS AS SHOWN. USE EXISTING CONDUCTORS, GROUNDS, BACK BOXES, CONDUIT, J-BOXES, RECEPTACLE, ETC
5	ROUTE THROUGH EMERGENCY POWER OFF CONTACTOR. SEE DETAIL 4/E600.
6	PROVIDE FLUSH MOUNT NEMA 1 ENCLOSURE FOR EMERGENCY POWER OFF CONTACTOR (EPO). MOUNT 72" AFF. SEE DETAIL 4/E600 FOR ADDITIONAL DETAILS.
7	PROVIDE THERMOSTAT OR SENSOR ROUGH-IN SIMILAR TO DETAIL 2/E600.
8	PROVIDE POWER AND DATA ROUGH-IN FOR OWNER FURNISHED TV. CONNECT TO EXISTING RECEPTACLE CIRCUIT IN CORRIDOR. COORDINATE PATCHING WITH GC.
9	PROVIDE LOW VOLTAGE ROUGH-IN FOR DEVICES COORDINATE INSTALLATION WITH OWNER FIRE ALARM CONTRACTOR. PROVIDE 3/4" CONDUIT TO NEAREST FIRE ALARM J-BOX WITH PULL STRING. MATCH SITE FIRE ALARM CONDUIT COLOR. SEE COVER FOR TYPICAL DEVICE HEIGHTS.
10	PROVIDE LEGRAND WIREMOLD AL4520 DUAL CHANNEL ALUMINUM RACEWAY AND MOUNT ONE FULL LENGHTH ON EACH SIDE OF CABLE TRAY. MOUNT WITH DATA ON TOP AND POWER ON THE BOTTOM. SEE ARCH FOR CABLE TRAY DETAILS AND MOUNTING. CIRCUIT AS SHOWN. PROVIDE ALL CONNECTORS, RECEPTACLES, MOUNTING HARDWARE, END CAPS, ETC TO MAKE COMPLETE. PROVIDE DATA ROUGH-IN AT DIRECTION OF OWNER, COORDINATE WITH OWNER IT PRIOR TO ORDERING RACEWAY. ANY DATA ROUGH-INS NOT USED BY OWNER IT SHALL HAVE A COVER PLATE.
11	PROVIDE WATERFALL DROPOUT IN EXISTING CABLE TRAY TO FACILITATE NEW CABLING.
12	PROVIDE SLEEVE THROUGH WALL AT PENETRATION. THIS SLEEVE IS NOT REQUIRED TO BE FIRE RATED.
13	PROVIDE WIRE BASKET STYLE CABLE TRAY WITH FACTORY FITTINGS. PLAN SHOWS INTENT AND NOT ALL FITTINGS AND OFFSETS NEEDED. COORDINATE WITH OTHER TRADES. PROVIDE TRAPEZE STYLE SUPPORTS TO STRUCTURE ABOVE. PROVIDE SEISMIC BRACING AS REQUIRED.
14	EC TO INSTALL CHALFANT SERIES 6 CABLE TRAYS BELOW ACT CEILINGS. SEE ARCH FOR MOUNTING DETAILS AND HEIGHTS.
15	ROUTE ALL CONDUITS THROUGH THIS END. PROVIDE CONDUIT END CAPS AS REQUIRED.
16	PROVIDE (2) TWO 3" DIA CONDUITS INTO CORRIDOR FROM JANITOR CLOSET. PROVIDE BUSHINGS ON EACH END AND COORDINATE WITH CABLE TRAY IN CORRIDOR. VERIFY LOCATION OF THESE CONDUITS WITH OWNER IT PRIOR TO INSTALL.
17	EXTEND EXISTING HALL CABLE TRAY TO NEW CONDUITS.
18	PROVIDE (2) TWO 3" DIA CONDUITS INTO JANITOR CLOSET FROM TR ROOM. PROVIDE BUSHINGS ON EACH END AND ALIGN WITH THE TWO CONDUITS TO THE NORTH. VERIFY LOCATION OF THESE CONDUITS WITH OWNER IT PRIOR TO INSTALL.

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: DS
REVIEWED BY: CG

REV.	DESCRIPTION	DATE

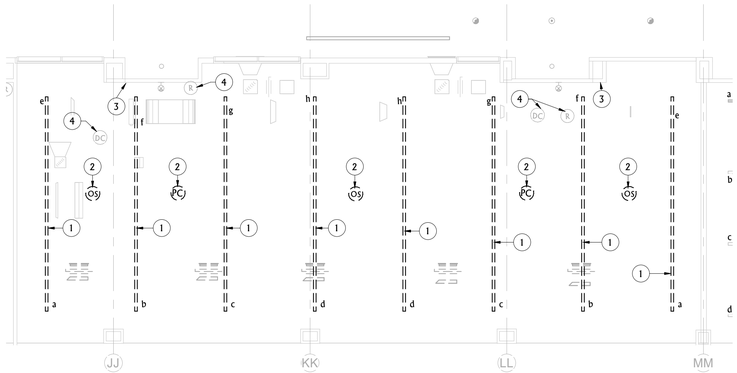
CHRISTOPHER B. GREEN No. 20308 PE 3/7/2023 LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

SHEET TITLE
POWER AND SPECIAL SYSTEMS RENOVATION PLAN

SHEET
E310P

DATE
3/7/2023

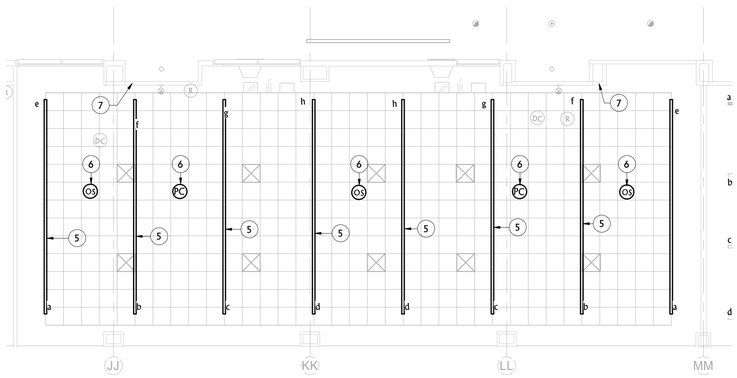


N

1
E311L

324 LIGHTING DEMO PLAN

1/8" = 1'-0"



N

2
E311L

324 LIGHTING REMODEL PLAN

1/8" = 1'-0"

ELECTRICAL GENERAL DEMOLITION NOTES

A	ELECTRICAL CONTRACTOR SHALL REMOVE ALL ELECTRICAL DEVICES IN AREAS OF THIS FACILITY AFFECTED BY REMODEL WORK INCLUDING BUT NOT LIMITED TO: JUNCTION BOXES, OUTLETS, LIGHTS, CABLE, CONDUIT AND WIRE. ALL DEVICES MAY NOT BE SHOWN ON THIS SHEET AND SITE INVESTIGATION IS REQUIRED FOR EXACT QUANTITIES. CONFIRM DEMOLITION SCOPE WITH GENERAL CONTRACTOR AT PRE-BID WALK AND RECYCLE WHERE FEASIBLE. DISPOSE OF ALL FLUORESCENT LAMPS AND BALLASTS IN A LEGAL AND ENVIRONMENTALLY FRIENDLY MANNER. PROVIDE PROPER DISPOSAL DOCUMENTATION STATING ITEMS DISPOSED OF AND QUANTITY TO OWNER FOR RETENTION.
B	EXISTING CONDUITS STUBBED THROUGH THE FLOOR THAT ARE NOT REUSED OR ARE ABANDONED SHALL BE CUT AT THE FLOOR SURFACE, GROUND FLUSH AND FILLED WITH GROUT. FLOOR FINISH SHALL MATCH THAT OF EXISTING.
C	DEVICES SHOWN ARE BASED ON EXISTING PLANS AND LIMITED VISUAL FIELD OBSERVATIONS AND ARE ONLY INTENDED TO CONVEY SCOPE. DEMO OR MODIFY ALL EXISTING ELECTRICAL INSTALLATIONS AS REQUIRED TO SUPPORT PROJECT. FIELD VERIFY ALL CONDITIONS PRIOR TO BIDDING.
D	ALL WORK SHALL BE PERFORMED IN STRICT ACCORDANCE WITH NEC, STATE AND LOCAL BUILDING CODE.
E	RETURN ANY USABLE/ SALVAGEABLE ELECTRICAL DEVICES TO OWNER INCLUDING BUT NOT LIMITED TO: LIGHT FIXTURES, ELECTRICAL HEATERS, PANELS, CIRCUIT BREAKERS ETC. CONFIRM WITH OWNER ITEMS THAT ARE DESIRABLE FOR RETENTION.
F	ALL DASHED ITEMS ON DEMOLITION PLANS ARE TO BE REMOVED UNLESS NOTED OTHERWISE. SOLID ITEMS ARE TO REMAIN OR TO BE RELOCATED AS NOTED. NOTE - ITEMS SHOWN IN THE DEMOLITION PLANS ARE BASED ON "EXISTING DRAWINGS". ADDITIONAL ELECTRICAL ITEMS MAY BE ENCOUNTERED THAT ARE NOT SHOWN - ALL GENERAL ELECTRICAL ITEMS IN THE AREA OF REMODEL ARE TO BE REMOVED THAT ARE AFFECTED BY REMODEL. VERIFY ALL EXISTING CONDITIONS PRIOR TO BIDDING.
G	ANY WORK THAT REQUIRES POWER DISRUPTIONS SHALL BE SCHEDULED AND APPROVED BY THE OWNER. ALL WORK SHALL BE PERFORMED WITH NO DISRUPTION OF THE OWNER'S BUSINESS.
H	DISCONNECT AND REMOVE ALL ELECTRICAL FROM MECHANICAL EQUIPMENT SHOWN TO BE DEMOLISHED. SEE MECHANICAL DRAWINGS FOR ADDITIONAL INFORMATION.
I	SOME DEVICES AND SYSTEMS THAT ARE NOT REMOVED MAY BE AFFECTED BY DEMOLITION AND CONSTRUCTION. PROVIDE ALL LABOR AND MATERIALS REQUIRED TO MAINTAIN OR RESTORE CONTINUITY AND FUNCTION OF ALL EXISTING DEVICES AND SYSTEMS THAT ARE NOT REMOVED BUT ARE AFFECTED BY DEMO OR CONSTRUCTION WORK.
J	REMOVE ALL ABANDONED WIRE, RACEWAY AND CABLING IN THE PROJECT AREA.
K	PROVIDE UPDATED, TYPEWRITTEN DIRECTORIES FOR ALL EXISTING PANELS AFFECTED BY DEMOLITION WORK. LABEL ALL CIRCUIT BREAKERS THAT HAVE THEIR ENTIRE LOAD REMOVED AS 'SPARE'.
L	MAINTAIN OR RESTORE FUNCTIONALITY TO ALL SYSTEMS THAT ARE AFFECTED BY PROJECT PHASING. CONTRACTOR SHALL PROVIDE ALL WORK TO MAINTAIN, CONNECT, RECONNECT, MODIFY OR RESTORE THE FUNCTION OF ALL SYSTEMS THAT ARE AFFECTED IN ANY WAY BY PROJECT PHASING. PROVIDE ALL WORK FOR TEMPORARY CONNECTIONS OR SYSTEM MODIFICATIONS REQUIRED TO ACCOMMODATE PROJECT PHASING. REFER TO ARCHITECTURAL FOR PHASING INFORMATION.
M	ALL PANELS TO REMAIN IN SERVICE UNTIL NEW SERVICE AND DISTRIBUTION SYSTEM IS COMPLETE. CONNECT ALL LOADS REMAINING AFTER DEMO IS COMPLETE TO NEW PANELS. MODIFY AND EXTEND WIRING AS REQUIRED.

LIGHTING GENERAL NOTES

A	WHEN LIGHT SWITCHES ARE SHOWN LOCATED ON THE WALL THAT IS COMMON WITH THE END OF THE DOOR SWING INTO A SPACE. DO NOT LOCATE THE SWITCHES BEHIND THE DOOR, BUT RATHER A MINIMUM OF 6" FROM THE END OF THE SWING. VERIFY EXACT DOOR SWING PRIOR TO ROUGH-IN.
B	ALL CABLING LOCATED WITHIN THE CEILING SPACE SHALL BE PLENUM RATED UNLESS IT IS COMPLETELY INSTALLED IN CONDUIT. THIS INCLUDES, BUT IS NOT LIMITED TO: OCCUPANCY SENSOR/ LIGHTING CONTROL CABLING. ALL FIRE ALARM CABLING SHALL BE IN A FULL CONDUIT SYSTEM, NO EXCEPTIONS.
C	OCCUPANCY SENSORS SHALL BE SET FOR A 30 MINUTE TIME OUT DELAY. OFFICES SHALL BE SET FOR 15 MINUTE DELAY AND REST ROOMS SHALL BE SET FOR 20 MINUTE DELAY.
D	NOT ALL CIRCUITRY IS SHOWN FROM SWITCHES TO EACH CONTROLLED LIGHT FIXTURE(S). EC SHALL MATCH SWITCH SUBSCRIPT TO ASSOCIATED LIGHT FIXTURE(S) AND CONNECT COMPLETE.
E	PROVIDE ALL LOW VOLTAGE WIRING REQUIRED TO CONNECT OCCUPANCY SENSORS IN A SPACE TO THE POWER PACK ASSOCIATED WITH AN INDIVIDUAL AREA. WIRING NOT SHOWN FOR DRAWING CLARITY.
F	WHERE MULTIPLE OCCUPANCY SENSORS ARE IN A SINGLE ROOM, CONNECT SO THAT ANY SENSOR TURNS ALL LIGHTS ON.
G	EC SHALL PROVIDE A COMPLETE WIRING SYSTEM CONSISTING OF PROPER QUANTITY OF SWITCH LEGS, NEUTRALS AND HOT CIRCUITS FOR A FUNCTIONAL INSTALLATION.
H	EXISTING LIGHTING CONTROL SYSTEMS IS WATTSTOPPER, PROVIDE WATTSTOPPER DEVICES AND CONTROLS FOR NEW DEVICES.

ELECTRICAL KEYNOTES

1	DISCONNECT AND SAFELY STORE EXISTING LIGHT FIXTURES. RETAIN CIRCUITING AND CONTROLS FOR REINSTALLATION IN APPROXIMATELY THE SAME LOCATION. PREPARE CIRCUITS TO BE EXTENDED TO NEW LOCATIONS BELOW NEW CEILING. RETAIN AIRCRAFT WIRE HANGERS IF POSSIBLE. COORDINATE WITH CEILING INSTALLATION.
2	DISCONNECT AND SAFELY STORE EXISTING LIGHTING CONTROLS FOR REINSTALLATION IN APPROXIMATELY THE SAME LOCATION. PREPARE CONTROL WIRING TO BE EXTENDED TO NEW LOCATIONS BELOW NEW CEILING.
3	RETAIN EXISTING SWITCHING.
4	DEMO AND STORE EXISTING DRY CONTACTS/RELAYS ONLY IF NECESSARY TO FACILITATE CEILING INSTALLATION.
5	CLEAN AND REINSTALL EXISTING FIXTURE IN APPROXIMATELY THE SAME LOCATION AT 8'-6" AFF. PROVIDE NEW AIRCRAFT CABLES AS IF NECESSARY. EXTEND EXISTING CIRCUITS AND CONTROLS TO NEW ELEVATION. PROVIDE ESCUTCHEONS WHERE CABLES, WIRES, OR CONTROLS PENETRATE NEW ACOUSTICAL CEILING. COORDINATE LOCATION WITH CEILING INSTALL CONTRACTOR. PROVIDE ALL CONDUCTORS, CABLE, CONDUIT, J-BOXES, ETC TO MAKE COMPLETE.
6	CLEAN REINSTALL EXISTING LIGHTING CONTROLS IN APPROXIMATELY THE SAME LOCATION ON ACOUSTICAL CEILING. CENTER IN ACOUSTICAL TILE. REPLACE EXISTING CABLING IF NECESSARY.
7	MAINTAIN EXISTING LIGHTING CONTROLS AND VERIFY OPERATION AFTER REINSTALLING EXISTING LIGHT FIXTURES.

This space reserved for Montana State University use (cover page only). Otherwise, use for Key Plan

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

CONSTRUCTION DRAWINGS

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: **Author**
REVIEWED BY: **Checker**

REV.	DESCRIPTION	DATE

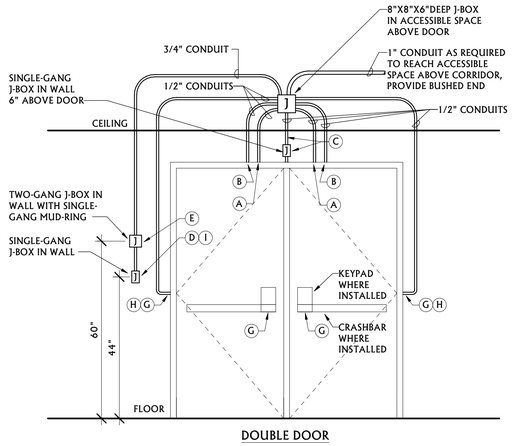
MONTANA
CHRISTOPHER B. GREEN
No. 20308 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

SHEET TITLE
324 LIGHTING REMODEL PLAN

SHEET
E311L

DATE
3/7/2023



DOUBLE DOOR

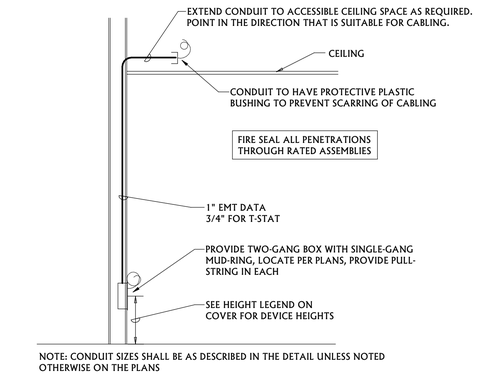
ROUGH-INS

	A DOOR POSITION SWITCH	B MAGNETIC LOCK	C MOTION SENSOR REQUEST TO EXIT	D ENTRY CARD READER/KEY PAD/PROX SENSOR	E INTERCOM	F ELECTRIC DOOR STRIKE	G ELECTRIC MORTISE LOCK/ELECTRONIC CRASH BAR	H ELECTRIC POWER TRANSFER	I PUSH BUTTON REQUEST TO EXIT
DOOR 360B	○			○		○	○		○

NOTES:

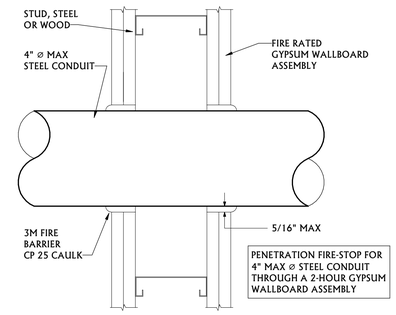
1. CARD READER/KEYPAD/INTERCOM/PROX SENSOR TO BE PROVIDED BY OTHERS. ELECTRICSTRIKE PROVIDED BY GENERAL CONTRACTOR.
2. ELECTRICAL CONTRACTOR TO VERIFY ALL DOOR REQUIREMENTS WITH ARCHITECTURAL DOOR SCHEDULE AND SPECIFICATIONS. PROVIDE CONDUIT AND J-BOXES AS REQUIRED.
3. ANYWHERE J-BOXES ARE MOUNTED BACK-TO-BACK IN WALL, PROVIDE NIPPLE BETWEEN BOXES AND SERVE BOTH BOXES WITH 3/4" CONDUIT. NO BACK TO BACK J-BOXES FOR CARD AND PROX READERS.
4. PROVIDE A PULL STRING FOR EACH DEVICE/SENSOR.
5. FLEXIBLE CONDUIT MAY BE USED IN DOOR FRAMES, EMT ELSEWHERE.
6. PROVIDE SOLID COVER PLATES FOR EACH J-BOX. STAINLESS STEEL WITH GASKET ON EXTERIOR.
7. PROVIDE BELL BOXES FOR EXTERIOR J-BOXES.

1 DOOR ROUGH-INS
NOT TO SCALE

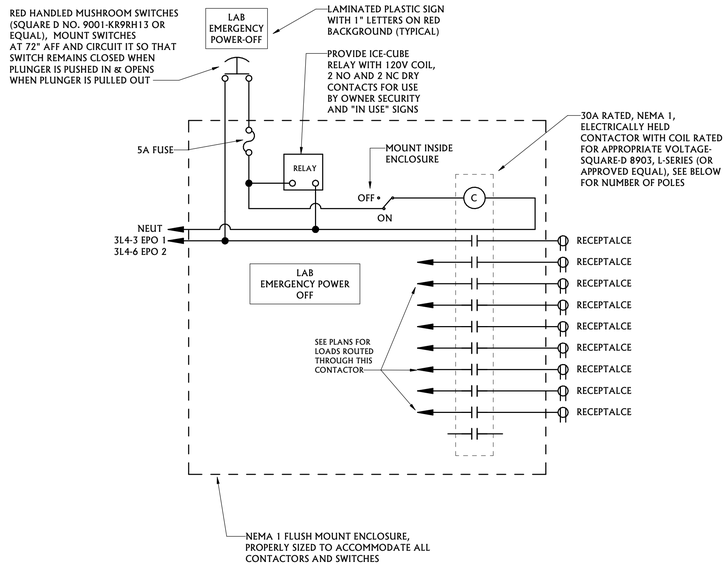


NOTE: CONDUIT SIZES SHALL BE AS DESCRIBED IN THE DETAIL UNLESS NOTED OTHERWISE ON THE PLANS

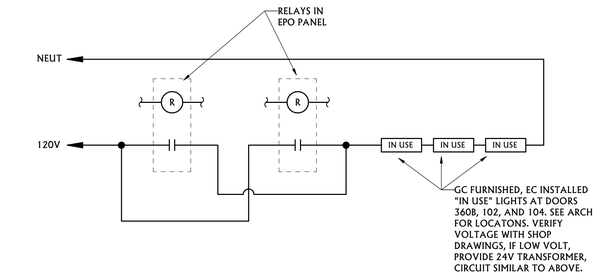
2 LOW VOLTAGE RACEWAY DETAIL
NOT TO SCALE



3 PENETRATION - STUD WALL
NOT TO SCALE



4 LAB EPO SWITCH & CONTACTOR
NOT TO SCALE



5 LAB "IN USE" SIGN WIRING
NOT TO SCALE

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH
MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY: DS
REVIEWED BY: CG

REV.	DESCRIPTION	DATE

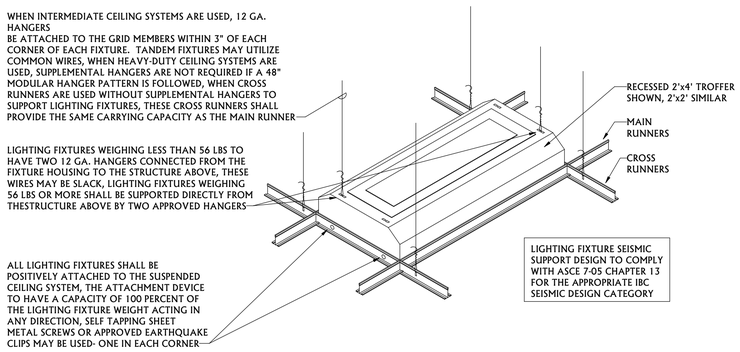
MONTANA
CHRISTOPHER B. GREEN
No. 20308 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174
SLATE #202141
ACE #22BL5657

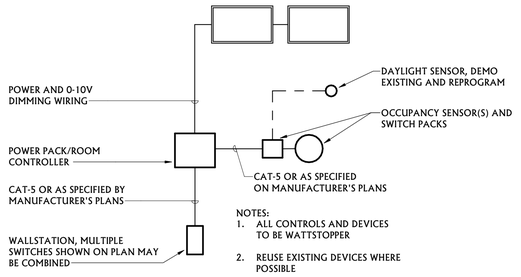
SHEET TITLE
ELECTRICAL DETAILS

SHEET
E600

DATE
3/7/2023



1 LIGHTING SUPPORT
NOT TO SCALE



2 LIGHTING CONTROL
NOT TO SCALE

CONSTRUCTION DRAWINGS

360 CREATION LAB & 324 LAB - MSU NAH

MONTANA STATE UNIVERSITY

MONTANA STATE UNIVERSITY

MSU-CPDC
MONTANA STATE UNIVERSITY
BOZEMAN, MONTANA
PHONE: 406.994.5413
FAX: 406.994.5665

ACE INC
ASSOCIATED • CONSTRUCTION • ENGINEERING
2040 HARNISH BLVD.
BILLINGS, MT 59102
406-245-0136
ACE JOB 22BL5657

DRAWN BY:	DS	
REVIEWED BY:	CG	
REV.	DESCRIPTION	DATE

MONTANA
CHRISTOPHER B. GREEN
No. 20308 PE
3/7/2023
LICENSED PROFESSIONAL ENGINEER

PPA#19-0174

SLATE #202141

ACE #22BL5657

SHEET TITLE
ELECTRICAL DETAILS

SHEET
E601

DATE
3/7/2023